SPXFLOW

INSTRUCTION MANUAL

W75 CP PMO

DOUBLE-SEAT MIX PROOF VALVE

FORM NO.: 95-03094 REVISION: 09/2018

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

OBSOLETE

Parts listed in this instruction manual are subject to be discontinued.
Please contact your local customer service representative for parts availability.

Waukesha Cherry-Burrell

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Warranty

LIMITED WARRANTY: Unless otherwise negotiated at the time of sale, SPX FLOW US, LLC (SPX FLOW) goods, auxiliaries and parts thereof are warranted to the original purchaser against defective workmanship and material for a period of twelve (12) months from date of installation or eighteen (18) months from date of shipment from factory, whichever expires first. If the goods or services do not conform to the warranty stated above, then as Buyer's sole remedy, SPX FLOW shall, at SPX FLOW's option, either repair or replace the defective goods or re-perform defective services. Third party goods furnished by SPX FLOW will be repaired or replaced as Buyer's sole remedy, but only to the extent provided in and honored by the original manufacturer's warranty. Unless otherwise agreed to in writing, SPX FLOW shall not be liable for breach of warranty or otherwise in any manner whatsoever for: (i) normal wear and tear; (ii) corrosion, abrasion or erosion; (iii) any good or services which, following delivery or performance by SPX FLOW, has been subjected to accident, abuse, misapplication, improper repair, alteration, improper installation or maintenance, neglect, or excessive operating conditions; (iv) defects resulting from Buyer's specifications or designs or those of Buyer's contractors or subcontractors other than SPX FLOW; or (v) defects resulting from the manufacture, distribution, promotion or sale of Buyer's products.

THE WARRANTIES CONTAINED HEREIN ARE THE SOLE AND EXCLUSIVE WARRANTIES AVAILABLE TO BUYER AND SPX FLOW HEREBY DISCLAIMS ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE FOREGOING REPAIR, REPLACEMENT AND RE-PERFORMANCE OBLIGATIONS STATE SPX FLOW'S ENTIRE AND EXCLUSIVE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS.

Shipping Damage or Loss

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

Warranty Claim

Warranty claims must have a **Returned Material Authorization (RMA)** from the Seller or returns will not be accepted. Contact 800-252-5200 or 262-728-1900.

Claims for shortages or other errors must be made in writing to Seller within ten (10) days after delivery. This does not include transit shortage or damages. 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

SPX FLOW 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)
2. National Fire Protection Association (NFPA)
3. National Electrical Code (NEC)
4. American National Standards Institute (ANSI)

⚠WARNING

Severe injury or death can result from electrical shock, burn, or unintended actuation of 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

Before putting SPXFLOW equipment into operation, the operator shall analyze the application for all foreseeable risks, their likelihood to occur and the potential consequences of the identified risks as per ISO 31000 and ISO/IEC 31010 in their actual current version.

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 equipment manufacturer's OEM renewal parts or kits. Adjust or repair in accordance with the manufacturer's instructions.

Periodic Inspection: 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

DANGER: *Immediate hazards which WILL result in severe personal injury or death.*

⚠WARNING

Hazards or unsafe practices which COULD result in severe personal injury or death.

⚠CAUTION

Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

Care of Component Materials

NOTE: *SPX FLOW recommends the use of an FDA-approved anti-seize compound on all threaded connections.*

⚠WARNING

Failure to comply with the Care of Component Materials could lead to bodily injury.

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 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. For additional product information, please see our website at www.spxflow.com/en/waukesha-cherry-burrell/.

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 SPX FLOW. Waukesha Cherry-Burrell brand products are subject to intensive intermediate and final leakage and functional tests.

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

W75CP PMO Mix Proof valves are double-seat shutoff valves for separating different media. Valves are equipped with a drain/vent for the space between the seats equal in size to the largest port into the valve body. Seats are tended by stems equipped with electrical switches capable of signaling whether the upper and/or lower seat is in proper location. W75CP PMO valves are air operated (air-to-raise).

Factory Inspection

Each Waukesha Cherry-Burrell brand 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: EPDM (optional); FKM (standard); FFKM upon request

Applications

W75CP 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 brand 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

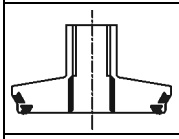
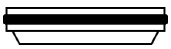
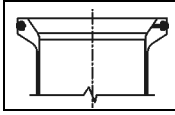
	Fluorelastomer (FKM) Seals	EPDM Seals
Thermal Range of Application	32°F to 375°F (0°C to 190°C)	0°F to 275°F (-18°C to 135°C)
Chemical Resistance	Silicone oil and grease	Silicone oil and grease
	Ozone, aging and weather resistant	Ozone, aging and weather resistant
	Oils and fats	Hot water and steam up 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, Formic and acetic acids	Mineral oil products (oils, greases and fuels)

Contact SPX FLOW 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	EPDM	Operation 280°F (137°C) Sterile 275°F (135°C)
	Blocker Insert		or
	Radial - Lower	FKM	Operation 350°F (176°C) Sterile (Consult Factory)

Pressure Ratings

Holding Pressure (all valve 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

⚠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.

Prior to installing, thoroughly inspect each valve. When using buttweld 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.

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

- Prior to installation, remove the stem 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.

NOTE: *Orient the valve so that the "UP" inscription (near the adapter-to-body connection) is pointed toward the actuator. See Figure 1.*

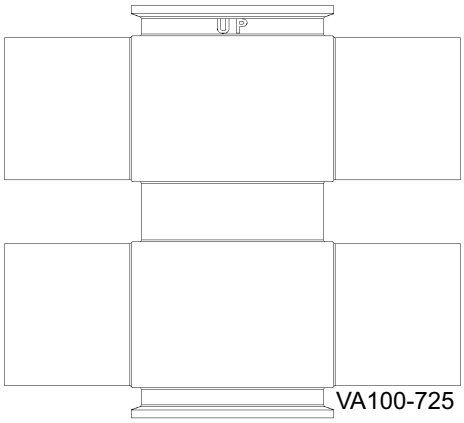


Figure 1 - Valve orientation

⚠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

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

Flow Direction

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

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 2, item C).
2. Install supports on both sides of the valves as close as possible to the connections. (Figure 2, item D).
3. Install supports at each change of pipeline direction. (Figure 2, 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 2, item G).

