

200 Series Butterfly Valve

MANUAL AND PNEUMATIC ACTUATORS

FORM NO.: 95-03096 REVISION: 11/2018

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



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Warranty

LIMITED WARRANTY: Unless otherwise mutually agreed to in writing, (a) SPX FLOW US, LLC (SPX FLOW) goods, auxiliaries and parts thereof are warranted to the Buyer against defective workmanship and material for a period of twelve (12) months from date of installation or eighteen (18) months from date of delivery, whichever expires first, and (b) SPX FLOW services are warranted to Buyer to have been performed in a workman-like manner for a period of ninety (90) days from the date of performance. 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. If Buyer makes a warranty claim to SPX FLOW and no actual defect is subsequently found, Buyer shall reimburse SPX FLOW for all reasonable costs which SPX FLOW incurs in connection with the alleged defect. 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 (including modifications or repairs by Buyer, the end customer or third parties other than SPX FLOW), 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; (vi) damage resulting from the combination, operation or use with equipment, products, hardware, software, firmware, systems or data not provided by SPX FLOW, if such damage or harm would have been avoided in the absence of such combination, operation or use; or (vii) Buyer's use of the goods in any manner inconsistent with SPX FLOW's written materials regarding the use of such product. In addition, the foregoing warranty shall not include any labor, dismantling, re-installation, transportation or access costs, or other expense associated with the repair or replacement of SPX FLOW goods. 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, ANY PERFORMANCE OR PROCESS OUTCOME DESIRED BY THE BUYER AND NOT SPECIFICALLY AGREED TO BY SPX FLOW. THE FOREGOING REPAIR, REPLACEMENT AND REPERFORMANCE 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

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

⚠ WARNING

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

⚠ CAUTION

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

Care of Component Materials

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

⚠ WARNING

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

Stainless Steel Corrosion

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

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

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

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

Elastomer Seal Replacement Following Passivation

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

Introduction

General Information

For control top information, please refer to publication 95-03083 (W-Series 2-piece), H326406 (CU4 AS-i), and H323871 (CU4 Direct Connect). For additional product information, please see our website at <http://www.spxflow.com/en/waukesha-cherry-burrell/resources/product-literature/>.

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.

Factory Inspection

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

Specifications

Materials

- Body and disc: 316L Stainless Steel, 32 Ra I.D. finish
- Seals: EPDM
FKM
Silicone

Equipment Serial Number

For Waukesha Cherry-Burrell brand valves with actuators, the valves are identified by a serial number found on the label on the actuator cylinder. Valves with a manual handle are not labeled with a serial number.

Operating Parameters

Temperature Range

The recommended operating temperature is determined by the material used for the seals. See “Seal Compatibility” on page 9.

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.

Pressure Range

Max pressure: 150 psi (10 bar)

| Pneumatic Actuator Air Requirements | |
|--|---|
| Opening angle of valve: | 90° |
| Min. air pressure for actuator: | 87 psi (6 bar) |
| Max. air pressure for actuator: | 145 psi (10 bar) |
| Air connection (for hose): | 1/4" (6 mm) Polyflo™ tube |
| Elbow union - G1/8" (swivel-mounted): | Tightening torque 1.5 ft-lb (2 N-m) |
| Compressed air: | Quality class according to DIN/ISO 8573-1 |
| Content of solid particles: | Quality Class 3. Max. size of solid particles per m ³ : 10000 of 0.5 µm <d<1.0µm; 500 of 1.0 µm <d<5.0 µm |
| Content of water: | Quality Class 4. Max. dew point temperature +3°C (37.4°F); installations at lower temperatures or higher altitudes may require adjustments to reduce the dew point accordingly. |

