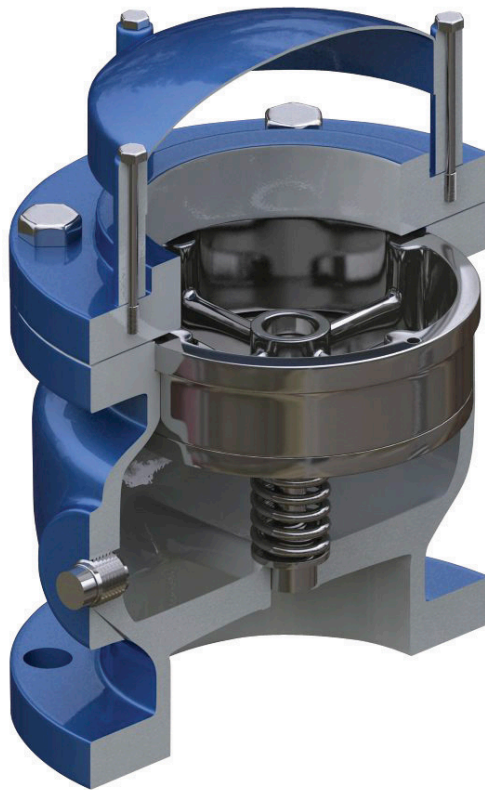




APCO AVR-1500 VACUUM RELIEF/AIR INLET VALVES



Instruction **D12016**
December 2012

DeZURIK

APCO AVR-1500 Vacuum Relief/Air Inlet Valves

Instructions

These instructions provide installation, operation and maintenance information for APCO AVR-1500 Vacuum Relief/Air Inlet Valves. They are for use by personnel who are responsible for installation, operation and maintenance of APCO AVR-1500 Vacuum Relief/Air Inlet Valves.

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 AVR-1500 Vacuum Relief/Air Inlet 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 choose from the following:

If the valve has a DeZURIK APCO nameplate please include the 7-digit part number and 4-digit revision number (example: 9999999R000) 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 any 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.

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APCO AVR-1500 Vacuum Relief/Air Inlet Valves

Description

The Vacuum Relief/Air Inlet Valve is normally closed. Should the system pressure become negative, it will immediately admit air into the system and prevent a vacuum from forming. When system pressure returns to positive, the Vacuum Relief/Air Inlet Valve closes air tight. Standard Vacuum Relief/Air Inlet Valves are designed to open with a minimal ¼ PSI pressure differential across the orifice. Higher or lower relief settings are available to suit the application.

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

Vacuum Relief/Air Inlet Valves are normally installed at high points on a pipeline or a tank or level points where vacuum could occur due to water column separation. This vacuum may cause the pipeline or tank to collapse, or cause water column separation to take place resulting in water hammer (pressure surge) when the water column rejoins.

- 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.



CAUTION!

Do not deflect the pipe-valve joint. Minimize bending stresses in the valve end connection with pipe loading.

- Tighten the flange bolts or studs in a crisscross pattern and minimum of four stages.

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 AVR-1500 Vacuum Relief/Air Inlet Valve is automatic in operation and requires little or no maintenance. It is recommended that it be checked visually semi-annually for leakage. A malfunction of the valve can be identified by seepage of the media through the exhaust port. If a malfunction occurs, the following steps should be taken to repair the valve;

Disassembly Procedure (AVR-1500T Valves)

See Figure 1 for part identification.



WARNING!

Servicing the Air 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 Valve.

1. Relieve pipeline pressure or shut off isolation valve before servicing the Air Valve.



WARNING!

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

2. Loosen pipe plug (17) to allow internal pressure to escape.
3. Remove cover screws (4), cover (2) and cover gasket (3).
4. Remove baffle screws (34) and baffle (24), and lift out seat (6) from the recess in the cover (2).
5. Remove float (14), spring (42), float guide (33) and baffle plug (41) from baffle (24).
6. Clean all surfaces before re-assembly. Replace all defective parts.

