



Operation and Maintenance Manual W75RS PMO Double Seat Mix Proof Valves with the W-Series 2-Piece Control Module



Read and understand this manual
prior to installing, operating or servicing this equipment.



®
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Waukesha Cherry-Burrell 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 WCB in good condition. WCB 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 WCB 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 web site at <http://www.spxpe.com/sites/wcb/literature.asp>.

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  standards for sanitation, design, and style.

W75RS PMO Mix Proof valves are double seat shutoff valves for separating different media. The valves are equipped with a drain/vent for the space between the seats equal in size to the largest port into the valve body. The seats are tended by stems equipped with electrical switches capable of signaling whether the upper and/or lower seat is in the proper location. W75RS PMO valves are air-operated (air-to-raise).

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)
- Non-Product: ASTM 304 (UNS-S30400); (DIN-1.4301)
- Seat Material: Tri Ring (optional)
- Elastomers: EPDM (optional)
FKM (standard)

Equipment Serial Number

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

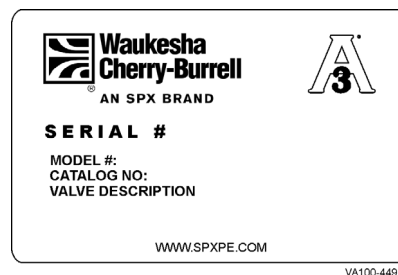


Figure 1 - Serial Number Label

Applications

W75RS PMO valves allow for the separation of milk and milk products from cleaning and sanitizing solutions, and are designed for installation in a milk processing system operating in compliance with the Pasteurized Milk Ordinance and M-A-76 Supplement #1. The valves are PMO Section 7, Item 15p(B) compliant, and meet 3-A standards for sanitation and T-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.

Operating Parameters

Temperature Range:

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.

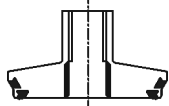
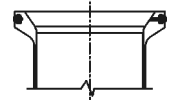
If operating below 32°F (0°C):

- Ensure that the control air has an appropriately low dew point.
- Protect the valve stems from icing to ensure a long working life for the valve stem seals.

Solenoid valves should not be used in the control module in room environments below 32°F (0°C) and over 180°F (82°C), as their function cannot be guaranteed. In those cases, install the solenoid valves in a separate solenoid cabinet.

Seal Material:	Fluorelastomer (FKM)	EPDM
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	Hot water and steam up to 275°F (135°C)
<i>Contact WCB Application Engineering for other fluid compatibility.</i>	Aliphatic, chlorinated, and aromatic hydrocarbons	Many organic and inorganic acids
	Oils and fats	Cleaning agents, soda and potassium alkalis
	Ozone, aging, and weather resistant	Silicone oil and grease Many polar solvents (alcohols, ketones, esters) Ozone, aging, and weather resistant
Not compatible with:	Superheated steam Formic and acetic acids	Mineral oil products (oils, greases, and fuels)

Seat Options

SEAT TYPE	MATERIAL / MAXIMUM TEMP.
 <p>Tri Ring (TR) - Upper</p>	<p>EPDM Operation 280°F (137°C) Sterile 275°F (135°C)</p>
 <p>Radial - Lower</p>	<p>FKM Operation 350°F (176°C) Sterile (Consult Factory)</p>

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.

Pressure Ratings

Operating Pressure: 1-1/2" - 3" sizes = 150 psi (10.3 bar); 4" size = 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. Allow 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.



CAUTION: Milk and milk products must be isolated away from the valve prior to maintenance.

Welding Instructions

Prior to installing, thoroughly inspect each valve. When using butt-weld two-piece body valves, use clamp connections on either the upper or lower body to allow the o-ring seal between the bodies to be serviced.

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



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

- 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.



CAUTION: Welding must be performed by qualified personnel.

Air Supply

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 the 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 it to the electrical supply.

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

Pipeline Support

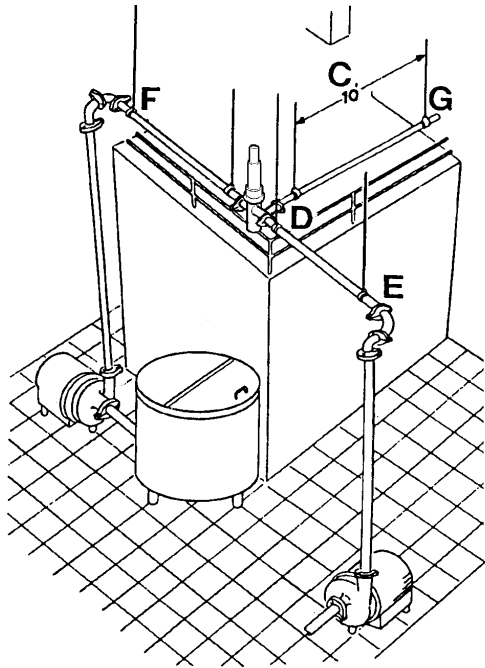


Figure 2 - Pipeline Support

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

1. Install supports at least every 10 feet (3 meters) 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).

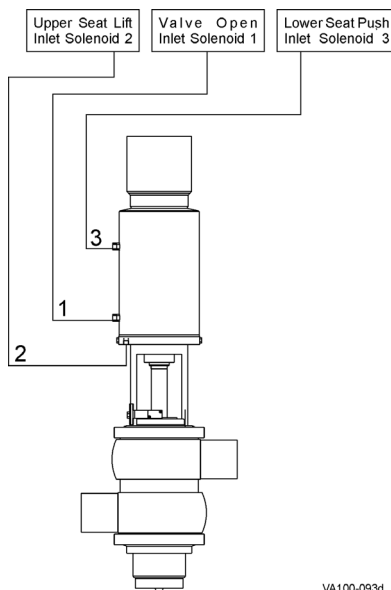
Stem Flush Adapter

Mix Proof valves utilize a stem flush adapter to provide a liquid or steam barrier around the valve stem. The valves are designed for 14.5 psi (1 bar) maximum flush pressure with 1/4" (6.35 mm) tube OD connections.



WARNING: Milk and milk products are to be flushed from the piping system and isolated prior to installation of valve or optional flush line.

Installing the Valve



VA100-093d

Figure 3 - Solenoid Valve Port Connections

1. Connect the air lines to Port A. Switch the controls to open condition (pressurize connection 3). See Figure 3.
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 and 2 (Figure 3).
6. Connect the electrical control cord to the valve. See publication 95-03083 for details.
7. Operate the valve through the four conditions (closed, open, upper seat cleaning, and lower seat cleaning). See "Solenoid Valve Port Connections" on page 11.

Connecting Flush Supply Line (Optional)

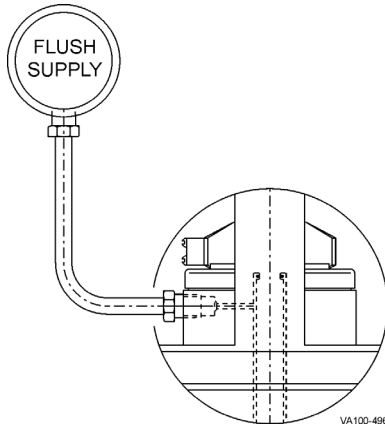


Figure 4 - Connection of Flush Supply

Connect the cavity cleaning supply to a suitable water supply to flush the vent/drain (Figure 4) during operation of the processing system.

