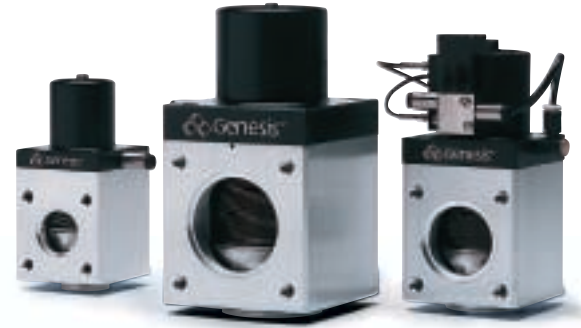




# Genesis

The Genesis modular vacuum valve system provides semiconductor equipment designers with unlimited possibilities for downstream vacuum subassemblies. Nippleless valve bodies and block fittings can be assembled by two attachment methods using universal ISO-KF centering ring/O-ring hardware, providing maximum flexibility and the smallest footprint possible.



## Genesis Valves

Simple and robust, Genesis valves are rated at one million cycles before service. During testing, these valves were cycled millions of times while maintaining vacuum integrity. The welded bellows is AM-350 for corrosion resistance, longevity and flexibility. The bellows fully retracts 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. Teflon® coated air cylinders feature a 15 micron air filter to prevent particle migration either into or out of the air cylinder.

Genesis valves and fittings have a patented nippleless body, which provides the highest conductance and smallest footprint available. Air solenoids, open/closed position indicators, and soft start actuators 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.

Genesis valve bodies and fittings 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.

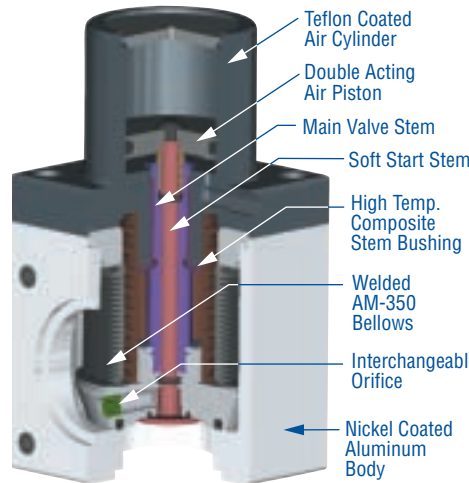
### Features and Benefits

- Million cycle reliability
- Low cost soft start option
- Low cost heated option
- Smallest footprint available
- Modular design
- Corrosion resistant

## Valve Options

### Soft Start Valve Actuator

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 pump down. (See charts page 4 and below)



### Open/Closed Position Indicator

The Genesis valve can be provided with CE certified proximity open/closed position indicators. These proximity indicators detect the position of the piston in the air cylinder. The technician has a visual indication of power to the circuit and the position of the valve, as does the operator watching the panel. With the soft start option only one position indicator can be provided for the fully open position.

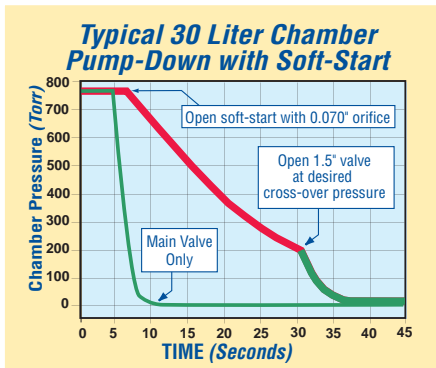
### O-rings

Standard Genesis valves are furnished with Viton® O-rings. They are resistant to most chemicals, but should not be heated to temperatures in excess 204°C. Even prolonged exposures of 150°C may begin to degrade the O-rings. The following O-rings can be provided as options. High temperature Kalrez® O-rings allow the valve to be heated to 316°C intermittently or 280°C for prolonged periods where the O-ring is allowed to expand. Chemical resistant Kalrez and Chemraz® are also available.

