

## AIR & VACUUM VALVES MODEL K-010, K-016, K-100

The following is a step by step narrated description of the A.R.I. air & vacuum valve installation, operation and maintenance processes.

The K-010 air valve is designed for systems that operate within the pressure and temperature framework of the model's specifications table. Please consult A.R.I. for products designed for other hazardous liquids systems.



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- product has not been duly installed and thereafter maintained in strict compliance with its designated Maintenance Instructions and/or any other installation and operation manuals provided by A.R.I. for the product and/or applicable ordinances and/or codes;
- Repairs made in and to the products by personnel not authorized by A.R.I.
- Maintenance or repairs using parts or components other than those specified by A.R.I. and in their original condition.
- Operating the products in ways other than the operating procedures described in the manuals provided by A.R.I., 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. A.R.I. 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 A.R.I. Any misuse of the product may lead to undesired damages and may affect your warranty coverage. Please consult with A.R.I. 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 A.R.I. at A.R.I.'s sole discretion.
11. Please note that A.R.I. 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 A.R.I. 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.

## Installation

1. Install the product according to the detailed Installation Instructions provided with it by A.R.I. 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 A.R.I. 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 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 air valve, raising the air/ vacuum float to its sealing position.

During filling, air is discharged through the air/ vacuum orifice. As the pipeline becomes fully pressurized, the air/ vacuum orifice will seal.

During pipe draining or water column separation, the float 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
Leak From the Air/Vacuum Orifice	Dirt particles stuck on the orifice seal, orifice seat, or on the float.	Shut the isolating valve, wait a minute, and open it again, very fast. If leaking continues, follow steps for: <b>5.1 Maintenance - K-010 Air/ Vacuum Valve</b>

## 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 on Page 3 of this document and with all the relevant local and general safety instructions, standards and work regulations.

### 5.1 Maintenance

#### WARNING

Perform the following operations prior to maintenance or removal of the air valve from the pipeline:

1. Shut the isolating valve on the riser below the air valve.
2. Gradually open cover Bolts (1) using the crossover method until water and air start to be released.
3. Only when the air and water cease to be released, continue to open the Bolts slowly, making sure that all the pressure has been released from inside the air valve prior to maintenance/removal from the pipeline.

B.1.1. Follow the instructions above under the section **WARNING**.

B.1.2. Unscrew the Bolts (1) that connect the valve Cover (8) to the Body (7).

B.1.3. Wash the Body, O-ring (6), Float (5) and Cover Assembly (3-4, 8) under clean running water in order to remove debris and/or accumulated scale.

B.1.4. Check the integrity of the O-ring. Replace if it is torn or cracked.

B.1.5. Check that the Orifice Seal (3) is not damaged (torn or cracked).

B.1.6. In case the Orifice Seal is damaged, consult your dealer.

B.1.7. Reassemble the air valve in the reverse order:

First insert the Float, then place the O-ring in the groove of the Body. Place the Cover on the Body, insert the Bolts and Washers and screw on the Nuts.

