

APCO AVV-140/150 AIR/VACUUM VALVE WITH OPTIONAL CSV SURGE CHECK VALVE



Instruction D12021
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DeZURIK

APCO AVV-140/150 Air/Vacuum Valve with Optional CSV Surge Check Valve

Instructions

These instructions provide installation, operation and maintenance information for APCO AVV-140/150 Air/Vacuum Valve with Optional CSV Surge Check Valve. They are for use by personnel who are responsible for installation, operation and maintenance of APCO AVV-140/150 Air/Vacuum Valve with Optional CSV Surge Check Valve.

Safety Messages

All safety messages in the instructions are flagged with an exclamation symbol and the word Caution, Warning or Danger. These messages indicate procedures that must be followed exactly to avoid equipment damage, personal injury or death. Safety label(s) on the product indicate hazards that can cause equipment damage, personal injury or death.

Safety label(s) on the product indicate hazards that can cause equipment damage, personal injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).



WARNING!

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves, which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your APCO AVV-140/150 Air/Vacuum Valve with Optional CSV Surge Check Valve has been packaged to provide protection during shipment; however, it can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Recommended spare parts are listed on the assembly drawing. These parts should be stocked to minimize downtime. Order parts from your local DeZURIK sales representative, or directly from DeZURIK. When ordering parts please provide the following information:

If the valve has a DeZURIK/APCO nameplate please include the 7-digit part number and either the 8-digit serial number or 4-digit revision number (whichever is applicable) located on the data plate attached to the valve assembly. Also include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

If there isn't a nameplate visible on the valve, please include valve model number, the part name, and item number from the assembly drawing. You may contact your local DeZURIK/APCO representative to help you identify your valve.

DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services.

For more information, contact your local DeZURIK sales representative or visit our website at www.dezurik.com.

**APCO AVV 140/150 Air/Vacuum Valve with Optional CSV
Surge Check Valve**

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Description

The APCO Air/Vacuum Valve mounted on top of a Surge Check Valve is designed to eliminate critical shock conditions occurring in those installations where the operating conditions cause a regular air valve to slam closed. This slow closing feature protects the Air/Vacuum valve and also prevents the Air/Vacuum valve from creating a surge in the pipeline by slamming shut.

This type Air/Vacuum Valve with Surge Check Valve should not be considered as relief for shock conditions which develop elsewhere in the system. However, actual field tests prove the Surge Check Valve may protect the Air/Vacuum Valve from damage by severe shut-off shock.

Handling and Storage

Lifting the valve improperly may damage it. Do not fasten lifting devices to piping or attached components. Lift the valve with slings, chains or cables fastened around the valve body, or fastened to bolts or rods through bolt holes in the flanges.

If installation will be delayed, place valve indoors in secure, weather tight storage. If temporary outside storage is unavoidable, make sure a vermin proof rain cover (water shedding tarp, etc.) is secured around/over the valve to keep off rain and mud. Skid and set the assembly on a flat, solid, and well drained surface for protection from ground moisture, runoff and pooled rain water.

Installation

The Air/Vacuum Valve with Surge Check Valve should always be installed in a vertical position. An isolation valve between this unit and the transmission (pipeline) system is recommended. Where to use:

- High points in pipelines where the hydraulic gradient and flow conditions are such that a negative pressure can possibly occur.
- High points on sections of pipeline having water velocities in excess of 10 F.P.S.
- Adjacent to any quick closing valve in a pipeline such as a check or gate valve where vacuum can occur upon closure.
- On the discharge of larger deep well turbine pumps between the pump and the check valve.
- If an Air/Vacuum Valve is to be installed inside a pump house, use threaded or flanged connections and pipe back into the well or to outside. This will greatly muffle the high noise level caused by the air being discharged and provide for drainage of any small amount of water or water vapor that may accumulate.
- Before installation, remove foreign material such as weld spatter, oil, grease, and dirt from the pipeline.
- Prepare pipe ends and install valves in accordance with the pipe manufacture's instructions for the joint used.
- Tighten the flange bolts or studs in a crisscross pattern and minimum of four stages.

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Fusion/Powder Coated Valves



CAUTION!

Valves with fusion/powder coated exterior paint require flat washers to be installed under the flange nuts when installing the valve to the pipeline flange to prevent the paint from cracking or chipping.

Maintenance

The APCO AVV-140/150 Air/Vacuum Valve with Optional CSV Surge Check Valve is automatic in operation and requires very little maintenance. It should always be installed in a vertical position.

