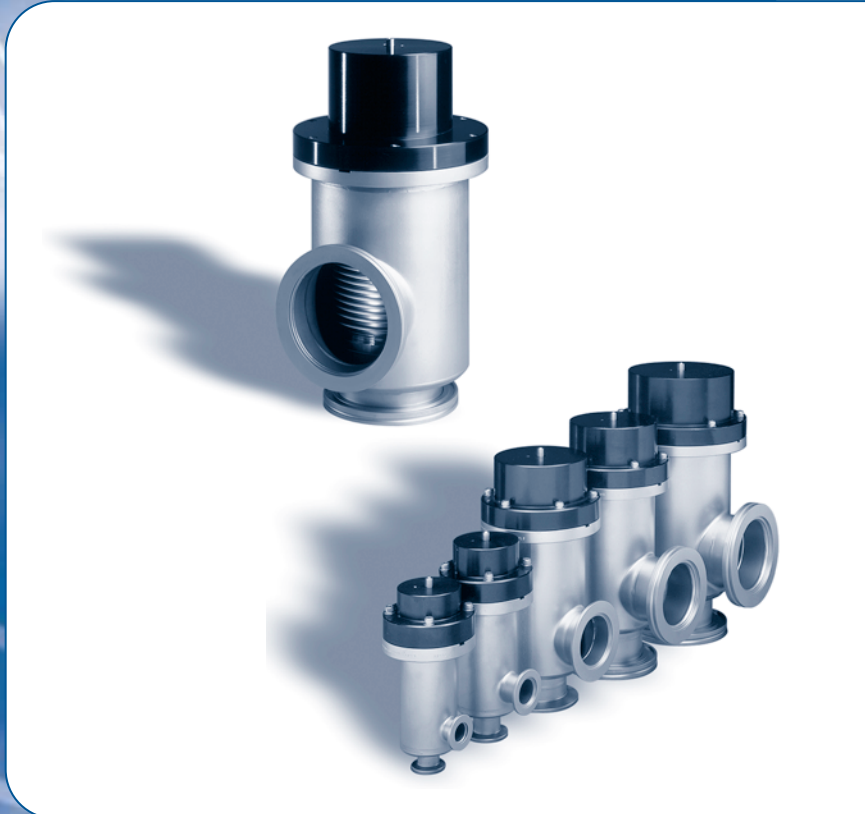


Vacuum

Series 150/160 and V-100 Valves

HIGH VACUUM BELLOWS SEALED VALVES

Technology
WWW.MKSINST.COM



Features and Benefits

- Choice of manual, pneumatic or electropneumatic actuation
- Angle and Inline body styles
- Available in port sizes from .75" to 6"
- Choice of ISO-KF, ISO-Universal, and CF flanges, and weld stubs
- Type 304 stainless steel body insures freedom from corrosion
- Formed bellows made of 321 stainless steel for a long life and resistance to particulate damage
- Installs in any position
- Cylinder pressure isolated from bellows, extending bellows life
- Visual indication of valve position
- Optional limit switches for remote indication of open and closed positions

Applications

The HPS® Series 150/160 and V-100 valves are designed to insure product quality, reliability and value. They function reliably in applications ranging from semiconductor manufacturing to plasma physics research to nuclear accelerators. MKS manufactures its valves with interchangeable parts, inspecting them at every step.

Description

Since bellows are a critical factor in valve reliability, HPS incorporates formed bellows into the 150/160 valves. The first major advantage of using formed bellows is consistency. Since formed bellows do not have welds joining each membrane, there is no stress concentration and fatigue failure from non-uniform welds. The second advantage is that the bellows convolutions never touch completely in the compressed position. Many vacuum processes, like chemical vapor or thin film deposition contain particulate contamination. If small particles fall between formed bellows, they have no effect. If similar particles fall between welded, nested bellows, they deform the membranes, cause stress concentration, and lead to early bellows failure.

An elastomer stem seal isolates the cylinder actuating pressure from the region within the bellows. The region within the bellows vents externally by grooves in the bonnet flange. If the stem seal fails, any air passing the seal would be vented harmlessly through these grooves. The vents also admit helium when leak checking the bellows.

The nosepiece O-ring must be firmly retained, especially in a valve that opens to a pressure differential. Vents in the O-ring groove eliminate the possibility of virtual leaks caused by air trapped in the corners of the groove.