The flush supply line can be connected to a pipe system by 1/4" (6 mm) rigid or flexible poly tubing.

Connect the supply line to the adapter connection with flexible poly tubing (Figure 4).

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

Regulate the flush supply for pressures of 30 psi minimum, 50 psi maximum.

Maximum solution temperature is 180°F (60°C).

! WARNING: The cavity cleaning operation must fall within the fail-safe control system. See "Cleaning" on page 15.

For PMO applications, consult the PMO for suitable water requirements.

! WARNING: PMO requires pasteurized water for water flushing in pasteurized product applications.

! WARNING: Take proper precautions to safeguard the flush water supply, such as installing backflow prevention devices.

Operation

All functions of mix proof valves are pneumatically controlled using a 72 to 100 psi (4.9 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 the top air chamber of the cylinder.
- Holds the upper plug in closed position.

Small Spring

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

Solenoid Valve Port Connections

Table 1: Solenoid/Valve Position

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

Typically three air supplies controlled by solenoid valves supply air to the valve actuator (Figure 5).

The air supply must be 72 to 100 psi (4.9 to 6.9 bar).

ON = Solenoid energized (OPEN).
 OFF = Solenoid de-energized (CLOSED).
 Solenoids are normally closed.
 Air connections are 1/8" NPT.

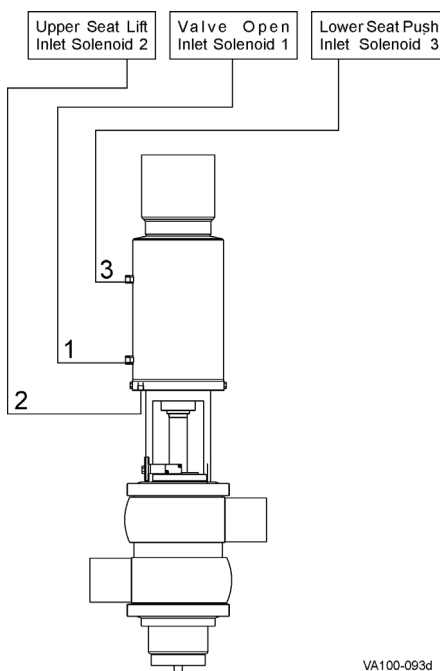


Figure 5 - Solenoid Valve Port Connections

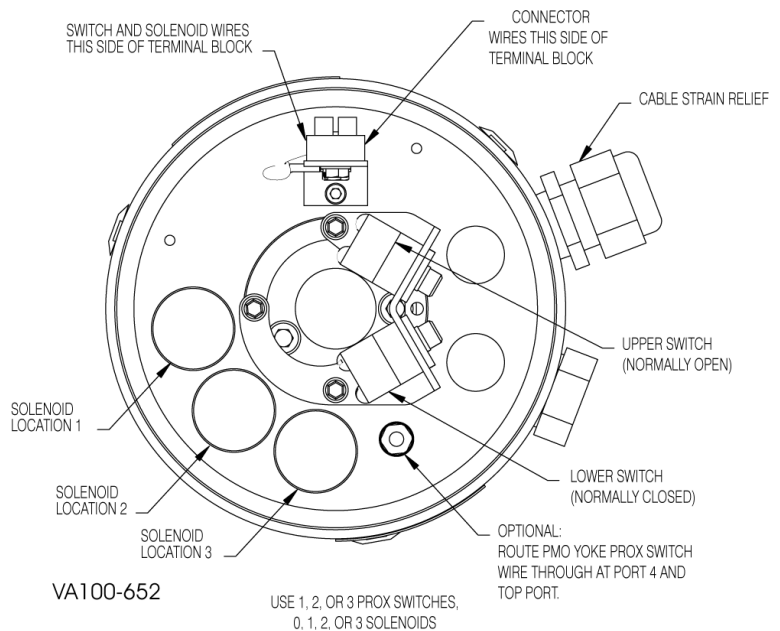
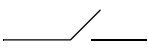
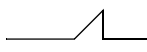
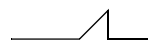


Figure 6 - Location of Solenoids

Automatic Fail-Safe System

Table 2: 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 Lift	0	1	0
Valve Closed with Lower Seat Lift	0	0	1

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

Upper Switch – Sends input signal when valve is properly open.

Lower Switch – Sends input signal when valve is properly closed.

Yoke Switch – Sends input signal when upper seat is properly closed.

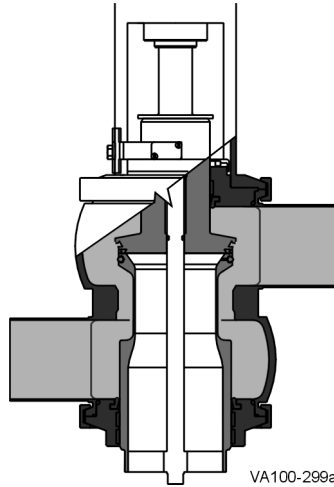
The valve seats are part of an automatic fail-safe system preventing contamination of product with cleaning or sanitizing solutions. Automatic fail-safe systems are unique to each particular installation. Typically, both blocking valve seats are properly seated in blocked position before the mechanical cleaning system can be activated for the cleaning circuit containing the valve arrangement. W75RS 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. To determine the integrity of fail-safe control interlocks, see “Positive Fail-Safe Detection Test” on page 14.

Valve Operating Conditions

See Figure 5 on page 11 for port and corresponding chambers.

Valve Open

The valve is open when Chamber 1 is pressurized and Chambers 3 and 2 are vented. See Figure 7.

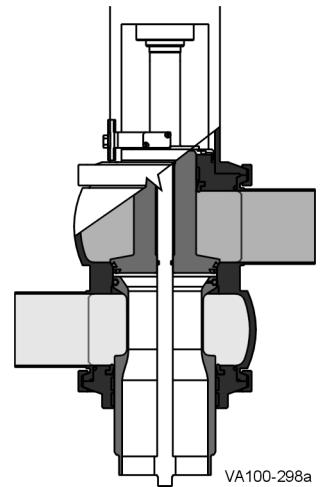


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Figure 7 - Valve Open

Valve Closed

The valve is closed when Chambers 3, 1, and 2 are vented. Large spring closes the valve to fail-safe position. See Figure 8.

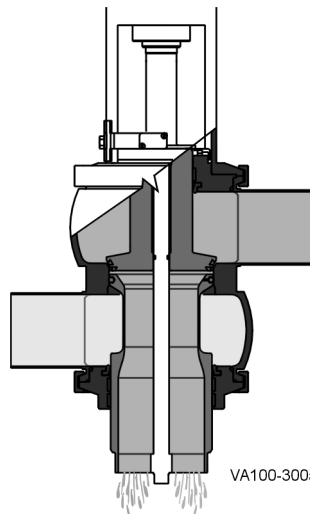


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Figure 8 - Valve Closed

Valve Closed, Upper Seat Lifted

For cleaning the upper seat on seat lifting models only. Chamber 2 is pressurized, and Chambers 3 and 1 are vented. See Figure 9.

