

A.R.I. D-070-P Dynamic Combination Air Valve

The following is a step by step narrated description of the A.R.I. D-070-P Dynamic Combination Air Valve installation, operation and maintenance processes.

A.R.I. D-070-P Combination Dynamic Air Valve is a unique valve, operating without a float and utilizing the rolling diaphragm principle.

A.R.I. D-070-P air valve is designed for water systems that operate within the pressure and temperature framework of the model's specifications table. Please consult Aquestia for products designed for other wastewater or hazardous liquids systems.



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- Maintenance or repairs using parts or components other than those specified by Aquestia and in their original condition.
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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.

1.

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. For lifting and positioning the product, use only approved lifting equipment operated by authorized employees and contractors.
3. Prior to the installation visually verify that the product was not damaged during shipment to the installation site.

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. 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.

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's 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 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 waste water models, may contain 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.

2.2. Conventions and Measurements

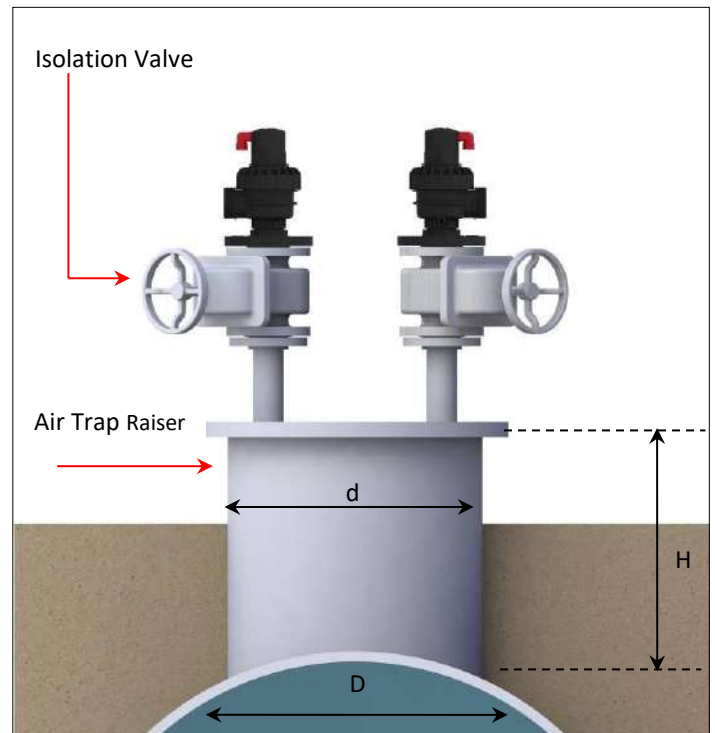
This paragraph presents and explains the terms and measurements used for the Installation process.

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).

