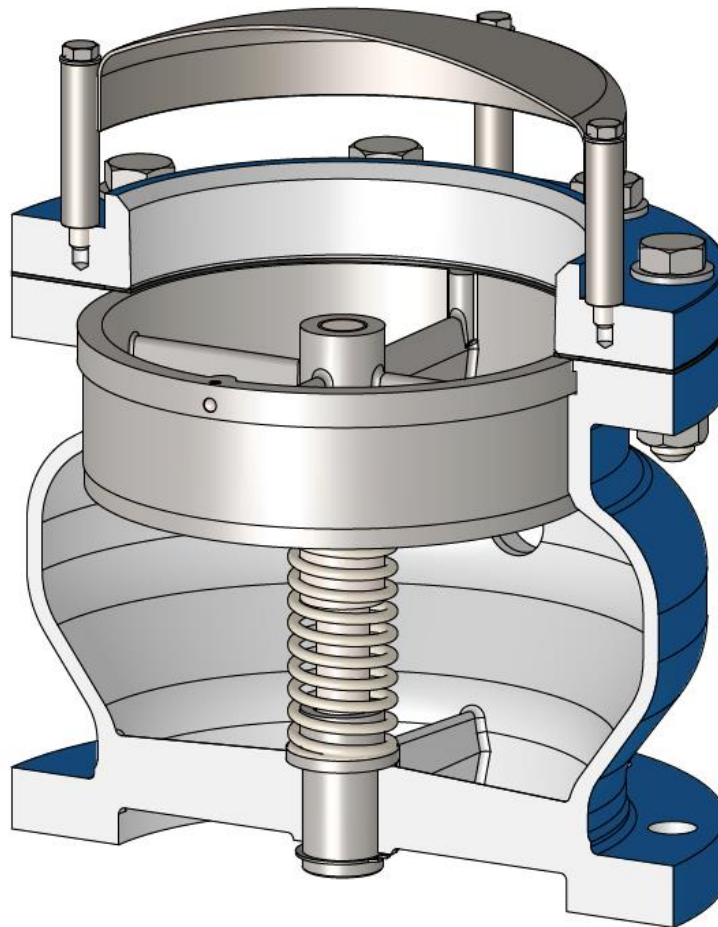


APCO AVR-1500A/1500AC VACUUM RELIEF/AIR INLET VALVES



Instruction **D12056**
March 2023

Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

Safety label(s) on the product indicate hazards that can cause 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 DeZURIK product has been packaged to provide protection during shipment; however, items 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

Replaceable wear parts are listed on the assembly drawing. These parts can 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 data plate: please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be 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 data plate visible on the valve: please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK 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 DeZURIK.com.

Table of Contents

Description	4
Handling and Storage	4
Installation	4
Fusion Bonded Epoxy Coated Valves.....	4
Maintenance.....	5
Disassembly Procedure (AVR-1500A Valves).....	5
Assembly Procedure (AVR-1500A Valves)	5
Disassembly Procedure (AVR-1500AC Valves)	6
Assembly Procedure (AVR-1500AC Valves).....	6
Operation	7
Drawings	8
<i>Figure 1: AVR-1500A Valve Components</i>	<i>8</i>
<i>Figure 2: AVR-1500AC equipped with 50A Air Release Valve, Valve Components.....</i>	<i>9</i>
<i>Figure 3: AVR-1500AC equipped with 200A Air Release Valve, Valve Components.....</i>	<i>10</i>
<i>Figure 4: AVR-1500AC equipped with 200 Air Release Valve, Valve Components</i>	<i>11</i>
<i>Figure 5: 50A Air Release Valve Components</i>	<i>12</i>
<i>Figure 6: 200 Air Release Valve Components.....</i>	<i>13</i>
<i>Figure 7: 200A Air Release Valve Components</i>	<i>14</i>
Troubleshooting.....	15

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 nominal ¼ PSI pressure differential across the orifice.

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, refer to **Form 1454 – Recommended Long & Short-Term Storage Procedures**.

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 manufacturer's instructions for the joint used.

NOTICE

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 Bonded Epoxy Coated Valves

NOTICE

Valves with optional fusion bonded epoxy coated exterior require flat washers to be installed under the flange nuts when installing the valve to the pipeline flange. This is to prevent the coating from cracking or chipping.

