Valves

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In This Section

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➤ Vacuum Valves

The three main functions of vacuum valves.

- Isolate vacuum volumes from pumps
- Control gas flow to achieve a particular pressure
- Enable transfer of objects between vacuum volumes

A valve's main design characteristics depend on function, but details are determined by manufacturing and user convenience. Construction materials include stainless steel, aluminum, and brass—the choice depending on the required bakeout temperature, pressure range, and the construction material of the remaining system.

Every valve has a part that physically moves to open and close it. This part's shape and motion varies greatly with the valve's design and, unfortunately, does not have a generic collective name. For conciseness, the term ***flapper*** *is used below.*

Sealing & Actuation

Sealing the Flapper

With the flapper in the closed position, a seal forms between it and the valve body. Depending on the application, pressure range, and maximum operating temperature, several types of seals are used: rubber o-rings, molded rubber rings, rubber diaphragms or cups, soft metal/hard metal seals, hard metal/hard metal seals, and soft metal/polished sapphire flat.

Rubber O-Rings are the most common type, often with the o-ring's groove cut into the flapper's surface. Molded rubber rings are vulcanized directly to the flapper without a groove. The rubber may be Buna-N (bakeable to ~80º C) or Viton® (bakeable with the valve open to ~200º C). The latter's chemical resistance and acceptable outgassing/permeation rates make it the elastomer of choice for vacuum applications. With the right construction materials, Viton-sealed valves are often compatible with UHV pressures.

Rubber Diaphragm or rubber cup seal is trapped around its rim by the valve body. The diaphragm's center is deflected into a saddle or port to block gas flow through the valve. This seal type is used in valves designed for foreline applications where the operating temperatures are not high and pressures vary from rough to high vacuum.

Soft Metal/Hard Metal seals have a sealing action similar to the CF flange. A metal knife-edge, machined into the body, mechanically deforms a copper pad mounted on the flapper. The valve is closed with a torque wrench and each pad has a relatively short life. However, the pad is replaceable and the valve's life span is not limited by the seal. Such valves enable baking to high temperature (300º C, perhaps 450º C), making them UHV compatible. A version of this mechanism is also found in all metal leak valves.

Hard Metal/Hard Metal seals are shaped like a large diameter, thin cupped washer (Belleville washer) around the flapper's seal face. As the valve closes, the mechanism causes this washer to flatten (increasing its O.D. and decreasing its I.D.) forcing its inner/outer edges to seal by elastic deformation to the flapper/body, respectively. The valves are bakeable to 300º C and UHV compatible.

Soft Metal/Sapphire Flat seals have a flapper-mounted optically flat sapphire pad mating to a copper gasket surrounding the valve's exit port. The closing force plastically deforms the copper to match the sapphire surface profile exactly. The valve's design prevents rotation of either component so the valve always re-seats in the same place. These valves, which are bakeable to 450º C, are used to control exceptionally low gas flows into UHV chambers.

Actuation

To move the flapper, a rotary or linear motion is transmitted from air-side to vacuum-side through a seal. Both the part that moves the flapper and the mechanism that causes movement are called the *actuator*. Actuators are driven by manual hand-wheel or levers, electro-magnetic actuators, motors, or pneumatic cylinders.

Solenoid for Pneumatic Valve Actuation

The choice of actuator is determined by the power needed to seal the flapper, convenience, automatic control, or remote operation. In general, small bore valves that can be easily reached may have manual actuators. For remote or automatic operation, solenoid or pneumatic actuation is used. Large bore valves with heavy flappers often need pneumatic actuation even if they can be reached. Both small and large valves used as conductance controllers (to give a desired gas flow or pressure control), require the flapper in intermediate, variable positions between fully open/closed. Manual actuation is occasionally used, but most often motor actuation is appropriate.

Pneumatic Actuators and Solenoids

Pneumatic actuators are basically pistons that are moved by routing compressed air into the volume at one end of the piston.

Two types of actuators are used to open/close valves:

(a) Spring-driven into one position and pneumatically driven to the other

(b) Pneumatically driven to both positions (by routing air first to "this" end then to "that" end while venting "this" end)

When discussing different valve actuators, confusion sometimes arises when the word *solenoid* is used in association with a pneumatic actuator. Isn't the solenoid (which might also be called electro-magnetic actuator) a different actuation mechanism than pneumatic actuation? Yes, it is, but to control the compressed air causing the valve to shut off, vent, and switch ends requires another level of actuation. The solenoid valve attached to the pneumatic cylinder is entirely dedicated to switching compressed air. In one sense, it may trigger the valve's actuation but isn't really part of the actuator.

To distinguish between the solenoid associated with a pneumatic actuator and the true solenoid actuator, the latter is called an *electro-magnetic* actuator throughout these notes.

Vacuum Valves

Sealing the Actuator

A rotating actuator is often sealed by a dynamic o-ring seal compressed around the shaft. Occasionally, they are used for linear actuators but the greater risk of gas burst makes them less popular than other linear seals. Most dynamic o-ring actuator seals are satisfactory for rough and the (mid) high vacuum pressure range.

The most common linear actuators are sealed in metal bellows. The bellows are often welded to the plate in the actuator shaft but are sealed to the valve body by welding, static o-ring seal, or metal gasket seal. Depending on the valve's design, the seals enable operation well into high vacuum or UHV ranges.

The rubber diaphragm described earlier is its own seal since the air-side actuator does not penetrate into the vacuum but simply pushes the diaphragm. In a similar way, the corrugated metal diaphragms, sealing extremely fine control leak valves, stretch to enable small travel distances required by the actuator.

Gate Valves

Gate valve applications include isolation between vacuum volume and pump, isolation between chamber and loadlock during sample introduction to the latter, access between chamber and loadlock during sample transfer, and isolation between synchrotron beam lines and experimental stations.

The bore's shape is typically circular but narrow rectangles are available for transferring disk-shape substrates such as wafers, CDs, or hard drive disks.

Placing a valve between the pump and chamber necessarily reduces the pumping speed from that chamber. To minimize this effect, the valve must have a high gas conductance meaning it must have a large diameter, unobstructed, straight-through bore, and a short distance between flange faces. While not a question of conductance, transferring objects from one chamber to another through a valve also demands a wide unobstructed path, which gate valves supply.

The gate valve's plate-like flapper, in its open position, completely retracts from the bore. The flapper's seal is most often an o-ring held in a groove cut into its surface. In well-designed valves, as the valve closes, the flapper remains some distance from the valve body so the opening's edges do not chop the o-ring. As it reaches the end of its linear travel, an over-center mechanism forces the flapper against the valve body, compressing the o-ring to make the seal.

While most gate valves will not leak with a 15 psi overpressure on either side of the flapper, typical installations have the o-ring facing the volume where vacuum is retained during pressure cycling or venting. That is, the increased pressure assists in forcing the flapper into its closed position and maintaining the seal.

Gate Valve Conductances

The conductance of a gate valve can either be determined experimentally or, since the fully open valve's shape is not unlike a tube, calculated using Dushman's table (**see section 17**). However, some valves have stated conductance numbers that far exceed those determined from Dushman's table. The reasoning behind these higher numbers is:

(a) A valve is always connected to other components

(b) Those components will have the same inner diameter as the valve, and will have length

(c) The above justifies using the "long tube" formula for calculating conductance

Unfortunately, the long tube formula applies to *long tubes*. For example, applying the long tube formula for a gate valve 10 cm thick by 25 cm clear bore gives, in molecular flow, ~19,000 L/s. But applying the Clausing factor (which is <1.0 for all length/diameter ratios <100) to the calculated conductance to allow for the valve's dimensions gives ~4,750 L/sec. Making interpolations to the information given in Dushman's table (which has the Clausing factor built-in) for the same dimension gives ~4,225 L/sec.

These various formulas and factors, plus the question "how can a long tube have a greater conductance than a short valve?", create difficulties for users unfamiliar with some deep vacuum technology concepts. Attempting to compare conductances for gate valves from different manufacturers can cause confusion. However, two points can be made: (a) if two gate valves have identical dimensions for thicknesses and clear bore, their conductances are equal; (b) when making conductance calculations, using the minimum calculated conductance is always the safe policy.

Pneumatic Actuation Gate Valve

Vacuum Valves

Angle Valves

The angle valve's applications include rough pumping shut-off, foreline switching between pumps, cryo-sorption pump shut-off, isolating foreline traps, UHV shut-off, sorption trap isolation, isolating sections baked to high temperature, and more.

As the name implies, the valve's ports are at 90º with the flapper's motion along the axis of one port. Although large-diameter angle valves (often called poppet valves) exist, the most popular sizes have ports between ¾" and 3". Their right angle construction reduces the gas conductance for a given bore-size to somewhat less than the equivalent length straight tube.

The flapper is sealed by o-ring, elastomeric disk, or soft metal/hard metal. The last named can be baked to high temperature and are extensively used on UHV systems. Although other actuator seals may exist, by far the most common is the flex metal bellows seal. The bellows' "outer" end is usually welded to a plate attached to the actuator shaft. The "inner" end is sealed to the body by using either an o-ring or knife-edge copper gasket seal similar to the CF flange.

Angle valves are actuated manually, by pneumatic cylinder, or by electro-magnetics. Valves using the last mechanism are sometimes called 'solenoid valves,' but the similarity of name to valves that divert compressed air in pneumatic valve actuation (noted earlier) causes confusion. Here, the 'solenoid' directly actuates the valve's flapper. This is a vacuum valve (not a compressed air valve) and is attractive for automating some parts of a system without the need for compressed air.

These valves are essentially on-off devices and are rarely used for conductance control (see below) except in the most primitive, manual way. Some advantages are construction simplicity and ease of mounting/demounting. Positioning a valve between two (rigid) tubes with a common centerline, or parallel/offset centerlines, is more difficult than using an angle valve and tubes at 90°.

Although well able to withstand 15 psi overpressure on either side of the flapper, the valve is often mounted with the flapper o-ring facing the normally evacuated space. A popular version of this valve is known as the block valve because it is manufactured from a block of aluminum.

Electromagnetic Actuation Angle Valve

Manual Actuation Angle Valve

Pneumatic Actuation In-Line Valve

In-Line Valves

These valves share most features and applications noted for angle valves. The difference is one port is turned 90° so its axis is parallel with the other port's axis. This means the valve's conductance is reduced by the additional right angle flow path. In-line metal sealed versions are not available.

Ball Valves

Ball valves are popular in many gas and water applications but less frequently found in vacuum applications. They do, however, provide low-cost, rugged performance at rough vacuum pressures and are found in foreline and trap applications.

The ball (flapper) is held in two PTFE rings that surround the connecting ports and seal the valve body to the ball. In the open position, a through-hole in the ball aligns with the ports. Given the limited vacuum applications, this valve's overall conductance is reasonable and rarely an issue. The ball's actuator, usually a handle rotating a shaft, is sealed by a dynamic o-ring.

An interesting mounting issue arises with ball valves that have, in addition to the through-hole, a "side-hole" at 90° through one half the ball. With the valve closed, the side-hole connects the valve's through-hole to one port. The intent is to mount it with the side-hole connected to the port closest to the pump. That enables gas trapped in the through-hole to be pumped before the valve is opened to the system.

Vacuum Valves

Butterfly Valves

Butterfly valves are available in a range of sizes—large enough to isolate diffusion pumps and small enough for many foreline applications. A popular application is as a down-stream conductance controller to maintain a constant chamber pressure in processes requiring gas flow.

The butterfly's flapper is a circular disk with an o-ring around its circumference. The flapper rotates (about its diameter) in the cone-shaped bore. The geometry of the actuating shaft's attachment to the flapper forces the latter into the cone as the valve closes with the o-ring sealing against the valve body. When open, a butterfly valve has a high conductance, with the bore only partially obstructed by the "edge-on" flapper.

A major application for this valve is down-stream conductance control. Two types are used, the first with the o-ring (as described above) and the second without an o-ring. Without an o-ring, the valve has a known, fixed, minimum conductance when fully closed. With an o-ring, the valve has zero conductance when fully closed. Which is the better choice depends on the application details.

The actuator's rotating shaft is sealed with a (dynamic) o-ring, making the valve unsuitable for UHV applications. One feature of large-diameter valves can surprise users and must be kept in mind when designing a system. Typical large bore valves are sufficiently thin with the valve open; the flapper appears above and below the flange surfaces. That is, the vacuum components adjacent to the valve must have enough free volume to enable this to happen.

Conductance Controllers

Conductance controllers are used in sputter or etch applications where the working pressure is roughly 10^{-2} Torr, but the initial check or post-process cleanup pressure is 10^{-6} Torr to 10^{-8} Torr. Most HV pumps cannot tolerate continuous inlet pressures approaching 10^{-2} Torr. But even if they could, a direct connection between chamber and pump would cause an unacceptably high process gas usage. Conductance controllers are ideally suited for applications involving low conductance during processing and high conductance during cleanup.

The conductance controller does not, usually, shut off gas flow. Common designs are based on: (a) a multiple vane structure, each shaped like a thin pie slice, and each rotating about its own centerline; and (b) a butterfly flapper (noted above in Butterfly Valves). Both have low conductance in the fully closed position and high conductance in the open position. The actuator shafts are o-ring sealed and actuated by manual control, preset position pneumatic cylinder, or motor-driven for automatic control from a pressure- or flow-measurement feedback loop.

Vane-Style Conductance Control Valve

Leak Valves

Leak valves have two specific applications: (a) to admit gas into a vacuum chamber at a controlled leak rate; and less frequently (b) to backfill a vacuum chamber to low pressure. Even when fully open, a leak valve's low conductance means it should not be mounted between a pump and vacuum volume. A few of the more common mechanisms for controlling gas flow are noted here.

Needle Valves: A tapered stem fits into a conical sleeve. Moving the stem (needle) in/out changes the valve's conductance and the gas flow rate through it. The needle's shaft is typically sealed by a dynamic o-ring or PTFE block.

Vacuum Leak Valves (commonly called leak valves): At least two sealing mechanisms are used: (a) a soft nickel pad closing against a hard stellite knife-edge ring surrounding the valve's exit port; (b) a hard, optically-flat polished sapphire pad closing against a soft copper ring surrounding the exit port. Both use flex metal bellows to seal the actuator shaft.

Choosing a Leak Valve

[Background notes: In viscous/transitional flow regimes, a gas's mass flow is affected by its viscosity which, in turn, is affected by temperature. Counter-intuitively, gas viscosity increases with rising temperature, reducing mass flow. In the molecular flow regime, viscosity has no meaning, but a large temperature will increase the average molecular velocity.]

In general, the appropriate leak valve for an application depends on the range of mass flow rate needed, precision with which the flow rate must be maintained, and (occasionally) the upstream pressure.

Needle valves find many uses in vacuum processes where moderate to high flow rates (say, 1 to 1,000 sccm) from high pressure sources (1 to 10 bar) are required. Under these conditions, however, some part of the constriction within the valve is in viscous or transitional regime. As noted in the Background, as the room temperature changes, so will the gas flow.

Additional disadvantages when using needle valves for high vacuum operation are (a) when closed to their limit, needle valves do not shut-off the gas flow. A common "solution"—over-tightening—often results in needle jamming; (b) bakeout temperatures are limited by o-ring or PTFE shaft seals (usually <200° C).

As a result, for applications demanding precise control in the flow range noted above, constant flow despite room temperature changes, and gas shut-off capability—mass flow controllers (see section 12) are frequently chosen.

Vacuum leak valves can accept high inlet pressures (~10 bar) yet control extremely low flow rates (say, 1×10^{-9} to 0.1 T.L/sec). At these flow rates, the significant "throttling" action of the valve is in molecular flow. Once the flow rate is established, it is not significantly affected by room temperature changes.

Of particular importance in high vacuum and UHV applications: (a) when closed, these valves shut off gas flow and; (b) since the actuator is sealed by a metal bellows, these valves can be baked to ~450° C making them UHV compatible.

Standard (SS)

CF Flanged Standard Gate Valves with Fluorocarbon Bonnet Seals

IN THIS SECTION

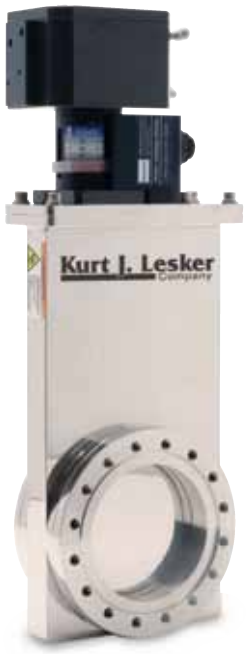
Kurt J. Lesker Co. Standard Gate Valve

Kurt J. Lesker Company's stainless steel standard gate valves are reliable, economical, general-purpose components for HV applications that require cleanliness and corrosion resistance.

- General purpose Electropolished Stainless Steel
- Provide high conductance with a compact design
- Shock-free operation with minimum vibration
- Available in manual or pneumatic operation
- Pneumatic valves stay closed in the event of power loss or loss of air pressure
- Visual LED position indicators
- Pneumatic models require solenoid kit (sold separately)

SPECIFICATIONS

Pressure Range (Torr) — 1 x 10^{-8} Torr to atm
Leak Rate (Torr) — <1X10^{-9} Torr.l/s
Material:
Body — Stainless steel
Gate — Stainless steel
Bellows — Welded 316L Stainless Steel
Seals — Viton



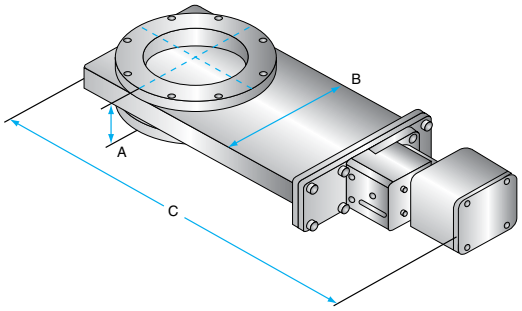


Figure 1 (Pneumatic Actuation)

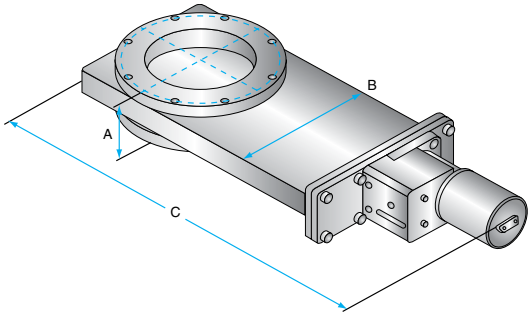


Figure 2 (Manual Actuation)

Figure	Flange Size	Port I.D.	Actuation	Imperial Tapped Dimensions (in.) A	B	C	Thread	Weight (lbs.)	Part No.	Price
1	6"	4"	Manual	2.73	5.98	17.67	5/16–24	18	GV0400MVCF	Call
1	8"	6"	Manual	2.94	7.80	21.41	5/16–25	29	GV0600MVCF	Call
2	6"	4"	Pneumatic	2.73	5.98	17.87	5/16–26	18	GV0400PVCF	Call
2	8"	6"	Pneumatic	2.94	7.80	21.61	5/16–27	29	GV0600PVCF	Call
							Metric Tapped			
1	6"	4"	Manual	2.73	5.98	17.67	M8x1.25	18	GV0400MVCFM	Call
1	8"	6"	Manual	2.94	7.80	21.41	M8x1.25	29	GV0600MVCFM	Call
2	6"	4"	Pneumatic	2.73	5.98	17.87	M8x1.25	18	GV0400PVCFM	Call
2	8"	6"	Pneumatic	2.94	7.80	21.61	M8x1.25	29	GV0600PVCFM	Call

Pneumatic Valves require Solenoid Kit (sold separately)

➤ Standard (SS)

ISO Flanged Standard Gate Valves

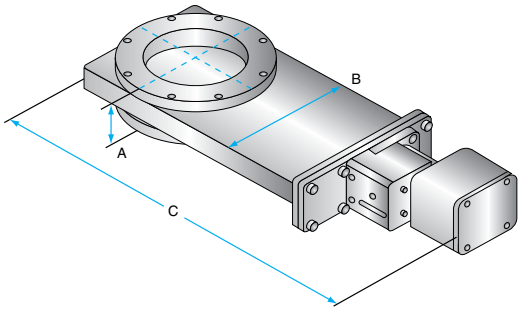


Figure 1 (Pneumatic Actuation)

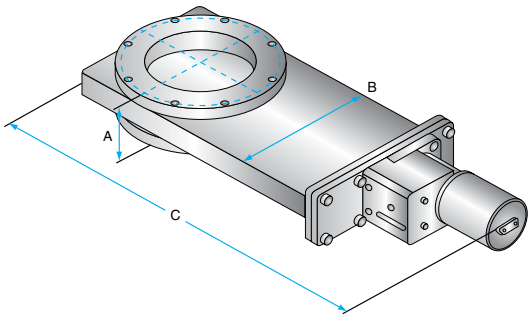


Figure 2 (Manual Actuation)

Figure	Flange Size	Port I.D.	Actuation	ISO Flanged Dimensions (in.) A	B	C	Thread	Weight (lbs.)	Part No.	Price
1	ISO 100	4”	Manual	2.36	5.98	17.67	M8x1.25	18	GV0400MVIF	Call
1	ISO 160	6”	Manual	2.43	5.98	21.41	M10x1.5	29	GV0600MVIF	Call
2	ISO 100	4”	Pneumatic	2.36	5.98	17.87	M8x1.25	18	GV0400PVIF	Call
2	ISO 160	6”	Pneumatic	2.43	7.80	21.61	M10x1.5	29	GV0600PVIF	Call

Stainless Steel Gate Valve Solenoid Options

Description	Part No.	Price
Solenoid Kit: 24 VDC	GVSOLKIT24	Call
Solenoid Kit: 120 VDC	GVSOLKIT120	Call
Solenoid Kit: 220/240 VAC	GVSOLKIT240	Call

NOTE: Solenoid kit includes solenoid, air line, mounting screws, and air fittings.

➤ Standard (SS)

IN THIS SECTION ➤

Standard (SS)

Valves handle applications in semiconductor and other processing, and are used most often to isolate pumps and sample entry locks from HV or UHV work chambers.