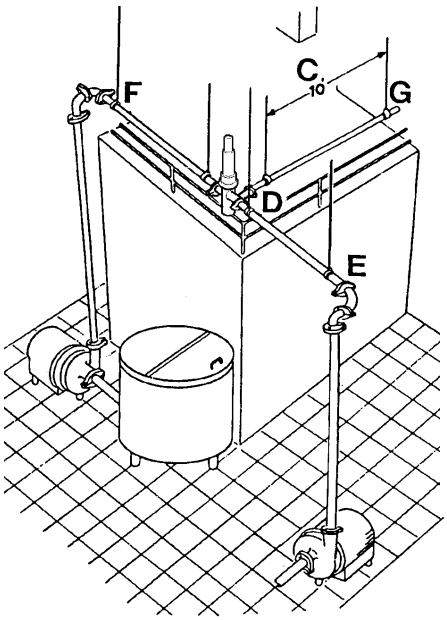


Figure 2 - Pipeline Support

⚠ 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

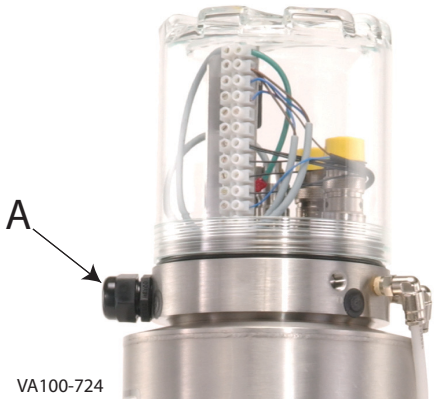


Figure 3 - Control Top Wire Connection Point

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 14.
2. Using caution, lift the actuator assembly and set the actuator in the body assembly.
3. Lower the valve slowly into the body, making sure the lower stem enters the lower bearing carrier.
4. Tightly clamp the yoke/body flange.
5. Connect the air lines to 1, 2 and 3, as shown in Figure 4 on page 14.
6. Connect the electrical control cord to the valve at location A (see Figure 3).

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.*

7. Operate the valve through the four conditions (closed, open, upper seat cleaning and lower seat cleaning). See Table 2 on page 14.

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 W75CP 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 4).

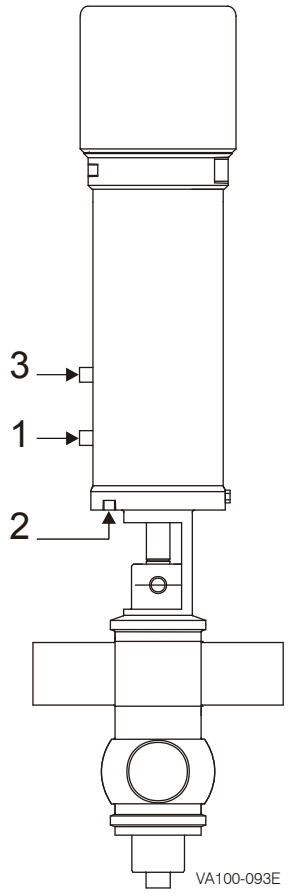


Figure 4 - Solenoid Valve Port Connections

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.

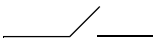
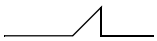
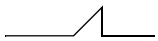
Air connections are 1/8" NPT x 1/4" push-to-connect poly tube fittings.

* 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. W75CP PMO valves are spring-to-closed fail-safe into the blocked position. SPX FLOW does not offer control systems, only the PMO double-seat valve.

Valve Operating Conditions

See Figure 4 on page 14 for port positions.

Valve Open

The valve is open when Port 1 is pressurized and Ports 3 and 2 are vented. See Figure 5 for valve open position illustration.

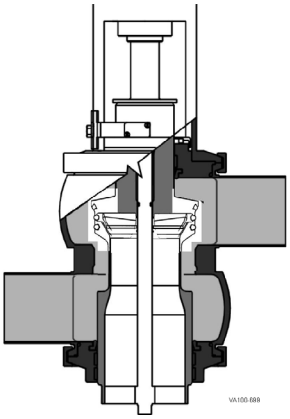


Figure 5 - Valve Open

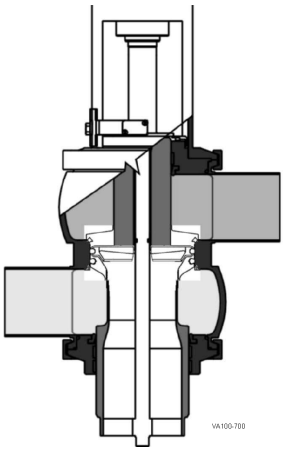


Figure 6 - Valve Closed

Valve Closed

The valve is closed when Ports 3, 1 and 2 are vented. See Figure 6. The large spring closes the valve to fail-safe position as indicated by the position detecting proximity switches.

NOTE: *For high-pressure applications, see the recommending closing control sequence listed after “Excess line pressure” in the "Troubleshooting" section on page 36.*

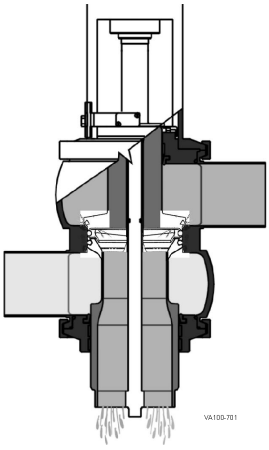


Figure 7 - Valve Closed, Upper Seat Lifted

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. See Figure 7.

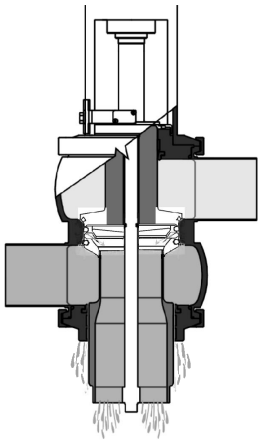


Figure 8 - Lower Seat Lowering

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. See Figure 8.

Test Procedures

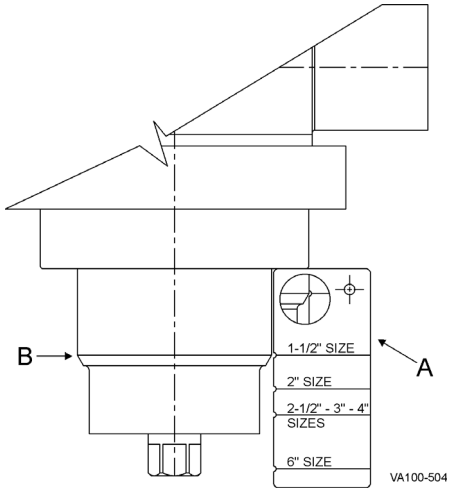


Figure 9 - Test Gauge and Stem Alignment

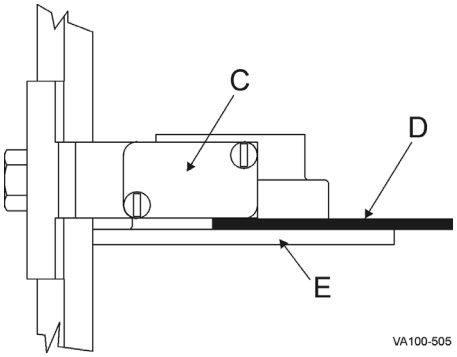


Figure 10 - Proximity Switch Location

Stem Gauge

Confirm the proper location of the lower valve stem. Place a test gauge (Figure 9, item A) as shown on the lower shoulder of the stem. The shoulder should line up with the gauge.