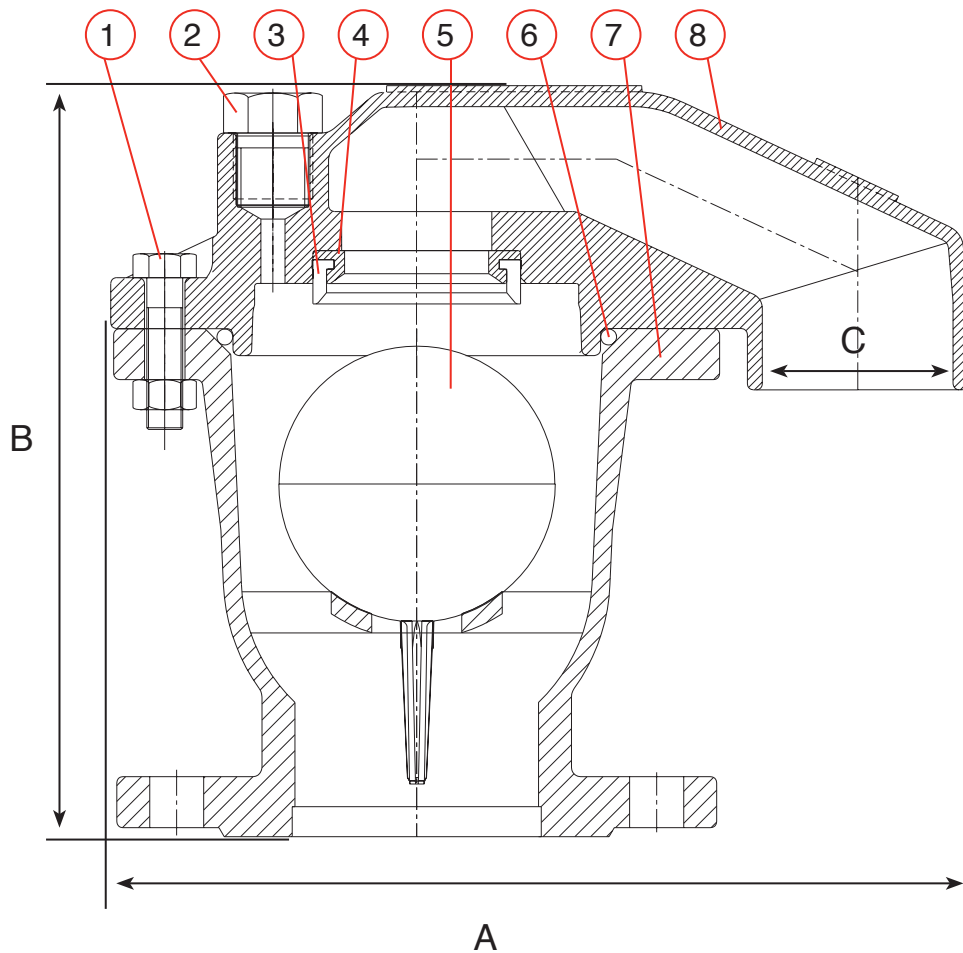
B.1.8. Tighten all the Bolts and Nuts using the crossover method.

The closure tightness of the Bolts and Nuts shall be according to the standard torque for their specific size.

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

## 6. ASSEMBLY BOM TABLE AND DRAWING

No.	Part name	QTY.
1	Bolt, Nut & Washer	4
2	Plug	1
3	Orifice Seal	1
4	Orifice Seat	1
5	Float	1
6	O-Ring	1
7	Body	4
8	Cover	1





## 8. A.R.I. LIMITED WARRANTY

### A.R.I. Standard International Warranty

A.R.I. manufactured products are guaranteed to be free from defect in material and/or workmanship and to perform as advertised when properly installed, used and maintained in accordance with current instructions, written or verbal.

Should any item prove defective within the time period set forth for that item(s), but in any case not later than within 5 (five) years of that product having left A.R.I.'s premises, and subject to receipt by A.R.I. or its authorized representative, of written notice thereof from the purchaser within 30 days of discovery of such defect or failure - A.R.I. will repair or replace or refund the purchase price, at its sole option, any items proven defective in workmanship or material.

A.R.I. will not be responsible, nor does this warranty extended to any consequential or incidental damages or expenses of any kind or nature regardless of the nature thereof, including without limitation, injury to persons or property, loss of use of the products, loss of goodwill, loss of profits or any other contingent liabilities of any kind or character alleged to be the cause of loss or damage to the purchaser.

This warranty does not cover damage or failure caused by misuse, abuse or negligence, nor shall it apply to our products upon which repairs or alterations have been made by other than an authorized A.R.I. representative.

This warranty does not extend to components, parts or raw materials used by A.R.I. but manufactured by others, which shall be only to extent warranted by the manufacturer's warranty.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, EXCEPT THIS WARRANTY WHICH IS GIVEN IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

This five year warranty applies only to valves with nylon or stainless steel body configurations. Epoxy coated ductile iron bodies carry a 1 (one) year warranty.

Guy Sagie  
Chief Executive Officer