| Seal Compatibility | | | |
|--------------------------------------|---|--|--|
| | EPDM Seals | Fluorelastomer (FKM) Seals | Silicone Seals |
| Thermal Range of Application: | 0°F to 200°F (-18°C to 93°C) | 32°F to 200°F (0°C to 93°C) | 32°F to 200°F (0°C to 93°C) |
| Chemical Resistance: | Silicone oil and grease | Silicone oil and grease | Oils and fats |
| | Ozone, aging and weather resistant | Ozone, aging and weather resistant | Dry heat |
| | Hot water and steam up to 275°F (135°C) | Oils and fats | |
| | Many organic and inorganic acids | Aliphatic, chlorinated and aromatic hydrocarbons | |
| | Cleaning agents, soda and potassium alkalis | | |
| | Many polar solvents (alcohols, ketones, esters) | | |
| | | | |
| Not compatible with: | Mineral oil products (oils, greases and fuels) | Superheated steam | Hot water and steam |
| | | Formic and acetic acids | Most petroleum oils |
| | | | Ketones (MEK and acetone) |
| | | | Hot acids (especially nitric and ethanoic) |
| | | | Dynamic applications |

Contact SPX FLOW Application Engineering for other fluid compatibility.

EPDM, FKM and Silicone seals comply with FDA regulations.

Installation

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 a minimum of 87 psi (6 bar) and a maximum of 145 psi (10 bar).

Flow Direction

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

Pipeline Support

As a general rule, support pipelines in such a way that they "float." This is particularly important when lines contain automatic valves. Temperature changes in the lines may cause expansion and contraction that can distort valve bodies, causing leaks. Contact SPX FLOW at 1-800-252-5200 for more information on our wide variety of fittings for all applications.

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

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

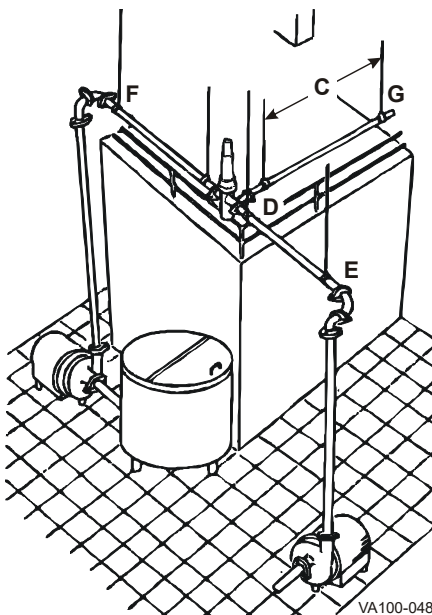


Figure 1 - Pipeline Support

CAUTION

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

Maintenance

Maintenance Intervals

Maintain adequate stock of replacement parts.

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

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

Inspection

Inspect the following on a regular basis:

- Valve body gaskets and ball seats
- 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 as than noted in the disassembly and assembly procedures. (Use food grade non-petroleum (silicone) grease on seals and o-rings.)

Apply Bostik Never-Seez® White Food Grade with PTFE or equivalent to all bolts and as noted in disassembly and assembly procedures.

