SPX
WHERE IDEAS MEET INDUSTRY

INSTRUCTION MANUAL

200 Series Butterfly Valve

MANUAL AND PNEUMATIC ACTUATORS

FORM NO.: 95-03096 REVISION: 10/2012

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

Waukesha Cherry-Burrell

SPX Flow Technology
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@spx.com
Web site: www.spxft.com

Revision Date: 10/2012

Publication: 95-03096

Warranty

Seller warrants its products to be free from defect in materials and workmanship for a period of one (1) year from the date of shipment. This warranty shall not apply to products which require repair or replacement due to normal wear and tear or to products which are subjected to accident, misuse or improper maintenance. This warranty extends only to the original Buyer. Products manufactured by others but furnished by Seller are exempted from this warranty and are limited to the original manufacturer's warranty.

Seller's sole obligation under this warranty shall be to repair or replace any products that Seller determines, in its discretion, to be defective. Seller reserves the right either to inspect the products in the field or to request their prepaid return to Seller. Seller shall not be responsible for any transportation charges, duty, taxes, freight, labor or other costs. The cost of removing and/or installing products which have been repaired or replaced shall be at Buyer's expense.

Seller expressly disclaims all other warranties, express or implied, including without limitation any warranty of merchantability of fitness for a particular purpose. The foregoing sets forth Seller's entire and exclusive liability, and Buyer's exclusive and sole remedy, for any claim of damages in connection with the sale of products. In no event shall Seller be liable for any special consequential incidental or indirect damages (including without limitation attorney's fees and expenses), nor shall Seller be liable for any loss of profit or material arising out of or relating to the sale or operation of the products based on contract, tort (including negligence), strict liability or otherwise.

Shipping Damage or Loss

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

Warranty Claim

Warranty claims must have a **Returned Goods Authorization (RGA)** from the Seller before returns will be accepted.

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

Safety

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

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

1. Occupational Safety and Health Administration (OSHA), Title 29 of the CFR
   Section 1910.212- General Requirements for all Machines
2. National Fire Protection Association, ANSI/NFPA 79
   ANSI/NFPA 79- Electrical Standards for Industrial Machinery
3. National Electrical Code, ANSI/NFPA 70
   ANSI/NFPA 70- National Electrical Code
   ANSI/NFPA 70E- Electrical Safety Requirement for Employee Workplaces
4. American National Standards Institute, Section B11

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

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

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

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

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

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

DANGER: *marked with a stop sign.*
Immediate hazards which WILL result in severe personal injury or death.

WARNING: *marked with a warning triangle.*
Hazards or unsafe practices which COULD result in severe personal injury or death.

CAUTION: *marked with a warning triangle.*
Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

Care of Stainless Steel

Stainless Steel Corrosion

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

Corrosion pitting, rusting and stress cracks may occur due to chemical attack. Use only cleaning chemicals specified by a reputable chemical manufacturer for use with 300 series stainless steel. Do not use excessive concentrations, temperatures or exposure times. Avoid contact with highly corrosive acids such as hydrofluoric, hydrochloric or sulfuric. Also avoid prolonged contact with chloride-containing chemicals, especially in presence of acid. If chlorine-based sanitizers are used, such as sodium hypochlorite (bleach), do not exceed concentrations of 150 ppm available chlorine, do not exceed contact time of 20 minutes, and do not exceed temperatures of 104°F (40°C).

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

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

Elastomer Seal Replacement Following Passivation

Passivation chemicals can damage product contact areas of 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 web site at http://www.spx.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 Waukesha Cherry-Burrell. Waukesha Cherry-Burrell products are subject to intensive intermediate and final leakage and functional tests.

Factory Inspection

Each Waukesha Cherry-Burrell 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 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 “” 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 m3: 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.

