

# "Apollo"®



## **INSTALLATION, OPERATION & MAINTENANCE MANUAL**

3/4" & 1" Spill Resistant Pressure Vacuum Breaker (SVB) Backflow Preventer

**SVB4A | SVBLF4A**

ES1604 IOM BFMMSVB4A rev.a

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## **I. DESCRIPTION AND OPERATION**

The Apollo® SVB4A Series Spill-resistant Vacuum Breaker consists of a replaceable check valve cartridge and an atmospheric vent bonnet/float assembly between two resilient seated shut-off valves. The modular design allows for unprecedented ease of inspection and maintenance.

During normal flow conditions, the check valve remains open and the float seals on the bonnet assembly. The valve is designed to shut the float before the check valve opens, a minimum supply pressure of 10 psig is normally required to achieve flow through the assembly. As the line pressure falls to 1 psig, the spring loaded atmospheric vent valve opens, breaking the vacuum and preventing back-siphonage.

## **II. INSTALLATION**

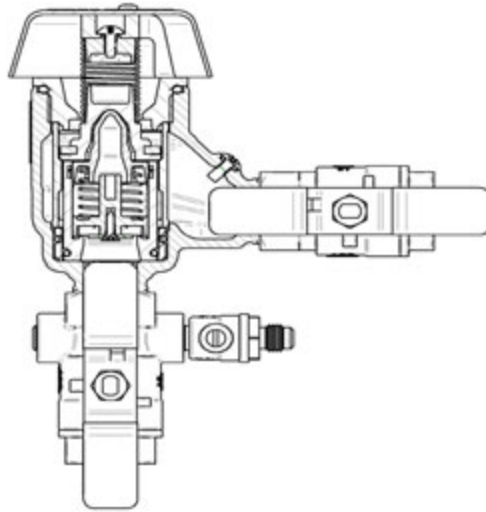
The Spill-resistant Vacuum Breaker assembly's critical level (CL is marked in raised lettering on the body of the SVB) should be installed at least 12 inches above the highest piping or outlet downstream of the device and with the supply line connected to the bottom of the device. Install the device in an accessible location to facilitate periodic field-testing and any required maintenance. Contact local water authorities for installation/service requirements.

Flush upstream piping thoroughly to remove foreign matter prior to installation. Use pipe dope sparingly on external threads only. Spill-resistant Vacuum Breakers are designed to shut the air inlet before the check valve opens, precluding water spillage. However, any fouling of the SVB's internals may allow spillage and thus the SVB should be installed where possible water spillage is not objectionable. If the water supply has the possibility to contain material which could foul the SVB it is highly recommended that the optional strainer be installed upstream of the inlet shut-off valve.

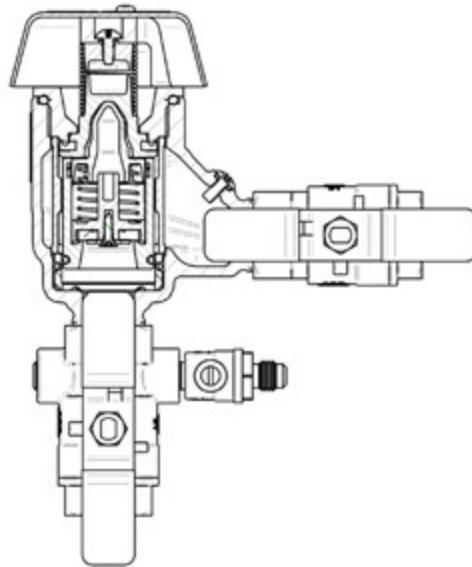
To winterize the valve:

1. Secure the water source at a location that will not freeze.
2. Open the test cock and the vent screw to drain the SVB as much as practicable.
3. Place the inlet and outlet ball valves in the halfway open/shut position.
4. If possible, blow the lines clear with pressurized air.
5. If equipped with union ball valves, remove the assembly.