A semi-annual visual inspection for leakage is recommended. A malfunction of the Air/Vacuum Valve can be identified by the seepage of water through the exhaust port, while malfunction of the Surge Check Valve would be a substantial amount of spillage through the Air/Vacuum exhaust port during pump start-up. Should a malfunction occur, the following steps should be taken to repair the valve:

Disassembly Procedure

Air/Vacuum Valve 1-20" (25-500mm) Only

See Figures 1-2 for part identification.

For information regarding 24" (600mm) Air/Vacuum Valves, contact your local DeZURIK sales representative.



WARNING!

Servicing the Air/Vacuum Valve while the pipeline is under pressure can cause personal injury or equipment damage. Relieve pipeline pressure or shut off isolation valve before servicing the Air/Vacuum Valve.

1. Relieve pipeline pressure or shut off isolation valve at inlet to Surge Check Valve before servicing the Air Valve.



WARNING!

Do not completely remove pipe plug or cover bolts while the valve is under pressure.

2. Slowly remove pipe plug near inlet of valve body (A1) to relieve internal pressure and to drain the unit.
3. Check to see if foreign matter or dirt is preventing float (A14) from seating properly against seat (A6). Clean as necessary.
4. Perform a seat test. Replace pipe plug and slowly fill valve chamber by cracking open isolation valve on inlet pipe. If seepage persists, repeat Steps 1 and 2 and proceed as follows:
5. Remove cover bolts (A4) and cover (A2).
6. Remove seat screws (A16/A34) and lift out seat (A6) from cover (A2).

APCO AVV-140/150 with CSV-1600 Option Slow Closing Air/Vacuum Valves

Maintenance (Continued)

7. Inspect seat (A6) and float (A14) seating surfaces for damage. Replace if necessary.
8. Inspect all other parts of the valve such as guide bushings (A26 & A43), bumper (A40), and float guide (A33) if applicable. Replace if necessary.

Surge Check Valve 3-24" (80-600mm) Only

See Figures 1-4 for part identification.

Replacement parts are not available for the 1-2" (25-50mm) Surge Check Valves. It is recommended to replace the complete valve.

9. Remove studs (P2) and nuts (P3) and remove Air/Vacuum Valve body (A1) from Surge Check Valve body (S1).
10. Loosen seat retaining screw (S7), located on the face of seat (S2). Push down plug (S3), to compress spring (S4), then release plug to knock out seat.
11. Remove plug (S3), spring (S4), retaining ring (S6) and bushing (S5) from body (S1).
12. Clean all surfaces before re-assembly. Replace all defective parts.

Assembly Procedure

Surge Check Valve 3-24" (80-600mm) Only

See Figures 1-4 for part identification.

Replacement parts are not available for the 1-2" (25-50mm) Surge Check Valves. It is recommended to replace the complete valve.

1. Install the parts inside the body (S1) in the following order:
 - a. Bushing (S5) at the center of the hub.
 - b. Spring (S4) centering on the bushing (S5).
Note: If conical spring, smaller diameter of spring should fit the outside diameter of bushing.
 - c. Plug (S3) with the concave side facing upward.
 - d. Seat (S2). Tighten seat retaining screw (S7) when flush with flange face.
2. If gasket (P1) is damaged, install new gasket making sure gasket fully covers the seat (S2) face.
3. Assemble Air/Vacuum Valve body (A1) to Surge Check Valve body (S1).

Air/Vacuum Valve 1-20" (25-500mm) Only

See Figures 1-2 for part identification.

For information regarding 24" (600mm) Air/Vacuum Valves, contact your local DeZURIK sales representative.

4. Clean surface of recess in cover (A2) and install seat (A6) with seat screws (A16/A34).
5. Install bumper (A40) and float (A14) in body (A1).
6. Assemble cover (A2) and gasket/O-ring (A3) to body (A1). Tighten cover bolts (A4) opposite each other in rotation.
7. Install and secure pipe plug and perform a seat test per Step 4 of Disassembly Procedure.
8. If valve was removed from pipeline, place valve in pipeline, and open isolation valve on inlet to Air Valve. Valve is now back in service.

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Operation

The Air/Vacuum Valve operates normally allowing air to escape freely at any velocity (maximum discharge velocity is approximately 300 feet per second (102 meters per second) at 6.7 psi (50KPa); however, good pipeline design restricts velocity flows of air to 100 feet per second (34 meters per second) which occurs at approximately 1 psi (7KPa)).

