

A.R.I.NR-010

Regev Check Valve

The following is a step-by-step narrated description of the A.R.I. NR-010 spring-loaded check valve (non-return, one way valve) installation, operation and maintenance processes.

A.R.I. NR-010 check valve prevents the return of flow to its source and ensure safe operation of well and stream pumps by keeping their suction pipe full of water.

Such installation is essential for pumping devices drawing water from levels lower than their installation location, or in cases where they are not equipped with self-priming equipment.

With its light weight, compact body and easy installation & maintenance, A.R.I. NR-010 check valve saves the need of operating vacuum pump in order to restart the main pump.

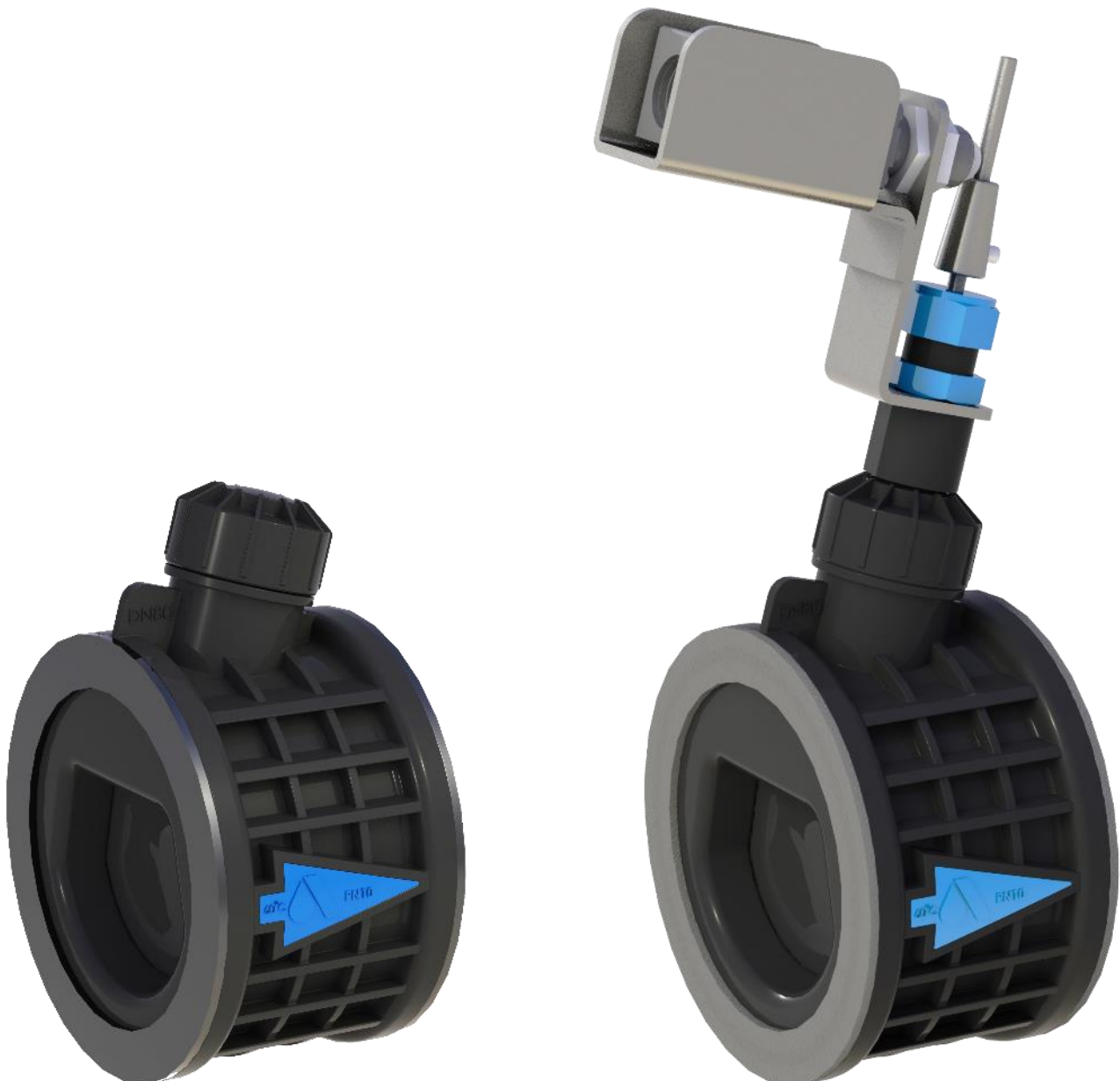


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1. Safety Instructions

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 with 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. 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 upstream of the check valve.
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'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 check valves with pressure release outlet, slowly open the pressure release plug or the ball valve and make sure that all pressure is released.
 - B. For check valves without a pressure release outlet, slowly unscrew the flange bolts until all the pressure is released from the valve.
5. Make sure the check 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.

