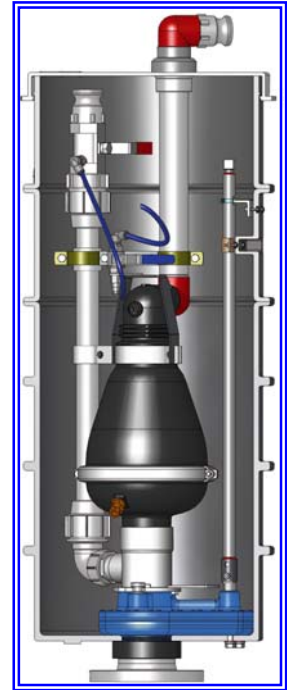


## D-025 SB Underground Air Valve System for Wastewater Installation and Maintenance

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### 1. General Description

The D-025 SB is a complete package that combines the reliable and efficient properties of the A.R.I. D-025 wastewater 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 D-025 SB assembly allows maintenance from ground level.

The shut-off valve is equipped with a safety mechanism enabling disconnection and removal of the D-025 air valve from its sub-surface housing, even 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.

## 1.1 Glossary of terms

**Back-Flush** – Flushing water through the valve by way of the outlet breather port. The frequency of back-flushing is determined by the quality of the fluid in the pipeline.

**Knife Shut-off Valve** – The shut-off valve, situated at the bottom of the Tube.

**Locked/unlocked** – When the safety mechanism is engaged/disengaged – See plate 3.

**Safety Mechanism** – Special mechanism designed to prevent the D-025 assembly from being extracted while the Knife valve is open (See plate 1,3).

**D-025 Combination Air Valve** – A combination air valve short version model for wastewater systems.

## 1.2 Features

- A combination air valve for wastewater, with a large air/vacuum orifice and a small automatic air release orifice, integrated into one body.
- The air valve's inlet diameter is 3".
- Pipe connections: 3" mm threaded (NPT) or flanged, in accordance with ASA standard.
- The D-025 SB integral, flat, quarter-turn, knife shut-off valve has a 80mm full-bore passage.
- The shut-off valve is operated from the surface.
- Easy and efficient back flushing, for cleaning, can be achieved while the air valve remains in its sub-surface housing.
- All connections are quick connections: to facilitate handling and maintenance operation flushing (inlet & outlet), connections and adaptor connected to the shut-off valve are quick connections.
- 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, and PVC.
- The air valve's body and base are made of Reinforced Nylon.
- Working Pressure Range: 3-150 psi.
- Working Temperature: 140°F.  
Maximum instantaneous working temperature: 194°F.

### 1.3 Advantages and Benefits

- Relatively light and convenient to install.
- Sub-surface installation.
- o **Low installation costs:**
  - No need for expensive, large excavation.
  - No need for expensive, human-accessible manholes.
- o **Low Maintenance costs:**
  - No need for specialized tools or safety equipment.
  - One-man operation and maintenance.
  - Clean and environmentally friendly.
  - Complete service and maintenance system, including an integral disassembly mechanism, to ensure easy back flushing and servicing, while reducing the need for spare, changeable valves.
- o **Safe in operation:** Greatly reduced danger of contact with local fauna – Snakes and scorpions etc!
  - Entirely operated and maintained from ground level.
- o **Reliable and efficient operation:**
  - Dynamic design allows high velocity air discharge, preventing premature closure.
  - A.R.I. patented rolling seal mechanism.

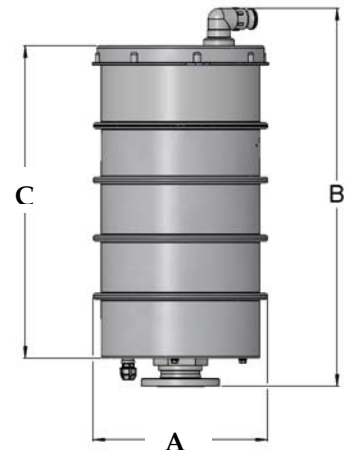
### 1.4 Components of package

1. D 025 Short Air Valve (See instructions below).
2. Unique Specially Designed safety shut off valve.
3. Integral Adapter for above.
4. Back flushing/Breather assembly.
5. Pressure relief assembly. (Ball Valve)
6. "T" Key.

All the above components are enclosed in an integral tube with cover; ready to be permanently buried.