Maintenance

The APCO AVR-1500A 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-1500A 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.
 2. Depress plug (S03) or loosen flange screws (S21) to relieve internal pressure. Do not completely remove flange (S25) while the valve is under pressure.
 3. Remove hood (S23), flange (S25), and gasket (S19) .
 4. Loosen seat retaining screw (S07), located on the face of seat (S02). Push down plug (S03), to compress spring (S04), then release plug to loosen seat.
-

⚠WARNING

This vessel contains a compressed spring; the potential for personal injury exists during disassembly. For safe disassembly, follow these instructions carefully. Keep extremities clear of any pinch points.

5. Remove plug (S03), spring (S04), bushing retaining ring (S11) and bushing (S05) from body (S01) .
6. Check that resilient seal (S08) in seat (S02) is not damaged.
7. Clean all surfaces before re-assembly. Replace all defective parts.

Assembly Procedure (AVR-1500A Valves)

1. Install the parts inside the body (S01) in the following order:
 - a. Bushing (S05) into central bore of body (S01). Secure with bushing retaining ring (S11).
 - b. Spring (S04) centering on the bushing (S05). If conical spring, smaller diameter of spring should fit the outside diameter of bushing.
 - c. Plug (S03) with the concave side facing upward.
 - d. Seat retaining balls (S06) into the outside diameter of the seat (S02). Hold the seat (S02) down flush with the flange face and install seat retaining screws (S07). Tighten seat retaining screw (S07) when flush with flange face.
2. If gasket (S19) is damaged, install new gasket.
3. Install flange (S25) and hood assembly (S23).
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-1500AC Valves)**

See Figure 5, 6, or 7 for part identification dependent on Air Release Valve model.

Air Release Valve (Model 50A, 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.

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.

3. Loosen pipe plug (R15 if applicable) or cover screws (R04) to allow internal pressure to escape.
4. Remove cover screws (R04) and cover (R02). All internals are attached to cover.
5. If cover gasket (R03) is torn or damaged, replace with new gasket. Clean flange surfaces of cover (R02) and body (R01).
6. Inspect sealing surface of needle (R07) and seat (R06) for nicks, wear or sediment coating from chemicals in the media.
7. Clean or replace needle (R07) and seat (R06).
8. Inspect float (R14 or R10) to ensure 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 1500A)

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

Assembly Procedure (AVR-1500AC Valves)

See Figure 5, 6, or 7 for part identification dependent on Air Release Valve model.

Vacuum Relief/Air Inlet Valve (Model 1500AC)

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

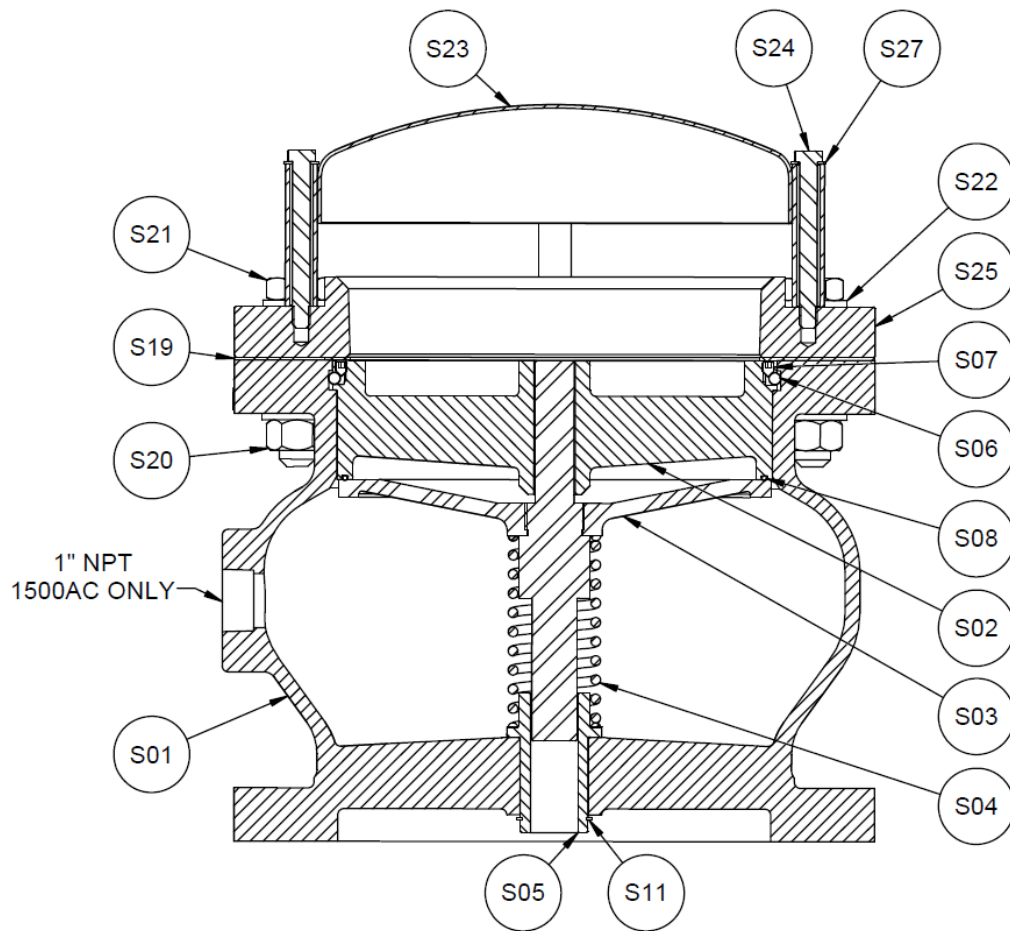
Air Release Valve (Model 50, 200 or 200A)

