Installation, Operation and Maintenance Manual

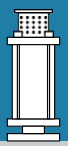




Combined Air Valve VAC 312

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General Information

The VAC 312 is a high-performance combined air valve (triple function plus slow-closing device as standard) designed for a wide range of water networks and operating conditions.
It allows for the rapid expulsion of air during pipeline filling, efficient release of air and gas pockets in pressurized systems, and the intake of large volumes of air in case of network drainage. Additionally, it features a surge protection system. With its advanced aerodynamic design, this valve offers excellent protection against air and gas accumulation, prevents vacuum formation, and reduces unwanted leakage with absolute tightness, even under low-pressure conditions.

Safety

Air valves operate in pressurized water systems. Therefore, before using the valve, carefully read this manual. Handle the valve with care and ensure that all relevant safety instructions and local regulations are followed.

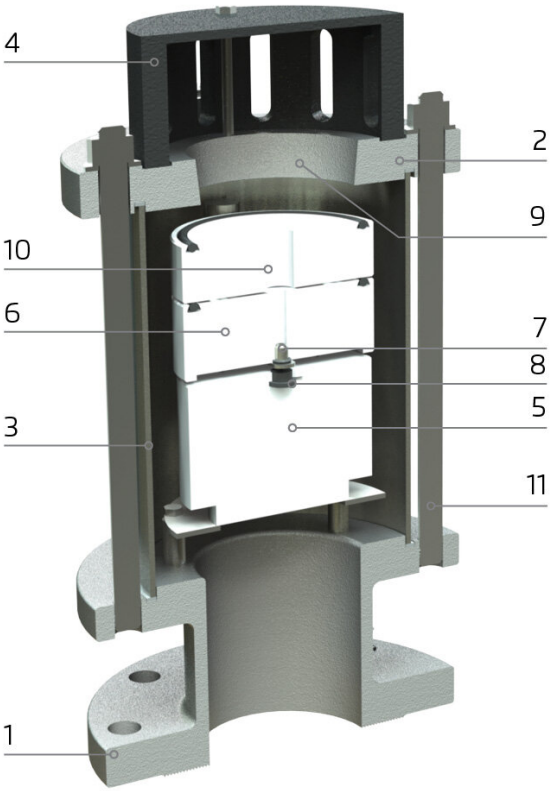
Operating Data

- **Pressure class**: PN10, 16, and 25
- **Operating temperature**: up to 60°C

Materials and Connections

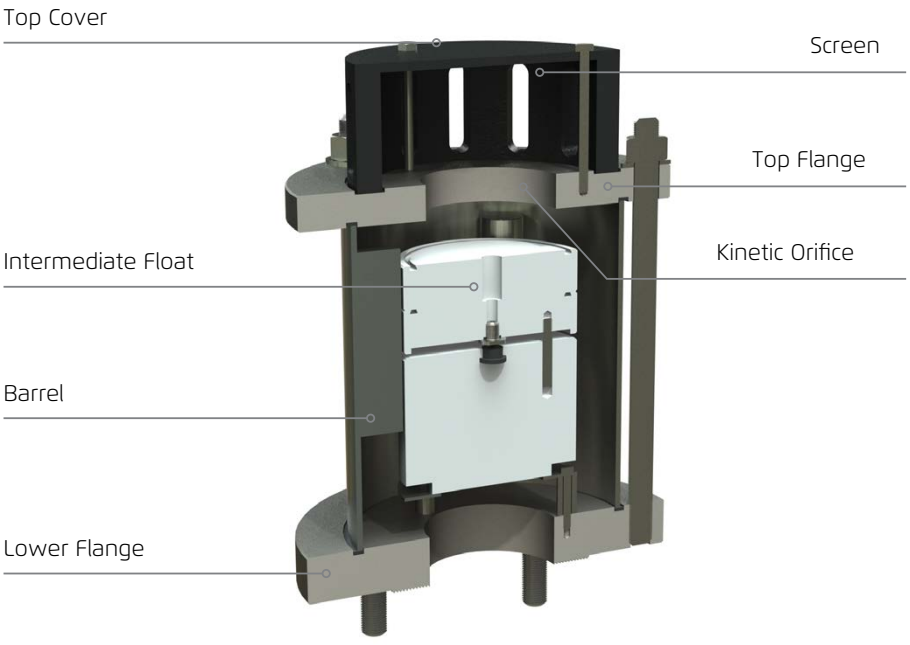
- **Body material**: Ductile Iron, Stainless steel, Super Duplex
- **Diameters**: DN50 - DN200 (2" - 8")
- **Connections**: Stud bolts 50 - 100mm (2 - 4");
  Flanged 50 - 200mm (2 - 8") ISO PN 10 / 16 / 25 or ANSI #150
- **Outlet**: Mushroom
- **Additional features**:
  - Slow-closing device
  - 1” drainage valve

Part list



[1] Lower Flange
[2] Upper Flange
[3] Body (Barrel)
[4] Cover
[5] Float
[6] Auto Orifice Disc
[7] Auto Orifice
[8] Auto Orifice Seal
[9] Kinetic Orifice
[10] Surge Protection Disc
[11] Tie Rod





Unpacking and Post-Shipping Inspection

Ensure that the valve remains dry and clean in its original packaging until installation is carried out.