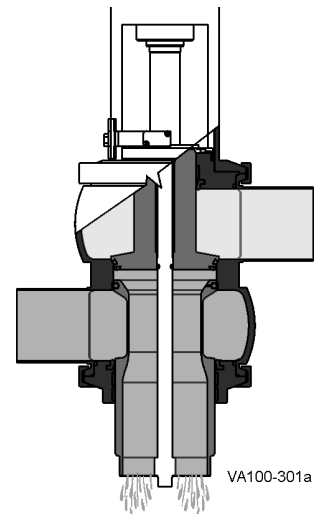


VA100-300a

Figure 9 - Valve Closed, Upper Seat Lifted

Valve Closed, Lower Seat Push

For cleaning the lower seat. Chamber 3 is pressurized, and Chambers 1 and 2 are vented. See Figure 10.



VA100-301a

Figure 10 - Lower Seat Lowering

Test Procedures

Stem Gauge

First confirm the proper location of the lower valve stem. Place a test gauge (Figure 11, 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 stem is fully turned in.

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 12, item C) should contact the gauge (item D, part number 121672), 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. The valve plug feedback proximity switches are to be set for the fully opened and fully closed positions of the valve. See Figure 5 on page 11 for port and corresponding chambers. See Figure 11 and Figure 12 on page 14 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 2 on page 12. Verify the switch status on the PLC control system.
2. Pressurize chamber 1 to open the valve. Confirm that the proximity switches conform to Table 2 on page 12.
3. Vent chamber 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 chamber 2.
5. When the upper seat lifts, confirm that the proximity switches conform to Table 2 on page 12. Verify the switch status on the PLC control system.
6. Vent the air in chamber 2 to deactivate the seat lift.
7. Activate the lower seat push either through the control system or manually by supplying air to chamber 3 on the valve actuator.
8. When the lower seat is pushed, confirm that the proximity switches conform to Table 2 on page 12. Verify the switch status on the PLC control system.
9. Vent the air in chamber 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.

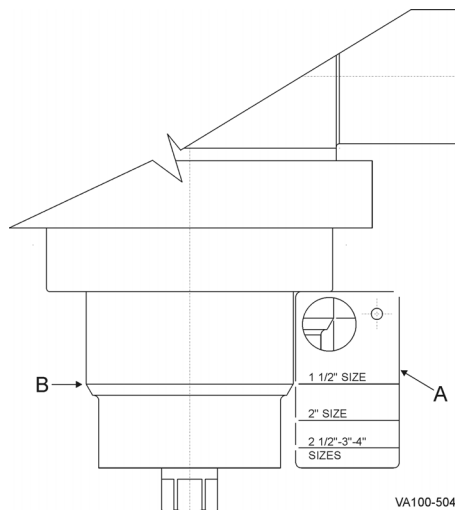


Figure 11 - Test Gauge and Stem Alignment

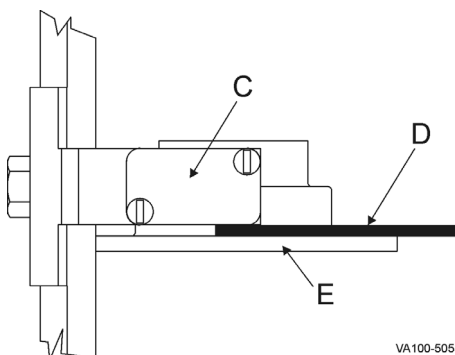


Figure 12 - Proximity Switch Location

Maintenance

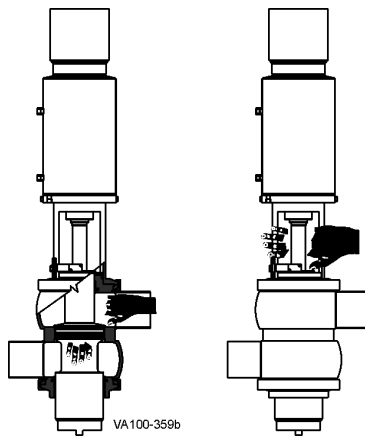
Maintenance Intervals

Maintain adequate stock of replacement parts. Maintenance intervals should be determined by the 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

STOP **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 67.)
- 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.

Cleaning-In-Place (CIP)

CIP methods can be used to clean installed automatic valves without disassembly. Methods must be selected subject to specific requirements of sanitarians and each application. Check with local chemical suppliers for the most effective cleaning agents and procedures.

Mix Proof valves can be fitted with a 1/4" NPT flush connection for rinsing the area between the seats and the vent/drain port. The area can be flushed regularly in the event of long intervals between CIP cleanings. See “Connecting Flush Supply Line (Optional)” on page 10.



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

Connect the flush connection to a suitable water supply to flush the vent/drain during operation of the processing system.

NOTE: Actuate each valve a minimum of twice each cycle to ensure effective cleaning and sanitizing.

Cleaning Solution

Mix Proof valves are designed to use a cleaning solution supplied by a CIP system. Cleaning of the seat area should be done during CIP treatment of the upper or lower valve housing.

When the upper or lower body is CIP, upper or lower seat lifting should occur. Seat lifting positions are factory set and marked in the yoke area. Seat lifting will produce visible leakage from the vent outlet. Brief multiple lifts should occur for each step in the CIP program, excluding the initial rinse. Seat lifting is not recommended during the initial rinse if heavy soils are experienced.



WARNING: Do not clean the vent until milk and dairy products have been removed or isolated from the valve.

- Maximum Solution Temperature: 160°F (71°C)
- Cleaning Time: dependent on inlet pressure; recommended cycle time is one to three seconds per cleaning cycle.

Cleaning Procedure

Cleaning procedures should be established for each installation depending on product characteristics, operating parameters (temperature, velocity, valve cycles), product velocities, etc.



WARNING: Do not clean the vent until milk and dairy products have been removed or isolated from the valve.

For optional external flush of the vent cavity, water flush can be activated during the final rinse.

The valves are 3A design and intended for CIP cleaning. Consult a local cleaning specialist regarding cleaning valves.

During CIP cleaning of the system, open and close the valve to clean all areas. CIP flow should be from bottom to top through the valve, if possible. If the actuator is a seat lifting actuator, open and close the upper and lower seats independently during CIP cleaning.



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

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

Seat Lifting Adjustment

NOTE: Always adjust the lower seat first.

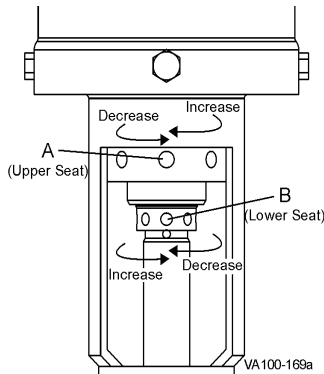


Figure 13 - Location of Adjusting Nut

Seat lifting models are factory set. A line on the stem in the yoke area provides a visual indication of the correct adjustment. If required, adjust the seat lift to factory settings or within the adjustment zone.

Lower seat

Operate the lower seat lift cycle. Observe the indicator stem movement at the top of the valve or at the balancer on the bottom of the valve. The proper movement is 0.28" (7.1 mm).

To adjust the movement of the lower seat for cleaning, use a spanner wrench to rotate the adjusting sleeve in the yoke (Figure 13, item B): Left to increase; right to decrease.