2. Assemble cover (R02) to body (R01), installing new gasket (R03) if necessary. Tighten cover screws (R04) opposite each other in rotation.
3. Tighten pipe plug (R15) if applicable.
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 a normally closed valve. Should the system pressure become negative, the valve will immediately open and admit air into the system preventing 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 nominal $\frac{1}{4}$ psi (1.7 kPa) pressure differential across the orifice.

Drawings



Item No.	Description
S01	Body
S02	Seat
S03	Plug
S04	Spring
S05	Bushing
S06	Seat Retaining Ball
S07	Seat Retaining Screw
S08	Resilient Seat
S11	Bushing Retaining Ring
S19	Flange Gasket
S20	Flange Nut
S21	Flange Screw
S22	Flange Washer
S23	Hood
S24	Hood Screw
S25	Flange
S27	Washer

Figure 1: AVR-1500A Valve Components

Drawings (Continued)

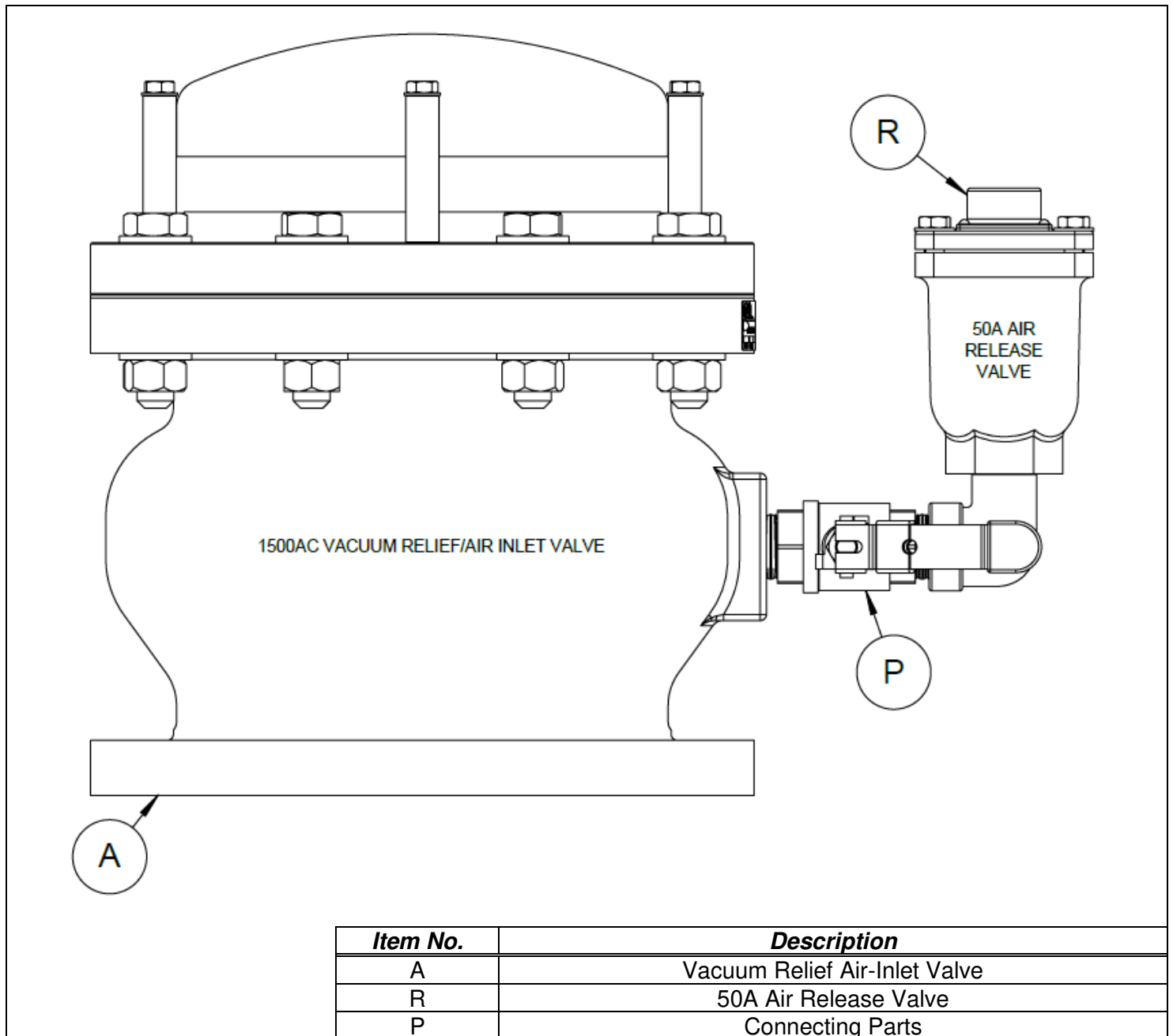