Assembly Procedure (AVR-1500T Valves)

1. Install baffle plug (41), float guide (33), spring (42) and float (14) to baffle (24). Replace new parts if any are damaged.
2. Install seat (6) into cover (2) and align holes. Replace old seat if damaged. Buna-N seat hardness (Durometer) should correspond to the operating pressure shown in Table A.

Table A: Buna-N Seat Hardness (Durometer)

Valve Size	Working Pressure, psi				
	0-10	11-50	51-100	101-200	201-300
½"	20	45	45	45	85
1"	45	65	65	65	85
2"	45	65	85	85	85
3"	45	65	85	85	85

3. With cover (2) lying upside down, set the baffle (24) assembly on seat (6). Align both seat and baffle holes and replace seat screws (7). Do not tighten seat screws.

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APCO AVR-1500 Vacuum Relief/Air Inlet Valves

Maintenance (Continued)

4. Before tightening seat screws (7), position baffle (24) by allowing float (14) to center perfectly in seat (6), then tighten screws. Tighten screws opposite each other in rotation.
5. Assemble cover (2) to body (1), installing new gasket (3) if necessary. Tighten cover screws (4) opposite each other in rotation.
6. Install pipe plug in cover (2) and tighten.
7. 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.

Disassembly Procedure (AVR-1500 Valves)

See Figure 2 for part identification.



WARNING!

Servicing the Air 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 Valve.

1. Relieve pipeline pressure or shut off isolation valve before servicing the Air Valve
2. Loosen pipe plug on the side of the body to relieve internal pressure. Do not completely remove pipe plug while the valve is under pressure.
3. Remove hood assembly (28), flange (30), and gasket (11).
4. Loosen seat retaining screw (7), located on the face of seat (2). Push down plug (3), to compress spring (4), then release plug to knock out seat.
5. Remove plug (3), spring (4), and bushing (5) from body (1).
6. Check that resilient seal in seat (2) is not damaged.
7. Clean all surfaces before re-assembly. Replace all defective parts.

Assembly Procedure (AVR-1500 Valves)

1. Install the parts inside the body (1) in the following order:
 - a. Bushing (5) at the center of the hub.
 - b. Spring (4) centering on the bushing (5).

Note: If conical spring, smaller diameter of spring should fit the outside diameter of bushing.

- c. Plug (3) with the concave side facing upward.
 - d. Seat (2). Tighten seat retaining screw (7) when flush with flange face.
2. If gasket (11) is damaged, install new gasket making sure gasket fully covers the seat face.
 3. Install flange (30) and hood assembly (28).
 4. 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.

Maintenance *(Continued)***Disassembly Procedure (AVR-1500TC Valves)**

The See Figure 3 for part identification.

Air Release Valve (Model 50)

**WARNING!**

Servicing the Air 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 Valve.

1. Relieve pipeline pressure or shut off isolation valve before servicing the Air Valve.
-

**WARNING!**

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

2. Loosen cover screws (4) to allow internal pressure to escape.
3. Remove cover screws (4) and cover (2). All internals are attached to cover.
4. If cover gasket (3) is torn or damaged, clean flange surfaces of cover (2) and body (1).
5. Inspect sealing surface of needle (7) and seat (6) for nicks, wear or sediment coating from chemicals in the media.
6. Clean or replace needle (7) and seat (6).
7. Inspect float (10) to insure that it is not damaged or that it does not have liquid in it.
8. Inspect all connections of linkage for excessive wear.

Vacuum Relief/Air Inlet Valve (Model 1500T)

9. Follow steps in the “Disassembly Procedure (AVR-1500T Valves)” section to disassemble the Vacuum Relief/Air Inlet Valve components.

Assembly Procedure (AVR-1500TC Valves)

The See Figure 3 for part identification.

Vacuum Relief/Air Inlet Valve (Model 1500T)

1. Follow steps in the “Assembly Procedure (AVR-1500T Valves)” section to assemble the Vacuum Relief/Air Inlet Valve components.

Air Release Valve (Model 50)

2. Assemble cover (2) to body (1), installing new gasket (3) if necessary. Tighten cover screws (4) opposite each other in rotation.
3. 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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APCO AVR-1500 Vacuum Relief/Air Inlet Valves

Maintenance (Continued)

Disassembly Procedure (AVR-1500C Valves)

See Figure 4 for part identification.

