THE WILLIAMS - CARVER COMPANY, INC.
4001 MISSION RD P.O. BOX #3140
KANSAS CITY, KS 66103-0140
Office (913) 236-4949 Fax (913) 236-9331
www.williamscarver.com

SPX
WHERE IDEAS MEET INDUSTRY

W75CP2 PMO

DOUBLE-SEAT MIX PROOF VALVE

FORM NO.: 95-03098 REVISION: 05/2013

READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR SERVICING THIS PRODUCT.

Waukesha Cherry-Burrell

SPX Flow Technology
611 Sugar Creek Road
Delavan, WI 53115 USA

Tel: (800) 252-5200 or (262) 728-1900
Fax: (800) 252-5012 or (262) 728-4904

E-mail: wcb@spx.com
Web site: www.spxft.com

THE WILLIAMS - CARVER COMPANY, INC.
4001 MISSION RD P.O. BOX #3140
KANSAS CITY, KS 66103-0140
Office (913) 236-4949 Fax (913) 236-9331
www.williamscarver.com

Date: 05/2013

Publication: 95-03098

Warranty

Seller warrants its products to be free from defect in materials and workmanship for a period of one (1) year from the date of shipment. This warranty shall not apply to products which require repair or replacement due to normal wear and tear or to products which are subjected to accident, misuse or improper maintenance. This warranty extends only to the original Buyer. Products manufactured by others but furnished by Seller are exempted from this warranty and are limited to the original manufacturer's warranty.

Seller's sole obligation under this warranty shall be to repair or replace any products that Seller determines, in its discretion, to be defective. Seller reserves the right either to inspect the products in the field or to request their prepaid return to Seller. Seller shall not be responsible for any transportation charges, duty, taxes, freight, labor or other costs. The cost of removing and/or installing products which have been repaired or replaced shall be at Buyer's expense.

Seller expressly disclaims all other warranties, express or implied, including without limitation any warranty of merchantability of fitness for a particular purpose. The foregoing sets forth Seller's entire and exclusive liability, and Buyer's exclusive and sole remedy, for any claim of damages in connection with the sale of products. In no event shall Seller be liable for any special consequential incidental or indirect damages (including without limitation attorney's fees and expenses), nor shall Seller be liable for any loss of profit or material arising out of or relating to the sale or operation of the products based on contract, tort (including negligence), strict liability or otherwise.

Shipping Damage or Loss

If equipment is damaged or lost in transit, file a claim at once with the delivering carrier. The carrier has signed the Bill of Lading acknowledging that the shipment has been received from SPX Flow Technology in good condition. SPX Flow Technology is not responsible for the collection of claims or replacement of materials due to transit shortages or damages.

Warranty Claim

Warranty claims must have a **Returned Goods Authorization (RGA)** from the Seller before returns will be accepted.

Claims for shortages or other errors, exclusive of transit shortages or damages, must be made in writing to Seller within ten (10) days after delivery. Failure to give such notice shall constitute acceptance and waiver of all such claims by Buyer.

Safety

READ AND UNDERSTAND THIS MANUAL PRIOR TO INSTALLING, OPERATING, OR SERVICING THIS EQUIPMENT

Waukesha Cherry-Burrell recommends users of our equipment and designs follow the latest Industrial Safety Standards. At a minimum, these should include the industrial safety requirements established by:

1. Occupational Safety and Health Administration (OSHA), Title 29 of the CFR
   Section 1910.212- General Requirements for all Machines

2. National Fire Protection Association, ANSI/NFPA 79
   ANSI/NFPA 79- Electrical Standards for Industrial Machinery

3. National Electrical Code, ANSI/NFPA 70
   ANSI/NFPA 70- National Electrical Code
   ANSI/NFPA 70E- Electrical Safety Requirement for Employee Workplaces

4. American National Standards Institute, Section B11

Attention: Servicing energized industrial equipment can be hazardous. Severe injury or death can result from electrical shock, burn, or unintended actuation of controlled equipment. Recommended practice is to disconnect and lockout industrial equipment from power sources, and release stored energy, if present. Refer to the National Fire Protection Association Standard No. NFPA70E, Part II and (as applicable) OSHA rules for Control of Hazardous Energy Sources (Lockout-Tagout) and OSHA Electrical Safety Related Work Practices, including procedural requirements for:

- Lockout-tagout
- Personnel qualifications and training requirements
- When it is not feasible to de-energize and lockout-tagout electrical circuits and equipment before working on or near exposed circuit parts

Locking and Interlocking Devices: These devices should be checked for proper working condition and capability of performing their intended functions. Make replacements only with the original manufacturer's renewal parts or kits. Adjust or repair in accordance with the manufacturer's instructions.

Periodic Inspection: Industrial equipment should be inspected periodically. Inspection intervals should be based on environmental and operating conditions and adjusted as indicated by experience. At a minimum, an initial inspection within 3 to 4 months after installation is recommended. Inspection of the electrical control systems should meet the recommendations as specified in the National Electrical Manufacturers Association (NEMA) Standard No. ICS 1.3, Preventative Maintenance of Industrial Control and Systems Equipment, for the general guidelines for setting-up a periodic maintenance program.

Replacement Equipment: Use only replacement parts and devices recommended by the manufacturer to maintain the integrity of the equipment. Make sure the parts are properly matched to the equipment series, model, serial number, and revision level of the equipment.

Warnings and cautions are provided in this manual to help avoid serious injury and/or possible damage to equipment:

DANGER: *marked with a stop sign.*
Immediate hazards which WILL result in severe personal injury or death.

WARNING: *marked with a warning triangle.*
Hazards or unsafe practices which COULD result in severe personal injury or death.

CAUTION: *marked with a warning triangle.*
Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

Care of Stainless Steel

Stainless Steel Corrosion

Corrosion resistance is greatest when a layer of oxide film is formed on the surface of stainless steel. If film is disturbed or destroyed, stainless steel becomes much less resistant to corrosion and may rust, pit or crack.

Corrosion pitting, rusting and stress cracks may occur due to chemical attack. Use only cleaning chemicals specified by a reputable chemical manufacturer for use with 300 series stainless steel. Do not use excessive concentrations, temperatures or exposure times. Avoid contact with highly corrosive acids such as hydrofluoric, hydrochloric or sulfuric. Also avoid prolonged contact with chloride-containing chemicals, especially in presence of acid. If chlorine-based sanitizers are used, such as sodium hypochlorite (bleach), do not exceed concentrations of 150 ppm available chlorine, do not exceed contact time of 20 minutes, and do not exceed temperatures of 104°F (40°C).

Corrosion discoloration, deposits or pitting may occur under product deposits or under gaskets. Keep surfaces clean, including those under gaskets or in grooves or tight corners. Clean immediately after use. Do not allow equipment to set idle, exposed to air with accumulated foreign material on the surface.

Corrosion pitting may occur when stray electrical currents come in contact with moist stainless steel. Ensure all electrical devices connected to the equipment are correctly grounded.

Elastomer Seal Replacement Following Passivation

Passivation chemicals can damage product contact areas of this equipment. Elastomers (rubber components) are most likely to be affected. Always inspect all elastomer seals after passivation is completed. Replace any seals showing signs of chemical attack. Indications may include swelling, cracks, loss of elasticity or any other noticeable changes when compared with new components.

Introduction

For control top information, please refer to publication 95-03083 (2-piece) or 95-03077 (3-Piece (obsoleted)). For additional product information, please see our web site at www.spx.com/en/waukesha-cherry-burrell/resources/product-literature.

General Information

Information in this manual should be read by all personnel involved in installation, setup, operation, and maintenance.

Always use installation tools and lubricants recommended by Waukesha Cherry-Burrell. Waukesha Cherry-Burrell products are subject to intensive intermediate and final leakage and functional tests.

Waukesha Cherry-Burrell Mix Proof valves meet 3-A standards for sanitation, design and style.

W75CP2 PMO Mix Proof valves are double-seat shutoff valves for separating different media. Valves are equipped with a vent separator which creates positive separation of both fluid streams with independent drain paths for visual indication during cleaning and process. Seats are tended by stems equipped with electrical switches capable of signaling whether the upper and/or lower seat is in proper location. W75CP2 PMO valves are air operated (air-to-raise) only.

Factory Inspection

Each Waukesha Cherry-Burrell valve is shipped completely assembled, lubricated, and ready for use.

Models and Specifications

Materials

- Product Wetted: ASTM 316L (UNS-S31603); (DIN-1.4404) AL6XN upon request
- Non-Product: ASTM 304 (UNS-S30400); (DIN-1.4301)
- Elastomers: FKM (standard); EPDM (optional)

Applications

W75CP2 PMO valves allow for separation of milk and milk products from cleaning and sanitizing solutions; single seat lift while milk is in the opposite housing; and are designed for installation in a milk processing system operating in compliance with the Pasteurized Milk Ordinance and M-A-76 Supplement #1. These valves are PMO Section 7, Item 15p(B) compliant, and meet 3-A standards for sanitation and 85 standard for double-seat mix proof valves.

⚠ ***WARNING:*** *PMO Double-seat Mix Proof valves cannot be used to separate raw milk and milk products from pasteurized milk, milk products, and other comestibles.*

Equipment Serial Number

Waukesha Cherry-Burrell valves are identified by a serial number found on the label on the actuator cylinder.

Operating Parameters

Temperature Range:

The recommended operating temperature is determined by the material used for the seals.

No special precautions are required for applications within a temperature range of 32°F to 180°F (0°C to 82°C).

For applications above 190°F (88°C), clearances can be affected by excessive thermal expansion when the valve is installed in compact fabrications or manifolds. Valve bodies have thicker cross-sections than tubing, but thermal expansion can affect clearances in interconnecting piping sections.

This valve is NOT designed to be used under aseptic or near aseptic conditions and temperatures.

If operating below 32°F (0°C):

- Control air must have an appropriately low dew point.
- Valve stems must be protected from icing to ensure long working life for valve stem seals.

Solenoid valves may not be used in the control module in room environments below 32°F (0°C) and over 140°F (60°C), as function cannot be guaranteed.

