Instructions for Installation, Operation & Maintenance:

Air Release Valves

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Section 1: Background

R&D Multiples was established in early 1980's and we are one of the pioneering manufacturers in India. An air valve is an essential component of any piped fluid transportation system.

Our air release valves have been very commonly used in various applications in multiples countries around the world. We are one of the few manufacturers to have >300,000 installations of these types of valves. This product type needs to be installed, operated & maintained by qualified & trained technicians as per the instructions & precautions given in this manual, using proper tools & tackles. Unauthorised / unskilled persons should not be allowed near the equipment unless under proper supervision. Alterations to the product or any of its components are also not permitted. In case if the same are not followed, we reserve the right to decline warranty responsibilities.

Disclaimer: R&D Multiples reserves the right to change this manual without prior notice, please refer to our website www.rdmultiples.com for the latest version.

Section 2: Introduction

We welcome you to a family of quality conscious & discerning customers of R&D Multiples' products. We thank you for the trust in our company & products & we assure you that we will spare no effort in establishing a rewarding long-term mutual relationship. This manual covers the air valves with design standards of AWWA C512.

Our Bi-stream air release valves are a single chamber, dual orifice type of valve and can also be called as a combination type valve. In a cylindrical body, a capsule type stainless-steel float is centred & guided inside the stainless-steel cage while moving up & down. A sturdy stainless-steel hood rides on top of the float & mates with the elastomeric seal ring which is sandwiched between the body top flange & the cover. This is backed up by a stainless-steel ring which supports the seal suitably. The hood has a stem in the centre. This stem has a hole (small aperture) at the centre on the valve inlet direction. This aperture terminates in a transverse aperture on the other side of the hood.

This way, the apertures in the stem connect the lower side of the hood with the outer side. The float has a resilient button seal at the top centre. The lower end surface of the stem (of the hood) seals against this button seal. In lower position, the float rests at the bottom on the cage. The cage has rectangular airway ducts at the top end just below the top flange.

Section 3: Site activities prior to installation

Inspection after material receipt:

- Transit damages: Inspect the valve visually for any transit damages on receipt at the site. Please check the flange surfaces, rubber components etc. If you observe any such damages, please get a report signed by the transporter
- Completeness: Please check the receipt of the components / sub-assemblies as per the packing list. If you find any shortages, please record the same & get a report signed by the transporter
- In case of companion flanges supplied with the valve, please check the correctness & quantity of the fasteners & gaskets as well
- Use the general arrangement drawing to check the overall dimensions of the valve: Flange dimensions, use the drawing to also identify the various components of the valve which are visually accessible. You may also cross-check basic data like valve size, pressure rating, material etc with the corresponding name plate affixed on every valve along with its as-cast markings. The as-cast marking would typically look like the following:

- Before you install the valve, make sure to clean the valve with air or water, so that it operates properly

Storage:

- If the valves have to be stored at site for some duration, ensure that the same are kept on raised platforms / pallets so that ground rain water does not wet the same. Store the valves in the shade & as far as possible, it should not be exposed to direct sun-light / ozone
- Keep the valves covered by tarpaulin so that atmospheric dust does not accumulate on the valve components

Handling procedures:

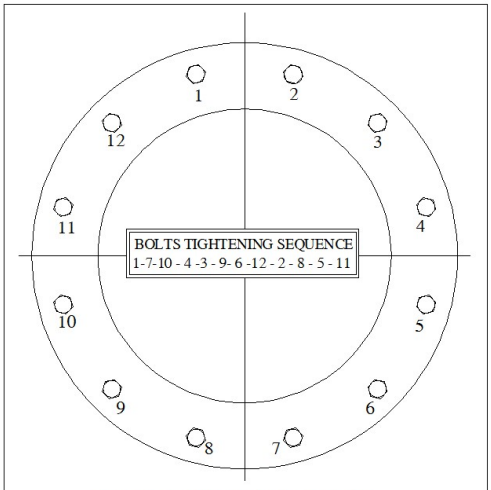
- On receipt from our plant, please unload the valves from vehicle carefully without allowing it to drop / impact etc. Please use pallets for handling to avoid damage to painted surfaces. Rig the load before lifting so that it does not move / slide / turn / topple / sway during unloading & carrying to the storage location
- Take the valves to the location of installation only at the time it has to be installed
- Always ensure that the equipment for lifting the valves has sufficient capacity to lift & carry the valve comfortably
- Never drag the valve along the ground. Do not carry the same hanging over when workmen are working below. Wherever possible, use soft pallets for valve movement

