Installation Instructions

INI-201 Revision -

VQ Series Needle Valve

MAXIMUM WORKING PRESSURE AND TEMPERATURE

Valve Size	Max Pressure and Temperature	Max Temperature and Pressure
V4Q	300 Psig at 70 °F 2.1 MPa at 21 °C	300 Psig at 200 °F 2.1 MPa at 93 °C
V6Q	300 Psig at 70 °F 2.1 MPa at 21°C	300 Psig at 200 °F 2.1 MPa at 93 °C

Refer to Parker VQ Series Needle Valve Maintenance Instructions MI-101 when Valve disassembly is required. Always consult your authorized Parker representative if questions arise. The arrow on the Valve Body indicates the normal direction of flow.

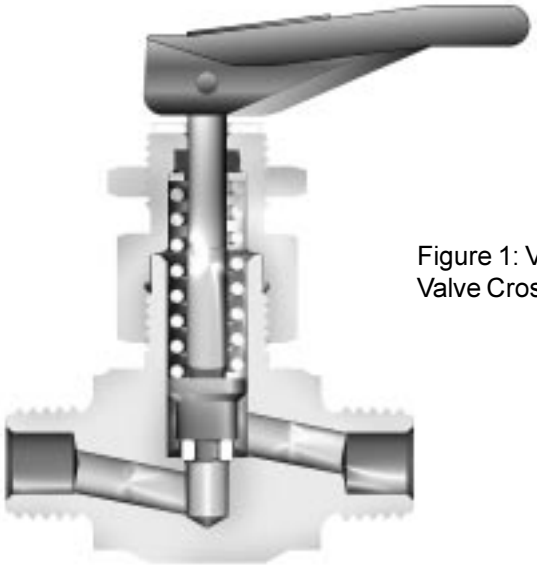

Figure 1: VQ Series Toggle Needle Valve Cross Sectional View

Parker Hannifin Corporation
Instrumentation Valve Division
Jacksonville, Alabama

PANEL MOUNTED VALVES

The panel must have a through-hole of the proper diameter as listed below:

V4Q Valves	33/64 inch (13.1 mm)
V6Q Valves	41/64 inch (16.3 mm)

The maximum panel thickness is 1/4 inch (6.4 mm). When the Valve is to be mounted to a thin panel, a spacer (or washer) may be necessary to permit full Panel Nut engagement on the Valve. It is not necessary to disassemble the Valve for panel mounting.

1. Actuate the Handle up to the "open" position, such that it is parallel with the Valve Stem.
2. Insert the Valve through the hole in the panel, and assemble the Panel Nut onto the Cap until the Panel Nut is finger-tight.
3. Tighten the Panel Nut with the correct sized wrench as specified below:

V4Q Valves	11/16 inch hex wrench
V6Q Valves	13/16 inch hex wrench

4. Actuate the Handle back to the "closed" position, such that it is at right-angles with respect to the Valve Stem.

USE OF THE (OPTIONAL) HANDLE POSITIONER

Assemble the positioner in the same manner as the Panel Nut. The positioner intentionally fits tightly on the valve and should be wrench tightened with the proper sized wrench as noted below:

V4Q Valves	5/8 inch hex wrench
V6Q Valves	3/4 inch hex wrench

When using the handle positioner and a panel mounting valve, the maximum panel thickness is 1/8 inch (3.2 mm). Whenever assembling the handle positioner, make certain it is screwed onto the valve far enough to allow the valve to fully close. This is evident by a visible gap between the handle and the slot in the positioner, and the lever handle will feel loose.

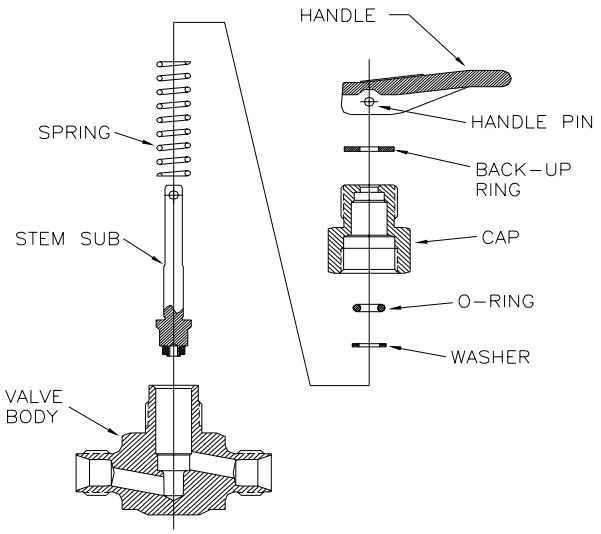

Figure 2: VQ Series Toggle Needle Valve Exploded View

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Instrumentation Valve Division
Jacksonville, Alabama

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

WARNING

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Parker Instrumentation

Installation Instructions

INI-202 Revision -

VQ-11 Series Needle Valve

MAXIMUM ALLOWABLE WORKING PRESSURE AND TEMPERATURE

Valve Size	Specifications	
V4		Actuator Pressure:
	Normally Open	75 Psig (.52 MPa)
	Normally Closed	75 Psig (.52 MPa)
	Double Acting	55 Psig (.38 MPa)
		System Pressure:
	Normally Open	450 Psig @ 70 °F (3.1 MPa @ 21 °C)
	Normally Closed	600 Psig @ 70 °F (4.1 MPa @ 21 °C)
	Double Acting	450 Psig @ 70 °F (3.1 MPa @ 21 °C)
V6		Actuator Pressure:
	Normally Open	75 Psig (.52 MPa)
	Normally Closed	75 Psig (.52 MPa)
	Double Acting	55 Psig (.38 MPa)
		System Pressure:
	Normally Open	450 Psig @ 70 °F (3.1 MPa @ 21 °C)
	Normally Closed	500 Psig @ 70 °F (3.4 MPa @ 21 °C)
	Double Acting	450 Psig @ 70 °F (3.1 MPa @ 21 °C)

The arrow on the valve body indicates the normal direction of flow. Valve pressure ratings are based on the normal direction of flow. Refer to Parker VQ-11 Series Needle Valve Maintenance Instruction MI-102 when maintenance is required.

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Jacksonville, Alabama

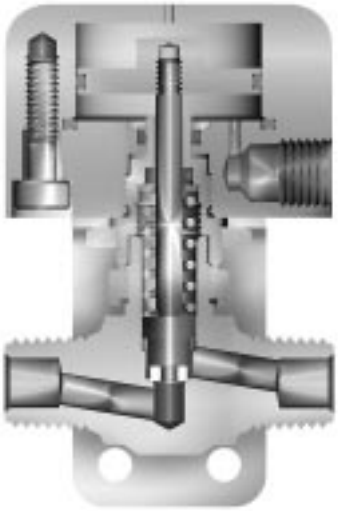

Figure 1: VQ-11AC Series Actuated Valve Cross Sectional View

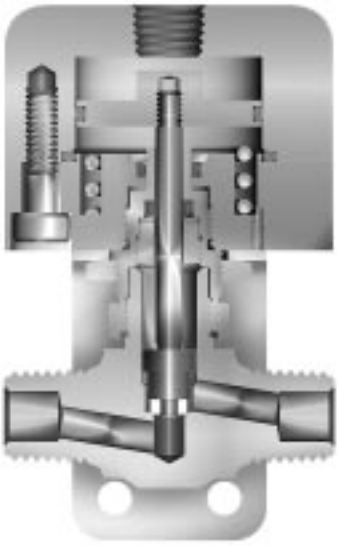

Figure 2: VQ-11AO Series Actuated Valve Cross Sectional View

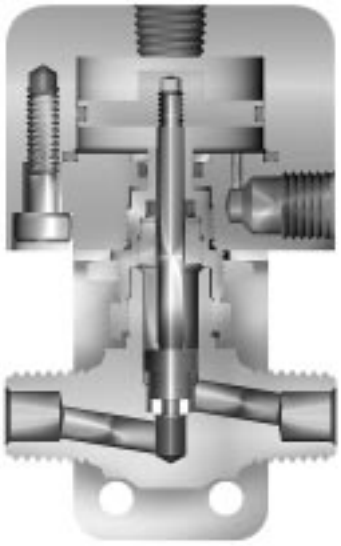

Figure 3: VQ-11AD Series Actuated Valve Cross Sectional View

AIR ACTUATOR CONNECTIONS

1. Air Actuator ports are 1/8-27 NPT internal female pipe threads. When making pipe thread connections to the air actuator, use a high quality pipe joint compound or PTFE tape made for this purpose. PTFE tape should not be overhanging or covering the first external pipe thread.
2. Engage the external pipe connection into the actuator, hand tight.
3. With a proper wrench, continue to tighten the connection to a leak tight joint.
4. It is recommended that no wrenching be applied to the actuator during this make-up but, rather be held firmly be hand. If clamping of the actuator for make-up is unavoidable, be certain the entire actuator length (or height) is supported to avoid crushing.

NOTE: Installation of this 1/8-27 NPT Port may be achieved by loosening the lock-nut located under the actuator with a 1 inch hex wrench. Rotate the actuator by hand in a counter-clockwise direction until the proper port alignment is realized but never more than one full turn; retighten the lock-nut to 25 in-lbs (2.8 N-m).

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

WARNING

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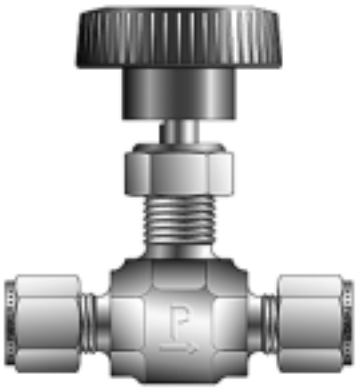
INI-202 Revision -

Installation Instructions

INI-203 Revision -

V Series Needle Valve
V4C Series Needle Valve



MAXIMUM WORKING PRESSURE AND TEMPERATURE

BRASS NEEDLE VALVES

Stem Packing	Stem Type	Maximum Pressure & Temperature	Maximum Temperature & Pressure
PTFE: V2	Metal-to-Metal	3000 psig @ 70 °F (20.7 MPa @ 21 °C)	0 psig @ 400 °F (0 MPa @ 204 °C)
	PCTFE	3000 psig @ 70 °F (20.7 MPa @ 21 °C)	0 psig @ 350 °F (0 MPa @ 177 °C)
V4, V6, V8, V12	Metal-to-Metal	3000 psig @ 70 °F (20.7 MPa @ 21 °C)	0 psig @ 400 °F (0 MPa @ 204 °C)
	PCTFE	3000 psig @ 70 °F (20.7 MPa @ 21 °C)	0 psig @ 350 °F (0 MPa @ 177 °C)
O-Ring: V2, V4, V6, V8, V12	Metal-to-Metal	3000 psig @ 70 °F (20.7 MPa @ 21 °C)	0 psig @ 400 °F (0 MPa @ 204 °C)
	PCTFE	3000 psig @ 70 °F (20.7 MPa @ 21 °C)	0 psig @ 350 °F (0 MPa @ 177 °C)

Note: Service temperature variations may require packing nut adjustment.

Refer to Parker Needle V Series Valve Maintenance Instructions MI-103 when Valve disassembly is required. Always consult your authorized Parker representative if questions arise. The arrow on the Valve Body indicates the normal direction of flow.

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Jacksonville, Alabama

MAXIMUM WORKING PRESSURE AND TEMPERATURE

STAINLESS STEEL NEEDLE VALVES

Stem Packing	Stem Type	Maximum Pressure & Temperature	Maximum Temperature & Pressure
PTFE: V2	Metal-to-Metal	5000 psig @ 70 °F (34.5 MPa @ 21 °C)	0 psig @ 450 °F (0 MPa @ 232 °C)
	PCTFE	5000 psig @ 70 °F (34.5 MPa @ 21 °C)	0 psig @ 350 °F (0 MPa @ 177 °C)
V4, V6, V8, V12	Metal-to-Metal	5000 psig @ 70 °F (34.5 MPa @ 21 °C)	0 psig @ 450 °F (0 MPa @ 232 °C)
	PCTFE	5000 psig @ 70 °F (34.5 MPa @ 21 °C)	0 psig @ 350 °F (0 MPa @ 177 °C)
O-Ring: V2, V4, V6, V8, V12	Metal-to-Metal	5000 psig @ 70 °F (34.5 MPa @ 21 °C)	0 psig @ 400 °F (0 MPa @ 204 °C)
	PCTFE	3000 psig @ 70 °F (34.5 MPa @ 21 °C)	0 psig @ 350 °F (0 MPa @ 177 °C)

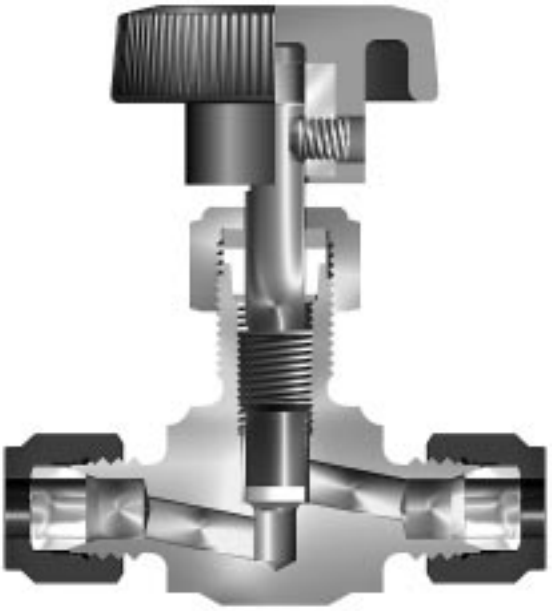

Figure 1: V Series Needle Valve Cross Sectional View (Sizes V4 to V12)

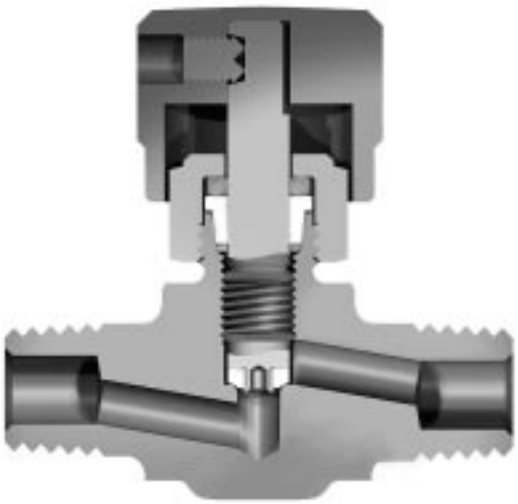

Figure 2: V4C Series Needle Valve Cross Sectional View

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

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M -ANSI/ASME B1.20.1 External pipe threads

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Parker Instrumentation

INI-203 Revision -

Installation Instructions

INI-204 Revision -

U Series Needle Valve

Table I: Maximum Working Pressure and Temperature

Valve Packing	Maximum Pressure and Temperaure	Maximum Temperature and Pressure
Grafoil ® Stem Packing	6000 psig at 70 °F 41.4 MPa at 21 °C	1545 psig at 1200 °F 10.7 MPa at 649 °C
PTFE Stem Packing	6000 psig at 70 °F 41.4 MPa at 21 °C	4280 psig at 450 °F 29.5 MPa at 204 °C

Refer to Parker U Series Neeele Valve Maintenance Instructions (MI-104) when valve disassembly is required. Always consult your authorized Parker representative if questions arise. The arrow on the Valve Body indicates the normal direction of flow.

Table II: Packing Nut Hex Wrench Sizes and Tightening Requirements

Valve Size	Hex Wrench Size	PTFE Stem Packing	Grafoil ® Stem Packing
U6 model	3/4 inch	125 in-lbs (14.1 N-m)	10.4 ft-lbs (37.3 N-m)
U12 model	15/16 inch	150 in-lbs (16.8 N-m)	33.3 ft-lbs (44.8 N-m)
U16 model	1-1/8 inch	50 ft-lbs (67.8 N-m)	50 ft-lbs (67.8 N-m)

Parker Hannifin Corporation
Instrumentation Valve Division
Jacksonville, Alabama

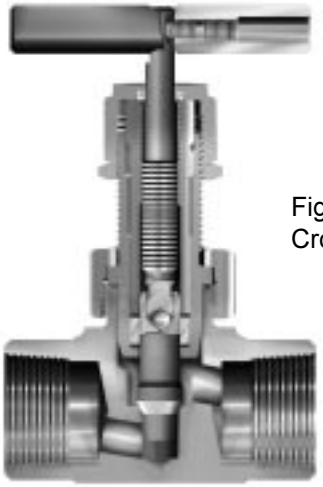

Figure 1: U Series Needle Valve
Cross Sectional View

Table III: Lock Nut
Hex Wrench Sizes and Tightening Requirements

Valve Size	Hex Wrench Size	Torque Requirement
U6 model	3/4 inch	125 in-lbs (14.1 N-m)
U12 model	15/16 inch	150 in-lbs (16.8 N-m)
U16 model	1 1/4 inch	150 in-lbs (16.8 N-m)

Table IV: Bonnet Nut
Hex Wrench Sizes and Tightening Requirements

Valve Size	Hex Wrench	Torque Requirements
U6 model	15/16 inch	65 ft-lbs. (88 N-m)
U12 model	1-1/4 inch	75 ft-lbs. (101 N-m)
U16 model	1-1/2 inch	100 ft-lbs. (135 N-m)

PANEL MOUNTED VALVES

The panel must have a through-hole diameter of correct diameter. The maximum panel thickness is 1/4 inch (6.4 mm).

U6 model	41/64 inch (16.2 mm)
U12 model	53/64 inch (21.0 mm)
U16 model	1-1/64 inch (25.8 mm)

1. Remove the Handle by unthreading the Set Screw in the side of the Handle with the following size allen wrench:

U6 model	3/32 inch
U12 model	3/32 inch
U16 model	1/8 inch

2. Grip the Packing Nut with a wrench as listed in Table II. With another wrench (as listed in Table III), loosen the Lock Nut.
3. Remove both the Packing Nut and the Lock Nut by unthreading until completely removed.
4. Insert the Valve through the hole in the panel and assemble the Panel Nut onto the Bonnet finger-tight. For assembly, grip the large Bonnet Nut with a hex wrench as listed in Table IV and tighten the Panel Nut securely.
   CAUTION: Do not grip the Valve Body or loosen the Bonnet Nut.
5. Thread the Lock Nut onto the Bonnet. Thread the Packing Nut onto the Bonnet and tighten in accordance with Table II.
6. Tighten the Lock Nut against the Packing Nut in accordance with Table III.
7. Re-install the Handle with the Set Screw onto the Stem.

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

WARNING

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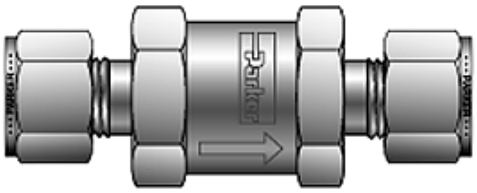
Parker Instrumentation

INI-204 Revision -

Installation Instructions

INI-205 Revision -

C Series Check Valve



Maximum Allowable Working Pressure

Valve Model	Brass Check Valves	Stainless Steel Check Valves
C2, C4, C6, C8 & C12	3000 Psig at 70 °F 20.7 MPa at 21 °C	6000 Psig at 70 °F 41.4 MPa at 21 °C
C16	3000 Psig at 70 °F 20.7 MPa at 21 °C	5000 Psig at 70 °F 34.5 MPa at 21 °C

Refer to Parker C Series Check Valve Maintenance Instructions MI-105 when valve disassembly is required. Always consult your authorized Parker representative if questions arise. The arrow on the Valve Body indicates the normal direction of flow.

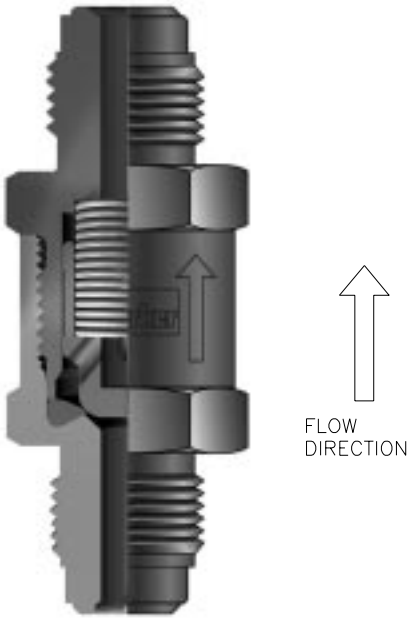


Figure 1: C Series Check Valve Cross Sectional View

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Jacksonville, Alabama

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

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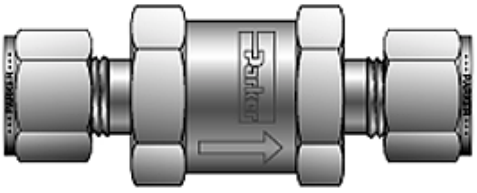
Parker Instrumentation

INI-205 Revision -

Installation Instructions

INI-206 Revision -

F Series Filter



MAXIMUM ALLOWABLE WORKING PRESSURE

Filter Size	Brass Body	Stainless Steel Body
F2, F4, F6, F8 & F12	3000 Psig at 70 °F 20.7 MPa at 21 °C	6000 Psig at 70 °F 41.4 MPa at 21 °C
F16	3000 Psig at 70 °F 20.7 MPa at 21 °C	5000 Psig at 70 °F 34.5 MPa at 21 °C

Refer to Parker F Series Filter Maintenance Instructions MI-106 when Filter disassembly is required. Always consult your authorized Parker representative if questions arise. The arrow on the Filter Cap indicates the normal direction of flow

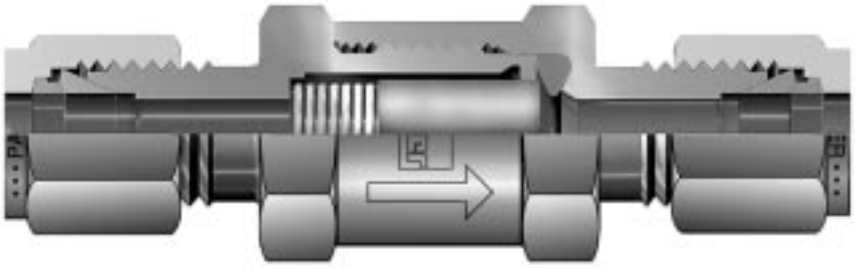


Figure 1: F Series Filter Cross Sectional View

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VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

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Parker Instrumentation

INI-206 Revision -

Installation Instructions

INI-207 Revision -

RV Series Rupture Disc Unit

MAXIMUM ALLOWABLE WORKING PRESSURES

The pre-set non-adjustable Rupture Disc burst pressure is indicated on the Disc manufacturer's metal ID tag. The standard Rupture Disc burst pressure is 1800 psig at 70 °F (12.4 MPa at 21 °C).

A stainless steel wire is provided with the Valve for the purpose of attaching the Rupture Disc manufacturer's ID Tag to the Valve,

Refer to Parker Rupture Disc Unit Maintenance Instructions MI-107 when disassembly is required. Always consult your authorized Parker representative if question arise.

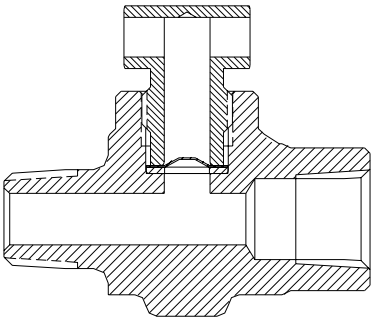

Figure 1: RV Series Rupture Disc Unit
Cross Sectional View

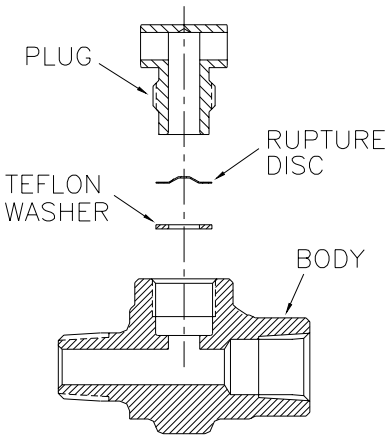

Figure 2: RV Series Rupture Disc Unit
Exploded View

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RUPTURE DISK USE

USERS SHOULD READ AND THOROUGHLY UNDERSTAND THESE INSTRUCTIONS BEFORE INSTALLING RUPTURE DISCS. THESE INSTRUCTIONS DO NOT PURPORT ALL OF THE SAFETY FACTORS ASSOCIATED WITH THE RUPTURE DISC'S USE IN SERVICE. IT IS THE RESPONSIBILITY OF THE USER TO ESTABLISH APPROPRIATE SAFETY, HEALTH, AND TRAINING MEASURES FOR THEIR PERSONNEL INSTALLING, SERVICING, OR WORKING IN AN AREA WHERE RUPTURE DISC ASSEMBLIES ARE IN USE.

IT IS THE USER'S RESPONSIBILITY FOR DESIGN OF ADEQUATE VENTING AND INSTALLATION OF ADEQUATE VENT PIPING OR DIRECTIONAL FLOW AFTER RUPTURE OCCURS WITH THE RUPTURE DISC AS INTENDED. LOCATE RUPTURE DISC WHERE PEOPLE OR PROPERTY WILL NOT BE EXPOSED TO THE SYSTEM DISCHARGE IN CASE OF RUPTURE. VENT TOXIC OR FLAMMABLE FUMES OR LIQUIDS TO A SAFE LOCATION TO PREVENT PERSONAL INJURY OR PROPERTY DAMAGE.

IT IS THE USER'S RESPONSIBILITY TO SPECIFY THE BURST PRESSURE RATING OF A RUPTURE DISC AT A COINCIDENT TEMPERATURE AT WHICH THE RUPTURE DISC IS TO BE USED. A RUPTURE DISC IS A TEMPERATURE SENSITIVE DEVICE. THE BURST PRESSURE OF THE RUPTURE DISC IS DIRECTLY AFFECTED BY ITS EXPOSURE TO THE COINCIDENT TEMPERATURE. GENERALLY, AS THE TEMPERATURE AT THE RUPTURE DISC INCREASES, THE BURST PRESSURE DECREASES; INVERSELY, AS THE TEMPERATURE AT THE RUPTURE DISC DECREASES, THE BURST PRESSURE MAY INCREASE. FAILURE TO PROPERLY UTILIZE A RUPTURE DISC AT THE SPECIFIED COINCIDENT TEMPERATURE COULD CAUSE PREMATURE OR OVERPRESSURIZATION OF A SYSTEM.