The Surge Check Valve operates on the interphase between the kinetic energy in the relative velocity flows of air and water. The Surge Check is a normally open valve, spring loaded, so that air passes through unrestricted. When water rushes into the Surge Check Valve, the disc begins to close against the spring tension and reduces the rate of flow of water into the air valve by means of throttling holes in the disc. This ensures normal gentle closing of the Air/Vacuum Valve regardless of the initial velocity flows involved and minimizes pressure surges when the valve closes.

As soon as the Air/Vacuum Valve is closed, the pressure on both sides of the Surge Check Valve disc equalizes and the disc automatically returns to the open position. This means the Air/Vacuum Valve does not need an incipient vacuum to open, but can open at any time the water level drops and line pressure approaches atmospheric. This allows immediate full re-entry flow of air into the pipeline before a vacuum can form.

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Drawings

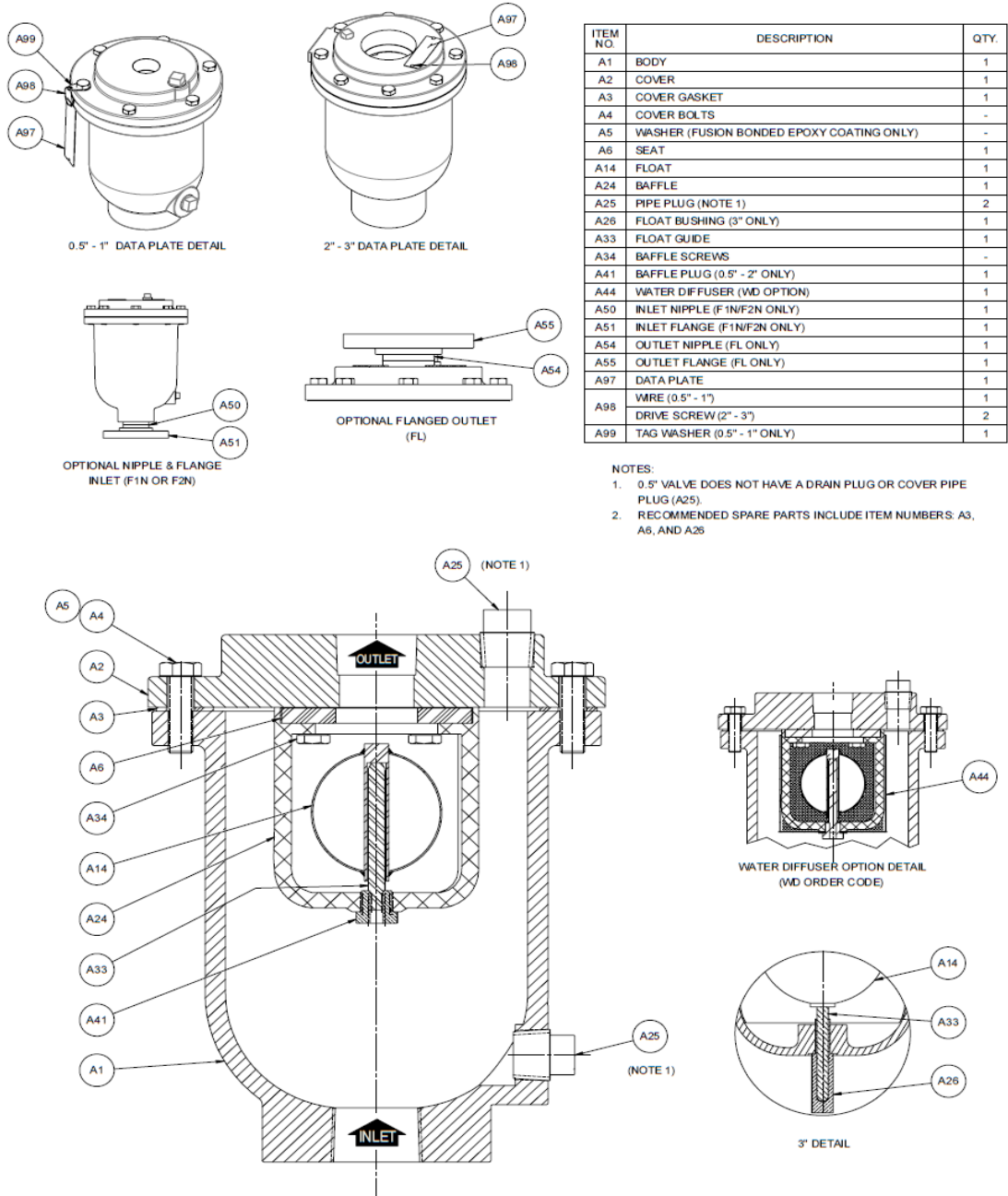


Figure 1: AVV-140 1-3" (25-80mm) Air/Vacuum Valve

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Drawings (Continued)

