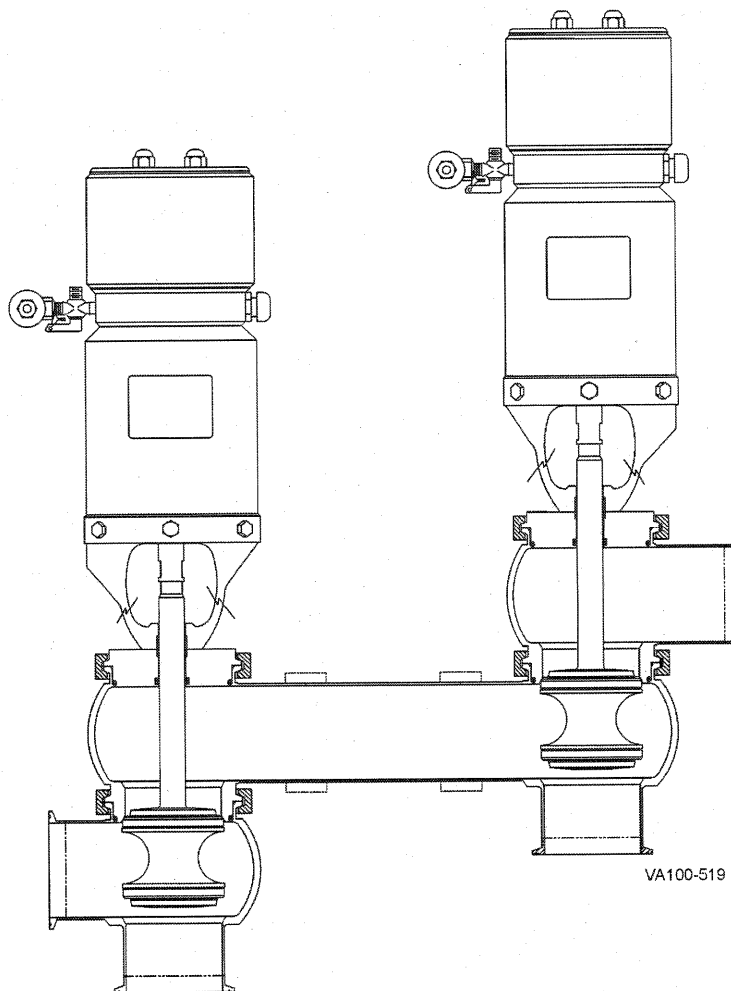


# Operation and Maintenance Manual

## MODEL W262 FD and W282 FD HTST DIVERT VALVES



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



Customer Service  
611 Sugar Creek Road  
Delavan, WI 53115

Phone: 800-252-5200 (within the USA)  
262-728-1900

Fax: 800-252-5012 (within the USA)  
262-728-4904

E-mail: [info@processequipment.spx.com](mailto:info@processequipment.spx.com)  
Website: [www.spxprocessequipment.com](http://www.spxprocessequipment.com)

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## WARRANTY

### 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 attorneys' 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 your 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.

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

### Warranty Claim

Warranty claims must have a **Returned Goods Authorization (RGA)** from the manufacturer before returns will be accepted. Your Distributor will help you with a warranty problem.

# 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:

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

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

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

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. NFPA 70E, 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, cautions and notes are provided in this manual to help avoid serious injury and/or possible damage to equipment.

**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.

**NOTE** Important information pertaining directly to the subject.  
(Information to be aware of when completing the task.)

# CARE OF STAINLESS STEEL

---

## Stainless Steel Corrosion

The austenitic stainless steel components in Waukesha Cherry-Burrell equipment are machined, welded and assembled by skilled craftsmen using manufacturing methods to preserve the corrosion resistant quality of the stainless steel.

**CAUTION:** Highly corrosive acids, such as hydrofluoric, hydrochloric and sulfuric are not recommended as acidic cleaners for austenitic stainless steel. Phosphoric and citric acid based cleaners at low concentrations (0.5 - 1.5% w/w) and temperature (phosphoric < 115°F (45°C) and citric < 160°F (70°C)) can be used in specific applications, as recommended by reputable chemical manufacturers. Acidic cleaners should contain corrosion inhibitors to reduce the corrosive effects on the metal.

**Corrosion resistance of austenitic stainless steel is greatest when a layer of oxidation is formed on the surface of the metal. If the protective surface is disturbed or destroyed, the metal can easily be corroded by contact fluids.**

1. Regularly inspect austenitic stainless steel equipment for surface deposition and/or localized **pitting corrosion**. If deposition or discoloration is detected, disassemble equipment, remove components and soak in a mild alkaline-based detergent. Rinse using warm water. Allow equipment to air dry thoroughly before assembly.
2. Regularly check all electrical devices and verify all equipment is grounded to avoid any **electrolytic-concentration corrosion**.
3. Regularly inspect joints and gaskets in the system for **crevice corrosion**.
4. Regularly inspect equipment for trapped air pockets to avoid pitting caused by **oxygen-concentration corrosion**.
5. Regularly inspect any areas of the equipment that use dissimilar metals connected by a mechanical joint to avoid **galvanic corrosion**.
6. Regularly inspect the components used in the design that aren't manufactured with stabilized low carbon stainless steel (**intergranular corrosion**).
7. Regularly inspect the equipment for implied stresses from either mechanical or chemical environments to avoid **stress corrosion cracking**. Chloride stress corrosion cracking of austenitic stainless steel is caused by the presence of chlorides on the surface of the metal, inducing cracks and fatiguing the metal. The use of chemicals or fluids that contain chlorides should be avoided.

# CARE OF STAINLESS STEEL

## Cleaning of Stainless Steel

Cleaning of austenitic stainless steel (AISI 300 Series), manually or chemically, is dependant on the process environment the equipment is operated in. Typically, the cleaning regimen should be developed and reviewed by a plant sanitarian or a formulation representative of a reputable chemical supply company. The following chemicals may be utilized to clean, passivate and disinfect equipment prior to operation.

**Alkaline Detergent:** A blended alkaline detergent may be used to clean equipment. The detergent should be a blended sodium hydroxide/water detergent, designed for use with austenitic stainless steel equipment and used at initial concentrations of 1-3% w/w solution at a temperature of 160°F (70°C) to 195°F (90°C) (dependant on the chemical supplier.) The detergent should be formulated with a metal chelation agent, such as sodium gluconate or gluconic acid, to remove metal ions in the water (hardness dependant) and a surfactant to increase the rinse ability of the solution.

**Acid:** To neutralize any residual alkali and render a passive surface on the stainless steel, a 160°F (70°C) solution of citric acid and water at a concentration of 0.5-3% w/w can be used. Phosphoric acid may be used at concentrations of 0.5-1.5% w/w at 115°F (45°C). If phosphoric acid is used, corrosion inhibitors should be blended in prior to use.

**Disinfectant (Food Plants):** Caution should be used with application of chemical disinfectants. Most chemical disinfectants are halogen or quarternary ammonium based compounds and in high concentrations are very corrosive to austenitic stainless steel. Typically, the most common disinfectant, iodophor, can be used with a maximum concentration of 25 mg/l at a maximum temperature of < 80°F (25°C). Other common disinfectants, such as sodium hypochlorite and chloroamine are not recommended.

### Suggested Cleaning Regimen

Cold water prerinse	60°F - 80°F (15°C - 25°C)
Warm water prerinse	115°F - 140°F (45°C - 60°C)
Alkali recirculation	160°F - 195°F (70°C - 90°C)
Warm water postrinse	115°F - 140°F (45°C - 60°C)
Acid recirculation	80°F - 115°F (25°C - 45°C)
Warm water postrinse	115°F - 140°F (45°C - 60°C)

### Suggested Passivation Regimen

Cold water prerinse	60°F - 80°F (15°C - 25°C)
Warm water prerinse	115°F - 140°F (45°C - 60°C)
Citric acid recirculation	140°F - 160°F (60°C - 70°C)
Warm water postrinse	115°F - 140°F (45°C - 60°C)
Cold water postrinse	60°F - 80°F (15°C - 25°C)

For manual cleaning, use only soft, non-metallic brushes, sponges or pads. Brush with the grain on polished surfaces. Avoid scratching.

# INTRODUCTION and SPECIFICATIONS

**MODELS:** W262 FD Standard Flow Diversion Valve Assembly

W282 FD Stem Flush Flow Diversion Valve Assembly

**SIZES:** 1", 1-1/2", 2", 2-1/2", 3", 4"

## FEATURES

- Flush ports
  - Replaceable Tef-Flow™ P seats
  - Maintainable actuators (4", 5", 6")
  - Use with existing control system
  - Transparent control top (*with or without solenoid*)
  - S or I clamp connections (*S is standard*)
- Two valves with interconnected bodies
  - Spring in the actuator holds valve in the Divert position
  - Air pressure positions valve in the Forward Flow position
  - Valve bodies (divert valve and leak detect valve) produce one inspection mode, and three operating modes (Divert, Flush, and Forward Flow)

