A.R.I. D-26 4" IOM

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COMBINATION AIR VALVE
MODEL D-26 4"

The following is a step by step narrated description of the A.R.I. D-26 industrial combination air valve installation, operation and maintenance processes.

The D-26 air valve is designed for systems that operate within the pressure and temperature framework of the model's specifications table. Please consult Aquestia for products designed for other hazardous liquids systems.

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- Repairs made in and to the products by personnel not authorized by Aquestia
- Maintenance or repairs using parts or components other than those specified by Aquestia and in their original condition.
- Operating the products in ways other than the operating procedures described in the manuals provided by Aquestia, or resulting from not following the cautionary remarks and warnings in the product manual.
  - Improper storage, workplace conditions and environmental conditions which do not conform to those stated in the Product manual.
  - Fires, earthquakes, floods, lightning, natural disasters, or acts of God.

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1. SAFETY INSTRUCTIONS

General

1. Aquestia products always operate as components in a larger system. It is essential for the system designers, installers, operators and maintenance personnel to comply with all the relevant safety standards.
2. Installation, operation or maintenance of the product should be done only by qualified workers, technicians and/or contractors using only good engineering practices, complying with and observing all conventional safety instructions in order to minimize risk and/or danger and/or hazard to workers, the public or to property in the vicinity in accordance with all relevant local standards.
3. Extra safety considerations should be taken with hot and hazardous liquids or in hazardous environments' applications to avoid bodily/physical harm and damage to public or private property.
4. All individuals installing operating and/or handling the products including all workers should at all times adhere to the occupational safety and health (OSH) instructions and wear safety helmets, goggles, gloves, and any other personal safety equipment required by the local standards and regulations.
5. Use only appropriate standard tools and equipment operated by qualified operators when installing, operating and maintaining the product.
6. Prior to installation, operation, maintenance or any other type of action carried out on the product, read carefully the safety, installation and operation instructions of the product.
7. Please note:
   - Pressurized fluid and/or gas may be discharged from the product without prior warning. Make sure that the product's outlet port is not directed toward electrical elements (pumps) or people.
   - The pressurized fluid and/or gas that can be discharged from the product may create high noise levels. Take this into consideration when installing the product in areas sensitive to noise.
8. Always open and close valves slowly and gradually.
9. Please note that the maximum working pressure indicated at the product's specifications table doesn't include pressure changes caused by water hammer and pressure surge effects. Use the product only according to its designated pressure rate specifications.
10. Use the product only for its intended use as designed by Aquestia Any misuse of the product may lead to undesired damages and may affect your warranty coverage. Please consult with Aquestia prior to any non regular use of this product and make no change or modification to the product without a prior written consent to be provided by Aquestia at Aquestia's sole discretion.
11. Please note that Aquestia shall NOT assume any liability with respect to any damage losses and/or expenses caused to any person and/or property whatsoever unless the product has been duly installed and thereafter maintained in strict compliance with its designated maintenance Instructions and/or any other installation and operation manuals provided by Aquestia for the product and/or applicable ordinances and/or codes.

Handling

1. Shipping and handling the product must be done in a safe and stable manner and in accordance with the relevant standards and regulations.
2. Storage should be in the original delivery crates or cases. Storage should be off the ground in a clean, dry indoor area.
3. For lifting and positioning the product, use only approved lifting equipment operated by authorized employees and contractors.
4. Prior to the installation visually verify that the product was not damaged during shipment to the installation site.

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Installation

1. Install the product according to the detailed Installation Instructions provided with it by Aquestia and according to the description given in this manual.
2. The user should install a manual Isolation Valve under the product's inlet port.
3. In all installation sites, the user should enable good visibility and verify that the work and auxiliary equipment used are done in accordance with the relevant local authorized standards. Extra safety considerations should be taken on hazardous environment sites.
4. Check and re-tighten the bolts connecting the product to the pipeline during commissioning and before operating the product for the first time.

Commissioning and Operation

1. Read carefully the operation instructions prior to any attempt to operate the product.
2. Observe the safety stickers on the product and never perform any operation contradicting the instructions given.
3. In order to achieve maximum performance and smooth operation of the product, it is crucial to perform the startup and first operation procedures exactly as described in this manual.

   4. In cases where formal commissioning procedure is required, it should be done by an authorized Aquestia technician prior to the

first operation of the product.

Maintenance

Before any maintenance or non-regular operation, please read the following:

1. Servicing the product should be done only by qualified technicians for this type of work.
2. Make sure that you know the exact type of the system fluid. Act accordingly and comply with all the relevant standards and regulations set for handling this type of fluid.
3. Before disconnecting the product from the system and before releasing the residual pressure do NOT:
   - loosen or unscrew the product bolts;
   - remove any protection cover;
   - open any service port.
4. Before any maintenance or non-regular operation, shut off the Isolation valve and release the residual pressure:
   A. For air valves with a pressure release outlet, slowly open the pressure release plug or the ball valve and make sure that all pressure is released. Please note that some air release valves, especially the wastewater models, may contain a significant volume of compressed gas with accumulated energy!
   B. For air valves without a pressure release outlet, slowly unscrew the flange bolts until all the pressure is released from the valve.
5. Make sure the air valve is empty of all liquid prior to commencing maintenance.
6. Remove the product from the line only after ensuring that internal pressure has been released.
7. Place warning signs around the work area as required by the local standards and procedures.
8. Inspect the product's safety stickers and replace any damaged or faded sticker.
9. Manual cleaning of the product and/or its components using high water pressure or steam should be performed in accordance with its specific cleaning instructions, the local standards and regulations and without endangering the operator or the vicinity
10. Manual cleaning of product and/or its components using acid or other chemical agents should be performed in accordance with the specific cleaning instructions, the relevant safety instructions for using that chemical as given by its supplier, the local standards and regulations and without endangering the operator or his vicinity.
11. For products used in potable water systems, if it is required to disinfect the product, do so according to the local water authority standards and regulations before putting the product into service.

