



VEC-313-SP **Combination Air Valve** **for Sewage & Wastewater**



Installation, Operation & Maintenance (IOM) Manual



Table of Contents

Section	Page
General Information	03
Safety	03
Operating Data	03
Materials and Connections	03
Parts List	04
Unpacking and Post-Shipping Inspection	05
Site Preparation	05
Installation – Typical Applications	05
Installation Instructions	05
Operation	06
Startup and Initial Operation	06
Pressurized Operation	06
Pipeline Draining	06
Surge Protection	06
Maintenance	07
Inspection	07
Troubleshooting	07
Assembly	08



General Information

The VEC 313 is a high-performance combined air valve (triple function plus slow-closing device as standard) designed for a wide range of sewer and wastewater 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.

Minimum operating pressure: 0.2 bar

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

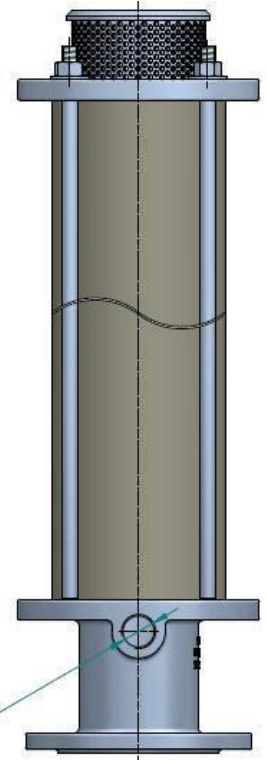
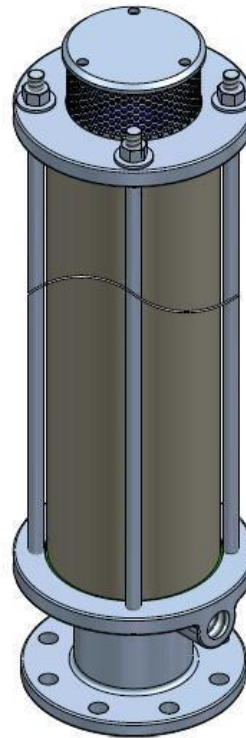
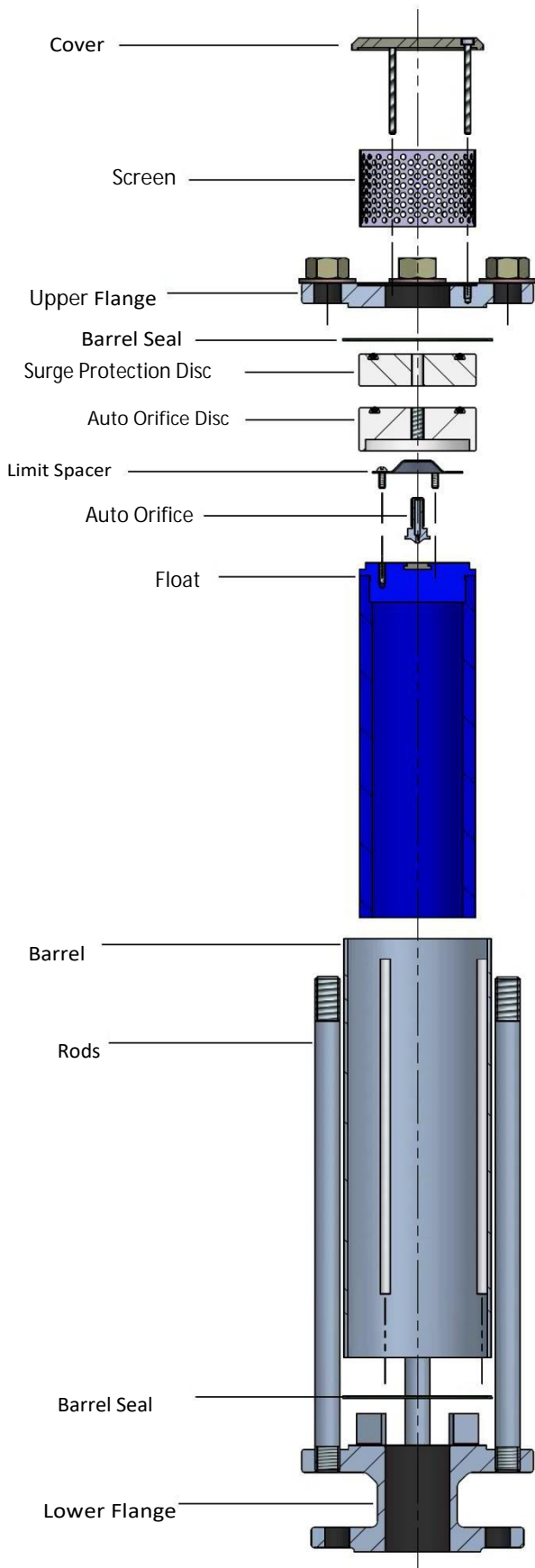
- Pressure rating: ISO PN16 (all inlet sizes), ISO PN25 (up to 4"; DN100)
- Minimum operating pressure: 0.2 bar
- Maximum operating pressure: 16 bar or 25 bar; 230 or 360 psi.
- Media and operating temperature: 1-60°C