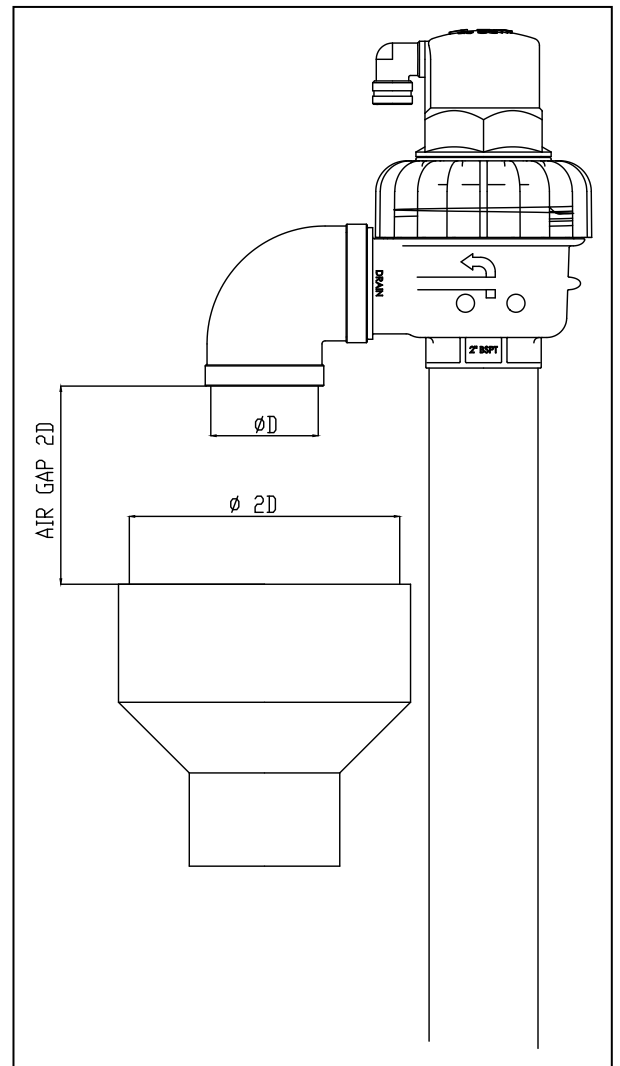


2.3. Installation Instructions

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. Install an isolating valve below the air valve, connected by a riser to the crown of the pipe.
4. The A.R.I. D-070-P Dynamic Combination Air Valve should be installed vertically on a riser on the crown of the pipeline.
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).

2.4. Directions for Discharge Outlet A.R.I. D-070-P Air Valve

1. It is recommended to leave the discharge outlet completely open and unhindered:
 - a. Avoid directing the discharge outlet opening in the direction of workers, bystanders or animals.
 - b. Avoid directing the discharge outlet opening in the direction of vulnerable equipment that can be damaged, such as electrical equipment, unstable structures, etc.
2. If a drain pipe must be installed to direct the outlet discharge away from sensitive areas, please follow the recommended drawing (do not use flexible pipe):



D = Diameter of the air valve

3. Operation

When the system is charged and the pipeline begins to fill with water, air flows in the pipeline and enters into the dynamic air valve, raising the rolling diaphragm sealing assembly to the open position.

Air is then discharged, mainly through the large orifice as well as small amounts of air released through the pilot orifice. When the ensuing water enters the dynamic air valve, it fills the lower chamber and some of it flows up and enters into the pilot, raising the pilot float which raises the sealing mechanism to its sealed position. Pressure develops inside the pilot, bringing about a controlled lowering of the rolling diaphragm sealing assembly, which, in turn, seals the large orifice.

4. Troubleshooting

Symptom	Possible Causes	Solution
Leakage from the Discharge Outlet	A. Debris or scale buildup on the Rolling Seal (Number [5] on the BOM table). B. Torn Rolling Seal.	Follow instructions in the Maintenance of the Pilot section of this document.
	A. Debris or foreign object caught in the Rolling Diaphragm Sealing Assembly (Number [9] on the BOM table).	Follow instructions in the Maintenance of the Dynamic Valve Body section of this document.
	A. Torn Sealing Assembly or Diaphragm	Follow instructions in the Maintenance of the Dynamic Valve Body section of this document.

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 section 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:

- 4.5mm roll pin punch
- Small bowl with kitchen type liquid soap



5.1.2. Releasing Pressure

- Shut the isolating valve located on the riser under the air valve.
- Carefully release the pressure and drain the air valve
- Important: Discard liquid to comply with local regulations

5.2. Removing the Pilot

- Unscrew and remove the Pilot Body [1], [2]