THE INSTANTANEOUS RELEASE OF PRESSURE FROM THE RUPTURE DISC CAN CREATE VIOLENT NOISES DUE TO THE DISCHARGE AT SONIC VELOCITY. IT IS THE USER'S RESPONSIBILITY TO PROTECT AGAINST HEARING DAMAGE TO ANY BYSTANDERS.

PARTICLES MAY BE DISCHARGED WHEN THE RUPTURE DISC RUPTURES. THESE PARTICLES MAY BE PART OF THE RUPTURE DISC ITSELF, OR OTHER ENVIRONMENTAL MATTER IN THE SYSTEM. IT IS THE USER'S RESPONSIBILITY TO ASSURE THAT THESE PARTICLES ARE DIRECTED TO A SAFE AREA TO PREVENT PERSONAL INJURY OR PROPERTY DAMAGE.

THERE IS NO GUARANTEE OF RUPTURE DISC LIFE. SUCH LIFE SPAN IS AFFECTED BY CORROSION, CREEP AND FATIGUE, AND PHYSICAL DAMAGE. THESE CONDITIONS WILL DERATE THE RUPTURE DISC TO A LOWER SET PRESSURE. THE CUSTOMER AND/OR USER SHOULD BE PREPARED TO HANDLE A PREMATURE FAILURE OF THE RUPTURE DISC. THE MEDIA OR OTHER ENVIRONMENTAL CONDITIONS SHOULD NOT ALLOW ANY BUILDUP OR SOLIDIFICATION OF MEDIA TO OCCUR ON A RUPTURE DISC. THIS MAY INCREASE THE PRESSURE SETTING OF THE RUPTURE DISC.

PREVENTATIVE MAINTENANCE

1. REPLACE RUPTURE DISC EVERY YEAR UNDER NORMAL CONDITIONS. A MORE FREQUENT CHANGEOUT MAY BE NECESSARY DUE TO CORROSION, FATIGUE, TEMPERATURE, OR ADVERSE CONDITIONS. THESE FACTORS MUST BE EVALUATED BY THE USER THROUGH ACTUAL SERVICE EXPERIENCE.

2. IF THE RUPTURE DISC IS NOT REPLACED PERIODICALLY WHEN EXPOSED TO THESE CONDITIONS, PREMATURE FAILURE OF THE RUPTURE DISC MAY OCCUR, THEREBY DISCHARGING THE PROCESS MEDIA.

3. TO AVOID EXTENDED DOWNTIME, MAINTAIN THREE SPARE RUPTURE DISCS IN STOCK AT ALL TIMES. THE NUMBER OF SPARES REQUIRED ULTIMATELY WILL BE DETERMINED BY SERVICE CONDITIONS.

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

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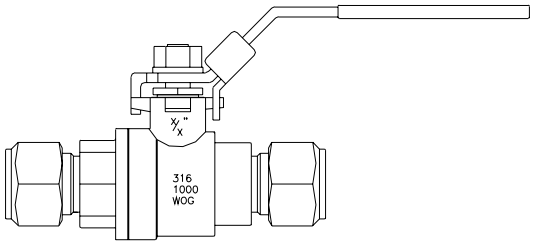
INI-207 Revision -

Installation Instructions

INI-209 Revision -

LB Series Ball Valve



Maximum Allowable Working Pressure and Temperature

Maximum Pressure Rating: 1000 psig (6.9 MPa) @ 70 °F (21 °C)	Maximum Temperature Rating: 350 °F (177 °C) @ 300 psig (2.1 MPa)

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Z -Single ferrule CPI™ compression port

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Instrumentation Valve Division
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Jacksonville, AL 36265-9681
USA
Phone: (256) 435-2130
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www.parker.com/IVD

Parker Instrumentation

Installation Instructions

INI-211 Revision -

Sample Cylinders

Stainless Steel Cylinders
Pressure and Temperature Ratings

1800 psig (124 bar)
-58 °F to 450 °F (-50 °C to 232 °C)

- DOT-3E 1800:
75, 150, 300, and 500cc with 1/4" NPT threads
- DOT-3A 1800:
1000 and 2250cc with 1/4" NPT threads
- DOT-3A 1800:
3785cc (1 gallon) with 1/2" NPT threads

Aluminum Cylinders
Pressure and Temperature Rating

1800 psig (124 bar)
0 °F to 120 °F (-18 °C to 49 °C)

- DOT-E 7737 1800:
150, 300, and 500cc with 1/4" NPT threads

Cylinder Design, Production and Testing

The design, manufacture and testing of steel sample cylinders is regulated by the US government in 49 CFR, Paragraphs 178.36 *Specification 3A; seamless steel cylinders* and 178.42 *Specification 3E; seamless steel cylinders.* Aluminum sample cylinders are governed by the same paragraphs, supplemented by Exemption DOT-E 7737. Specification 3A deals with cylinders not over 1,000 pounds (455 kg) water capacity and Specification 3E is for cylinders having an outside diameter no greater than 2 inches (51 mm), with a length less than 2 feet (61 cm). Service pressure is limited to 1,800 psi (124 bar) for Parker Sample Cylinders.

The above regulations control all aspects of the design and production of sample cylinders. Material physical properties and chemical characteristics are controlled. Each cylinder must be hydrostatically tested between 3,000 and 4,500 psi (207 and 310 bar). In addition, one cylinder out of each lot of 500 or less must be subjected to a burst test and result in a safety factor on burst pressure of 3.3 minimum.

All cylinder tests must be inspected and verified by an independent inspection agency, and all test reports must be maintained for fifteen years. Each cylinder must also be marked and packaged in accordance with 49 CFR.

Parker Hannifin Corporation
Instrumentation Valve Division
Jacksonville, Alabama

DOT Cylinder Retesting Requirements
(Per 49 CFR, Paragraph 173.34)

DOT Rating	Minimum Retest Pressure	Retest Period (Years)
3E 1800	Retest not required	N/A
3A 1800	3000 psig (207 bar)	5
E 7737 1800	Retest not required	N/A

DOT Approved Materials for use in Aluminum Sample Cylinders

Air, Compressed
Ammonia, anhydrous
Argon
Boron trichloride
Butadiene, inhibited
Butane
Carbon Dioxide, liquefied
Compressed gas, n.o.s. (Bromotrifluorethylene)
Compressed gas, n.os. (Deuterium)
Compressed gas, n.o.s. (Difluoroethylene)
Compressed gas, n.o.s. (Krypton)
Compressed gas, n.o.s. (Ozone)
Cyclopropane
Dimethylamine, anhydrous
Dimethyl ether
Ethane
Ethylene
Ethylene oxide
Flammable liquid, n.o.s. (Dimethylpropane)
Refrigerant gas (Freon)
Helium
Hydrocarbon gas, non-liquefied (Coal gas)
Hydrogen
Hydrogen sulphide
Isobutane
Isobutylene
Liquefied petroleum gas (Butene)
Liquefied petroleum gas (Cyclobutane)
Liquefied petroleum gas (Propylene)
Methane
Methylamine, anhydrous
Methyl butene
Monoethylamine
Neon
Nitrogen
Nitrous oxide
Oxygen*
Pentane
Propane
Sulphur dioxide
Sulphur hexafluoride
Trimethylamine, anhydrous
Vinyl chloride
Vinyl fluoride, inhibited
Xenon

***Note:** Oxygen is only acceptable if the cylinder has straight threads

Aluminum Sample Cylinders

This cylinder is produced from a high strength aluminum alloy designated by the Aluminum Association as 6061 and heat treated to T6 temper. It should be noted that this cylinder is manufactured under Department of Transportation Exemption Number DOT-E 7737-1800 and is the aluminum equivalent of DOT-3E 1800 cylinder. The cylinder has been inspected by and testing has been witnessed by an independent inspection agency.

It is important that the user respect the fact that this is an aluminum cylinder. If this cylinder is exposed to fire, it should not be refilled and the cylinder should be properly disposed.

In some cases, the user may evacuate or clean the cylinder by heating in an oven; and in this case the cylinder should not be exposed to temperature above 350 °F.

This cylinder is approved for any hazardous material for which the DOT specification 3AL cylinder is prescribed or authorized in 49 CFR Part 173, classed as flammable gas, non-flammable gas, flammable liquid, or Poison A. The gases listed above are generally those that are approved.

Oxygen Service

For aluminum sample cylinders to be charged with oxygen, the following applies: Straight threads only. (Since this cylinder has tapered threads it cannot be used for oxygen service.)

Nitrous Oxide & Oxygen Service

Each cylinder requires special cleaning in compliance with Federal Specification RR-C-901b dated August 1, 1967, paragraph 3.8.2 This aluminum sample cylinder has not been processed by this special cleaning and therefore should not be used for oxygen service.

Valve Insertion Procedure for Sample Cylinders

1. It is recommended that new valves be used. If a valve has been used in a steel cylinder, the threads may be distorted and possibly would not produce a proper seal.
2. Valve and cylinder threads should be clean. Examine the valve and cylinder for damaged threads, and reject or repair those containing defects such as burrs, dings, nicks, gouges, etc.
3. Apply 1-1/2 wraps of PTFE tape on the valve threads, leaving the first lead thread exposed. Apply a PTFE paste to the first lead thread and over the tape, evenly but sparingly. For stainless steel valves, PTFE paste is suggested for proper sealing.
4. Assemble the lubricated valve to the cylinder by inserting and hand tightening to engage a minimum of 2 to 3 threads. If the valve fails to start easily, recheck the valve to make sure it is to gauge. Also, check the valve and cylinder for damaged threads.
5. Place the valved cylinder in a holding device providing protective material around the cylinder to prevent gouging of the side walls with the vice holding jaws. Using a torque wrench with an adapter to fit the wrench flats on the valve, tighten the valve to **8 to 10 foot pounds maximum**. This torque should yield another 2 to 3 threads engagement, giving a total engagement of 5 to 6 threads. If a problem develops, please contact the Instrumentation Valve Division or Parker Distributor for assistance.

Caution

Aluminum cylinders require care in the assembly of valves with tapered threads. The aluminum cylinder is of the same relative hardness as a brass valve and does not reshape or rethread the valve during insertion as does a steel cylinder. Therefore, an interface problem could be created by damaged threads or excessive valve torque preventing a gas-tight connection.

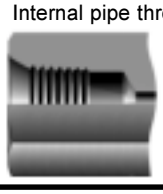
VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

F -ANSI/ASME B1.20.1
Internal pipe threads



M -ANSI/ASME B1.20.1
External pipe threads

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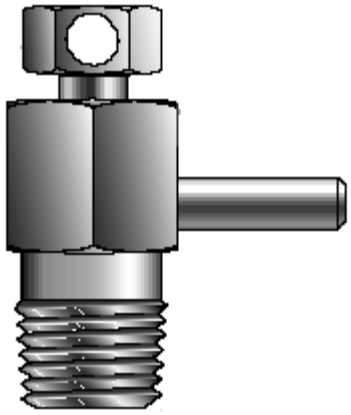
INI-216 Revision -

BV Series Bleed Valve



MAXIMUM ALLOWABLE WORKING PRESSURES AND TEMPERATURE

Valve Material	Maximum Pressure Rating	Temperature Rating
316SS	10,000 psi @ 70 °F (68.95 MPa @ 21 °C)	-65 °F to 850 °F (-54 °C to 454 °C)

Caution: This valve does not contain packing. It is possible for media to leak thru the threads when the valves are open.

Warning: Always direct the vent hole away from operating personnel.

Figure 1: BV Series Bleed Valve Cross Sectional View

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VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

WARNING

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Installation Instructions

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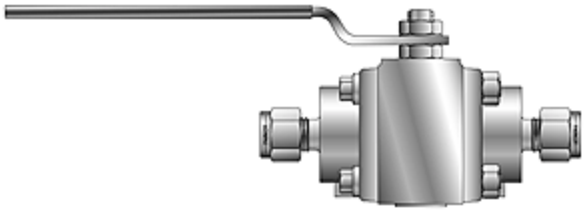
SB Series Swing-Out Ball Valve



INSTALLATION

1. SB Series Swing-out Ball Valves may be installed for flow in either direction. Use care to exclude pipe sealants from the valve cavity. Valves upstream relief hole in ball (vented option) are one way valves.

2. SBXD Valves (Diverter) may be installed using the bottom port as the inlet port. The flow can then be diverted to either one of the two side ports.

3. SBX Valves (Selector) may be installed using any of the ports as inlet or outlet ports. The source can be selected from either of two sources to be directed toward one outlet. It can be selected from one source to one outlet and then by rotating the valve, use that outlet as an inlet and use the third port as the new outlet. The 3 way valve does not have separate body seats. This function is incorporated into the valve seat. Therefore, more care than normal must be taken to not damage the back face of this seat upon disassembly and reassembly.

CAUTION

Parker recommends that all product which must be stored prior to installation be stored indoors, in an environment suitable for human occupancy. Do not store product in areas where exposure to relative humidity above 85%, acid or alkali fumes, radiation above nomal back ground, ultraviolet light, or temperatures above 120 °F (48 °C) or below 40 °F (4 °C) may occur. Do not store within 50 feet of any source of ozone.

PACKING MAINTENANCE

Tighten the retaining nut if leakage is observed at the stem. Caution: For maximum packing life, proper stem seal adjustment procedures must be followed.

1. Tighten the bottom retaining nut until the belleville washers are flat (the nut will bottom).
2. Loosen the retaing nut 1/16 turn. NOTE: Excessive tightening causes higher torque and shorter seal life.
3. Tighten the handle nut securely to lock the retaining nut in place.

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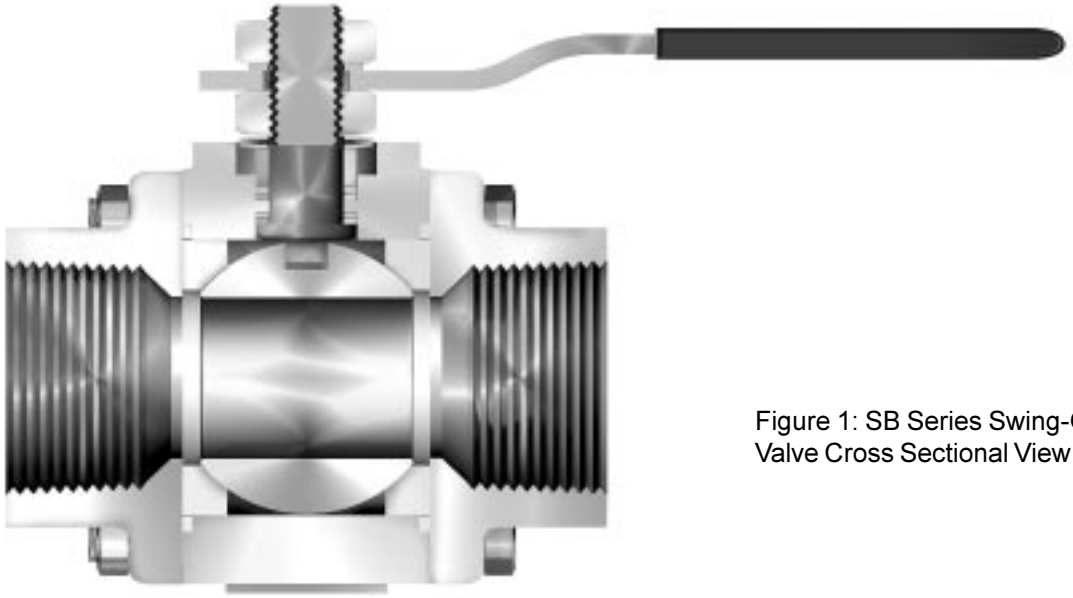

Figure 1: SB Series Swing-Out Ball Valve Cross Sectional View

OPERATION

a. Operation consists of turning the handle.
b. These valves will provide bubble-tight shut-off when used in accordance with published pressure versus temperature curves.
c. It is not good practice to leave a ball valve partly open (throttling operation).
d. As shipped, valves contain a silicone-based lubricant. This is for break-in, and may be removed if it is objectionable for an application by disassembling and solvent washing.
e. Media which may solidify, crystallize, or polymerize should not be allowed to stand in the ball valve cavity.

Torque Requirements

Torque requirements are subject to variability depending on the length of time between operations and the media in the valve. All figures below are based on laboratory tests with water as the media. They are measured at rated pressure, 70 °F (21 °C), with clean tap water after 24 hours. Breakaway torque is that force which must be exerted to cause the ball to begin to move.

Valve	Breakaway Torque
SB8	30 inch pounds
SB12	45 inch pounds
SB16	100 inch pounds
SB20	200 inch pounds
SB24	300 inch pounds
SB32	400 inch pounds

WELDED PORT CONNECTIONS

Notes

a. Always consult your authorized Parker representative if questions arise.
b. Careful welding procedures are recommended and welding should be performed by trained, qualified personnel. Socket weld ports require the tube be inserted into the socket until bottomed against the stop. The tube is then to be backed out approximately 1/16 of an inch and then welded. This procedure will help in avoiding excessive static stress on the weld.
c. Prior to Welding or Brazing THOROUGHLY CLEAN ALL JOINT SURFACES to remove surface protective coatings.

Procedure

1. Tack weld the valve in place.

2. Remove all body bolts except one. Open the valve. Loosen the last bolt. Swing the body out. Remove all bolts and spread the flange ends to clear the body seals. Remove the body seals, seats, and ball (turn valve handle to the closed position to remove the ball). Place the body back into the line and tighten diagonally with two body bolts.

3. Finish Welding (If gas welding or brazing, do not place flame directly on valve body.

4. Allow valve to cool, re-assemble the valve. Install new body seals, if they were shipped separately from the valve. Temporary BUNA body seals, found in the valve as received are not to be reused. If "SS" gasket body seals are used, the wide face of the gasket must be the face of the valve body.

5. Note: Care must be taken to avoid scratching the body seats.

6. Tighten the body bolts evenly and diagonally opposite each other, alternating in a criss-cross pattern. Use the torque figures shown in the following tables.

THREE-PIECE VALVES BODY BOLT TORQUE
(TORQUE ON NUT SIDE)

SB8- SB32 STANDARD VALVES WITH CARBON STEEL BOLTS

VALVE SIZES	BOLT DIAMETER	IN-LBS	FT-LBS	N-M
SB8-SB12	1/4	96-120	8-10	10.8-13.6
SB16	5/16	156-204	13-17	17.6-23.0
SB20	3/8	216-264	18-22	24.4-29.8
SB24	7/16	480-540	40-45	54.2-61.0
SB32	1/2	720-780	60-65	81.3-88.1

SB8 - SB32 STANDARD VALVES WITH STAINLESS STEEL OR ALLOY 20 BOLTS

VALVE SIZES	BOLT DIAMETER	IN-LBS	FT-LBS	N-M
SB8-SB12	1/4	72-94	6-8	8.1-10.6
SB16	5/16	120-144	10-12	13.6-16.3
SB20	3/8	192-216	16-18	21.7-24.4
SB24	7/16	336-384	28-32	38.0-43.4
SB32	1/2	504-552	42-46	56.9-62.4

NOTE: Stainless steel bolts and nuts are generally used in all 3-piece valves with stainless steel bodies.

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

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3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
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NP Series Needle Valve

Allowable Working Pressures and Temperatures
"R" Type Metal Stem Tip

Stem Packing	Maximum Pressure and Temperature	Maximum Temperature and Pressure
PTFE	6000 Psig at 70 °F 41.4 MPa at 21 °C	0 Psig at 400 °F 0 MPa at 204 °C
O-Ring	6000 Psig at 70 °F 41.4 MPa at 21 °C	0 Psig at 400 °F 0 MPa at 204° C
Grafoil®	6000 Psig at 70 °F 41.4 MPa at 21 °C	3930 Psig at 700 °F 27.1 MPa at 371 °C

Allowable Working Pressures and Temperatures
"K" Type PCTFE Stem Tip

Stem Packing	Maximum Pressure and Temperature	Maximum Temperature and Pressure
PTFE	6000 Psig at 70 °F 41.4 MPa at 21 °C	0 Psig at 350 °F 0 MPa at 176 °C
O-Ring	6000 Psig at 70 °F 41.4 MPa at 21 °C	0 Psig at 350 °F 0 MPa at 176 °C
Grafoil®	6000 Psig at 70 °F 41.4 MPa at 21 °C	0 Psig at 350 °F 0 MPa at 176 °C

Refer to Parker NP Series Needle Valve Maintenance Instructions (MI-116) when valve disassembly is required. The arrow on the Valve Body indicates the normal direction of flow.

Parker Hannifin Corporation
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PANEL MOUNTED VALVES

The panel must have a through-hole of 49/64 inch (19.4 mm) diameter. The maximum panel thickness is 1/4 inch (6.4 mm). When the Valve is mounted to a thin panel, a spacer (or washer) may be necessary to permit full Panel Nut engagement on the Valve.

1. Remove the Handle by unthreading the Handle Set Screw in the side of the Handle with a 3/32 inch allen wrench.
2. Remove the Body Set Screw with a 1/16 inch allen wrench.
3. Insert the Valve through the hole in the panel and assemble the Panel Nut, using a 3/4 inch hex wrench.
4. Re-install the Body Set Screw into the Body using a 1/16 inch allen wrench and torque to 6 in-lbs.
5. Re-install the Handle with the Set Screw into the grooved flat on the Stem, using a 3/32 inch allen wrench.

PACKING ADJUSTMENT

(Valves With PTFE Packing)

Packing adjustment may be necessary depending on the many and varied uses for the Valve. It is recommended an adjustment be made shortly after the initial installation and just prior to flow start-up.

NOTE: There is no packing adjustment necessary for Valves with an optional O-Ring Stem Packing.

1. Turn the stem to the closed position, finger tight.
2. Tighten the Packing Nut using a 9/16 inch wrench from 1/8 to 1/4 turn, or torque to 75 In-lbs. (8.4 N-m).

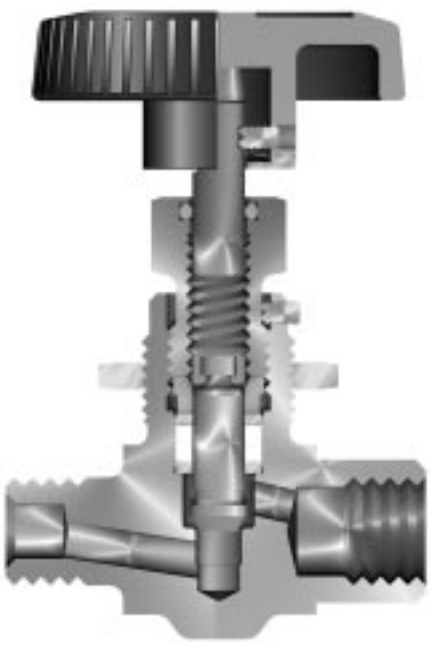

Figure 1: NP Series Needle Valve Cross Sectional View

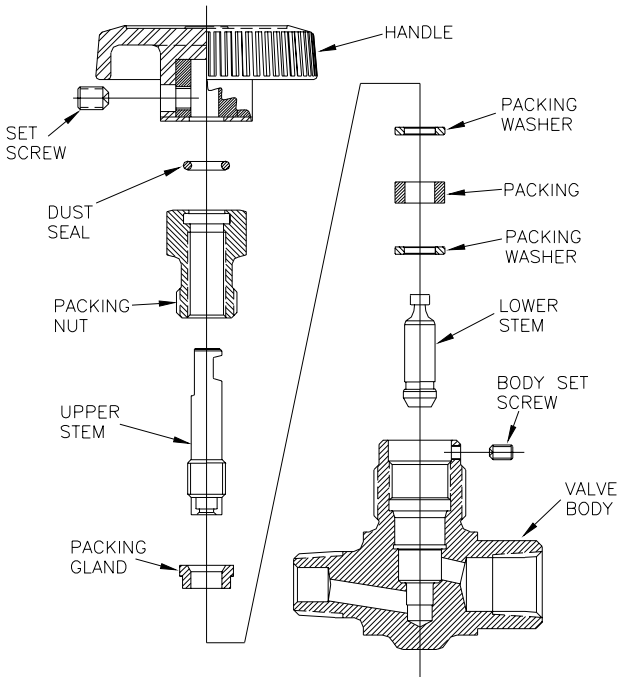

Figure 2: NP Series Needle Valve Exploded View

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VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

WARNING

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Parker Instrumentation

INI-218 Revision -

Installation Instructions

INI-219 Revision -

RVCK Series Needle Valve (with Rupture Disc)

MAXIMUM ALLOWABLE WORKING PRESSURES

The Valve's pre-set non-adjustable Rupture Disc burst pressure is indicated on the Disc manufacturer's metal ID tag. The standard Rupture Disc burst pressure is 1800 Psig at 70 °F (12.4 MPa at 21 °C). A stainless steel wire is provided with the Valve for the purpose of attaching the Rupture Disc manufacturer's ID Tag to the Valve.

Refer to Parker Combination Needle / Rupture Disc Valve Maintenance Instructions MI-117 when Valve disassembly is required. Always consult your authorized Parker representative if questions arise. The arrow on the Valve Body indicates the normal direction of flow.

PACKING ADJUSTMENT
(Valves With PTFE Packing)

Packing adjustment may be necessary depending on the many and varied uses for the Valve. It is recommended an adjustment be made shortly after the initial installation and just prior to flow start-up.

NOTE: There is no packing adjustment necessary for Valves with an optional O-Ring Stem Packing.

1. Turn the stem to the closed position, finger tight.
2. Remove the Handle by turning the Set Screw counter-clockwise with a 3/32 inch hex allen wrench.
3. Tighten the Packing Nut using a 9/16 inch wrench from 1/8 to 1/4 turn, or torque to 25 In-lbs. (2.8 N-m).
4. Reinstall the Handle on the Valve by turning the Set Screw clockwise with a 3/32 inch hex allen wrench.

