



Flow, Pressure, and On/Off Control Devices

This section includes stainless needle valves, our combination on/off needle valves, high pressure prime/purge and on/off valves, and VICI pressure regulators and flow controllers.

Because cast parts can introduce porosity and contamination, every VICI control device is assembled from components which are precision-machined from bar stock. This assures that every item has the same high quality workmanship, with careful assembly and testing to rigid standards.

On/Off and Prime/Purge Valves

Valco high pressure on/off or prime/purge valves feature quality engineering, precision machining, and extremely low internal volume (< 2 μ l), making them the ideal choice in the most demanding liquid or supercritical fluid chromatography or extraction systems.* The on/off function is self-explanatory; in prime/purge models, mobile phase flows around the needle when the valve is closed, relieving the back pressure from the column. When the valve opens, mobile phase vents to waste to prime the pump.

Standard models provide leak-tight operation up to 10,000 psi (690 bar) at 100°C, with high temperature versions rated up to 6,000 psi/300°C. A 1/16" fitting model with a larger bore and a 1/8" fitting model are available for high flow applications.

The valve needle is made from a special high strength alloy which is resistant even to the buffer salts which might accidentally precipitate inside the valve. Seals are fluorocarbon, with valve bodies machined from HPLC grade stainless steel, ensuring long lifetime in even the most demanding situations.

The on/off and prime/purge valves are available in manual or air/CO₂ actuated versions. The automated valves require a single three-way solenoid: application of 50 psi opens the valve; venting the air allows the spring to return the valve to the closed position.



**Not suitable for use with gases.*

ULTRA-HIGH PRESSURE VALVES

See our new 40,000 psi on/off and prime/purge valves

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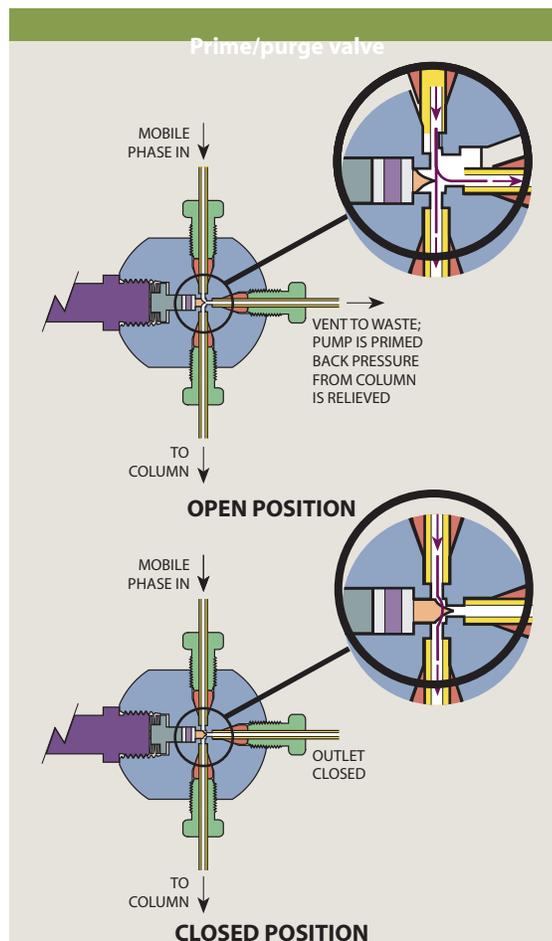
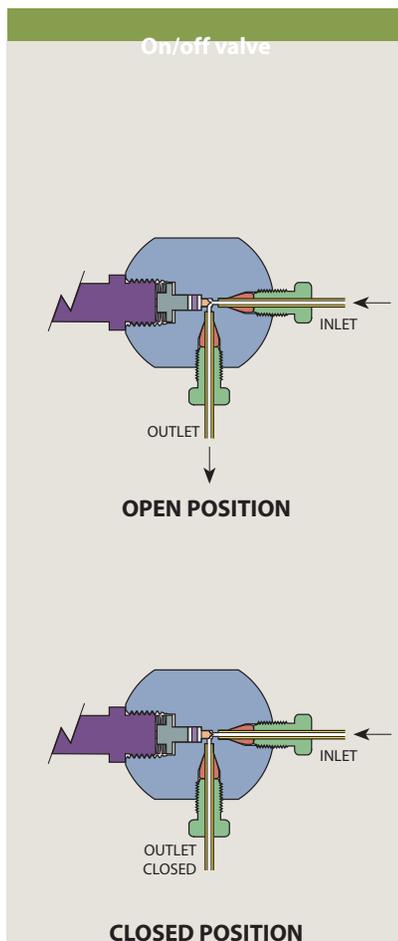
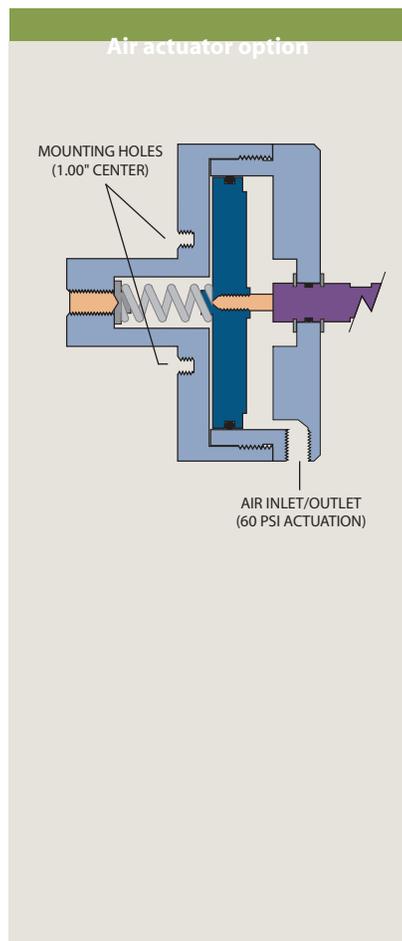
CHROMalytic TECHNOlogy Pty Ltd AUSTRALIAN Distributors e-mail: sales@chromtech.net.au Tel: 03 9762 2034