Corrective Action: Check the stem assembly, ensuring that the lower and upper stems are fully turned in until a metal-to-metal stop is achieved.

Confirm the yoke area proximity switch location for detection of upper stem movement within 1/16". Insert a test gauge sideways between the detection cap and the switch with the valve in the closed position.

The proximity switch (Figure 10, item C) should contact the gauge (item D) without compressing the detection cap (item E).

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 4 on page 14 for corresponding ports. See Figure 9 and Figure 10 to confirm the stem and switch positions using a stem gauge.

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 15. 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 15.
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 15. 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 36.

Test Procedures for 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 W75CP 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 W75CP 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 17).
2. Choose upper body cleaning or lower body cleaning.
3. Energize CIP for the selected body. Confirm that CIP pressure is present in the selected body.

⚠WARNING

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

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

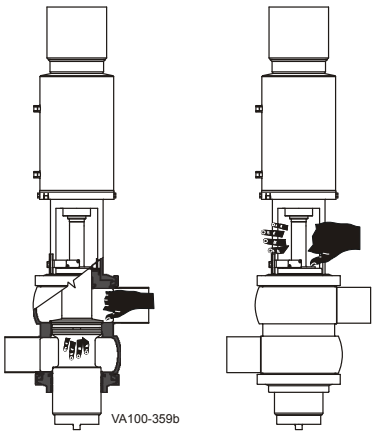
Maintain an adequate stock of replacement parts. Maintenance intervals should be determined by user and specific application, based on the following conditions:

- 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 36.)
- Pneumatic connections:
- Air pressure at supply connection
- Air lines for kinks and leaks
- Threaded connections for tight fit
- Clean air filter at regular intervals
- Electrical connections secure on control module:
- Wire connections tight on terminal strip
- Electrical connections to control module
- Threaded strain relief for tight fit.

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 cleaning to ensure effective cleaning and sanitizing. Expose all product-contact surfaces to the appropriate cleaning solutions.*

⚠CAUTION

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

⚠CAUTION

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

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

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. The vent outlet/cavity must be unobstructed to guarantee the leakage of fluid to atmosphere.

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

The following statements are intended as suggestions or guidelines for cleaning procedures and will vary by application:

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.

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 lower 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. This seat clean cycle time of each valve should be visually confirmed during commissioning.

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 13, item B) and nut (Figure 20, item N, on page 26). 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.*

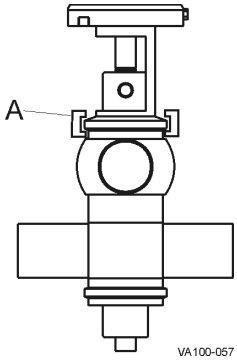


Figure 11 - Location of Adapter Clamp

⚠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.
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 11, 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 actuator and stems out of the valve body.
8. Move the valve to a work station.

Disassembly of Valve Stems

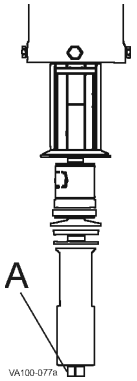


Figure 12 - Valve Stem Removal

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

1. Using an open end wrench, remove the lower stem (Figure 12, 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 13, item B), turn the stem counter-clockwise and remove it from the actuator. If the adapter (item C) comes out of the yoke, handle it with care. The blocker insert is retained to the upper stem. To re-install, tighten it clockwise until it is stopped.
3. To remove the blocker from the insert, grasp the upper stem (see page 24, Figure 17, item E) firmly and unscrew the retainer (Figure 17, item A).

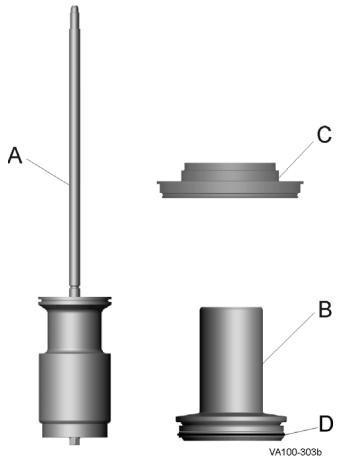


Figure 13 - Stem Removal

Table 4: Callout table for Figure 13

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

Adapter Bearings and O-rings

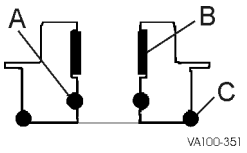


Figure 14 - Adapter O-rings and Bearing

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 upper stem.
2. Remove and replace the O-ring (Figure 14, item A) inside the adapter.
3. Check the split bearing (Figure 14, 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 or pick 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 upper 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 upper stem.
2. Slide or cut the outer O-ring (Figure 14, 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

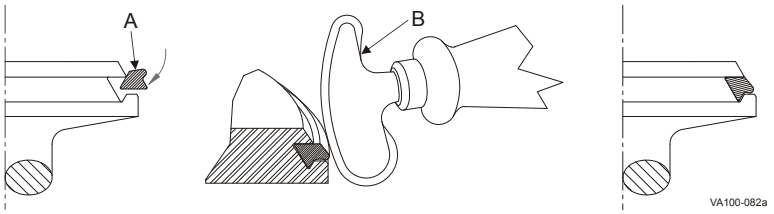


Figure 15 - Installing New Tri Ring Seat

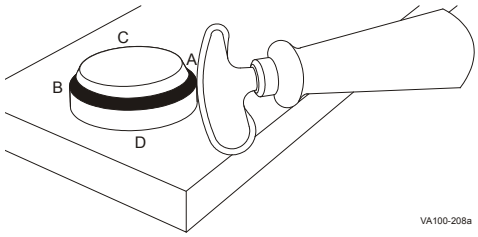


Figure 16 - Pressing Tri Ring Into Plug

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 15, 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.
5. Start the Tri Ring as shown in Figure 15.
6. Using the installation tool, part number 102797+ (Figure 15, item B), press the Tri Ring into the plug at locations A, B, C, and D (Figure 16). If the tool is not used, DO NOT use a knife or any other sharp item that will tear or cut the Tri Ring.
7. To finish installation, press small sections of the seal, alternating from side to side (A-B-C-D), avoiding large loops of seal.
8. When properly installed, the Tri Ring seat lip will protrude slightly from the seat edge as shown in Figure 15.