Seal Compatibility

Table 1: Seal Compatibility for FKM/EPDM Seals

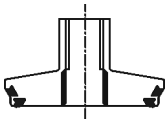
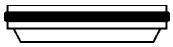
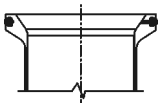
	Fluorelastomer (FKM) Seals	EPDM Seals
Thermal Range of Application	32°F to 375°F (0°C to 190°C)	0°F to 275°F (-18°C to 135°C)
Chemical Resistance	Silicone oil and grease	Silicone oil and grease
	Ozone, aging and weather resistant	Ozone, aging and weather resistant
	Oils and fats	Hot water and steam up to 275°F (135°C)
	Aliphatic, chlorinated and aromatic hydrocarbons	Many organic and inorganic acids
		Cleaning agents, soda and potassium alkalis
		Many polar solvents (alcohols, ketones, esters)
Not compatible with	Superheated steam	Mineral oil products (oils, greases and fuels)
	Formic and acetic acids	

Contact SPX Application Engineering for other fluid compatibility.

FKM and EPDM seals comply with FDA regulations.

Seat Options

NOTE: *For higher temperature applications than those listed, please consult the factory. Operating conditions such as flow rate and pressure must be considered when operating near the maximum temperature rating.*

SEAT TYPE	MATERIAL / MAXIMUM TEMP.
 Tri Ring (TR) - Upper	FKM (Std.) Operation 350°F (176°C) Sterile (Consult Factory) or EPDM (opt.) Operation 280°F (137°C) Sterile 275°F (135°C)
 Vent Separator	
 Radial - Lower	

Pressure Ratings

Parameter	Valve Size	Pressure Rating
Operating Pressure	2" - 3"	150 psi (10.3 bar)
	4"	90 psi (6.2 bar)
Holding Pressure	All sizes	150 psi (10.3 bar)

Installation

CAUTION: *When installing the valve, ensure that no foreign materials (e.g. tools, screws, welding wire, lubricants, cloths, etc.) are enclosed in the system.*

Location

The valve must be in a vertical position to ensure that the vent/drain outlet system functions properly.

CAUTION: *Isolate products away from the valve prior to performing maintenance.*

Locate the valve for easy access for inspection.

Ensure that the valves and pipe systems drain properly. The two-piece body option enables the positions of the connections to be adjusted in relation to each other.

Welding Instructions

Prior to installing, thoroughly inspect each valve. When using butt-weld two-piece body valves, clamp connections must be used on either the upper or lower body to allow for servicing of the o-ring seal between the bodies. This does not apply single-piece bodies.

CAUTION: *Before attempting to buttweld an automatic valve into a line, disassemble the body from the actuator. Dissipate heat away from the valve body to prevent warping.*

Mix Proof valves with welded connections require the following to be performed before installation:

- Prior to installation, remove the valve insert (stem and actuator assembly) and lower bearing carrier.
- Remove all seals from the body.
- Weld the body into position, ensuring that the connection is free of tension and distortion.

CAUTION: *Welding must be carried out by qualified personnel.*

For manifold welding, fixture tables are recommended. Matrix manifold welding requires a controlled deliberate process to maintain the alignment of the parts.

Air Supply

The air supply must be 75 to 100 psi (5.2 to 6.9 bar). Install the valves using dry, filtered air. Lubrication is not required. If using lubricated air, refer to the solenoid manufacturer's specifications.

Flow Direction

The valves should be installed to close against the flow to prevent hammering.

Fittings

When using suitable fittings, Mix Proof valves with detachable connections can be installed in a pipe system per the fitting requirements. The valve must be installed free of tension. After the valve is installed in the pipe system, attach the control air hoses and connect them to the electrical supply.

Contact SPX at 1-800-252-5200 for more information on our wide variety of fittings for all applications.

Pipeline Support

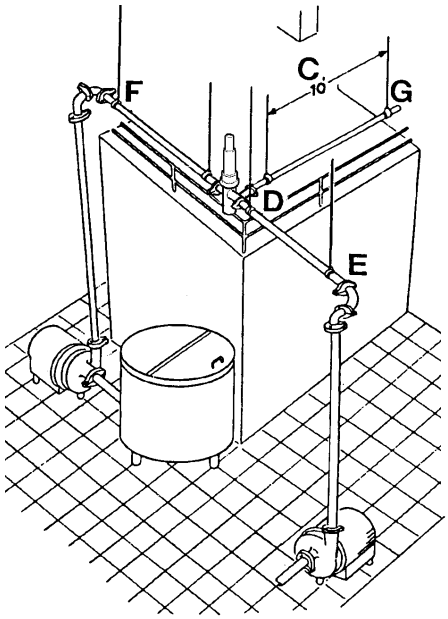


Figure 1 - Pipeline Support

Install adequate supports to prevent strain on the fittings, valves and equipment connections.

1. Install supports at least every 10 feet on straight runs of piping. (Figure 1, item C).
2. Install supports on both sides of the valves as close as possible to the connections. (Figure 1, item D).
3. Install supports at each change of pipeline direction. (Figure 1, item E and F).
4. For pipelines passing through walls, floors or ceilings, provide at least 1 inch (25 mm) of clearance around the pipe to allow for expansion and contraction. (Figure 1, item G).

⚠ ***CAUTION:*** *In higher temperature applications, ensure proper accommodation for thermal expansion in the pipeline design to minimize stresses on the valve bodies. Excessive mechanical and thermal stresses can distort and damage the valve bodies.*

Installing Valve Manifolds

Install automatic valve manifolds with a uniform pitch for proper drainage. Elevate one corner of the cluster and pitch 1/16" per foot (1.59 mm per meter) if desired. Arrange the supports for the floor-mounted valve manifolds to provide alignment of the inlet and outlet lines.

Installing the Valve

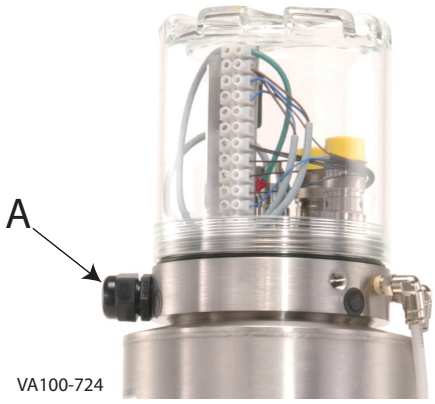


Figure 2 - Control Top Wire Connection Point

1. If solenoids are mounted in a control top, connect the air supply lines to “air in.” If solenoids are mounted externally from the control top, connect the air lines as explained in “Solenoid Valve Port Connections” on page 13.
2. Using caution, lift the valve insert (actuator and stem assembly) and set the actuator in the body assembly.
3. Slowly lower the valve insert into the body, making sure the lower stem enters the lower bearing carrier.
4. Supply air to Port 1 (see Figure 3 on page 13), allowing the valve insert to completely drop into the body.
5. Tightly clamp the yoke/body flange.
6. Connect the air lines to 1, 2 and 3, as shown in Figure 3 on page 13.
7. Connect the electrical control cord to the valve at location A (see Figure 2).

NOTE: *Control tops are available with strain relief cord grip for hard wiring or threaded pin connectors for quick disconnect. Mating cables must be ordered separately.*

8. Operate the valve through the four conditions (closed, open, upper seat cleaning and lower seat cleaning). See Table 2 on page 13.

Quality of Control Air to Control Module

Do not exceed the following values:

- Suspended solids content:
  Particle size: 5 microns max.
  Particle Density: 5 mg/m^3 max. (= quality class 3)
- Water content: Dewpoint +35°F (+1.6°C)
  (= quality class 3). For applications at great elevations or at low ambient temperatures, the dewpoint changes.
- Oil content (if possible, without oil): Up to 25mg/m^3 max. oil (= quality class 5).

Operation

All functions of W75CP2 PMO valves are pneumatically controlled using a 75 min. to 100 max. psi (5.2 to 6.9 bar) clean air supply.

The valve contains a large and small spring in the valve actuator. The springs hold the valve seats in the closed position.

Large Spring

- Located in top air chamber of cylinder.
- Holds valve in the closed position.

Small Spring

- Located in the extended hub of the upper piston.
- When the valve is open, the spring acts on the upper seat stem to hold the upper and lower plugs together.

Solenoid Valve Port Connections

Up to three air supplies, controlled by solenoid valves, supply air to the valve actuator (Figure 3)

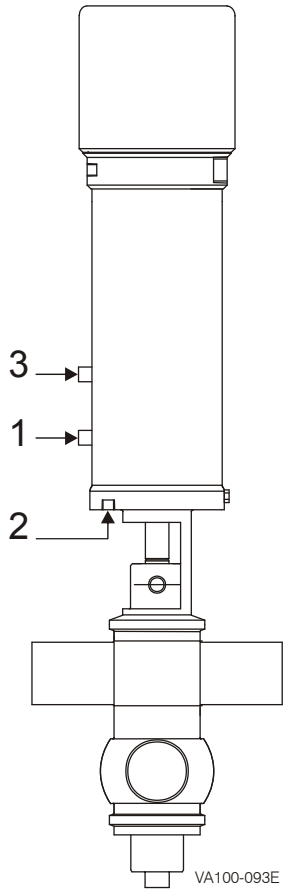


Figure 3 - Solenoid Valve Port Connections

Table 2: Solenoid/Valve Position

Condition	Solenoid 1	Solenoid 2	Solenoid 3
Closed	OFF	OFF	OFF
Open	ON	OFF	OFF
Upper Seat Cleaning *	OFF	ON	OFF
Lower Seat Cleaning *	OFF	OFF	ON

1 = Valve Open Inlet Solenoid

2 = Upper Seat Clean Inlet Solenoid*

3 = Lower Seat Clean Inlet Solenoid*

ON = Solenoid energized (OPEN). LED is lit.

OFF = Solenoid de-energized (CLOSED). LED is off.

Solenoids are normally closed.

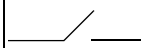
Air connections are 1/8" NPT x 1/4" push-to-connect poly tube fittings.

