



CUSTOM COMBINATION AIR VALVE

INTRODUCTION

This manual will provide you with the information to properly install and maintain this valve to ensure a long service life. The valve has been designed with stainless steel trim to give years of trouble-free operation. The Combination Air Valve is typically mounted at the high points in a piping system and performs the functions of both an air release valve and air/vacuum valve.

The Combination Air Valve automatically vents air which accumulates at high points in a system during its operation. The valve will also exhaust and admit large quantities (volumes) of air during filling or draining operations and after emergency conditions such as a power failure. Both the air release and air/vacuum functions are needed to maintain pipeline efficiency while providing protection from adverse pressure conditions.

Note: This valve is not intended for fluids containing suspended solids such as wastewater.

CAUTION: This valve is not intended for fuel service of fluids containing suspended solids.

The valve is a float-operated, resilient-seated valve designed to handle clean fluids. The Maximum Working Pressure and Model No. are stamped on the nameplate for reference.

*bronze trim provided when specified

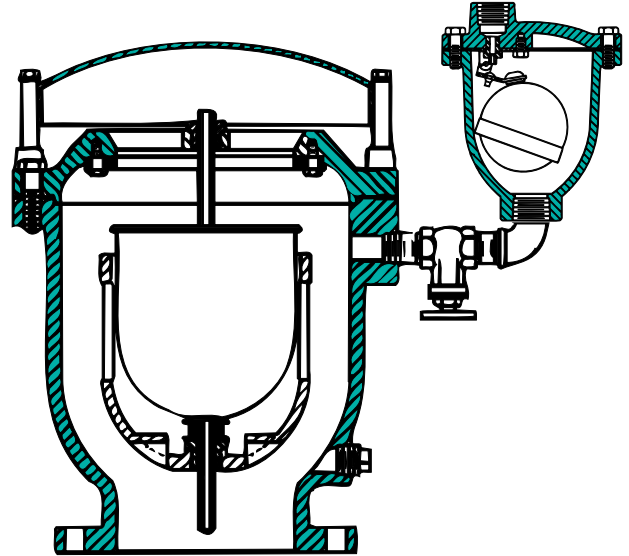


Figure 1. Custom Combination Air Valve

RECEIVING AND STORAGE

Inspect valves upon receipt for damage in shipment. Handle all valves carefully without dropping. Valves should remain boxed, clean and dry until installed to prevent weather related damage. For long term storage greater than six months, the valves must remain in the box and stored indoors. Do not expose valves to sunlight or ozone for any extended periods.

DESCRIPTION OF OPERATION

The Combination Air Valve is fully automatic and designed to continuously remove air accumulating at high points in a piping system. It also will exhaust and admit air during filling and draining of the pipeline or tank. The valve, as shipped, is a normally open valve and has three functions.

1. During System start-up, the open valve will exhaust large quantities of air until fluid enters the valve. The float will then rise and press the orifice button located in the float arm, against the plug stem and raise the plug. Pressure within the valve body will force the plug upward tightly against the seat. See Figure 2.
2. As air accumulates in the piping system and enters the valve, the float drops and the orifice button breaks contact with the plug stem. Accumulated air will vent through the plug stem. As the air is vented, the float raises once again and closes the plug stem orifice. See Figure 3.

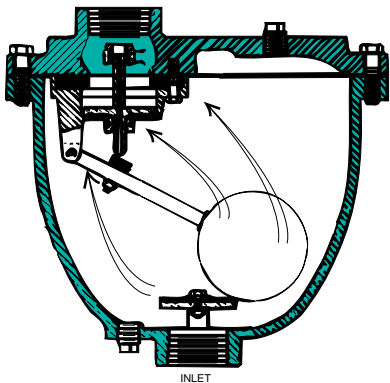


Figure 2. Air Exhausted During Pipeline Fill

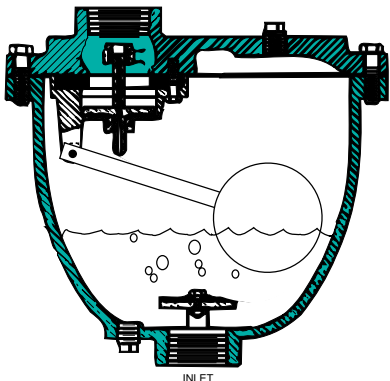


Figure 3. Accumulated Air Continuously Released

- When the system is drained, the plug will reopen allowing air to rapidly re-enter the piping system. See Figure 4.

