SPXFLOW

INSTRUCTION MANUAL

W71 and W72RS Schedule 5 Mix Proof Valves

FORM NO.: 95-03091 REVISION: 08/2018

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

Waukesha Cherry-Burrell

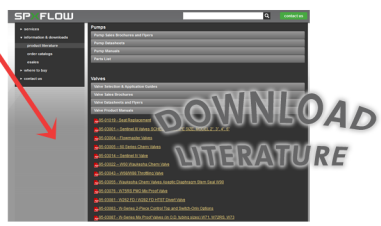
SPX FLOW, Inc.
611 Sugar Creek Road
Delavan, WI 53115 USA

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

E-mail: wcb@spxflow.com
Web site: www.spxflow.com

This manual is also available in an interactive PDF version online at:
www.spxflow.com/en/assets/pdf/95-03091_w71_w72Rrs_mixproofv_wcb.pdf

This interactive manual incorporates links to maintenance videos designated by this symbol



throughout the maintenance section of the manual, to help you better service your valve.
An internet connection is required for the video hyperlinks to be active.

This enhanced operation and maintenance manual shows you step by step videos on how to maintain your Waukesha Cherry-Burrell brand product. Creating these new tools shows our commitment to provide you with the most up-to-date maintenance technology available.

Date: 08/2018

Publication: 95-03091

Warranty

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

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

Shipping Damage or Loss

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

Warranty Claim

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

Claims for shortages or other errors must be made in writing to Seller within ten (10) days after delivery. This does not include transit shortage or damages. Failure to give such notice shall constitute acceptance and waiver of all such claims by Buyer.

Safety

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

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

1. Occupational Safety and Health Administration (OSHA)
2. National Fire Protection Association (NFPA)
3. National Electrical Code (NEC)
4. American National Standards Institute (ANSI)

⚠WARNING

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

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

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

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

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

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

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

⚠DANGER

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

⚠WARNING

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

⚠CAUTION

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

Care of Component Materials

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

⚠WARNING

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

Stainless Steel Corrosion

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

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

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

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

Elastomer Seal Replacement Following Passivation

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

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.

The vent/drain outlet at the bottom of the Mix Proof valve must not be obstructed. The unrestricted vent/drain outlet must allow leakages and cleaning/rinsing/sterilization fluids to go to atmosphere in order to guarantee mix proof safe separation. If hoses, pipes, or other components are mounted to the vent/drain outlet to prevent splashing of leakage and cleaning/rinsing/sterilization fluids, then they must be designed such that the fluids flow freely to atmosphere.

Locate the valve for easy access for inspection.

⚠CAUTION

Isolate products away from the valve prior to performing maintenance.

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

Welding Instructions

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

⚠CAUTION

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

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

- Prior to installation, remove the 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.

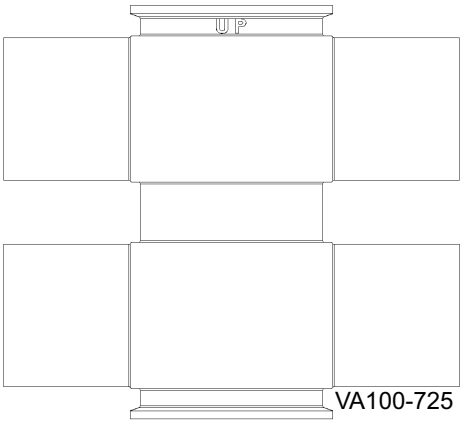


Figure 1 - Valve orientation

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

⚠CAUTION

Welding must be carried out by qualified personnel.

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

Air Supply

Install the valves using dry, filtered air. Lubrication is not required. If using lubricated air, refer to the solenoid manufacturer's specifications. The air supply must be 75 to 90 psi (5.2 to 6.2 bar).

Flow Direction

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

Fittings

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

Pipeline Support

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

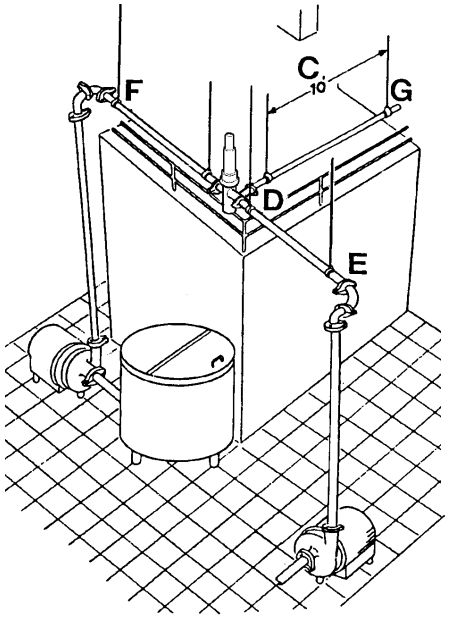


Figure 2 - Pipeline Support

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

⚠CAUTION

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

Installing Valve Manifolds

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

Installing the Valve

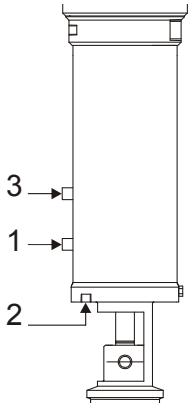


Figure 3 - Solenoid Valve Port Connections

1. If solenoids are mounted in a control top, connect the air supply lines to “air in.” If solenoids are mounted externally from the control top, connect the air lines as explained in “Solenoid Valve Port Connections” on page 17.
2. Using caution, lift the actuator assembly and set the actuator in the body assembly.
3. Lower the valve slowly into the body, making sure the lower stem enters the lower bearing carrier.
4. Tightly clamp the yoke/body flange.
5. Connect the air lines to 1, 2 and 3, as shown in Figure 3, left, and Figure 11 on page 17.

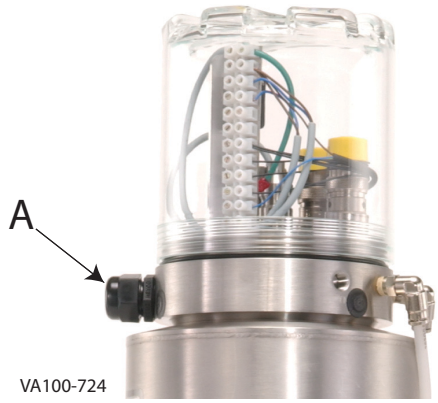


Figure 4 - Control Top Wire Connection Point

6. Connect the electrical control cord to the valve at location A (see Figure 4).

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

7. Operate the valve through the available conditions (closed, open, upper seat cleaning and lower seat cleaning). See Table 3, “Solenoid/Valve Position,” on page 17.

Quality of Control Air to Control Module

Do not exceed the following values:

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

External Flush - Liquid Vent Cavity

NOTE: *Liquid flush of the vent cavity is typically used in applications with high sugar content product that may crystallize if dried. Cavity flush is recommended after valve transitions to keep the seats and cavity moist.*

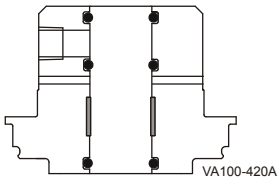


Figure 5 - Upper Stem Flush Adapter

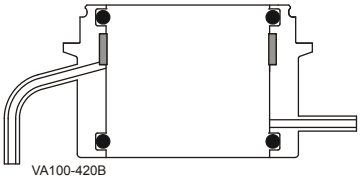


Figure 6 - Lower Stem Flush Adapter

Liquid Vent Cavity Only

Use Upper Stem Flush Adapter

Liquid Vent Cavity and Lower Stem

Use both Upper Stem Flush Adapter and Lower Stem Flush/ Steam Adapter.

Options allow for the liquid flush of the vent cavity and leakage channel alone or with the lower stem flush.

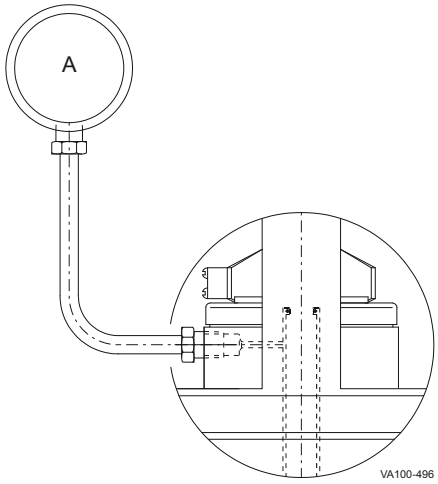


Figure 7 - Connection of Flush Supply

Connect the cavity cleaning supply to a suitable liquid supply to flush the vent/drain (Figure 7) during the operation of the processing system.

The flush supply line can be connected to the pipe system by 1/4" (6 mm) rigid or poly flow tubing. The flush supply is blocked when the valve is open.

Connect the supply line to the adapter connection with poly flow tubing (Figure 7).

⚠WARNING

During CIP cleaning and valve opening (W71), fluid escapes from the drain port. Drain this off to prevent a possible hazard to personnel.

Regulate the flush supply (Figure 7, item A) for pressures of 30 psi minimum, 50 psi maximum.

The maximum solution temperature is 180°F (60°C).

⚠WARNING

Cavity cleaning operation must fall within the fail-safe control system. See “Cleaning” on page 23.

⚠WARNING

Take proper precaution to safeguard the flush water supply, such as installing backflow prevention devices.

External Flush - Steam Vent Cavity

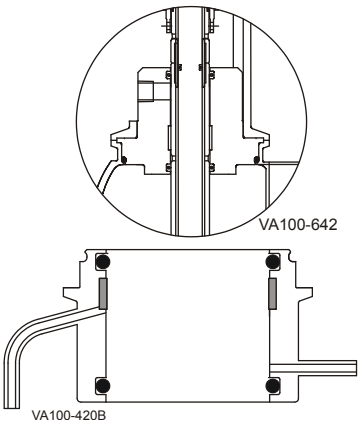


Figure 8 - External Steam Barrier - upper stem

Steam Vent Cavity, Upper and Lower Stem

Use both Upper Stem Steam Flush Adapter and Lower Stem Steam Adapter.

This option allows continuous steaming of the vent cavity (in both open and closed positions), upper and lower stems.

⚠DANGER

Valves equipped with the steam flush option for stem and vent cavity can produce high temperatures and steam hazards that may result in personal injury or death.

To steam flush the upper and/or lower stem as well as the vent cavity, the Mix Proof Valve must be ordered with the Steam Flush for stem and vent cavity. This option (See Figure 9 on page 12) contains the following components:

- External flush connection, 1/4" NPT.
- Modified adapter with removed o-rings to flush the stem.
- Jacket with 1/4" Tube (S.S.) on lower balancer to flush the lower stem (balancer).
- EPDM gaskets for all seals in the wetted area.

⚠WARNING

*The W70 Series Mix Proof Valve equipped with the steam flush option for stem and vent cavity is designed **only** for **low-pressure, product-compatible saturated steam** with a maximum pressure of 10 psig (0.65 bar) = 240°F (115°C) temperature.*

⚠DANGER

The steam connection must be shut off and the valve must cool before servicing the valve.

Installation

Installation of a steam flush system on a W70 Series Mix Proof valve should be done only by a licensed Steam Fitter.

The valve must be installed vertically to drain out any steam/condensate and have a drain funnel placed directly below it. Refer to Figure 9 to see the shut-off valves in the supply lines.

Function

The low pressure steam enters through port B of the upper stem steam flush adapter. Steam purges the outside and inside of the upper stem and the vent cavity. Steam exits out the leakage port F.

For steam flushing the outside of the lower stem (balancer), the low pressure steam enters port D and exits at port E.

Table 1: Callout table for Figure 9

A. Saturated Steam (wet steam) Max 10 psig
B. Steam IN (Upper Stem Adapter)
C. Product
D. Steam IN (Lower Stem Adapter)
E. Steam out of Lower Stem Adapter
F. Steam out from vent cavity (leakage port)

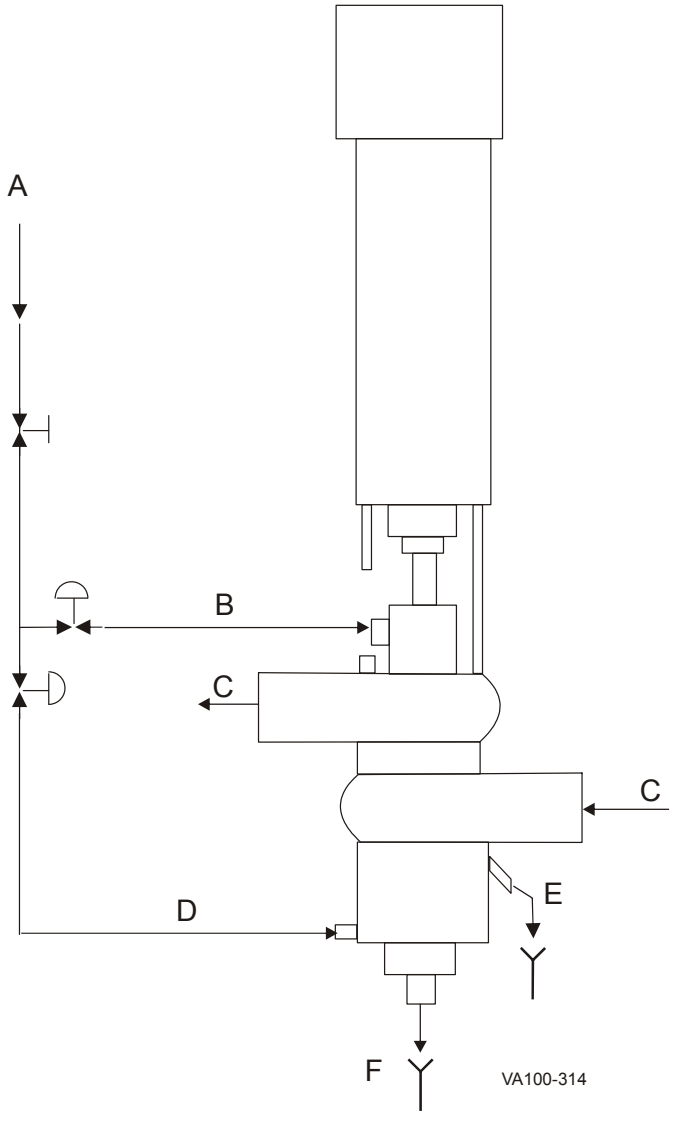


Figure 9 - Steam Flush Option for Stem and Vent Cavity Schematic

Introduction

For control top information, please refer to publication 95-03083. For additional product information, please see our website at spxflow.com/en/waukesha-cherry-burrell/resources/product-literature.

General Information

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

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

Double-Seat Mix Proof valves provide safe separation of dissimilar products within the same valve body. SPX FLOW offers several basic valve types in the W70 Series product line:

- W71 and W72RS Series for standard shut-off service
- W72RS Mix Proof valves feature a lower radial seal for minimal spill operation when opening or closing.

Factory Inspection

Each Waukesha Cherry-Burrell brand valve is shipped completely assembled, lubricated and ready for use. The valve must be cleaned before use.

Models and Specifications

Materials

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

Equipment Serial Number

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

Operating Parameters

Temperature Range:

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.

Operating valves above 180°F (82°C) could result in shortened life of elastomers and/or erratic valve operation.

If operating below 32°F (0°C):

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

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

Seal Compatibility

Table 2: Seal Compatibility for FKM/EPDM Seals

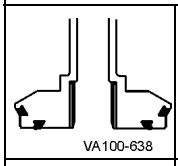
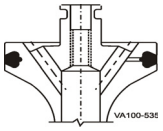
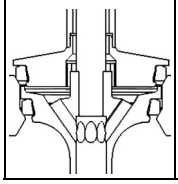
	Fluorelastomer (FKM) Seals	EPDM Seals
Thermal Range of Application *	32°F to 375°F * (0°C to 190°C)	0°F to 275°F * (-18°C to 135°C)
Chemical Resistance	Silicone oil and grease	Silicone oil and grease
	Ozone, aging and weather resistant	Ozone, aging and weather resistant
	Oils and fats	Hot water and steam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

* ***NOTE:*** *The temperature listed is the rating for the elastomer only, in static condition.*

Contact SPX FLOW Application Engineering for other fluid compatibility.

FKM and EPDM seals comply with FDA regulations.

Seat Options

Seat Type		Material / Maximum Temp.	
 VA100-638	Tri Ring (TR) Compression Seal: Upper on W71/W72RS Lower on W71	**EPDM**	Operation: 275°F (135°C) Sterile: 275°F (135°C) or Operation: 375°F (190°C) Sterile: Consult Factory
	Radial: Lower on W72RS	**FKM**	
	Seat Ring Insert Compression Seal Upper on W71 Lower on W71	**Tef-Flow™ P** (gray in color)	Operation 280°F (137°C)

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. Contact the Factory for FFKM.

