

SB UNDERGROUND AIR VALVE ASSEMBLY

INTRODUCTION

The A.R.I. Underground Air Valve System for water conveyance systems is a complete package that combines the reliable and efficient properties of the A.R.I. air valve with the added feature of a sub-surface valve that is buried below ground. A specially designed shut-off valve - situated at the base of the Air Valve Assembly: - allows maintenance from ground level. The shut-off disc valve is equipped with a safety mechanism enabling disconnection and removal of the air valve from its sub-surface housing when the system is under pressure.

Since service and maintenance operations of the unit are performed entirely from the surface, there is no need for the safety considerations associated with confined space entry.

FEATURES

- A combination air valve, with a large air/vacuum orifice and a small automatic air release orifice, integrated into one body.
- The air valve inlet diameter is 80mm (3"). Available also in 50mm (2")
- Pipe connections: 80 mm (3") threaded (BSP/NPT) or flanged, in accordance with BS-10 1947, BS 4504 (DIN-2501), ASA standards.
- The integral, flat, gear box driven shut-off disc valve has an 80 mm (3") full bore passage.
- The shut-off valve is operated from the surface.
- All connections are quick connections including the adaptor connection to the shutoff valve.
- Safety elements: Disengaging the air valve is safeguarded - unless the shut-off valve is in "closed" position, and the internal pressure is released, it is not possible to extract the air valve.
- All parts are corrosion resistant: Metal parts - made of St.St.316 and coated ductile iron, composite material parts – made of reinforced nylon, PE, PVC.
- Working pressure range: 0.2-25 bar
- Working temperature: 60°C.
- Maximum intermittent temperature 90°C.

INSTALLATION

It is recommended to install the unit simultaneously with the installation of the pipeline. This will preclude the need to excavate later, when the line is already in place.

Before beginning installation: Remove the Air Valve Assembly from the Valve Box (see removal instructions below). The unit will be lighter and easier to handle and install.

Before installing, make sure the unit cover is in place – this prevents soil, media or dirt from falling into the unit.



REMOVAL OF THE AIR VALVE ASSEMBLY FROM THE VALVE BOX

1. Close the Disc Valve (8) by attaching the "T" Key (1) to the upper end of the Operator Rod (4) and turning fully in a clockwise direction.
2. Unlock the Air Valve Assembly by rotating the Frame (3) of Air Valve Assembly in a clockwise direction - see Fig. 1B, 1C.
3. Lift and remove the Air Valve Assembly from the Valve Box (5).

HEIGHT

The distance from the top surface of the Valve Box Cover (2) to the bottom of the access cover {h1} should be between 5 cm (2") and 20 cm (8"). From this point the overall height {H} of the unit from the pipeline flange or riser flange will be measured (See Fig. 3).

Care must be taken that the unit is installed at a perpendicular angle to the horizontal.

BORE DIAMETER AND DEPTH

The bore diameter {d1} should be at least 1 meter (40"). This will allow at least 30 cm (12") for the filling material around the Valve Box (5) (See Fig. 3).

The height of the flange on the pipe line or riser should allow the cover of the unit to be situated as defined in the previous section (HEIGHT). If this is not possible then an extender/riser must be attached and the flange of the unit fastened to it.

Diagonal riser: If the unit is to be installed on a riser that is at an angle, the diagonal slope should be at least 7° - (See Fig. 4).

In the case of a diagonal riser, it is advisable to install the riser with an air/gas trap (See Fig. 4).

FILLING

The unit must be surrounded with a fine grained filling material such as sand or very fine gravel (in accordance with local standards and by-laws). The filling material must be of a type that will not expand when absorbing water. (See Fig. 3).

CAUTION

- DO NOT use clay or similar materials – These will expand on absorption of water.
- DO NOT use filling materials that contain sharp objects such as rocks and bricks or pieces of metal or glass.

INSERTION OF THE AIR VALVE ASSEMBLY INTO THE VALVE BOX

CAUTION

DO NOT OPEN the shut-off disc valve (8) until the air valve assembly is locked in its place.