### Air Solenoid

As an option, low 1.8 wattage, CE certified air solenoids in several current ratings can be provided on the valve, ready to attach to the house air supply. One three-way air solenoid is required for a standard Genesis valve and two three-way air solenoids are required for a soft start version. Air solenoids can also be supplied as a kit with assembly hardware and instructions.

Due to Nor-Cal's continuing improvement program, pricing and specifications are subject to change without notice.



After the chamber has been pumped from atmosphere to the desired cross over 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 air-to-open, spring-to-close.

Prices subject to change without notice. - International product pricing will vary.

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## Modular Valve System

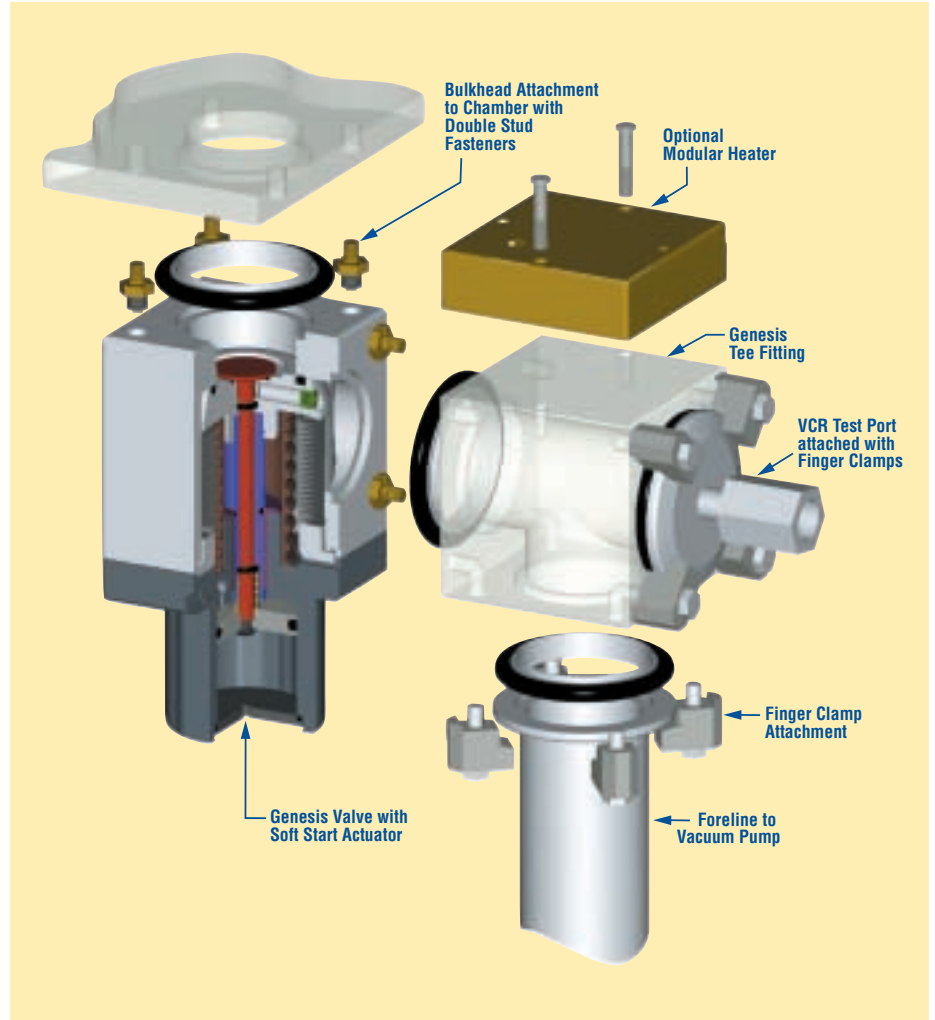
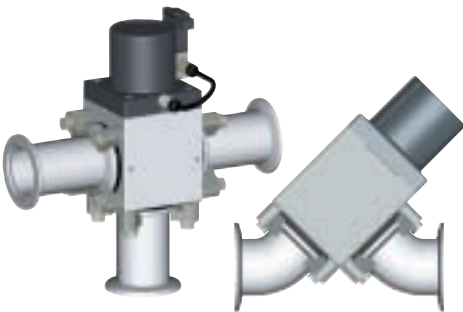
### Block Subassemblies with Double Stud Fasteners