Valve Torque Requirements					
Valve Size (in.)	**Minimum torque required to rotate valve ft-lbs (N-m)**			**Cv value**	**Recommended actuator size in (mm)**
	EPDM	**Silicone**	**Viton**		
.5	N/A	N/A	N/A	N/A	3 (80)
.75	N/A	N/A	N/A	N/A	
1	11.1 (15.05)	14.8 (20.07)	18.4 (24.95)	22	
1.5	14.8 (20.07)	18.4 (24.95)	22.2 (30.1)	66	
2	14.8 (20.07)	18.4 (24.95)	22.2 (30.1)	132	
2.5	18.5 (25.08)	22.2 (30.1)	25.9 (35.12)	254	
3	25.8 (34.98)	29.5 (40)	33.2 (45.01)	358	
4	33.2 (45.01)	36.9 (50.03)	40.6 (55.05)	809	5 (125)
6	36.9 (50.03)	40.6 (55.05)	44.3 (60.06)	N/A	

Actuator Torque Requirements				
Air Pressure psig (bar)	**Torque, Air-to-Spring ft-lb (N-m)**		**Torque, Air-to-Air ft-lb (N-m)**	
	3" (80 mm) Actuator	**5" (125 mm) Actuator**	**3" (80 mm) Actuator**	**5" (125 mm) Actuator**
90 (6)	17.7 (24)	47.9 (65)	22.1 (30)	62.7 (85)

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 WCB 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 150 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 WCB 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).

⚠ ***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.*

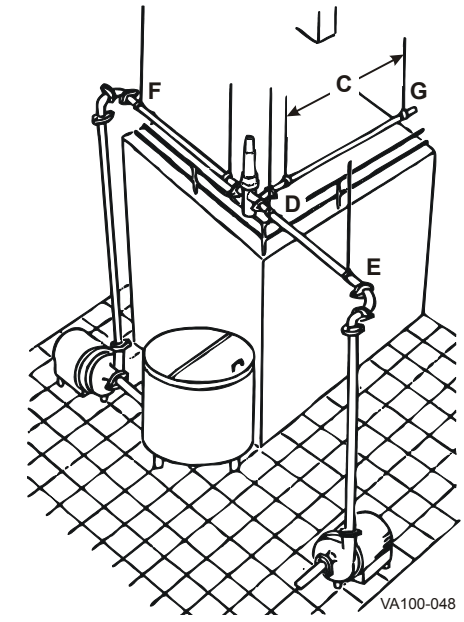


Figure 1 - Pipeline Support

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

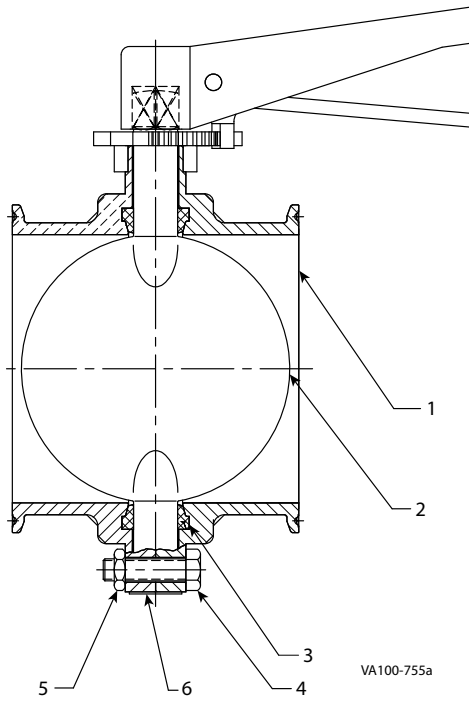


Figure 2 - 200 Series Valve

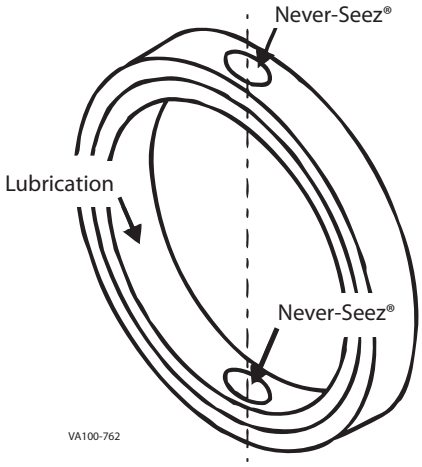


Figure 3 - Seal Lubrication

Valve Disassembly and Seal Replacement

1. Drain and flush the piping surrounding the valve.
2. To remove the handle, remove the socket head capscrew 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 capscrews (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 capscrew 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 capscrew and tighten.