Pressure Ratings

Valve Size	Maximum Pressure at 70°F (21°C)
2" - 4"	150 psi (10.3 bar)
6"	Contact factory

W70 Series Mix Proof Actuator Air Volumes

Non-Seat Lifting Actuators

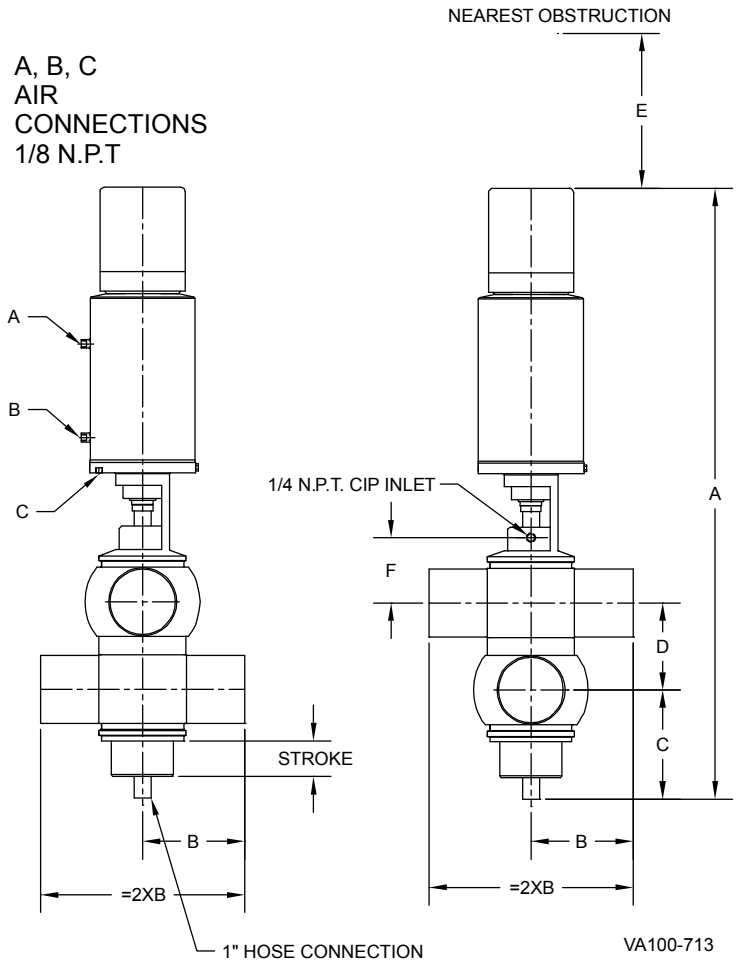
Size (dia.)	Open
2" - 4"	0.039 ft³ (0.0011 m³)
6"	0.055 ft³ (0.0016 m³)

Seat Lifting Actuators

Size (dia.)	Open	Upper Seat Clean	Lower Seat Clean
2" - 4"	0.07 ft³ (0.002 m³)	0.005 ft³ (0.0001 m³)	0.08 ft³ (0.002 m³)
6"	0.055 ft³ (0.0015 m³)	0.011 ft³ (0.0003 m³)	0.011 ft³ (0.0046 m³)

Valve Dimensions

W71 and W72RS Schedule 5 Valve Dimensions



Body Size		W71 Schedule 5 Valve Dimensions							W72RS Schedule 5 Valve Dimensions						
Upper	Lower	A	B	C	D	E	F	Stroke	A	B	C	D	E	F	Stroke
2	2	35.8	6.00	5.28	3.39	10.77	3.0	1.7	32.6	6.00	5.63	3.39	10.77	3.0	1.7
2	3	36.9	6.00	5.82	3.94	11.86	3.0	1.7	33.7	6.00	6.17	3.94	1.86	3.0	1.7
2	4	37.9	6.00	5.82	4.44	12.86	3.0	1.7	34.7	6.00	6.67	4.44	12.86	3.0	1.7
2	6	39.9	6.00	7.35	5.47	14.93	3.0	1.7	36.7	6.00	7.71	5.47	14.94	3.0	1.7
3	2	36.7	6.00	5.28	3.94	11.39	3.6	1.7	33.7	6.00	5.63	3.94	11.76	3.6	1.7
3	3	37.5	6.00	5.82	4.36	12.15	3.6	1.7	34.5	6.00	6.07	4.36	12.73	3.6	1.7
3	4	38.5	6.00	6.32	4.86	13.48	3.6	1.7	35.5	6.00	6.57	4.86	13.73	3.6	1.7
3	6	40.6	6.00	7.35	5.90	15.55	3.6	1.7	37.6	6.00	7.61	5.90	15.80	3.6	1.7
4	2	40.2	6.00	5.91	4.44	13.47	4.0	1.7	34.7	6.00	5.63	4.44	12.86	4.0	1.7
4	3	41.3	6.00	6.45	4.86	14.56	4.0	1.7	35.5	6.00	6.07	4.86	13.73	4.0	1.7
4	4	42.3	6.00	6.55	5.81	15.56	4.2	1.7	38.9	6.00	6.90	5.81	15.40	4.2	1.7
4	6	44.4	6.00	7.99	6.50	17.63	4.2	1.7	41.0	6.00	8.00	6.50	17.50	4.2	1.7
6	2	47.9	6.00	6.69	5.47	16.36	5.1	1.7	36.8	6.00	5.47	5.47	14.94	5.1	1.7
6	3	49.0	6.00	7.24	5.90	17.45	5.1	1.7	37.6	6.00	5.90	5.90	15.81	5.1	1.7
6	4	50.0	6.00	7.73	6.85	18.45	5.2	1.7	41.0	6.00	6.66	6.85	17.50	5.2	1.7
6	6	52.1	6.00	8.77	7.74	20.52	5.3	2.4	49.4	6.00	7.91	7.91	21.90	5.3	2.3

PL5027-CH152

Figure 10 - W71 and W72RS Schedule 5 Valve Dimensions

Operation

All functions of W70 Series Mix Proof valves are pneumatically controlled using a 75 min. to 90 max. psi (5.2 to 6.2 bar) clean air supply.

The valve contains a large and small spring in the valve actuator. The springs compress the valve seats to seal closed.

Large Spring

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

Small Spring

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

Solenoid Valve Port Connections

Up to three air supplies controlled by solenoid valves supply air to the valve actuator (Figure 11).

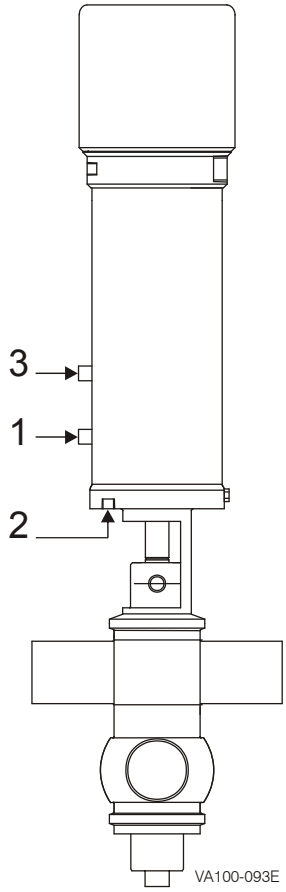


Figure 11 - Solenoid Valve Port Connections

Table 3: Solenoid/Valve Position

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

1 = Valve Open Inlet Solenoid

2 = Upper Seat Clean Inlet Solenoid*

3 = Lower Seat Clean Inlet Solenoid*

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

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

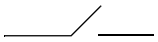
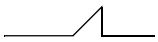
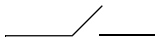
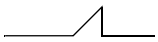
Solenoids are normally closed.

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

* Seat lifting is an option which requires (2) two additional air supplies. Non-seat lifting valves (NSL) only have one air inlet (1).

For specific air-routing and solenoid porting, please refer to control module publication 95-03083.

Automatic Fail-Safe System

WCB 2-Piece Control Top	W71		W72RS	
Valve Stem Detection Condition	**Upper Sensor (NO)**	**Lower Sensor (NC)**	**Upper Sensor (NO)**	**Lower Sensor (NC)**
Sensor Symbol				
Valve Closed	0	1	0	1
Valve Open	1	0	1	0
Valve Closed with Upper Seat Clean *	0	1	0	0
Valve Closed with Lower Seat Clean *	0	0	0	1

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

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

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

Additional Sensor: A third yoke-mounted proximity sensor is available for additional signal feedback.

* W71 Valves: Seat lift during both upper and lower seat clean; indicator stem raises;
W72RS Valves: Seat lift during upper seat clean; seat push during lower seat clean, indicator stem lowers.

Bürkert 8681 Control Top	All W70 Series Valves				
Valve Stem Detection Condition	**S1**	**S2**	**S3**	**S4***	**Top LED Indication**
Valve Closed	1	0	0	0	Steady Red
Valve Open	0	1	0	1	Steady Green
Valve Closed with Upper Seat Clean	1	0	0	1	Fast Flashing Green
Valve Closed with Lower Seat Clean	0	0	1	0	Slow Flasing Green

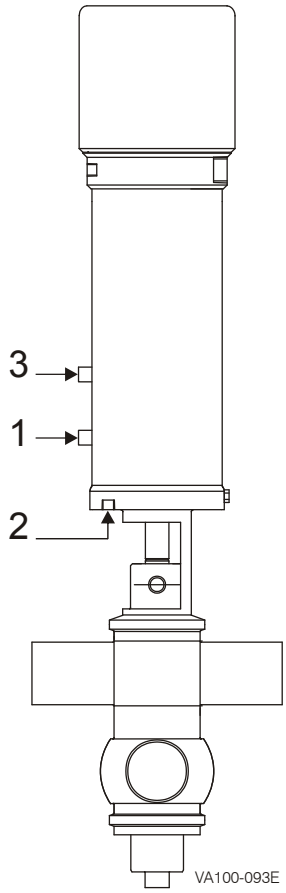
1 = Feedback; 0 = No Feedback

***** Normally Closed External Proximity Sensor; LED is opposite of feedback signal.

CU4 Control Top	W71	
Valve Stem Detection Condition	**Open Sensor (Upper)**	**Closed Sensor (Lower)**
Valve Closed	0	1
Valve Open	1	0
Valve Closed with Upper Seat Clean	0	1
Valve Closed with Lower Seat Clean	0	0

1 = Feedback; 0 = No Feedback

Test Procedures



1 = Valve Open Inlet Solenoid
2 = Upper Seat Clean Inlet Solenoid
3 = Lower Seat Clean Inlet Solenoid

Figure 12 - Solenoid Valve Port Connections

Positive Fail-Safe Detection Test

Perform a test to verify the fully closed fail-safe position. The valve stem feedback proximity sensors should be set for the fully opened and fully closed positions of the valve. See Figure 12 for port and corresponding chambers.

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

1. With the valve fully closed, confirm that the proximity sensors conform to the tables on page 18. Verify the sensor status on the PLC control system.
2. Pressurize air chamber 1 to open the valve. Confirm that the proximity sensors conform to the tables on page 18. Verify the sensor status on the PLC control system.
3. Vent air chamber 1 to close the valve.
4. If used, activate the upper seat lift either through the control system or by supplying air to port 2.
5. When the upper seat lifts, confirm that the proximity sensors conform to the values in the tables on page 18. If the yoke area does not have a limit sensor, visually confirm the upper seat lifting.
6. Vent the air in chamber 2 to deactivate the seat lift.
7. If used, pressurize air chamber 3 to activate the lower seat push.
8. Confirm that the proximity sensors conform to the tables on page 18. Verify the sensor 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 sensors 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:

- First, check the proximity sensor adjustment.
- Check for the correct assembly and adjustment of the valve.
- For specific information on sensor setting, please refer to control module publication 95-03083.

Valve Operating Conditions

See Figure 11 on page 17 for port and corresponding chambers.

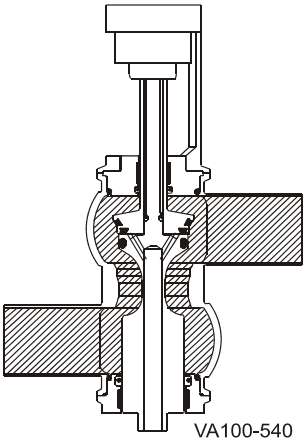


Figure 13 - Valve Open

Valve Open

The valve is open when Chamber 1 is pressurized and Chambers 3 and 2 are vented. See Figure 13.

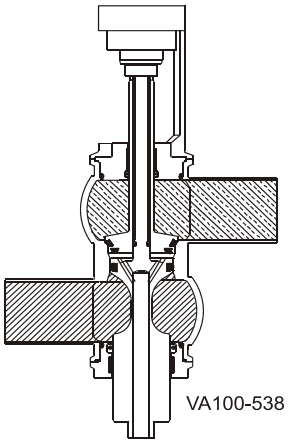


Figure 14 - Valve Closed

Valve Closed

The valve is closed when Chambers 3, 1, and 2 are vented. The large spring closes the valve to the fail safe position. See Figure 14.

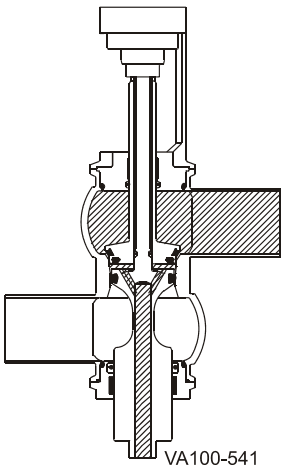


Figure 15 - Valve Closed, Upper Seat Lifted

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 15.

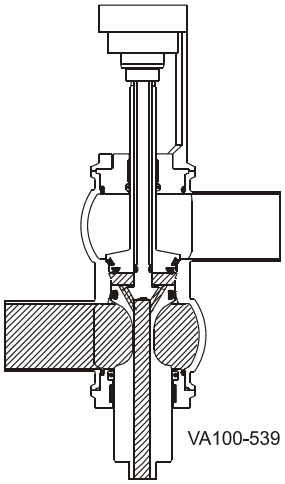


Figure 16 - Lower Seat Push for W72RS Series

Valve Closed, Lower Seat Push (for W72RS Series Only)

Chamber 3 is pressurized, and Chambers 1 and 2 are vented. See Figure 16. For W72RS Series valves, the lower seat is pushed down for seat cleaning.

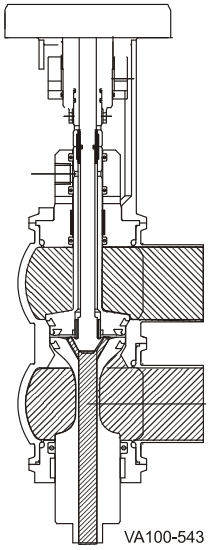


Figure 17 - Lower Seat Lift for W71

Valve Closed, Lower Seat Lift (for W71 Series valves only)

The lower seat is lifted for seat cleaning. See Figure 17.

Maintenance

Maintenance Intervals

Maintain adequate stock of replacement parts. See the items in bold beginning on page 38 for recommended spare parts.

Maintenance intervals should be determined by the user and specific application, based on the following conditions:

- Daily operation period
- Sensoring frequency
- Application parameters, such as temperature, pressure, and flow
- Product type
- CIP time and temperature

Use the following recommendation as a rough guide:

- For fluid temperatures ranging from 180°F to 212°F (82°C to 100°C): approx. every 3 to 6 months
- For fluid temperatures of 140°F (60°C) and lower: approx. every 12 months

The values listed above are only general guidelines and do not apply, for example, to fluids which crystallize on contact with air. The values listed are subject to the chemical resistance of the seal material.

W70 Series Mix Proof valves operate best at temperatures below 180°F (82°C), regardless of seal type.

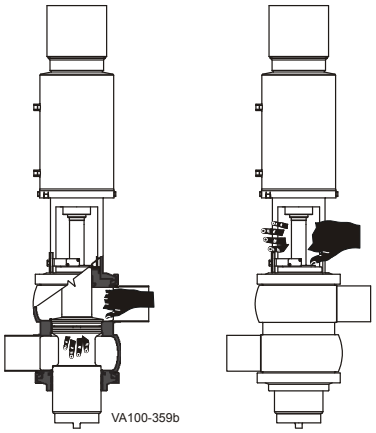
The maximum temperature of 280°F (138°C) listed for the seat seal type is the rating for the elastomers only, in a static condition. This is not the temperature rating for the valve in operation.

The 180°F (82°C) max. rating also applies to valves welded together in a manifold. Operating W70 Series Mix Proof valves at temperatures above 180°F (82°C) could result in shortened life of elastomers and/or erratic valve operation.

Inspection

⚠ DANGER

Do not put a hand into the yoke or body of a pneumatically-actuated valve.



Inspect the following on a regular basis:

- Actuator connections for air leaks
- Valve body and stem O-rings
- Valve seats (If leakage occurs, see “Troubleshooting” on page 61.)
- Pneumatic connections:
  - Air pressure at supply connection
  - Air lines for kinks and leaks
  - Threaded connections for tight fit
  - Clean air filter at regular intervals
- Electrical connections secure on control module:
  - Wire connections tight on terminal strip
  - Electrical connections to control module
  - Threaded strain relief for tight fit.

Lubrication

No lubrication is required other than as noted in the disassembly and assembly procedures. Use Dow Corning #7 or equivalent food grade non-petroleum (silicone) grease on seals and O-rings.

Apply Bostik Never-Seez® White Food Grade with PTFE or equivalent to all bolts and threaded stem parts.

Cleaning

⚠ CAUTION

Avoid splashing any liquid into the air vent of the actuator during clean up

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

Cleaning-In-Place (CIP)

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

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 times between CIP cleanings. See “External Flush - Liquid Vent Cavity” on page 10.

Cleaning Procedure

Mix Proof valves are designed to use a cleaning solution supplied by a CIP system. The vent outlet/cavity must be unobstructed to guarantee the leakage of fluid to atmosphere.

Establish cleaning procedures for each installation depending on product characteristics, operating parameters (temperature, velocity, valve cycles), and product velocities.

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

⚠CAUTION

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

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

NOTE: *Seat cleaning is not recommended during the initial rinse.*

- Maximum Solution Temperature is 180°F (82°C).
- Maximum line pressure during seat cleaning is 90 psi (6.2 bar).
- Minimum cleaning solution velocity is 5 ft/s (0.3 m/s).
- Cleaning time is dependent on the inlet pressure. The recommended cycle time is 3 to 5 seconds per cycle after the valve achieves the seat clean position. This seat clean cycle time of each valve should be visually confirmed during commissioning.
- Typical cleaning procedures include pulsing the seat during cleaning until the valve has been demonstrated to be clean. This is usually accomplished in 3 to 5 consecutive pulses per step in the CIP program; however, each installation and product varies, so pulsing should continue until all product/ debris is removed.
- For the optional external flush of the vent cavity, water flush can be activated during the final rinse.
- Every few months of operation, remove and inspect one valve in the system to ensure that complete cleaning is being achieved.

Seat Cleaning Adjustment

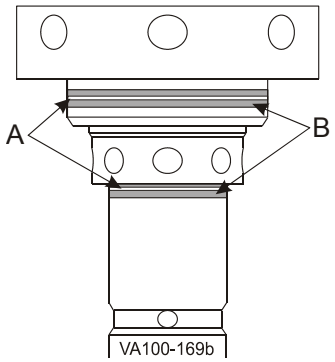


Figure 18 - Adjustment zones with scribe lines

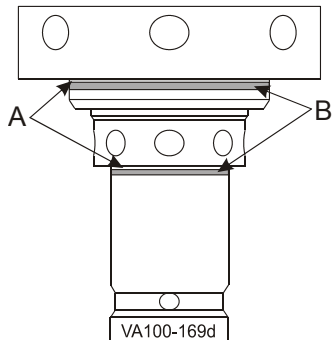
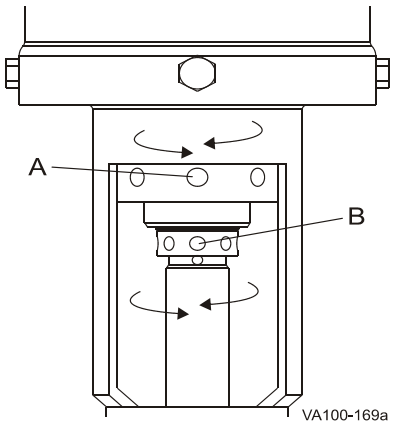


Figure 19 - Bottom edges align with scribe lines



A. Adjusting nut, upper seat
B. Adjusting nut, lower seat

Figure 20 - Location of Adjusting Nut

Seat lifting models are factory set. See Figure 18 and Figure 19. Scribe lines (item A) within the acid-etched adjustment zone (item B) provide a visual indication of the correct factory-set adjustment. Screw the adjusting sleeve and adjusting nut until the bottom edges align with the scribe line as shown in Figure 19, item A.

NOTE: *Always adjust the lower seat clean first.*

⚠WARNING

Do not adjust the seat clean collars with pliers, vice-grips or adjustable jaw pliers (channel locks).