Special subassemblies, such as diverter valves or roughing/high vacuum circuits can be assembled quickly using double stud fasteners with valves and block fittings. These subassemblies can be provided as a unit from Nor-Cal or you may choose to assemble them from individual components. They are ideal for limited space installations, such as on cluster tool frames, and provide highest conductance, while eliminating unnecessary hardware. Double stud fasteners can be used to make a bulkhead attachment from a valve directly to a chamber. Stud fasteners can be installed using a jeweler's screwdriver and an ignition wrench. An installation tool for stud fasteners is provided with each stud fastener kit or assembly, or one can be purchased separately.

### Finger Clamp Component Assembly

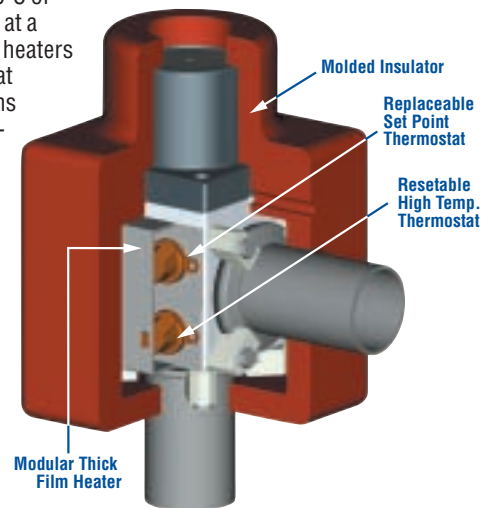
Elbows, reducers, chamber ports, roughing lines, or other vacuum components can be attached directly to valve bodies or fittings with finger clamps. Unnecessary valve ports have been eliminated, shortening the gas path and increasing system conductance.

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.



## Heaters and Insulators

A unique, UL listed modular heater provides 120°C or 150°C internal temperatures in valves or fittings at a fraction of the cost of a silicone heater. Genesis heaters use thick film technology to provide uniform heat throughout the component. Each heater contains a control set point and a resettable high temperature shut off. The 1.5 and 2.0 inch sizes also have a low temperature alert that can be connected to a remote alarm. Each thermostat can be replaced without destroying the heater. The same heater can be attached to a valve body or fitting with two screws. A trim-to-fit, molded insulator covers the heated component and mating flanges. These clean room compatible insulators are constructed of .50 inch thick molded silicone. When in use, the exterior surface remains touch-safe. Insulators meet UL 94 V-0 requirements. Insulators for other components are available upon request.



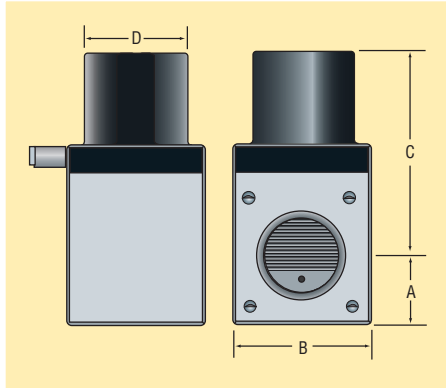
Genesis is a registered trademark of Nor-Cal Products, Inc.  
 Teflon is a registered trademark of DuPont de Nemours & Co., Inc.  
 Viton is a registered trademark of DuPont Dow Elastomers.  
 Kalrez is a registered trademark of DuPont Dow Elastomers.  
 Chemraz is a registered trademark of Green Tweed Co.