At other times the valve is closed and under pressure as shown in Figure 5.

INSTALLATION

The installation of the valve is important for its proper operation. Valves must be installed at the system high points in the vertical position with the inlet down. For pipeline service, a vault with freeze protection, adequate screened venting, and drainage should be provided. During closure, some fluid discharge will occur so vent lines should be extended to an open drain area in plant services. A shut-off valve should be installed below the valve in the event servicing is required.

CAUTION: Installed valve with "INLET" port down or leakage will occur.

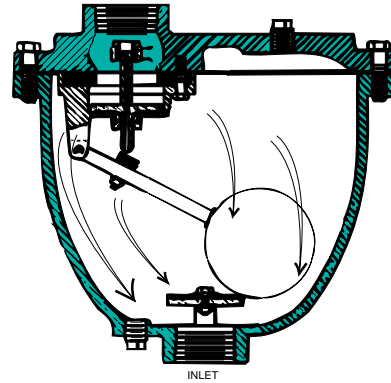


Figure 4. Air Enters During Pipeline Draining

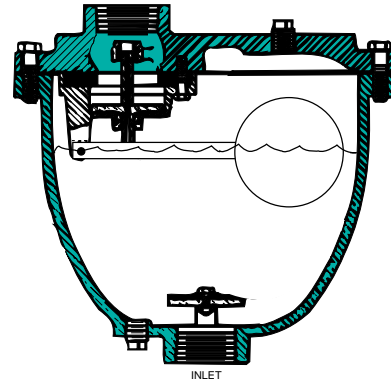


Figure 5. Pipeline Under Normal Pressure

MAINTENANCE

The Combination Air Valve requires no scheduled lubrication or maintenance.

INSPECTION: Periodic inspection to verify operation can be performed. A manual drain valve can be installed in the lower drain plug to perform this operation as shown in Figure 7.