A single acting cylinder opens the pneumatic valves up through the 3 inch size. When the cylinder is vented, a strong spring closes the valve. The spring within the bellows acts directly upon the nosepiece. Upon failure of the electric control voltage to the

solenoid coil or upon failure of the pneumatic supply, the valve fails closed. Valves in the 4 inch size are available either with (V-100 series) or without (150 series) a closing spring, and 6 inch valves are only available without a closing spring. Valves without a closing spring have double acting cylinders. In all sizes the pneumatic cylinder is lubricated adequately for the service life of the valve.

The V-100 is a 4 inch valve that is available in both manual and pneumatic options, and either angle or inline configurations. The pneumatic versions are available with a closing spring. Ordering codes are different than the 150/160 series, with more sealing options.

HPS vacuum valves may be installed in any position, with either the bellows or the nosepiece facing the pump. In systems with condensable materials, it is advantageous to install the valve with the nosepiece toward the chamber. The electropneumatic valve has a solenoid valve attached to the cylinder with a nipple. The cap screws fixing the cylinder to the body may be removed and the cylinder indexed at 90° increments for valves of sizes .75" to 1.5", and 60° increments for valves with port sizes 2" to 6". If necessary, the solenoid valve can be removed and located remotely.

Limit switches provide a signal to the control circuit or operator confirming that the valve is opened or closed. This option is often used in large vacuum installations with a microprocessor or computer controller. Limit switch components are available factory installed or as a kit that may be fitted to the valve by the user.

HPS Solenoid Valves are reliable, small, and consistent with needed conductance. Solenoid coils are available for use with a wide range of voltages and frequencies. The complete catalog number for an electropneumatic valve with a solenoid valve is the part number and the solenoid voltage and the frequency. For example, the number 153-1040K-24V/50-60 designates a 1.5" angle valve with NW 40 ISO-KF flanges, limit switches and solenoid valve with a coil rated for 24 volts and 50-60Hz frequency.

Many accessories can be attached through the pneumatic connection port. Another feature of the solenoid control valve is the threaded vent port that can accept an exhaust fitting. This is crucial in applications where it is not allowable to vent waste air into the room, for example in cleanrooms.

The Series 150, 160 and V-100 valves are primarily vacuum valves. Sometimes the valves encounter pressures above atmospheric in gas handling, or in backfilled systems. HPS valves may be used over the pressure range from 10⁻⁹ Torr to 15 psig. The bellows design and closing force provide reliable operation to the maximum pressures stated.

For more information, call MKS Instruments, HPS Products at 1-800-345-1967, or 303-449-9861. Or visit our website at www.mksinst.com.



Specifications

Specifications for Series 150/160 Valves

Nominal Port Size in. (mm)	Vacuum Conductance ** (ltr / sec)		Cylinder Air Pressure psig (N/m ² abs)		Cylinder Volume ft ³ (m ³)	Actuation Time in Seconds opening (closing)	Blow-By Pressure ¹ psia (N/m ² abs)	Max. Internal Closing Pressure psia (N/m ² abs)	Solenoid Vent Thread
	Angle	In-Line	Min.	Max.					
.75 (16)	6	5	50 (4.5 x 10 ⁵)	120 (9.3 x 10 ⁵)	1.4 x 10 ⁻³ (4.1 x 10 ⁻⁵)	.5 (1)	80 (5.5 x 10 ⁵)	40 (2.8 x 10 ⁵)	10-32
1.00 (25)	13	11	50 (4.5 x 10 ⁵)	120 (9.3 x 10 ⁵)	2.1 x 10 ⁻³ (5.8 x 10 ⁻⁵)	.5 (1)	80 (5.5 x 10 ⁵)	43 (3.0 x 10 ⁵)	10-32
1.50 (40)	33	30	50 (4.5 x 10 ⁵)	120 (9.3 x 10 ⁵)	2.8 x 10 ⁻³ (8.0 x 10 ⁻⁵)	1 (2)	50 (3.4 x 10 ⁵)	60 (4.1 x 10 ⁵)	10-32
2.00 (50)	75	60	50 (4.5 x 10 ⁵)	100 (7.9 x 10 ⁵)	7.7 x 10 ⁻³ (2.2 x 10 ⁻⁴)	1 (2)	45 (3.1 x 10 ⁵)	38 (2.6 x 10 ⁵)	10-32
2.50 (63)	120	90	60 (5.2 x 10 ⁵)	100 (7.9 x 10 ⁵)	7.7 x 10 ⁻³ (2.2 x 10 ⁻⁴)	2 (2)	40 (2.8 x 10 ⁵)	50 (3.4 x 10 ⁵)	10-32
3.00 (80)	190	160	60 (5.2 x 10 ⁵)	100 (7.9 x 10 ⁵)	1.6 x 10 ⁻² (4.6 x 10 ⁻⁴)	2 (2)	38 (2.6 x 10 ⁵)	40 (2.8 x 10 ⁵)	10-32
4.00 (100)*	390		55 (4.8 x 10 ⁵)	100 (7.9 x 10 ⁵)	1.3 x 10 ⁻² (3.7 x 10 ⁻⁴)	2 (2)	50 (3.4 x 10 ⁵)	45 (3.1 x 10 ⁵)	1/4" NPT
6.00 (160)*	1040		50 (4.5 x 10 ⁵)	100 (7.9 x 10 ⁵)	3.4 x 10 ⁻² (9.6 x 10 ⁻⁴)	3 (3)	40 (2.8 x 10 ⁵)	35 (2.4 x 10 ⁵)	1/4" NPT