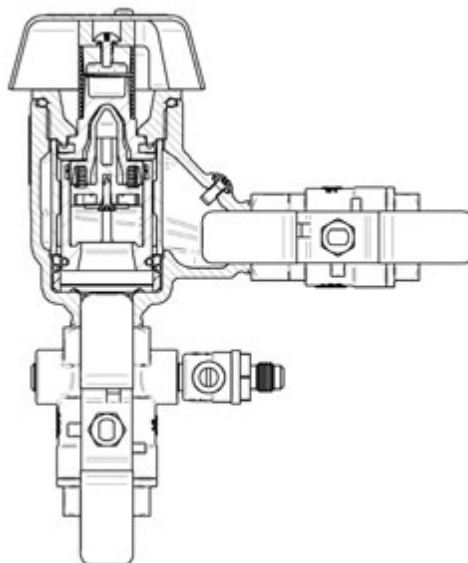
**FIGURE 1  
(DEPRESSURIZED)**



**FIGURE 2  
(PRESSURIZED, NO FLOW)**



**FIGURE 3  
(FLOWING)**



**III. TROUBLESHOOTING**

SYMPTOM	CAUSE	CORRECTIVE ACTION
Atmospheric vent valve fails to open as gauge drops to 0.0 psig.	<ol style="list-style-type: none"> <li>1. Air Inlet stuck to seat.</li> <li>2. Air Inlet spring damaged or missing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean vent seat and replace disc.</li> <li>2. Check and/or replace spring.</li> </ol>
Atmospheric vent fails to shut before check valve opens.	<ol style="list-style-type: none"> <li>1. Check O-ring damaged or bushing surface is dirty.</li> <li>2. Initial start-up supply pressure applied too rapidly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect and/or replace check O-ring and bushing surface.</li> <li>2. Open supply pressure valve slowly. Do not water hammer.</li> </ol>
Check valve fails to hold 1 psig.	<ol style="list-style-type: none"> <li>1. Check valve fouled with debris.</li> <li>2. Check valve seat damage.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove, clean, and/or replace check valve.</li> <li>2. Replace seat</li> </ol>

**IV. MAINTENANCE INSTRUCTIONS**

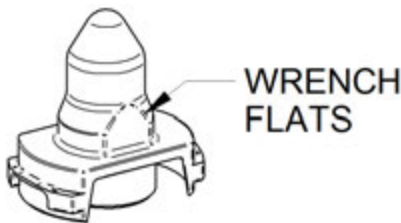
**A. DISASSEMBLY**

1. Shut the #2 shut-off valve, then the #1 shut-off valve.
2. Bleed pressure from the device by opening the test cock and the bleed screw.
3. Remove the air inlet canopy by loosening the two screws, rotating the canopy to the left, and lifting up.
4. Unscrew and remove the bonnet, float assembly and float spring. **DO NOT USE THE CANOPY TO UNSCREW BONNET! DAMAGE TO THE CANOPY MAY OCCUR!** If the float rubber disc appears worn or damaged peel it off of the float.
5. Remove the check guide and the check. The check may be grabbed with fingers and gently rocked back and forth to pull it out. **DO NOT USE PLIERS OR OTHER TOOLS WHICH MAY DAMAGE OR SCRATCH PLASTIC COMPONENTS!**
6. It is normally not necessary to remove the bushing. Should its removal be necessary there are 4 semi-circle notches in the bottom to place a hook under. Pull up a little bit under each notch going around to each one in turn until the bushing is free.



**CAUTION: TAKE CARE TO NOT SCRATCH OR DAMAGE THE COATING OR THE INTERIOR SURFACE OF THE BUSHING!**

7. To disassemble the check, hold the check in one hand and turn the spring retainer with an adjustable wrench using the two flats. Ensure the wrench is adjusted snugly to the flats to preclude rounding the edges of the post on the spring retainer. As the spring retainer rotation approaches 90°, its retaining tabs will lose engagement with the seat and if not constrained the spring retainer and spring will be ejected.