Radial Seal Installation

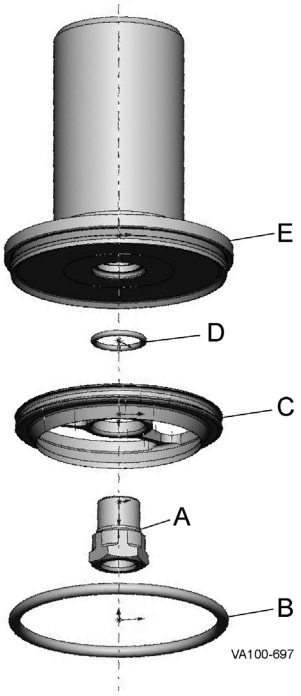


Figure 17 - Upper Stem

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.
5. Place the assembly tool over the stem, so the beveled angles are touching the O-ring, and extrude the O-ring seal into the groove by evenly tightening the cap screws on the installation tool. For a list of installation tools, see “Installation Tools” on page 35.
6. Remove the tool. The dovetail groove permanently retains the O-ring seal.
7. Press in the blocker insert radial seal (Figure 17, item B) by hand.

Table 5: Callout table for Figure 17

A. Retainer
B. Blocker Insert Radial Seal
C. Blocker Insert
D. O-Ring
E. Upper Stem

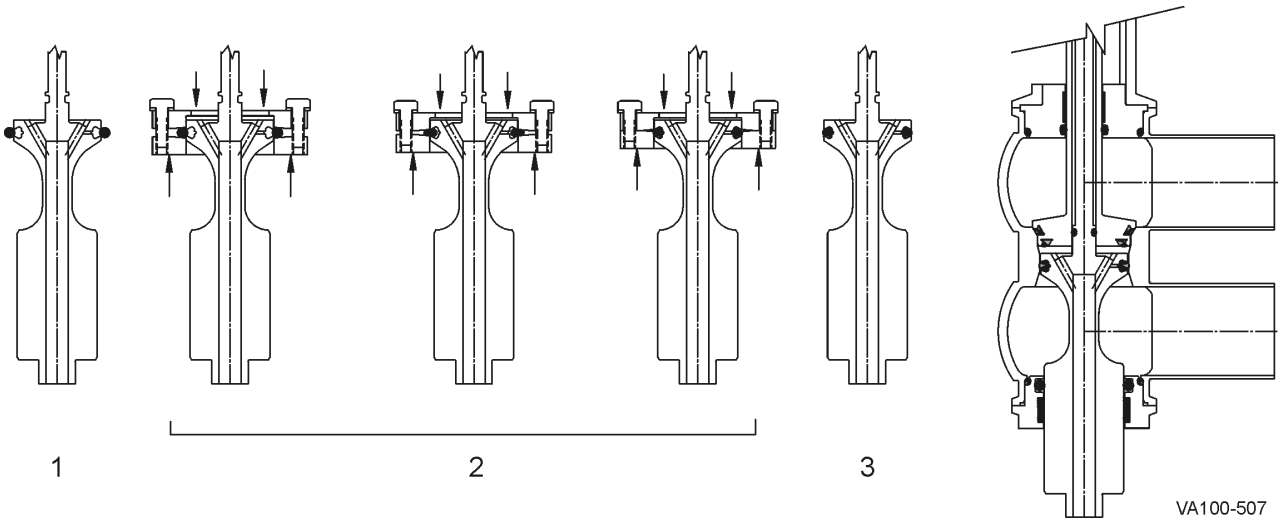


Figure 18 - Radial Seal Installation

Lower Bearing Carrier O-ring and Bearing Replacement

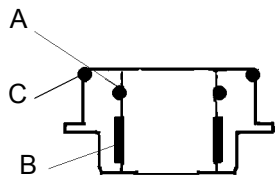


Figure 19 - Lower Bearing Carrier

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

1. Remove and replace the O-ring (Figure 19, item A) located inside the lower bearing carrier.
2. Check the split bearing (Figure 19, 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 or pick 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 lower 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 19, 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.

⚠CAUTION

Although WCB fully-maintainable actuators are designed with a contained spring for safety, always use caution when handling any piston/spring assembly as any compressed coil spring can be extremely dangerous.

1. See “Disassembly of Valve Stems” on page 21.
2. Remove the cap screws (Figure 20, 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.
7. Assemble the stack components as shown in Figure 20. 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 Cleaning Piston
N. Nut

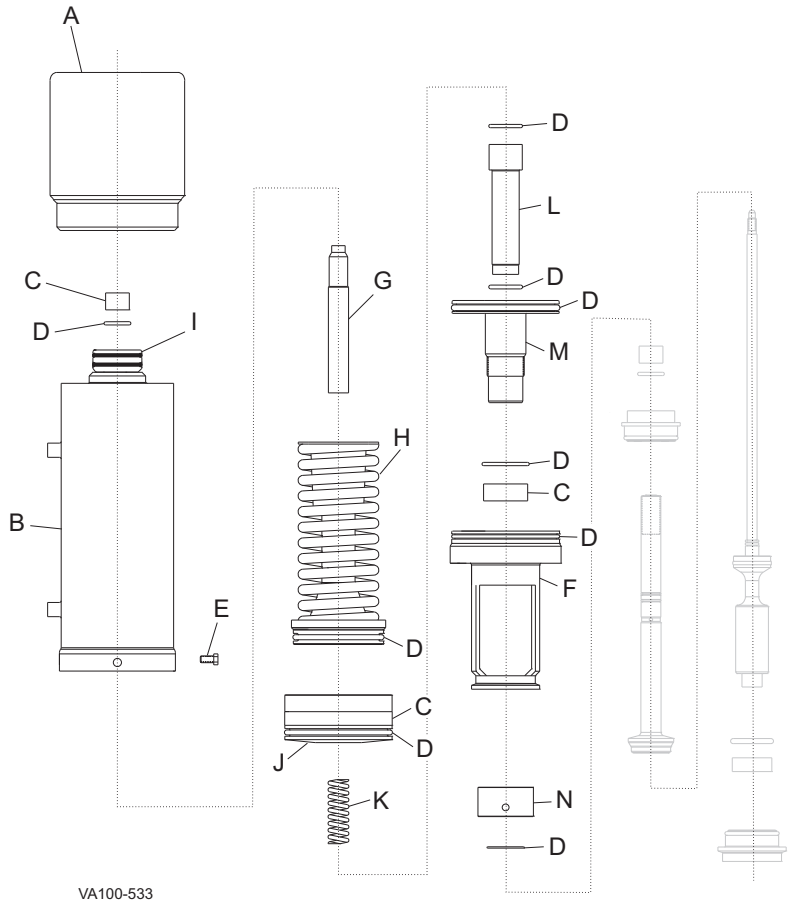


Figure 20 - Actuator Assembly (generic valve assembly shown for reference)