If required, adjust the seat movement. With the valve closed, using a 3/16" diameter pin spanner or allen wrench, adjust the movement of the seats to the factory settings or within the adjustment zone (Figure 18 and Figure 19, item B). Once a successful seat movement is established, clearly mark where the bottom edges of the adjusting sleeve and adjusting nut align, to ensure proper resetting after disassembly.

Lower seat

Operate the lower seat clean cycle multiple times. Observe the indicator stem movement at the top of the actuator, or at the balancer on the bottom of the valve.

To adjust the movement of the lower seat for cleaning, rotate the adjusting sleeve in the yoke (Figure 20, item B):

- W71: Rotate right to increase; left to decrease.
- W72RS: Rotate left to increase; right to decrease. See also “W72RS Lower Stem Measurement” on page 26.

Upper seat

Operate the upper lift cycle multiple times. Observe the outer stem movement by watching the adjusting nut in the yoke (Figure 20, item A).

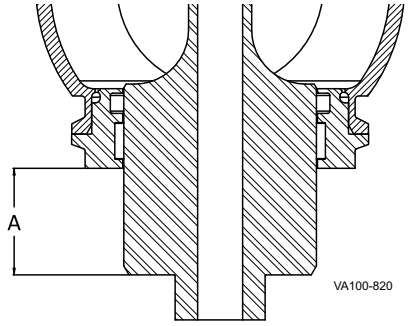
- To adjust the movement of the upper seat, rotate the adjusting nut (Figure 20, item A) left to increase; right to decrease.

Table 4: Proper Seat Movement: W71

VALVE SIZE	LOWER SEAT	UPPER SEAT
2" - 4"	1/16" (1.59 mm)	1/16" (1.59 mm)

Table 5: Proper Seat Movement: W72RS

VALVE SIZE	LOWER SEAT	UPPER SEAT
2" - 4"	1/4"(6.35 mm)	1/8" (3.175 mm)



W72RS SIZE	DIM. "A"
2" and 3" 4"	1-3/4" (44.45 mm) 2-1/8" (53.98 mm)

Figure 21 - W72RS Lower Stem

W72RS Lower Stem Measurement

For the W72RS models, the location of the lower stem is more critical than the stem travel. Confirm the proper location of the lower stem by measuring the distance from the lower seal retainer to the lower shoulder of the stem (Figure 21, dimension "A") when the valve is static.

- To increase this measurement distance and allow more cleaning of the lower seat, turn the adjustment sleeve to the left.
- To decrease the distance and allow less cleaning of the lower seat, turn the adjustment sleeve to the right.

Removing Valve from System

NOTE: *If the valve has a control module with a solenoid, the air and electric can remain ON to assist with removal of the valve from the body.*

NOTE: *On seat lifting model valves, clearly mark on the other stem and adjusting threads where the bottom edges of the adjusting sleeve and adjusting nut align to ensure proper resetting of seat movements after disassembly.*

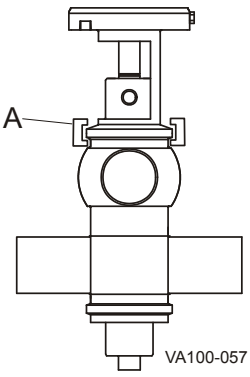


Figure 22 - Location of Adapter Clamp

Maintenance Video 2: Re-install valve into body

This icon indicates a link to a maintenance video available online. To access the PDF online, go to: www.spxflow.com/en/assets/pdf/95-03091_w71_w72Rrs_mixproofv_wcb.pdf.

⚠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. If supplied, seat lifts can be used to check for pressurization of the pipeline.
2. Disconnect the external flush if used.
3. Supply air to open the valve.
4. Remove the clamp between the yoke and the adapter (Figure 22, item A).

Maintenance Video 1: Remove valve from body

5. Remove the air pressure to cycle the valve closed, lifting the valve approximately 3/8" (9.5 mm) out of the body. Shut off and disconnect the air supply.
6. Disconnect and lock out electrical power to the valve.
7. Lift the complete valve actuator and stems out of the valve body, being careful not to damage the stems or internals.
8. Move the valve to a work station.
9. Re-install in reverse order. Keep in mind that air must be applied to cycle the valve open and lower the valve insert approximately 3/8", in order to completely reseat the valve in the body.
10. Re-fasten the clamp between the yoke and the adapter (Figure 22, item A), then remove the air pressure to cycle the valve closed.

Disassembly of Valve Stems

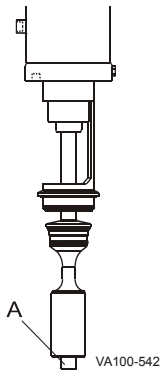


Figure 23 - Valve Stem Removal

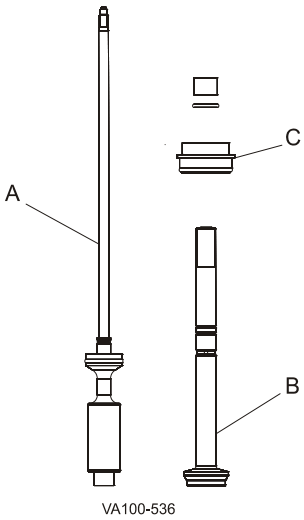


Figure 24 - Stem Removal

Adapter Bearings and O-rings

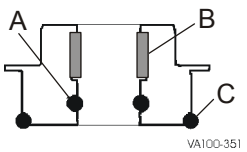


Figure 25 - Standard Top Adapter

Disassembly of the valve stems is required for seat ring replacement. (For "Reassembly of Valve Stems," turn to page 37.)

NOTE: *(For seat lifting valves) Before disassembly, note the position of the upper and lower seat lifting adjustment nuts. See Figure 20 on page 25.*

NOTE: *Seals, seal grooves, and contact surfaces are precision parts and must not be damaged.*

1. Lower stem removal: Using an open end wrench, remove the lower stem (Figure 23, item A) from the actuator by turning it counter-clockwise.

⚠WARNING

Handle the lower stem with care to prevent bending the inner stem. A bent inner stem will cause the valve to operate incorrectly.

Maintenance Video 3: Remove lower stem

2. Upper stem removal: Hold the adjusting sleeve stationary with a spanner wrench, turn the stem (Figure 24, item B) counter-clockwise, and remove it from the actuator. If the adapter (Figure 24, item C) comes out of the yoke, handle it with care.

Table 6: Call-out table for Figure 24

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

Maintenance Video 5: Remove upper stem

⚠WARNING

Do not pressurize the actuator with the stems removed, as internal O-ring damage will result.

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(s) (Figure 25, item A) inside the adapter. For the flush/steam barrier adapters, see Figure 5 on page 10 and Figure 6 on page 10, respectively.

Maintenance Video 7: Adapter O-rings and bearing removal and replacement

3. Check the split bearing (Figure 25, item B) inside the adapter by feeling the amount protruding from the adapter wall. If the bearing is flush with the wall, replace the bearing.
4. Place a screwdriver or pick behind the bearing and pry it away from the wall of the adapter. A needle-nose pliers can be used to grip the bearing for removal. Be careful not to scratch or damage the metal surfaces.

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

5. To install a new bearing, coil the bearing to a size smaller than the inside diameter of the adapter and insert it into the proper location.
6. Using your finger, ensure that the bearing is properly seated. Visually inspect the seating.
7. If necessary, push the actuator stem into the adapter to help properly seat the bearing.

Outer O-ring Replacement

1. Remove the valve stem assembly from the actuator and slide the adapter off the outer stem.
2. Slide or cut the outer O-ring (Figure 25, item C) off the adapter. Do not nick or scratch the O-ring groove.
3. Lubricate the new O-ring with grease and install it.

Tri Ring Seat Replacement

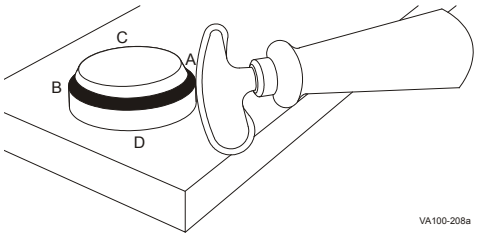


Figure 27 - Pressing Tri Ring Into Plug

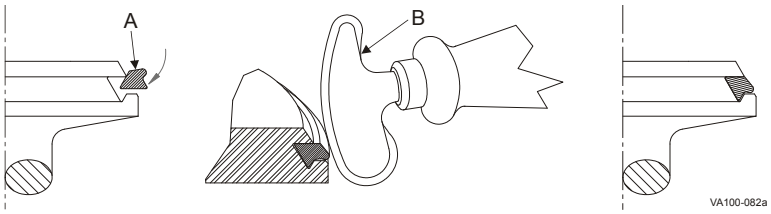


Figure 26 - Installing New Tri Ring Seat

1. Remove the Tri Ring seat by carefully cutting or using an o-ring tool or pick to pull the seat out of the groove. Do not scratch or nick the metal seating surface.

Maintenance Video 8: Upper stem Tri Ring removal

2. Clean the Tri Ring groove after removing the seat.
3. Lubricate the new Tri Ring (Figure 26, item A) with acceptable cleansing solution or lubricant.
4. Place the stem through a 1-1/8 inch (30 mm) hole bored through a board, or secure it with a vise with copper or aluminum jaws.
5. Start the Tri Ring as shown in Figure 26.

Maintenance Video 9: Upper stem Tri Ring replacement

6. Using the installation tool, part number 102797+ (Figure 26, item B), press the Tri Ring into the plug at locations A, B, C, and D (Figure 27). If this tool is not available, a dull, flat tool can be 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 26.

Maintenance Video 10: Lower stem o-ring and Tri Ring replacement (W71)

Radial Seat Ring Replacement (for W72RS Lower Stem)

1. Remove the lower stem radial seal by carefully prying up and cutting the O-ring. Do not scratch or nick the metal seating surface.

Maintenance Video 11: Radial Seal Removal

2. Clean the radial seal groove after removal.
3. Ensure that the vent port in the back of the groove is clean and unblocked.
4. Lubricate the O-ring seal and expand it over the stem groove.
5. Place the assembly tool over the stem, ensuring proper tool orientation. Extrude the O-ring seal into the groove by evenly tightening the cap screws on the installation tool.
6. Remove the tool. The dovetail groove permanently retains the O-ring seal.

Maintenance Video 12: Radial Seat Ring Replacement

For a list of installation tools, see Figure 29 below and “Installation Tools” on page 57.

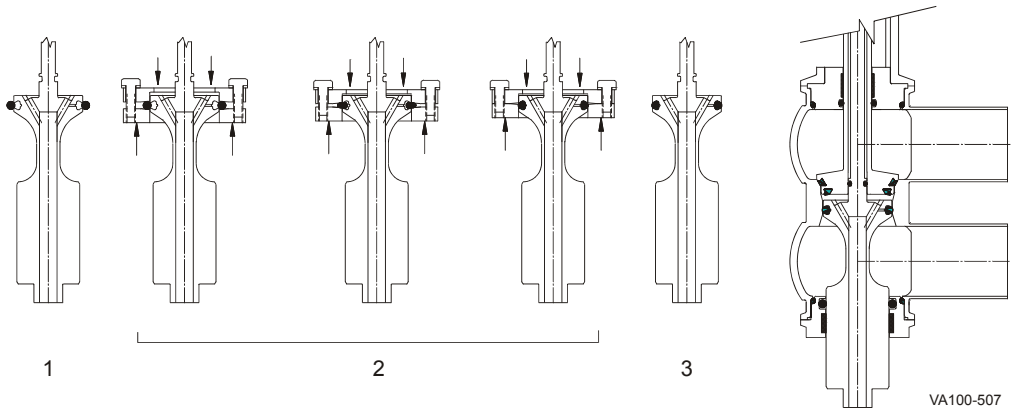
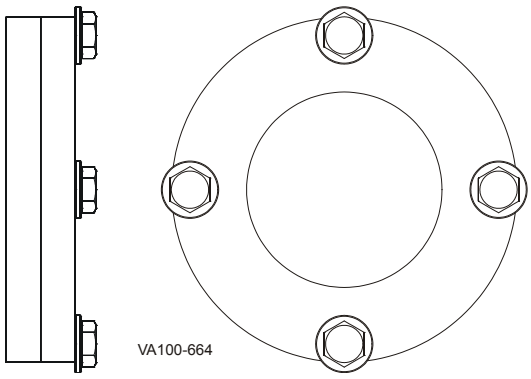


Figure 28 - Radial Seal Installation



Valve Size	2"	3"	4"
Part No.	120051+	120053+	120055+

Valve Size	6"
Part No.	120057+

Figure 29 - Radial Seal Insertion Collar Tool (for W72RS Valves)

Tef Flow® P Seat Replacement with W71 Stems

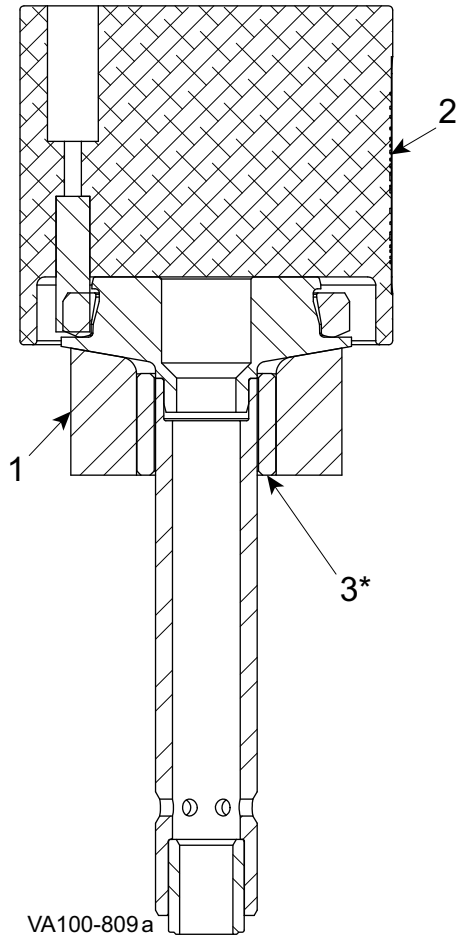


Figure 30 - Upper Stem Tef Flow® P Seat Removal (Kit # 132990+)

* used with 2" W71 ODT valves only

Upper Stem Tef Flow® P Seat Removal

W71 Upper Stem Tef Flow® P Seat Removal

1. With the upper stem in hand, take note of the orientation of the Tef Flow® P seat.
2. Place the PTFE installation base (item 1) over the stem, making sure that the chamfered side rests on top of the stem plug and the flat side of the base faces away from the stem plug.
3. Hold the installation base in place on the stem in one hand, then take the aluminum Tef Flow® P seat removal tool (item 2) and carefully set it on the existing seat ring. Make sure that the removal tool's pins rest only on the seat, not directly on the stem plug, as this can damage the metal stem plug itself.
4. With the stem facing down, carefully place the stacked components onto an arbor press, with the aluminum seat removal tool (item 2) on top.
5. Using an arbor press, apply even pressure directly to the removal tool until the seat is cut into three pieces.
6. Remove the stacked components from the arbor press, and carefully remove the tools and seat pieces from the stem.
7. Inspect the stem and stem plug for damage. Clean up any minor scratches with an emory cloth, if needed.

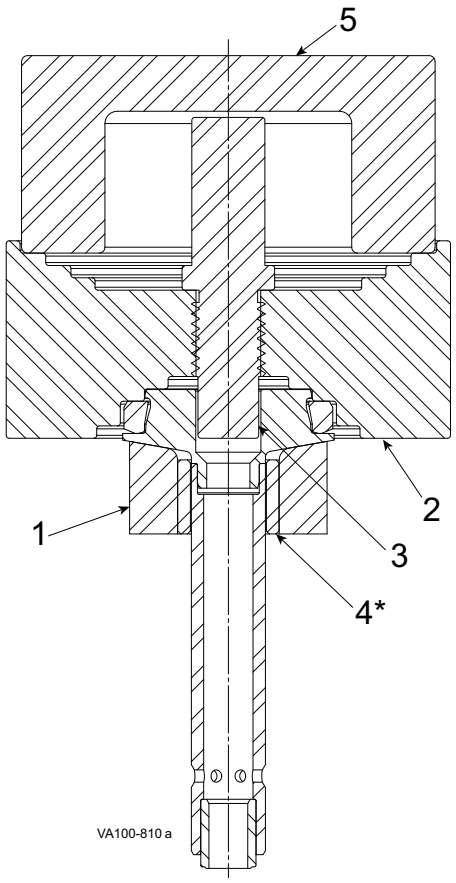


Figure 31 - Upper Stem Tef Flow® P Seat Installation (Kit # 132356+)

* for 2" W71 ODT valves only

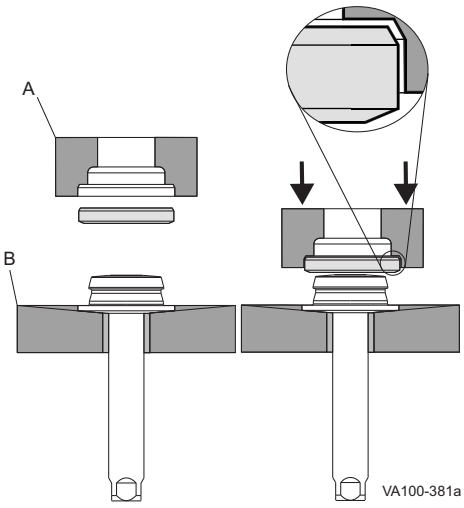


Figure 32: Tef Flow® P Seat

Upper Stem Tef Flow® P Seat Installation

W71 Upper Stem Tef Flow® P Seat Installation

1. Place the PTFE installation base (Figure 31, item 1; Figure 32, item B) over the stem, making sure that the chamfered side rests on top of the stem plug and the flat side of the base faces away from the stem plug.
2. Take the aluminum seat installation tool (Figure 31, item 2; Figure 32, item A) and install the aluminum locator pin (Figure 31, item 3) by threading it into the seat installation tool, orienting it so that the locator pin fits into the seat plug and the correct size shoulder matches the seat that is being installed.
3. Place the new Tef Flow® P Seat in the aluminum seat installation tool (Figure 31, item 2; Figure 32, item A), orienting the seat so that the side with the chamfered edge is facing into the installation tool as shown in Figure 32.
4. Carefully set the stem on the seat and installation tool so that the locating plug fits into the plug stem.
5. With the stem facing down, carefully set the stacked components onto an arbor press.
6. Set the protective installation tool puck (Figure 31, item 5) over the top of the locating pin and installation tool.
7. With the arbor press, apply even pressure to the top of the installation tool puck (Figure 31, item 5) until the seat snaps into place on the stem plug.
8. Carefully remove the stem stack from the arbor press, removing the installation tools in reverse order.
9. Inspect the seat for correct orientation. The seat ring should spin freely on the plug if it is installed correctly.
10. Inspect the stem and stem plug for damage. Clean up any minor scratches with an emory cloth, if needed.

