

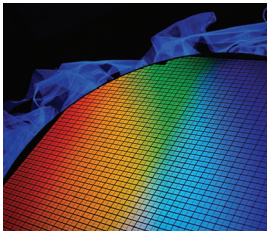
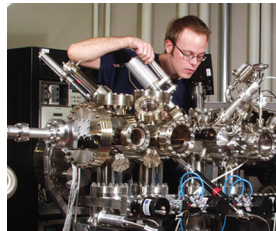
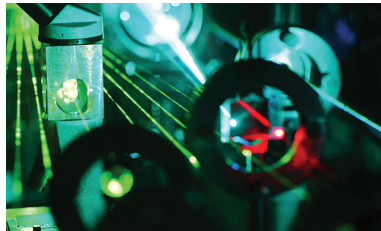


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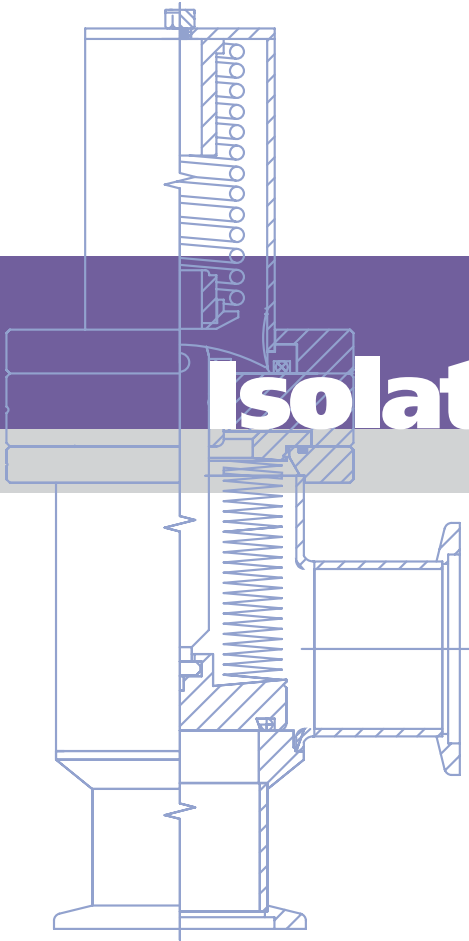


Nor-Cal Products

where technology takes shape



vacuum products catalog



Isolation Valves

Section Three



3.1	Isolation Valves General Information	98
3.2	N-Series Poppet Valves	100
3.3	Poppet Valves	102
3.4	Ball Valves	112
3.5	Genesis Valves & Hardware	114
3.6	Manual Butterfly Valves	121
3.7	Pendulum Valves	122
3.8	Linear Gate Valves	123
3.9	Bellowless Poppet Valves & Leak Valves	126
3.10	Isolation Valve Heaters	127
3.11	Bakeable All Metal Valves	128



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Isolation Valves

General Information



Since 1962, Nor-Cal Products has been improving our valve designs and expanding our product line in order to offer valves for almost every vacuum application. Our valves provide outstanding performance in the most demanding applications such as semiconductor and compound semiconductor processing.

Valve Applications

PROCESS APPLICATION	VALVE TYPE	UNIQUE FEATURES	SIZES (NOMINAL ID)	SEAT SEAL	TEMPERATURE RANGE	PRESSURE RANGE	ACTUATION	CYCLES ⁽¹⁾
HIGH-VACUUM ROUGHING	N-Series Poppet	Compact. High Cycle.	3/4 to 2 (19 to 50)	FKM	-20° to 150°C	1000 to 10 ⁻⁹ mbar	Pneumatic	3,000,000
	Poppet	Large stroke	3/8 to 4 (10 to 100)	FKM	-20° to 150°C	1000 to 10 ⁻⁹ mbar	Manual or Pneumatic	250,000
	Genesis	Small footprint. Low profile	3/4 to 4 (19 to 100)	FKM	-20° to 150°C	1000 to 10 ⁻⁹ mbar	Pneumatic	1,000,000
	Bellowless Poppet	O-ring sealed shaft	3/8 to 2 (10 to 50)	FKM	-20° to 150°C	1000 to 10 ⁻⁹ mbar	Pneumatic	250,000
	Butterfly	Low profile. 1/4 swing	3/4 to 1 1/2 (19 to 38)	FKM	-20° to 150°C	1000 to 10 ⁻⁹ mbar	Manual	30,000
UHV ROUGHING	All-metal	All-metal seals	3/4 to 1 1/2 (19 to 38)	Copper	-250° to 400°C	1000 to 10 ⁻¹¹ mbar	Manual	10,000 ⁽²⁾
HV, UHV PUMP ISOLATION	Gate	Highest conductance	5/8 to 12 (16 to 300)	FKM	-20° to 150°C	1000 to 10 ⁻¹⁰ mbar	Manual or Pneumatic	100,000 ⁽³⁾
HIGH-VACUUM PUMP ISOLATION	Pendulum	Low particle generation. Low vibration	6 to 16 (150 to 400)	FKM	-20° to 150°C	1000 to 10 ⁻⁹ mbar	Pneumatic	200,000
PUMP EXHAUST	Ball	1/4 swing open/close	3/4 to 2 (19 to 50)	PTFE	20° to 150°C	1000 to 10 ⁻⁴ mbar	Manual	20,000
GAS INTRODUCTION	Leak	Variable leak	N/A	Copper	-250° to 450°C	1000 to ≥1x 10 ⁻¹¹ mbar	Manual	300 ⁽²⁾

(1) MTBF (2) Cycle life is reduced with high temperature bakeouts

(3) Optional Million Cycle Valve is available.

Poppet Valves

Our poppet valves are fully opening for high conductance and to prevent bellows contamination while the valve is in the open position, reducing particle contamination when the valve is cycled. Our bodies are die-formed from 304 stainless steel to eliminate sharp inside corners and improve conductance. The valves are electropolished for lower outgassing and better corrosion resistance. The welded bellows are made from AM-350 stainless steel to provide excellent corrosion resistance and flexibility. They are designed with additional segments to provide extended life.

Ball Valves

Ball valves are a low cost, manually or pneumatically operated, straight through isolation device. Their simple, robust design provides high reliability in "dirty" applications. They are commonly used on MOCVD and CVD equipment downstream from the chamber or vacuum pump to isolate traps or abatement tools. A stainless steel body and PTFE seat make these valves ideal for corrosive environments. Other applications include vacuum and other facilities requirements.

Genesis Valves

The Genesis Soft Start vacuum valves are available in a nippleless aluminum body as well as stainless steel angle and angle-in-line configurations. The nippleless aluminum version can be assembled with finger clamps and universal ISO-KF centering ring/O-ring hardware for the smallest footprint possible. Both configurations provide high performance and improved conductance over standard poppet valves, with million cycle reliability, integrated low-cost soft start circuitry, heaters and other options.

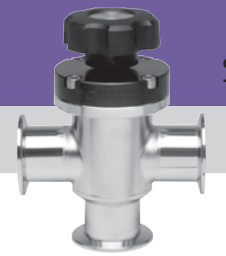
Linear Gate Valves

Our linear gate valves have an ultra-slim profile, which makes them perfect for applications where space is limited, and their smaller volume results in lower outgassing and faster pumpdown. Larger sizes have a unique feature in the actuator, which dampens the vibration, which can arise when the gate is opened. This makes these valves ideal for semiconductor and other vibration sensitive processes.

All-Metal Valves

Nor-Cal Products bakeable all-metal seal angle valves are intended for use in UHV or cryogenic applications where temperature extremes preclude the use of our elastomer seal valves. Approved for use in beamline facilities, these valves have a temperature operating range from -250°C to 400°C.





Other Valves

N-Series Poppet Valves

N-Series poppet valves feature an innovative, compact design with an MTBF of 3 million cycles. A bellows-sealed stem and electropolished stainless steel body provides long life even in the most demanding applications. Standard pneumatic actuation is normally closed. N-series valves are available in right angle or angle-in-line body styles with tube ends, NW flanges and CF rotatable flanges. Optional air solenoids are available in multiple voltages and can be ordered factory installed or as separate kits for easy field installation.



Leak Valves

Leak valves are used for controlling gas introduction into high and ultra-high vacuum systems. They utilize an optically flat sapphire poppet and a metal seal seat, allowing bakeout temperatures to 450°C.



Manual Butterfly Valves

These FKM O-ring sealed valves provide a low-cost alternative to bellows sealed gate valves. Quarter-turn actuation, small footprint and the shortest possible gas path make manual butterfly valves the preferred choice for many applications.



Machined Ball Valves

Our new ball valves are a low cost, manually or pneumatically operated, straight through isolation device. Their simple, robust design provides high reliability in "dirty" applications. They are commonly used on MOCVD and CVD equipment downstream from the chamber or vacuum pump to isolate traps or abatement tools.

A stainless steel body and PTFE seat make these valves ideal for corrosive environments. A quarter turn of the handle quickly switches the valve from open to close. They are available with NW-16 through NW-50 flanges as standards. Heater jackets are also available to reduce process by-product accumulation.

Custom Valves

Nor-Cal Products frequently provides custom and modified standard isolation valves to meet our customer's specific requirements. Single or multiple valves can be integrated with manifolds, chambers and other components. Many special features can be specified by adding options. See page 103.

Standard Options

- Normally open pneumatic actuation
- Microswitch position indication
- Special O-rings
- Various air solenoid voltages
- Fitting options for bypass lines
- Heater jackets, insulators and controllers

Custom Features

- Special port lengths and configurations for drop-in compatibility with other manufacturer's valves
- Custom flange configurations
- Special position indicators
- Pump out ports
- Custom finishes
- Gate shields for linear gate valve O-rings



Single acting pneumatic actuator with gate shield



Custom fitting option



Custom valve manifold

Isolation Valves

N-Series Poppet Valves



SPECIFICATIONS

Nominal Port OD's: ¾ (19), 1 (25) and 1 ½ (38) inches (mm)

Materials

Body: Electropolished 304 stainless steel
Bellows: Welded AM-350 stainless steel
Bonnet seal: FKM
Poppet seal: FKM
Other O-ring compounds available

Actuation: Spring / Pneumatic
 Single Acting / Normally Closed

Helium leak tested: $\leq 10^{-9}$ mbar l/sec.

Operating Temperature: 150°C Max.

Supply Pressure: 60 to 100 psig (4-7 bar)

Differential pressure: Maximum 20psi (1.4bar) differential across the valve seat

Maximum temperature with FKM seals: 150°C Max

Vacuum Range: 1000 to 1×10^{-9} mbar

Options: Solenoids, optical sensors, Heater jackets and controllers available for all valves.



N-Series poppet valves are an innovative, compact design with an MTBF of 3 million cycles. A bellows-sealed stem and electropolished stainless steel body provides long life even in the most demanding applications. Standard pneumatic actuation is Single Acting / Normally Closed. N-series valves are available in right angle or angle-in-line body styles with tube ends, NW flanges or CF rotatable flanges. Optional air solenoids

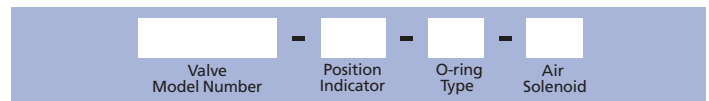
are available in multiple voltages and can be ordered factory installed or as separate kits for easy field installation. Mounting slots for optional position indicators are incorporated into the actuator body resulting in a reduction in overall size and elimination of the risk of physical damage to the sensors. Sensors are easily installed without adjustment. Optical switch sensors indicate both the open & closed valve positions. It is possible

for each valve to have two sensors installed for redundancy. Position indicators can be ordered factory installed or as separate kits for easy field installation.

One rebuild kit fits the four valve sizes from NW-16 through NW-50 to reduce maintenance inventory costs. FKM O-ring seals are standard, however the valve is designed to accept alternate seal compounds to satisfy your application requirements.

N-Series Options

Please use the following part numbering tree to add the appropriate options to a standard N-Series valve model number. See tables below for option codes.



Example: **NAP-150-NW-NPN-K91-511**

Right angle N-Series valve with 1.5 inch (38.1) bore, NW-40 flanges, optical position indicators, Kalrez 9100 O-rings, 120VAC and air solenoid option.

O-ring Material Options

SEAL MATERIAL	CODE
FKM	Default (no code)
Kalrez 4079	-K79
Kalrez 8085	-K85
Kalrez 8575	-K75
Kalrez 9100	-K91
Chemraz E38	-C38
Dupra 192	-D19
Perlast G74P	-PP7

Air Solenoid Option

DESCRIPTION	CODE	KIT
120VAC, 50/60 Hz	-S11	N-S11-K
24VDC	-S21	N-S21-K
240VAC, 50/60 Hz	-S31	N-S31-K
24VAC, 50/60 Hz	-S41	N-S41-K

Position Indicator Option

DESCRIPTION	CODE	KIT
Optical - main valve open & closed	NPN	N-NPN-K
Optical - main valve open & closed	PNP	N-PNP-K

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

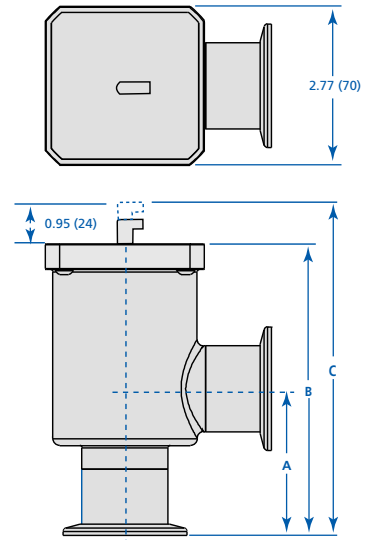
Isolation Valves

N-Series Poppet Valves



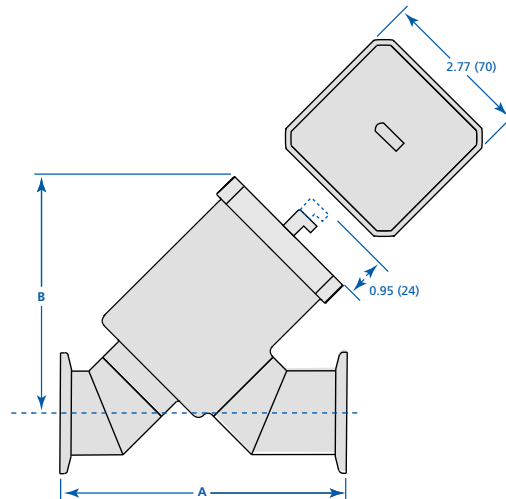
Pneumatic N-Series Angle Valve

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C
NAP-075	3/4 (19)	No Flanges	1.42 (36)	3.95 (100)	4.90 (124)
NAP-075-NW	3/4 (19)	NW-16	1.57 (40)	4.10 (104)	5.05 (128)
NAP-075-CF	3/4 (19)	CF-133, Rotatable	1.91 (48)	4.73 (120)	5.68 (144)
NAP-100	1 (25)	No Flanges	1.82 (46)	4.35 (111)	5.30 (135)
NAP-100-NW	1 (25)	NW-25	1.97 (50)	4.50 (114)	5.45 (138)
NAP-100-CF	1 (25)	CF-212, Rotatable	2.28 (58)	4.81 (122)	5.76 (146)
NAP-150	1 1/2 (38)	No Flanges	2.41 (61)	4.94 (125)	5.89 (150)
NAP-150-NW	1 1/2 (38)	NW-40	2.56 (65)	5.09 (129)	6.04 (153)
NAP-150-CF	1 1/2 (38)	CF-275, Rotatable	2.62 (67)	5.15 (131)	6.09 (155)
NAP-200	1 1/2 (38)	No Flanges	2.61 (66)	5.14 (131)	6.09 (155)
NAP-200-NW	1 1/2 (38)	NW-50	2.76 (70)	5.29 (134)	6.24 (159)
NAP-200-CF	1 1/2 (38)	CF-338, Rotatable	2.84 (72)	5.37 (136)	6.32 (161)



Pneumatic N-Series Angle In-Line Valve

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B
NAIP-075	3/4 (19)	No Flanges	3.64 (92)	4.60 (117)
NAIP-075-NW	3/4 (19)	NW-16	3.94 (100)	4.60 (117)
NAIP-075-CF	3/4 (19)	CF-133, Rotatable	4.20 (107)	4.60 (117)
NAIP-100	1 (25)	No Flanges	3.64 (92)	4.00 (102)
NAIP-100-NW	1 (25)	NW-25	5.12 (130)	4.00 (102)
NAIP-100-CF	1 (25)	CF-212, Rotatable	4.75 (121)	4.00 (102)
NAIP-150	1 1/2 (38)	No Flanges	4.82 (122)	4.37 (111)
NAIP-150-NW	1 1/2 (38)	NW-40	5.12 (130)	4.37 (111)
NAIP-150-CF	1 1/2 (38)	CF-275, Rotatable	5.24 (133)	4.37 (111)
NAIP-200	1 1/2 (38)	No Flanges	5.21 (132)	4.37 (111)
NAIP-200-NW	1 1/2 (38)	NW-50	5.51 (140)	4.37 (111)
NAIP-200-CF	1 1/2 (38)	CF-338, Rotatable	5.66 (144)	4.37 (111)



N-Series Seal Kit

MODEL NUMBER	DESCRIPTION
NA-075-95	Seal kit for 0.75 (19) through 2 (50) inch (mm) sizes, FKM. Includes (1) poppet and (1) bonnet O-ring.

N-Series Rebuild Kit

MODEL NUMBER	DESCRIPTION
NA-075-99	Valve rebuild kit for 0.75 (19) through 2 (50) inch (mm) sizes. Includes valve actuator/bellows assembly.

Note: Seals are not included. Recommend use of the NA-075-95 Seal Kit.

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.



Isolation Valves

Poppet Valve General Information

SPECIFICATIONS

Nominal port ODs: 3/8 to 4 inch (10-102mm)

Body: Electropolished 304 stainless steel

Bellows: Welded AM-350 stainless steel

Bonnet seal: FKM or Copper

Poppet seal: FKM

Other O-ring compounds available

Flanges: CF, NW, ISO or ASA

Maximum temperature with FKM seals

See bakeability chart this page

Sustained: $\leq 150^{\circ}\text{C}$

Intermittent: $\leq 204^{\circ}\text{C}$

Helium leak tested: $\leq 10^{-9}$ mbar l/sec.

Vacuum range

FKM bonnet seal: $\geq 1 \times 10^{-9}$ mbar - High

Vacuum

Copper bonnet seal: $\geq 1 \times 10^{-10}$ mbar - UHV

Manual actuation: Bronze nuts/ACME threads

Pneumatic actuation: Normally closed

Operating Pressure: 60 to 80 psig

3/4 to 2 inch (19-50) ODs:

Single Acting / Normally Closed

2 1/2 to 4 inch (63-101) ODs:

Double Acting

Differential pressure: Maximum 20psi (1.4bar) differential across the valve seat

Options: See facing page.

Thermal: Heater jackets and controllers available for all valves. Call for details

Construction

Bodies are die-formed from 304 stainless steel to eliminate sharp inside corners and improve conductance. The valves are electropolished for faster pumpdown, lower outgassing and better corrosion resistance.

The welded bellows are made from AM-350 stainless steel to provide corrosion resistance and excellent flexibility. The bellows fully retract from the side port when the valve is open, eliminating buildup of by-products on the bellows and subsequent particle generation during operation. They are designed with additional segment segments to provide extended life. Nor-Cal Products valves can be operated in any position and actuators can be removed quickly for routine inspection without disassembling the system.

Models

Our poppet valves are available in most port configurations with CF, NW, ISO or ASA flanges. Valves through 3 inch (76mm) OD's are available with manual or pneumatic actuators and FKM or copper bonnet seals. Valves over 3 inches (76mm) are available with pneumatic actuators only. Custom port lengths, flange configurations and bellows valves are also available.

Vacuum Range

Poppet seals have helium leak rates of $\leq 10^{-9}$ mbar l/sec. FKM bonnet sealed valves can be used in the 10^{-9} mbar range, while copper bonnet seal valves are suited for use in the 10^{-10} range.

Copper Bonnet Seal

Copper bonnet seal poppet valves with CF flanges provide metal seals between the inside of the valve and the atmosphere. They are available in all standard sizes and port configurations.

Bakeability

The valve's bakeout temperature should not exceed that of the elastomer that is used in it. See chart below. Standard FKM sealed valves are bakeable to 150°C sustained and 204°C for intermittent periods. However, the FKM O-rings begin to take a set at 150°C . Other O-ring compounds are available for use at higher temperatures.

BONNET/POPPET SEAL	APPLICATION	PNEUMATIC VALVES		MANUAL VALVES	
		OPEN	CLOSED	OPEN	CLOSED
FKM	General purpose	150°C	120°C	150°C	120°C
Kalrez 4079	High temperature	316°C	316°C	316°C	316°C
Chemraz	Chemical resistant	210°C	210°C	210°C	210°C
Silicone	High temperature	232°C	232°C	232°C	232°C

Poppet Valve Conductance (Liters per second)

The conductance values in the table below have been calculated for air at room temperature using the formulas for tubes and elbows presented in the third edition of Roth's Vacuum Technology: $C_v = 182(D^4/L)P$ for viscous flow or $C_m = 12(D^3/L')$ for molecular flow. Port lengths without flanges and inner diameters for the valve sizes and configurations were used. This method is an approximation, use values accordingly.

NOMINAL PORT OD	ANGLE OR TEE		ANGLE-IN-LINE		IN-LINE		STRAIGHT-THROUGH	
	VISCOUS	MOLECULAR	VISCOUS	MOLECULAR	VISCOUS	MOLECULAR	VISCOUS	MOLECULAR
1/2 (13)	60	3	-	-	45	2	-	-
3/4 (19)	135	5	120	4	105	4	90	4
1 (25)	391	12	286	9	270	8	436	11
1 1/2 (38)	1925	37	1324	25	1263	24	1203	23
2 (50)	4677	65	3459	48	3113	44	-	-
2 1/2 (63)	12332	136	7505	83	7610	84	-	-
3 (76)	23263	217	12558	115	14258	130	-	-
4 (100)	57994	396	-	-	34577	236	-	-

Note: P =air at 1 mbar. L' =Laxial +1.33(O/180)D for elbows.



Valve rebuild kits are on page 113

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

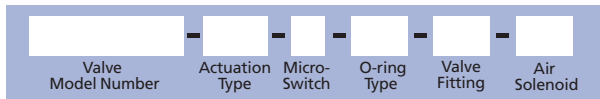
Isolation Valves

Poppet Valve Options



One or more options can be added to a particular valve by adding the option suffix to the basic valve model number as shown below. Heater jackets and controllers are also available for all poppet valves. Call for details and pricing.

• Add option suffixes in the following order:



• Example of a model number with options: **ESVP-1502-CF-AS-M-S11**

Actuation Option

OPTION	DESCRIPTION
Default	Single Acting / Normally Closed
-A	Double Acting
-AS	Double Acting with Spring Assist
-SA	Single Acting / Normally Open

Pneumatic valves with port ODs through 2 inches (50) are normally single acting / normally closed for immediate closure in case of electrical or air failure. Larger valves are normally double acting. These actuation options are available on nearly all sizes and port configurations of Nor-Cal Products' pneumatically actuated poppet valves.

Micro-Switch Option

-M
Micro-switches are available on all pneumatically actuated Nor-Cal Products' valves. A pair of 5-amp micro-switches are opened or closed by the movement of the valve stem. One switch closes when the valve is fully open and the other when it is fully closed. These can be connected to control panels with alarms or lights for positive position indication. Electrical leads are approximately 10 inches (254) long, but may be cut to any length upon request.



NOMINAL PORT OD	E
3/8 (10)	2.06 (52)
1/2 (13)	2.06 (52)
3/4 (19)	2.06 (52)
1 (25)	2.06 (52)
1 1/2 (38)	2.06 (52)
2 (50)	3.54 (90)
3 (76)	3.54 (90)
4 (100)	5.01 (127)

O-ring Option

OPTION	COMPOUND	TEMPERATURE MIN.	TEMPERATURE MAX.	APPLICATION
<i>Standard</i>	FKM	-29°C	204°C	Industry standard
-KT	Kalrez 4079	-20°C	316°C	High temperatures
-CR	Chemraz 513	-30°C	210°C	Chemical resistant
-S	Silicone	-55°C	232°C	High temperatures

Standard Nor-Cal Products valves use chemical resistant FKM O-rings. FKM O-rings should not be heated to above 204°C. Even prolonged exposures of 150°C may degrade the O-rings. High temp Kalrez O-rings allow valve bakeouts to higher temperature. Silicone O-rings provide adequate sealing performance in thermal cycling from -55°C to 230°C.

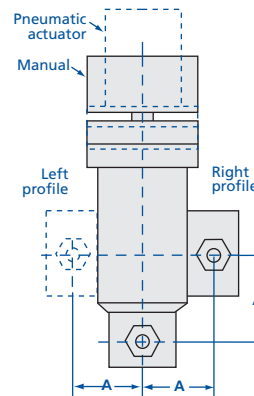


Right Angle Valve Fitting Option

OPTION	PROFILE	DESCRIPTION	VALVE PORTS
-F1	Left	1/4 female VCR	Both
-F2	Left	3/8 female VCR	Both
-F3	Left	1/2 female NPT	Bottom
-F4	Right	1/4 female VCR	Both
-F5	Right	3/8 female VCR	Both
-F6	Right	1/2 female NPT	Bottom

Note: Available on ESV, ESVP, CSV and CSVP models only.

All Nor-Cal Products right angle valves (ESV, CSV, ESVP and CSVP models) are available with the six fitting options described in the table above. These options are designed to make it easy for our customers to retrofit our valves with thermocouple gauges, leak valves, up-to-air valves or gas introduction lines. Other fittings or configurations are available.



NOMINAL PORT OD	A
3/4 (19)	1.50 (38)
1 (25)	1.22 (31)
1 1/2 (38)	1.62 (41)
2 - 2 1/4 (50-57)	2.25 (57)
2 1/2 (63)	2.25 (57)
3 (76)	2.44 (62)
4 (100)	3.22 (82)

Air Solenoid Option

OPTION	KIT	NOMINAL PORT OD	DESCRIPTION
-S11	S11-K	3/8 to 2 (10 to 50)	3-way, 120VAC, 50/60 Hz
-S21	S21-K	3/8 to 2 (10 to 50)	3-way, 24VDC
-S31	S31-K	3/8 to 2 (10 to 50)	3-way, 240VAC, 50/60 Hz
-S41	S41-K	3/8 to 2 (10 to 50)	3-way, 24VAC, 50/60 Hz
-S12	S12-K	2 1/2 to 3 (63 to 76)	4-way, 120VAC, 50/60 Hz
-S22	S22-K	2 1/2 to 3 (63 to 76)	4-way, 24VDC
-S32	S32-K	2 1/2 to 3 (63 to 76)	4-way, 240VAC, 50/60 Hz
-S42	S42-K	2 1/2 to 3 (63 to 76)	4-way, 24VAC, 50/60 Hz

Note: Use 4-way solenoid option for 1.12 and 1.5 (28-38) OD STVP and CSTVP models.