## Genesis Modular Valves

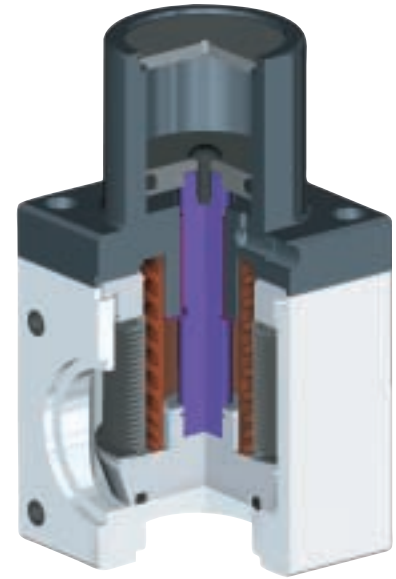
Valve Size	Model Number	Flange	A	B	C	D	Thread	Bolt Circle	Price
0.75	GNV-072	NW-16	1.15	2.31	3.04	1.46	12-24	2.031	
1.00	GNV-102	NW-25	1.06	2.13	3.14	1.46	12-24	2.031	
1.50	GNV-152	NW-40	1.25	2.50	3.71	1.88	12-24	2.616	
2.00	GNV-202	NW-50	1.63	3.25	4.44	2.25	1/4-20	3.406	

3" and 4" Genesis valves available upon request. Call for pricing and information. Dimensions in inches



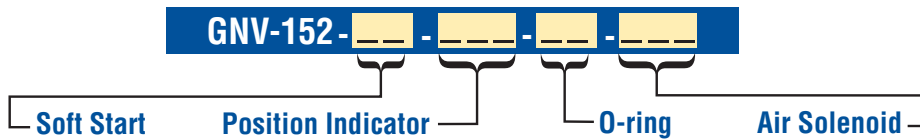
### SPECIFICATIONS

- Million cycle service interval
- Electroless nickel coated aluminum bodies
- Teflon™ coated aluminum air cylinder
- Welded AM-350 bellows
- Viton O-rings standard
- High temperature composite stem bushing
- Air-to-open, spring-to-close actuation
- 60-80 psi required air pressure
- Helium leak rate  $1 \times 10^{-9}$  Torr standard cc./sec. maximum
- Differential pressure, 25 psi maximum
- 5/32 inch One-Touch air fittings standard. Other sizes are available in US and Metric tubing diameters
- Larger valve sizes available. Call for details.



## Valve Options

Follow the part tree to add one or more options to a particular Genesis valve. Add option suffixes to the basic valve part number in the order show by part tree. EXAMPLES: GNV-152-S2-P1-KT-B21, GNV-102-P2-A11 & GNV-202-S0-P1



## O-ring Option

Option	Description	Price
KT	4079 High Temperature Kalrez	
KC	2051 Chemical Resistant Kalrez	
CR	513 Chemraz	
S	Silicone	

## Position Indicator Option

Actuator	Option	Description	Add to Price
Soft Start/Standard	P10	One position indicator - main valve open only	
Standard	P1C	One position indicator - main valve closed only	
Standard	P2	Two position indicators - main valve open and closed	

### SPECIFICATIONS

Refer to diagram at left for dimensions.

- CE certified
- 12 to 24 VDC
- -25°C to 70°C temperature range
- Shielded
- Normally open
- Not available on heated valves
- M5 threads x 30mm long

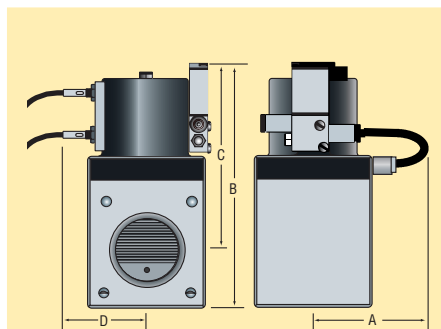
## Air Solenoid Option

Actuator	Option	Kit	Quantity	Description	Price
Standard	A11	A11-K	1	120 VAC, 50/60 Hz	
	A21	A21-K	1	24 VDC	
	A31	A31-K	1	240 VAC, 50/60 Hz	
	A41	A41-K	1	24 VAC, 50/60 Hz	
Soft Start	B11	B11-K	2	120 VAC, 50/60 Hz	
	B21	B21-K	2	24 VDC	
	B31	B31-K	2	240 VAC, 50/60 Hz	
	B41	B41-K	2	24 VAC, 50/60 Hz	