On/off valves

| SPECS | | | Manual | Manual with 4" standoff | Air actuated with 1" standoff | Air actuated with 4" standoff | | |
|---|----------|------------|-------------------|-------------------------|-------------------------------|-------------------------------|----------|-----------|
| Temp | Pressure | | Prod No | Prod No | Prod No | Prod No | | |
| Standard temperature | | | Fitting size Bore | | | | | |
| 1/16" | 100°C | 10,000 psi | | | | | | |
| High temperature / high pressure | | | | | | | | |
| 1/16" | 300°C | 6,000 psi | SFVO | – | ASFVO | – | | |
| 1/8" | 300°C | 2,000 psi | SFVOL | – | ASFVOL | – | | |
| High temperature / high pressure | | | | | | | | |
| 1/16" | 300°C | 6,000 psi | SFVOHT | SFVOHT4 | ASFVOHT | ASFVOHT4 | | |
| 1/8" | 300°C | 2,000 psi | – | – | ASFVOLHT | ASFVOLHT4 | | |
| | | | 1/8" | 1.50 mm | – | – | ASFVO2HT | ASFVO2HT4 |

Prime/purge valves

| SPECS | | | Manual | Air actuated with 1" standoff | Air actuated with 4" standoff | |
|---|----------|------------|-------------------|-------------------------------|-------------------------------|----------|
| Temp | Pressure | | Prod No | Prod No | Prod No | |
| Standard temperature | | | Fitting size Bore | | | |
| 1/16" | 100°C | 10,000 psi | | | | |
| High temperature / high pressure | | | | | | |
| 1/16" | 300°C | 6,000 psi | SFV | ASFV | – | |
| 1/8" | 300°C | 2,000 psi | SFVL | ASFVL | – | |
| High temperature / high pressure | | | | | | |
| 1/16" | 300°C | 6,000 psi | – | ASFVHT | ASFVHT4 | |
| 1/8" | 300°C | 2,000 psi | – | ASFVLHT | ASFVLHT4 | |
| | | | 1/8" | 1.50 mm | – | ASFV2HT4 |



Combo Valves

A new generation needle and shut-off valve provides screwdriver-adjustable control and positive shut-off without damage to the needle. It is ideal for providing hydrogen and air to an FID, since the flow setting is not changed by turning the valve on and off. It can also be used to supply make-up or combustion gas in a wide variety of applications.

The valve body materials are anodized aluminum or stainless steel, with Viton

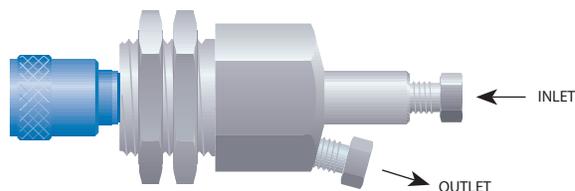
O-ring seals. Maximum temperature is 100°C, and maximum inlet pressure is 100 psig. The valve can be panel-mounted in an 11/16" or 3/4" hole, using hardware supplied, and all are supplied with Valco 1/16" ZDV fittings. Other configurations are available in OEM quantity upon request.

The standard knob is silver-colored and .62" long. Colored knobs for gas identification are available separately, in two lengths.

