

# D-040 PN 16

## Combination Air Valve (PATENTED)

### Description

The D-040 Combination Air Valve has the features of both an Air-release valve and an Air/vacuum valve.

The Air-release component of the D-040 was designed to automatically release to the atmosphere small pockets of air as they accumulate at local high points along a pipeline when the pipeline or piping system is full and operating under pressure.

The Air/vacuum component was designed to automatically discharge or admit large volumes of air during the filling or draining of a pipeline or piping system. This valve will open to relieve negative pressures whenever water column separation occurs.



### Applications

- Pump stations: after the pump and after the check valve
- Downstream (after) and upstream (before) shut-off valve
- After deep-well pump
- On long water supply lines
- At peaks along the line
- At the end of lines
- Before water meter
- On strainers and filters

### Valve Selection

The air valve is available:

- With 3/4", 1", 2" male NPT , BSPT connections, as requested.
- With a ball valve tap BSPT/NPT male connection upon request.
- Vacuum check - The valve is available as a valve that will only release air from the system and will not admit air to the system when under pressure condition occur.
- This feature is accomplished by the addition of a check valve inserted in the air outlet.

# D-040 PN 16

## Combination Air Valve (PATENTED)

### Operation

The air & vacuum component, with the large orifice, discharges air at high flow rates during the filling of the system and admits air into the system at high flow rates during its drainage and at water column separation. High velocity air, should not blow the float shut. Water will lift the float and cause sealing of the valve.

At any time during system operation, should internal pressure of the system fall below atmospheric pressure, air will re-enter the systems, preventing down-surge and cavitation.

The smooth release of air prevents pressure surges and other destructive phenomena.

Admitting air in response to negative pressure protects the system from destructive vacuum conditions, prevents damage caused by water column separation. Air re-entry is essential to efficiently drain the system.

The automatic small orifice air release component releases entrapped air in the pressurized systems.

Pockets of accumulated air may cause the following destructive phenomena:

- Impediment of effective flow and hydraulic conductivity of the system along with a throttling effect as would a partially closed valve. In extreme cases this will cause complete flow stoppage.
- Accelerate cavitation damages.
- High pressure surges.
- Accelerate corrosion of metal parts.
- Danger of high-energy burst of compressed air.
- Inaccuracies in flow metering.

As the system starts to fill, the valve functions according to the following stages:

1. Entrapped air is released by the valve
2. Liquid enters the valve, lifting the float which draws the "seal plug" to its sealing position.
3. Entrapped air, which accumulates at peaks along the system (where combination air valves should be installed), rises to the top of the valve, which in turn displaces the liquid in the valve's body.
4. The float descends, peeling the "rolling seal", the smaller orifice opens and the accumulated air is released.
5. Liquid penetrates into the valve and the float rises unrolling the rolling seal to its sealing position.

When internal pressure falls below atmospheric pressure (negative pressure):

1. Both orifices will be immediately unplugged and the float drops away.
2. Air is admitted to the system.



### Main Features

Working pressure range: 0.2-16 bar (3-230 psi.) Testing pressure: 25 bar (360 psi.)

- Working Temperature: 60° C

Maximum instantaneous working temperature: 90° C

- Light, simple and reliable structure.
- Prevents premature closing:  
The valve discharges air at high velocity, exceeding 11 psi differential pressure.
- The orifice of the automatic continuous acting valve is larger than in any other air release valve of it's kind, therefore it discharges air at higher flow rates.
- The size of the automatic orifice makes its obstruction by debris most unlikely.
- The valve design - rolling seal mechanism: is less sensitive to pressure differentials than a direct float seal. It accomplishes this by having a comparably large orifice for a wide pressure range (up to 16 bar).
- The body is made of high strength plastic, and all operating parts are made of specially selected corrosion resistant materials.
- Due to its light weight, the valve may be installed on plastic piping systems, as well as other lightweight piping.
- A threaded drainage outlet enables removal of excess fluids (1 1/2" in the 2", 3/8" in the 3/4", 1")

# D-040 PN 16

## Combination Air Valve (PATENTED)

### Project (tender) Specification

Type Combination air valve

Operation

-Kinetic component

The valve must discharge air at high velocity during filling of the system and admit air during its drainage. The valve should be designed to prevent premature closing and discharge air.

-Automatic component

The valve will release accumulated air from the system while it is under pressure and operating.

Large dimension automatic orifice of at least 804 mm<sup>2</sup>, attached to the air & vacuum orifice making it less prone to obstruction by debris.

The same orifice for a wide pressure range (up to 16 bar).

Pressure - 0.2-16 bar (3-230 psi.)

Testing pressure: 25 bar (360 psi.)

Ends 3/4", 1", 2" male threads NPT, BSP.

Body material Reinforced nylon.

Drainage outlets For easy removal of excess fluids.

### Accessories

#### Ball Valve

Shut-off valve

Made of brass ATSM B-124

Suitable for: D-040 1" 2", D-040-C 1" 2"

#### Flanges

Made of reinforced nylon / cast nylon

Suitable for: D-040 1" 2", D-040-C 1" 2"

Diameter 40/50/60 Internal threads: 3/4" 1" 2"

Diameter 40/50/65 Internal threads: 3/4" 1" 2"

Diameter 80 Internal threads: 2" 3"

#### Freeze Jacket

Made of polyurethan

#### Model one way

The D-040 air valve is available:

D040-V -With a vacuum guarding, out-only attachment, which only allows air discharge, not allowing air intake (all models).