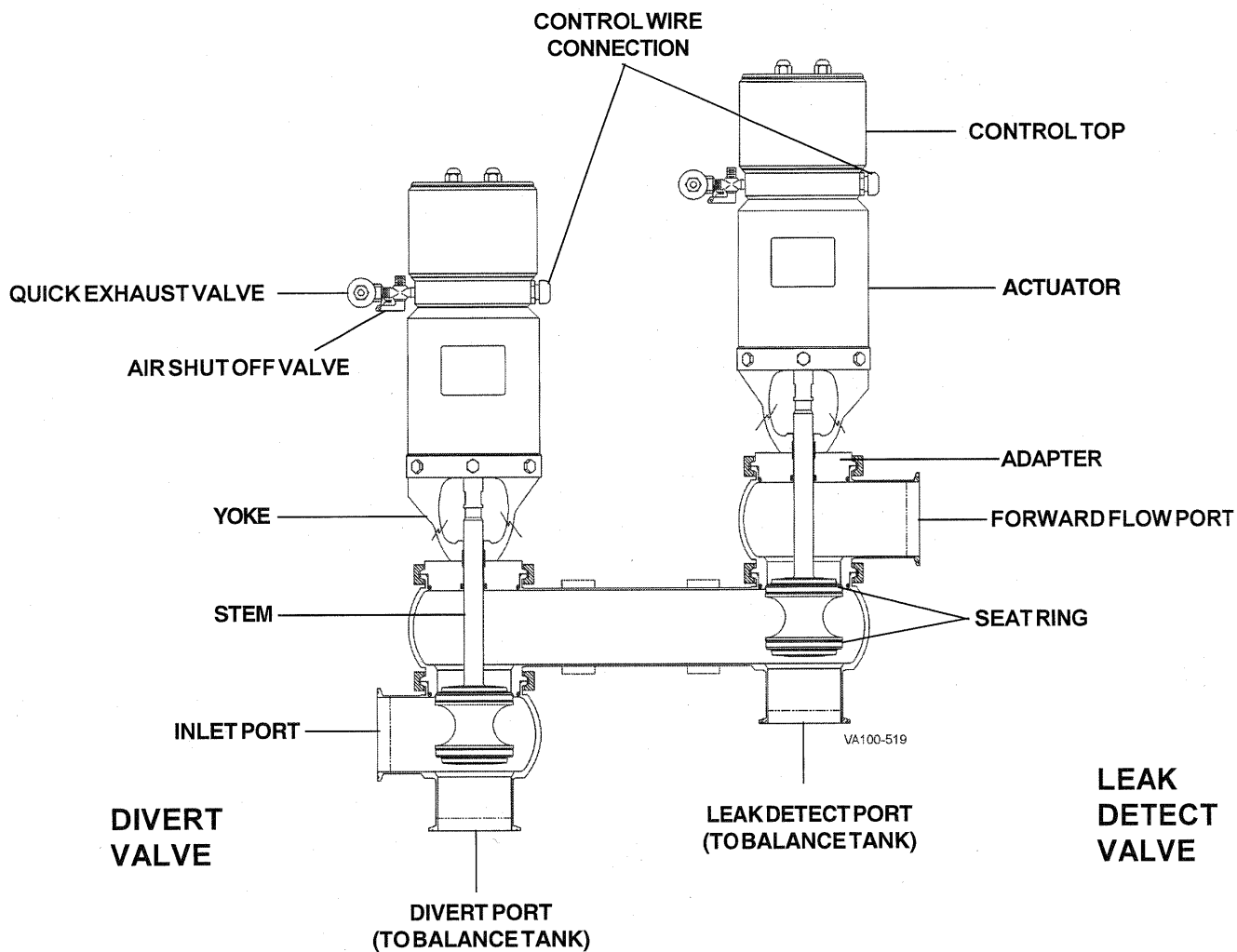


Figure 1

Flow Diversion Valve Nomenclature



## INTRODUCTION and SPECIFICATIONS

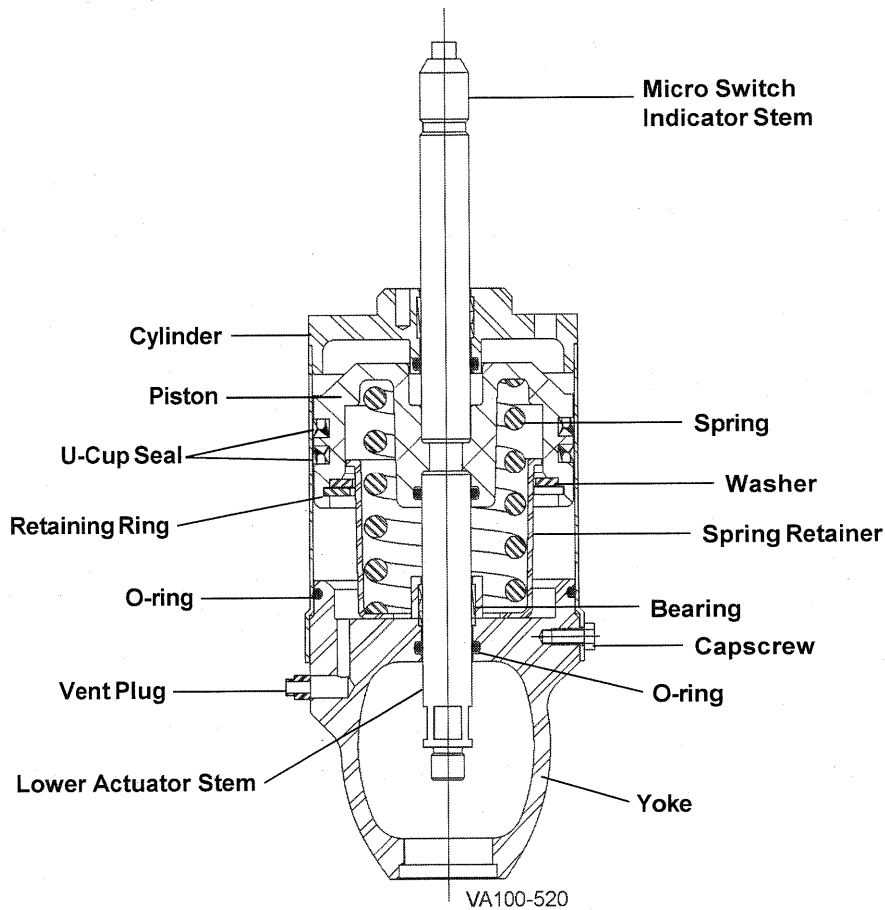


Figure 2 Actuator Components

### Effective Area of Actuators:

4" AL= 12.12 in<sup>2</sup> (78.19 cm<sup>2</sup>)  
5" AL= 19.19 in<sup>2</sup> (123.80 cm<sup>2</sup>)  
6" AL= 27.80 in<sup>2</sup> (179.35 cm<sup>2</sup>)

### Air Supply Requirements:

Minimum Air Pressure:	50 psi (3.4 bar)
Air Pressure Range:	50 psi (3.4 bar) to 90 psi (6.1 bar)
Air Volume Required:	4" AL= 14.0 in <sup>3</sup> (229.4 cm <sup>3</sup> ) 5" AL= 27.1 in <sup>3</sup> (444.1 cm <sup>3</sup> ) 6" AL= 33.1 in <sup>3</sup> (542.4 cm <sup>3</sup> )

**AL = AIR-TO-LOWER**

# INSTALLATION

## DIMENSIONS

Valve Size	A		A		A		B		C		C	
	4" Actuator		5" Actuator		6" Actuator				I-Line		S-Line	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
1"	15.81	401	17.12	435	18.88	480	2.63	67	3.75	95	3.12	79
1-1/2"	15.81	401	17.12	435	18.88	480	2.63	67	3.19	81	2.75	70
2"	16.06	407	17.37	441	19.13	486	3.13	79	4.03	102	3.50	89
2-1/2"	-	-	17.62	447	19.38	492	3.63	92	4.16	106	3.50	89
3"	-	-	-	-	19.63	498	4.13	105	4.47	113	3.75	95
4"	-	-	-	-	20.11	511	5.11	130	5.22	132	4.50	114

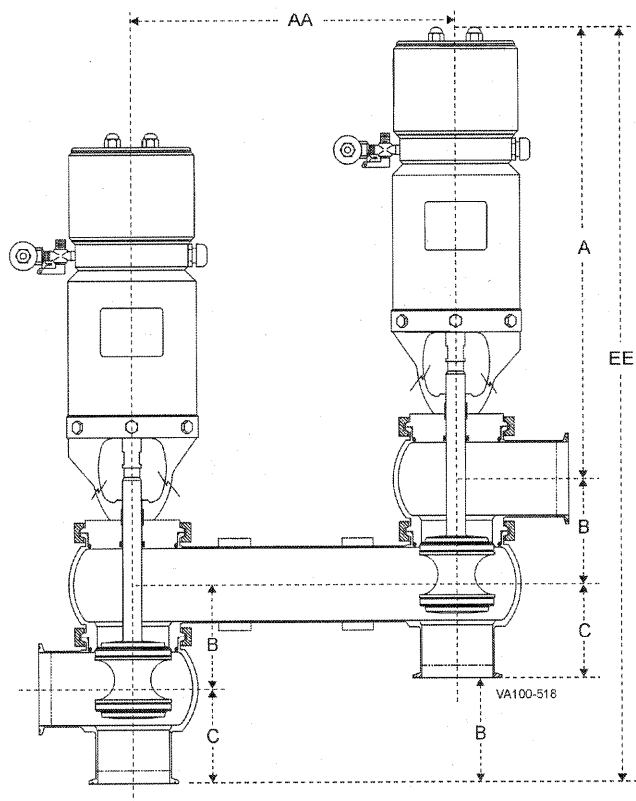


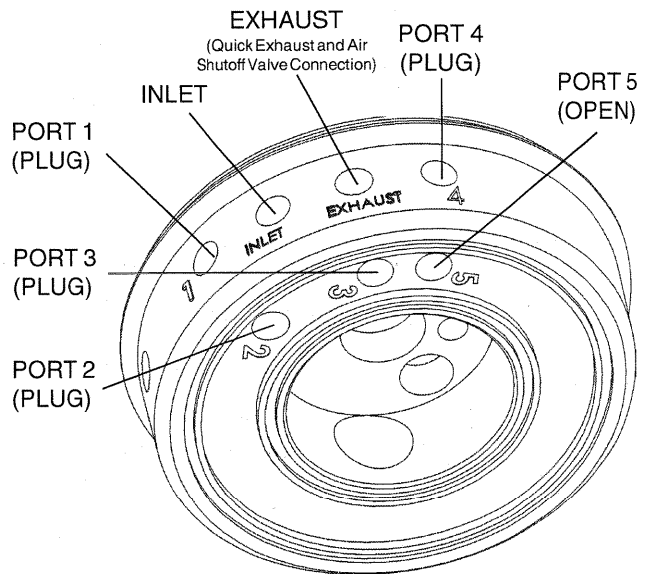
Figure 3 Valve Dimensions

Valve Size	Actuator		AA		EE		EE	
					I-Line		S-Line	
	in	mm	in	mm	in	mm	in	mm
1"	4	102	7.89	200	24.82	630	24.19	614
1-1/2"	4	102	7.89	200	24.26	616	23.82	605
2"	4	102	7.89	200	26.35	669	25.82	656
2-1/2"	5	127	7.89	200	29.04	738	28.38	721
3"	6	152	8.38	213	32.36	822	28.61	727
4"	6	152	8.41	214	35.55	903	34.83	885

# INSTALLATION

## CONTROL TOP WITH SOLENOID

The base of the control top has five (5) ports. For the solenoid to work correctly, ports 1, 2, 3 and 4 must be plugged. Figure 4 at right shows the position and condition of each port in the control top base.