Materials and Connections

- **Body material:** Ductile Iron, Stainless steel
- **Diameters:** DN50 - DN200 (2" - 8")
- **Connections:** ISO PN 10 / 16 / 25 or ANSI #150 or ANSI #300 flanged
- **Outlet:** Mushroom
- **Additional features:**
 - Slow-closing device (no water hammer)
 - 1" ball valve for waste drainage during pre-washing



Part list



Threaded for drainage valve (optional)



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 and wastewater systems – air relief and vacuum prevention.

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

Municipal and industrial wastewater 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 filling process of a pipeline, high air flow is forced out through the kinetic orifice of the Air Valve. Once water enters the valve’s chamber, the float buoyed upward causes the kinetic orifice to close. The unique aerodynamic structure of the valve body and float ensures that the float cannot be closed before water reaches the valve..

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 a pipeline is drained, a negative differential pressure is created causing atmospheric air to push the float down. The kinetic orifice stays open and air enters the valve chamber, 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:

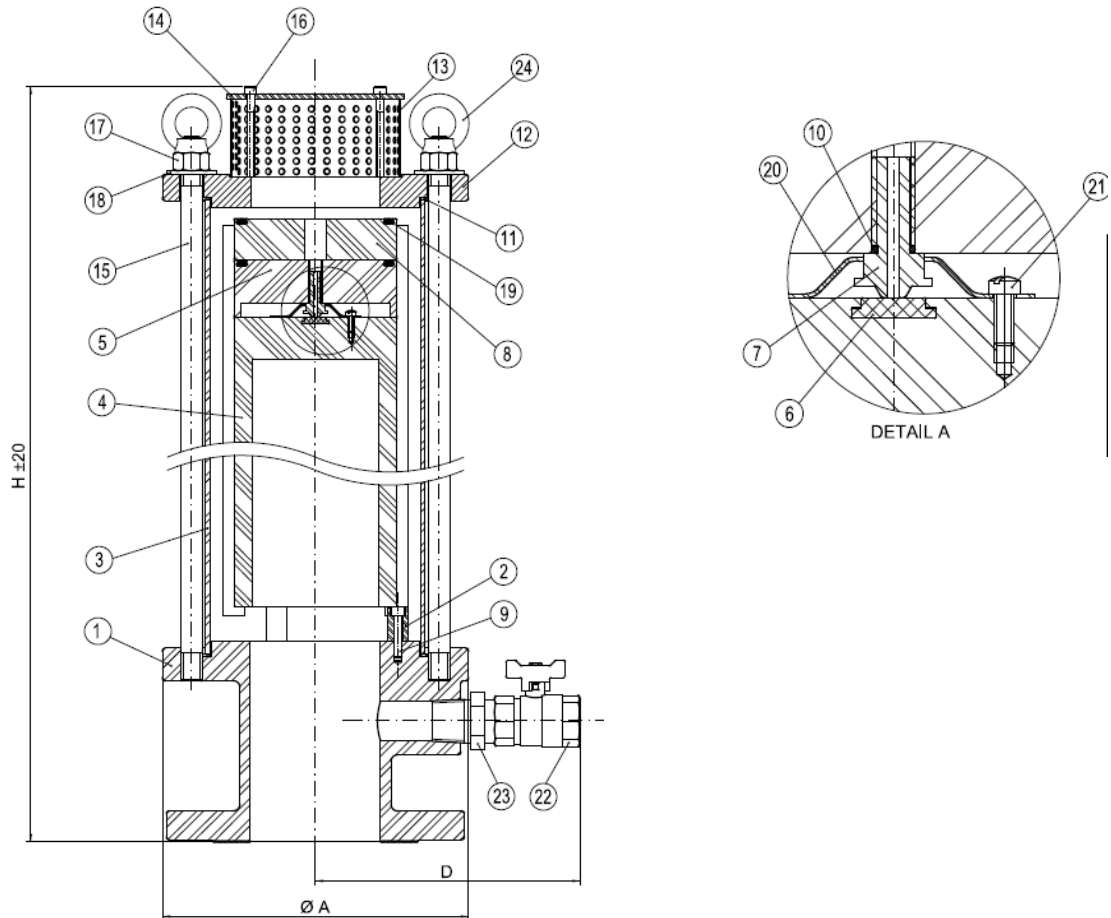
The valve does not require specific maintenance; however, periodic inspection of the seals is recommended to remove dirt and foreign objects.