Switches

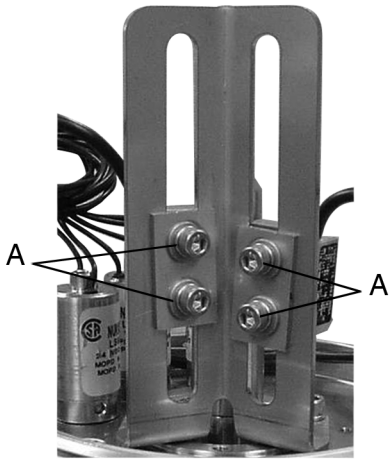


Figure 21 - Switch Adjustment

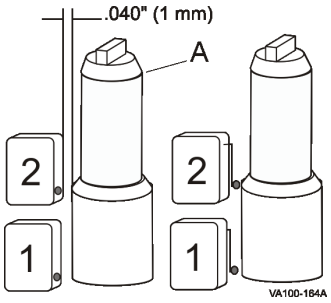


Figure 22 - Valve Open Adjustment

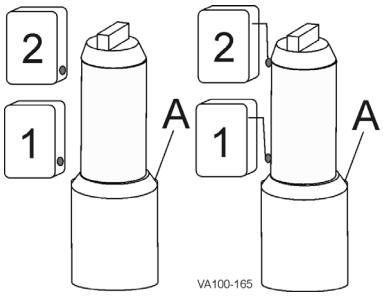


Figure 23 - Valve Closed Adjustment

Micro Switch

- A mechanical switch using a lever arm and roller that is compressed or released by stem movement.
- AC/DC 24VDC or 110VAC
- The position of the actuator stem is felt by a roller

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 21, 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 21, 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 22). 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 23). 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).*