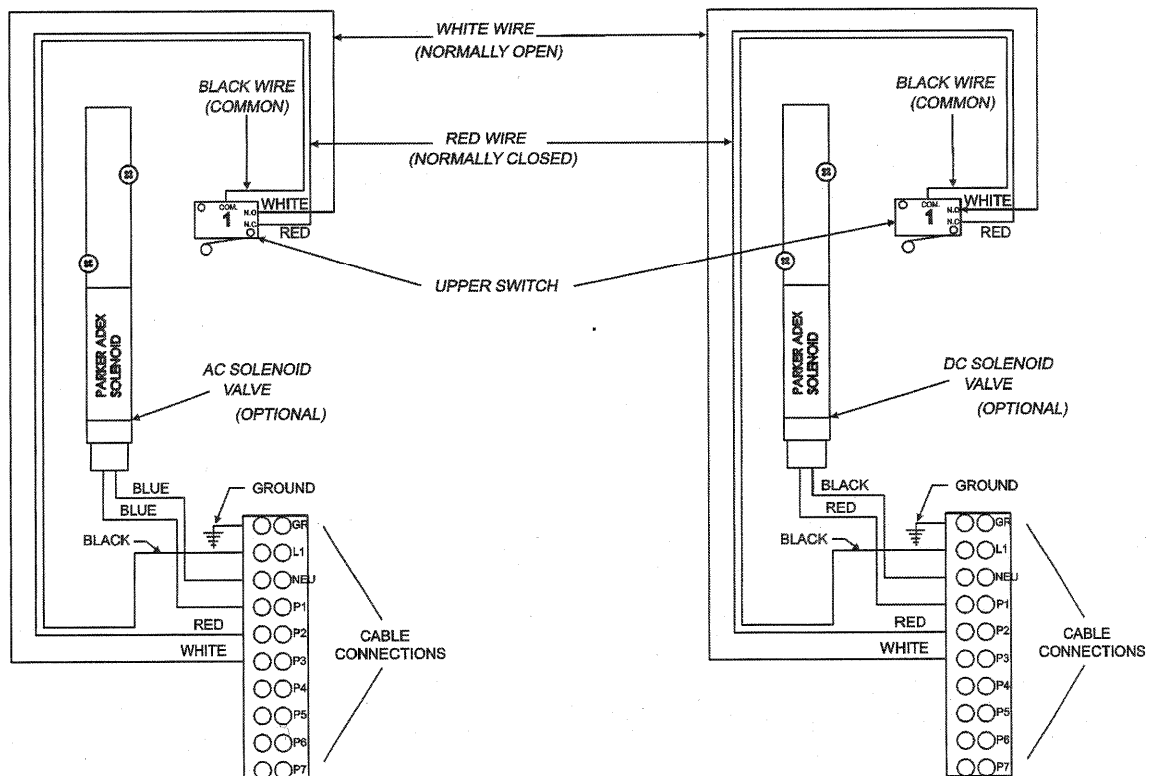
VA100-163a

Figure 4

**Solenoid Control Top Base**  
Bottom view of Control Module

## CONTROL TOP WIRING

Use the electrical schematic below for connection of control tops with or without optional solenoid. The cable connected to the terminal block in the control tops should connect directly to the terminal block in the controller, without any splices.



VA100-431a

Figure 5

**Control Wiring - Optional AC Solenoid**

Figure 6

**Control Wiring - Optional DC Solenoid**

# OPERATION

## OPERATING MODES

The Flow Diversion Device consists of 2 valves, each two-position, connected by a common body. The common body is the upper body of the Divert Valve and the lower body of the Leak Detect Valve. The air-to-lower actuators of the two valves are connected to independent air supplies which cycle the valves to the three operating modes: Divert, Flush, and Forward Flow. A description of each of the three modes follows.

## DIVERT MODE

Divert is the first mode of operation assumed by the Flow Diversion Valve in the start-up procedure. Until legal product temperature is reached and normal system operation is established, product is diverted to the Balance Tank. *This mode is indicated by the stems of both valves being in raised position.* This can be seen by checking the indicator stem in the control top. The roller arm of the micro switch, in both valves, will be positioned as shown in Figure 7 below.

The Divert Valve should be in the Divert position when:

1. Control panel selector switch is in the Divert position.
2. Control panel selector switch is in the Off position.
3. The power supply is interrupted.
4. The air supply is interrupted.

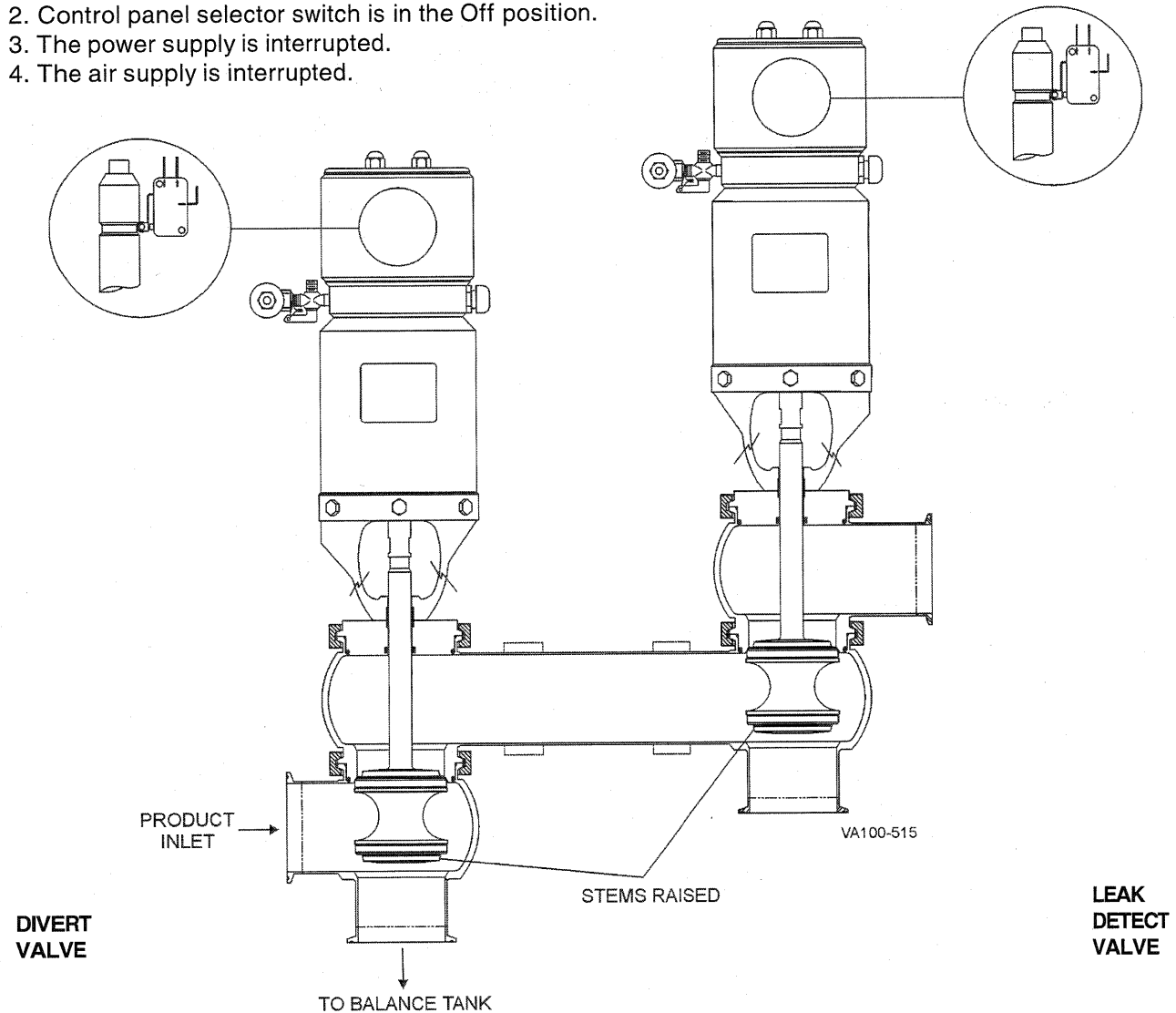


Figure 7 Divert Mode

# OPERATION

## FLUSH MODE

In this mode, correctly pasteurized product flushes and clears the common body between the Divert Valve and the Leak Detect Valve, prior to initiating product Forward Flow.

The flush time is controlled by the Flow Divert Valve Controller. This control system is separate from the Divert Valve's, but works in conjunction with the Divert Valve's. The control system can be from several sources and of several designs but must be approved by the FDA prior to use.

Product that goes through the valves in the Flush mode is returned to the Balance Tank through the Leak Detect Valve and the Return Line. This line must be separate from the Divert Product Return Line, but both of these lines return the product to the Balance Tank.

In the Flush mode, the stem of the Divert Valve will be lowered, as seen in the control top. The Leak Detect stem will be in the raised position, which is the same as when in the Divert mode. The roller arm of the micro switch, in both valves, will be positioned as shown in Figure 8 below.