* Seat lifting requires (2) two additional air supplies.

For specific air-routing and solenoid porting, please refer to control module publications 95-03083 (2-piece) or 95-03077 (3-Piece (obsoleted).

Automatic Fail-Safe System

Table 3: Valve Stem Detection Conditions

Condition	Upper Switch (NO)	Lower Switch (NC)	Yoke Switch (NC)
Switch Symbol			
Valve Closed	0	1	1
Valve Open	1	0	0
Valve Closed with Upper Seat Clean*	0	1	0
Valve Closed with Lower Seat Clean*	0	0	1

Notes:

1 = Energized, LED is lit; 0 = De-energized, LED is off

Upper Switch: Sends an input signal when the valve is properly open.

Lower Switch: Sends an input signal when the valve is properly closed.

Yoke Switch: Sends an input signal when the upper seat is properly closed.

* Seat lift during upper seat clean; seat push during lower seat clean, indicator stem lowers.

The valve seats are part of an automatic fail-safe system preventing contamination of the product with cleaning or sanitizing solutions. Automatic fail-safe systems are unique to each particular installation. Typically, both blocking valve seats are properly seated in the blocked position before the mechanical cleaning system can be activated for the cleaning circuit containing the valve arrangement. W75CP2 PMO valves are spring-to-closed fail-safe into the blocked position. Waukesha Cherry-Burrell does not offer control systems, only the PMO double-seat valve.

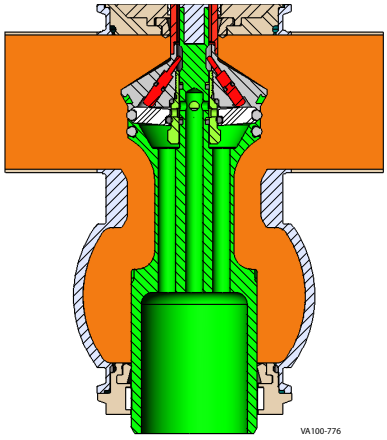
Valve Operating Conditions

See Figure 3 on page 13 for port positions.

NOTE: *For high-pressure applications, see the recommending closing control sequence listed after "Excess line pressure" in the "Troubleshooting" section on page 34.*

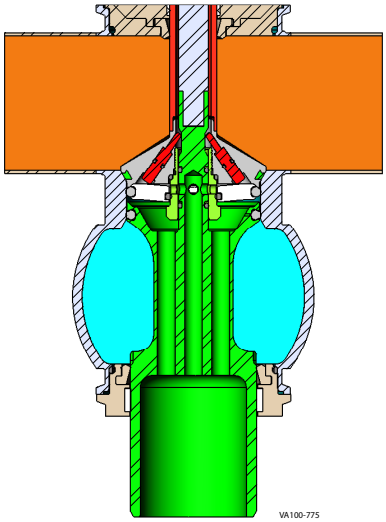
Valve Open

The valve is open when Port 1 is pressurized and Ports 3 and 2 are vented.



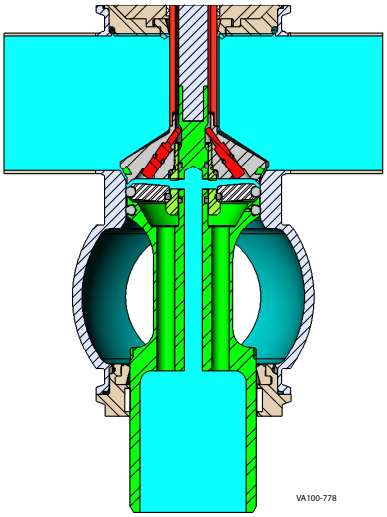
Valve Closed

The valve is closed when Ports 3, 1 and 2 are vented. The large spring closes the valve to fail-safe position as indicated by the position-detecting proximity switches.



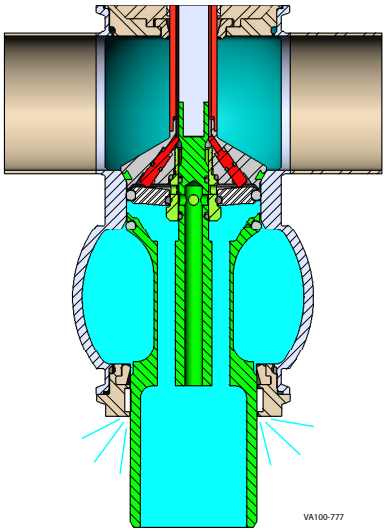
Valve Closed, Upper Seat Lifted

For cleaning the upper seat on seat lifting models only. Port 2 is pressurized, and Ports 3 and 1 are vented.



Valve Closed, Lower Seat Push

For cleaning the lower seat. Port 3 is pressurized, and Ports 1 and 2 are vented. Liquid escapes from the vent and from the lower retainer along the O.D. of the lower balancer.



Test Procedures

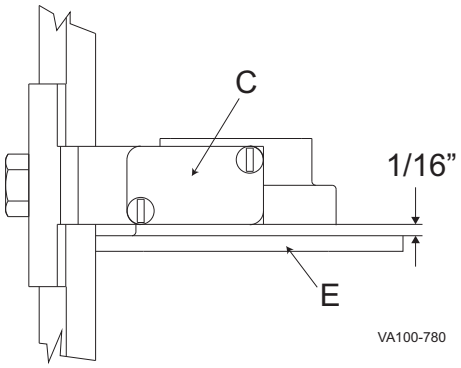


Figure 4 - Proximity Switch Location

Yoke-Mounted Proximity Switch

Adjust the proximity switch (Figure 4, item C) so that it has1/16" clearance above the detection cap (item E), but without compressing it.

Corrective Action: Loosen the proximity switch bolt and adjust the position.

Positive Fail-Safe Detection Test

Perform a test to verify the fully closed fail-safe position. Both the upper and lower valve plugs are position-detectable via proximity switches. Set the valve plug feedback proximity switches for the fully opened and fully closed positions of the valve. See Figure 3 on page 13 for corresponding ports. See Figure 4 to confirm the stem and switch positions have a 1/16" clearance.

Decommission the system, drain the lines and lock out the pumps.

1. With the valve fully closed, confirm that the proximity switches conform to Table 3 on page 14. Verify the switch status on the PLC control system.
2. Pressurize Port 1 to open the valve. Confirm that the proximity switches conform to Table 3 on page 14.
3. Vent Port 1 to close the valve.
4. Activate the upper seat lift either through the control system or manually by supplying air to the air port in Port 2.
5. When the upper seat lifts, confirm that the proximity switches conform to Table 3. Verify the switch status on the PLC control system.
6. Vent the air in Port 2 to deactivate the seat lift.
7. Activate the lower seat push either through the control system or manually by supplying air to Port 3 on the valve actuator.
8. When the lower seat is pushed, confirm that the proximity switches conform to Table 3 on page 14. Verify the switch status on the PLC control system.
9. Vent the air in Port 3 to deactivate the seat lift.
10. Disconnect the air from the valve actuator, placing the valve in the fail-safe position. Verify that the proximity switches register that the valve is fully closed.

Corrective Action: If the Double-seat Mix Proof valve fails to respond as indicated above, immediately check the valve assembly and wiring to locate and correct the cause.

- Check the proximity switch adjustment.
- Check for the correct assembly and adjustment of the valve.
- Check if the valve close control sequence is used. See “Excess line pressure” in the “Troubleshooting” section on page 34.

Confirmation of control system seat lifting interlock during operation

The purpose of this test is for regulatory inspectors to check and confirm that proper controls interlocking of the W75CP2 PMO valve is in place during active CIP operation.

This test is to be performed during active CIP of either the upper or lower housing of the valve. The inspector will manually force open the protected seat lift to confirm proper interlocking.

Procedure

1. Select a W75CP2 test valve for the interlock test. Confirm proper valve assembly and switch status prior to testing (refer to “Positive Fail-Safe Detection Test” on page 16).
2. Choose upper body cleaning or lower body cleaning.

WARNING: *Confirm that the product is not present in the valve prior to start and through the duration of this test.*

3. Energize CIP for the selected body. Confirm that CIP pressure is present in the selected body.
4. Energize the seat lift of the protected seat:
   - Cleaning through the upper body: energize solenoid for lower seat lift.
   - Cleaning through the lower body: energize solenoid for upper seat lift.

   If the control system interlocking is correct, the CIP supply pump or source will be de-activated.
5. De-energize the seat lift of the protected seat.

Corrective Action

If the control system does not de-activate the cleaning solution pressure, shut down the control system and evaluate and revise the control interlocking.

Maintenance

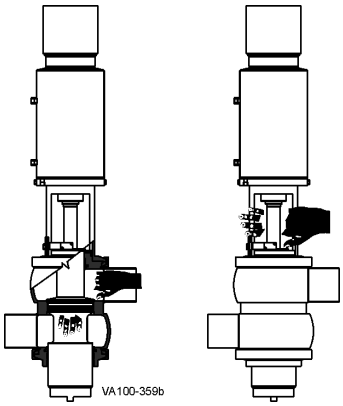
Maintenance Intervals

Maintain an adequate stock of replacement parts. Maintenance intervals should be determined by user and specific application, based on the following conditions:

- Daily operation period.
- Switching frequency
- Application parameters, such as temperature, pressure, and flow
- Product type

Inspection

DANGER: *Do not put a hand into the yoke or body of a pneumatically actuated valve.*



Inspect the following on a regular basis:

- Actuator connections for air leaks
- Valve body and stem o-rings
- Valve seats (if leakage occurs, see “Troubleshooting” on page 34.)
- Pneumatic connections:
  - Air pressure at supply connection
  - Air lines for kinks and leaks
  - Threaded connections for tight fit
  - Threaded strain relief for tight fit
  - Electrical connections secure on control module
  - Wire connections tight on terminal strip
  - Clean air filter at regular intervals

Lubrication

No lubrication is required other than as noted in the disassembly and assembly procedures. (Use food grade non-petroleum (silicone) grease on seals and o-rings.) Apply Bostik Never-Seez® White Food Grade with PTFE or equivalent to all bolts and threaded stem parts.