- General purpose Electropolished Stainless Steel
- Vacuum brazed at 1,100º C to ensure reliable operation at HV and UHV pressures
- Provide high conductance within a compact design
- Shock-free operation with minimum vibration
- 100,000-cycle service before requiring maintenance
- Available in manual or pneumatic operation
- Pneumatic valves close or remain closed in the event of power loss or loss of air pressure
- All pneumatic 1.5" flange O.D. and larger models incorporate magnetic REED switches for position indication
- Pneumatic valves feature a 120VAC solenoid operator at no extra charge (other voltages, both AC and DC, available on request)

SPECIFICATIONS

Pressure Range (Torr): 1 x 10^{-9} to 760
Differential Pressure (Torr): 760 either direction
Maximum △ Pressure Before Opening (Torr): 20
Material:
Body: Electropolished 304 stainless steel
Gate: Electropolished 304 stainless steel
Bellows: AM-350
Seals: Fluorocarbon o-ring

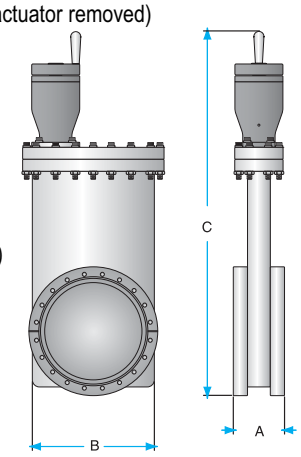
NOTE: For ease of maintenance, the carriage assembly can be removed from the body without requiring removal of the valve from the system.

NOTE: Please contact us for options such as roughing ports or valves that remain open in the event of power failure.

CF Flanged with Copper Gasket Bonnet Seals

- Operate in the atmosphere to 10^{-11} Torr pressure range, bakeable up to 200º C (with actuator removed)

Figure 1
(Manual Actuation)



NOTE: Manual Gate Valves with 3" port I.D.'s and smaller do not have crank handle.

Figure 2
(Pneumatic Actuation)

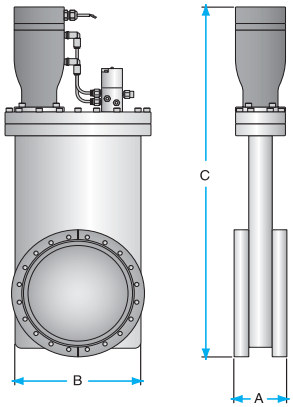


Figure	Flange Size	Port I.D.	Conductance (L/sec.)	Manual Actuation Dimensions (in.) A	B	C	Thread	Weight (lbs.)	Part No.	Price
1	1 1/3" CF	0.625"	10	1.56	1.31	4.19	8–32	3	SG0063MCCF	Call
1	2 3/4" CF	1.50"	130	2.03	2.46	8.30	1/4–28	10	SG0150MCCF	Call
1	3 3/8" CF	2"	270	2.28	2.96	9.21	5/16–24	13	SG0200MCCF	Call
1	4 1/2" CF	2.5"	500	2.41	3.52	10.12	5/16–24	18	SG0250MCCF	Call
1	4 5/8" CF	3"	800	2.53	4.28	11.33	5/16–24	22	SG0300MCCF	Call
1	6" CF	4"	1,700	2.97	5.65	18.67	5/16–24	33	SG0400MCCF	Call
1	8" CF	6"	5,200	3.17	7.55	21.99	5/16–24	50	SG0600MCCF	Call
1	10" CF	8"	12,000	3.35	10.02	26.34	5/16–24	75	SG0800MCCF	Call
1	12" CF	10"	21,500	3.89	12.00	36.80	5/16–24	147	SG1000MCCF	Call
1	13 1/4" CF	10.75"	25,000	3.89	13.08	39.28	3/8–24	160	SG1075MCCF	Call
1	14" CF	12"	34,900	3.89	14.24	41.53	3/8–24	170	SG1200MCCF	Call
				Pneumatic Actuation						
2	1 1/3" CF	0.625"	10	1.56	1.31	4.97	8–32	3	SG0063PCCF	Call
2	2 3/4" CF	1.50"	130	2.03	2.46	10.05	1/4–28	10	SG0150PCCF	Call
2	3 3/8" CF	2"	270	2.28	2.96	11.10	5/16–24	13	SG0200PCCF	Call
2	4 1/2" CF	2.5"	500	2.41	3.52	12.33	5/16–24	18	SG0250PCCF	Call
2	4 5/8" CF	3"	800	2.53	4.28	13.37	5/16–24	22	SG0300PCCF	Call
2	6" CF	4"	1,700	2.97	5.65	18.07	5/16–24	33	SG0400PCCF	Call
2	8" CF	6"	5,200	3.17	7.55	21.58	5/16–24	50	SG0600PCCF	Call
2	10" CF	8"	12,000	3.35	10.02	26.12	5/16–24	75	SG0800PCCF	Call
2	12" CF	10"	21,500	3.89	12.00	34.14	5/16–24	147	SG1000PCCF	Call
2	13 1/4" CF	10.75"	25,000	3.89	13.08	36.62	3/8–24	160	SG1075PCCF	Call
2	14" CF	12"	34,900	3.89	14.24	38.88	3/8–24	170	SG1200PCCF	Call

** Pneumatic valves require 60–80 psi air pressure for actuation. Actuator on SG0063MCCF and SG0063PCCF cannot be removed without breaking vacuum.*

➤ Standard (SS)

CF Flanged with Fluorocarbon O-Ring Bonnet Seals

- Operate in the atmosphere to 10^{-9} Torr pressure range, bakeable up to 150° C (in the open position)

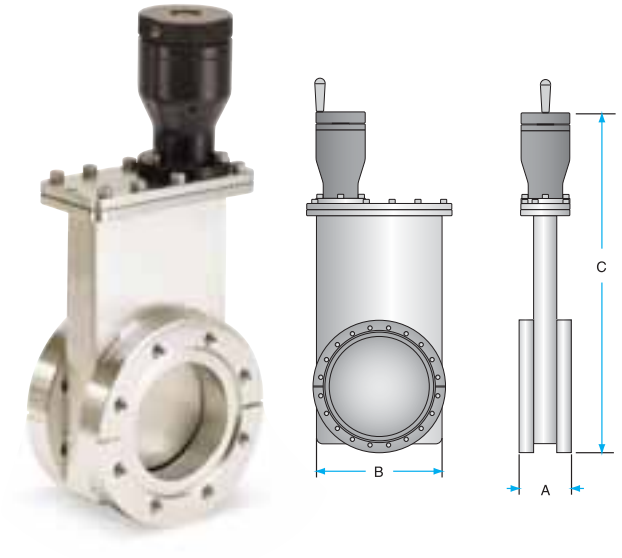


Figure 1 (Manual Actuation)

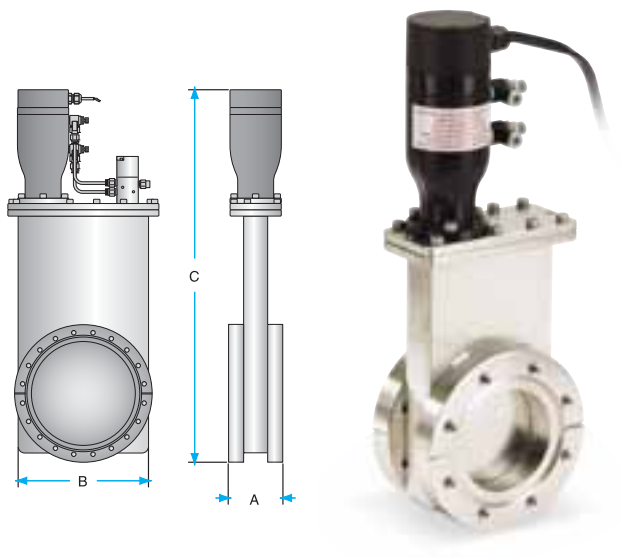


Figure 2 (Pneumatic Actuation)

NOTE: Manual Gate Valves with 3" port I.D.s and smaller do not have crank handle.

Figure	Flange Size	Port I.D.	Conductance (L/sec.)	Manual Actuation Dimensions (in.) A	B	C	Thread	Weight (lbs.)	Part No.	Price
1	1 1/3" CF	0.625"	10	1.56	1.31	4.19	8–32	3	SG0063MVCF	Call
1	2 3/4" CF	1.5"	130	2.03	2.46	8.30	1/4–28	10	SG0150MVCF	Call
1	3 3/8" CF	2"	270	2.28	2.96	9.21	5/16–24	13	SG0200MVCF	Call
1	4 1/2" CF	2.5"	500	2.41	3.52	10.12	5/16–24	18	SG0250MVCF	Call
1	4 5/8" CF	3"	800	2.53	4.28	11.33	5/16–24	22	SG0300MVCF	Call
1	6" CF	4"	1,700	2.97	5.65	18.67	5/16–24	33	SG0400MVCF	Call
1	8" CF	6"	5,200	3.17	7.55	21.99	5/16–24	50	SG0600MVCF	Call
1	10" CF	8"	12,000	3.35	10.02	26.34	5/16–24	75	SG0800MVCF	Call
1	12" CF	10"	21,500	3.89	12.00	36.68	5/16–24	147	SG1000MVCF	Call
1	13 1/4" CF	10.75"	25,000	3.89	13.08	39.15	3/8–24	160	SG1075MVCF	Call
1	14" CF	12"	34,900	3.89	14.24	41.41	3/8–24	170	SG1200MVCF	Call
					Pneumatic Actuation					
2	1 1/3" CF	0.625"	10	1.56	1.31	4.97	8–32	3	SG0063PVCF	Call
2	2 3/4" CF	1.5"	130	2.03	2.46	10.05	1/4–28	10	SG0150PVCF	Call
2	3 3/8" CF	2"	270	2.28	2.96	11.10	5/16–24	13	SG0200PVCF	Call
2	4 1/2" CF	2.5"	500	2.41	3.52	12.33	5/16–24	18	SG0250PVCF	Call
2	4 5/8" CF	3"	800	2.53	4.28	13.37	5/16–24	22	SG0300PVCF	Call
2	6" CF	4"	1,700	2.97	5.65	18.07	5/16–24	33	SG0400PVCF	Call
2	8" CF	6"	5,200	3.17	7.55	21.58	5/16–24	50	SG0600PVCF	Call
2	10" CF	8"	12,000	3.35	10.02	26.12	5/16–24	75	SG0800PVCF	Call
2	12" CF	10"	21,500	3.89	12.00	34.14	5/16–24	147	SG1000PVCF	Call
2	13 1/4" CF	10.75"	25,000	3.89	13.08	36.62	3/8–24	160	SG1075PVCF	Call
2	14" CF	12"	34,900	3.89	14.24	38.88	3/8–24	170	SG1200PVCF	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

Stainless Steel Gate Valve Solenoid Options

Description	Part No.	Price
Solenoid: 12 VDC	SE012D4XX	Call
Solenoid: 24 VDC	SE024D4XX	Call
Solenoid: 220/240 VAC	SE240A4XX	Call

➤ Standard (SS)

KF (QF) & ISO Flanged with Fluorocarbon O-Ring Seals

- Operate in the atmosphere to 10^{-9} Torr pressure range, bakeable up to 150° C (in the open position)

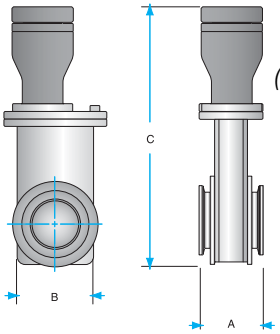


Figure 1 (Manual Actuation/ KF Flanged)

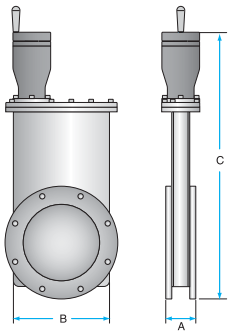
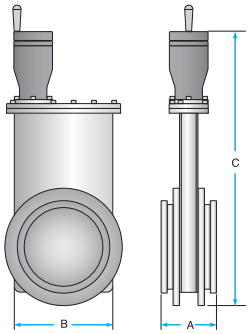


Figure 3 (Manual Actuation/ISO Flanged)

(ISO-F Flanged—Bolted)

(ISO-K Flanged—Clamped)



NOTE: Manual Gate Valves with 3″ port I.D.s and smaller do not have crank handle.

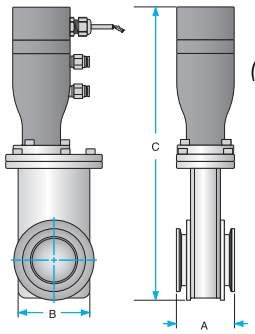


Figure 2 (Pneumatic Actuation/ KF Flanged)

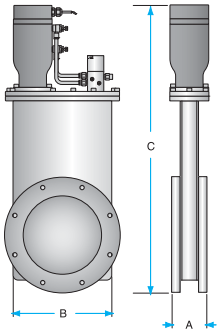


Figure 4 (Pneumatic Actuation/ISO Flanged)

(ISO-F Flanged—Bolted)

(ISO-K Flanged—Clamped)

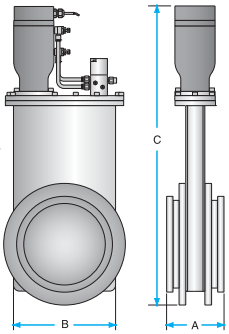


Figure	Flange Size	Port I.D.	Conductance (L/sec.)	Manual Actuation Dimensions (in.) A	B	C	Thread	Weight (lbs.)	Part No.	Price
1	KF16	0.625"	10	2.96	1.31	4.19	N/A	3	SG0063MVQF	Call
1	KF40	1.5"	85	2.00	2.46	8.30	N/A	10	SG0150MVQF	Call
1	KF50	2"	315	2.00	2.96	9.21	N/A	13	SG0200MVQF	Call
3	ISO63-F	2.5"	615	2.03	3.52	10.12	M8 x 1.25	18	SG0250MVIF	Call
3	ISO63-K	2.5"	360	3.46	3.52	10.12	N/A	25	SG0250MVIK	Call
3	ISO80-F	3"	1,070	1.97	4.28	12.24	M8 x 1.25	22	SG0300MVIF	Call
3	ISO80-K	3"	540	3.84	4.28	12.12	N/A	32	SG0300MVIK	Call
3	ISO100-F	4"	2,120	2.41	5.65	19.28	M8 x 1.25	33	SG0400MVIF	Call
3	ISO100-K	4"	1,190	4.25	5.65	19.41	N/A	43	SG0400MVIK	Call
3	ISO160-F	6"	7,140	2.36	7.55	22.96	M10 x 1.5	50	SG0600MVIF	Call
3	ISO160-K	6"	3,960	4.25	7.55	23.03	N/A	70	SG0600MVIK	Call
3	ISO200-F	8"	11,590	2.66	10.02	27.45	M10 x 1.5	75	SG0800MVIF	Call
3	ISO200-K	8"	9,440	4.25	10.02	27.32	N/A	95	SG0800MVIK	Call
3	ISO250-F	10"	24,990	3.15	11.99	36.90	M10 x 1.5	160	SG1000MVIF	Call
3	ISO250-K	10"	17,535	5.51	11.99	36.81	N/A	190	SG1000MVIK	Call
3	ISO320-F	12"	43,260	3.15	14.28	42.40	M12 x 1.75	170	SG1200MVIF	Call
3	ISO320-K	12"	24,500	4.49	14.28	41.41	N/A	230	SG1200MVIK	Call
				Pneumatic Actuation						
2	KF16	0.625"	10	2.96	1.31	4.97	N/A	3	SG0063PVQF	Call
2	KF40	1.5"	85	2.00	2.46	9.99	N/A	10	SG0150PVQF	Call
2	KF50	2"	315	2.00	2.96	10.89	N/A	13	SG0200PVQF	Call
4	ISO63-F	2.5"	615	2.03	3.52	12.65	M8 x 1.25	18	SG0250PVIF	Call
4	ISO63-K	2.5"	360	3.46	3.52	12.65	N/A	25	SG0250PVIK	Call
4	ISO80-F	3"	1,070	1.97	4.28	13.91	M8 x 1.25	22	SG0300PVIF	Call
4	ISO80-K	3"	540	3.84	4.28	13.80	N/A	32	SG0300PVIK	Call
4	ISO100-F	4"	2,120	2.41	5.65	18.34	M8 x 1.25	33	SG0400PVIF	Call
4	ISO100-K	4"	1,190	4.25	5.65	18.46	N/A	43	SG0400PVIK	Call
4	ISO160-F	6"	7,140	2.36	7.55	22.02	M10 x 1.5	50	SG0600PVIF	Call
4	ISO160-K	6"	3,960	4.25	7.55	22.09	N/A	70	SG0600PVIK	Call
4	ISO200-F	8"	11,590	2.66	10.02	26.51	M10 x 1.5	75	SG0800PVIF	Call
4	ISO200-K	8"	9,440	4.25	10.02	26.38	N/A	95	SG0800PVIK	Call
4	ISO250-F	10"	24,990	3.15	11.99	34.37	M10 x 1.5	160	SG1000PVIF	Call
4	ISO250-K	10"	17,535	5.51	11.99	34.27	N/A	190	SG1000PVIK	Call
4	ISO320-F	12"	43,260	3.15	14.28	39.87	M12 x 1.75	170	SG1200PVIF	Call
4	ISO320-K	12"	24,500	4.49	14.28	39.24	N/A	230	SG1200PVIK	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

➤ Standard (SS)

ASA/ANSI Flanged with Fluorocarbon O-Ring Gate Seals

- Operate in the atmosphere to 10^{-9} Torr pressure range, bakeable up to 150º C (in the open position)

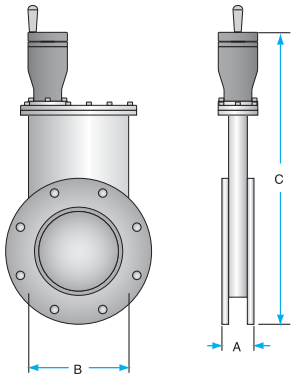


Figure 1
(Manual Actuation)

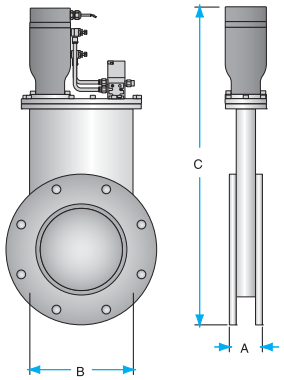


Figure 2
(Pneumatic Actuation)

NOTE: Manual Gate Valves with 3" port I.D.s and smaller do not have crank handle.

Figure	Flange O.D.	Port I.D.	Conductance (L/sec.)	Manual Actuation Dimensions (in.) A	B	C	Thread	Weight (lbs.)	Part No.	Price
1	6"	2"	310	2.03	2.96	10.71	3/8–16	13	SG0200MVA1	Call
1	6"	2.5"	615	2.03	3.52	11.41	3/8–16	18	SG0250MVA1	Call
1	6"	3"	1,025	2.03	4.28	12.37	3/8–16	22	SG0300MVA1	Call
1	7 1/2"	3"	1,025	2.03	4.28	13.13	3/8–16	22	SG0300MVA2	Call
1	9"	4"	2,120	2.41	5.65	20.53	3/8–16	33	SG0400MVA1	Call
1	11"	6"	7,020	2.41	7.55	24.04	3/4–10	50	SG0600MVA1	Call
1	11"	8"	14,370	2.76	10.02	27.33	3/4–10	75	SG0800MVA1	Call
1	13 1/2"	8"	14,370	2.78	10.02	28.58	3/4–10	75	SG0800MVA2	Call
1	16"	10"	24,990	3.15	11.99	38.31	3/4–10	160	SG1000MVA1	Call
1	16"	10.75"	31,020	3.15	13.08	40.16	3/4–10	160	SG1075MVA1	Call
1	16"	12"	43,260	3.15	14.28	42.02	3/4–10	170	SG1200MVA1	Call
1	19"	12"	43,260	3.15	14.28	43.54	3/4–10	180	SG1200MVA2	Call
				Pneumatic Actuation						
2	6"	2"	310	2.03	2.96	12.39	3/8–16	13	SG0200PVA1	Call
2	6"	2.5"	615	2.03	3.52	13.09	3/8–16	18	SG0250PVA1	Call
2	6"	3"	1,025	2.03	4.28	14.05	3/8–16	22	SG0300PVA1	Call
2	7 1/2"	3"	1,025	2.03	4.28	14.81	3/8–16	22	SG0300PVA2	Call
2	9"	4"	2,120	2.41	5.65	19.59	3/8–16	33	SG0400PVA1	Call
2	11"	6"	7,020	2.41	7.55	23.10	3/4–10	50	SG0600PVA1	Call
2	11"	8"	14,370	2.76	10.02	26.39	3/4–10	75	SG0800PVA1	Call
2	13 1/2"	8"	14,370	2.78	10.02	27.64	3/4–10	75	SG0800PVA2	Call
2	16"	10"	24,990	3.15	11.99	35.77	3/4–10	160	SG1000PVA1	Call
2	16"	10.75"	31,020	3.15	13.08	37.62	3/4–10	160	SG1075PVA1	Call
2	16"	12"	43,260	3.15	14.28	39.50	3/4–10	170	SG1200PVA1	Call
2	19"	12"	43,260	3.15	14.28	41.00	3/4–10	180	SG1200PVA2	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

NOTE for ASA/ANSI Only: To specify o-ring grooves, add appropriate suffix to end of part number when ordering. No extra charge! GT—groove on top side, GB—groove on bottom, GG—grooves on both sides.

