

Valve

Solutions

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Integrated LoPro™ Two-Stage Valves

COMPACT, MULTIPLE-STAGE VACUUM
SOFT START VALVES



Features and Benefits

- Compact design - two valves in one compact body for system space savings
- Small system footprint - streamlined limit switch with LED for remote indication of main valve position
- Internal bypass valve for reduced turbulence and contamination during pumpdown
- Eliminates the need for small bypass lines
- Formed bellows for 1 million cycles in clean environments
- Heatable to 105°C
- Available in port diameters of 1, 1½, and 2 inches
- Adjustable pumpdown times
- Visual valve position indicator

Applications

Vacuum systems often require a slow initial evacuation of the roughing or loadlock area of the system. This process is called soft start or soft pumpdown. The soft start process reduces turbulent flow during initial system evacuation, diminishing product contamination and damage.

Often a bypass line is used to soft start a system, which utilizes system space and can clog, requiring frequent cleaning and maintenance. The Integrated LoPro (ILP) Two-Stage valve has been designed to replace the bypass line.

The ILP accommodates the space constraints found on vacuum applications like loadlock and transfer chambers specifically in semiconductor or optical processing for which a cleaner environment is necessary. A heater jacket is available for processes with condensable materials.

Description

The ILP is a pneumatically-actuated poppet valve with a bypass valve combined into a single unit. The main valve is a normally closed bellows sealed valve. The bypass valve is a spring to close, o-ring sealed valve located within the main stage.

In the first stage, the bypass valve pumps down slowly from atmospheric pressure to a preset vacuum pressure. In the second stage, the main valve opens, allowing use of full pumping speed.

A formed 321 stainless steel bellows, not edge-welded, prevents outgassing, virtual leaks, and particle entrapment between bellows convolutions and extends the main valve's cycle life. We have optimized the bellows stroke length to assure a longer cycle life while maintaining a high conductance.

The bypass stage conductance is adjustable by turning an adjustment screw. The adjustment screw has machined detents that lock the screw into place during cycling. There are 10 detents per full turn. See Figure 2 for the bypass pumpdown curve.

The external valve body consists of high grade, corrosion resistant 304 stainless steel. Tungsten inert gas (TIG) welding ensures significantly fewer entrapment areas, resulting in less contaminant build-up.

Limit switches provide a signal to the control circuit or operator confirming that the valve is opened or closed. The limit switch for the ILP is ultracompact. It consists of an electronic

proximity switch that is streamlined into the cap of the valve. In addition, the switch has an LED to visually indicate the valve position. The limit switch is available for the main valve only, factory installed or as a kit that may be fitted to the valve by the user.

An air solenoid valve option is available for electropneumatic control of the valve when direct pneumatic control is inconvenient. In its unenergized state, this 3-way valve vents the cylinder of the ILP through a threaded hole centered in the top of the solenoid. When energized, the solenoid valve allows pressurized air to enter the actuating cylinder that opens the valve.

The Integrated LoPro Two-Stage valve can be heated to 105°C with MKS heater solutions. The heaters are made of a 1/2-inch thick silicone foam insulation. We have optimized the thickness of the insulation for the highest degree of temperature insulation and uniformity, while still offering an easy fit into tight places. The heaters' elastic, conforming shape and convenient snaps make installation and removal fast and easy. All materials used in the heaters are suitable for clean room use. The Low Temperature Alert (LTA) option and monitor indicate, by LED, if the temperature of one or more heaters in a line has fallen below the heaters' lowest set temperature.

ILP Two-Stage valves can be customized to fit each customer's needs, including geometries, modulus, flanging and seals.