All pneumatic poppet valves can be provided with air solenoids with several current ratings for electropneumatic actuation. Valves with single acting / normally closed actuation require three-way air solenoids, while double acting actuators require four-way solenoids. Both three and four-way air solenoids are available in four current ratings. A pneumatic valve ordered with this option will arrive with an air solenoid installed.

18 inch (450) long electrical leads are provided for connection to the power supply. Air solenoids can be purchased separately in a kit complete with instructions for installation by the customer. When placing your order please specify the model number of the valve that the air solenoid will be installed on, so that our sales staff can confirm whether a three-way or four-way solenoid is required.



Isolation Valves

Manual Angle Poppet Valves



SPECIFICATIONS

Port ODs: 3/8 to 3 inches (10 to 76mm)

Materials

Body: Electropolished 304 stainless steel
 Bellows: Welded AM-350 stainless steel
 Bonnet seal: Copper or FKM
 Poppet seal: FKM
Other O-ring compounds available

Actuation: Self-lubricating bronze nuts with ACME threads

Differential pressure: Maximum 20psi (1.4bar) differential across the valve seat

Maximum temperature with FKM seals
 Sustained: $\leq 150^{\circ}\text{C}$
 Intermittent: $\leq 204^{\circ}\text{C}$

Vacuum range

FKM bonnet seal: $\geq 1 \times 10^{-9}$ mbar - High Vacuum
 Copper bonnet seal: $\geq 1 \times 10^{-10}$ mbar - UHV

Options: Fittings and O-rings. See page 103

Thermal: Heater jackets and controllers available for all valves. See page 127

Manual FKM Seal Angle Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D
ESV-038	3/8 (10)	No flanges	1.50 (38.1)	4.06 (103)	4.44 (113)	2.25 (57)
ESV-0382-CF	3/8 (10)	Rotatable 1.33 CF	1.60 (40.6)	4.16 (106)	4.54 (115)	2.25 (57)
ESV-0382-NWB	3/8 (10)	NW-10B	1.65 (41.9)	4.21 (107)	4.59 (117)	2.25 (57)
ESV-050	1/2 (13)	No flanges	1.50 (38.1)	4.06 (103)	4.56 (116)	2.25 (57)
ESV-0502-CF	1/2 (13)	Rotatable 1.33 CF	1.60 (40.6)	4.16 (106)	4.66 (118)	2.25 (57)
ESV-0502-NWB	1/2 (13)	NW-10B	1.65 (41.9)	4.21 (107)	4.71 (120)	2.25 (57)
ESV-075	3/4 (19)	No flanges	2.00 (50.8)	4.56 (116)	5.31 (135)	2.25 (57)
ESV-0752-CF	3/4 (19)	Rotatable 1.33 CF	2.50 (63.5)	5.06 (129)	5.81 (148)	2.25 (57)
ESV-0752-NWB	3/4 (19)	NW-16B	2.15 (54.6)	4.71 (120)	5.46 (139)	2.25 (57)
ESV-100	1 (25)	No flanges	1.88 (47.8)	4.32 (110)	5.32 (135)	2.25 (57)
ESV-1002-CF	1 (25)	Rotatable 2.12 CF	2.05 (52.1)	4.49 (114)	5.49 (139)	2.25 (57)
ESV-1002-NWB	1 (25)	NW-25B	2.03 (51.6)	4.47 (114)	5.47 (139)	2.25 (57)
ESV-150	1 1/2 (38)	No flanges	2.25 (57.2)	5.63 (143)	7.13 (181)	3.00 (76)
ESV-1502-CF	1 1/2 (38)	Rotatable 2.75 CF	2.46 (62.5)	5.84 (148)	7.34 (186)	3.00 (76)
ESV-1502-NWB	1 1/2 (38)	NW-40B	2.40 (62.0)	5.78 (147)	7.28 (185)	3.00 (76)
ESV-200	2 (50)	No flanges	3.25 (82.6)	7.85 (199)	9.85 (250)	3.50 (89)
ESV-2002-CF	2 (50)	Rotatable 3.38 CF	3.48 (88.4)	8.08 (205)	10.08 (256)	3.50 (89)
ESV-2002-NWB	2 (50)	NW-50B	3.40 (86.4)	8.00 (203)	10.00 (254)	3.50 (89)
ESV-2002-ASA	2 (50)	Rotatable ASA-5-200R	3.50 (88.9)	8.10 (206)	10.10 (257)	3.50 (89)
ESV-250	2 1/2 (63)	No flanges	3.00 (76.2)	8.27 (210)	10.77 (274)	4.00 (102)
ESV-2502-CF	2 1/2 (63)	Rotatable 4.50 CF	3.38 (85.9)	8.65 (220)	11.15 (283)	4.00 (102)
ESV-2502-ISO	2 1/2 (63)	ISO-63-250-OF	3.25 (82.6)	8.52 (216)	11.02 (280)	4.00 (102)
ESV-2502-ASA	2 1/2 (63)	Rotatable ASA-5-250R	3.25 (82.6)	8.52 (216)	11.02 (280)	4.00 (102)
ESV-300	3 (76)	No flanges	3.25 (82.6)	8.68 (220)	11.68 (297)	4.50 (114)
ESV-3002-CF	3 (76)	Rotatable 4.62 CF	3.53 (89.7)	8.96 (228)	11.96 (304)	4.50 (114)
ESV-3002-ISO	3 (76)	ISO-80-300-OF	3.50 (89.0)	8.93 (227)	11.93 (303)	4.50 (114)
ESV-3002-ASA	3 (76)	Rotatable ASA-6-300R	3.50 (89.0)	8.93 (227)	11.93 (303)	4.50 (114)

Manual Copper Seal Bonnet Angle Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D
CSV-038	3/8 (10)	No flanges	1.50 (38.1)	4.06 (103)	4.44 (113)	2.73 (69)
CSV-0382-CF	3/8 (10)	Rotatable 1.33 CF	1.60 (40.6)	4.16 (106)	4.54 (115)	2.73 (69)
CSV-050	1/2 (13)	No flanges	1.50 (38.1)	4.06 (103)	4.56 (116)	2.73 (69)
CSV-0502-CF	1/2 (13)	Rotatable 1.33 CF	1.60 (40.6)	4.16 (106)	4.66 (118)	2.73 (69)
CSV-075	3/4 (19)	No flanges	2.00 (50.8)	4.56 (116)	5.31 (135)	2.73 (69)
CSV-0752-CF	3/4 (19)	Rotatable 1.33 CF	2.50 (63.5)	5.06 (129)	5.81 (148)	2.73 (69)
CSV-100	1 (25)	No flanges	1.88 (47.8)	4.32 (110)	5.32 (135)	2.73 (69)
CSV-1002-CF	1 (25)	Rotatable 2.12 CF	2.05 (52.1)	4.49 (114)	5.49 (139)	2.73 (69)
CSV-150	1 1/2 (38)	No flanges	2.25 (57.2)	5.63 (143)	7.13 (181)	3.25 (83)
CSV-1502-CF	1 1/2 (38)	Rotatable 2.75 CF	2.46 (62.5)	5.84 (148)	7.34 (186)	3.25 (83)
CSV-200	2 (50)	No flanges	3.25 (82.6)	7.85 (199)	9.85 (250)	4.05 (103)
CSV-2002-CF	2 (50)	Rotatable 3.38 CF	3.48 (88.4)	8.08 (205)	10.08 (256)	4.05 (103)
CSV-250	2 1/2 (63)	No flanges	3.00 (76.2)	8.27 (210)	10.77 (274)	4.61 (117)
CSV-2502-CF	2 1/2 (63)	Rotatable 4.50 CF	3.38 (85.9)	8.65 (220)	11.15 (283)	4.61 (117)
CSV-300	3 (76)	No flanges	3.25 (82.6)	8.68 (220)	11.68 (297)	5.62 (143)
CSV-3002-CF	3 (76)	Rotatable 4.62 CF	3.53 (89.7)	8.96 (228)	11.96 (304)	5.62 (143)

ESV O-ring Kits

MODEL NUMBER	NOMINAL PORT OD
ESV-075-95	3/8-1 (10-25)
ESV-150-95	1 1/2 (38)
ESV-200-95	2 (50)
ESV-250-95	2 1/2 (63)
ESV-300-95	3 (76)

CSV O-ring & Gasket Kits

MODEL NUMBER	NOMINAL PORT OD
CSV-075-95	3/8-1 (10-25)
CSV-150-95	1 1/2 (38)
CSV-200-95	2 (50)
CSV-250-95	2 1/2 (63)
CSV-300-95	3 (76)



Valve rebuild kits available. See page 113

Isolation Valves

Pneumatic Angle Poppet Valves

SECTION 3.3



Pneumatic FKM Seal Angle Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D
ESVP-038	3/8(10)	No flanges	1.50 (38.1)	3.62 (92)	5.77 (147)	2.25 (57)
ESVP-0382-CF	3/8(10)	Rotatable 1.33 CF	1.60 (40.6)	3.72 (95)	5.87 (149)	2.25 (57)
ESVP-0382-NWB	3/8(10)	NW-10B	1.65 (41.9)	3.77 (96)	5.92 (150)	2.25 (57)
ESVP-050	1/2(13)	No flanges	1.50 (38.1)	3.62 (92)	5.77 (147)	2.25 (57)
ESVP-0502-CF	1/2(13)	Rotatable 1.33 CF	1.60 (40.6)	3.72 (95)	5.87 (149)	2.25 (57)
ESVP-0502-NWB	1/2(13)	NW-10B	1.65 (41.9)	3.77 (96)	5.92 (150)	2.25 (57)
ESVP-075	3/4(19)	No flanges	2.00 (50.8)	4.12 (105)	6.26 (159)	2.25 (57)
ESVP-0752-CF	3/4(19)	Rotatable 1.33 CF	2.50 (63.5)	4.62 (117)	6.76 (171)	2.25 (57)
ESVP-0752-NWB	3/4(19)	NW-16B	2.15 (54.6)	4.27 (109)	6.41 (163)	2.25 (57)
ESVP-100	1 (25)	No flanges	1.88 (47.8)	3.88 (98.6)	6.02 (152)	2.25 (57)
ESVP-1002-CF	1 (25)	Rotatable 2.12 CF	2.05 (52.1)	4.05 (103)	6.19 (157)	2.25 (57)
ESVP-1002-NWB	1 (25)	NW-25B	2.03 (51.6)	4.03 (102)	6.17 (157)	2.25 (57)
ESVP-150	1 1/2(38)	No flanges	2.25 (57.2)	4.98 (127)	7.56 (192)	3.00 (76)
ESVP-1502-CF	1 1/2(38)	Rotatable 2.75 CF	2.46 (62.5)	5.19 (132)	7.77 (197)	3.00 (76)
ESVP-1502-NWB	1 1/2(38)	NW-40B	2.40 (61.0)	5.13 (130)	7.71 (196)	3.00 (76)
ESVP-200	2 (50)	No flanges	3.25 (82.6)	6.74 (171)	11.23 (285)	3.50 (89)
ESVP-2002-CF	2 (50)	Rotatable 3.38 CF	3.48 (88.4)	6.97 (177)	11.46 (291)	3.50 (89)
ESVP-2002-NWB	2 (50)	NW-50B	3.40 (86.4)	6.89 (175)	11.38 (289)	3.50 (89)
ESVP-2002-ASA	2 (50)	Rotatable ASA-5-200R	3.50 (88.9)	6.99 (178)	11.48 (292)	3.50 (89)
ESVP-250	2 1/2(63)	No flanges	3.00 (76.2)	7.18 (182)	10.1 (257)	4.00 (100)
ESVP-2502-CF	2 1/2(63)	4.50 CF	3.38 (85.9)	7.56 (192)	10.48 (266)	4.00 (100)
ESVP-2502-ISO	2 1/2(63)	ISO-63-250-OF	3.25 (82.6)	7.43 (189)	10.35 (263)	4.00 (100)
ESVP-2502-ASA	2 1/2(63)	Rotatable ASA-5-250R	3.25 (82.6)	7.43 (189)	10.35 (263)	4.00 (100)
ESVP-300	3 (76)	No flanges	3.25 (82.6)	7.62 (194)	11.00 (297)	4.5 (114)
ESVP-3002-CF	3 (76)	Rotatable 4.62 CF	3.53 (90.0)	7.90 (201)	11.28 (287)	4.5 (114)
ESVP-3002-ISO	3 (76)	ISO-80-300-OF	3.50 (88.9)	7.87 (200)	11.25 (286)	4.5 (114)
ESVP-3002-ASA	3 (76)	Rotatable ASA-6-300R	3.50 (88.9)	7.87 (200)	11.25 (286)	4.5 (114)
ESVP-400	4 (100)	No flanges	4.22 (107)	9.55 (243)	14.99 (381)	6.50 (165)
ESVP-4002-CF	4 (100)	Rotatable 6.00 CF	4.66 (118)	9.99 (254)	15.43 (392)	6.50 (165)
ESVP-4002-ISO	4 (100)	ISO-100-400-OF	4.47 (114)	9.80 (249)	15.24 (387)	6.50 (165)
ESVP-4002-ASA	4 (100)	Rotatable ASA-7.5-400R	4.47 (114)	9.80 (249)	15.24 (387)	6.50 (165)

SPECIFICATIONS

Port ODs: 3/8 to 4 inches (10-100mm)

Materials

Body: Electropolished 304 stainless steel
Bellows: Welded AM-350 stainless steel
Bonnet seal: Copper or FKM
Poppet seal: FKM
Other O-ring compounds available

Actuation: Normally closed

3/8 to 2 inch (10-50) ODs:

Single Acting

2 1/2 to 4 inch (63-100) ODs:

Double Acting

See page 103 for more actuation options

Operating pressure: 60 to 80 psig (4-5.5 bar)

Differential pressure: Maximum 6psi (0.4 bar) differential across the valve seat

Maximum temperature with FKM seals

Sustained: ≤150°C
 Intermittent: ≤204°C

Vacuum range

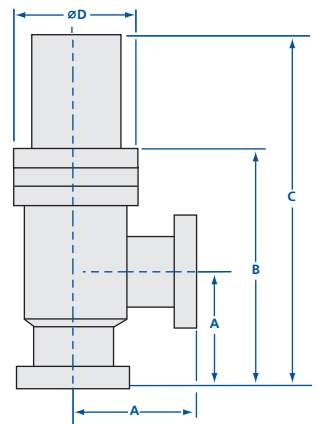
FKM bonnet seal: ≥1x 10⁻⁹mbar - High Vacuum
 Copper bonnet seal: ≥1x 10⁻¹⁰mbar - UHV

Options: Fittings, O-rings, air solenoids, micro-switches and actuators. *See page 103*

Thermal: Heater jackets and controllers available for all valves. *See page 127*

Pneumatic Copper Seal Bonnet Angle Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D
CSVP-038	3/8(10)	No flanges	1.50 (38.1)	3.75 (95)	5.77 (147)	2.73 (69)
CSVP-0382-CF	3/8(10)	Rotatable 1.33 CF	1.60 (40.6)	3.85 (98)	5.82 (148)	2.73 (69)
CSVP-050	1/2(13)	No flanges	1.50 (38.1)	3.75 (95)	5.77 (147)	2.73 (69)
CSVP-0502-CF	1/2(13)	Rotatable 1.33 CF	1.60 (40.6)	3.85 (98)	5.82 (148)	2.73 (69)
CSVP-075	3/4(19)	No flanges	2.00 (50.8)	4.25 (108)	6.26 (159)	2.73 (69)
CSVP-0752-CF	3/4(19)	Rotatable 1.33 CF	2.50 (63.5)	4.75 (121)	6.76 (172)	2.73 (69)
CSVP-100	1 (25)	No flanges	1.88 (47.8)	4.00 (102)	6.02 (153)	2.73 (69)
CSVP-1002-CF	1 (25)	Rotatable 2.12 CF	2.05 (52.1)	4.17 (106)	6.19 (157)	2.73 (69)
CSVP-150	1 1/2(38)	No flanges	2.25 (57.2)	4.98 (126)	7.56 (192)	3.25 (83)
CSVP-1502-CF	1 1/2(38)	Rotatable 2.75 CF	2.46 (62.5)	5.19 (132)	7.77 (197)	3.25 (83)
CSVP-200	2 (50)	No flanges	3.25 (82.6)	6.62 (168)	11.23 (285)	4.05 (103)
CSVP-2002-CF	2 (50)	Rotatable 3.38 CF	3.48 (88.4)	6.85 (174)	11.45 (291)	4.05 (103)
CSVP-250	2 1/2(63)	No flanges	3.00 (76.2)	7.18 (182)	10.10 (257)	4.61 (117)
CSVP-2502-CF	2 1/2(63)	Rotatable 4.50 CF	3.38 (85.9)	7.56 (192)	10.48 (266)	4.61 (117)
CSVP-300	3 (76)	No flanges	3.25 (82.6)	7.62 (194)	11.00 (279)	5.62 (143)
CSVP-3002-CF	3 (76)	Rotatable 4.62 CF	3.53 (89.7)	7.90 (201)	11.28 (287)	5.62 (143)
CSVP-400	4 (100)	No flanges	4.22 (107)	9.55 (243)	14.99 (381)	6.73 (171)
CSVP-4002-CF	4 (100)	Rotatable 6.00 CF	4.66 (118)	9.99 (254)	15.43 (392)	6.73 (171)



ESVP O-Ring Kits

MODEL NUMBER	NOMINAL PORT OD
ESVP-075-95	3/8-1 (10-25)
ESVP-150-95	1 1/2(38)
ESVP-200-95	2 (50)
ESVP-250-95	2 1/2(63)
ESVP-300-95	3 (76)
ESVP-400-95	4 (100)

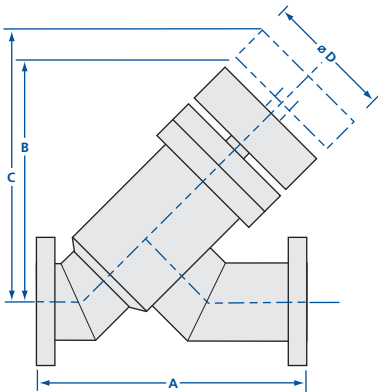
CSVP O-Ring & Gasket Kits

MODEL NUMBER	NOMINAL PORT OD
CSVP-075-95	3/8-1 (10-25)
CSVP-150-95	1 1/2(38)
CSVP-200-95	2 (50)
CSVP-250-95	2 1/2(63)
CSVP-300-95	3 (76)
CSVP-400-95	4 (100)

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Isolation Valves

Manual Angle-In-Line Poppet Valves



Manual FKM Seal Angle-In-Line Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D
AIV-075	3/4 (19)	No flanges	3.70 (94)	3.47 (88)	4.01 (102)	2.25 (57)
AIV-0752-CF	3/4 (19)	Rotatable 1.33 CF	4.70 (119)	3.47 (88)	4.01 (102)	2.25 (57)
AIV-0752-NWB	3/4 (19)	NW-16B	4.00 (102)	3.47 (88)	4.01 (102)	2.25 (57)
AIV-100	1 (25)	No flanges	3.90 (99)	3.42 (87)	4.14 (105)	2.25 (57)
AIV-1002-CF	1 (25)	Rotatable 2.12 CF	4.23 (107)	3.42 (87)	4.14 (105)	2.25 (57)
AIV-1002-NWB	1 (25)	NW-25B	4.20 (107)	3.42 (87)	4.14 (105)	2.25 (57)
AIV-150	1 1/2 (38)	No flanges	4.82 (122)	4.55 (116)	5.61 (142)	3.00 (76)
AIV-1502-CF	1 1/2 (38)	Rotatable 2.75 CF	5.24 (133)	4.55 (116)	5.61 (142)	3.00 (76)
AIV-1502-NWB	1 1/2 (38)	NW-40B	5.12 (130)	4.55 (116)	5.61 (142)	3.00 (76)
AIV-200	2 (50)	No flanges	6.70 (170)	6.19 (157)	9.15 (232)	3.50 (89)
AIV-2002-CF	2 (50)	Rotatable 3.38 CF	7.15 (181)	6.19 (157)	9.15 (232)	3.50 (89)
AIV-2002-NWB	2 (50)	NW-50B	7.00 (178)	6.19 (157)	9.15 (232)	3.50 (89)
AIV-250	2 1/2 (63)	No flanges	7.75 (197)	6.99 (178)	10.31 (262)	4.00 (100)
AIV-2502-CF	2 1/2 (63)	Rotatable 4.50 CF	8.50 (216)	6.99 (178)	10.31 (262)	4.00 (100)
AIV-2502-ISO	2 1/2 (63)	ISO-63-250-OF	8.25 (210)	6.99 (178)	10.31 (262)	4.00 (100)
AIV-300	3 (76)	No flanges	10.05 (255)	7.71 (196)	11.38 (289)	4.50 (114)
AIV-3002-CF	3 (76)	Rotatable 4.62 CF	10.61 (269)	7.71 (196)	11.38 (289)	4.50 (114)
AIV-3002-ISO	3 (76)	ISO-80-300-OF	10.55 (268)	7.71 (196)	11.38 (289)	4.50 (114)

Manual Copper Seal Bonnet Angle-In-Line Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D
CAIV-075	3/4 (19)	No flanges	3.70 (94)	3.47 (88)	4.01 (102)	2.73 (69)
CAIV-0752-CF	3/4 (19)	Rotatable 1.33 CF	4.70 (119)	3.47 (88)	4.01 (102)	2.73 (69)
CAIV-100	1 (25)	No flanges	3.90 (99.1)	3.42 (87)	4.14 (105)	2.73 (69)
CAIV-1002-CF	1 (25)	Rotatable 2.12 CF	4.48 (114)	3.42 (87)	4.14 (105)	2.73 (69)
CAIV-150	1 1/2 (38)	No flanges	4.82 (122)	4.55 (116)	5.61 (142)	3.25 (83)
CAIV-1502-CF	1 1/2 (38)	Rotatable 2.75 CF	5.24 (133)	4.55 (116)	5.61 (142)	3.25 (83)
CAIV-200	2 (50)	No flanges	6.70 (170)	6.19 (157)	9.15 (232)	4.05 (103)
CAIV-2002-CF	2 (50)	Rotatable 3.38 CF	7.15 (182)	6.19 (157)	9.15 (232)	4.05 (103)
CAIV-250	2 1/2 (63)	No flanges	7.75 (197)	6.99 (178)	10.31 (262)	4.61 (117)
CAIV-2502-CF	2 1/2 (63)	Rotatable 4.50 CF	8.50 (216)	6.99 (178)	10.31 (262)	4.61 (117)
CAIV-300	3 (76)	No flanges	10.05 (255)	7.71 (196)	11.38 (289)	5.62 (143)
CAIV-3002-CF	3 (76)	Rotatable 4.62 CF	10.61 (269)	7.71 (196)	11.38 (289)	5.62 (143)

SPECIFICATIONS

Port ODs: 3/8 to 3 inches (10 to 76mm)

Materials

Body: Electropolished 304 stainless steel
 Bellows: Welded AM-350 stainless steel
 Bonnet seal: Copper or FKM
 Poppet seal: FKM
 Other O-ring compounds available

Actuation: Self-lubricating bronze nuts with ACME threads

Differential pressure: Maximum 6 psi (0.4 bar) differential across the valve seat

Maximum temperature with FKM seals
 Sustained: ≤150°C
 Intermittent: ≤204°C

Vacuum range

FKM bonnet seal: ≥1x 10⁻⁹mbar - High Vacuum
 Copper bonnet seal: ≥1x 10⁻¹⁰mbar - UHV

Options: Fittings and O-rings. See page 103

Thermal: Heater jackets and controllers available for all valves. See page 127

CAIVP O-Ring & Gasket Kits

AIV O-Ring Kits

MODEL NUMBER	NOMINAL PORT OD
ESV-075-95	3/8-1 (10-25)
ESV-150-95	1 1/2 (38)
ESV-200-95	2 (50)
ESV-250-95	2 1/2 (63)
ESV-300-95	3 (76)

MODEL NUMBER	NOMINAL PORT OD
CSVP-075-95	3/8-1 (10-25)
CSVP-150-95	1 1/2 (38)
CSVP-200-95	2 (50)
CSVP-250-95	2 1/2 (63)
CSVP-300-95	3 (76)

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

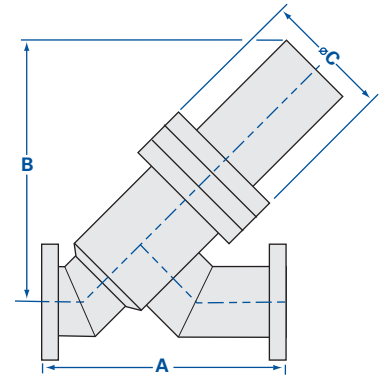
Isolation Valves

Pneumatic Angle-In-Line Poppet Valves



Pneumatic FKM Seal Angle-In-Line Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C
AIVP-075	3/4 (19)	No flanges	3.70 (94)	4.32 (110)	2.25 (57)
AIVP-0752-CF	3/4 (19)	Rotatable 1.33 CF	4.70 (119)	4.32 (110)	2.25 (57)
AIVP-0752-NWB	3/4 (19)	NW-16B	4.00 (102)	4.32 (110)	2.25 (57)
AIVP-100	1 (25)	No flanges	3.90 (99)	4.27 (108)	2.25 (57)
AIVP-1002-CF	1 (25)	Rotatable 2.12 CF	4.23 (107)	4.27 (108)	2.25 (57)
AIVP-1002-NWB	1 (25)	NW-25B	4.20 (107)	4.27 (108)	2.25 (57)
AIVP-150	1 1/2 (38)	No flanges	4.82 (122)	5.69 (145)	3.00 (76)
AIVP-1502-CF	1 1/2 (38)	Rotatable 2.75 CF	5.24 (133)	5.69 (145)	3.00 (76)
AIVP-1502-NWB	1 1/2 (38)	NW-40B	5.12 (130)	5.69 (145)	3.00 (76)
AIVP-200	2 (50)	No flanges	6.70 (170)	7.94 (202)	3.50 (89)
AIVP-2002-CF	2 (50)	Rotatable 3.38 CF	7.15 (182)	7.94 (202)	3.50 (89)
AIVP-2002-NWB	2 (50)	NW-50B	7.00 (178)	7.94 (202)	3.50 (89)
AIVP-250	2 1/2 (63)	No flanges	7.75 (197)	7.64 (194)	4.00 (100)
AIVP-2502-CF	2 1/2 (63)	Rotatable 4.50 CF	8.50 (216)	7.64 (194)	4.00 (100)
AIVP-2502-ISO	2 1/2 (63)	ISO-63-250-OF	8.25 (210)	7.64 (194)	4.00 (100)
AIVP-300	3 (76)	No flanges	10.05 (255)	8.7 (221)	4.50 (114)
AIVP-3002-CF	3 (76)	Rotatable 4.62 CF	10.61 (269)	8.7 (221)	4.50 (114)
AIVP-3002-ISO	3 (76)	ISO-80-300-OF	10.55 (268)	8.7 (221)	4.50 (114)



Pneumatic Copper Seal Bonnet Angle-In-Line Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C
CAIVP-075	3/4 (19)	No flanges	3.70 (94)	4.32 (110)	2.73 (69)
CAIVP-0752-CF	3/4 (19)	Rotatable 1.33 CF	4.70 (119)	4.32 (110)	2.73 (69)
CAIVP-100	1 (25)	No flanges	3.90 (99)	4.27 (108)	2.73 (69)
CAIVP-1002-CF	1 (25)	Rotatable 2.12 CF	4.48 (114)	4.27 (108)	2.73 (69)
CAIVP-150	1 1/2 (38)	No flanges	4.82 (122)	5.69 (145)	3.25 (82)
CAIVP-1502-CF	1 1/2 (38)	Rotatable 2.75 CF	5.24 (133)	5.69 (145)	3.25 (82)
CAIVP-200	2 (50)	No flanges	6.70 (170)	7.94 (202)	4.05 (103)
CAIVP-2002-CF	2 (50)	Rotatable 3.38 CF	7.15 (182)	7.94 (202)	4.05 (103)
CAIVP-250	2 1/2 (63)	No flanges	7.75 (197)	7.64 (194)	4.61 (117)
CAIVP-2502-CF	2 1/2 (63)	Rotatable 4.50 CF	8.50 (216)	7.64 (194)	4.61 (117)
CAIVP-300	3 (76)	No flanges	10.05 (255)	8.70 (221)	5.62 (143)
CAIVP-3002-CF	3 (76)	Rotatable 4.62 CF	10.61 (269)	8.70 (221)	5.62 (143)

SPECIFICATIONS

Port ODs: 3/8 to 3 inches (10 to 76mm).