1. Before inserting the Air Valve Assembly, visually inspect the two O-Rings (7) at the base of the assembly. If damaged, they must be replaced. Clean and lubricate the O-Rings lightly with silicon-based lubricant.
2. Insert the Air Valve Assembly into the Disc Valve (8).
4. Lock the Air Valve Assembly into the Disc Valve by rotating the Frame (3) of the Air Valve Assembly in a counterclockwise direction - see Fig. 1B, 1A
5. Place the "T" Key (1) inside the Valve Box (5) prior to closing the unit – close the Valve Box Cover (2) tightly on the Valve Box

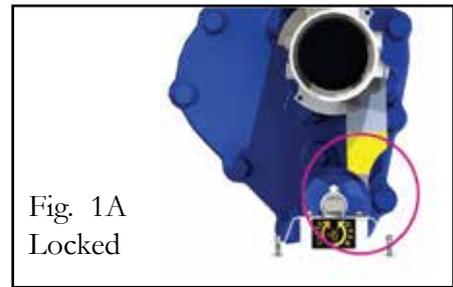


Fig. 1A
Locked

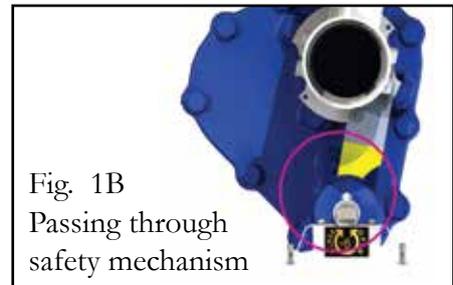


Fig. 1B
Passing through
safety mechanism

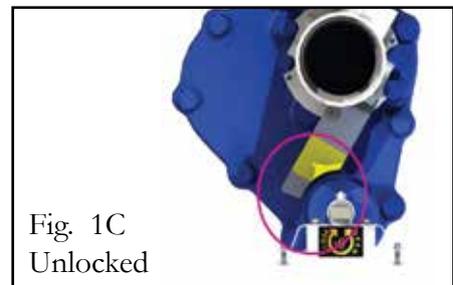


Fig. 1C
Unlocked

INITIAL OPERATION

1. Make sure that the Air Valve Assembly is in the locked position (the yellow indicator plate is positioned to the right of the gear box) - see Fig. 1A. Locking is carried out by holding the Frame (3) and rotating the Air Valve Assembly in a counterclockwise direction.
2. Open the Disc Valve (8) by fully turning the Operator Rod (4) in a counterclockwise direction.

OPERATION AND MAINTENANCE

The unit is designed so that all operation and maintenance can be carried out at ground level. To this purpose, the Air Valve Assembly is easy to extract from the Valve Box (5) and the Air Valve can be substituted very quickly with a pre-serviced replacement Air Valve. Alternatively, once extracted, the Air Valve can be serviced in-situ and returned into the Valve Box.