Upper seat

Operate the upper lift cycle once. Operate it three more times to observe the outer stem movement by watching the adjusting nut in the yoke. The proper movement is 0.12" (3 mm).

To adjust the movement of the upper seat, use a 1/4" pin to rotate the adjusting nut (Figure 13, item A): Left to increase; right to decrease.

Removing Valve from System

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



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 the electrical supply and lock out all power.
4. Supply air to open the valve.
5. Remove the clamp between the yoke and adapter (Figure 14, 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.

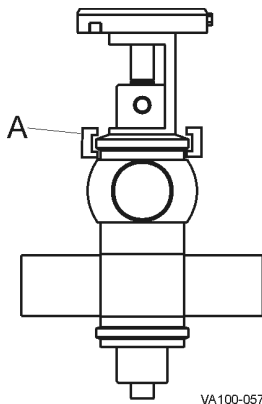


Figure 14 - Location of Adapter Clamp

Disassembly of Valve Stems

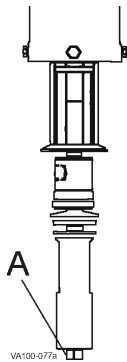


Figure 15 - Valve Stem Removal

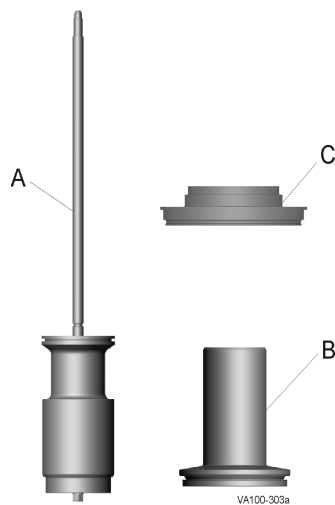


Figure 16 Stem Removal

The valve stems must be disassembled in order to replace the seat ring.

1. Using an open end wrench, remove the lower stem (Figure 15, item A) from the actuator by turning it counter-clockwise.

NOTE: Before disassembly, note the position of the upper and lower seat lifting adjustment nuts. See Figure 13 on page 17.

2. To remove the upper stem (Figure 16, item B), hold the adjusting sleeve with the spanner wrench, turn the stem counter-clockwise, and remove it from the actuator. If the adapter (Figure 16, item C) comes out of the yoke, handle it with care.

A = Lower Stem
 B = Upper Stem
 C = Top Adapter (Bonnet)

Adapter Bearings and O-rings

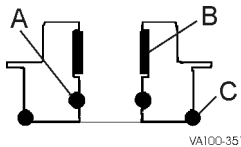


Figure 17 - Adapter O-rings and Bearing

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 17, item A) inside the adapter.
3. Check the split bearing (Figure 17, item B) inside the adapter by feeling the amount protruding from the adapter wall. If the bearing is flat against the wall, replace the bearing.
4. Place a screw driver 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. Use care 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. Push the actuator stem into the adapter to help properly seat the bearing.
7. Using your finger, ensure that the bearing is properly seated. Visually inspect the seating.

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 17, 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

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 18, 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 18.
6. Using the installation tool, part number 102797 (Figure 18, item B), press the Tri Ring into the plug at locations A, B, C, and D (Figure 19). 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 18.

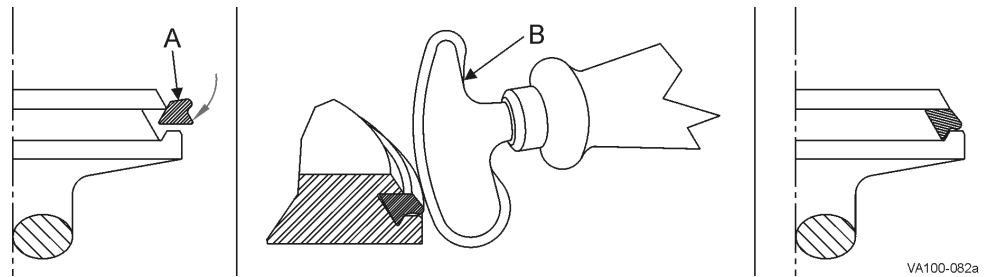


Figure 18 - Installing New Tri Ring Seat

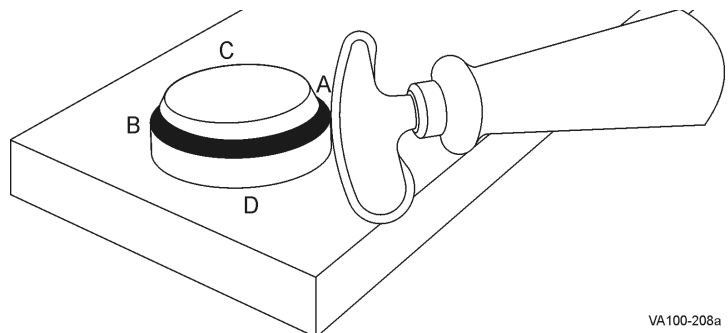


Figure 19 - Pressing Tri Ring Into Plug

Radial Seal Installation

1. Lubricate the o-ring seal and expand it over the stem groove.
2. 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.
3. Remove the tool. The dovetail groove permanently retains the o-ring seal.