Disassembly and Maintenance

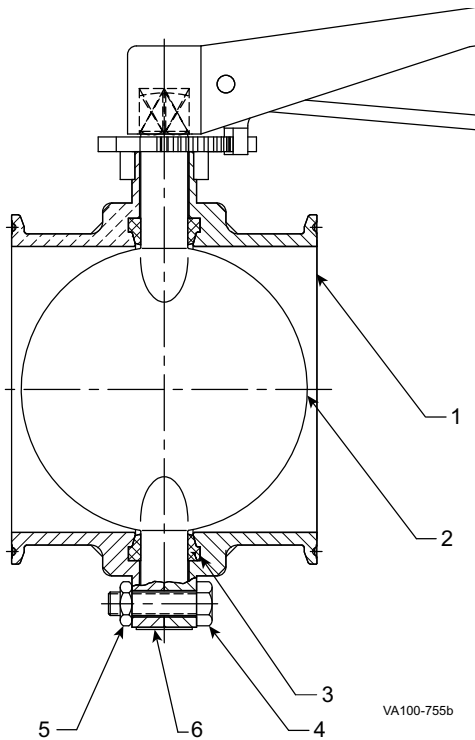


Figure 2 - 200 Series Valve

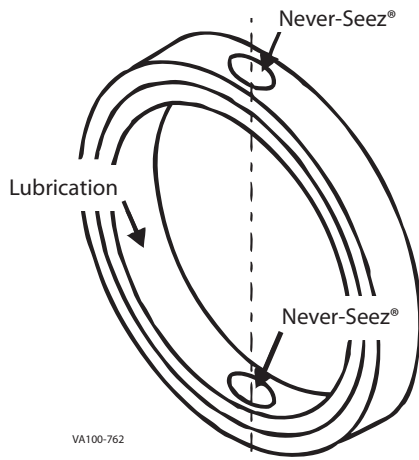


Figure 3 - Seal Lubrication

Valve Disassembly and Seal Replacement

1. Drain and flush the piping surrounding the valve.
2. To remove the handle, remove the socket head cap screw found at the top of the valve handle with the proper sized allen wrench.

NOTE: For proper removal of the actuator, see "Mounting a Linear Actuator" on page 13; disassembly is in reverse order of these instructions.

3. Remove the nuts and cap screw (items 4 and 5).
4. Separate the valve body halves (item 1).
5. Set the butterfly disc (item 2) to the open position.
6. Squeeze the seal (item 3) until oval shaped, then slide the short end of the stem from the seal.
7. Pinch the disc (item 2) between the thumb and forefinger, and pull the long end of the stem from the seal.
8. Check for a cracked or worn seal (item 3), stem and disc (item 2), or screw threads. Clean the valve disc and valve body (item 1) if necessary.
9. When inserting new seal, lubricate the inside diameter of the seal and apply Bostik Never-Seez® White Food Grade with PTFE or equivalent to the holes in the seal as shown in Figure 3.

10. To reassemble, reverse the steps above.

Reverse Valve Action (Manual Handle Only)

1. Remove the socket head cap screw found at the top of the valve handle.
2. Remove the handle from atop the valve spider by lifting straight up.
3. With the valve handle in hand, rotate the handle 90 degrees to the left or right, then replace the handle.
4. Replace the socket head cap screw and tighten.

NOTE: The tighter the cap screw, the greater the pressure needed to turn the valve handle.

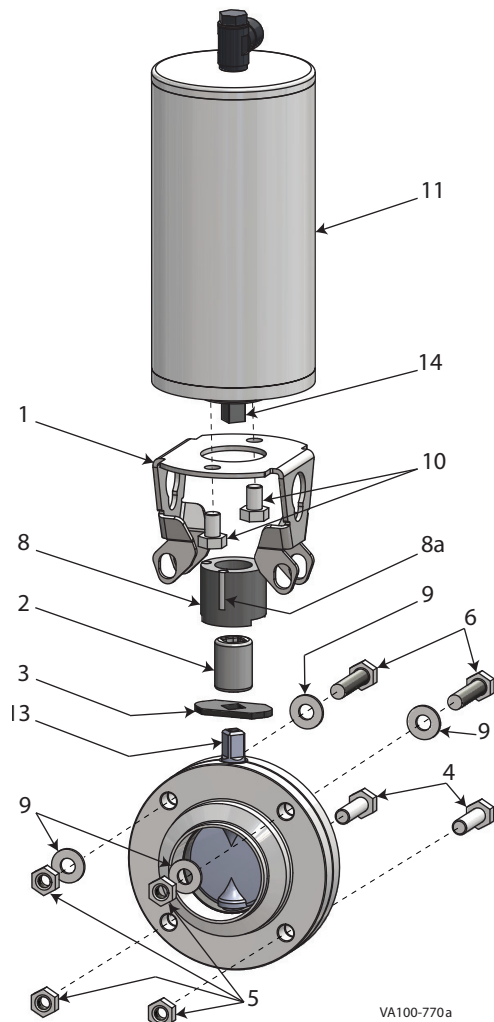


Figure 4 - Mounting Linear Adapter

NOTE: 1/2" - 4" size valve shown; 6" valve has 6 bolts/nuts.