### SPECIFICATIONS

Refer to diagram at left for dimensions.

- 24 inch long electrical leads with quick disconnect
- 5/32 inch One-Touch air fittings supplied
- 1.8 watt power consumption
- Remote mount on heated valves



### Air Solenoid and Position Indicator Diagram

SIZE	A	B	C	D
.75	2.55	4.82	3.76	1.66
1.0	2.55	4.82	3.76	1.66
1.5	2.73	5.31	4.06	1.82
2.0	3.11	6.05	4.42	2.03

Dimensions in inches

**Viton Replacement O-rings, Bellows Assemblies and Valve Rebuild Kits are available on Page 5**

Prices subject to change without notice. - International product pricing will vary.

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## Soft Start Actuator Option

Option	Description	Add to Price
S0	Soft start actuator - no orifice. For 1", 1.5" and 2" valves.	
S1	Soft start actuator with 0.147 orifice installed. For 1", 1.5" and 2" valves.	
S2	Soft start actuator with 0.109 orifice installed. For 1", 1.5" and 2" valves.	
S3	Soft start actuator with 0.070 orifice installed. For 1", 1.5" and 2" valves.	

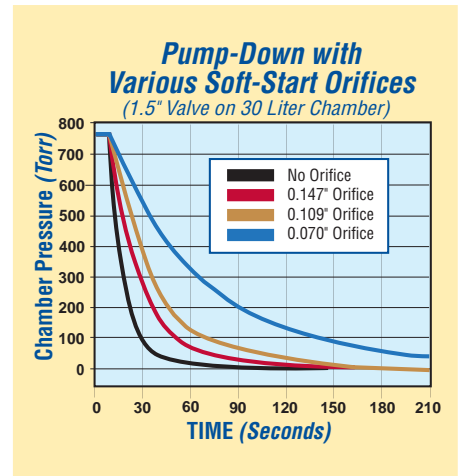
Refer to the "Pump Down Curves" graph to right.  
Soft start actuators for larger valves available. Call for information.

Dimensions in inches

## Soft Start Orifice Kits

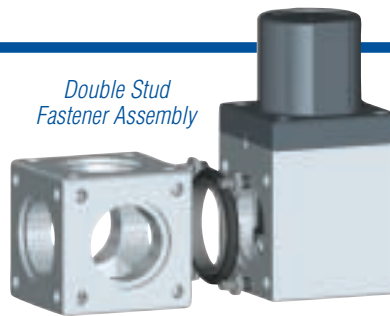
Model Number	Contents	Price
GNV-075-SO-K	3 orifice sizes and a 1/8 inch allen wrench for installation	
GNV-075-SO-1	0.070 orifice	
GNV-075-SO-2	0.109 orifice	
GNV-075-SO-3	0.147 orifice	
GNV-075-SO-T	1/8 inch allen wrench for orifice installation	

Dimensions in inches

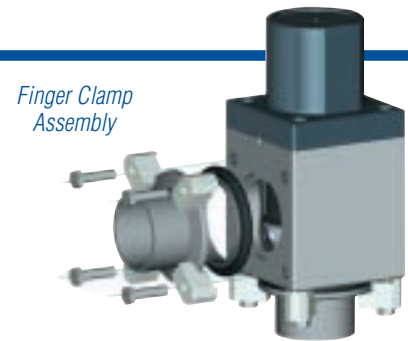


## Assembly Hardware

Two fastening systems are available for Genesis valves and fittings providing maximum flexibility and the smallest footprint possible. Nippleless valve bodies and block fittings can be assembled with finger clamps or double stud fasteners using universal ISO-KF centering ring/O-ring hardware, providing maximum flexibility and the smallest footprint possible.