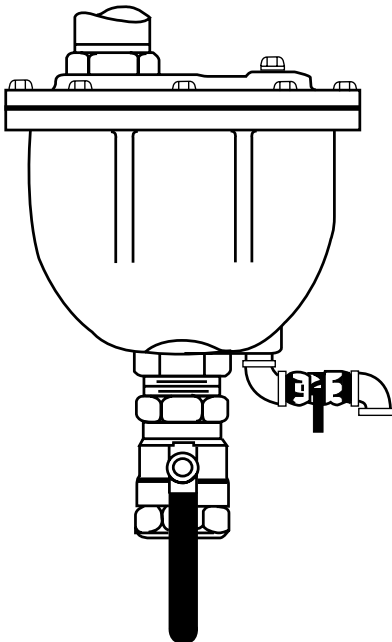


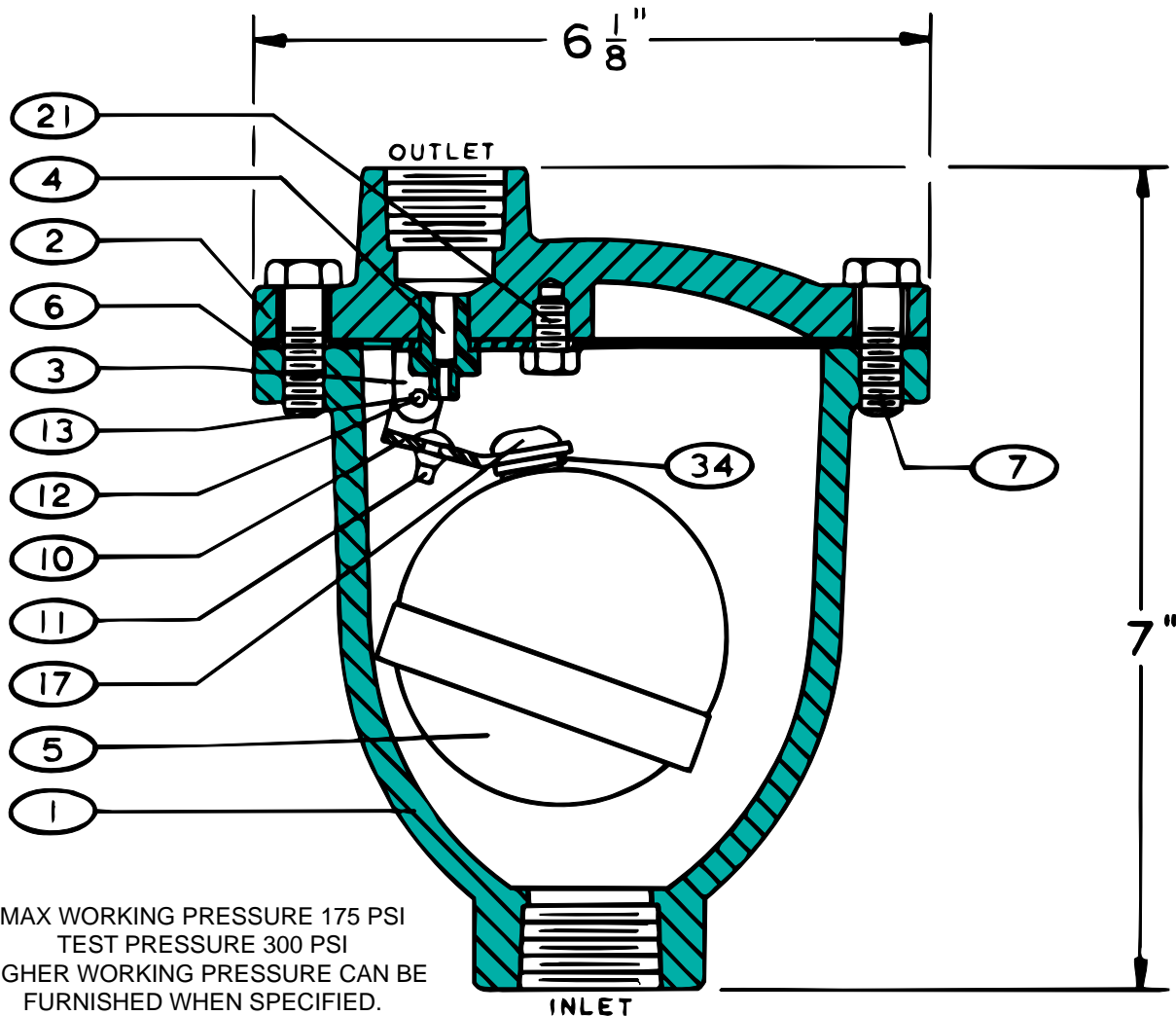
FIGURE 7. INSPECTION PIPING

- With the inlet shut-off valve open, partially open the drain valve until flow can be heard. If the air valve is working properly, water should be exhausted from the drain valve. If air is exhausted, follow steps 2-6.
- Close the inlet shut-off valve.
- Slowly open the drain valve to allow the fluid in the valve to drain. If draining is difficult, the valve may be clogged (valve requires service).
- Close the drain valve
- Slowly open the inlet shut-off valve to fill the valve with water. Observe the seating action and verify that the valve closes without leakage.
- If leakage occurs, the valve should be removed and inspected for water or possible damage from foreign matter.



Series 34

Air Release Valve – Simple Lever Type



MAX WORKING PRESSURE 175 PSI
 TEST PRESSURE 300 PSI
 HIGHER WORKING PRESSURE CAN BE
 FURNISHED WHEN SPECIFIED.