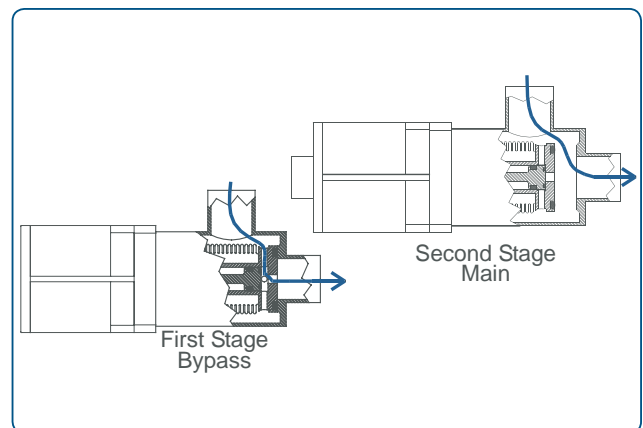


Figure 1 —
Flow pattern of valve stages

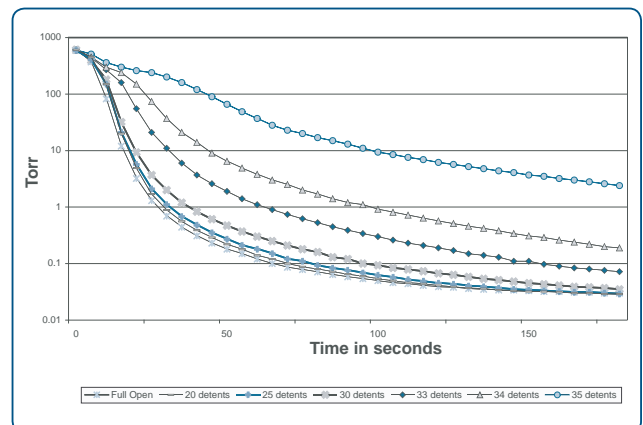


Figure 2 —
Bypass Pumpdown Curve - Approximately 9 liters volume air



Specifications

Specifications					
Port Size in. (NW)	Weight ISO-KF, pneumatic lb. / (kg)		Cylinder Volume Main Valve in. ³ (cm ³)	Actuation Time Main Valve seconds opening/(closing)	Blow-By Pressure ¹ Main Valve psia
	Angle	Inline			
1.0 (25)	2.3 (1.0)	2.4 (1.1)	1.2 (20)	.12 (.18)	100
1.5 (40)	3.6 (1.6)	3.7 (1.7)	2.2 (36)	.27 (.53)	50
2.0 (50)	6.0 (2.7)	6.4 (2.9)	6.4 (105)	.45 (1.13)	45

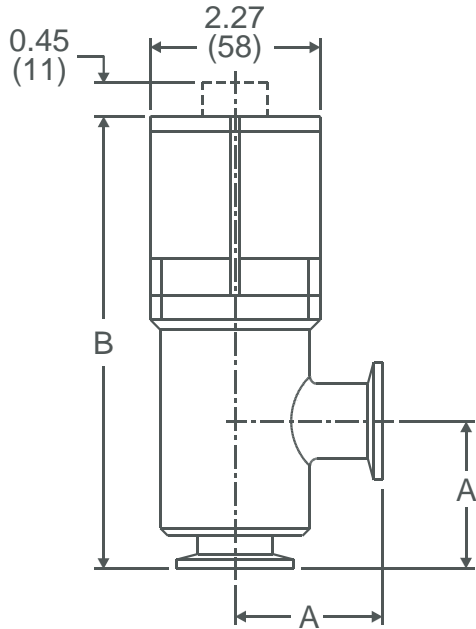
¹ Blow-by pressure is that pressure applied to the nosepiece port at which the nosepiece will not seal with the body port initially at vacuum.

Specifications	
Vacuum Range	Atmosphere to 1.0 x 10 ⁻⁹ Torr
Cylinder Air Pressure	90 psig ±30 psig
Helium Leak Rate	1.0 x 10 ⁻⁹ std cc/sec
Limit Switch Function of actuation Operating voltage range Switching current max. Response time Temperature range	Normally open 12-27 VDC (24 VDC nominal) 1W (DC) on - < 0.6 msec -20°C to 70°C
Typical Life	1 million cycles in clean environments

Specifications - Bypass Valve	
Volume	.16 in ³ (2.6 cm ³)
Actuation Time	< .10 seconds
Blow-by-Pressure	> 100 psia

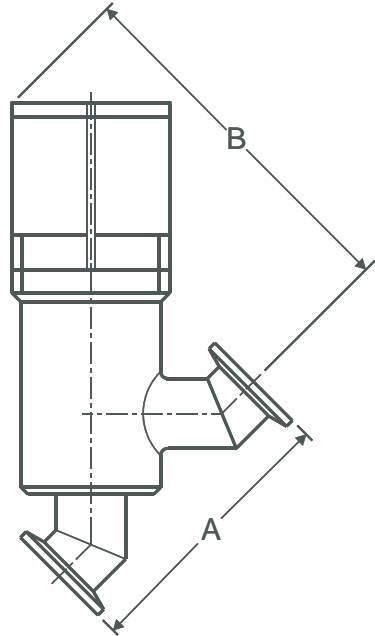


NW 25 Angle Dimensions in/(mm)



	KF	Tube
A	1.97 (50)	1.88 (48)
B	6.05 (154)	6.34 (161)

NW 25 Inline Dimensions in/(mm)



	KF	Tube
A	3.94 (100)	4.35 (110)
B	5.26 (134)	5.27 (134)