Air Release Valve (Model 50, 200 or 200A)



WARNING!

Servicing the Air 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 Valve.

2. Relieve pipeline pressure or shut off isolation valve before servicing the Air Valve.
-



WARNING!

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

3. Loosen pipe plug or cover screws (4) to allow internal pressure to escape.
4. Remove cover screws (4) and cover (2). All internals are attached to cover.
5. If cover gasket (3) is torn or damaged, clean flange surfaces of cover (2) and body (1).
6. Inspect sealing surface of needle (7) and seat (6) for nicks, wear or sediment coating from chemicals in the media.
7. Clean or replace needle (7) and seat (6).
8. Inspect float (10) to insure that it is not damaged or that it does not have liquid in it.
9. Inspect all connections of linkage for excessive wear.

Vacuum Relief/Air Inlet Valve (Model 1500)

10. Follow steps in the “Disassembly Procedure (AVR-1500 Valves)” section to disassemble the Vacuum Relief/Air Inlet Valve components.

Assembly Procedure (AVR-1500C Valves)

See Figure 4 for part identification.

Vacuum Relief/Air Inlet Valve (Model 1500)

1. Follow steps in the “Assembly Procedure (AVR-1500 Valves)” section to assemble the Vacuum Relief/Air Inlet Valve components.

Air Release Valve (Model 50, 200 or 200A)

2. Assemble cover (2) to body (1), installing new gasket (3) if necessary. Tighten cover screws (4) opposite each other in rotation.
3. Tighten pipe plug if required.
4. 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.

Operation

The Vacuum Relief/Air Inlet Valve is normally closed. Should the system pressure become negative, it will immediately admit air into the system and prevent a vacuum from forming. When system pressure returns to positive, the Vacuum Relief/Air Inlet Valve closes air tight. Standard Vacuum Relief/Air Inlet Valves are designed to open with a minimal $\frac{1}{4}$ PSI pressure differential across the orifice. Higher or lower relief settings are available to suit the application.

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APCO AVR-1500 Vacuum Relief/Air Inlet Valves