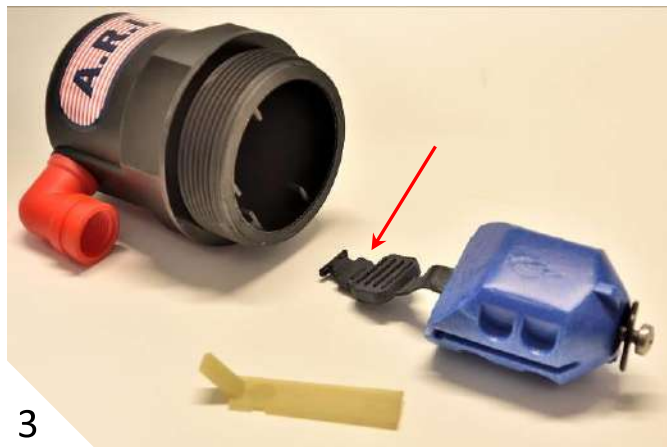
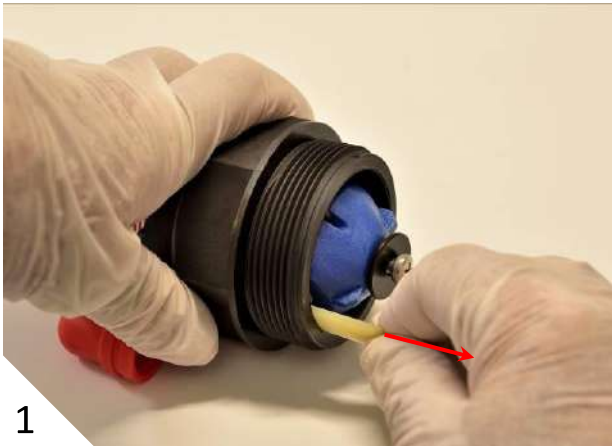
5.2.1. Cleaning of the Air Valve

- Thoroughly wash and clean the air valve components under clean running water to remove all grime; Pay special attention to the internal parts.
- Thoroughly clean the O-ring (replace it if needed [1]. Make sure that the O-ring is correctly seated in its designated groove [2].



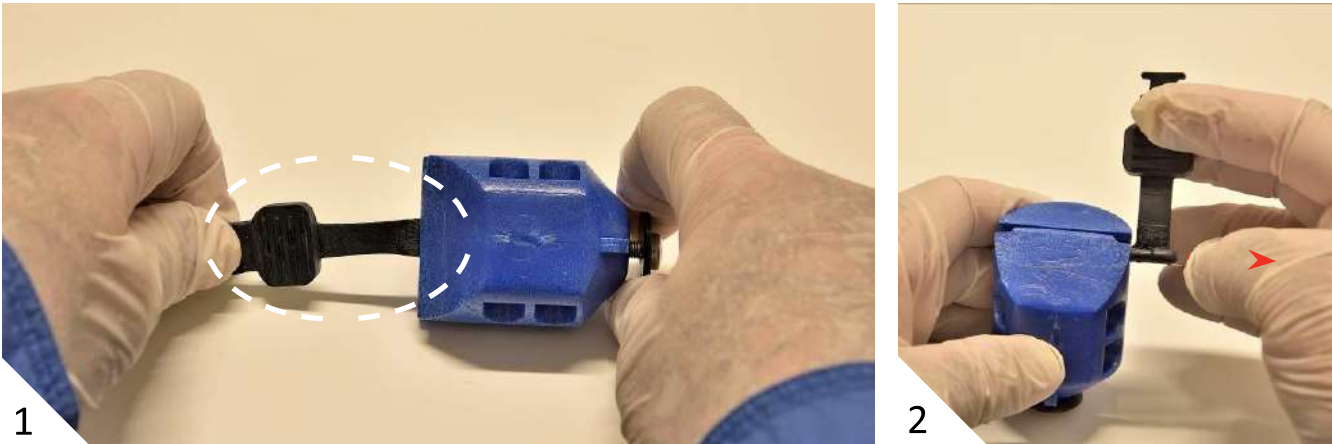
5.3. Maintenance of the Pilot

- Hold the Pilot Body, turn it to the side. Remove the Clamping Stem [1] and the Float [2] together with the Rolling Seal [3].