Part no.	Part description	Qty.	Material
1	Drainage Elbow	1	Polypropylene
2	Quick lock (Camlock)	1	Polypropylene
3	Thread union (Record)	1	PVC
3.1	Thread union O-ring	1	NBR
4	Tube Cover	1	Polyethylene
5	Ball valve 1.5"	1	Stainless steel SAE316
6	Draining elbow 1/4" (Quick release)	1	Chrome coated
7	Male quick coupler 1.5"	1	Polyethylene
8	Spacer	2	Polyethylene
9	Backflow flushing Pipe	1	Polyethylene
10	Angle inside thread 1.5"	1	Polyethylene
11	Open/Close sticker	2	Stainless steel SAE304
12	Bolt and nut M 8	2	Stainless steel SAE 316
13	Body D-025 valve	1	Reinforced Nylon
14	Band D-025 valve	1	Stainless steel SAE 316
15	Base D-025 valve	1	Reinforced Nylon
16	Quick Connection 3"	1	Stainless steel SAE304
17	O-ring 2-235	2	NBR
18	Safety Position Indicator	1	Stainless steel SAE316
19	Tube	1	Polyethylene
20	Oppering rod	1	Stainless steel SAE304
21	Stopper	2	Stainless steel SAE304
22	Bottom Rod adaptor	1	PVC
23	Knife Shut-Off valve	2	
24	Fiber seal	4	Fiber
25	Washer M10 DIN125	4	Stainless steel SAE304
26	Bolt M10 DIN 933	4	Stainless steel SAE304
27	Nut 3"	1	Acetal
28	Flange O-ring 2-339	1	Buna-N
29	Flange 3"	1	Reinforced Nylon
30	Pressure release tube 8 mm.	2	Polyurethane
31	Ball valve 1/4"	1	Stainless steel SAE316
32	Washer M12 DIN 6798	1	Stainless steel SAE304
33	Bridge Assembly	1	Stainless steel SAE304
34	Quick lock 1/4"	1	Chrome coated
35	Bolt M6 DIN 933	3	Stainless steel SAE304
36	O-ring 6-027	1	Buna-N
37	Bolt #8-15x5/8" DIN 7981	3	Stainless steel SAE304
38	Drainage Elbow	1	Polypropylene
39	Band union	1	Stainless steel SAE304
40	Nut M6 DIN934	3	Stainless steel SAE304
41	Band 1.5"	2	Stainless steel SAE304
42	Bridge band	2	Stainless steel SAE304
43	M5 DIN934	8	Stainless steel SAE304
44	Omega 1.5"	1	Stainless steel SAE304
45	Bolt M5 DIN 7985	2	Stainless steel SAE304
46	Position arrow	1	Polyethylene
47	Hose band	1	Stainless steel SAE304
48	Open/Close sticker	1	
49	Open/Close seat	1	Alluminum
50	Bolt M5 DIN 7985	4	Stainless steel SAE304
51	Rod support	1	Stainless steel SAE304
52	"T" Handle	1	Stainless steel SAE304



A	B	C	weight
17.5"	38/5	32	84
17.5"	47	39.5	88

### 3.Installation

Before beginning installation: Remove the D-025 valve assembly from the Tube (see operating instructions below).

**Before installing, make sure the unit cover (4) is in place** – This prevents soil, media or dirt from falling into the unit.

It is recommended to install the D 025 SB simultaneously when the sewage line is installed. This will preclude the need to excavate later, when the line is already in place.

#### Caution

- When installing, operating and maintaining this unit, all sensible care must be taken and any local by-laws and safety regulations must be adhered to.
- The systems to which the D-025 SB are intended to be attached are, or have been, under pressure – be aware of this and take appropriate safety precautions.
- Before attempting to install, operate or maintain the unit, read and understand the following instructions.

#### 3.1. Height

1.1. The distance from the top surface of the Tube cover (4) and the bottom of the access cover { h1 } should be between 2" and 8" . From this point the overall height {H} of the unit from the pipeline flange or riser flange will be measured – See Illustration 2.

1.2. Care must be taken, at all times, that the Unit is installed at the perpendicular angle to the horizontal.

#### 3.2. Bore Diameter and depth

2.1. - The bore diameter {d1} should be 40" . This will allow 12" for the filling material around the tube.

2.1.2 - The height of the flange on the pipe line or riser should allow the unit cover to be situated as defined in the previous section (1. Height ). If this is not possible then an extender/riser must be attached and the flange of the unit fastened to this.