NOTE: *The tighter the capscrew, the greater the pressure needed to turn the valve handle.*

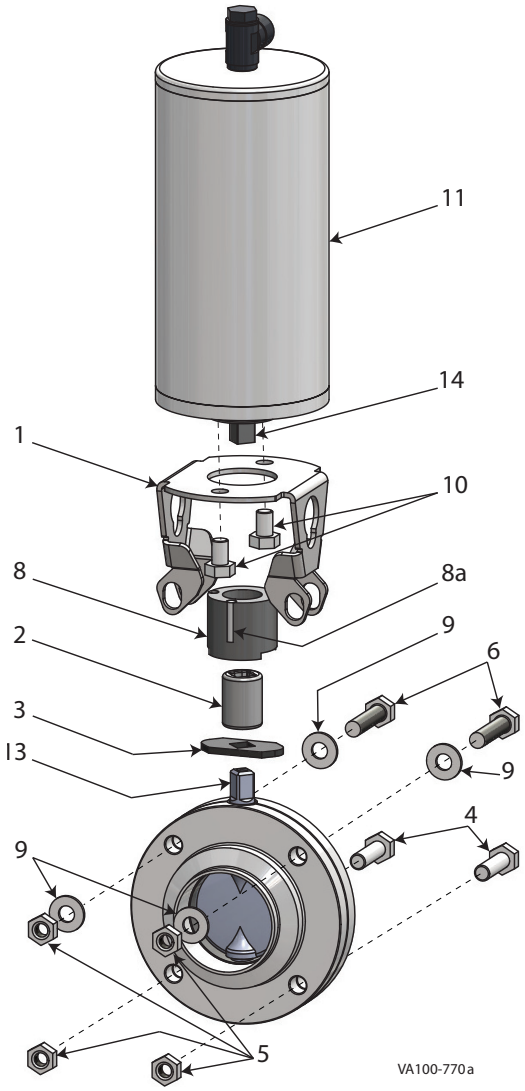


Figure 4 - Mounting Linear Adapter

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.*

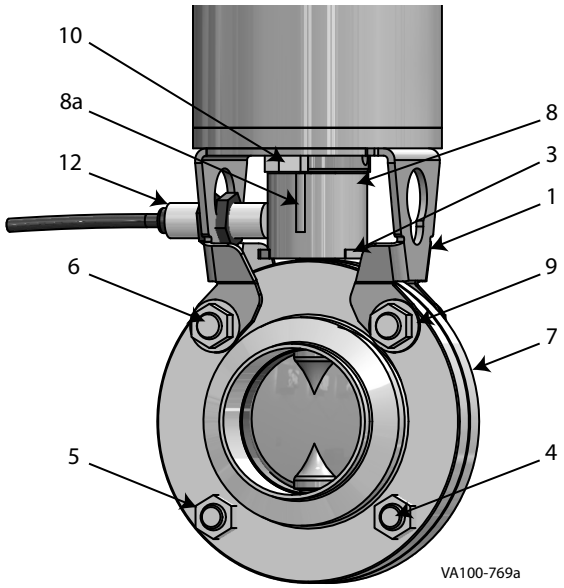
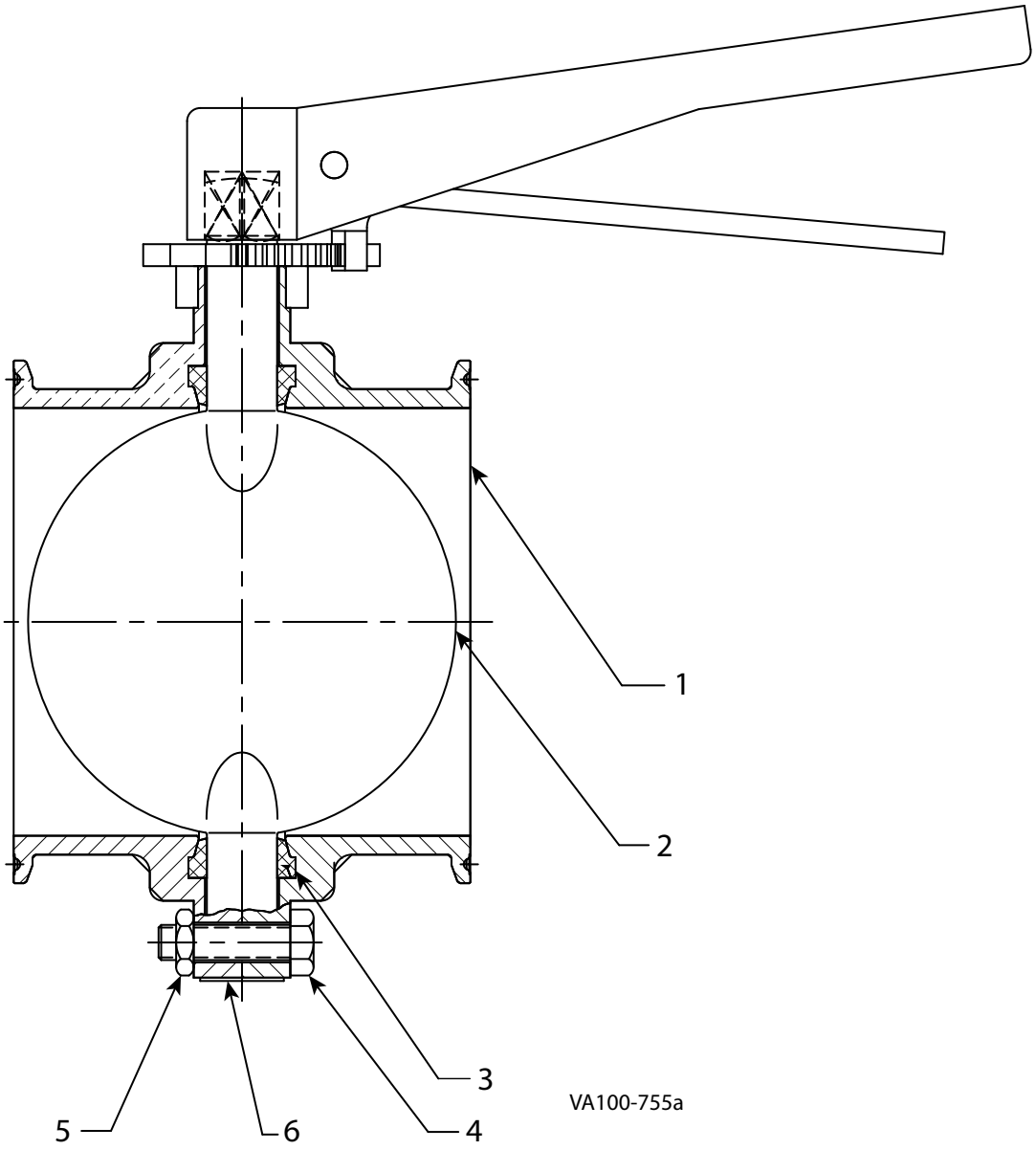