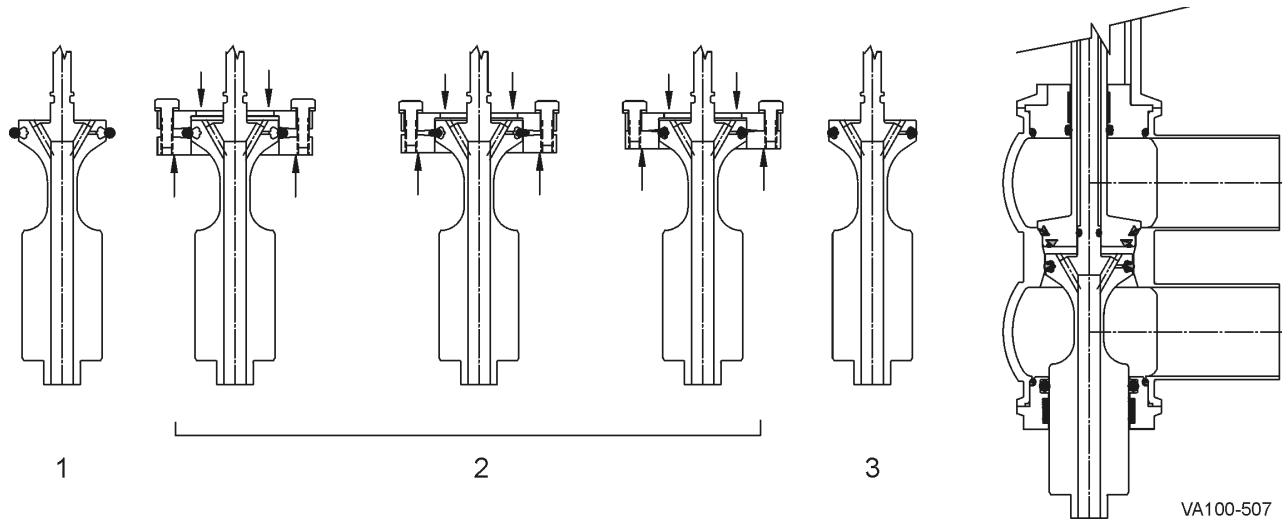


Figure 20 - Radial Seal Installation

Lower Bearing Carrier O-ring and Bearing Replacement

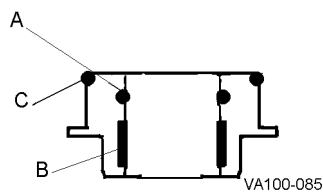


Figure 21 - Lower Bearing Carrier

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

1. Remove and replace the o-ring (Figure 21, item A) located inside the lower bearing carrier.
2. Check the split bearing (Figure 21, item B) inside the lower bearing carrier by feeling the amount protruding from the lower bearing carrier wall. If the bearing is flat against the wall, replace the bearing.
3. Place a screw driver 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 a new bearing, coil the bearing to a size smaller than the inside diameter of the adapter and insert it into the proper location.
5. Push the actuator stem into the lower bearing carrier to help properly seat the bearing.
6. Using your finger, ensure that the bearing is properly seated. Visually inspect the seating.
7. To remove the outer o-ring (Figure 21, item C), slide or cut the o-ring off the lower bearing carrier. Do not nick or scratch the o-ring groove.
8. Lubricate a new o-ring with an approved lubricant and install it.

Actuator O-ring and Bearing Replacement

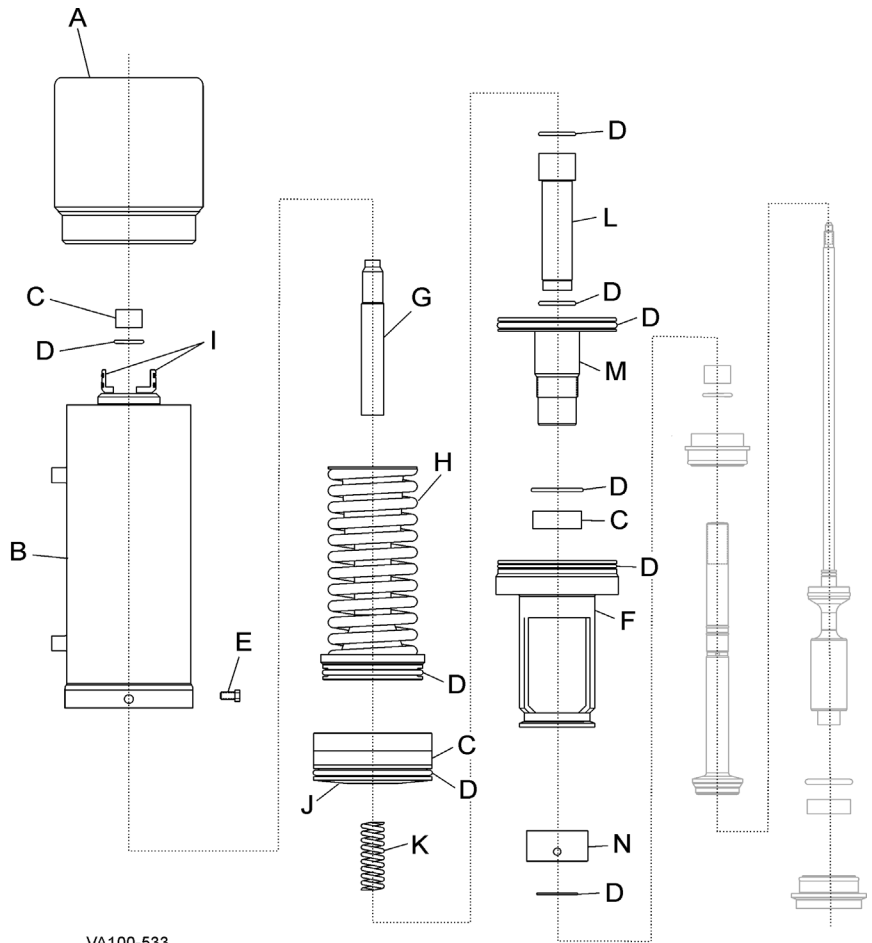


CAUTION: The valve stems and actuator must be removed from the valve body before servicing the actuator components.

1. See “Disassembly of Valve Stems” on page 18.
2. Remove the Control Top. See “Control Top Removal and Disassembly” on page 22.
3. Remove the cap screws (Figure 22, item E) and yoke (item F) from the cylinder assembly. Set the yoke aside.
4. Pull the spring cage assembly (item H) and main piston (item N) from the cylinder assembly.
5. Inspect the o-rings (item D). Replace them if they are worn or damaged.
6. Inspect the bearings (item C). If the bearing does not extend slightly above the edge of the metal surface, replace the bearing.
7. The bearing is split to allow it to be removed from the groove. Place a screw driver 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.
8. Assemble the stack components as shown in Figure 22. Install the yoke and cap screws.

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

- A. Control Top
- B. Cylinder Assembly
- C. Bearing
- D. O-ring
- E. Cap Screw
- F. Yoke
- G. Indicator Stem
- H. Spring Cage Assembly
- I. Mounting Cup
- J. Main Piston
- K. Small Spring
- L. Adjusting Sleeve
- M. Upper Seat Lifting Piston
- N. Adjusting Nut



VA100-533

Figure 22 - Actuator Assembly

Control Top Removal and Disassembly

The W-Series, 2-Piece Control Module can be removed from the valve while the valve either remains connected to the piping system or is separately removed. Due to air requirements and system interlock integrity, it is not recommended to keep the valve in service while control module is removed.

Removal from Valve

1. Disconnect the air.
2. Remove the (3) set screws behind the (3) plastic plugs with tabs at the base of the module (see Figure 23).
3. Lift off the control module, being careful not to strain or stretch the wiring connector.
4. If required, disconnect the electrical supply and lock out the power.



CAUTION: Only an authorized electrician should disconnect the power.

Disassembly

1. Remove the valve from service.
2. Shut off the delivery of air.
3. Disconnect the electrical supply and lock out the power.



CAUTION: Only an authorized electrician should disconnect the power.

4. Unscrew the single-piece clear top and remove it.
5. To remove solenoids, unscrew them from the base, taking care with the wires.
6. To disassemble the proximity or micro-switch mounts, disconnect the wires, then unscrew the round-head screws holding the switch to the switch blocks. See Figure 24 on page 23.

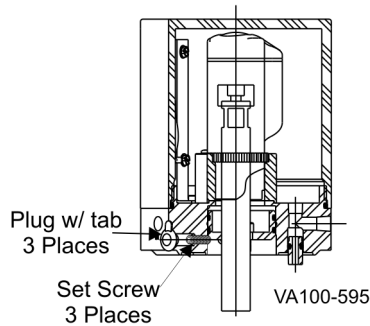


Figure 23: Control Top Removal

Switches

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

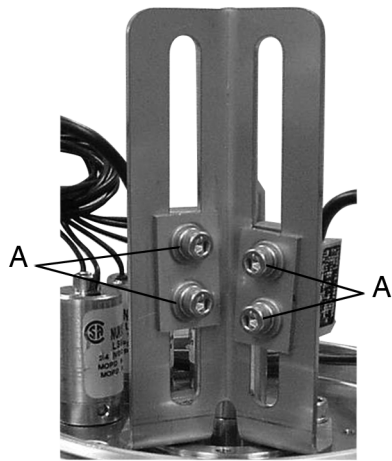


Figure 24: Switch Adjustment

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 the 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 the power is passed and are inactive when the power is stopped.