NOTE: *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

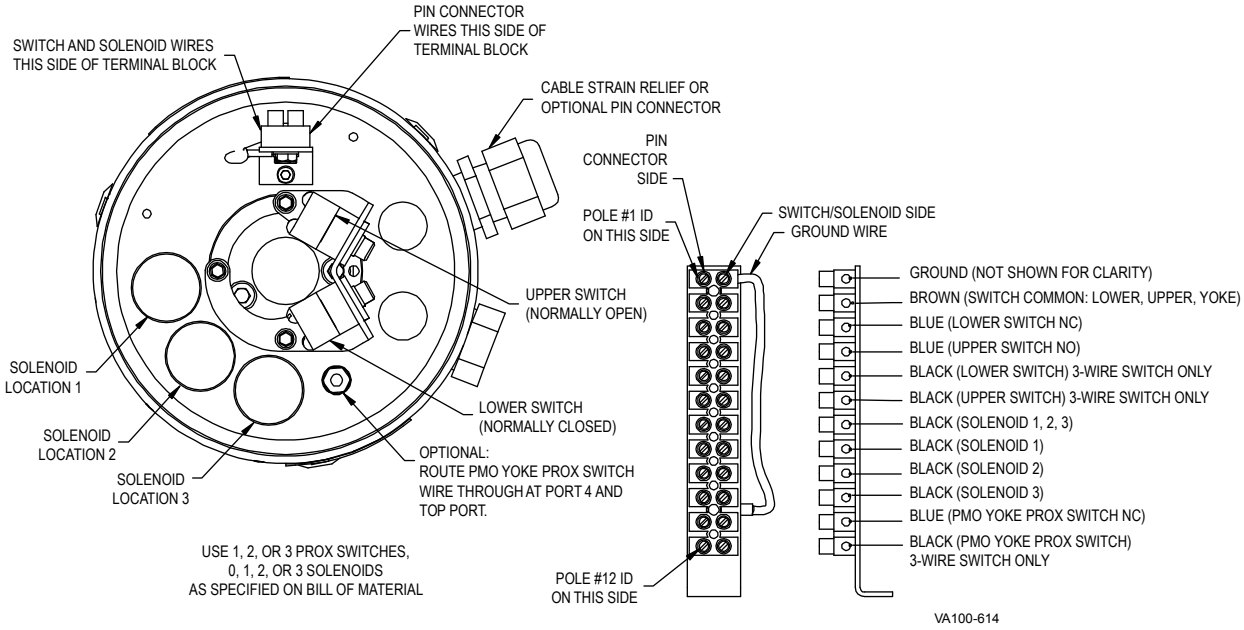


Figure 24 - Strain Relief Proximity Switch

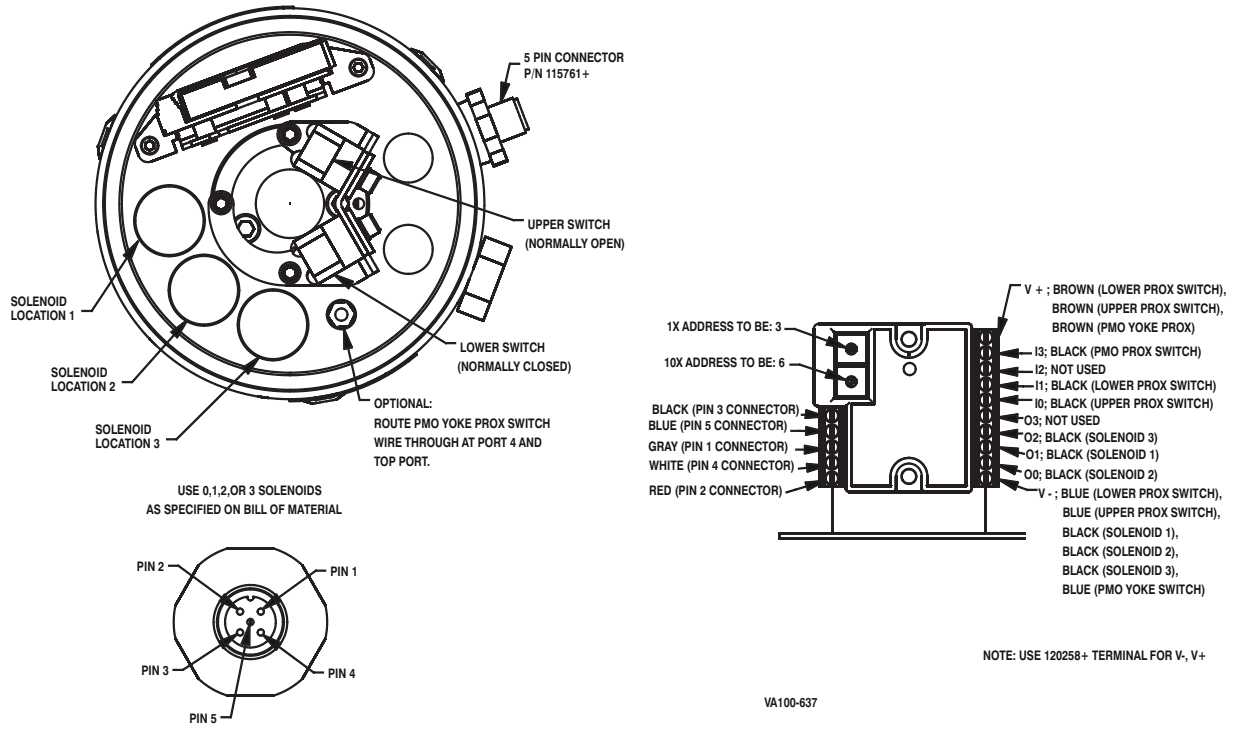


Figure 25 : 5-Pin Eurofast with DeviceNet Card, Mix Proof

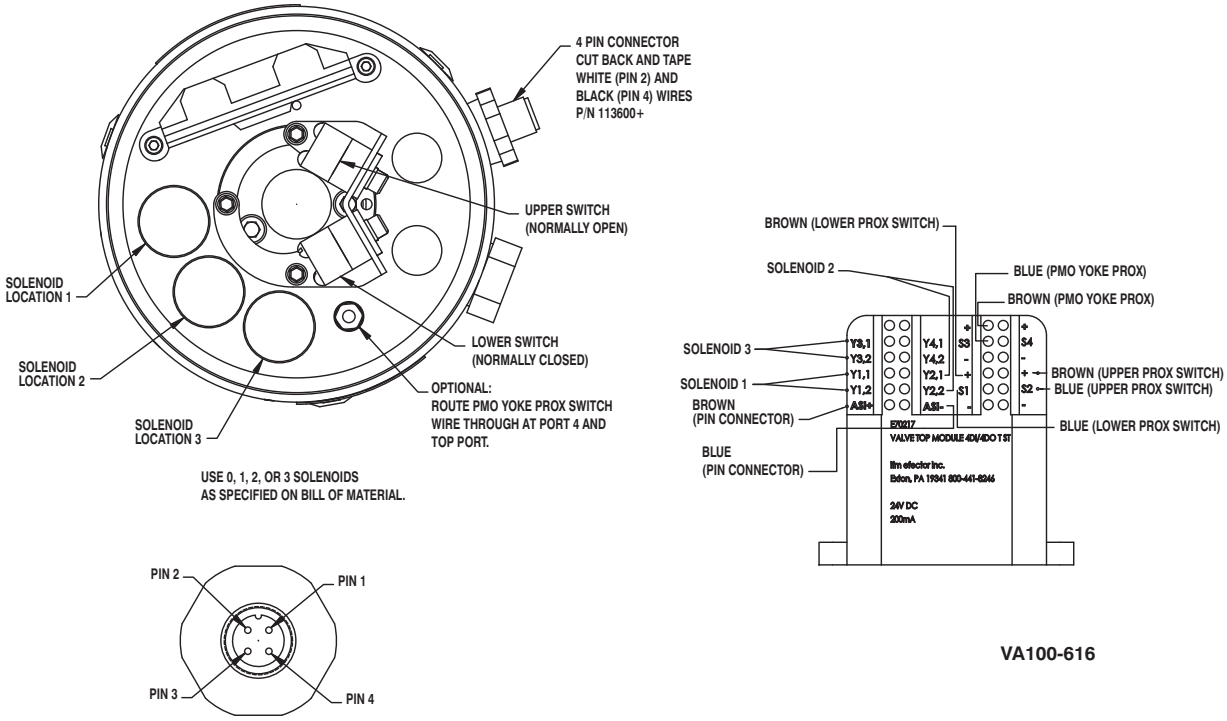
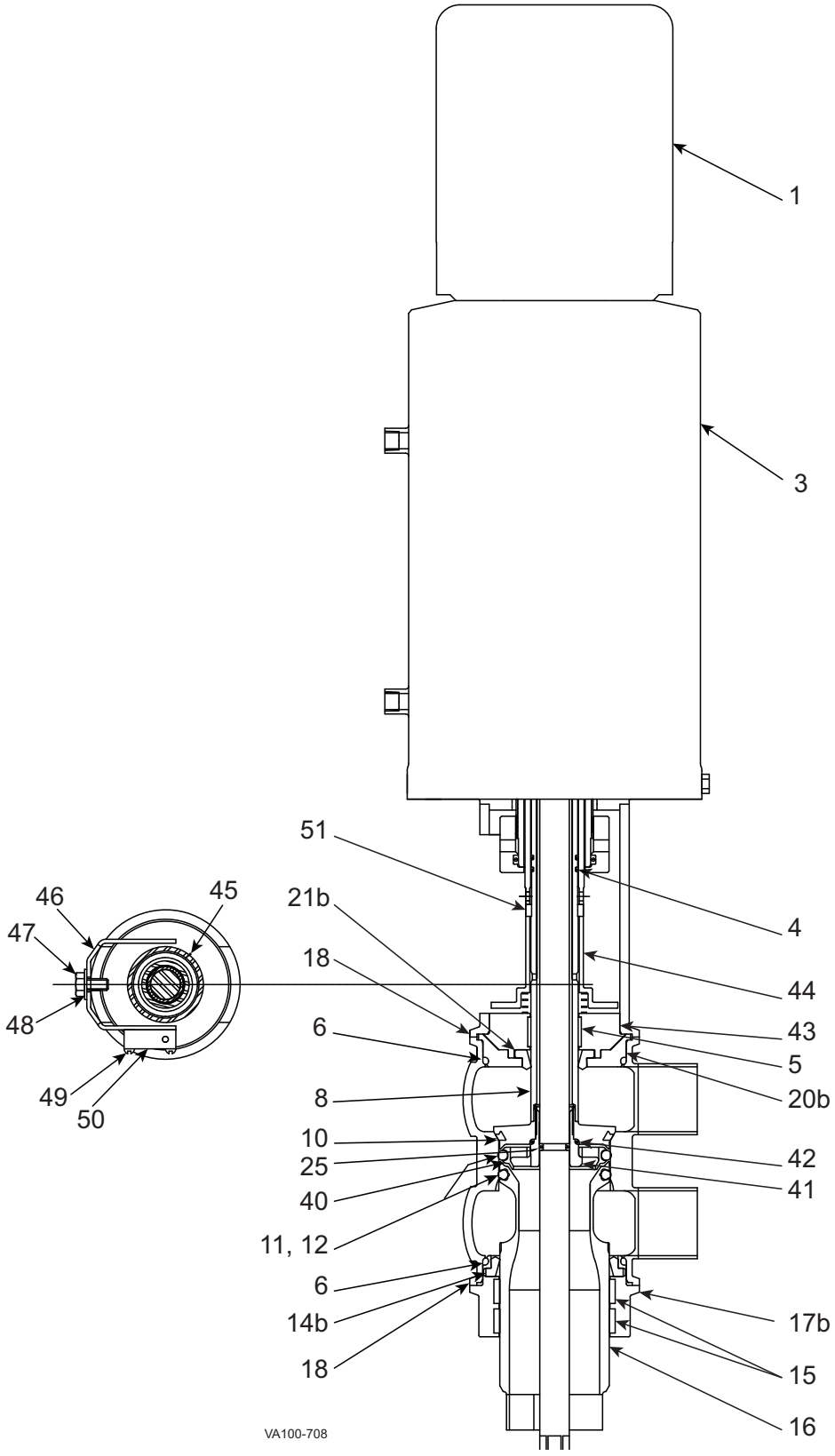