Stainless Steel Gate Valve Solenoid Options

Description	Part No.	Price
Solenoid: 12 VDC	SE012D4XX	Call
Solenoid: 24 VDC	SE024D4XX	Call
Solenoid: 220/240 VAC	SE240A4XX	Call

➤ Standard (Al)

In This Subsection ➤
Standard (Al)

Aluminum Gate Valves (ISO) & (ASA)

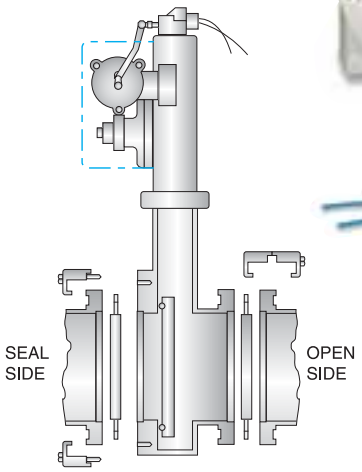
Features:

- Easy-to-maintain bonnet design (an operator, without special tools or training, can replace every moving part in the bonnet style valve in five minutes while the valve port stays in the system to support the pump and vacuum lines)
- He rates of less than 2 x 10^{-9} std cc/sec.
- A high-conductance large port with ISO or ASA flanges (JIS flanges available, call us for details or visit our website)
- Withstand bakeout to 150° C when equipped with fluorocarbon O-rings and in the open position
- Made of 6061 aluminum
- Pneumatic valves feature a 120VAC solenoid operator at no extra charge (other voltages, both AC and DC, available on request)

Valve Neck Style Legend

N1 Style	Tapped holes on seal side and open side
N5 Style	Neck on seal side and open side
N6 Style	Neck on seal side only
N8 Style	Neck on open side (opposite seal side) only

Electro-Pneumatic Actuation



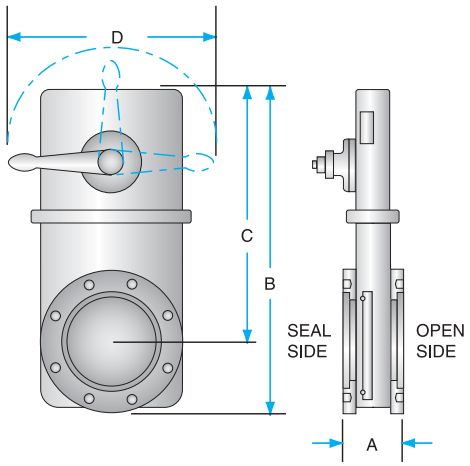
N8 STYLE

ISO Flanged—Manual Actuation

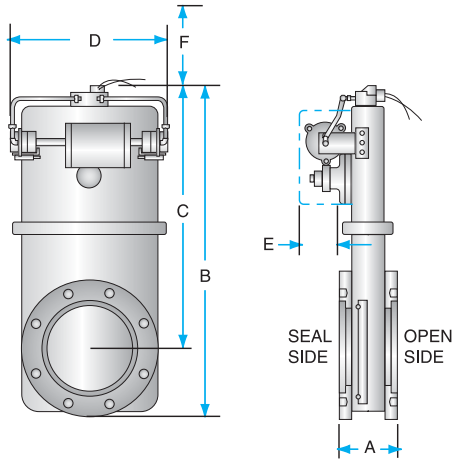
Flange Size	Neck Style	Port I.D.	Bolt Circle	(# of Bolts) Size–Pitch	Dimensions (mm) A	B	C	D	Weight (kg)	Part No.	Price
ISO63-F (One Piece)	N1	70 mm	110 mm	(4) M8 – 1.25	70	238	270	100	8	VRO0277MB000	Call
ISO63-K (One Piece)	N5	70 mm	110 mm	No Bolts, ISO-K	105	238	270	100	8	VRO0288MB000	Call
ISO63-F (One Piece)	N6	70 mm	110 mm	(4) M8 – 1.25	90	238	270	100	8	VRO0287MB000	Call
ISO63-F (One Piece)	N8	70 mm	110 mm	(4) M8 – 1.25	90	238	270	100	8	VRO0278MB000	Call
ISO80-F	N1	83 mm	125 mm	(8) M8 – 1.25	95	353	385	254	10	VRW0377MB000	Call
ISO80-K	N5	83 mm	125 mm	No Bolts, ISO-K	105	353	385	254	10	VRW0388MB000	Call
ISO80-F	N6	83 mm	125 mm	(8) M8 – 1.25	100	353	385	254	10	VRW0387MB000	Call
ISO80-F	N8	83 mm	125 mm	(8) M8 – 1.25	100	353	385	254	10	VRW0378MB000	Call
ISO100-F	N1	102 mm	145 mm	(8) M8 – 1.25	95	362	394	254	10	VRW0477MB000	Call
ISO100-K	N5	102 mm	145 mm	No Bolts, ISO-K	105	362	394	254	10	VRW0488MB000	Call
ISO100-F	N6	102 mm	145 mm	(8) M8 – 1.25	100	362	394	254	10	VRW0487MB000	Call
ISO100-F	N8	102 mm	145 mm	(8) M8 – 1.25	100	362	394	254	10	VRW0478MB000	Call
ISO160-F	N1	153 mm	200 mm	(8) M10 – 1.5	105	513	544	406	14	VRW0677MB000	Call
ISO160-K	N5	153 mm	200 mm	No Bolts, ISO-K	143	513	544	406	14	VRW0688MB000	Call
ISO160-F	N6	153 mm	200 mm	(8) M10 – 1.5	127	513	544	406	14	VRW0687MB000	Call
ISO160-F	N8	153 mm	200 mm	(8) M10 – 1.5	127	513	544	406	14	VRW0678MB000	Call
ISO200-F	N1	213 mm	260 mm	(12) M10 – 1.5	111	629	660	406	25	VRW0877MB000	Call
ISO200-K	N5	213 mm	260 mm	No Bolts, ISO-K	155	629	660	406	25	VRW0888MB000	Call
ISO200-F	N6	213 mm	260 mm	(12) M10 – 1.5	127	629	660	406	25	VRW0887MB000	Call
ISO200-F	N8	213 mm	260 mm	(12) M10 – 1.5	127	629	660	406	25	VRW0878MB000	Call
ISO250-F	N1	261 mm	310 mm	(12) M10 – 1.5	117	738	770	533	50	VRW1077MB000	Call
ISO250-K	N5	261 mm	310 mm	No Bolts, ISO-K	219	738	770	533	50	VRW1088MB000	Call
ISO250-F	N6	261 mm	310 mm	(12) M10 – 1.5	168	738	770	533	50	VRW1087MB000	Call
ISO250-F	N8	261 mm	310 mm	(12) M10 – 1.5	168	738	770	533	50	VRW1078MB000	Call
ISO320-F	N1	318 mm	395 mm	(12) M12 – 1.75	117	738	815	533	58	VRW1277MB000	Call
ISO320-K	N5	318 mm	395 mm	No Bolts, ISO-K	219	738	815	533	58	VRW1288MB000	Call
ISO320-F	N6	318 mm	395 mm	(12) M12 – 1.75	168	738	815	533	58	VRW1287MB000	Call
ISO320-F	N8	318 mm	395 mm	(12) M12 – 1.75	168	738	815	533	58	VRW1278MB000	Call

➤ Standard (Al)

Aluminum Gate Valves (ISO)



Manual Actuation



Pneumatic Actuation

NOTE: Valves listed use a fluorocarbon o-ring for the gate seal and Buna-N o-rings for all other locations. We can supply gate valves with one or several roughing ports in a variety of locations. Please call to specify.

NOTE: We recommend using these valves only to 150° C in the closed position because of the performance of the o-rings.

ISO Flanged—Electro-Pneumatic Actuation

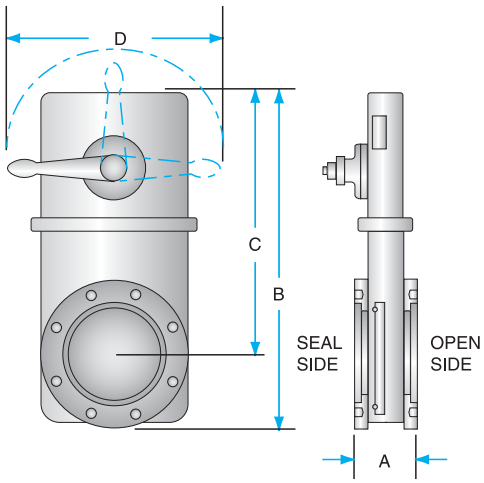
Flange Size	Neck Style	Port I.D.	Bolt Circle	(# of Bolts) Size–Pitch	Dimensions (mm) A	B	C	D	E	F	Weight(kg)	Part No.	Price
ISO63-F	N1	70 mm	110 mm	(4) M8 – 1.25	70	270	205	175	60	67	8	VRO0277PB000	Call
ISO63-K	N5	70 mm	110 mm	No Bolts, ISO-K	105	270	205	175	60	67	8	VRO0288PB000	Call
ISO63-F	N6	70 mm	110 mm	(4) M8 – 1.25	90	270	205	175	60	67	8	VRO0287PB000	Call
ISO63-F	N8	70 mm	110 mm	(4) M8 – 1.25	90	270	205	175	60	67	8	VRO0278PB000	Call
ISO80-F	N1	83 mm	125 mm	(8) M8 – 1.25	95	385	312	228	60	67	10	VRW0377PB000	Call
ISO80-K	N5	83 mm	125 mm	No Bolts, ISO-K	105	385	312	228	60	67	10	VRW0388PB000	Call
ISO80-F	N6	83 mm	125 mm	(8) M8 – 1.25	100	385	312	228	60	67	10	VRW0387PB000	Call
ISO80-F	N8	83 mm	125 mm	(8) M8 – 1.25	100	385	312	228	60	67	10	VRW0378PB000	Call
ISO100-F	N1	102 mm	145 mm	(8) M8 – 1.25	95	394	312	228	60	100	10	VRW0477PB000	Call
ISO100-K	N5	102 mm	145 mm	No Bolts, ISO-K	105	394	312	228	60	100	10	VRW0488PB000	Call
ISO100-F	N6	102 mm	145 mm	(8) M8 – 1.25	100	394	312	228	60	100	10	VRW0487PB000	Call
ISO100-F	N8	102 mm	145 mm	(8) M8 – 1.25	100	394	312	228	60	100	10	VRW0478PB000	Call
ISO160-F	N1	153 mm	200 mm	(8) M10 – 1.5	105	544	432	257	89	114	14	VRW0677PB000	Call
ISO160-K	N5	153 mm	200 mm	No Bolts, ISO-K	143	544	432	257	89	114	14	VRW0688PB000	Call
ISO160-F	N6	153 mm	200 mm	(8) M10 – 1.5	127	544	432	257	89	114	14	VRW0687PB000	Call
ISO160-F	N8	153 mm	200 mm	(8) M10 – 1.5	127	544	432	257	89	114	14	VRW0678PB000	Call
ISO200-F	N6	213 mm	260 mm	(12) M10 – 1.5	111	660	518	318	86	140	25	VRW0877PB000	Call
ISO200-K	N5	213 mm	260 mm	No Bolts, ISO-K	155	660	518	318	86	140	25	VRW0888PB000	Call
ISO200-F	N6	213 mm	260 mm	(12) M10 – 1.5	127	660	518	318	86	140	25	VRW0887PB000	Call
ISO200-F	N8	213 mm	260 mm	(12) M10 – 1.5	127	660	518	318	86	140	25	VRW0878PB000	Call
ISO250-F	N1	261 mm	310 mm	(12) M10 – 1.5	117	770	602	458	79	121	50	VRW1077PB000	Call
ISO250-K	N5	261 mm	310 mm	No Bolts, ISO-K	219	770	602	458	79	121	50	VRW1088PB000	Call
ISO250-F	N6	261 mm	310 mm	(12) M10 – 1.5	168	770	602	458	79	121	50	VRW1087PB000	Call
ISO250-F	N8	261 mm	310 mm	(12) M10 – 1.5	168	770	602	458	79	121	50	VRW1078PB000	Call
ISO320-F	N1	318 mm	395 mm	(12) M12 – 1.75	117	815	602	458	79	121	58	VRW1277PB000	Call
ISO320-K	N5	318 mm	395 mm	No Bolts, ISO-K	219	815	602	458	79	121	58	VRW1288PB000	Call
ISO320-F	N6	318 mm	395 mm	(12) M12 – 1.75	168	815	602	458	79	121	58	VRW1287PB000	Call
ISO320-F	N8	318 mm	395 mm	(12) M12 – 1.75	168	815	602	458	79	121	58	VRW1278PB000	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

Turn the page for the ASA Flanged version! ➤

➤ Standard (Al)

Aluminum Gate Valves (ASA)



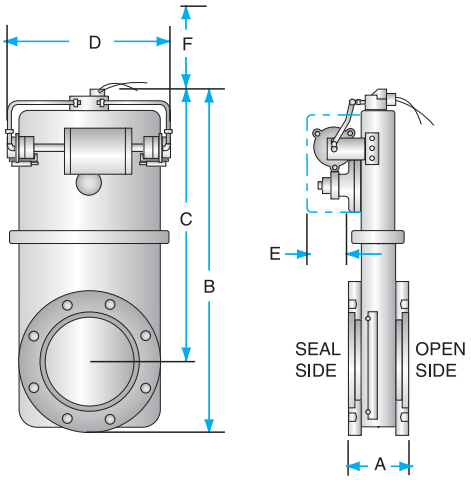
Manual Actuation

ASA Flanged—Manual Actuation

Flange O.D.	Port I.D.	Neck Style	Flange O-Ring Part No.	Bolt Circle	(# of Bolts) Size–Pitch	Dimensions (in.) A	B	C	D	Weight (kg)	Part No.	Price
6"	3.38"	N1	O-V239	4.75"	(4) 5/8–11	3.75	12.88	11.25	10	13	VRW0200MB000	Call
6"	3.38"	N5	O-V239	4.75"	(4) Slotted	6.50	12.88	11.25	10	13	VRW0255MB000	Call
6"	3.38"	N6	O-V239	4.75"	(4) 5/8–11	5.13	12.88	11.25	10	13	VRW0250MB000	Call
6"	3.38"	N8	O-V239	4.75"	(4) 5/8–11	5.13	12.88	11.25	10	13	VRW0205MB000	Call
7.5"	3.38"	N1	O-V242	6"	(4) 5/8–11	3.75	13.63	11.25	10	15	VRW0300MB000	Call
7.5"	3.38"	N5	O-V242	6"	(4) Slotted	6.50	13.63	11.25	10	15	VRW0355MB000	Call
7.5"	3.38"	N6	O-V242	6"	(4) 5/8–11	5.13	13.63	11.25	10	15	VRW0350MB000	Call
7.5"	3.38"	N8	O-V242	6"	(4) 5/8–11	5.13	13.63	11.25	10	15	VRW0305MB000	Call
9"	5.38"	N1	O-V256	7.5"	(8) 5/8–11	4.13	20.25	17.00	16	31	VRW0400MB000	Call
9"	5.38"	N5	O-V256	7.5"	(8) Slotted	7.13	20.25	17.00	16	31	VRW0455MB000	Call
9"	5.38"	N6	O-V256	7.5"	(8) 5/8–11	5.63	20.25	17.00	16	31	VRW0450MB000	Call
9"	5.38"	N8	O-V256	7.5"	(8) 5/8–11	5.63	20.25	17.00	16	31	VRW0405MB000	Call
11"	7.13"	N1	O-V264	9.5"	(8) 3/4–10	4.38	24.88	20.38	16	49	VRW0600MB000	Call
11"	7.13"	N5	O-V264	9.5"	(8) Slotted	7.88	24.88	20.38	16	49	VRW0655MB000	Call
11"	7.13"	N6	O-V264	9.5"	(8) 3/4–10	6.13	24.88	20.38	16	49	VRW0650MB000	Call
11"	7.13"	N8	O-V264	9.5"	(8) 3/4–10	6.13	24.88	20.38	16	49	VRW0605MB000	Call
13.5"	8"	N1	O-V447	11.75"	(8) 3/4–10	4.38	26.13	20.38	16	55	VRW0800MB000	Call
13.5"	8"	N5	O-V447	11.75"	(8) Slotted	7.88	26.13	20.38	16	55	VRW0855MB000	Call
13.5"	8"	N6	O-V447	11.75"	(8) 3/4–10	6.13	26.13	20.38	16	55	VRW0850MB000	Call
13.5"	8"	N8	O-V447	11.75"	(8) 3/4–10	6.13	26.13	20.38	16	55	VRW0805MB000	Call
16"	11.63"	N1	O-V453	14.25"	(12) 7/8–9	4.63	30.44	23.69	21	109	VRW1000MB000	Call
16"	11.63"	N8	O-V453	14.25"	(12) Slotted	8.63	30.44	23.69	21	109	VRW1055MB000	Call
16"	11.63"	N8	O-V453	14.25"	(12) 7/8–9	6.63	30.44	23.69	21	109	VRW1050MB000	Call
16"	11.63"	N8	O-V453	14.25"	(12) 7/8–9	6.63	30.44	23.69	21	109	VRW1005MB000	Call
19"	12"	N1	O-V455	17"	(12) 7/8–9	4.63	32.00	23.69	21	129	VRW1200MB000	Call
19"	12"	N5	O-V455	17"	(12) Slotted	8.63	32.00	23.69	21	129	VRW1255MB000	Call
19"	12"	N6	O-V455	17"	(12) 7/8–9	6.63	32.00	23.69	21	129	VRW1250MB000	Call
19"	12"	N8	O-V455	17"	(12) 7/8–9	6.63	32.00	23.69	21	129	VRW1205MB000	Call

➤ Standard (Al)

Aluminum Gate Valves (ASA)



Pneumatic Actuation

NOTE: Valves listed use a fluorocarbon o-ring for the gate seal and Buna-N o-rings for all other locations. We can supply gate valves with one or several roughing ports in a variety of locations. Please call to specify.

NOTE: We recommend using these valves only to 150° C in the closed position because of the performance of the o-rings.

NOTE: All ASA flange aluminum valves shown here have flange o-ring grooves on both sides of the valve. For other configurations, please call. Flange o-rings included with valve.

ASA Flanged—Electro-Pneumatic Actuation

Flange O.D.	Port I.D.	Neck Style	Flange O-Ring Part No.	Bolt Circle	(# of Bolts) Size–Pitch	Dimensions (in.) A	B	C	D	E	F	Weight (kg)	Part No.	Price
6"	3.38"	N1	O-V239	4.75"	(4) 5/8–11	3.75	14.25	11.25	8.50	2.38	2.63	13	VRW0200PB000	Call
6"	3.38"	N5	O-V239	4.75"	(4) Slotted	6.50	14.25	11.25	8.50	2.38	2.63	13	VRW0255PB000	Call
6"	3.38"	N6	O-V239	4.75"	(4) 5/8–11	5.13	14.25	11.25	8.50	2.38	2.63	13	VRW0250PB000	Call
6"	3.38"	N8	O-V239	4.75"	(4) 5/8–11	5.13	14.25	11.25	8.50	2.38	2.63	13	VRW0205PB000	Call
7.5"	3.38"	N1	O-V242	6"	(4) 5/8–11	3.75	15.00	11.25	8.50	2.38	2.63	15	VRW0300PB000	Call
7.5"	3.38"	N5	O-V242	6"	(4) Slotted	6.50	15.00	11.25	8.50	2.38	2.63	15	VRW0355PB000	Call
7.5"	3.38"	N6	O-V242	6"	(4) 5/8–11	5.13	15.00	11.25	8.50	2.38	2.63	15	VRW0350PB000	Call
7.5"	3.38"	N8	O-V242	6"	(4) 5/8–11	5.13	15.00	11.25	8.50	2.38	2.63	15	VRW0305PB000	Call
9"	5.38"	N1	O-V256	7.5"	(8) 5/8–11	4.13	21.50	17.00	10.13	3.50	4.50	31	VRW0400PB000	Call
9"	5.38"	N5	O-V256	7.5"	(8) Slotted	7.13	21.50	17.00	10.13	3.50	4.50	31	VRW0455PB000	Call
9"	5.38"	N6	O-V256	7.5"	(8) 5/8–11	5.63	21.50	17.00	10.13	3.50	4.50	31	VRW0450PB000	Call
9"	5.38"	N8	O-V256	7.5"	(8) 5/8–11	5.63	21.50	17.00	10.13	3.50	4.50	31	VRW0405PB000	Call
11"	7.13"	N1	O-V264	9.5"	(8) 3/4–10	4.38	26.00	20.38	12.50	3.38	5.50	49	VRW0600PB000	Call
11"	7.13"	N5	O-V264	9.5"	(8) Slotted	7.88	26.00	20.38	12.50	3.38	5.50	49	VRW0655PB000	Call
11"	7.13"	N6	O-V264	9.5"	(8) 3/4–10	6.13	26.00	20.38	12.50	3.38	5.50	49	VRW0650PB000	Call
11"	7.13"	N8	O-V264	9.5"	(8) 3/4–10	6.13	26.00	20.38	12.50	3.38	5.50	49	VRW0605PB000	Call
13.5"	8"	N1	O-V447	11.75"	(8) 3/4–10	4.38	27.25	20.38	12.50	3.38	5.50	55	VRW0800PB000	Call
13.5"	8"	N5	O-V447	11.75"	(8) Slotted	7.88	27.25	20.38	12.50	3.38	5.50	55	VRW0855PB000	Call
13.5"	8"	N6	O-V447	11.75"	(8) 3/4–10	6.13	27.25	20.38	12.50	3.38	5.50	55	VRW0850PB000	Call
13.5"	8"	N8	O-V447	11.75"	(8) 3/4–10	6.13	27.25	20.38	12.50	3.38	5.50	55	VRW0805PB000	Call
16"	11.63"	N1	O-V453	14.25"	(12) 7/8–9	4.63	31.69	23.69	18.00	3.13	4.75	109	VRW1000PB000	Call
16"	11.63"	N8	O-V453	14.25"	(12) Slotted	8.63	31.69	23.69	18.00	3.13	4.75	109	VRW1055PB000	Call
16"	11.63"	N8	O-V453	14.25"	(12) 7/8–9	6.63	31.69	23.69	18.00	3.13	4.75	109	VRW1050PB000	Call
16"	11.63"	N8	O-V453	14.25"	(12) 7/8–9	6.63	31.69	23.69	18.00	3.13	4.75	109	VRW1005PB000	Call
19"	12"	N1	O-V455	17"	(12) 7/8–9	4.63	33.25	23.69	18.00	3.13	4.75	129	VRW1200PB000	Call
19"	12"	N5	O-V455	17"	(12) Slotted	8.63	33.25	23.69	18.00	3.13	4.75	129	VRW1255PB000	Call
19"	12"	N6	O-V455	17"	(12) 7/8–9	6.63	33.25	23.69	18.00	3.13	4.75	129	VRW1250PB000	Call
19"	12"	N8	O-V455	17"	(12) 7/8–9	6.63	33.25	23.69	18.00	3.13	4.75	129	VRW1205PB000	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

For complete o-ring listing, turn to page 2-159

Million Cycle Gate Valves (SS)

Million Cycle Gate Valves

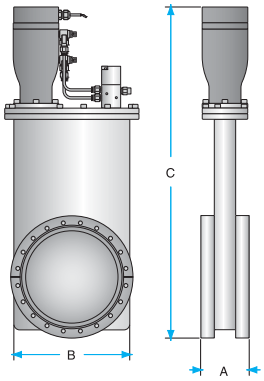
Used with cryopumps, turbomolecular pumps, and ion pumps; ideal for applications requiring clean, high-vacuum, low-maintenance valves.