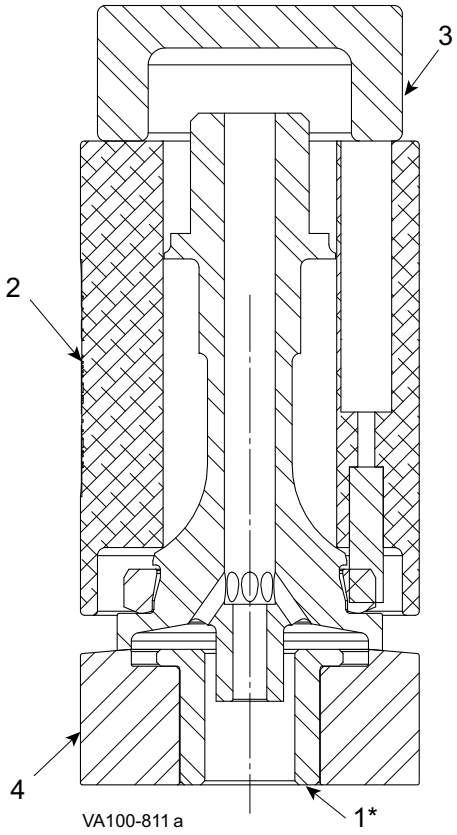


Figure 33 - Lower Stem Tef Flow® P Seat Removal (Kit # 132947+)

* for 2" W71 ODT valves only

Lower Stem Tef Flow® P Seat Removal

W71 Lower Stem Tef Flow® P Seat Removal

1. With the lower stem in hand, take note of the orientation of the Tef Flow® P seat.
2. Remove the balancer from the bottom of the stem.
3. Install the PTFE installation base (item 4) over the stem, positioned so that the chamfered side of the base rests snugly on top of the lower stem plug. Make sure the flat side of the base faces away from the plug.
4. Invert the stem so that it is oriented with the stem facing toward the floor.
5. While holding the installation base (item 4) in place on the stem, carefully set the pins of the Tef Flow® P seat removal tool (item 2) on the existing seat ring. Make sure that the pins rest only on the Tef Flow® P seat, not the seat plug, as this can cause damage to the metal plug.
6. Place the protective puck (item 3) on top of the removal tool (item 2). With the stem facing down, carefully place the components on an arbor press.
7. Apply even pressure to the top of the protective puck (item 3) until the seat is cut into three pieces.
8. Carefully retrieve the stack from the arbor press, removing the tools and seat pieces from the stem in reverse order.
9. Inspect the stem and stem plug for damage. Clean up any minor scratches with an emory cloth, if needed.

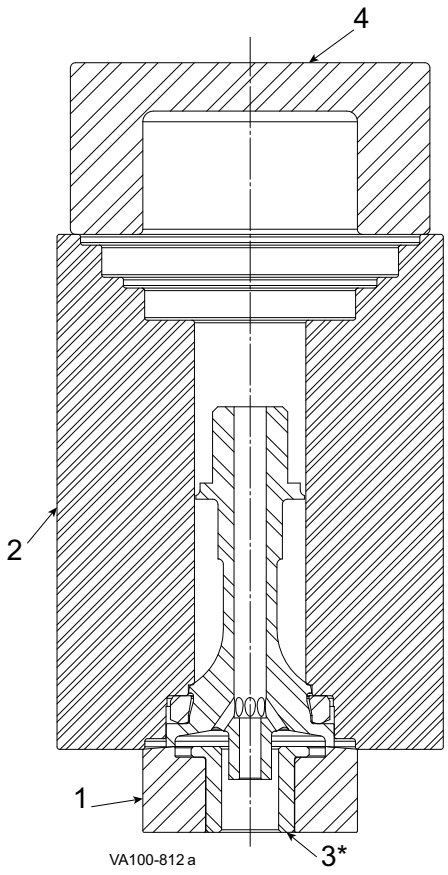


Figure 34 - Lower Stem Tef Flow® P Seat Installation (Kit # 132357+)

* for 2" W71 ODT valves only

Lower Stem Tef Flow® P Seat Installation

W71 Lower Stem Tef Flow® P Seat Installation

1. With the lower stem in hand, install the PTFE installation base (item 1) over the stem, positioning it so that the chamfered side of the base rests snugly on top of the lower stem plug. Make sure the flat side of the base faces away from the stem plug.
2. Invert the stem so that it is oriented with the stem facing toward the floor, then carefully set the new Tef Flow® P seat onto the stem plug, positioned so that the chamfered angle faces away from the plug base, and is centered.
3. Carefully place the aluminum Tef Flow® P seat installation tool (item 2) over the seat, so that the matching shoulder rests snugly over the seat.
4. With the stem facing down, carefully place the stem stack on an arbor press. Set the protective puck (item 4) on top of the installation tool.
5. Apply even pressure directly on the protective puck until the seat snaps onto the stem plug.
6. Carefully remove the stem stack from the press, then remove the tools in reverse order.
7. Inspect the seat for correct installation. The seat ring should spin freely on the plug, with the chamfered edge visible.
8. Closely inspect the stem and plug for damage and clean any small scratches or dings with an emery cloth.
9. Reinstall the lower stem balancer with o-ring seal.

Lower Bearing Carrier O-ring and Bearing Replacement

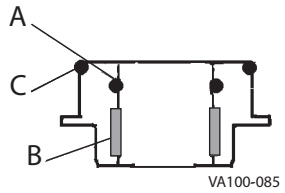


Figure 35 - Standard Lower Bearing Carrier

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

1. Remove and replace the O-ring(s) (Figure 35, item A) located inside the lower bearing carrier. For the flush/steam barrier adapter, see Figure 6 on page 13.

Maintenance Video 13: Lower bearing carrier; removal and replacement of O-ring and bearings

2. Check the split bearing (Figure 35, item B) inside the lower bearing carrier by feeling the amount protruding from the lower bearing carrier wall. If the bearing is flush with the wall, replace the bearing.
3. Place a screwdriver or pick behind the bearing and pry it away from the wall of the lower bearing carrier. A needle-nose pliers can be used to grip the bearing for removal.
4. To install the new bearing, coil the bearing to a size smaller than the inside diameter of the lower bearing carrier and insert it into the proper location.
5. Push the lower stem into the lower bearing carrier to help seat the bearing properly.
6. Using your finger, ensure that the bearing is properly seated. Visually inspect the seating.
7. To remove the outer O-ring (Figure 35, item C), slide or cut the O-ring off the lower bearing carrier. Do not nick or scratch the O-ring groove.
8. Lubricate the new O-ring with grease and install it.
9. Re-install the lower bearing carrier into the body prior to re-installing the entire valve.

Actuator O-ring and Bearing Replacement

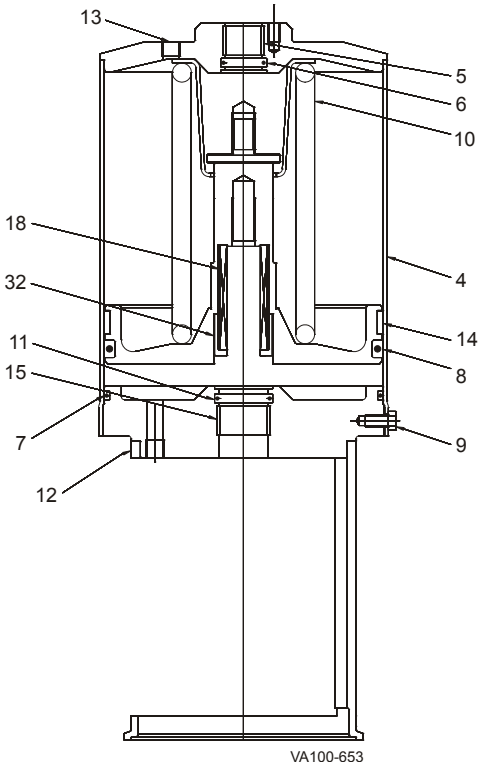


Figure 36 - W71/W72RS Sch. 5 Actuator Assembly (Non-Seat Lift Valve)

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

⚠CAUTION

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

⚠CAUTION

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

NOTE: *Do not pressurize the actuator with air when the stems are removed. This may tear the O-rings and cause the actuator to leak air when it is re-assembled.*

NOTE: *If present, the control module must be removed to replace the O-rings and bearings in the top of the cylinder assembly. Please refer to control module publication 95-03083.*

NOTE: *For larger drawings and complete partlists, see "W71/W72RS Schedule 5 Mix Proof Non-Seat Lift Valve Actuator" on page 52.*

Removal of O-rings and Bearings, Non-Seat Lifting Actuators

Non Seat Lifting Actuators

1. For non-seat lifting valves, remove the cap screws (Figure 36, item 9) and remove the yoke (item 12) from the cylinder assembly. Set the yoke aside.

Maintenance Video 14: Actuator disassembly; lower cartridge removal

2. Pull the piston and spring assembly (Figure 36, item 10) from the cylinder assembly.
3. Inspect the four O-rings (Figure 36, items 6, 7, 8, and 11). Replace them if they are worn or damaged.

Maintenance Video 16: Removal of main piston, lower seat lift piston

4. Inspect the three bearings (Figure 36, items 5, 14, and 15). If the bearing does not extend slightly above the edge of the metal surface, replace the bearing.
5. The bearing is split to allow its removal from the groove. Place a screwdriver or pick behind the bearing and pry it away from the wall of the yoke or cylinder cap. A needle-nose pliers can be used to grip the bearing for removal.

Maintenance Video 17: Main piston O-ring removal

Maintenance Video 18: Main piston O-ring replacement with bearing

6. Assemble the stack components as shown in Figure 36. Install the yoke and cap screws.

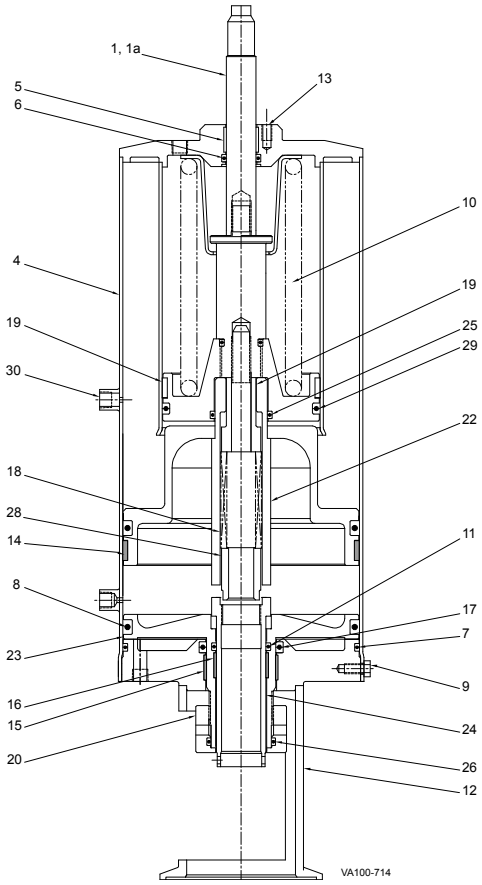


Figure 37 - W71 Sch. 5 Actuator Assembly (Seat Lift Valve)

Maintenance Video 17: Main piston O-ring removal

Maintenance Video 18: Main piston O-ring replacement with bearing

Maintenance Video 19: Can top bearing and O-ring; removal and replacement

Maintenance Video 20: Main piston bearing

Maintenance Video 21: Lower seat lift piston reassembly

Maintenance Video 23: Reassembly of actuator: spacers and inner spring

Maintenance Video 24: Reassembly of lower cartridge O-rings and bearings

Maintenance Video 25: Re-installation of lower cartridge

Removal of O-rings and Bearings, Seat Lifting Actuators

NOTE: *For larger drawings and complete partlists, see "W71 Schedule 5 Mix Proof Seat Lift Valve Actuator" on page 50 and "W72RS Schedule 5 Mix Proof Seat Lift Valve Actuator" on page 54.*

1. For seat lifting valves, remove the cap screws (Figure 37, item 9) and remove the lower cartridge (yoke, item 12; adjusting nut, item 20; adjusting sleeve, item 24; and upper seat piston, item 23).

Maintenance Video 14: Actuator disassembly; lower cartridge removal

2. To disassemble the cartridge, remove the adjusting nut (item 20) and separate the parts.

Maintenance Video 15: Adjusting Nut removal

3. Remove the small spring (Figure 37, item 18). On W71 valves, also remove the bushing (Figure 36, item 28).

4. Pull out the upper cartridge (main piston, item 22; lower seat spring and piston, item 10), by carefully threading in the lower stem to pull it. Do not bend the lower stem.

   Alternate method: Flip the canister right-side up and gently tap it on the table (or push down the indicator stem) until the air vacuum releases and the upper cartridge slides out the open end.

Maintenance Video 16: Removal of main piston, lower seat lift piston

5. Inspect the nine O-rings (Figure 37, items 6, 7, 8, 11, 17, 25, 26, and 29) and replace them if they are worn or damaged.

6. Inspect the five bearings on W71 (Figure 37, items 5, 14, 15, 16, and 21) or four bearings on W72RS actuators (items 5, 14, 15, and 16). If the bearing does not extend slightly above the edge of the metal surface, replace it.

7. The bearing is split to allow its removal from the groove. Place a screwdriver or pick 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.

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

8. Assemble the stack components as shown. Make sure that the upper cartridge components are fully inserted. Install the yoke and adjustment nut.

NOTE:

Reassembly of Valve Stems

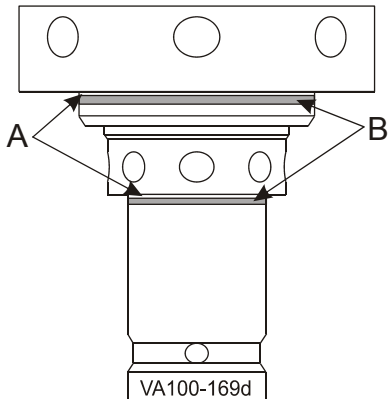


Figure 38 - Assembly

NOTE: *Perform maintenance on stems and adapter bearings and O-rings while the stems are removed from the actuator and before reassembly.*

Upper Stem Assembly

1. Apply Bostik® Never-Seez White Food Grade with PTFE or equivalent to the threads of the upper stem.
2. Screw the upper stem clockwise into the actuator. Hold the adjusting sleeve stationary with a spanner or allen wrench.
3. Screw the upper stem in until the scribe line (Figure 38, item A) within the etch mark adjustment zone (item B) aligns with the bottom of the adjustment sleeve. This is the factory-set lower seat clean position. See “Seat Cleaning Adjustment” on page 25 for instructions on modifying the seat clean movement.

Maintenance Video 6: Upper stem reassembly into valve

⚠WARNING

Do not screw the upper stem all the way into the actuator, as internal O-ring damage may result.

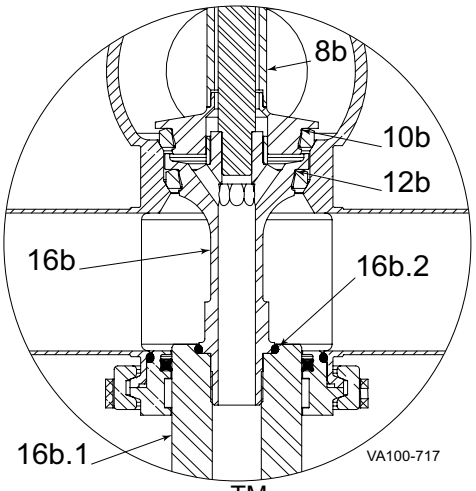
Lower Stem Assembly

1. Apply Bostik® Never-Seez White Food Grade with PTFE or equivalent to the threads of lower stem.
2. If the valve has external flush, slide the spray bushing onto the inner stem of the lower stem.
3. Screw the lower stem clockwise into the actuator until metal-to-metal contact stops.
4. Using an open-end wrench and rubber hammer, rap the lower stem to lock the threads into place within the actuator.

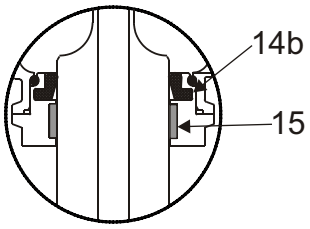
Maintenance Video 4: Lower stem reassembly into valve

Parts Lists

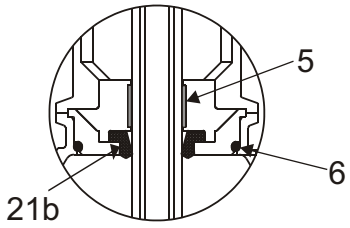
W71 Schedule 5 Mix Proof Seat Lift Valve



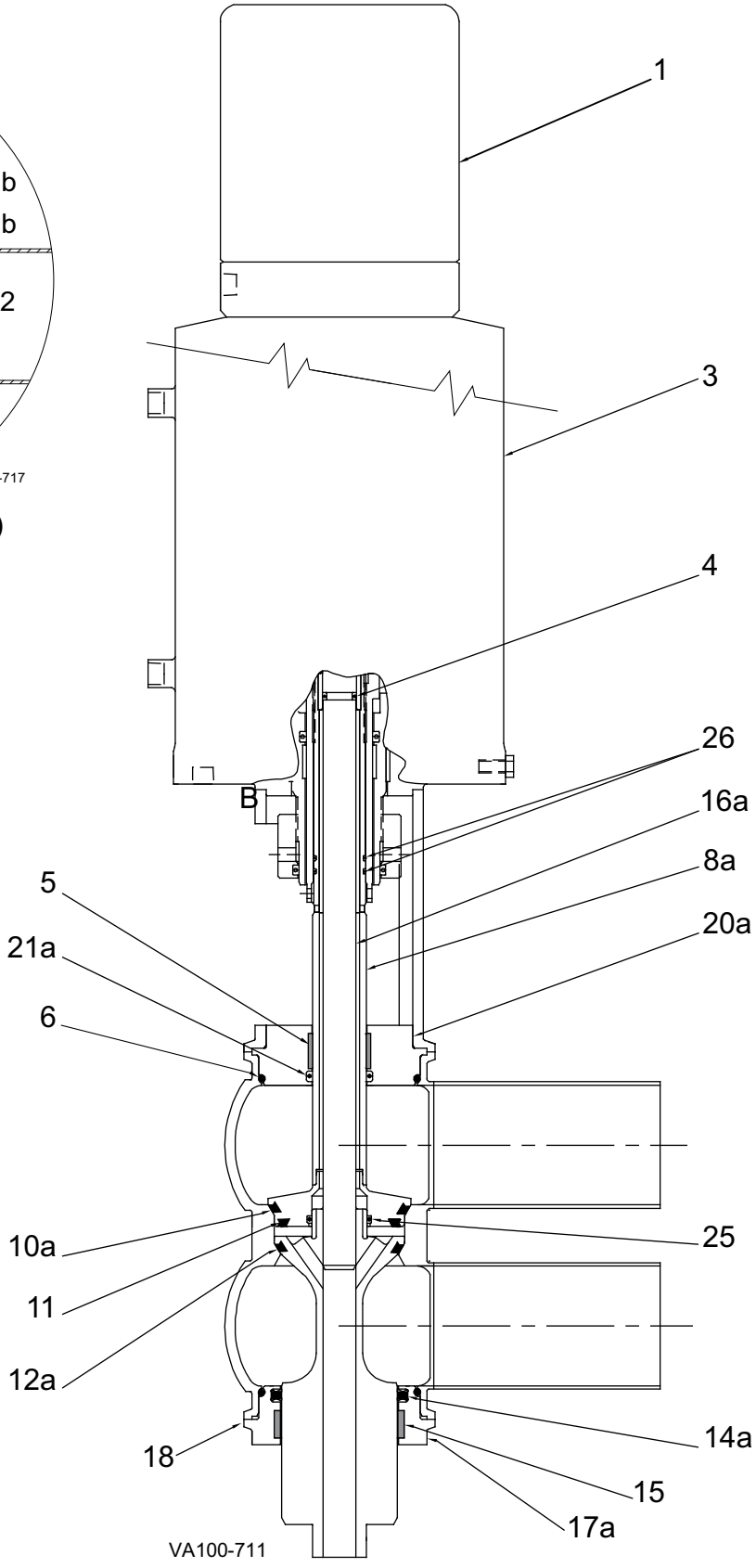
(Tef-Flow™ P Design)