Materials

Body: Electropolished 304 stainless steel
Bellows: Welded AM-350 stainless steel
Bonnet seal: Copper or FKM
Poppet seal: FKM
Other O-ring compounds available

Actuation:

Normally closed
 3/8 to 2 inch (9.5-50.8mm) ODs:
 Single Acting
 2 1/2 to 3 inch (63.5-76.2mm) ODs:
 Double Acting
See page 103 for more actuation options

Operating pressure: 60 to 80 psig (4-5.5 bar)

Differential pressure: Maximum 6psi (0.4 bar) differential across the valve seat

Maximum temperature with FKM seals

Sustained: ≤150°C
 Intermittent: ≤204°C

Vacuum range

FKM bonnet seal: ≥1x 10⁻⁹mbar - High Vacuum
 Copper bonnet seal: ≥1x 10⁻¹⁰mbar - UHV

Options: Fittings, O-rings, air solenoids, micro-switches and actuators. *See page 103*

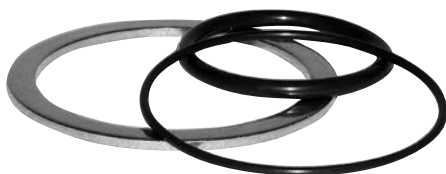
Thermal: Heater jackets and controllers available for all valves. *See page 127*

AIVP O-Ring Kits

MODEL NUMBER	NOMINAL PORT OD
ESVP-075-95	3/8-1 (10-25)
ESVP-150-95	1 1/2 (38)
ESVP-200-95	2 (50)
ESVP-250-95	2 1/2 (63)
ESVP-300-95	3 (76)

CAIVP O-Ring & Gasket Kits

MODEL NUMBER	NOMINAL PORT OD
CSVP-075-95	3/8-1 (10-25)
CSVP-150-95	1 1/2 (38)
CSVP-200-95	2 (50)
CSVP-250-95	2 1/2 (63)
CSVP-300-95	3 (76)



All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Isolation Valves

Manual In-Line Poppet Valves



SPECIFICATIONS

Port ODs: 3/8 to 3 inches (10 to 76mm)

Materials

Body: Electropolished 304 stainless steel
Bellows: Welded AM-350 stainless steel
Bonnet seal: Copper or FKM
Poppet seal: FKM
Other O-ring compounds available

Actuation: Self-lubricating bronze nuts with ACME threads

Differential pressure: Maximum 6 psi (0.4 bar) differential across the valve seat

Maximum temperature with FKM seals
 Sustained: $\leq 150^{\circ}\text{C}$
 Intermittent: $\leq 204^{\circ}\text{C}$

Vacuum range
 FKM bonnet seal: $\geq 1 \times 10^{-9}$ mbar - High Vacuum
 Copper bonnet seal: $\geq 1 \times 10^{-10}$ mbar - UHV

Options: Fittings and O-rings. See page 103

Thermal: Heater jackets and controllers available for all valves. See page 127

Manual FKM Seal In-Line Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D	E	F
ILV-038	3/8 (10)	No flanges	1.50 (38.1)	0.94 (24)	1.50 (38)	4.06 (103)	2.25 (57)	4.44 (113)
ILV-0382-CF	3/8 (10)	Rotatable 1.33 CF	1.60 (40.6)	0.94 (24)	1.50 (38)	4.06 (103)	2.25 (57)	4.44 (113)
ILV-0382-NWB	3/8 (10)	NW-10B	1.65 (41.91)	0.94 (24)	1.50 (38)	4.06 (103)	2.25 (57)	4.44 (113)
ILV-050	1/2 (13)	No flanges	1.50 (38.1)	1.00 (25)	1.62 (41)	4.19 (106)	2.25 (57)	4.69 (119)
ILV-0502-CF	1/2 (13)	Rotatable 1.33 CF	1.60 (40.6)	1.00 (25)	1.62 (41)	4.19 (106)	2.25 (57)	4.69 (119)
ILV-0502-NWB	1/2 (13)	NW-10B	1.65 (41.9)	1.00 (25)	1.62 (41)	4.19 (106)	2.25 (57)	4.69 (119)
ILV-075	3/4 (19)	No flanges	2.00 (50.8)	1.12 (28)	1.87 (47)	4.44 (113)	2.25 (57)	5.19 (132)
ILV-0752-CF	3/4 (19)	Rotatable 1.33 CF	2.50 (63.5)	1.12 (28)	1.87 (47)	4.44 (113)	2.25 (57)	5.19 (132)
ILV-0752-NWB	3/4 (19)	NW-16B	2.15 (54.6)	1.12 (28)	1.87 (47)	4.44 (113)	2.25 (57)	5.19 (132)
ILV-100	1 (25)	No flanges	1.88 (47.8)	1.37 (35)	2.25 (57)	4.69 (119)	2.25 (57)	5.69 (145)
ILV-1002-CF	1 (25)	Rotatable 2.12 CF	2.05 (52.1)	1.37 (35)	2.25 (57)	4.69 (119)	2.25 (57)	5.69 (145)
ILV-1002-NWB	1 (25)	NW-25B	2.03 (51.6)	1.37 (35)	2.25 (57)	4.69 (119)	2.25 (57)	5.69 (145)
ILV-150	1 1/2 (38)	No flanges	2.25 (57.2)	1.88 (48)	3.12 (79)	6.52 (166)	3.00 (76)	8.02 (204)
ILV-1502-CF	1 1/2 (38)	Rotatable 2.75 CF	2.46 (62.5)	1.88 (48)	3.12 (79)	6.52 (166)	3.00 (76)	8.02 (204)
ILV-1502-NWB	1 1/2 (38)	NW-40B	2.40 (61.0)	1.88 (48)	3.12 (79)	6.52 (166)	3.00 (76)	8.02 (204)
ILV-200	2 (50)	No flanges	3.25 (82.6)	2.62 (67)	4.12 (105)	8.73 (222)	3.50 (89)	10.73 (273)
ILV-2002-CF	2 (50)	Rotatable 3.38 CF	3.48 (88.4)	2.62 (67)	4.12 (105)	8.73 (222)	3.50 (89)	10.73 (273)
ILV-2002-NWB	2 (50)	NW-50B	3.40 (86.4)	2.62 (67)	4.12 (105)	8.73 (222)	3.50 (89)	10.73 (273)
ILV-2002-ASA	2 (50)	Rotatable ASA-5-200R	3.50 (88.9)	2.62 (67)	4.12 (105)	8.73 (222)	3.50 (89)	10.73 (273)
ILV-250	2 1/2 (63)	No flanges	3.00 (76.2)	3.12 (79)	4.93 (125)	10.2 (259)	4.00 (102)	12.7 (323)
ILV-2502-CF	2 1/2 (63)	Rotatable 4.50 CF	3.38 (85.9)	3.12 (79)	4.93 (125)	10.2 (259)	4.00 (102)	12.7 (323)
ILV-2502-ISO	2 1/2 (63)	ISO-63-250-OF	3.25 (82.6)	3.12 (79)	4.93 (125)	10.2 (259)	4.00 (102)	12.7 (323)
ILV-2502-ASA	2 1/2 (63)	Rotatable ASA-5-250R	3.25 (82.6)	3.12 (79)	4.93 (125)	10.2 (259)	4.00 (102)	12.7 (323)
ILV-300	3 (76)	No flanges	3.25 (82.6)	3.68 (93)	5.62 (143)	11.04 (280)	4.50 (114)	14.04 (357)
ILV-3002-CF	3 (76)	Rotatable 4.62 CF	3.53 (89.7)	3.68 (93)	5.62 (143)	11.04 (280)	4.50 (114)	14.04 (357)
ILV-3002-ISO	3 (76)	ISO-80-300-OF	3.50 (88.9)	3.68 (93)	5.62 (143)	11.04 (280)	4.50 (114)	14.04 (357)
ILV-3002-ASA	3 (76)	Rotatable ASA-6-300R	3.50 (88.9)	3.68 (93)	5.62 (143)	11.04 (280)	4.50 (114)	14.04 (357)

Manual Copper Seal Bonnet In-Line Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D	E	F
CILV-038	3/8 (10)	No flanges	1.50 (38.1)	0.94 (24)	1.50 (38)	4.06 (103)	2.73 (69)	4.44 (113)
CILV-0382-CF	3/8 (10)	Rotatable 1.33 CF	1.60 (40.6)	0.94 (24)	1.50 (38)	4.06 (103)	2.73 (69)	4.44 (113)
CILV-050	1/2 (13)	No flanges	1.50 (38.1)	1.00 (25)	1.62 (41)	4.19 (106)	2.73 (69)	4.69 (119)
CILV-0502-CF	1/2 (13)	Rotatable 1.33 CF	1.60 (40.6)	1.00 (25)	1.62 (41)	4.19 (106)	2.73 (69)	4.69 (119)
CILV-075	3/4 (19)	No flanges	2.00 (50.8)	1.12 (28)	1.87 (47)	4.44 (113)	2.73 (69)	5.19 (132)
CILV-0752-CF	3/4 (19)	Rotatable 1.33 CF	2.50 (63.5)	1.12 (28)	1.87 (47)	4.44 (113)	2.73 (69)	5.19 (132)
CILV-100	1 (25)	No flanges	1.88 (47.8)	1.37 (35)	2.25 (57)	4.69 (119)	2.73 (69)	5.69 (145)
CILV-1002-CF	1 (25)	Rotatable 2.12 CF	2.05 (52.1)	1.37 (35)	2.25 (57)	4.69 (119)	2.73 (69)	5.69 (145)
CILV-150	1 1/2 (38)	No flanges	2.25 (57.2)	1.88 (48)	3.12 (79)	6.52 (166)	3.25 (83)	8.02 (204)
CILV-1502-CF	1 1/2 (38)	Rotatable 2.75 CF	2.46 (62.5)	1.88 (48)	3.12 (79)	6.52 (166)	3.25 (83)	8.02 (204)
CILV-200	2 (50)	No flanges	3.25 (82.6)	2.62 (67)	4.12 (105)	8.73 (222)	4.05 (103)	10.73 (273)
CILV-2002-CF	2 (50)	Rotatable 3.38 CF	3.48 (88.4)	2.62 (67)	4.12 (105)	8.73 (222)	4.05 (103)	10.73 (273)
CILV-250	2 1/2 (63)	No flanges	3.00 (76.2)	3.12 (79)	4.93 (125)	10.2 (259)	4.61 (117)	12.7 (323)
CILV-2502-CF	2 1/2 (63)	Rotatable 4.50 CF	3.38 (85.9)	3.12 (79)	4.93 (125)	10.2 (259)	4.61 (117)	12.7 (323)
CILV-300	3 (76)	No flanges	3.25 (82.6)	3.62 (92)	5.55 (141)	11.04 (280)	5.62 (143)	14.04 (357)
CILV-3002-CF	3 (76)	Rotatable 4.62 CF	3.53 (89.7)	3.62 (92)	5.55 (141)	11.04 (280)	5.62 (143)	14.04 (357)

ILV O-Ring Kits

MODEL NUMBER	NOMINAL PORT OD
ESV-075-95	3/8-1 (10-25)
ESV-150-95	1 1/2 (38)
ESV-200-95	2 (50)
ESV-250-95	2 1/2 (63)
ESV-300-95	3 (76)

CILV O-Ring and Gasket Kits

MODEL NUMBER	NOMINAL PORT OD
CSV-075-95	3/8-1 (10-25)
CSV-150-95	1 1/2 (38)
CSV-200-95	2 (50)
CSV-250-95	2 1/2 (63)
CSV-300-95	3 (76)

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Isolation Valves

Pneumatic In-Line Poppet Valves



Pneumatic FKM Seal In-Line Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D	E	F
ILVP-038	3/8(10)	No flanges	1.50 (38.1)	0.94 (24)	1.50 (38)	3.62 (92)	2.25 (57)	5.76 (146)
ILVP-0382-CF	3/8(10)	Rotatable 1.33 CF	1.60 (40.6)	0.94 (24)	1.50 (38)	3.62 (92)	2.25 (57)	5.76 (146)
ILVP-0382-NWB	3/8(10)	NW-10B	1.65 (41.9)	0.94 (24)	1.50 (38)	3.62 (92)	2.25 (57)	5.76 (146)
ILVP-050	1/2(12)	No flanges	1.50 (38.1)	1.00 (25)	1.62 (41)	3.75 (95)	2.25 (57)	5.89 (150)
ILVP-0502-CF	1/2(12)	Rotatable 1.33 CF	1.60 (40.6)	1.00 (25)	1.62 (41)	3.75 (95)	2.25 (57)	5.89 (150)
ILVP-0502-NWB	1/2(12)	NW-10B	1.65 (41.9)	1.00 (25)	1.62 (41)	3.75 (95)	2.25 (57)	5.89 (150)
ILVP-075	3/4(19)	No flanges	2.00 (50.8)	1.12 (28)	1.87 (47)	4.00 (102)	2.25 (57)	6.14 (156)
ILVP-0752-CF	3/4(19)	Rotatable 1.33 CF	2.50 (63.5)	1.12 (28)	1.87 (47)	4.00 (102)	2.25 (57)	6.14 (156)
ILVP-0752-NWB	3/4(19)	NW-16B	2.15 (54.6)	1.12 (28)	1.87 (47)	4.00 (102)	2.25 (57)	6.14 (156)
ILVP-100	1 (25)	No flanges	1.88 (47.8)	1.37 (35)	2.25 (57)	4.25 (108)	2.25 (57)	6.39 (162)
ILVP-1002-CF	1 (25)	Rotatable 2.12 CF	2.05 (52.1)	1.37 (35)	2.25 (57)	4.25 (108)	2.25 (57)	6.39 (162)
ILVP-1002-NWB	1 (25)	NW-25B	2.03 (51.6)	1.37 (35)	2.25 (57)	4.25 (108)	2.25 (57)	6.39 (162)
ILVP-150	1 1/2(38)	No flanges	2.25 (57.2)	1.88 (48)	3.12 (79)	5.86 (149)	3.00 (76)	8.45 (215)
ILVP-1502-CF	1 1/2(38)	Rotatable 2.75 CF	2.46 (62.5)	1.88 (48)	3.12 (79)	5.86 (149)	3.00 (76)	8.45 (215)
ILVP-1502-NWB	1 1/2(38)	NW-40B	2.40 (61.0)	1.88 (48)	3.12 (79)	5.86 (149)	3.00 (76)	8.45 (215)
ILVP-200	2 (50)	No flanges	3.25 (82.6)	2.62 (67)	4.12 (105)	7.62 (194)	3.50 (89)	12.11 (308)
ILVP-2002-CF	2 (50)	Rotatable 3.38 CF	3.48 (88.4)	2.62 (67)	4.12 (105)	7.62 (194)	3.50 (89)	12.11 (308)
ILVP-2002-NWB	2 (50)	NW-50B	3.40 (86.4)	2.62 (67)	4.12 (105)	7.62 (194)	3.50 (89)	12.11 (308)
ILVP-2002-ASA	2 (50)	Rotatable ASA-5-200R	3.50 (88.9)	2.62 (67)	4.12 (105)	7.62 (194)	3.50 (89)	12.11 (308)
ILVP-250	2 1/2(63)	No flanges	3.00 (76.2)	3.12 (79)	4.93 (125)	9.11 (231)	4.00 (102)	12.03 (306)
ILVP-2502-CF	2 1/2(63)	Rotatable 4.50 CF	3.38 (85.9)	3.12 (79)	4.93 (125)	9.11 (231)	4.00 (102)	12.03 (306)
ILVP-2502-ISO	2 1/2(63)	ISO-63-250-OF	3.25 (82.6)	3.12 (79)	4.93 (125)	9.11 (231)	4.00 (102)	12.03 (306)
ILVP-2502-ASA	2 1/2(63)	Rotatable ASA-5-250R	3.50 (88.9)	3.12 (79)	4.93 (125)	9.11 (231)	4.00 (102)	12.03 (306)
ILVP-300	3 (76)	No flanges	3.25 (82.6)	3.68 (93)	5.62 (143)	9.98 (253)	4.50 (114)	13.38 (340)
ILVP-3002-CF	3 (76)	Rotatable 4.62 CF	3.53 (89.7)	3.68 (93)	5.62 (143)	9.98 (253)	4.50 (114)	13.38 (340)
ILVP-3002-ISO	3 (76)	ISO-80-300-OF	3.50 (88.9)	3.68 (93)	5.62 (143)	9.98 (253)	4.50 (114)	13.38 (340)
ILVP-3002-ASA	3 (76)	Rotatable ASA-6-300R	3.50 (88.9)	3.68 (93)	5.62 (143)	9.98 (253)	4.50 (114)	13.38 (340)
ILVP-400	4 (100)	No flanges	4.22 (107)	4.88 (124)	7.38 (187)	12.83 (326)	6.50 (165)	18.27 (464)
ILVP-4002-CF	4 (100)	Rotatable 6.00 CF	4.66 (118)	4.88 (124)	7.38 (187)	12.83 (326)	6.50 (165)	18.27 (464)
ILVP-4002-ISO	4 (100)	ISO-100-400-OF	4.47 (114)	4.88 (124)	7.38 (187)	12.83 (326)	6.50 (165)	18.27 (464)
ILVP-4002-ASA	4 (100)	Rotatable ASA-7.5-400R	4.47 (114)	4.88 (124)	7.38 (187)	12.83 (326)	6.50 (165)	18.27 (464)

SPECIFICATIONS

Port ODs: 3/8 to 4 inches (10 to 100mm)

Materials

Body: Electropolished 304 stainless steel
 Bellows: Welded AM-350 stainless steel
 Bonnet seal: Copper or FKM
 Poppet seal: FKM
 Other O-ring compounds available

Actuation:

Normally closed
 3/8 to 2 inch (9.5-50.8mm) ODs:
 Single Acting
 2 1/2 to 4 inch (63.5-102mm) ODs:
 Double Acting
 See page 103 for more actuation options

Operating pressure:

60 to 80 psig (4-5.5 bar)

Differential pressure:

Maximum 6 psi (0.4 bar) differential across the valve seat

Maximum temperature with FKM seals

Sustained: ≤150°C
 Intermittent: ≤204°C

Vacuum range

FKM bonnet seal: ≥1x 10⁻⁹mbar-High Vacuum
 Copper bonnet seal: ≥1x 10⁻¹⁰mbar - UHV

Options:

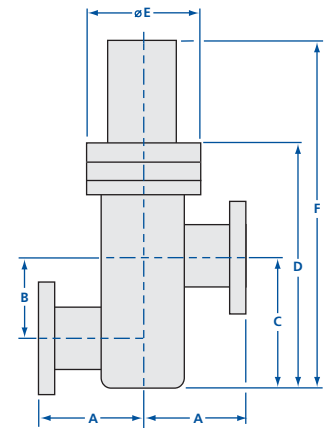
Fittings, O-rings, air solenoids, micro-switches and actuators. See page 103

Thermal:

Heater jackets and controllers available for all valves. See page 127

Pneumatic Copper Seal Bonnet In-Line Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D	E	F
CILVP-038	3/8(10)	No flanges	1.50 (38.1)	0.94 (24)	1.50 (38)	3.74 (95)	2.73 (69)	5.76 (146)
CILVP-0382-CF	3/8(10)	Rotatable 1.33 CF	1.60 (40.6)	0.94 (24)	1.50 (38)	3.74 (95)	2.73 (69)	5.76 (146)
CILVP-050	1/2(12)	No flanges	1.50 (38.1)	1.00 (25)	1.62 (41)	3.88 (99)	2.73 (69)	5.89 (150)
CILVP-0502-CF	1/2(12)	Rotatable 1.33 CF	1.60 (40.6)	1.00 (25)	1.62 (41)	3.88 (99)	2.73 (69)	5.89 (150)
CILVP-075	3/4(19)	No flanges	2.00 (50.8)	1.12 (28)	1.87 (47)	4.12 (105)	2.73 (69)	6.14 (156)
CILVP-0752-CF	3/4(19)	Rotatable 1.33 CF	2.50 (63.5)	1.12 (28)	1.87 (47)	4.12 (105)	2.73 (69)	6.14 (156)
CILVP-100	1 (25)	No flanges	1.88 (47.8)	1.37 (35)	2.25 (57)	4.38 (111)	2.73 (69)	6.39 (162)
CILVP-1002-CF	1 (25)	Rotatable 2.12 CF	2.05 (52.1)	1.37 (35)	2.25 (57)	4.38 (111)	2.73 (69)	6.39 (162)
CILVP-150	1 1/2(38)	No flanges	2.25 (57.2)	1.88 (48)	3.12 (79)	5.86 (149)	3.25 (83)	8.44 (214)
CILVP-1502-CF	1 1/2(38)	Rotatable 2.75 CF	2.46 (62.5)	1.88 (48)	3.12 (79)	5.86 (149)	3.25 (83)	8.44 (214)
CILVP-200	2 (50)	No flanges	3.25 (82.6)	2.62 (67)	4.12 (105)	7.50 (191)	4.05 (103)	12.11 (308)
CILVP-2002-CF	2 (50)	Rotatable 3.38 CF	3.48 (88.4)	2.62 (67)	4.12 (105)	7.50 (191)	4.05 (103)	12.11 (308)
CILVP-250	2 1/2(63)	No flanges	3.00 (76.2)	3.12 (79)	4.93 (125)	9.11 (231)	4.61 (117)	12.03 (306)
CILVP-2502-CF	2 1/2(63)	Rotatable 4.50 CF	3.38 (85.9)	3.12 (79)	4.93 (125)	9.11 (231)	4.61 (117)	12.03 (306)
CILVP-300	3 (76)	No flanges	3.25 (82.6)	3.62 (92)	5.55 (141)	9.98 (253)	5.62 (143)	13.38 (340)
CILVP-3002-CF	3 (76)	Rotatable 4.62 CF	3.53 (89.7)	3.62 (92)	5.55 (141)	9.98 (253)	5.62 (143)	13.38 (340)
CILVP-400	4 (100)	No flanges	4.22 (107)	4.88 (124)	7.38 (187)	12.83 (326)	6.73 (171)	18.27 (464)
CILVP-4002-CF	4 (100)	Rotatable 6.00 CF	4.66 (118)	4.88 (124)	7.38 (187)	12.83 (326)	6.73 (171)	18.27 (464)



ILVP O-Ring Kits

MODEL NUMBER	NOMINAL PORT OD
ESVP-075-95	3/8-1 (10-25)
ESVP-150-95	1 1/2(38)
ESVP-200-95	2 (50)
ESVP-250-95	2 1/2(63)
ESVP-300-95	3 (76)
ESVP-400-95	4 (100)

CILVP O-Ring & Gasket Kits

MODEL NUMBER	NOMINAL PORT OD
CSVP-075-95	3/8-1 (10-25)
CSVP-150-95	1 1/2(38)
CSVP-200-95	2 (50)
CSVP-250-95	2 1/2(63)
CSVP-300-95	3 (76)
CSVP-400-95	4 (100)