Figure 5 - Assembled valve with proximity sensor

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"
*	1	**Valve body** (see note 1) **316SS**	POA	POA	3029493+	3029494+	3029495+
*	2	**Valve Disc 316SS**	POA	POA	3028545+	3028546+	3028547+
*	3	**Seal seat EPDM (black)**	POA	POA	3028464+	3028465+	3028466+
		Silicone (white/gray)	POA	POA	3028470+	3028471+	3028472+
		FKM (black w/green dot)	POA	POA	20-265	20-266	20-267
	4	Valve bolts, M8 (qty. 4)	POA	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	N/A

	Item #	Part Description	Valve Size			
			2 1/2"	3"	4"	6"
*	1	**Valve body** (see note 1) **316SS**	3029496+	3029497+	3029498+	N/A
*	2	**Valve Disc 316SS**	3028548+	3028549+	3029543+	3029697+
*	3	**Seal seat EPDM (black)**	3028467+	3028468+	3028469+	3029549+
		Silicone (white/gray)	3028473+	3028474+	3028475+	3029548+
		FKM (black w/green dot)	20-268	20-269	20-270	20-279
	4	Valve bolts (qty. 4 for 1/2" - 4"; qty. 6 for 6" valves)	30-635			30-637
	5	Valve nuts, (qty. 4 for 1/2"- 4"; qty. 6 for 6" valves)	36-136 [M8]			36-137
	6	Plug	N/A	N/A	N/A	N/A

Notes:

PL5027-CH166

*** Spare Part**

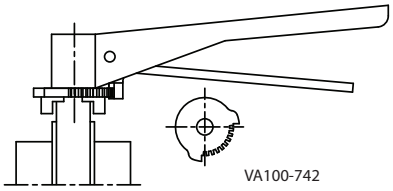
1. Valve body includes (2) symmetrical housing halves
2. Valve body, disc, seat, bolts, nuts, and plug are provided by supplier all in one package, but can be ordered as separate spares with the above part numbers.
3. Quantity required is 1 unless otherwise noted.