(17b)



(20b)



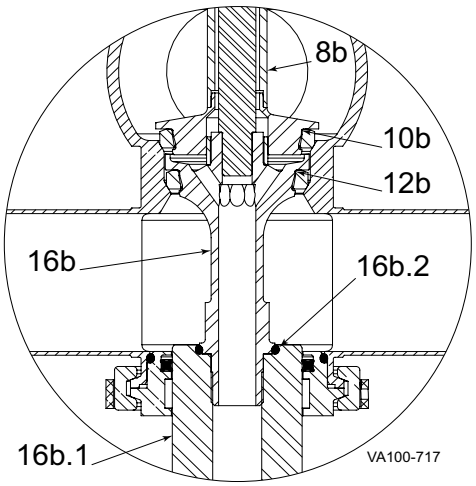
W71 Schedule 5 Mix Proof Seat Lift Valve

	Item #	Part Description		2"	3"	4"	6"	Notes
	1	Control Top		Contact Factory				
	3	Actuator Assembly		124621+	124614+	123942+	123997+	
*	**4**	**O-ring, Outer Stem (qty 2 req)**	**Nitrile**	N70111	N70111	N70111	N70111	
*	**5**	**Bearing, Upper Adapter**		106047+	106047+	106047+	101995+	
		Tef-Flow™ P design				102002+	N/A	3
*	**6**	**O-ring, Body**	**EPDM**	E70232	E70236	E70244	E70258	
			FKM	V70232	V70236	V70244	V70258	
	8a	Stem, Upper		123906+	123922+	123937+	122591+	
	8b	Stem, Upper Tef-Flow™ P design		POA	131797+	132243+	POA	
*	**10a**	**Seat Ring -Tri Ring, Upper**	**EPDM**	107048+	102488+	102491+	102738+	
			FKM	107982+	107974+	107977+	108020+	
*	**10b**	**Seat Ring Insert- Upper**	**Tef-Flow™ P**	130233+	130234+	130235+	POA	3
*	**11**	**Seat Ring -Tri Ring, Vent**	**EPDM**	107696+	107697+	102490+	102737+	
			FKM	107987+	107988+	107976	108019+	
*	**12a**	**Seat Ring -Tri Ring, Lower**	**EPDM**	102487+	102489+	102492+	102739+	
			FKM	107973+	107975+	107978+	108021+	
*	**12b**	**Seat Ring Insert - Lower**	**Tef-Flow™ P**	130245+	130246+	130247+	POA	3
*	**14a**	**Quad Ring, Lower**	**EPDM**	34429+	117561+	116952+	122350+	
			FKM	35415+	117562+	116953+	122351+	
*	**14b**	**Wiping Stem Seal, Lower**	**EPDM**	116190+	116195+	116199+	POA	
			FKM	116191+	116196+	116200+	POA	
*	**15**	**Bearing, Lower Seat Retainer**		106049+	106048+	102003+	114232+	
	16a	Stem, Lower Assembly		123908+	123921+	123940+	124162+	9
	16b	Stem, Lower Assembly Tef-Flow™ P design		POA	POA	POA	POA	9
	16b.1	Lower Balancer, Tef-Flow™ P design		129063+	129064+	129065+	POA	3
	16b.2	O-Ring, Tef-Flow™ P Design	EPDM	E70217	E70217	E70217	POA	3
			FKM	V70217	V70217	V70217	POA	
	17a	Seal Retainer, Quad Ring		106068+	106069+	124392+	125047+	
	17b	Seal Retainer, Wiping Stem Seal		117446+	117447+	POA	POA	
	18	Clamp		119-34	119-51	119-87	119-123	
	20a	Adapter, Quad Ring		111196+	111026+	119596+	123970+	
	20b	Adapter, Wiping Stem Seal		POA	POA	POA	POA	
*	**21a**	**Quad Ring, Upper**	**EPDM**	121299+	121299+	116791+	114221+	
			FKM	124163+	121300+	116792+	114223+	
*	**21b**	**Wiping Stem Seal, Upper**	**EPDM**	116184+	116184+	POA	POA	
			FKM	116185+	116185+	POA	POA	
*	**25**	**O-ring, Non-Flush**	**EPDM**	E70121	E70121	E70121	E70121	
			FKM	V70121	V70121	V70121	V70121	
*	**26**	**O-ring, Inner Stem**	**Nitrile**	N90020	N90020	N90020	N90020	
*	**30**	**Stop Ring**		122357+	122357+	122357+	122357+	

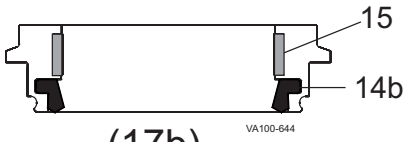
PL5027-CH150

Notes:
* Recommended Spare Parts
2. For one-piece body, qty. 2 are required for item 6 and item 18; for a clamped body, qty. 3 are required.
3. For valve with Tef-Flow™ P design stem only.
4. Unless otherwise noted, quantity required is 1.
6. POA = Part # on availability; N/A = not available with this design.
9. Part number includes lower stem and inner stem, which are assembled together.

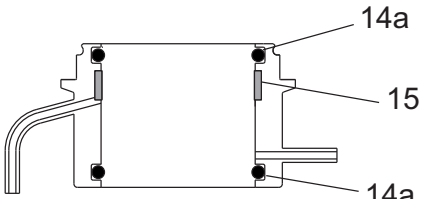
W71 Schedule 5 Mix Proof Seat Lift Valve with External Flush



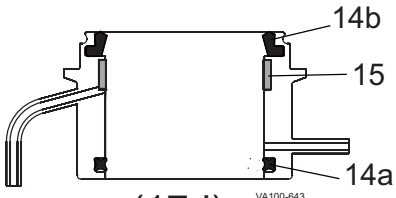
(Tef-Flow™ P Design)



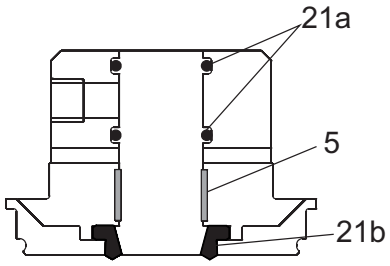
(17b)



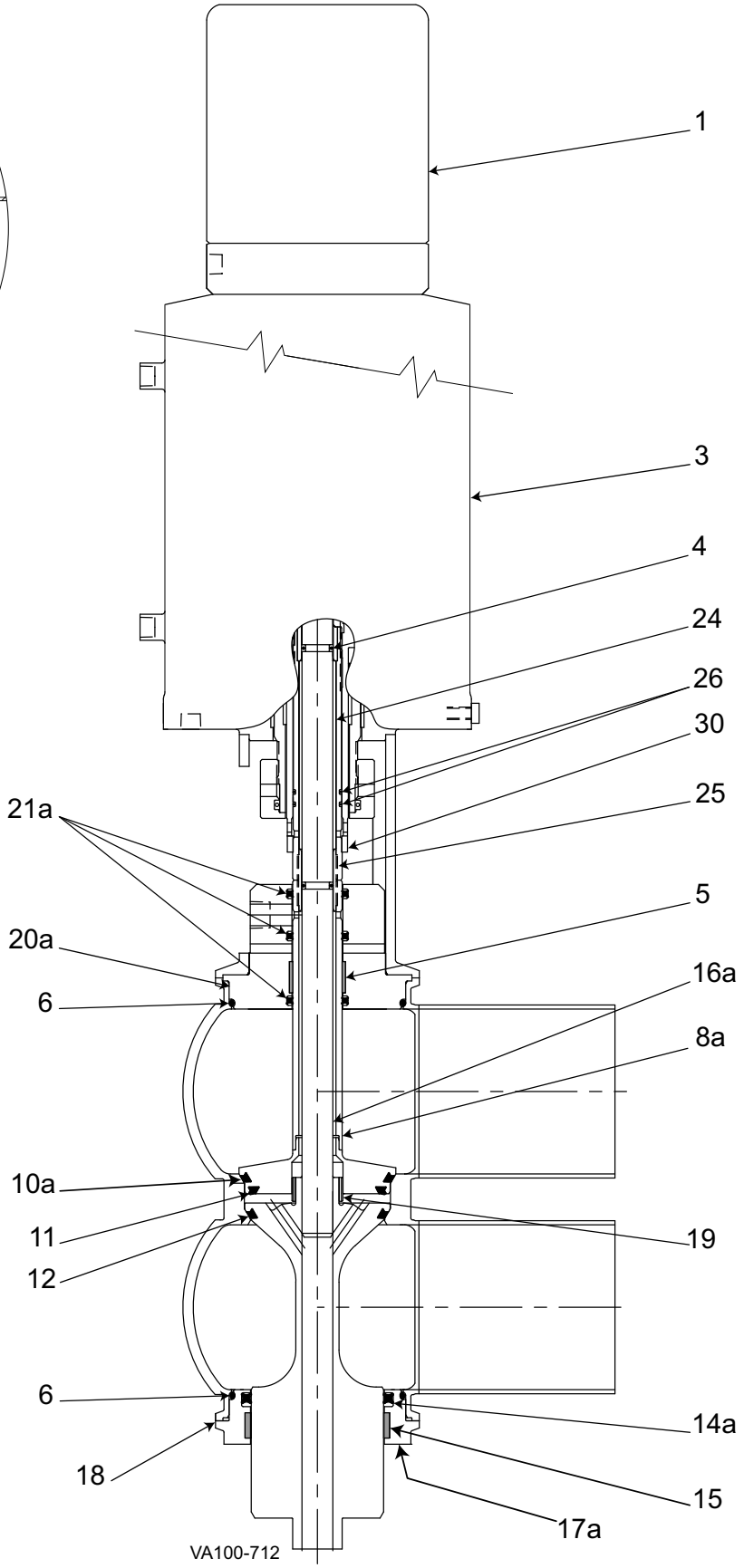
(17c)



(17d)



(20b)



W71 Schedule 5 Mix Proof Seat Lift Valve with External Flush

	Item #	Part Description		2"	3"	4"	6"	Notes
	1	Control Top		Contact Factory				
	3	Actuator		See actuator parts list				
*	**4**	**O-ring, Inner Stem**	**Nitrile**	N70111	N70111	N70111	N70111	
*	**5**	**Bearing, Upper Adapter**		106047+	106047+	106048+	101995+	
*	**6**	**O-ring, Body**	**EPDM**	E70232	E70236	E70244	E70258	
			FKM	V70232	V70236	V70244	V70258	
	8a	Stem, Upper Assembly (Liquid Flush)		124618+	124609+	124603+	124568+	11
	8b	Stem, Upper Assy Tef-Flow™ P (Liq. Flush)		POA	POA	POA	POA	11
*	**10a**	**Seat Ring - Tri Ring, Upper**	**EPDM**	107048+	102488+	102491+	102738+	
			FKM	107982+	107974+	107977+	108020+	
*	**10b**	**Seat Ring Insert- Upper**	**Tef-Flow™ P**	130233+	130234+	130235+	POA	3
*	**11**	**Seat Ring - Tri Ring, Vent**	**EPDM**	107696+	107697+	102490+	102737+	
			FKM	107987+	107988+	107976+	108019+	
*	**12a**	**Seat Ring - Tri-ring, Lower**	**EPDM**	102487+	102489+	102492+	102739+	
			FKM	107973+	107975+	107978+	108021+	
*	**12b**	**Seat Ring Insert - Lower**	**Tef-Flow™ P**	POA	POA	POA	POA	3
*	**14a**	**Quad Ring, Lower**	**EPDM**	34429+	117561+	116952+	114222+	
			FKM	35415+	117562+	116953+	114224+	
*	**14b**	**Wiping Stem Seal, Lower**	**EPDM**	116190+	116195+	116199+	POA	
			FKM	116191+	116196+	116200+	POA	
*	**15**	**Bearing, Lower Seat Retainer**		106049+	106048+	102003+	114232+	
	16a	Stem, Lower Assembly		124619+	124610+	124606+	124599+	9
	16b	Stem, Lower Assembly Tef-Flow™ P		POA	POA	POA	POA	9, 3
	16b.1	Lower Balancer, Tef-Flow™ P design		POA	POA	POA	POA	3
	16b.2	O-Ring, Tef-Flow™ P Design	EPDM	POA	POA	POA	POA	3
			FKM	POA	POA	POA	POA	
	17a	Seal Retainer, Quad Ring		106068+	106069+	124392+	119407+	
	17b	Seal Retainer, Wiping Stem Seal		117446+	117447+	POA	POA	
	18	Clamp		119-34	119-51	119-87	119-123	
	19	Spray Bushing		107950+	107950+	107950+	107950+	
	20a/c	Adapter (External Flush), Quad Ring		106022+	106023+	119596+	128651+	12
	20b	Adapter (External Flush), Wiping Stem Seal		POA	POA	POA	POA	
*	**21a**	**Quad Ring, Upper Stem**	**EPDM**	124163+	124163+	124163+	114221+	
		(qty 3 req.)	**FKM**	121299+	121299+	121299+	114223+	
*	**21b**	**Wiping Stem Seal,**	**EPDM**	116184+	116184+	POA	POA	
		Upper (qty 3 req.)	**FKM**	116185+	116185+	POA	POA	
*	**25**	**O-ring, Flush**	**EPDM**	E70111	E70111	E70111	E70111	
			FKM	V70111	V70111	V70111	V70111	
*	**26**	**O-ring, Outer Stem (qty 2)**	**Nitrile**	N90020	N90020	N90020	N90020	
*	**30**	**Stop Ring**		122357+	122357+	122357+	122357+	

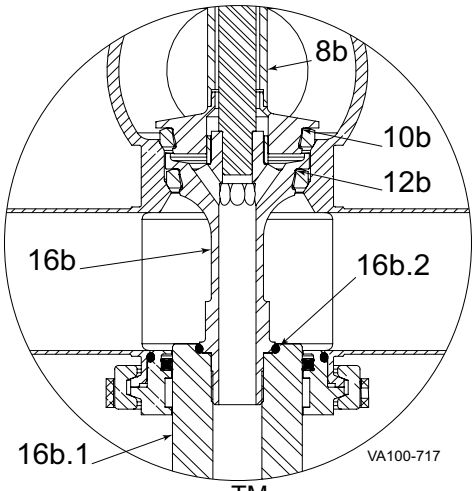
PL5027-CH151

Notes:

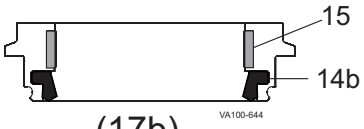
* Recommended Spare Parts

2. For one-piece body, qty. 2 are required for item 6 and item 18; for a clamped body, qty. 3 are required.
3. For valve with Tef-Flow™ P design stem only.
4. Unless otherwise noted, quantity required is 1.
6. POA = Part # on availability; N/A = not available with this design.
9. Part number includes lower stem and inner stem, which are assembled together.
11. Part number includes upper stem, outer stem and coupling sleeve, which are assembled together.
12. 4" Valves only: Design changed 07/2012; for valves older than this, use p/n 124604+.