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Isolation Valves

Manual Tee Poppet Valves



Manual FKM Seal Tee Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D
ESV-038T	3/8 (10)	No flanges	1.50 (38.1)	4.06 (103)	4.44 (113)	2.25 (57)
ESV-0383T-CF	3/8 (10)	Rotatable 1.33 CF	1.60 (40.6)	4.16 (106)	4.54 (115)	2.25 (57)
ESV-0383T-NWB	3/8 (10)	NW-10B	1.65 (41.9)	4.21 (107)	4.59 (117)	2.25 (57)
ESV-050T	1/2 (12)	No flanges	1.50 (38.1)	4.06 (103)	4.56 (116)	2.25 (57)
ESV-0503T-CF	1/2 (12)	Rotatable 1.33 CF	1.60 (40.6)	4.16 (106)	4.54 (115)	2.25 (57)
ESV-0503T-NWB	1/2 (12)	NW-10B	1.65 (41.9)	4.21 (107)	4.71 (120)	2.25 (57)
ESV-075T	3/4 (19)	No flanges	2.00 (50.8)	4.56 (116)	5.31 (135)	2.25 (57)
ESV-0753T-CF	3/4 (19)	Rotatable 1.33 CF	2.50 (63.5)	5.06 (129)	5.81 (148)	2.25 (57)
ESV-0753T-NWB	3/4 (19)	NW-16B	2.15 (54.6)	4.71 (120)	5.46 (139)	2.25 (57)
ESV-100T	1 (25)	No flanges	1.88 (47.8)	4.32 (110)	5.32 (135)	2.25 (57)
ESV-1003T-CF	1 (25)	Rotatable 2.12 CF	2.05 (52.1)	4.49 (114)	5.49 (140)	2.25 (57)
ESV-1003T-NWB	1 (25)	NW-25B	2.03 (51.6)	4.47 (114)	5.47 (139)	2.25 (57)
ESV-150T	1 1/2 (38)	No flanges	2.25 (57.2)	5.63 (143)	7.13 (181)	3.00 (76)
ESV-1503T-CF	1 1/2 (38)	Rotatable 2.75 CF	2.46 (62.5)	5.84 (148)	7.34 (186)	3.00 (76)
ESV-1503T-NWB	1 1/2 (38)	NW-40B	2.40 (61.0)	5.78 (147)	7.28 (185)	3.00 (76)
ESV-200T	2 (50)	No flanges	3.25 (82.6)	7.85 (199)	9.85 (250)	3.50 (89)
ESV-2003T-CF	2 (50)	Rotatable 3.38 CF	3.48 (88.4)	8.08 (205)	10.08 (256)	3.50 (89)
ESV-2003T-NWB	2 (50)	NW-50B	3.40 (86.4)	8.00 (203)	10.00 (254)	3.50 (89)
ESV-2003T-ASA	2 (50)	Rotatable ASA-5-200R	3.25 (82.6)	8.10 (206)	10.10 (257)	3.50 (89)
ESV-250T	2 1/2 (63)	No flanges	3.00 (76.2)	8.27 (210)	10.77 (274)	4.00 (100)
ESV-2503T-CF	2 1/2 (63)	Rotatable 4.50 CF	3.38 (85.9)	8.65 (220)	11.15 (283)	4.00 (100)
ESV-2503T-ISO	2 1/2 (63)	ISO-63-250-OF	3.25 (82.6)	8.52 (216)	11.02 (280)	4.00 (100)
ESV-2503T-ASA	2 1/2 (63)	Rotatable ASA-5-250R	3.25 (82.6)	8.52 (216)	11.02 (280)	4.00 (100)
ESV-300T	3 (76)	No flanges	3.25 (82.6)	8.68 (220)	11.68 (297)	4.50 (114)
ESV-3003T-CF	3 (76)	Rotatable 4.62 CF	3.53 (89.7)	8.96 (228)	11.96 (304)	4.50 (114)
ESV-3003T-ISO	3 (76)	ISO-80-300-OF	3.50 (88.9)	8.93 (227)	11.93 (303)	4.50 (114)
ESV-3003T-ASA	3 (76)	Rotatable ASA-6-300R	3.50 (88.9)	8.93 (227)	11.93 (303)	4.50 (114)

SPECIFICATIONS

Port ODs: 3/8 to 3 inches (10 to 76mm)

Materials

Body: Electropolished 304 stainless steel
 Bellows: Welded AM-350 stainless steel
 Bonnet seal: Copper or FKM
 Poppet seal: FKM
Other O-ring compounds available

Actuation: Self-lubricating bronze nuts with ACME threads

Differential pressure: Maximum 6 psi (0.4 bar) differential across the valve seat

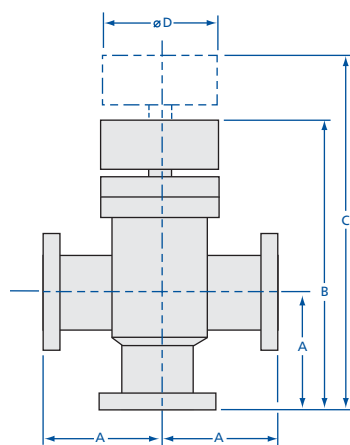
Maximum temperature with FKM seals
 Sustained: ≤150°C
 Intermittent: ≤204°C

Vacuum range

FKM bonnet seal: ≥1x 10⁻⁹ mbar - High Vacuum
 Copper bonnet seal: ≥1x 10⁻¹⁰ mbar - UHV

Options: Fittings and O-rings. See page 103

Thermal: Heater jackets and controllers available for all valves. See page 127



Manual Copper Seal Bonnet Tee Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D
CSV-038T	3/8 (10)	No flanges	1.50 (38.1)	4.06 (103)	4.44 (113)	2.73 (69)
CSV-0383T-CF	3/8 (10)	Rotatable 1.33 CF	1.60 (40.6)	4.16 (106)	4.54 (115)	2.73 (69)
CSV-050T	1/2 (12)	No flanges	1.50 (38.1)	4.06 (103)	4.56 (116)	2.73 (69)
CSV-0503T-CF	1/2 (12)	Rotatable 1.33 CF	1.60 (40.6)	4.16 (106)	4.66 (118)	2.73 (69)
CSV-075T	3/4 (19)	No flanges	2.00 (50.8)	4.56 (116)	5.31 (135)	2.73 (69)
CSV-0753T-CF	3/4 (19)	Rotatable 1.33 CF	2.50 (63.5)	5.06 (129)	5.81 (148)	2.73 (69)
CSV-100T	1 (25)	No flanges	1.88 (47.8)	4.32 (110)	5.32 (135)	2.73 (69)
CSV-1003T-CF	1 (25)	Rotatable 2.12 CF	2.05 (52.1)	4.49 (114)	5.49 (139)	2.73 (69)
CSV-150T	1 1/2 (38)	No flanges	2.25 (57.2)	5.63 (143)	7.13 (181)	3.25 (83)
CSV-1503T-CF	1 1/2 (38)	Rotatable 2.75 CF	2.46 (62.5)	5.84 (148)	7.34 (186)	3.25 (83)
CSV-200T	2 (50)	No flanges	3.25 (82.6)	7.85 (199)	9.85 (250)	4.05 (103)
CSV-2003T-CF	2 (50)	Rotatable 3.38 CF	3.48 (88.4)	8.08 (205)	10.08 (256)	4.05 (103)
CSV-250T	2 1/2 (63)	No flanges	3.00 (76.2)	8.27 (210)	10.77 (274)	4.61 (117)
CSV-2503T-CF	2 1/2 (63)	Rotatable 3.38 CF	3.38 (85.9)	8.65 (220)	11.15 (283)	4.61 (117)
CSV-300T	3 (76)	No flanges	3.25 (82.6)	8.68 (220)	11.68 (297)	5.62 (143)
CSV-3003T-CF	3 (76)	Rotatable 4.62 CF	3.53 (89.7)	8.96 (228)	11.96 (304)	5.62 (143)

CSV-T O-Ring & Gasket Kits

ESV-T O-Ring Kits

MODEL NUMBER	NOMINAL PORT OD
ESV-075-95	3/8-1 (10-25)
ESV-150-95	1 1/2 (38)
ESV-200-95	2 (50)
ESV-250-95	2 1/2 (63)
ESV-300-95	3 (76)

MODEL NUMBER	NOMINAL PORT OD
CSV-075-95	3/8-1 (10-25)
CSV-150-95	1 1/2 (38)
CSV-200-95	2 (50)
CSV-250-95	2 1/2 (63)
CSV-300-95	3 (76)

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Isolation Valves

Pneumatic Tee Poppet Valves



Pneumatic FKM Seal Tee Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D
ESVP-038T	3/8(10)	No flanges	1.50 (38.1)	3.62 (92)	5.77 (147)	2.25 (57)
ESVP-0383T-CF	3/8(10)	Rotatable 1.33 CF	1.60 (40.6)	3.67 (93)	5.87 (149)	2.25 (57)
ESVP-0383T-NWB	3/8(10)	NW-10B	1.65 (41.9)	3.77 (96)	5.92 (150)	2.25 (57)
ESVP-050T	1/2(12)	No flanges	1.50 (38.1)	3.62 (92)	5.77 (147)	2.25 (57)
ESVP-0503T-CF	1/2(12)	Rotatable 1.33 CF	1.60 (40.6)	3.67 (93)	5.87 (149)	2.25 (57)
ESVP-0503T-NWB	1/2(12)	NW-10B	1.65 (41.9)	3.77 (96)	5.92 (150)	2.25 (57)
ESVP-075T	3/4(19)	No flanges	2.00 (50.8)	4.12 (105)	6.26 (159)	2.25 (57)
ESVP-0753T-CF	3/4(19)	Rotatable 1.33 CF	2.50 (63.5)	4.62 (117)	6.76 (172)	2.25 (57)
ESVP-0753T-NWB	3/4(19)	NW-16B	2.15 (54.6)	4.27 (108)	6.41 (163)	2.25 (57)
ESVP-100T	1 (25)	No flanges	1.88 (47.8)	3.88 (99.0)	6.02 (153)	2.25 (57)
ESVP-1003T-CF	1 (25)	Rotatable 2.12 CF	2.05 (52.1)	4.05 (102)	6.19 (157)	2.25 (57)
ESVP-1003T-NWB	1 (25)	NW-25B	2.03 (51.6)	4.03 (102)	6.17 (157)	2.25 (57)
ESVP-150T	1 1/2(38)	No flanges	2.25 (57.2)	4.98 (126)	7.56 (192)	3.00 (76)
ESVP-1503T-CF	1 1/2(38)	Rotatable 2.75 CF	2.45 (62.2)	5.19 (132)	7.77 (197)	3.00 (76)
ESVP-1503T-NWB	1 1/2(38)	NW-40B	2.40 (61.0)	5.13 (130)	7.71 (196)	3.00 (76)
ESVP-200T	2 (50)	No flanges	3.25 (82.6)	6.74 (171)	11.23 (285)	3.50 (89)
ESVP-2003T-CF	2 (50)	Rotatable 3.38 CF	3.48 (88.4)	6.97 (177)	11.46 (291)	3.50 (89)
ESVP-2003T-NWB	2 (50)	NW-50B	3.40 (86.4)	6.89 (175)	11.38 (289)	3.50 (89)
ESVP-2003T-ASA	2 (50)	Rotatable ASA-5-200R	3.50 (88.9)	6.99 (178)	11.48 (292)	3.50 (89)
ESVP-250T	2 1/2(63)	No flanges	3.00 (76.2)	7.18 (182)	10.10 (257)	4.00 (100)
ESVP-2503T-CF	2 1/2(63)	Rotatable 4.50 CF	3.38 (85.9)	7.56 (192)	10.48 (266)	4.00 (100)
ESVP-2503T-ISO	2 1/2(63)	ISO-63-250-OF	3.25 (82.6)	7.43 (189)	10.35 (263)	4.00 (100)
ESVP-2503T-ASA	2 1/2(63)	Rotatable ASA-5-250R	3.25 (82.6)	7.43 (189)	10.35 (263)	4.00 (100)
ESVP-300T	3 (76)	No flanges	3.25 (82.6)	7.62 (194)	11.00 (279)	4.50 (114)
ESVP-3003T-CF	3 (76)	Rotatable 4.62 CF	3.53 (89.7)	7.90 (201)	11.28 (287)	4.50 (114)
ESVP-3003T-ISO	3 (76)	ISO-80-300-OF	3.50 (88.9)	7.87 (200)	11.25 (286)	4.50 (114)
ESVP-3003T-ASA	3 (76)	Rotatable ASA-6-300R	3.50 (88.9)	7.87 (200)	11.25 (286)	4.50 (114)
ESVP-400T	4 (100)	No flanges	4.22 (107)	9.55 (243)	14.99 (381)	6.50 (165)
ESVP-4003T-CF	4 (100)	Rotatable 6.00 CF	4.66 (118)	9.99 (254)	14.43 (392)	6.50 (165)
ESVP-4003T-ISO	4 (100)	ISO-100-400-OF	4.47 (114)	9.80 (249)	15.24 (387)	6.50 (165)
ESVP-4003T-ASA	4 (100)	Rotatable ASA-7.5-400R	4.47 (114)	9.80 (249)	15.24 (387)	6.50 (165)

SPECIFICATIONS

Port ODs: 3/8 to 4 inches (10 to 100mm)

Materials

Body: Electropolished 304 stainless steel
 Bellows: Welded AM-350 stainless steel
 Bonnet seal: Copper or FKM
 Poppet seal: FKM
 Other O-ring compounds available

Actuation: Normally closed

3/8 to 2 inch (9.5-50.8mm) ODs:

Single Acting

2 1/2 to 4 inch (63.5-102mm) ODs:

Double Acting

See page 103 for more actuation options

Operating pressure: 60 to 80 psig (4-5.5 bar)

Differential pressure: Maximum 6 psi (0.4 bar) differential across the valve seat

Maximum temperature with FKM seals

Sustained: ≤150°C

Intermittent: ≤204°C

Vacuum range

FKM bonnet seal: ≥1x 10⁻⁹mbar - High Vacuum

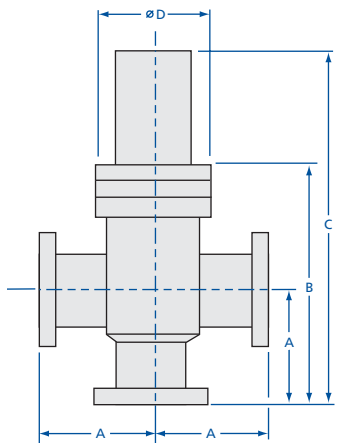
Copper bonnet seal: ≥1x 10⁻¹⁰mbar - UHV

Options: Fittings, O-rings, air solenoids, micro-switches and actuators. See page 103

Thermal: Heater jackets and controllers available for all valves. See page 127

Pneumatic Copper Seal Bonnet Tee Valves

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION	A	B	C	D
CSVP-038T	3/8(10)	No flanges	1.50 (38.1)	3.75 (95)	5.77 (147)	2.73 (69)
CSVP-0383T-CF	3/8(10)	Rotatable 1.33 CF	1.60 (40.6)	3.85 (98)	5.82 (148)	2.73 (69)
CSVP-050T	1/2(12)	No flanges	1.50 (38.1)	3.75 (95)	5.77 (147)	2.73 (69)
CSVP-0503T-CF	1/2(12)	Rotatable 1.33 CF	1.60 (40.6)	3.85 (98)	5.82 (148)	2.73 (69)
CSVP-075T	3/4(19)	No flanges	2.00 (50.8)	4.25 (108)	6.26 (159)	2.73 (69)
CSVP-0753T-CF	3/4(19)	Rotatable 1.33 CF	2.50 (63.5)	4.75 (121)	6.76 (172)	2.73 (69)
CSVP-100T	1 (25)	No flanges	1.88 (47.8)	4.00 (102)	6.02 (153)	2.73 (69)
CSVP-1003T-CF	1 (25)	Rotatable 2.12 CF	2.05 (52.1)	4.17 (106)	6.19 (157)	2.73 (69)
CSVP-150T	1 1/2(38)	No flanges	2.25 (57.2)	4.98 (126)	7.56 (192)	3.25 (83)
CSVP-1503T-CF	1 1/2(38)	Rotatable 2.75 CF	2.46 (62.5)	5.19 (132)	7.77 (197)	3.25 (83)
CSVP-200T	2 (50)	No flanges	3.25 (82.6)	6.62 (168)	11.23 (285)	4.05 (103)
CSVP-2003T-CF	2 (50)	Rotatable 3.38 CF	3.48 (88.4)	6.85 (174)	10.58 (269)	4.05 (103)
CSVP-250T	2 1/2(63)	No flanges	3.00 (76.2)	7.18 (182)	10.10 (257)	4.61 (117)
CSVP-2503T-CF	2 1/2(63)	Rotatable 4.50 CF	3.38 (85.9)	7.56 (192)	10.48 (266)	4.61 (117)
CSVP-300T	3 (76)	No flanges	3.25 (82.6)	7.62 (194)	11.00 (279)	5.62 (143)
CSVP-3003T-CF	3 (76)	Rotatable 4.62 CF	3.53 (89.7)	7.90 (201)	11.28 (287)	5.62 (143)
CSVP-400T	4 (100)	No flanges	4.22 (107.2)	9.55 (243)	14.99 (381)	6.73 (171)
CSVP-4003T-CF	4 (100)	Rotatable 6.00 CF	4.66 (118.4)	9.99 (254)	15.43 (392)	6.73 (171)



ESVP-T O-Ring Kits

MODEL NUMBER	NOMINAL PORT OD
ESVP-075-95	3/8-1 (10-25)
ESVP-150-95	1 1/2(38)
ESVP-200-95	2 (50)
ESVP-250-95	2 1/2(63)
ESVP-300-95	3 (76)
ESVP-400-95	4 (100)

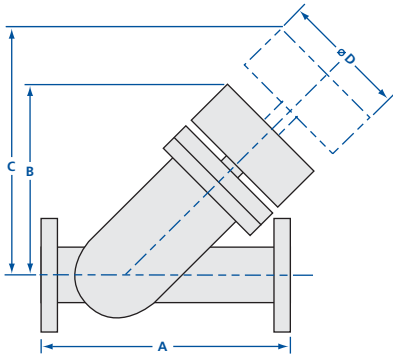
CSVP-T O-Ring & Gasket Kits

MODEL NUMBER	NOMINAL PORT OD
CSVP-075-95	3/8-1 (10-25)
CSVP-150-95	1 1/2(38)
CSVP-200-95	2 (50)
CSVP-250-95	2 1/2(63)
CSVP-300-95	3 (76)
CSVP-400-95	4 (100)

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Isolation Valves

Straight-Through Poppet Valves



SPECIFICATIONS

Port ODs: 3/4 to 1 1/2 inches (19 to 38mm)

Materials

Body: Electropolished 304 stainless steel
Bellows: Welded AM-350 stainless steel
Bonnet seal: Copper or FKM
Poppet seal: FKM
Other O-ring compounds available

Manual actuation: Self-lubricating bronze nuts with ACME threads

Pneumatic actuation: Normally closed
 3/4 inch (19.05mm) ODs:
 Single Acting
 1 1/8 to 1 1/2 inch (29-38mm) ODs:
 Double Acting
See page 103 for more actuation options

Operating pressure: 60 to 80 psig (4-5.5 bar)

Differential pressure: Maximum 20psi (1.4bar) differential across the valve seat

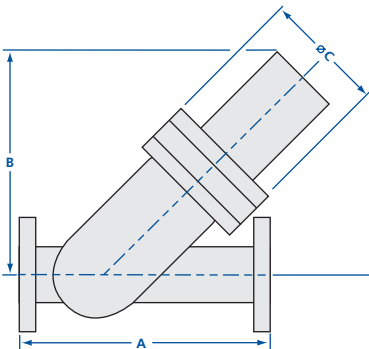
Maximum temperature with FKM seals
 Sustained: <150°C
 Intermittent: <204°C

Vacuum range

FKM bonnet seal: >1x 10⁻⁹ mbar - High Vacuum
 Copper bonnet seal: >1x 10⁻¹⁰ mbar - UHV

Options: Fittings, O-rings, air solenoids, micro-switches and actuators. *See page 103*

Thermal: Heater jackets and controllers available for all valves. *See page 127*



All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Manual FKM Seal Straight-Through Valves

MODEL NUMBER	PORT ID	NOMINAL PORT OD	DESCRIPTION	A	B	C	D
STV-075	0.65 (16.5)	3/4 (19)	No flanges	5.00 (127)	3.30 (84)	4.50 (114)	2.25 (57)
STV-0752-CF	0.65 (16.5)	3/4 (19)	Rotatable 1.33 CF	6.00 (152)	3.30 (84)	4.50 (114)	2.25 (57)
STV-0752-NWB	0.65 (16.5)	3/4 (19)	NW-16B	5.30 (135)	3.30 (84)	4.50 (114)	2.25 (57)
STV-112	1.00 (25.4)	1 1/8 (29)	No flanges	5.50 (140)	3.86 (98)	5.15 (131)	3.00 (76)
STV-1122-CF	1.00 (25.4)	1 1/8 (29)	Rotatable 2.12 CF	5.83 (148)	3.86 (98)	5.15 (131)	3.00 (76)
STV-1122-NWB	1.00 (25.4)	1 1/8 (29)	NW-40B	5.80 (147)	3.86 (98)	5.15 (131)	3.00 (76)
STV-150	1.38 (35.1)	1 1/2 (38)	No flanges	7.00 (178)	5.47 (139)	7.69 (195)	3.50 (89)
STV-1502-CF	1.38 (35.1)	1 1/2 (38)	Rotatable 2.75 CF	7.42 (188)	5.47 (139)	7.69 (195)	3.50 (89)
STV-1502-NWB	1.38 (35.1)	1 1/2 (38)	NW-40B	7.30 (185)	5.47 (139)	7.69 (195)	3.50 (89)

Manual Copper Seal Bonnet Straight-Through Valves

MODEL NUMBER	PORT ID	NOMINAL PORT OD	DESCRIPTION	A	B	C	D
CSTV-075	0.65 (16.5)	3/4 (19)	No flanges	5.00 (127)	3.51 (89)	4.71 (120)	2.73 (69)
CSTV-0752-CF	0.65 (16.5)	3/4 (19)	Rotatable 1.33 CF	6.00 (152)	3.51 (89)	4.71 (120)	2.73 (69)
CSTV-150	1.38 (35.1)	1 1/2 (38)	No flanges	7.00 (178)	5.47 (139)	7.69 (195)	4.05 (103)
CSTV-1502-CF	1.38 (35.1)	1 1/2 (38)	Rotatable 2.75 CF	7.42 (188)	5.47 (139)	7.69 (195)	4.05 (103)



STV O-Ring Kits

MODEL NUMBER	NOMINAL PORT OD
ESV-075-95	3/4 (19)
STV-112-95	1 1/8 (29)
STV-150-95	1 1/2 (38)

CSTV O-Ring & Gasket Kits

MODEL NUMBER	NOMINAL PORT OD
CSV-075-95	3/4 (19)
CSV-150-95	1 1/2 (38)

Pneumatic FKM Seal Straight-Through Valves

MODEL NUMBER	PORT ID	NOMINAL PORT OD	DESCRIPTION	A	B	C
STVP-075	0.65 (16.5)	3/4 (19)	No flanges	5.00 (127)	3.92 (100)	2.25 (57)
STVP-0752-CF	0.65 (16.5)	3/4 (19)	Rotatable 1.33 CF	6.00 (152)	3.92 (100)	2.25 (57)
STVP-0752-NWB	0.65 (16.5)	3/4 (19)	NW-16B	5.30 (135)	3.92 (100)	2.25 (57)
STVP-112	1.00 (25.4)	1 1/8 (29)	No flanges	5.50 (140)	5.10 (130)	3.00 (76)
STVP-1122-CF	1.00 (25.4)	1 1/8 (29)	Rotatable 2.12 CF	5.83 (148)	5.10 (130)	3.00 (76)
STVP-1122-NWB	1.00 (25.4)	1 1/8 (29)	NW-40B	5.80 (147)	5.10 (130)	3.00 (76)
STVP-150	1.38 (35.1)	1 1/2 (38)	No flanges	7.00 (178)	6.11 (155)	3.50 (89)
STVP-1502-CF	1.38 (35.1)	1 1/2 (38)	Rotatable 2.75 CF	7.42 (188)	6.11 (155)	3.50 (89)
STVP-1502-NWB	1.38 (35.1)	1 1/2 (38)	NW-40B	7.30 (185)	6.11 (155)	3.50 (89)

Pneumatic Copper Seal Bonnet Straight-Through Valves

MODEL NUMBER	PORT ID	NOMINAL PORT OD	DESCRIPTION	A	B	C
CSTVP-075	0.65 (16.5)	3/4 (19)	No flanges	5.00 (127)	3.92 (100)	2.73 (69)
CSTVP-0752-CF	0.65 (16.5)	3/4 (19)	Rotatable 1.33 CF	6.00 (152)	3.92 (100)	2.73 (69)
CSTVP-150	1.38 (35.0)	1 1/2 (38)	No flanges	7.00 (178)	6.11 (155)	4.05 (103)
CSTVP-1502-CF	1.38 (35.0)	1 1/2 (38)	Rotatable 2.75 CF	7.42 (188)	6.11 (155)	4.05 (103)

STVP O-Ring Kits

MODEL NUMBER	NOMINAL PORT OD
ESVP-075-95	3/4 (19)
STVP-112-95	1 1/8 (29)
STVP-150-95	1 1/2 (38)

CSTVP O-Ring & Gasket Kits

MODEL NUMBER	NOMINAL PORT OD
CSV-075-95	3/4 (19)
CSTVP-150-95	1 1/2 (38)

Isolation Valves

Replacement Parts & Rebuild Kits



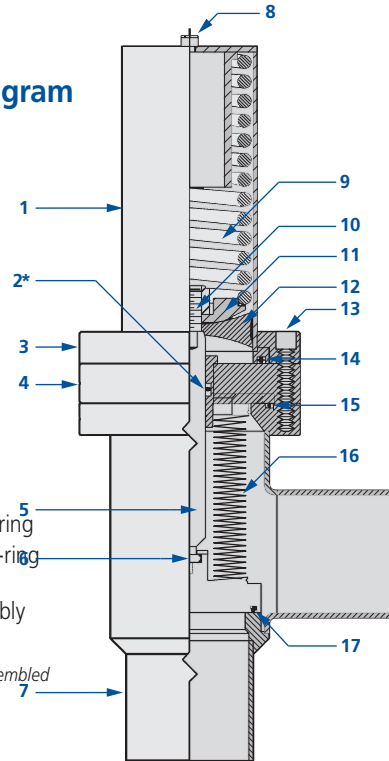
Complete Valve Rebuild Kits

Contains all items except valve body (#7), refer to kit contents diagram at right.

MODEL NUMBER	FOR VALVE MODEL NUMBERS
CSV-075-99	CSV, CILV and CAIV, -038 to -100
CSV-150-99	CSV, CILV and CAIV-150
CSV-200-99	CSV, CILV and CAIV-200
CSV-250-99	CSV, CILV and CAIV-250
CSV-300-99	CSV, CILV and CAIV-300
CSVP-075-99	CSVP, CILVP and CAIVP, -038 to -100
CSVP-150-99	CSVP, CILVP and CAIVP-150
CSVP-200-99	CSVP, CILVP and CAIVP-200
CSVP-250-99	CSVP, CILVP and CAIVP-250
CSVP-300-99	CSVP, CILVP and CAIVP-300
CSVP-400-99	CSVP, CILVP and CAIVP-400
ESV-075-99	ESV, ILV, AIV, STV, -038 to -100
ESV-150-99	ESV, ILV, AIV, STV, -150
ESV-200-99	ESV, ILV and AIV-200
ESV-250-99	ESV, ILV and AIV-250
ESV-300-99	ESV, ILV and AIV-300
ESVP-075-99	ESVP, ILVP, AIVP, STVP, -038 to -100
ESVP-150-99	ESVP, ILVP, AIVP, STVP, -150
ESVP-200-99	ESVP, ILVP and AIVP-200
ESVP-250-99	ESVP, ILVP and AIVP-250
ESVP-300-99	ESVP, ILVP and AIVP-300
ESVP-400-99	ESVP, ILVP and AIVP-400
STV-112-99	STV-112
STVP-112-99	STVP-112
STV-150-99	STV-150
STVP-150-99	STVP-150

Kit Contents Diagram

- 1. Air cylinder
 - 2. Stem O-ring*
 - 3. Retaining plate
 - 4. Center plate
 - 5. Stem shaft
 - 6. Set screw
 - 7. Body
 - 8. Air filter
 - 9. Air cylinder spring
 - 10. Jam nut
 - 11. Spring retainer
 - 12. Piston cup
 - 13. Bonnet screws
 - 14. Air cylinder O-ring
 - 15. Body flange O-ring or gasket
 - 16. Bellows assembly
 - 17. Poppet O-ring
- * 2 inch (50) ID valves are assembled with two stem O-rings.