#### 3. 2.2 Diagonal Riser

2.2..1- If the Unit is to be installed on a riser that is at an angle, the diagonal slope should be at least 7% - See Illustration 1.

2.2.2 - In the case of a diagonal riser, it is advisable to install the riser on a gas collection cell - See Illustration 1.

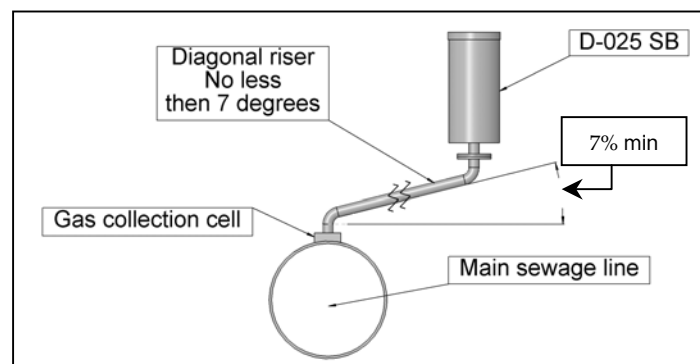


Illustration 1.

#### 3.3. Filling –

##### 3.3.1 Filling materials



3.1.1 - 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 Illustration2).

**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.

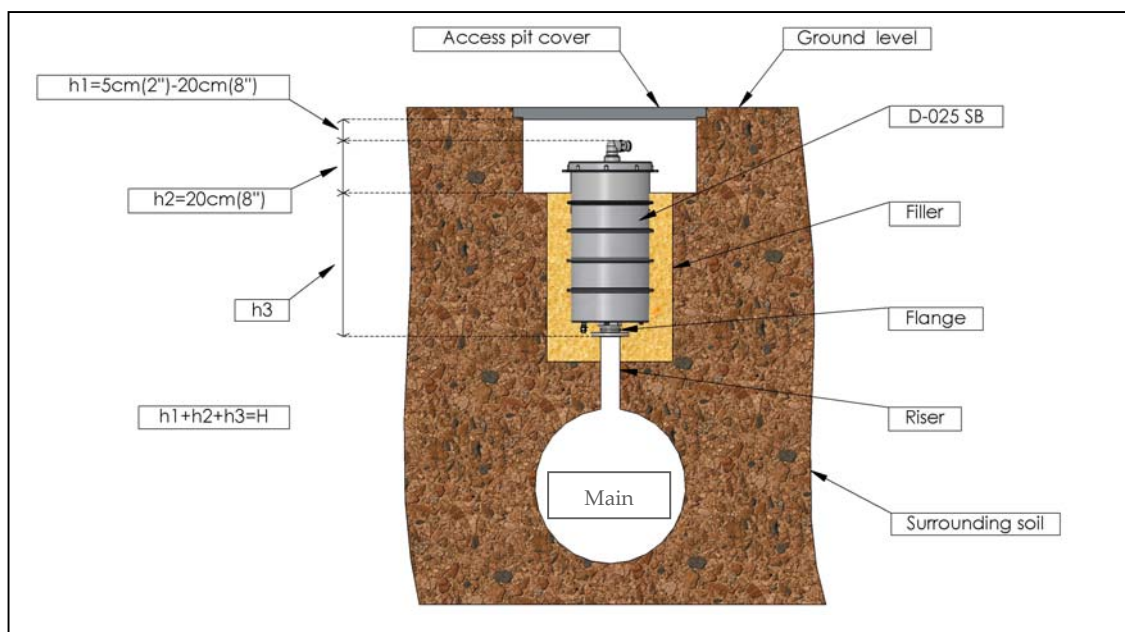


Illustration2.

### 3.3.2 Method of filling

3.2.1 The Filling material should be layered approximately 3 12" thick and then compressed to 90% of its volume. This should be repeated until the filling layers reach 8" below the top of the Unit. (See Illustration2).

### 3.3.3 Re-insertion of D-025 assembly

**CAUTION :** DO NOT OPEN the Knife Shut-off Valve (23) when the D-025 assembly is not locked in its place.

1. Before replacing the D-025 assembly, visually inspect the two "O" rings (17) at the base of the assembly (16); if damaged, these must be replaced. Clean and lubricate the "O" rings lightly with silicon based lubricant
2. Replace assembly in reverse order as given in the "Extracting D-025 assembly for maintenance" instructions above.
3. **VERY IMPORTANT:** Before opening the Knife Shut-off valve (23), check that all valves are closed and that the D-025 assembly is securely locked in position.