Mounting a Linear Actuator

1. Remove the handle nut and handle from the butterfly valve as described on page 12, under Valve Disassembly and Seal Replacement, step 2.
2. See Figure 4. Determine the actuator and valve shaft orientation (normally closed or normally open). Slide the position indicator (item 3) onto the valve shaft (item 13) to align with the valve disc (item 7).
3. Place the adapter/coupling (item 2) and feedback cam (item 8) onto the valve shaft (item 13) to align with the position indicator (item 3). Ensure that the metal pins (item 8a) of the feedback cam (item 8) are oriented correctly for valves with yoke prox. sensors. (See Figure 5 for assembled valve with proximity switch (item 12).)
4. Slide the top of the yoke/bracket (item 1) over the actuator shaft (item 14) and attach it to the actuator (item 11) with actuator bolts (item 10).
5. Place the actuator with the yoke/bracket over the assembly created in step 3, align the actuator shaft (item 14) with the adapter/coupling (item 2), and fasten the bottom of the yoke/bracket to the valve (item 7) using the valve bolts (item 6) and valve nuts (item 5).

NOTE: The valve nuts (item 5) and bottom two valve bolts (item 4) are re-used from the manual valve (item 7); it is only the two top valve bolts (item 6) that replace the existing top two bolts on the manual valve.

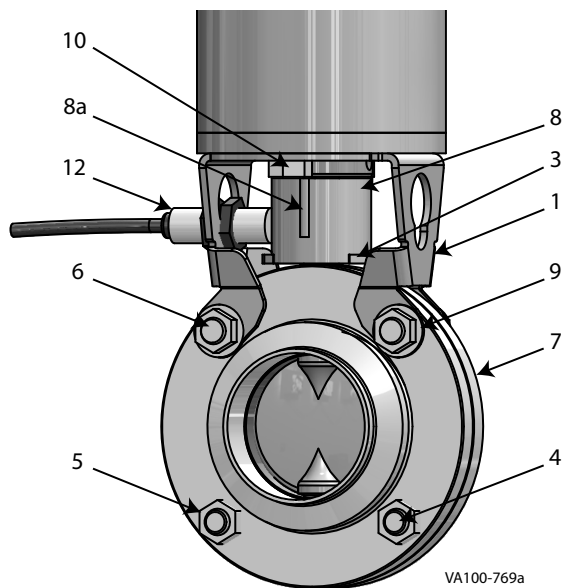
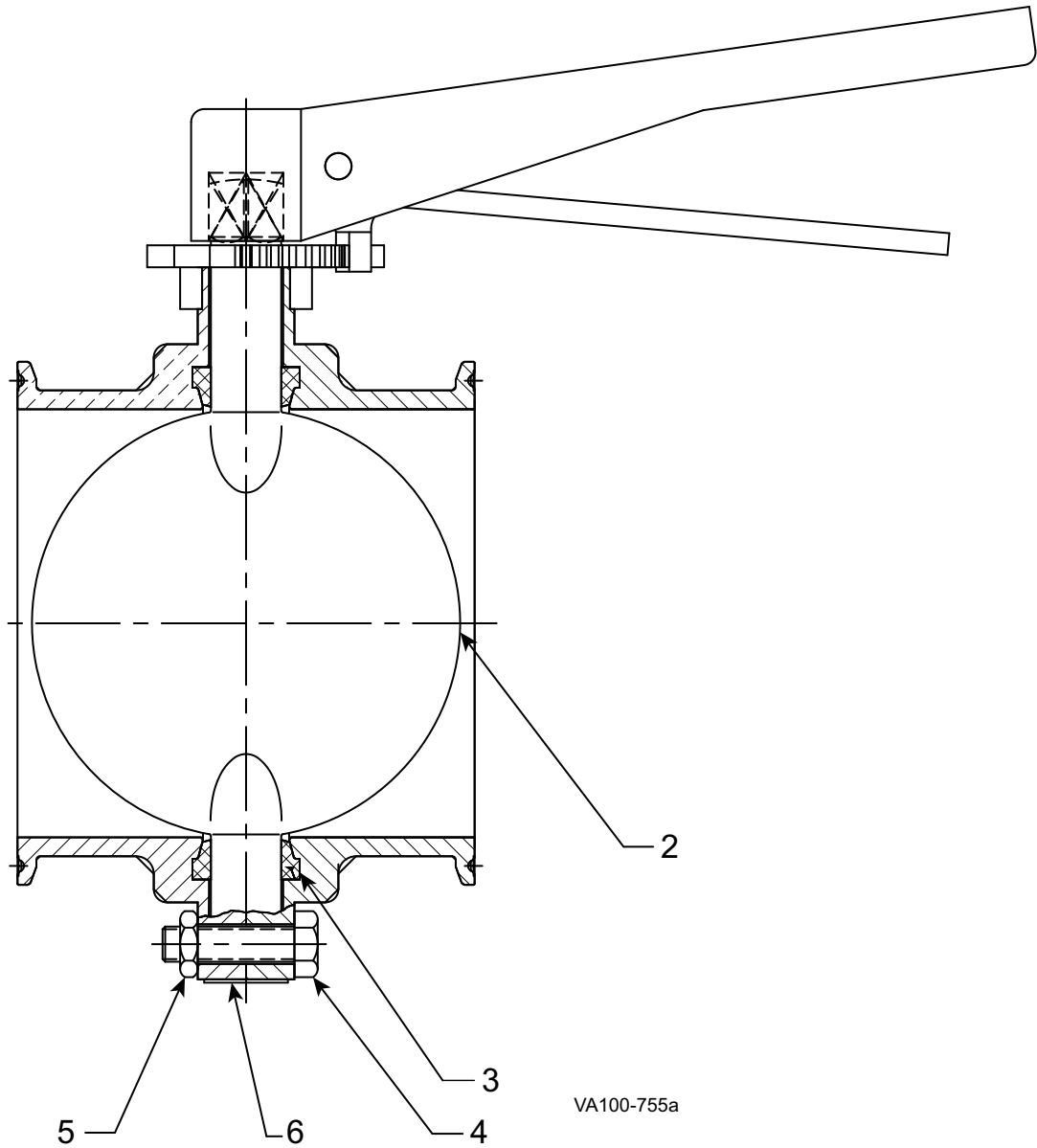