O-Ring or Gasket Kits

MODEL NUMBER	KIT CONTENTS (See drawing)	FOR VALVE MODEL NUMBERS
ESV-075-95	2, 14, 15, 17	ESV, AIV, ILV, ESV-T, STV, -038 to -100
ESV-150-95	2, 14, 15, 17	ESV, AIV, ILV, ESV-T, -150
ESV-200-95	2, 14, 15, 17	ESV, AIV, ILV, ESV-T, -200
ESV-250-95	2, 14, 15, 17	ESV, AIV, ILV, ESV-T, -250
ESV-300-95	2, 14, 15, 17	ESV, AIV, ILV, ESV-T, -300
STV-112-95	2, 14, 15, 17	STV-112
STV-150-95	2, 14, 15, 17	STV-150
ESVP-075-95	2, 14, 15, 17	ESVP, AIVP, ILVP, ESVP-T, STVP, -038 to -100
ESVP-150-95	2, 14, 15, 17	ESVP, AIVP, ILVP, ESVP-T, -150
ESVP-200-95	2, 14, 15, 17	ESVP, AIVP, ILVP, ESVP-T, -200
ESVP-250-95	2, 14, 15, 17	ESVP, AIVP, ILVP, ESVP-T, -250
ESVP-300-95	2, 14, 15, 17	ESVP, AIVP, ILVP, ESVP-T, -300
ESVP-400-95	2, 14, 15, 17	ESVP, AIVP, ILVP, ESVP-T, -400
STVP-112-95	2, 14, 15, 17	STVP-112
STVP-150-95	2, 14, 15, 17	STVP-150
CSV-075-95	2, 14, 15, 17	CSV, CAIV, CILV, CSTV, -038 to -100
CSV-150-95	2, 14, 15, 17	CSV, CAIV, CILV, -150
CSV-200-95	2, 14, 15, 17	CSV, CAIV, CILV, -200
CSV-250-95	2, 14, 15, 17	CSV, CAIV, CILV, -250
CSV-300-95	2, 14, 15, 17	CSV, CAIV, CILV, -300
CSTV-150-95	2, 14, 15, 17	CSTV-150
CSVP-075-95	2, 14, 15, 17	CSVP, CAIVP, CILVP, CSTVP, -038 to -100
CSVP-150-95	2, 14, 15, 17	CSVP, CAIVP, CILVP, -150
CSVP-200-95	2, 14, 15, 17	CSVP, CAIVP, CILVP, -200
CSVP-250-95	2, 14, 15, 17	CSVP, CAIVP, CILVP, -250
CSVP-300-95	2, 14, 15, 17	CSVP, CAIVP, CILVP, -300
CSVP-400-95	2, 14, 15, 17	CSVP, CAIVP, CILVP, -400
CSTVP-150-95	2, 14, 15, 17	CSTVP-150

Bellows Assembly Kits

MODEL NUMBER	CONTENTS (See drawing)	FOR VALVE MODEL NUMBERS
CSV-075-16K	6, 16, 17	CSV, CILV, CAIV, CSTV, manual or pneumatic, -038 to -100
CSV-150-16K	6, 16, 17	CSV, CILV, CAIV, CSTV, manual or pneumatic, -150
CSV-200-16K	6, 16, 17	CSV, CILV, CAIV, manual or pneumatic, -200
CSV-250-16K	6, 16, 17	CSV, CILV, CAIV, manual or pneumatic, -250
CSV-300-16K	6, 16, 17	CSV, CILV, CAIV, manual or pneumatic, -300
CSVP-400-16K	6, 16, 17	CSVP and CILVP-400
ESV-075-16K	6, 16, 17	ESV, ILV and AIV, manual or pneumatic, -038 to -100
ESV-150-16K	6, 16, 17	ESV, ILV and AIV-150, manual or pneumatic
ESV-200-16K	6, 16, 17	ESV, ILV and AIV-200, manual
ESVP-200-16K	6, 16, 17	ESVP, ILVP and AIVP-200, pneumatic
ESV-250-16K	6, 16, 17	ESV, ILV and AIV-250, manual
ESVP-250-16K	6, 16, 17	ESV, ILV and AIV-250, pneumatic
ESV-300-16K	6, 16, 17	ESV, ILV and AIV-300, manual
ESVP-300-16K	6, 16, 17	ESV, ILV and AIV-300, pneumatic
ESVP-400-16K	16, 17	ESV, ILV and AIV-400, manual or pneumatic



Isolation Valves

Ball Valves



SPECIFICATIONS

Port OD's: ¾, 1, 1 ½ and 2 inches (19, 25, 38 and 50mm)

Materials:

Body: 316L stainless steel

Ball: 316L stainless steel

Stem seal: FKM

(other O-ring compounds available)

Ball seal: PTFE

Actuation: Choice of Single Acting/Normally Closed or Normally Open; or Double Acting

Helium Leak Rates: $<1 \times 10^{-9}$ mbar l/sec to atmosphere, $<1 \times 10^{-7}$ mbar l/sec across the seat.

Operating Temperature: 150°C Max.

Supply Pressure (pneumatic/spring version): 60-100 psig (4-7 bar)

Vacuum Range: 1000 to 1×10^{-4} mbar

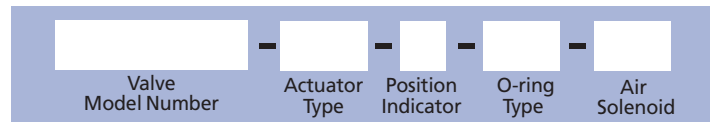
Options: Heater jackets and controllers available for all valves.

Nor-Cal Products Ball Valves are a low cost, manually or pneumatically operated, straight through isolation device. Their simple, robust design provides high reliability in "dirty" applications. They are commonly used on MOCVD and CVD equipment downstream from the chamber or vacuum pump to isolate traps or abatement tools. A stainless steel body and PTFE seat make these valves ideal for corrosive environments. A quarter turn of the handle quickly switches the valve from open to close. They are available with NW-16 through NW-50 flanges as standards. Heater jackets are available to reduce process by-product accumulation.



Ball Valve Options

Please use the following part numbering tree to add the appropriate options to a standard ball valve model number. See tables below for option codes.



Example: **BVP-2004-NW-NPN-S21**

Pneumatic ball valve with 1.5 inch (38) ball ID, NW-50 flanges, single acting / normally closed, position indicators and 24VDC air solenoid.

O-ring Material Option

CODE	DESCRIPTION
<i>Default (no code)</i>	FKM
-K79	Kalrez 4079
-K85	Kalrez 8085
-K75	Kalrez 8575
-K91	Kalrez 9100
-C38	Chemraz E38
-D19	Dupra 192
-PP7	Perlast G74P

Actuator Option - BVM

CODE	DESCRIPTION
<i>(Default)</i>	Non-locking handle
-L	Locking handle

Air Solenoid Option - BVP

CODE	KIT	DESCRIPTION
-S11	BVP-S11-K	120VAC, 50/60 Hz
-S21	BVP-S21-K	24VDC
-S31	BVP-S31-K	240VAC, 50/60 Hz
-S41	BVP-S41-K	24VAC, 50/60 Hz
-S12	BVP-S12-K	120VAC, 50/60 Hz (Use with -A actuator option)
-S22	BVP-S22-K	24VDC (Use with -A actuator option)
-S32	BVP-S32-K	240VAC, 50/60 Hz (Use with -A actuator option)
-S42	BVP-S42-K	24VAC, 50/60 Hz (Use with -A actuator option)

Actuator Option - BVP

DESCRIPTION	CODE
Single Acting / Normally Closed	<i>(Default)</i>
Single Acting / Normally Open	-SA
Double Acting	-A

Position Indicator Option - BVP

Open/closed position indicators detect the valve position. 24 VDC powered.

DESCRIPTION	CODE	KIT
Optical sensor	NPN	B-NPN-K
	PNP	B-PNP-K

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Isolation Valves

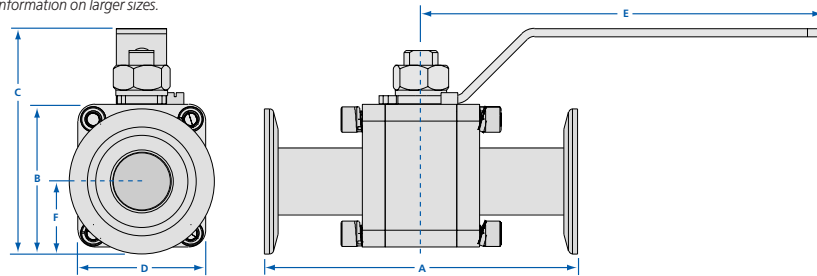
Ball Valves



Manual Ball Valve - BVM

MODEL NUMBER	NOMINAL PORT OD	BALL ID	DESCRIPTION	A	B	C	D	E	F
BVM-0751	0.75 (19)	0.56 (14.2)	No Flanges	4.36 (110.7)	1.85 (47)	2.94 (75)	1.85 (47)	5.80 (147)	0.93 (24)
BVM-0751-NW	0.75 (19)	0.56 (14.2)	NW-16	3.47 (88.1)	1.85 (47)	2.94 (75)	1.85 (47)	5.80 (147)	0.93 (24)
BVM-1001-NW	0.75 (19)	0.56 (14.2)	NW-25	3.93 (99.8)	1.85 (47)	2.94 (75)	1.85 (47)	5.80 (147)	0.93 (24)
BVM-1002	1.0 (25)	0.85 (21.6)	No Flanges	4.78 (121.4)	2.13 (54)	3.33 (85)	1.90 (48)	6.20 (157)	0.98 (25)
BVM-1002-NW	1.0 (25)	0.85 (21.6)	NW-25	3.93 (99.8)	2.13 (54)	3.33 (85)	1.90 (48)	6.20 (157)	0.98 (25)
BVM-1502-NW	1.0 (25)	0.85 (21.6)	NW-40	4.66 (118.4)	2.13 (54)	3.33 (85)	1.90 (48)	6.20 (157)	0.98 (25)
BVM-1503	1.5 (38)	1.25 (31.8)	No Flanges	4.59 (142.0)	2.80 (71)	4.04 (103)	2.80 (71)	7.20 (183)	1.40 (36)
BVM-1503-NW	1.5 (38)	1.25 (31.8)	NW-40	4.66 (118.4)	2.80 (71)	4.04 (103)	2.80 (71)	7.20 (183)	1.40 (36)
BVM-2003-NW	1.5 (38)	1.25 (31.8)	NW-50	4.97 (126.2)	2.80 (71)	4.04 (103)	2.80 (71)	7.20 (183)	1.40 (36)
BVM-2004	2.0 (50)	1.50 (38.1)	No Flanges	6.25 (159.0)	3.33 (85)	4.56 (116)	3.33 (85)	7.20 (183)	1.66 (42)
BVM-2004-NW	2.0 (50)	1.50 (38.1)	NW-50	4.97 (126.2)	3.33 (85)	4.56 (116)	3.33 (85)	7.20 (183)	1.66 (42)
BVM-2005	2.0 (50)	1.87 (47.5)	No Flanges	6.75 (171.5)	3.83 (97)	5.18 (131)	3.83 (97)	8.00 (203)	1.91 (49)
BVM-2005-NW	2.0 (50)	1.87 (47.5)	NW-50	6.31 (160.3)	3.83 (97)	5.18 (131)	3.83 (97)	8.00 (203)	1.91 (49)

Call for information on larger sizes.



SPECIFICATIONS

Port OD's: ¾, 1, 1 ½ and 2 inches (19, 25, 38 and 50mm)

Materials:

- Body: 316L stainless steel
- Ball: 316L stainless steel
- Stem seal: FKM (other O-ring compounds available)
- Ball seal: PTFE

Actuation: Manual

Helium Leak Rates: $\leq 1 \times 10^{-9}$ mbar l/sec to atmosphere, <math>< 1 \times 10^{-7}</math> mbar l/sec across the seat.

Operating Temperature: 150°C Max.

Supply Pressure (pneumatic/spring version): 60-100 psig (4-7 bar)

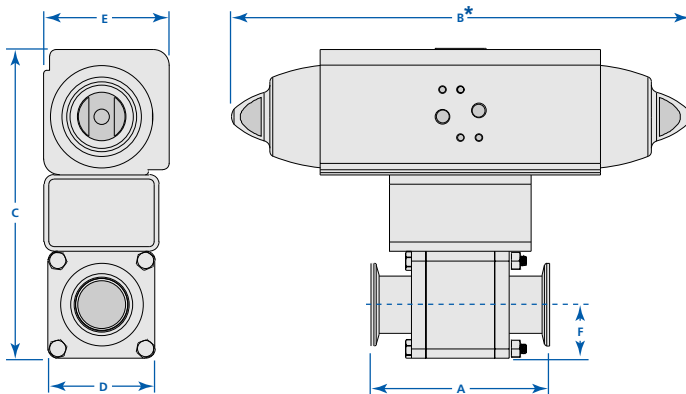
Vacuum Range: 1000 to 1x10⁻⁴ mbar

Options: Heater jackets and controllers available for all valves.

Pneumatic Ball Valve - BVP

MODEL NUMBER	NOMINAL PORT OD	BALL ID	DESCRIPTION	A	B	C	D	E	F
BVP-0751	0.75 (19)	0.56 (14.2)	No Flanges	4.36 (110.7)	10.20 (259)	6.62 (168)	1.85 (47)	2.77 (70)	0.93 (24)
BVP-0751-NW	0.75 (19)	0.56 (14.2)	NW-16	3.47 (88.1)	10.20 (259)	6.62 (168)	1.85 (47)	2.77 (70)	0.93 (24)
BVP-1001-NW	0.75 (19)	0.56 (14.2)	NW-25	3.93 (99.8)	10.20 (259)	6.62 (168)	1.85 (47)	2.77 (70)	0.93 (24)
BVP-1002	1.0 (25)	0.85 (21.6)	No Flanges	4.78 (121.4)	10.20 (259)	6.90 (175)	1.90 (48)	2.77 (70)	0.98 (25)
BVP-1002-NW	1.0 (25)	0.85 (21.6)	NW-25	3.93 (99.8)	10.20 (259)	6.90 (175)	1.90 (48)	2.77 (70)	0.98 (25)
BVP-1502-NW	1.0 (25)	0.85 (21.6)	NW-40	4.66 (118.4)	10.20 (259)	6.90 (175)	1.90 (48)	2.77 (70)	0.98 (25)
BVP-1503	1.5 (38)	1.25 (31.8)	No Flanges	5.59 (142.0)	10.20 (259)	7.57 (192)	2.80 (71)	2.77 (70)	1.40 (36)
BVP-1503-NW	1.5 (38)	1.25 (31.8)	NW-40	4.66 (118.4)	10.20 (259)	7.57 (192)	2.80 (71)	2.77 (70)	1.40 (36)
BVP-2003-NW	1.5 (38)	1.25 (31.8)	NW-50	4.97 (126.2)	10.20 (259)	7.57 (192)	2.80 (71)	2.77 (70)	1.40 (36)
BVP-2004	2.0 (50)	1.50 (38.1)	No Flanges	6.25 (159.0)	10.20 (259)	8.10 (206)	3.33 (85)	2.77 (70)	1.66 (42)
BVP-2004-NW	2.0 (50)	1.50 (38.1)	NW-50	4.97 (126.2)	10.20 (259)	8.10 (206)	3.33 (85)	2.77 (70)	1.66 (42)
BVP-2005	2.0 (50)	1.87 (47.5)	No Flanges	6.75 (171.5)	10.20 (259)	8.60 (218)	3.83 (97)	2.77 (70)	1.91 (49)
BVP-2005-NW	2.0 (50)	1.87 (47.5)	NW-50	6.31 (160.3)	10.20 (259)	8.60 (218)	3.83 (97)	2.77 (70)	1.91 (49)

Call for information on larger sizes.



*B Actuator option: Add -A (Double Acting) reduces dimension to 6.76" (172mm).

SPECIFICATIONS

Port OD's: ¾, 1, 1 ½ and 2 inches (19, 25, 38 and 50mm)

Materials:

- Body: 316L stainless steel
- Ball: 316L stainless steel
- Stem seal: FKM (other O-ring compounds available)
- Ball seal: PTFE

Actuation: Choice of Single Acting / Normally Closed or Normally Open; or Double Acting

Helium Leak Rates: $\leq 1 \times 10^{-9}$ mbar l/sec to atmosphere, <math>< 1 \times 10^{-7}</math> mbar l/sec across the seat.

Operating Temperature: 150°C Max.

Supply Pressure (pneumatic/spring version): 60-100 psig (4-7 bar)

Vacuum Range: 1000 to 1x10⁻⁴ mbar

Options: Heater jackets and controllers available for all valves.

Ball Valve Seal Kit

MODEL NUMBER	DESCRIPTION
BVM-1-95	PTFE seats, FKM Flange Seals
BVM-2-95	PTFE seats, FKM Flange Seals
BVM-3-95	PTFE seats, FKM Flange Seals
BVM-4-95	PTFE seats, FKM Flange Seals
BVM-5-95	PTFE seats, FKM Flange Seals

Ball Valve Rebuild Kit

MODEL NUMBER	DESCRIPTION
BVM-1-99	-95 Seal Kit, SS ball, shaft bushings and seals
BVM-2-99	-95 Seal Kit, SS ball, shaft bushings and seals
BVM-3-99	-95 Seal Kit, SS ball, shaft bushings and seals
BVM-4-99	-95 Seal Kit, SS ball, shaft bushings and seals
BVM-5-99	-95 Seal Kit, SS ball, shaft bushings and seals

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Isolation Valves

Genesis Valves



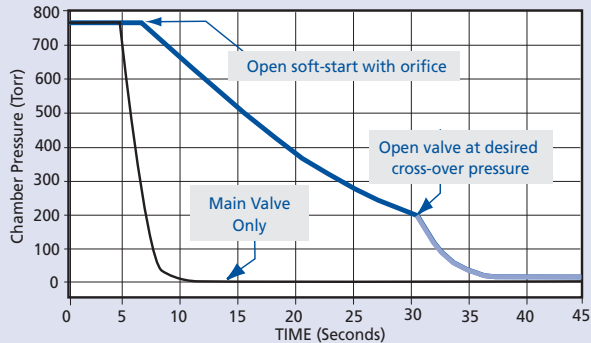
Genesis Valve Conductance Charts

Table A - Calculated Conductance Values (l^*s^{-1})

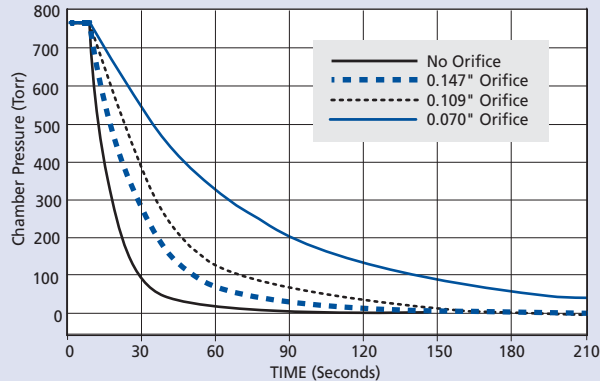
NOMINAL PORT OD	ALUMINUM BLOCK VISCOUS	ALUMINUM BLOCK MOLECULAR	STAINLESS STEEL ANGLE VALVES VISCOUS	STAINLESS STEEL ANGLE VALVES MOLECULAR	STAINLESS STEEL ANGLE-IN-LINE VISCOUS	STAINLESS STEEL ANGLE-IN-LINE MOLECULAR
3/4 (19)	273	11	135	5	120	4
1 (25)	717	21	391	12	285	9
1 1/2 (38)	3115	59	1925	37	1324	25
2 (50)	8183	114	4677	65	3459	48
2 1/2 (63)	-	-	12332	136	7505	83
3 (76)	-	-	23763	217	12558	115
4 (100)	-	-	57994	396	26820	189

Valve/Orifice Pumpdown Curves Charts

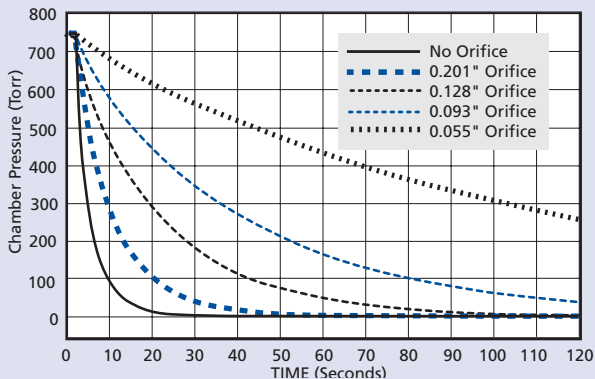
TYPICAL PUMP-DOWN WITH SOFT-START



CHAMBER PUMP DOWN FOR DN-16 TO DN-50 SIZE VALVES



CHAMBER PUMP DOWN FOR DN-80 TO DN-100 SIZE VALVES



Simple and robust, Genesis valves are rated at one million cycles before service.

The welded bellows is AM-350 stainless steel for corrosion resistance, longevity and flexibility. The bellows fully retract from the side port when the valve is open, eliminating buildup of process by-products on the bellows and subsequent particle generation during operation. Valve center plates have been eliminated in order to provide precise alignment between the poppet and valve seat.

A composite stem bushing resists wear even at high temperatures. Valve return springs are shot peened in order to provide millions of cycles without loss of force. PTFE coated air cylinders feature a 15 micron air filter to prevent particle migration either into or out of the air cylinder.

Air solenoids, open/closed position indicators, and soft start single acting / normally closed actuation in port sizes from DN-16 to DN-100 can be added with no addition to size. All valves are designed for easy O-ring or bellows replacement. Design symmetry allows the air actuator to be oriented at 90° increments for easy access to the air solenoid and visibility of position indicators.

These simple, robust valves are available with standard and soft start actuation. FKM O-ring seals are standard. Other O-ring compounds, open/closed position indicators and air solenoids are available as options. See page 118.

Heater jackets and insulators are also available. See page 119.

Genesis Aluminum Valves

Genesis aluminum valves have a patented bulkhead mount block body, which provide the highest conductance and smallest footprint available. Valve bodies are electroless nickel-coated aluminum for excellent thermal characteristics and corrosion resistance.

Components are machined from solid 6061-T6 aluminum to eliminate welds, leak paths and entrapments. All tapped holes are supplied with stainless steel threaded inserts for long term serviceability.

Genesis stainless steel poppet valves offer equipment designers the high performance and optimized conductance of Genesis aluminum valves in Nor-Cal Products' standard stainless steel poppet valve body.

Genesis Stainless Steel Valves

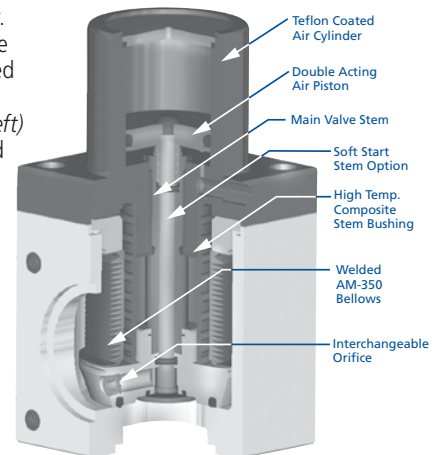
Genesis stainless steel poppet valves offer equipment designers the high performance and optimized conductance of Genesis aluminum valves in Nor-Cal Products' standard stainless steel poppet valve body.

Soft Start Valve Option

For reduced particle contamination in load locks and process chambers, Genesis valves can be provided with a patented low cost soft start actuator with no increase in valve size. A double-acting air piston, opens a soft start circuit inside the valve when air is supplied to the top of the air cylinder.

The soft start by-pass opening can be provided fully open or with a specified orifice, depending on the desired pumpdown. (See diagrams on the left)

After the chamber has been pumped from atmosphere to the desired crossover pressure, the main valve circuit is opened by supplying air to the bottom of the air cylinder. Each circuit can be operated independently and is single acting / normally closed. Soft start Genesis valves are offered standard with no orifice. Various orifice size options and multiple size orifice kits are available. See page 118.



Isolation Valves

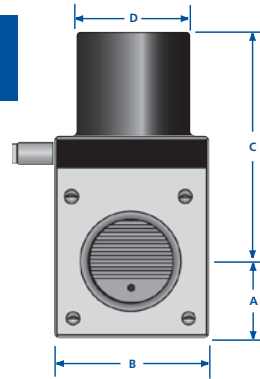
Genesis Aluminum & Stainless Steel Valves



Add options to a basic Genesis valve part number in the order shown.

Example: GNV-152-S2-P10-KT-B21

See Options and Option Details on page 118



SPECIFICATIONS

Port ODs: 3/4 to 4 inches (19 to 100mm).

Larger sizes and metric tubing diameters available on request

Mating flanges:

Aluminum Body:

NW-16 through 50 standard

Stainless Steel Body:

NW-16 through ISO-100 standard

Air fittings: 3/32 inch (4mm) One-Touch

Materials

Aluminum Body:

Electroless nickel coated

Stainless Steel Body:

304 stainless steel

Bellows: Welded AM-350 stainless steel

O-rings: FKM standard

Other compounds available.

Air cylinder: PTFE coated aluminum

Service interval: One million cycles

Actuation:

Aluminum Valves:

Single Acting / Normally Closed

Stainless Steel Valves:

Single Acting / Normally Closed

Operating pressure:

60 to 80 psig (4 to 5.5 bar)

Differential pressure:

Maximum 20psi (1.4 bar)

differential across the valve seat

Helium leak rate: $\leq 1 \times 10^{-9}$ mbar l/sec.

Operating temperature

Sustained: $\leq 150^{\circ}\text{C}$

Intermittent: $\leq 204^{\circ}\text{C}$

Options: Soft Start actuator with or without orifice, open/closed position indicators, air solenoids, and various O-ring compounds.

Thermal: Heaters and insulators available.