Cleaning

CAUTION: *Avoid splashing any liquid into the air vent of the actuator during clean up.*

NOTE: *Actuate each valve or use seat lifting to ensure effective cleaning and sanitizing. Expose all product-contact surfaces to the appropriate cleaning solutions.*

Cleaning-In-Place (CIP)

CIP methods can be used to clean installed automatic valves without disassembly. Select methods based on the specific requirements of sanitarians and each application. Check with local chemical suppliers for the most effective cleaning agents and procedures intended for the application, in order to properly dissolve the product residue. Ensure that the cleaning agent is compliant with the temperature range.

Cleaning Procedure

Mix Proof valves are designed to use a cleaning solution supplied by a CIP system.

CAUTION: *During valve opening and CIP cleaning, fluid escapes from the drain port. Drain it off to prevent any possible hazard to personnel.*

Establish cleaning procedures for each installation depending on product characteristics and operating parameters (temperature, velocity, valve cycles, and product velocities). The valves are 3-A design and intended for CIP cleaning. Consult a local cleaning specialist regarding cleaning of the valves.

CAUTION: *Proper cleaning solution pressure is required for proper cleaning of the valve. The CIP pump must be energized during seat lifting.*

For seat lifting valves, when the upper or lower body is in CIP, seat movement should occur. Seat cleaning positions are factory-set and marked in the yoke area. Seat cleaning will produce visible leakage from the vent outlet. Brief multiple lifts should occur for each step in the CIP program, excluding the initial rinse.

NOTE: *If heavy soils are experienced, seat cleaning is not recommended during the initial rinse.*

The lower seat lift cleans the full lower stem product contact area. The cleaning solution exits the valve from both the vent cavity and the balancer O.D.

Maximum Solution Temperature is 160°F (71°C).

Maximum line pressure during seat cleaning is 90 psi (6.2 bar).

Minimum cleaning solution velocity is 5 ft/s (0.3 m/s).

Cleaning time is dependent on the inlet pressure. The recommended cycle time is 3 to 5 seconds per cycle after the valve achieves the seat clean position.

Typical cleaning procedures include pulsing the seat during cleaning until the valve has been demonstrated to be clean. This is usually accomplished in 3 to 5 consecutive pulses per step in the CIP program; however, each installation and product varies, so pulsing should continue until all product/debris is removed.

Every few months of operation, remove and inspect one valve in the system to ensure that complete cleaning is being achieved.

Non-Adjustable Seat Cleaning

The seat cleaning movements are fixed at 0.16" upper and 0.28" lower. Confirm the stroke lengths after proper assembly of the upper stem (Figure 7, item B) and nut (Figure 14, item N). Tighten both clockwise until stopped, metal to metal.

Removing Valve from System

NOTE: *If the valve has a control module with solenoid, air and electric must remain ON until valve is properly disassembled.*

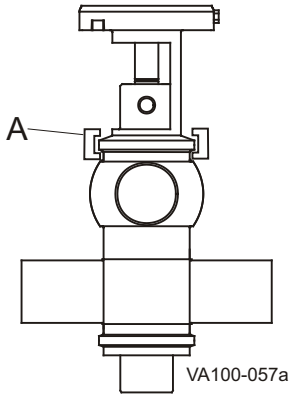


Figure 5 - Location of Adapter Clamp

WARNING: *Before removing the actuator/valve stem assembly from the valve body, drain all product lines connected to the body.*

1. Clean, rinse, and drain the pipe system elements attached to the valve. Remove or block the fluid and gas lines to prevent material from entering the pipe system elements attached to the valve. If present, disconnect the flush water supply connection.
2. Shut off delivery of the control air unless required for removal of the valve stem/actuator assembly of the body.
3. Disconnect electrical supply and lock out all power.
4. Supply air to open the valve.
5. Remove the clamp between the yoke and the adapter (Figure 5, item A).
6. Remove the air pressure to cycle the valve closed, lifting the valve approximately 3/8" (9.5 mm) out of the body.
7. Lift the complete valve insert (actuator and stems) out of the valve body.
8. Move the valve to a work station.

Disassembly of Valve Stems

Disassembly of the valve stems is required for seat ring replacement.

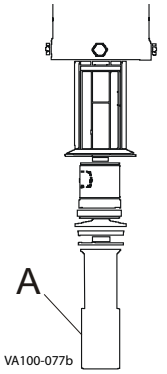


Figure 6 - Valve Stem Removal

1. Using a strap wrench or stem installation tool (see page 33), remove the lower stem (Figure 6, item A) from the actuator by turning it counter-clockwise. To re-install, tighten it clockwise until it is stopped.
2. To remove the upper stem (Figure 7, item B and Figure 8, item 8), turn the stem counter-clockwise and remove it from the actuator. If the adapter (Figure 7, item C) comes out of the yoke, handle it with care. The vent separator is retained to the upper stem. To re-install, tighten it clockwise until it is stopped.
3. See Figure 8 on page 21. To remove the vent separator from the insert, grasp the upper stem (item 8) firmly and unscrew the retaining bolt (item 41).

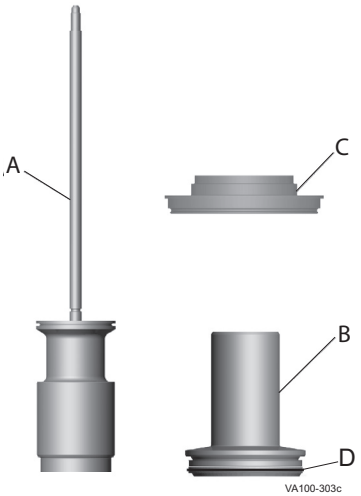


Figure 7 - Stem Removal

Table 4: Callout table for Figure 7

A. Lower Stem
B. Upper Stem
C. Top Adapter (Bonnet)
D. Vent Separator (retained to upper stem)

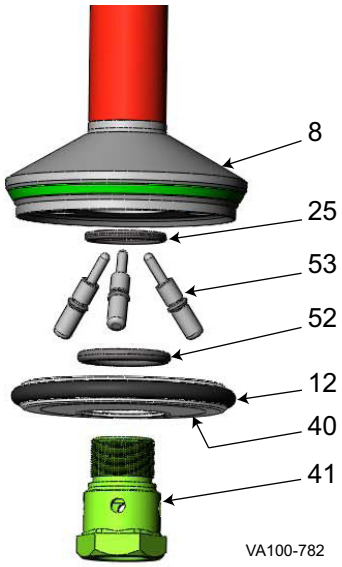


Figure 8 - Upper Stem Detail

Table 5: Callout table for Figure 8

8. Upper Stem
12. O-ring, Vent Separator Seat
25. O-ring, Upper Stem assembly
40. Vent Separator
41. Retaining Bolt
52. O-ring, Vent Separator assembly
53. Vent Separator Stop Pin

Adapter Bearings and O-rings

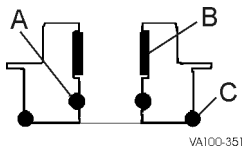


Figure 9 - Adapter O-rings and Bearing

NOTE: *The bearing will be damaged during removal and must be replaced with a new bearing.*

Inner O-ring and Bearing Replacement

1. Remove the valve stem assembly from the actuator and slide the adapter off the outer stem.
2. Remove and replace the o-ring (Figure 9, item A) inside the adapter.
3. Check the split bearing (Figure 9, item B) inside the adapter by feeling the amount protruding from the adapter wall. If the bearing is flush with the wall, replace the bearing.
4. Place a screwdriver behind the bearing and pry it away from the wall of the adapter. A needle-nose pliers can be used to grip the bearing for removal. Be careful not to scratch or damage the metal surfaces.
5. To install a new bearing, coil the bearing to a size smaller than the inside diameter of the adapter and insert it into the proper location.
6. Using your finger, ensure that the bearing is properly seated. Visually inspect the seating.
7. If necessary, push the actuator stem into the adapter to help properly seat the bearing.

Outer O-ring Replacement

1. Remove the valve stem assembly from the actuator and slide the adapter off the outer stem.
2. Slide or cut the outer o-ring (Figure 9, item C) off the adapter. Do not nick or scratch the o-ring groove.
3. Lubricate the new o-ring with grease and install it.

Tri Ring Seat Replacement

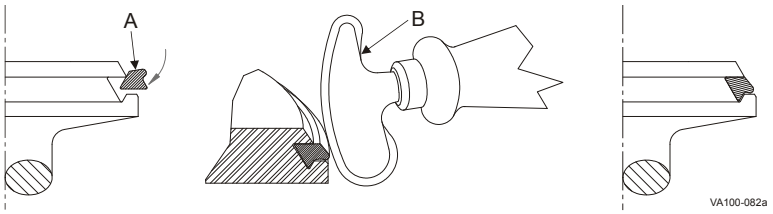


Figure 10 - Installing New Tri Ring Seat

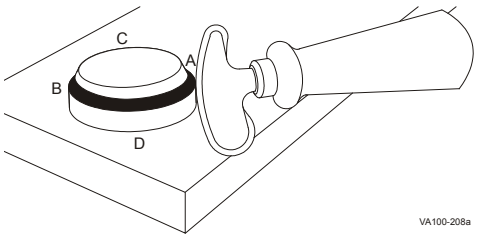


Figure 11 - Pressing Tri Ring Into Plug

NOTE: *For part numbers, see "Installation Tools" on page 33.*

1. Remove the Tri Ring seat by carefully cutting or using an o-ring tool to pull the seat out of the groove. Do not scratch or nick the metal seating surface.
2. Clean the Tri Ring groove after removing the seat.
3. Lubricate the new Tri Ring (Figure 10, item A) with an acceptable cleansing solution or lubricant.
4. Place the stem through a 1-1/8 inch (30 mm) hole bored through a board, secured by a vise. Start the Tri Ring as shown in Figure 11.
5. Using the installation tool, press the Tri Ring into the plug at locations A, B, C, and D. If the tool is not used, DO NOT use a knife or any other sharp item that will tear or cut the Tri Ring. To finish installation, press small sections of the seal, alternating from side to side (A-B-C-D), avoiding large loops of seal. When properly installed, the Tri Ring seat lip will protrude slightly from the seat edge as shown in Figure 10.