Combo valves

| Maximum flow @ 40 psi He or N ₂ | Aluminum body <i>Prod No</i> | Stainless body <i>Prod No</i> | SPECS Inlet pressure: 100 psi Maximum temperature: 100°C |
|---|------------------------------------|-------------------------------------|--|
| 10 ml/min | CNV1A10S1 | CNV1S10S1 | |
| 50 ml/min | CNV1A50S1 | CNV1S50S1 | |
| 150 ml/min | CNV1A150S1 | CNV1S150S1 | |
| 250 ml/min | CNV1A250S1 | CNV1S250S1 | |
| 500 ml/min | CNV1A500S1 | CNV1S500S1 | |

| Optional colored knobs | Standard (.62") <i>Prod No</i> | Long (1.25") <i>Prod No</i> |
|------------------------|--------------------------------------|-----------------------------------|
| Green | CNVEKG | CNVEKLG |
| Red | CNVEKR | CNVEKLR |
| Blue | CNVEKU | CNVEKLU |
| Silver | CNVEKS | CNVEKLS |
| Black | CNVEKB | CNVEKLB |



Very similar in function to the Valco combo valves, these are the original, hex-bodied combo valves made by the Condyne division of VICI Metronics for nearly 30 years. Condyne products have been transferred to the Valco Houston location, where a number of improvements have been made.

Standard construction features an anodized aluminum body with Viton O-ring seals. Maximum inlet pressure is 100 psi, with a maximum

temperature of 100°C. The valve can be panel mounted through an 11/16" or 3/4" diameter hole. Valco 1/16" fittings are standard, but 1/8" fittings are also available. Nuts and ferrules are included.

Typically, the knob color is used as an indicator of the rated flow, but the standard knob can be changed if desired. A longer version of the knob is also available, as is an all brass valve (in OEM quantities). Consult the factory regarding these options.

Condyne combo valves

| SPECS Maximum inlet pressure: 100 psi Maximum temperature: 100°C | Maximum flow @ 40psi He or N2 | 1/16" Valco fittings | 1/8" Valco fittings | |
|--|-------------------------------|----------------------|---------------------|-----------|
| | Knob color | Prod No | Prod No | |
| | 10 ml/min | Green | CVA10GS1 | CVA10GS2 |
| | 50 ml/min | Red | CVA50RS1 | CVA50RS2 |
| | 150 ml/min | Blue | CVA150US1 | CVA150US2 |
| | 500 ml/min | Black | CVA500BS1 | CVA500BS2 |
| | 1 liter/min | Yellow | CVA1KYS1 | CVA1KYS2 |



Gas Flow Controllers

Flow controllers provide a stable flow rate under varying pressure. VICI flow controllers are precision machined from aluminum or stainless bar stock to eliminate the contamination often found in die cast parts. Positive flow

shut-off is provided by an integral Viton-sealed adjustment valve.

With all our flow controllers, the inlet pressure must exceed the outlet pressure by 10 psi.

Model 100 gas flow controller

Fixed span upstream referenced flow controller

The Model 100 is available in a variety of preset maximum flow rates, from 150 mL/min to 10 liters/min (N₂ at 40 psi). Any flow controller in this series can be ordered with a 10-turn Spectrol digital dial (3 or 4 digits), to permit a visual indication of the flow setting.

All flow rates listed below are based on N₂ at 40 psi inlet pressure. Maximum inlet pressure is 200 psi.



SPECS

Preset max flow rates:

150 mL/min to 10 liters/min (N₂ at 40 psi).

Maximum inlet pressure:

200 psi

Maximum temperature:

100°C

Standard fittings:

■ 1/8" external tube fittings (EAOR22)

Other fittings are available. Contact the factory for further information.