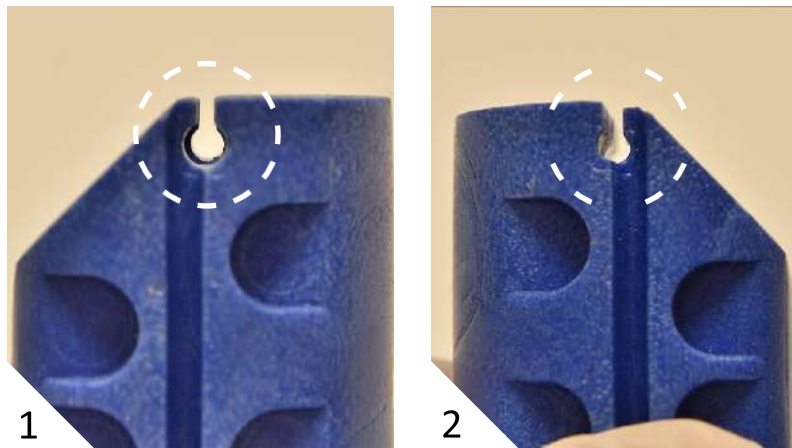


- Thoroughly but gently wash and clean all the components under clean running water. Pay attention to the sealing area inside the Body.

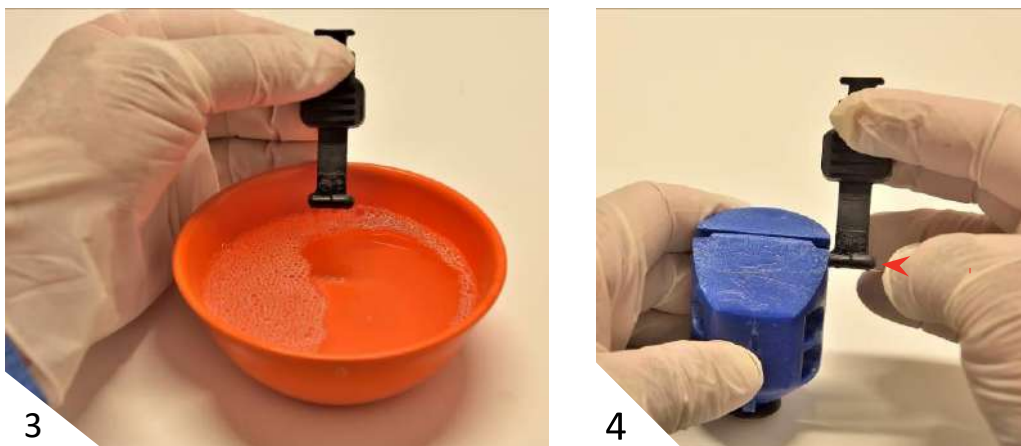
- Visually check the condition of the Rolling Seal [1]. If any cracks or tears are found, remove it from the Float [2] and replace it.

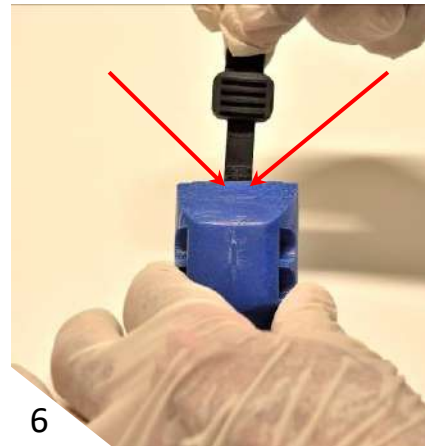
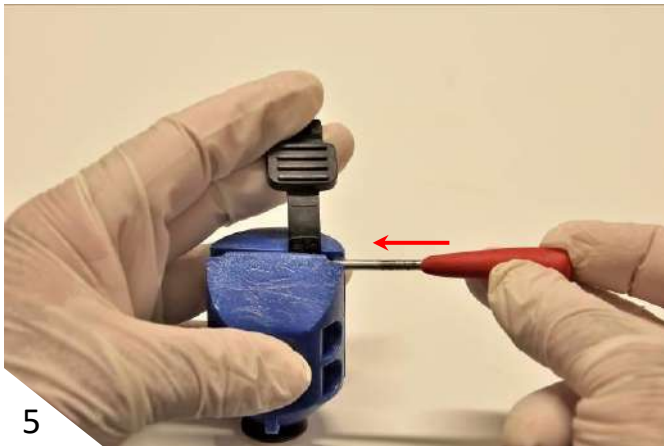


- When required, replace the seal by inserting a new Rolling Seal into its designated groove. Please note: side [1] of the groove is slightly wider than the other [2]; therefore the seal can be inserted only from the wider side of the groove.