Features:

- Rugged valves share the design features of the standard valves
- Enhanced to withstand 1 million+ cycles before requiring service
- Bellows reinforced for longer operating life
- All moving joints are made of 304 stainless steel, hardened to increase durability, reduce particulate generation, and provide smoother actuation
- Maintain closed status in the event of a power failure

CF Flanged

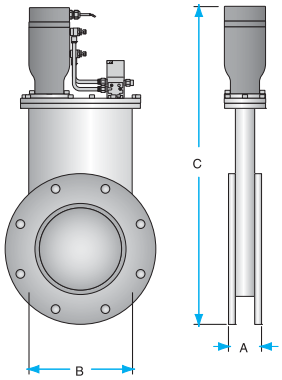
Flange Size	Port I.D.	Conductance (L/sec.)	Pneumatic Actuation Dimensions (in.) A	B	C	Thread	Weight (lbs.)	Part No.	Price
1 1/3" CF	0.625"	10	1.56	1.31	4.29	8–32	3	SGM0063CF	Call
2 3/4" CF	1.5"	130	2.03	2.46	10.05	1/4–28	10	SGM0150CF	Call
3 3/8" CF	2"	270	2.28	2.96	11.10	5/16–24	13	SGM0200CF	Call
4 1/2" CF	2.5"	500	2.41	3.52	12.33	5/16–24	18	SGM0250CF	Call
4 5/8" CF	3"	800	2.53	4.28	13.37	5/16–24	22	SGM0300CF	Call
6" CF	4"	1,700	2.97	5.65	18.07	5/16–24	33	SGM0400CF	Call
8" CF	6"	5,200	3.17	7.55	21.58	5/16–24	50	SGM0600CF	Call
10" CF	8"	12,000	3.35	10.02	26.12	5/16–24	75	SGM0800CF	Call
12" CF	10"	21,500	3.65	11.99	34.14	5/16–24	147	SGM1000CF	Call
13 1/4" CF	10.75"	25,000	3.89	13.08	36.62	3/8–24	160	SGM1075CF	Call
14" CF	12"	34,900	3.89	14.28	38.88	3/8–24	170	SGM1200CF	Call



Pneumatic valves require 60–80 psi air pressure for actuation.

ASA/ANSI Flanged

Flange O.D.	Port I.D.	Conductance (L/sec.)	Pneumatic Actuation Dimensions (in.) A	B	C	Thread	Weight (lbs.)	Part No.	Price
6"	2"	310	2.03	2.96	12.39	3/8–16	13	SGM0200A1	Call
6"	2.5"	615	2.03	3.52	13.09	3/8–16	18	SGM0250A1	Call
6"	3"	1,025	2.03	4.28	14.05	3/8–16	22	SGM0300A1	Call
7 1/2"	3"	1,025	2.03	4.28	14.81	3/8–16	22	SGM0300A2	Call
9"	4"	2,120	2.41	5.65	19.59	3/8–16	33	SGM0400A1	Call
11"	6"	7,020	2.41	7.55	23.10	3/4–10	50	SGM0600A1	Call
11"	8"	14,370	2.76	10.02	26.39	3/4–10	75	SGM0800A1	Call
13 1/2"	8"	14,370	2.78	10.02	27.64	3/4–10	75	SGM0800A2	Call
16"	10"	24,990	3.15	11.99	35.77	3/4–10	160	SGM1000A1	Call
16"	10.75"	31,020	3.15	13.08	37.62	3/4–10	160	SGM1075A1	Call
16"	12"	43,260	3.15	14.28	39.50	3/4–10	170	SGM1200A1	Call
19"	12"	43,260	3.15	14.28	41.00	3/4–10	180	SGM1200A2	Call



Pneumatic valves require 60–80 psi air pressure for actuation.

NOTE for ASA/ANSI Only: To specify o-ring grooves, add appropriate suffix to end of part number when ordering. No extra charge! GT—groove on top side, GB—groove on bottom, GG—grooves on both sides.

Stainless Steel Gate Valve Solenoid Options

Description	Part No.	Price
Solenoid: 12 VDC	SE012D4XX	Call
Solenoid: 24 VDC	SE024D4XX	Call
Solenoid: 220/240 VAC	SE240A4XX	Call

➤ Million Cycle Gate Valves (SS)

NOTE: Available options include larger sizes, microswitches, custom flanges, and latching-type solenoids. Please call if ordering options.

- Feature fluorocarbon seals (bakeable to 150° C) and electro-pneumatic operators
- Body-mounted solenoid with manual override provides easy control
- 120 VAC solenoid incorporates speed controls for smoother actuation
- 1.5" to 12.0" models are equipped with magnetic reed switches for position indicator

SPECIFICATIONS

Pressure Range (Torr): 1 x 10^{-9} to 760
Differential Pressure (Torr): 760 either direction
Maximum △ Pressure before Opening (Torr): 20
Material:
Body: Electropolished 304 stainless steel
Gate: Electropolished 304 stainless steel
Bellows: AM-350
Drive Shaft/Pins: Hardened, electropolished, stainless steel
Seals: Fluorocarbon o-ring
Requirements: Up to 80 psi filtered, dry air

KF (QF) & ISO Flanged

Figure 1 (KF)

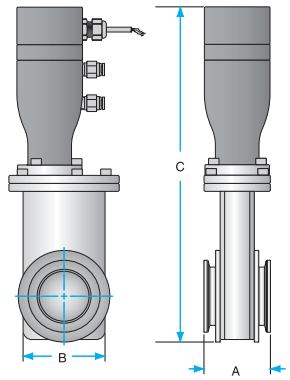


Figure 2 (ISO-F Bolted)

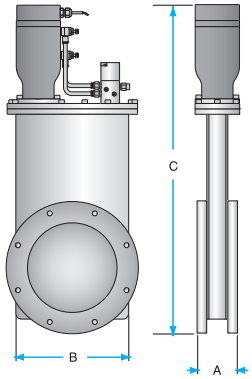


Figure 3 (ISO-K Clamped)

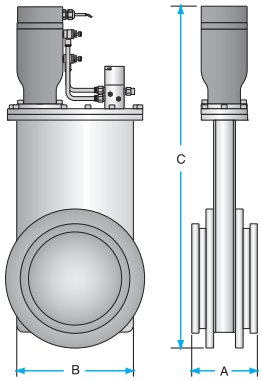


Figure	Flange Size	Port I.D.	Conductance (L/sec.)	Pneumatic Actuation Dimensions (in.) A	B	C	Thread	Weight (lbs.)	Part No.	Price
1	KF16	0.625"	10	2.96	1.31	4.97	N/A	3	SGM0063QF	Call
1	KF40	1.5"	85	2.00	2.46	9.99	N/A	10	SGM0150QF	Call
1	KF50	2"	315	2.00	2.96	10.89	N/A	13	SGM0200QF	Call
2	ISO63-F	2.5"	615	2.03	3.52	12.65	M8 x 1.25	18	SGM0250IF	Call
3	ISO63-K	2.5"	360	3.46	3.52	12.65	N/A	25	SGM0250IK	Call
2	ISO80-F	3"	1,070	1.97	4.28	13.91	M8 x 1.25	22	SGM0300IF	Call
3	ISO80-K	3"	540	3.84	4.28	13.80	N/A	32	SGM0300IK	Call
2	ISO100-F	4"	2,120	2.41	5.65	18.34	M8 x 1.25	33	SGM0400IF	Call
3	ISO100-K	4"	1,190	4.25	5.65	18.46	N/A	43	SGM0400IK	Call
2	ISO160-F	6"	7,140	2.36	7.55	22.02	M10 x 1.5	50	SGM0600IF	Call
3	ISO160-K	6"	3,960	4.25	7.55	22.09	N/A	70	SGM0600IK	Call
2	ISO200-F	8"	11,590	2.66	10.02	26.51	M10 x 1.5	75	SGM0800IF	Call
3	ISO200-K	8"	9,440	4.25	10.02	26.38	N/A	95	SGM0800IK	Call
2	ISO250-F	10"	24,990	3.15	11.99	34.37	M10 x 1.5	160	SGM1000IF	Call
3	ISO250-K	10"	17,535	5.51	11.99	34.27	N/A	190	SGM1000IK	Call
2	ISO320-F	12"	43,260	3.15	14.28	39.87	M12 x 1.75	170	SGM1200IF	Call
3	ISO320-K	12"	24,500	5.51	14.28	39.67	N/A	230	SGM1200IK	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

Stainless Steel Gate Valve Solenoid Options

Description	Part No.	Price
Solenoid: 12 VDC	SE012D4XX	Call
Solenoid: 24 VDC	SE024D4XX	Call
Solenoid: 220/240 VAC	SE240A4XX	Call

Kurt J. Lesker Company

➤ 3-Position Gate Valves (SS)

IN THIS SECTION ➤

3-Position Gate Valves (SS)

Typically used for upstream pressure control applications in conjunction with mass flow controllers.

These valves utilize a micrometer-set third position from which the valve can be remotely actuated to some degree of the open position. The body and all major internal components are vacuum furnace brazed at 1100º C, at 10^{-6} Torr, ensuring maximum joint integrity. This eliminates the possibility of "virtual leaks" or entrapment areas while minimizing body distortion found in conventionally welded valves. For maintenance purposes, the carriage assembly can be removed from the body without removing the valve from the system.

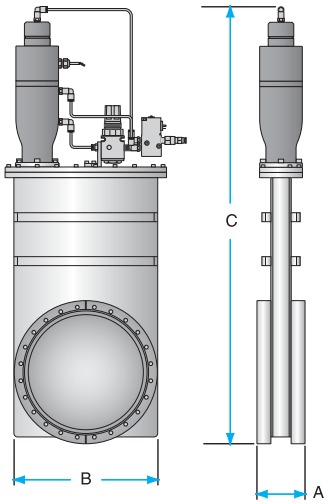
Additional features:

- Electropolished stainless steel
- One of the smallest interior surface areas in the vacuum valve industry
- Positive shut off—valve will maintain its closed position in the event of a power loss followed by a pressure drop
- Unique air cylinder design with no mechanical locks inside the vacuum reduces shock and vibration to a minimum
- Ideal for semiconductor and other sensitive processes

SPECIFICATIONS

Leak Rate (cc/sec): 2 x 10^{-10} ATM
Pressure Range (Torr): 1 x 10^{-9} to 760
Differential Pressure (Torr): 760 either direction
Maximum △ Pressure Before Opening (Torr): 20
Cycles Until Service (approx.): 1,000,000
Bakeout Limitation (º C):
Seal Bonnet & Gate: 150
Actuator: 60
Material:
Body: Electropolished 304 stainless steel
Gate: Electropolished 304 stainless steel
Bellows: AM-350
Drive Shaft/Pins: Hardened, electropolished, stainless steel
Seals: Fluorocarbon O-ring
Solenoid:
Voltage* (VAC, Hz): 120, 50/60
Power Required (Watts): 4.0
Position Indicator:
Reed Switch (for open & closed position): 115 VAC MAX or 28 VDC MAX – 20 mA MAX
Micro Switch (for third position): 5A@115 VAC — 5A@250 VAC
<5A@28 VDC — Resistive Load
3A@28 VDC — Inductive Load
Options: Custom flanges
Requirements: Up to 80 psi filtered, dry air
* Other voltages available.

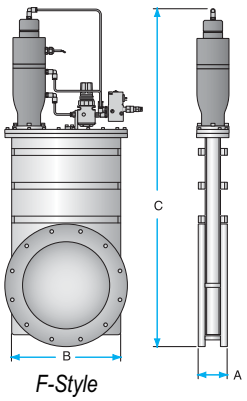
CF Flanged



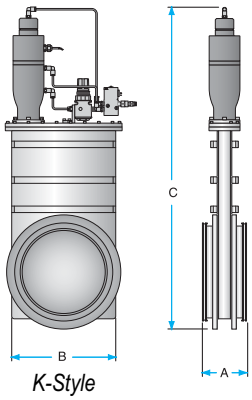
Flange Size	Port I.D.	Conductance (L/sec.)	Dimensions (in.) A	B	C	Thread	Weight (lbs.)	Part No.	Price
6" CF	4"	1,700	2.97	5.65	22.66	5/16–24	33	SGP0400CF	Call
8" CF	6"	5,200	3.17	7.55	26.16	5/16–24	50	SGP0600CF	Call
10" CF	8"	12,000	3.35	10.02	30.07	5/16–24	75	SGP0800CF	Call
12" CF	10"	21,500	3.65	12.00	39.15	5/16–24	147	SGP1000CF	Call
13 1/4" CF	10.75"	25,000	3.62	13.08	40.55	3/8–24	160	SGP1075CF	Call
14" CF	12"	34,900	3.89	14.28	43.61	3/8–24	170	SGP1200CF	Call

➤ 3-Position Gate Valves (SS)

ISO Flanged



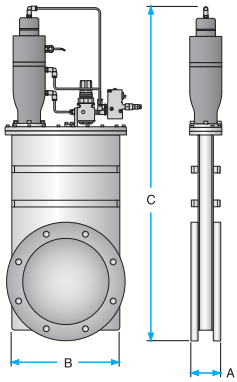
F-Style



K-Style

Flange Size	Port I.D.	Conductance (L/sec.)	Dimensions (in.) A	B	C	Thread	Weight (lbs.)	Part No.	Price
ISO100-F	4"	2,120	2.41	5.65	22.92	M8 x 1.25	33	SGP0400IF	Call
ISO100-K	4"	1,190	4.25	5.65	23.05	N/A	43	SGP0400IK	Call
ISO160-F	6"	7,140	2.36	7.55	26.61	M10 x 1.5	50	SGP0600IF	Call
ISO160-K	6"	3,960	4.25	7.55	26.68	N/A	70	SGP0600IK	Call
ISO200-F	8"	11,590	2.66	10.02	31.09	M10 x 1.5	75	SGP0800IF	Call
ISO200-K	8"	9,440	4.25	10.02	30.96	N/A	95	SGP0800IK	Call
ISO250-F	10"	24,990	3.15	12.00	39.10	M10 x 1.5	160	SGP1000IF	Call
ISO250-K	10"	17,535	5.51	12.00	39.01	N/A	190	SGP1000IK	Call
ISO320-F	12"	43,260	3.15	14.28	44.60	M12 x 1.75	170	SGP1200IF	Call
ISO320-K	12"	24,500	5.51	14.28	43.67	N/A	230	SGP1200IK	Call

ASA/ANSI Flanged



Flange O.D.	Port I.D.	Conductance (L/sec.)	Dimensions (in.) A	B	C	Thread	Weight (lbs.)	Part No.	Price
9"	4"	2,120	2.41	5.65	24.17	3/8–16	33	SGP0400A1	Call
11"	6"	7,020	2.41	7.55	27.69	3/4–10	50	SGP0600A1	Call
11"	8"	14,370	2.76	10.02	30.97	3/4–10	75	SGP0800A1	Call
13 1/2"	8"	14,370	2.78	10.02	32.22	3/4–10	75	SGP0800A2	Call
16"	10"	24,990	3.15	12.00	40.51	3/4–10	160	SGP1000A1	Call
16"	12"	43,260	3.15	14.28	44.31	3/4–10	170	SGP1200A1	Call
19"	12"	43,260	3.15	14.28	45.81	3/4–10	180	SGP1200A2	Call

NOTE for ASA/ANSI Only: To specify o-ring grooves, add appropriate suffix to end of part number when ordering. No extra charge! GT—groove on top side, GB—groove on bottom, GG—grooves on both sides.

Stainless Steel Gate Valve Solenoid Options

Description	Part No.	Price
Solenoid: 12 VDC	SE012D4XX	Call
Solenoid: 24 VDC	SE024D4XX	Call
Solenoid: 220/240 VAC	SE240A4XX	Call

➤ Semiconductor Processing Valves (SS & Al)

Protection Valve System

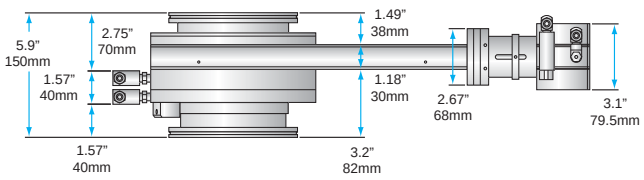
- Significantly reduces down time by protecting your system from backstreaming process in the event of vacuum pump failure
- Ideally suited for high particulate generating applications
- Fast pneumatic actuation-close in <0.3 seconds
- Long cycle life under adverse process conditions
- Low shock/motion during open/close cycling
- Local/remote control with status LCD display
- 1, 2, 3, or 4 channel control options

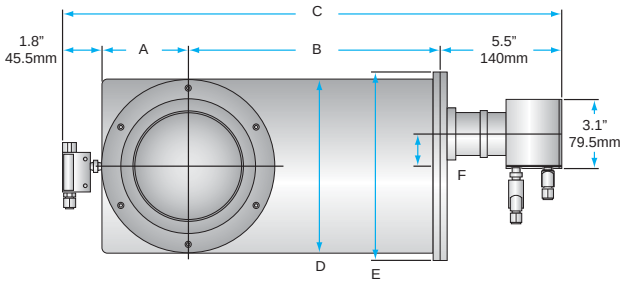
SPECIFICATIONS

Leak Rate: < $6x10^{-8}$ mbar.L/sec
Pressure Range: $1x10^{-7}$ mbar ~ 1 atm
Differential Pressure:
Gate: 1 bar in either direction
At opening: ≤30 mbar in either direction
Air Pressure: 60~100 [sil (4.1 ~ 6.9 bar)
Bakeout Limitation:
Body: <150° C
Actuator: <60° C

Material:
Body: 304 stainless steel
Bellows: 316L stainless steel
Actuator : A1-6061
Seals: Viton

*NOTE: To watch a short informational flash video about the product; please go to the Protection Valve System Video page on **www.lesker.com**.*





Flange Size	Dimensions (in.) (mm) A	B	C	D	E	F	Part No.	Price
100 ISO-K	3.3" (84)	9.5" (242)	20.1" (521)	6.6" (168)	7.3" (186)	1.2" (31.5)	GVP0400IK	Call
160 ISO-K	4.4" (112)	13.26" (337)	23.18" (589)	8.81" (224)	9.44" (240)	1.88" (48)	GVP0600IK	Call

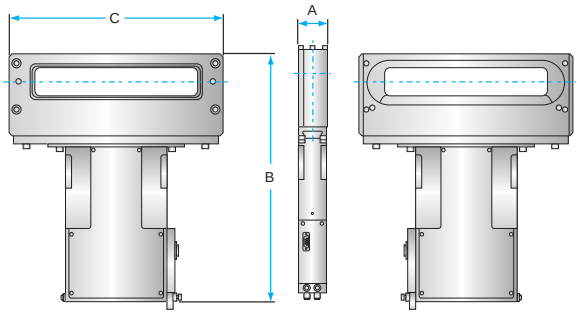
Protection Vacuum Gate Valve Channel Controllers

Description	Part No.	Price
Channel Controller 1	GVPCONTROL1	Call
Channel Controller 2	GVPCONTROL2	Call
Channel Controller 3	GVPCONTROL3	Call
Channel Controller 4	GVPCONTROL4	Call

➤ Semiconductor Processing Valves (SS & Al)

Rectangular—Stainless Steel

Enable transfer of thin, wide objects, such as wafers, from load locks to chambers or between vacuum chambers.



Description	Port Size (mm)	Dimensions (mm.) A	B	C	Part Number Bolted	Clamped	Price
SEMI E21-94 (200 mm / 8")	32 x 222	50	425	340	SGR3222250B	SGR3222250C	Call
SEMI E21-94 (200 mm / 8")	46 x 236	50	440	340	SGR4623650B	SGR4623650C	Call
SEMI E21-94 (300 mm / 12")	50 x 336	60	398	440	SGR5033660B	SGR5033660C	Call
450 mm / 18"	56 x 496	80	480	630	SGR5649680B	SGR5649680C	Call

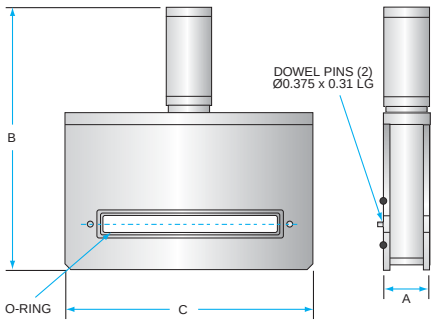
*NOTE: For complete details on these semiconductor processing valves, visit **www.lesker.com** or contact us at **hardware@lesker.com**.*

Rectangular—Aluminum

- Constructed of 6061-T6 aluminum
- Helium rates of less than 2 x 10^{-9} std cc/sec.
- Feature smooth extruded aluminum surfaces with low outgassing characteristics

Selections

- Port sizes to fit any wafer or display
- Bolt patterns to fit any tool or chamber



Port Size (mm)	Dimensions (mm.) A	B	C	Part Number Bolted	Clamped	Price
32 x 222	70	416	356	AGR3222270B	AGR3222270C	Call
46 x 236	86	420	406	AGR4623686B	AGR4623686C	Call
46 x 335	86	420	406	AGR4638586B	AGR4638586C	Call
51 x 686	178	914	813	AGR51686178B	AGR51686178C	Call

*NOTE: For complete details on these semiconductor processing valves, visit **www.lesker.com** or contact us at **hardware@lesker.com**.*

➤ Bellows Sealed Angle Valves (SS)

IN THIS SECTION ➤

Bellows Sealed Angle Valves (SS)

Reliable, economical, general-purpose components for HV and UHV applications requiring cleanliness and corrosion resistance.

