

DNS Variant Air Valves



Designed Network Solutions Ltd, 15 Buckingham Drive, Northwich, CW9 8WB
T 07375 385089 E craig@dns-uk-ltd.co.uk W dns-uk-ltd.co.uk

General

Variant combination air release and vacuum break valves protect pipelines from damaging vacuum conditions while ensuring that the system maintains design efficiency. The integral anti-shock feature provides protection against the damaging effects of uncontrolled filling and pump stoppages.

Functions

- ◆ High capacity air discharge
- ◆ High capacity air intake
- ◆ Pressurized air release
- ◆ Surge alleviation

Features

- ◆ Optimum flow characteristics
- ◆ Low pressure sealing
- ◆ Compact design
- ◆ No dissimilar metal corrosion

Operation of Variant Air Valves

Large orifice air discharge

During initial filling the pipeline is filled with air. As water is introduced into the pipeline, the air flows naturally towards the highest points along the pipeline. Air valves, positioned at these high points, allow air to pass freely through the large orifice to atmosphere.

Vacuum break

During scouring or when a pipeline ruptures, it is imperative that the pipeline is protected from damaging negative pressures. Variant air valves provide a full bore, unimpeded flow path that maximises the valve's air intake capacity. The rapid inflow of air effectively prevents detrimental vacuum conditions.

Pressurized air release

During normal operating conditions, air accumulates in the air valves, located at the high points along the pipeline. Once sufficient air has collected in the valve, the automatic float drops, allowing the air to escape to atmosphere.

Surge protection

Should pump stoppages cause water column separation within the pipeline, air is admitted rapidly through the air valve's large orifice to protect the pipeline. As the water column returns, this air is then gradually discharged through the air valve's anti-shock orifice. By restricting the discharge through the anti-shock orifice, sufficient air is retained in the pipeline to create a temporary surge accumulator.

In instances where pipelines are filled too quickly, the anti-shock mechanism is blown shut by the excessive air flow. Air is now only released through the anti-shock orifice in a controlled manner, creating an air cushion in the pipeline. This air cushion slows down the approaching water column and absorbs any potential surges.

Anti-theft

Air valve theft adversely affects the reliability and efficiency of pipelines. This problem is compounded when multiple air valves are stolen from the same pipeline. The Variant models LN and LT were developed to prevent the theft of air valves thereby ensuring that the pipeline maintains its design and structural integrity.

Air Valve Selection and Technical Specifications

Sizing

The overriding criteria for air valve sizing is the intake requirement under vacuum conditions. To protect the pipeline and joints, it is necessary to limit the system negative pressure to 3.5m vacuum by admitting sufficient air into the pipeline as it empties. One needs to consider the pipeline diameter, gradient, rupture percentage and scour valve size when calculating the required flow rate. Once the required intake flow rates have been calculated, the appropriate air valve can be selected.

Although the air valve size is determined by the air flow required under the vacuum conditions, the flow rate (switching rate) at which the anti-shock mechanism is activated, needs to be considered to ensure that your pipeline will be adequately protected.

Intake flow rates at 3.5 meters vacuum

VALVE SIZE MM	MODEL LX	MODEL LN	MODEL LS	MODEL LT
25mm	58 L/S	58 L/S	-	-
50mm	215 L/S	215 L/S	208 L/S	-
80mm	573 L/S	573 L/S	558 L/S	540 L/S
100mm	792 L/S	792 L/S	772 L/S	735 L/S
150mm	2053 L/S	-	2012 L/S	1865 L/S
200mm	3361 L/S	-	3294 L/S	3135 L/S

Orifice sizes and switching rates

SIZE MM	25MM LX/LN	50MM LX/LN/LS	80MM LX/LN/LS	100MM LX/LN/LS	150MM LX/LS	200MM LX/LS	80MM LT *	100MM LT *	150MM LT *	200MM LT *
Anti-shock orifice	4	9	14	17	25	34	14	17	25	34
Inlet	25	50	80	100	150	200	80	100	150	200
Outlet	25	50	80	100	150	200	80	95	150	200
Switching Flow L/S	12	30	119	161	447	632	48	130	350	500

* The LT can be supplied with a range of switching rates for each size.

Model LX Specifications

Type: Triple acting three stage

Material specifications

Body : 304/316 Stainless steel
 Automatic float: High Density polyethylene
 Kinetic float : High Density polyethylene
 Anti shock float: High Density polyethylene
 Automatic seal : EPDM
 Kinetic seal and O rings: Nitrile
 Spacers, Studs, nuts and bolts: 304/316 Stainless steel

NOMINAL SIZE	MODEL NO.	PRESSURE RATING	HEIGHT	DIAMETER
25mm Screwed	025LX16	1600KPA	325mm	95mm
25mm Screwed	025LX25	2500KPA	325mm	95mm
25mm Flanged	025LX16	1600KPA	260mm	115mm
25mm Flanged	025LX25	2500KPA	260mm	115mm
25mm Flanged	025LX40	4000KPA	320mm	115mm
50mm Screwed	050LX16	1600KPA	335mm	120mm
50mm Screwed	050LX25	2500KPA	335mm	120mm
50mm Flanged	050LX16	1600KPA	255mm	165mm
50mm Flanged	050LX25	2500KPA	255mm	165mm
50mm Flanged	050LX40	4000KPA	296mm	165mm
80mm Flanged	080LX16	1600KPA	330mm	200mm
80mm Flanged	080LX25	2500KPA	330mm	200mm
80mm Flanged	080LX40	4000KPA	380mm	200mm
100mm Flanged	100LX16	1600KPA	330mm	235mm
100mm Flanged	100LX25	2500KPA	330mm	235mm
100mm Flanged	100LX40	4000KPA	385mm	235mm
150mm Flanged	150LX16	1600KPA	440mm	285mm
150mm Flanged	150LX25	2500KPA	440mm	300mm
150mm Flanged	150LX40	4000KPA	520mm	300mm
200mm Flanged	200LX16	1600KPA	510mm	340mm
200mm Flanged	200LX25	2500KPA	510mm	360mm
200mm Flanged	200LX40	4000KPA	595mm	375mm

250mm and 300mm available on request

Working temperatures

4 - 75 Degrees Celcius.