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Jacksonville, Alabama

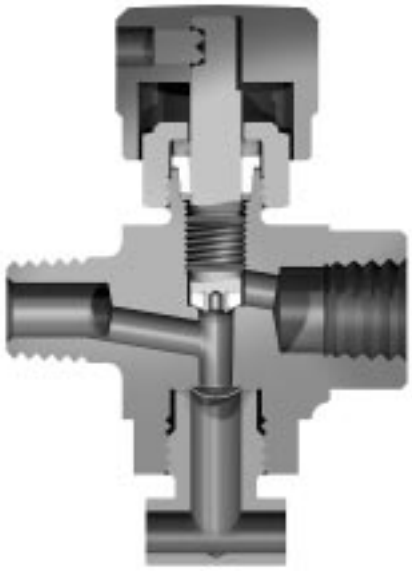

Figure 1: RVCK Series Valve
Cross Sectional View

RUPTURE DISK USE

USER SHOULD READ AND THOROUGHLY UNDERSTAND THESE INSTRUCTIONS BEFORE INSTALLING RUPTURE DISC. THESE INSTRUCTIONS DO NOT PURPORT ALL OF THE SAFETY FACTORS ASSOCIATED WITH THE RUPTURE DISC'S USE IN SERVICE. IT IS THE RESPONSIBILITY OF THE USER TO ESTABLISH APPROPRIATE SAFETY, HEALTH, AND TRAINING MEASURES FOR THEIR PERSONNEL INSTALLING, SERVICING, OR WORKING IN AN AREA WHERE RUPTURE DISC ASSEMBLIES ARE IN USE.
IT IS THE USER'S RESPONSIBILITY FOR DESIGN OF ADEQUATE VENTING AND INSTALLATION OF ADEQUATE VENT PIPING OR DIRECTIONAL FLOW AFTER RUPTURE OCCURS WITH THE RUPTURE
DISC AS INTENDED. LOCATE RUPTURE DISC WHERE PEOPLE OR PROPERTY WILL NOT BE EXPOSED TO THE SYSTEM DISCHARGE IN CASE OF RUPTURE. VENT TOXIC OR FLAMMABLE FUMES OR LIQUIDS TO A SAFE LOCATION TO PREVENT PERSONAL INJURY OR PROPERTY DAMAGE.

IT IS THE USER'S RESPONSIBILITY TO SPECIFY THE BURST PRESSURE RATING OF A RUPTURE DISC AT A COINCIDENT TEMPERATURE AT WHICH THE RUPTURE DISC IS TO BE USED. A RUPTURE DISC IS A TEMPERATURE SENSITIVE DEVICE. THE BURST PRESSURE OF THE RUPTURE DISC IS DIRECTLY AFFECTED BY ITS EXPOSURE TO THE COINCIDENT TEMPERATURE. GENERALLY, AS THE TEMPERATURE AT THE RUPTURE DISC INCREASES, THE BURST PRESSURE DECREASES; INVERSELY, AS THE TEMPERATURE AT THE RUPTURE DISC DECREASES, THE BURST PRESSURE MAY INCREASE. FAILURE TO PROPERLY UTILIZE A RUPTURE DISC AT THE SPECIFIED COINCIDENT TEMPERATURE COULD CAUSE PREMATURE OR OVERPRESSURIZATION OF A SYSTEM.

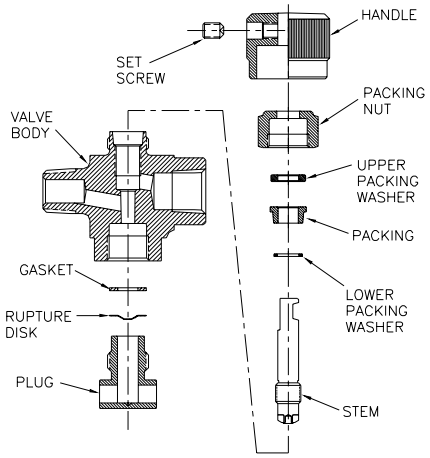

Figure 2: RVCK Series
Valve Exploded View

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Jacksonville, Alabama

THE INSTANTANEOUS RELEASE OF PRESSURE FROM THE RUPTURE DISC CAN CREATE VIOLENT NOISES DUE TO THE DISCHARGE AT SONIC VELOCITY. IT IS THE USER'S RESPONSIBILITY TO PROTECT AGAINST HEARING DAMAGE TO ANY BYSTANDERS.

PARTICLES MAY BE DISCHARGED WHEN THE RUPTURE DISC RUPTURES. THESE PARTICLES MAY BE PART OF THE RUPTURE DISC ITSELF, OR OTHER ENVIRONMENTAL MATTER IN THE SYSTEM. IT IS THE USER'S RESPONSIBILITY TO ASSURE THAT THESE PARTICLES ARE DIRECTED TO A SAFE AREA TO PREVENT PERSONAL INJURY OR PROPERTY DAMAGE.

THERE IS NO GUARANTEE OF RUPTURE DISC LIFE. SUCH LIFE SPAN IS AFFECTED BY CORROSION, CREEP AND FATIGUE, AND PHYSICAL DAMAGE. THESE CONDITIONS WILL DERATE THE RUPTURE DISC TO A LOWER SET PRESSURE. THE CUSTOMER AND/OR USER SHOULD BE PREPARED TO HANDLE A PREMATURE FAILURE OF THE RUPTURE DISC. THE MEDIA OR OTHER ENVIRONMENTAL CONDITIONS SHOULD NOT ALLOW ANY BUILDUP OR SOLIDIFICATION OF MEDIA TO OCCUR ON A RUPTURE DISC. THIS MAY INCREASE THE PRESSURE SETTING OF THE RUPTURE DISC.

PREVENTATIVE MAINTENANCE

1. REPLACE RUPTURE DISC EVERY YEAR UNDER NORMAL CONDITIONS. A MORE FREQUENT CHANGEOUT MAY BE NECESSARY DUE TO CORROSION, FATIGUE, TEMPERATURE, OR ADVERSE CONDITIONS. THESE FACTORS MUST BE EVALUATED BY THE USER THROUGH ACTUAL SERVICE EXPERIENCE.
2. IF THE RUPTURE DISC IS NOT REPLACED PERIODICALLY WHEN EXPOSED TO THESE CONDITIONS, PREMATURE FAILURE OF THE RUPTURE DISC MAY OCCUR, THEREBY DISCHARGING THE PROCESS MEDIA.
3. TO AVOID EXTENDED DOWNTIME, MAINTAIN THREE SPARE RUPTURE DISCS IN STOCK AT ALL TIMES. THE NUMBER OF SPARES REQUIRED ULTIMATELY WILL BE DETERMINED BY SERVICE CONDITIONS.

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

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Parker Instrumentation

INI-219 Revision -

Installation Instructions

INI-222 Revision -

CO Series Check Valve

MAXIMUM ALLOWABLE WORKING PRESSURE

6000 PSIG AT 70 °F
41.4 MPa at 21 °C

Refer to Parker CO Series Check Valve Maintenance Instructions MI-118 when Valve disassembly is required. Always consult your authorized Parker representative if questions arise. The arrow on the Valve Body indicates the normal direction of flow.

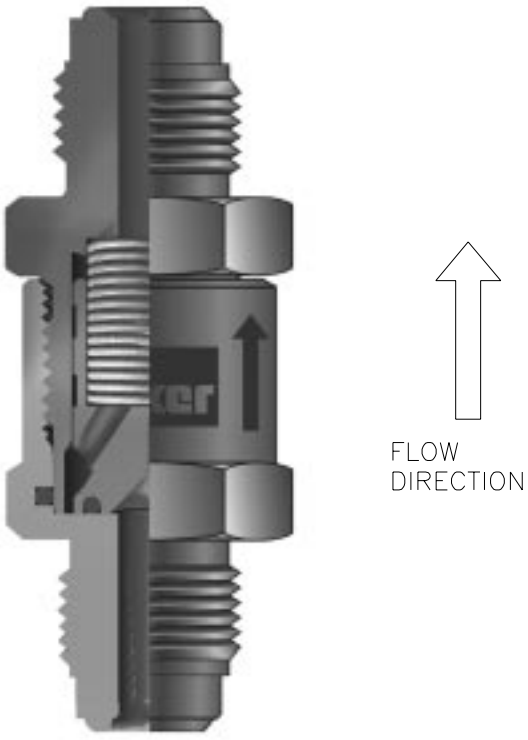

Figure 1: CO Series Check Valve Cross Sectional View

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Jacksonville, Alabama

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

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A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

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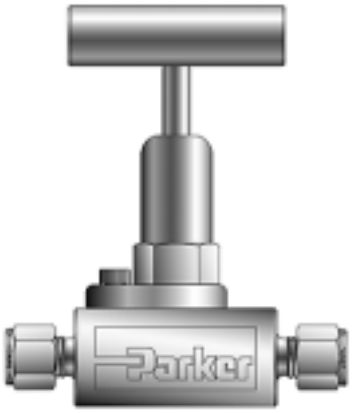
Installation Instructions

INI-223 Revision -

PV Series Rising Stem Plug Valve



Maximum Allowable Working Pressure and Temperature

Valve Seat Material	Maximum Pressure Rating	Maximum Pressure Rating at Maximum Temperature
Acetal	6000 Psig at 100 °F 15.2 MPa at 38 °C	1500 Psig at 250° F 10.3 MPa at 121 °C
PCTFE	2200 Psig at 100° F 15.2 MPa at 381 °C	100 Psig at 200 °F 0.68 MPa at 931 °C
PTFE	750 Psig at 100 °F 5.17 MPa at 38 °C	100 Psig at 400 °F 0.68 MPa at 204 °C
PEEK	6000 Psig at 100 °F 41.4 MPa at 38 °C	1000 Psig at 400 °F 6.89 MPa at 204 °C

Refer to Parker Rising Stem Plug Valve Maintenance Instructions MI-128 when Valve disassembly is required. Always consult your authorized Parker representative if questions arise.

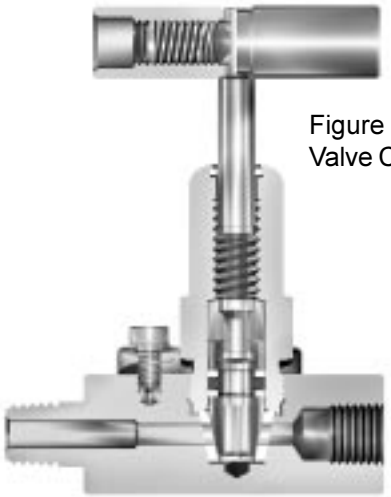


Figure 1: PV Series Needle Valve Cross Sectional View

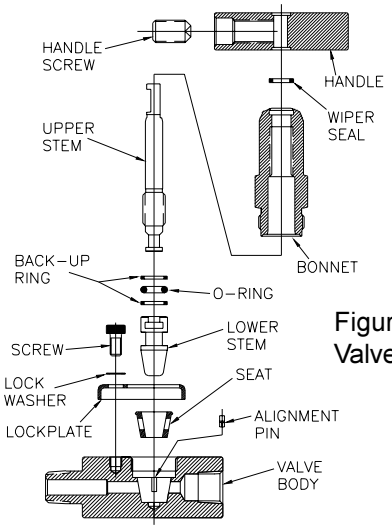


Figure 2: PV Series Needle Valve Exploded View

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Jacksonville, Alabama

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

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Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

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Parker Instrumentation

INI-223 Revision -

Installation Instructions

INI-224 Revision -

C Series Check Valve with PTFE Seats

Maximum Allowable Working Pressure

Valve Model	Stainless Steel Valves
C2T C4T C6T C8T C12T C16T	4000 psi @ 70 °F (27.6 MPa @ 21°C)

Refer to Parker Check Valve Maintenance Instructions MI-124 when valve disassembly is required. Always consult your authorized Parker representative if questions arise. The arrow on the Valve Body indicates the normal direction of flow.

CAUTION: **THIS VALVE IS DESIGNED TO HAVE A GAP BELOW THE OUTLET HEX. PROPER VALVE FUNCTION DICTATES THE GAP EXIST.**

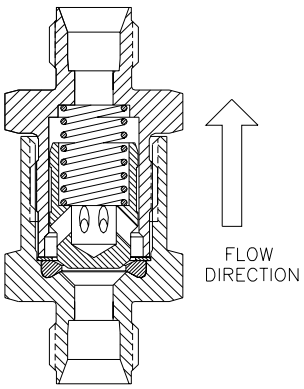

Figure 1: C Series Check Valve with PTFE Seats Cross Sectional View

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Instrumentation Valve Division
Jacksonville, Alabama

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

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TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

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 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.

ALL PARKER VALVES MUST PASS A RIGID OPERATIONAL AND LEAKAGE TEST BEFORE LEAVING THE FACTORY. IT IS RECOMMENDED AFTER ANY REASSEMBLY, THE VALVE SHOULD BE TESTED BY THE USER FOR OPERATION AND LEAKAGE. IF THESE INSTRUCTIONS ARE NOT FULLY COMPLIED WITH, THE REPAIRED PRODUCT MAY FAIL AND CAUSE DAMAGE TO PROPERTY OR INJURY TO PERSONS. PARKER HANNIFIN CANNOT ASSUME RESPONSIBILITY FOR PERFORMANCE OF A CUSTOMER SERVICED VALVE.

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Parker Instrumentation

INI-224 Revision -

Installation Instructions

INI-227 Revision -

BL Series Ball Valves with 60 Series Actuators

MAXIMUM ALLOWABLE WORKING PRESSURES AND TEMPERATURE

Seat Material	Valve Body Material	
	Brass or Monel	Stainless Steel or Hastelloy
PTFE	1500 Psig at 70 °F 10.4 MPa at 21 °C	1500 Psig at 70° F 10.4 MPa at 21 °C
PCTFE	3000 Psig at 70 °F 20.7 MPa at 21 °C	6000 Psig at 70 °F 41.4 MPa at 21 °C

Pneumatic Actuator Air Supply Requirements

Double Acting model: 20 to 120 psig (138 to 828 kPa)
Spring Return model: 40 to 120 psig (276 to 828 kPa)
Actuator Service Temperature Rating: - 4 ° to 175 °F (- 20 ° to 79 °C)

Refer to Parker B-Series Manual Ball Valve Maintenance Instructions (MI-108) when valve disassembly is required. The Pneumatic Actuator is not designed for field maintenance. Please consult your authorized Parker representative if any questions arise.

PACKING ADJUSTMENT

(For B-Series Ball Valves with a PTFE Stem Packing)

Packing adjustment may be necessary depending on the many and varied uses for the Valve. It is recommended an adjustment be made shortly after initial installation and just prior to flow start-up. Always consult your authorized Parker representative if questions arise.

1. Remove the Valve from the Actuator.
2. Tighten the Packing Nut 1/8 to 1/4 turn or, to the following torque using the specified hex wrench size, while holding the body at the wrench flats.
3. Reinstall the Valve to the Actuator. Refer to the Mounting instructions that follow.

Parker Hannifin Corporation
Instrumentation Valve Division
Jacksonville, Alabama

PACKING NUT TIGHTENING PARAMETERS

Ball Valve Size	Hex Wrench Size	Tightening Torque
B2	5/16 inch	30 In-lbs (3.3 N-m)
B6	7/16 inch	70 In-lbs (7.8 N-m)
B8	1/2 inch	90 In-lbs (10 N-m)

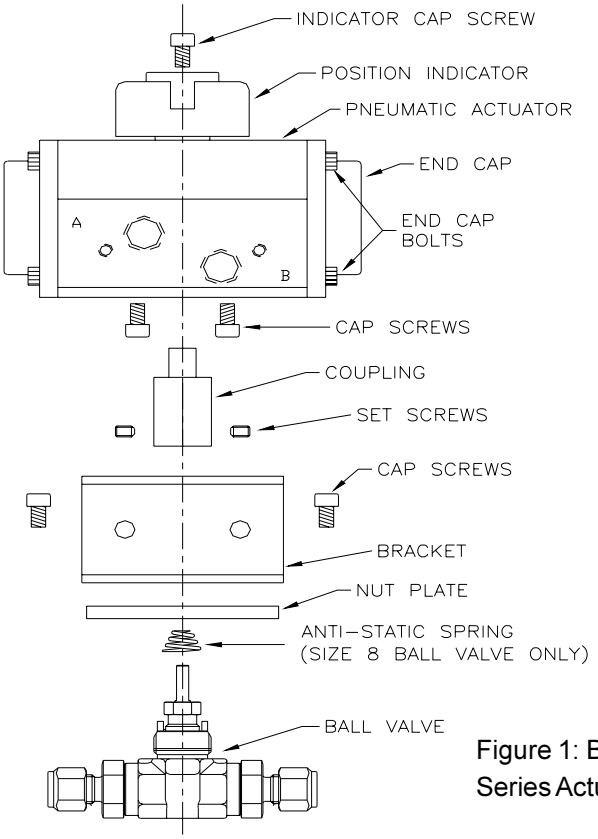

Figure 1: BL Series Valve with 60 Series Actuator Exploded View

MANUAL OVERRIDE OF AUTOMATIC BALL VALVE OPERATION BY PNEUMATIC ACTUATORS

In the event of a local power supply failure a method is provided to manually change the Valve position to either open or closed. This method may be used as often as necessary as long as these directions are followed.

1. Locate the Coupling which extends between the Actuator and the valve stem.

2. It may be necessary to disconnect the Actuator's air supply before the Coupling is rotated in the next step.

3. Rotate the Coupling 90 degrees, using an appropriately sized wrench.

4. Insure the Actuator indicates the Ball Valve is in the desired position (either Open or Closed) by observing the Position Indicator.

PNEUMATIC ACTUATOR
AIR SUPPLY and EXHAUST PORT CONNECTIONS

Refer to Figures 2 and 3. The 61 Series Actuators (both Double Acting and Spring Return) are provided with two 1/8 inch NPT ports labeled “A” and “B” located on the side of the actuator opposite of the nameplate. All other 60 Series Actuators (Double Acting and Spring Return) are provided with two 1/4 inch NPT ports labeled “A” and “B”.

1. DOUBLE ACTING MODEL (AD):
   a. When port “A” is pressurized (as port “B” exhausts) the Actuator Stem will rotate counter-clockwise.
   b. When port “B” is pressurized (as port “A” exhausts) the Actuator Stem will rotate clockwise.

Any quality four-way piloting system may be used successfully with the Parker Double-Acting Actuator models.

2. SPRING-RETURN MODELS (AC and AO):
   a. For the normally closed model (AC), pressure applied to port A will cause counter-clockwise rotation of the Actuator Shaft (as viewed by the Position Indicator).
   b. For the normally open model (AO), pressure applied to port A will cause clockwise rotation of the Actuator Shaft.
   c. Releasing the pressure will cause the actuator to rotate in the reverse direction.

Any quality three-way piloting system may be used successfully with Parker Spring-Return Actuator models.
Note: On the spring return model, when no pressure is supplied to the actuator, the valve should be in the desired fail safe position.

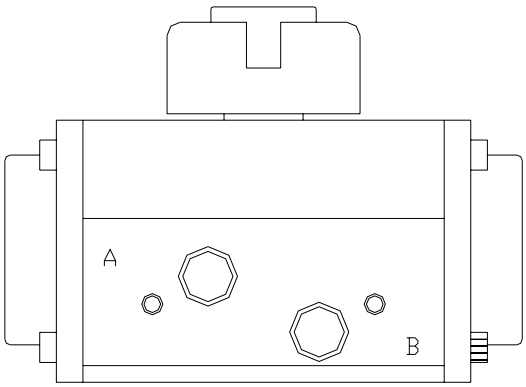

Figure 2: Port Connections on a 61 Series Actuator

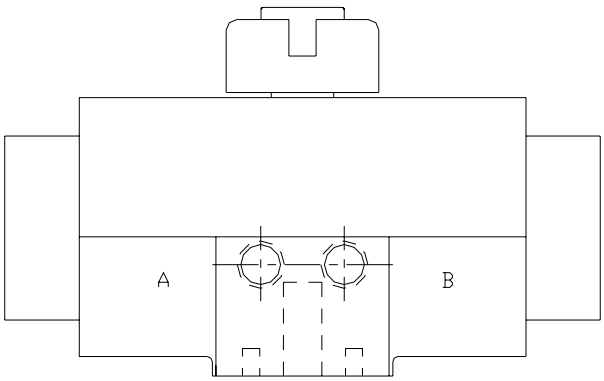

Figure 3: Port Connections on Actuators other than the 61 Series Actuator

Parker Actuators will operate dependably on any air supply suitable for use with air tools and pneumatic cylinders. Among the factors to consider in specifying or evaluating a compressed air supply for pneumatic power are:

1. Pressure and flow capacity: a minimum of 4 SCFM at 60 psig is recommended for each Actuator in the system.

2. Cleanliness (install filters upstream of Actuators)

3. Dryness (water, condensation, etc.)

4. Lubrication (optional).

Air delivery capacity (the potential of an air supply to deliver compressed air at a specified pressure and at an adequate rate of flow), seldom presents a direct problem. However, restrictions in the piloting system or in interconnecting tubing, can "starve" a pneumatic device such as an Actuator. The tubing that feeds the Actuator must be sufficiently large. The following tubing sizes are recommended:

1/4 inch I.D. tubing for up to five feet lengths
5/16 inch I.D. tubing from five to 30 feet lengths
3/8 inch I.D. tubing for over 30 feet lengths.

No severe restrictions to flow (such as those found in certain solenoid valves and fittings) should be present. If more than one Actuator is to be supplied from a single pilot system, the minimum passage requirement applies per Actuator. For example, if two Actuators are interconnected for simultaneous operation, the minimum passageway will become .003 square inches x 2 Actuators = .006 square inches (equivalent to a 3/32 inch diameter orifice).

MOUNTING A PARKER ROTARY PNEUMATIC ACTUATOR TO A B-SERIES TWO-WAY BALL VALVE

1. Remove the Handle by turning the Set Screw counter-clockwise with the following size allen wrench:
   Size 2 Valves 5/64 inch
   Size 6 Valves 3/32 inch
   Size 8 Valves 1/8 inch

2. This Step only applies to the 60 Series AO and AC versions of the Pneumatic Actuator for the B-Series Ball Valve (two-way). Proceed to step 3 for the 60 series AD Pneumatic Actuators. Verify that the actuator, when no air is supplied to port A, is in the closed position for a Normally Closed Actuator (AC), or in the open position for a Normally Open Actuator (AO).

3. Refer to Figure 1 for the following steps of this Procedure.

4. Engage the Nut Plate onto the panel nut threads of the Ball Valve Body until the Nut Plate is half way down the threads.

5. Lower the Lower Bracket onto the stem end of the Ball Valve.

Note: a. For mounting in-line Ball Valve bodies to a normally closed (AC) Pneumatic Actuator, the Ball Valve should be fully closed.
b. For mounting In-line Ball Valve bodies to a normally open (AO) Pneumatic Actuator, the Ball Valve should be fully open.
c. The Bracket channel should run parallel to the Ball Valve ports, and the bracket's wall mounting holes should be flush with the Valve's Parker logo.

6. Rotate the Nut Plate up the Ball Valve panel nut threads until it almost touches the Lower Bracket and the Nut Plate's two threaded holes line up with the holes on the Lower Bracket.

7. Place two Cap Screws into the two holes located in the bottom of the Lower Bracket. Screw them into the Nut Plate evenly, careful not to cock the Nut Plate. Torque the Cap Screws to 15 In-lbs. +2/-2 In-lbs. (1.7 N-m)

8. Remove the two Set Screws from the Lower Coupling. Apply a drop of Loctite® No. 242 adhesive to the following:
   a. Lower Coupling internal threads (both sides)
   b. Set Screws.

Engage the Set Screws into the Lower Coupling.

9. This Step only applies to Size 8 Ball Valves. Proceed to Step 10 for Size 2 and 6 Ball Valves. Place the Anti-Static Spring over the top of the Ball Valve stem and mount the Lower Coupling onto the Ball Valve stem.
   Note: If the Anti-Static Spring is conical, then the larger spring opening must be placed adjacent to the Ball Valve Body.

10. Engage the two Set Screws against the flats of the Ball Valve stem with the Lower Coupling pressed down completely onto the stem (fully compressing the Anti-Static Spring on the size 8). Torque the Set Screws to 8 In-lbs. +1/-1 In-Lbs.

11. Select the proper Actuator for the Valve application. Perform either steps A or B depending upon the specific type of Actuator.
   A. Double Acting Actuators (AD):
      Check the position of the Ball Valve ball to make sure the position corresponds with that indicated by the position indicator on the actuator top. If the two positions do not correspond, adjust the actuator shaft so that the indication corresponds to the Ball Valve's open or closed position.
   B. Spring Return Actuators (AC and AO):
      Rotate the Ball Valve stem to orient the Ball Valve ball to the position desired for the Actuator's spring action (either the Normally Open (AO) or Normally Closed (AC) position). Observe the Actuator's "Open/Closed" indicator and verify that it corresponds to the Ball Valve's actual position.

12. Install the Ball Valve and Bracket Sub-Assembly (from Step 10) onto the Actuator using four Cap Screws. Torque each Cap Screw to 15 In-Lbs. +2/-0 In-Lbs (1.7 N-m).

Note: Position the Ball Valve such that its Parker logo is on the same side of the Sub-Assembly as the Actuator Label and the bracket's wall mounting holes are positioned on the opposite side of the Actuator ports.

13. Your Parker Actuated Ball Valve is now ready to be installed and the Actuator connected to the air supply. Always contact your authorized Parker representative if questions arise.

CAUTION: The Parker Pneumatic Actuator Assembly must be properly supported such that no excess stress is created from the tubing or piping to the Valve or to the Actuator.

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

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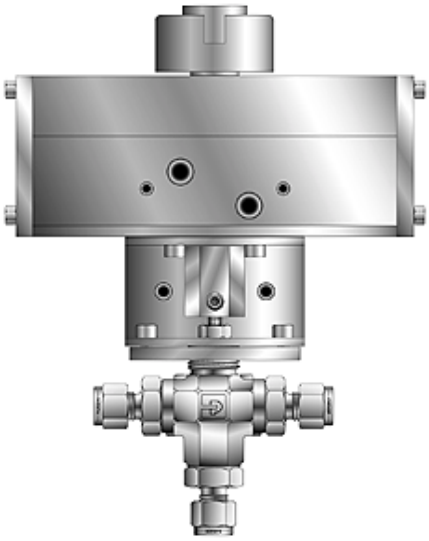
Parker Instrumentation

INI-227 Revision -

Installation Instructions

INI-228 Revision -

BX Series Ball Valves with 60 Series Actuators



MAXIMUM ALLOWABLE WORKING PRESSURES AND TEMPERATURE

Seat Material	Valve Body Material	
	Brass or Monel	Stainless Steel or Hastelloy
PTFE	1500 Psig at 70 °F 10.4 MPa at 21 °C	1500 Psig at 70° F 10.4 MPa at 21 °C
PCTFE	3000 Psig at 70 °F 20.7 MPa at 21 °C	6000 Psig at 70 °F 41.4 MPa at 21 °C

Pneumatic Actuator Air Supply Requirements

Double Acting model: 20 to 120 psig (138 to 828 kPa)
Spring Return model: 40 to 120 psig (276 to 828 kPa)

Actuator Service Temperature Rating

- 4 ° to 175 °F (- 20 ° to 79 °C)

Refer to Parker B-Series Manual Ball Valve Maintenance Instructions (MI-108) when valve disassembly is required. The Pneumatic Actuator is not designed for field maintenance. Please consult your authorized Parker representative if any questions arise.