In the open position:

- Edge-welded bellows and valve seat move out of the gas path thereby achieving high conductance
- Can withstand baking to 200° C (copper bonnet seal), improving ultimate vacuum

NOTE: We list a wide variety of standard tube sizes from 3/8" to 4". Other sizes and valves with mixed flanges are available on request.

Features:

- Helium leak tested before shipment using a helium mass spectrometer with a sensitivity of 2 x 10^{-10} std. cc/sec.
- Poppet seals are fluorocarbon o-rings
- Bonnet seals can be fluorocarbon or copper gaskets (select copper for higher temperature bakeout and better ultimate vacuum)
- Normal repairs can be made without removing the valve body from the system

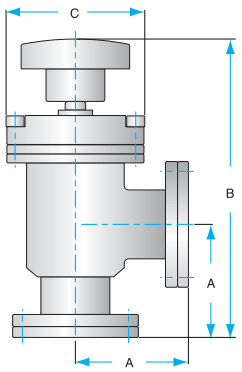
Pneumatic models:

- Spring-to-close operation on valves ≤2", 2½" and larger are air-to-open air-to-close; 60–80 psi air pressure opens the valves
- Require a solenoid (sold separately, see accessories)

Electromagnetically actuated angle valves:

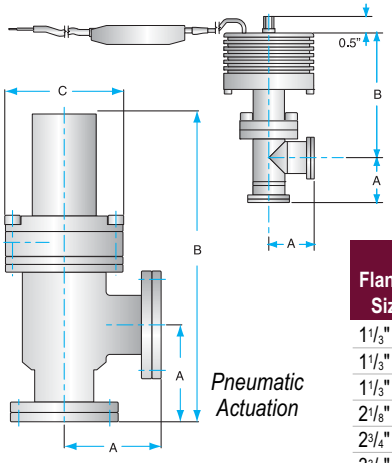
- Small valves operate on 24 VDC
- Designed for a variety of high vacuum processes requiring a simple, compact, high conductance electric valve to 10^{-9} Torr
- Ideal for pump systems, portable vacuum stands and benchtop analytical systems
- Easy installation—no pneumatic connections, gas bottles, or house air supply lines required
- Unique coil saver design minimizes the heat traditionally associated with conventional electric valves
- An option for applications where temperature sensitive gauge isolation is critical

CF Flanged



Manual Actuation

Electromagnetic Actuation



Pneumatic Actuation

Manual Actuation

Pneumatic Actuation

Flange Size	Bonnet Seal	Manual Actuation Dimensions (in.) A	B	C	Part No.	Price
1 1/3" CF	Fluorocarbon	1.60	4.54	2.25	SA0037MVCF	Call
1 1/3" CF	Fluorocarbon	1.60	4.66	2.25	SA0050MVCF	Call
1 1/3" CF	Fluorocarbon	2.50	6.50	2.25	SA0075MVCF	Call
2 1/8" CF	Fluorocarbon	2.05	5.49	2.25	SA0100MVCF	Call
2 3/4" CF	Fluorocarbon	2.45	7.71	3.00	SA0150MVCF	Call
3 3/8" CF	Fluorocarbon	3.48	10.08	3.50	SA0200MVCF	Call
4 1/2" CF	Fluorocarbon	3.38	11.15	4.00	SA0250MVCF	Call
4 5/8" CF	Fluorocarbon	3.53	11.96	4.50	SA0300MVCF	Call
1 1/3" CF	Copper	1.60	4.54	2.73	SA0037MCCF	Call
1 1/3" CF	Copper	1.60	4.66	2.73	SA0050MCCF	Call
1 1/3" CF	Copper	2.50	6.50	2.73	SA0075MCCF	Call
2 1/8" CF	Copper	2.05	5.49	2.73	SA0100MCCF	Call
2 3/4" CF	Copper	2.45	7.71	3.25	SA0150MCCF	Call
3 3/8" CF	Copper	3.48	10.08	4.05	SA0200MCCF	Call
4 1/2" CF	Copper	3.38	11.32	4.61	SA0250MCCF	Call
4 5/8" CF	Copper	3.53	11.96	5.62	SA0300MCCF	Call

Flange Size	Bonnet Seal	Pneumatic Actuation Dimensions (in.) A	B	C	Part No.	Price
1 1/3" CF	Fluorocarbon	1.60	5.57	2.25	SA0037PVCF	Call
1 1/3" CF	Fluorocarbon	1.60	5.87	2.25	SA0050PVCF	Call
1 1/3" CF	Fluorocarbon	2.50	6.35	2.25	SA0075PVCF	Call
2 1/8" CF	Fluorocarbon	2.05	6.19	2.25	SA0100PVCF	Call
2 3/4" CF	Fluorocarbon	2.45	7.73	3.00	SA0150PVCF	Call
3 3/8" CF	Fluorocarbon	3.48	11.46	3.50	SA0200PVCF	Call
4 1/2" CF	Fluorocarbon	3.38	10.48	4.00	SA0250PVCF	Call
4 5/8" CF	Fluorocarbon	3.53	11.28	4.50	SA0300PVCF	Call
6" CF	Fluorocarbon	4.66	15.43	6.50	SA0400PVCF	Call
1 1/3" CF	Copper	1.60	5.57	2.73	SA0037PCCF	Call
1 1/3" CF	Copper	1.60	5.87	2.73	SA0050PCCF	Call
1 1/3" CF	Copper	2.50	6.35	2.73	SA0075PCCF	Call
2 1/8" CF	Copper	2.05	6.19	2.73	SA0100PCCF	Call
2 3/4" CF	Copper	2.45	7.73	3.25	SA0150PCCF	Call
3 3/8" CF	Copper	3.48	11.46	4.05	SA0200PCCF	Call
4 1/2" CF	Copper	3.38	10.48	4.61	SA0250PCCF	Call
4 5/8" CF	Copper	3.53	11.28	5.62	SA0300PCCF	Call
6" CF	Copper	4.66	15.43	6.73	SA0400PCCF	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

Flange Size	Bonnet Seal	Electromagnetic Actuation—24 VDC only Dimensions (in.) A	B	Part No.	Price
1 1/3" CF	Fluorocarbon	1.80	3.70	SA0075EVCF	Call
2 3/4" CF	Fluorocarbon	2.00	3.80	SA0150EVCF	Call

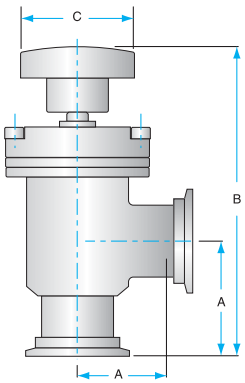
➤ Bellows Sealed Angle Valves (SS)

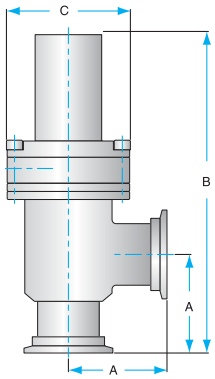
KF (QF) Flanged

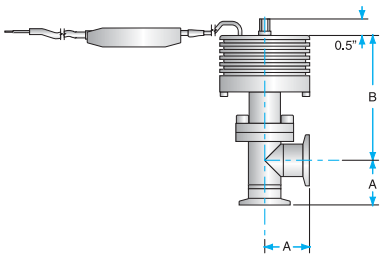
Manual Actuation

Pneumatic Actuation

Electromagnetic Actuation







Flange Size	Bonnet Seal	Manual Actuation Dimensions (in.) A	B	C	Part No.	Price
KF10	Fluorocarbon	1.65	4.59	2.25	SA0037MVQF	Call
KF10	Fluorocarbon	1.65	5.31	2.25	SA0050MVQF	Call
KF16	Fluorocarbon	2.15	6.15	2.25	SA0075MVQF	Call
KF25	Fluorocarbon	2.03	5.85	2.25	SA0100MVQF	Call
KF40	Fluorocarbon	2.40	7.65	3.00	SA0150MVQF	Call
KF50	Fluorocarbon	3.40	9.91	3.50	SA0200MVQF	Call

Flange Size	Bonnet Seal	Pneumatic Actuation Dimensions (in.) A	B	C	Part No.	Price
KF10	Fluorocarbon	1.65	5.92	2.25	SA0037PVQF	Call
KF10	Fluorocarbon	1.65	5.92	2.25	SA0050PVQF	Call
KF16	Fluorocarbon	2.15	6.18	2.25	SA0075PVQF	Call
KF25	Fluorocarbon	2.03	5.92	2.25	SA0100PVQF	Call
KF40	Fluorocarbon	2.40	7.84	3.00	SA0150PVQF	Call
KF50	Fluorocarbon	3.40	10.33	3.50	SA0200PVQF	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

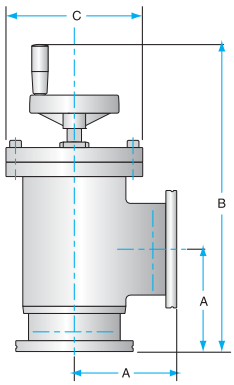
Flange Size	Bonnet Seal	Electromagnetic Actuation—24 VDC only Dimensions (in.) A	B	Part No.	Price
KF16	Fluorocarbon	1.4	3.7	SA0075EVQF	Call
KF25	Fluorocarbon	1.4	3.8	SA0100EVQF	Call

Angle Valve Accessories: Solenoids & Fittings

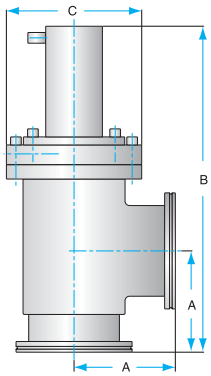
Description	Valve Port	Voltage	Part No.	Price
Solenoid	≤ 2"	12 VDC	SE012D3XX	Call
Solenoid	≤ 2"	24 VDC	SE024D3XX	Call
Solenoid	≤ 2"	110/120 VAC	SE120A3SC310	Call
Solenoid	≤ 2"	220/240 VAC	SE240A3XX	Call
Solenoid	> 2"	12 VDC	SE012D4XX	Call
Solenoid	> 2"	24 VDC	SE024D4XX	Call
Solenoid	> 2"	110/120 VAC	SE120A4SC410	Call
Solenoid	> 2"	220/240 VAC	SE240A4XX	Call
Fittings: 1/8" NPT Double Male Union	—	—	B-2-HN	Call
Fittings: 1/8" Male NPT to 1/8" O.D. Air Tube	—	—	W68PL-2-2	Call

Bellows Sealed Angle Valves (SS)

ISO Flanged



Manual Actuation



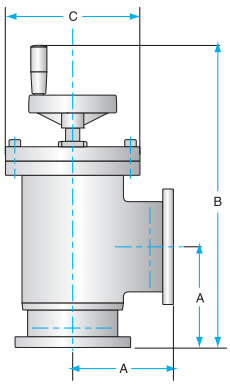
Pneumatic Actuation

Flange Size	Bonnet Seal	Manual Actuation Dimensions (in.) A	B	C	Part No.	Price
ISO 63	Fluorocarbon	3.25	11.20	4.00	SA0250MVIK	Call
ISO 80	Fluorocarbon	3.50	11.28	4.50	SA0300MVIK	Call
ISO 100	Fluorocarbon	4.47	12.00	6.50	SA0400MVIK	Call

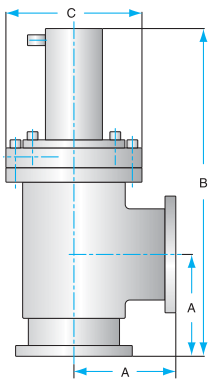
Flange Size	Bonnet Seal	Pneumatic Actuation Dimensions (in.) A	B	C	Part No.	Price
ISO 63	Fluorocarbon	3.25	10.80	4.00	SA0250PVIK	Call
ISO 80	Fluorocarbon	3.50	11.21	4.50	SA0300PVIK	Call
ISO 100	Fluorocarbon	4.47	14.57	6.50	SA0400PVIK	Call
ISO 160	Fluorocarbon	6.26	20.28	9.25	SA0600PVIK	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

ASA Flanged



Manual Actuation



Pneumatic Actuation

Flange O.D.	Port I.D.	Bonnet Seal	Manual Actuation Dimensions (in.) A	B	C	Part No.	Price
5"	2"	Fluorocarbon	3.50	10.10	3.50	SA0200MVAS	Call
5"	2.5"	Fluorocarbon	3.25	11.02	4.00	SA0250MVAS	Call
6"	3"	Fluorocarbon	3.50	11.93	4.50	SA0300MVAS	Call

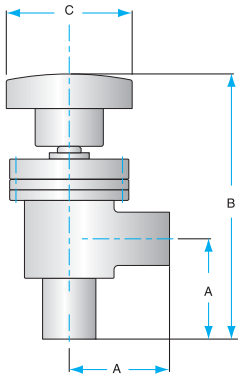
Note: Call to specify flange o-ring grooves; two flat flanges are standard.

Flange O.D.	Port I.D.	Bonnet Seal	Pneumatic Actuation Dimensions (in.) A	B	C	Part No.	Price
5"	2"	Fluorocarbon	3.50	11.48	3.50	SA0200PVAS	Call
5"	2.5"	Fluorocarbon	3.25	10.35	4.00	SA0250PVAS	Call
6"	3"	Fluorocarbon	3.50	11.25	4.50	SA0300PVAS	Call
7.5"	4"	Fluorocarbon	4.47	15.24	6.50	SA0400PVAS	Call

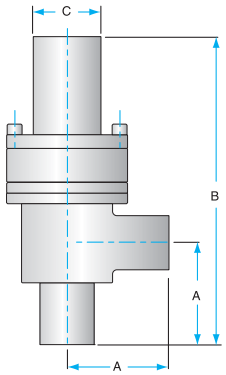
Pneumatic valves require 60–80 psi air pressure for actuation.

Bellows Sealed Angle Valves (SS)

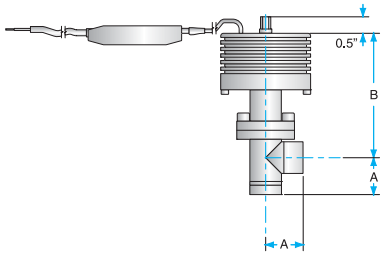
Tube Ends & VCR® Fittings



Manual Actuation



Pneumatic Actuation



Electromagnetic Actuation

Manual Actuation Dimensions (in.)						
Tube O.D.	Bonnet Seal	A	B	C	Part No.	Price
3/8" Tube End	Fluorocarbon	1.50	4.44	2.25	SA0037MVTE	Call
1/2" Tube End	Fluorocarbon	1.50	4.56	2.25	SA0050MVTE	Call
3/4" Tube End	Fluorocarbon	2.00	5.31	2.25	SA0075MVTE	Call
1" Tube End	Fluorocarbon	1.88	5.32	2.25	SA0100MVTE	Call
1 1/2" Tube End	Fluorocarbon	2.25	7.13	3.00	SA0150MVTE	Call
2" Tube End	Fluorocarbon	3.25	9.85	3.50	SA0200MVTE	Call
2 1/2" Tube End	Fluorocarbon	3.00	10.77	4.00	SA0250MVTE	Call
3" Tube End	Fluorocarbon	3.25	11.68	4.50	SA0300MVTE	Call
3/8" Tube End	Copper	1.50	4.44	2.73	SA0037MCTE	Call
1/2" Tube End	Copper	1.50	4.56	2.73	SA0050MCTE	Call
3/4" Tube End	Copper	2.00	5.31	2.73	SA0075MCTE	Call
1" Tube End	Copper	1.88	5.32	2.73	SA0100MCTE	Call
1 1/2" Tube End	Copper	2.25	7.13	3.25	SA0150MCTE	Call
2" Tube End	Copper	3.25	9.85	4.05	SA0200MCTE	Call
2 1/2" Tube End	Copper	3.00	10.77	4.61	SA0250MCTE	Call
3" Tube End	Copper	3.25	11.68	5.62	SA0300MCTE	Call

Electromagnetic Actuation—24 VDC only Dimensions (in.)					
Termination	Bonnet Seal	A	B	Part No.	Price
1/4" Female VCR	Fluorocarbon	2.2	3.7	SA0025EV4F	Call
1/4" Male VCR	Fluorocarbon	2.2	3.7	SA0025EV4M	Call
1/4" Tube End	Fluorocarbon	1.6	3.7	SA0025EVTE	Call
1/2" Female VCR	Fluorocarbon	2.3	3.7	SA0050EV8F	Call
1/2" Male VCR	Fluorocarbon	2.3	3.7	SA0050EV8M	Call
1/2" Tube End	Fluorocarbon	1.6	3.7	SA0050EVTE	Call
3/4" Tube End	Fluorocarbon	1.6	3.7	SA0075EVTE	Call
1" Tube End	Fluorocarbon	1.8	3.8	SA0100EVTE	Call

Pneumatic Actuation Dimensions (in.)						
Tube O.D.	Bonnet Seal	A	B	C	Part No.	Price
3/8" Tube End	Fluorocarbon	1.50	5.77	2.25	SA0037PVTE	Call
1/2" Tube End	Fluorocarbon	1.50	5.77	2.25	SA0050PVTE	Call
3/4" Tube End	Fluorocarbon	2.00	6.26	2.25	SA0075PVTE	Call
1" Tube End	Fluorocarbon	1.88	6.02	2.25	SA0100PVTE	Call
1 1/2" Tube End	Fluorocarbon	2.25	7.56	3.00	SA0150PVTE	Call
2" Tube End	Fluorocarbon	3.25	11.23	3.50	SA0200PVTE	Call
2 1/2" Tube End	Fluorocarbon	3.00	10.10	4.00	SA0250PVTE	Call
3" Tube End	Fluorocarbon	3.25	11.00	4.50	SA0300PVTE	Call
4" Tube End	Fluorocarbon	4.22	14.99	6.50	SA0400PVTE	Call
3/8" Tube End	Copper	1.50	5.77	2.73	SA0037PCTE	Call
1/2" Tube End	Copper	1.50	5.77	2.73	SA0050PCTE	Call
3/4" Tube End	Copper	2.00	6.26	2.73	SA0075PCTE	Call
1" Tube End	Copper	1.88	6.02	2.73	SA0100PCTE	Call
1 1/2" Tube End	Copper	2.25	7.56	3.25	SA0150PCTE	Call
2" Tube End	Copper	3.25	11.23	4.05	SA0200PCTE	Call
2 1/2" Tube End	Copper	3.00	10.10	4.61	SA0250PCTE	Call
3" Tube End	Copper	3.25	11.00	5.62	SA0300PCTE	Call
4" Tube End	Copper	4.22	14.99	6.73	SA0400PCTE	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

Angle Valve Accessories: Solenoids & Fittings

Description	Valve Port	Voltage	Part No.	Price
Solenoid	≤ 2"	12 VDC	SE012D3XX	Call
Solenoid	≤ 2"	24 VDC	SE024D3XX	Call
Solenoid	≤ 2"	110/120 VAC	SE120A3SC310	Call
Solenoid	≤ 2"	220/240 VAC	SE240A3XX	Call
Solenoid	> 2"	12 VDC	SE012D4XX	Call
Solenoid	> 2"	24 VDC	SE024D4XX	Call
Solenoid	> 2"	110/120 VAC	SE120A4SC410	Call
Solenoid	> 2"	220/240 VAC	SE240A4XX	Call
Fittings: 1/8" NPT Double Male Union	—	—	B-2-HN	Call
Fittings: 1/8" NPT Double Male Union	—	—	W68PL-2-2	Call

Kurt J. Lesker Company

➤ Bellows Sealed Angle Valves (Al)

IN THIS SECTION ➤

Bellows Sealed Angle Valves (Al)

- These HV angle valves feature an all-welded, 6061 aluminum body
- Automatic closure on power failure
- High-conductance round port
- Very low outgassing rate
- Leak tests have demonstrated He rates of 2 x 10^{-9} scc/sec.
- Include a 120VAC solenoid for pneumatic actuation (other voltages available upon request)

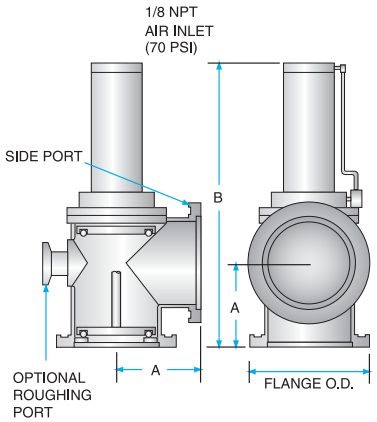
*NOTE: Contact **hardware@lesker.com** for pricing and availability of valve options and other solenoid voltages.*

ISO Flanged

Features ISO-K flanges with fluorocarbon o-rings in an easy-to-maintain bonnet design.