1. Raise the stem to open, then loosen the cap screws holding the switch blocks (Figure 24, 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 24, 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 25). 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 26). Tighten the cap screws securely.

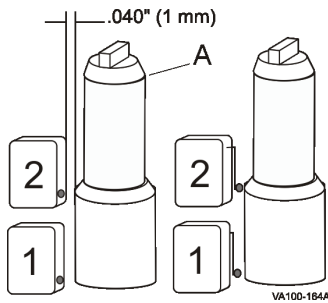


Figure 25: Valve Open Adjustment

NOTE: Switches should detect stem movement within 1/16 inch (0.062 in/1.58 mm)

CAUTION: Do not over-tighten.

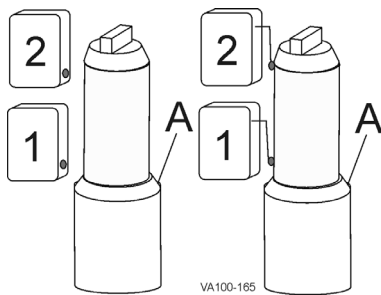
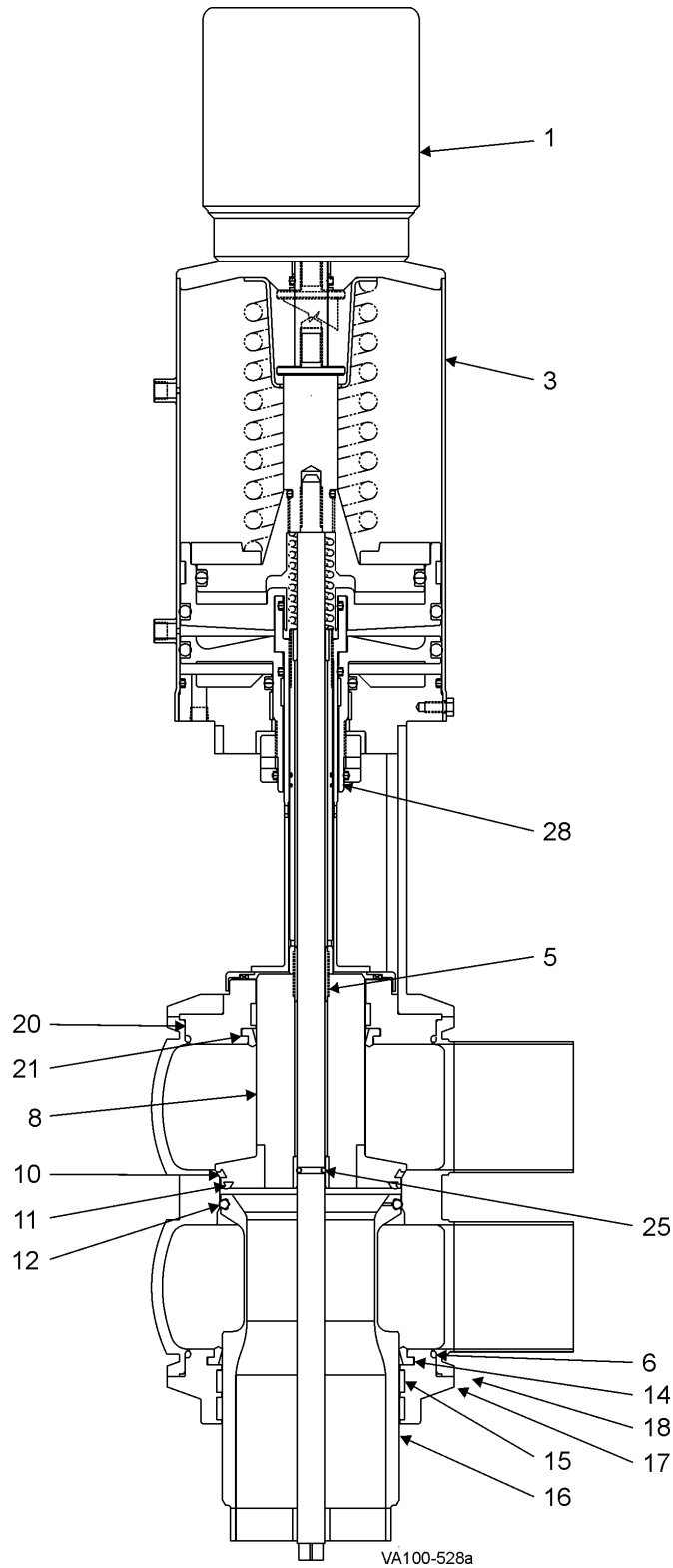


Figure 26: Valve Closed Adjustment

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.