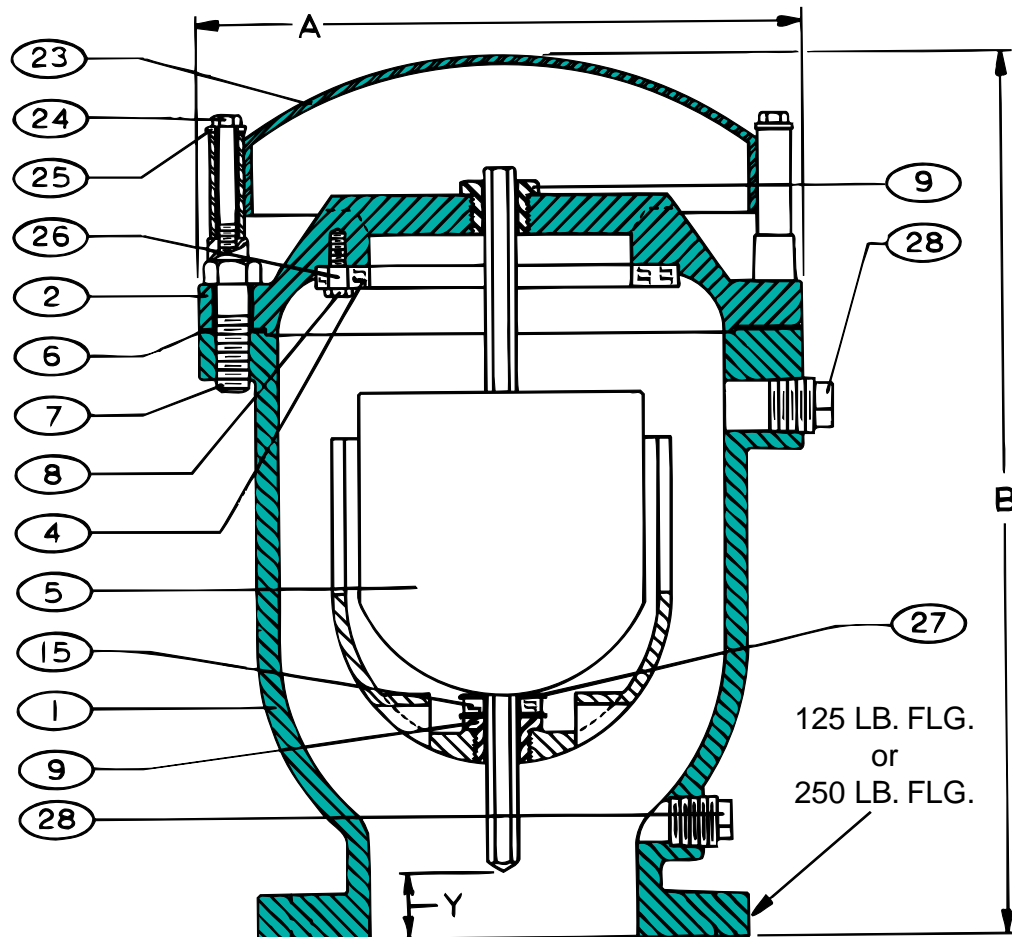
Detail No.	Part Name	Material	Detail No.	Part Name	Material
1	Body	Cast Iron ASTM A126, Class B	10	Float Arm	Stainless Steel SAE 30303
2	Cover	Cast Iron ASTM A126, Class B	11	Orifice Button	Viton - 70 Duro
3	Lever Frame	Stainless Steel T304, ASTM A240	12	Pivot Pin	Stainless Steel SAE 30303
4	Seat	Stainless Steel SAE 30303	13	Pin Retainer	Stainless Steel PH 15-7 Mo
5	Float	Stainless Steel T304, ASTM A240	17	Float Retainer	Stainless Steel T304, ASTM A276
6	Gasket	Garlock #3000 (Non-Asbestos)	21	Locator	Stainless Steel T18-8, ASTM A276
7	Cover Bolt	Alloy Steel SAE A449 Grade 5	34	Lock Washer	Stainless Steel T304, ASTM A240

Model No.			Model No.			
Valve Size	175 psi Max. W.P.	175 psi Orifice	300 psi Max. W.P.	300 psi Orifice	Inlet Size	Outlet Size
3/4"	3475AR-018	1/8"	3475-AR564.3	5/64"	3/4"	1/2" N.P.T.
1"	3410AR-018	1/8"	3410-AR564.3	5/64"	1"	1/2" N.P.T.



Series 35

Air and Vacuum Valve



Detail No.	Part Name	Material	Detail No.	Part Name	Material
1	Body	Cast Iron ASTM A126, Class B	15	Cushion	Buna - N
2	Cover	Cast Iron ASTM A126, Class B	23	Hood	Steel - #1020
4	Seat	Buna - N	24	Hood Retaining Screw	Steel (Cadmium Plated)
5	Float	Stainless Steel T304, ASTM A240	25	Washer - External	Steel (Cadmium Plated)
6	Gasket	Ilexide Nk-511 (Non-Asbestos)	26	Seat Retaining Sleeve	Stainless Steel T304, ASTM A269
7	Cover Bolt	Alloy Steel ASTM A449, Grade 5	27	Washer - Internal	Stainless Steel T303, ASTM A240
8	Retaining Screw	Stainless Steel T303, ASTM A276	28	Pipe Plug	Malleable Iron
9	Guide Bush	Stainless Steel T303, ASTM A276			