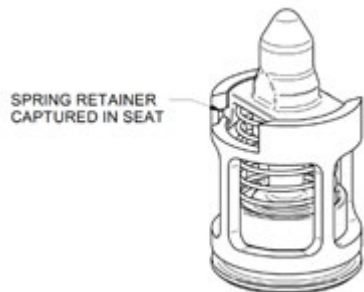


8. Remove the spring and poppet from the check seat.
9. Inspect the rubber seat disc in the poppet for wear or damage. To remove the seat disc, hold the poppet assembly in one hand and remove the screw, retaining washer and the seat disc.
10. Remove the vent screw and inspect the vent screw O-ring.
11. All parts should be carefully inspected for any damage or excessive wear and thoroughly rinsed in clean potable water prior to reassembly. Replace worn parts as necessary.

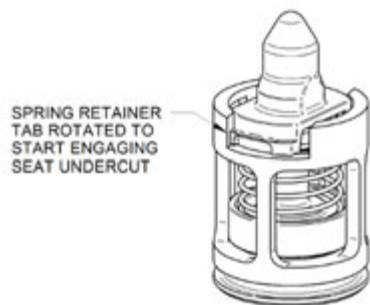
## IV. MAINTENANCE INSTRUCTIONS

### B. ASSEMBLY

1. If the bushing was removed, install the new O-ring and lubricate with Apollo supplied lubricant, DOW 111, or equal. Line up the bushing with the bore with the notches facing down and push into place.
2. If the rubber seat disc was removed, place a new disc in the poppet and secure with the washer and screw.
3. Place and center the poppet assembly in the seat.
4. Install the spring onto the poppet, ensure it is centered inside the pocket on top of the poppet.
5. Install the spring retainer onto the spring and push it compressing the spring until the spring retainer tabs butt up to the seat. Rotate the spring retainer until the tabs starts to engage the undercut of the seat and resistance to turning is felt.



6. While holding the spring retainer in the seat to prevent rotation, use an adjustable wrench to continue turning the spring retainer until it locks into the undercut in the seat, which is after about 90° of total rotation. Ensure the wrench is adjusted snugly to the flats to preclude rounding the edges of the post on the spring retainer. When properly locked into place the spring retainer will be able to rotate easily by hand several degrees before heavier resistance is felt.



7. Replace the O-ring on the check seat and lubricate with Apollo supplied lubricant, DOW 111, or equal. Insert the check module assembly into the bushing until it is fully inserted.
8. Install the check guide, ensure it is centered and sitting square on top of the bushing.
9. Install the new float rubber disc on the float and set the float on top of the post on the check spring retainer.
10. Apply a thin coat of Apollo supplied lubricant, DOW 111, or equal, to the bonnet O-ring, screw the bonnet into the valve body.
11. Apply a thin coat of Apollo supplied lubricant, DOW 111, or equal, to the vent screw O-ring and screw the vent screw into the body.
12. Test the device to ensure proper installation.
13. Install the air inlet canopy, tighten the screws.

## V. TESTING PROCEDURES

**Equipment Required:** Differential Pressure Test Kits 40-200-TKU or 40-200 TK5U.

**NOTE:** *These procedures may or may not be approved in all jurisdictions. Consult your local water purveyor for acceptable test procedures.*

### TEST SETUP

1. Obtain permission to shut off the water supply.
2. Determine the direction of flow.
3. Identify and "blow out" the test cock.
4. All test kit valves are closed.

**IMPORTANT:** THE TEST KIT AND HOSE MUST BE HELD AT THE SAME LEVEL AS THE SVB DURING TESTS 1 AND 2.

#### TEST NO. 1

**Requirement:** The air inlet shall open when the inlet pressure is no less than 1.0 psi above atmospheric pressure and the outlet pressure is at atmospheric pressure. The air inlet shall be fully open when the inlet pressure is atmospheric.