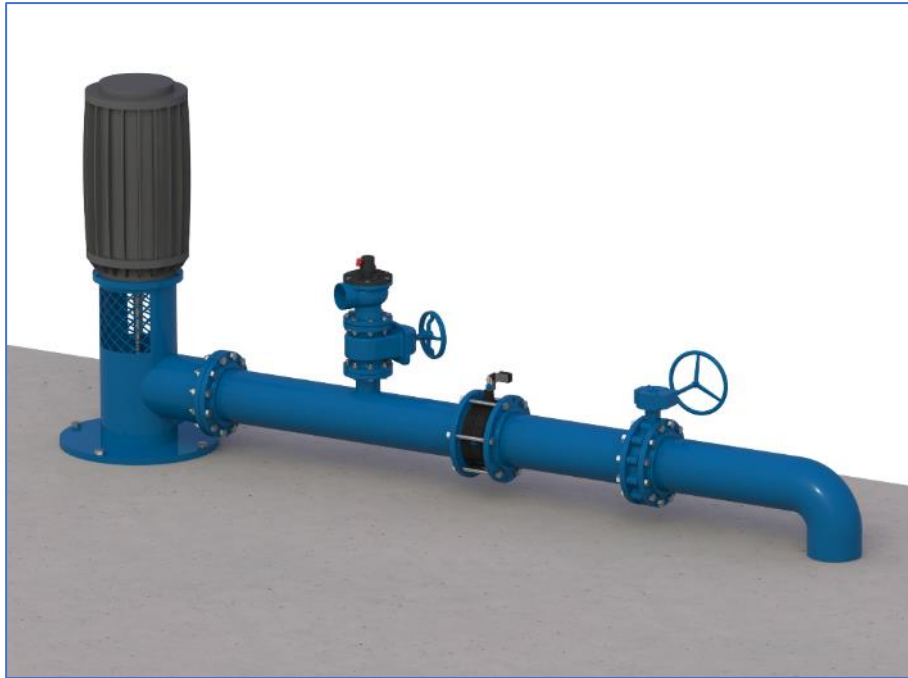
Before returning to regular operation

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 check 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 (Horizontal and Vertical Installations)



2.3. Installation Instructions

1. Flush the system before installing the check valve to avoid any debris or sharp objects getting into the valve.
2. Carefully remove the check valve from the shipping package. Unload it carefully to a sturdy level surface taking care not to drop it.
3. The A.R.I. NR-010 check valve can be installed either horizontally, or vertically while the flow direction is upwards.
4. Shut-off valve – in order to allow maintenance and removal of the valve from the line, it is recommended to install a shut-off valve upstream or downstream of the valve, in order to isolate the valve from all the pressure sources of the pipeline.
5. For easy maintenance, when the valve is installed horizontally the valve should be installed with its spring & piston unit oriented upwards.
6. NR-010 check valves sized 3" and above are installed in between flanges; make sure the isolation valve is not interfering with the check valve's disc full movement.

3. Operation

The A.R.I. NR-010 check valve allows high flow rates operation with minimal head loss thanks to its dynamic actuator, free water flow without interferences, and an innovative spring-assisted mechanism that is installed asymmetrically in relation to the valve's central axis for keeping its mechanic resistance in high flow rates.

When the pump shuts off, the NR-010 dynamic actuator closes immediately, keeping the suction pipe full of water even at low pressure. The spring assembly allows for easy cleaning, maintenance, and seal replacement without the need to remove the check valve from the line.

4. Troubleshooting

Symptom	Possible Causes	Solution
The disc doesn't close	1. Interference between the disc motion and an adjacent shut-off valve (butterfly).	1. Separate the two devices, far enough, to avoid any physical contact between the NR-010 disc and the shut-off valve.
	2. Body deformation due to over tightening of the positioning bolts.	2. Check the tightening-moment of the retaining bolts to a reasoning level, allowing sealing at the flanges.
	3. The spring is clogged or not fully seated in its designated place.	3. Check the spring, correct or replace it.
Swelling of the Rubber seal disc	In the majority of cases, the swelling is caused by the presence of dissolved Chlorine in the water near the Chlorinator in swimming pools or treatment stations.	The use of NR-010 in water with more than 4-6 ppm dissolved chlorine is not recommended
Leakage from the indicator rode O-Ring	Erosion or chemical attack	Change the spring chamber assembly.

5. Periodic Maintenance

Please note that the periodic maintenance of the check 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 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.