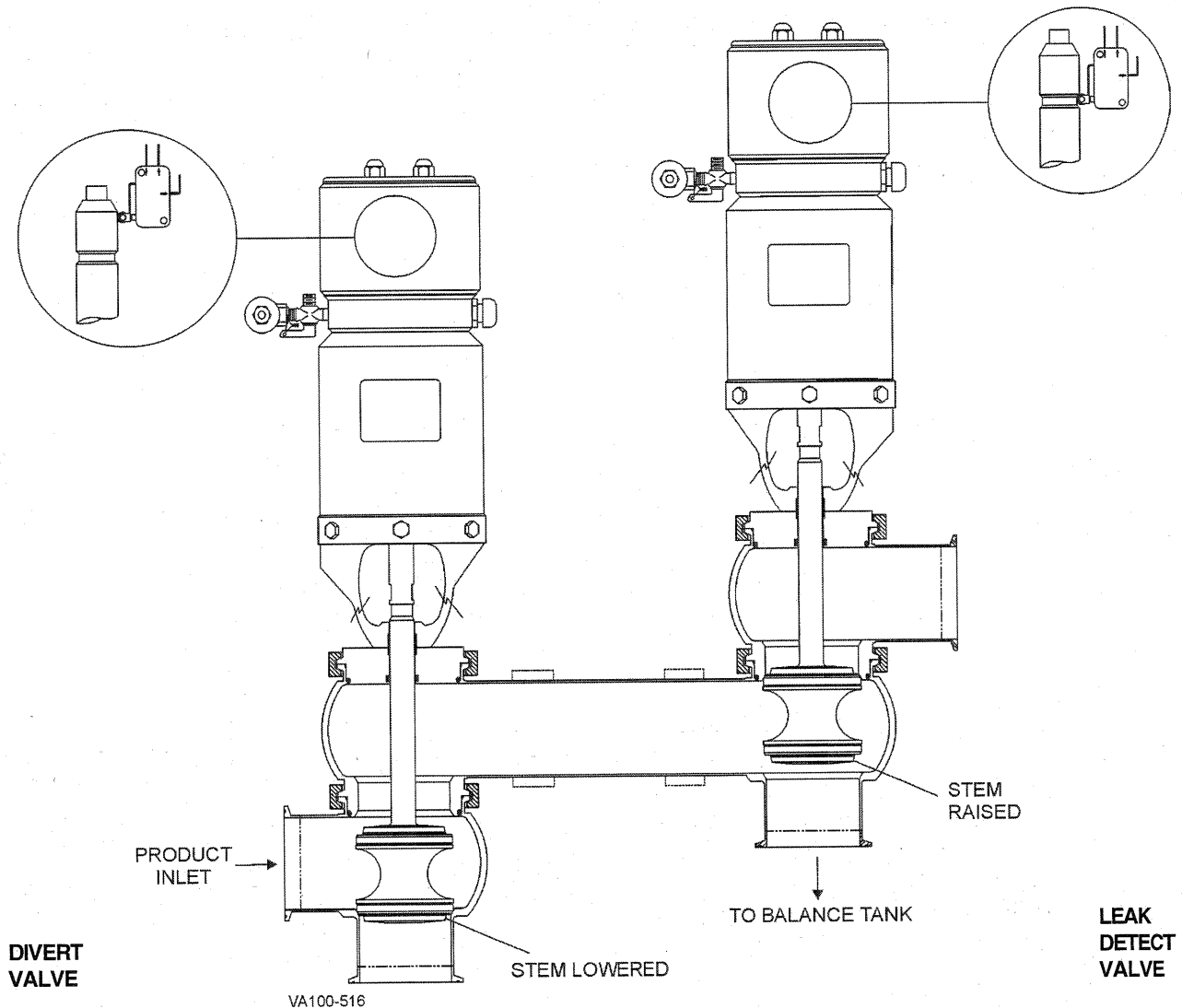


Figure 8 Flush Mode

# OPERATION

## FORWARD FLOW MODE

Forward Flow is the final operating mode of the Flow Diversion Valve. Product flows through both valves to the cooling sections of the pasteurization system. The stems of both valves are lowered, as seen in the control top. The roller arm of the micro switch, in both valves, will be positioned as shown in Figure 9 below.

For the Forward Flow mode to be maintained:

1. The legal set temperature must be maintained.
2. The power supply and air supply must be maintained.

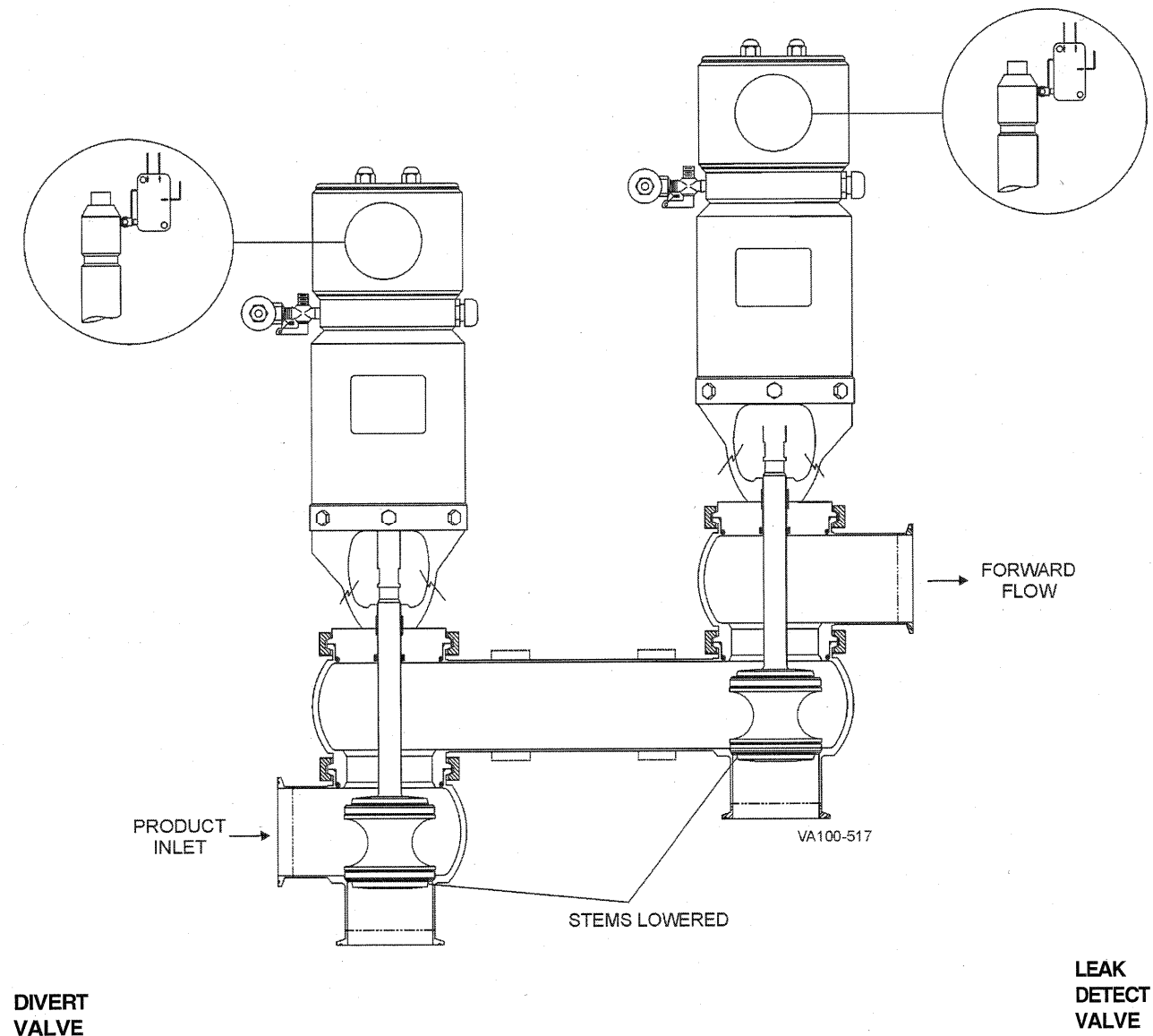


Figure 9 Forward Flow Mode

## MICRO SWITCH

Figure 10 at right shows the correct position of the micro switch when valve is in Divert mode. This position allows the switch to give a signal when valve opens and roller moves out of the groove and also gives an indication if valve seat is worn excessively (stem moves up and roller is out of groove).

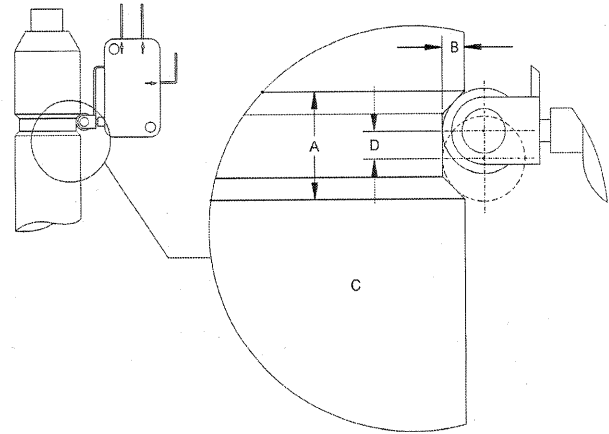
When roller is out of groove, timing pump will not start. Width of groove in stem is manufactured 1/16-inch wider than roller to compensate for vibration and heat expansion.

**Switch roller should be positioned against upper shoulder of groove.**

**NOTE:** Sensitivity of switch is increased by moving switch toward stem and decreased by moving switch away from stem.

## MICRO SWITCH ADJUSTMENT

1. With valve in Divert position (stem raised), adjust switch up or down so roller on switch arm is in groove against upper shoulder on indicator stem. Adjust switch position using the two nuts (item 7, page 24) on lead screw (item 8, page 24).
2. Tighten nuts on lead screw to lock switch carriage (item 6, page 24) in position.
3. Open valve by applying air to actuator. This will lower stem.
4. Loosen setscrew (item 9, page 24), and move switch toward indicator stem until switch clicks. *(The position where switch clicks or makes the circuit can be confirmed using a volt ohm meter connected to the common and normally open contacts on switch.)*
5. Correct adjustment is the point at which the switch just clicks.
6. When adjustment point is found, tighten setscrew.
7. Remove air from actuator to raise stem. Roller should be in groove.
8. Circuit should be open when roller is in groove and made when stem is lowered. If this is not achieved, confirm that roller is in groove when stem is raised; then repeat steps 3 through 6.



Detail of micro switch position for Divert mode

A - Groove Width:	.241
B - Groove Depth:	.050
C - Stem	
D - Roller Travel	.063
(To allow cold flow of Tef-Flow™ P seat ring.)	