Radial Seal Installation

1. Remove the lower stem radial seal by carefully prying up and cutting the o-ring. Pry up the o-ring and pull it out to remove it. Do not scratch or nick the metal seating surface.
2. Clean the radial seal groove after removal.
3. Ensure that the vent port in the back of the groove is clean and unblocked.
4. Lubricate the o-ring seal and expand it over the stem groove, while trying to avoid twisting the o-ring.
5. Place the assembly tool over the stem and extrude the o-ring seal into the groove by evenly tightening the cap screws on the installation tool. See Figure 12. For a list of installation tools, see page 33.
6. Remove the tool. The dovetail groove permanently retains the o-ring seal.

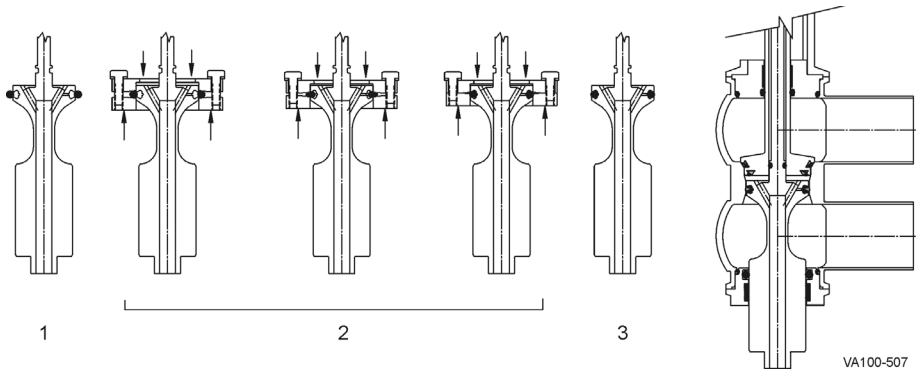


Figure 12 - Radial Seal Installation

Lower Bearing Carrier O-ring and Bearing Replacement

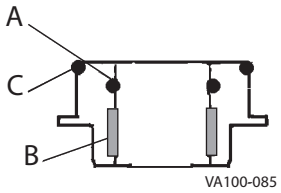


Figure 13 - Lower Bearing Carrier

NOTE: *The bearing will be damaged during removal and must be replaced with a new bearing.*

1. Remove and replace the o-ring (Figure 13, item A) located inside the lower bearing carrier.
2. Check the split bearing (Figure 13, item B) inside the lower bearing carrier by feeling the amount protruding from the lower bearing carrier wall. If the bearing is flush with the wall, replace the bearing.
3. Place a screwdriver behind the bearing and pry it away from the wall of the lower bearing carrier. A needle-nose pliers can be used to grip the bearing for removal.
4. To install the new bearing, coil the bearing to a size smaller than the inside diameter of the lower bearing carrier and insert it into the proper location.
5. Push the actuator stem into the lower bearing carrier to help seat the bearing properly.
6. Using your finger, ensure that the bearing is properly seated. Visually inspect the seating.
7. To remove the outer o-ring (Figure 13, item C), slide or cut the o-ring off the lower bearing carrier. Do not nick or scratch the o-ring groove.
8. Lubricate the new o-ring with grease and install it.

Actuator O-ring and Bearing Replacement

CAUTION: *The valve stems and actuator must be removed from the valve body before servicing the actuator components.*

1. See “Disassembly of Valve Stems” on page 20.
2. Remove the cap screws (Figure 14, item E) and remove the yoke (item F) from the cylinder assembly. Set the yoke aside.
3. Pull the spring cage assembly (item H) and main piston (item J) from the cylinder assembly.
4. Inspect the o-rings (item D). Replace them if worn or damaged.
5. Inspect the bearings (item C). If the bearing does not extend slightly above the edge of the metal surface, replace the bearing.

NOTE: *The bearing will be damaged during removal and must be replaced with a new bearing.*

6. The bearing is split to allow its removal from the groove. Place a screwdriver behind the bearing and pry it away from the wall of the yoke. A needle-nose pliers can be used to grip the bearing for removal. Take care not to gouge or scratch the metal surfaces.
7. Assemble the stack components as shown in Figure 14. Install the yoke and cap screws.

A. Control Top
B. Cylinder Assembly
C. Bearing
D. O-ring
E. Cap Screw
F. Yoke
G. Indicator Stem
H. Spring Cage Assembly
I. Control Top Mounting Assembly (see control top manual for detail)
J. Main Piston
K. Small Spring
L. Sleeve
M. Upper Seat Lifting Piston
N. Nut

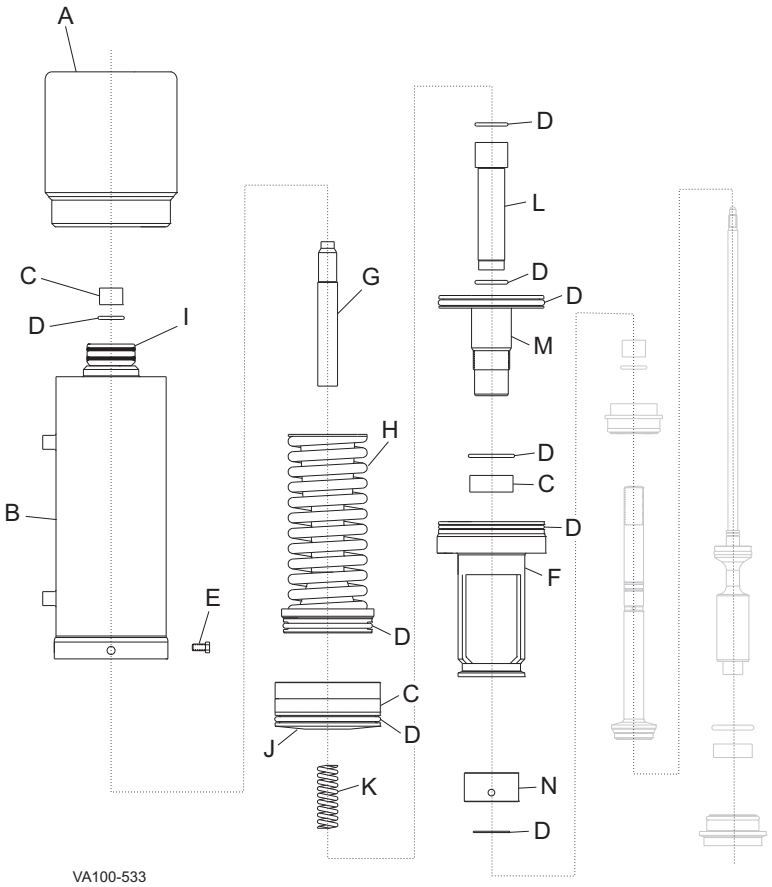


Figure 14 - Actuator Assembly (generic valve assembly shown for reference)

Switches

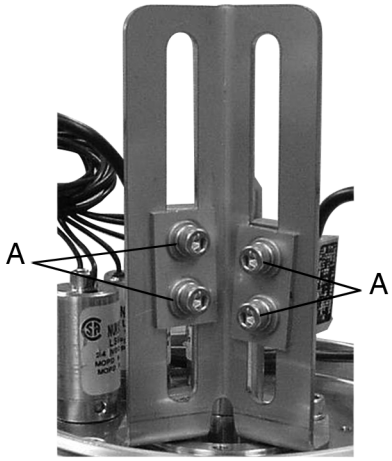


Figure 15 - Switch Adjustment

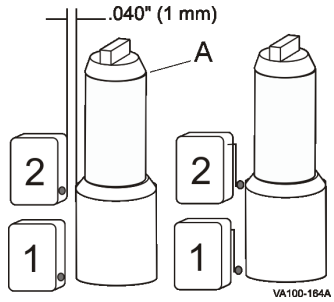


Figure 16 - Valve Open Adjustment

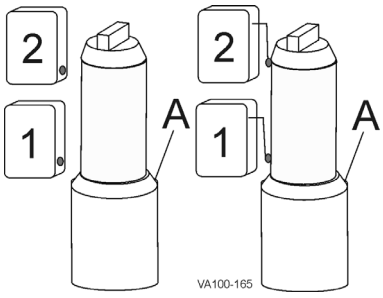


Figure 17 - Valve Closed Adjustment

Proximity Switch

- IP67 sealed, inductive coil switch
- AC/DC
- The position of the actuator stem is detected by a sensor at the target printed on the switch.

Switch Adjustment

W-Series Control Modules with proximity switches or micro switches utilize a positive switching configuration to provide discrete inputs for each valve position.

Lower Switch 1 is normally closed (NC) and passing power when the stem is down. When the stem raises, switch 1 opens and power is stopped.

Upper Switch 2 is normally open (NO) and does not pass power when the stem is down. When the stem is fully raised, Upper Switch 2 closes and passes power.

Proximity switches are supplied with incorporated LED's which light when power is passed and are inactive when power is stopped.

1. Raise the stem to open, then loosen the cap screws holding the switch blocks (Figure 15, item A) with a 9/64" allen wrench and slide the switches to set the distance between the switches and the stem shaft at 0.040" (1 mm). If using a micro switch, place a 0.020" feeler gauge between the roller and the small diameter of the stem. Adjust the switch toward the stem until a "click" is heard.
2. Hand-tighten the cap screws (Figure 15, item A) to hold the switch position.
3. With the stem raised, adjust the vertical height of the upper switch target to slightly below the stem shoulder (Figure 16). Tighten the cap screws securely.
4. Lower the stem to close the valve and adjust the target of the lower switch to slightly above the stem shoulder (Figure 17). Tighten the cap screws securely.

CAUTION: *Do not over-tighten.*

NOTE: *Switches should detect stem movement within 1/16 inch (0.062 in/1.58 mm).*
In this manual, "stem-raised" is understood to be when the valve stem is fully retracted into the actuator. "Stem-lowered" is understood to be when the valve stem is fully extended out from the actuator.