Figure 5 - Assembled valve with proximity sensor

NOTE: Two proximity switches can be used; only one is shown in Figure 5.

Parts Lists

200-Series Manual Butterfly Valve



Valve shown with Intermediate Step (9-Position) handle. For handle part numbers, see "Manual Handles" on page 17.

200-Series Manual Butterfly Valve

| Item | Part Description | Valve Size | | | |
|------|------------------------------------|-------------|----------|----------|----------|
| | | 1/2 & 3/4" | 1" | 1 1/2" | 2" |
| * 2 | Valve Disc 316SS | POA | 3028545+ | 3028546+ | 3028547+ |
| * 3 | Seal seat EPDM (black w/green dot) | POA | 3028464+ | 3028465+ | 3028466+ |
| | Silicone (gray, no dot) | POA | 3028470+ | 3028471+ | 3028472+ |
| | FKM (brown w/white dot) | POA | 20-265 | 20-266 | 20-267 |
| 4 | Valve bolts, M8 (qty. 4) | POA | 30-634 | 30-635 | 30-635 |
| 5 | Valve nuts (qty. 4) | 36-136 [M8] | | | |
| 6 | Plug | N/A | N/A | N/A | N/A |

| Item | Part Description | Valve Size | | | |
|------|---|-------------|----------|----------|----------|
| | | 2 1/2" | 3" | 4" | 6" |
| * 2 | Valve Disc 316SS | 3028548+ | 3028549+ | 3029543+ | 3029697+ |
| * 3 | Seal seat EPDM (black w/green dot) | 3028467+ | 3028468+ | 3028469+ | 3029549+ |
| | Silicone (gray, no dot) | 3028473+ | 3028474+ | 3028475+ | 3029548+ |
| | FKM (brown w/white dot) | 20-268 | 20-269 | 20-270 | 20-279 |
| 4 | Valve bolts (qty. 4 for 1/2" - 4"; qty. 6 for 6") | 30-635 | | | 30-637 |
| 5 | Valve nuts, (qty. 4 for 1/2"- 4"; qty. 6 for 6") | 36-136 [M8] | | | 36-137 |
| 6 | Plug | N/A | N/A | N/A | N/A |

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Notes:

* Spare Part

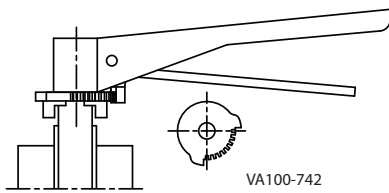
1. Quantity required is 1 unless otherwise noted.