Figure 10      **Micro Switch Adjustment**

# MAINTENANCE

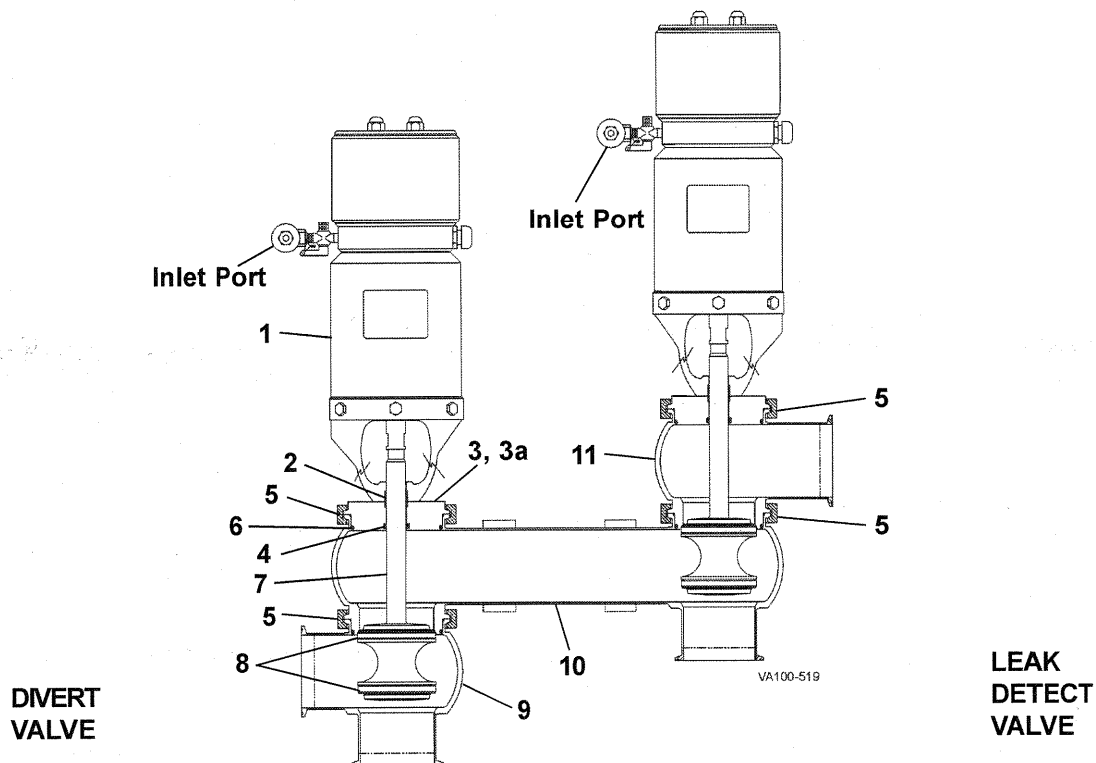
Lubricate all O-rings with Dow® Corning #7 Silicone Lubricant, or equivalent and apply anti-seize with Teflon® (for stainless steel) to all threads. Stems should be tightened with 5/8-inch open end wrenches. Do not use long wrenches or handles on wrenches to tighten stems. Over tightening will damage stems.

## DISASSEMBLY PROCEDURE:

1. Remove lower body clamp (item 5) and lower body from divert valve (item 9).
2. Apply air to inlet port to lower stem on divert valve.
3. Using 5/8-inch wrench flats on stem, unscrew and remove valve stem (item 7).
4. Shut off air and disconnect air line to actuator.
5. Remove common body clamps (item 5) on divert valve and leak detect valve. Remove common body (item 10).
6. Apply air to inlet port to lower stem on leak detect valve.
7. Using 5/8-inch wrench flats on stem, unscrew and remove valve stem (item 7).
8. Shut off air and disconnect air line to actuator.
9. Remove upper body clamp (item 5) and upper body on leak detect valve (item 11).
10. Replace seat rings (item 8) as needed.
11. Unscrew adapters (item 3) from yokes.
12. Remove body o-rings (item 6) and stem o-rings (item 4); replace as needed.
13. Inspect and replace PTFE bearings (item 2) as needed.

## ASSEMBLY PROCEDURE:

1. Screw adapters (item 3) onto yoke.
2. Install body o-rings (item 6), stem o-rings (item 4) and PTFE bearings (item 2).
3. Assemble upper body on leak detect valve (item 11) to adapter. Secure with upper body clamp (item 5).
4. Apply air to inlet port to lower stem on leak detect valve.
5. Using 5/8-inch wrench flats on stem, install valve stem (item 7). Tighten to 380 in/lbs.
6. Release air pressure.
7. Install common body o-ring (item 6).
8. Assemble common body (item 10); secure with common body clamps (item 5).
9. Apply air to inlet port to lower stem on divert valve.
10. Using 5/8-inch wrench flats on stem, install valve stem (item 7). Tighten to 380 in/lbs.
11. Release air pressure.
12. Install common body o-ring (item 6).
13. Assemble lower body (item 9); secure with lower body clamp (item 5)





## MAINTENANCE

### 4" AND 5" ACTUATOR STEM O-RING REPLACEMENT

#### CAUTION

Remove the actuator from the valve before starting any service work on the actuator.

1. Remove capscrews and pull off cylinder.
2. Using an open end wrench, remove actuator stem located in center of yoke.
3. Remove O-ring from yoke, being careful not to score or nick groove in yoke during removal.
4. Coat new O-ring with Dow® Corning #7 Silicone Lubricant, or equivalent, and install in yoke groove.
5. Carefully install actuator stem in yoke, being careful not to cut O-ring.
6. Apply Loctite® 242 to stem threads in actuator, per manufacturer's specifications.
7. Torque stems to 200 in-lbs.
8. Assemble actuator in reverse order.

### 4" and 5" ACTUATOR STEM BEARING REPLACEMENT

1. Remove capscrews and pull off cylinder.
2. Using an open end wrench, remove actuator stem located in center of yoke.
3. Remove actuator stem bearing from yoke. *The bearing has a split along its length to allow removal from groove.*
4. Install new bearing in yoke and carefully assemble actuator stem in yoke, being careful not to cut O-ring.
5. Apply Loctite® 242 to stem threads in actuator, per manufacturer's specifications.
6. Torque stems to 200 in-lbs.
7. Assemble actuator in reverse order.

**NOTE:** Bearing and O-ring in actuator cylinder are replaced the same way as bearing and O-ring in yoke.

### 4" and 5" ACTUATOR U-CUP REPLACEMENT

1. Remove capscrews and pull off cylinder.
  2. Remove worn U-Cup, being careful not to score or nick grooves in piston.
  3. Coat new U-Cup with Dow® Corning #7 Silicone Lubricant, or equivalent.
  4. Stretch lubricated seals lightly to fit over piston as shown in Figure. Install lower seal first with "U" pointing down. Install upper seal with "U" pointing up.
- NOTE:** U-Cup seals are flared slightly at outer edges when properly installed.
5. Install actuator cylinder, being careful not to roll over U-Cup lips.

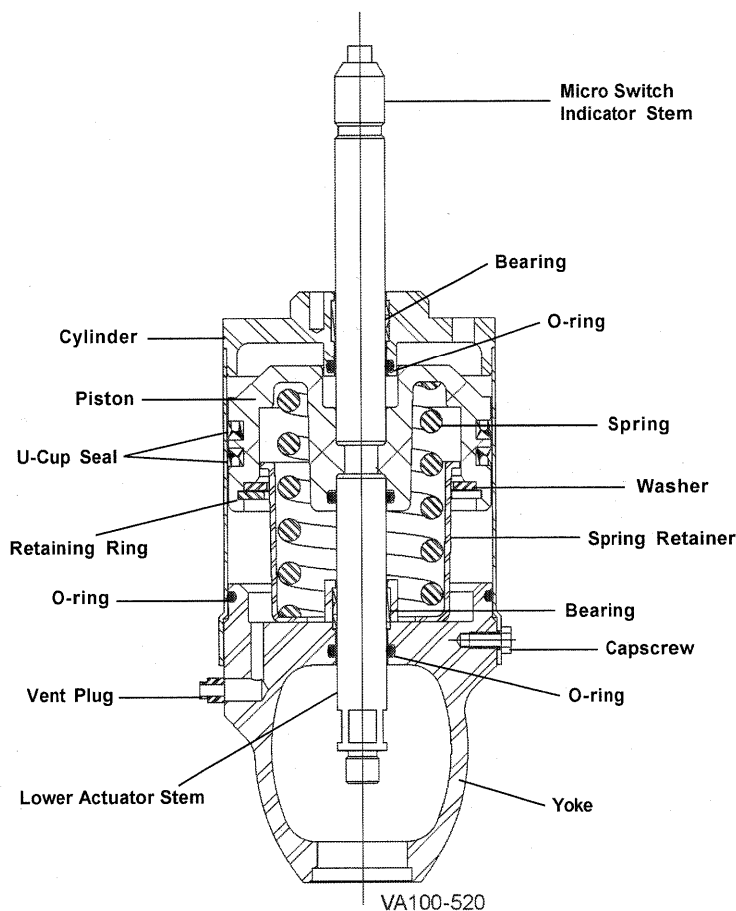


Figure 12

4" & 5" Actuator  
O-Ring, Bearing, U-Cup Replacement

## MAINTENANCE

### 6" ACTUATOR STEM O-RING REPLACEMENT

#### CAUTION

Remove the actuator from the valve before starting any service work on the actuator.

1. Remove capscrews and pull off cylinder.
2. Using an open end wrench, remove lower actuator stem located in center of yoke.
3. Remove O-ring from yoke, being careful not to score or nick groove in yoke during removal.
4. Coat new O-ring with Dow® Corning #7 Silicone lubricant, or equivalent, and install in yoke groove.
5. Carefully install actuator stem in yoke, being careful not to cut O-ring.
6. Apply Loctite® 242 to stem threads in actuator, per manufacturer's specifications.
7. Torque stems to 400 in-lbs.
8. Assemble actuator in reverse order.