Wiring Diagrams

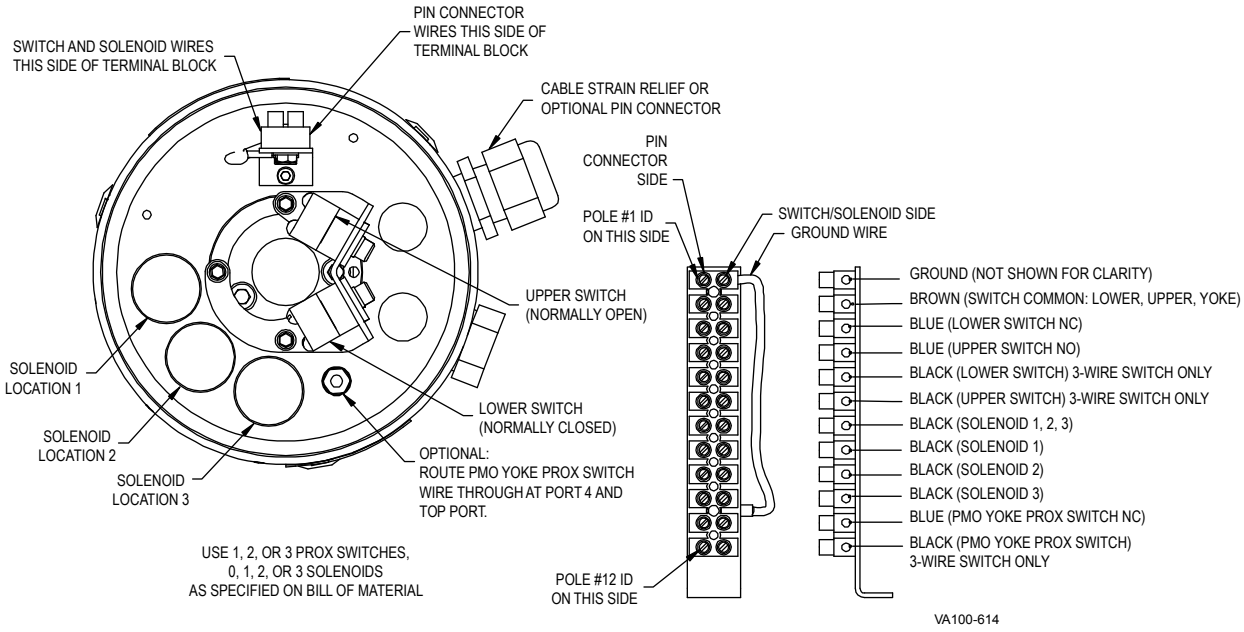


Figure 18 - Strain Relief Proximity Switch

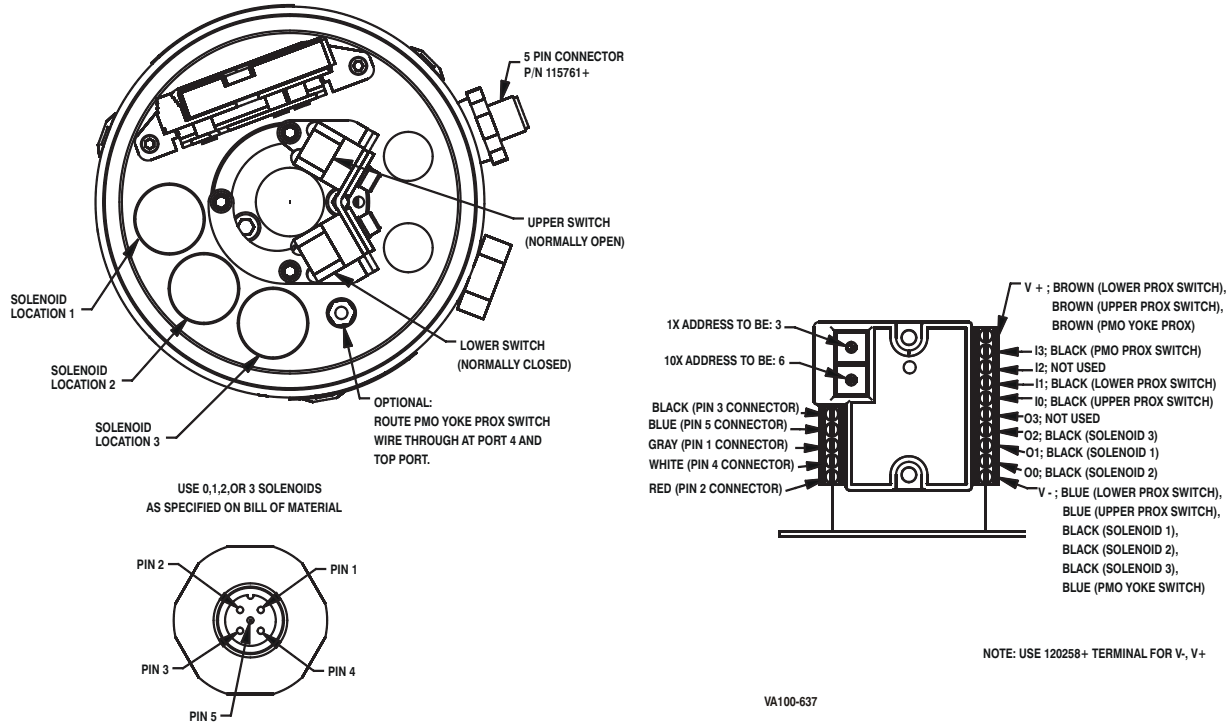


Figure 19: 5-Pin Eurofast with DeviceNet Card, Mix Proof

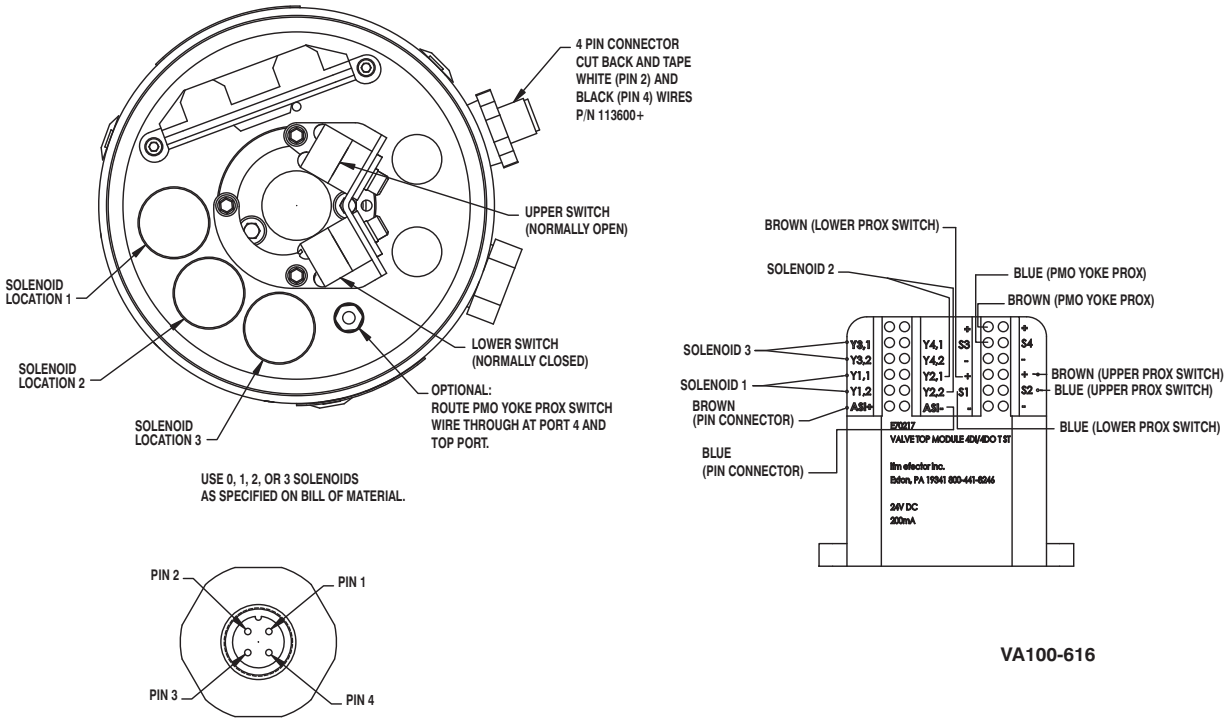
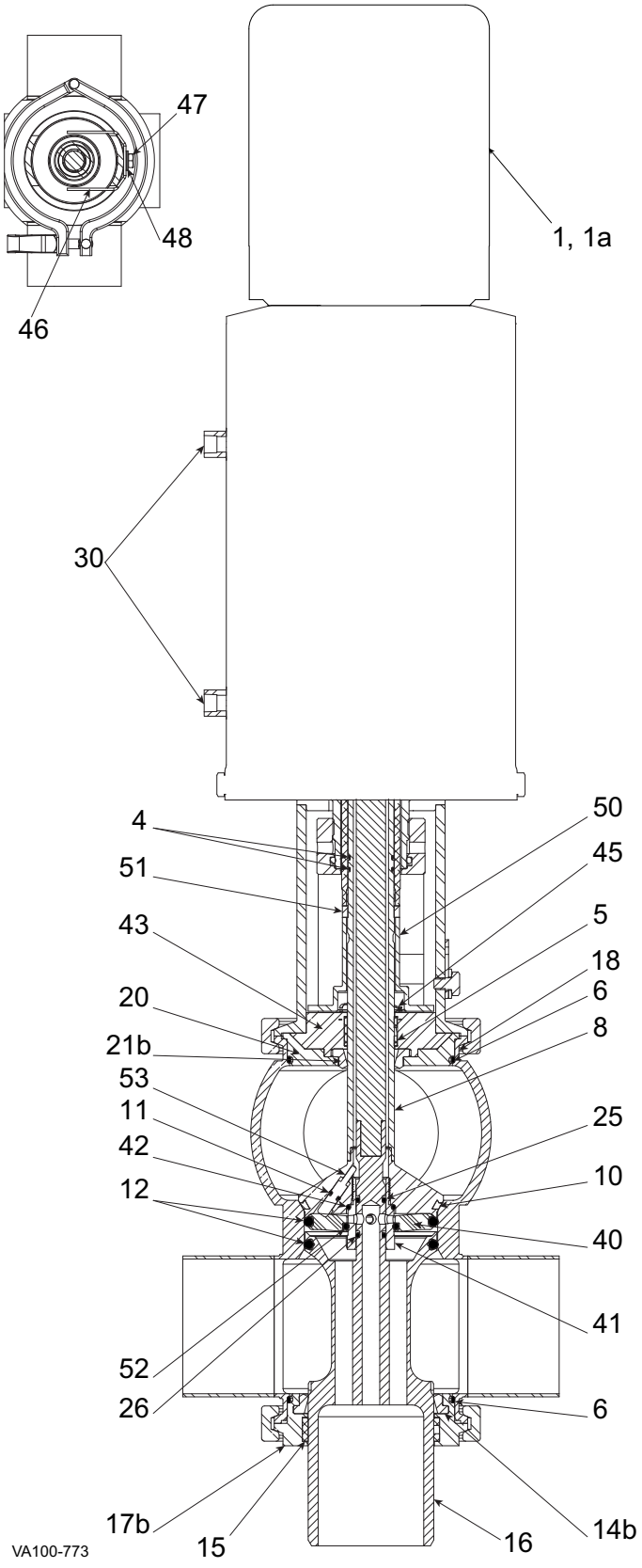