Parker Hannifin Corporation
Instrumentation Valve Division
Jacksonville, Alabama

PACKING ADJUSTMENT
(For B-Series Ball Valves with a PTFE Stem Packing)

Packing adjustment may be necessary depending on the many and varied uses for the Valve. It is recommended an adjustment be made shortly after initial installation and just prior to flow start-up. Always consult your authorized Parker representative if questions arise.

1. Remove the Valve from the Actuator.
2. Tighten the Packing Nut 1/8 to 1/4 turn or, to the following torque using the specified hex wrench size, while holding the body at the wrench flats.
3. Reinstall the Valve to the Actuator. Refer to the Mounting instructions that follow.

PACKING NUT TIGHTENING PARAMETERS

Ball Valve Size	Hex Wrench Size	Tightening Torque
B2	5/16 inch	30 In-lbs (3.3 N-m)
B6	7/16 inch	70 In-lbs (7.8 N-m)
B8	1/2 inch	90 In-lbs (10 N-m)

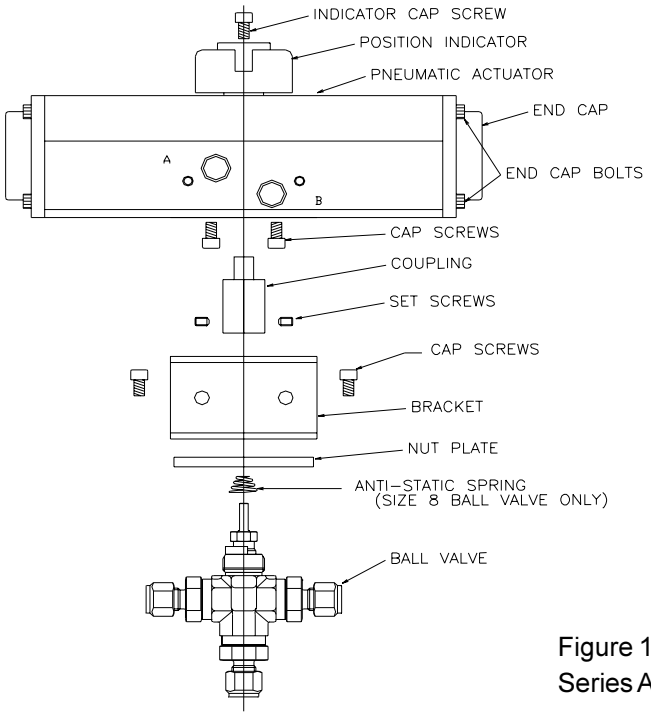


Figure 1: BX Series Valve with 60 Series Actuator Exploded View

MANUAL OVERRIDE OF AUTOMATIC BALL VALVE OPERATION BY PNEUMATIC ACTUATORS

In the event of a local power supply failure a method is provided to manually change the Valve position to either open or closed. This method may be used as often as necessary as long as these directions are followed.

1. Locate the Coupling which extends between the Actuator and the valve stem.
2. It may be necessary to disconnect the Actuator's air supply before the Coupling is rotated in the next step.
3. Rotate the Coupling 90 degrees, using an appropriately sized wrench.
4. Insure the Actuator indicates the Ball Valve is in the desired position (either Open or Closed) by observing the Position Indicator.

PNEUMATIC ACTUATOR
AIR SUPPLY and EXHAUST PORT CONNECTIONS

Refer to Figures 2 and 3. The 61 Series Actuators (both Double Acting and Spring Return) are provided with two 1/8 inch NPT ports labeled “A” and “B” located on the side of the actuator opposite of the nameplate. All other 60 Series Actuators (Double Acting and Spring Return) are provided with two 1/4 inch NPT ports labeled “A” and “B”.

1. DOUBLE ACTING MODEL (ADX):
   a. When port “A” is pressurized (as port “B” exhausts) the Actuator Stem will rotate counter-clockwise.
   b. When port “B” is pressurized (as port “A” exhausts) the Actuator Stem will rotate clockwise.

Any quality four-way piloting system may be used successfully with the Parker Double-Acting Actuator models.

2. SPRING-RETURN MODELS (ACX):
   a. For the normally closed model (AC), pressure applied to port A will cause counter-clockwise rotation of the Actuator Shaft (as viewed by the Position Indicator).
   b. For the normally open model (AO), pressure applied to port A will cause clockwise rotation of the Actuator Shaft.
   c. Releasing the pressure will cause the actuator to rotate in the reverse direction.

Any quality three-way piloting system may be used successfully with Parker Spring-Return Actuator models.
Note: On the spring return model, when no pressure is supplied to the actuator, the valve should be in the desired fail safe position.

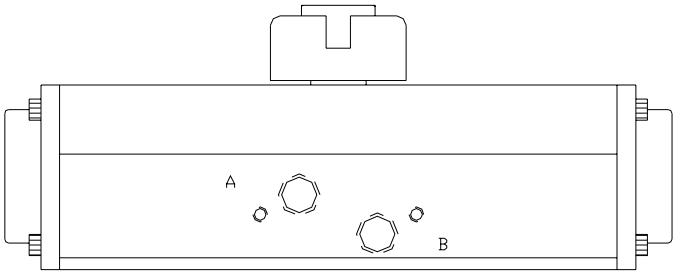


Figure 2: Port Connections on a 61 Series Actuator

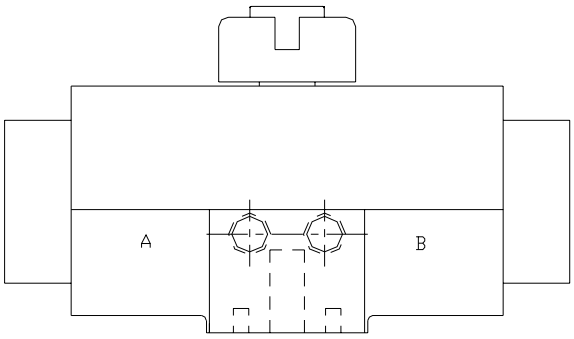


Figure 3: Port Connections on a 64 Series Actuator

Parker Actuators will operate dependably on any air supply suitable for use with air tools and pneumatic cylinders. Among the factors to consider in specifying or evaluating a compressed air supply for pneumatic power are:

1. Pressure and flow capacity: a minimum of 4 SCFM at 60 psig is recommended for each Actuator in the system.

2. Cleanliness (install filters upstream of Actuators)

3. Dryness (water, condensation, etc.)

4. Lubrication (optional).

Air delivery capacity (the potential of an air supply to deliver compressed air at a specified pressure and at an adequate rate of flow), seldom presents a direct problem. However, restrictions in the piloting system or in interconnecting tubing, can "starve" a pneumatic device such as an Actuator. The tubing that feeds the Actuator must be sufficiently large. The following tubing sizes are recommended:

1/4 inch I.D. tubing for up to five feet lengths
5/16 inch I.D. tubing from five to 30 feet lengths
3/8 inch I.D. tubing for over 30 feet lengths.

No severe restrictions to flow (such as those found in certain solenoid valves and fittings) should be present. If more than one Actuator is to be supplied from a single pilot system, the minimum passage requirement applies per Actuator. For example, if two Actuators are interconnected for simultaneous operation, the minimum passageway will become .003 square inches x 2 Actuators = .006 square inches (equivalent to a 3/32 inch diameter orifice).

MOUNTING A PARKER ROTARY PNEUMATIC ACTUATOR TO A B-SERIES THREE-WAY BALL VALVE

1. Remove the Handle by turning the Set Screw counter-clockwise with the following size allen wrench:
   Size 2 Valves 5/64 inch
   Size 6 Valves 3/32 inch
   Size 8 Valves 1/8 inch

2. The valve should be completely opened to one port or the other.

3. Refer to Figure 1 for the following steps of this Procedure.

4. Engage the Nut Plate onto the panel nut threads of the Ball Valve Body until the Nut Plate is half way down the t threads.

5. Place the Lower Bracket onto the stem end of the Ball Valve. The Bracket channel should run parallel to the Ball Valve ports and the bracket's wall mounting holes should be positioned on the same side of the Valve as the Valve's Parker logo.

6. Rotate the Nut Plate up the Ball Valve panel nut threads until it almost touches the Lower Bracket, leaving a slight gap, and the Nut Plate's two threaded holes line up with the holes on the Lower Bracket .

7. Place two Cap Screws into the two holes located in the bottom of the Lower Bracket . Screw them into the Nut Plate evenly, careful not to cock the Nut Plate. Torque the Cap Screws to 15 In-Lbs +2/-2 In-Lbs.

8. Remove the two Set Screws from the Lower Coupling. Apply a drop of Loctite® No. 242 adhesive to the following:
   a. Lower Coupling internal threads (both sides)
   b. Set Screws
   Engage the Set Screws into the Lower Coupling.

9. This step only applies to Ball Valves with Anti-Static Springs. Proceed to Step 10 for Ball Valves without them. Place the Anti-Static Spring over the top of the Ball Valve stem and mount the Lower Coupling onto the Ball Valve stem.

Note: If the Anti-Static Spring is conical, then the larger spring opening must be placed adjacent to the Ball Valve.

10. Engage the two Set Screws against the flats of the Ball Valve stem with the Lower Coupling pressed down completely onto the stem (fully compressing the Anti-Static Spring, if applicable). Torque the Set Screws to 8 In-Lbs +1/-1 In-Lbs.

11. Install the Ball Valve and Bracket Sub-Assembly (from Step 10) onto the Actuator using four Cap Screws. Torque each Cap Screw to 15 In-Lbs +2/-2 In-Lbs.

Note: Position the Ball Valve such that its Parker logo is on the same side of the Sub-Assembly as the Actuator Label and the bracket's wall mounting holes are positioned on the opposite side from the Actuator ports.

12. Your Parker Actuated Ball Valve is now ready to be installed and the Actuator connected to the air supply. Always contact your authorized Parker representative if questions arise.

CAUTION: The Parker Pneumatic Actuator Assembly must be properly supported such that no excess stress is created from the tubing or piping to the Valve or to the Actuator.

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

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Parker Instrumentation

INI-228 Revision -

Installation Instructions

INI-230 Revision A

PR Series Rotary Plug Valve

MAXIMUM WORKING PRESSURE AND TEMPERATURE

Seal Material	Maximum Pressure and Temperature	Maximum Pressure and Temperature
Fluorocarbon	3000 psig at 70 °F 20.7 MPa at 21 °C	2000 psig at 450 °F 13.8 MPa at 232 °C
EPR	3000 psig at 70 °F 20.7 MPa at 21 °C	2500 psig at 275 °F 17.2 MPa at 204 °C
Buna-N	3000 psig at 70 °F 20.7 MPa at 21 °C	2600 psig at 225 °F 17.9 MPa at 107 °C
Highly Fluori-nated Fluoro-carbon	3000 psig at 70 °F 20.7 MPa at 21 °C	0 psig at 300 °F 0 MPa at 149 °C

* For flow in the opposite direction of the normal flow or the By-Pass option, the Maximum Pressure Rating is 150 Psig (1 MPa).

Refer to Parker PR Series Rotating Plug Valve Maintenance Instructions (MI-130) when valve disassembly is required. Always consult your authorized Parker representative if questions arise. The arrow on the Valve Handle indicates the normal direction of flow.

Figure 1: PR Series Rotary Plug Valve Cross Sectional View

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VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

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F -ANSI/ASME B1.20.1 Internal pipe threads

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Parker Instrumentation

INI-230 Revision A

Installation Instructions

INI-232 Revision -

SB Series Swing-out Ball Valves with 60 Series Actuators

MAXIMUM ALLOWABLE WORKING PRESSURES

Table I
Maximum Allowable Valve Working Pressure and Temperature

Body Material	Valve Size		
	SB8-SB12	SB16	SB20-SB32
Stainless or Carbon Steel	3000 Psig at 70 °F 20.7 MPa at 21 °C	2500 Psig at 70 °F 17.3 MPa at 21 °C	2000 Psig at 70 °F 13.8 MPa at 21 °C
Brass	1500 Psig at 70 °F 10.4 MPa at 21 °C	1500 Psig at 70 °F 10.4 MPa at 21 °C	1000 Psig at 70 °F 6.9 MPa at 21 °C

Table 2
Pneumatic Actuator Air Supply Requirements

Actuator Model	Minimum Pressure	Maximum Pressure
Double Acting (AD)	20 psig (138 kPa)	120 psig (828 kPa)
Normally Closed (AC)	40 psig (276 kPa)	120 psig (828 kPa)
Normally Opened (AO)	40 psig (276 kPa)	120 psig (828 kPa)

Actuator Service Temperature Rating: - 4 °F to 175 °F (- 20 °C to 79 °C)

Refer to Parker SB-Series Manual Ball Valve Maintenance Instructions (MI-122) when valve disassembly is required. The Pneumatic Actuator is not designed for field maintenance. Please consult your authorized Parker representative if any questions arise.

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STEM PACKING ADJUSTMENT

1. Remove the Valve from the Actuator. Remove jam nut from stem.
2. While holding stem, tighten packing nut until spring washers are flat (the nut will "bottom").
3. Loosen packing nut 1/6 turn.
4. Reinstall the jam nut, and torque to 40 In-Lbs +4/-4. Reinstall the Valve to the Actuator. Refer to the Mounting instructions.

MANUAL OVERRIDE OF AUTOMATIC BALL VALVE OPERATION BY PNEUMATIC ACTUATORS

In the event of a local power supply failure, a method is provided to manually change the Valve position to either open or closed. This method may be used as often as necessary as long as these directions are followed.

1. Locate the Coupling which extends between the Actuator and the valve stem.
2. It may be necessary to disconnect the Actuator's air supply before the Coupling is rotated in the next step.
3. Rotate the Coupling 90 degrees, using an appropriately sized wrench.
4. Insure the Actuator indicates the Ball Valve is in the desired position (either Open or Closed) by observing the Position Indicator.

PNEUMATIC ACTUATOR AIR SUPPLY and EXHAUST PORT CONNECTIONS

The 61 Series Actuators (both Double Acting and Spring Return) are provided with two 1/8 inch NPT ports labeled "A" and "B" located on the side of the actuator opposite of the nameplate. All other 60 Series Actuators (Double Acting and Spring Return) are provided with two 1/4 inch NPT ports labeled "A" and "B".

1. DOUBLE ACTING MODEL (AD):
   a. When port "A" is pressurized (as port "B" exhausts), the Actuator Stem will rotate counter-clockwise.
   b. When port "B" is pressurized (as port "A" exhausts), the Actuator Stem will rotate clockwise.

Any quality four-way piloting system may be used successfully with the Parker Double-Acting Actuator models.

2. SPRING-RETURN MODELS (AC and AO):
   a. For the normally closed model (AC), pressure applied to port A will cause counter-clockwise rotation of the Actuator Shaft (as viewed by the Position Indicator).
   b. For the normally open model (AO), pressure applied to port A will cause clockwise rotation of the Actuator Shaft.
   c. Releasing the pressure will cause the actuator to rotate in the reverse direction.

Any quality three-way piloting system may be used successfully with Parker Spring-Return Actuator models.

Parker Actuators will operate dependably on any air supply suitable for use with air tools and pneumatic cylinders. Among the factors to consider in specifying or evaluating a compressed air supply for pneumatic power are:

1. Pressure and flow capacity: a minimum of 4 SCFM at 60 psig is recommended for each Actuator in the system.
2. Cleanliness (install filters upstream of Actuators)
3. Dryness (water, condensation, etc.)
4. Lubrication (optional).

Air delivery capacity (the potential of an air supply to deliver compressed air at a specified pressure and at an adequate rate of flow) seldom presents a direct problem. However, restrictions in the piloting system or in interconnecting tubing can "starve" a pneumatic device such as an Actuator. The tubing that feeds the Actuator must be sufficiently large. The following tubing sizes are recommended:

1/4 inch I.D. tubing for up to five feet
5/16 inch I.D. tubing from five to 30 feet
3/8 inch I.D. tubing for over 30 feet

No severe restrictions to flow (such as those found in certain solenoid valves and fittings) should be present. If more than one Actuator is to be supplied from a single pilot system, the minimum passage requirement applies per Actuator. For example, if two Actuators are interconnected for simultaneous operation, the minimum passageway will become .003 square inches x 2 Actuators = .006 square inches (equivalent to a 3/32 inch diameter orifice).

MOUNTING A PARKER ROTARY PNEUMATIC ACTUATOR TO AN SB-SERIES TWO-WAY BALL VALVE

1. This Step only applies to the 60 Series AO and AC versions of the Pneumatic Actuator for the SB-Series Ball Valve (two-way). Proceed to step 2 for the 60 series AD Pneumatic Actuators.

   Verify that the actuator, when no air is supplied to port A, is in the closed position for a Normally Closed Actuator (AC) or in the open position for a Normally Open Actuator (AO).

2. Position the valve to the opened position for the AO actuator. Position the valve to the closed position for the AD and AC actuators.
3. Remove the handle retaining nut. Remove the handle and the handle stop plate. Reinstall the handle retaining nut and washer. While holding the stem with the handle, torque the handle retaining nut to 40 In-Lbs +4/-4 In-Lbs.
4. Place the bracket onto the valve. The bracket should be mounted such that the bracket channel is parallel to the flow path of the valve.
5. Place the coupling into the bracket channel and onto the valve stem.
6. Place the actuator on top of the bracket and valve sub assembly, inserting the coupling into the actuator shaft socket.

Note: Position the Ball Valve such that its Nomenclature is on the same side of the Sub-Assembly as the Actuator Ports and the bracket's wall mounting holes are positioned on the opposite side from the Actuator ports.

7. Secure the bracket to the actuator with the cap screws. Torque the Cap Screws to 15 In-Lbs +2/-2 In-Lbs.
8. Your Parker Actuated Ball Valve is now ready to be installed and the Actuator connected to the air supply. Always contact your authorized Parker representative if questions arise.

CAUTION: The Parker Pneumatic Actuator Assembly must be properly supported such that no excess stress

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

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2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
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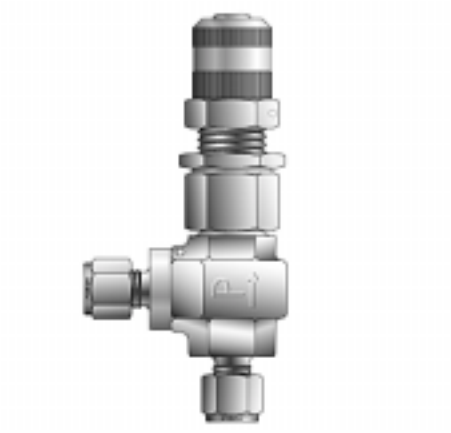
INI-232 Revision -

Installation Instructions

INI-233 Revision -

RH Series Relief Valve



Spring Acquisition

The valve is shipped assembled complete less the adjustment cap and the lock nut. Springs may be acquired by ordering the appropriate kit. Spring kits are as follows:

Spring Pressure Range	Kit Name	Color Code
50-350 psi	KIT-RH4SP-50-350	Gray
350-750 psi	KIT-RH4SP-350-750	Red
750-1500 psi	KIT-RH4SP-750-1500	Orange
1500-2250 psi	KIT-RH4SP-1500-2250	Yellow
2250-3000 psi	KIT-RH4SP-2250-3000	Light Green
3000-4000 psi	KIT-RH4SP-3000-4000	Light Blue
4000-5000 psi	KIT-RH4SP-4000-5000	Burgundy
5000-6000 psi	KIT-RH4SP-5000-6000	Bright Yellow

Each kit includes a Spring, two (2) PTFE washers, a label, locking wire, and a lead tie down disk.

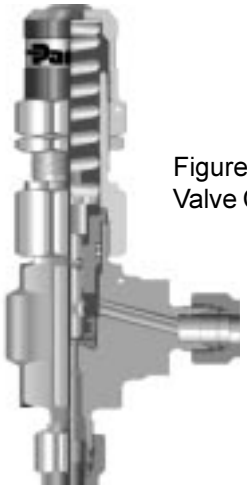


Figure 1: RH Series Relief Valve Cross Sectional View

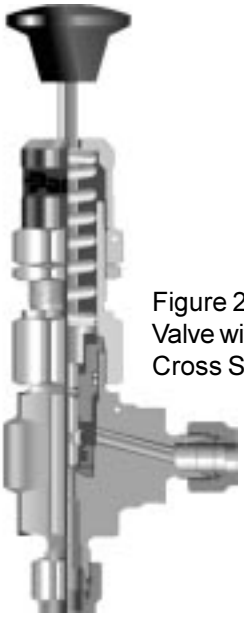


Figure 2: RH Series Relief Valve with Manual Override Cross Sectional View

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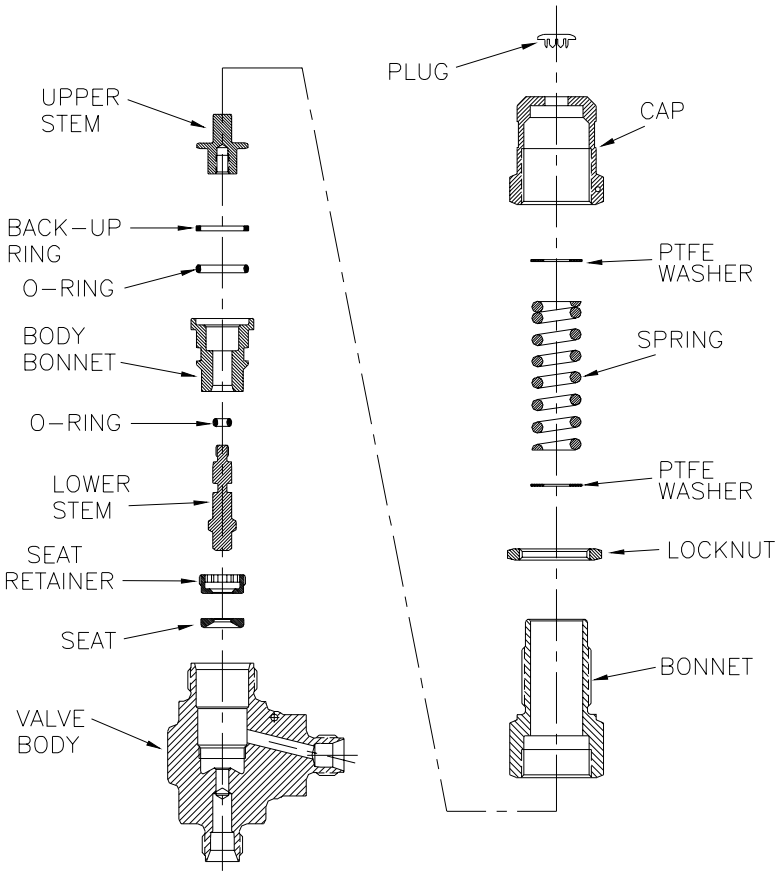

Figure 3: RH Series Relief Valve Exploded View

Pre-Installation Assembly Instructions

(Standard Version)

Once the appropriate spring kit has been determined, assemble the valve complete according to the following instructions:

1. Thread the **Locknut** onto the **Bonnet**.
2. Place a **PTFE Washer** into the bore of the **Bonnet**.
3. Place the **Spring** into the bore of the **Bonnet**.
4. Place the second **PTFE washer** on top of the **Spring**.
5. Thread the **Cap** onto the **Bonnet**. Be careful that the **PTFE Washer** does not move from its position atop the **Spring**.

Setting Desired Cracking Pressure

1. Rotate the **Cap** to set the desired cracking pressure.
2. Tighten the **Lock Nut** against the **Cap**.
3. If required, secure the pressure setting by using the **Lockwire** to fasten the **Cap** and **Valve Body** together.

Pre-Installation Assembly Instructions
(Manual Version)

The valve is shipped assembled complete with the exception of the handle which is included in the box. The manual version of the valve uses the same springs as seen in the standard version. The appropriate spring kit can be determined from viewing the Spring Acquisition section of this document.

1. Remove the **Cap** from the valve assembly.
2. Place the flat **PTFE Washer** into the bore of the **Bonnet**.
3. Place the **Spring** into the bore of the **Bonnet**.
4. Place the second **PTFE Washer** into the Cap such that it fits within the machined hole in the top of the **Cap**.
5. Thread the **Cap** onto the **Bonnet**. Be careful that the **PTFE Washer** does not move from its position within the **Cap**.
6. Thread the **Handle** onto the **Manual Upper Stem**.

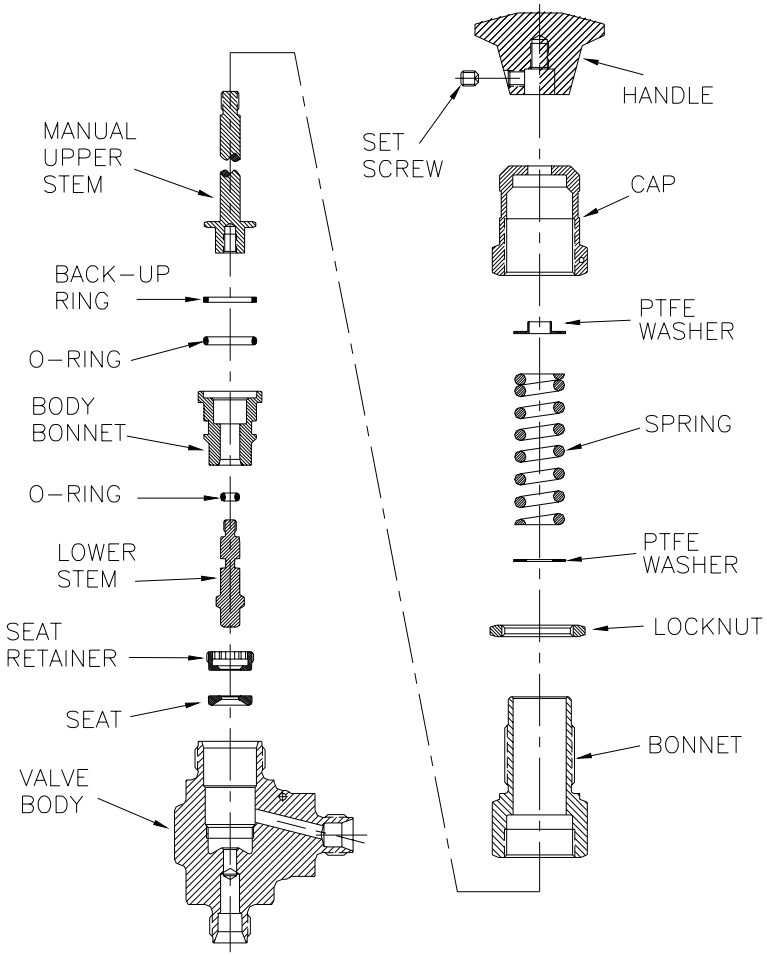

Figure 4: RH Series Relief Valve with Manual Override Exploded View

Setting Desired Cracking Pressure

1. Rotate the **Cap** to set the desired cracking pressure.
2. Tighten the **Lock Nut** against the **Cap**.
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Parker Instrumentation

INI-233 Revision -

Installation Instructions

INI-235 Revision -

FT Series Filter

Maximum Allowable Working Pressure

Seal Material	Brass Filters	Stainless Steel Filters
Elastomeric & Metallic	2000 Psig at 70 °F 13.8 MPa at 21 °C	6000 Psig at 70 °F 41.4 MPa at 21 °C
PTFE	2000 Psig at 70 °F 13.8 MPa at 21 °C	2000 Psig at 70 °F 13.8 MPa at 21 °C

Refer to Parker FT Series Filter Maintenance Instructions MI-135 when valve disassembly is required. Always consult your authorized Parker representative if questions arise. The arrow on the Filter Body indicates the normal direction of flow.