4. Place the "T" key (52) inside tube (19), prior to closing unit - Replace cover(4) in reverse order.

## 4. Initial Operation

When installed, and before opening the line, make sure that the D-025 Valve assembly is correctly and locked in place (see operating instructions below) and that the pressure relief ball valve (31) is closed.

Trouble shooting the D-025SB during initial installation		
Problem	Possible cause	Solution
The D-025 assembly does not turn when attempting to extract or replace.	The knife valve (23) may still be open.	Verify that the Valve is closed.
The assembly does not extract.	Assembly not fully turned to the extraction position, at end of travel.	1. Try to turn the assembly to the end of its travel. 2. Try re-locking and un-locking several times.
Safety mechanism does not engage (When reassembling).	Safety mechanism on wrong side.	Partially extract the assembly, rotate it 180 degrees, reinsert in correct position.
Leakage from below D-025 (13) valve.	Possible damage to "O" rings (17).	1. Check area around port for debris. 2. Inspect and replace "O-ring if damaged.
Water discharges from air outlet pipe.	Possible damage to rolling seal of D-025.(See instructions for Standard D-025)	1. Check area around rolling seal housing for debris. 2. Inspect and replace rolling seal if damaged.
Water and pressure discharge from pressure relief cock.	Pressure relief ball valve (31) open.	Close pressure relief cock.

## 5. Back-Flushing

*For the parts described below - please see main Drawing and parts list.*

### 5.1 General

Back-flushing is carried out in two ways:

- I. Back-flushing with retrieval of flushing liquid.
  - II. Back-flushing into the line.
- If using the first method, the Knife shut-off valve (23) must be closed at start of operation.
  - In BOTH methods the Back-flush pump pressure should not exceed 30 psi pressure.

### 5.2 Back-flushing with retrieval of flushing liquid

1. Detach record joint (3) and remove the cover(4). After removing cover, replace record, paying attention to position of "O" ring (3.1).
2. With the supplied "T" key (52), close knife shut-off valve; making sure that the indicator arrow (46) points to "closed".(see Plate 1).
3. Release internal pressure: Make sure that the pressure release tube (30) is held out of tube (19) and away from operator and then open pressure relief ball valve (31). When all pressure is released, re-close pressure relief cock.
4. Attach feed hose from pump to the camlock fitting at out-let (2) of D-025 valve(13).
5. Attach retrieval hose to the camlock fitting on the fluid retrieval pipe {(9)- Backflow flushing pipe) }.
6. Open retrieval pipe ball valve (5).



7. Back flush for suitable time according to fluid quality and degree of fouling. When finished, turn off pump.
8. Close retrieval pipe ball valve (5) and detach retrieval hose.
9. Detach feed hose.

**CAUTION**

**Before proceeding to next step:**

- a. Make sure that the D-025 valve assembly is located correctly and locked in-place ( See maintenance instructions below).
- b. Make sure all stop-cocks are closed.
- c. Make sure pressure relief ball valve (31) is closed.

10. Open Knife shut-off valve (23) with "T" key (52). Make sure that the indicator arrow (46) points to open. (See plate 1)
11. Place the "T" key (52) inside tube (19), prior to closing unit - Replace cover in reverse order.

Trouble shooting the D-025SB while Back-flushing with retrieval of fluids.		
Problem	Possible cause	Solution
When Pump operating, NO fluids are released through the fluid retrieval pipe.	1. Fluid Retrieval pipe ball valve (5) closed.	Open Fluid Retrieval pipe cock.
	2. Knife Shut-off valve (23) open.	Close Knife Shut-off valve.
When Pump operating, Fluid leaks from joins or connections.	Loose joins or connections.	Tighten joins and connections that are leaking.

### 5.3 Back-flushing into the line.

**WARNING!**

**DO NOT USE THIS PROCEDURE UNLESS LINE IS UN-PRESSURISED**

1. Detach record joint (3) and remove cover(4). After removing cover, replace record, paying attention to position of "O" ring (3.1).
2. With the supplied "T" key (52), close knife shut-off valve (23); making sure that the indicator arrow (46) points to "closed". (See plate 1)
3. Release internal pressure: Make sure that the pressure release tube (30) is held out of tube (19) and away from operator and then open pressure relief ball valve (31). When all pressure is released, re-close pressure relief cock.
4. Attach feed hose to outlet (2) of D – 025 valve(13).
5. Make sure all cocks are closed.
6. Using the "T" key (52), open Knife valve (23) so that indicator(46) arrow points to open.(See plate 1).