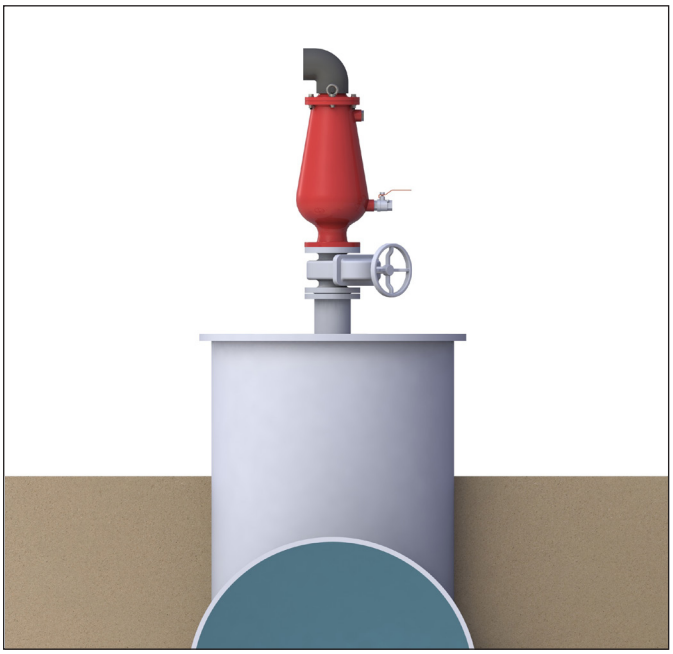
Before returning to regular operation

1. Re-assemble any protection covers or protection mechanisms removed during service or maintenance operations.
2. Make sure that all the tools, ladders, lifting devices, etc. used during the maintenance procedures are taken away from the product area and stored.
3. Remove grease and fat material residues in order to avoid slipping.
4. In order to return the product to regular operation, follow the First Start-up Operation instructions as detailed in your user manual.

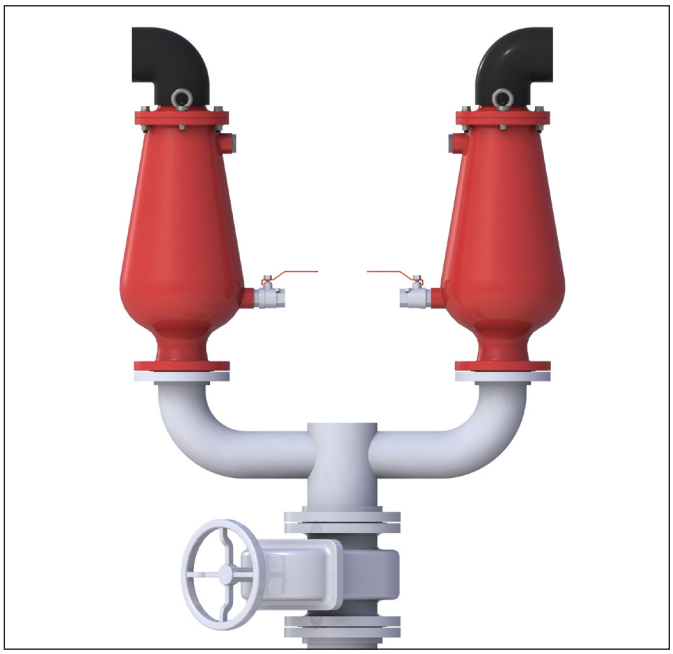
2. INSTALLATION

Important: Before performing any work on the air valve make sure that all workers on site are familiar with the safety instructions and the relevant local and general safety instructions and work regulations.

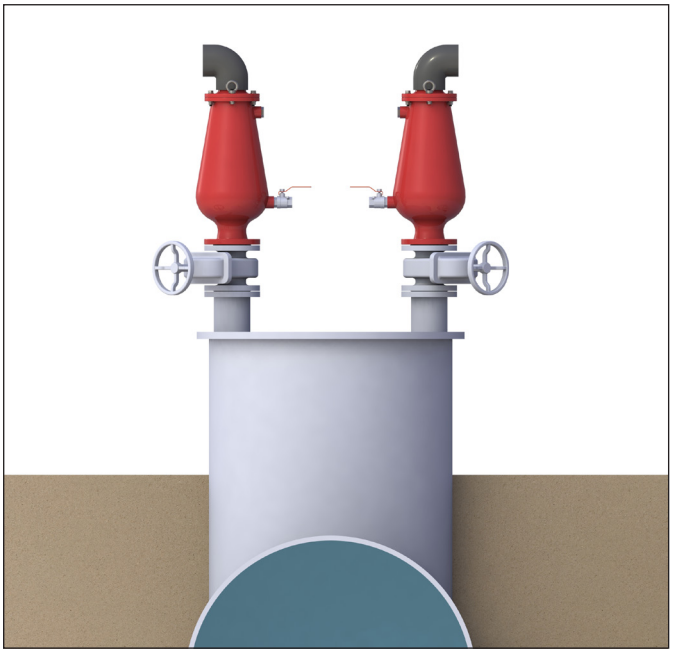
2.1. Installation Recommendations



Single Air Valve on an Isolating Valve at 45° to Air Valve outlet



Two Air Valves on a shared Isolating Valve. Air Valves outlets face outward and the Isolating Valve at 45° to Air Valve outlets



Two Air Valves on an Air Trap with separate Isolating Valves. Air Valve outlets face outward and the Isolating Valves at 45° to Air Valve outlets

Underground Installations

- Underground installations require a venting pipe from the manhole
- Use an angular installation to bypass an obstacle directly above the pipeline.

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2.2. Conventions and Measurements