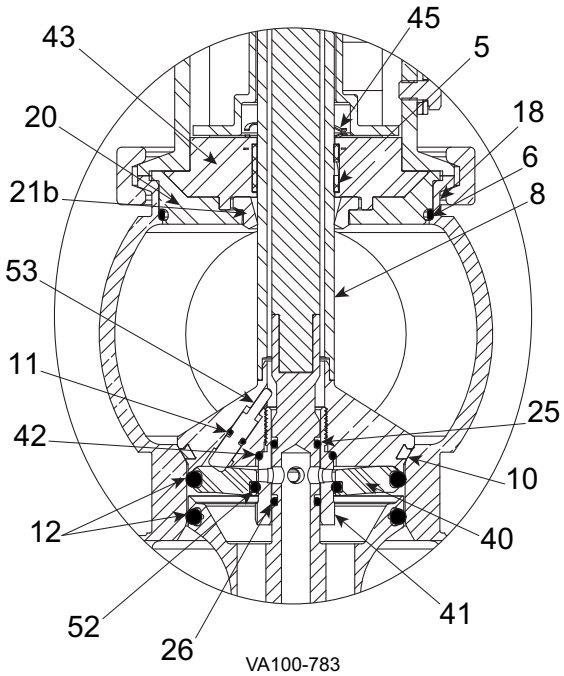
Figure 20: 4-Pin Eurofast with AS-I Card

Parts Lists

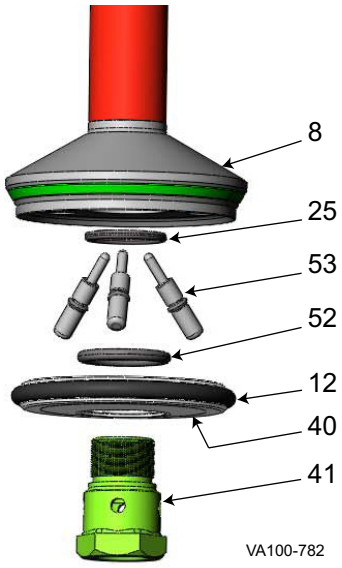
W75CP2 PMO Double-Seat Mix Proof Valves



Stem Detail



Exploded View, upper stem



W75CP2 PMO Double-Seat Mix Proof Valves

	Item #	Part Description	Qty	2"	2-1/2"	3"	4"
	1	Control Top	1	Contact Factory			
	3	Actuator	1	***			
*	**4**	**O-ring, Outer Stem Nitrile**	2	N90016	N90020	N90020	N90020
*	**5**	**Bearing, Upper**	1	102757+	106047+	106047+	106047+
*	**6**	**O-ring, Body FKM**	2	V70228	V70232	V70236	V70244
	8	Stem, Upper Assembly	1	131970+	131971+	131972+	131973+
*	**10**	**Tri Ring, Upper Stem FKM**	1	107985+	107982+	107974+	107977+
*	**11**	**O-ring, Vent Separator Stop Pin FKM**	3	V70004	V70007	V70007	V70007
*	**12**	**O-ring, Lower Stem and Separator Seats FKM**	2	V80325	V80329	V80333	V80340
*	**14b**	**Wiping Stem Seal, Lower FKM**	1	116189+	116191+	116196+	116200+
*	**15**	**Bearing, Lower**	1	102000+	106049+	106048+	102003+
	16	Stem, Lower Assembly	1	131981+	131982+	131983+	131984+
	17b	Seal Retainer, Wiping Stem Seal	1	117445+	117446+	117447+	117448+
	18	Clamp	2	119-33	119-34	119-51	119-87
	20b	Adapter, Wiping Stem Seal	1	116169+	116170+	116273+	116172+
*	**21b**	**Wiping Stem Seal, Upper FKM**	1	115626+	116185+	116185+	116185+
*	**25**	**O-ring, Upper Stem assy. FKM**	1	V70010	V70111	V70111	V70111
*	**26**	**O-ring, Lower Stem assy. FKM**	1	V70011	V70111	V70111	V70111
	30	Quick Exhaust Valve (see note 8)	1	114680+	114680+	114680+	114680+
	40	Vent Separator	1	131985+	131974+	131975+	131986+
	41	Bolt, Vent Separator	1	131987+	131990+	131976+	131976+
*	**42**	**O-ring, Outer Vent Separator Bolt assy. FKM**	1	V70112	V70117	V70117	V70117
	43	Adapter, Upper	1	116164+	116165+	116166+	116167+
	45	Spring, Crest to Crest Wave Spring	1	60091+	60091+	60091+	60091+
	46	Bracket, Yoke Switch	1	120679+	111619+	111619+	111619+
	47	HHCS 1/4-20 x 3/8 Bolt, Switch Target	1	30-68	30-68	30-68	30-68
	48	1/4" Washer, Switch Target	1	43-27	43-27	43-27	43-27
	50	Target, W75CP2 Prox Switch	1	132524+	132140+	132140+	132140+
	51	Ring, Stop	1	131999+	122357+	122357+	122357+
*	**52**	**O-ring, Vent Separator assy. FKM**	1	V70208	V70213	V70213	V70213
	53	Pin, W75CP2 Vent Separator Stop	3	131992+	131991+	131988+	131994+