200 Series Butterfly Valve Assemblies

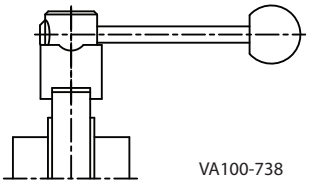
Complete (Assembled) Valve With 9-Position Handle			
Valve size	**Seal Type**	**S-Line**	**Buttweld**
1/2"	EPDM	WM20001707	WM20001547
	FKM	WM20001674	WM20001548
	Silicone	POA	POA
3/4"	EPDM	WM20001380	WM20002430
	FKM	WM20001675	WM20001569
	Silicone	POA	POA
1"	EPDM	WM20000022	WM20000064
	FKM	WM20000036	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

PL5027-CH183

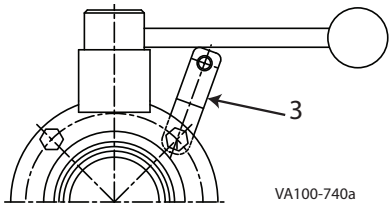
Manual Handles



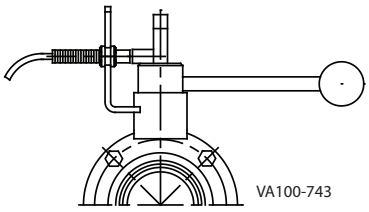
1. Intermediate Step (9-Position) Handle

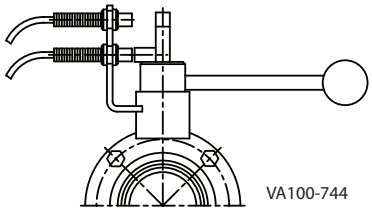


2. Pull-Style Handle



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





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

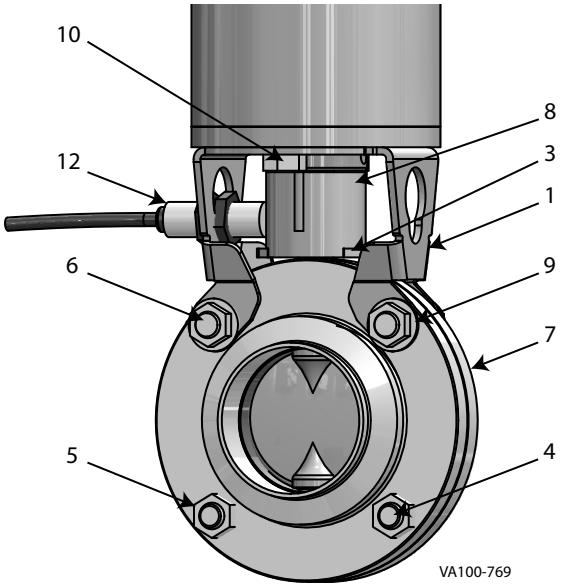
Item #	Part Description	1/2"	3/4"	1" thru 2 1/2"	3"	4"	6"
1	Intermediate Step (9-position) Handle	3029869+			3029870+	3029871+	3029881+
2	Pull-Style Handle	3029860+			3029861+	3029862+	N/A
3	Padlock Bracket for Pull-Style Handle (note 1)	N/A	N/A	3029864+			N/A
4	Pull-Style Handle with Bracket (for Prox.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