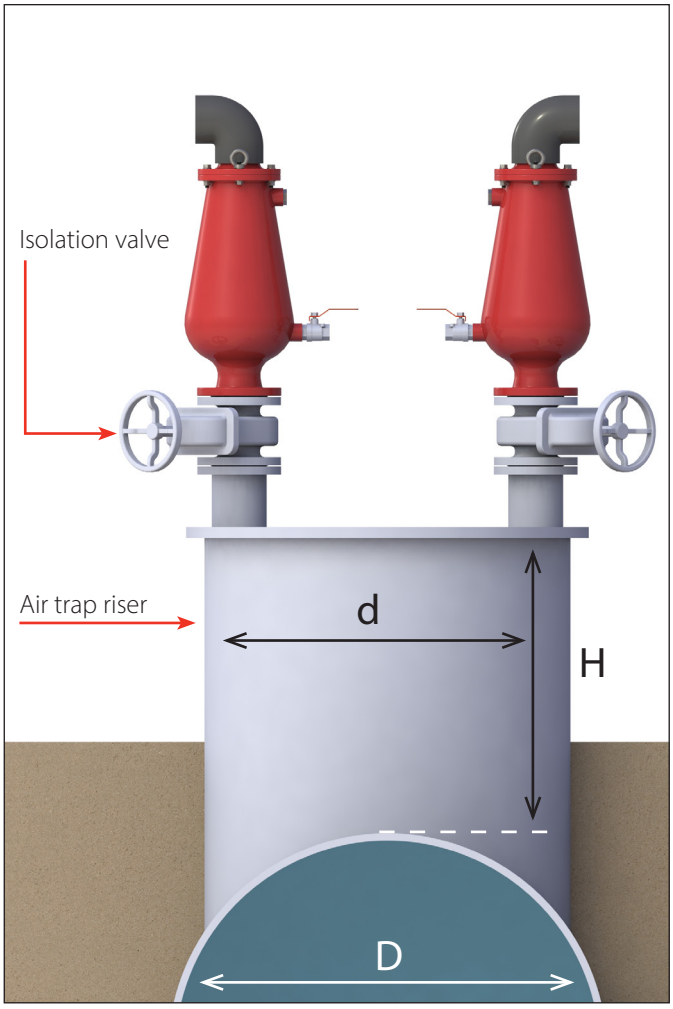
This paragraph presents and explains the terms and measurements used for the Installation process.

D = Diameter of pipeline

d = diameter of riser

H = Height of riser on the pipeline

(measured from crown of pipeline)



- For pipelines up to 12" (300mm) in diameter (D), the Air Trap diameter (d) should be the same as the pipeline diameter.
- For larger pipelines of up to 60" (1500mm) in diameter (D), the Air trap diameter (d) should be 60% of the pipeline diameter.
- For larger than 60" (1500mm) pipelines (D), the Air trap diameter (d) should be 35% of the pipeline diameter.
- The Air trap length (H) should allow easy access to the air valve from below and should be at least 6" (150mm).

2.3. Installation Instructions

1. Flush the system before installing the air valve to avoid any debris or sharp objects getting into the air valve.
2. Carefully remove the air valve from the shipping package. Unload all air valves carefully to a sturdy level surface taking care not to drop them.
3. Air valves fitted with hoist rings should only be lifted and conveyed using these hoist rings.
4. Install an isolating valve below the air valve, connected by a Riser to the crown of the pipe.
5. Mount the air valve carefully on the rubber gaskets of the isolating valve.
6. Place washers on each of the bolts & nuts that connect the air valve flange to the isolating valve flange.
7. Tighten all the bolts and nuts using the crossover method.

a. The closure tightness of the bolts and nuts shall be according to the standard torque for their specific size.

b. Use ring wrench keys for the closing and opening of all bolts of the air valve (including the flange bolts).

3. OPERATION

When the system is charged and the pipeline begins to fill, the water flowing in the pipeline enters into the combination air valve, raising the air/ vacuum and air release floats to their sealing position.
During filling, air is discharged mainly through the air/ vacuum orifice as well as small amounts of air released through the air release orifice. As the pipeline becomes fully pressurized, the air/ vacuum orifice will seal and entrapped air will then be automatically released only from the air release orifice.
During pipe draining or water column separation, the floats will drop down due to the vacuum created, and air will enter into the pipeline through the air/ vacuum orifice.

4. TROUBLESHOOTING

Symptom	Possible Causes	Remedy
Valve leaking from the Discharge Outlet	A. Low pressure B. Debris caught in sealing mechanism or Rolling Seal is damaged	A. Requires a minimum pressure of 0.05 bar (0.7 psi) to seal properly B. Perform 5.2 First Stage Maintenace
Valve continues to leak after 1st Stage Maintenance or leak is large	Debris caught in sealing mechanism or Rolling Seal is damaged	Perform 5.3 Second Stage Maintenace
Leakage from the Ball Valve	A. Ball Valve not completely closed B. Debris caught inside the Ball Valve	A. Tightly close the the Ball Valve B. Fully open, then fully close the Ball Valve

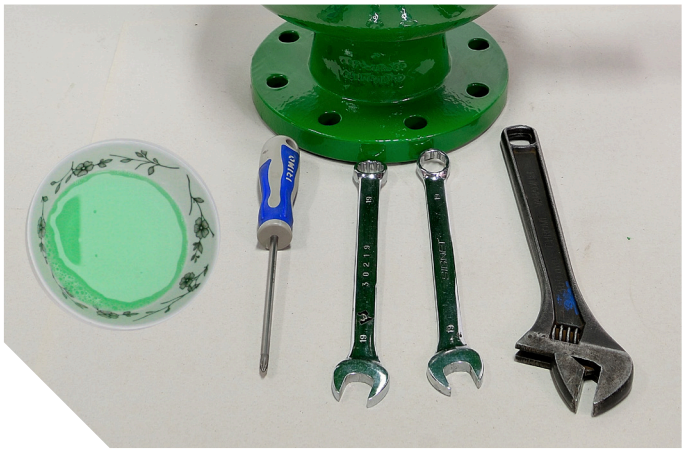
5. PERIODIC MAINTENANCE

Please note that the periodic maintenance of the air valve is an integral part of the proper pipeline maintenance regime; it should be maintained at least once a year in accordance with the quality and composition of the fluid in the system.

Important: Before performing any work on the air valve, make sure that all workers on site are familiar with the safety instructions as appear in chapter 1 of this document and with all the relevant local and general safety instructions, standards and work regulations.