Parts Lists

W75RS PMO Double Seat Mix Proof Valves - Seat Lift



W75RS PMO Double Seat Mix Proof Valves - Seat Lift

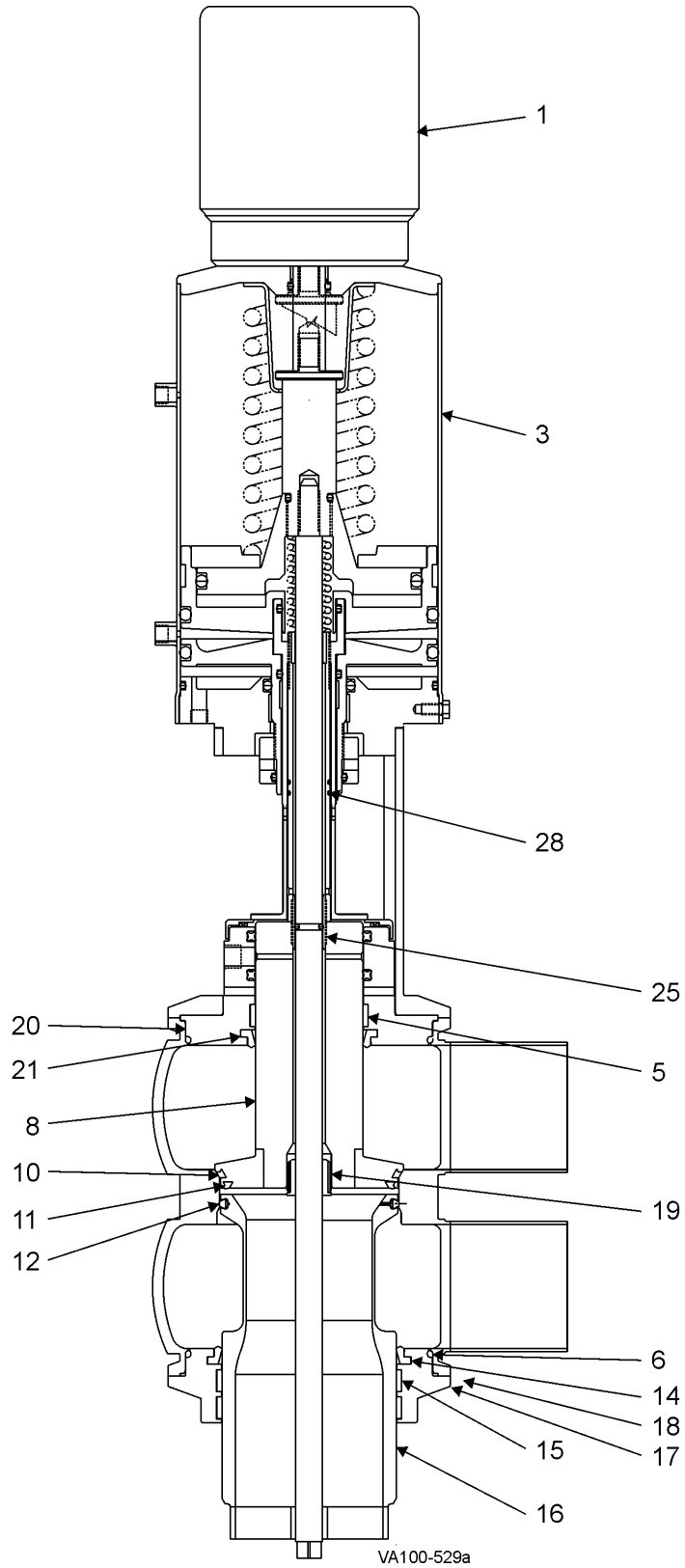
Item #	Part Description	1-1/2	2	2-1/2	3	4	
1	Control Top	**	**	**	**	**	
3	Actuator Assembly	***	***	***	***	***	
5	Bearing	106047	106047	106047	102002	114231	
6	O-ring, Body	EPDM	E70232	E70236	E70244	E70252	E70258
		FKM	V70232	V70236	V70244	V70252	V70258
8	Stem, Upper	116820	116781	116841	119543	114230	
10	Seat Ring - Tri Ring, Upper	EPDM	102487	111633	102492	102491	102738
		FKM	107973	111635	107978	107977	108020
11	Seat Ring - Tri Ring, Vent	EPDM	102736	107048	116837	116795	102739
		FKM	107980	107982	116838	116796	108021
12	Seat Ring - O-ring, Lower	EPDM	E80328	E80333	E80339	E80343	E80354
		FKM	V90328	V90333	V90339	V90343	V90354
14	Wiping Seal, Lower	EPDM	116192	116197	116201	116203	116773
		FKM	116193	116198	116202	115624	116774
15	Bearing	106049	106048	102003	112560	114232	
16	Lower Stem Assembly	116530	116546	116560	116276	116577	
17	Seal Retainer	116529	116544	116559	116272	114226	
18	Clamp	119-34	119-51	119-87	119-71	113827	
20	Adapter	Upper	116523	116538	116553	116273	114220
		Lower	116522	116537	116552		
21	Wiping Seal, Upper	EPDM	116184	116184	116184	116194	114221
		FKM	116185	116185	116185	115625	114223
25	O-ring	EPDM	E70111	E70111	E70111	E70111	E70111
		FKM	V70111	V70111	V70111	V70111	V70111
28	O-ring	Nitrile	N80020	N80020	N80020	N80020	--

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Notes:

- ** Contact WCB Customer Service for Control Top information.
- *** See W75RS PMO Double Seat Mix Proof Valve Actuator pages.

W75RS PMO Double Seat Mix Proof Valves - Seat Lift with Flush



W75RS PMO Double Seat Mix Proof Valves - Seat Lift with Flush

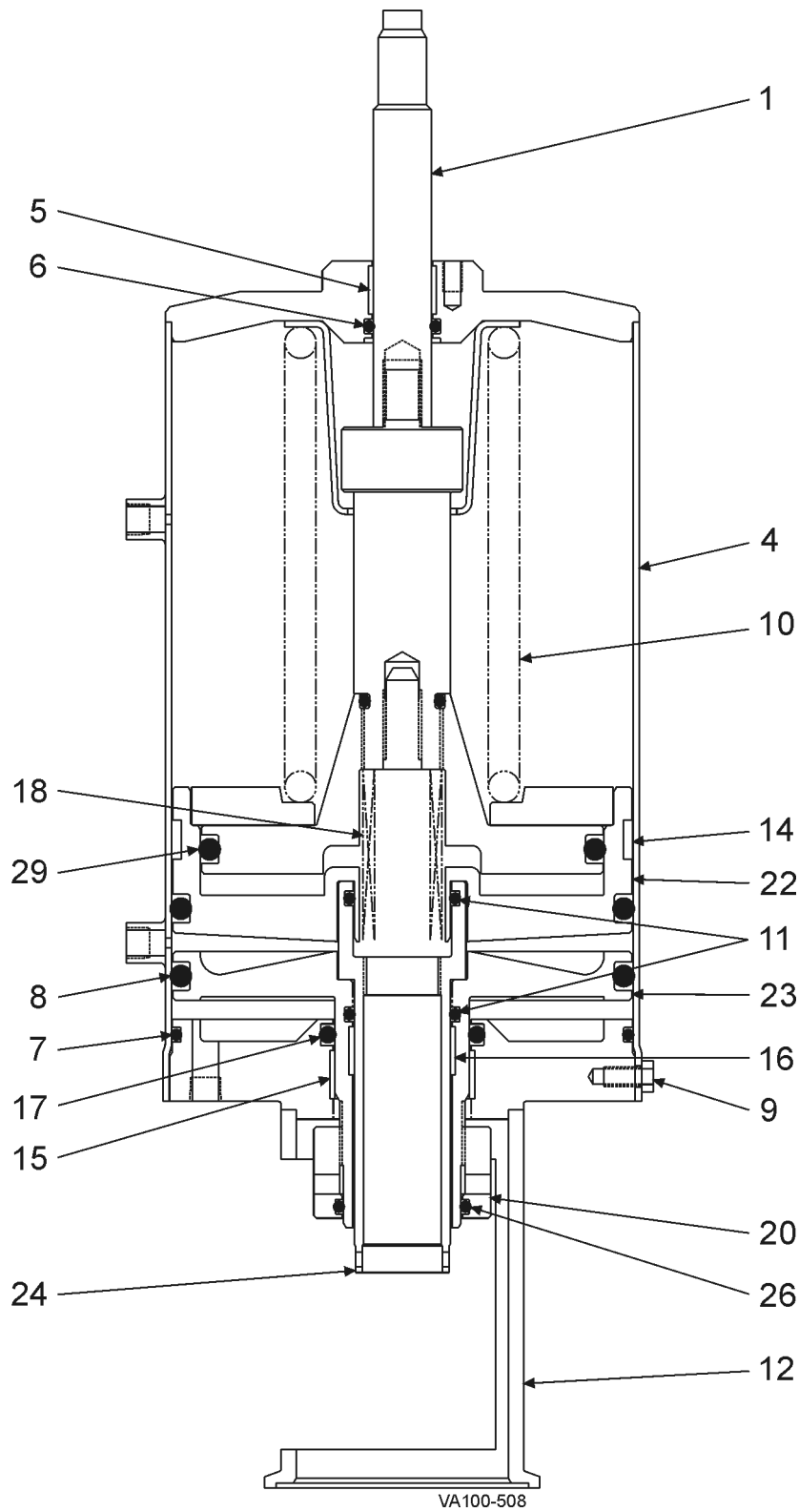
Item #	Part Description	1-1/2	2	2-1/2	3	4	
1	Control Top	**	**	**	**	**	
3	Actuator Assembly	***	***	***	***	***	
5	Bearing	106047	106047	106047	102002	114231	
6	O-ring, Body	EPDM	E70232	E70236	E70244	E70252	E70258
		FKM	V70232	V70236	V70244	V70252	V70258
8	Stem, Upper	116823	116827	116828	119544	114230	
10	Seat Ring - Tri Ring, Upper	EPDM	102487	111633	102492	102491	102738
		FKM	107973	111635	107978	107977	108020
11	Seat Ring - Tri Ring, Vent	EPDM	102736	107048	116837	116795	102739
		FKM	107980	107982	116838	116796	108021
12	Seat Ring - O-ring, Lower	EPDM	E80328	E80333	E80339	E80343	E80354
		FKM	V90328	V90333	V90339	V90343	V90354
14	Wiping Seal, Lower	EPDM	116192	116197	116201	115624	116773
		FKM	116193	116198	116202	116203	116774
15	Bearing	106049	106048	102003	112560	114232	
16	Lower Stem Assembly	119725	116721	119666	119623	119654	
17	Seal Retainer	116529	116544	116559	116272	114226	
18	Clamp	119-34	119-51	119-87	119-71	113827	
19	Spray Bushing	115388	115388	115388	115388	115388	
20	Adapter	Upper	116783	116782	116784	115378	114220
		Lower	116522	116537	116552		
21	Wiping 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
28	O-ring	Nitrile	N80020	N80020	N80020	N80020	--