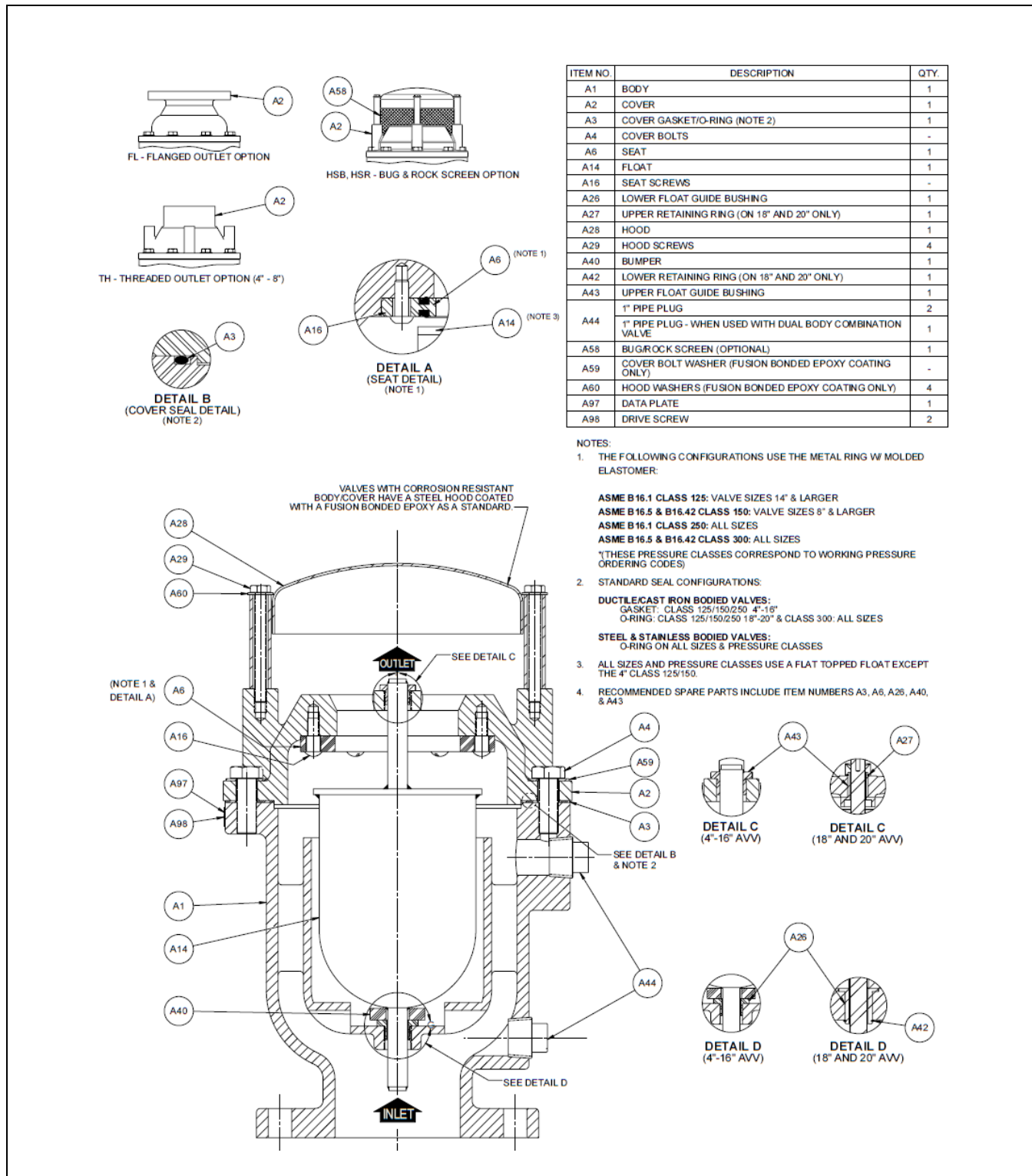


Figure 2: AVV-150 4-20" (100-500mm) Air/Vacuum Valve

APCO AVV-140/150 with CSV-1600 Option Slow Closing Air/Vacuum Valves

Drawings (Continued)