### 6" ACTUATOR STEM BEARING REPLACEMENT

1. Remove capscrews and pull off cylinder.
2. Using an open end wrench, remove lower actuator stem located in center of yoke.
3. Remove actuator stem bearing from yoke. *The bearing has a split along its length to allow removal from groove.*
4. Install new bearing in yoke and carefully assemble actuator stem in yoke, being careful not to cut O-ring.
5. Apply Loctite® 242 to stem threads in actuator, per manufacturer's specifications.
6. Torque stems to 400 in-lbs.
7. Assemble actuator in reverse order.

**NOTE:** Bearing and O-ring in actuator cylinder are replaced the same way as bearing and O-ring in yoke.

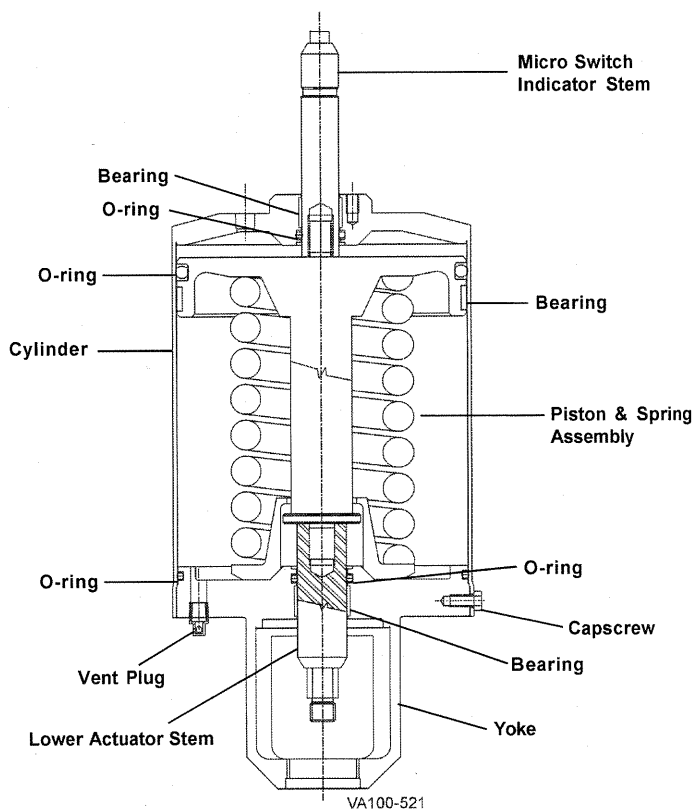


Figure 13 6" Actuator  
O-ring and Bearing Replacement

### REMOVAL AND INSTALLATION OF TEF-FLOW™ P SEAT RINGS

1. Melt through seat ring using a clean plastic cutting tip on a heavy duty soldering iron capable of maintaining a 700°F tip temperature.
2. DO NOT cut seat ring from stem with a knife to avoid personal injury and/or damage to stem.
3. To install new seat, place installation tool base (Figure 14, item 1) onto table or bench with a 1.0" hole.
4. Place stem through hole in base.
5. Place new seat ring onto stem, with 30° seat angle and flat side facing away from base, as shown in Figure.
6. Place seat ring tool (Figure 14, item 2) over seat ring.
7. Using a hand-operated arbor press, apply constant steady pressure to seat ring tool to snap seat ring into place.  
(**CAUTION:** Do not use hammer to install.)
8. Valve seat will spin freely when properly installed.

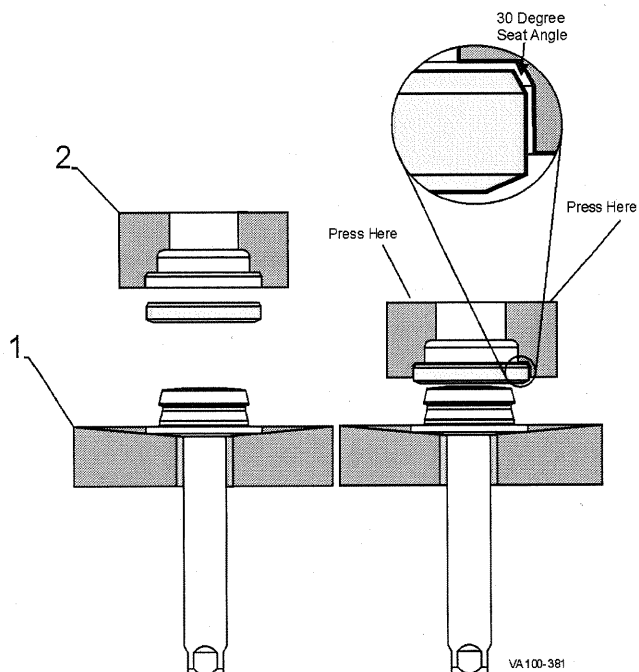


Figure 14      **Seat Ring Installation**

# TEST PROCEDURES

## INSPECTION TEST PROCEDURES

These procedures are used to check the assembly and operating condition of the Flow Diversion Device. As positive test results are obtained, attach the required **seal wire** (Figure 15) in the locations specified by the procedure. Suggested corrective actions are presented at the end of each procedure in the event of test failure.

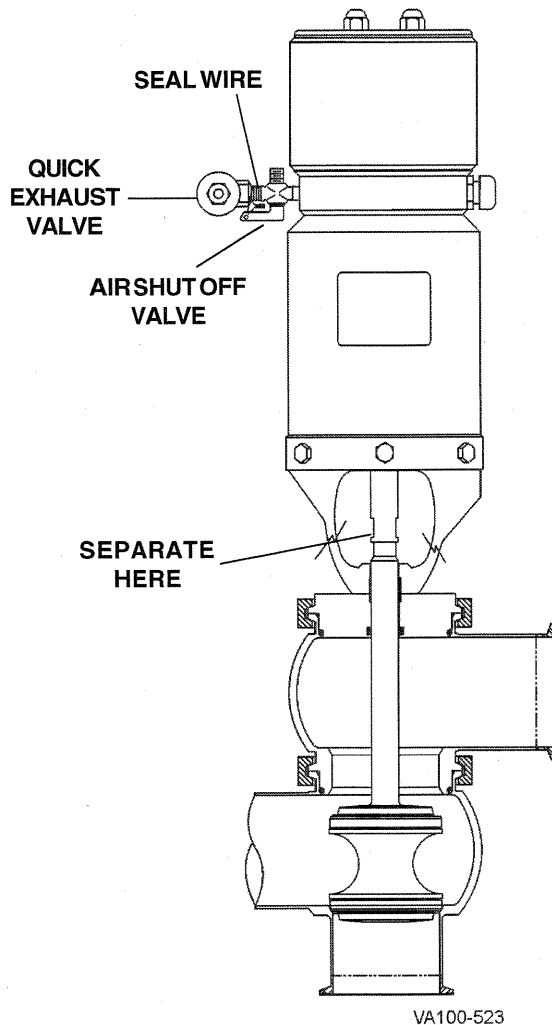


Figure 15 Inspection Test Procedures

## TEST 1

### DEVICE ASSEMBLED CORRECTLY

Perform this test to verify Flow Diversion Device is properly assembled and adjusted. Check each valve independently, as follows, beginning with Divert Valve.

1. With system temperature sub-legal, set FDV Switch to INSPECT.
2. All Flow Promoting Devices (Timing Pumps) must be de-energized and stopped.
3. Divert Valve shifts to Forward Flow position (Figure 9, page 14). Break *seal wire* on Air Shut Off Valve handle (Figure 15). Turn handle 90 degrees to trap air in actuator. Actuator will remain in lowered position.
4. Set FDV Switch to PROCESS (product/run) and Mode Switch to AUTO. Flow Promoting Device (Timing Pump) shall not run.
5. Set Mode Switch to OFF. Slowly open Air Shut Off Valve (Figure 15) until valve stem moves up approximately 1/2-inch, then close Air Shut Off Valve.
6. Use two 5/8-inch open wrenches to unscrew valve stem from lower actuator stem about 1/8-inch (Figure 15, SEPARATE HERE). Open Air Shut Off Valve again. Stem will raise to Divert position.
7. Set Mode Switch to PROCESS. Flow Promoting Device (Timing Pump) shall not run.
8. Repeat steps 1, 2, 3, and 4. Tighten valve stem to raise actuator stem, using two 5/8-inch open end wrenches. Return Air Shut Off Valve to its normally open position. Attach new *seal wire* through handle of Air Shut Off Valve.
9. Repeat steps 1 through 8 for Leak Detect Valve.

**Corrective Action** --- If the Flow Promoting Device (Timing Pump) fails to respond as indicated in the above procedure, an immediate check of the Flow Diversion Device assembly and wiring is required to locate and correct the cause. *Check micro switch adjustment first* (page 15).

## TEST PROCEDURES

---

### TEST 2

#### TIME DELAY INTERLOCK WITH METERING PUMP

**Method** --- Determine that the device does not assume a manually induced Forward Flow position, while the metering pump is running.

**Procedure** --- With the system running in Forward Flow, move the control switch to the INSPECT position and observe that the following events automatically occur in sequence:

- a. The device immediately moves to the Divert position and the metering pump is turned off.
- b. The device remains in the Divert position while the metering pump is running down.
- c. After the metering pump stops turning, the device assumes the Forward Flow position.
- d. Repeat the above procedure by moving the control switch to the Clean-In-Place (CIP) position.
- e. Record the test results and seal the control enclosure.

**Corrective Action** --- If the above sequence of events does not occur, either a timer adjustment or a wiring change is required.

### TEST 3

#### CIP TIME DELAY RELAY

**Application** --- To all high-temperature, short-time pasteurizer systems in which it is desired to run the Timing Pump and/or other Flow Promoting Devices during the CIP cycle.

**Frequency** --- Upon installation and semi-annually thereafter, or whenever the seal on the Time Delay Relay is broken.

**Criteria** --- When the mode switch on the Flow Diversion Device is moved from Process Product to CIP, the Flow Diversion Device shall move immediately to the Divert Flow position and remain in the Divert Flow position for at least 10 minutes before starting its normal cycling in the CIP mode. Simultaneously, the booster pump shall be turned off and shall not run during the 10 minute time delay.