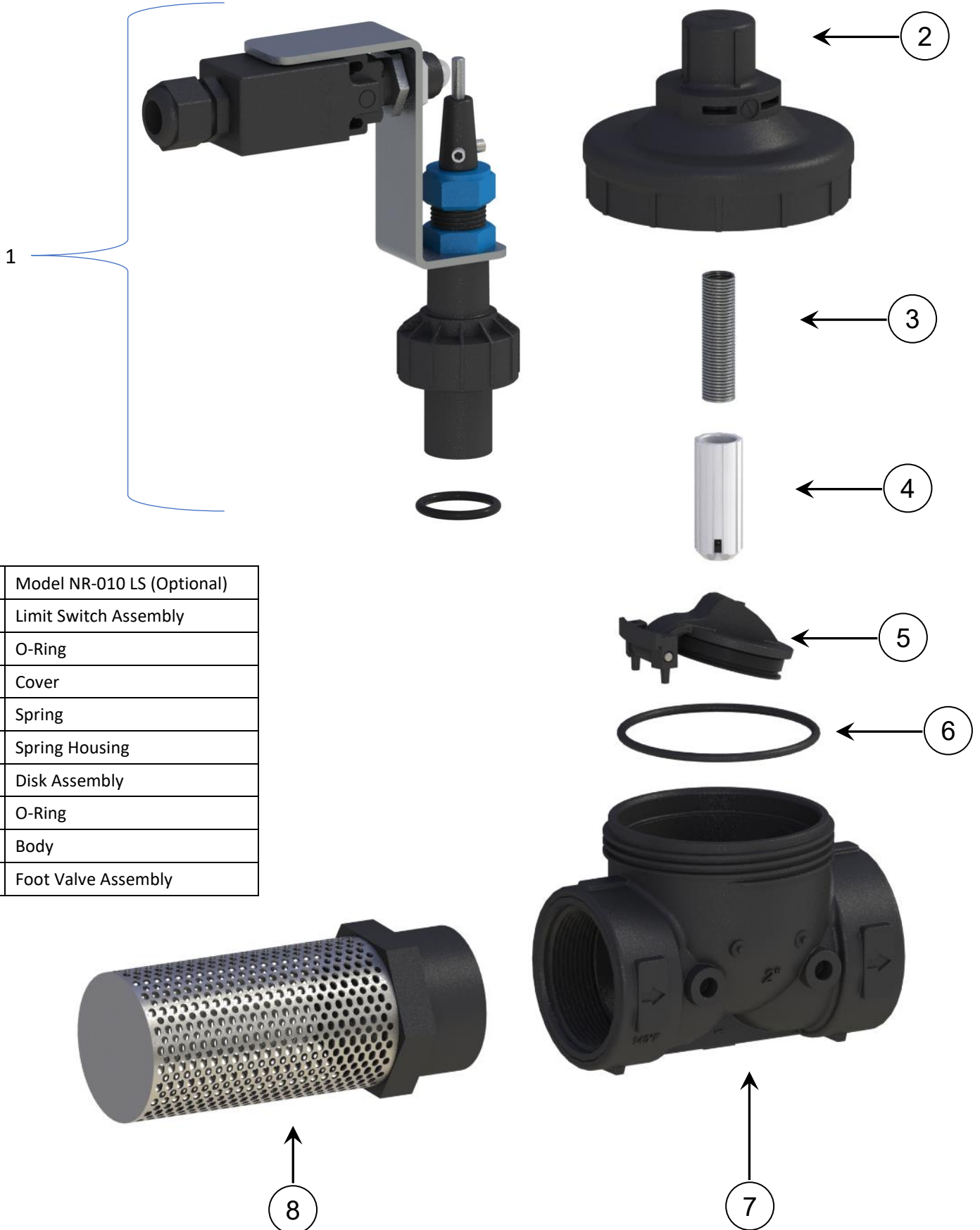
- Shut off the pump and the isolating valve.
- Carefully release the pressure and drain the valve. Important: Discard liquid to comply with local regulation.
- Check the flanges tightening bolts twice a year and retighten if needed.
- When the check valve is closed under backpressure, visually check the O-ring and the disc seal for reverse flow leakage, check the rod up and down movement, and verify that the limit switch clicks.

Assembly and Testing for Leaks

- Reassemble the valve in the disassembly reverse order.
- Slowly open the isolating valve.
- Look for leaks correct if needed then restart the pump and check again.