Drawings

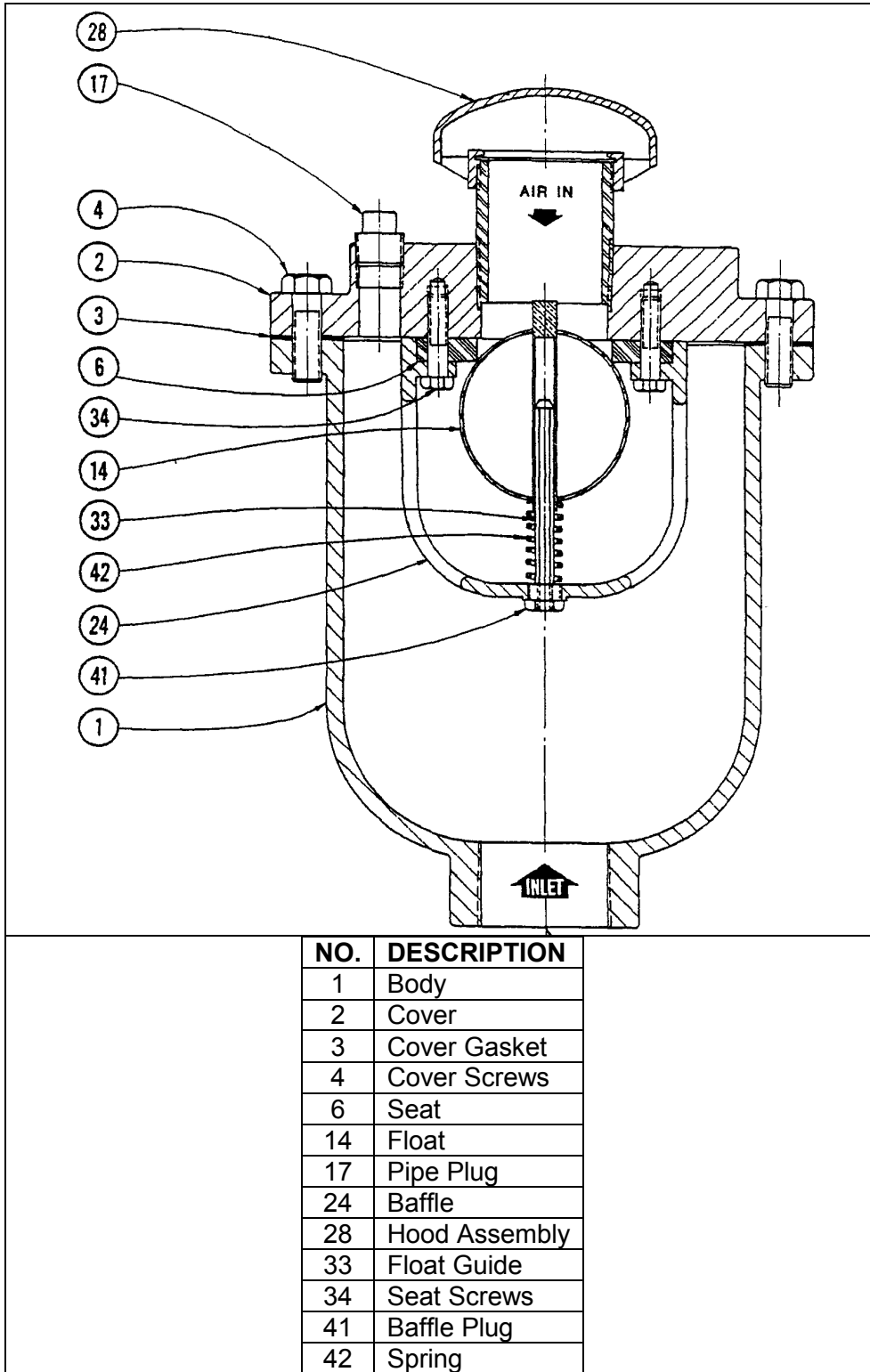
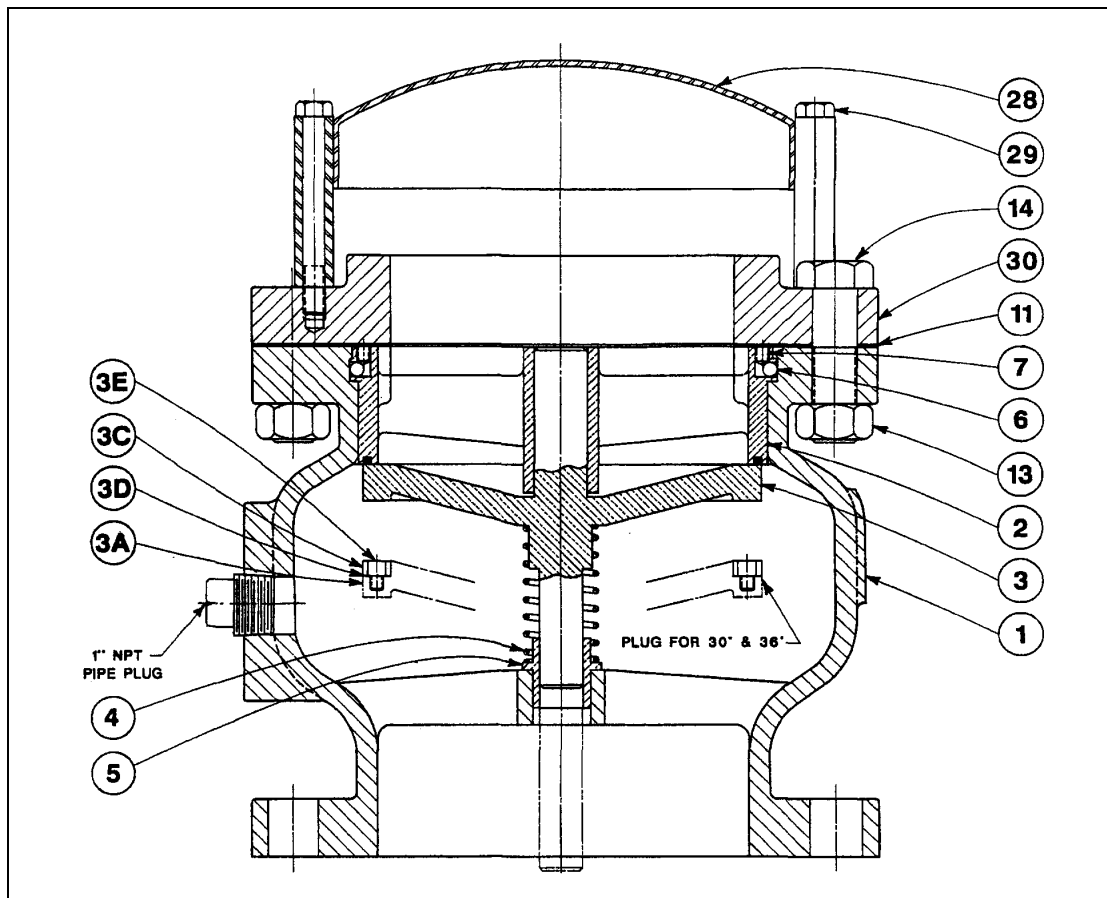