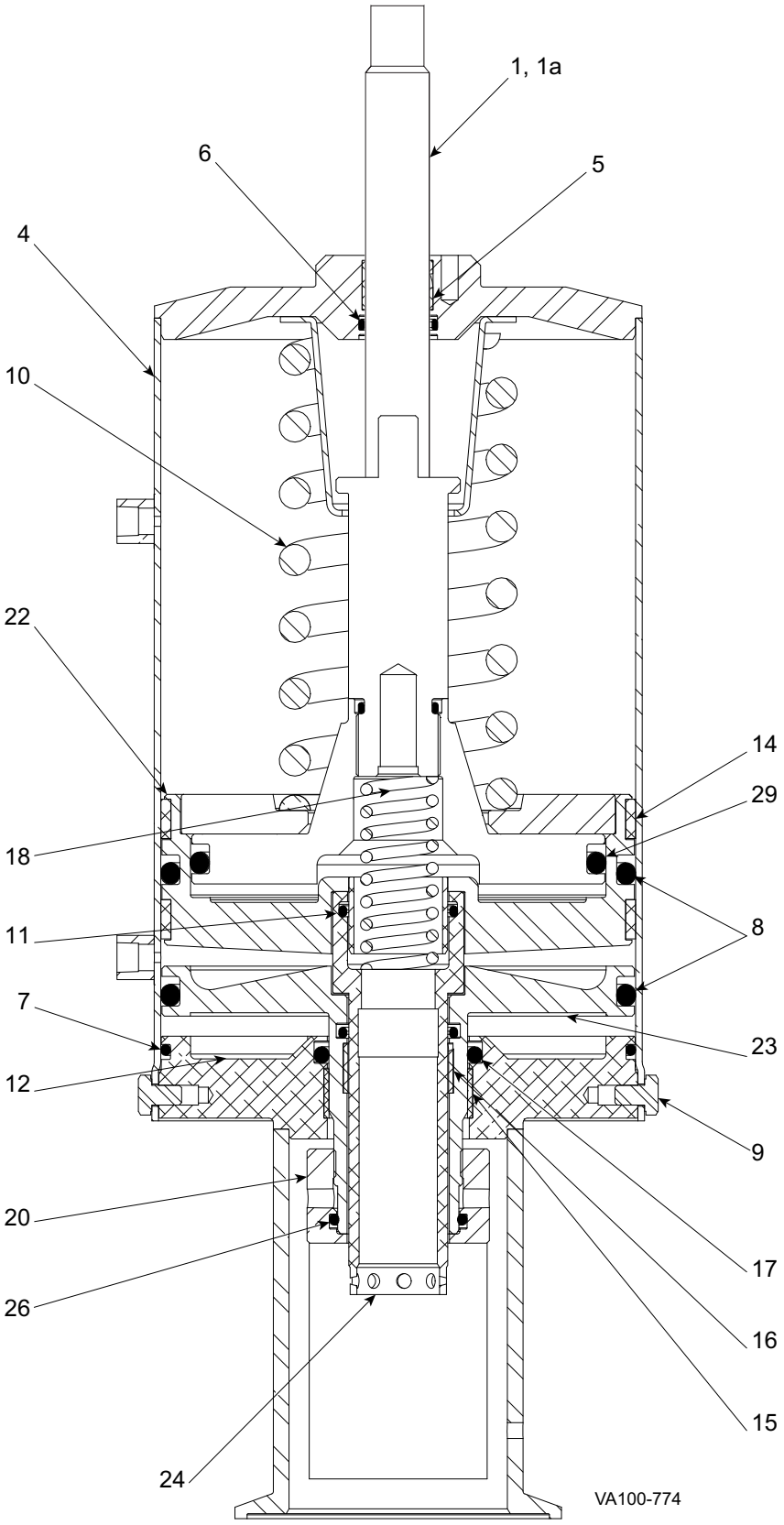
Notes: PL5027-CH188

* Recommended Spare Parts

*** See actuator parts lists

8. Quick Exhaust Valve not shown; item 30 indicates mounting location.

W75CP2 PMO Double-Seat Mix Proof Valve Actuator



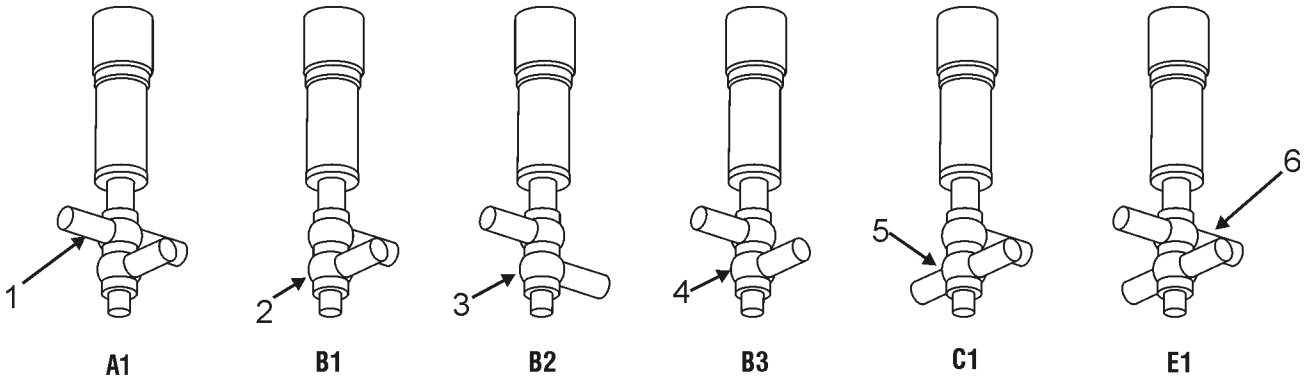
W75CP2 PMO Double-Seat Mix Proof Valve Actuator

	Item #	Part Description		Qty	2"	2.5", 3", 4"
	1	Indicator Stem - Visual		1	106050+	106003+
	1a	Indicator Stem - Control Top		1	107951+	131010+
	4	Cylinder		1	113099+	113112+
*	**5**	**Bearing, Indicator Stem**		1	102757+	102757+
*	**6**	**O-ring, Indicator Stem**	Nitrile	1	N70210	N70210
*	**7**	**O-ring, Cylinder**	Nitrile	1	N70240	N70255
*	**8**	**O-ring, Upper Seat Piston**	Nitrile	2	N70342	N70433
	9	Cap Screw, 1/4-20 x 3/8 lg.			30-68 (qty 4)	30-68 (qty 8)
	10	Piston & Spring Assembly		1	113679+	122039+
*	**11**	**O-ring, Adjusting Sleeve, Outer**	Nitrile	2	N70214	N70219
	12	Yoke	2"	1	120761+	--
			2.5"		--	120762+
			3"		--	128101+
			4"		--	128127+
*	**14**	**Bearing, Main Piston**		2	101995+	102052+
*	**15**	**Bearing, Lifting Piston**		1	109820+	109920+
*	**16**	**Bearing**		1	106047+	109919+
*	**17**	**O-ring, Adjusting Sleeve, Inner**	Nitrile	1	N70222	N70328
	18	Spring, Upper Stem		1	101946+	128072+
	20	Nut, Upper Seat Clean		1	131995+	122345+
	22	Main Piston		1	117215+	129932+
	23	Upper Seat Piston	2"	1	131997+	124543+
	24	Adjusting Sleeve	2"	1	117439+	116469+
*	**26**	**O-ring, adjustment collar**	Nitrile	1	N80026	N90222
*	**29**	**O-ring, Lower Seat Piston**	Nitrile	1	N70337	N70427

Notes: PL5027-CH190

*** Recommended Spare Parts**

W75CP2 PMO Double-Seat Mix Proof Valve Bodies



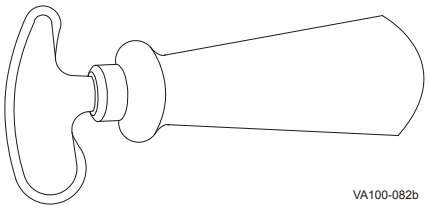
VA100-530

Item #	Part Description	2"	2-1/2"	3"	4"
1	Buttweld - A1	130760+	129946+	129961+	131018+
2	Buttweld - B1	130762+	129948+	129963+	131020+
3	Buttweld - B2	130763+	129949+	129964+	131021+
4	Buttweld - B3	130764+	129950+	129965+	131022+
5	Buttweld - C1	130761+	129947+	129962+	131019+
6	Buttweld - E1	130759+	129945+	129960+	131017+

PL5027-CH189

Installation Tools

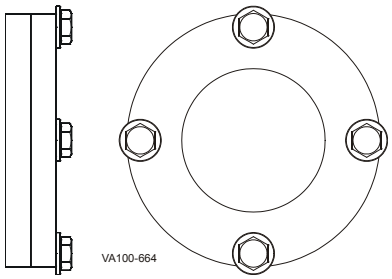
Tri Ring Tool



Tri Ring Tool	102797+

PL5027-CH85

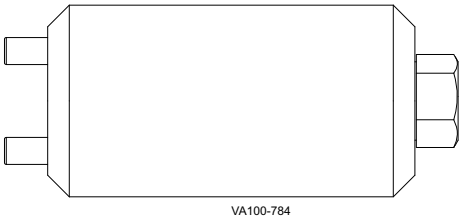
Seal Insertion Collar Tool



Valve Size	2"	2-1/2"	3"	4"
Part No.	120049+	120051+	120053+	120055+

PL5027-CH67a

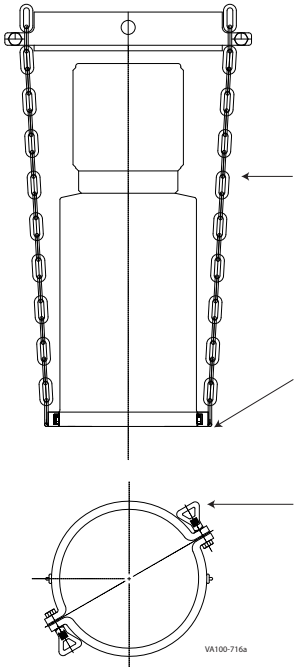
W75CP2 Stem Installation Tool



Valve Size	2"	2-1/2"	3"	4"
Part No.	132172+	132173+	132174+	132175+

PL5027-CH191

Mix Proof Valve Lifter



Stainless-steel chain is adjustable on the lifting bar to accommodate tight overhead clearances.

Provides lift at the balance point to allow easy maneuvering of the valve in crowded settings.

Lifting clamp is attached to the actuator base.

Valve Model, Size	Part No.
2-1/2" through 4" O.D.	127036+

PL5027-CH156D

Troubleshooting

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Leakage		
Leakage from vent/drain with valve closed	Upper or lower seat ring failure	Remove valve. Replace seat rings.
	Debris trapped in upper seat or lower seat	Inspect/change cleaning procedure to correct.
	Upper or lower seat not closed	Inspect inner and outer stems for galling and burrs on adapter.
		Check actuator function.
	Upper or lower seat clean activated	Check control sequence.
Leakage from vent/drain with valve open	Blocker radial seal failed	Replace seal.
	Valve seats not meshed together	Inspect inner and outer stems for galling and burrs.
	Small spring not holding upper stem in place	Check and replace small spring and stems in actuator.
Leakage around yoke	Internal adapter o-ring failure	Replace o-ring.
	External adapter o-ring failure	Replace o-ring.
Leakage through outer stem	Inner stem o-ring failure	Replace o-ring.
Operation		
Valve fails to open	Air pressure too low	Set air pressure to 72 psi (5 bar) minimum.
	Control failure	Check control sequence.
		Check control wiring and power source.
Valve fails to close	Controls failed	Check control sequence.
		Check control wiring and power source.
	Excess line pressure	A short air pulse to Port #3 is recommended after the valve is closed for precise positioning of the stems, to allow accurate sensing of the valve closed condition. Typical valve close control sequence: 1. De-energize solenoid #1 2. Delay 10 seconds 3. Pulse Solenoid #3 on for 1 second For solenoid valve port connections, see Figure 3 on page 13.

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Upper or lower seat fails to lift during seat lift	Actuator seal failure or no air	Confirm no air leaks from the actuator. Confirm solenoid operation.
Actuator moves when valve opened	Clamp loose	Tighten clamp with valve open.
Electrical		
No valve closed or open indication	Lower switch not adjusted properly	Adjust switch. See “Switch Adjustment” on page 25.
No valve open signal.	Upper switch not adjusted	Adjust switch. See “Switch Adjustment” on page 25.
Moisture in switch housing	Missing and/or damaged gaskets	Replace gaskets.

Notes

W75CP2 PMO

DOUBLE-SEAT MIX PROOF VALVE

SPX
WHERE IDEAS MEET INDUSTRY

THE WILLIAMS - CARVER COMPANY, INC.
4001 MISSION RD P.O. BOX #3140
KANSAS CITY, KS 66103-0140
Office (913) 236-4949 Fax (913) 236-9331
www.williamscarver.com

SPX FLOW TECHNOLOGY
611 Sugar Creek Road
Delavan, WI 53115
P: (262) 728-1900 or (800) 252-5200
F: (262) 728-4904 or (800) 252-5012
E: wcb@spx.com

ISSUED: 05/2013