- Take a new Rolling Seal Assembly and dip the tail end into the liquid soap solution [3]
- Pay attention to the correct position and direction and insert the tail end of the Rolling Seal Assembly into the groove on the Float [4].
- Gently pull the Rolling Seal Assembly until it is partially inserted into the Float groove. Use the 4.5mm Roll Pin Punch to push the Rolling Seal Assembly to the middle of the Float [5] and align the middle of the Rolling Seal Assembly tail with the midline of the Float [6].

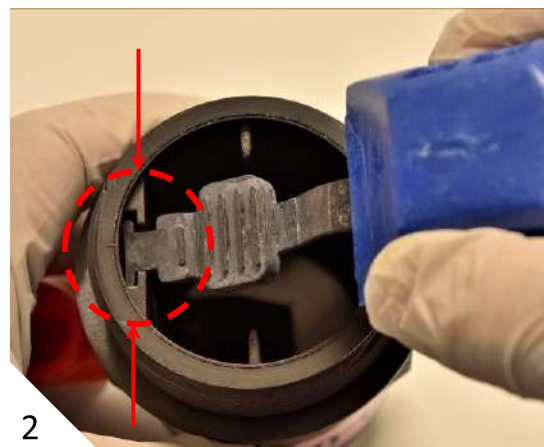




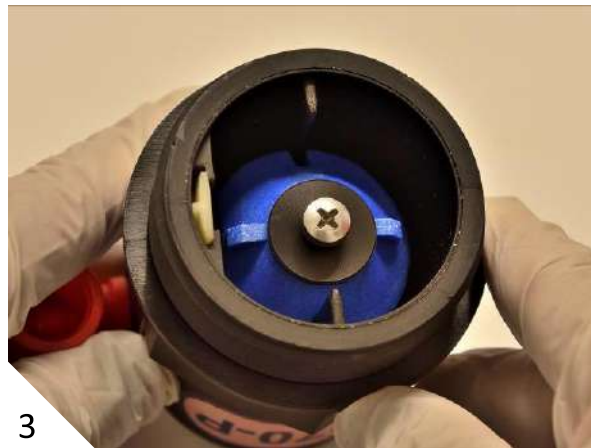
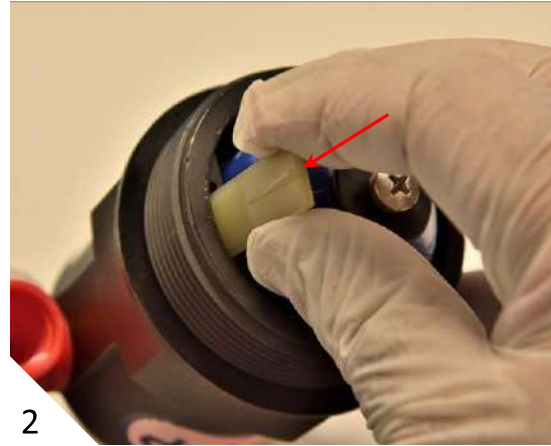
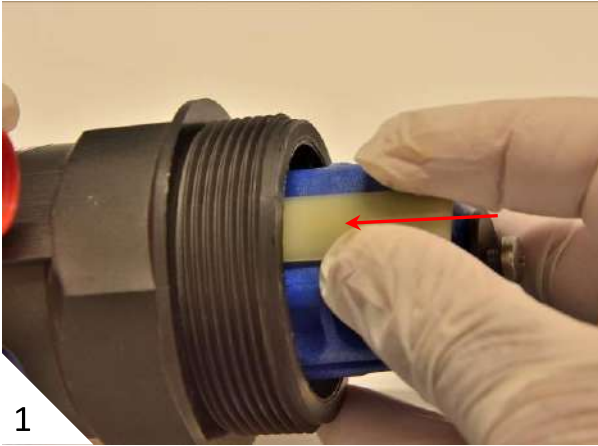
- Dip the head end of the Rolling Seal into the liquid soap solution [1]



- Reassemble the Pilot by inserting the loose end of the Rolling Seal into its designated groove in the Pilot Body [2]; making sure that the insertion direction of the seal's end is as shown by the arrows.