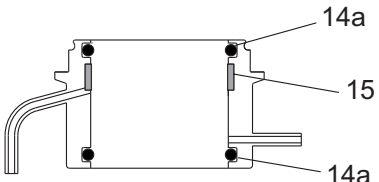
W71 Schedule 5 Mix Proof Non-Seat Lift Valve with External Flush



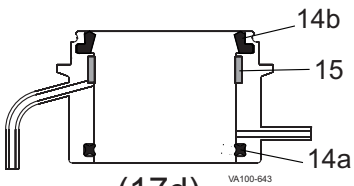
(Tef-Flow™ P Design)



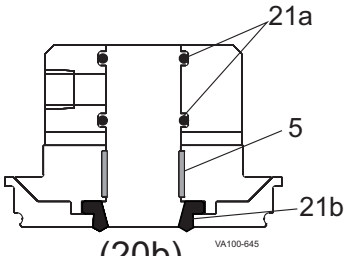
(17b)



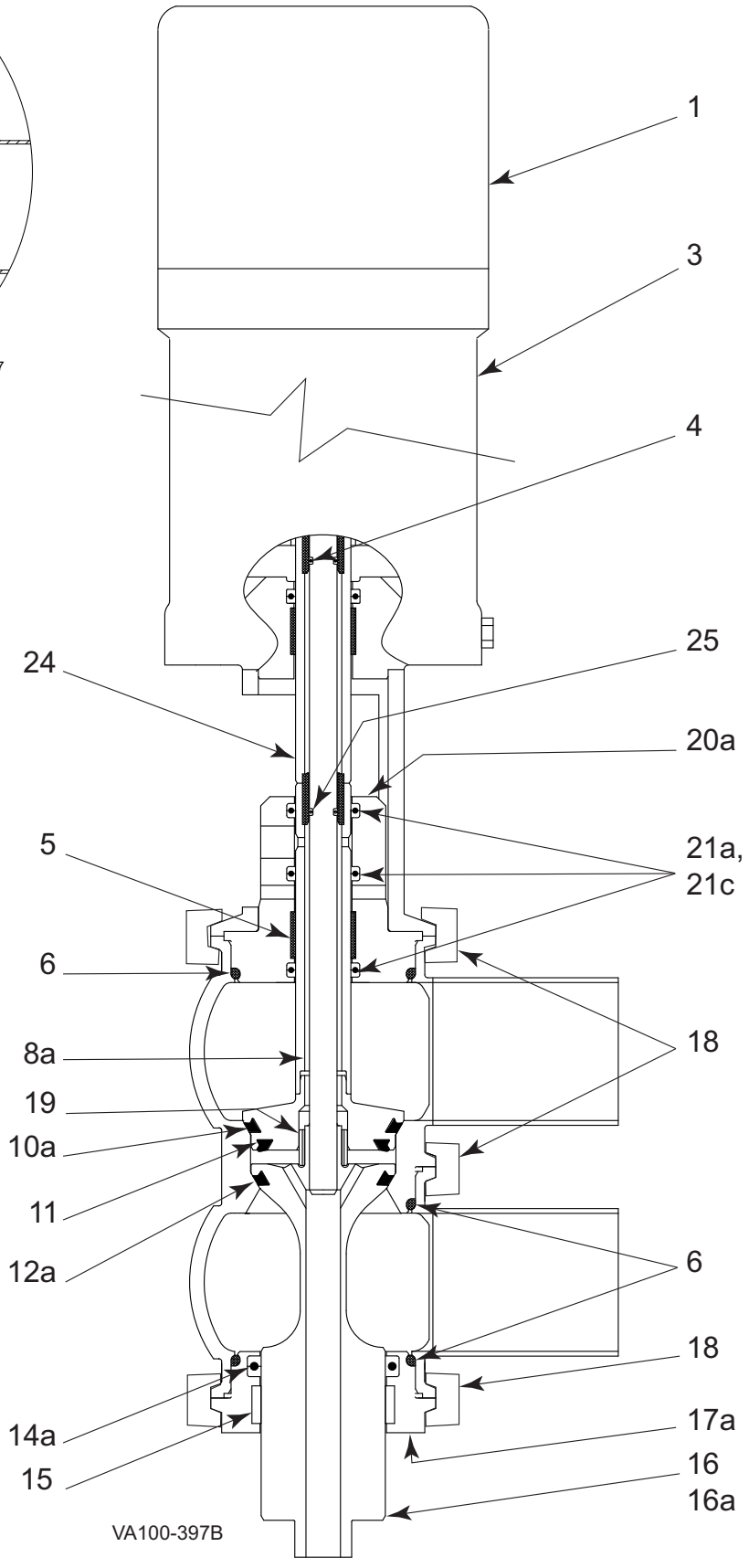
(17c)



(17d)



(20b)



W71 Schedule 5 Mix Proof Non-Seat Lift Valve with External Flush

	Item #	Part Description		2"	3"	4"	6"	Notes
	1	Control Top		Contact Factory				
	3	Actuator		See actuator parts lists				
*	**4**	**O-ring, Inner Stem**	**Nitrile**	N70111	N70111	N70111	N70111	
*	**5**	**Bearing, Upper Adapter**	**Standard**	106047+	106047+	106047+	101995+	
			Tef-Flow™ P design			102002+	N/A	3
*	**6**	**O-ring, Body**	**EPDM**	E70232	E70236	E70244	E70258	
			FKM	V70232	V70236	V70244	V70258	
	8a	Stem, Upper Assembly (Liquid Flush)		124618+	124609+	124603+	124568+	8, 10
	8b	Stem, Upper Assy Tef-Flow™ P (Liq. Fl.)		131865+	131848+	132242+	POA	3
*	**10a**	**Seat Ring - Tri Ring, Upper**	**EPDM**	107048+	102488+	102491+	102738+	
			FKM	107982+	107974+	107977+	108020+	
*	**10b**	**Seat Ring Insert- Upper**	**Tef-Flow™ P**	130233+	130234+	130235+	POA	3
*	**11**	**Seat Ring - Tri Ring, Vent**	**EPDM**	107696+	107697+	102490+	102737+	
			FKM	107987+	107988+	107976+	108019+	
*	**12a**	**Seat Ring - Tri-ring, Lower**	**EPDM**	102487+	102489+	102492+	102739+	
			FKM	107973+	107975+	107978+	108021+	
*	**12b**	**Seat Ring Insert - Lower**	**Tef-Flow™ P**	130245+	130246+	130247+	POA	3
*	**14a**	**Quad Ring, Lower**	**EPDM**	34429+	117561+	116952+	122350+	
			FKM	35415+	117562+	116953+	122351+	
*	**14b**	**Wiping Stem Seal, Lower**	**EPDM**	116190+	116195+	116199+	POA	
			FKM	116191+	116196+	116200+	POA	
*	**15**	**Bearing, Lower Seat Retainer**		106049+	106048+	102003+	114232+	
	16/16a	Stem, Lower Assembly		124619+	124610+	124606+	124599+	9
	16b	Stem, Lower Assembly Tef-Flow™ P		131820+	131821+	131822+	POA	9, 3
	16b.1	Lower Balancer, Tef-Flow™ P design		129063+	129064+	129065+	POA	3
	16b.2	O-Ring, Tef-Flow™ P Design	EPDM	E70217	E70217	E70217	POA	3
			FKM	V70217	V70217	V70217	POA	
	17a	Seal Retainer, Quad Ring		106068+	106069+	124392+	119407+	
	17b	Seal Retainer, Wiping Stem Seal		117446+	117447+	POA	POA	
	17c	Seal Retainer, Quad Ring		114920+	117736+	118364+	POA	
	17d	Seal Retainer, Wiping Stem Seal		118226+	117559+	118253+	POA	
	18	Clamp		119-34	119-51	119-87	119-123	
	19	Spray Bushing		107950+	107950+	107950+	107950+	
	20a/c	Adapter, Quad Ring		106022+	106023+	119596+	128651+	12
	20b	Adapter, Wiping Stem Seal		POA	POA	POA	POA	
	21a	**O-ring, Upper Stem**	**EPDM**	E70214	E70214	E70214	N/A	
		(qty 3 required)	**FKM**	V70214	V70214	V70214	POA	
*	**21c**	**Quad Ring, Upper Stem**	**EPDM**	124163+	124163+	124163+	114221+	
		(qty 3 req.)	**FKM**	121299+	121299+	121299+	114223+	
*	**21b**	**Wiping Stem Seal, Upper (qty**	**EPDM**	116184+	116184+	POA	POA	
		3 req.)	**FKM**	116185+	116185+	POA	POA	
	24	Stem, Actuator, NSL Flush		107949+	107949+	107949+	POA	
*	**25**	**O-ring, Flush**	**EPDM**	E70111	E70111	E70111	E70111	
			FKM	V70111	V70111	V70111	V70111	

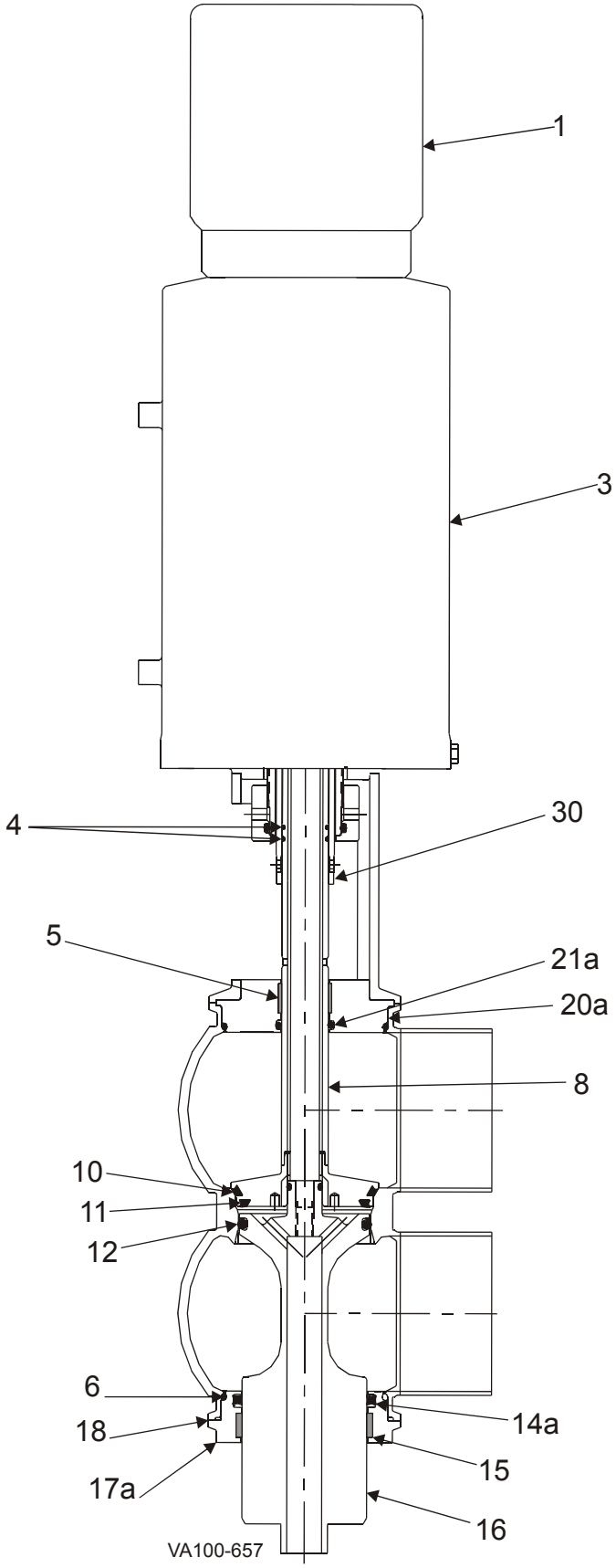
PL5027-CH159

Notes: Unless otherwise noted, quantity required is 1.

* Recommended Spare Parts

3. For valve with Tef-Flow™ P design stem only.
6. POA = Part # on availability; N/A = not available with this design.
8. Part number includes upper stem and coupling sleeve, which are assembled together.
9. Part number includes lower stem and inner stem, which are assembled together.
10. A separate actuator stem (item 24) mates with item 8.
12. 4" Valves only: Design changed 07/2012; for valves older than this, use p/n 124604+.

W72RS Schedule 5 Mix Proof Seat Lift Valve



W72RS Schedule 5 Mix Proof Seat Lift Valve

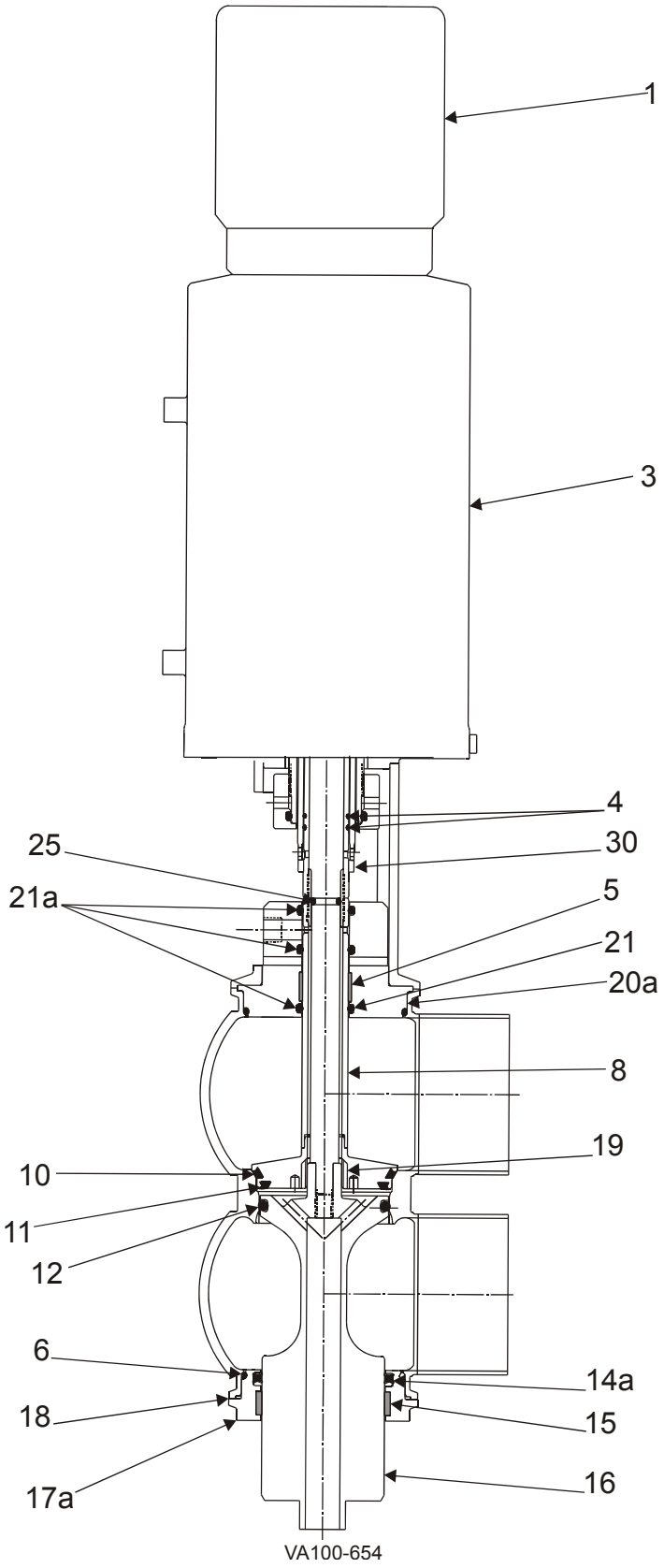
	Item #	Part Description		2"	3"	4"	6"	Notes
	1	Control Top		Contact Factory				
	3	Actuator		See actuator parts lists				
*	**4**	**O-ring, Outer Stem (qty 2 req.)**	**Nitrile**	N90020	N90020	N90020	N90020	
*	**5**	**Bearing, Upper Adapter**		106047+	106047+	102002+	114232+	
*	**6**	**O-ring, Body**		E70232	E70236	E70244	E70258	
			FKM	V70232	V70236	V70244	V70258	
	8	Stem, Upper		122652+	122659+	119604+	119392+	
*	**10**	**Seat Ring - Tri Ring, Upper**	**EPDM**	107048+	102488+	102491+	102738+	
			FKM	107982+	107974+	107977+	108020+	
*	**11**	**Seat Ring - Tri Ring, Vent**	**EPDM**	107696+	107697+	102490+	102738+	
			FKM	107987+	107988+	107976+	108020+	
*	**12**	**Seat Ring - Radial O-ring,**	**EPDM**	E80329	E80333	E80340	E80354	
		Lower	**FKM**	V80329	V80333	V80340	V80354	
*	**14a**	**Quad Ring, Lower**	**EPDM**	34429+	117561+	116952+	114222+	
			FKM	35415+	117562+	116953+	114224+	
*	**14b**	**Wiping Stem Seal, Lower**	**EPDM**	116198+	116195+	116199+	POA	
			FKM	116191+	116196+	116200+	POA	
*	**15**	**Bearing, Lower Seal Retainer**		106049+	106048+	102003+	102004+	
	16	Stem, Lower Assembly		124916+	124917+	124918+	124919+	1
	17a	Seal Retainer, Quad Ring		106068+	106069+	124392+	119407+	
	17b	Seal Retainer, Wiping Stem Seal		117446+	117447+	117448+	POA	
	18	Clamp		119-34	119-51	119-87	119-123	
	20a	Adapter, Quad Ring		111196+	111026+	119605+	122684+	
	20b	Adapter, Wiping Stem Seal		POA	POA	POA	POA	
*	**21a**	**Quad Ring, Upper**	**EPDM**	124163+	124163+	116954+	122350+	
			FKM	121299+	121299+	116955+	122351+	
*	**21b**	**Wiping Stem Seal, Upper**	**EPDM**	116184+	116184+	POA	POA	
			FKM	116185+	116185+	POA	POA	
*	**29**	**O-ring, Non-Flush**	**EPDM**	E70113	E70113	E70113	E70113	
			FKM	V70113	V70113	V70113	V70113	
*	**30**	**Stop Ring**		122357+	122357+	122357+	122357+	

PL5027-CH73

Notes:

1. Part number includes lower stem and inner stem, which are assembled together.

W72RS Schedule 5 Mix Proof Seat Lift Valve with External Flush



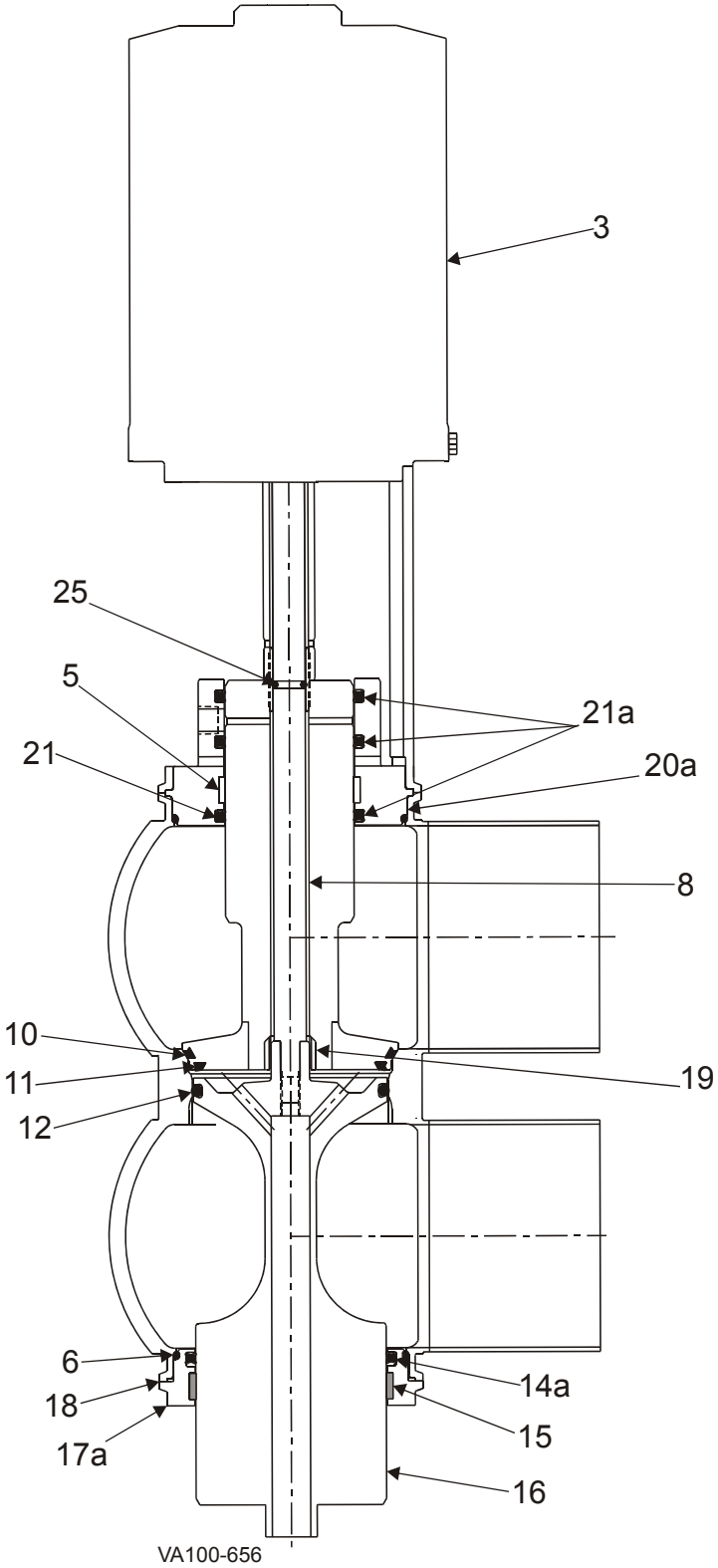
W72RS Schedule 5 Mix Proof Seat Lift Valve with External Flush