Double Stud Fastener Assembly



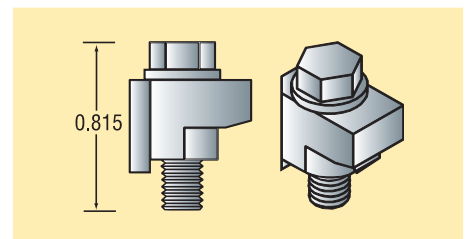
Finger Clamp Assembly

## Finger Clamps

Valve Size	Model Number	Material	Bolt	Torque	Price
.75-1.5	GNCPC-150-S	Stainless	12-24 x 7/8	60 in. lbs.	
2.0	GNCPC-200-S	Stainless	1/4-20 x 7/8	100 in. lbs.	

Dimensions in inches

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. Each kit contains four finger clamps, hex head bolts and washers for one connection.



**DIMENSIONS**  
for Modular Valve Joining  
with Double Studs Fasteners

NOM. ID	A	B
1.0	2.28	4.40
1.5	2.65	5.15
2.0	3.40	6.65

Dimensions in inches

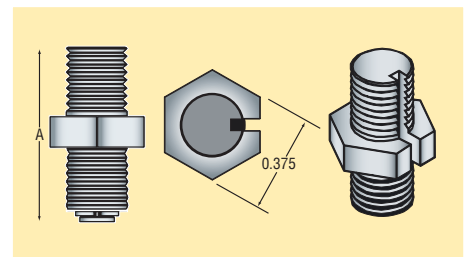
## Double Stud Fasteners

Valve Size	Model Number	Thread	A	Price
.75-1.5	GNSF-150	12-24	.625	
	GNSF-150-K	12-24	.625	
2.0	GNSF-200	1/4-20	.730	
	GNSF-200-K	1/4-20	.730	

To order Stud Fastener Tool separately - order Model Number GNSF-T. Price \$5.00.

Dimensions in inches

Double stud fasteners allow two Genesis components to be connected using a standard ISO-KF centering ring and O-ring. Each kit contains four double stud fasteners for one connection and an installation tool.





Genesis heaters use thick film technology to provide uniform heat throughout the component. Each heater contains a control set point and a resettable high temperature shut off. The 1.5 and 2.0 inch sizes also have a low temperature alert that can be connected to a remote alarm. Each thermostat can be replaced without destroying the heater. The same heater can be attached to a valve body or fitting with two screws.

## Valve Heaters

Valve Size	Model Number	Set Point	Watts	A	Price
.75 & 1.0	HT-GN-100-120-1	120°C	120	2.13	
	HT-GN-100-150-1	150°C	120	2.13	
1.5	HT-GN-150-120-1	120°C	120	2.50	
	HT-GN-150-150-1	150°C	120	2.50	
2.0	HT-GN-200-120-1	120°C	160	3.25	
	HT-GN-200-150-1	150°C	160	3.25	

Dimensions in inches

### SPECIFICATIONS

- Compact, modular design
- 120 VAC, 240 VAC available upon request
- 120°C or 150°C set points, standard
- Manually resettable 200°C over temperature shutoff, standard
- Low temperature alert, standard on 1.5 and 2.0 inch
- 12 inch power cord with AMP 3-pin connector
- Two 12 inch low temperature alert cords with AMP MR connectors, standard on 1.5 and 2.0 inch
- UL listed. CE certification pending