200 Series Butterfly Valve Assemblies

| Complete (Assembled) Valve With 9-Position Handle | | | |
|--|------------------|---------------|-----------------|
| Valve size | Seal Type | S-Line | Buttweld |
| 1/2" | EPDM | WM20001707 | WM20001547 |
| | FKM | WM20001674 | WM20001548 |
| | Silicone | POA | POA |
| 3/4" | EPDM | WM20001380 | WM20002430 |
| | FKM | WM20001675 | WM20001569 |
| | Silicone | POA | POA |
| 1" | EPDM | WM20000022 | WM20000064 |
| | FKM | WM20000036 | WM20000078 |
| | Silicone | POA | POA |
| 1 1/2" | EPDM | WM20000023 | WM20000065 |
| | FKM | WM20000037 | WM20000079 |
| | Silicone | POA | POA |
| 2" | EPDM | WM20000024 | WM20000066 |
| | FKM | WM20000038 | WM20000080 |
| | Silicone | POA | POA |
| 2 1/2" | EPDM | WM20000025 | WM20000067 |
| | FKM | WM20000039 | WM20000081 |
| | Silicone | POA | POA |
| 3" | EPDM | WM20000026 | WM20000068 |
| | FKM | WM20000040 | WM20000082 |
| | Silicone | POA | POA |
| 4" | EPDM | WM20000027 | WM20000069 |
| | FKM | WM20000041 | WM20000083 |
| | Silicone | POA | POA |
| 6" | EPDM | WM20000028 | WM20000070 |
| | FKM | WM20000042 | WM20000084 |
| | Silicone | POA | POA |

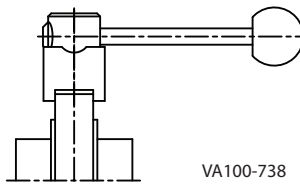
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Manual Handles



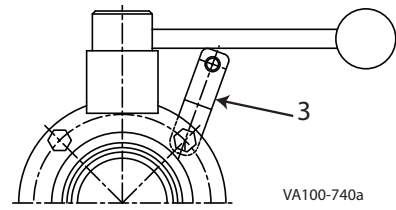
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1. Intermediate Step (9-Position) Handle



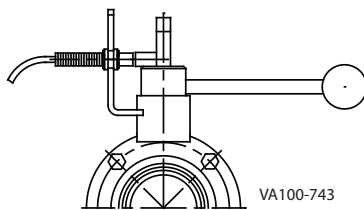
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2. Pull-Style Handle