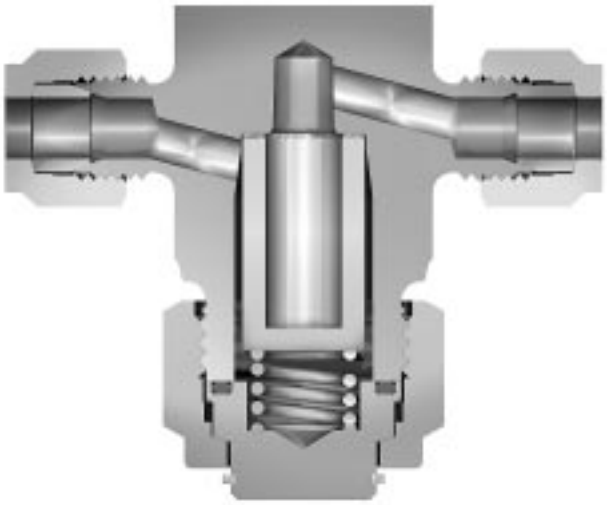

Figure 1: FT Series Filter Cross Sectional View

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Jacksonville, Alabama

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

WARNING

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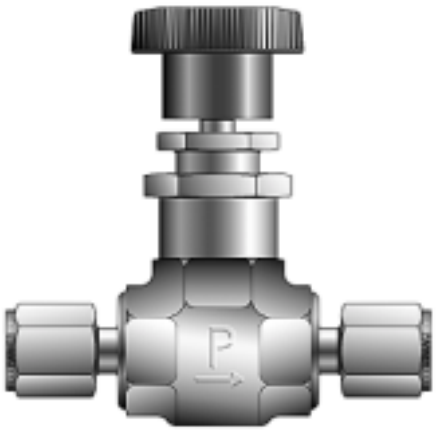
Parker Instrumentation

INI-235 Revision -

Installation Instructions

INI-236 Revision -

VL Series Needle Valve



MAXIMUM WORKING PRESSURES AND TEMPERATURE

Valve Size	Maximum Pressure	Maximum Temperature
VL4	600 psi at 70 °F	600 psi at 300 °F
VL6	4.1 MPa at 21 °C	4.1 MPa at 149 °C

Refer to Parker VL-Series Needle Valve Maintenance Instructions MI-136 when valve disassembly is required. Always consult your authorized Parker representative if questions arise. The arrow on the Valve Body indicates the normal direction of flow.

PACKING ADJUSTMENT

Packing adjustment may be necessary depending on the many varied uses for the Valve. It is recommended an adjustment be made shortly after the initial installation and just prior to flow start-up.

1. Turn the Stem to the full OPEN position, finger-tight.
2. Loosen the Locknut from the Valve Body.
3. Tighten the Bonnet using a 9/16 inch hex wrench to 20 in-lbs.
4. Tighten the Locknut onto the Valve Body approximately 1/8 turn past finger tight.

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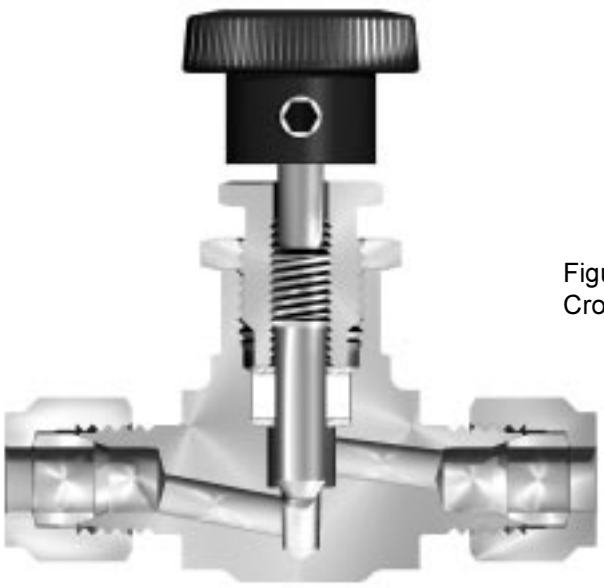

Figure 1: VL Series Needle Valve
Cross Sectional View

PANEL MOUNTED VALVES

The panel must have a through hole of the proper diameter as listed below:

VL4 Valves 29/64 inch diameter hole (11.5 mm)
VL6 Valves 29/64 inch diameter hole (11.5 mm)

The maximum panel thickness is 1/4 inch (6.4 mm). When the valve is to be mounted to a thin panel, a spacer or washer may be necessary to permit full panel nut engagement on the valve.

1. Remove the Handle by unthreading the Set Screw in the side of the Handle with a 5/64 inch hex wrench.
2. Insert the Valve through the hole in the panel and engage the Panel Nut, hand-tight.
3. Re-install the Handle by threading the Set Screw into the Handle with a 5/64 inch hex wrench.

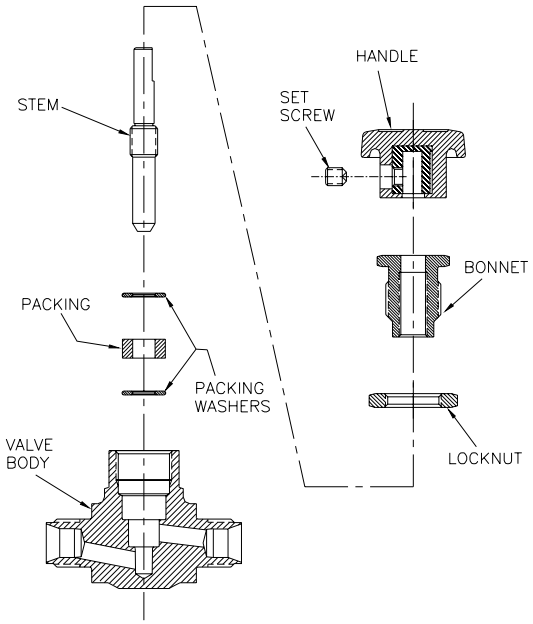

Figure 2: VL Series Needle Valve Exploded View

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VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

WARNING

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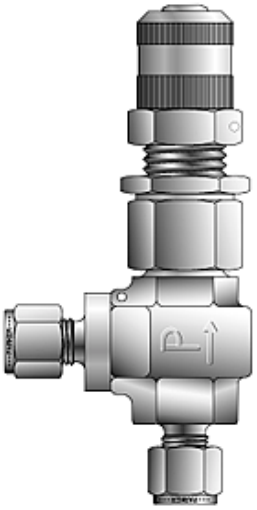
INI-236 Revision -

Installation Instructions

INI-237 Revision A

RL Series Relief Valve



Spring Acquisition

The valve is shipped assembled complete less the adjustment cap and the lock nut. Springs can be acquired by ordering the appropriate kit. Spring kits are as follows:

Spring Pressure Range	Kit Name	Color Code
10-25 psi	KIT-RL4SP-0-25	Magenta
25- 50 psi	KIT-RL4SP-25-50	Brown
50-100 psi	KIT-RL4SP-50-100	Purple
100-150 psi	KIT-RL4SP-100-150	Dark Green
150-225 psi	KIT-RL4SP-150-225	Dark Blue
225-400 psi	KIT-RL4SP-225-400	White
10-225 psi	KIT-RL4SP-10-225	None

Each kit includes a Spring, two (2) PTFE washers, a label, locking wire, and a lead tie down disk.

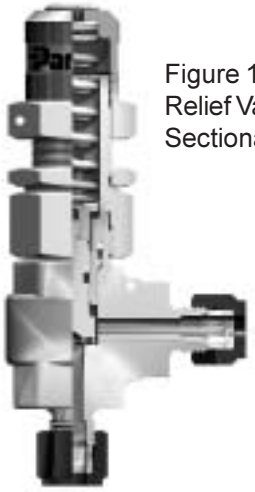


Figure 1: RL Series Relief Valve Cross Sectional View

Figure 2: RL Series Relief Valve with Manual Overrride Cross Sectional View

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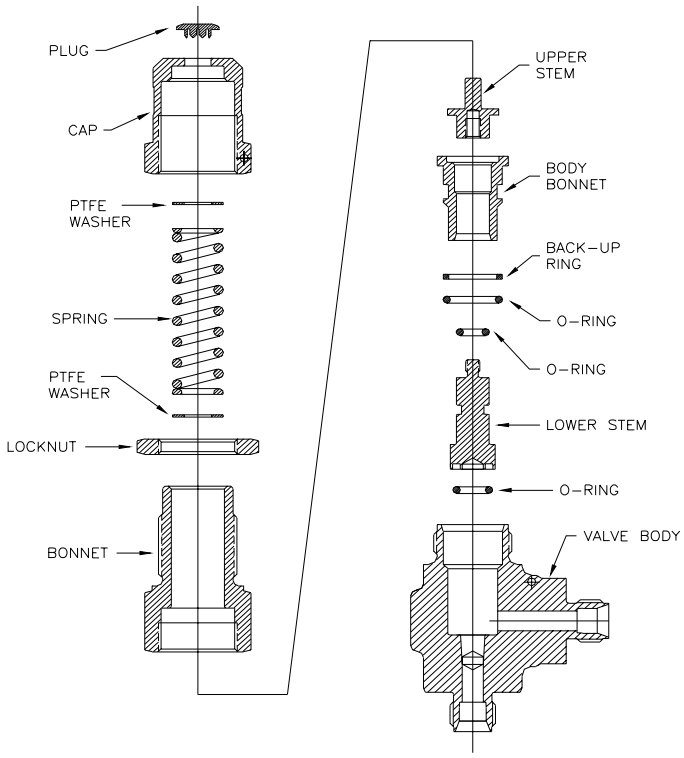

Figure 3: RL Series Relief Valve Exploded View

Pre-Installation Assembly Instructions
(Standard Version)

Once the appropriate spring kit has been determined, assemble the valve complete according to the following instructions:

1. Thread the **Locknut** onto the **Bonnet**.
2. Place a **Teflon Washer** into the bore of the **Bonnet**.
3. Place the **Spring** into the bore of the **Bonnet**.
4. Place the other **Teflon washer** on top of the **Spring**.
5. Place an appropriate lubricant, consistent with the valve's service requirements, on the internal threads of the **Cap**.
6. Thread the **Cap** onto the **Bonnet**. Be careful that the **Teflon Washer** does not move from its position atop the **Spring**.

Setting Desired Cracking Pressure

1. Rotate the **Cap** to set the desired cracking pressure.
2. Tighten the **Lock Nut** against the **Cap**.
3. If required, secure the pressure setting by using the **Lockwire** to fasten the **Cap** and **Valve Body** together.

Pre-Installation Assembly Instructions
(Manual Version)

The valve is shipped assembled complete with the exception of the handle which is included in the box. The manual version of the valve uses the same springs as seen in the standard version. The appropriate spring kit can be determined from viewing the Spring Acquisition section of this document.

1. Remove the **Cap** from the valve assembly.
2. Place a **Teflon Washer** into the bore of the **Bonnet**.
3. Place the **Spring** into the bore of the **Bonnet**.
4. Place the other **Teflon Washer** on top of the **Spring**.
5. Place an appropriate lubricant, consistent with the valve's service requirements, on the internal threads of the **Cap**.
6. Thread the **Cap** onto the **Bonnet**. Be careful that the **Teflon Washer** does not move from its position atop the **Spring**.
7. Thread the **Handle** onto the **Manual Upper Stem**.

Setting Desired Cracking Pressure

1. Rotate the **Cap** to set the desired cracking pressure.
2. Tighten the **Lock Nut** against the **Cap**.
3. If required, secure the pressure setting by using the **Lockwire** to fasten the **Cap** and **Valve Body** together.

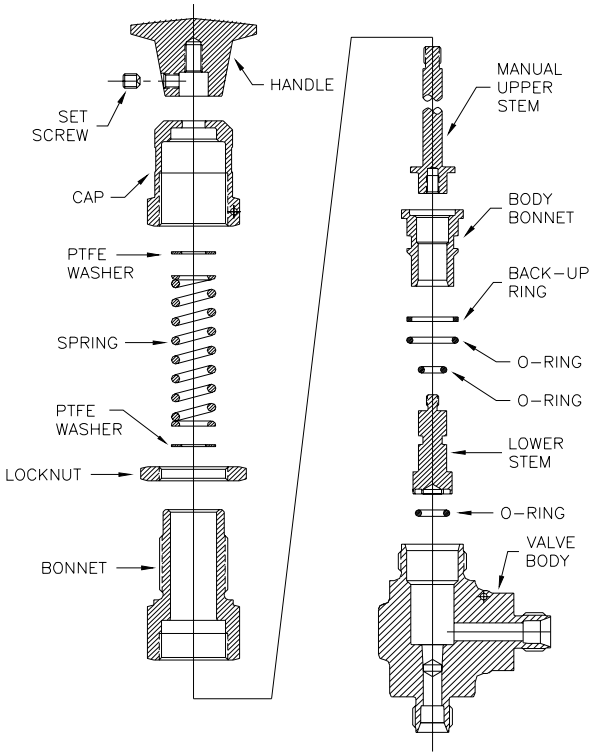

Figure 4: RL Series Relief Valve with Manual Override Exploded View

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VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

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Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

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INI-237 Revision A

Installation Instructions

INI-238 Revision -

NS Series Metering Valve

WORKING PRESSURES AND TEMPERATURES

Elastomer	Working Pressure	Temperature Range
Buna-N	2000 psig @ 70 °F 13.8 MPa @ 21 °C	-10 °F to 250 °F -23 °C to 121 °C
EPR		-40 °F to 250 °F -40 °C to 121 °C
Neoprene		-40 °F to 250 °F -40 °C to 121 °C
Fluorocarbon		-10 °F to 400 °F -23 °C to 204 °C

Refer to Parker NS Series Relief Valve Maintenance Instructions MI-138 when Valve disassembly is required. Always consult your authorized Parker representative if questions arise.

GENERAL PANEL MOUNTING INSTRUCTIONS

The panel must have a through-hole of 29/64 inches (11.5 mm) in diameter. The maximum panel thickness is 5/32 inch (4.0 mm). When the valve is mounted to a thin panel, a spacer (or washer) may be necessary to permit full Panel Nut engagement on the Valve.
CAUTION: DO NOT TURN THE STEM WHILE THE HANDLE IS OFF THE VALVE.

VERNIER KNOB PANEL MOUNTING INSTRUCTIONS

The vernier knob assembly consists of a graduated collar, stem adapter, and the vernier knob.

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Figure 1: NS Series Metering Valve with Knurled Knob Cross Sectional View

1. Close the valve by turning the Vernier knob clockwise until the knob's zero reading aligns with the zero reading on the graduated collar.
2. Remove the vernier knob, stem adapter, and graduated collar by loosening the set screw with a 1/16 inch allen wrench.
3. Remove the panel nut.
4. Insert the valve through the panel hole and assemble the Panel Nut using a 9/16 inch hex wrench.
5. Place the graduated collar onto the packing nut and butt it against the top of the packing nut threads. Orient the graduations for viewing ease and tighten the collar's set screw using a 1/16 inch allen wrench.
6. Place the stem adapter onto the valve stem, aligning the stem adapter's set screw with the valve stem flat. Position the stem adapter against the top of the packing nut. Tighten the set screw using a 1/16 inch hex wrench.

Note: Correct positioning of the stem adapter is important as the stem adapter provides a positive stop ensuring against the over tightening and potential damage to the valve stem.

7. Position the vernier knob onto the stem adapter and align the zero reading on the graduated collar with the zero reading on the vernier knob. Tighten the set screw using a 1/16 inch allen wrench.

PRECISION ADJUSTMENT KNOB PANEL MOUNTING INSTRUCTIONS

The precision adjustment knob assembly consists of a precision adjustment knob, a knob set screw, and two (2) torque adjustment set screws.

1. Close the valve by turning the knob clockwise until it reaches a positive stop against the top of the packing nut threads.
2. Loosen the torque adjustment (in applicable) using a .050 inch allen wrench and the knob set screw using a 1/16 inch allen wrench and remove the knob assembly.
3. Remove the panel nut.
4. Insert the valve through the panel hole and assemble the Panel Nut using a 9/16 inch hex wrench. Orient the valve in the desired position and tighten the panel nut.
5. Place the precision adjustment knob assembly onto the valve stem, aligning the knob set screw with the valve stem flat. Position the knob against the top of the packing nut threads. Tighten the knob set screw using a 1/16 inch allen wrench.

Note: Correct positioning of the knob is important as it provides a positive stop ensuring against the over tightening and potential damage to the valve stem. Tighten the torque adjustment set screws to give the desired knob torque.

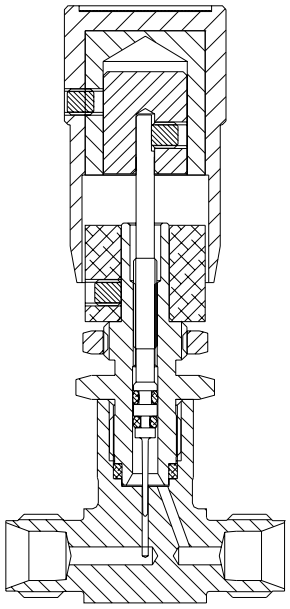

Figure 2: NS Series Metering Valve with Vernier Handle Cross Sectional View

PRECISION ADJUSTMENT KNOB PANEL MOUNTING INSTRUCTIONS

The precision adjustment knob assembly consists of a precision adjustment knob, a knob set screw, and two (2) torque adjustment set screws.

1. Close the valve by turning the knob clockwise until it reaches a positive stop against the top of the packing nut threads.
2. Loosen the torque adjustment (in applicable) using a .050 inch allen wrench and the knob set screw using a 1/16 inch allen wrench and remove the knob assembly.
3. Remove the panel nut.
4. Insert the valve through the panel hole and assemble the Panel Nut using a 9/16 inch hex wrench. Orient the valve in the desired position and tighten the panel nut.
5. Place the precision adjustment knob assembly onto the valve stem, aligning the knob set screw with the valve stem flat. Position the knob against the top of the packing nut threads. Tighten the knob set screw using a 1/16 inch allen wrench.

Note: Correct positioning of the knob is important as it provides a positive stop ensuring against the over tightening and potential damage to the valve stem. Tighten the torque adjustment set screws to give the desired knob torque.

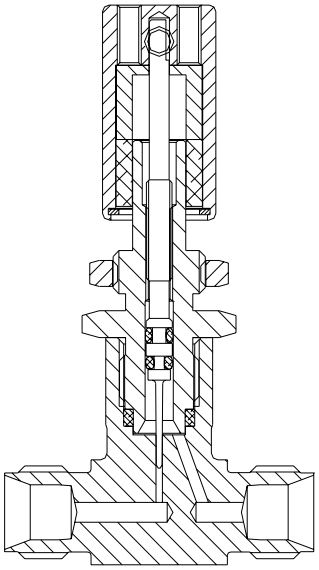

Figure 3: NS Series Metering Valve with Precision Adjustment Handle Cross Sectional View

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Jacksonville, Alabama

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

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1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

WARNING

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Parker Instrumentation

INI-238 Revision -

Installation Instructions

INI-239 Revision -

NM/NL Series Metering Valve

WORKING PRESSURES AND TEMPERATURES

Elastomer	Working Pressure	Temperature Range
Buna-N	1000 psig @ 70 °F 6.9 MPa @ 21 °C	-10 °F to 250 °F -23 °C to 121 °C
EPR		-40 °F to 250 °F -40 °C to 121 °C
Neoprene		-40 °F to 250 °F -40 °C to 121 °C
Fluorocarbon		-10 °F to 400 °F -23 °C to 204 °C

Refer to Parker NM/NL Series Relief Valve Maintenance Instructions MI-139 when Valve disassembly is required. Always consult your authorized Parker representative if questions arise.

GENERAL PANEL MOUNTING INSTRUCTIONS

The panel must have a through-hole of 37/64 inches (14.9 mm) in diameter. The maximum panel thickness is 1/8 inch (3.2 mm). When the valve is mounted to a thin panel, a spacer (or washer) may be necessary to permit full Panel Nut engagement on the Valve.
CAUTION: DO NOT TURN THE STEM WHILE THE HANDLE IS OFF THE VALVE.

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Jacksonville, Alabama

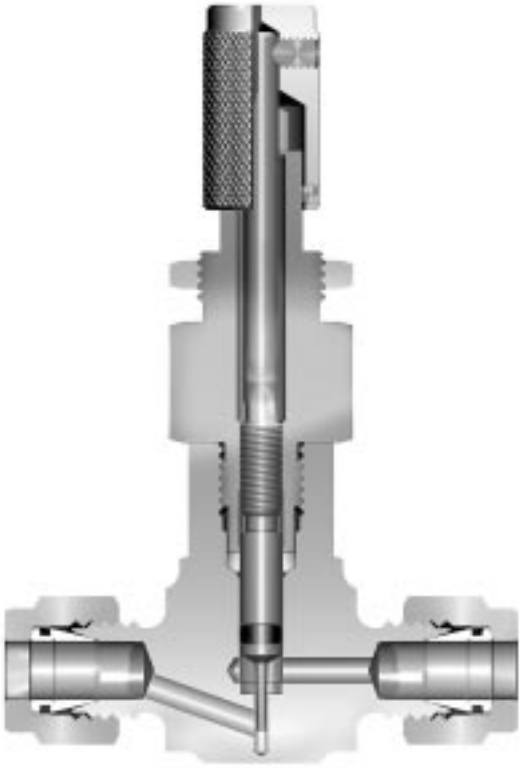

Figure 1: NM/NL Series Metering Valve with Knurled Handle Cross Sectional View

VERNIER KNOB PANEL MOUNTING INSTRUCTIONS

The vernier knob assembly consists of a graduated collar, stem adapter, and the vernier knob.

1. Turn the Vernier knob clockwise until the knob's zero reading aligns with the zero reading on the graduated collar. The valve is now in the closed position (as determined during assembly and testing prior to shipment from the factory).

   CAUTION: Do not turn the valve stem until the remaining steps are completed!

2. Loosen the Handle Set Screw using a 1/16 inch allen wrench and remove the vernier knob, stem adapter, and graduated collar.
3. Remove the Panel Nut from the Valve.
4. Install the valve assembly through the panel hole and assemble the Panel Nut using an 11/16 inch hex wrench.
5. Place the graduated collar onto the packing nut and butt it against the top of the packing nut threads. Orient the graduations for viewing ease and tighten the collar's set screw using an 1/16 inch allen wrench.
6. Place the stem adapter onto the valve stem, aligning the stem adapter's set screw with the drill point on the valve stem. Tighten the set screw using an 11/16 inch hex wrench.
7. Position the vernier knob onto the stem adapter and align the zero reading on the graduated collar with the zero reading on the vernier knob. Tighten the set screw using an 1/16 inch allen wrench.

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

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A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

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Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

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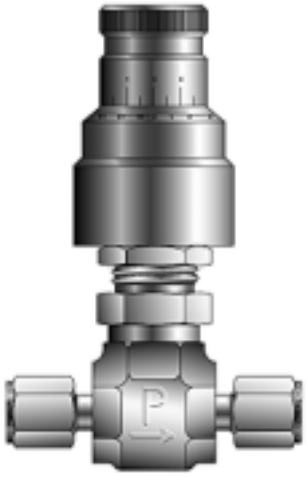
HR Series Metering Valve



WORKING PRESSURES AND TEMPERATURES

Elastomer	Working Pressure	Temperature Range
Buna-N	250 psig @ 70 °F 1.7 MPa @ 21 °C	-10 °F to 250 °F -23 °C to 121 °C
EPR		-40 °F to 250 °F -40 °C to 121 °C
Neoprene		-40 °F to 250 °F -40 °C to 121 °C
Fluorocarbon		-10 °F to 400 °F -23 °C to 204 °C

Refer to Parker HR Series Relief Valve Maintenance Instructions MI-140 when Valve disassembly is required. Always consult your authorized Parker representative if questions arise.

GENERAL PANEL MOUNTING INSTRUCTIONS

The panel must have a through-hole of 21/32 inches (16.7 mm) in diameter. The maximum panel thickness is 1/4 inch (6.4 mm). When the valve is mounted to a thin panel, a spacer (or washer) may be necessary to permit full Panel Nut engagement on the Valve.

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Jacksonville, Alabama

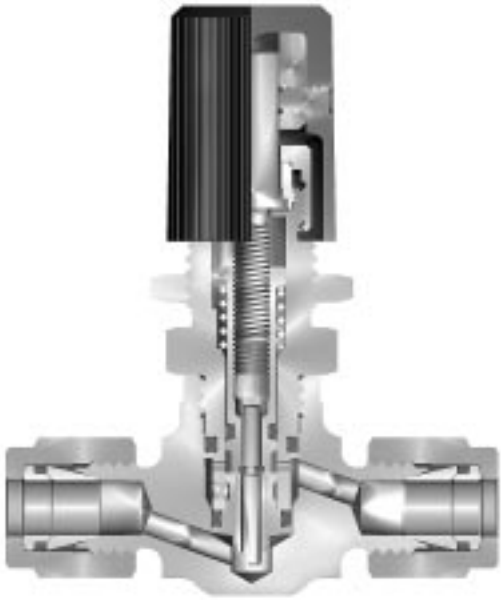

Figure 1: HR Series Metering Valve with Knurled Handle Cross Sectional View

TURNS COUNTER KNOB PANEL MOUNTING INSTRUCTIONS

The turns counter knob is a seven (7) piece assembly consisting of a graduated knob, locking collar, graduated dial, bezel, compression spring, panel nut and rubber gasket.

1. Close the valve by turning the graduated knob clockwise until the knob's zero reading aligns with the zero reading on the graduated dial.

   NOTE: DO NOT TURN THE VALVE UNTIL THE MOUNTING IS COMPLETE!