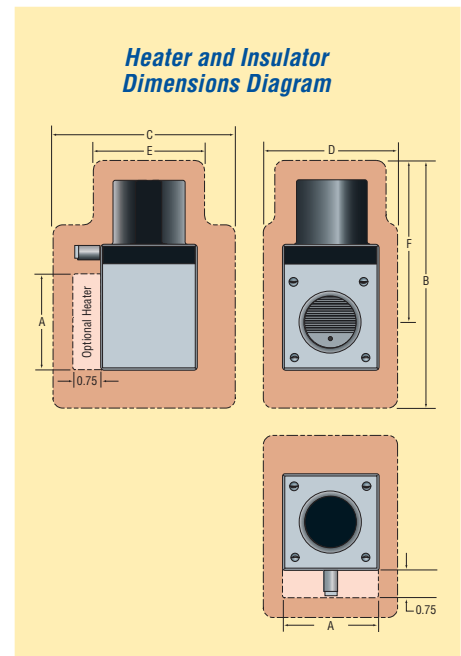
## Valve Heater Insulators

Valve Size	Model Number	B	C	D	E	F	Price
.75 & 1.0	HI-GNV-100	6.00	4.50	3.13	2.50	3.64	
1.5	HI-GNV-150	6.63	5.00	3.63	2.88	4.25	
2.0	HI-GNV-200	8.00	5.88	4.38	3.31	5.00	

Dimensions in inches

### SPECIFICATIONS

- Touch safe exterior
- .50 inch thick molded silicone construction
- Trimable
- Clean room compatible
- Meets UL 94 V-0
- Insulators for other components available



## Heater Power Cords

Model Number	Length	Price
HT-GN-PCD-6	6 ft.	
HT-GN-PCD-12	12 ft.	

Fused 120 VAC power cords. Other length power cords are available on request. Call for price.

## Genesis Valve Repair Kits

First maintenance is recommended at one million cycles, depending on the cleanliness of the process. Typical service will require O-ring replacement.

### Viton O-rings

Includes bellows O-ring and poppet O-ring. Other O-ring materials available. Call for pricing.

Valve Size	Actuator	Model Number	Price
.75 & 1.0	Standard	GNV-100-95	
	Soft Start	GNV-100-95-S0	
1.5	Standard	GNV-150-95	
	Soft Start	GNV-150-95-S0	
2.0	Standard	GNV-200-95	
	Soft Start	GNV-200-95-S0	

Dimensions in inches

### Bellows Assembly

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

Valve Size	Actuator	Model Number	Price
.75 & 1.0	Standard	GNV-100-16	
	Soft Start	GNV-100-16-S0	
1.5	Standard	GNV-150-16	
	Soft Start	GNV-150-16-S0	
2.0	Standard	GNV-200-16	
	Soft Start	GNV-200-16-S0	

Dimensions in inches

### Valve Rebuild

Includes all valve parts except the body and position indicator.\*

Valve Size	Actuator	Model Number	Price
.75 & 1.0	Standard	GNV-100-99	
	Soft Start	GNV-100-99-S0	
1.5	Standard	GNV-150-99	
	Soft Start	GNV-150-99-S0	
2.0	Standard	GNV-200-99	
	Soft Start	GNV-200-99-S0	

Dimensions in inches

\* Position indicator type must be specified when ordering. See page 3.

Example: GNV-150-99-S0-P10



Genesis fittings provide the most compact, highest conductance, corrosion resistant vacuum connection available when used with Genesis valves, fittings and double stud fasteners. These fittings can also attach with finger clamps to standard ISO-KF components with universal O-rings, which are also available from Nor-Cal Products.

## SPECIFICATIONS

- Electroless nickel coated 6061 T-6 aluminum
- Stainless steel threaded inserts
- Attach to standard components with finger clamps
- Optional modular heater available
- Attach to Genesis valves and fittings with double stud fasteners

## 90° Elbow

Valve Size	Model Number	A	B	Thread	Bolt Circle	Price
1.0	GNF-102	2.125	1.063	12-24	2.031	
1.5	GNF-152	2.500	1.250	12-24	2.616	
2.0	GNF-202	3.250	1.625	1/4-20	3.406	

Fittings for .75 inch valves are available on request. Call for pricing and information.