Model No	Valve Size	A	B	* Y	Inlet Size	Outlet Size
354-AV	4"	12"	17"	1 3/8"	4" FLG.	4"
356-AV	6"	14"	20"	2 1/2"	6" FLG.	6"
358-AV	8"	18"	23"	7/8"	8" FLG.	8"
3510-AV	10"	20"	26"	1"	10" FLG.	10"
3512-AV	12"	24"	31"	2 3/4"	12" FLG.	12"
3514-AV	14"	27"	34"	1 1/2"	14" FLG.	14"
3516-AV	16"	30 1/2"	34"	1 5/8"	16" FLG.	16"

OPTIONAL ARRESTOR CHECK OPERATION

Air/Vacuum Valves may be factory or field equipped with an arrestor check on the inlet port as shown in Figure 4. The function of the arrestor check is to protect the air/vacuum valve from slam shock, resulting from instant pipeline flow stoppage.

The arrestor check is normally open, allowing unrestricted flow of air in and out of the air/vacuum valve. But, when high velocity water enters the valve, the force raises the disc to its closed position and the flow of water is throttled through small ports in the disc to reduce shock closure and water hammer.

The standard valve body material is cast iron with bronze disc. General details of construction are illustrated in figure 5. The body (1) is flanged for connection to the pipeline. See page 2 for installation to the pipeline.

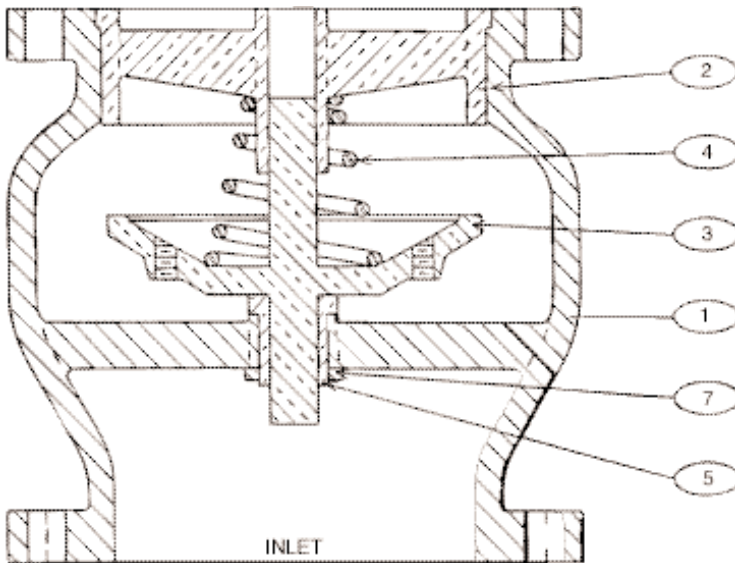


FIGURE 5. ARRESTOR CHECK

ITEM	DESCRIPTION	MATERIAL
1	Body	Cast Iron
2	Seat	Bronze
3	Disc*	Bronze
4	Spring (4" - 12")	Stainless Steel
5	Bushing	Brass
6	Seat Ret. Screw*	Stainless Steel
7	Retainer Nut*	Brass

TABLE 4. ARRESTOR CHECK PARTS LIST

* Recommended Spare Part List

MAINTENANCE: Arrestor checks require no schedule maintenance. Flow thru this valve is adjustable. should the float in the air valve slam shut due to the water flow, plug up the tapped holes of the disc with standard fastener and lockwashers until the desired non-slam is achieved.

DISASSEMBLY:

The arrestor check must be disconnected from the air vacuum valve for disassembly

WARNING: Drain the valve before unbolting the flanged or internal pressure may cause injury.

1. Close main isolation valve. Drain air/vacuum valve and remove from top of anti-slam valve. Replace gasket if damaged.
2. Unbolt air/vacuum valve and remove from top of anti-slam valve. Replace gasket if damaged.
3. Remove small seat fastener on flange face.
4. Lift seat, disc and spring from valve body. 14" and larger valves do not have spring.
5. Clean and inspect parts for wear.