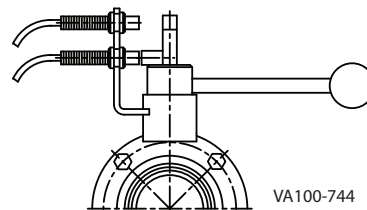


VA100-740a

3. Padlock Travel Stop Bracket for use with Pull-Style Handle (item 4) (See note 1)



VA100-743



VA100-744

4. Pull-Style Handle with bracket for Proximity Switch(es) (See note 2)

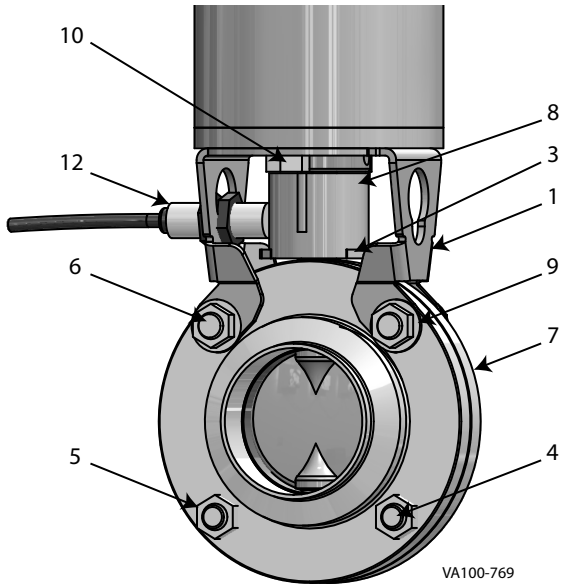
| Item | Part Description | Valve size | | | | |
|------|--|-------------|----------------|----------|----------|----------|
| | | 1/2" & 3/4" | 1" thru 2 1/2" | 3" | 4" | 6" |
| 1 | Intermediate Step (9-position) Handle | 3029869+ | | 3029870+ | 3029871+ | 3029881+ |
| 2 | Pull-Style Handle | 3029860+ | | 3029861+ | 3029862+ | N/A |
| 3 | Padlock Bracket for Pull-Style Handle (note 1) | N/A | 3029864+ | | | N/A |
| 4 | Pull-Style Handle with Bracket (for Prox. Switch(es) (note 2)) | N/A | 3029876+ | 3029875+ | N/A | N/A |

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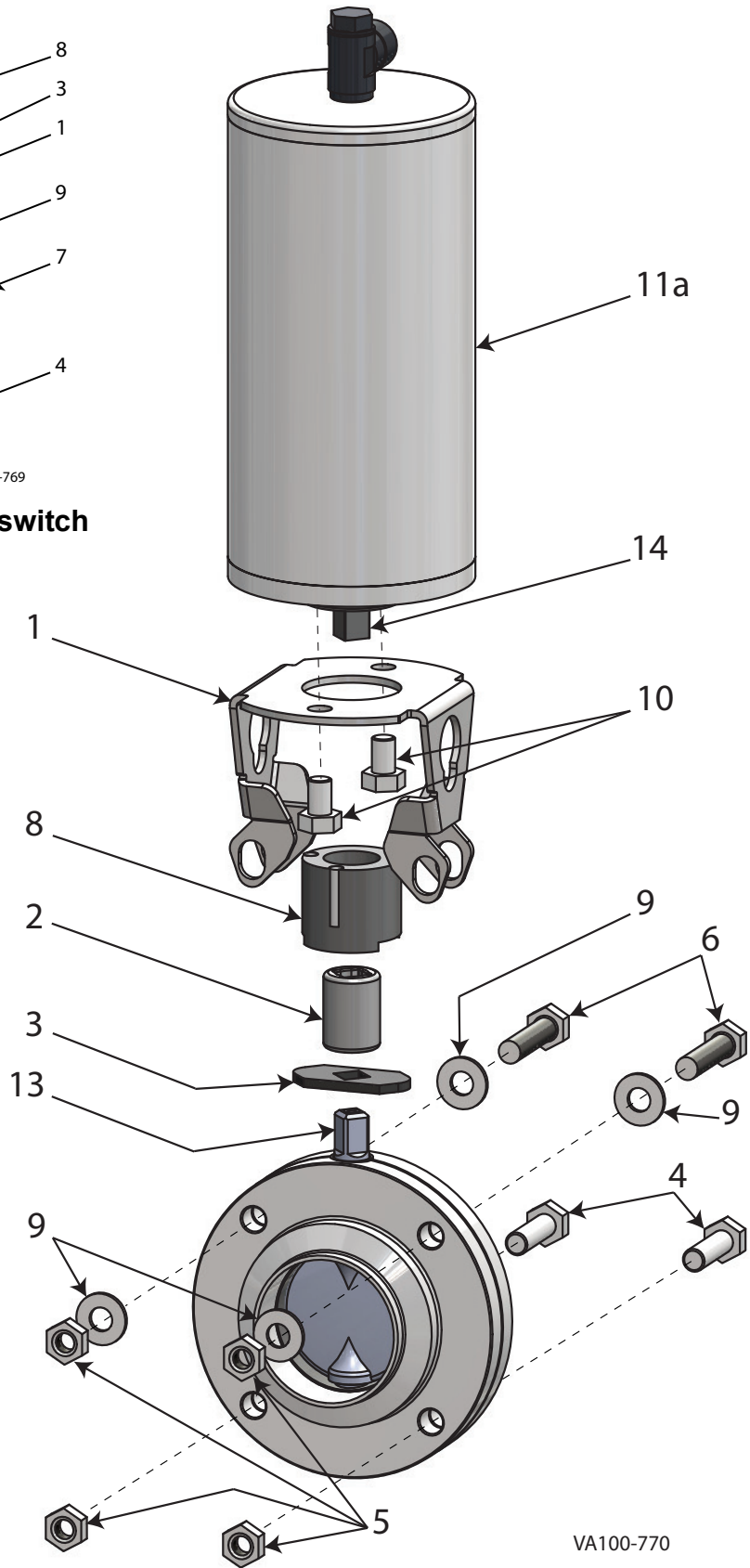
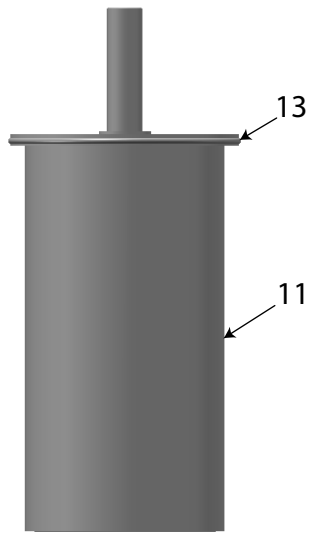
Notes:

1. Padlock bracket is not included with the handle. Pull-Style Handle (item 2) and Padlock Bracket (item 3) must be ordered separately (Padlock not included). Field modification is required to weld the bracket to the valve body.
2. Proximity switches are not included with the handle.

Linear Actuator



As assembled, with proximity switch



Linear Actuator

| Item | Part Description | Qty | Valve Size | | |
|------|--|-----|--|-------------------------|---------|
| | | | 1/2", 3/4", 1", 1 1/2", 2", 2 1/2", 3" | 4" | 6" |
| * 1 | Yoke/Bracket | 1 | available in kit | | |
| * 2 | Adapter/Coupling | 1 | available in kit | | |
| * 3 | Indicator | 1 | available in kit | | |
| 4 | Valve Bolts (see notes 2 and 3) | 2 | 30-635 (M8 x 30 mm) | 30-637 (M10 x 40 mm) | |
| 5 | Valve Nuts (see notes 2 and 3) | 4 | 36-136 (M8) | 36-137 (M10) | |
| * 6 | Valve Bolts | 2 | available in kit | | |
| 7 | Manual Valve | 1 | See note 1 | | |
| * 8 | Feedback Cam with pins | 1 | available in kit | | |
| * 9 | Washers | 4 | available in kit | | |
| * 10 | Actuator Bolts | 2 | available in kit | | |
| 11 | Actuator (Air/Air) for control unit | 1 | H328357 | | H328358 |
| | Actuator (Air/Spring) for control unit | | H203918 | | H328353 |
| 11a | Actuator (Air/Air) | | H328360 | | H328361 |
| | Actuator (Air/Spring) | | H203917 | | H328355 |
| 12 | Proximity Switch, M12 threaded | 1 | 17-73 | | |
| 13 | O-ring (for use with item 11) | 1 | H143352 | | |

PL5027-CH184

Notes:

- * Available only as a complete yoke/bracket kit.
- 1. See "200 Series Butterfly Valve Assemblies" on page 16.
- 2. Re-used from Manual valve assembly.
- 3. 6" valve (not shown) has quantity 4 valve bolts (item 4) and quantity 6 Valve nuts (item 5).

Yoke/Bracket Kit

(contains items above marked with *)

| Valve Size | | | | | | |
|----------------|---------|---------|---------|---------|---------|---------|
| 1/2", 3/4", 1" | 1 1/2" | 2" | 2 1/2" | 3" | 4" | 6" |
| H328292 | H328293 | H327174 | H328294 | H328577 | H328578 | H328579 |

PL5027-CH184a

Notes

200 Series Butterfly Valve

MANUAL AND PNEUMATIC ACTUATORS



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