**Caution:** Make sure the D-025 assembly is securely locked in place – Fully turned in clockwise direction.

7. Turn on pump and back flush for suitable time according to fluid quality and degree of fouling.
8. When finished, turn off pump.
9. Detach feed hose.
10. Recheck that the D-025 assembly is securely locked in place - Fully turned in clockwise direction.

11. Place the "T" key (52) inside tube(19), prior to closing unit - Replace cover in reverse order.

Trouble shooting the D-025SB while Back-flushing to line.		
Problem	Possible cause	Solution
When Pump operating, NO fluids enter D-025 (13) through the breather.	Knife Shut-off valve (23) closed	Open Knife Shut-off valve.
When Pump operating, Fluid leaks from joins or connections.	Loose joins or connections.	Tighten joins and connections that are leaking.
At end of operation, the Knife Shut-off valve (23) does not close.	Possible blockage	Resume Back-flush operation to until blockage removed.

## 6. Operation and Maintenance

The ARI D-025 SB is designed so that all operation and maintenance can be carried out at ground level. To this purpose, the D-025 Air Release Valve (23) is easy to extract from the Tube (19) and can be substituted, very quickly, with a pre-serviced replacement D-025. Alternatively, once extracted, the D-025 can be serviced in-situ and returned into the tube.

### 6.1 Extracting D-025 assembly for maintenance

1. Detach record joint (3) and remove cover (4).
2. With the supplied "T" key (52) close the Knife shut-off valve (23). Make sure that the indicator arrow (46) points to closed. (See Plate 1).

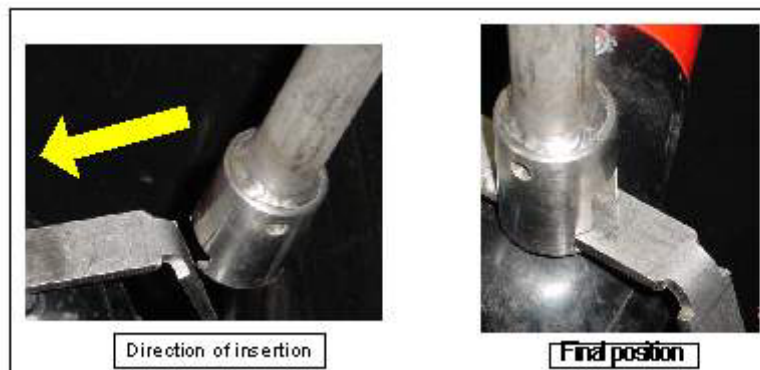


Plate 1

### 3. **VERY IMPORTANT**

#### **Release internal pressure:**

- a. Make sure that the pressure release tube (30) is held out of tube and pointed away from operator.
  - b. When all pressure is released, leave the pressure relief ball valve (31) open.
4. Slide the "T" Key (52) base onto the stainless steel assembly handle until it reaches the end of travel – See Plate 2.



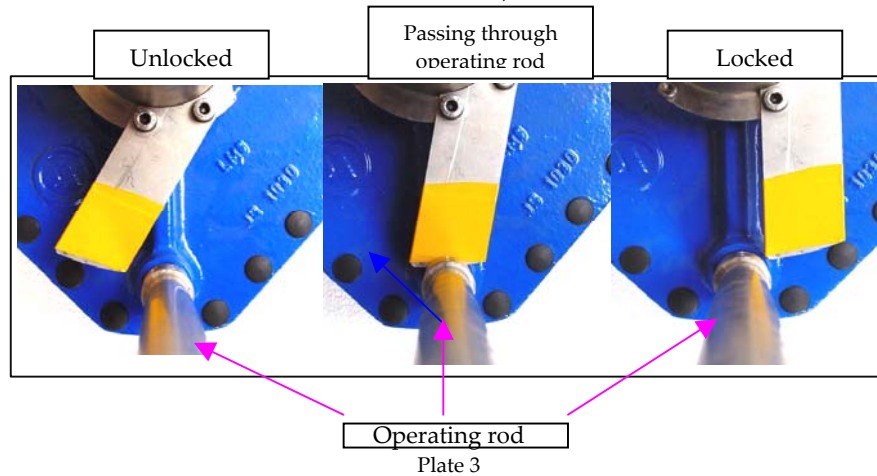
5. Turn  
Key in

direction until it

Plate 2.

the "T"  
a  
clockwise  
ceases to turn. At the

same time observing the safety position indicator (18) (Bright yellow in colour) at the base of the D-025; the indicator should pass through the operating rod base and clear it completely ( see Plate 3).