* Double Acting Pneumatic 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.
 ** See curve below

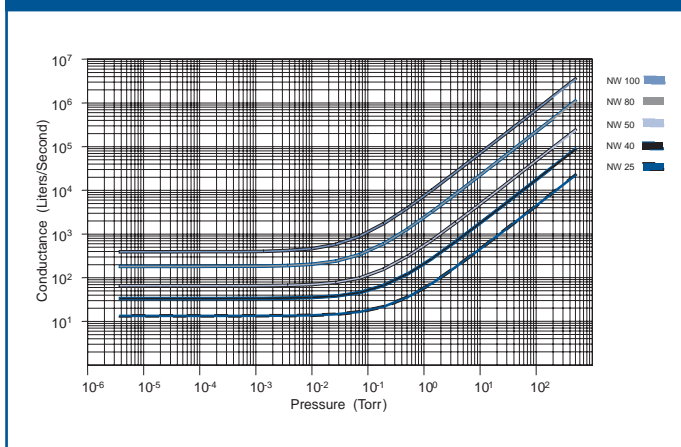
Specifications 150/160 Valves

Pressure Range	15 psig to 1.0 x 10 ⁻⁹ Torr
Helium Leak Rate	1.0 x 10 ⁻⁹ std cc/sec
Maximum Bakeout Temp.	150°C - Body 70°C - Cylinder
Limit Switch Rating Single Pole, Single Throw	5A - 250 VAC 5A - 30 VDC
Materials	
Body, Nosepiece and Bellows Termination	Type 304 Stainless Steel
Bellows	Type 321 Stainless Steel
Nosepiece and Bonnet Seals	Viton®
Pneumatics	Anodized aluminum alloys, Buna and plated steel
Pneumatic Connection	1/8" NPT-F (through 3") 1/4" NPT-F (4" and 6")

Specifications V-100 Valves

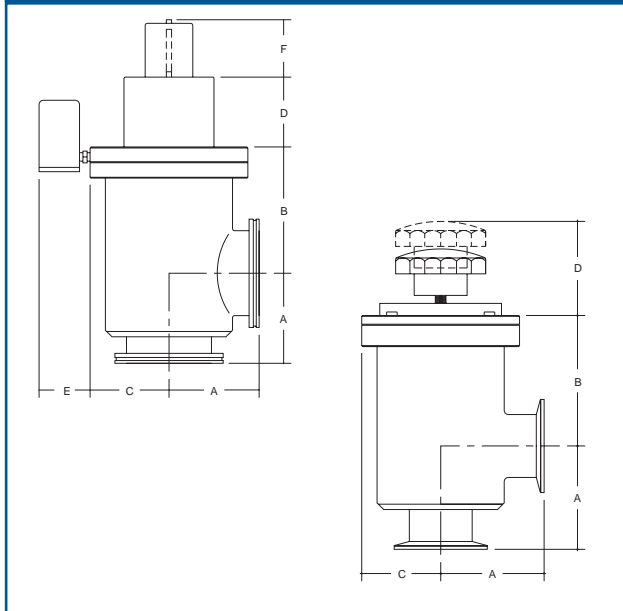
Conductance (see graph)	
Angle	390 ltr/sec
Inline	360 ltr/sec
Cylinder Air Pressure	
Minimum	50 psig (4.5 x 10 ⁵ N/m ² abs)
Maximum	100 psig (7.9 x 10 ⁵ N/m ² abs)
Cylinder Volume	1.6 x 10 ⁻² ft ³ (4.6 x 10 ⁻⁴ m ³)
Actuation Time in Seconds	Opening: 2 Closing: 2
Blow-by Pressure	32 psia (2.2 x 10 ⁵ N/m ² abs)
Maximum Internal Closing Pressure	30 psia (2.0 x 10 ⁵ N/m ² abs)
Pressure Range	15 psig to 10 ⁻⁹ Torr
Helium Leak Rate	1.0 x 10 ⁻⁹ std cc/sec
Maximum Bakeout Temperature	150°C
Limit Switch Rating Single Pole, Single Throw	5A - 250 VAC 5A - 30 VDC
Materials	
Body, Nosepiece and Bellows Termination	Type 304 Stainless Steel
Bellows	Type 321 Stainless Steel
Nosepiece and Bonnet Seals	Choice - see table
Pneumatics	Anodized aluminum alloys, Buna and plated steel
Weight	
Angle	22 lbs. (10 kg)
Inline	27 lbs. (12.3 kg)
Pneumatic Connection	1/8" NPT-F