Standard factory tests

Hydrostatic - 1.5 times working pressure.
 Low pressure sealing - 20kpa.
 Automatic orifice operation.

End connections

Screwed Valves: Male BSP
 Flanged Valves: SANS 1123 studded

Model LX Air Valve



Model LS Specifications

Type: Triple acting three stage

Material specifications

Body	: 304/316 Stainless steel	Automatic seal	: EPDM
Automatic float	: High Density polyethylene	Kinetic seal and O rings	: Nitrile
Kinetic float	: High Density polyethylene	Spacers, Studs, nuts and bolts	: 304/316 Stainless steel
Anti shock float	: High Density polyethylene		

NOMINAL SIZE	MODEL NO.	PRESSURE RATING	HEIGHT	DIAMETER
50mm Flanged	050LS16	1600KPA	650mm	175mm
50mm Flanged	050LS25	2500KPA	650mm	175mm
80mm Flanged	080LS16	1600KPA	660mm	200mm
80mm Flanged	080LS25	2500KPA	660mm	200mm
100mm Flanged	100LS16	1600KPA	666mm	235mm
100mm Flanged	100LS25	2500KPA	666mm	235mm
150mm Flanged	150LS16	1600KPA	767mm	285mm
150mm Flanged	150LS25	2500KPA	767mm	300mm
200mm Flanged	200LS16	1600KPA	850mm	340mm
200mm Flanged	200LS25	2500KPA	850mm	360mm

Working temperatures

4 - 75 Degrees Celcius.

Standard factory tests

Hydrostatic - 1.5 times working pressure.
Low pressure sealing - 20kpa.
Automatic orifice operation.

End connections

Flanged Valves: SANS 1123 studded

Model LS Sewerage Air Valve



Model LN Specifications

Type: Triple acting three stage

Material specifications

Body: Molybdenum reinforced nylon 11
 Base Flange : 304/316 Stainless Steel
 Automatic float : High Density polyethylene
 Kinetic float : High Density polyethylene
 Anti shock float : High Density polyethylene
 Automatic seal : EPDM
 Kinetic seal and O rings : Nitrile
 Spacers, Studs, nuts and bolts : 304/316 Stainless Steel

NOMINAL SIZE	MODEL NO.	PRESSURE RATING	HEIGHT	DIAMETER
25mm Flanged *	025LN16	1600KPA	280mm	165mm
25mm Flanged *	025LN25	2500KPA	280mm	165mm
25mm Flanged *	025LN40	4000KPA	340mm	165mm
50mm Flanged	050LN16	1600KPA	275mm	165mm
50mm Flanged	050LN25	2500KPA	275mm	165mm
50mm Flanged	050LN40	4000KPA	316mm	165mm
80mm Flanged	080LN16	1600KPA	345mm	200mm
80mm Flanged	080LN25	2500KPA	345mm	200mm
100mm Flanged	100LN16	1600KPA	345mm	240mm
100mm Flanged	100LN25	2500KPA	345mm	240mm

* The 25mm valve has a 50mm mounting flange and should be installed above a 50mm isolating butterfly valve.

Working temperatures

4 - 75 Degrees Celcius.

Standard factory tests

Hydrostatic - 1.5 times working pressure.
 Low pressure sealing - 20kpa.
 Automatic orifice operation.

End connections

Flanged Valves: SANS 1123 studded



Model LN nylon Anti-theft Air Valve



Model LT Specifications

Type: Triple acting three stage

Material specifications

Body : 304/316 Stainless steel
 Automatic float : High Density polyethylene
 Kinetic float : High Density polyethylene
 Anti shock float: High Density polyethylene
 Automatic seal : EPDM
 Kinetic seal and O rings: Nitrile
 Spacers, Studs, nuts and bolts: 304/316 Stainless steel

NOMINAL SIZE	MODEL NO.	PRESSURE RATING	HEIGHT	DIAMETER
80mm Flanged	080LT16	1600KPA	360mm	235mm
80mm Flanged	080LT25	2500KPA	360mm	235mm
80mm Flanged	080LT40	4000KPA	450mm	235mm
100mm Flanged	100 LT16	1600KPA	360mm	235mm
100mm Flanged	100LT25	2500KPA	360mm	235mm
100mm Flanged	100LT40	4000KPA	450mm	235mm
150mm Flanged	150LN16	1600KPA	510mm	370mm
150mm Flanged	150LN25	2500KPA	510mm	370mm
150mm Flanged	150LN40	4000KPA	575mm	370mm
200mm Flanged	200LT16	1600KPA	590mm	410mm
200mm Flanged	200LT25	2500KPA	590mm	410mm
200mm Flanged	200LT40	4000KPA	650mm	410mm

Working temperatures

4 - 75 Degrees Celcius.

Standard factory tests

Hydrostatic - 1.5 times working pressure.
 Low pressure sealing - 20kpa.
 Automatic orifice operation.

End connections

Flanged Valves: SANS 1123 studded



Model LT Air Valve