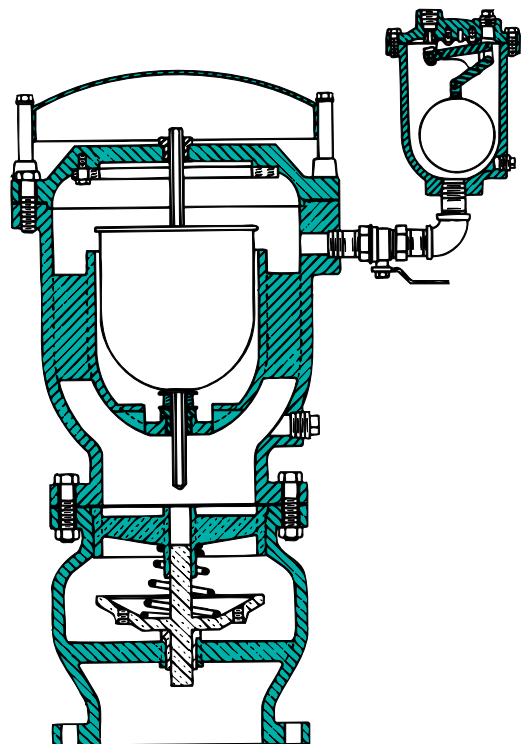
Replace parts if worn or damaged. During reassembled, tighten flange bolts with the "Max. Torque" values given in table 1.

PARTS AND SERVICE

Parts and service are available from your local representative or the factory. Make note of the valve size and model no. located on the valve nameplate and contact

CLA-VAL

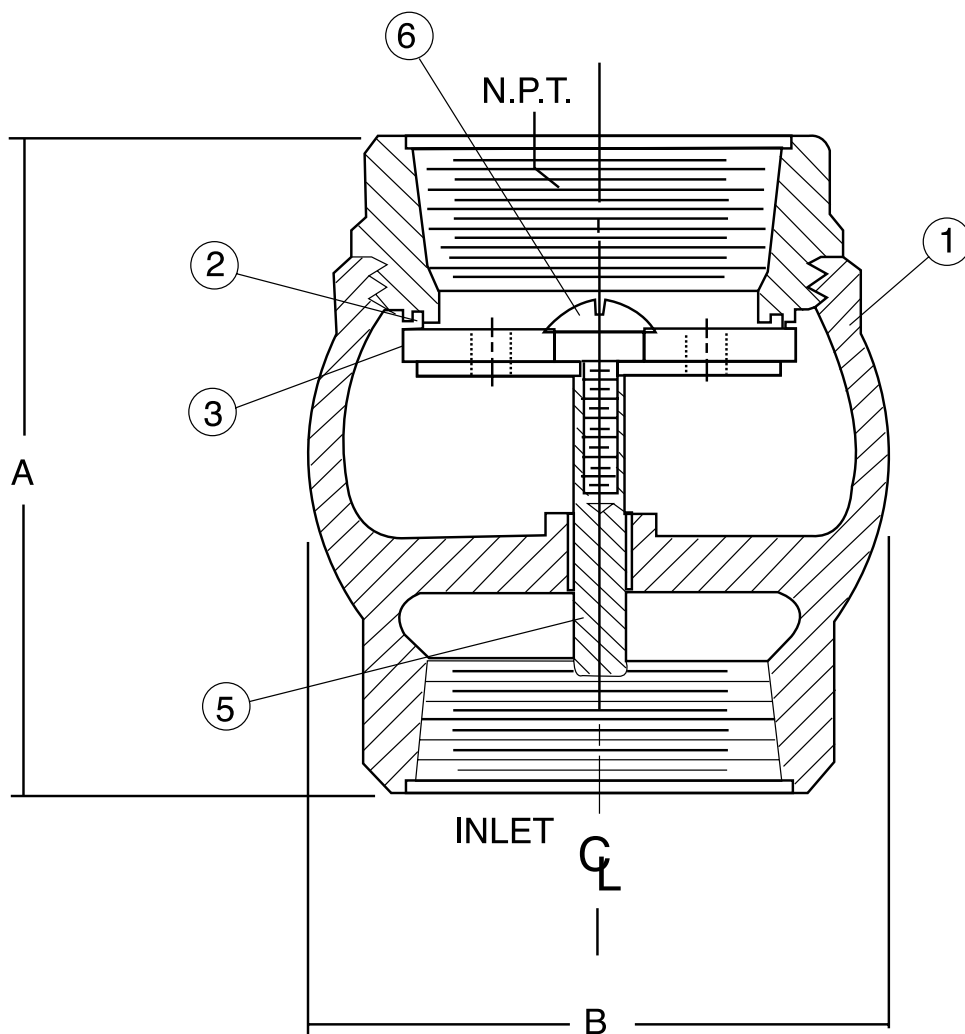
A sales representative will quote prices for parts or arrange for service as needed.