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:



24	Eye Nut (only for 6" and 8")	Stainless Steel AISI 316	02
23	Niple	Stainless Steel AISI 316	01
22	Ball Valve	Stainless Steel AISI 316	01
21	Auto Orifice Disc Screw	Stainless Steel AISI 316	03
20	Limit spacer	Stainless Steel AISI 316	01
19	O'Ring float Seal	Natural Rubber	02
18	Washer	Stainless Steel AISI 316	04
17	Nut	Stainless Steel AISI 316	04
16	Cover Screw	Stainless Steel AISI 316	--
15	Tie Rod	Stainless Steel AISI 316	--
14	Cover	Carbon Steel	01
13	Screen	Stainless Steel AISI 304	01
12	Top/Upper Flange	Ductile Iron ASTM A 536 Gr.65-45-12	01
11	Barrel Seal	Polypropylene (PP)	02
10	O'Ring sealing (nozzle)	Natural Rubber	01
09	Support Screw	Stainless Stee AISI 316	03
08	Slow Closing float	High Density Polyethylene (HDPE)	01
07	Auto Orifice	Stainless Steel AISI 316	01
06	Auto Orifice Seat	Polyurethane (PU)	01
05	Auto Orifice Disc	High Density Polyethylene (HDPE)	01
04	Float	High Density Polyethylene (HDPE)	01
03	Barrel	Stainless Steel AISI 316	01
02	Baffle Spacer	Stainless Steel AISI 316	03
01	Lower Flange Assembly	Ductile Iron ASTM A 536 Gr.65-45-12	01
ITEM	DESCRIPTION	MATERIAL	QTY

Remarks: part list refers to VEC-313-SP-C model 475 in Ductile Iron



When disassembling the air valve for field maintenance, first open the ball valve at the base of the air valve (part **22**) to remove any residue inside. Then follow the disassembly steps below:

1. Loosen the **cover** (part **14**) by removing the three Allen screws (part **16**) 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** (part **17**) from the **rods (15)** using a 19 mm wrench and take off the **top flange** (part **12**).
3. Remove the surge protection disc (part **8**). Inspect the **O-ring float seal** (part **19**) 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** (part **3**) to remove it. Clean it if necessary. Remove any residue or dirt from the interior.
5. Remove the auto orifice disc **and float assembly** (parts **5** and **4**). Clean and remove any debris if needed.
6. Using a screwdriver, screw in the auto orifice (part **7**) clockwise. This will separate the auto orifice disc (part **5**) from the **float** (part **4**).
7. Check the auto orifice **Seat (6)** positioned in the **float (4)** and replace it if needed.
8. To remove the **limit spacer** (part **20**), unscrew the three **bolts** (part **21**) using a screwdriver to access the **O-ring sealing (auto orifice)** (part **10**). Ensure it is in good condition and replace it if necessary.
9. To remove the **tie rods** (part **15**), simply turn them counterclockwise, If needed.
10. To remove the screen **spacers** (part **2**), use the same Allen key used to remove the top cover, If Needed.

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

Also, The **Barrel seal (11)** should be replaced if not in good conditions.



- Assembly

11. Place the screen **spacers** (part **2**) onto the **lower flange assembly** (part **1**) 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** (part **15**) into the **lower flange assembly** (part **1**) clockwise.
13. Then, position the **barrel** (part **3**) between the spacers and onto the lower flange (Make sure we have the **barrel seal (11)** correctly positioned in between both sides of the **Barrel (3)**).
14. Make sure the auto orifice **Seat (6)** is correctly positioned in the **float (4)**.
15. Insert the auto orifice **O-ring (10)** correctly in the auto orifice **(7)**. Then, insert it in the limit spacer and fix it in the **float (4)** using the auto orifice **screw(21)**.
16. Connect the auto orifice disc **and float assembly** (parts **5 and 4**) by threading the auto orifice disc **(5)** in the **nozzle(7)**. Make sure the **O-ring(19)** is correctly fixed in the auto orifice disc **(5)**.
17. Insert the auto orifice disc **and float assembly** (parts **5 and 4**) inside the **barrel** (part **3**) and over the spacers.
18. Place the slow-closing float (**part 8**) inside the barrel (part 03) on top of the **float assembly (parts 5 and 4)**. Make sure the **O-ring(19)** is correctly fixed in the surge protection disc **(8)**.
19. Close the assembly by placing the **top flange (part 12)** over the barrel (part 03).
(Ensure the **cover seal (11)** is firmly attached to the barrel.)
Secure the cover by tightening the **nuts (part 17)** in the **rods(15)** using a 19 mm wrench.
20. If separated from the **cover (14)**, attach the screen (**part 13**) to the cover and top flange by tightening the three **cover screws (part 16)** using a hex key (Allen wrench).