Unpack the valve and make sure all packaging materials have been removed.

Before installation, inspect the valve for any possible damage during transport; do not install a damaged valve!

Verify that the valve to be installed meets the design specifications for the specific installation site. Pay special attention to ensure that the expected system pressure matches the air valve's pressure rating.

Site Preparation

Air valves installed above ground must be protected against contamination and vandalism.

If the air valve is installed in a chamber, ensure it has proper drainage and enough space for valve maintenance.

Flush the pipeline before installing the air valves to prevent internal damage caused by debris carried by the water during initial filling.

Installation

Typical Applications:

Pumping stations in water supply – air relief and vacuum prevention.

Pipelines in water supply – protection against air and gas accumulation and vaccum formation at high points, slope changes, and road/river crossings.

Municipal and industrial water treatment plants – protection against air and gas accumulation and vacuum formation.

Installation Instructions:

Install the air valve as close as possible to the pipe, at the top of the pipe circumference, in a vertical position (within 5 degrees of vertical alignment), with its inlet facing downward.

The diameter of the pipe connecting the air valve to the main line must be at least equal to the valve's inlet diameter.

Install an isolation valve between the air valve and the pipeline to allow for easy inspection and maintenance.

Operation

Startup and Initial Operation:

Open the isolation valve and check that the air valve connections are leak-free. If necessary, follow the instructions in the “Troubleshooting” section of this document.

Avoid water hammer during startup and pipeline filling by keeping the velocity below 0.5 m/s (1.6 ft/s). Consider adding surge protection to systems where higher velocities are expected.

Operating Principles

Pipeline Filling:

During the pipeline filling process, a large volume of air is expelled through the kinetic orifice of the air valve. When water enters the valve, the float—connected by a shaft to the sealing system—rises, causing the kinetic orifice to close. The aerodynamic structure of the valve and float body prevents premature closure.

Pressurized Operation:

During system operation under pressure, air accumulates at the top of the air valve, causing the float to move downward, opening the automatic orifice and releasing the accumulated air. Once the air is released, the water level and float rise, closing the automatic orifice.

Pipeline Draining:

When the pipeline is drained, a negative pressure differential is created, causing atmospheric air to push the float downward. The kinetic orifice opens, allowing air to enter the valve and preventing vacuum formation in the pipeline.

Surge Protection

The slow-closing device (SP) is installed at the air valve outlet. In the event of a water hammer, it partially closes the air outlet. The approaching water column is slowed down due to the resistance generated by the increased air pressure inside the valve.

Maintenance

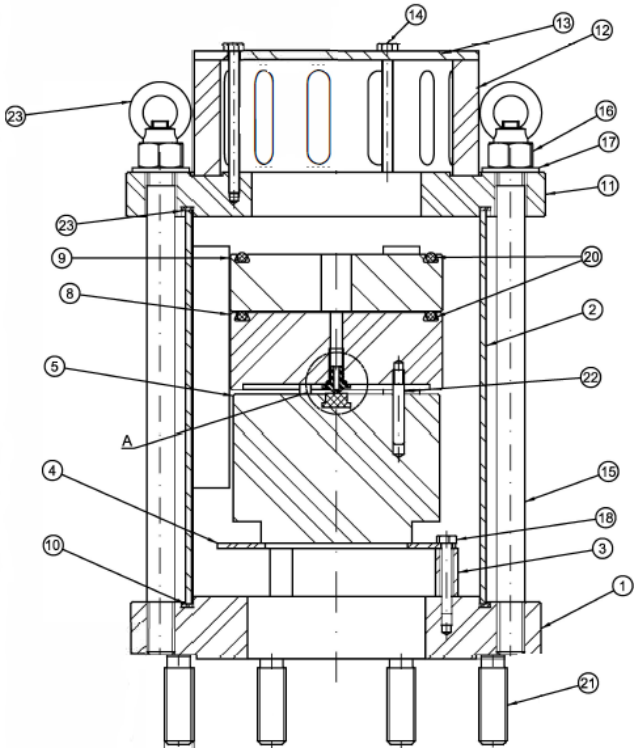
Inspection:

The valve does not require specific maintenance; however, periodic inspection of the seals is recommended to remove dirt and foreign objects.