Series AC

Threaded Style Anti-Slam Device



1. Body - Bronze ASTM B.584
2. Seat - Teflon
3. Disc - Stainless Steel
4. Stem - Stainless Steel
5. Seat Screw - Stainless Steel

VALVE SIZE	Model	Size	A	B
1" N.P.T	AC01	1"	2 5/8"	2"
2" N.P.T	AC02	2"	3 3/4"	3 3/8"

COLD WORKING PRESSURE 250 P.S.I.

TROUBLESHOOTING

Several problems and solutions are presented below to assist you in troubleshooting the valve assembly in efficient manner

Leakage at Bottom Connection:

Tighten valve threaded connection. If leaks persist, remove valve and seals threads with pipe sealant or tape.

Leakage at Cover:

Tighten bolts per Table 2, replace gasket.

Valve Leaks when Closed:

Flush valve to remove debris. Disassemble and inspect seat, orifice button and float. NOTE: Many floats contain sand for weight but if water is detected replace float.

Valve not venting Air:

Check that operating pressure does not exceed Working Pressure on nameplate. Perform inspection steps 2-6 and disassemble valve if problem persists.

DISASSEMBLY

The valve can be disassembled without removing it from the pipeline. Or for convenience, the valve can be removed from the line. All work on the valve should be performed by a skilled mechanic with proper tools. No special tools are required.

CAUTION: The valve must be drained before removing the cover or pressure may be released causing injury.

1. Close inlet shut-off valve. Slowly open drain valve or remove drain plug. Remove the covers bolts (7) on the top cover.
2. Pry cover (2) loose and lift off valve body.
3. Remove the retainer ring (13) and pivot pin (12) that pass through the float arm (10).
4. To remove baffle (3), remove fasteners (8).
5. Remove locknut (18) and orifice button (11).
6. Clean and inspect parts. Note: some floats contain sand for extra weight; if water is detected, replace float. Replace worn parts as necessary and lubricate parts with FDA grease such as Lubriko #Cw-606. Remove all foreign matter from body and cover.

REASSEMBLY

All parts must be cleaned and gaskets surfaces should be cleaned with a stiff wire brush in the direction of the serrations or machine marks. Worn parts, gaskets and seal should be replaced during reassembly. Refer to Figure 6.

1. Apply Loctite Primer and 680 Compound to float threads and assemble to arm (10). Apply Loctite to bushing (9) and install into baffle (3).
2. Lay cover on flat surface with outlet faced down. Lay seat (4), plug (16), and baffle (3) over cover with screws (8) loosely engaged. Verify that plug moves up and down freely. Lift plug and drop into seat until baffle is positioned and plug contacts seat smoothly; tighten screws to 5-10 ft. lbs.
3. Screw new orifice button (11) into arm (10) with lockwasher (34) and locknut (18). Do not tighten nut at this time.

4. Connect arm (10) to baffle (3) with pivot pin (12) and retaining rings (13).
5. Adjust orifice button so that when it is in light contact with the plug stem, the arm (10) slopes away from the cover about 1/15". Lock orifice button with lock nut (18).
6. Install new cushion (15) with fastener items (29, 30, 34, & 18).
7. Lay new cover gasket on clean surface and apply a gasket compound such as Permatex #80065 to both surfaces. Assemble gasket (6) and cover (2) over bolt holes in body (1).
8. Insert lubricated bolts (7) and tighten to the torques listed in Table 2.
9. Place valve back in service. Slowly open inlet isolation valve.

<u>BOLT SIZE</u>	<u>TORQUE (FT. LBS.)</u>
7/16"-14	30
1/2"-13	45
5/8"-11	93
3/4"-10	150
7/8"-9	200

TABLE 2. VALVE COVER BOLT TORQUES

PARTS AND SERVICE

Parts and service are available from your local representative or the factory. Make note of the valve Model No. and Working Pressure located on the valve nameplate.