Options available on request:

- Remote position indicator
- Roughing ports



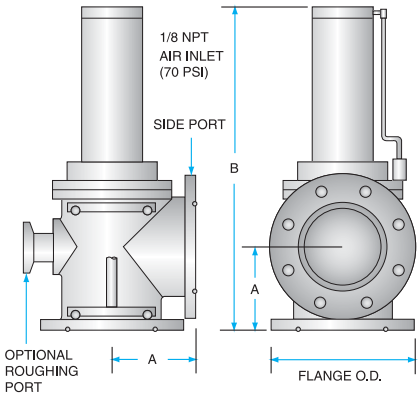
Flange Size	Port Flange O.D. (in.) (mm)	Dimensions (in.) (mm) A	B	Part No.	Price
ISO63	3.74 (95)	3.46 (88)	14.69 (373)	VRA0266PV000	Call
ISO100	5.18 (130)	4.25 (108)	15.51 (394)	VRA0466PV000	Call
ISO160	7.08 (180)	5.43 (138)	16.69 (424)	VRA0666PV000	Call
ISO200	9.45 (240)	7.24 (184)	31.50 (800)	VRA0866PV000	Call
ISO250	11.42 (290)	9.25 (235)	33.46 (850)	VRA1066PV000	Call
ISO320	14.57 (370)	10.87 (276)	40.0 (889)	VRA1266PV000	Call
ISO400	17.72 (450)	13.27 (337)	42.79 (1,087)	VRA1666PV000	Call
ISO500	21.65 (550)	15.24 (387)	54.02 (1,372)	VRA2066PV000	Call

ASA/ANSI Flanged

Features ANSI flanges with fluorocarbon o-rings in an easy-to-maintain fluorocarbon-sealed bonnet design.

Options available on request:

- Remote position indicator
- Roughing ports
- Two o-ring grooved flanges standard; call for other configurations



Flange O.D.	Port I.D.	Dimensions (in.) A	B	Flange O-Ring Part No.	Part No.	Price
6"	2.5"	3.69	12.50	O-V335	VRA0255PV000	Call
7.5"	3.2"	4.50	17.13	O-V345	VRA0355PV000	Call
9"	4.2"	5.50	19.50	O-V433	VRA0455PV000	Call
11"	6.2"	6.25	30.38	O-V443	VRA0655PV000	Call
13.5"	8.5"	8.25	30.38	O-V447	VRA0855PV000	Call
16"	10.3"	9.17	35.50	O-V453	VRA1055PV000	Call
19"	12"	12.00	40.00	O-V458	VRA1255PV000	Call
23.5"	16"	14.00	43.25	O-V464	VRA1655PV000	Call
27.5"	20"	16.00	58.88	O-V470	VRA2055PV000	Call

➤ Angled Block Valves (Al)

KF (QF) Flanged

Recommended for rough and high vacuum environments.

- Can be used down to pressures of less than 1 x 10^{-9} Torr
- Bakeable to 100° C
- Leak rate through the main valve seal is tested at less than 1 x 10^{-9} std cc/sec. with helium during manufacture
- Available with manual, pneumatic, and electromagnetic actuators

Manually actuated valves:

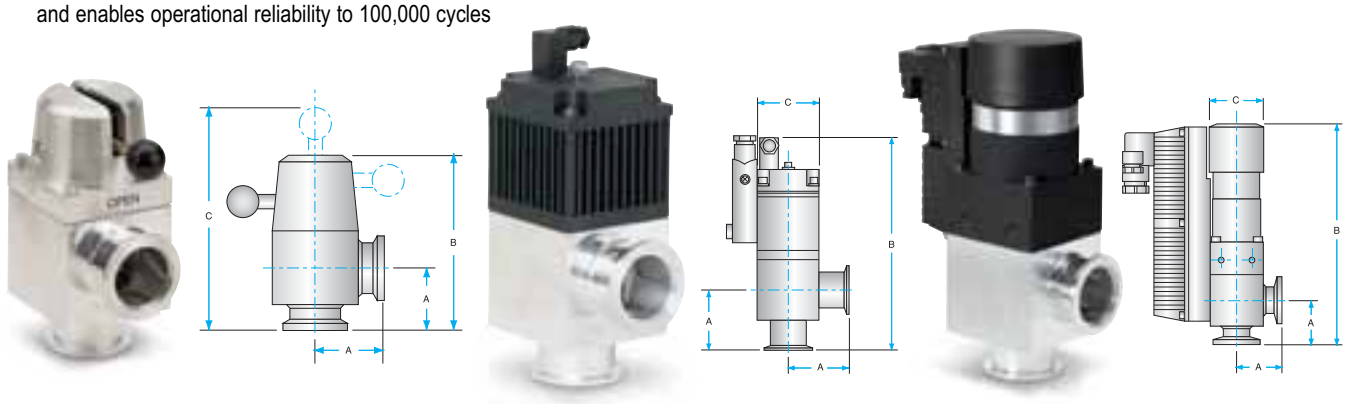
- Feature a quick-acting lever attached to a self-lubricating cam-piston for precise valve stem actuation
- PTFE bearings ensure smooth action
- Sealed grease-free bellows minimizes valve maintenance and enables operational reliability to 100,000 cycles

Pneumatically actuated valves:

- Feature a single-acting cylinder and spring return pipeline for fast acting close times when compared to conventional pneumatic lines
- Sealed grease-free bellows minimizes valve maintenance and enables operational reliability to 500,000 cycles

Electromagnetically actuated valves:

- Feature a double-wound coil combined with an electronic switching circuit, ensuring low power consumption and operating temperature while prolonging cycle life
- Includes twin reed switch to indicate open or closed position of the valve
- Circuit is fused to protect against surges and transient low voltage spikes
- Sealed grease-free bellows minimizes valve maintenance and enables operational reliability to 500,000 cycles for the larger flange sizes (130,000 cycles for KF25 and smaller)



Flange Size	Max. Gas Load (Torr-L/Sec)	Voltage	Manual Actuation Dimensions (in.) A	B	C	Part No.	Price
KF16	5	–	1.56	3.34	4.45	ED-C31205000	Call
KF25	15	–	1.95	4.68	5.81	ED-C31305000	Call
KF40	38	–	2.54	6.59	8.66	ED-C31405000	Call
Pneumatic Actuation							
KF16	3.5	–	1.57	5.18	1.49	ED-C41211000	Call
KF25	5	–	1.96	6.31	2.00	ED-C41311000	Call
KF40	55	–	2.55	7.50	3.00	ED-C41411000	Call
KF50	60	–	2.75	8.46	3.62	ED-C41510000	Call
Electromagnetic Actuation							
KF16	5	110/120VAC	1.56	5.57	1.48	ED-C41203000	Call
KF16	5	220/240VAC	1.56	5.57	1.48	ED-C41201000	Call
KF25	15	110/120VAC	1.95	6.70	1.99	ED-C41303000	Call
KF25	15	220/240VAC	1.95	6.70	1.99	ED-C41301000	Call
KF40	60	110/120VAC	2.54	8.69	2.96	ED-C41403000	Call
KF40	60	220/240VAC	2.54	8.69	2.96	ED-C41401000	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

NOTE: All pneumatic valves shown here have a 1/8" female BSP port for air connection; the optional soleniods too. Use the adapter fitting noted below to adapt to 1/8 NPT

Options for Pneumatic Block Valves

*NOTE: Contact **hardware@lesker.com** for pricing and availability of valve options.*

Description	Part No.	Price
Solenoid:		
24 VDC	ED-H06200124	Call
110/120 VAC	ED-H06200126	Call
230 VAC	ED-H06200138	Call
Fittings:		
1/8" Male Tapered BSP to 1/8" Female NPT	B-2-A-2RT	Call
1/8" Male NPT Double Union	B-2-HN	Call
1/8" Male NPT to 1/8" O.D. Air Tube	W68PL-2-2	Call

➤ Bellows Sealed Inline Valves (SS)

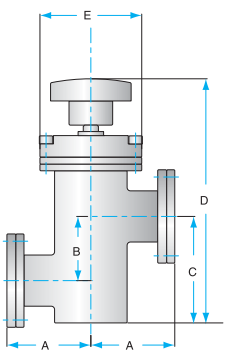
IN THIS SECTION ➤

Inline Valves (SS)

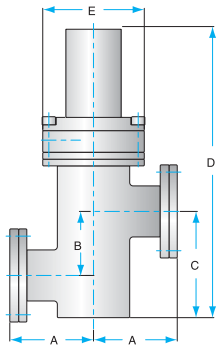
- The moderate conductance of inline valves results from the gas flow making two right-angle turns through the valve.
- Recommended for applications requiring a line-of-sight connection between two offset ports
- Feature fluorocarbon o-ring seat seals, bellows-sealed shafts, and bonnet seals
- Enable operation to 10^{-9} Torr
- Available in manual or pneumatic actuation
- Withstand temperatures to 200° C (open) and 120° C (closed)

NOTE: We check each valve with a helium mass spectrometer with a sensitivity of 2 x 10^{-10} std. cc/sec. before shipment.

NOTE: Pneumatic valves require a solenoid operator (sold separately). Please see the Inline Valve Accessories chart for the sizes/voltages that are available.



Manual Actuation



Pneumatic Actuation

CF Flanged with Copper Bonnet Seal

Flange Size	Manual Actuation Dimensions (in.) A	B	C	D	E	Part No.	Price
1 1/3" CF	1.60	0.94	1.50	4.43	2.25	SL0037MCCF	Call
1 1/3" CF	1.60	1.00	1.62	4.44	2.25	SL0050MCCF	Call
1 1/3" CF	2.50	1.12	1.87	5.19	2.25	SL0075MCCF	Call
2 1/8" CF	2.05	1.37	2.25	5.69	2.25	SL0100MCCF	Call
2 3/4" CF	2.46	1.88	3.12	8.02	3.00	SL0150MCCF	Call
3 3/8" CF	3.48	2.62	4.12	10.73	3.50	SL0200MCCF	Call
Pneumatic Actuation							
1 1/3" CF	1.60	0.94	1.50	5.76	2.73	SL0037PCCF	Call
1 1/3" CF	1.60	1.00	1.62	5.89	2.73	SL0050PCCF	Call
1 1/3" CF	2.50	1.12	1.87	6.14	2.73	SL0075PCCF	Call
2 1/8" CF	2.05	1.37	2.25	6.39	2.73	SL0100PCCF	Call
2 3/4" CF	2.46	1.88	3.12	8.44	3.25	SL0150PCCF	Call
3 3/8" CF	3.48	2.62	4.12	12.11	4.05	SL0200PCCF	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

CF Flanged with Fluorocarbon Bonnet Seal

Flange Size	Manual Actuation Dimensions (in.) A	B	C	D	E	Part No.	Price
1 1/3" CF	1.60	0.94	1.50	4.06	2.25	SL0037MVCF	Call
1 1/3" CF	1.60	1.00	1.62	4.19	2.25	SL0050MVCF	Call
1 1/3" CF	2.50	1.12	1.87	4.44	2.25	SL0075MVCF	Call
2 1/8" CF	2.05	1.37	2.25	4.69	2.25	SL0100MVCF	Call
2 3/4" CF	2.46	1.88	3.12	6.52	3.00	SL0150MVCF	Call
3 3/8" CF	3.48	2.62	4.12	8.73	3.50	SL0200MVCF	Call
4 1/2" CF	3.38	3.12	4.93	10.2	4.00	SL0250MVCF	Call
4 5/8" CF	3.53	3.68	5.62	11.04	4.50	SL0300MVCF	Call
Pneumatic Actuation							
1 1/3" CF	1.60	0.94	1.50	5.76	2.25	SL0037PVCF	Call
1 1/3" CF	1.60	1.00	1.62	5.89	2.25	SL0050PVCF	Call
1 1/3" CF	2.50	1.12	1.87	6.14	2.25	SL0075PVCF	Call
2 1/8" CF	2.05	1.37	2.25	6.39	2.25	SL0100PVCF	Call
2 3/4" CF	2.46	1.88	3.12	8.45	3.00	SL0150PVCF	Call
3 3/8" CF	3.48	2.62	4.12	12.11	3.50	SL0200PVCF	Call
4 1/2" CF	3.38	3.12	4.93	12.03	4.00	SL0250PVCF	Call
4 5/8" CF	3.53	3.68	5.62	13.38	4.50	SL0300PVCF	Call
6" CF	4.66	4.88	7.38	18.27	6.50	SL0400PVCF	Call

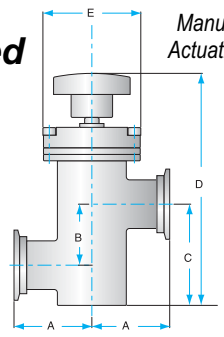
Pneumatic valves require 60–80 psi air pressure for actuation.

Inline Valve Accessories: Solenoids & Fittings

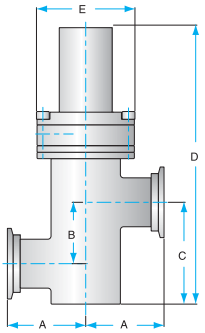
Description	Valve Port	Voltage	Part No.	Price
Solenoid	≤ 2"	12 VDC	SE012D3XX	Call
Solenoid	≤ 2"	24 VDC	SE024D3XX	Call
Solenoid	≤ 2"	110/120 VAC	SE120A3SC310	Call
Solenoid	≤ 2"	220/240 VAC	SE240A3XX	Call
Solenoid	> 2"	12 VDC	SE012D4XX	Call
Solenoid	> 2"	24 VDC	SE024D4XX	Call
Solenoid	> 2"	110/120 VAC	SE120A4SC410	Call
Solenoid	> 2"	220/240 VAC	SE240A4XX	Call
Fittings: 1/8" NPT Double Male Union	—	—	B-2-HN	Call
Fittings: 1/8" Male NPT to 1/8" O.D. Air Tube	—	—	W68PL-2-2	Call

Bellows Sealed Inline Valves (SS)

KF (QF) & ISO Flanged



Manual Actuation

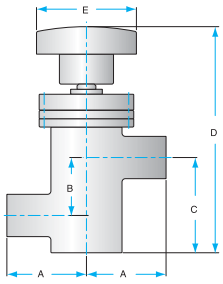


Pneumatic Actuation

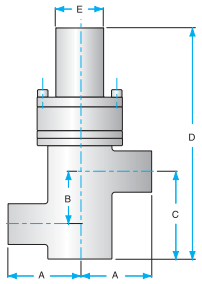
Flange Size	Manual Actuation Dimensions (in.) A	B	C	D	E	Part No.	Price
KF 10	1.65	0.94	1.50	4.44	2.25	SL0037MVQF	Call
KF 10	1.65	1.00	1.62	4.69	2.25	SL0050MVQF	Call
KF 16	2.15	1.12	1.87	5.19	2.25	SL0075MVQF	Call
KF 25	2.03	1.37	2.25	5.69	2.25	SL0100MVQF	Call
KF 40	2.40	1.88	3.12	8.02	3.00	SL0150MVQF	Call
KF 50	3.40	2.62	4.12	10.73	3.50	SL0200MVQF	Call
ISO 63	3.25	3.12	4.93	12.70	4.00	SL0250MVIK	Call
ISO 80	3.50	3.68	5.62	14.04	4.50	SL0300MVIK	Call
Pneumatic Actuation							
KF 10	1.65	0.94	1.50	5.76	2.25	SL0037PVQF	Call
KF 10	1.65	1.00	1.62	5.89	2.25	SL0050PVQF	Call
KF 16	2.15	1.12	1.87	6.14	2.25	SL0075PVQF	Call
KF 25	2.03	1.37	2.25	6.39	2.25	SL0100PVQF	Call
KF 40	2.40	1.88	3.12	8.49	3.00	SL0150PVQF	Call
KF 50	3.40	2.62	4.12	12.11	3.50	SL0200PVQF	Call
ISO 63	3.25	3.12	4.93	12.03	4.00	SL0250PVIK	Call
ISO 80	3.50	3.68	5.62	18.27	4.50	SL0300PVIK	Call
ISO 100	4.47	4.88	7.38	13.38	6.50	SL0400PVIK	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

Tube End Terminations



Manual Actuation



Pneumatic Actuation

Flange Size	Manual Actuation Dimensions (in.) A	B	C	D	E	Part No.	Price
3/8" Tube End	1.50	0.94	1.5	4.44	2.25	SL0037MVTE	Call
1/2" Tube End	1.50	1.00	1.62	4.69	2.26	SL0050MVTE	Call
3/4" Tube End	2.00	1.12	1.87	5.19	2.25	SL0075MVTE	Call
1" Tube End	1.88	1.37	2.25	5.69	2.25	SL0100MVTE	Call
1 1/2" Tube End	2.25	1.88	3.12	8.02	3.00	SL0150MVTE	Call
2" Tube End	3.25	2.62	4.12	10.73	3.50	SL0200MVTE	Call
2 1/2" Tube End	3.00	3.12	4.93	12.7	4.00	SL0250MVTE	Call
3" Tube End	3.25	3.68	5.62	14.04	4.50	SL0300MVTE	Call
Pneumatic Actuation							
3/8" Tube End	1.50	0.94	1.50	5.76	2.25	SL0037PVTE	Call
1/2" Tube End	1.50	1.00	1.62	5.89	2.26	SL0050PVTE	Call
3/4" Tube End	2.00	1.12	1.87	6.14	2.25	SL0075PVTE	Call
1" Tube End	1.88	1.37	2.25	6.39	2.25	SL0100PVTE	Call
1 1/2" Tube End	2.25	1.88	3.12	8.45	3.00	SL0150PVTE	Call
2" Tube End	3.25	2.62	4.12	12.11	3.50	SL0200PVTE	Call
2 1/2" Tube End	3.00	3.12	4.93	12.03	4.00	SL0250PVTE	Call
3" Tube End	3.25	3.68	5.62	13.38	4.50	SL0300PVTE	Call
4" Tube End	4.00	4.22	7.38	18.27	6.50	SL0400PVTE	Call

Pneumatic valves require 60–80 psi air pressure for actuation.

All-Metal Angled Valves (SS)

CF Flanged

This series is intended for use in UHV or cryogenic applications where temperature extremes preclude the use of elastomer seal valves.

- Approved for use in beam line facilities
- Temperature operating range from 450° C to -250° C

Maximum temperature bakeouts may require poppet seal replacement after 50 cycles, while hundreds of cycles are possible with moderate bakeouts. A dial indicator at the top of the valve indicates the proper torque for closure and also when the seal should be replaced.

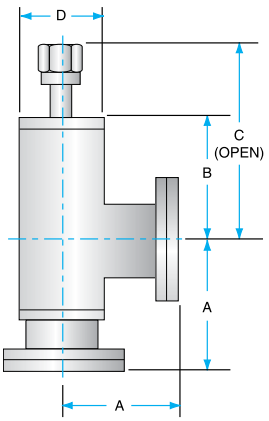
Additional features:

- Bakeable to 350° C, 300° C closed
- Operable at cryogenic temperatures
- Vacuum rated to below 10^{-11} Torr
- All stainless steel construction
- Electropolished inside and out
- Extended-life stainless steel bellows
- Easily replaceable copper poppet seal
- Pulled port bodies for higher conductance
- Clean room assembled
- Leak rate 10^{-11} std. cc/sec. or less
- 1⅓", 2¾", and 4½" O.D. CF flanges available
- Dial indicator for closure

The poppet seal is easily replaced with a slotted screwdriver. After seal replacement, the valve must be torqued to a higher value than during normal operation to make it seat. After closing the valve to its normal torque value, loosen the set screw below the closure nut, rotate the indicator to the farthest counter-clockwise line on top of the valve, and retighten the set screw. The valve may be closed to this mark almost indefinitely.

Periodic checks with a torque wrench will indicate seat wear and the proper mark to use for alignment. When the indicator has reached the last mark, we recommend seal replacement. Do not exceed the maximum torque specifications.

All-Metal Angle Valves



Flange Size	Conductance (L/sec.)	Port O.D.	Dimensions (in.) A	B	C	D	Torque Range (N–m)	Part No.	Price
1⅓" CF	5	0.75	1.50	2.32	3.39	0.87	2.4–3.7	VZCR20R	Call
2¾" CF	34	1.5	2.48	2.72	4.29	1.93	7.7–12.1	VZCR40R	Call
4½" CF	100	2.5	4.13	4.17	6.14	2.99	19.0–29.9	VZCR60R	Call

Valve Service Parts

Part	Valve	Part No.	Price
Spare Pad	For 1⅓" CF Flanged Valve	VZCR20C	Call
Service Tool Kit	For 1⅓" CF Flanged Valve	VZCR20TK	Call
Spare Pad	For 2¾" CF Flanged Valve	VZCR40C	Call
Service Tool Kit	For 2¾" CF Flanged Valve	VZCR40TK	Call
Spare Pad	For 4½" CF Flanged Valve	VZCR60C	Call
Service Tool Kit	For 4½" CF Flanged Valve	VZCR60TK	Call
Hand Wheel	For 2¾" and 4½" CF Flanged Valve	VZCRHW	Call

All-Metal Leak Valves

CF Flanged

Bakeable leak valves are used to control the flow of gas into a vacuum system from an external source. A soft metal pad is compressed against a harder metal seat, creating the necessary seal for precise gas flow control.