Conductance



Dimensions

Series 150 Angle Valves



150 Angle Dimension A

in. (mm)

Valve Size	ISO Flange	CF Flange	Weld Stub
.75 (16)	1.57 (40)	1.97 (50)	1.50 (38)
1.00 (25)	1.97 (50)	2.02 (51)	1.88 (48)
1.50 (40)	2.56 (65)	2.43 (62)	2.25 (57)
2.00 (50)	2.76 (70)	3.19 (81)	3.00 (76)
2.50 (63)	3.46 (88)	3.35 (85)	3.00 (76)
3.00 (80)	3.86 (98)	3.50 (89)	3.25 (83)
4.00 (100)	4.25 (108)	5.28 (134)	4.00 (102)
6.00 (160)	5.43 (138)	6.56 (167)	5.18 (132)

150 Pneumatic Dimensions

in. (mm)

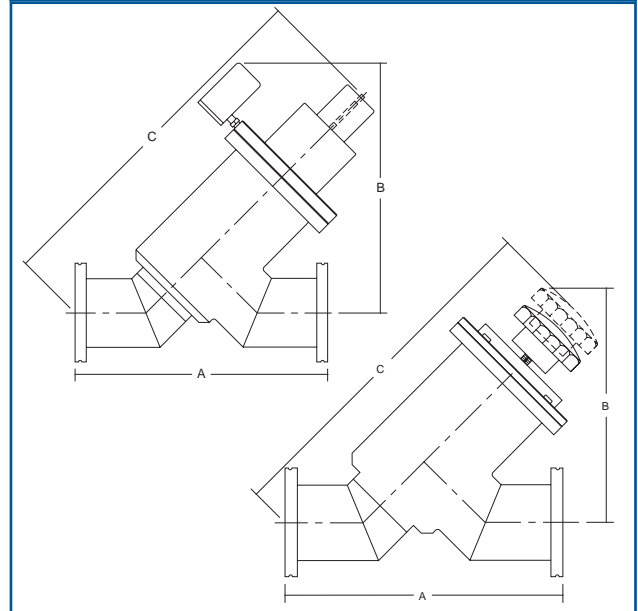
Valve Size	B	C	D	E	F
.75 (16)	3.86 (98)	1.62 (41)	.87 (22)	1.84 (47)	1.33 (34)
1.00 (25)	4.14 (105)	1.74 (44)	1.00 (25)	1.84 (47)	1.43 (37)
1.50 (40)	3.88 (99)	1.98 (50)	1.00 (25)	1.84 (47)	1.43 (37)
2.00 (50)	5.05 (128)	2.35 (60)	1.57 (40)	2.44 (62)	1.93 (49)
2.50 (63)	4.80 (122)	2.35 (60)	1.57 (40)	2.44 (62)	1.93 (49)
3.00 (80)	5.63 (143)	2.93 (74)	2.03 (52)	2.44 (62)	2.24 (57)
4.00 (100)	6.12 (155)	3.72 (94)	3.10 (79)	1.70 (43)	2.72 (69)
6.00 (160)	9.94 (252)	3.72 (94)	4.05 (103)	2.33 (59)	3.51 (89)

150 Manual Dimensions

in. (mm)