2. Loosen the two (2) graduated knob set screws using a 0.050 inch allen wrench and remove the knob.

3. With your free hand, depress the compression spring by pushing the bezel toward the valve's body. Hold in this position and remove the locking collar using a spanner wrench.

4. Lift off the graduated dial, carefully relax the compression spring tension and remove the bezel and the compression spring. Remove the panel nut using a 13/16 inch hex wrench.

5. Install the valve assembly through the panel hole and install the panel nut. Tighten the panel nut using a 13/16 inch hex wrench so that the valve is positioned in the desired orientation.

6. Ensure the rubber gasket is in place on top of the knurled nut. Replace the compression spring and bezel. Depress the compression spring and bezel and install the graduated dial and locking collar. Tighten the locking collar using a spanner wrench.

7. Ensure the scribed line is indicating a zero reading on the graduated dial. If not, insert a pointed instrument into the slot in the inner ring of the dial and turn until a zero reading is obtained.

8. Align the small pin on the back of the graduated knob with the above slot and install the knob. Tighten the set screws using a 0.050 inch allen wrench.

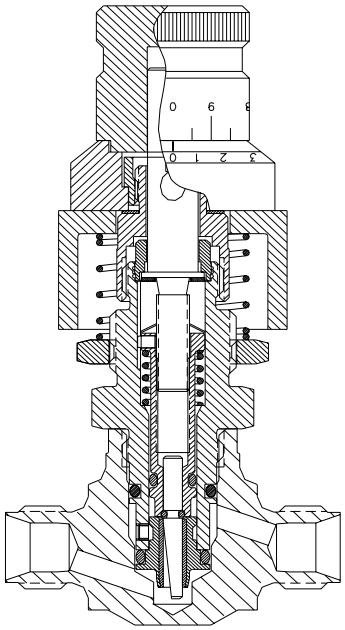

Figure 2: HR Series Metering Valve with Turns Counter Handle Cross Sectional View

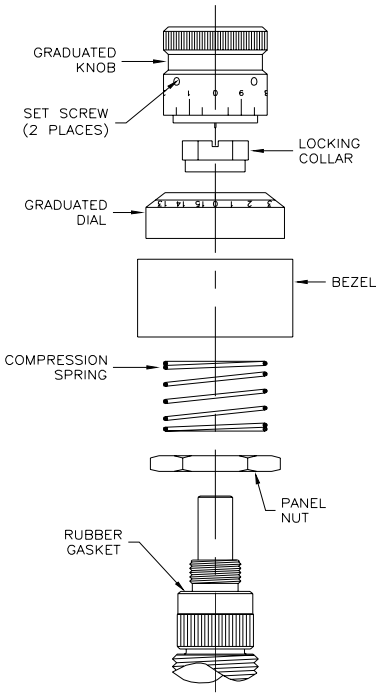

Figure 2: HR Series Metering Valve with Turns Counter Handle Exploded View

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

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A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

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INI-240 Revision -

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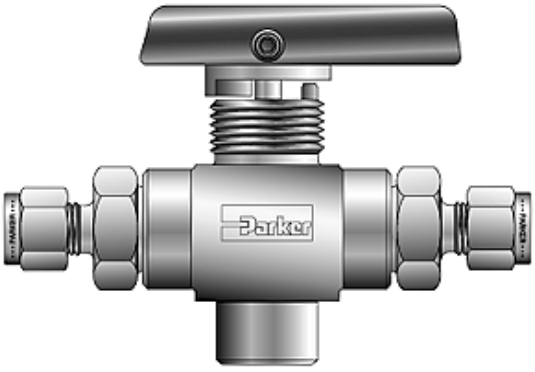
INI-242 Revision -

HB Series Ball Valve



MAXIMUM ALLOWABLE WORKING PRESSURES

Table 1
Maximum Allowable Working Pressure versus Seat Material

Seat Material	Stainless Steel Body Material
PCTFE	6,000 Psig at 70 °F 41.4 MPa at 21 °C
PEEK	10,000 Psig at 70 °F 68.9 MPa at 21°C

Table 2
Maximum Allowable Working Pressure versus Port Ends

Size	Pressure Rating @100 °F (38 °C)	End Connections
2F	10,000 psig	1/8" Female NPT
4F	10,000 psig	1/4" Female NPT
4FL	10,000 psig	1/4" Female NPT Long
M6	10,000 psig	6mm CPI and ALOK
4Z	10,000 psig	1/4" CPI
4A	10,000 psig	1/4" ALOK
M8	7,975 psig	8mm CPI and ALOK
M10	6,525 psig	10mm CPI and ALOK
M12	6,162 psig	12mm CPI and ALOK
6Z	6,600 psig	3/8" CPI
6A	6,600 psig	3/8" ALOK
8Z	6,300 psig	1/2" CPI
8A	6,300 psig	1/2" ALOK

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Figure 1: HB Series Ball Valve Cross Sectional View

Refer to HB Series Ball Valve Maintenance Instructions (MI142) when valve disassembly is required. The arrow on the Valve Handle may be used to indicate the normal direction of flow.

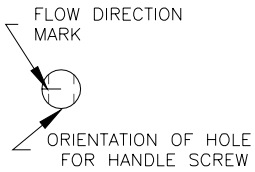
Table 3
INSTALLATION OF PANEL MOUNTED VALVES

Panel Thickness (max)	Through-Hole Diameter
3/8 inch (9.5mm)	29/32 inch (23mm)

When the Valve is mounted to a thin panel, a spacer (or washer) may be necessary to permit full Panel Nut engagement on the Valve.

1. Remove the handle by turning the Set Screw counter-clockwise with a 3/32 inch hex-socket wrench.
2. Insert the Valve through the hole in the panel and assemble the Panel Nut. Snug the Panel Nut finger-tight, followed by proer tightening.
3. Re-install the Handle and secure by turning the Set-Screw clockwise and torque to 15 in-lbs.

Note: The handle direction should point in the same direction as indicated by the mark on top of the stem as shown below:



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VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

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Parker Instrumentation

INI-242 Revision -

Installation Instructions

INI-243 Revision -

MB Series Ball Valve

MAXIMUM ALLOWABLE WORKING PRESSURES

Valve Size	Valve Body Material	
	Brass	Stainless Steel
MB2/MB4	2500 Psig at 70 °F 17.2 MPa at 21 °C	2500 Psig at 70 °F 17.2 MPa at 21 °C
MB6	3000 Psig at 70 °F 20.70 MPa at 21 °C	3000 Psig at 70 °F 20.70 MPa at 21 °C

NOTE:

1. The valve is assembled to provide bubble-tight service to 1000 psig (6.9 MPa). To attain a 3000 psig rating , the packing nut must be tightened to the values provided on Page 2.
2. The arrow on the Valve Handle may be used to indicate the normal direction of flow.
3. The Seat and Seal Material is PFA.

INSTALLATION OF PANEL MOUNTED VALVES

Ball Valve Size	Panel Thickness (max)	Through-Hole Diameter
MB2/MB4	¼ inch (6.4 mm)	37/64 inch (14.7 mm)
MB6	¼ inch (6.4 mm)	49/64 inch (19.5 mm)

When the Valve is mounted to a thin panel, a spacer (or washer) may be necessary to permit full Panel Nut engagement on the Valve.

1. Remove the Handle by turning the Set Screw counter-clockwise with the following size hex-socket wrench:

   MB2/4 valves 5/64 inch

   MB6 valves 3/32 inch

2. Insert the Valve through the hole in the panel and assemble the Panel Nut. Snug the Panel Nut finger-tight, followed by proper tightening.
3. Adjust the Stem packing as explained below and re-install the Handle.

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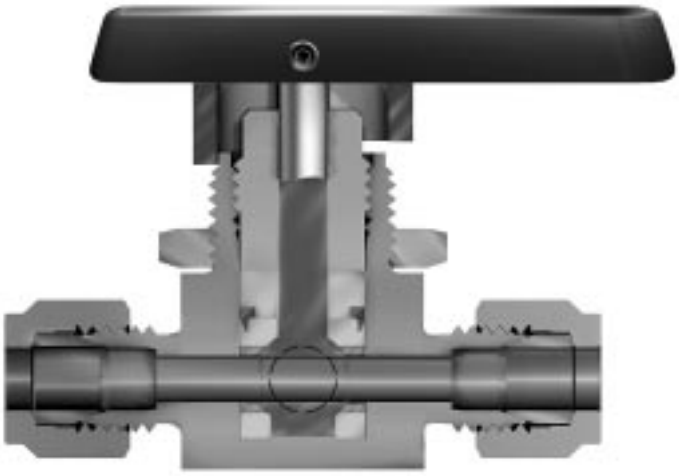

Figure 1: MB Series Valve Cross Sectional View

PACKING ADJUSTMENT

Packing adjustment may be occasionally necessary depending on the many and varied uses for the Valve. It is recommended an adjustment be made shortly after initial installation and just prior to flow start-up. Always consult your authorized Parker representative if questions arise.

1. Remove the Handle by turning the Set Screw counter-clockwise with the following size hex-socket wrench:

MB2/MB4 valves	5/64 inch
MB6 valves	3/32 inch

2. Tighten the Packing Nut 1/8 to 1/4 turn or, to the following torque using the specified hex wrench size, while holding the body at the wrench flats.

Packing Nut Tightening Parameters

for 1000 psig rating:

Ball Valve Size	Hex Wrench Size	Tightening Torque
MB2/MB4	5/16 inch	10 In-lbs (1.1 N-m)
MB6	3/8 inch	20 In-lbs (2.2 N-m)

for maximum pressure rating:

Ball Valve Size	Hex Wrench Size	Tightening Torque
MB2/MB4	5/16 inch	30 In-lbs (3.4 N-m)
MB6	3/8 inch	50 In-lbs (5.6 N-m)

3. Re-install the Handle and secure by turning the Set-Screw clockwise and torque to 30 In-lbs.

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

WARNING

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INI-243 Revision -

Installation Instructions

INI-245 Revision -

BLS/BXS Series Ball Valve

Two-Way Maximum Allowable Working Pressure and Temperature

	Valve Body Material	
Seat Material	**Brass**	**Stainless Steel**
PCTFE	3000 psig @ 70 °F 20.7 MPa @ 21 °C	6000 psig @ 70 °F 41.4 MPa @ 21 °C

Three-Way Maximum Allowable Working Pressure and Temperature (with bottom port as inlet)

	Valve Body Material	
Seat Material	**Brass**	**Stainless Steel**
PCTFE	3000 psig @ 70 °F 20.7 MPa @ 21 °C	6000 psig @ 70 °F 41.4 MPa @ 21 °C

Three-Way Maximum Allowable Working Pressure and Temperature (with side ports as inlet)

	Valve Body Material	
Seat Material	**Brass**	**Stainless Steel**
PCTFE	3000 psig @ 70 °F 20.7 MPa @ 21 °C	3000 psig @ 70 °F 20.7 MPa @ 21 °C

Refer to Parker B Series Spring Loaded Ball Valve Maintenance Instructions (MI-145) when valve disassembly is required. The arrow on the Valve Handle may be used to indicate the normal direction of flow.

The 3-Way Series Ball Valves are designed exclusively for directional flow control. The 3-Way B Series Ball Valves are NOT recommend for shutoff service. Always consult your authorized Parker representative if questions arise.

INSTALLATION OF PANEL MOUNTED VALVES

Ball Valve Size	**Panel Thickness (max)**	**Through-Hole Diameter**
B2	1/8 inch (3.2 mm)	37/64 inch (14.7 mm)
B6	1/4 inch (6.4 mm)	49/64 inch (19.5 mm)
B8	3/8 inch (9.4 mm)	57/64 (22.6 mm)

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When the Valve is mounted to a thin panel, a spacer (or washer) may be necessary to permit full Panel Nut engagement on the Valve.

1. Remove the Handle by turning the Set Screw counter-clockwise with the following size hex-socket wrench:

Size 2 valves	5/64 inch
Size 6 valves	3/32 inch
Size 8 valves	1/8 inch

2. Insert the Valve through the panel hole and assemble the Panel Nut. Snug the Panel Nut finger-tight, followed by proper tightening.
3. Adjust the Stem packing as explained below (except for Valves with an O-Ring Stem packing), and re-install the Handle.

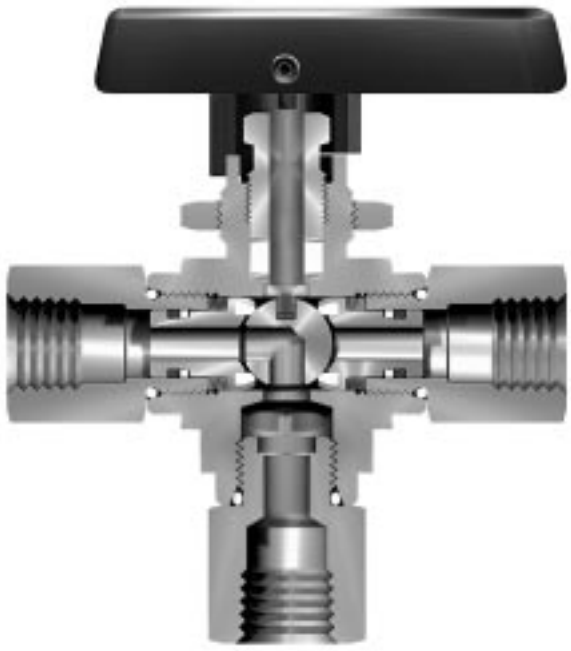

Figure 1: B6XS Series Valve Cross Sectional View

PACKING ADJUSTMENT
(For B-Series Ball Valves with PTFE Stem Packing)

Packing adjustment may be occasionally necessary depending on the many and varied uses for the Valve. It is recommended an adjustment be made shortly after initial installation and just prior to flow start-up. Always consult your authorized Parker representative if questions arise.

1. Remove the Handle by turning the Set Screw counter-clockwise with the following size hex-socket wrench:

Size 2 valves	5/64 inch
Size 6 valves	3/32 inch
Size 8 valves	1/8 inch

2. Tighten the Packing Nut 1/8 to 1/4 turn or to the following torque using the specified hex wrench size.

Ball Valve Size	Hex Wrench Size	Tightening Torque
B2	5/16 inch	30 In-lbs (3.3 N-m)
B6	7/16 inch	70 In-lbs (7.8 N-m)
B8	1/2 inch	90 In-lbs (10 N-m)

3. Re-install the Handle and secure by turning the Set-Screw clockwise and torque to 15 In-lbs.

VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

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Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

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INI-245 Revision -

Installation Instructions

INI-248 Revision -

MB Series Ball Valve Locking Device

INSTALLATION OF LOCKING DEVICE

1. Remove the Handle by turning the Set Screw counter-clockwise with the following size hex-socket wrench:

MB2/MB4 valves	0.080 inch
MB6 valves	3/32 inch

2. For two-way Ball Valves, engage the flat plate onto the valve body handle stop tangs with the “Close” marking visible. For three-way Ball Valves, engage the flat plate onto the valve body handle stop tangs with the letter markings visible.

3. Install the remaining plate onto the base of the handle with the bend directed away from the handle. Slight force may be necessary to position the mating areas of the plate and handle together.

4. Re-install the Handle to the stem and secure by turning the Set-Screw clockwise and torque to 15 In-lbs.

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VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
2. A positive seal is obtained by advancing the Nut no less than 1/4 turn from the finger-tight position. Proper UltraSeal make-up is achieved when a sharp rise in required application torque occurs, which indicates proper seal face contact and O-Ring seal compression into the UltraSeal groove.

VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

PLEASE FOLLOW THE ABOVE DIRECTIONS FOR COUNTING THE NUMBER OF TURNS FOR PROPER FITTING MAKE-UP. DO NOT MAKE-UP TUBE FITTINGS BY TORQUE OR "FEEL". VARIABLES SUCH AS TUBING AND FITTING TOLERANCES, TUBE WALL THICKNESS, AND THE LUBRICITY OF NUT LUBRICANTS CAN RESULT IN AN IMPROPERLY ASSEMBLED TUBE FITTING CONNECTION.

A -Two ferrule A-LOK® compression port

Z -Single ferrule CPI™ compression port

F -ANSI/ASME B1.20.1 Internal pipe threads

V -VacuSeal face seal port

Q -UltraSeal face seal port

M -ANSI/ASME B1.20.1 External pipe threads

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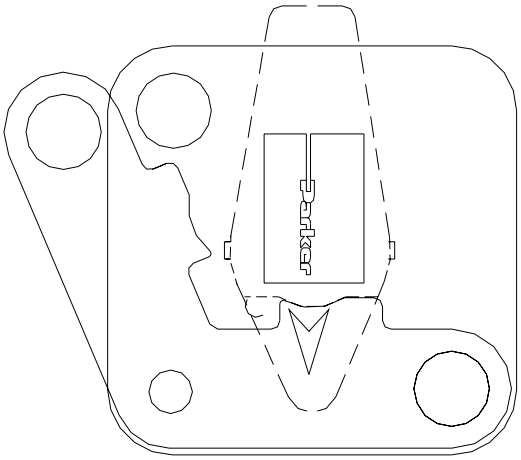
Installation Instructions

INI-249 Revision -

PR Series Rotary Plug Valve Locking Device

1. Remove the Handle and Plug assembly by removing the Retaining Ring located at the bottom of the Valve Assembly and carefully pulling up on the Handle, sliding the assembly vertically away from the Valve Body.
2. Place the Locking Device assembly on the Valve Body with the tabs on the Locking Device griping the sides of the Valve Body and centering the Locking Device with the bore of the Valve Body as shown:



3. Insert the Handle and Plug assembly through the hole of the Locking Device and into the bore of the Valve Body turned in the open position. Take care not to damage the O-Rings and Backup Rings, and Seat Insert.
4. Using the proper size retaining ring pliers, place the Retaining Ring into the bottom groove of the Plug. Assure the Retaining Ring is properly seated.
5. Verify the assembly was made correctely by checking the Seat Insert is in the inlet position when the valve is closed. Turn the Handle or Handle Adapter through at least one (1) “Close and Open” cycle to verify proper operation.

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VALVE CONNECTOR MAKE-UP INSTRUCTIONS

MALE AND FEMALE PIPE PORTS

Wrench flats are provided on the Valve Body. It is recommended a smooth- jawed wrench or vise be used to grip the Valve Body.

1. On the male threaded part of the connection, apply a high quality pipe joint compound or PTFE tape made for this purpose. When PTFE tape is used, it is recommended two full turns of tape be applied. PTFE tape should not be overhanging or covering the first thread
2. Engage the Valve and the other component part together, until hand-tight.
3. With a proper wrench, holding both the Valve and the component part, continue to tighten to achieve a leak-tight joint.

ULTRASEAL CONNECTIONS

1. Insert the proper O-Ring into the UltraSeal fitting's O-Ring groove. Position the UltraSeal gland sealing face against the O-Ring, and then advance the Nut to a finger-tight position.
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VACUSEAL CONNECTIONS

1. A positive seal is obtained by advancing the Nut 1/8 turn from the finger-tight position.
2. A new gasket should be installed upon each fitting re-make to insure system pressure integrity.

TUBE FITTING CONNECTIONS

1. Insert the tube into the Valve port until the tube bottoms out in the Valve Body. Care should be exercised to insure the tube is properly aligned with the Valve Body and port.
2. Normal make-up for US Customary port sizes 1 thru 3 (1/16 thru 3/16 inch) and SI port sizes 2 thru 4 (2 thru 4 mm) is 3/4 turn from finger tight. Normal make-up for US Customary port sizes 4 thru 16 (1/4 thru 1 inch) and SI port sizes 5 thru 25 (5 thru 25 mm) is 1 1/4 turn from finger tight. For larger port sizes consult Parker Ferrule Presetting Tool Instructions.

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Installation Instructions

INI-251 Revision -

70/70R Series Actuator

Parker's 70 Series Electric Actuators are designed to provide reliable and efficient operation of 2 way and 3 way ball valves. The 70 Series Actuators are available in AC models with a 25% duty cycle and DC models with a 100% duty cycle.

PARTS LIST

1 - Limit Switches
2 - Cams
3 - O-ring

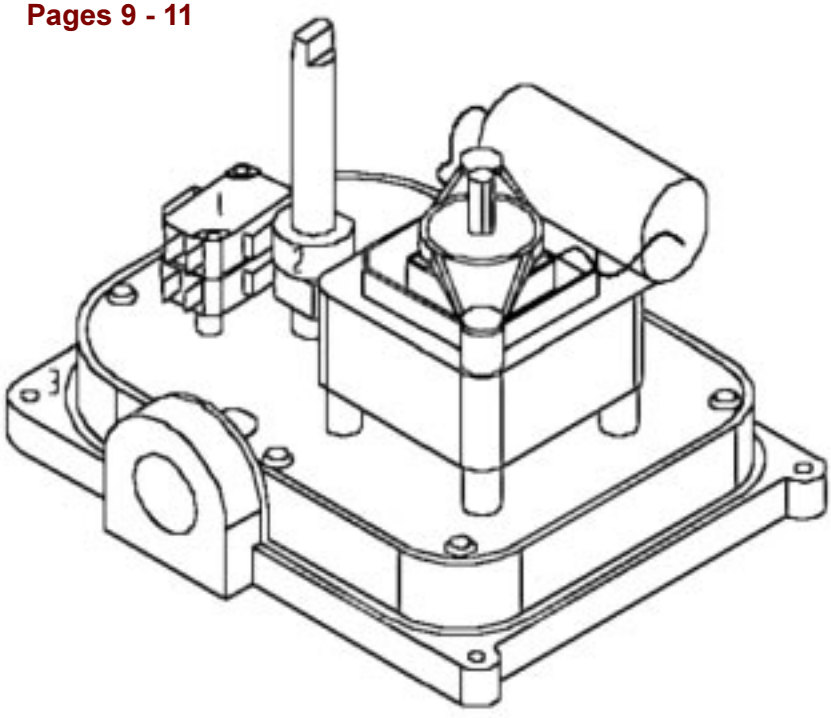

Figure 1: 70 Series Parts Identification

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70 SERIES GENERAL TECHNICAL INFORMATION

70 Series AC voltage actuators use a split phase motor which internally steps up the applied 115 AC voltage and feeds it back to the off terminal. For example, when 115 VAC power is applied at terminals 1 and 4, 230 volts will be fed back to terminal 3. This can create a problem for controllers with solid state outputs rated for less then 230 VAC and it is suggested that relay outputs be used. Additionally, due to this feed back, multiple actuators cannot be wired in parallel, and individual leads (isolated contacts) must be run to each actuator. It is important to verify that the output torque of the actuator is appropriate for the torque requirements of the valve and that the actuator duty cycle is appropriate for the intended application.

INSTALLATION

CAUTION: Dangerous voltages are present inside the actuator unless the power supply to the actuator has been shut off or disconnected. Use extreme caution whenever working on the actuator with the cover removed.

Tools Required: Phillips screwdriver, Flat blade screwdriver and 1/16 inch hex wrench.

Temperature Limits

Low ambient temperatures: The minimum recommended ambient temperature without the optional heater and thermostat is approximately 30 °F (-1 °C), although it varies with the frequency of use. With the optional heater and thermostat installed, the recommended minimum ambient temperature is -40 °F (-40 °C).

High ambient temperatures: The maximum recommended ambient temperature is 160 °F (71 °C).

High media temperatures: For media temperatures up to 200 °F (93 °C), additional precautions are not typically required. For media temperatures between 200 °F and 300 °F (93 °C and 148 °C), a shielding plate about one inch larger than the actuator in each dimension should be placed between the actuator and the mounting bracket. In addition, the actuator should be mounted at the 3 o'clock or 9 o'clock position relative to the pipe. For media temperatures above 300 °F (148 °C), a valve with an extended shaft mounting arrangement should be used.

Mounting the Actuator

First, verify that the output torque of the actuator is appropriate for the torque requirements of the valve and that the actuator duty cycle is appropriate for the intended application.

NOTE: A 25% duty cycle means for every operating cycle that the actuator is ON (to open or close the valve), the actuator must be OFF for a time equal to three operating cycles. For example, if the operating cycle time is 5 seconds, for every operating cycle that the actuator is ON, it must be OFF for 15 seconds. **Exceeding the actuator's rated duty cycle may cause the thermal overload switch to temporarily shut off power to the motor.**

Actuator Drive Output Requirements: Parker's 70 Series actuators have a male square drive output. Two industry standard bolt hole circle configurations are provided (See Figure 2).

Bracket requirements: It is mandatory the actuator be firmly secured to a sturdy mounting bracket. A minimum of four bolts with lockwashers must be used to secure the actuator to the bracket. There can be no flexibility in the bracket, and backlash ("play") in the coupling should be minimized. In addition, the actuator output shaft must be in line (centered) with the valve shaft. This avoids side-loading the shafts (crossed-slot couplings are more tolerant of misalignment).

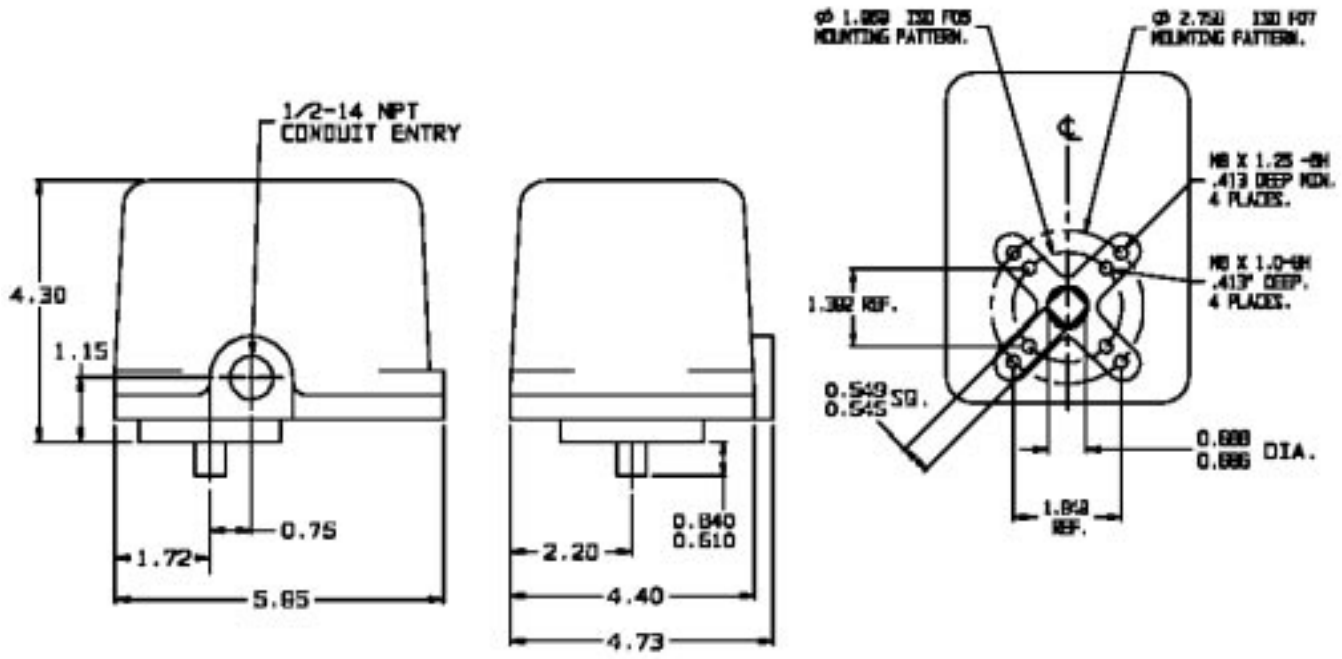

Figure 2: 70 Series Dimensions

Wiring

Adhere to local wiring codes.