5.1. Preparation

5.1.1. Required tools and materials:

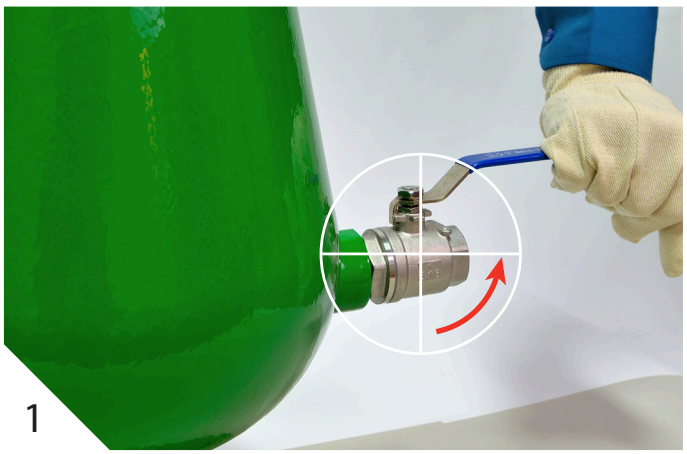


- Phillips head screwdriver
- 19mm combination spanner X 2
- 12" (200mm) adjustable wrench
- Liquid type dish soap

5.2. First Stage Maintenance

Perform when a small leak is detected from the Cover Discharge Outlet and clogging or debris in the sealing mechanism is suspected or for periodic maintenance.

5.2.1. Releasing Pressure



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- Shut the isolating valve located on the riser under the air valve
- Open the Ball Valve to release pressure and drain the air valve [1]
- Important: Discard liquid to comply with local regulations

5.2.2 Removing the Plug

• Using the 12" (200 mm) adjustable wrench, turn in a counterclockwise direction to open and remove the Plug from the air valve Body [1] [2]

• Store the Plug in an accessible area

1

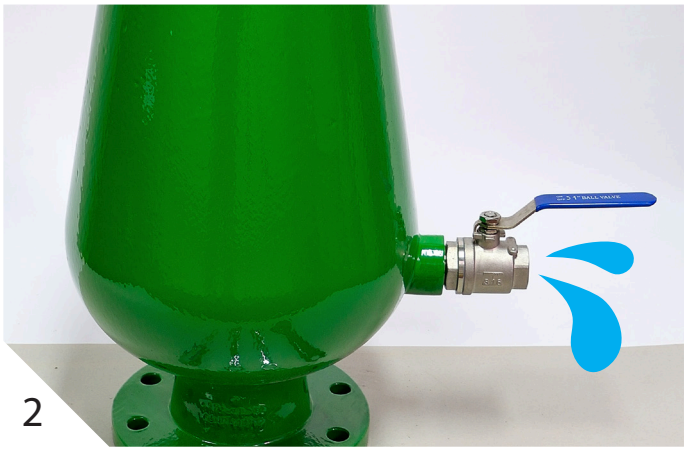
2

5.2.3. Backwashing the Inner Valve Body, Float and Sealing Assembly

• Insert a hose with a strong stream of water into the Plug port to wash the inside parts of the valve [1]

• Important: Gather up all backflush water discharged from the Ball Valve and discard the liquid in compliance with local regulations [2]

1



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5.2.4. Assembly and Testing for Leaks

- Insert the Plug into the air valve Body port [1]
- Using the 12" (200 mm) adjustable wrench, turn in a clockwise direction to tighen [2]
- Close the Ball Valve [3]

* Slowly open the isolating valve located on the riser under the air valve.

- Look for leaks in the Cover Discharge Outlet. If the air valve still leaks, proceed to: Second Stage Maintenance


1


2

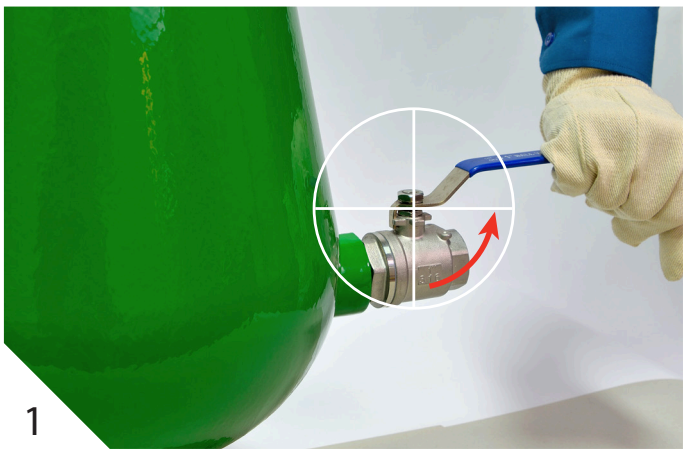

3

5.3. Second Stage Maintenance

Perform if the first stage doesn't solve the leak, if one of the seals or inner parts needs replacement or for periodic maintenance to thoroughly clean the valve.

5.3.1. Releasing Pressure

- Shut the isolating valve located on the riser under the air valve
- Open the Ball Valve to release pressure and drain the air valve [1]
- Important: Discard liquid to comply with local regulations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5.3.2. Disassembly

1- Remove of the Cover and Seal & Float Assembly

- Using the two 19mm combination spanners, open and remove the four Bolts, Nuts and Washers [1] [2]
- Store the four Bolts, Nuts and Washers in an accessible area [3]
- Lift and extract the Cover assembly from the valve Body [4], [5]
- Place the Cover Assembly on a clean flat surface [1] to prepare for the next step

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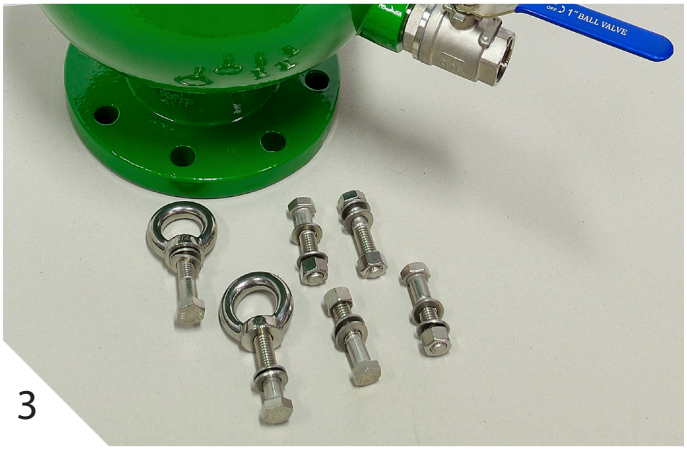