Valve Size	B	C	D
.75 (16)	3.31 (84)	1.62 (41)	2.46 (62)
1.00 (25)	3.59 (91)	1.74 (44)	2.56 (65)
1.50 (40)	3.33 (85)	1.98 (50)	2.56 (65)
2.00 (50)	4.50 (114)	2.35 (60)	3.62 (92)
2.50 (63)	4.25 (108)	2.35 (60)	3.62 (92)
3.00 (80)	5.08 (129)	2.93 (74)	3.87 (98)

Series 160 Inline Valves



160 Inline Dimension A

in. (mm)

Valve Size	ISO Flange	CF Flange	Weld Stub
.75 (16)	3.14 (80)	3.94 (100)	3.00 (76)
1.00 (25)	3.94 (100)	4.62 (117)	4.35 (110)
1.50 (40)	5.12 (130)	5.19 (132)	4.83 (123)
2.00 (50)	7.00 (178)	7.88 (200)	7.20 (183)
2.50 (63)	8.25 (210)	8.44 (214)	7.75 (197)
3.00 (80)	10.55 (268)	10.55 (268)	10.06 (256)

160 Pneumatic Dimensions

in. (mm)

Valve Size	B	C ISO Flange	C CF Flange	C Weld Stub
.75 (16)	6.59 (167)	7.94 (202)	7.91 (201)	7.66 (196)
1.00 (25)	7.09 (180)	7.78 (198)	8.82 (224)	8.74 (222)
1.50 (40)	7.23 (184)	9.21 (234)	9.01 (229)	8.89 (226)
2.00 (50)	9.36 (237)	11.91 (303)	12.13 (308)	12.03 (306)
2.50 (63)	9.36 (237)	12.26 (311)	12.22 (310)	12.03 (306)
3.00 (80)	10.79 (273)	14.99 (381)	14.95 (380)	14.00 (356)

160 Manual Dimensions

in. (mm)

Valve Size	B	C ISO Flange	C CF Flange	C Weld Stub
.75 (16)	5.88 (149)	7.59 (193)	7.55 (192)	7.30 (185)
1.00 (25)	6.20 (157)	8.48 (215)	8.53 (217)	8.45 (215)
1.50 (40)	6.62 (168)	8.81 (224)	8.76 (223)	8.66 (220)
2.00 (50)	8.72 (222)	12.05 (306)	12.28 (312)	12.17 (309)
2.50 (63)	8.87 (225)	12.33 (313)	12.29 (312)	12.10 (307)
3.00 (80)	9.64 (245)	14.35 (365)	14.31 (364)	14.12 (359)

Series 150 Angle Valve Ordering Information

150 Angle Valves with ISO Flanges - ISO-KF (.75" - 2.0") / ISO-Universal (2.5" - 6.0")

ISO Flange Size (Port Size)	Shipping Weight lbs. (kg)	Manual		Pneumatic		Pneumatic w/ Limit Switches		Pneumatic w/ Solenoid Valve *		Pneumatic w/ Solenoid Valve * & Limit Switches	
		Part Number	Price	Part Number	Price	Part Number	Price	Part Number	Price	Part Number	Price
NW16 (.75")	2.3 (1.0)	151-0016K		152-0016K		152-1016K		153-0016K		153-1016K	
NW25 (1.0")	3.5 (1.6)	151-0025K		152-0025K		152-1025K		153-0025K		153-1025K	
NW40 (1.5")	4.5 (2.0)	151-0040K		152-0040K		152-1040K		153-0040K		153-1040K	
NW50 (2.0")	7.5 (3.4)	151-0050K		152-0050K		152-1050K		153-0050K		153-1050K	
NW63 (2.5")	8.5 (3.9)	151-0063P		152-0063P		152-1063P		153-0063P		153-1063P	
NW80 (3.0")	14.0 (6.4)	151-0080P		152-0080P		152-1080P		153-0080P		153-1080P	
NW100 (4.0")	22.0 (10.0)			154-0100P		154-1100P		155-0100P		155-1100P	
NW160 (6.0")	29.0 (13.2)			154-0160P		154-1160P		155-0160P		155-1160P	