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Notes:

- ** Contact WCB Customer Service for Control Top information.
- *** See W 75RS PMO Double Seat Mix Proof Valve Actuator pages.

W75RS PMO Double Seat Mix Proof Valve Actuator



W75RS PMO Double Seat Mix Proof Valve Actuator

Item #	Part Description	6" Diameter
1	Indicator Stem - Visual	107951
1a	Indicator Stem - Control Top	119487
4	Cylinder	113112
5	Bearing, Cylinder	102757
6	O-ring Nitrile	N70210
7	O-ring, Cylinder Nitrile	N70255
8	O-ring, Piston Nitrile	N70433
9	Cap Screw, 1/4-20 x 3/8 lg.	30-68
10	Piston & Spring Assembly	1-1/2" 122037
		2" 122038
		2-1/2" 133678
		3", 4" 122039
		11
12	Yoke	1-1/2" 116818
		2" 116776
		2-1/2" 116834
		3" 116938
	Yoke (flush)	1-1/2" 119871
		2" 119873
		2-1/2" 119875
		3" 119877
4" 119879		
14	Bearing, Main Piston	102052
15	Bearing, Lifting Piston	109920
16	Bearing	109919
17	O-ring Nitrile	N70328
18	Spring, Upper Stem	5901106
20	Nut, Upper Seat Clean	109918
22	Main Piston	116472
23	Upper Seat Piston	111489
24	Adjusting Sleeve	116469
26	O-ring Nitrile	N90222
29	O-ring, Lower Seat Piston Nitrile	N70427

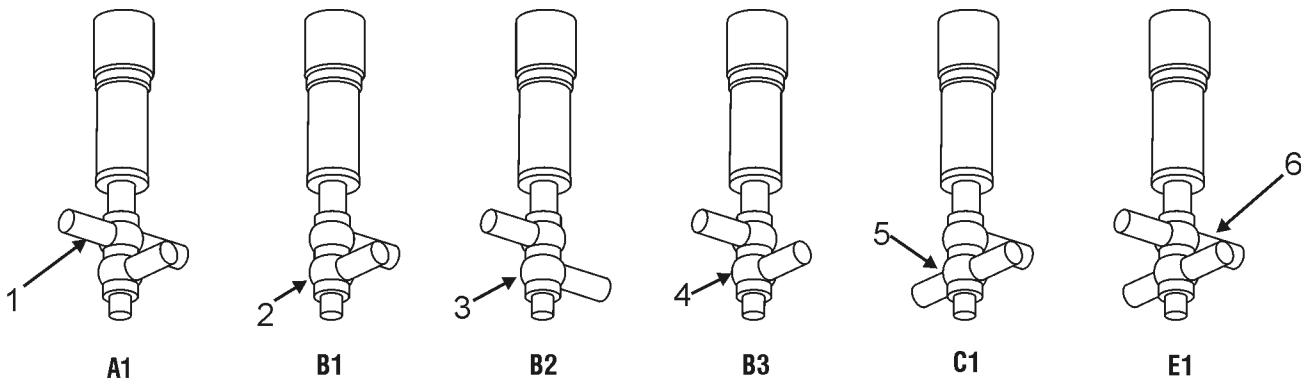
Complete Actuator Assemblies

W75RS PMO without Flush		
Part Description	Valve Size	6" Diameter
Visual Indicator Stem	1-1/2"	ACT00386
	2"	ACT00387
	2-1/2"	ACT00388
	3"	ACT00389
Control Top Indicator Stem	4"	ACT00390
	1-1/2"	ACT00396
	2"	ACT00397
	2-1/2"	ACT00398
	3"	ACT00399
	4"	ACT00400

W75RS PMO with Flush		
Part Description	Valve Size	6" Diameter
Visual Indicator Stem	1-1/2"	ACT00391
	2"	ACT00392
	2-1/2"	ACT00393
	3"	ACT00394
	4"	ACT00395
Control Top Indicator Stem	1-1/2"	ACT00401
	2"	ACT00402
	2-1/2"	ACT00403
	3"	ACT00404
	4"	ACT00405

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W75RS PMO Double Seat Mix Proof Valve Bodies



VA100-530

Item #	Part Description	1-1/2"	2"	2-1/2"	3"	4"
1	Buttweld - A1	117683	117678	117672	115380	117574
2	Buttweld - B1	117685	117680	117674	115382	117576
3	Buttweld - B2	117687	117682	117676	115384	117577
4	Buttweld - B3	117686	117681	117675	115383	117578
5	Buttweld - C1	117684	117679	117673	115381	117575
6	Buttweld - E1	116533	116548	116563	115379	116580

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Troubleshooting

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
<i>Leakage</i>		
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.	Tri-ring on bottom of top seat failed.	Replace seal. 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.
<i>Operation</i>		
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.
	Controls failed.	Check control sequence. Check control wiring and power source.
Upper seat fails to lift during seat lift.	Lifting piston not adjusted correctly.	Adjust adjusting sleeve. Outer stem should move .12" (3 mm). See "Seat Lifting Adjustment" on page 17.
Lower seat fails to lift during seat lift.	Adjusting sleeve not adjusted correctly.	Adjust adjusting sleeve. Inner stem should move .28" (7.1 mm). See "Seat Lifting Adjustment" on page 17.
Actuator moves when valve opened.	Clamp loose.	Tighten clamp with valve open.
<i>Electrical</i>		
No valve closed or open indication.	Lower switch not adjusted properly.	Adjust switch. See "Switch Adjustment" on page 23.
No valve open signal.	Upper switch not adjusted.	Adjust switch. "Switch Adjustment" on page 23
Moisture in switch housing.	Missing and/or damaged gaskets.	Replace gaskets.

Notes

SPX[®]
PROCESS EQUIPMENT

Your local contact:



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For more information about our worldwide locations, approvals, certifications, and local representatives, please visit www.spxpe.com.

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