Figure 1: AVR-1500T Vacuum Relief/Air Inlet Valve

APCO AVR-1500 Vacuum Relief/Air Inlet Valves

Drawings (Continued)



NO.	DESCRIPTION
1	Body
2	Seat
3	Plug
4	Spring
5	Bushing
6	Seat Retaining Ball
7	Seat Retaining Screw
11	Gasket
13	Flange Nut
14	Flange Bolt
28	Hood
29	Hood Bolt
30	Flange
For 30" and 36"	
3A	Plug
3C	Plug Ring
3D	Gasket
3E	Plug Ring Screw

Figure 2: AVR-1500 Vacuum Relief/Air Inlet Valve

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APCO AVR-1500 Vacuum Relief/Air Inlet Valves

Drawings (Continued)

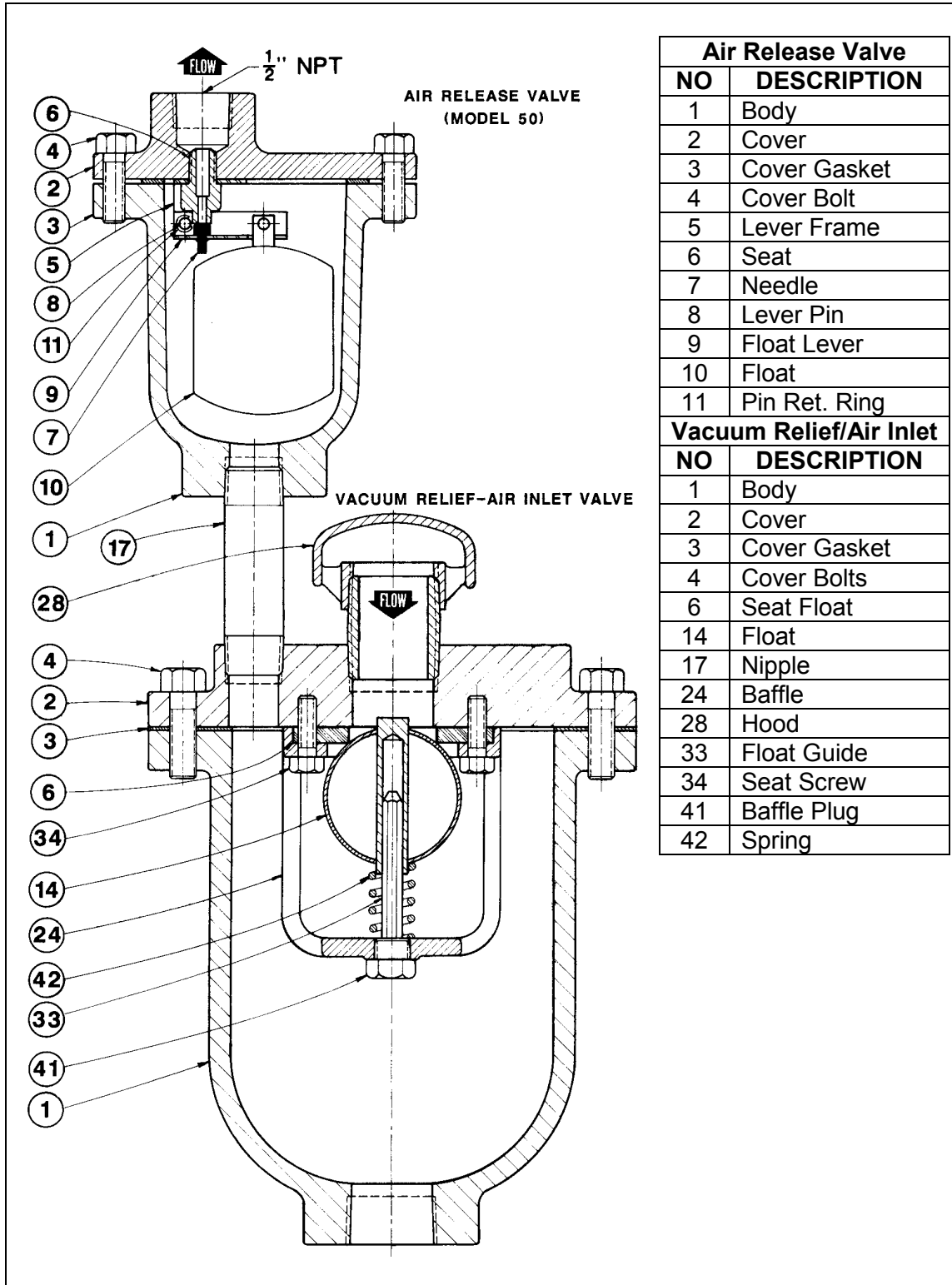
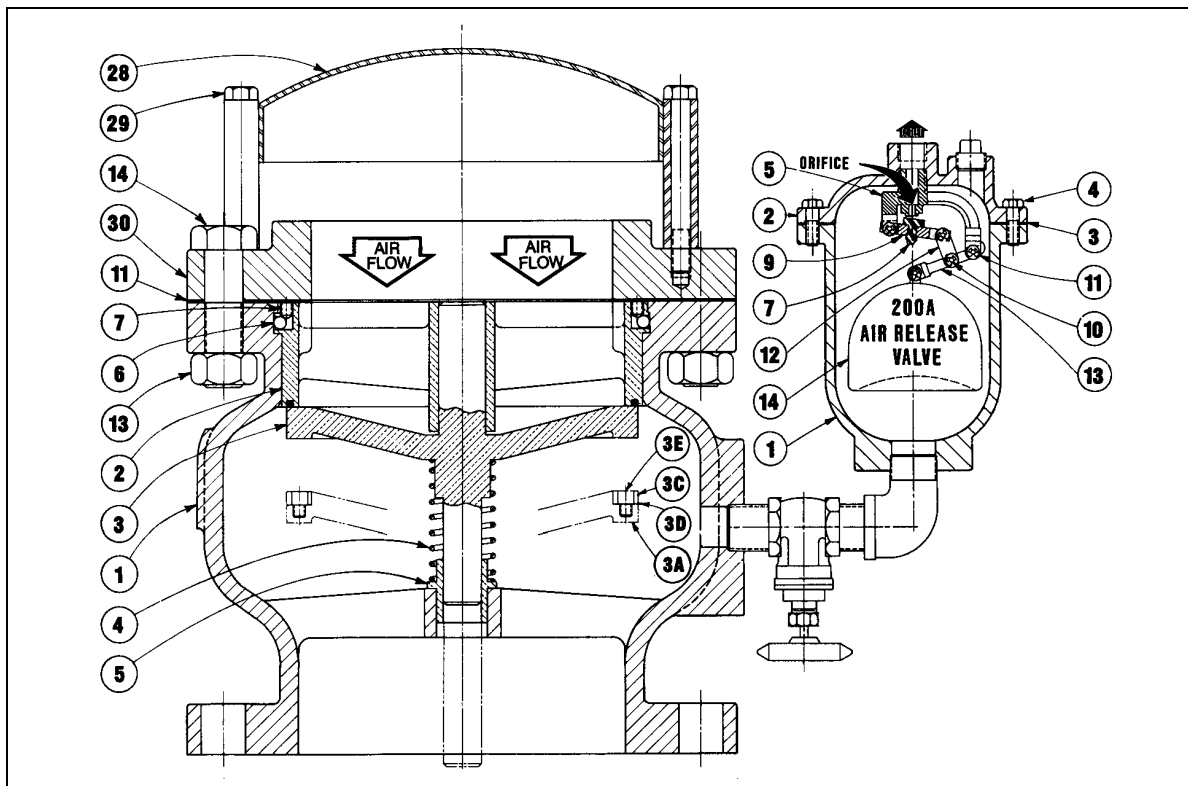