See page 119

Genesis Aluminum Valves

See conductance chart on facing page

MODEL NUMBER	ACTUATION	NOMINAL PORT OD	FLANGE	A	B	C	D	THREAD	BOLT CIRCLE
GNV-072	Standard	3/4(19)	NW-16	1.15 (29.2)	2.31 (58.7)	3.04 (77.2)	1.46 (37.1)	12-24	2.031 (51.59)
GNV-072-SO	Soft Start	3/4(19)	NW-16	1.15 (29.2)	2.31 (58.7)	3.04 (77.2)	1.46 (37.1)	12-24	2.031 (51.59)
GNV-102	Standard	1 (25)	NW-25	1.06 (26.9)	2.13 (54.1)	3.14 (79.8)	1.46 (37.1)	12-24	2.031 (51.59)
GNV-102-SO	Soft Start	1 (25)	NW-25	1.06 (26.9)	2.13 (54.1)	3.14 (79.8)	1.46 (37.1)	12-24	2.031 (51.59)
GNV-152	Standard	1 1/2(38)	NW-40	1.25 (31.8)	2.50 (63.5)	3.71 (94.2)	1.88 (47.8)	12-24	2.616 (66.45)
GNV-152-SO	Soft Start	1 1/2(38)	NW-40	1.25 (31.8)	2.50 (63.5)	3.71 (94.2)	1.88 (47.8)	12-24	2.616 (66.45)
GNV-202	Standard	2 (50)	NW-50	1.63 (41.4)	3.25 (82.6)	4.44 (113)	2.25 (57.2)	1/4-20	3.406 (86.51)
GNV-202-SO	Soft Start	2 (50)	NW-50	1.63 (41.4)	3.25 (82.6)	4.44 (113)	2.25 (57.2)	1/4-20	3.406 (86.51)

Note: See page 116 for options and descriptions. See diagram above for how to add an option.

Genesis Stainless Steel Angle Valves

See conductance chart on facing page

MODEL NUMBER	ACTUATION	FLANGE TYPE	NOMINAL PORT OD	A	B	C	D	E
GNVS-072-NWB	Standard	NW-16	3/4(19)	1.50 (38.1)	3.40 (86)	4.78 (121)	1.46 (37)	2.13 (54)
GNVS-072-NWB-SO	Soft Start	NW-16	3/4(19)	1.50 (38.1)	3.40 (86)	4.78 (121)	1.46 (37)	2.13 (54)
GNVS-102-NWB	Standard	NW-25	1 (25)	2.42 (61.47)	4.19 (106)	5.57 (141)	1.46 (37)	2.13 (54)
GNVS-102-NWB-SO	Soft Start	NW-25	1 (25)	2.42 (61.47)	4.19 (106)	5.57 (141)	1.46 (37)	2.13 (54)
GNVS-152-NWB	Standard	NW-40	1 1/2(38)	2.49 (63.2)	4.51 (115)	6.20 (157)	1.88 (48)	2.50 (63)
GNVS-152-NWB-SO	Soft Start	NW-40	1 1/2(38)	2.49 (63.2)	4.51 (115)	6.20 (157)	1.88 (48)	2.50 (63)
GNVS-202-NWB	Standard	NW-50	2 (50)	3.22 (81.9)	5.56 (141)	7.66 (195)	2.25 (57)	3.25 (83)
GNVS-202-NWB-SO	Soft Start	NW-50	2 (50)	3.22 (81.9)	5.56 (141)	7.66 (195)	2.25 (57)	3.25 (83)
GNVS-302-ISO	Standard	ISO-80	3 (76)	3.86 (98.0)	7.33 (186)	10.85 (276)	4.13 (105)	5.45 (138)
GNVS-302-ISO-SO	Soft Start	ISO-80	3 (76)	3.86 (98.0)	7.33 (186)	10.85 (276)	4.13 (105)	5.45 (138)
GNVS-402-ISO	Standard	ISO-100	4 (100)	4.25 (108)	8.38 (213)	13.04 (331)	5.00 (127)	6.40 (163)
GNVS-402-ISO-SO	Soft Start	ISO-100	4 (100)	4.25 (108)	8.38 (213)	13.04 (331)	5.00 (127)	6.40 (163)

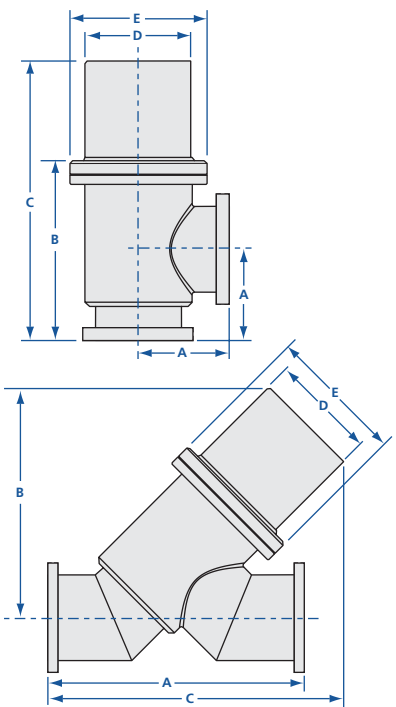
Note: See page 116 for options and descriptions. See diagram above for how to add an option.

Genesis Stainless Steel Angle-In-Line Valves

See conductance chart on facing page

MODEL NUMBER	ACTUATION	FLANGE TYPE	NOMINAL PORT OD	A	B	C	D	E
GNVSAI-072-NWB	Standard	NW-16	3/4(19)	4.20 (107)	3.76 (95)	4.37 (111)	1.46 (37)	2.13 (54)
GNVSAI-072-NWB-SO	Soft Start	NW-16	3/4(19)	4.20 (107)	3.76 (95)	4.37 (111)	1.46 (37)	2.13 (54)
GNVSAI-102-NWB	Standard	NW-25	1 (25)	4.00 (102)	3.85 (98)	4.63 (118)	1.46 (37)	2.13 (54)
GNVSAI-102-NWB-SO	Soft Start	NW-25	1 (25)	4.00 (102)	3.85 (98)	4.63 (118)	1.46 (37)	2.13 (54)
GNVSAI-152-NWB	Standard	NW-40	1 1/2(38)	5.12 (130)	4.47 (114)	5.28 (134)	1.88 (48)	2.50 (63)
GNVSAI-152-NWB-SO	Soft Start	NW-40	1 1/2(38)	5.12 (130)	4.47 (114)	5.28 (134)	1.88 (48)	2.50 (63)
GNVSAI-202-NWB	Standard	NW-50	2 (50)	7.00 (178)	5.79 (147)	7.00 (178)	2.25 (57)	3.25 (83)
GNVSAI-202-NWB-SO	Soft Start	NW-50	2 (50)	7.00 (178)	5.79 (147)	7.00 (178)	2.25 (57)	3.25 (83)
GNVSAI-302-ISO	Standard	ISO-80	3 (76)	10.55 (268)	8.88 (226)	11.62 (295)	4.13 (105)	5.45 (138)
GNVSAI-302-ISO-SO	Soft Start	ISO-80	3 (76)	10.55 (268)	8.88 (226)	11.62 (295)	4.13 (105)	5.45 (138)
GNVSAI-402-ISO	Standard	ISO-100	4 (100)	12.00 (305)	10.75 (273)	13.81 (351)	5.00 (127)	6.40 (163)
GNVSAI-402-ISO-SO	Soft Start	ISO-100	4 (100)	12.00 (305)	10.75 (273)	13.81 (351)	5.00 (127)	6.40 (163)

Note: See page 116 for options and descriptions. See diagram above for how to add an option.



Valve rebuild and replacement part kits are available on page 118

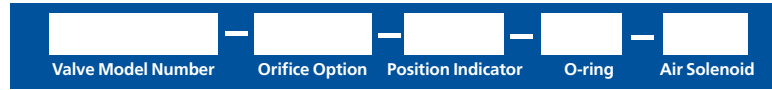


Isolation Valves

Genesis Valve Options

Add options to the basic Genesis valve part numbers in the order shown.

Example: GNV-152-S2-P10-KT-B21



Orifice Options, Replacement Orifices & Kits

Genesis aluminum and stainless steel valves with Soft Start actuation come standard with no orifice. To order these valves with an orifice replace the "S0" part number suffix with one of the following options.

Example: Change standard valve part number **GNVS-072-NWB-S0** to **GNVS-072-NWB-S1**. Refer to diagrams on Page 116 and valve selections on Page 117 to help identify the correct orifice for your valve.

ORIFICE OPTION	ORIFICE REPLACEMENTS & KITS	VALVE SIZE	ORIFICE SIZE
-S0	NA	All	No orifice
-S1	GNV-S1	3/4 to 2 (19-50)	.147 (3.7)
-S2	GNV-S2	3/4 to 2 (19-50)	.109 (2.8)
-S3	GNV-S3	3/4 to 2 (19-50)	.070 (1.8)
-S4	GNV-S4	3 & 4 (76 & 100)	.055 (1.4)
-S5	GNV-S5	3 & 4 (76 & 100)	.093 (2.4)
-S6	GNV-S6	3 & 4 (76 & 100)	.128 (3.3)
-S7	GNV-S7	3 & 4 (76 & 100)	.201 (5.1)
	GNV-075-K	3/4 to 2 (19-50)	KIT*
	GNV-300-K	3 & 4 (76 & 100)	KIT*
	GNV-T	3/4 to 4 (76 & 100)	Wrench

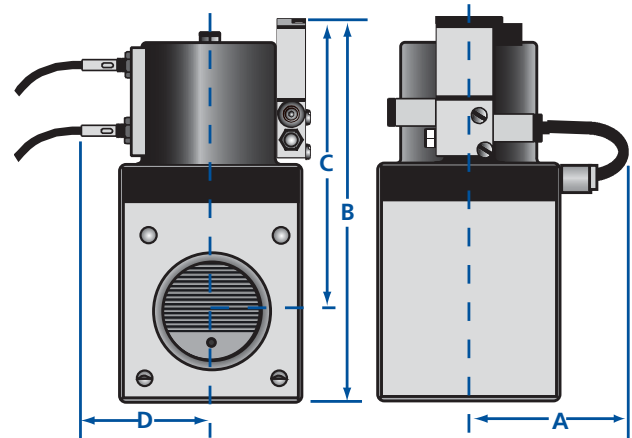
* Kits include all orifice sizes and installation wrench for specified valve size

Air Solenoid Option

Low 1.8 wattage, CE certified three-way air solenoids can be provided on the valve in several electrical current ratings, with 24 inch (610mm) quick disconnect electrical leads, and 5/32 inch (3.97mm) one-touch air fittings - ready to attach to the house air supply. One solenoid is required for standard Genesis stainless valves. Two solenoids are required for soft start versions. Remote mount is required on heated valves. Air solenoid kits with assembly hardware and instructions are available. Kit part numbers are in the 2nd column below.

OPTION	KIT	ACTUATOR	DESCRIPTION	QUANTITY
-A11	A11-K	Standard	120 VAC, 50/60 Hz	1
-A21	A21-K	Standard	24 VDC	1
-A31	A31-K	Standard	240 VAC, 50/60 Hz	1
-A41	A41-K	Standard	24 VAC, 50/60 Hz	1
-B11	B11-K	Soft Start	120 VAC, 50/60 Hz	2
-B21	B21-K	Soft Start	24 VDC	2
-B31	B31-K	Soft Start	240 VAC, 50/60 Hz	2
-B41	B41-K	Soft Start	24 VAC, 50/60 Hz	2

Refer to diagram below for dimensions.



Air Solenoid & Position Indicator Dimensions

SIZE	A	B	C	D
3/4 (19)	2.55 (64.8)	4.82 (122)	3.76 (95.5)	1.66 (42.2)
1 (25)	2.55 (64.8)	4.82 (122)	3.76 (95.5)	1.66 (42.2)
1 1/2 (38)	2.73 (69.3)	5.31 (135)	4.06 (103)	1.82 (46.2)
2 (50)	3.11 (79.0)	6.05 (154)	4.42 (112)	2.03 (51.6)

Open/Closed Position Indicator Option

Nor-Cal Products CE certified, shielded, open/closed position indicators detect the piston position in the valve's air cylinder giving the technician and operator a visual indication of power to the circuit (12 to 24 VDC) and the valve position. With the soft start option only one position indicator can be provided for the fully open position. Operating temps range is -25°C to 70°C for valves with position indicators. Call for more information on high temperature position indicators.

OPTION	VALVE ACTUATOR	DESCRIPTION
-P10	Soft Start/Standard	1 position indicator - main valve open only
-P1C	Standard	1 position indicator - main valve closed only
-P2	Standard	2 position indicators - main valve open & closed

Refer to the diagram above for dimensions.

O-ring Options

Standard Genesis valves use chemical resistant FKM O-rings for closure, which are resistant to most chemicals, but should not be heated to temperatures in excess 204°C. Even prolonged exposures of 150°C may degrade the O-rings. High temp Kalrez O-rings allow valve bakeouts to 220°C intermittently or 170°C for prolonged periods. Silicone O-rings provide adequate sealing performance in thermal cycling from -55°C to 230°C.

OPTION	COMPOUND	TEMPERATURE MIN. MAX.	APPLICATION
Standard	FKM	-29°C 204°C	Industry Standard
-KT	Kalrez 4079	-20°C 316°C	High temp
-CR	Chemraz 513	-30°C 210°C	Chemical resistant
-S	Silicone	-55°C 230°C	Extreme temps

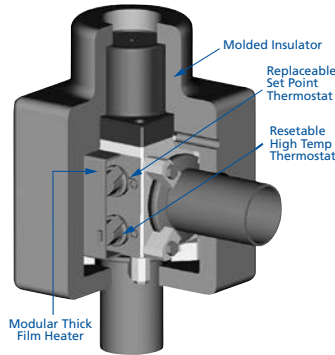
Isolation Valves

Genesis Valve Heaters and Insulators



Genesis Aluminum Valve Heaters & Insulators

Nor-Cal Products unique Genesis heaters provide 120°C or 150°C internal temperatures in Genesis valves. Each heater contains a control set point and a resettable high temperature shut off. The 1½ and 2 inch (38.1 and 50.8mm) sizes also have a low temperature alert that can be connected to a remote alarm. The heater can be attached to a valve body with two screws. A trim-to-fit, molded insulator covers the heated component and mating flanges. These clean room compatible insulators are constructed of ½ inch (12.7mm) thick molded silicone. When in use, the exterior surface remains touch-safe. Insulators meet UL 94 V-O requirements. Insulators for other components are available upon request. *Heater jackets for Genesis Stainless Steel Valves are available - see below.*



SPECIFICATIONS

Compatible Valves: Genesis Aluminum Valves

Insulator Body:
½ inch (13mm) thick, trimable, molded silicone construction
Touch safe exterior

Heater:
Voltage: 120 or 240 VAC standard
Set points: 120°C or 150°C
Manual reset:
200°C with over temp shutoff
Low temperature alert: standard on 1½ and 2 inch (38-50mm) valves

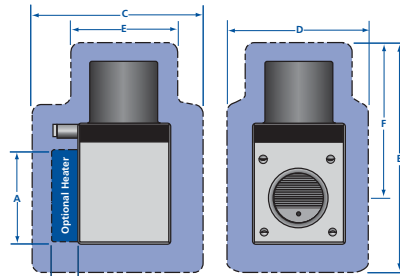
Connections:
Power cord: 12 inch (300mm) with AMP 3-pin
Alert cords: Two 12 inch (300mm) with AMP MR connectors standard on 1½ & 2 (38 & 50mm) inch valves

Certification:
Insulators: UL 94 V-O
Heaters: UL Recognized

Heaters

MODEL NUMBER	VALVE SIZE	SET POINT	WATTS	A
HT-GN-150-150-1	1½ (38)	150°C	120	2.50 (63)
HT-GN-200-120-1	2 (50)	120°C	160	3.25 (83)
HT-GN-200-150-1	2 (50)	150°C	160	3.25 (83)

NOTE: Replace "-1" with "-2" for 240V heaters.



Heater Insulators

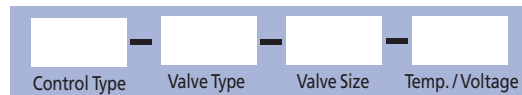
MODEL NUMBER	VALVE SIZE	B	C	D	E	F
HI-GNV-100	¾ & 1 (19 & 25)	6.00 (152)	4.50 (114)	3.13 (80)	2.50 (63)	3.64 (92)
HI-GNV-150	1½ (38)	6.63 (168)	5.00 (127)	3.63 (92)	2.88 (73)	4.25 (108)
HI-GNV-200	2 (50)	8.00 (203)	5.88 (149)	4.38 (111)	3.31 (84)	5.00 (127)

Heater Power Cords

MODEL NUMBER	LENGTH
HT-GN-PCD-6	6 ft.
HT-GN-PCD-12	12 ft.

Genesis Stainless Steel Valve Heater Jackets

Use this part number tree to specify a heater jacket for your Stainless Steel Genesis valve. Heaters are also available - contact Nor-Cal Products for the latest pricing, availability and other options.



Example: GNVS-NAP-150-091 Electronic thermostatically controlled heater jacket for 1.5 inch (38mm) Genesis SS angle valve, 90°C, 120VAC.

Control Type

TYPE	CODE
PID control*	HC
Electronic thermostat	HTE

* Requires separate PID controller. (See Controllers Section 6.)

Valve Type

TYPE	CODE
SS Genesis angle (stainless steel)	GNVS
SS Genesis angle-in-line	GNVSAI

Valve Size

SIZE	CODE
0.75 (19)	075
1.00 (25)	100
1.50 (38)	150
2.00 (50)	200
3.00 (76)	300
4.00 (100)	400

Temperature/Voltage

TEMP & VOLTAGE	CODE
HC type, 120 VAC	201
HC Type, 208 VAC	202
HTE type, 90°C, 120 VAC	091
HTE type, 90°C, 208 VAC	092
HTE type, 120°C, 120 VAC	121
HTE type, 120°C, 208 VAC	122
HTE type, 150°C, 120 VAC	151
HTE type, 150°C, 208 VAC	152

SPECIFICATIONS

Compatible Valves: Genesis Stainless Steel Valves

Insulator Body:
½ inch (13mm) thick, trimable, molded silicone construction
Touch safe exterior

Heater:
Voltage: 120 or 240 VAC standard
Set points: ≤150°C
Manual reset:
≤150°C with over temp shutoff
Low temperature alert: standard on 1½ and 2 inch (38-50mm) valves

Connections:
Power cord: 12 inch (300mm) with AMP 3-pin
Alert cords: Two 12 inch (300mm) with AMP MR connectors standard on 1½ & 2 (38 & 50mm) inch valves

Certification:
Insulators: UL 94 V-O
Heaters: UL Recognized



Isolation Valves

Genesis Valve Kits and Hardware

Genesis Valve Assembly Kits and Replacement Hardware

The kits below are for use with all Genesis valves. First maintenance is recommended at one million cycles, depending on the cleanliness of the process. Typical valve service will require O-ring replacement.

Valve Rebuild Kits

Includes all standard parts except valve body and position indicator. Your valve's position indicator type must be specified when ordering. Example: GNV-150-99-S0-P10

KIT NUMBER	VALVE SIZE	ACTUATOR
GNV-100-99	3/4 & 1 (19 & 25)	Standard
GNV-100-99-S0	3/4 & 1 (19 & 25)	Soft Start
GNV-150-99	1 1/2 (38)	Standard
GNV-150-99-S0	1 1/2 (38)	Soft Start
GNV-200-99	2 (50)	Standard
GNV-200-99-S0	2 (50)	Soft Start
GNV-300-99	3 (76)	Standard
GNV-300-99-S0	3 (76)	Soft Start
GNV-400-99	4 (100)	Standard
GNV-400-99-S0	4 (100)	Soft Start

FKM O-Ring Kits

Includes bellows O-ring and poppet O-ring. Other O-ring compounds are available on request.

KIT NUMBER	VALVE SIZE	ACTUATOR
GNV-100-95	3/4 & 1 (19 & 25)	Standard
GNV-100-95-S0	3/4 & 1 (19 & 25)	Soft Start
GNV-150-95	1 1/2 (38)	Standard
GNV-150-95-S0	1 1/2 (38)	Soft Start
GNV-200-95	2 (50)	Standard
GNV-200-95-S0	2 (50)	Soft Start
GNV-300-95	3 (76)	Standard
GNV-300-95-S0	3 (76)	Soft Start
GNV-400-95	4 (100)	Standard
GNV-400-95-S0	4 (100)	Soft Start

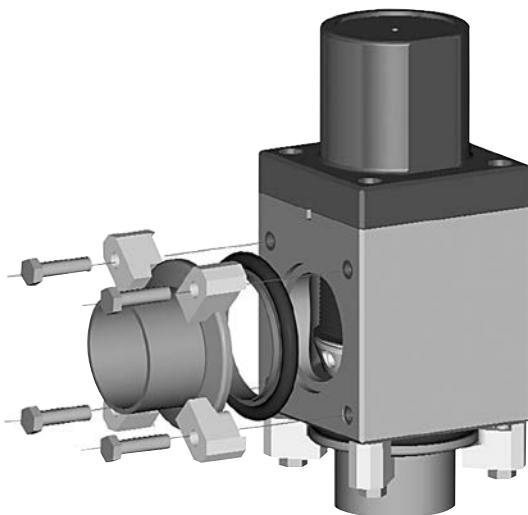
Bellows Assembly Kits

Includes bellows, top flange and poppet weldment assembly. Requires O-ring kit to seal.

KIT NUMBER	VALVE SIZE	ACTUATOR
GNV-100-16	3/4 & 1 (19 & 25)	Standard
GNV-100-16-S0	3/4 & 1 (19 & 25)	Soft Start
GNV-150-16	1 1/2 (38)	Standard
GNV-150-16-S0	1 1/2 (38)	Soft Start
GNV-200-16	2 (50)	Standard
GNV-200-16-S0	2 (50)	Soft Start
GNV-300-16	3 (76)	Standard
GNV-300-16-S0	3 (76)	Soft Start
GNV-400-16	4 (100)	Standard
GNV-400-16-S0	4 (100)	Soft Start

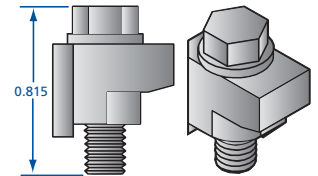


Bellows assembly



Finger Clamp Component Assembly

Stainless steel finger clamps allow a standard ISO-KF flange to be attached directly to a Genesis valve or fitting using a standard ISO-KF centering ring and O-ring. Elbows, reducers, chamber ports, roughing lines, or other vacuum components can be attached directly to valve bodies or fittings with finger clamps. Unnecessary valve ports have been eliminated, shortening the gas path and increasing system conductance. For ultimate versatility standard nipples and elbows can be attached with finger clamps in order to make a drop-in replacement valve, such as an angle-in-line or tee valve. Once the finger clamp bolt is loosened it can be pivoted out of the way in order to remove or install the flange and centering ring. The finger clamp does not need to be removed from the valve or fitting. The clamp is self-aligning when tightened, for ease of flange installation. Each kit contains four finger clamps, hex head bolts and washers for one connection.



MODEL NUMBER	VALVE SIZE	BOLT	TORQUE
GNCP-150-S	3/4 to 1 1/2 (19 to 38)	12-24 x 7/8	6.8 Nm.
GNCP-200-S	2 (50)	1/4-20 x 7/8	11.3 Nm.

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Isolation Valves

Manual Butterfly Valves



Patented design

Our manual butterfly valves provide a low-cost alternative to bellows sealed gate valves. These valves easily actuate from the fully-closed position to fully open with only a quarter turn of the knob. A patented design allows the sealing disk to center itself when closing, with even pressure around the FKM O-ring seal. This design also helps to lower the amount of scuffing or rolling of the O-ring. Quarter-turn actuation, small footprint and the shortest possible gas path make manual butterfly valves the preferred choice for many applications.

SPECIFICATIONS

Port ODs: 3/4 to 2 inches (19 to 50mm)

Materials

Body: 304 stainless steel
Knob: Aluminum
Port seal: FKM

Actuation: Manual using knurled knob

Maximum temperature with FKM seals

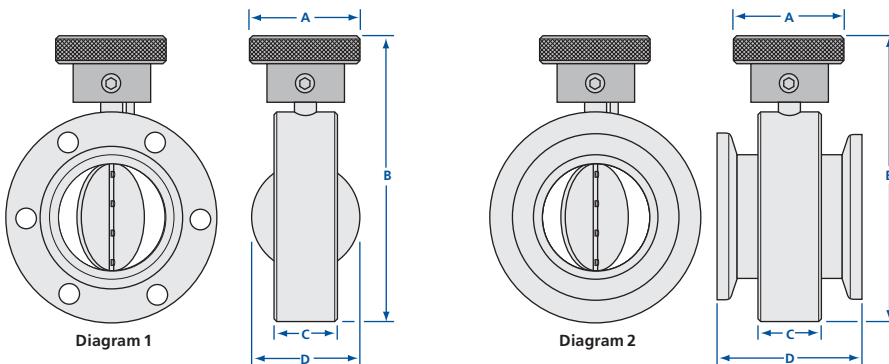
Sustained: ≤150°C
Intermittent: ≤204°C

Vacuum range

FKM o-ring: ≥1x10⁻⁹ mbar-High vacuum

Manual Butterfly Valves

MODEL NUMBER	DIAGRAM	VALVE SIZE	FLANGE TYPE	A	B	C	D
BFV-0752-CF	1	3/4 (19)	1.33 CF	0.75 (19)	2.01 (51)	0.75 (19)	-
BFV-0752-NWB	2	3/4 (19)	NW 16	0.75 (19)	2.01 (51)	0.75 (19)	1.75 (44)
BFV-1002-CF	1	1 (25)	2.12 CF	1.00 (25)	2.75 (70)	1.00 (25)	1.04 (26)
BFV-1002-NWB	2	1 (25)	NW 25	1.00 (25)	2.75 (70)	1.00 (25)	2.00 (50)
BFV-1502-CF	1	1 1/2 (38)	2.75 CF	1.25 (32)	3.71 (94)	0.75 (19)	1.34 (34)
BFV-1502-NWB	2	1 1/2 (38)	NW 40	1.25 (32)	3.71 (94)	1.37 (35)	2.25 (57)
BFV-2002-CF	1	2 (50)	3.38 CF	1.75 (44)	4.90 (124)	1.00 (25)	1.90 (48)
BFV-2002-NWB	2	2 (50)	NW 50	1.75 (44)	4.90 (124)	1.00 (25)	2.25 (57)



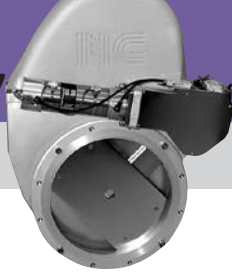
Replacement O-rings

MODEL NUMBER	VALVE SIZE	O-RING COMPOUND
BFV-075-95	3/4 (19.1)	FKM
BFV-100-95	1 (25.4)	FKM
BFV-150-95	1 1/2 (38.1)	FKM
BFV-200-95	2 (50.8)	FKM

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Isolation Valves

Isolation Pendulum Valves



SPECIFICATIONS

Materials

Body: Cast aluminum A356.0
 Valve plate: Aluminum 6061-T6
 Other parts: A6061, A7075, SS304, SS316, Inconel X-750 and FKM
 Seals: FKM standard. Kalrez, Chemraz, Perlast and other materials available
 Body and plate surface treatment
 Bare aluminum standard.
 Hard Type III anodizing optional

Compressed air source

CDA or equivalent at 65 to 85 psig

Differential pressure

With valve fully sealed: 1.02 bar maximum across the valve plate
 While opening the valve
 20 mbar (DN160 and DN200)
 24 mbar (DN250)
 29 mbar (DN350)

Operating pressure: 3.8×10^{-8} to 1000 mbar

Heating or bakeout capabilities

Body: 150°C maximum with optional heater kits
 Actuator: 60°C maximum

Ambient operating temps: 0 - 60°C

Helium Leak rate: $<10^{-9}$ mbar l/sec across seat and to atmosphere (1×10^{-8} mbar l/sec He for hard anodized body or gate)

Maximum speed: Customer adjustable depending on size

Reliability: 99% confidence level in clean environment O-ring cycle life: 200K cycles open to fully closed MTBF: $\geq 10,000$ hrs. continuous operation

Options: Heater jackets, other O-ring materials and flange configurations available

Nor-Cal Products' pneumatically actuated isolation pendulum valves contain the same patented Penduroll mechanism that is found in the Intellisys™ throttling pendulum valves. These valves offer the user a highly reliable, compact and low cost alternative to competitive designs. In addition, the smooth actuation results in low particle generation and rapid open-to-close speeds.