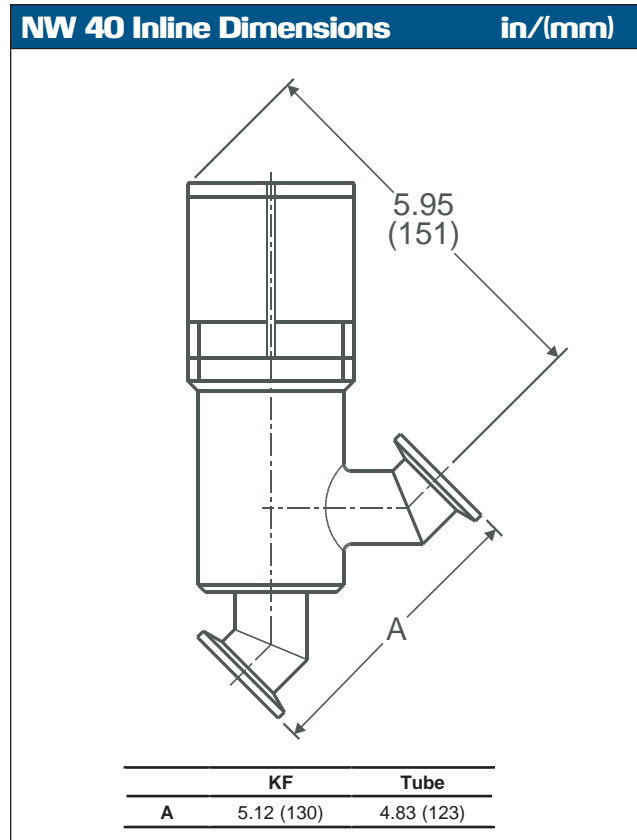
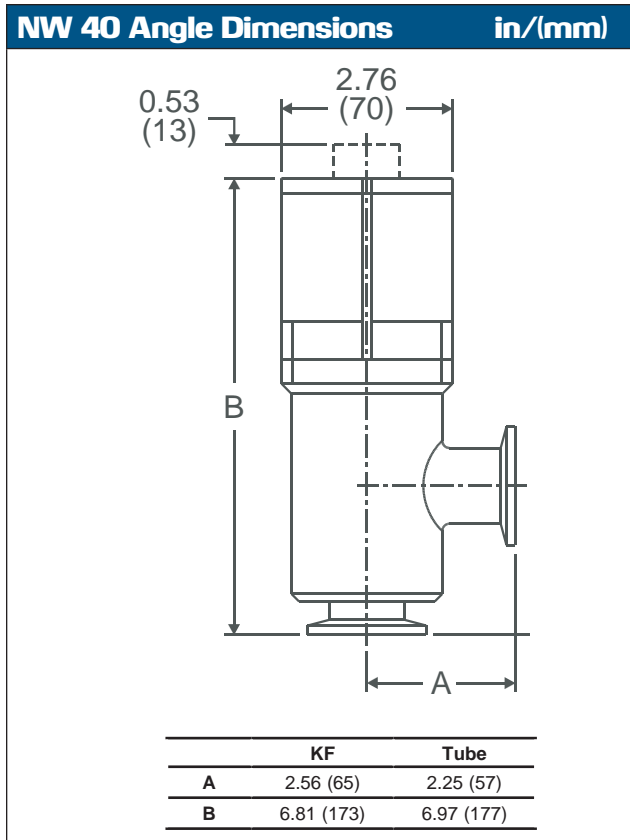
NW 25 Integrated LoPro Two-Stage Valve Ordering Information

Body Configuration 3325-XX	Limit Switch X	Seal Type X	Pneumatic Solenoid Voltage X
Select 1	Select 1	Select 1	Select 1 or leave blank
3325-21 KF 25 Angle	1 w/ Limit Switch	1 Viton®	1 120 VAC 50/60 Hz
3325-22 1" Tube Angle	0 w/o Limit Switch	3 Kalrez	2 208 VAC 50/60 Hz
3325-11 KF 25 Inline			3 220 VAC 50/60 Hz
3325-12 1" Tube Inline			4 24 VAC 50/60 Hz
			5 24 VDC
			6 T12
			7 T25
			0 1/8" NPT-F

Add the price of the options to the price of the body. Sample part number: 3325-21111.



Ordering Information



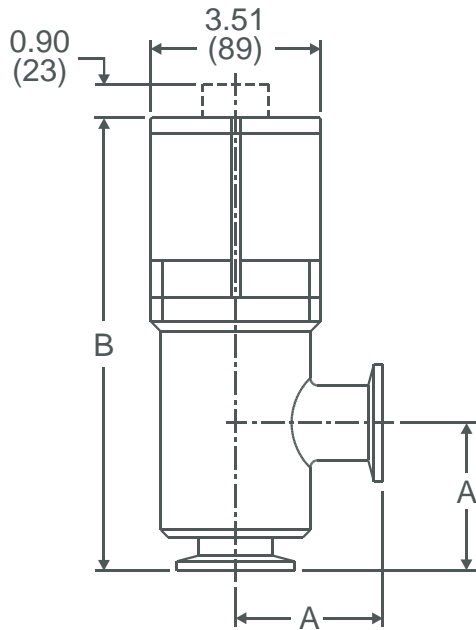
NW 40 Integrated LoPro Two-Stage Valve Ordering Information