6. Assembly Drawings

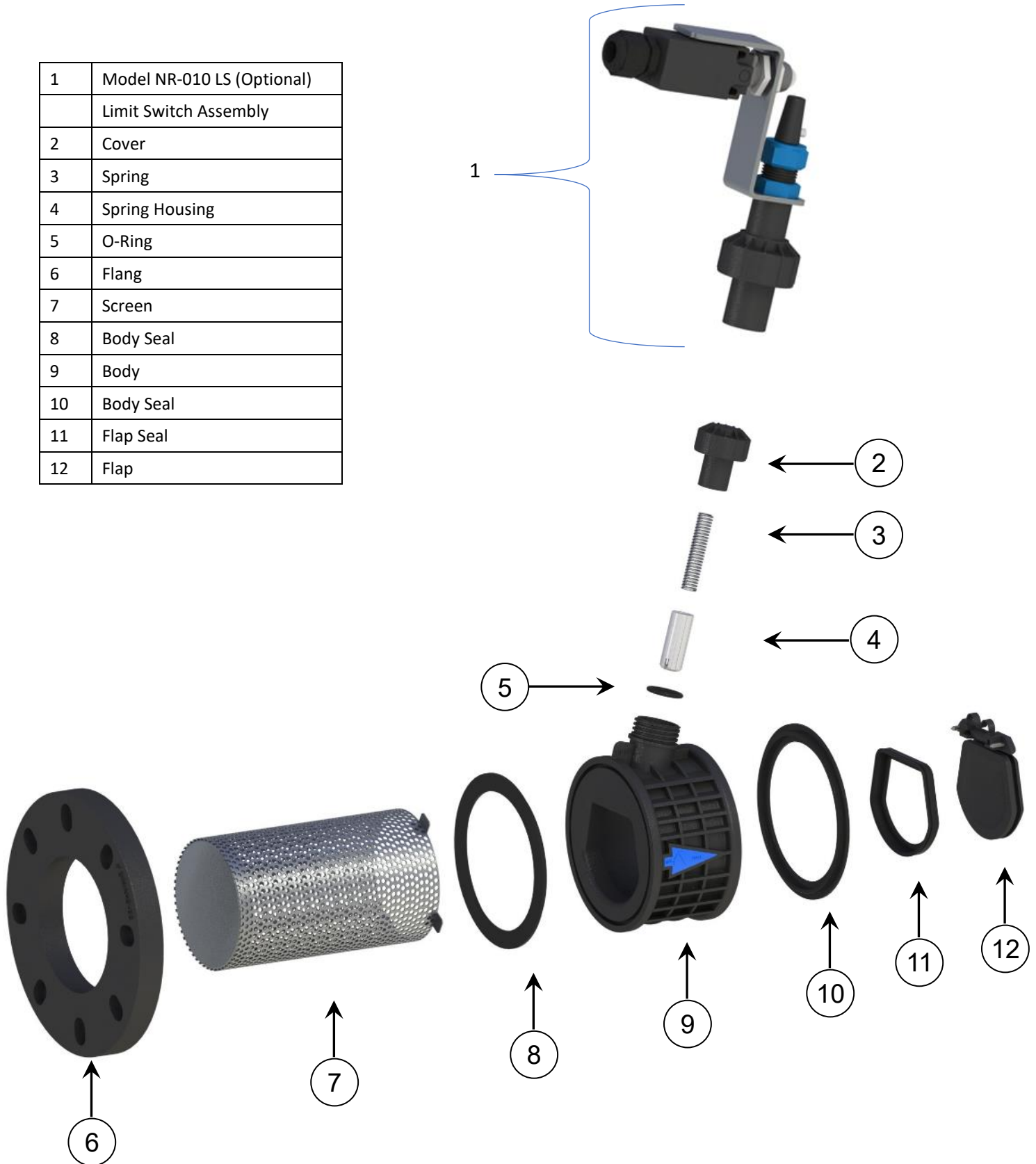
NR-010 FV / NR-010 LS Sizes 1½" - 2"



1	Model NR-010 LS (Optional) Limit Switch Assembly
	O-Ring
2	Cover
3	Spring
4	Spring Housing
5	Disk Assembly
6	O-Ring
7	Body
8	Foot Valve Assembly

NR-010 FV / NR-010 LS Sizes 3" - 4"

1	Model NR-010 LS (Optional) Limit Switch Assembly
2	Cover
3	Spring
4	Spring Housing
5	O-Ring
6	Flang
7	Screen
8	Body Seal
9	Body
10	Body Seal
11	Flap Seal
12	Flap



NR-010 FV / NR-010 LS Sizes 6" - 8"

1	Model NR-010 LS (Optional) Limit Switch Assembly
2	Cover
3	Spring
4	Spring Housing
5	O-Ring
6	Flang
7	Screen
8	Body Seal
9	Body
10	Body Seal
11	Flap Seal
12	Flap