# PARTS LISTS

## CONTROL TOP WITHOUT SOLENOID

Disconnect All Power  
Before Removing

**NOTICE**  
SWITCHES ARE FACTORY SET  
AT AN APPROXIMATE LOCATION  
ADJUSTMENT DURING START-UP  
AND USE MAY BE REQUIRED.

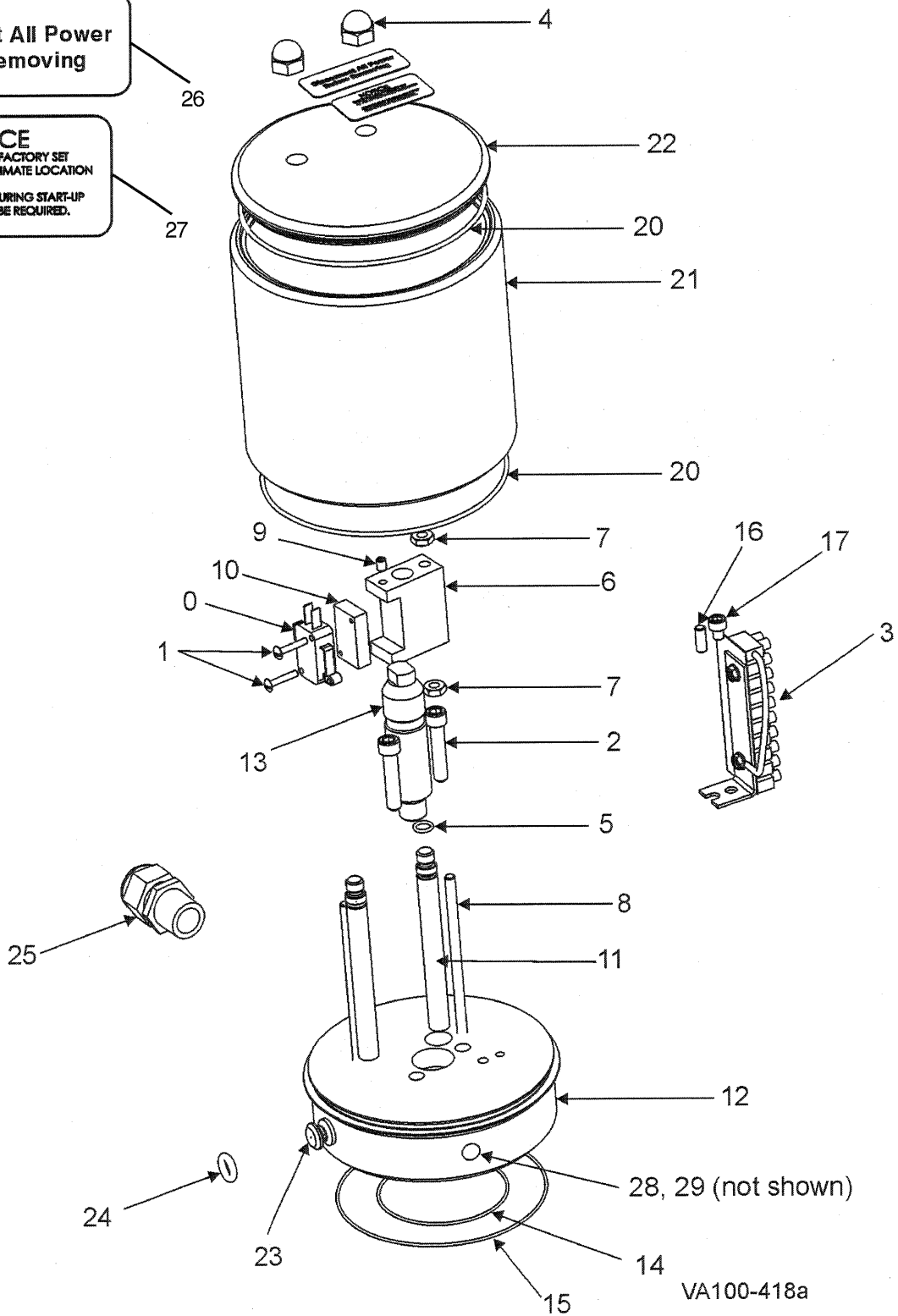


Figure 16 Control Top without Solenoid

## PARTS LISTS

### CONTROL TOP WITHOUT SOLENOID

	DESCRIPTION	PART #	QTY
0.	Micro Switch	17-9	1
1.	Screw, Machine #4-40 x 5/8	30-69	2
2.	Capscrew, Socket Head 1/4-28 x 1-1/4	30-530	2
3.	Terminal Block	110272	1
4.	Nut, Acorn 5/16-18	36-49	2
5.	O-ring, Switch Post	N70010	2
6.	Carriage, Switch	102118	1
7.	Nut, Hex #10-24	36-74	2
8.	Screw, Lead	102122	2
9.	Setscrew, Socket Head #8-32 x 1/4	30-540	1
10.	Block, Switch	102119	1
11.	Post, Switch	102120	2
12.	Base	102869	1
13.	Stem - Micro Switch Indicator		
	4" Actuator	118940	1
	5" Actuator	118941	1
	6" Actuator - Not Shown	110899	1
14.	O-ring, Inner Base	N70035	1
15.	O-ring, Outer Base	N70044	1
16.	Pin, Dowel 3/16 x 1/2	30-363	1
17.	Capscrew, Socket Head #10-32 x 1/4	30-519	1
20.	O-ring, Cover	N70155	2
21.	Cover, Clear	102125	1
22.	Cap	102126	1
23.	Vent Body	116944	1
24.	Vent O-ring	N50202	1
25.	Cable Strain Relief Connector	17-88	1
	Warning Labels:		
26.	Label - "Disconnect..."	5902473	1
27.	Label - "Notice..."	112094	1
28.	Quick Exhaust - Not Shown	5560525	1
29.	Air Shut Off Valve - Not Shown	5560639	1