150 Angle Valves with CF Flanges

CF Flange Size (Port Size)	Shipping Weight lbs. (kg)	Manual		Pneumatic		Pneumatic w/ Limit Switches		Pneumatic w/ Solenoid Valve *		Pneumatic w/ Solenoid Valve * & Limit Switches	
		Part Number	Price	Part Number	Price	Part Number	Price	Part Number	Price	Part Number	Price
1 1/8" (.75")	2.3 (1.0)	151-0016C		152-0016C		152-1016C		153-0016C		153-1016C	
2 1/8" (1.0")	3.5 (1.6)	151-0025C		152-0025C		152-1025C		153-0025C		153-1025C	
2 3/8" (1.5")	4.5 (2.0)	151-0040C		152-0040C		152-1040C		153-0040C		153-1040C	
3 3/8" (2.0")	7.5 (3.4)	151-0050C		152-0050C		152-1050C		153-0050C		153-1050C	
4 1/2" (2.5")	8.5 (3.9)	151-0063C		152-0063C		152-1063C		153-0063C		153-1063C	
4 7/8" (3.0")	14.0 (6.4)	151-0080C		152-0080C		152-1080C		153-0080C		153-1080C	
6" (4.0")	22.0 (10.0)			154-0100C		154-1100C		155-0100C		155-1100C	
8" (6.0")	29.0 (13.2)			154-0160C		154-1160C		155-0160C		155-1160C	

150 Angle Valves with Weld Stubs

Nominal Port Size inch (mm)	Shipping Weight lbs. (kg)	Manual		Pneumatic		Pneumatic w/ Limit Switches		Pneumatic w/ Solenoid Valve *		Pneumatic w/ Solenoid Valve * & Limit Switches	
		Part Number	Price	Part Number	Price	Part Number	Price	Part Number	Price	Part Number	Price
.75" (16)	2.3 (1.0)	151-0016T		152-0016T		152-1016T		153-0016T		153-1016T	
1.0" (25)	3.5 (1.6)	151-0025T		152-0025T		152-1025T		153-0025T		153-1025T	
1.5" (40)	4.5 (2.0)	151-0040T		152-0040T		152-1040T		153-0040T		153-1040T	
2.0" (50)	7.5 (3.4)	151-0050T		152-0050T		152-1050T		153-0050T		153-1050T	
2.5" (63)	8.5 (3.9)	151-0063T		152-0063T		152-1063T		153-0063T		153-1063T	
3.0" (80)	14.0 (6.4)	151-0080T		152-0080T		152-1080T		153-0080T		153-1080T	
4.0" (100)	22.0 (10.0)			154-0100T		154-1100T		155-0100T		155-1100T	
6.0" (160)	29.0 (13.2)			154-0160T		154-1160T		155-0160T		155-1160T	

Solenoid Voltage & Frequency

	24 VDC	24 VAC 50-60 Hz	208 VAC 50-60 Hz (Up to 3" only)	100-120 VAC 50 Hz 110-130 VAC 60 Hz	210-240 VAC 50 Hz 220-250 VAC 60 Hz
Part Number Extension	-24VDC	-24V/50-60	-208V/50-60	-120V/50-60	-220V/50-60

* The complete part number for an electropneumatic valve with a solenoid valve is the part number listed above, plus the solenoid voltage and frequency extension. Sample part number: 153-0016K-24VDC.



Series 160 Inline Valve Ordering Information

160 Inline Valves with ISO Flanges - ISO-KF (.75" - 2.0") / ISO-Universal (2.5" - 3.0")

ISO Flange Size (Port Size)	Shipping Weight lbs. (kg)	Manual		Pneumatic		Pneumatic w/ Limit Switches		Pneumatic w/ Solenoid Valve *		Pneumatic w/ Solenoid Valve * & Limit Switches	
		Part Number	Price	Part Number	Price	Part Number	Price	Part Number	Price	Part Number	Price
NW16 (.75")	3.0 (1.4)	161-0016K		162-0016K		162-1016K		163-0016K		163-1016K	
NW25 (1.0")	3.5 (1.6)	161-0025K		162-0025K		162-1025K		163-0025K		163-1025K	
NW40 (1.5")	4.5 (2.0)	161-0040K		162-0040K		162-1040K		163-0040K		163-1040K	
NW50 (2.0")	8.0 (3.6)	161-0050K		162-0050K		162-1050K		163-0050K		163-1050K	
NW63 (2.5")	9.0 (4.1)	161-0063P		162-0063P		162-1063P		163-0063P		163-1063P	
NW80 (3.0")	16.0 (7.3)	161-0080P		162-0080P		162-1080P		163-0080P		163-1080P	