PL5027-CH167

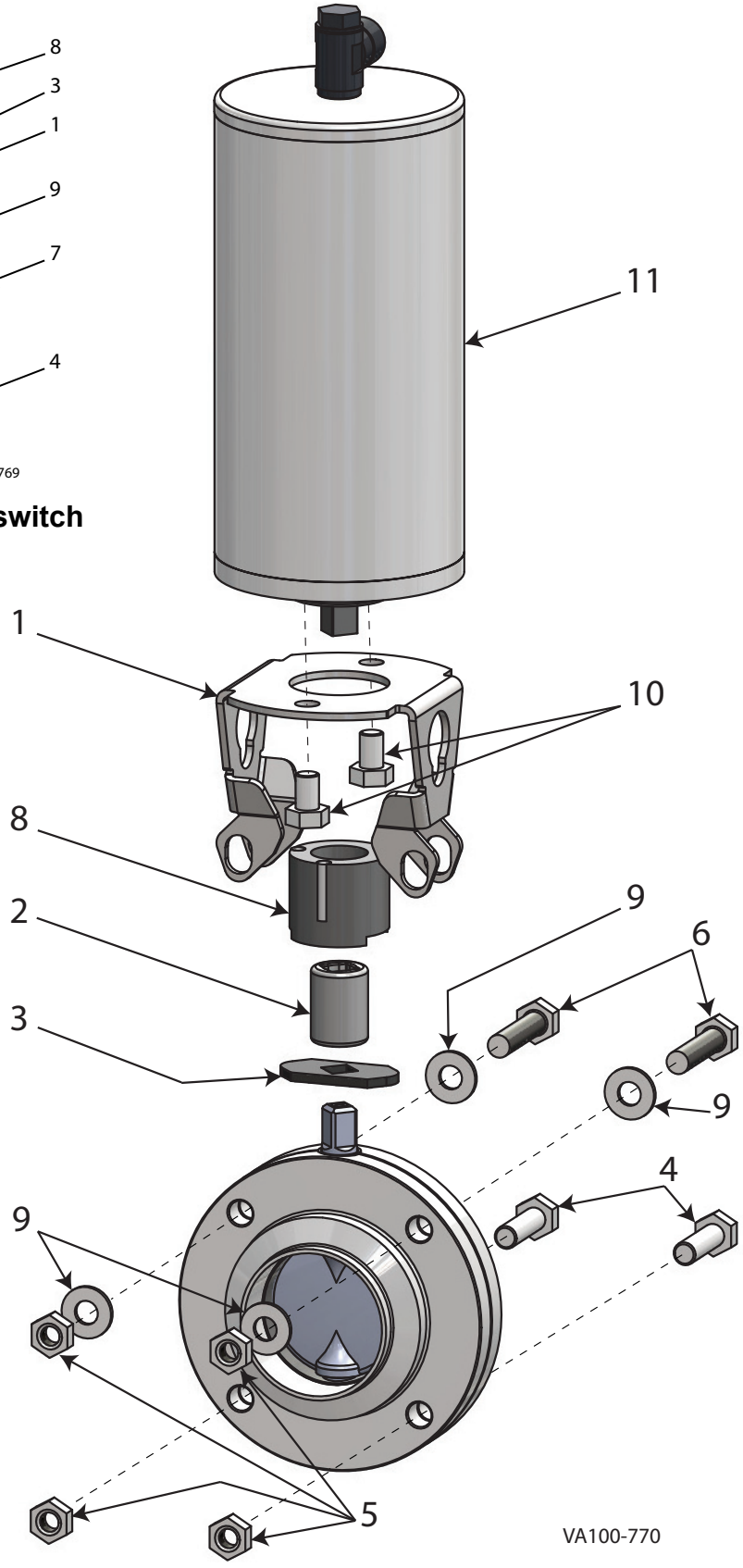
Notes:

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	H328289	H328290	H325093	H328291	H328574	H328575	H328576
*	2	Adapter/Coupling	1	H327176					H328950	H329224
*	3	Indicator	1	H14634					H329221	H329222
	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	H78791 (M8 x 35 mm)					H78790 (M8 x 40 mm)	30-638 (M10 x 50 mm)
	7	Manual Valve	1	See note 1						
*	8	Feedback Cam with pins	1	132118+					132119+	132120+
*	9	Washers	4	H79594						POA
*	10	Actuator Bolts	2	M8 x 12 mm					M10 x 14mm	
	11	Actuator (Air/Air) with control unit, polished	1	H328357					H328358	
		Actuator (Air/Spring) with control unit, polished		H203918					H328353	
		Actuator (Air/Air) without control unit, polished		H328360					H328361	
		Actuator (Air/Spring) without control unit, polished		H203917					H328355	
	12	Proximity Switch, M12 threaded	1	H317438						

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

Notes:

PL5027-CH184

* Included in Yoke/Bracket Kit

1. See "200 Series Butterfly Valve Assemblies" page.
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).

Notes

200 Series Butterfly Valve

MANUAL AND PNEUMATIC ACTUATORS

WHERE IDEAS MEET INDUSTRY

SPX FLOW TECHNOLOGY
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@spx.com

ISSUED: 10/2012