Figure 3: AVR -1500TC Vacuum Relief-Air Inlet/Air Release Valve

APCO AVR-1500 Vacuum Relief/Air Inlet Valves

Drawings (Continued)



Vacuum Relief/Air Inlet Valve		Air Release Valve*	
NO	DESCRIPTION	NO	DESCRIPTION
1	Body	1	Body
2	Seat	2	Cover
3	Plug	3	Cover Gasket
4	Spring	4	Cover Bolt
5	Bushing	5	Leverage Frame
6	Seat Retaining Ball	7	Needle
7	Seat Retaining Screw	9	Needle Lever
11	Gasket	10	Lever Pin
13	Flange Nut	11	Retaining Ring
14	Flange Bolt	12	Connecting Link
28	Hood	13	Float Lever
29	Hood Bolt	14	Float
30	Flange		
For 30" and 36"			
3A	Plug		
3C	Plug Ring		
3D	Gasket		
3E	Plug Ring Screw		

* Note: Series 50, 200A or 200 Air Release valve may be used depending on required orifice size.

Figure 4: AVR-1500C Vacuum Relief-Air Inlet/Air Release Valve

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APCO AVR-1500 Vacuum Relief/Air Inlet Valves

Troubleshooting

Condition	Possible Cause	Corrective Action
Valve leaks at flange joint.	Loose flange bolting.	Tighten flange bolting.
	Blown flange gasket.	Replace flange gasket.
	Miss-alignment or damage to field piping and supports.	Adjust miss-alignment 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.	Replace seat with softer seat.
	Float linkage is dirty.	Clean float linkage.

Guarantee

Products, auxiliaries and parts thereof of DeZURIK, Inc. manufacture are warranted to the original purchaser for a period of twenty-four (24) months from date of shipment from factory, against defective workmanship and material, but only if properly installed, operated and serviced in accordance with DeZURIK, Inc. recommendations. Repair or replacement, at our option, for items of DeZURIK, Inc. manufacture will be made free of charge, (FOB) our facility with removal, transportation and installation at your cost, if proved to be defective within such time, and this is your sole remedy with respect to such products. Equipment or parts manufactured by others but furnished by DeZURIK, Inc. will be repaired or replaced, but only to the extent provided in and honored by the original manufacturers warranty to DeZURIK, Inc., in each case subject to the limitations contained therein. No claim for transportation, labor or special or consequential damages or any other loss, cost or damage shall be allowed. You shall be solely responsible for determining suitability for use and in no event shall DeZURIK, Inc. be liable in this respect. DeZURIK, Inc. does not guarantee resistance to corrosion, erosion, abrasion or other sources of failure, nor does DeZURIK, Inc. guarantee 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 DeZURIK, Inc. 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 install and operate said products and parts according to instructions furnished by DeZURIK, Inc., or misuse, modification, abuse or alteration of such product, accident, fire, flood or other Act of God, or failure to pay entire contract price when due shall be a waiver by you of all rights under this warranty.

The foregoing guarantee 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 DeZURIK, Inc. Factory 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 DeZURIK, Inc., despite anything to the contrary contained in the purchase order or represented by any agent or employee of DeZURIK, Inc., in writing or otherwise, notwithstanding, including but not limited to implied warranties.

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Sales and Service

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

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