160 Inline Valves with CF Flanges

CF Flange Size (Port Size)	Shipping Weight lbs. (kg)	Manual		Pneumatic		Pneumatic w/ Limit Switches		Pneumatic w/ Solenoid Valve *		Pneumatic w/ Solenoid Valve * & Limit Switches	
		Part Number	Price	Part Number	Price	Part Number	Price	Part Number	Price	Part Number	Price
1 1/8" (.75")	3.0 (1.4)	161-0016C		162-0016C		162-1016C		163-0016C		163-1016C	
2 1/8" (1.0")	3.5 (1.6)	161-0025C		162-0025C		162-1025C		163-0025C		163-1025C	
2 3/8" (1.5")	4.5 (2.0)	161-0040C		162-0040C		162-1040C		163-0040C		163-1040C	
3 3/8" (2.0")	8.0 (3.6)	161-0050C		162-0050C		162-1050C		163-0050C		163-1050C	
4 1/2" (2.5")	9.0 (4.1)	161-0063C		162-0063C		162-1063C		163-0063C		163-1063C	
4 5/8" (3.0")	16.0 (7.3)	161-0080C		162-0080C		162-1080C		163-0080C		163-1080C	

160 Inline Valves with Weld Stubs

Nominal Port Size inch (mm)	Shipping Weight lbs. (kg)	Manual		Pneumatic		Pneumatic w/ Limit Switches		Pneumatic w/ Solenoid Valve *		Pneumatic w/ Solenoid Valve * & Limit Switches	
		Part Number	Price	Part Number	Price	Part Number	Price	Part Number	Price	Part Number	Price
.75" (16)	3.0 (1.4)	161-0016T		162-0016T		162-1016T		163-0016T		163-1016T	
1.0" (25)	3.5 (1.6)	161-0025T		162-0025T		162-1025T		163-0025T		163-1025T	
1.5" (40)	4.5 (2.0)	161-0040T		162-0040T		162-1040T		163-0040T		163-1040T	
2.0" (50)	8.0 (3.6)	161-0050T		162-0050T		162-1050T		163-0050T		163-1050T	
2.5" (63)	9.0 (4.1)	161-0063T		162-0063T		162-1063T		163-0063T		163-1063T	
3.0" (80)	16.0 (7.3)	161-0080T		162-0080T		162-1080T		163-0080T		163-1080T	

Solenoid Voltage & Frequency

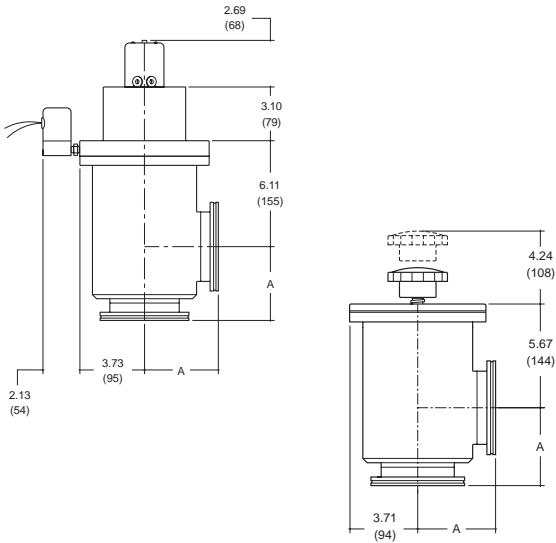
	24 VDC	24 VAC 50-60 Hz	208 VAC 50-60 Hz (Up to 3" only)	100-120 VAC 50 Hz 110-130 VAC 60 Hz	210-240 VAC 50 Hz 220-250 VAC 60 Hz
Part Number Extension	-24VDC	-24V/50-60	-208V/50-60	-120V/50-60	-220V/50-60

* The complete part number for an electropneumatic valve with a solenoid valve is the part number listed above, plus the solenoid voltage and frequency extension. Sample part number: 163-0016K-24VDC.



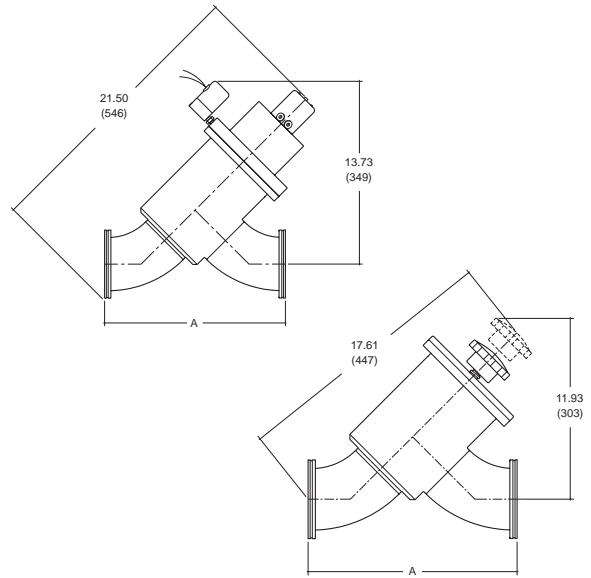
V-100 Valve Ordering Information

NW 100 Angle Dimensions in./(mm)