Troubleshooting

Problem	Action
Leak at the inlet connection	Tighten the air valve flange bolts. Check for damaged parts.
Leak in the air valve body	Tighten the air valve body; check the O-ring.
Leaking valve outlet	Disassemble and inspect the air valve orifices, float, and seals. Clean the valve to remove dirt. Remove any foreign objects. Check and replace damaged parts.
Air valve does not release or admit air	Ensure that the operating pressure does not exceed the specified working pressure for the air valve.

Assembly:



Item	DESCRIPTION	MATERIAL	QTY
1	Flange for Tie Rod	Inox Super Duplex UNS S32750	1
2	Barrel	Inox Super Duplex UNS S32750	1
3	Baffle Spacer	Inox Super Duplex UNS S32750	3
4	Baffle Plate	Inox Super Duplex UNS S32750 / Polypropylene (PP)	1
5	Lower Float	Polypropylene (PP)	1
6	Nozzle Seat	EPDM	1
7	Nozzle	Inox Super Duplex UNS S32750	1
8	Top Float	Polypropylene (PP)	1
9	Slow Closing Float	Polypropylene (PP)	1
10	Barrel Seal	Polypropylene (PP)	2
11	Top Flange	Inox Super Duplex UNS S32750	1
12	Top Baffle	Stainless Steel AISI 316 / Polypropylene (PP)	1
13	Top Cover	Stainless Steel AISI 316 / Polypropylene (PP)	1
14	Top Cover Screw	Stainless Steel AISI 316	3
15	Tie Rod	Stainless Steel AISI 316	--
16	Nut	Stainless Steel AISI 316	--
17	Washer	Stainless Steel AISI 316	--
18	Support Screw	Inox Super Duplex UNS S32750	--
19	O Ring	EPDM	1
20	O Ring	EPDM	2
21	Stud Bolt for Flange	Stainless Steel AISI 316	--
22	Guide Pin	Inox Super Duplex UNS S32750	--
23	Eye	Aço Inox AISI 316	2

Remarks: assembly list based on an Super Duplex valve

Internal inspection process

- Disassembly

Warning:

When disassembling the air valve for field maintenance, first open the ball valve at the base of the air valve to remove any residue inside. Then follow the disassembly steps below:

1. Loosen the **top cover** by removing the three Allen screws using the appropriate tool.
   (This step is only relevant for inspecting the mesh screen and interior. For internal disassembly, proceed directly to step 2.)
2. Remove the **hex nuts** from the **rods** using a 19 mm wrench and take off the **top flange**.
3. Remove the **slow-closing float** . Inspect the **O-ring float seal** and replace it if necessary. If it is in good condition, ensure it is properly seated in the groove of the float.
4. Lift the **barrel** to remove it. Clean it if necessary. Remove any residue or dirt from the interior.
5. Remove the **intermediate float**. Clean and remove any debris if needed.
6. Using a screwdriver, screw in the **Nozzle** (part **7**) clockwise. This will separate the **intermediate float** from the **lower float**.
7. Check the **Nozzle Seat** positioned in the **lower float** and replace it if needed.
8. To remove the **limit spacer**, unscrew the three **bolts** using a screwdriver to access the **O-ring sealing (nozzle)**. Ensure it is in good condition and replace it if necessary.
9. To remove the **tie rods**, simply turn them counterclockwise, If needed.
10. To remove the **baffle spacers**, use the same Allen key used to remove the top cover, If Needed.

Remark: Replace all Orings is highly recommended, unless the intention is just to clean the valve internally.

Also, The **Barrel seal** should be replaced if not in good conditions.

- Assembly

11. Place the **baffle spacers** onto the **lower flange assembly** using one of the Allen screws. The spacers are necessary to prevent the air inlet from being blocked when the float is lowered.
12. Thread the **tie rods** into the **lower flange assembly** clockwise.
13. Then, position the **barrel** between the spacers and onto the lower flange (Make sure we have the **Barrel seal** correctly positioned in between both sides osf the **Barrel**.
14. Make sure The **Nozzle Seat** is correctly positioned in the **lower float.**
15. Insert the **Nozzle Oring** correctly in the **Nozzle.** Then, insert it in the limit spacer and fix it in the **lower float** using the **nozzle screw.**
16. Conect the **intermediate and lower float assembly** by threading the **Intermediate float** in the **nozzle**. Make sure the **Oring** is correctly fixed in the **intermediate float.**
17. Insert the **intermediate and lower float assembly** inside the **barrel** and over the spacers.
18. Place the slow-closing float inside the barrel on top of the **float assembly**. Make sure the **Oring** is correctly fixed in the **slow-closing float.**
19. Close the assembly by placing the **top flange** over the barrel.
    (Ensure the **cover seal** is firmly attached to the barrel.)
    Secure the cover by tightening the **nuts** in the **rods** using a 19 mm wrench.
20. If separated from the **top cover**, attach the **baffle plate** to the cover and top flange by tightening the three **top cover screws** using a hex key (Allen wrench).

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