The identification label on each actuator specifies the voltage and current requirements for the actuator. For convenience, Figures 3A & 3B show the standard power and control wiring connections for the actuator. The terminal strip is numbered from the bottom to the top . Since all Parker 70 series actuators travel in the clockwise direction in 90° stops, applying power between terminals 1 and 4 will stop the actuator at the 90° or 270° positions (closed) while applying power between terminals 1 and 3 will stop the actuator at the 0° or 180° positions (open)

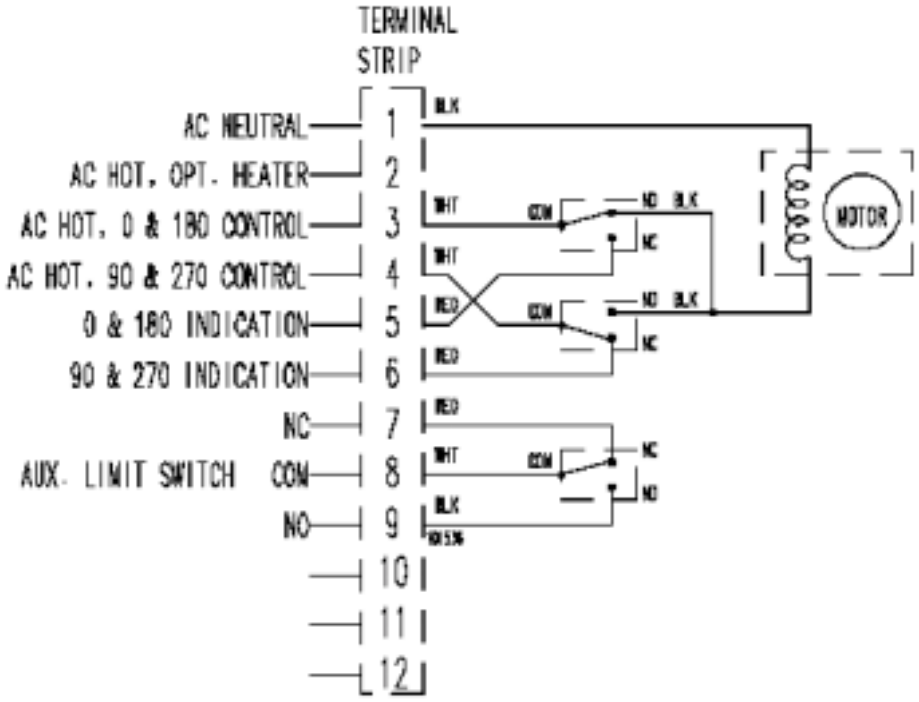

Figure 3A: 70 Series Wiring Diagram, AC Models

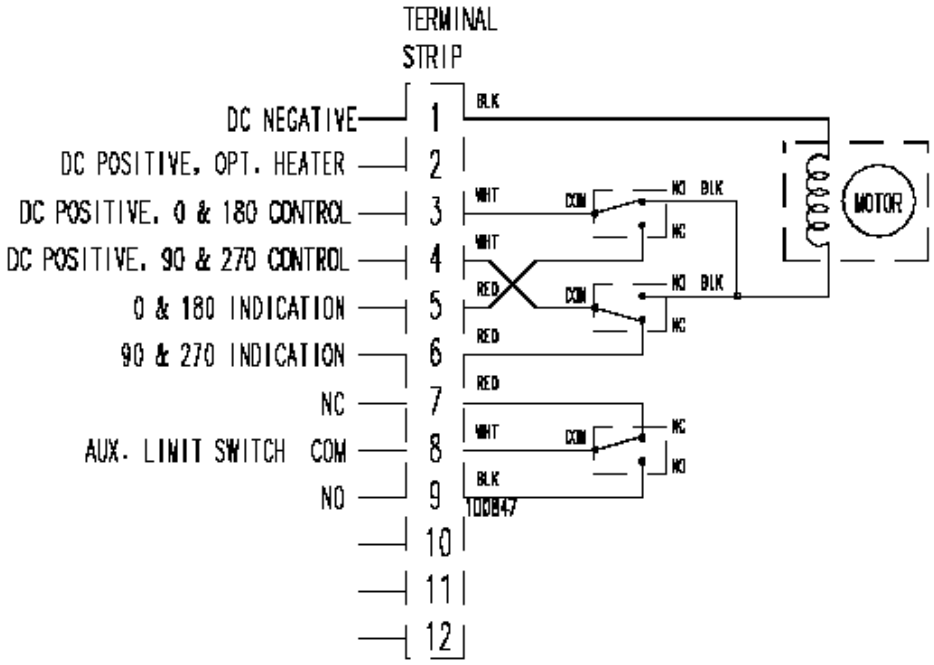

Figure 3B: 70 Series Wiring Diagram, DC Models

ADJUSTMENT OF THE 70 SERIES LIMIT SWITCHES

If adjustment of the open or closed position is required, proceed as follows:

A. Adjust the OPEN limit switch cam

1. Using a hex wrench, loosen the set screw in the OPEN limit switch cam (the second up from the bottom).
2. Apply power to terminals 1 and 3 (See Figures 3) to drive the actuator to the open position (counterclockwise rotation).
3. Remove the power from the actuator.
4. Rotate the cam toward the limit switch arm just until the switch clicks closed.
5. Set the vertical cam position so that the bottom of the cam will be in contact with the limit switch arm. Tighten the Cam set screw to secure the Cam in position. Do not over-tighten the screws (use less than 8 in-lbs of tightening torque). If the cam is not set “high” as described, the cam will become disengaged from the limit switch arm when using the manual override feature.

B. Adjust the CLOSED limit switch cam

1. Using a hex wrench, loosen the set screw in the CLOSED limit switch cam (the bottom one).
2. Apply power to terminals 1 and 4 (See Figures 3) to drive the actuator to the closed position (clockwise rotation).
3. Remove the power from the actuator.
4. Rotate the cam toward the limit switch arm just until the switch clicks closed.
5. Set the vertical cam position so that the bottom of the cam will be in contact with the limit switch arm. Tighten the Cam set screw to secure the Cam in position. Do not over-tighten the screws (use less than 8 in-lbs of tightening torque). If the cam is not set “high” as described, the cam will become disengaged from the limit switch arm when using the manual override feature.

70R SERIES GENERAL TECHNICAL INFORMATION

70R Series AC voltage actuators use a split phase motor which internally steps up the applied 115 AC voltage and feeds it back to the off terminal. For example, when 115 VAC power is applied at terminals 1 and 4, 230 volts will be fed back to terminal 3. This can create a problem for controllers with solid state outputs rated for less then 230 VAC and it is suggested that relay outputs be used. Additionally, due to this feed back, multiple actuators cannot be wired in parallel, and individual leads (isolated contacts) must be run to each actuator. It is important to verify that the output torque of the actuator is appropriate for the torque requirements of the valve and that the actuator duty cycle is appropriate for the intended application.

INSTALLATION

CAUTION: Dangerous voltages are present inside the actuator unless the power supply to the actuator has been shut off or disconnected. Use extreme caution whenever working on the actuator with the cover removed.

Tools Required: Phillips screwdriver, Flat blade screwdriver and 1/16 inch hex wrench.

Temperature Limits

Low ambient temperatures: The minimum recommended ambient temperature without the optional heater and thermostat is approximately 30 °F (-1 °C), although it varies with the frequency of use. With the optional heater and thermostat installed, the recommended minimum ambient temperature is -40 °F (-40 °C).

High ambient temperatures: The maximum recommended ambient temperature is 160 °F (71 °C).

High media temperatures: For media temperatures up to 200 °F (93 °C), additional precautions are not typically required. For media temperatures between 200 °F and 300 °F (93 °C and 148 °C), a shielding plate about one inch larger than the actuator in each dimension should be placed between the actuator and the mounting bracket. In addition, the actuator should be mounted at the 3 o'clock or 9 o'clock position relative to the pipe. For media temperatures above 300 °F (148 °C), a valve with an extended shaft mounting arrangement should be used.

Mounting the Actuator

First verify that the output torque of the actuator is appropriate for the torque requirements of the valve and that the actuator duty cycle is appropriate for the intended application.

NOTE: A 25% duty cycle means for every operating cycle that the actuator is ON (to open or close the valve), the actuator must be OFF for a time equal to three operating cycles. For example, if the operating cycle time is 5 seconds, for every operating cycle that the actuator is ON, it must be OFF for 15 seconds. Exceeding the actuator's rated duty cycle may cause the thermal overload switch to temporarily shut off power to the motor.

Actuator Drive Output Requirements: Parker's 70R Series actuators have a male square drive output. Two industry standard bolt hole circle configurations are provided (See Figure 4).

Bracket requirements: It is mandatory that the actuator be firmly secured to a sturdy mounting bracket. A minimum of four bolts with lockwashers must be used to secure the actuator to the bracket. There can be no flexibility in the bracket, and backlash (“play”) in the coupling should be minimized. In addition, the actuator output shaft must be in line (centered) with the valve shaft. This avoids side-loading the shafts (crossed-slot couplings are more tolerant of misalignment).

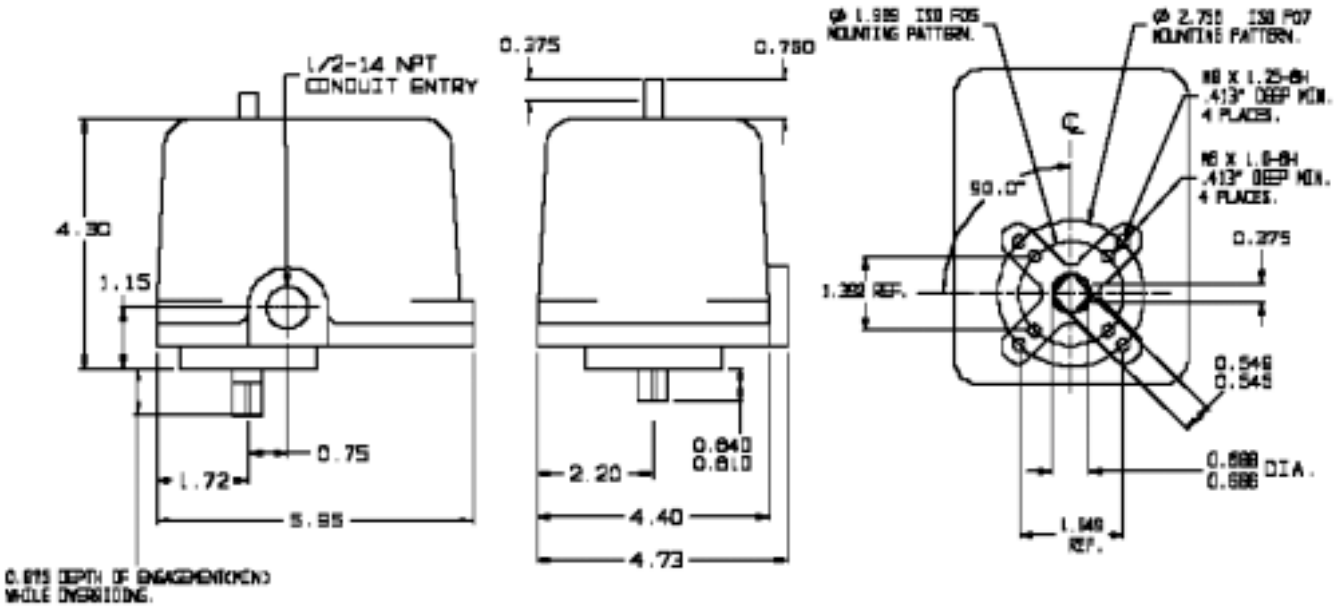

Figure 4: 70R Series Dimensions

Manual Overide

To operate the actuator manually, push the overide shaft down approximately 1/4 inch and use a wrench on the flats of the shaft to rotate the actuator. As noted in Figure 4, the coupling must be designed to accommodate this shaft movement. The overide shaft may also be used to provide visual identification of valve position.

Wiring

Adhere to local wiring codes.

The identification label on each actuator specifies the voltage and current requirements for the actuator. For convenience, Figures 5A & 5B show the standard power and control wiring connections for the actuator. The terminal strip is numbered from the bottom to the top . To operate the 70R Series actuator, the user supplies power to the actuator’s motor through to limit switches. The limit switches control the actuator’s mechanical travel limits and are factory set at 90 degrees.

VAC - To drive the actuator counterclockwise, apply power to terminals 1 and 3. To drive the actuator clockwise, apply power to terminals 1 and 4. The actuator mat be friven fully open or closed by maintaining power to the motor until the actuatopr trips the internal limit switches. Power may be disconnected at any point during the travel to position the actuator.

VDC - The 70R Series actuators require a reversing of the power polarity. To drive the actuator clockwise, apply power so that terminal 1 is negative and terminal 4 is positive. To drive the actuator counterclockwise, apply power so that terminal 1 is positive and terminal 4 is negative.

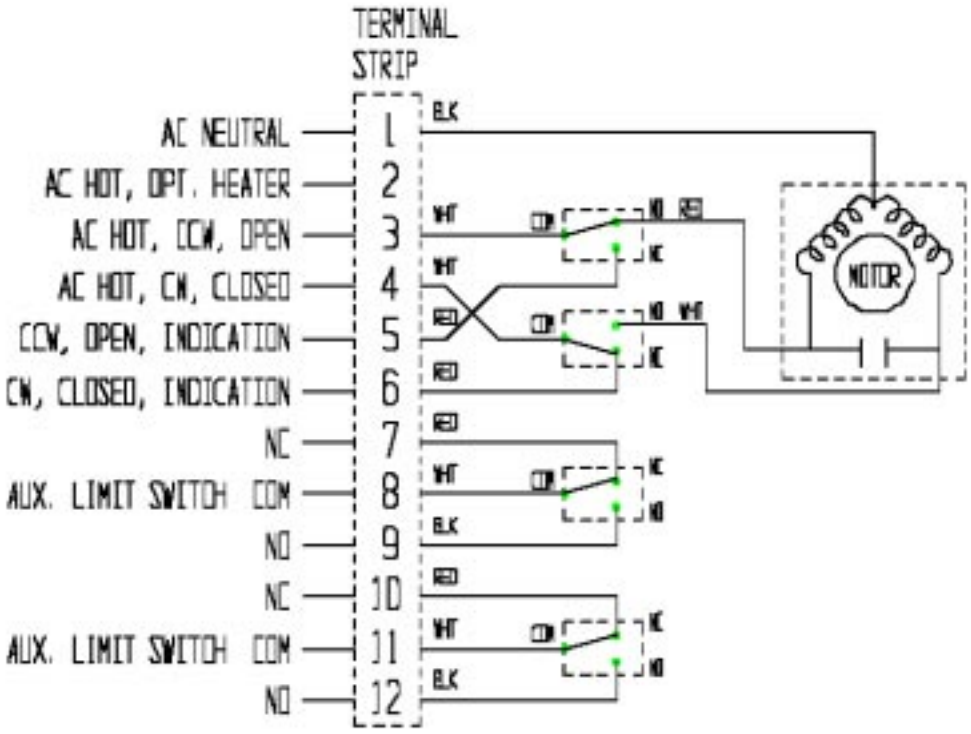

Figure 5A: 70R Series Wiring Diagram, AC Models

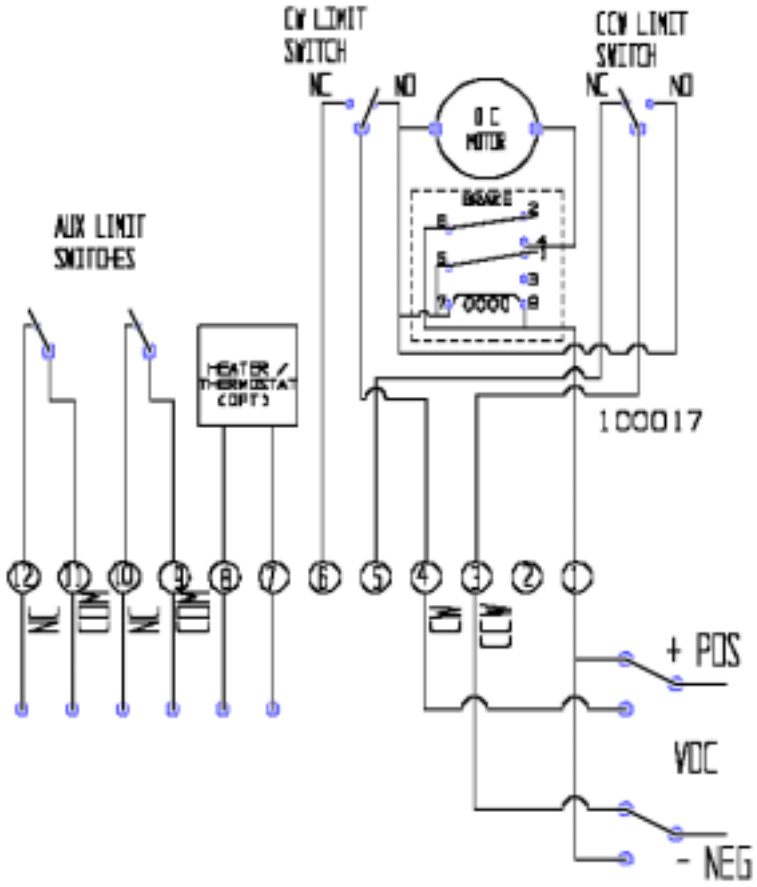

Figure 5B: 70R Series Wiring Diagram, DC Models

ADJUSTMENT OF THE 70R SERIES LIMIT SWITCHES

If adjustment of the open or closed position is required, proceed as follows:

A. Adjust the OPEN limit switch cam

1. Using a hex wrench, loosen the set screw in the OPEN limit switch cam (the second up from the bottom).
2. Apply power to terminals 1 and 3 (See Figures 5) to drive the actuator to the open position (counterclockwise rotation).
3. Remove the power from the actuator.
4. Rotate the cam toward the limit switch arm just until the switch clicks closed.
5. Set the vertical cam position so that the bottom of the cam will be in contact with the limit switch arm. Tighten the Cam set screw to secure the Cam in position. Do not over-tighten the screws (use less than 8 in-lbs of tightening torque). If the cam is not set “high” as described, the cam will become disengaged from the limit switch arm when using the manual override feature.

B. Adjust the CLOSED limit switch cam

1. Using a hex wrench, loosen the set screw in the CLOSED limit switch cam (the bottom one).
2. Apply power to terminals 1 and 4 (See Figures 5) to drive the actuator to the closed position (clockwise rotation).
3. Remove the power from the actuator.
4. Rotate the cam toward the limit switch arm just until the switch clicks closed.
5. Set the vertical cam position so that the bottom of the cam will be in contact with the limit switch arm. Tighten the Cam set screw to secure the Cam in position. Do not over-tighten the screws (use less than 8 in-lbs of tightening torque). If the cam is not set “high” as described, the cam will become disengaged from the limit switch arm when using the manual override feature.

70 SERIES LIMIT SWITCH KIT

70 Series Limit Switch Kits add additional limit switches to an actuator. Standard actuators are shipped from the factory with two limit switches installed—one to operate at the fully open position and one to operate at the fully closed position. Additional limit switches may be installed to operate at any actuator position.

PARTS LIST

Limit Switch kit consists of the following parts:

1· Limit Switch(es)
2· Cam
3· (2) #4-40 Studs
4· (2) #4-40 Nuts
5· (2) #4 Flat Nylon Washers
6· (3) Limit Switch Wires
7· Wire Tie

Tools Required: Small flat blade Screwdriver; 1/4 inch nut driver; Small Phillips blade Screwdriver; 1/16 inch hex wrench

CAUTION: Dangerous voltages are present inside the actuator cover unless the power supply to the actuator has been shut off or disconnected. Use extreme caution whenever working on the actuator with the cover removed.

A. Remove Actuator Cover

Remove the actuator cover by removing the screws securing the cover to the base.

B. Install Limit Switch

1. Carefully remove the #4-40 Limit Switch Screws which secure the existing Limit Switches in place.
2. Place one each of the #4 Flat Nylon Washers over each of the mounting holes of the existing upper limit switch.
3. Place the additional Limit Switch on top of the #4 Flat Nylon Washers.
4. Using the supplied #4-40 Studs and #4-40 Nuts, secure the Limit Switches in place. Do not over-tighten the fasteners.

C. Install Wiring Assembly

1. Attach the faston end of the White Wire to the Common (COM) connector on the Limit Switch. Connect the stripped end of the White Wire to terminal number 8 on the terminal strip.
2. Attach the faston end of the Black Wire to the Normally Open (NO) connector on the Limit Switch. Connect the stripped end of the Black Wire to terminal number 9 on the terminal strip.
3. Attach the faston end of the Red Wire to the Normally Closed (NC) connector on the Limit Switch. Connect the stripped end of the Red Wire to terminal number 7 on the terminal strip.
4. Using the supplied Wire Tie, secure the Limit Switch wires to avoid contact with any moving parts.

D. Install Cam

1. Slide the additional Cam down the actuator cam shaft on top of the existing Cams.
2. Drive the actuator to the desired trip point.
3. Rotate the cam counterclockwise until the limit switch lever passes through one of the flats on the cam and operates the limit switch (pushes the lever in). Now rotate the cam clockwise until the limit switch just clicks open.
4. Re-tighten the set screw in the limit switch cam. (Do not over-tighten the screws, use less than 8 in/lbs of tightening torque)
5. Operate the actuator to verify proper setting of the Cam.

D. Replace Actuator Cover

NOTE: When reinstalling the cover, follow the normal practice of tighten the cover screws in a cross pattern to insure that the cover is pulled down flat without over-stressing a corner.

70 SERIES HEATER/THERMOSTAT KIT

This Heater/Thermostat Kit is intended for use with any Parker's 70 Series Electric Actuator equipped with a 115 /230 VAC motor. Parker's Heater/Thermostat Kit is designed to provide a controlled means of heating the actuator motor and gear train in order to allow use of the actuator in environments where the ambient temperature is as low as -40 °F (-40 °C). The thermostat energizes at 40 °F (-40 °C) and de-energizes at 60 °F (15 °C).

INSTALLATION

CAUTION: Dangerous voltages are present inside the actuator cover unless the power supply to the actuator has been shut off or disconnected. Use extreme caution whenever working on the actuator with the cover removed.

Installation of Heater/Thermostat Kit

A. Remove Actuator Cover

Remove the actuator cover by removing the screws securing the cover to the base.

1. Remove the white plastic backing from the heater element to expose the adhesive surface of the heater element.
2. Apply the adhesive surface of the heater element to the motor support plate between the motor and the limit switch posts.
3. Route the lead from the heater strip to the bottom of terminal position one (1).
4. Route the lead from thermostat to the bottom of terminal position two (2).
5. Using the supplied wire ties, secure the thermostat and heater element wires to keep them clear of any moving parts.

B. Wiring

1. Wire terminal 1 to 115 /230 NEUTRAL.
2. Wire terminal 2 to 115 /230 HOT.
3. Depending on the actuator option, AC power may already be connected at terminals 1 and 2. In this case NO additional wiring is required.

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 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.

ALL PARKER VALVES MUST PASS A RIGID OPERATIONAL AND LEAKAGE TEST BEFORE LEAVING THE FACTORY. IT IS RECOMMENDED AFTER ANY REASSEMBLY, THE VALVE SHOULD BE TESTED BY THE USER FOR OPERATION AND LEAKAGE. IF THESE INSTRUCTIONS ARE NOT FULLY COMPLIED WITH, THE REPAIRED PRODUCT MAY FAIL AND CAUSE DAMAGE TO PROPERTY OR INJURY TO PERSONS. PARKER HANNIFIN CANNOT ASSUME RESPONSIBILITY FOR PERFORMANCE OF A CUSTOMER SERVICED VALVE.

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Parker Instrumentation

INI-251 Revision -

Installation Instructions

INI-252 Revision -

80 Series Actuator

Parker 80 Series Electric Actuators are designed to provide reliable and efficient operation of final control elements, such as 1/4 turn valves, with torque requirements up to 3000 inch pounds. 80 Series actuators are available as AC models with duty cycles of 25% or 75% and DC models with a 100% duty cycle. In addition, a variety of options and accessories are available and use a modular design where all “daughter” boards and actuator accessories plug into the “mother” board. Installation is simple and reliability is very high.

PARTS LIST

1 - Cover
2 - Cover Screws
3 - Gasket
4 - Base
5 - Output coupling
6 - Bull gear
7 - Bull gear retaining ring
8 - Output shaft / Cam shaft
9 - Cams
10 - Mother board
11 - Mother board bracket
12 - Limit switches
13 - Override shaft
14 - Motor gear box
15 - Motor support plate screws
16 - Motor support plate
17 - Pinion gear

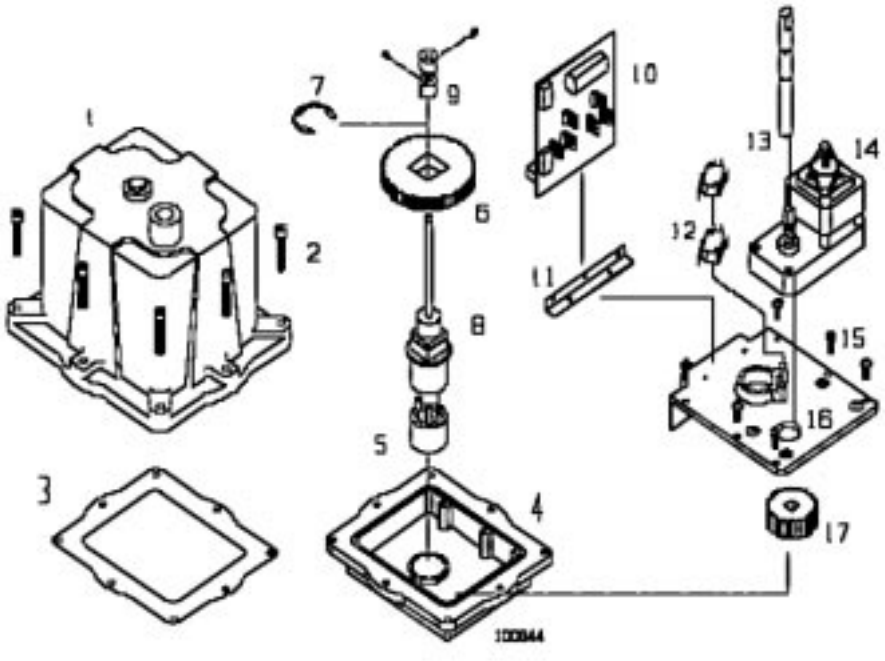

Figure 1: Parts Identification (No options installed)

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GENERAL TECHNICAL INFORMATION

Parker 80 Series AC voltage actuators use a split phase motor which internally steps up the applied 115 AC voltage and feeds it back to the off terminal. For example, when 115 VAC power is applied at terminals 1 and 4, 230 volts will be fed back to terminal 3. This can create a problem for controllers with solid state outputs rated for less then 230 VAC and it is suggested that relay outputs be used. Additionally, due to this feed back, multiple actuators cannot be wired in parallel, and individual leads (isolated contacts) must be run to each actuator.