1. If not already removed, remove the air inlet canopy.
2. Bleed water through the test cock and vent screw to eliminate foreign material. Shut both.
3. Attach the high side hose to the test cock, open the test cock, and bleed air from the hose and gauge by opening the high side bleed valve. Shut the high side bleed valve.
4. Shut No. 2 shutoff valve, then shut No. 1 shutoff valve.
5. Open the vent screw to lower the outlet pressure to atmospheric. Slowly open the high side bleed valve. Record the pressure reading on the gauge when the air inlet opens. The reading must be 1.0 psi or greater. Continue to reduce pressure to 0.0 psi. The air inlet must be completely open.

#### TEST NO. 2

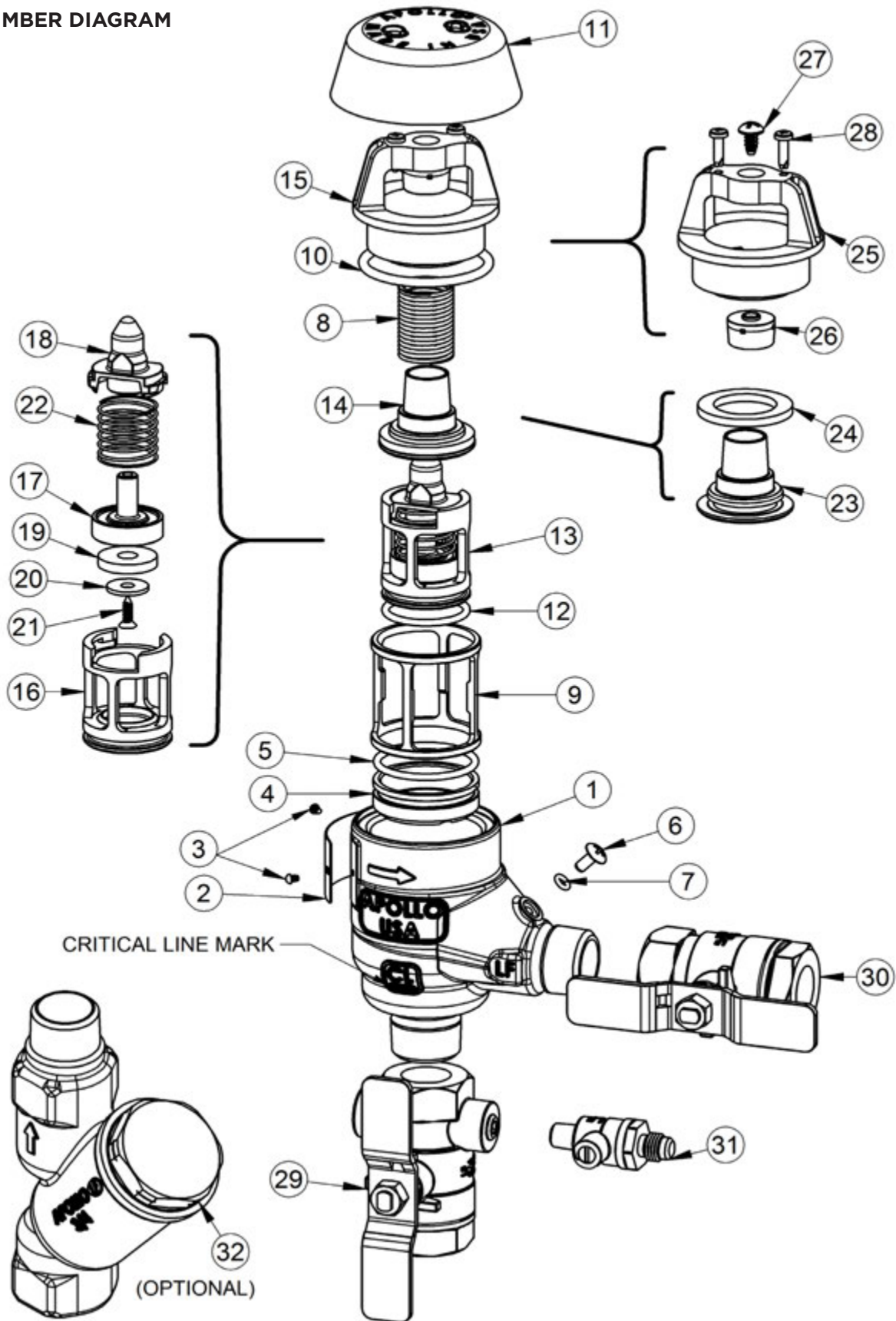
**Requirement:** The static pressure drop across the check valve must be at least 1.0 psi.