- Insert the Float halfway into the Pilot Body [1], insert the Clamping Stem into the Rolling Seal groove of the Pilot Body; make sure that it is inserted in the direction of the arrow [2]. Push the Float and the Clamping Stem together downwards into the Pilot Body until they are locked [3].



- Make sure that the O-ring of the dynamic valve Body is clean and intact [1] (replace it if needed). Re-screw the Pilot Assembly back to its place in the dynamic valve's Cover [2]. Align the Outlet Elbow of the Pilot with the discharge outlet of the dynamic valve Body [3].





5.4. Maintaining the Dynamic Valve Body

- Unscrew and remove the Pilot Body [1], [2]



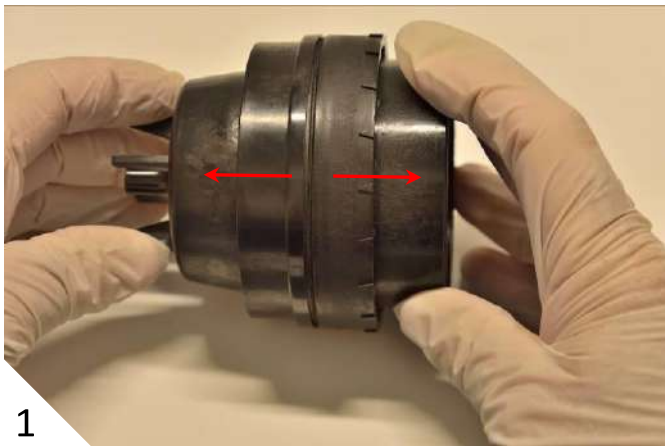
- Unscrew and remove the Locking Ring [1], [2]



- Remove the Rolling Diaphragm Sealing Assembly from the Body [1], [2]. Thoroughly but gently wash and clean all the components under clean running water, remove coarse grime and accumulated scale. Pay attention to the sealing area inside the Body [3].



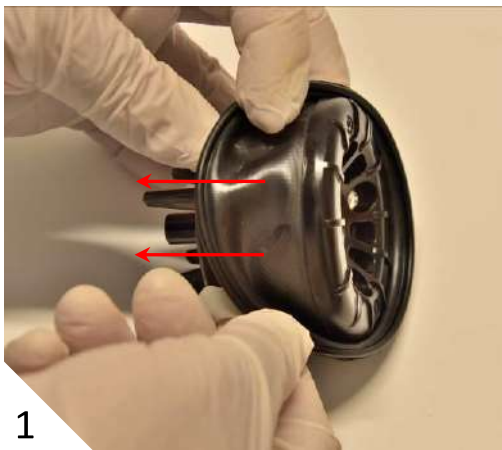
- Separate the Adaptor from the Rolling Diaphragm Sealing [1], [2], [3].
- Make sure that the passage opening of the Adaptor is clean [4].



- Separate the Supporting Ring from the Rolling Diaphragm Sealing [1], [2].



- Fold backwards the rubber part of the Rolling Diaphragm Sealing [1] and check for any cracks and tears [2]. Replace the entire Rolling Diaphragm Sealing Assembly if any damage is detected. Do not open screws of the assembly under any circumstances!



5.5 Assembly and Testing for Leaks

- Reassemble the Dynamic Valve in reverse order of its maintenance section.
- Reconnect the Pilot to the air valve.
- Slowly open the isolating valve located on the riser under the air valve.
- Look for leaks in the Outlet Discharge Elbow.
- Check the air valve for proper operation.

6. Assembly BOM Table and Drawing

No.	Part name	QTY.
1	Discharge Elbow	1
2	Pilot Body	1
3	O-ring	1
4	Clamping Stem	1
5	Rolling Seal	1
6	Pilot Float Assy.	1
7	Locking Ring	1
8	Adaptor	1
9	Rolling Diaphragm Sealing Assy.	1
10	Supporting Ring	1
11	Body	1