Section 4: Procedures for Installation & Commissioning

- Clean the faces of both the mating flanges (isolation valve & air valve)
- Place the elastomeric gasket seal between the flanges or in the groove properly, as applicable
- Place the air valve so that the covers, cowls, drain plug (if applicable) are accessible from the desired position & in a convenient orientation
- Engage the joint fasteners & tighten in diametrically opposite sequence in multiple tightening sequences progressively

Thread Size (mm)	Tightening torque (Nm)	
	Class 4.6	Class 8.8
M6	4	11
M8	10	26
M10	19	51
M12	33	89
M16	80	215
M20	156	420
M24	270	725
M27	398	1070
M30	540	1450
M33	740	1970
M36	950	2530
M39	1230	3290

- A sample illustration with 12 flange bolts is shown in the schematic drawing below. Same principle applies to other sizes having different number of flange bolts



Cross-Over / Diametrically Opposite sequence for flange bolts tightening.

- The following are some safety precautions while installing & commissioning the air valves:

- In case of a new installation, while charging the pipeline, ensure that the speed of air release is so controlled, as to be within such limit that the large float does not close prematurely
- No workmen should be in close vicinity of the air valve when it is likely to either vent out large volumes or ingest huge quantities of air. This can be dangerous
- It is recommended to install a cage of wire-mesh fabricated on angles to prevent tampering of the valves
- Insect-mesh can be installed on the valve cover to prevent entry of pests / insects on the system for particularly drinking water lines
- Never try to remove the air valve from its position without fully closing the isolation valve
- In areas prone to get submerged during rainy season, install the air valve assembly at an elevated position above the expected level of submergence