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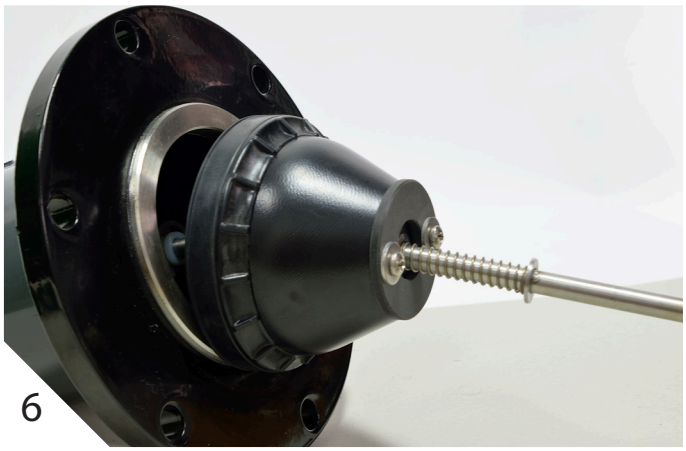

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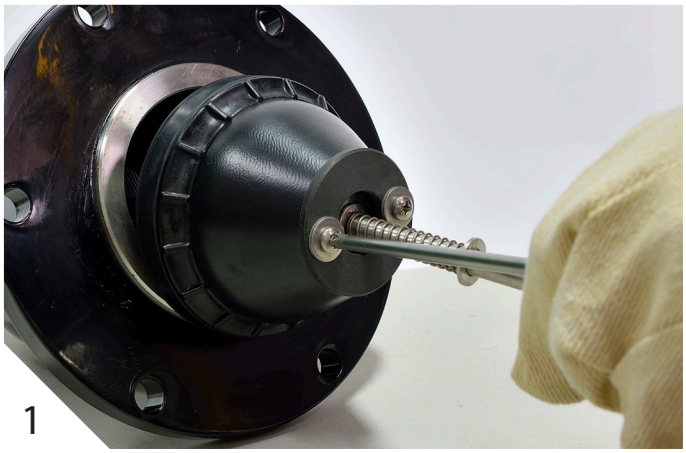
5.3.3. Maintenance

1- Replacing the Automatic Air Release and Air & Vacuum (Kinetic) Seals

1.1 Opening the Seal Assembly

• Using the Phillips head screwdriver, unscrew the 2 screws that connect the Float & Seal Assembly [1] and remove them from the housing [2]

• Separate the two sections of the Float & Seal Assembly [3]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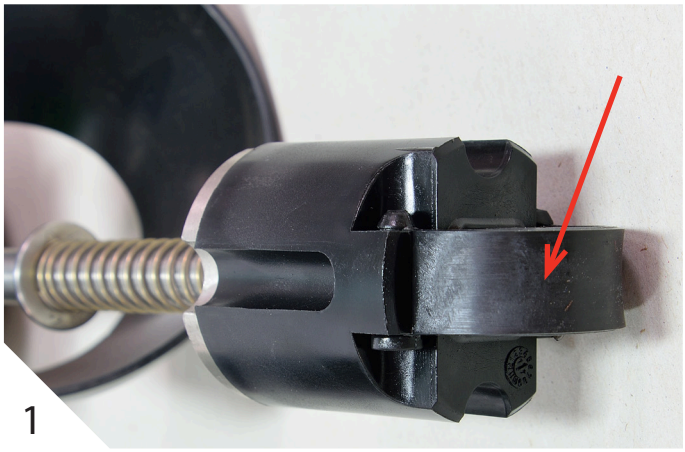
1.2 Replacing the Automatic Air Release Rolling Seal

• To replace the Air Release Rolling Seal [1] , pull the seal out of the slots from both ends and discard [2] [3]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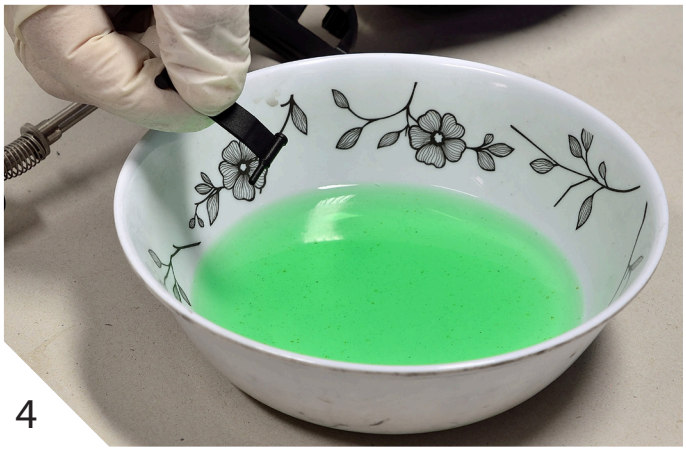
• Dip both ends of the new replacement Rolling Seal in the liquid soap [4]

• Insert the tail end of the Rolling Seal and press in on the wide end until it is fully inserted into the slot. [5]

• Repeat the above procedure for the second side till both sides are inserted properly [6] , [7]



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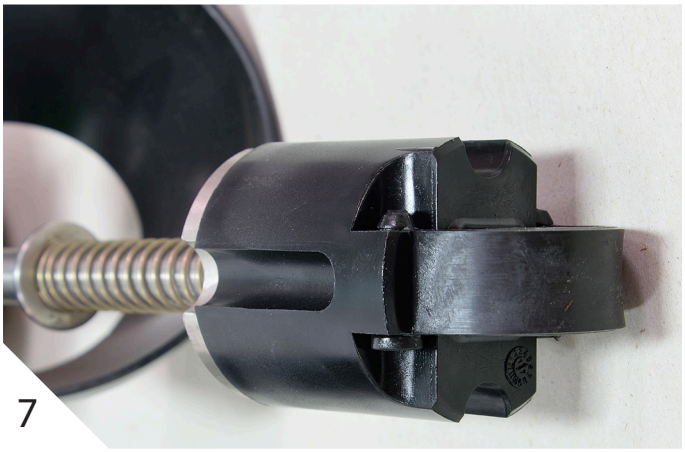