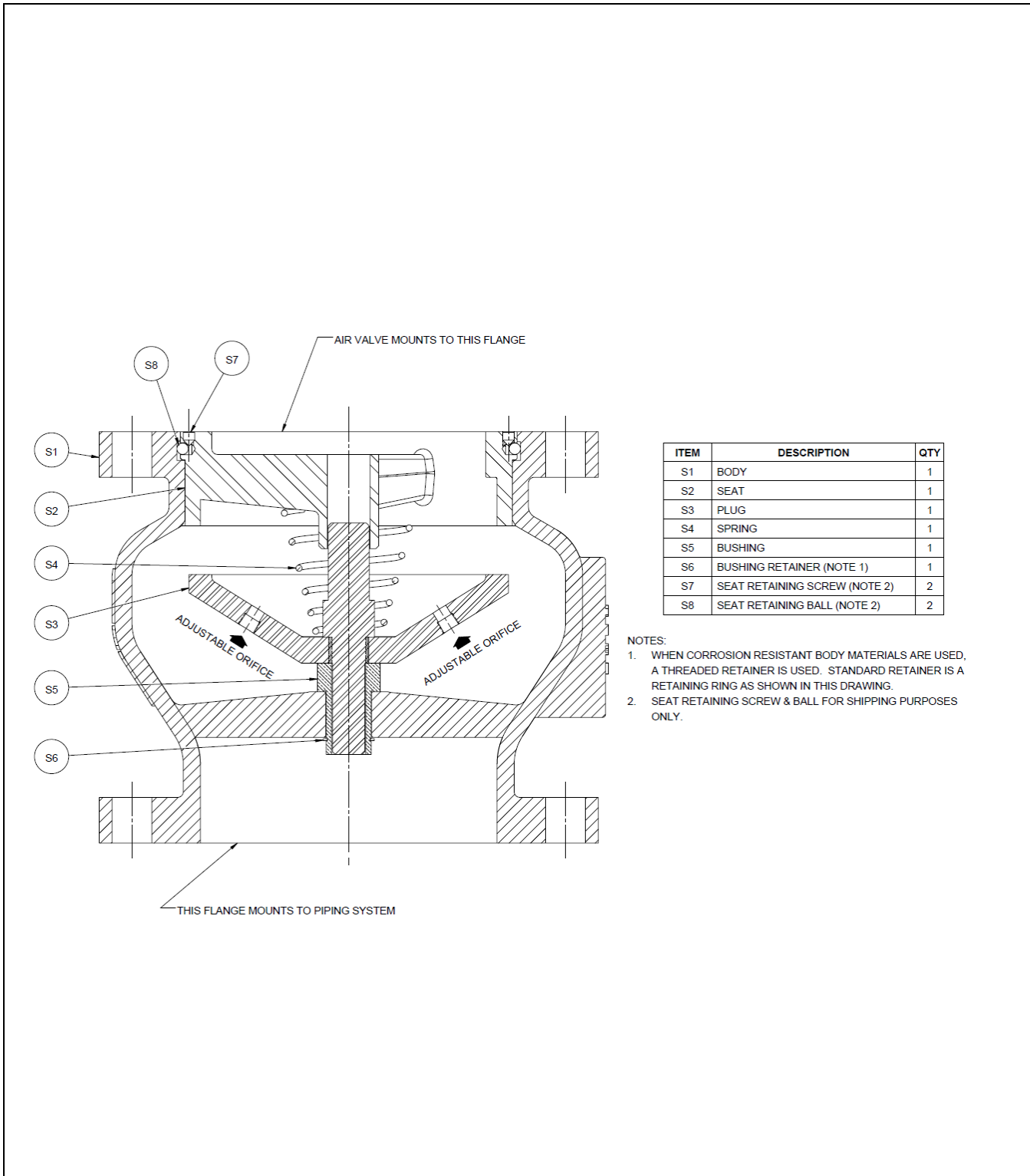


Figure 3: CSV 3-24" (80-600mm) Surge Check Valve

**APCO AVV 140/150 Air/Vacuum Valve with Optional CSV
Surge Check Valve**

Drawings (Continued)