Body Configuration 3340-XX	Limit Switch X	Seal Type X	Pneumatic Solenoid Voltage X
Select 1	Select 1	Select 1	Select 1 or leave blank
3340-21 KF 40 Angle	1 w/ Limit Switch	1 Viton®	1 120 VAC 50/60 Hz
3340-22 1 1/2" Tube Angle	0 w/o Limit Switch	3 Kalrez	2 208 VAC 50/60 Hz
3340-11 KF 40 Inline			3 220 VAC 50/60 Hz
3340-12 1 1/2" Tube Inline			4 24 VAC 50/60 Hz
			5 24 VDC
			6 T12
			7 T25
			0 1/8" NPT-F

Add the price of the options to the price of the body. Sample part number: 3340-21111.

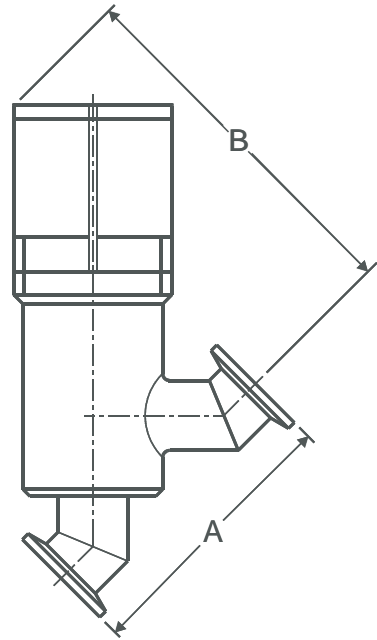


NW 50 Angle Dimensions in/(mm)



	KF	Tube
A	2.76 (70)	3.00 (76)
B	8.33 (212)	8.88 (226)

NW 50 Inline Dimensions in/(mm)



	KF	Tube
A	7.00 (178)	7.20 (183)
B	7.42 (188)	7.74 (197)

NW 50 Integrated LoPro Two-Stage Valve Ordering Information

Body Configuration 3350-XX	Limit Switch X	Seal Type X	Pneumatic Solenoid Voltage X
Select 1	Select 1	Select 1	Select 1 or leave blank
3350-21 KF 50 Angle	1 w/ Limit Switch	1 Viton®	1 120 VAC 50/60 Hz
3350-22 2" Tube Angle	0 w/o Limit Switch	3 Kalrez	2 208 VAC 50/60 Hz
3350-11 KF 50 Inline			3 220 VAC 50/60 Hz
3350-12 2" Tube Inline			4 24 VAC 50/60 Hz
			5 24 VDC
			6 T12
			7 T25
			0 1/8" NPT-F

Add the price of the options to the price of the body. Sample part number: 3350-21111.



Ordering Information

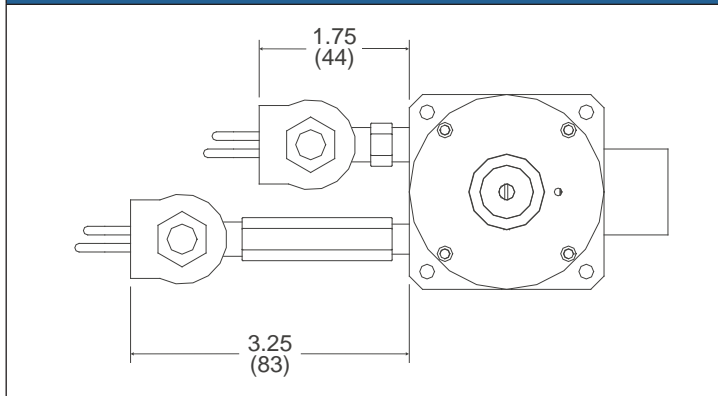
Spare Parts

Port Size in (NW)	Valve Internals, Viton® Seals	Valve Internals, Kalrez® Seals	Viton® Seal Set	Kalrez® Seal Set
	Part Number	Part Number	Part Number	Part Number
1.0 (25)	100011461	100011467	100011470	100011476
1.5 (40)	100011462	100011468	100011471	100011477
2.0 (50)	100011463	100011469	100011472	100011478

Replacement Solenoid Valves & Limit Switch

Voltage and Frequency	Qty	Watts	Part Number
24 VAC 50/60 Hz	1	6.0	100008164
24 VDC	1	7.0	100008163
12 VDC	1	7.0	100008539
120 VAC 50/60 Hz	1	7.5	100008165
208 VAC 50/60 Hz	1	7.5	100008166
220 VAC 50/60 Hz	1	7.5	100008167
Limit Switch	2		100011479

Solenoid Valve Dimensions





ILP Two-Stage - 7/17
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