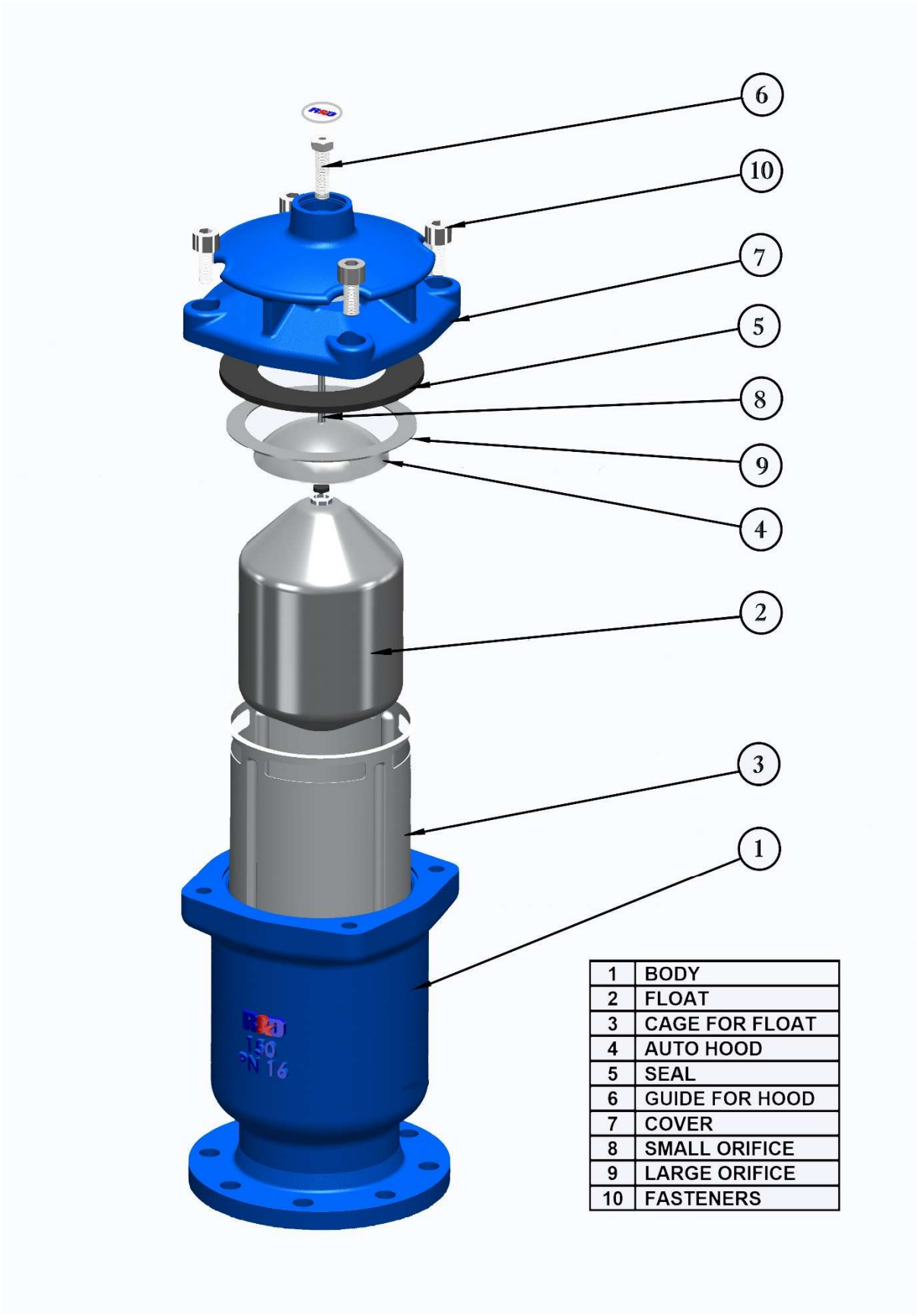
Section 5: Maintenance

R&D Multiple's air valves are designed & manufactured so as not to need regular maintenance. However, it is advisable to:

- Periodically check visually for any signs of damage on the components
- Look for any increased friction in any of the moving parts
- Watch out for any abnormal noise and vibrations on the valve
- If any debris / plastic material is accumulated in the valve cover, the same should be removed

Dismantling & Re-assembly:

- The pipeline should be de-pressurised & drained before loosening the valve mounting fasteners
- The valve should be carefully removed from the pipeline using appropriate handling & lifting equipment
- The valve is to be kept vertical on a clean, flat platform. Wooden rafters can be used to keep the valve at an elevated position & for accessibility.
- Remove the air valve cover by loosening the joint bolts gradually pull up. Lower this onto the floor, so as to not damage any of the parts. Remove the rubber seal, followed by the stainless-steel hood, cage and float
- Visually check for any damage to any of the individual parts, and take necessary corrective actions. If any of the parts are damaged, it needs to be replaced. Contact your R&D representative if you need help in locating any of the spares
- After all the individual parts are determined to be okay and the valve parts are thoroughly cleaned, the valve can then be re-assembled following this procedure in the reverse order



1	BODY
2	FLOAT
3	CAGE FOR FLOAT
4	AUTO HOOD
5	SEAL
6	GUIDE FOR HOOD
7	COVER
8	SMALL ORIFICE
9	LARGE ORIFICE
10	FASTENERS

Section 6: Quick reference guide

Troubleshooting

Observations	Possible root cause	Remedies / suggestions
Leakage from top cover	Debris / plastic accumulated in the air flow passage area	Dis-assemble the valve and clean all the parts
	Float / hood is damaged and needs replacement	Replace the float / hood and check again
	Rubber seal damaged	Replace the rubber seal
Body leak	Excessive pipeline pressure beyond the valve rating	Replace with a valve suitable for the working pressure
Leakage from the flange face	Flange bolts not evenly tightened or non-parallel pipeline flanges	Loosen the flange bolts and retighten the same. Check & ensure parallelism of pipeline flanges
	Improper pipeline flanges / gaskets	Check for the correctness of pipeline flanges, gaskets and replace as required

 DO'S	 DON'TS
• Always refer to the GA drawing, data sheets & name plate details & ensure that the correct valve is being installed at the correct location	• Installation next to high pressure pumps which causes sudden turbulence in the pipeline
• Before installation, ensure that the float movements from bottom to top are smooth & free	• Try to align oblique / crossed flanges by tightening the bolts
• Clean the valve from inside & outside thoroughly before installation	• Subject the valve to pressure higher than its rated pressure
• Installation to be done on a high point beyond human reach to avoid tampering	• Installation of these valves in a sewage / effluent pipeline
• Wire-mesh / cage to be installed for protection around the air valve assembly	
• Keep visual check on the valve performance. Keep a routine log of operation	
• Flush the line before installation to remove cut pieces of pipeline fabrication	

Still need help? Write to us with the valve details (serial no) and a brief description of the issue on the contact details given below:

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