CONNECTING PARTS		
ITEM	DESCRIPTION	QTY
P1	GASKET	1
P2	THREADED ROD	-
P3	NUT	-
P4	NIPPLE	1

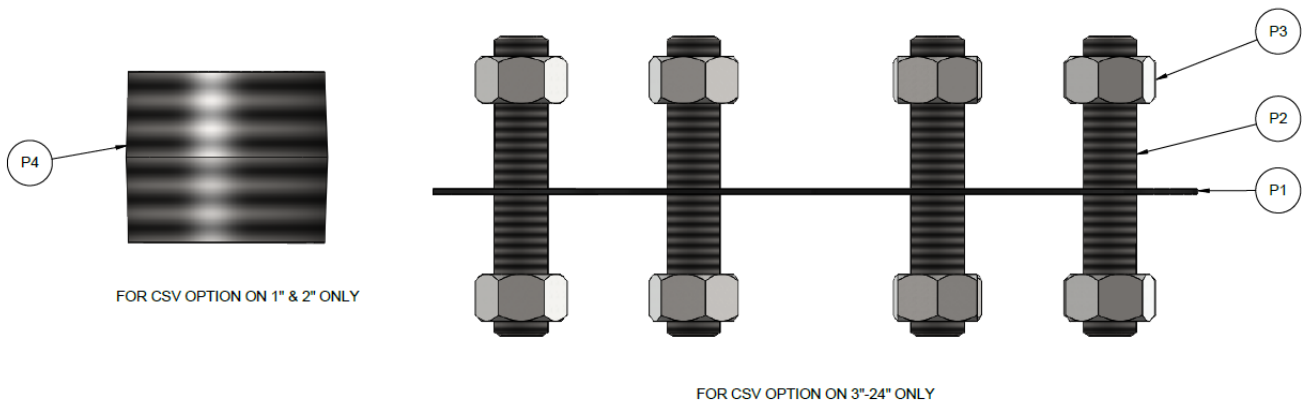


Figure 4: Connecting Parts

APCO AVV-140/150 with CSV-1600 Option Slow Closing Air/Vacuum Valves

Troubleshooting

Condition	Possible Cause	Corrective Action
Valve leaks at flange joint.	Loose flange bolting.	Tighten flange bolting.
	Blown flange gasket.	Replace flange gasket.
	Misalignment or damage to field piping and supports.	Adjust misalignment or repair piping or supports.
	Damaged flange face/s or improper flange connections.	Repair flange, replace valve body or adjust flange connections.
Valve leaks out of outlet port.	Dirty seat and/or float.	Clean seat and/or float.
	Worn seat and/or float.	Replace seat and/or float.
	Line pressure is under 10 psi (70KPa).	Replace seat with softer seat.
	Float linkage is dirty.	Clean float linkage.

Limited Warranty

DeZURIK, Inc. ("Seller") manufactured products, auxiliaries and parts for a period of twenty-four (24) months from date of shipment from Seller's factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller's recommendations and instructions.

For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller's option, FCA Incoterms 2020 Seller's facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller will provide repair or replacement for other's products or parts only to the extent provided in and honored by the original manufacturer's warranty to Seller, in each case subject to the limitations contained in the original manufacturer's warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller's product, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.

The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to, an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous Warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

THE FOREGOING REPAIR AND REPLACEMENT LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, OBLIGATIONS AND LIABILITIES, INCLUDING ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE SELLER'S ENTIRE AND EXCLUSIVE LIABILITY AND YOUR 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.

Disclaimer

Metric fasteners should not be used with ASME Class 150/300 bolt holes and flange bolt patterns. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, it may lead to product failure, injury, and loss of life. DeZURIK Inc. disclaims all liability associated with the use of metric fasteners with ASME Class 150/300 bolt holes and flange patterns, including but not limited to personal injury, loss of life, loss of product, production time, equipment, property damage, lost profits, consequential damages of any kind and environment damage and/or cleanup. Use of metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns is a misuse that voids all warranties and contractual assurances. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, you do so at your sole risk and any liability associated with such use shall not be the responsibility of DeZURIK, Inc. In addition to the foregoing, DeZURIK's Manufacturer's Conditions apply.

Limitation of Liability

IN NO EVENT SHALL SELLER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES WHATSOEVER, AND SELLER'S LIABILITY, UNDER NO CIRCUMSTANCES, WILL EXCEED THE CONTRACT PRICE FOR THE GOODS AND/OR SERVICES FOR WHICH LIABILITY IS CLAIMED. ANY ACTION FOR BREACH OF CONTRACT BY YOU, OTHER THAN RIGHTS RESPECTING OUR LIMITED WARRANTY DESCRIBED ABOVE, MUST BE COMMENCED WITHIN 12 MONTHS AFTER THE DATE OF SALE.

Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:

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