	KF	MF	CF	Tube
A	4.25 (108)	4.25 (108)	5.28 (134)	4.00 (102)

NW 100 Inline Dimensions in./(mm)



	KF	MF	CF	Tube
A	13.59 (345)	13.48 (342)	13.89 (353)	13.07 (332)

V-100 Valve Ordering Information

Body Configuration V-100-XX		Actuator Type -XR		Limit Switch -X		Seal Type X		Pneumatic Solenoid Voltage -XXX	
Select 1	Price	Select 1	Price	Select 1	Price	Select 1	Price	Select 1 or leave blank	Price
V-100-AM MF 100 Angle		SR Normally Closed		L w/ Limit Switch		V Viton®		12D 12 VDC	
V-100-IM MF 100 Inline		MR Manual		N w/o Limit Switch		B Buna		24D 24 VDC	
V-100-AC CF 6" Angle						K Kalrez		24A 24 VAC 50/60 Hz	
V-100-IC CF 6" Inline						Z Chemraz		100 100 VAC 50 Hz	
V-100-AK KF 100 Angle								120 120 VAC 50/60 Hz	
V-100-IK KF 100 Inline								208 208 VAC 50/60 Hz	
V-100-AT 4" Tube Angle								240 220 VAC 50/60 Hz	
V-100-IT 4" Tube Inline								<i>None</i> 1/8" NPT-F	

Add the price of the options to the price of the body. Sample part number: V-100-AK-SR-LV-120.



Ordering Information

Spare Parts for 150/160 Pneumatic Valves

Nominal Port Size in (mm)	Limit Switch Retrofit Kit		Internal Assembly Kit (Includes Seal Set)		Seal Set (Viton)	
	Part Number	Price	Part Number	Price	Part Number	Price
.75" (16)	100001682		100006122		100001673	
1.00" (25)	100001520		100006123		100001674	
1.50" (40)	100001520		100006124		100001675	
2.00" (50)	100001683		100006125		100001676	
2.50" (63)	100001683		100006126		100001677	
3.00" (80)	100001684		100006127		100001691	
4.00" (100)	100003663		100006128		100003876	
6.00" (160)	100005802		100006129		100006113	

Spare Parts for 150/160 Manual Valves

Nominal Port Size in (mm)	Knob		Seal Set		Internal Assembly Kit	
	Part Number	Price	Part Number	Price	Part Number	Price
.75" (16)	100014470		100001699		100008413	
1.00" (25)	100014470		100001700		100008414	
1.50" (40)	100014470		100001701		100008415	
2.00" (50)	100014471		100001702		100008416	
2.50" (63)	100014471		100001703		100008417	
3.00" (80)	100014471		100001704		100008418	

Spare Parts for V-100 Valves

Part	Part Number	Price
Pneumatic Seal Set - Viton	100008760	
Pneumatic Internal Assembly - Viton	100004917	
Limit Switch Retrofit Kit	100003663	
Manual Seal Set - Viton	100004792	
Manual Internal Assembly - Viton	100008419	
Manual Knob	100009486	

Replacement Solenoid Valves (Series 150/160 up to 3" and V-100)

Voltage and Frequency	Watts	Part Number	Price
24VAC 50/60 Hz	6.0	100008164	
24VDC	7.0	100008163	
12 VDC	7.0	100008539	
120VAC 50/60 Hz	7.5	100008165	
208VAC 50/60 Hz	7.5	100008166	
220VAC 50/60 Hz	7.5	100008167	

Replacement Solenoid Valves (Series 150 4" and 6")

Voltage and Frequency	Watts	Part Number	Price
24VAC 50/60 Hz*	4.5	100003640	
24VDC	6.7	100003639	
100-120V/50 Hz	8.5	100003641	
110-130V/60 Hz*			
210-240V/50 Hz	6.1	100006166	
220-250V/60 Hz*			



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