D-040-I -With a vacuum breaking, In-only attachment, which only allows air intake, not allowing air discharge (D-040 2" only).

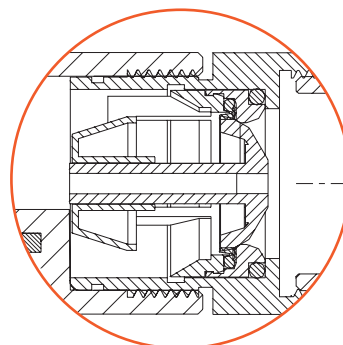
D-040-NS -With a non-slam, discharge-throttling attachment, which allows free air intake, but throttles air discharge (D-040 2" only).



D-041 P 2"



D-041 P 1"



D-040 NS 2"

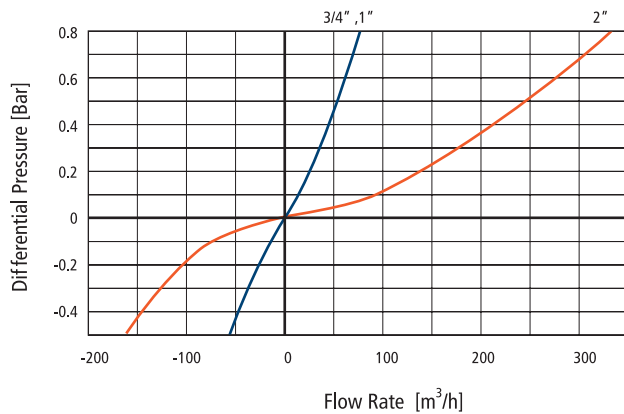
# D-040 PN 16

## Combination Air Valve (PATENTED)

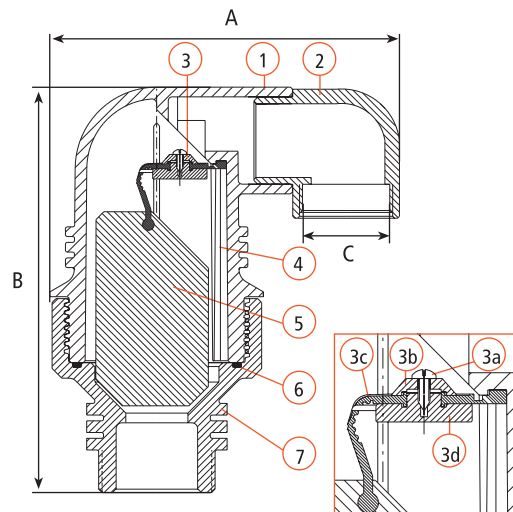
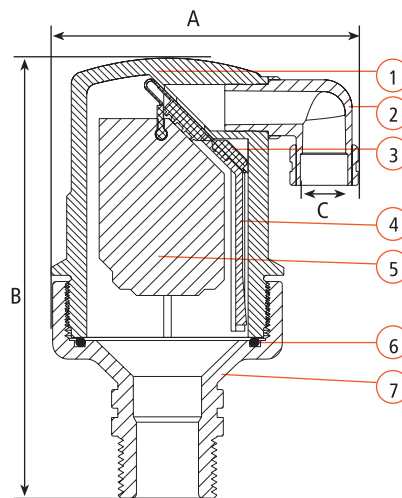
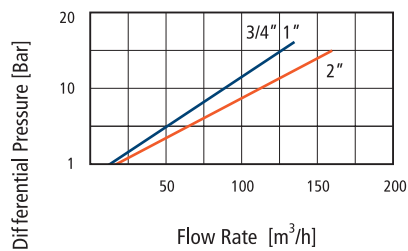
### Dimensions and Weights

Model	Dim. mm			Weight Gr.	Orifice Area (mm <sup>2</sup> )	
	A	B	C		Auto.	Kin.
1", 3/4"						
D-040 P	100	143	3/8" BSP	0.33	7.8	100
D-040 B	100	143	3/8" BSP	0.70	7.8	100
D-040 ST.	100	143	3/8" BSP	0.65	7.8	100
D-040 ST.ST.	100	143	3/8" BSP	1.40	7.8	100
2"						
D-040-P	180	209	1 1/2" BSP	1.1	12	804
D-040-B	180	209	1 1/2" BSP	2.2	12	804
D-040-ST.	180	209	1 1/2" BSP	2.1	12	804
D-040 ST.ST.	180	209	1 1/2" BSP	3.1	12	804

### Air and Vacuum Flow Rate



### Automatic Air Discharge



### Parts list and specification

No.	Part	Material	
		D-040 P / B / ST	D-040 ST ST
1.	Body	Reinforced Nylon	St.St. SAE 316
2.	Drainage Elbow	Polypropylene	Polypropylene
3.	Seal Plug Assembly		
3a.	Screws	Stainless Steel	Stainless Steel
3b.	Plug Cover	Reinforced Nylon	Polypropylene
3c.	Rolling Seal	E.P.D.M.	Viton
3d.	Plug	Reinforced Nylon	Polypropylene
4.	Clamping Stem	Reinforced Nylon	Polypropylene
5.	Float	Foamed Polypropylene	
6.	O-Ring	BUNA-N	Viton
7.	Base	Reinforced Nylon	St.St. SAE 316
		/ Brass ASTM B124	
		/ St.St. SAE 316	
Optional	Ball valve	Brass ASTM B124	