6. The D-025 assembly can now be extracted by pulling the “T” key gently and firmly upwards.

The D-025 assembly can now be dismantled for servicing.

## 6.2 Dismantling the D-025 assembly for servicing

There are two basic methods of dismantling the D-025:

**6.2.1 Partial Dismantle** – This is the preferred method; where the D-025 upper section is separated from the bottom body section by opening the central clamp. This leaves the bottom adapter still attached to the lower body section. This method is useful for in-situ maintenance.

**6.2.2. Full Dismantle** – The complete D-025 valve is dismantled from the adapter and back-flush and breather pipe work. This method is useful if the entire valve is to be removed from the vicinity with the aim of servicing in a workshop.

### 6.3 Partial dismantle

1. Release pressure release tube from the inlet (34) of the pressure release ball valve (31).
2. Release the upper breather pipe (38) from the red elbow by turning counter clock-wise.
3. There are two optional lengths of D-025 SB: 800 cm (32”) and 1000 cm (40”).
  - a. 800 cm (32”):
    - I. Release the three handle retaining nuts and bolts (40 + 35) ( see drawing ).
    - II. Loosen the Back-flush fluid retrieval pipe joint (10) (at side of adapter (16) and slide the pipe (9) carefully in a clock-wise or counter clock-wise direction to the horizontal (see drawing). This pipe may be completely disconnected for convenience.
  - b. 1000 cm (40”):
    - I. Release the two nuts and bolts (40 + 35) on separator bar(39)).
    - II. Release the three handle retaining nuts and bolts (40 + 35) (see drawing).
    - III. Remove the Breather pipe (38).
4. Release and remove the central retaining band (14).
5. The upper (13) and lower (15) sections of the D-025 valve can now be serviced in-situ.
6. Check central “O” ring – If damaged, replace.

7. Assemble in reverse order.

#### 6.4 Full dismantle

1. Follow the above instructions from 1 until 3.b.iii.
2. Unscrew the D-025 valve from the stainless steel adapter(16).
3. The D-025 is now isolated.

**\*\* Instructions for D-025 Maintenance, See Appendix A.**

#### 6.5 Re-insertion of D-025 assembly

**CAUTION:** DO NOT OPEN the Knife Shut-off Valve(23) when the D-025 assembly is not fully locked in place.

1. Before replacing the D-025 assembly, visually inspect the two "O" rings (17) 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. Replace assembly in reverse order as given in the "Extracting D-025 assembly for maintenance" instructions above.

**Remember, after extracting the "T" Key (52) close the pressure release ball valve(31).**

5. **VERY IMPORTANT:** Before opening the Knife Shut-off valve, check that all ball valves are in closed position and that the D-025 assembly is securely locked in position.

#### 6.6

Trouble shooting the D-025SB		
Problem	Possible cause	Solution
The D-025 assembly does not turn when attempting to extract or replace.	The knife valve (23) may still be open.	1. Verify that the Valve is closed. - Before trying to release the D-025 assembly; release pressure through pressure relief ball valve(31).
The assembly does not extract.	Assembly not fully turned to the extraction position, at end of travel.	1. Try to turn the assembly to the end of its travel. 2. Try locking and unlocking the assembly repeatedly.
Safety mechanism(18) does not engage (When reassembling ).	Safety mechanism on wrong side.	Partially extract the assembly, rotate it 180 degrees, reinsert in correct position.
	Debris preventing re-insertion of assembly.	Inspect Knife valve port and surround- Clean out any debris present.
Leakage from below D-025 valve.	Possible damage to "O" rings (17).	Replace "O-ring if damaged.
Water discharges from air outlet pipe.	Possible damage to rolling seal of D-025.	Replace rolling seal if damaged.
Water and pressure discharge from pressure relief cock.	Pressure relief ball valve(31) open during standard operation.	Close pressure relief cock.

#### APPENDIX A.

1. Open and remove the two parts of the clamp.(1)
2. Pull out the top part (2) , wash the mechanism and the inside of the valve.
3. Reassemble the two parts and tighten the screws (2)  
Pay attention to correct placement of the seal's O-Ring (4).