Figure 26 : 4-Pin Eurofast with AS-I Card

Parts Lists

W75CP PMO Double-Seat Mix Proof Valves



W75CP PMO Double-Seat Mix Proof Valves

	Item #	Part Description		1-1/2"	2"	2-1/2"	3"	4"
	1	Control Top		Contact Factory				
	3	Actuator		See actuator parts list				
*	**4**	**O-ring, Outer Stem (qty 2)**	**Nitrile**	N90020	N90020	N90020	N90020	N90020
*	**5**	**Bearing, Upper Adapter**		106047+	106047+	106047+	102002+	114231+
*	**6**	**O-ring, Body**	**EPDM**	E70232	E70236	E70244	E70252	E70258
			FKM	V70232	V70236	V70244	V70252	V70258
	8	Stem, Upper Assembly (see note 1)		126293+	126318A	126336+	130800+	130801+
*	**10**	**Seat Ring - Tri Ring, Upper**	**EPDM**	102487CP	111633CP	102492CP	102491CP	102738CP
			FKM	107973CP	111635CP	107978CP	107977CP	108020CP
*	**11**	**Seat Ring - O-Ring, Spray Blocker**	**EPDM**	E80328	E80333	E80340	E80343	E80354
			FKM	V80328	V80333	V80340	V80343	V80354
*	**12**	**Seat Ring - O-ring, Lower**	**EPDM**	E80328	E80333	E80340	E80343	E80354
			FKM	V80328	V80333	V80340	V80343	V80354
*	**14b**	**Wiping Stem Seal, Lower**	**EPDM**	116192+	116197+	116201+	116203+	116773+
			FKM	116193+	116198+	116202+	115624+	116774+
*	**15**	**Bearing, Lower Seal Retainer**		106049+	106048+	102003+	112560+	114232+
	16	Stem, Lower Assembly (see note 2)		126296A	126321A	126335A	126251A	126338A
	17b	Seal Retainer, Wiping Stem Seal		116529+	116544+	116559+	116272+	116573+
	18	Clamp		119-34	119-51	119-87	119-71	119-123
	20b	Adapter, Wiping Stem Seal		116522+	116537+	116552+	116273+	116574+
*	**21b**	**Wiping Stem Seal, Upper**	**EPDM**	116184+	116184+	116184+	116194+	116203+
			FKM	116185+	116185+	116185+	115625+	115624+
*	**25**	**O-ring**	**EPDM**	E70111	E70111	E70111	E70111	E70111
			FKM	V70111	V70111	V70111	V70111	V70111
	40	Baffle		126291+	126310+	126325+	126248+	126349+
	41	Bolt, Baffle		126292+	126292+	126253+	125253+	126341+
*	**42**	**O-ring**	**EPDM**	E70117	E70117	E70117	E70117	E70117
			FKM	V70117	V70117	V70117	V70117	V70117
	43	Adapter, Upper (see note 7)		116523+	116538+	116553+	N/A	N/A
	44	Switch Target		126796+	126698+	126698+	112558+	114214+
	45	Spring, Switch Target		60091+	60091+	60091+	126807+	114233+
	46	Bracket, Switch Target		111619+	111619+	111619+	112556+	114215+
	47	HHCS 1/4-20 x 3/8 Bolt, Switch Target		30-68	30-68	30-68	30-68	30-68
	48	1/4" Washer, Switch Target		43-27	43-27	43-27	43-27	43-2
	49	RHMS 4-40 x 5/8 LG., Switch Target		30-69	30-655	30-655	30-655	30-69
	50	Prox. Switch, Switch Target, 2-wire		17-79	17-79	17-79	17-79	17-79
		Prox. Switch, Switch Target, 3-wire (DeviceNet)		17-79A	17-79A	17-79A	17-79A	17-79A
	51	Ring, Stop		122357+	122357+	122357+	122357+	122357+

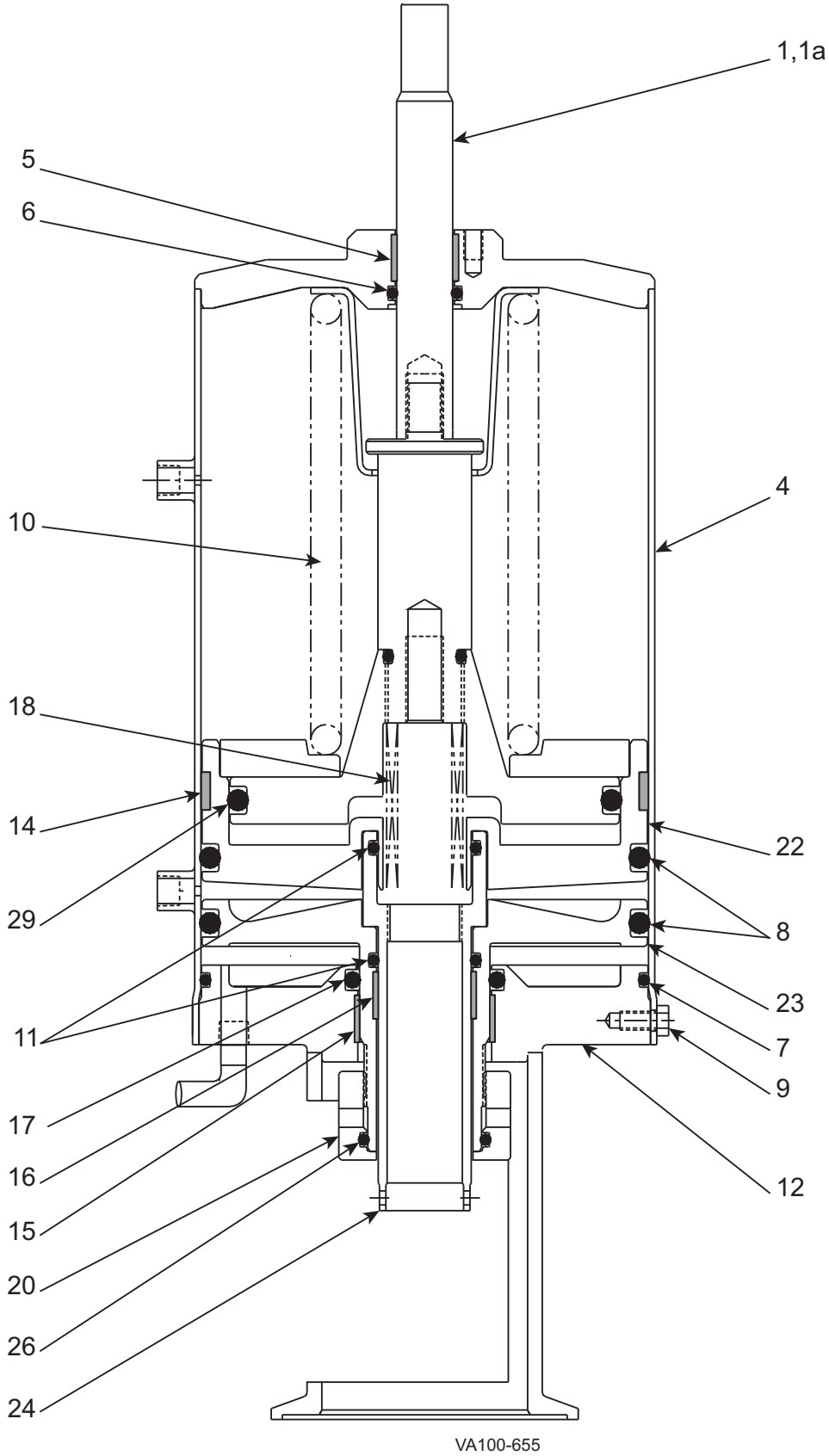
PL5027-CH144

Notes:

* Recommended Spare Parts

1. Part number includes upper stem and coupling sleeve, which are assembled together.
2. Part number includes lower stem and stem bushing, which are assembled together.
4. Unless otherwise noted, quantity required is 1.
6. POA = Part # on availability; N/A = not available with this design.
7. Item 43: The 3" and 4" sizes are one-piece design and so do not have an upper adapter.

W75CP PMO Double-Seat Mix Proof Valve Actuator



W75CP PMO Double-Seat Mix Proof Valve Actuator

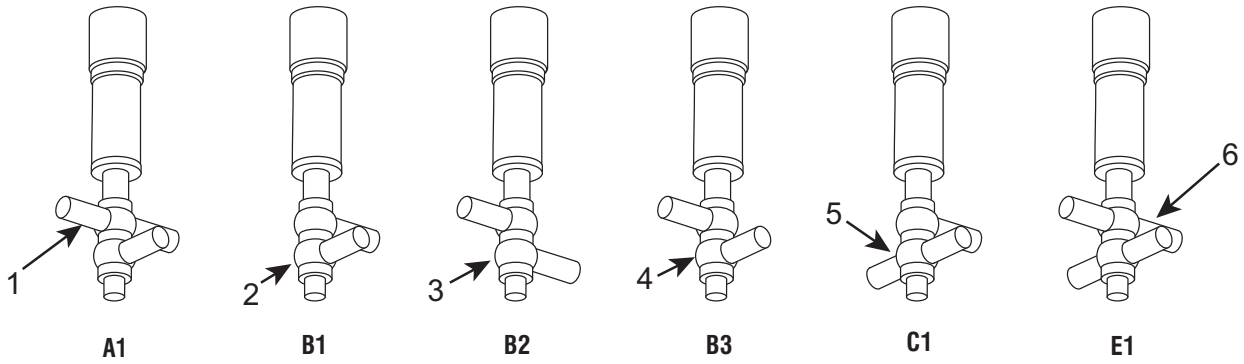
	Item #	Part Description, 6" Diameter Actuator		Qty	Valve Size				
					1-1/2"	2"	2-1/2"	3"	4"
	1	Indicator Stem - Visual		1	107951+				
	1a	Indicator Stem - Control Top		1	119487+				
	4	Cylinder		1	113112+				
*	**5**	**Bearing, Indicator Stem**		1	102757+				
*	**6**	**O-ring, Indicator Stem**	Nitrile	1	N70210				
*	**7**	**O-ring, Cylinder**	Nitrile	1	N70255				
*	**8**	**O-ring, Upper Seat Piston**	Nitrile	2	N70433				
	9	Cap Screw, 1/4-20 x 3/8 lg.		8	30-68				
	10	Piston & Spring Assembly		1	122037+	122038+	113678+	122039+	122039+
*	**11**	**O-ring, Adjusting Sleeve, Outer**	Nitrile	2	N70219				
	12	Yoke		1	116818+	116776+	116834+	116938+	114209+
*	**14**	**Bearing, Main Piston**		1	102052+				
*	**15**	**Bearing, Lifting Piston**		1	109920+				
*	**16**	**Bearing**		1	109919+				
*	**17**	**O-ring, Adjusting Sleeve, Inner**	Nitrile	1	N70328				
	18	Spring, Upper Stem		1	128072+				
	20	Nut, Upper Seat Clean		1	122345+				
	22	Main Piston		1	116472+				
	23	Upper Seat Piston		1	122346+				
	24	Adjusting Sleeve		1	116469+				
*	**26**	**O-ring, adjustment collar**	Nitrile	1	N90222				
*	**29**	**O-ring, Lower Seat Piston**	Nitrile	1	N70427				

PL5027-CH146

Notes:

* Recommended Spare Parts

W75CP PMO Double-Seat Mix Proof Valve Bodies



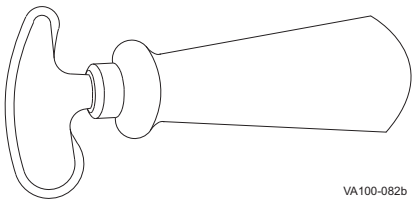
VA100-530

Item #	Part Description	1-1/2"	2"	2-1/2"	3"	4"
1	Buttweld - A1	126299+	126313+	126328+	126242+	126344+
2	Buttweld - B1	126301+	126315+	126330+	126244+	126346+
3	Buttweld - B2	126302+	126316+	126331+	126245+	126347+
4	Buttweld - B3	126303+	126317+	126332+	126246+	126348+
5	Buttweld - C1	126300+	126314+	126329+	126243+	126345+
6	Buttweld - E1	126298+	126312+	126327+	126241+	126343+

PL5027-CH145

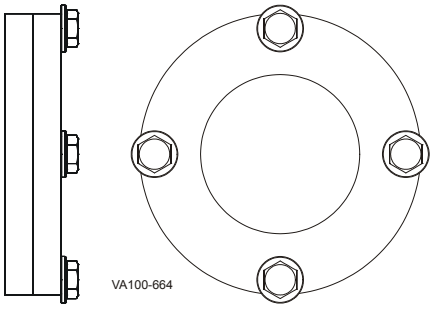
Installation Tools

Tri Ring Tool



Tri Ring Tool: Part number 102797+

Seal Insertion Collar Tool



Valve Size	1-1/2"	2"	2-1/2"	3"	4" *
Part No.	120050+	120052+	120054+	120056+	120058+

PL5027-CH185

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 4 on page 14.
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.

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Electrical		
No valve closed or open indication.	Lower switch not adjusted properly	Adjust switch. See “Switch Adjustment” on page 27.
No valve open signal.	Upper switch not adjusted	Adjust switch. “Switch Adjustment” on page 27.
Moisture in switch housing.	Missing and/or damaged gaskets	Replace gaskets.

Notes

W75 CP PMO

DOUBLE-SEAT MIX PROOF VALVE

SPXFLOW

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