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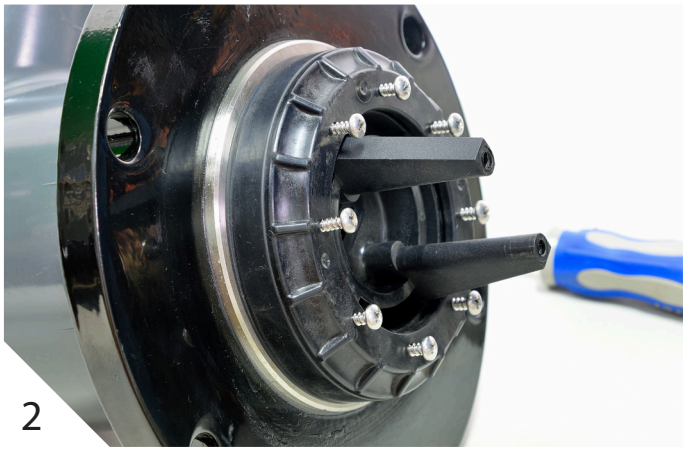
1.3 Replacing the Air & Vacuum (Kinetic) Seal

- Using the Phillips head screwdriver, turn the 8 screws on the Air & Vacuum Seal cover in a counterclockwise direction until they are free from their housing and turn freely [1] [2]
- Remove the Air & Vacuum Seal cover together with the Air & Vacuum Seal [3]
- Examine the Air & Vacuum Seal for tears or cracks. Replace if necessary.
- Place the new Air & Vacuum Seal on the Seal housing and press down until it fits securely and tightly on the housing [4]
- Place the Air & Vacuum Seal cover over the Air & Vacuum Seal [5] and screw all 8 screws tightly into the housing [6]


1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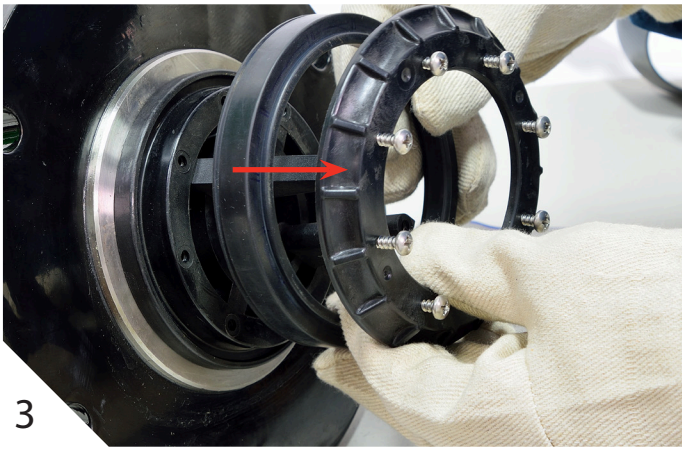
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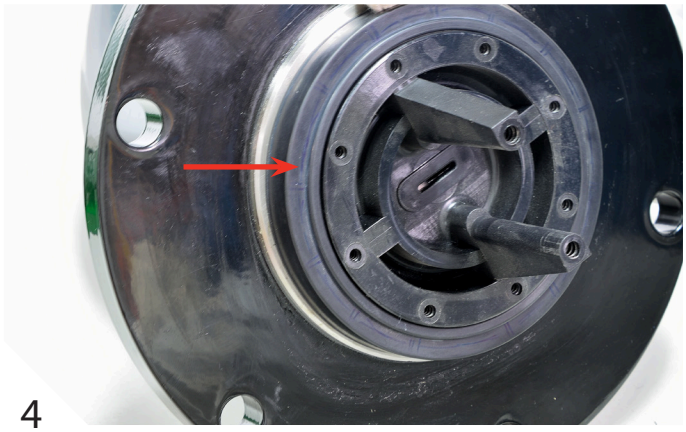
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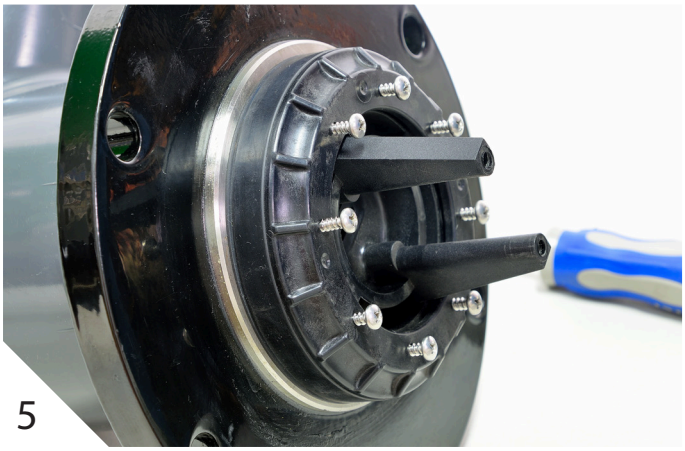
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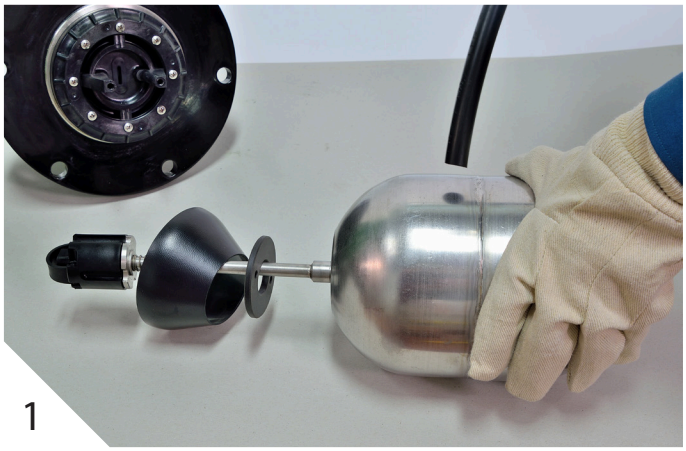
2- Cleaning

Wash and clean all disassembled parts, including the Float and Seal Assembly, Spray Guard, Body and Cover under clean running water to remove all dirt and grime pictures [1] [2] [3] [4] . Pay special attention that the Air Release Orifice is clean of debris [5]