1. Crack open No.1 shutoff valve (No. 2 shutoff remains shut from Test No. 1) to pressurize the SVB. Shut the vent screw and the high side bleed valve after the air is purged. Shut shutoff valve No. 1.
2. Open the vent screw. Allow water to stop flowing through the vent screw. Record the gauge reading. This gauge reading must be 1.0 psi or greater.
3. Shut the test cock and the vent screw. Remove the test equipment and drain it.
4. Open the No. 1 shutoff valve, then No. 2 shutoff valve.
5. Replace the air inlet canopy.

# INSTALLATION, OPERATION & MAINTENANCE MANUAL

## PART NUMBER DIAGRAM

FIGURE 4





**SVB4A/SVBLF4A PARTS LIST**

ITEM #	DESCRIPTION	QTY.	PART NUMBER	
			3/4"	1"
1	Body	1	Consult Factory	
2	Label Plate	1	Consult Factory	
3	Label Plate Tacks	2	I-2614-00	
4	Bushing	1	I-9542-15	I-9543-15
5	Bushing O-ring	1	D-5277-00	D-5033-00
6	Vent Screw	1	B-3254-00	
7	Vent Screw O-ring	1	D-3294-00	
8	Float Spring	1	A-2594-00	A-2595-00
9	Check Guide	1	F-4154-00	F-4155-00
10	Bonnet O-ring	1	D-4812-00	D-4883-00
11	Canopy	1	F-3842-00	F-3838-00
12	Check Module O-ring	1	D-5279-00	D-5280-00
13	Check Module S-Assy (See Below)	1	W-9906-05	W-9907-05
14	Float S-Assy (See Below)	1	W-2440-05	W-2441-05
15	Bonnet S-Assy (See Below)	1	W-2437-05	W-2438-05

Individual parts are only available for bulk sales. Please refer to the appropriate repair kits.

**CHECK MODULE SUB-ASSEMBLY PARTS LIST**

ITEM #	DESCRIPTION	QTY.	PART NUMBER	
			1/2"	3/4"
16	Check Seat	1	L-7815-00	L-7727-00
17	Poppet	1	K-4491-00	K-4471-00
18	Spring Retainer	1	L-8943-00	L-8944-00
19	Seat Disc	1	D-4771-00	D-4743-00
20	Disc Retaining Washer	1	E-2372-00	E-2841-00
21	Screw	1	B-3279-00	B-1750-00
22	Spring	1	A-2573-00	A-2574-00

Individual parts are only available for bulk sales. Please refer to the appropriate repair kits.

**FLOAT SUB-ASSEMBLY PARTS LIST**

ITEM #	DESCRIPTION	QTY.	PART NUMBER	
			1/2"	3/4"
23	Float	1	K-4681-00	K-4682-00
24	Float Disc	1	D-4811-00	D-4784-00

Individual parts are only available for bulk sales. Please refer to the appropriate repair kits.