EXTRACTING THE AIR VALVE ASSEMBLY FOR MAINTENANCE

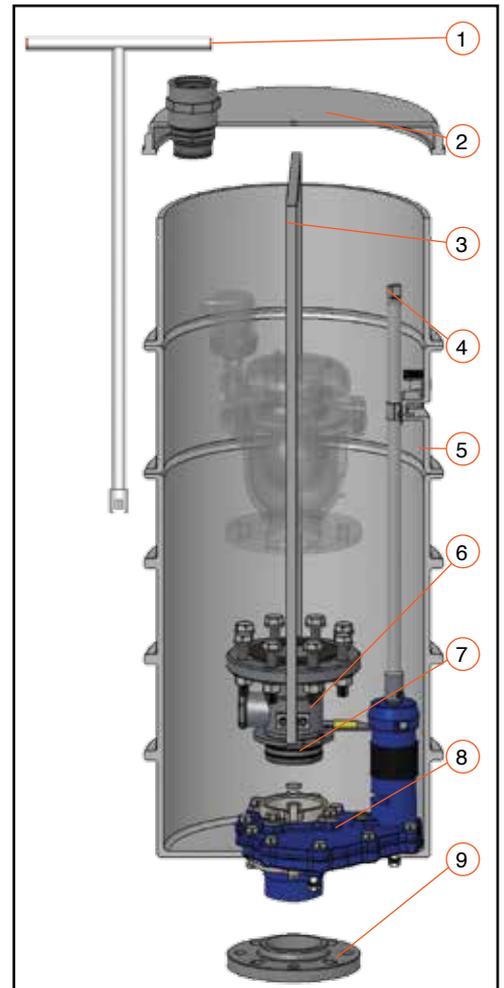
1. Remove the Valve Box Cover (2).
2. Close the Disc Valve (8) by attaching the "T" Key (1) to the upper end of the Operator Rod (4) and fully turning in a clockwise direction.
3. Unlock the Air Valve Assembly by rotating the Frame (3) of the Air Valve Assembly in a clockwise direction - see Fig. 1B, 1C.
4. Lift and remove the Air Valve Assembly from the Valve Box (5).
5. Perform maintenance on the Air Valve (Refer to the specific air valve maintenance manual found at the end of this IOM manual.).

INSERTION OF THE AIR VALVE ASSEMBLY

CAUTION

DO NOT OPEN the shut-off disc valve (8) until the air valve assembly is fully locked in place

1. Before inserting the Air Valve Assembly, visually inspect the two O-Rings (7) at the base of the assembly; if damaged, these must be replaced. Clean and lubricate the O-Rings lightly with silicon based lubricant. Clean and remove debris from the housing area.
2. Insert the Air Valve Assembly into the Disc Valve (8).
3. Lock the Air Valve Assembly into the Disc Valve by rotating the Frame (3) of the Air Valve Assembly in a counterclockwise direction - see Fig. 1B, 1A
5. Continue by following instructions for – INITIAL OPERATION.



PARTS LIST

No.	Part
1.	"T" Key
2.	Valve Box Cover
3.	Frame
4.	Operator Rod
5.	Valve Box
6.	Adaptor - Quick Connector
7.	O-Rings
8.	Disc Valve
9.	Flange