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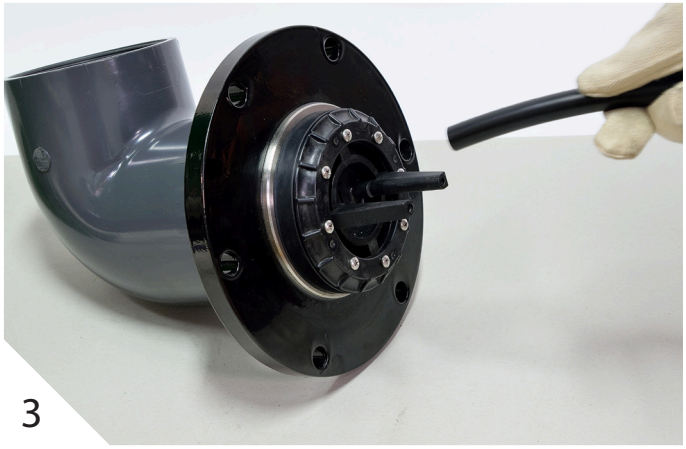

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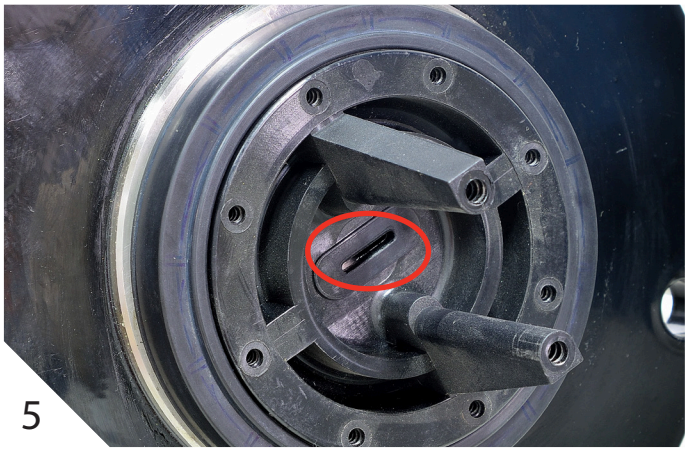

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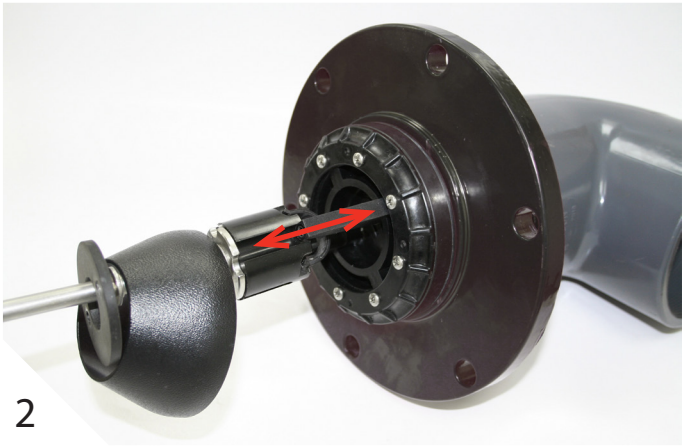
3- Closing the Seal Assembly

- Align the 2 grooves of the Slider opposite the 2 legs of the Air/ Vacuum Housing and slide inward into place [1] [2]
- Align the 2 holes of the Disc opposite the 2 holes in the legs of the Seal Assembly Housing [3]
- Insert the 2 screws and screw them tightly into place [4] [5], [6]


1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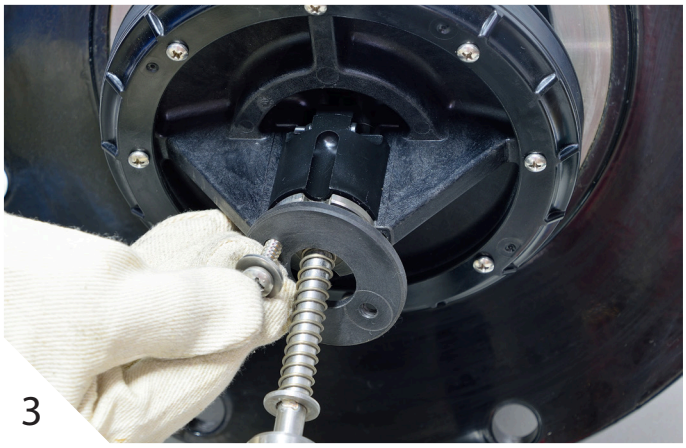
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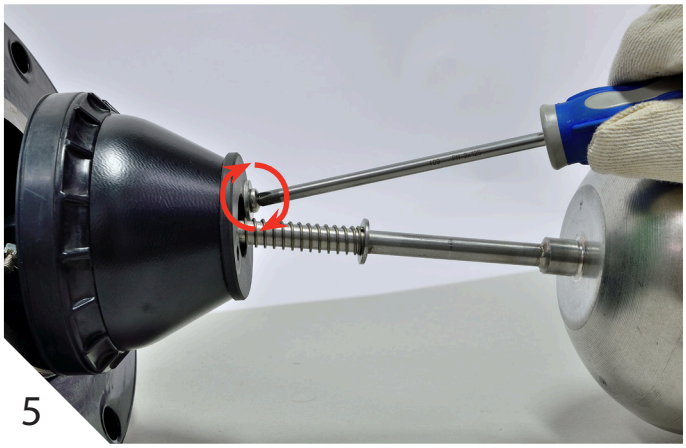
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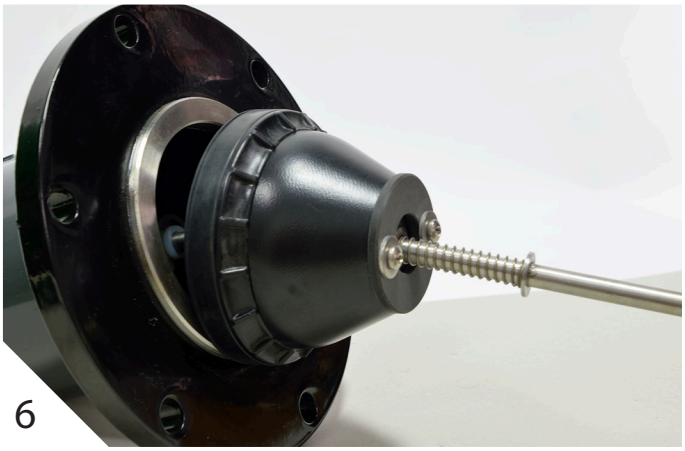