Dimensions in inches

## Tee

Valve Size	Model Number	A	B	Thread	Bolt Circle	Price
1.0	GNF-103	2.125	1.063	12-24	2.031	
1.5	GNF-153	2.500	1.250	12-24	2.616	
2.0	GNF-203	3.250	1.625	1/4-20	3.406	

Fittings for .75 inch valves are available on request. Call for pricing and information.

Dimensions in inches

## 4-Way Cross

Valve Size	Model Number	A	B	Thread	Bolt Circle	Price
1.0	GNF-104	2.125	1.063	12-24	2.031	
1.5	GNF-154	2.500	1.250	12-24	2.616	
2.0	GNF-204	3.250	1.625	1/4-20	3.406	

Fittings for .75 inch valves are available on request. Call for pricing and information.

Dimensions in inches

## 5-Way Cross

Valve Size	Model Number	A	B	Thread	Bolt Circle	Price
1.0	GNF-105	2.125	1.063	12-24	2.031	
1.5	GNF-155	2.500	1.250	12-24	2.616	
2.0	GNF-205	3.250	1.625	1/4-20	3.406	

Fittings for .75 inch valves are available on request. Call for pricing and information.

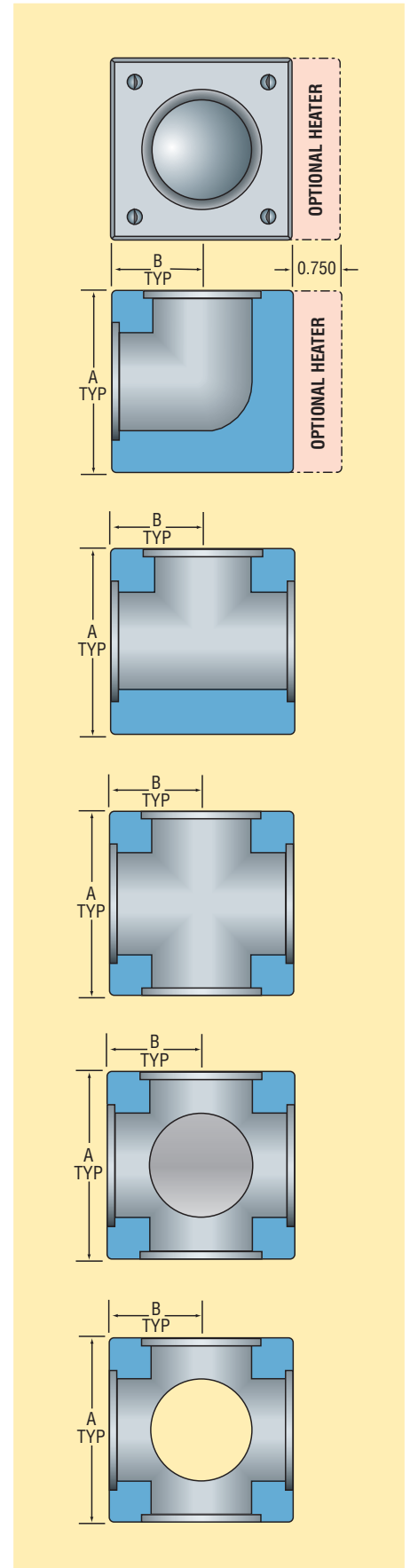
Dimensions in inches

## 6-Way Cross

Valve Size	Model Number	A	B	Thread	Bolt Circle	Price
1.0	GNF-106	2.125	1.063	12-24	2.031	
1.5	GNF-156	2.500	1.250	12-24	2.616	
2.0	GNF-206	3.250	1.625	1/4-20	3.406	

Fittings for .75 inch valves are available on request. Call for pricing and information.

Dimensions in inches



Prices subject to change without notice. - International product pricing will vary.

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