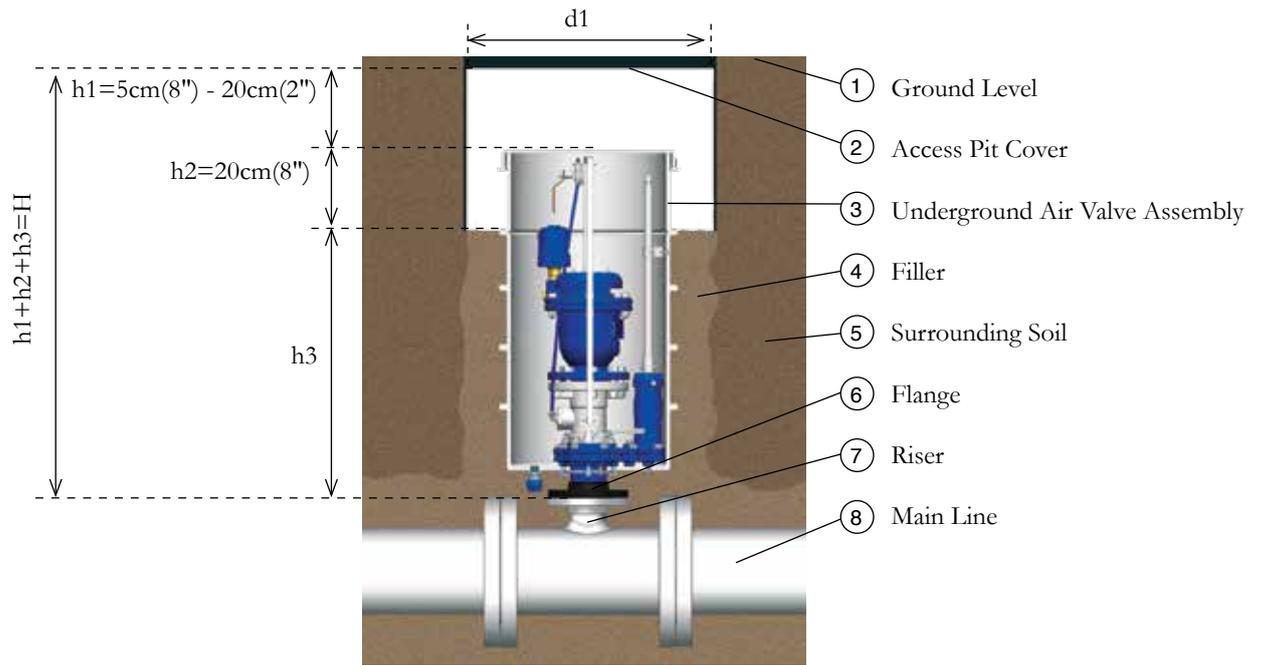


Fig. 2

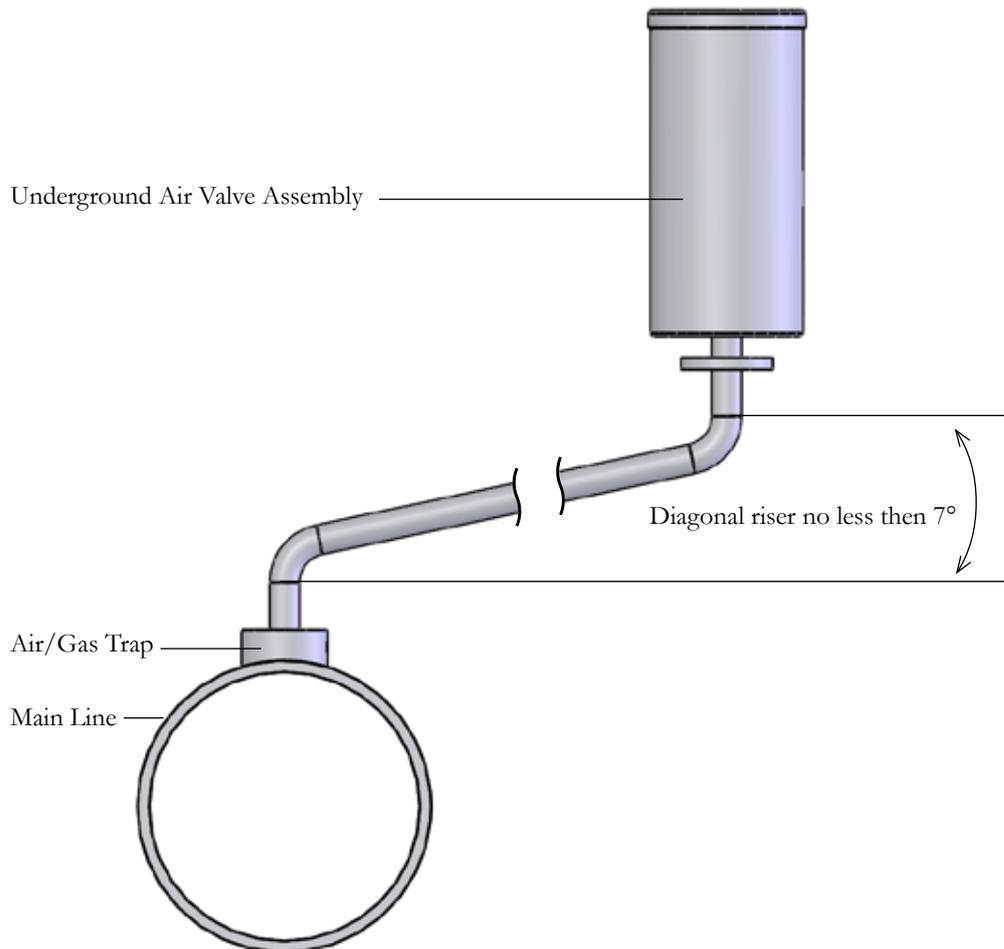


Fig. 3

TROUBLESHOOTING GUIDE

PROBLEM	REASON	SOLUTION
1. The air valve assembly can't be removed from the disc valve	Mechanical interference	<ol style="list-style-type: none"> 1. Rotate the Frame (3) of the Air Valve Assembly counterclockwise to the locked position (Fig. 1A) 2. Make sure that the Disc Valve is in the closed position 3. Rotate the Air Valve Assembly clockwise to the open position - see Fig. 1B, 1C.
2. The air valve continuously leaks water with the opening of the disc valve.	Air valve malfunction	<ol style="list-style-type: none"> 1. Follow Instructions for REMOVAL OF THE AIR VALVE ASSEMBLY FROM THE VALVE BOX 2. Maintain the air valve (See specific air valve maintenance manual)

NOTE

Please contact your local representative with any clarifications, questions you may have regarding the instructions in this manual.



COMBINATION NON SLAM AIR VALVE MODELS D-060 NS / D-060-C NS / D-062 NS

A. Removal of the SB UNDERGROUND AIR VALVE ASSEMBLY

1. Follow instructions for removal found in the first section of this manual.
2. Follow maintenance instructions below. They can be performed on the D-060 still attached to the underground assembly or the D-060 can be removed from the assembly prior to maintenance by opening the 4 bolts and nuts and removing it from the assembly.

B. MAINTENANCE

B.1. Maintenance - Automatic Air Release Component

1. Remove the Clamping Stem (4) and the Float (5) from the Body.
2. Wash the inside of the Body, the Clamping Stem, the Float and the Rolling Seal (3) under clean running water.
3. Check to make sure that the Rolling Seal is not damaged (torn or cracked) and is situated precisely in the middle of its groove in the Float. Replace the Rolling Seal if it is damaged or has been removed from the float. See B.2 Instructions for Replacing the Automatic Air Release Rolling Seal.
4. Reassemble the air valve in the reverse order:
First insert half the length of the Rolling Seal into the groove in the Body, and then push it the rest of the way in the groove with the aid of the Clamping Stem. Make sure that the Rolling Seal is set and held in place.

B. 2 Instructions for Replacing the Automatic Air Release Rolling Seal

1. Begin with stage B.1.1. above in **Maintenance - Automatic Air Release Component**.
2. Remove the Rolling Seal (3) by sliding it out of the groove in the Float(5).
3. Place the replacement Rolling Seal in the groove of the Float and slide it until it reaches the exact middle of the Float (The middle of the Rolling Seal should line up exactly opposite the middle seam of the Float).
4. Hold the bottom end of the Float in one hand with the thumb resting on the flat side surface of the Float. Hold the Body (1) upside down in the other hand.
5. Slide the tail end of the Rolling Seal into the corresponding groove on the Body while simultaneously sliding the the two grooves on the sides of the Float onto the two corresponding rails inside the Body.
6. Hold in place. Before lowering the Float,with the other hand insert the Clamping Stem (4), flat side facing outward – protusion side facing inward, into the same grove in the Body as the Rolling Seal.
7. Lower the Float and Clamping Stem simultaneously into the Body, pushing down the clamping Stem with the tip of the second finger.
8. Make sure the O-Ring is situated precisely in the inside groove of the Base (7).
9. Screw the assembled Body into the Base. Tighten manually (only).

B.3 Maintenance - Air & Vacuum Valve Component

1. Unscrew the Bolts (16) that connect the valve Cover (13) to the Body (21).
2. Remove the Cover assembly from the air valve Body.
3. Clean the following parts: Body (21) including the groove of the O-ring (19), Screen (12), Float (20), and Cover (13) including the Orifice Seat (17) and Orifice Seal (18) under clean running water in order to remove coarse grime and/or accumulated scale.