Figure 2: AVR-1500AC equipped with 50A Air Release Valve, Valve Components

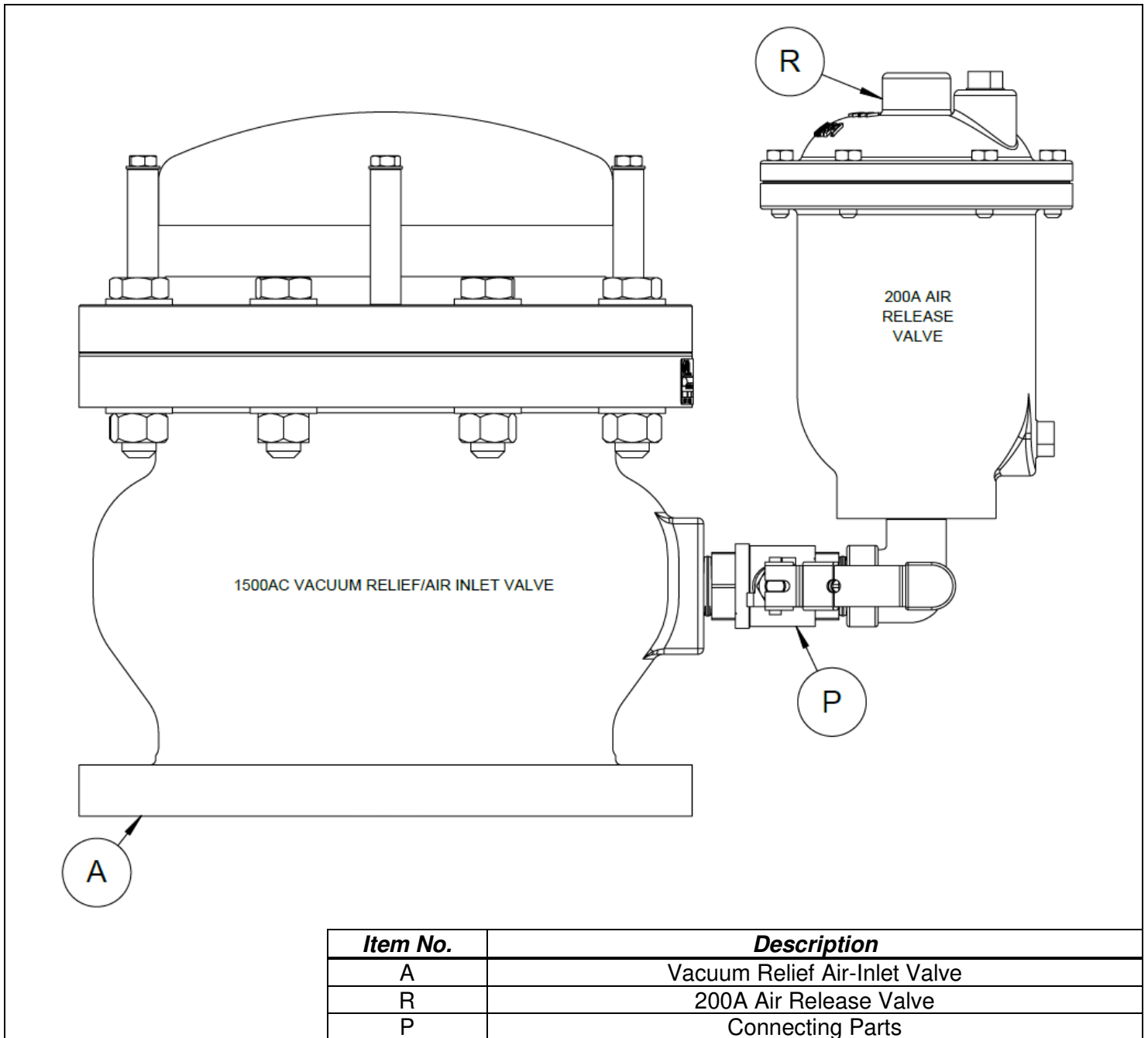


Figure 3: AVR-1500AC equipped with 200A Air Release Valve, Valve Components

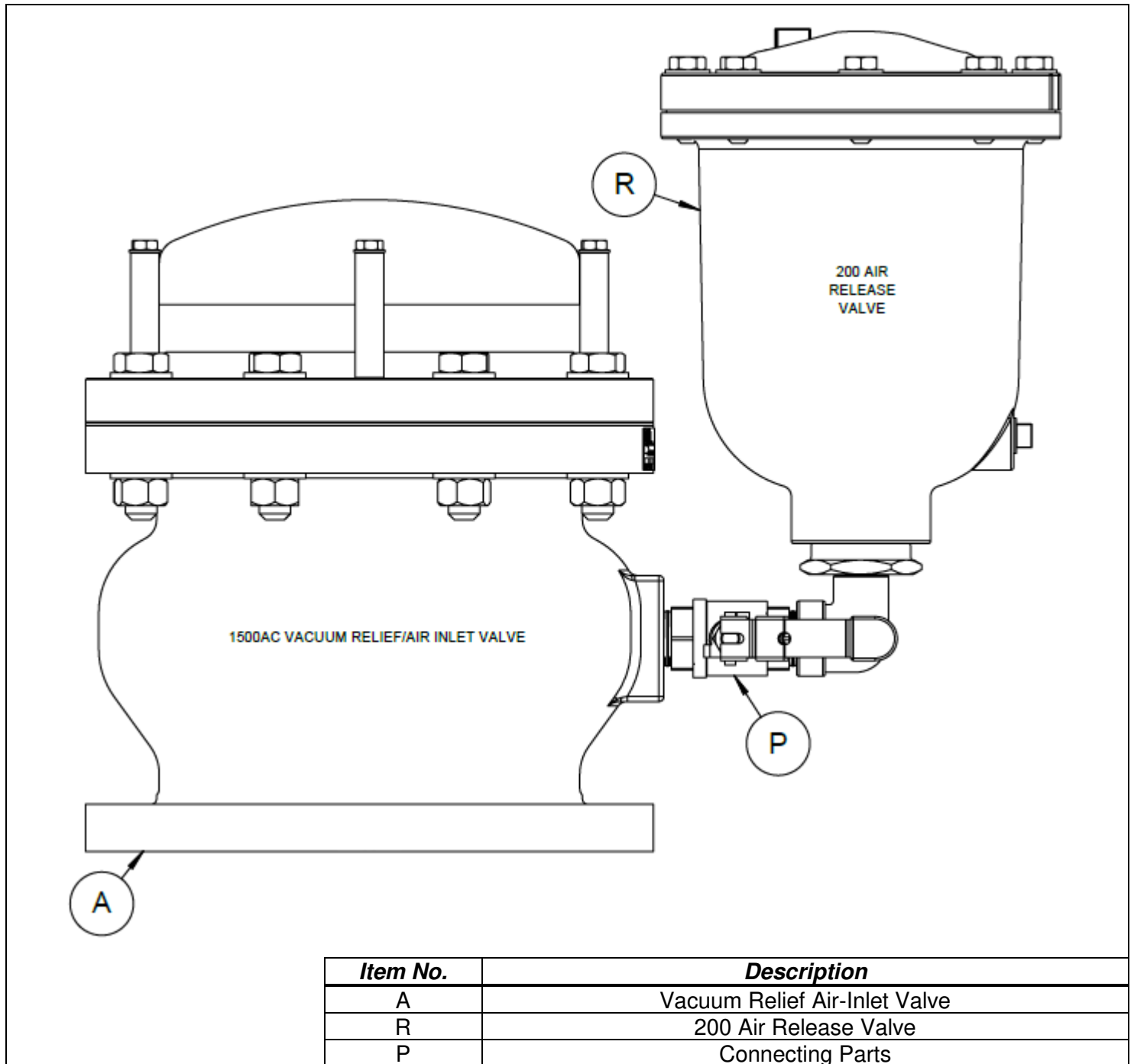
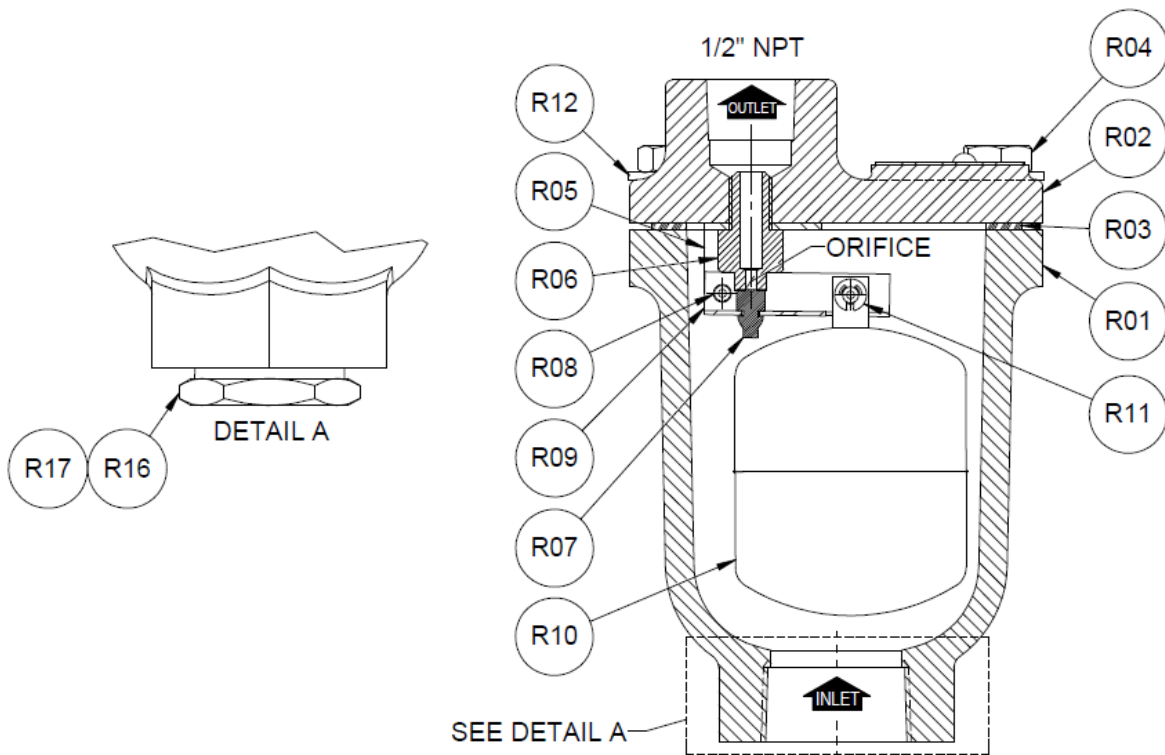