In-situ serviceability of the valve is made possible through the incorporation of a removable bonnet cover. The entire gate assembly and sealing O-ring can be accessed without removing the valve from the system, making regular inspection, cleaning and O-ring replacement quick and easy.

The valve body can be heated to 150°C with optional heater jackets. Call for information and pricing.



Heated pendulum valve assembly in our 3000 square foot Class 1000 clean room

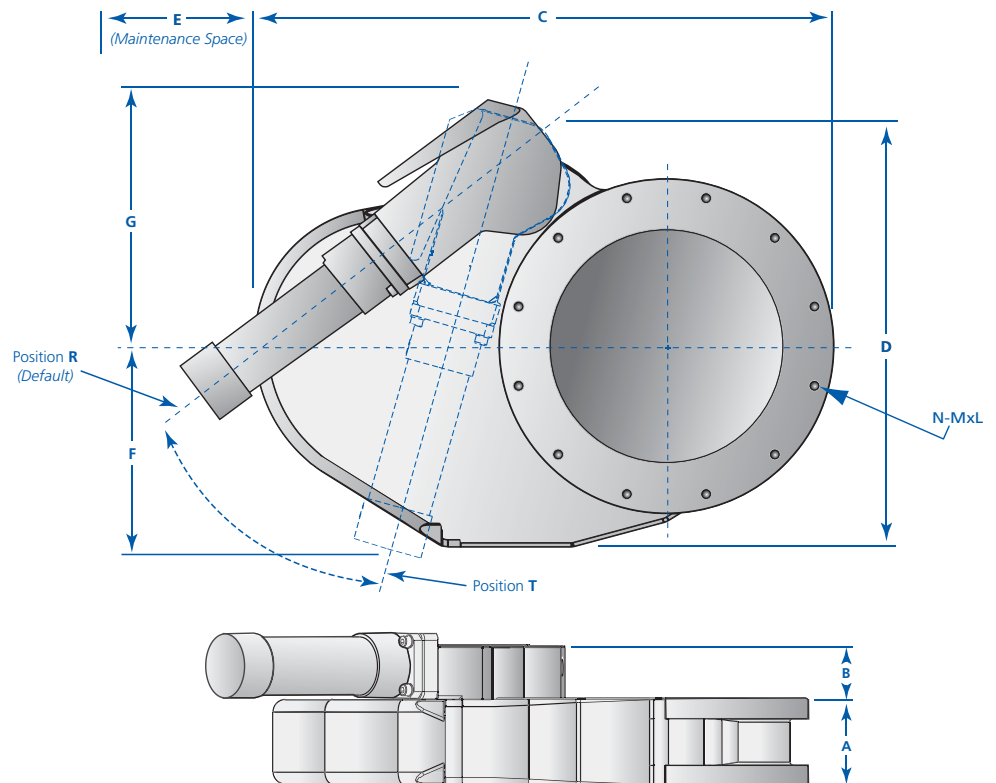
Isolation Pendulum Valves

MODEL NUMBER	NOMINAL ID	A	B	C	D	E	F	G	WEIGHT IN LBS.
IPV-600-ISO-160	6 (150)	3.15 (80)	3.78 (96)	15.9 (404)	12.2 (310)	5.32 (135)	5.87 (149)	8.5 (216)	40 lbs.
IPV-800-ISO-200	8 (200)	3.46 (88)	3.78 (96)	19.9 (505)	14.4 (366)	6.5 (165)	5.28 (134)	9.29 (236)	49 lbs.
IPV-1000-ISO-250	10 (254)	3.94 (100)	3.78 (96)	23.8 (605)	16.6 (422)	8.46 (215)	5.47 (139)	9.49 (241)	62 lbs.
IPV-1200-ISO-320	12 (300)	4.72 (120)	4.06 (103)	30.2 (767)	22 (559)	10.6 (269)	7.24 (184)	12.8 (325)	123 lbs.
IPV-1400-JIS-350	14 (350)	4.92 (125)	4.06 (103)	32.3 (820)	22 (559)	12.2 (310)	7.64 (194)	12.8 (325)	143 lbs.

Note: Other sizes and flange configurations available. Call for details. See page 137 for bolt hole specifications. N-MxL

JIS Flange O-Rings

SIZE	O-RINGS
350	OR-JIS-350



All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Isolation Valves

Linear Gate Valve General Information & Options



Nor-Cal Products stainless steel gate valves share with our poppet valves the innovative design, highest grade materials and superior workmanship that has made us a major supplier of valves to the vacuum industry. The estimated service interval on these valves is 100,000 cycles, depending on the application.

Our gate valves have an ultra-slim profile which makes them perfect for applications where space is limited, and their smaller volume results in lower outgassing and faster pumpdown. Larger sizes have a unique feature in the actuator which dampens the vibration which can arise when the gate is opened. This makes these valves ideal for semiconductor and other vibration sensitive processes. The carriage assembly and actuator can be removed without disassembling the body from the system for easy maintenance. The 304 stainless steel bodies are vacuum furnace brazed to 1100°C at 10-6 mbar before being electropolished inside and out. The welded AM-350 bellows have a short stroke for a longer cycle life.

Nor-Cal Products gate valves are available with NW (ISO-KF), ISO (clamp and bolt type), CF and ASA flanges in port sizes from 5/8 to 12 inches (16-300mm). Larger sizes are available upon request. Choose from manual or pneumatic actuation and FKM or copper seal bonnet.

Nor-Cal Products gate valves with FKM seal bonnet and gate and standard Reed-switch position indicators are bakeable to 150°C, as long as the actuator is not baked above 60°C. A gate valve with copper seal bonnet, FKM gate and micro-switch option can be baked to 200°C, except for the actuator. With the air solenoid and position indicators removed, a copper seal bonnet valve with high temperature Kalrez gate O-ring can be baked to 250°C with the gate in the open position. Silicone heater jackets for bakeouts up to 200°C can be provided. Please call for pricing.

Gate Valve Options

One or more options can be ordered by adding the option suffix to the basic valve model number. Please add the option suffixes in the following order:

Example: GVMP-4002-CF-KT-S22

	-		-		-	
Valve Model Number		Micro-Switch		O-ring Type		Air Solenoid

O-rings

OPTION	COMPOUND	TEMPERATURE		DESCRIPTION
		MIN.	MAX.	
Standard	FKM	-29°C	204°C	Industry standard
-KT	Kalrez 4079	-20°C	316°C	High temperatures
-CR	Chemraz 513	-30°C	210°C	Chemical resistant
-S	Silicone	-55°C	232°C	Extreme temperatures

Air Solenoids

OPTION	DESCRIPTION
-S12	4-way, 120V AC, 60 Hz
-S22	4-way, 24V DC
-S32	4-way, 240V AC, 50/60 Hz
-S42	4-way, 24V AC, 50/60 Hz

Air solenoids require 4 watts of power to actuate. Solenoids are mounted on all FKM seal bonnet gate valves with 4 inch (100mm) ID and larger. Solenoids for FKM seal bonnet gate valves with under 4 inch (100mm) ID and all sizes of copper seal gate valves are shipped unmounted with the valve.

Micro-Switch

OPTION -M
Micro-switches are available on all pneumatically actuated Nor-Cal Products valves. One switch closes when the valve is fully open and the other when it is fully closed. These can be connected to control panels with alarms or lights for positive position indication.

Silicone heater jackets for bakeouts up to 200°C can be provided for all gate valves. (See page 127 for details.)



SPECIFICATIONS

General

Nominal IDs: 5/8 to 12 inch (16 to 300mm)
Helium leak rate: $\leq 2 \times 10^{-9}$ mbar l/sec.

Materials

Body: 304 SS vacuum furnace brazed body
Bellows: Welded AM-350
O-ring: FKM (standard)
Other compounds available.

Finish: Electropolished inside and out

Maximum pressure differential

At opening: 20 mbar
Closed: 1000 mbar in either direction

Vacuum range

FKM Seal Bonnet: $\geq 10^{-9}$ mbar
Copper Seal Bonnet: $\geq 10^{-10}$ mbar

Temperature range

FKM Seal Bonnet: $\leq 150^\circ\text{C}$
Copper Seal Bonnet: $\leq 200^\circ\text{C}$ with CF flanges and gate in open position

Pneumatically actuated:

Double Acting (standard)
Single Acting, Normally Closed actuation available on sizes up to DN-100 80 psig (5.5 bar) max. air pressure (Higher operating pressures available upon request)

Position indicator:

Reed-switch position indicator, standard on 1.5" (38) and larger valves

Manually actuated

Acme threads for fewer turns

Thermal: Heater jackets and controllers available. Call for information and pricing

Options:

- Air solenoid
- Microswitch position indicator
- O-ring compounds
- Single Acting Option
- Million Cycle Option
- High pressure air actuator



Isolation Valves

Linear Gate Valves



Manually Operated FKM Seal Gate Valves

MODEL NUMBER	NOM. ID	FLANGE TYPE	L/SEC (molecular)	A	B	C	D	E	F	G
GV-0622-NW	5/8(16)	NW-16	12	2.39(61)	1.75(44)	2.96(75.2)	1.49(38)	1.80(46)	1.88(48)	1.31(33)
GV-0622-CF	5/8(16)	1.33 CF	12	2.39(61)	1.75(44)	1.56(39.6)	1.49(38)	1.80(46)	1.88(48)	1.31(33)
GV-1502-NW	1 1/2(38)	NW-40	98	4.69(119)	3.40(86)	1.99(50.6)	2.00(50)	3.61(92)	3.31(84)	2.45(62)
GV-1502-CF	1 1/2(38)	2.75 CF	130	4.69(119)	3.40(86)	2.03(51.6)	2.00(50)	3.61(92)	3.31(84)	2.45(62)
GV-2002-NW	2(50)	NW-50	220	5.60(142)	4.12(105)	1.99(50.6)	2.00(50)	3.61(92)	3.81(97)	2.96(75)
GV-2002-CF	2(50)	3.38 CF	300	5.60(142)	4.12(105)	2.28(57.9)	2.00(50)	3.61(92)	3.81(97)	2.96(75)
GV-2502-CF	2 1/2(63)	4.50 CF	520	6.50(165)	4.81(122)	2.40(61.0)	2.00(50)	3.61(92)	4.37(111)	3.52(89)
GV-2502-ASA	2 1/2(63)	ASA-6*	610	6.50(165)	4.81(122)	2.03(51.6)	2.00(50)	3.61(92)	4.37(111)	3.52(89)
GV-2502-ISO	2 1/2(63)	ISO-63	610	6.50(165)	4.81(122)	2.03(51.6)	2.00(50)	3.61(92)	4.37(111)	3.52(89)
GV-2502-ISO-OF	2 1/2(63)	ISO-63-OF	320	6.50(165)	4.81(122)	3.46(87.9)	2.00(50)	3.61(92)	4.37(111)	3.52(89)
GV-3002-CF	3(76)	4.62 CF	840	7.70(196)	5.77(147)	2.53(64.3)	2.00(50)	3.61(92)	4.94(125)	4.28(109)
GV-3002-ASA	3(76)	ASA-7.5*	1,070	7.70(196)	5.77(147)	2.03(51.6)	2.00(50)	3.61(92)	4.94(125)	4.28(109)
GV-3002-ISO	3(76)	ISO-80	1,070	7.70(196)	5.77(147)	1.97(50.0)	2.00(50)	3.61(92)	4.94(125)	4.28(109)
GV-3002-ISO-OF	3(76)	ISO-80-OF	550	7.70(196)	5.77(147)	3.84(97.5)	2.00(50)	3.61(92)	4.94(125)	4.28(109)
GV-4002-CF	4(100)	6.00 CF	1,700	10.8(273)	8.13(207)	2.97(75.4)	3.11(79)	7.90(201)	7.00(178)	5.65(144)
GV-4002-ASA	4(100)	ASA-9*	2,100	10.8(273)	8.13(207)	2.41(61.2)	3.11(79)	7.90(201)	7.00(178)	5.65(144)
GV-4002-ISO	4(100)	ISO-100	2,100	10.8(273)	8.13(207)	2.41(61.2)	3.11(79)	7.90(201)	7.00(178)	5.65(144)
GV-4002-ISO-OF	4(100)	ISO-100-OF	1,400	10.8(273)	8.13(207)	4.25(108)	3.11(79)	7.90(201)	7.00(178)	5.65(144)
GV-6002-CF	6(150)	8.00 CF	5,400	14.1(357)	10.6(270)	3.17(80.5)	3.11(79)	7.90(201)	8.75(222)	7.55(192)
GV-6002-ASA	6(150)	ASA-11*	7,100	14.1(357)	10.6(270)	2.41(61.2)	3.11(79)	7.90(201)	8.75(222)	7.55(192)
GV-6002-ISO	6(150)	ISO-160	7,100	14.1(357)	10.6(270)	2.36(59.9)	3.11(79)	7.90(201)	8.75(222)	7.55(192)
GV-6002-ISO-OF	6(150)	ISO-160-OF	4,000	14.1(357)	10.6(270)	4.25(108)	3.11(79)	7.90(201)	8.75(222)	7.55(192)
GV-8002-CF	8(200)	10.00 CF	12,200	18.4(468)	13.9(354)	3.35(85.1)	3.11(79)	7.90(201)	11.3(286)	10.0(255)
GV-8002-ASA	8(200)	ASA-11*	14,500	18.4(468)	13.9(354)	2.76(70.1)	3.11(79)	7.90(201)	11.3(286)	10.0(255)
GV-8002-ISO	8(200)	ISO-200	15,200	18.4(468)	13.9(354)	2.66(67.5)	3.11(79)	7.90(201)	11.3(286)	10.0(255)
GV-8002-ISO-OF	8(200)	ISO-200-OF	9,500	18.4(468)	13.9(354)	4.25(108)	3.11(79)	7.90(201)	11.3(286)	10.0(255)
GV-10002-CF	10(254)	12.00 CF	24,900	24.0(611)	18.3(465)	3.65(92.7)	8.98(228)	12.0(305)	13.4(341)	12.0(305)
GV-10002-ASA	10(254)	ASA-16*	24,800	24.0(611)	18.3(465)	3.15(80.0)	8.98(228)	12.0(305)	13.4(341)	12.0(305)
GV-10002-ISO	10(254)	ISO-250	26,900	24.0(611)	18.3(465)	3.15(80.0)	8.98(228)	12.0(305)	13.4(341)	12.0(305)
GV-10002-ISO-OF	10(254)	ISO-250-OF	15,400	24.0(611)	18.3(465)	5.51(140)	8.98(228)	12.0(305)	13.4(341)	12.0(305)
GV-12002-CF	12(300)	14.00 CF	34,600	28.9(734)	22.0(560)	3.89(98.8)	8.98(228)	12.0(305)	15.9(404)	14.3(363)
GV-12002-ASA	12(300)	ASA-16*	42,800	28.9(734)	22.0(560)	3.15(80.0)	8.98(228)	12.0(305)	15.9(404)	14.3(363)
GV-12002-ISO	12(300)	ISO-320	42,800	28.9(734)	22.0(560)	3.15(80.0)	8.98(228)	12.0(305)	15.9(404)	14.3(363)

*Note: All ASA flanged valves are provided without O-ring grooves. Grooves can be provided on request.

SPECIFICATIONS

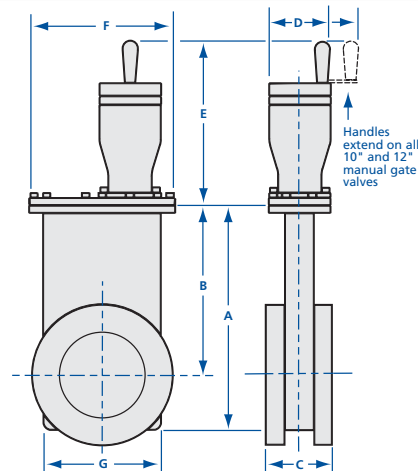
- General**
 Nominal IDs: 5/8 to 12 inch (16 to 300mm)
 Helium leak rate: $\leq 2 \times 10^{-9}$ mbar l/sec.
- Materials**
 Body: 304 SS vacuum furnace brazed body
 Bellows: Welded AM-350
 O-ring: FKM (standard)
 Other compounds available.
- Finish:** Electropolished inside and out
- Maximum pressure differential**
 At opening: 20 mbar
 Closed: 1000 mbar in either direction
- Vacuum range**
 FKM seal bonnet: $\geq 10^{-9}$ mbar
 Copper seal bonnet: $\geq 10^{-10}$ mbar
- Temperature range**
 FKM Seal Bonnet: $\leq 150^\circ\text{C}$
 Copper Seal Bonnet: $\leq 200^\circ\text{C}$ with CF flanges and gate in open position
- Manually actuated**
 Acme threads for fewer turns
- Options:**
- O-ring compounds
 - Single Acting Option
 - Million Cycle Option
 - Heater Jackets

Manually Operated Copper Seal Bonnet Gate Valves

MODEL NUMBER	NOM. ID	FLANGE TYPE	L/SEC (molecular)	A	B	C	D	E	F	G
GVM-0622-CF	5/8(16)	1.33 CF	12	2.39(61)	1.75(44)	1.56(39.6)	1.49(38)	1.80(46)	1.88(47.8)	1.31(33)
GVM-1502-CF	1 1/2(38)	2.75 CF	130	4.69(119)	3.40(86)	2.03(51.6)	2.00(50)	3.57(91)	3.31(84.1)	2.45(62)
GVM-2002-CF	2(50)	3.38 CF	300	5.60(142)	4.12(105)	2.28(57.9)	2.00(50)	3.61(92)	3.81(96.8)	2.96(75)
GVM-2502-CF	2 1/2(63)	4.50 CF	520	6.50(165)	4.81(122)	2.40(61.0)	2.00(50)	3.61(92)	4.37(111)	3.52(89)
GVM-3002-CF	3(76)	4.62 CF	840	7.70(196)	5.77(147)	2.53(64.3)	2.00(50)	3.61(92)	5.24(133)	4.28(109)
GVM-4002-CF	4(100)	6.00 CF	1,700	10.8(273)	8.13(207)	2.97(75.4)	3.11(79)	7.90(201)	7.00(178)	5.65(144)
GVM-6002-CF	6(150)	8.00 CF	5,400	14.1(357)	10.6(270)	3.17(80.5)	3.11(79)	7.90(201)	8.75(222)	7.55(192)
GVM-8002-CF	8(200)	10.00 CF	12,200	18.4(468)	13.9(354)	3.35(85.1)	3.11(79)	7.90(201)	11.3(286)	10.0(255)
GVM-10002-CF	10(254)	12.00 CF	24,900	24.0(611)	18.3(465)	3.65(92.7)	8.98(228)	12.1(308)	13.4(341)	12.0(305)
GVM-12002-CF	12(300)	14.00 CF	34,600	28.9(734)	22.0(560)	3.89(98.8)	8.98(228)	12.1(308)	15.9(404)	14.3(363)

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

To order gate valve replacement O-rings, pin and bearing kits or O-ring/gasket kits, you must provide us with your valve's serial number.



Pneumatically Actuated FKM Seal Gate Valves

MODEL NUMBER	NOM. ID	FLANGE TYPE	L/SEC (molecular)	A	B	C	D	E	F	G
GVP-0622-NW	5/8(16)	NW-16	12	2.39 (61)	1.75 (44)	2.96 (75.2)	1.00 (25)	2.55 (65)	1.88 (48)	1.31 (33)
GVP-0622-CF	5/8(16)	1.33 CF	12	2.39 (61)	1.75 (44)	1.56 (39.6)	1.00 (25)	2.55 (65)	1.55 (39)	1.31 (33)
GVP-1502-NW	1 1/2(38)	NW-40	98	4.69 (119)	3.40 (86)	1.99 (50.6)	2.00 (50)	5.29 (134)	3.31 (84)	2.45 (62)
GVP-1502-CF	1 1/2(38)	2.75 CF	130	4.69 (119)	3.40 (86)	2.03 (51.6)	2.00 (50)	5.29 (134)	3.31 (84)	2.45 (62)
GVP-2002-NW	2 (50)	NW-50	220	5.60 (142)	4.12 (105)	1.99 (50.6)	2.00 (50)	5.29 (134)	3.81 (97)	2.96 (75)
GVP-2002-CF	2 (50)	3.38 CF	300	5.60 (142)	4.12 (105)	2.28 (57.9)	2.00 (50)	5.29 (134)	3.81 (97)	2.96 (75)
GVP-2502-CF	2 1/2(63)	4.50 CF	520	6.50 (165)	4.81 (122)	2.40 (61.0)	2.45 (62)	5.29 (134)	4.37 (111)	3.52 (89)
GVP-2502-ASA	2 1/2(63)	ASA-6*	610	6.50 (165)	4.81 (122)	2.03 (51.6)	2.45 (62)	5.29 (134)	4.37 (111)	3.52 (89)
GVP-2502-ISO	2 1/2(63)	ISO-63	610	6.50 (165)	4.81 (122)	2.03 (51.6)	2.45 (62)	5.29 (134)	4.37 (111)	3.52 (89)
GVP-2502-ISO-OF	2 1/2(63)	ISO-63-OF	320	6.50 (165)	4.81 (122)	3.46 (87.9)	2.45 (62)	5.29 (134)	4.37 (111)	3.52 (89)
GVP-3002-CF	3 (76)	4.62 CF	840	7.7 (196)	5.77 (147)	2.53 (64.3)	2.45 (62)	5.29 (134)	4.94 (125)	4.28 (109)
GVP-3002-ASA	3 (76)	ASA-7.5*	1,070	7.7 (196)	5.77 (147)	2.03 (51.6)	2.45 (62)	5.29 (134)	4.94 (125)	4.28 (109)
GVP-3002-ISO	3 (76)	ISO-80	1,070	7.7 (196)	5.77 (147)	1.97 (50.0)	2.45 (62)	5.29 (134)	4.94 (125)	4.28 (109)
GVP-3002-ISO-OF	3 (76)	ISO-80-OF	550	7.7 (196)	5.77 (147)	3.84 (97.5)	2.45 (62)	5.29 (134)	4.94 (125)	4.28 (109)
GVP-4002-CF	4 (100)	6.00 CF	1,700	10.8 (273)	8.13 (207)	2.97 (75.4)	2.97 (75)	6.95 (177)	7.00 (178)	5.65 (144)
GVP-4002-ASA	4 (100)	ASA-9*	2,100	10.8 (273)	8.13 (207)	2.41 (61.2)	2.97 (75)	6.95 (177)	7.00 (178)	5.65 (144)
GVP-4002-ISO	4 (100)	ISO-100	2,100	10.8 (273)	8.13 (207)	2.41 (61.2)	2.97 (75)	6.95 (177)	7.00 (178)	5.65 (144)
GVP-4002-ISO-OF	4 (100)	ISO-100-OF	1,400	10.8 (273)	8.13 (207)	4.25 (108)	2.97 (75)	6.95 (177)	7.00 (178)	5.65 (144)
GVP-6002-CF	6 (150)	8.00 CF	5,400	14.1 (357)	10.6 (270)	3.17 (80.5)	2.97 (75)	6.95 (177)	8.75 (222)	7.55 (192)
GVP-6002-ASA	6 (150)	ASA-11*	7,100	14.1 (357)	10.6 (270)	2.41 (61.2)	2.97 (75)	6.95 (177)	8.75 (222)	7.55 (192)
GVP-6002-ISO	6 (150)	ISO-160	7,100	14.1 (357)	10.6 (270)	2.36 (59.9)	2.97 (75)	6.95 (177)	8.75 (222)	7.55 (192)
GVP-6002-ISO-OF	6 (150)	ISO-160-OF	4,000	14.1 (357)	10.6 (270)	4.25 (108)	2.97 (75)	6.95 (177)	8.75 (222)	7.55 (192)
GVP-8002-CF	8 (200)	10.00 CF	12,200	18.4 (468)	13.9 (354)	3.35 (85.1)	2.97 (75)	6.95 (177)	11.3 (286)	10.0 (255)
GVP-8002-ASA	8 (200)	ASA-11*	14,500	18.4 (468)	13.9 (354)	2.76 (70.1)	2.97 (75)	6.95 (177)	11.3 (286)	10.0 (255)
GVP-8002-ISO	8 (200)	ISO-200	15,200	18.4 (468)	13.9 (354)	2.66 (67.6)	2.97 (75)	6.95 (177)	11.3 (286)	10.0 (255)
GVP-8002-ISO-OF	8 (200)	ISO-200-OF	9,500	18.4 (468)	13.9 (354)	4.25 (108)	2.97 (75)	6.95 (177)	11.3 (286)	10.0 (255)
GVP-10002-CF	10 (254)	12.00 CF	24,900	24.0 (611)	18.3 (465)	3.65 (92.7)	4.75 (121)	9.47 (241)	13.4 (341)	11.9 (305)
GVP-10002-ASA	10 (254)	ASA-16*	24,800	24.0 (611)	18.3 (465)	3.15 (80.0)	4.75 (121)	9.47 (241)	13.4 (341)	11.9 (305)
GVP-10002-ISO	10 (254)	ISO-250	26,900	24.0 (611)	18.3 (465)	3.15 (80.0)	4.75 (121)	9.47 (241)	13.4 (341)	11.9 (305)
GVP-10002-ISO-OF	10 (254)	ISO-250-OF	15,400	24.0 (611)	18.3 (465)	5.51 (140)	4.75 (121)	9.47 (241)	13.4 (341)	11.9 (305)
GVP-12002-CF	12 (300)	14.00 CF	34,600	28.9 (734)	22.0 (560)	3.89 (98.8)	4.75 (121)	9.47 (241)	15.9 (404)	14.3 (363)
GVP-12002-ASA	12 (300)	ASA-16*	42,800	28.9 (734)	22.0 (560)	3.15 (80.0)	4.75 (121)	9.47 (241)	15.9 (404)	14.3 (363)
GVP-12002-ISO	12 (300)	ISO-320	42,800	28.9 (734)	22.0 (560)	3.15 (80.0)	4.75 (121)	9.47 (241)	15.9 (404)	14.3 (363)

*Note: All ASA flanged valves are provided without O-ring grooves. Grooves can be provided on request



SPECIFICATIONS

- General**
 Nominal IDs: 5/8 to 12 inch (16 to 300mm)
 Helium leak rate: $\leq 2 \times 10^{-9}$ mbar l/sec.
- Materials**
 Body: 304 SS vacuum furnace brazed body
 Bellows: Welded AM-350
 O-ring: FKM (standard)
 Other compounds available.