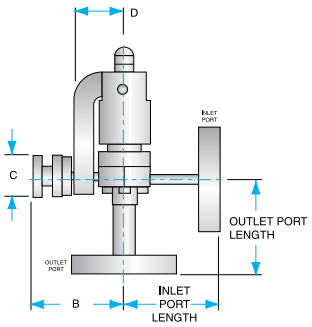
- Available in two different series
- Each series utilizes different types of sealing materials tailored for specific applications
- Typical applications include argon processing, sputtering, system purging, precision gas control, and laser back-filling

LVM Series:

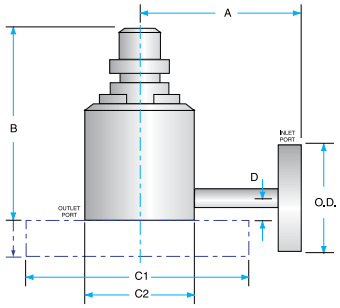
- Stainless steel and copper alloy construction for long life
- Inlet pressure to 10 bar maximum
- Operating pressure from 1 bar to 10^{-11} mbar
- Precision control mechanism
- Adjustable graduated indexing
- Bakeable to 450° C (open), 250 ° C (closed)
- Minimum control backlash
- User serviceable

MD5 Series:

- Stellite knife-edge and nickel diaphragm seals for hot or corrosive gas applications
- Inlet pressure to 10 bar maximum
- Operating pressure from 1 bar to 10^{-7} mbar
- Diaphragm use minimizes the valve's internal volume
- Bakeable to 450° C (open), 250° C (closed)
- User serviceable



LVM Series



MD5 Series

LVM Series

Flanges Inlet	Flanges Outlet	Operating Pressure (Torr)	Open Conductance (ls^{-1})	Closed Leak Rate (mbar.l.s-1)	Inlet Port Length	Outlet Port Length	Dimensions (in.) B	C	D	Part No.	Price
1 1/3" CF	1 1/3" CF	7.5–10^{-12}	0.1	1 x 10^{-12}	1.57	1.57	2.4	1.1	1.3	VZLVM940R	Call
1 1/3" CF	1 1/3" CF	7.5–10^{-12}	0.1	1 x 10^{-12}	2.83	2.64	2.4	1.1	1.3	VZLVM967	Call
1 1/3" CF	*2 3/4" CF	7.5–10^{-12}	0.1	1 x 10^{-12}	1.73	1.3	2.4	1.1	1.3	VZLVM29	Call
2 3/4" CF	2 3/4" CF	7.5–10^{-12}	0.1	1 x 10^{-12}	2.48	2.48	2.4	1.1	1.3	VZLVM263R	Call
2 3/4" CF	2 3/4" CF	7.5–10^{-12}	0.1	1 x 10^{-12}	2.83	2.64	2.4	1.1	1.3	VZLVM267	Call

* This 2.75" CF flange is non-rotatable

MD5 Series

Flanges Inlet	Flanges Outlet	Operating Pressure (Torr)	Open Conductance (ls^{-1})	Closed Leak Rate (mbar.l.s-1)	Dimensions (in.) A	B	C1	C2	D	Part No.	Price
1 1/3" CF	1 1/3" CF	750–10^{-7}	0.1	1 x 10^{-12}	1.97	2.64	—	1.42	0.26	VZMD95	Call
1 1/3" CF	2 3/4" CF	750–10^{-7}	0.1	1 x 10^{-12}	1.97	3.09	2.75	—	0.71	VZMD9538	Call

Valve Service Kits

- Diaphragm service kits include the stem assembly and cap, pad, seal ring, gold wire seal, and the necessary washers to service the valve diaphragm
- Pad service kits contain the replacement pad, gold wire seal, and the necessary wrenches to replace the pad

NOTE: Contact hardware@lesker.com for the service kits available for other valve models not listed.

Description	Part No.	Price
Diaphragm Service Kit for VZLVM940R	VZLVMDSK	Call
Pad Service Kit for VZLVM940R	VZLVMPSK	Call

➤ Standard (SS)

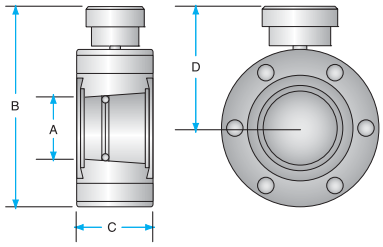
IN THIS SECTION ➤

Butterfly Valves Standard (SS)

Fit rough, bypass, and forelines that require high conductance, low profile, rapid opening, and throttling action.

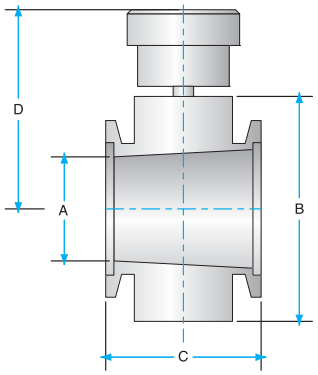
- Manually actuated (pneumatic available on request)
- Remove easily from the line for servicing
- High vacuum valves rotate open to give a high gas conductance path
- Pass a leak test on a helium mass spectrometer with a sensitivity of 2 x 10^{-10} std. cc/sec. before shipment
- Recommended in operating conditions involving frequent changing and cleaning; recommended for applications not requiring line of sight or mechanical movement through the bore

CF Flanged



Flange Size	Manual Actuation Dimensions (in.) A	B	C	D	Part No.	Price
2¾" CF	1.13	2.74	1.38	2.37	KBV015MSCF	Call
4½" CF	2.38	4.47	1.50	3.50	KBV025MSCF	Call
6" CF	3.87	5.97	1.50	6.75	KBV040MSCF	Call
8" CF	5.62	7.97	1.50	8.00	KBV060MSCF	Call

KF (QF) Flanged



Flange Size	Manual Actuation Dimensions (in.) A	B	C	D	Part No.	Price
KF16	0.65	2.75	2.25	2.33	KBV007MSQF16	Call
KF25	0.86	2.75	1.85	2.33	KBV010MSQF25	Call
KF40	1.27	2.75	1.85	2.33	KBV015MSQF40	Call
KF50	1.46	2.95	2.05	2.42	KBV020MSQF50	Call

ISO Flanged—(SS)

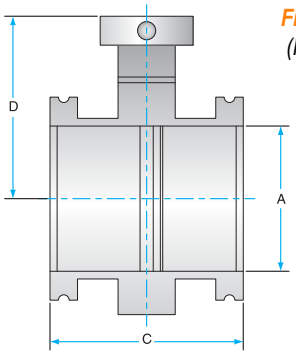
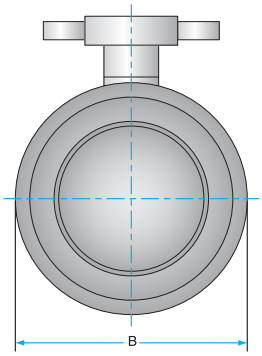
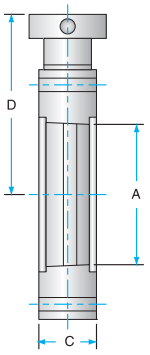


Figure 2
(ISO-K)





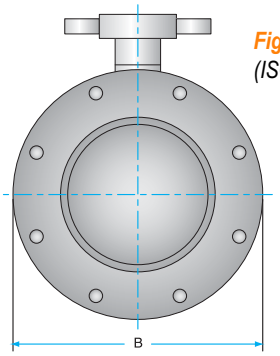
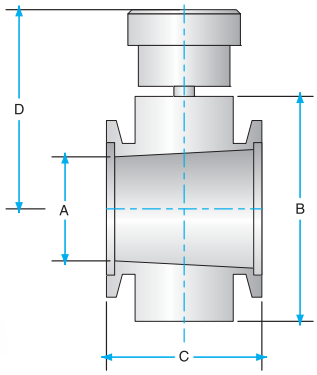


Figure 1
(ISO-F)

Figure	Flange Size	Manual Actuation Dimensions (in.) A	B	C	D	Part No.	Price
1	ISO63-F	2.37	5.12	1.50	3.50	KBV025MSIF	Call
1	ISO80-F	2.85	5.72	1.50	4.19	KBV030MSIF	Call
1	ISO100-F	3.87	6.50	1.50	4.69	KBV040MSIF	Call
1	ISO160-F	5.75	8.86	1.50	7.30	KBV060MSIF	Call
2	ISO63-K	2.37	4.50	4.18	3.56	KBV025MSIK	Call
2	ISO80-K	2.85	5.50	4.18	4.08	KBV030MSIK	Call
2	ISO100-K	3.87	5.75	4.18	4.31	KBV040MSIK	Call
2	ISO160-K	5.75	8.00	4.18	6.87	KBV060MSIK	Call

KF (QF) Flanged—(Al)



Flange Size	Manual Actuation Dimensions (in.) A	B	C	D	Part No.	Price
KF16	0.65	2.75	2.25	2.33	KBV007MAQF16	Call
KF25	0.86	2.75	1.85	2.33	KBV010MAQF25	Call
KF40	1.27	2.75	1.85	2.33	KBV015MAQF40	Call

Soft Start Check Valves for KF (QF) Flanges

Used for throttling roughing pumps during their initial evacuation.

- Flow actuated
- 304 stainless steel construction
- Reduce turbulence in a system by extending the pumpdown time*
- Ideal for applications (semiconductor, thin film, etc.) that are sensitive to the disruption of particles within the system
- Also used in conjunction with vent valves when venting a system to avoid extreme pressure differentials and high turbulence

These valves feature a vane, held open by a pair of coil springs, that pivots about an off-center axis.

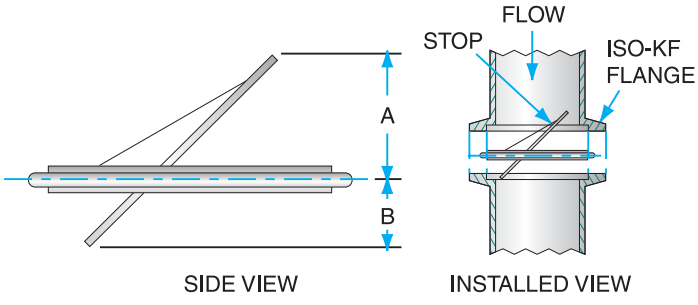
Whenever the pressure differential is low enough, the vane opens.

When the roughing pump is operated, the initial flow causes the vane assembly to close—automatically throttling the pump.

Also, the valves closes quickly at the start of system evacuation and open automatically when a set pressure differential is reached.

Additional benefits and features:

- Reduce particulate contamination by reducing turbulence
- Prevent substrate damage
- Replace expensive pressure control bypass valves
- Fast-action vane closing—12ms or better during testing**
- Operate without electrical power
- Replace KF centering ring for easy installation



Flange Size	Closing Flow (L/sec.)	Opening Pressure (Torr)	Clearance Dimensions (in.) A	B	Part No.	Price
KF40	2.8	2	0.70	0.30	M2250040	Call
KF50	5.7	3	1.00	0.40	M2250050	Call

** Typical pumpdown time using the soft start check valve is increased by 3X.*

*** Test times measured using a 27 CFM pump evacuating a volume of 100 liters. Results will vary based on system configuration.*

Manual Ball Valves

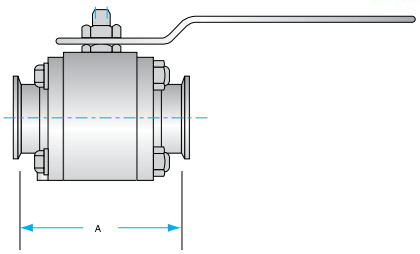
IN THIS SECTION

Manual Ball Valves

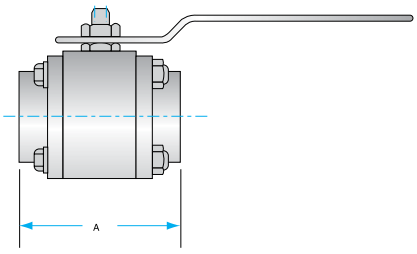
Intended for high- and course-vacuum service.

- Leak rate is less than $1x10^{-9}$ std. cc/sec. He.
- Feature PTFE seats and fluorocarbon seals, both easily replaceable without demounting
- When open, valves have an unrestricted bore, giving high gas conductance and making them useful in low-cost sample entry locks
- When closed, main bore is pumped through a side vent hole
- Available with terminations in female NPT, KF flanges, as well as weldable or braze sockets which are able to accept tubes from 1/4" to 2 1/8" diameter

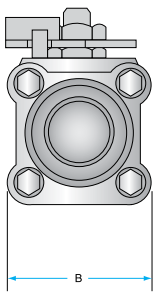
NOTE: Pneumatic actuation is available upon request. Please contact hardware@lesker.com for pricing and availability.

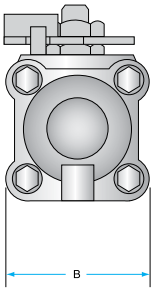


KF Flanged



Tube Socket





Brass

Termination	Bore	Dimensions (in.) A	B	Part No.	Price
1/8" NPT	0.44	2.25	1.25	BV-013SE-B	Call
1/4" NPT	0.44	2.25	1.25	BV-025SE-B	Call
1/4" Tube Socket	0.44	2.98	1.75	BV-025TE-B	Call
3/8" Tube Socket	0.44	2.98	1.75	BV-037TE-B	Call
1/2" NPT	0.44	2.98	1.75	BV-050SE-B	Call
1/2" Tube Socket	0.44	2.98	1.75	BV-050TE-B	Call
KF25 Flange	0.56	3.48	1.75	BV-075QF16-B	Call
KF25 Flange	0.56	3.48	1.75	BV-075QF25-B	Call
3/4" NPT	0.56	2.98	1.75	BV-075SE-B	Call
3/4" Tube Socket	0.56	2.98	1.75	BV-075TE-B	Call
7/8" Tube Socket	0.56	2.98	1.75	BV-088TE-B	Call
KF25 Flange	0.81	3.75	2.25	BV-100QF25-B	Call
1" NPT	0.81	3.68	2.25	BV-100SE-B	Call
1" Tube Socket	0.81	3.68	2.25	BV-100TE-B	Call
1 1/8" Tube Socket	0.81	3.68	2.25	BV-113TE-B	Call
KF40 Flange	1.25	4.65	3.20	BV-150QF40-B	Call
1 1/2" NPT	1.25	4.45	3.20	BV-150SE-B	Call
1 1/2" Tube Socket	1.25	4.45	3.20	BV-150TE-B	Call
1 5/8" Tube Socket	1.25	4.45	3.20	BV-163TE-B	Call
KF50 Flange	1.50	4.97	3.58	BV-200QF50-B	Call
2" NPT	1.50	5.00	3.58	BV-200SE-B	Call
2" Tube Socket	1.50	5.00	3.58	BV-200TE-B	Call
2 1/8" Tube Socket	1.50	5.00	3.58	BV-213TE-B	Call

NOTE: Ball valves can be very "stiff" upon initial operation, this is normal.

Stainless Steel

Termination	Bore	Dimensions (in.) A	B	Part No.	Price
1/8" NPT	0.44	2.98	1.75	BV-013SE-S	Call
1/4" NPT	0.44	2.98	1.75	BV-025SE-S	Call
1/4" Tube Socket	0.44	2.98	1.75	BV-025TE-S	Call
3/8" Tube Socket	0.44	2.98	1.75	BV-037TE-S	Call
1/2" NPT	0.44	2.98	1.75	BV-050SE-S	Call
1/2" Tube Socket	0.44	2.98	1.75	BV-050TE-S	Call
KF25 Flange	0.56	3.48	1.75	BV-075QF16-S	Call
KF25 Flange	0.56	3.48	1.75	BV-075QF25-S	Call
3/4" NPT	0.56	2.98	1.75	BV-075SE-S	Call
3/4" Tube Socket	0.56	2.98	1.75	BV-075TE-S	Call
7/8" Tube Socket	0.56	2.98	1.75	BV-088TE-S	Call
KF25 Flange	0.81	3.75	2.25	BV-100QF25-S	Call
1" NPT	0.81	3.68	2.25	BV-100SE-S	Call
1" Tube Socket	0.81	3.68	2.25	BV-100TE-S	Call
1 1/8" Tube Socket	0.81	3.68	2.25	BV-113TE-S	Call
KF40 Flange	1.25	4.65	3.20	BV-150QF40-S	Call
1 1/2" NPT	1.25	4.45	3.20	BV-150SE-S	Call
1 1/2" NPT	1.25	4.45	3.20	BV-150TE-S	Call
1 5/8" Tube Socket	1.50	4.97	3.20	BV-163TE-S	Call
KF50 Flange	1.50	4.97	3.58	BV-200QF50-S	Call
2" NPT	1.50	5.00	3.58	BV-200SE-S	Call
2" Tube Socket	1.50	5.00	3.58	BV-200TE-S	Call
2 1/8" Tube Socket	1.50	5.00	3.58	BV-213TE-S	Call

➤ Butterfly

IN THIS SECTION ➤

Conductance Control Valves

Conductance control valves open and close to obstruct a stream of gas, maintaining a specified chamber pressure by enabling a steady flow into the chamber. Unlike other valves which seal off gas chambers, conductance control valves usually do not make an airtight seal.

When operated with its appropriate controller and with a capacitance manometer to sense chamber pressure, each butterfly valve conductance controller opens and closes to limit gas throughput according to the settings of the control. This triad of components (conductance control valve, conductance controller, and the capacitance manometer) makes a closed-loop which, if operated properly, can regulate the pressure of any chamber. Butterfly conductance control valves have a greater range of conductance between fully open and fully closed, than other conductance controller designs.

Butterfly

Multi-Vane

NOTE: Pneumatic valves should not exceed 55 psi air pressure for actuation.

Multi-Vane Conductance Control Valves

- CF Flanged Valves have stainless steel flanges and vanes, while others have clear alodine aluminum flanges with SST vanes.
- Have no parts protruding above or below the flange surfaces in the open position
- Radial vanes give a uniform gas flow through the valve
- Available in very large sizes (up to 35" ASA) on request

Pneumatic version:

- Operates in 2 positions (fully open or preset, manually adjustable throttled position)
- Built-in micrometer allows repeatable, precision settings to .001"

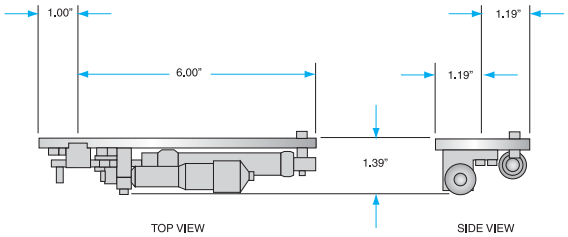
Since the rotating vanes cannot completely block gas, never use vane-style conductance control valves as shutoff valves (see table). They simply throttle the gas flow, enabling a higher pressure in the chamber while maintaining the pumping system within its normal pressure range.

This effect has three main applications:

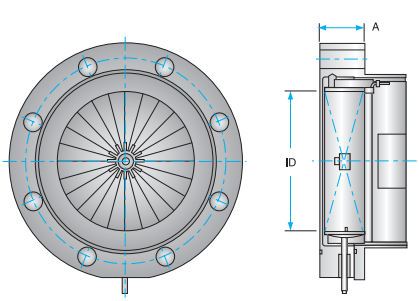
- Quickly raising the pressure in a normal high vacuum chamber needed for "gassy" processes such as sputtering or plasma etching, rapidly returning to high vacuum.
- Reducing the gas flow required for a process because the pumping system's full pumping speed is not used while gas is let in. This reduces the expense of pure gases while reducing the problems associated with removing corrosive or active gases.
- Where chamber wall desorption will contaminate the process gas, the conductance control valve is adjusted to the optimum compromise between minimizing gas usage and maintaining contamination below some required level.

ISO Flanged

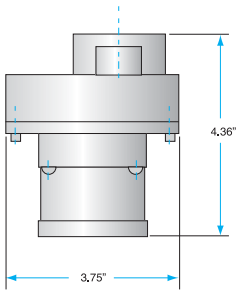
Flange Size	Dimensions (Nominal) I.D.	A	Pneumatic Valves Conductance (Nominal) (L/sec.) Min.	Max.	Part No.	Price
ISO100F	4.0"	1.75"	15	660	TV04QFPAA	Call
ISO160F	6.0"	2.25"	20	1,550	TV06QFPAA	Call
ISO200F	7.4"	2.38"	30	2,440	TV08QFPAA	Call
ISO250F	10.3"	2.75"	55	5,050	TV10QFPAA	Call
ISO320F	12.52"	2.37"	85	7,680	TV12QFPAA	Call
ISO400F	18"	2.75"	135	16,300	TV16QFPAA	Call
Motorized Valves						
ISO100F	4.0"	1.75"	15	660	TV04QFE1AA	Call
ISO160F	6.0"	2.25"	20	1,550	TV06QFE1AA	Call
ISO200F	7.4"	2.38"	30	2,440	TV08QFE1AA	Call
ISO250F	10.3"	2.75"	55	5,050	TV10QFE1AA	Call
ISO320F	12.52"	2.37"	85	7,680	TV12QFE1AA	Call
ISO400F	18"	2.75"	135	16,300	TV16QFE1AA	Call



Pneumatic Actuator



Multi-Vane Actuator



Motorized Actuator

NOTE: ASA flanged multi-vane control valves have a flange o-ring groove on one side as standard.

CF Flanged

Flange Size	Dimensions (Nominal) I.D.	A	Pneumatic Valves Conductance (Nominal) (L/sec.) Min.	Max.	Part No.	Price
6" CF	4"	1.00"	10	350	TV04CFPSS	Call
8" CF	5.7"	0.87"	20	2,450	TV06CFPSS	Call
10" CF	6.4"	0.97"	20	2,450	TV08CFPSS	Call
12" CF	9.9"	2.50"	50	4,500	TV10CFPSS	Call
Motorized Valves						
6" CF	4"	1.00"	10	350	TV04CFE1SS	Call
8" CF	5.7"	0.87"	20	2,450	TV06CFE1SS	Call
10" CF	6.5"	0.97"	20	2,450	TV08CFE1SS	Call
12" CF	9.9"	2.50"	50	4,500	TV10CFE1SS	Call

ASA Flanged

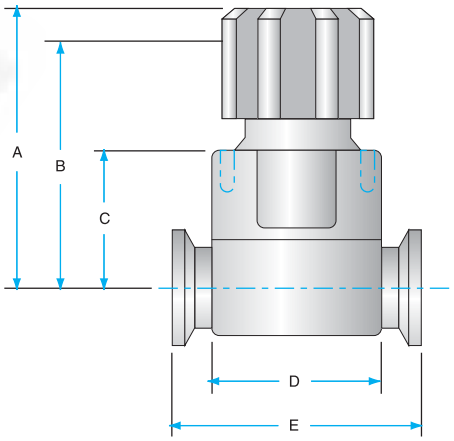
Flange O.D.	Dimensions (Nominal) I.D.	A	Pneumatic Valves Conductance (Nominal) Min.	(L/sec.) Max.	Part No.	Price
11"	7.4"	2.38"	30	2,450	TV08A1PAA	Call
13.5"	7.4"	2.38"	30	2,450	TV08A2PAA	Call
16"	11.9"	2.38"	40	6,900	TV12A1PAA	Call
23.5"	18.0"	2.75"	100	16,200	TV18A1PAA	Call
Motorized Valves						
11"	7.4"	2.38"	30	2,450	TV08A1E1AA	Call
13.5"	7.4"	2.38"	30	2,450	TV08A2E1AA	Call
16"	11.9"	2.38"	40	6,900	TV12A1E1AA	Call
23.5"	18"	2.75"	100	16,200	TV18A1E1AA	Call

➤ Aluminum Diaphragm Valves-Manual Actuation

Aluminum Diaphragm Valves—Manual Actuation

Offer high tolerance for dirty systems at a relatively low cost.