Figure 4: AVR-1500AC equipped with 200 Air Release Valve, Valve Components



VALVE BODY ALWAYS TAPPED WITH 1" NPT. ALL VALVES ARE SUPPLIED WITH 1" NPT TO 1/2" NPT AND 1" NPT TO 3/4" NPT HEX REDUCER BUSHINGS. SEE DETAIL A.

Item No.	Description
R01	Body
R02	Cover
R03	Cover Gasket
R04	Cover Bolts
R05	Lever Frame
R06	Seat
R07	Needle
R08	Lever Pin
R09	Float Lever
R10	Float
R11	Pin Retainer
R12	Washer (Epoxy/FBE Coating Only)
R16	1" NPT to 3/4" NPT Reducer
R17	1" NPT to 1/2" NPT Reducer

Figure 5: 50A Air Release Valve Components

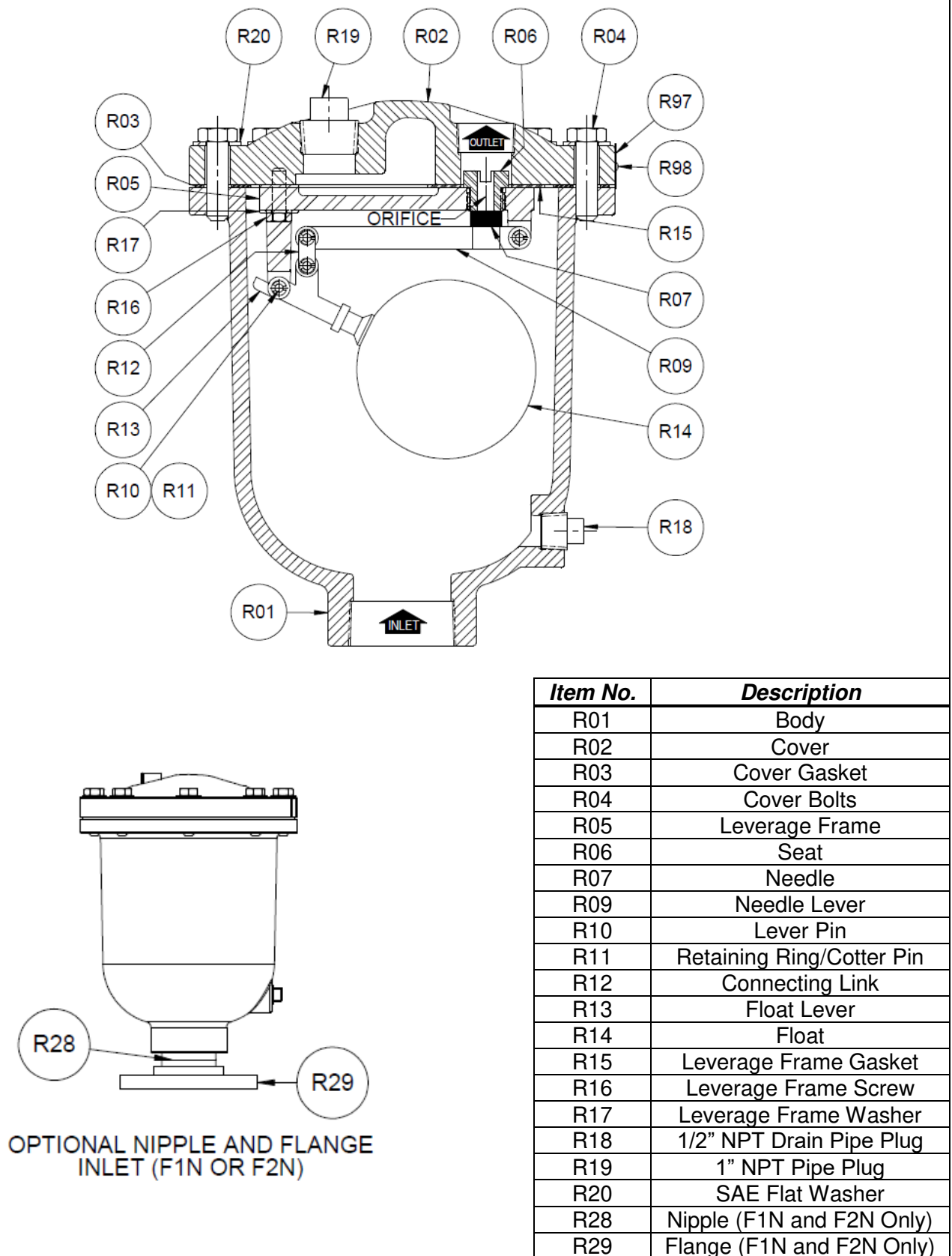


Figure 6: 200 Air Release Valve Components

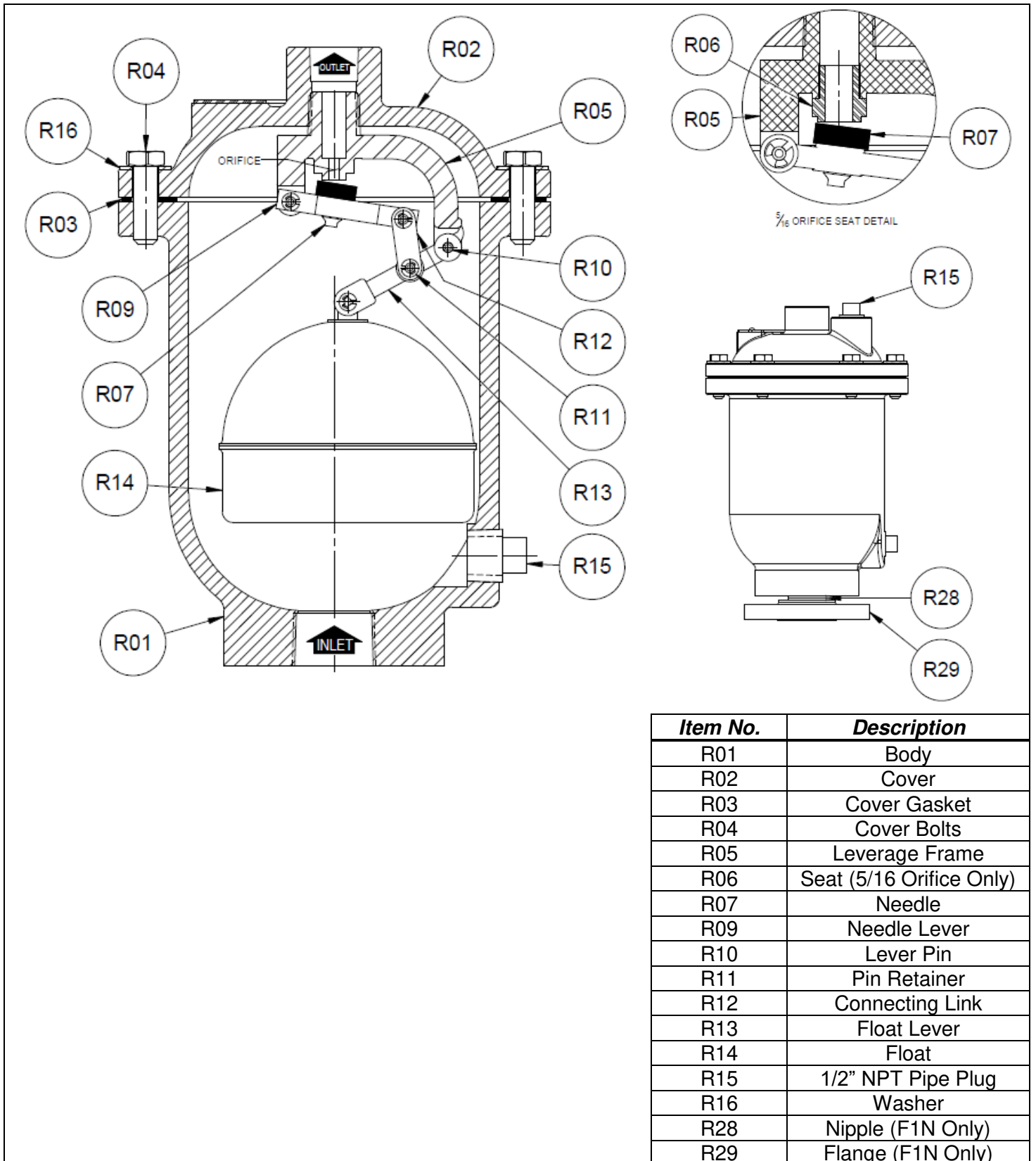


Figure 7: 200A Air Release Valve Components

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 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 (69 kPa).	Replace seat with softer seat.
	Float linkage is dirty.	Clean float linkage.

Limited Warranty

DeZURIK, Inc. ("Seller") manufactured products, auxiliaries and parts thereof that we manufacture 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 may 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 or part, 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, BUT NOT LIMITED TO, 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. NEITHER ANY PERFORMANCE OR OTHER CONDUCT, NOR ANY ORAL OR WRITTEN INFORMATION, STATEMENT, OR ADVICE PREPARED BY SELLER OR ANY OF OUR EMPLOYEES OR AGENTS WILL CREATE A WARRANTY, OR IN ANY WAY INCREASE THE SCOPE OR DURATION OF THE LIMITED WARRANTY.

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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.

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IN NO EVENT SHALL SELLER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, PUNITIVE, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO; DAMAGE TO OR LOSS OF OTHER PROPERTY OR EQUIPMENT, BUSINESS INTERRUPTION, COST OF SUBSTITUTE PRODUCTS, LOSS OF TIME, LOSS OF PROFITS OR REVENUE, COST OF CAPTIAL, LOSS OF USE, OR DIMINUTION IN VALUE) 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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Design features, materials of construction and dimensional data, as described in this manual, are provided for your information only and should not be relied upon unless confirmed in writing by DeZURIK, Inc. Certified drawings are available upon request.