Finish: Electropolished inside and out

Maximum pressure differential
 At opening: 200 mbar
 Closed: 1000 mbar in either direction

Vacuum range
 FKM seal bonnet: $\geq 10^{-9}$ mbar
 Copper seal bonnet: $\geq 10^{-10}$ mbar

Temperature range
 FKM seal bonnet: $\leq 150^\circ\text{C}$
 Copper seal bonnet: $\leq 200^\circ\text{C}$ with CF flanges and gate in open position

Pneumatically actuated:
 Double Acting (standard)
 Single Acting, Normally Closed actuation available on sizes up to DN-100
 80 psig (5.5 bar) max. air pressure
 (Higher operating pressures available upon request)

Position indicator:
 Reed-switch position indicator, standard on 1.5" (38) and larger valves

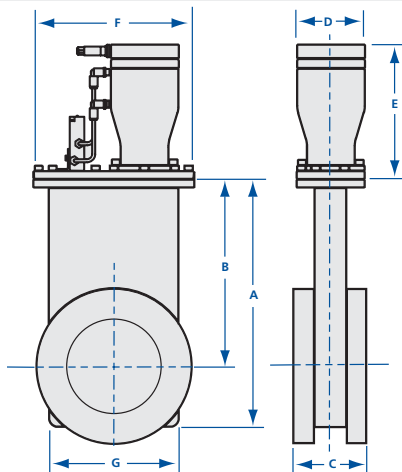
- Options:**
- Air solenoid
 - Microswitch position indicator
 - O-ring compounds
 - Single Acting Option
 - Million Cycle Option
 - High pressure air actuator
 - Heater Jackets

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

To order gate valve replacement O-rings, pin and bearing kits or O-ring/gasket kits, you must provide us with your valve's serial number.

Pneumatically Actuated Copper Seal Bonnet Gate Valves

MODEL NUMBER	NOM. ID	FLANGE TYPE	L/SEC (molecular)	A	B	C	D	E	F	G
GVMP-0622-CF	5/8(16)	1.33 CF	12	2.39 (61)	1.75 (44)	1.56 (39.6)	1.00 (25)	2.55 (65)	1.88 (48)	1.31 (33)
GVMP-1502-CF	1 1/2(38)	2.75 CF	130	4.69 (119)	3.4 (86)	2.03 (51.6)	2.00 (50)	5.29 (134)	3.31 (84)	2.45 (62)
GVMP-2002-CF	2 (50)	3.38 CF	300	5.6 (142)	4.12 (105)	2.28 (57.9)	2.00 (50)	5.29 (134)	3.81 (97)	2.96 (75)
GVMP-2502-CF	2 1/2(63)	4.50 CF	520	6.5 (165)	4.81 (122)	2.4 (61.0)	2.00 (50)	5.29 (134)	4.37 (111)	3.52 (89.4)
GVMP-3002-CF	3 (76)	4.62 CF	840	7.7 (196)	5.77 (147)	2.53 (64.3)	2.00 (50)	5.29 (134)	5.24 (133)	4.28 (109)
GVMP-4002-CF	4 (100)	6.00 CF	1,700	10.8 (273)	8.13 (207)	2.97 (75.4)	2.97 (75)	6.95 (177)	7.00 (178)	5.65 (144)
GVMP-6002-CF	6 (150)	8.00 CF	5,400	14.1 (357)	10.6 (270)	3.17 (80.5)	2.97 (75)	6.95 (177)	8.75 (222)	7.55 (192)
GVMP-8002-CF	8 (200)	10.00 CF	12,200	18.4 (468)	13.9 (354)	3.35 (85.1)	2.97 (75)	6.95 (177)	11.3 (286)	10.0 (255)
GVMP-10002-CF	10 (254)	12.00 CF	24,900	24.0 (611)	18.3 (465)	3.65 (92.7)	4.75 (121)	9.47 (241)	13.4 (341)	12.0 (305)
GVMP-12002-CF	12 (300)	14.00 CF	34,600	28.9 (734)	22.0 (560)	3.89 (98.8)	4.75 (121)	9.47 (241)	16.9 (404)	14.3 (363)



Isolation Valves

Bellowless Poppet Valves & Leak Valves



Pneumatic Bellowless Angle Valves

Right angle bellowless poppet valves are now available in sizes from $\frac{3}{8}$ thru $1\frac{1}{2}$ inches (9.53-38.1mm). These valves are typically used for applications with large differential pressures, extremely high cycle rates or "dirty" processes that cause frequent bellows failures. Poppet shafts are sealed with double O-rings. Heater jackets and other port and flange configurations are available on request.

MODEL NUMBER	NOMINAL PORT OD	FLANGE TYPE	L/SEC (molecular)	A	B	C	D
ESVP-0382-NWB-5	$\frac{3}{8}$ (10)	NW-10B	0.66	1.65 (41.9)	3.77 (96)	5.92 (150)	2.25 (57)
ESVP-0752-NWB-5	$\frac{1}{4}$ (19)	NW-16B	5.00	2.15 (54.6)	4.27 (108)	6.41 (163)	2.25 (57)
ESVP-1002-NWB-5	1 (25)	NW-25B	12.00	2.03 (51.6)	4.03 (102)	6.17 (157)	2.25 (57)
ESVP-1502-NWB-5	$1\frac{1}{2}$ (38)	NW-40B	128.00	2.40 (61.0)	5.13 (130)	7.71 (196)	3.00(76)

SPECIFICATIONS

Nominal Port ODs: $\frac{3}{8}$ to $1\frac{1}{2}$ inches (10 to 38mm)

Materials

Body: Electropolished 304 stainless steel
Bonnet seal: FKM
Poppet seal: FKM
Other O-ring compounds available

Actuation: Normally closed

$\frac{3}{8}$ to $1\frac{1}{2}$ inch (10 to 38mm) ODs:
Single Acting/Normally Closed
See page 103 for actuation options

Operating pressure: 60 to 80 psig (4-5.5 bar)

Differential pressure

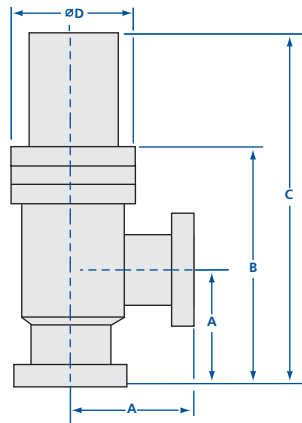
Port side: Maximum 100 psig (7 bar)
Poppet: Maximum 6psi (0.4 bar) differential across the valve seat.

Maximum temperature with FKM seals

Sustained: $\leq 150^{\circ}\text{C}$
Intermittent: $\leq 204^{\circ}\text{C}$

Vacuum range: $\geq 1 \times 10^{-9}$ mbar - High Vacuum

Options: Fittings, O-rings, air solenoids, micro-switches and actuators. See page 103



Replacement O-Ring & Valve Rebuild Kits

MODEL NUMBER	NOMINAL PORT OD	DESCRIPTION
ESVP-075-95-5	$\frac{3}{8}$ -1 (10-25)	O-ring kit
ESVP-150-95-5	$1\frac{1}{2}$ (38)	O-ring kit
ESVP-075-99-5	$\frac{3}{8}$ -1 (10-25)	Complete rebuild kit, includes all valve parts except valve body
ESVP-150-99-5	$1\frac{1}{2}$ (38)	Complete rebuild kit, includes all valve parts except valve body

SPECIFICATIONS

Materials

Body: Electropolished 304 stainless steel

Flanges

Inlet: 1.33 CF, rotatable, clearance bolt holes
Outlet: 2.75 CF, nonrotatable, clearance bolt holes

Poppet: Sapphire
Poppet seat: Copper

Actuation: Manual, adjustable set point

Maximum temperature

Sustained: $\leq 250^{\circ}\text{C}$
Intermittent: $\leq 450^{\circ}\text{C}$

Vacuum range: $\geq 1 \times 10^{-11}$ mbar - UHV

Minimum leak rate

Normal: 1×10^{-10} mbar l/sec.
Non-condensable gas: 1×10^{-8} mbar l/sec.

Inlet gas pressure: maximum 500 psig (34 bar)

Poppet seat life

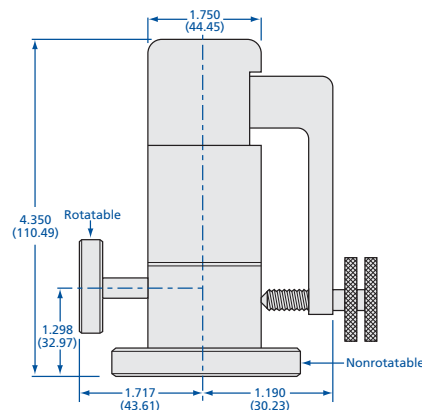
Unbaked: 250 to 300 closures
 $\leq 250^{\circ}\text{C}$: 80 to 100 closures
 $\leq 450^{\circ}\text{C}$: 20 to 30 closures

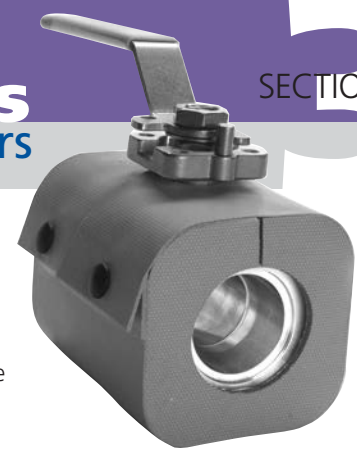
All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Leak Valves

Leak valves are used for controlling gas introduction into high- and ultra-high vacuum systems. They utilize an optically flat sapphire poppet and a metal seal seat, allowing bakeout temperatures to 450°C . These valves are manually actuated by a cantilever arm with precision adjustment threads. The adjustment knobs can be set to allow controlled leak rates as small as 1×10^{-10} mbar l/sec.

MODEL NUMBER	DESCRIPTION
LL-275-133	Leak Valve, 1.33" OD CF Inlet, 2.75 CF Outlet
LL-275-95	Replacement Gasket Assembly
LL-275-SA	Replacement Sapphire Assembly
LL-275-ST	Insertion Tool to replace Sapphire





Poppet Valve, Ball Valve and Gate Valve Heaters

Many semiconductor processes are carried out in vacuum chambers with internal temperatures of several hundred degrees Celsius. Process by-products exit the chamber in vapor phase, but sublimate in the foreline and vacuum pump exhaust when gas temperatures drop sufficiently for them to form solids. The resultant buildup can increase wafer defects from particle back-streaming, reduce throughput of vacuum lines, impede the function of throttle valves and isolation valves,

damage some dry pumps and reduce the efficiency of the scrubber. This buildup can be reduced or eliminated by heating vacuum lines and associated components from the chamber to the scrubber, or by using a combination of heaters and foreline traps, which collect the by-products preventing them from continuing downstream.

Heater jackets with a UL recognized electronic thermostat for fixed set-point applications is available for temperatures up to 150°C. For fully

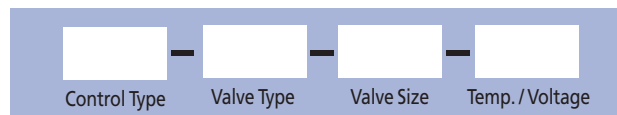
adjustable temperature set-points up to 200 °C, a UR/CE certified heater with a Type K thermocouple and PID controller can provide precise temperature control.

Standard 1/2" insulation add-on heaters are available for all poppet valves and gate valves. (Aluminum Genesis valves have their own integrated heater.) These can be purchased and installed separately provided that the valve is fitted with the proper high temperature seals and other thermally compatible components.

Heater Jacket Part Number and Ordering Information

Please use the following part numbering tree to specify the heater jacket to fit your poppet valve or gate valve.

Note: All part number combinations may not be valid or available. Contact Nor-Cal Products for the latest pricing, availability and other options.



Control Type

CONTROL TYPE	CODE
PID control*	HC
Electronic thermostat	HTE

* Requires separate PID controller. (See controllers Section 6.)

Valve Type

VALVE TYPE	CODE
Angle-in-line	AIV
Manual Ball valve	BVM
Pneumatic Ball Valve	BVP
Angle valve	ESV
SS Genesis (stainless steel)	GNVS
SS Genesis angle-in-line	GNVSAI
Gate valve with CF flange	GVC
Gate valve with ISO flange	GVI
In-line valve	ILV
N-Series angle	NAP
N-Series angle-in-line	NAIP

Valve Size

VALVE SIZE	CODE
0.38 (10)	038
0.50 (13)	050
0.75 (19)	075
1.00 (25)	100
1.50 (38)	150
2.00 (50)	200
2.50 (63)	250
3.00 (76)	300
4.00 (100)	400
6.00 (150)	600
8.00 (200)	800
10.00 (254)	1000

Temperature/Voltage

TEMPERATURE & VOLTAGE	CODE
HC type, 120 VAC	201
HC Type, 208 VAC	202
HTE type, 90°C, 120 VAC	091
HTE type, 90°C, 208 VAC	092
HTE type, 120°C, 120 VAC	121
HTE type, 120°C, 208 VAC	122
HTE type, 150°C, 120 VAC	151
HTE type, 150°C, 208 VAC	152

Example: HTE-NAP-150-091

Electronic thermostatically controlled heater jacket for 1.5 inch (38mm) N-Series angle valve, 90°C, 120VAC.

Isolation Valves

Bakeable All Metal Valves



Nor-Cal Products metal-seal angle valves are intended for use in UHV or cryogenic applications where temperature extremes preclude the use of our elastomer seal valves. Approved for use in beamline facilities, these valves have a temperature operating range from -250°C to 400°C.

The pulled-port method is used for the fabrication of the stainless steel bodies resulting in higher conductance and better cleanliness. Heater jackets and controllers are available on request.

The life of the copper poppet seal is dependent upon the temperature at which the valve is used. Maximum temperature bakeouts may require copper poppet seal replacement after 50 cycles, while hundreds of cycles are possible with moderate bakeouts. As many as 10,000 cycles have been obtained from the same seal during testing.

A dial indicator at the top of the valve indicates the proper torque for closure and also when the seal should be replaced. The copper poppet seal is easily replaced by opening the valve with a slotted screw driver. The seal is removed through the side port and a new one replaced in a like manner.

After seal replacement the valve must be torqued to a higher value



than during normal operation to make it seat. Do not exceed the maximum torque specifications. (See *torque specifications table*.)

After closing the valve to its normal torque value loosen the set screw below the closure nut, rotate the indicator to the furthest counter-

clockwise line on top of the valve and retighten the set screw. The valve may be closed to this mark 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.

SPECIFICATIONS

Port ODs: 3/4 and 1 1/2 inch (19 to 38mm)

Finish: Electropolished

Assembly: Clean room

Materials

Pulled port body: 304 stainless steel
Bellows: Formed 321 stainless steel
Poppet seal: OFHC Copper

Actuation: Manual using self-lubricating bronze nuts with ACME threads

Operating temperature: -250°C to 400°C

Maximum bakeout temperature

Open: 400°C
Closed: 300°C

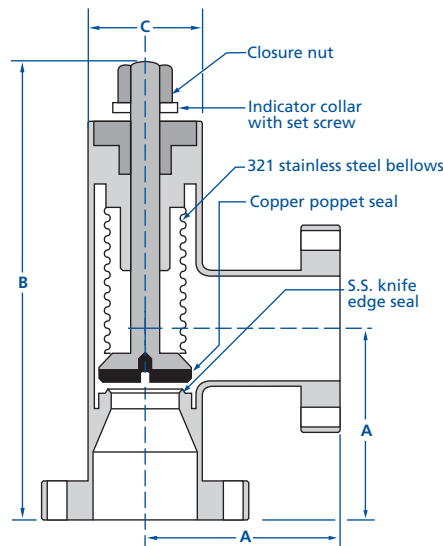
Vacuum rated: $\geq 1 \times 10^{-10}$ mbar - UHV

Helium leak rate: $\leq 10^{-10}$ mbar l/sec.

Options: Heater jackets and controllers

MODEL NUMBER	NOMINAL PORT OD	FLANGE TYPE	CONDUCTANCE (L/sec)		(OPEN)		
			MOLECULAR	VISCOUS	A	B	C
AMV-075-CF	3/4 (19)	Rotatable 1.33 CF	3	56	1.50 (38)	5.40 (137)	1.50 (38)
AMV-150-CF	1 1/2 (38)	Rotatable 2.75 CF	10	356	2.45 (62)	6.87 (175)	1.50 (38)

NOTE: Port lengths that match other manufacturers' products are available upon request.



All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

Replacement Seals

MODEL NUMBER	NOMINAL PORT OD
AMV-075-95	0.75 (19)
AMV-150-95	1.50 (38)

Torque Specifications

MODEL NUMBER	SEATING NORMAL MAXIMUM		
	Nm	Nm	Nm
AMV-075-CF	6.8	5.6	13.6
AMV-150-CF	13.6	11.3	22.6

Order Information

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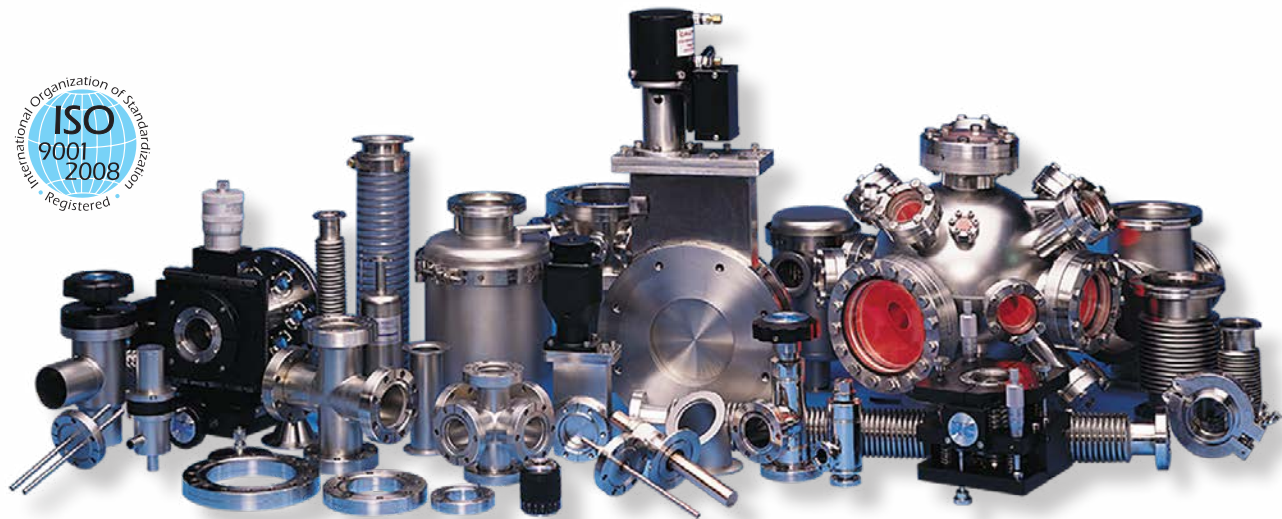
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Terms & Conditions of Sale

Payment terms are net 30 days from the date of the invoice once credit has been approved. Otherwise, C.O.D. Most major credit cards are accepted.

If payment in full is not received within 30 days, a 1.5% per month late charge may be added to the unpaid balance. Discounts may be revoked if an account is not paid within these terms.

MINIMUM ORDERS: The minimum domestic order is \$40. The minimum international order is \$100.00.

QUANTITY PRICING:

Quantity pricing is valid on single shipments only.

AVAILABILITY: Our inventory is updated automatically, but there is always a possibility that an item may be unavailable or sold-out. If this occurs, customers are notified as soon as possible and alternative options are offered if available.

PACKAGING: The factory will determine the most cost effective method to package items for shipment. A \$5.00 USD per cardboard box charge will be applied to all orders with a maximum charge of \$25.00 USD per shipment. Large products requiring a wooden crate will be charged an amount consistent with the fabrication of the necessary crate.

FOB POINT: All orders ship FOB Yreka from 1967 S. Oregon, Yreka, California, 96097, USA unless quoted otherwise.

LOST OR DAMAGED ITEMS: Nor-Cal does not assume responsibility for items lost or damaged in transit, or for any direct or indirect damages incurred. Shipping damages are to be handled by the customer. Nor-Cal will provide the tracking number and contact information for the shipping company as needed. All items are purchased at the customer's risk.

EXPORTED COMMODITIES: US Export administration Regulations must be followed. Diversion contrary to US Law is prohibited.

Pricing & Dimensions

In order to meet the changing needs of our customers we periodically make design revisions in our standard product line. As a result, the dimensions, pricing and specifications are subject to change without notice. International pricing may also vary.

SPECIAL TOOLING: Products ordered to non-standard specifications should state specification requirements in detail. Fee for special tooling may apply. On request, test report(s) and/or certification(s) can be supplied at additional cost.

Discounts

OEM and quantity discounts are available to qualified customers.

Return Policy

An RMA (Return Materials Authorization) number must be obtained from Nor-Cal Products before returning any merchandise. The RMA form can be found under SUPPORT in the footer of pages at www.n-c.com. To expedite the assignment of an RMA number, complete the form online and submit online. You may also print and email the completed form to rma@n-c.com or fax to the attention of the RMA Coordinator at 866-640-9012.

- Nor-Cal Products reserves the right to refuse the return of non-stocked items. A twenty-five (25) percent restocking fee may be charged.
- Nor-Cal Products shall incur no liability for damage, shortages or other cause alleged to have occurred at, or prior to, delivery to the carrier unless buyer shall have entered full details thereof on its receipt to the carrier. Products over 60 days old from the date of shipment will not be accepted for return.
- Nor-Cal Products must be allowed time to investigate all returns.

Cancellations & Rescheduling

Any request by customers to reschedule or cancel in total or part of any purchase order must be approved at the sole discretion of Nor-Cal Products and shall be subject to the following conditions. Nor-Cal must receive written notice of Request for Cancellation or Reschedule, stating the reasons therefore.

Customer shall be liable for payment of the following charges to Nor-Cal in the event of Cancellation or Reschedule.

- For all charges incurred (including overhead, G&A, and profit) prior to the date that notice of cancellation is received by Nor-Cal for all parts peculiar to customer's requirements. Upon payment by the customer of these charges, such parts become the property of customer, Nor-Cal will store said parts for a reasonable period of time pending the receipt of customer's instructions for disposition. Such storage is at customer's risk and may be subject to storage charges if stored by Nor-Cal for longer than 30 days from the cancellation date; plus
- Charges to convert modified standard parts for return to Nor-Cal's inventory; plus
- A restocking charge of twenty (25) percent of the purchase price of the cancelled item.

Warranty

Products manufactured by Nor-Cal Products are warranted against defects in material and workmanship for a period of twelve (12) months from the date of shipment from Nor-Cal Products to the buyer. Any modification to the product by the buyer or their agent voids this warranty. Liability under this warranty is expressly limited to the replacement or repair (at Nor-Cal Products' option) of defective parts. Nor-Cal Products may at any time discharge its warranty as to any of its products by refunding the purchase price and taking back the products. This warranty applies only to parts manufactured and labor provided by Nor-Cal Products under valid warranty claims received by Nor-Cal Products within the applicable warranty period and shall be subject to the terms and conditions hereof.

- Expendable items such as tubes, heaters, sources, bellows, etc., by their nature, may not function for one year; if such items fail to give reasonable service for a reasonable period of time, as determined solely by Nor-Cal Products, they will be repaired or replaced by Nor-Cal Products at its election.
- All warranty replacement or repair of parts shall be limited to equipment malfunctions which, in the sole opinion of Nor-Cal Products, are due or traceable to defects in original materials or workmanship. Malfunctions caused by abuse or neglect of the equipment are expressly not covered by this warranty. Nor-Cal Products expressly disclaims responsibility for any loss or damage caused by the use of its products other than in accordance with proper operating and safety procedures. Reasonable care must be taken by the user to avoid hazards.
- The buyer shall give Nor-Cal Products prompt notice of any claim under this warranty. If Nor-Cal Products, in its sole discretion, determines that the product does not conform to this warranty, Nor-Cal Products shall replace or repair the product free of charge. If such replacement or repair is not feasible, Nor-Cal Products may, at its sole option, refund the purchase price.
- In-warranty repaired or replacement parts are warranted only for the remaining unexpired portion of the original warranty period applicable to the parts which have been repaired or replaced.
- After the expiration of the applicable warranty period, the buyer shall be charged at Nor-Cal Products' then current prices for parts and labor plus transportation.
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Order Information

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Genesis Modular Valves are manufactured under patent number 6289932

Intellisys Pressure Control Products are manufactured under patent number 6612331

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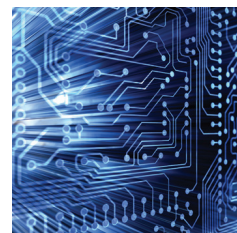
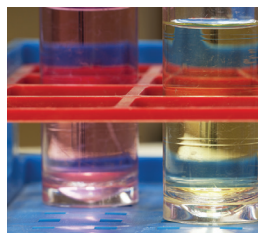
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