# PARTS LISTS

## CONTROL TOP WITH SOLENOID

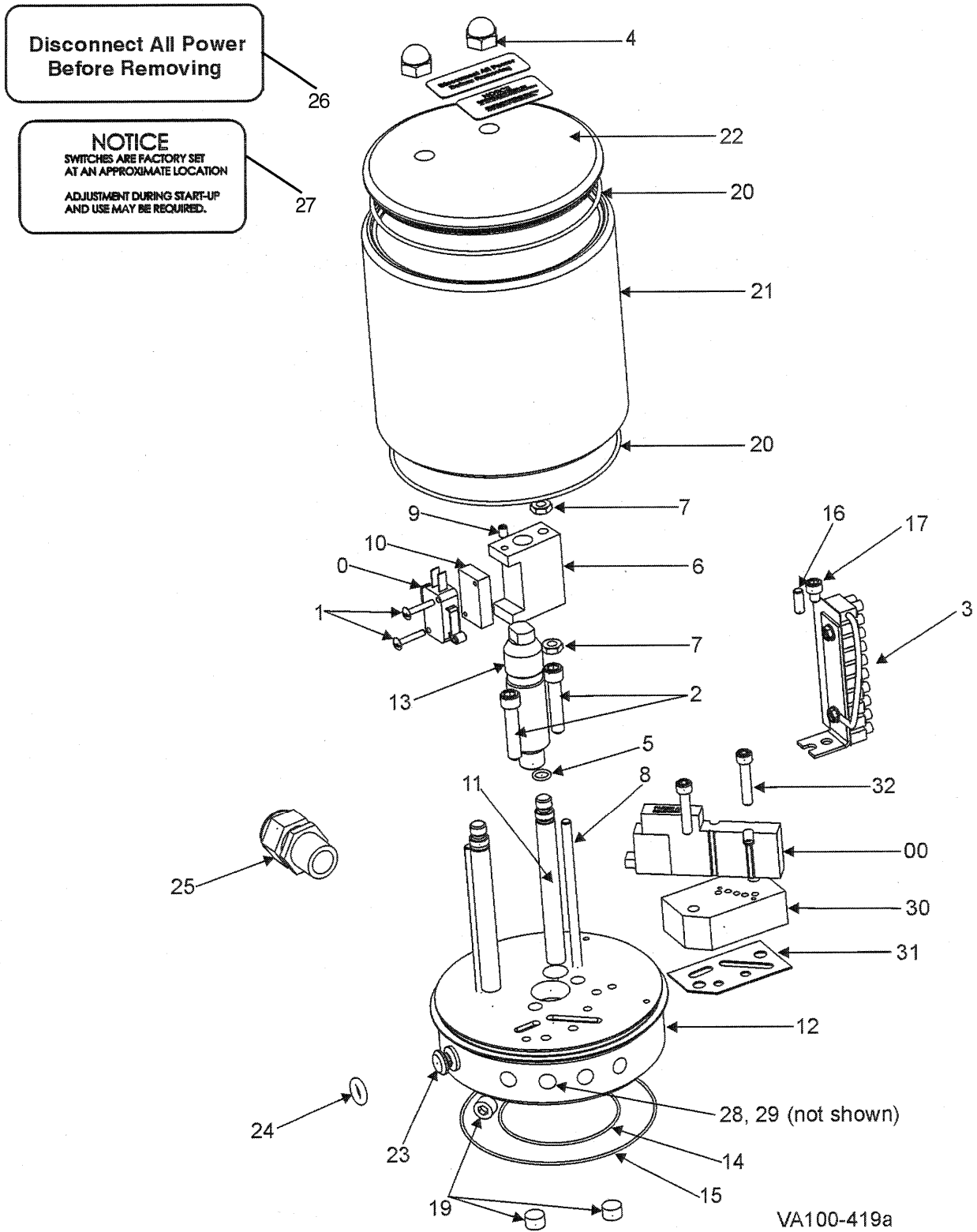


Figure 17 Control Top with Solenoid



## PARTS LISTS

### CONTROL TOP WITH SOLENOID

	DESCRIPTION	PART #	QTY
0.	Micro-Switch	17-9	1
00.	Solenoid Valve (120 VAC)	117490	1
	Solenoid Valve (24 VDC) Not Shown	117488	1
	Solenoid Valve Cable (AC) Not Shown	117491	1
	Solenoid Valve Cable (DC) Not Shown	117489	1
1.	Screw, Machine #4-40 x 5/8	30-69	2
2.	Capscrew, Socket Head 1/4-28 x 1-1/4	30-530	2
3.	Terminal Block	110272	1
4.	Nut, Acorn 5/16-18	36-49	2
5.	O-ring, Switch Post	N70010	2
6.	Carriage, Switch	102118	1
7.	Nut, Hex #10-24	36-74	2
8.	Screw, Lead	102122	2
9.	Setscrew, Socket Head #8-32 x 1/4	30-540	1
10.	Block, Switch	102119	1
11.	Post, Switch	102120	2
12.	Base	102124	1
13.	Stem - Micro Switch Indicator		
	4" Actuator	118940	1
	5" Actuator	118941	1
	6" Actuator - Not Shown	110899	1
14.	O-ring, Inner Base	N70035	1
15.	O-ring, Outer Base	N70044	1
16.	Pin, Dowel 3/16 x 1/2	30-363	1
17.	Capscrew, Socket Head #10-32 x 1/4	30-519	3
19.	Plug	78-73	1
20.	O-ring, Cover	N70155	2
21.	Cover, Clear	102125	1
22.	Cap	102126	1
23.	Vent Body	116944	1
24.	Vent O-ring	N50202	1
25.	Cable Strain Relief Connector	17-88	1
	Warning Labels:		
26.	Label - "Disconnect..."	5902473	1
27.	Label - "Notice..."	112094	1
28.	Quick Exhaust - Not Shown	5560525	1
29.	Air Shut Off Valve - Not Shown	5560639	1
30.	Block, Solenoid Mounting	117487	1
31.	Gasket, Solenoid Mounting	104138	1
32.	Capscrew, Socket Head #10-32 x 1	30-654	2

## 26



# PARTS LISTS

Item #	Part Description	1"	1-1/2"	2"	2-1/2"	3"	4"
1	Actuator	See Pages 28-29					
* 2	Bearing	102757	102757	102757	102757	102757	102757
3	Adapter, Upper - W60 (Std.)	102406	102406	102407	102408	102409	102410
3b	Adapter, Upper - W80 <sup>1</sup>	106291	106291	106292	106293	106294	106295
3d	Adapter, Upper - Wiping Stem Seal	117879	117879	117880	117881	117882	117883
* 4	O-ring	EPDM E70210	E70210	E70210	E70210	E70210	E70210
		FKM V70210	V70210	V70210	V70210	V70210	V70210
* 4a	Wiping Stem Seal	EPDM 116183	116183	116183	116183	116183	116183
		FKM 115626	115626	115626	115626	115626	115626
5	Clamp Standard	119-30	119-30	119-33	119-34	119-51	119-87
* 6	O-ring, Body	EPDM E70223	E70223	E70228	E70232	E70236	E70244
		FKM V70223	V70223	V70228	V70232	V70236	V70244
7	Stem (less seat ring) Tef-Flow™	102423	102424	102425	102426	102427	102428
* 8	Seat Ring Tef-Flow™ P	115347	115347	115348	115349	115350	115351
12	Body, Upper Tee S-Line	104167	104171	104175	104179	104183	104187
	I-Line	104165	104169	104173	104177	104181	104185
13	Body, Lower Tee S-Line	104143	104147	104151	104155	104159	104163
	I-Line	104141	104145	104149	104153	104157	104161
14	Body, Common Upper/Lower <sup>2</sup>	111204	111206	111264	111265	111266	111267
		111205	111207	N/A	N/A	N/A	N/A
16	Quick Exhaust Valve	5560525	5560525	5560525	5560525	5560525	5560525
17	Air Shut-off	5560639	5560639	5560639	5560639	5560639	5560639
19	Hanger	109064	109241	109242	109243	109244	109384
20	High Pressure Clamp	119-271	119-271	N/A	N/A	N/A	N/A
21	Gasket - FKM(not shown)	20-62	20-57	N/A	N/A	N/A	N/A
22	Tef-Flow™ P Tool (not shown) Base	109064	109241	109242	109243	109244	109384
	Seat Ring Tool	119-271	119-271	N/A	N/A	N/A	N/A
23	Tri-Ring Installation Tool (not shown)	20-62	20-57	N/A	N/A	N/A	N/A

## \*Recommended Spare Parts

<sup>1</sup>W80 Adapter allows for liquid or steam flush of stem o-ring only.

<sup>2</sup>1" and 1-1/2" valves will be clamped together with a 13 MHP clamp.

## 4" and 5" ACTUATORS

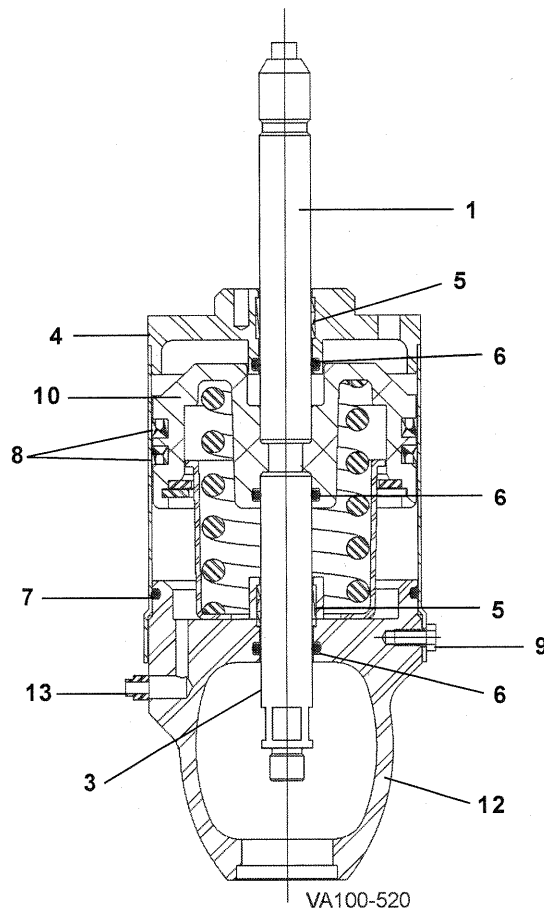


Figure 19

4" and 5" Actuator

### ACTUATOR SIZE

	4"	Qty	5"	Qty
1. Stem	118940	1	118941	1
3. Stem - Lower	102141	1	102134	1
4. Cylinder	102136	1	102130	1
5. Bearing	102757	2	102757	2
6. O-ring - Stem	N70210	3	N70210	3
7. O-ring - Cylinder	N70240	1	N70248	1
8. Seal - U-Cup	57-15	2	57-13	2
9. Capscrew - 1/4-20 x 3/8	30-68	4	30-68	6
10. Piston & Spring Assembly				
Standard Spring	118144	1	118145	1
Heavy Duty Spring	118146	1	118147	1
12. Yoke	102137	1	102131	1
13. Plug - Vent	3023957	1	3023957	1
16. Quick Exhaust Valve See Fig. 18, p. 26	5560525	1	5560525	1
17. Air Shut Off Valve - Not Shown	5560639	1	5560639	1

# 6" ACTUATOR

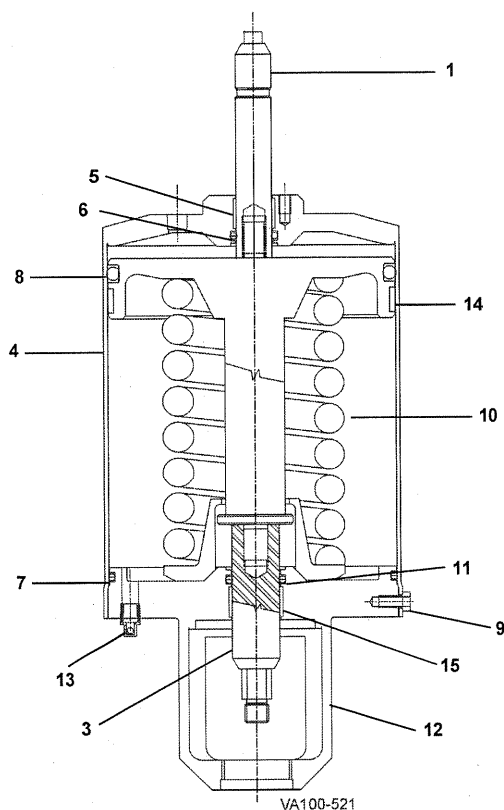


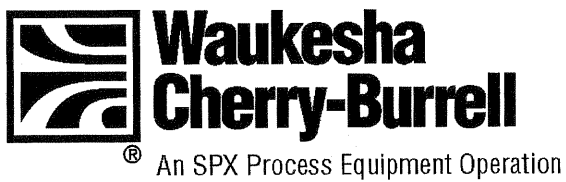
Figure 20 6" Actuator

	Part #	Qty
1. Stem - Micro Switch Indicator	110899	1
3. Stem - Lower	108825	1
4. Cylinder	106007	1
5. Bearing - Upper Stem	102757	1
6. O-ring - Upper Stem	N70210	1
7. O-ring - Cylinder	N70255	1
8. O-ring - Piston	N70433	1
9. Capscrew, 1/4-20 x 3/8	30-68	8
10. Piston and Spring Assembly		
Light Spring	110288	1
Standard Spring	108832	1
11. O-ring - Lower Stem	N70214	1
12. Yoke	108827	1
13. Plug - Vent	3023957	1
14. Bearing - Piston	102052	1
15. Bearing - Lower Stem	106047	1
16. Quick Exhaust Valve	5560525	1
See Fig. 18, p. 26		
17. Air Shut Off Valve - Not Shown	5560639	1

## NOTES

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**NELSON JAMESON**  
INC.  
800-826-8302 nelsonjameson.com

611 Sugar Creek Road  
Delavan, WI 53115 USA  
Phone 800-252-5200 or 262-728-1900  
Fax 800-252-5012 or 262-728-4904

E-mail: [info@processequipment.spx.com](mailto:info@processequipment.spx.com)  
Web Site: [www.spxprocessequipment.com](http://www.spxprocessequipment.com)

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