6

5.3.4. Assembly

1- Cover O-ring

• Examine the Cover O-ring for cracks or tears [1] [2]. Replace, if necessary

1

2

2- Inserting the Plug

• Using the 12" (200 mm) adjustable wrench, turn in a clockwise direction to insert and screw the Plug into the air valve Body [1] [2]

1

2

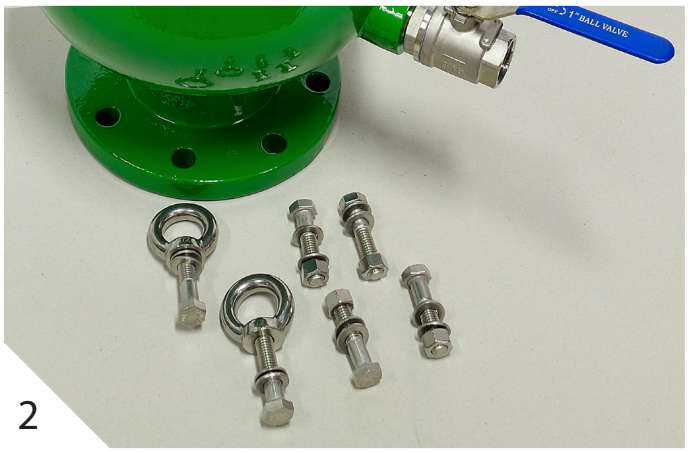
A.R.I. D-26 4" IOM

Aquestia
Directing the Flow

1

3- Inserting the Cover and Seal & Float Assembly

- Lift and insert the Float and Seal Assembly into the Body [1]
- Insert the four Bolts, Nuts and Washers [2],[3]
- Using the two 19mm combination spanners, manually tighten the Bolts using the crossover method [4]
- Close the Ball Valve [5] [6]
- Slowly open the isolating valve located on the riser under the air valve.



2

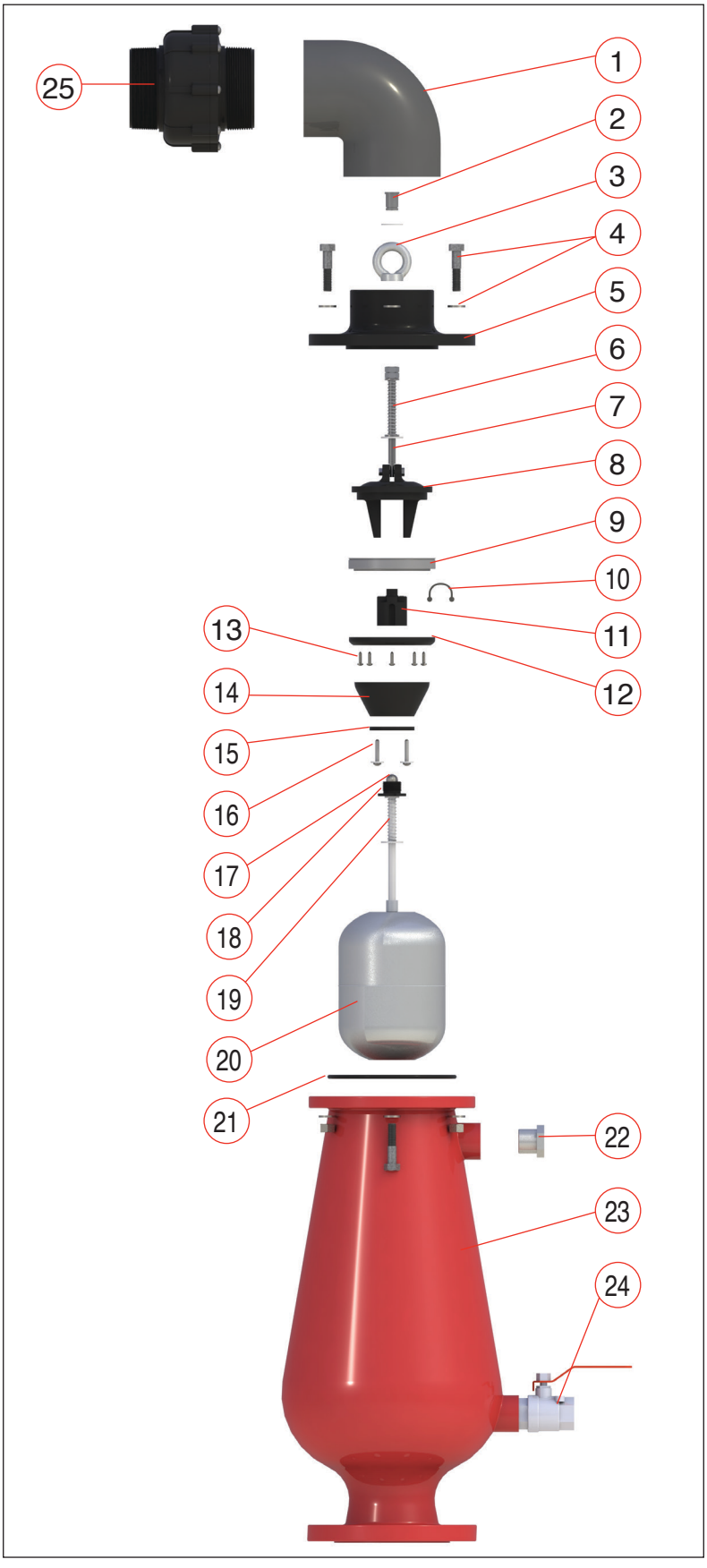
3

4

5

6. ASSEMBLY BOM TABLE AND DRAWING

No.	Part name	QTY.
1	Discharge Elbow	1
2	Bushing	1
3	Lifting Ring	2
4	Bolt, Nut & Washer	6, 4, 12
5	Cover Assy.	1
6	Spring	1
7	Guide Rod Assembly	1
8	Air & Vacuum Seal Seat	1
9	Air & Vacuum Seal	
10	Air Release Seal	1
11	Air Release Seal Seat	1
12	Air & Vacuum Seal Cover	1
13	Screw	8
14	Flow Enhancer	1
15	Seal Assy. Cover	1
16	Screw	2
17	Domed Nut & Washer	1
18	Stopper	
19	Spring	1
20	Float & Rod	1
21	O-ring	1
22	Plug	1
23	Body	1
24	Ball Valve	1
25	NS Component	1



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