4. Check that the Orifice Seal is not damaged (torn and/or cracked). In case the Orifice Seal is damaged, consult your dealer.
5. Reassemble the air valve in the reverse order:
First insert the Float, and then place the O-ring in the groove.
Place the Cover on the Body, insert the Bolts and Washers and tighten the Nuts (16).
6. Tighten all 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 for the closing and opening of all bolts of the air valve (including the flange bolts).

B.4 Maintenance - NS Non-Slam Component

1. Check the movement of the Non Slam Disc (15) in the disc housing that it moves without any interference.
2. In case the Disc does not move freely in the housing, there might be embedded debris which needs to be flushed out.
3. To flush and clean the area inside the disc housing:
Unscrew the Bolts (16) that connect the valve Cover (13) to the Body (21).
Remove the Cover (13) from the valve Body (21).
Unscrew the four Domed Nuts (9); remove the Screen Cover (10) and the Screen (12). Make sure to save the Washers (9) that sit under the Screen and on the Threaded Rods (11).
4. Flush the Cover disc housing and the Disc (15) from both sides of the cover and clean with a cloth as necessary in order to remove any debris, coarse grime or accumulated scale.
5. Make sure that the Disc moves freely in the Cover disc housing.
6. Reassemble in the opposite order:
Place the Screen (12) on the Cover disc housing between the Threaded Rods (11), making sure that the Washers (9) on the Rods are between the disc housing and the Screen.
Place the Screen Cover (10) on top of the Threaded Rods, making sure that the Washers are in place between the Screen and the Cover.
Screw the Domed Nuts (9) on to the Threaded Rods (which extend out from the screen cover) and close tightly.

TROUBLESHOOTING GUIDE

PROBLEM	REASON	SOLUTION
Leak From the Small Orifice	<ol style="list-style-type: none"> a. Dirt particles stuck in the Orifice b. Rolling Seal torn 	<ol style="list-style-type: none"> a. Shut the isolating valve, wait a minute, and open it again, very fast. If leaking continues, follow instructions for: B.1. Maintenance - Automatic Air Release Component b. Follow Instructions for: B. 2 Instructions for Replacing the Automatic Air Release Rolling Seal
Leak From the Large 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.3 Maintenance - Air & Vacuum Valve Component
Non-slam Component is stuck	Non-slam disc doesn't move freely in the Disc Housing	Dirt particles stuck in the disc housing. Follow steps for: B.4 Maintenance - NS Non-Slam Component

2"-10" PARTS LIST AND SPECIFICATION

No. Part	Material
1. Body	Reinforced Nylon
2. Air Release Outlet	Polypropylene
3. Rolling Seal	E.P.D.M.
4. Clamping Stem	Reinforced Nylon
5. Float	Foamed Polypropylene
6. O-Ring	BUNA-N
7. Base	Brass ASTM B-124
8. Strainer	Nylon
9. Domed Nut & Washer	Stainless Steel SAE 304
10. Screen Cover 2"-4"	Ductile Iron / Cast Iron
6"-10"	Polyethylene / Cast Iron / Ductile Iron
11. Threaded Rod	Stainless Steel SAE 304
12. Screen	Stainless Steel SAE 304
13. Cover	Ductile Iron ASTM A-536 60-40-18
6", 8" NS Housing	Polyethylene
Cover	Ductile Iron ASTM A-536 60-40-18
14. Ring 2"-4"	Stainless Steel SAE 316
6"-10"	Steel DIN ST.37
15. Non-Slam Disc 2"-4"	Stainless Steel SAE 316
6"-10"	Cast Iron ASTM A-48 CL.35B / Ductile Iron
16. Bolt, Nut & Washer	Steel, Zinc Cobalt Coated
17. Orifice Seat	Bronze
18. Orifice Seal	E.P.D.M.
19. O-Ring	BUNA-N
20. Float	Polycarbonate / Stainless Steel
21. Body	Ductile Iron ASTM A-536 60-40-18