- Maximum leak rate of <1 x 10^{-6} mbar ls^{-1}
- Works best in the pressure range 10,000 - 1 x 10^{-5} mbar
- Withstands bakeouts to 60° C
- Buna-N and Viton® diaphragm versions are available



Techniques, such as Finite Element Analysis, are used to optimize the design of these valves, while testing each valve with a helium mass spectrometer ensures it meets stringent specification standards.

Note: The KF40 versions are available for pipeline mounting only and the smaller sizes can be panel mounted using the tapped holes provided.

Buna-N (Nitrile) Diaphragm Valves

Flange Size	Dimensions — (in.) (mm) A (Open)	B (Closed)	C	D	E	Thread	Part No.	Price
KF10	2.79 (71)	2.52 (64)	1.34 (34)	1.65 (42)	2.36 (60)	4xM4x8	ED-C33105000	Call
KF16	2.79 (71)	2.52 (64)	1.34 (34)	1.65 (42)	3.15 (80)	4xM4x8	ED-C33205000	Call
KF25	4.84 (123)	4.37 (111)	2.01 (51)	2.64 (67)	3.94 (100)	4xM4x12	ED-C33305000	Call
KF40	5.12 (130)	—	—	4.13 (105)	5.12 (130)	–	ED-C33405000	Call

Viton (Fluorocarbon) Diaphragm Valves

Flange Size	Dimensions — (in.) (mm) A (Open)	B (Closed)	C	D	E	Thread	Part No.	Price
KF10	2.79 (71)	2.52 (64)	1.34 (34)	1.65 (42)	2.36 (60)	4xM4x8	ED-C33155000	Call
KF16	2.79 (71)	2.52 (64)	1.34 (34)	1.65 (42)	3.15 (80)	4xM4x8	ED-C33255000	Call
KF25	4.84 (123)	4.37 (111)	2.01 (51)	2.64 (67)	3.94 (100)	4xM4x12	ED-C33355000	Call
KF40	5.12 (130)	—	—	4.13 (105)	5.12 (130)	–	ED-C33455000	Call

➤ Auto-Off Safety Vent Valves

Auto-Off Safety Vent Valves

Our automatic foreline shut-off valve is a safety valve that protects the vacuum system upon power failure by isolating the vacuum system and venting the mechanical pump.

- Eliminate time consuming and costly cleanup of dirty vacuum lines, caused by oil backstreaming from the pump
- Small orifice in the shut-off valves vents the mechanical pump to atmospheric pressure for easy restart when power resumes
- Even when the mechanical pump is equipped with an anti-suckback valve, these valves are recommended because the pump's integral valve will not vent the pump
- Available in a variety of KF flange sizes, solenoid voltages, and frequencies

How it all works:

The automatic foreline shut-off valves (anti suck-back vent valves) are connected in parallel with the mechanical pump's electrical supply, either at its source or at the pump's switch. When the electrical power is on, the solenoid valve is held closed, enabling the pump to keep both the shut-off valve's body and the vacuum system evacuated.

Interruption of electrical power to the mechanical pump causes the solenoid valve to open, admitting air into the shut-off valve, causing it to close. The pressure differential between the outside atmosphere and the vacuum system provides the necessary force to maintain the valve in its closed position without the aid of electrical or pneumatic power.

With the vacuum system isolated, a series of small orifices admits air into the inlet port of the mechanical pump until it has risen to atmospheric pressure. When the power comes back on, the solenoid closes the pump. The mechanical pump is then restarted and evacuates the area above the piston until the pressure is lowered to approximately that of the vacuum system. The automatic foreline shut-off valve then reopens, enabling the vacuum system to be pumped at the full speed of the mechanical pump.

Additional features and benefits:

- Protects vacuum system from oil backstreaming in the event of power failure (to the pump)
- Enables quick system restarts
- Operates up to 100,000 cycles
- No external pressurized gas source required for actuation
- Available in a variety of sizes for use with the most common mechanical pumps

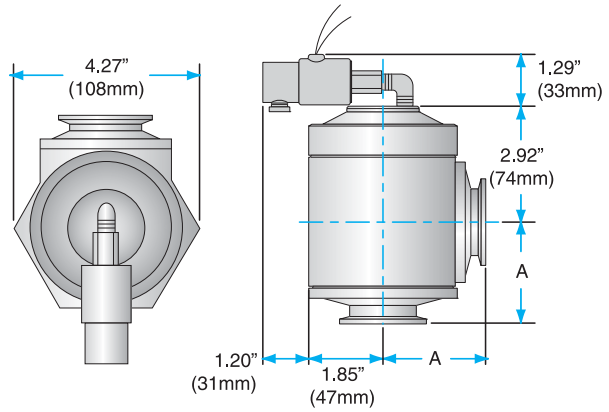
SPECIFICATIONS

Leak Rate:
Body: < $1x10^{-9}$ std cc/sec. He
Seal: < $1x10^{-9}$ std cc/sec. He
Closing Time: 30 ms
Power: 7W @ 115 VAC
Materials:
Body: AL 6061-T6
Piston: AL 2024
Seals: Viton®
Guide Pin: Viton

Temperature Range:
Valve: 0° to 100° C
Solenoid: 0° to 55° C

Venting Time: 10 sec./Liter of vented volume
Weight: 4 lbs. (1.8 kg)
(for KF40 size)

KF (QF) Flanged



Flange Size	Solenoid Voltage	A (in.) (mm)	Part No.	Price
KF25	120 VAC/60 Hz	2.76 (70.1)	ASVQF25-120A	Call
KF25	220 VAC/50–60 Hz	2.76 (70.1)	ASVQF25-220A	Call
KF25	24 VAC/50–60 Hz	2.76 (70.1)	ASVQF25-24AC	Call
KF25	24 VDC	2.76 (70.1)	ASVQF25-24DC	Call
KF25	100 VAC/50 Hz	2.76 (70.1)	ASVQF25-100A	Call
KF25	208 VAC/60 Hz	2.76 (70.1)	ASVQF25-208A	Call
KF40	120 VAC/60Hz	2.56 (65.0)	ASVQF40-120A	Call
KF40	220 VAC/50–60 Hz	2.56 (65.0)	ASVQF40-220A	Call
KF40	24 VAC/50–60 Hz	2.56 (65.0)	ASVQF40-24AC	Call
KF40	24 VDC	2.56 (65.0)	ASVQF40-24DC	Call
KF40	100 VAC/50 Hz	2.56 (65.0)	ASVQF40-100A	Call
KF40	208 VAC/60 Hz	2.56 (65.0)	ASVQF40-208A	Call
KF50	120 VAC/60 Hz	2.76 (70.1)	ASVQF50-120A	Call
KF50	220 VAC/50–60 Hz	2.76 (70.1)	ASVQF50-220A	Call
KF50	24 VAC/50–60 Hz	2.76 (70.1)	ASVQF50-24AC	Call
KF50	24 VDC	2.76 (70.1)	ASVQF50-24DC	Call
KF50	100 VAC/50 Hz	2.76 (70.1)	ASVQF50-100A	Call
KF50	208 VAC/60 Hz	2.76 (70.1)	ASVQF50-208A	Call

➤ Shut-Off Valves and Manifolds

Whitey "40" Water Shut-Off Valves

Helps manage water flow around a vacuum system.

- Available in stainless steel and brass
- Available with Swagelok® fittings for connecting to stainless steel water tubing and NPT fittings for connecting to reinforced plastic tubing terminated in NPT hose connectors

SPECIFICATIONS

Valve Series	Pressure Rating (psi)	Temp Rating (° C)	Flow Coeff. Cv	Flow Rate Air (std. cf/min) at Given Pressure Drop 10 psi	50 psi	100 psi	Flow Rate Water (gal./min.) at Given Pressure Drop 10 psi	50 psi	100 psi
42	2,500	10 to 65	0.6	8.3	23	41	1.9	4.2	6.0
43	3,000	10 to 65	1.5	21	57	100	4.7	11.0	15.0
43	3,000	10 to 65	2.4	33	92	160	7.5	17.0	24.0
44	1,500	10 to 65	2.6	36	99	180	8.2	18.0	26.0
44	1,500	10 to 65	3	42	110	200	9.4	21.0	30.0
45	1,500	10 to 65	12	170	60	810	38.0	85.0	120.0

Valve Model	Orifice	C_V	Fittings	Part No.	Price
Stainless Steel					
42S4	0.125"	0.6	1/4" Swagelok	SS-42S4	Call
43S4	0.187"	2.4	1/4" Swagelok	SS-43S4	Call
43S6	0.187"	1.5	3/8" Swagelok	SS-43S6	Call
44F4	0.281"	3.0	1/4" Female NPT	SS-44F4	Call
44F6	0.281"	2.6	3/8" Female NPT	SS-44F6	Call
45S8	0.406"	12.0	1/2" Swagelok	SS-45S8	Call
Brass					
42S4	0.125"	0.6	1/4" Swagelok	B-42S4	Call
43S4	0.187"	2.4	1/4" Swagelok	B-43S4	Call
43S6	0.187"	1.5	3/8" Swagelok	B-43S6	Call
44F4	0.281"	3.0	1/4" Female NPT	B-44F4	Call
44F6	0.281"	2.6	3/8" Female NPT	B-44F6	Call
45S8	0.406"	12.0	1/2" Swagelok	B-45S8	Call

Water Control Panels & Manifolds

Fully assembled—eliminates the work needed to interconnect the valves, tubing, flow indicators, switches, and interlocks for water service on a vacuum system.

- For new or existing vacuum systems
- Front panel features flow indicators or switches, and shutoff valves
- Water manifolds each enable up to eight separate cooling networks at a flow rate of 6 gallons per minute
- Plugs cap the ports not used for the particular application

Channels	Description	Components	Part No.	Price
2	Flow Control Panel	Flow Indicators	EJWFPSFI2	Call
8	Water Manifold	(Inlets & Outlets)	EJWFM8	Call
–	Water Manifolds Plug	(One Unit)	B-600-P	Call
–	Return Shutoff Valves	(Two Units)	EJWFSO	Call

Water Flow Indicators & Switches

Indicators

We recommend installing a visual flow indicator on every water circuit to give the operator confirmation, usually by a spinning rotor, that water is flowing.

Use flow indicators without switches when an interrupted supply will not cause damage or when the component has its own coolant alarm. For water-cooled components critical to the vacuum (diffusion pump, turbo pump) or those possibly damaged by flow failure (e-beam source, sputter gun), use a water switch with the indicator. Switch should connect to an alarm or process "kill" button.

Switches

In a flow switch, a rotating magnet induces a current in an external coil. The current is sensed and compared to a variable set-point value. If the water flow decreases to a value below the set-point, a relay is de-energized. This arrangement ensures that a stuck rotor carrying the magnet cannot give a false positive flow indication.

SFI Water Flow Indicators

SPECIFICATIONS

Max. Pressure (psi): 100
Pressure Drop:
Normal Models: 3" long pipe (same I.D.)
Low Flow Models: 6 psi drop (1gpm)
Max. Temperature (° C): 90
Power (VAC, Hz): 115, 50/60
Relay (115 VAC or 28 VDC): SPDT 3A noninductive; 0.5A Inductive

Flow (gpm)	Body Face Plate	Termination	Part No.	Price
0.1–6.0	Celcon (Polysulphone)	¼" Female NPT	SFI-10C	Call
1.5–12	Celcon (Polysulphone)	¼" Female NPT	SFI-15C	Call

FFS Water Flow Switches

SPECIFICATIONS

Max. Pressure (psi): 100
Pressure Drop:
Normal Models: 3" long pipe (same I.D.)
Low Flow Models: 6 psi drop (1 gpm)
Max. Temperature (° C): 90
Power (VAC, Hz): 115, 50/60
Relay (115 VAC or 28 VDC): SPDT 3A noninductive; 0.5A inductive

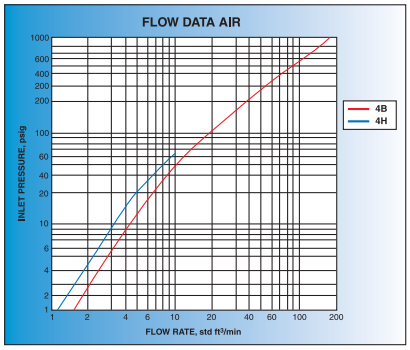
Flow (gpm)	Body Face Plate	Termination	Part No.	Price
0.1–1.0	Brass (Polysulphone)	¼" Female NPT	FFS-100B	Call
0.1–6.0	Celcon (Polysulphone)	¼" Female NPT	FFS-100C	Call
1.5–12	Brass (Polysulphone)	½" Female NPT	FFS-150B	Call
1.5–12	Celcon (Polysulphone)	½" Female NPT	FFS-150C	Call
4.0–20	Brass (Polysulphone)	½" Female NPT	FFS-155B	Call
4.0–20	Celcon (Polysulphone)	½" Female NPT	FFS-155C	Call
6–30	Brass (Polysulphone)	¾" Female NPT	FFS-160B	Call

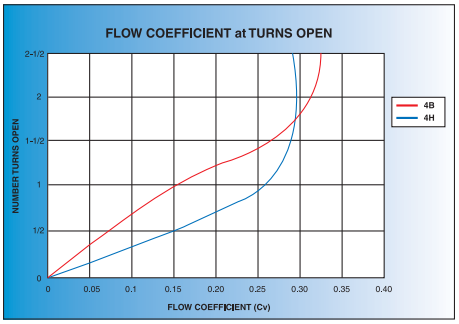
➤ Shut-Off and Metering Valves

Nupro® Shut-Off Valves

For gas shut-off applications.

- 316 stainless steel construction
- Available in H-series and B-series
- Compact H-series cover most gas applications in vacuum processing
- B-series valves feature demountable bonnets for easy maintenance or cleaning of the valve seat





SPECIFICATIONS

Valve Type	Nupro BG	Nupro BK	Nupro BKT	Nupro H
Max. Pressure @21° C (psi)	1,000	1,000	100	1,000
Temperature Rating (° C)	315	93	93	-62 to 315
Flow Coefficient (C_v)	0.39	0.39	0.36	0.28
Bonnet Seal	Bellows	Bellows	Bellows	Bellows
Turns to Open	2.5	2.5	N/A	1
Used for Shut-Off	Yes	Yes	Yes	Yes
Internal Volume (cm^3)	1.6	1.6	1.1	1.3

Nupro "B" Shut-Off Valves—Manual *

Model – Actuator	Stem Insert	Terminations	Part No.	Price
BG–In T-Bar In	Metal (Spherical)	1/4" Swagelok®	SS-4BG	Call
BK–Knob	Kel-F® (Flat)	1/4" Swagelok	SS-4BK	Call
BK–Knob	Kel-F (Flat)	1/4" Female VCR	SS-4BK-V51	Call
BK–Knob	Kel-F (Flat)	1/4" Male VCR®	SS-4BK-VCR	Call
BG–In T-Bar In	Metal (Spherical)	1/4" Tube Socket Weld 3/8" Male Tube Weld	SS-4BG-TW	Call
BK–Knob	Kel-F (Flat)	3/8" Male Tube Weld	SS-4BK-TW	Call
BKT–Toggle	Kel-F (Flat)	1/4" Swagelok	SS-4BKT	Call

* Pneumatic version available for some models.

Nupro "H" Shut-Off Valves—Manual

Stem Insert	Terminations	Part No.	Price
Metal (Conical)	1/4" Swagelok	SS-4H	Call
Metal (Conical)	1/4" Male NPT	SS-4H2	Call
Metal (Conical)	1/4" Female NPT	SS-4H4	Call
Metal (Conical)	1/4" Tube Socket Weld	SS-4H-TW	Call
Metal (Conical)	1/4" O.D. Tube Ext.	SS-4H-TH3	Call

Nupro Metering Valves

Controls the gas flow into vacuum systems.

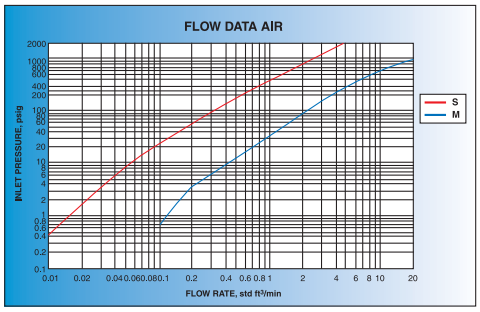
- Constructed of 316 stainless steel

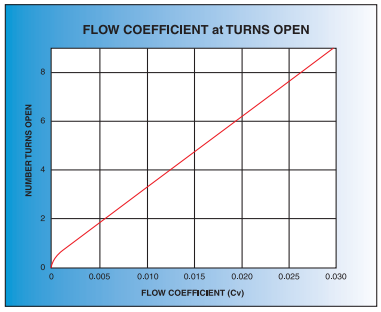
M Series:

- Enable regulation of medium gas flows at temperatures up to 200° C
- Rated to 1,000 psi

S Series:

- Provide very fine flow control
- Rated to 2,000 psi





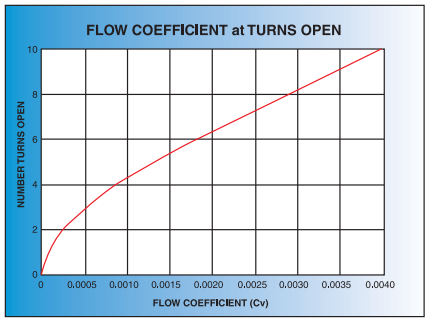
NOTE: Metering valves are not shut-off valves and should not be used as such. Attempting to force them shut usually results in needle damage.

SPECIFICATIONS

Valve Type	Nupro M	Nupro S
Max. Pressure @21° C (psi)	1,000	2,000
Temperature Rating (° C):		
Fluorocarbon	-23 to 204	-23 to 204
Buna-N	-23 to 149	-23 to 149
Flow Coefficient (C_v)	0.03	0.004
Orifice (mm)	1.40	0.79
Stem Taper (include angle)	3°	1°
Turns to Open	8 to 10	8 to 12
Dead Stop Handle	Not Required	Yes
Used for Shut-Off	No	No
Internal Volume (mm^3)	460	98

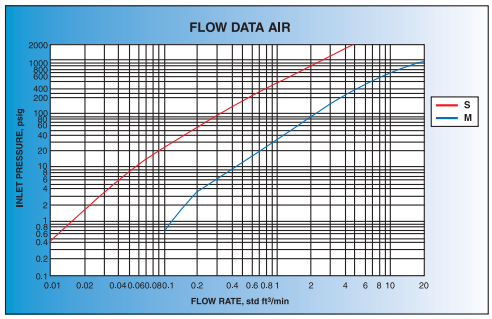
➤ Metering, Needles, UTA, and Leak Valves

Nupro "S" Series Metering Valves



Description	Terminations	Part No.	Price
Double Valve	1/8" Swagelok®	SS-SS2-D	Call
Angle Valve	1/4" Swagelok	SS-SS4-A	Call
Straight Valve	1/4" Swagelok	SS-SS4	Call
Straight Valve	1/4" VCR®	SS-SVCR4	Call

Nupro "M" Series Metering Valves



Description	Terminations	Part No.	Price
Angle Valve	1/4" Swagelok	SS-4MA	Call
Straight Valve	1/4" Swagelok	SS-4MG	Call
Straight Valve	1/4" VCR	SS-4MG-VCR	Call
Double Valve	1/4" Swagelok	SS-4MGD	Call

KF (QF) Needle Valve

Provides close control of gas processes like those needed for gas bleeds and leak regulators.

LV10K

- Provides fine control down to 10^{-5} Torr
- Suits the pressure range 10^{-3} to 10^{-4} Torr
- Valve can be mounted on pipelines or panels

SPECIFICATIONS

	Construction Materials
Component	LV10K
Body	HE30 aluminum
Seat	Brass BS2784 C2112
Seal	N/A
Needle	Martensitic SS EN56AM
Filter	Brass BS249
	Value
Max. Flow Rate (L/sec.)	0.1 (@1 bar diff.)
Max. Inlet Pressure (psi)	30.5
Max. Leak Rate, Across Body (TL/sec.)	10^{-7}
Max. Leak Rate, Across Seat (TL/sec.)	10^{-7}
Vacuum Connection	KF10
Weight (oz.)	4.87

Model	Part No.	Price
LV10K	ED-C37102000	Call

Aluminum KF (QF) Up Air Valves

Aluminum alloy air admittance valves (also called vent valves).

- Both have a control knob attached to a screw-actuated plunger sealed by a nitrile o-ring onto a seat in the valve body

AV10K

- Mounts on a pipeline with a KF10 flange (supplied with valve)

SPECIFICATIONS

	Construction Materials
Component	AV10K
Body	HE30 Al
Plunger	N/A
Knob	Nylon 6
Seal	Nitrile
	Value
Leak Rate, Across Seat (TL/sec.)	10^{-7}
Leak rate, Through Body (TL/sec.)	10^{-7}
Weight (oz.)	3.5

Model	Part No.	Price
AV10K	ED-C35103000	Call

Flanged SS Up To Air Valves

Our Up To Air Valves can be used to vent a chamber to atmosphere or can be used as a gas inlet to allow for backfilling of a chamber. Up To Air Valves are mounted on KF and CF Flanges, with a bellows sealed manually actuated valve.

Flange Type	Tube Size	Weight (lbs.)	Part No.	Price
1 1/3" CF	1/4"	1/2	F0133XVALVE	Call
2 3/4" CF	1/4"	1/2	F0275XVALVE	Call
KF16	1/4"	1/2	QF16XVALVE	Call
KF25	1/4"	1/2	QF25XVALVE	Call
KF40	1/4"	1/2	QF40XVALVE	Call

Bakeable All Metal Leak Valves

NOTE: Please see page 2-33 for a list of Bakeable All Metal Leak Valves

Global Distribution & Support Network

We have an unprecedented global distribution and sales support system strategically setup to service the international vacuum community.

- Multi-million dollar inventory spanning five global distribution centers
- Over 10,000 products in-stock for immediate delivery
- Consignment inventories and customized B2B solutions available
- Comprehensive sales and support coverage