It is important to verify that the output torque of the actuator is appropriate for the torque requirements of the valve and that the actuator duty cycle is appropriate for the intended application.

DUTY CYCLE

Exceeding the actuator's rated duty cycle may cause the thermal overload switch to temporarily shut off power to the motor. A 25% duty cycle means for every operating cycle that the actuator is ON (to open or close the valve), the actuator must be OFF for a time equal to three operating cycles. For example, an operating cycle time of 5 seconds ON, it must be OFF for 15 seconds before it is again operated. A 75% duty cycle means that for every operating cycle that the actuator is ON , the actuator must be OFF for 1/3 of a cycle.

TEMPERATURE LIMITS

Low ambient temperatures: The minimum recommended ambient temperature is 30 °F (-1 °C). With the optional heater and thermostat installed, the recommended minimum ambient temperature can be lowered to -40 °F (-40 °C).

High ambient temperatures: The maximum recommended ambient temperature is 150 °F (65 °C) with the actuator shaded from direct sunlight.

High media temperatures: For media temperatures between 200 °F and 300 °F (93 °C and 148 °C), a shielding plate (about one inch larger than the actuator in each dimension and at least a 1/16 " thick) should be placed between the actuator and the mounting bracket. Additionally, the actuator should be mounted at the 3 o'clock or 9 o'clock position relative to the pipe. For media temperatures above 300 °F (148 °C), a valve with an extended shaft mounting arrangement should be used.

INSTALLATION

CAUTION: Dangerous voltages are present inside the actuator cover unless the power supply to the actuator has been shut off or disconnected. Use extreme caution whenever working on the actuator with the cover removed.

Mounting the Actuator

The actuator may be mounted in any position. In outdoor applications the actuator should not be installed upside down.

Verify that the output torque of the actuator is appropriate for the torque requirements of the valve. 80 Series actuators are furnished with a female drive output. On the 80 Series actuators, the output is 0.75" square by 0.64" deep. Two I.S.O. bolt patterns (ISO 5211) are provided for actuator mounting.

It is mandatory that the actuator be firmly secured to a sturdy mounting bracket. A minimum of four bolts with lockwashers should be used to secure the actuator to the bracket. Flexibility in the bracket is not allowed, and backlash, or “play”, in the coupling should be minimized. The actuator output shaft must be in line (centered) with the valve shaft to avoid side-loading the shaft.

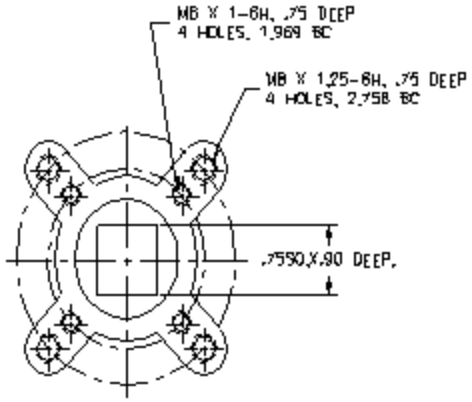


Figure 2: Mounting Pattern

WIRING

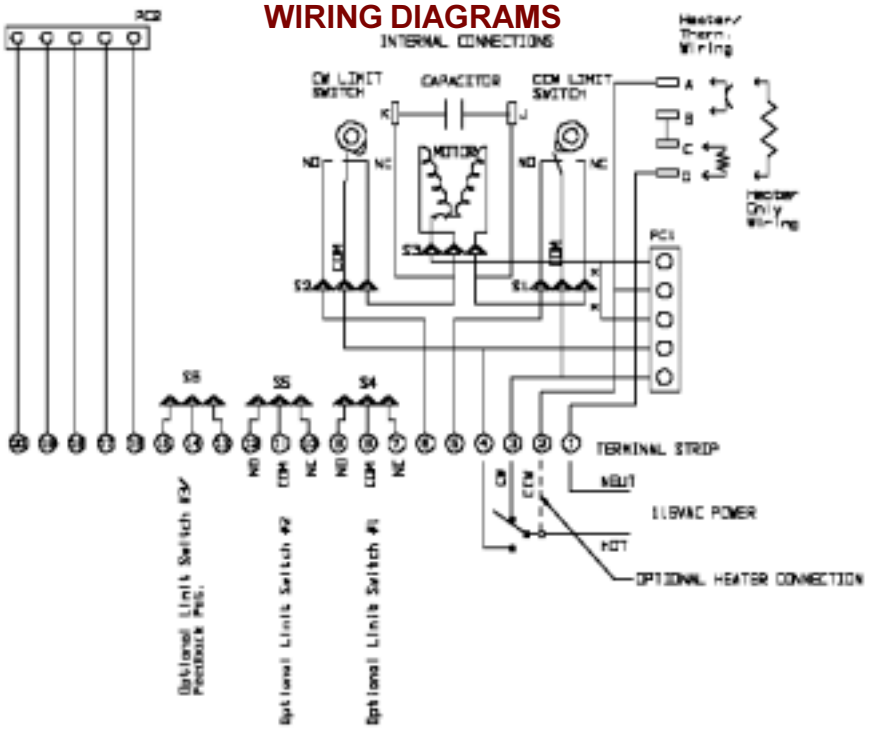
For 115 VAC actuators, 18 or 20 gauge wire may be used for short runs. At least 16 gauge wire is recommended for longer runs. Be sure to follow local wiring codes.

Actuators may run on one of the following voltages: 24VAC, 115VAC, 230 VAC, 12VDC and 24VDC, dependent on the actuator. Please match before wiring as the wrong voltage will destroy the motherboard. Input power is wired directly to the actuator’s motor through the motherboard and two limit switches.

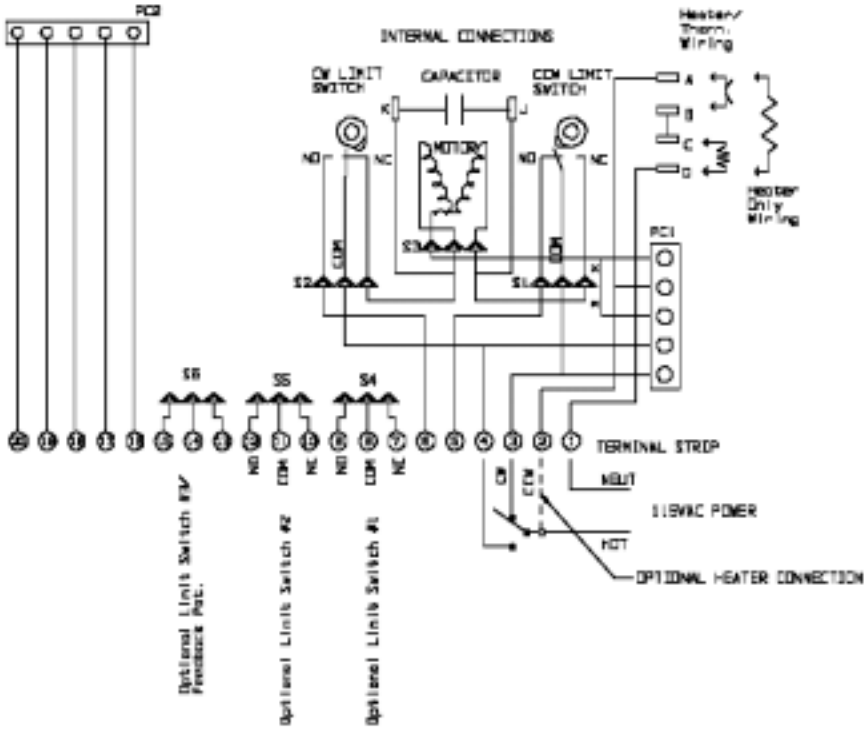
A wiring label is affixed to each actuator directly above the terminal strip, specific to the configuration of options included.

To drive the actuator counterclockwise, apply power to terminals 1 and 3. To drive the actuator clockwise, apply power to terminals 1 and 4. The actuator can be driven fully open counterclockwise or closed clockwise by maintaining power to the motor until the actuator trips the internal limit switches . Power can also be disconnected at any point during travel to position the actuator.

WIRING DIAGRAMS



STANDARD WIRING - OPEN/CLOSE
Figure 3A: 115 or 24 VAC Actuator Diagram
INTERNAL CONNECTIONS



STANDARD WIRING - OPEN/CLOSE
Figure 3B: DC Voltage Actuator Diagram

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ADJUSTMENT OF LIMIT SWITCHES

The two limit switches operating off the cams on the output shaft determine the exact positions where the actuator will stop at the end of each cycle. The first limit switch (lower) determines the closed position (CW rotation). The second limit switch (upper) determines the open position (CCW rotation). The limit switches can be adjusted from 5 to 320 degrees of actuator rotation. If an adjustment of any of the positions is required, proceed as follows:

A. Remove Actuator Cover

Remove the actuator cover by removing the screws securing the cover to the base.

B. Adjust the OPEN limit switch cam

1. Using a 1/16 hex wrench, loosen the set screw in the OPEN limit switch cam (the second up from the bottom).
2. Apply power to terminals 1 and 3 (See Figures 3) to drive the actuator to the open position (counterclockwise rotation).
3. Remove the power from the actuator.
4. Rotate the cam toward the limit switch arm just until the switch clicks closed.
5. Re-tighten the set screw on the limit switch cam (Be careful not to over-tighten the screw).

C. Adjust the CLOSED limit switch cam

1. Using a 1/16 inch hex wrench, loosen the set screw in the CLOSED limit switch cam (the bottom one).
2. Apply power to terminals 1 and 4 (See Figures 3) to drive the actuator to the closed position (clockwise rotation).
3. Remove the power from the actuator.
4. Rotate the cam toward the limit switch arm just until the switch clicks closed.
5. Re-tighten the set screw on the limit switch cam (Be careful not to over-tighten the screw).

OPTIONAL ADDITIONAL LIMIT SWITCHES

For AC actuators, the two standard limit switches may be used to indicate the open and closed status of the actuator. Power at terminal 3 is switched to terminal 5 when the actuator is fully counterclockwise. Power at terminal 4 is switched to terminal 6 when the actuator is fully clockwise.

MANUAL OVERRIDE FUNCTION

To use the manual override function, push the override shaft down approximately a 1/4 inch to disengage the motor from the gear train. While holding the shaft down, turn the shaft with a wrench to reach the desired position. NOTE: The rotation of the output may not be the same as the rotation of the override shaft! Note which way the output rotates whenever you use the override shaft. Also, be careful not to drive the actuator past the limit switch settings; it is possible to damage installed options.

TROUBLESHOOTING

If the actuator fails to operate:

Visually inspect for damage, burn marks, or loose conections.
Check that the proper voltages are present at the actuator's terminal connections.
Check all the plug-in connections to be sure they are properly installed -

- Motor to connector S3
- Bottom limit switch to S2
- Second limit switch to S1
- Motor capacitor to J & K.

If the motor is hot the actuator may have gone in to thermal over load protection (the motors are equipped with internal thermal overload protection). Let the motor cool and try again.

Check the following:
Are the limit switches properly set?
Is the actuator's duty cycle correct for the application?
Is the actuator's output torque within the required range?
If the actuator's motor hums or turns slowly, check the actuator's motor capacitor to see if it is broken or cracked.
Make sure power is applied only to one terminal (either 3 or 4 but not both).
Check for a bad connection at motor socket S3.
Ensure you do not have more than one actuator wired in parallel.
If the motor turns, but the output does not, ensure the manual override has returned to its fully upward position.

80 SERIES LIMIT SWITCH KIT

Parker 80 Series Limit Switch Kits add additional limit switches to an actuator. Standard actuators are shipped from the factory with two limit switches installed—one to operate at the fully open position and one to operate at the fully closed position. Additional limit switches may be installed to operate at any actuator position. This Limit Switch Kit is intended for use with any 80 Series Electric Actuator. The switches are rated for 5 amps at 230VAC.

For “S1”, the additional limit switch will be factory set at the full clockwise position.
For “S2”, the first additional limit switch will be factory set at the full clockwise position, and the second will be set at the full counterclockwise position.

PARTS LIST

1 - Limit switch(es)
2 - Cam(s)
3 - (2) #4-40 Studs
4 - (2) #4-40 Nuts
5 - Limit switch wiring assembly (not pictured)
6 - (2) Wire ties (not pictured)

TOOLS REQUIRED

1 - Small flat blade screwdriver
2 - 1/4 inch nut driver
3 - 1/16 inch hex wrench

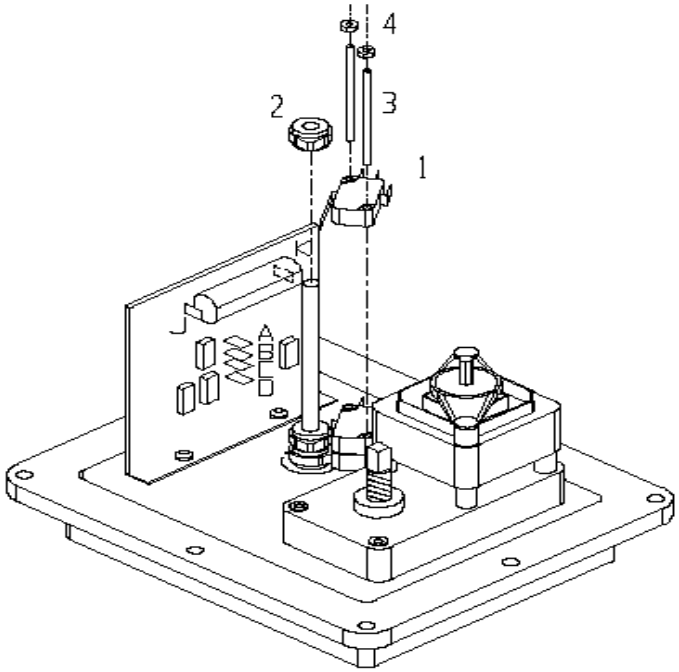


Figure 4: Limit Switch Part Identification

INSTALLATION

CAUTION: Dangerous voltages are present inside the actuator cover unless the power supply to the actuator has been shut off or disconnected. Use extreme caution whenever working on the actuator with the cover removed.

A. Remove the Actuator Cover

1) Remove the actuator cover by removing the screws securing the cover to the base.

B. Install the Limit Switch(es)

1) Carefully remove the #4-40 Limit Switch screws which secure the existing Limit Switches in place.
2) Place the additional Limit Switch(es) on top of the existing Limit Switches.
3) Slide the supplied #4-40 Studs (NOTE: The original 4-40 screws may be used if only one (1) limit switch is being installed) through the switch holes and using the 4-40 nuts, secure the Limit Switches in place. Do not over-tighten the fasteners.

C. Install the Wiring Assembly

1) Attach the White Wire to the Common (COM) spade connector on the new Limit Switch(es).
2) Attach the Black Wire to the Normally Open (NO) spade connector on the new Limit Switch(es).
3) Attach the Red Wire to the Normally Closed (NC) spade connector on the new Limit Switch(es).
4) Attach the three-wire connector to the Mother Board as follows:
   Extra Limit Switch #1 connects to socket S4.
   Extra Limit Switch #2 connects to socket S5.
   Note: Be sure that the locking fingers on the three-wire connector(s) firmly engage the mating fingers on the socket.
5) Using the supplied Wire Ties, secure the Limit Switch wires so they avoid contact with any moving parts.

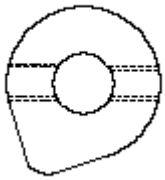
D. Install the Cam(s)

1) Place the cam on the shaft. The stainless steel cams which are supplied with each actuator, or as a kit, have two locations where a set screw may be installed. The diagram below shows the installation of the set screw for both clockwise and counterclockwise rotation of the cams. To orient the cam, place on top of the figure.

Lower Cam

Place set screw for
"CW" cam setting

Upper Cam
Place set screw for
"CCW" cam setting



* Note: When installing the cams on the camshaft, ensure that the side with the set screw installed is oriented toward the left (the conduit openings straight ahead) and visible between the motherboard and the motor.

2) Drive the actuator to the desired trip point.
3) Rotate the Cam slowly to the point where the Limit Switch "clicks" closed. If the Limit Switch is to operate at a given point during the *opening* cycle of the actuator, rotate the Cam *counterclockwise* to set its position. If the Limit Switch is to operate at a given point during the closing cycle of the actuator, rotate the Cam *clockwise* to set its position.
4) Tighten the Cam set screw to secure the Cam in position. Do not over-tighten the screws (use less than 8 in/lbs of tightening torque).
5) Operate the actuator to verify the proper setting of the Cam(s).

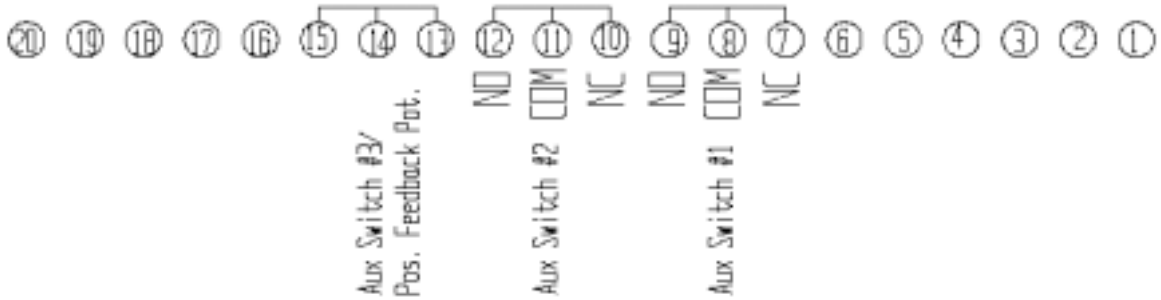


Figure 5: Limit Switch Wiring

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80 SERIES HEATER/THERMOSTAT KIT

The 80 Series Heater/Thermostat Kit provides controlled heating of the actuator motor and gear train permitting the actuator to operate in temperatures as low as -40 °F (-40 °C). Separate kits are available for 115 VAC, 230 VAC, 24 VAC, 12 VDC and 24 VDC motor voltages (Note: Be certain the kit voltage matches the motor voltage). The heater is rated at 15 Watts (except for 230 VAC heaters, which are rated at 30 Watts). The thermostat turns the heater on at 40 °F (4 °C) and off at 60 °F (15 °C). The heater may also be installed without a thermostat to assist in humidity control.

PARTS LIST

1 - Heater element
2 - Thermostat
3 - (2) Wire ties (not pictured)

TOOLS REQUIRED

1 - 3/16 inch hex wrench

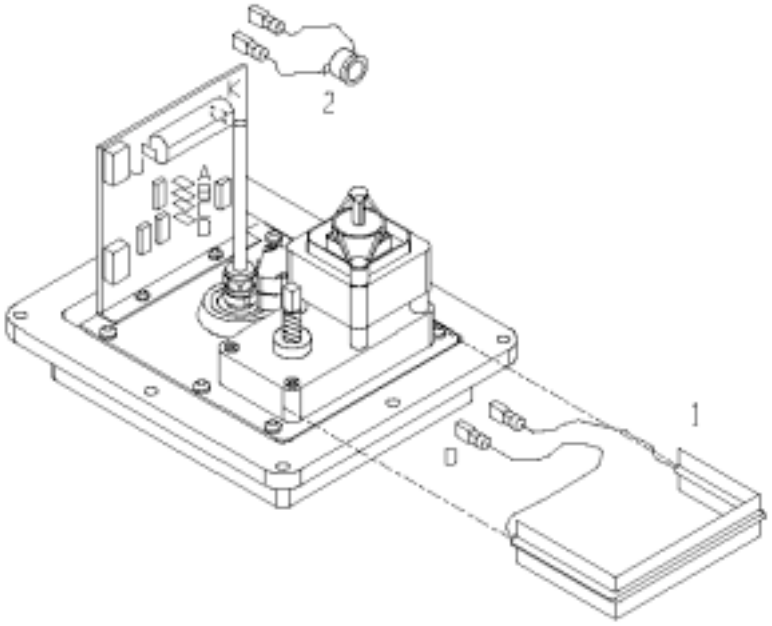

Figure 6: Heater/Thermostat Kit Part Identification

INSTALLATION

CAUTION: Dangerous voltages are present inside the actuator cover unless the power supply to the actuator has been shut off or disconnected. Use extreme caution whenever working on the actuator with the cover removed.

A. Remove the Actuator Cover

1) Remove the actuator cover by removing the screws securing the cover to the base.

B. Install the Heater Element

1) Remove the white plastic backing from the heater element to expose the adhesive surface of the heater element.
2) Locate the longer lead (Figure 6, part D) on the heater element and keep this lead on the left side of the motor gearbox (motor closest to you as indicated in Figure 6). Apply the adhesive surface of the heater element against the motor gearbox, wrap the heater element around both short sides and the backside of the gearbox (the side with the nameplate).
3) Route the long heater lead (D) between the gearbox and the limit switches.
4) Plug the heater element's leads onto terminals D and C (if using a heater only, plug into terminals A & D).
5) Using one of the supplied wire ties, secure the heater element wires to keep them clear of any moving parts.

C. Install Thermostat

1) Plug the thermostat leads onto terminals A and B.
2) Place the thermostat at the corner of the gearbox under the limit switch wiring.
3) Using the supplied wire ties, secure the thermostat to keep it clear of any moving parts.

WIRING

AC WIRING

AC power may already be connected at terminals 1 and 2. In this case, no additional wiring is required. If AC power is not already connected at terminals 1 and 2:

1) Wire terminal 1 to VAC Neutral.
2) Wire terminal 2 to VAC Hot.

DC WIRING

To wire a heater and thermostat in a DC powered actuator, a jumper must be brought from terminal location 5 to terminal location 2, and another jumper from terminal location 6 to terminal location 2. For other options, contact the factory.

80 SERIES FEEDBACK POTENTIOMETER OPTION

The Feedback Potentiometer provides a variable resistance (0-1000 ohms) to indicate the position of the actuator's output shaft. The signal can be fed at positions 13, 14 and 15 on the terminal strip.

CALIBRATION

The potentiometer has been calibrated at the factory. However, if re-calibration is required, proceed as follows:
1) Apply power (or use the manual override) to drive the actuator to its true closed position (clockwise rotation).
2) Unplug the potentiometer lead from the back of the motherboard (connection "S6").
3) Connect an ohmmeter to the BLACK and GREEN pot leads.
4) Loosen the cam shaft gear, raise it up above the pot shaft gear, and gently rotate it clockwise until the feedback pot hits its stop. (***NOT APPLICABLE WITH 360 POT***)
5) Gently rotate the cam shaft gear counterclockwise until the ohmmeter reads 50 ohms (+/- 5 ohms). **NOTE:** If you are installing a positioner with the optional 360 degree pot, adjust until the ohmmeter reads 140 ohms (+/- 5 ohms).
6) While maintaining this reading, re-engage the two gears and tighten the cam gear set screw.
7) Apply power (or use the manual override) to drive the actuator to its true open position.
8) Connect the ohmmeter to the BLACK and RED pot leads. The reading should be between 35 and 60 ohms. (or between 120 and 160 ohms for the 360 degree pot). If the reading is not between 35 and 60 ohms, repeat the above steps for calibrating the potentiometer.
9) Connect the feedback potentiometer plug to the motherboard connection "S6." Be sure that the locking tab and ramp face each other. Finally, use the wire ties provided to secure the pot wires away from any rotating components in the actuator.

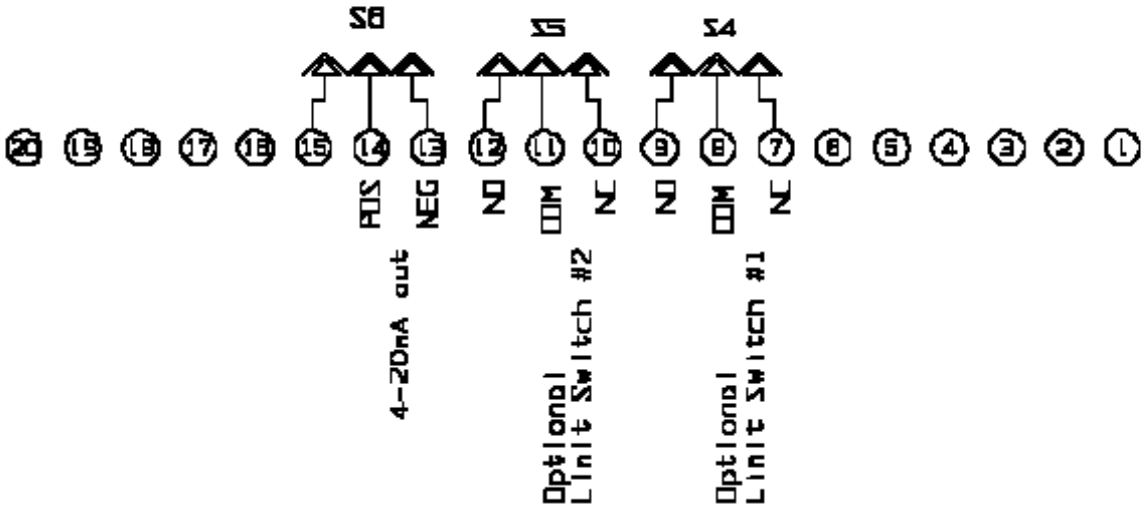

Figure 7: Re-transmit Wiring

Parker Hannifin Corporation
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Jacksonville, Alabama

WARNING

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

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