	Item #	Part Description		2"	3"	4"	6"	Notes
	1	Control Top		Contact Factory				
	3	Actuator		See actuator parts lists				
*	**4**	**O-ring, Outer Stem (qty 2 req.)**	**Nitrile**	N90020	N90020	N90020	N90020	
*	**5**	**Bearing, Upper Adapter**		106047+	106047+	102002+	114232+	
*	**6**	**O-ring, Body**		E70232	E70236	E70244	E70258	
			FKM	V70232	V70236	V70244	V70258	
	8	Stem, Upper Assembly (Liquid Flush)		124927+	124929+	124931+	124933+	1
*	**10**	**Seat Ring - Tri Ring, Upper**	**EPDM**	107048+	102488+	102491+	102738+	
			FKM	107982+	107974+	107977+	108020+	
*	**11**	**Seat Ring - Tri Ring, Vent**	**EPDM**	107696+	107697+	102490+	102738+	
			FKM	107987+	107988+	107976+	108020+	
*	**12**	**Seat Ring - Radial O-ring, Lower**	**EPDM**	E80329	E80333	E80340	E80354	
			FKM	V80329	V80333	V80340	V80354	
	14a	**Quad Ring, Lower**	**EPDM**	34429+	117561+	116952+	114222+	
			FKM	35415+	117562+	116953+	114224+	
	14b	**Wiping Stem Seal, Lower**	**EPDM**	116198+	116195+	116199+	POA	
			FKM	116191+	116196+	116200+	POA	
*	**15**	**Bearing, Lower Seal Retainer**		106049+	106048+	102003+	114232+	
	16	Stem, Lower Assembly		124926+	124928+	124930+	124932+	2
	17a	Seal Retainer, Quad Ring		106068+	106069+	124392+	119407+	
	17b	Seal Retainer, Wiping Stem Seal		117446+	117447+	117448+	POA	
	18	Clamp		119-34	119-51	119-87	119-123	
	19	Spray Bushing		118210+	118210+	118210+	118210+	
	20a	Adapter (External Flush), Quad Ring		106022+	106023+	119596+	119409+	
	20b	Adapter (External Flush), Wiping Stem Seal		POA	POA	POA	POA	
*	**21a**	**Quad Ring, Upper (qty 3 req.)**	**EPDM**	124163+	124163+	116954+	122350+	
			FKM	121299+	121299+	116955+	122351+	
*	**21b**	**Wiping Stem Seal, Upper (qty 3 req.)**	**EPDM**	116184+	116184+	POA	POA	
			FKM	116185+	116185+	POA	POA	
*	**25**	**O-ring, Flush**	**EPDM**	E70111	E70111	E70111	E70111	
			FKM	V70111	V70111	V70111	V70111	
*	**30**	**Stop Ring**		122357+	122357+	122357+	122357+	

PL5027-CH71

Notes:
* Recommended Spare Parts
1. Part number includes upper stem, outer stem and coupling sleeve which are assembled together.
2. Part number includes lower stem and inner stem which are assembled together.

W72RS Schedule 5 Mix Proof Non-Seat Lift Valve with External Flush



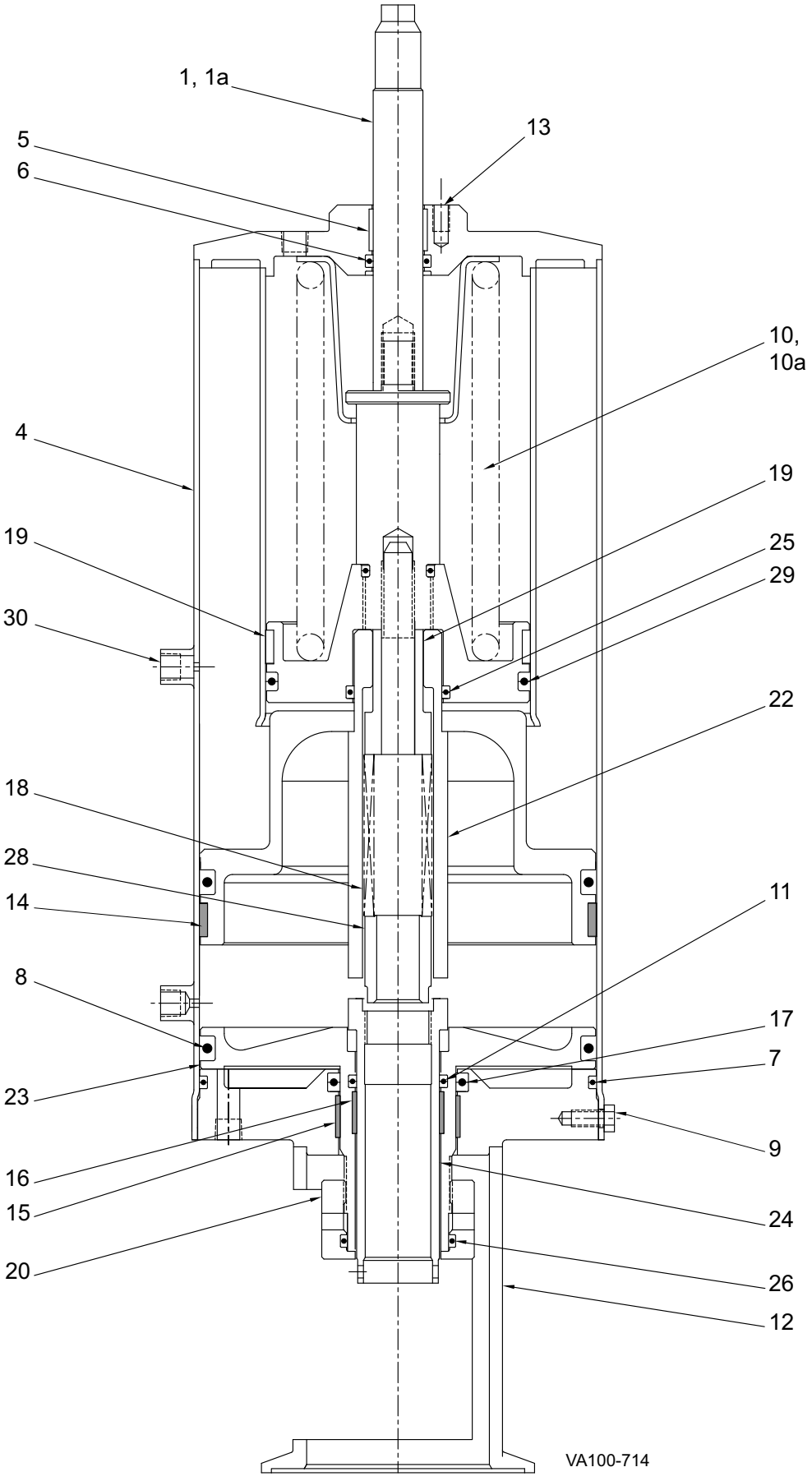
W72RS Schedule 5 Mix Proof Non-Seat Lift Valve with External Flush

	Item #	Part Description		2"	3"	4"	6"	Notes
	1	Control Top (Option not shown)		Contact Factory				
	3	Actuator		See actuator parts lists				
*	**4**	**O-ring, Inner Stem (not shown)**	**Nitrile**	N70111	N70111	N70111	N70111	
*	**5**	**Bearing, Upper Adapter**		106047+	106047+	102002+	101995+	
*	**6**	**O-ring, Body**		E70232	E70236	E70244	E70258	
			FKM	V70232	V70236	V70244	V70258	
	8	Stem, Upper Assembly (Liquid Flush)		126487+	124921+	124923+	POA	1
*	**10**	**Seat Ring - Tri Ring, Upper**	**EPDM**	107048+	102488+	102491+	102738+	
			FKM	107982+	107974+	107977+	108020+	
*	**11**	**Seat Ring - Tri Ring, Vent**	**EPDM**	107696+	107697+	102490+	102737+	
			FKM	107987+	107988+	107976+	108019+	
*	**12**	**Seat Ring - Radial O-ring, Lower**	**EPDM**	E80329	E80333	E80340	E80354	
			FKM	V80329	V80333	V80340	V80354	
*	**14**	**Quad Ring, Lower**	**EPDM**	34429+	117561+	116952+	114222+	
			FKM	35415+	117562+	116953+	114224+	
*	**14b**	**Wiping Stem Seal, Lower**	**EPDM**	116198+	116195+	116199+	POA	
			FKM	116191+	116196+	116200+	POA	
*	**15**	**Bearing, Lower Seal Retainer**		106049+	106048+	102003+	102004+	
	16	Stem, Lower Assembly		122648+	124920+	124922+	POA	2
	17a	Seal Retainer, Quad Ring		106068+	106069+	124392+	125047+	
	17b	Seal Retainer, Wiping Stem Seal		117446+	117447+	117448+	POA	
	18	Clamp		119-34	119-51	119-87	119-123	
	19	Spray Bushing		118210+	118210+	118210+	118210+	
	20a	Adapter (External Flush), Quad Ring		106022+	106023+	119596+	POA	
	20b	Adapter (External Flush), Wiping Stem Seal		POA	POA	POA	POA	
*	**21a**	**Quad Ring, Upper (qty 3 req.)**	**EPDM**	121299+	124163+	116954+	114221+	
			FKM	124163+	121299+	116955+	114223+	
*	**21b**	**Wiping Stem Seal, Upper (qty 3 req.)**	**EPDM**	116184+	116184+	POA	POA	
			FKM	116185+	116185+	POA	POA	
*	**25**	**O-ring, Flush**	**EPDM**	E70111	E70111	E70111	E70111	
			FKM	V70111	V70111	V70111	V70111	

PL5027-CH72

Notes:
* Recommended Spare Parts
1. Part number includes upper stem, outer stem and coupling sleeve which are assembled together.
2. Part number includes lower stem and inner stem which are assembled together.

W71 Schedule 5 Mix Proof Seat Lift Valve Actuator



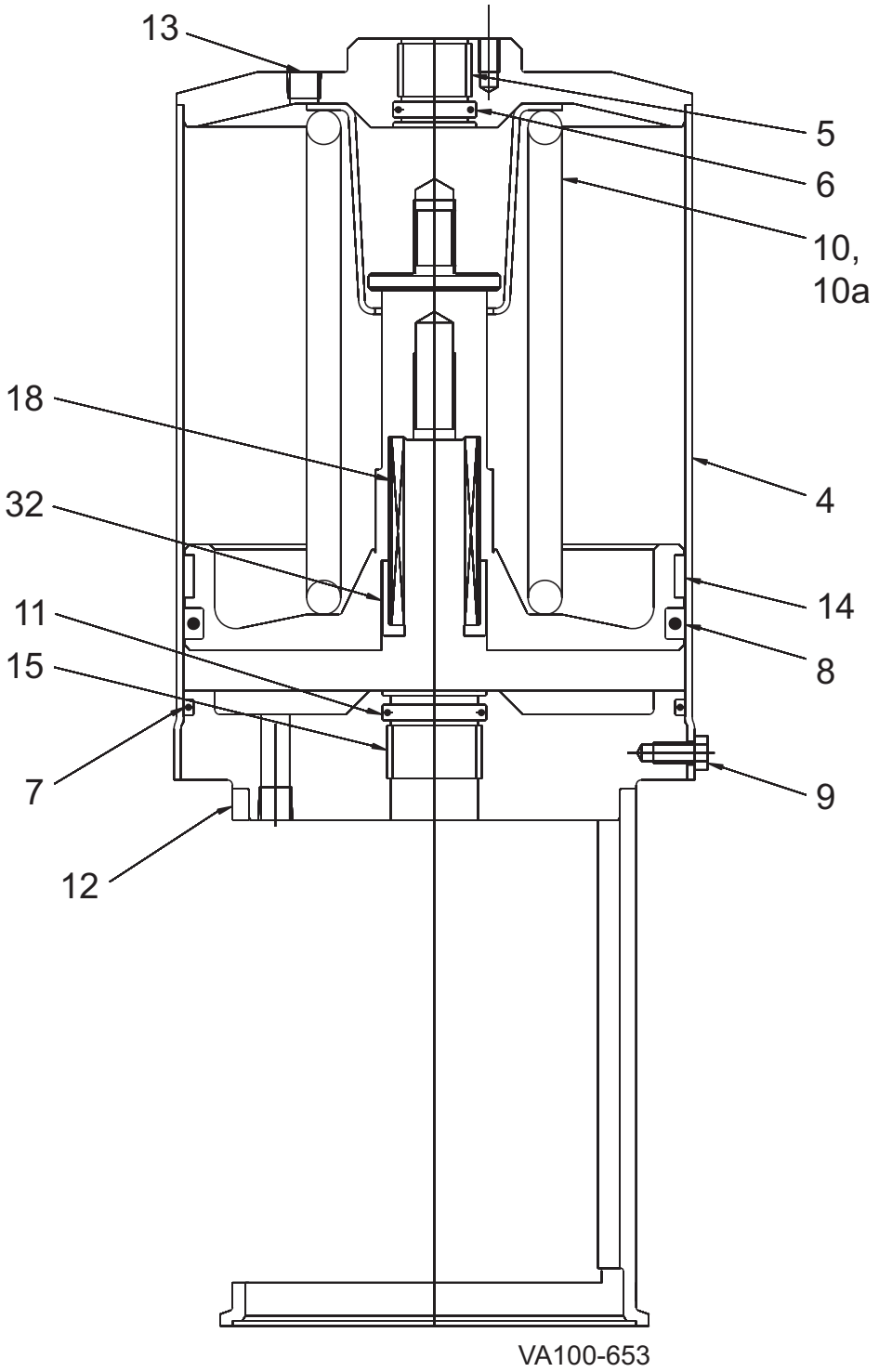
W71 Schedule 5 Mix Proof Seat Lift Valve Actuator

	Item #	Part Description		6" Diameter	8" Diameter	Notes
	1	Indicator Stem - Visual		107951+	POA	
	1a	Indicator Stem - Control Top		106004+	110800+	2
	4	Cylinder		111491+	123974+	
*	**5**	**Bearing, Indicator Stem**		102757+	102757+	
*	**6**	**O-ring, Indicator Stem**	**Nitrile**	N70210	N70210	
*	**7**	**O-ring, Cylinder**	**Nitrile**	N70255	N70367	
*	**8**	**O-ring, Upper Seat Piston, qty 2 req.**	**Nitrile**	N70433	N70443	
	9	Cap Screw, 1/4-20 x .375" lg.		30-68 (8 req)	30-361 (12 req)	
	10	Lower Seat Piston & Spring Assembly		113660+	129823+	
	10a	Lower Seat Piston & Spring Assy, Tef-Flow™ P Design		132189+	POA	
*	**11**	**O-ring, Adjusting Sleeve, qty 2 req.**	**Nitrile**	N70219	N70219	
	12	Yoke	2" Valve	109928+	--	
			3" Valve	126054+	--	
			4" Valve	119591+	--	
			6" Valve	--	123971+	
	13	Vent Plug		3023957+	3023957+	3
*	**14**	**Bearing, Main Piston**		102052+	100256+	
*	**15**	**Bearing, Lifting Piston**		109920+	109920+	
*	**16**	**Bearing, Adjusting Sleeve**		109919+	109919+	
	17	O-ring, Inner Yoke	Nitrile	N70328	N70328	
	18	Spring, Upper Stem		5901106+	5901106+	
	19	Stop, Lifter		109913+	123998+	
	20	Adjusting Nut, Upper Seat Lift	2"-3" Valve	122345+	--	
			4" Valve	109918+	--	
			6" Valve	--	122345+	
	21	Bearing, Lower seat piston		101995+	102052+	
	22	Main Piston		111486+	123979+	
	23	Upper Seat Lift Piston	2"-3" Valve	124543+	--	
			4" Valve	111489+	--	
			6" Valve	--	124555+	
	24	Adjusting Sleeve, Lower Seat Clean	2"-3" Valve	126834+	--	
			4" Valve	109912+	--	
			6" Valve	--	126834+	
	25	O-ring, Inner Lower Seat Piston	Nitrile	N70219	N70219	
	26	O-ring, Adjusting Nut	Nitrile	N80222	N80222	
	28	Bushing		112517+	112517+	
*	**29**	**O-ring, Outer Lower Seat Piston**	**Nitrile**	N70342	N70433	
	30	Quick Exhaust		114680+	114680+	
	33	Elbow swivel 90° (not shown)		78-157	78-157	

PL5027-CH153

Notes:
* Recommended Spare Parts
1. 6-inch diameter actuator for 2-inch thru 4-inch valves; 8" diameter for 6 inch valves.
2. For valves with control top, please contact factory.
3. Only required for valves without control top.