**BONNET SUB-ASSEMBLY PARTS LIST**

ITEM #	DESCRIPTION	QTY.	PART NUMBER	
			1/2"	3/4"
25	Valve Bonnet	1	F-3843-00	F-3839-00
26	Float Spring Guide	1	K-4679-00	
27	Float Spring Guide Screw	1	B-3363-00	
28	Canopy Screws	2	B-3232-00	

Individual parts are only available for bulk sales. Please refer to the appropriate repair kits.

## INLET SHUT-OFF VALVES

ITEM #	DESCRIPTION	QTY.	PART NUMBER	
			1/2"	3/4"
29	-A2 Inlet Ball Valve (Std)	1	91B-104-83	91B-105-83
29A	-A2 Inlet Ball Valve (Lead Free)		91BLF-104-83	91BLF-105-83

## REPLACEMENT HANDLES FOR BALL VALVE SHUT-OFF VALVES (-A2 OPTION)

DESCRIPTION	PART NUMBER	
	1/2"	3/4"
"T" Handle (Std)	W-3069-00	W-3070-00
"T" Handle (Lead Free)	W-3074-00	W-3075-00

*Stainless steel handles are standard on all Apollo® backflow devices.*

## OUTLET SHUT-OFF VALVES

ITEM #	DESCRIPTION	QTY.	PART NUMBER	
			1/2"	3/4"
30	-A2 Outlet Ball Valve (Std)	1	91C-104-83	91C-105-83
30A	-A2 Outlet Ball Valve (Lead Free)		91CLF-104-83	91CLF-105-83

## TEST COCK

ITEM #	DESCRIPTION	QTY.	PART NUMBER	
			1/2"	3/4"
31	Test Cock SAE (Std and Lead Free)	1	78LF-270-01	

## OPTIONAL STRAINER

ITEM #	DESCRIPTION	QTY.	PART NUMBER	
			1/2"	3/4"
32	Inlet Strainer (Std)	1	59-404-01	59-405-01
32A	Inlet Strainer (Lead Free)	1	59LF-404-01	59LF-405-01

**REPAIR KITS**

SVB COMPLETE INTERNALS KIT		QTY	SIZE	
ITEM #	REPAIR KIT MODEL NUMBER		3/4"	1"
	ORDERING NUMBER		RK4A34TSVB 4A-004-25	RK4A1TSVB 4A-005-25
not shown	O-Ring Lubricant	1	I-9016-00	
10	Bonnet O-Ring	1	D-4812-00	D-4883-00
5	Bushing O-Ring	1	D-5277-00	D-5033-00
12	Check Module O-Ring	1	D-5279-00	D-5280-00
13	Check Module S-Assy	1	W-9906-05	W-9907-05
14	Float S-Assy	1	W-2440-05	W-2441-05
8	Float Spring	1	A-2594-00	A-2595-00
9	Check Guide	1	F-4154-00	F-4155-00
4	Bushing	1	I-9542-15	I-9543-15
11	Canopy	1	F-3842-00	F-3838-00
15	Bonnet S-Assy	1	W-2437-05	W-2438-05
7	Vent Screw O-Ring	1	D-3294-00	
6	Vent Screw	1	B-3362-00	

SVB TOTAL RUBBER KIT		QTY	SIZE	
ITEM #	REPAIR KIT MODEL NUMBER		3/4"	1"
	ORDERING NUMBER		RK4A34TSVB 4A-004-25	RK4A1TSVB 4A-005-25
not shown	O-Ring Lubricant	1	I-9016-00	
10	Bonnet O-Ring	1	D-4812-00	D-4883-00
5	Bushing O-Ring	1	D-5277-00	D-5033-00
12	Check Module O-Ring	1	D-5279-00	D-5280-00
24	Float Seat Disc	1	D-4811-00	D-4784-00
19	Check Seat Disc	1	D-4771-00	D-4743-00
7	Vent Screw O-Ring	1	D-3294-00	

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**PHONE:** (704) 841-6000

**FAX:** (704) 841-6020

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