W71/W72RS Schedule 5 Mix Proof Non-Seat Lift Valve Actuator



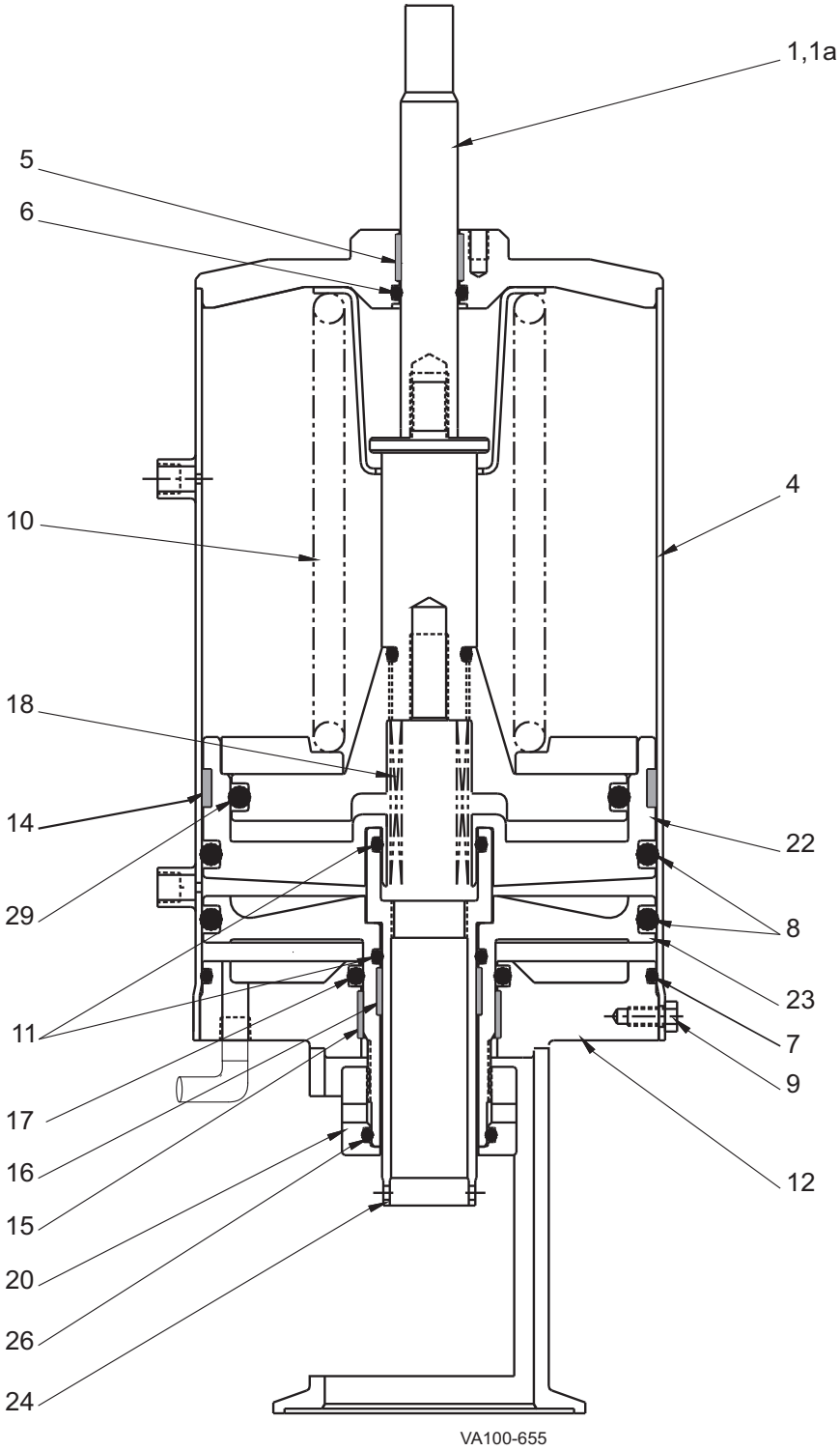
W71/W72RS Schedule 5 Mix Proof Non-Seat Lift Valve Actuator

	Item #	Part Description		6" Diameter	Notes
	1	Indicator Stem - Visual		107951+	
	1a	Indicator Stem - Control Top		106004+	
	4	Cylinder		106007+	
*	**5**	**Bearing, Indicator Stem**		102757+	
*	**6**	**O-ring, Indicator Stem**	**Nitrile**	N70210	
*	**7**	**O-ring, Cylinder**	**Nitrile**	N70255	
*	**8**	**O-ring, Piston**	**Nitrile**	N70433	
	9	Cap Screw, 1/4-20 x .375" lg.		30-68 (8 req)	
	10	Piston & Spring Assembly		118530+	
	10a	Piston & Spring Assy, Tef-Flow™ P Design		X11428	2
*	**11**	**O-ring, Yoke**	**Nitrile**	N70214	
	12	Yoke	2"	124130+	
			3"	118533+	
			4"	124130+	
			6"	POA	
	13	Vent Plug		3023957+	1
*	**14**	**Bearing, Piston**		102052+	
*	**15**	**Bearing, Yoke**		106047+	
	18	Spring, Upper Stem		5901106+	
	32	Spring Guide		118529+	
	33	Stop Ring		122357+	
	30	Quick Exhaust (avail. upon request)		114680+	
	33	Elbow swivel 90°		78-157	

PL5027-CH75

Notes:
* Recommended Spare Parts
1. Installed when no control top is used.
2. Applies to Tef-Flow™ P design W71 Schedule 5 Non-Seat Lift Valve only.

W72RS Schedule 5 Mix Proof Seat Lift Valve Actuator



W72RS Schedule 5 Mix Proof Seat Lift Valve Actuator

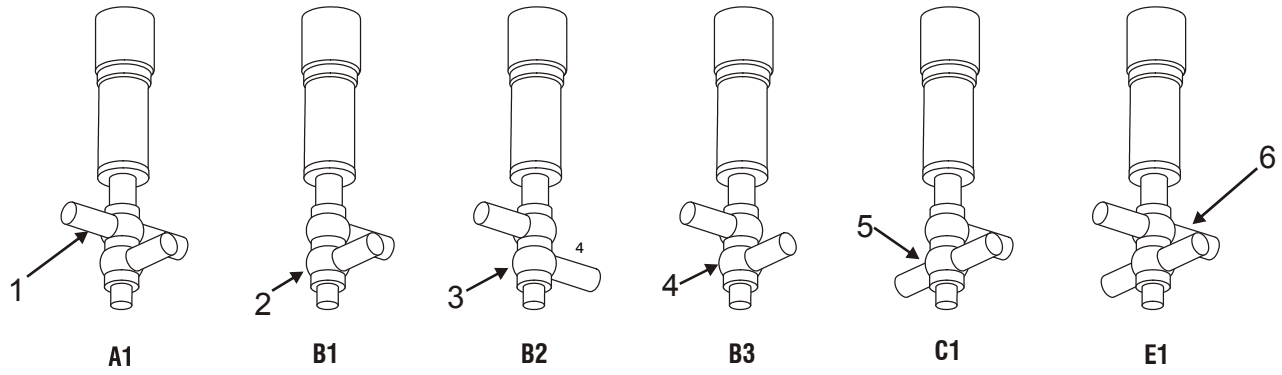
	Item #	Part Description		6" Diameter	6.6" Diameter	Notes
	1	Indicator Stem - Visual		POA	POA	
	1a	Indicator Stem - Control Top		106004+	POA	
	4	Cylinder		113112+	119418+	
	5	**Bearing, Indicator Stem**		102757+	102757+	
*	**6**	**O-ring, Indicator Stem**	**Nitrile**	N70210	N70210	
*	**7**	**O-ring, Cylinder**	**Nitrile**	N70255	N70259	
*	**8**	**O-ring, Upper Seat Piston (qty 2 req)**	**Nitrile**	N70433	N70437	
	9	Cap Screw, 1/4-20 x .375" lg. (qty 8 required)		30-68	30-68	
	10	Piston & Spring Assembly	2" - 4"	113678+	--	
			6"	--	129904+	
*	**11**	**O-ring, Adjustment Sleeve (qty 2 req)**	**Nitrile**	N70219	N70219	
	12	Yoke	2"	109928+	--	
			3"	109934+	--	
			4"	119591+	--	
			6"	--	119410+	
	13	Vent Plug (not shown)		3023957+	3023957+	2
*	**14**	**Bearing, Main Piston**		102052+	122355+ (2 req)	
*	**15**	**Bearing, Lifting Piston**		109920+	109920+	
*	**16**	**Bearing, Adjusting Sleeve**		109919+	109919+	
	17	O-ring, Inner Yoke	Nitrile	N70328	N70328	
	18	Spring, Upper Stem		5901106+	5901106+	
	20	Adjusting Nut, Upper Seat Lift		122345+	122345+	
	22	Main Piston		116472+	122348+	
	23	Upper Seat Piston		124543+	122346+	
	24	Adjusting Sleeve, Lower Seat Clean		116469+	119419+	
	26	O-ring, Adjusting Nut	Nitrile	N90222	N90222	
*	**29**	**O-ring, Outer Lower Seat Piston**		N70427	N70338	
	30	Quick Exhaust (avail. upon request)		114680+	114680+	
	33	Elbow swivel 90°		78-157	78-157	

PL5027-CH76

Notes:
* Recommended Spare Parts
1. 6" diameter actuator for 2", 3" and 4" valves; 6.6" diameter actuator for 6" valves.
2. Only required for valves without control top.

Mix Proof Valve Bodies for W71 and W72RS Schedule 5 Valves

W71 and W72RS One Piece Bodies



VA100-436b

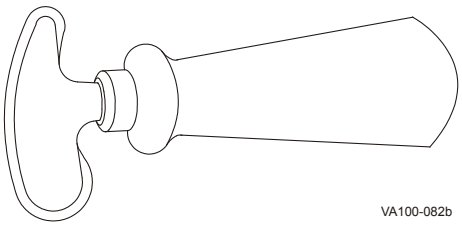
Item #	Part Description	2"	3"	4"	6"
W71 One Piece Body					
1	Buttweld - A1	123899+	123912+	123944+	123964+
2	Buttweld - B1	123901+	123914+	123946+	123966+
3	Buttweld - B2	123902+	123915+	123947+	123967+
4	Buttweld - B3	123903+	123916+	123948+	123968+
5	Buttweld - C1	123900+	123913+	123945+	123965+
6	Buttweld - E1	123898+	123911+	123943+	123963+
W72RS One Piece Body					
1	Buttweld - A1	122641+	119855+	119583+	119380+
2	Buttweld - B1	122643+	119857+	119585+	119382+
3	Buttweld - B2	122644+	119858+	119586+	119383+
4	Buttweld - B3	122645+	119859+	119587+	119384+
5	Buttweld - C1	122642+	119856+	119584+	119381+
6	Buttweld - E1	122640+	119854+	119582+	119379+

PL5027-CH161

Installation Tools

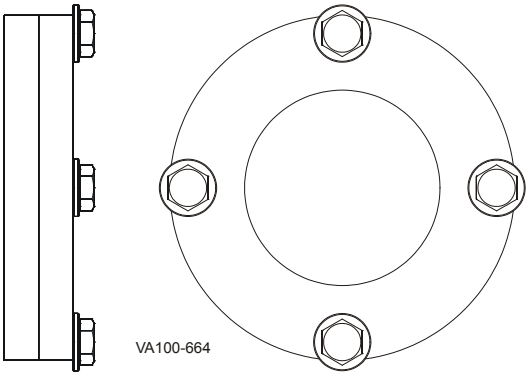
Item	Used with Valve Model
Tri Ring Tool (page 57) Radial Seal Insertion Collar Tool (page 57) Tef Flow® P Seat Installation/Removal Kits (starting on page 57)	W71 / W72RS W72RS W71, Tef Flow® P Design

Tri Ring Tool (for W71 and W72RS Valves)



Tri Ring Tool
Part number 102797+

Radial Seal Insertion Collar Tool (for W72RS Valves)



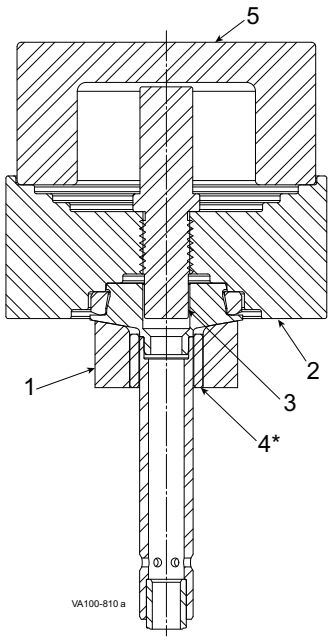
Valve Size	2"	3"	4"
Part No.	120051+	120053+	120055+

Valve Size	6"
Part No.	120057+

W71 Tef Flow® P Seat Installation/Removal Kits

Tef Flow® P Tool Kits	Part No. (applies to all valve sizes)	
	W71 (Upper Stem)	W71 (Lower Stem)
Installation Tool Kit	132356+	132990+
Removal Tool Kit	132357+	132947+

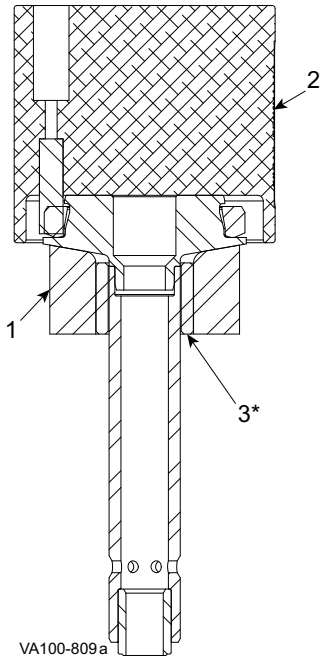
W71 Upper Stem Tef Flow® P Seat Installation Kit 132356+



Item	Description	Qty	Part No.
1	Install Base Tool, Upper Stem Insert	1	131301+
2	Upper Stem Seat Install Tool (Aluminum)	1	131884+
3	Locator Pin (Aluminum)	1	131885+
4*	Stem Sleeve Plug Tool, 2" ODT Valve	1	131305+
5	Puck	1	132899+

* applies to 2" ODT valve size only.

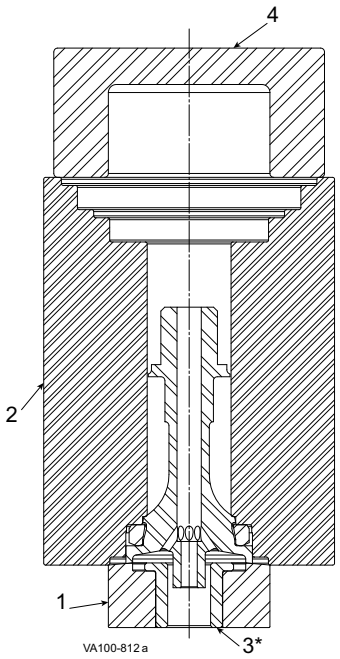
W71 Lower Stem Tef Flow® P Seat Removal Kit 132990+



Item	Description	Qty	Part No.
1	Install Base Tool, Upper Stem Insert	3	131301+
2	Upper Stem Seat Removal Tool, 2" ODT Valve	1	132983+
	Upper Stem Seat Removal Tool, 2.5" ODT and 2" Sch.5 Valve	1	132982+
	Upper Stem Seat Removal Tool, 3" Valve	1	132981+
	Upper Stem Seat Removal Tool, 4" Valve	1	132980+
3*	Stem Sleeve Plug Tool, 2" ODT Valve	1	131305+

* applies to 2" ODT valve size only.

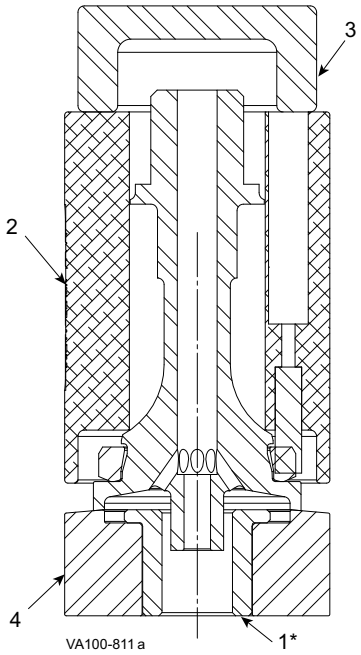
W71 Upper Stem Tef Flow® P Seat Installation Kit 132357+



Item	Description	Qty	Part No.
1	Install Base Tool, Lower Stem Insert	1	131302+
2	Upper Stem Seat Tool	1	131886+
3*	Install Base Plug Tool, 2" ODT Valve	1	131303+
4	Puck	1	132899+

* applies to 2" ODT valve size only.

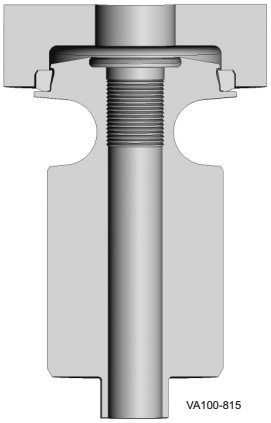
W71 Lower Stem Tef Flow® P Seat Removal Kit 132947+



Item	Description	Qty	Part No.
1*	Base Plug Tool, 2" ODT Valve	1	131303+
2	Lower Stem Seat Removal Tool, 2" ODT Valve	1	132910+
	Lower Stem Seat Removal Tool, 2.5" ODT and 2" Sch.5 Valve	1	132909+
	Lower Stem Seat Removal Tool, 3" Valve	1	132908+
	Lower Stem Seat Removal Tool, 4" Valve	1	132907+
3	Puck	4	132900+
4	Install Base Tool, Lower Stem Insert	4	131302+

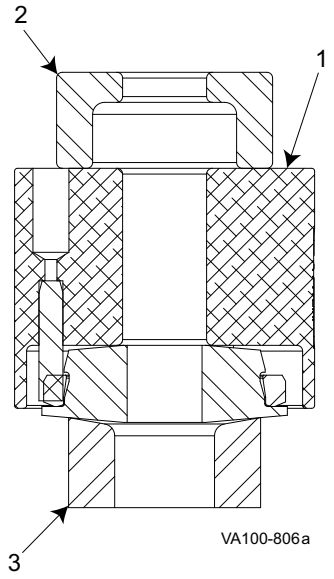
* applies to 2" ODT valve size only.

W73 (Lower Stem) Tef Flow® P Seat Insert Tools



Description	Qty	Part No.
Seat Insert Tool, 1"/1.5" Valve	1	115654+
Seat Insert Tool, 2" Valve	1	115655+
Seat Insert Tool, 2.5" Valve	1	115656+
Seat Insert Tool, 3" Valve	1	115657+
Seat Insert Tool, 4" Valve	1	115658+

W73 (Lower Stem) Tef Flow® P Seat Removal Kit 133470+



Item	Description	Qty	Part No.
1	Install Base Stem Tool	1	131301+
2	Puck	1	132900+
3	Seat Removal Tool, 1" Valve	1	133476+
	Seat Removal Tool, 2" Valve	1	133477+
	Seat Removal Tool, 2.5" Valve	1	133478+
	Seat Removal Tool, 3" Valve	1	133479+
	Seat Removal Tool, 4" Valve	1	133480+

Troubleshooting

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Leakage		
Leakage from vent/ drain with valve closed.	Upper or lower seat ring failure.	Remove valve. Replace seat rings.
	Debris trapped in upper seat or lower seat.	Inspect/change cleaning procedure to correct.
	Upper or lower seat not closed.	Inspect inner and outer stems for galling and burrs on adapter.
		Check actuator function.
	Upper or lower seat clean activated.	Check control sequence.
Leakage from vent/ drain with valve open.	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.
Operation		
Valve fails to open.	Air pressure too low.	Set air pressure to 72 psi (5 bar) minimum.
	Control failure.	Check control sequence.
		Check control wiring and power source.
Valve fails to close.	Controls failed.	Check control sequence.
		Check control wiring and power source.
Upper seat fails to lift during seat lift.	Lifting piston not adjusted correctly.	Adjust adjusting sleeve. See “Seat Cleaning Adjustment” on page 25.
Lower seat fails to lift during seat lift.	Adjusting sleeve not adjusted correctly.	Adjust adjusting sleeve. See “Seat Cleaning Adjustment” on page 25.
Actuator moves when valve opened.	Clamp loose.	Tighten clamp with valve open.
Electrical		
No valve closed or open indication.	Lower sensor not adjusted properly.	Adjust sensor. See control module publication 95-03083.
No valve open signal.	Upper sensor not adjusted.	Adjust sensor. See control module publication 95-03083.
Moisture in sensor housing.	Missing and/or damaged gaskets.	Replace gaskets.

Notes

W71 and W72RS Schedule 5 Mix Proof Valves

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

ISSUED: 08/2018