| Flow rate /min | Aluminum body Viton diaphragm Prod No | Aluminum body SS diaphragm Prod No | SS body Viton diaphragm Prod No | SS body SS diaphragm Prod No |
|-----------------------------------|--|---------------------------------------|------------------------------------|---------------------------------|
| With standard control knob | | | | |
| 0 - 150 mL | FC10AV1K | FC10AS1K | FC10SV1K | FC10SS1K |
| 0 - 250 mL | FC10AV2K | FC10AS2K | FC10SV2K | FC10SS2K |
| 0 - 850 mL | FC10AV3K | FC10AS3K | FC10SV3K | FC10SS3K |
| 0 - 1.2 L | FC10AV4K | FC10AS4K | FC10SV4K | FC10SS4K |
| 0 - 4.5 L | FC10AV5K | FC10AS5K | FC10SV5K | FC10SS5K |
| 0 - 10.0 L | FC10AV6K | FC10AS6K | FC10SV6K | FC10SS6K |
| With Spectrol 3-digit dial | | | | |
| 0 - 150 mL | FC10AV1S3 | FC10AS1S3 | FC10SV1S3 | FC10SS1S3 |
| 0 - 250 mL | FC10AV2S3 | FC10AS2S3 | FC10SV2S3 | FC10SS2S3 |
| 0 - 850 mL | FC10AV3S3 | FC10AS3S3 | FC10SV3S3 | FC10SS3S3 |
| 0 - 1.2 L | FC10AV4S3 | FC10AS4S3 | FC10SV4S3 | FC10SS4S3 |
| 0 - 4.5 L | FC10AV5S3 | FC10AS5S3 | FC10SV5S3 | FC10SS5S3 |
| 0 - 10.0 L | FC10AV6S3 | FC10AS6S3 | FC10SV6S3 | FC10SS6S3 |
| With Spectrol 4-digit dial | | | | |
| 0 - 150 mL | FC10AV1S4 | FC10AS1S4 | FC10SV1S4 | FC10SS1S4 |
| 0 - 250 mL | FC10AV2S4 | FC10AS2S4 | FC10SV2S4 | FC10SS2S4 |
| 0 - 850 mL | FC10AV3S4 | FC10AS3S4 | FC10SV3S4 | FC10SS3S4 |
| 0 - 1.2 L | FC10AV4S4 | FC10AS4S4 | FC10SV4S4 | FC10SS4S4 |
| 0 - 4.5 L | FC10AV5S4 | FC10AS5S4 | FC10SV5S4 | FC10SS5S4 |
| 0 - 10.0 L | FC10AV6S4 | FC10AS6S4 | FC10SV6S4 | FC10SS6S4 |

ALTERNATE FITTING TYPES

Models 100 and 300

The standard is the

EAOR22 1/8" external tube fitting. Alternative fitting types are listed below. Order separately.

Internal fitting with O-ring seal

| | Prod No | Price |
|------------------|---------|-------|
| 1/8" to 5/16-24 | ZAOR22 | \$14 |
| 1/16" to 5/16-24 | ZAOR12 | 14 |

Model 202

The standard 1/8" NPT female pipe thread with pipe adapters to 1/16" OD tubing included. Another adapter is listed below. Order separately.

| | Prod No | Price |
|--------------------------------------|---------|-------|
| 1/8" NPT male pipe to Valco internal | PZA22 | \$14 |

WHICH KIND OF CONTROLLER?

An **upstream-referenced** controller maintains the flow rate as long as the upstream (inlet) pressure is held constant.

A **downstream-referenced** controller maintains a constant flow under constant downstream (outlet) pressure.

Model 202 gas flow controller

Adjustable span upstream-referenced flow controller

SPECS

Flow range:
infinitely adjustable
Min: 5 mL/min
Max: 1.6 L/min
(N₂ at 40 psi)

Maximum inlet pressure:
200 psi

Maximum temperature:
100°C

Standard fittings:
■ 1/8" NPT female pipe threads
■ Pipe adapters to 1/16" OD tubing are included.

Other fittings are available. (See facing page.)

The Model 202 provides a user-variable span adjustment permitting it to be used for a variety of flow ranges. After the span is adjusted, the flow controller has a full 10 turns of resolution between the minimum and maximum flow rates. When equipped with a Spectrol digital dial, settings are reproducible to better than 1%.



| | Aluminum body Viton diaphragm <i>Prod No</i> | Aluminum body SS diaphragm <i>Prod No</i> | SS body Viton diaphragm <i>Prod No</i> | SS body SS diaphragm <i>Prod No</i> |
|-----------------------------------|--|---|--|---|
| With standard control knob | FC22AV1K | FC22AS1K | FC22SV1K | FC22SS1K |
| With Spectrol 3-digit dial | FC22AV1S3 | FC22AS1S3 | FC22SV1S3 | FC22SS1S3 |
| With Spectrol 4-digit dial | FC22AV1S4 | FC22AS1S4 | FC22SV1S4 | FC22SS1S4 |

Model 300 gas flow controller

Fixed span downstream-referenced flow controller

SPECS

Maximum flow rate:
1.6 L/min
with ambient
downstream pressure

Maximum inlet pressure:
200 psi

Maximum temperature:
100°C

Standard fittings:
■ 1/8" external tube fittings (EAOR22)

Other fittings are available. (See facing page.) Contact the factory for further information.

The Model 300 flow controller provides a stable flow rate when upstream pressure conditions vary, providing the downstream pressure remains constant.

All flow rates listed below are based on N₂ at 40 psi inlet pressure. Maximum inlet pressure is 200 psi.



| | Aluminum body Viton diaphragm <i>Prod No</i> | Aluminum body SS diaphragm <i>Prod No</i> | SS body Viton diaphragm <i>Prod No</i> | SS body SS diaphragm <i>Prod No</i> |
|---|--|---|--|---|
| <i>Flow rate /min</i> | | | | |
| With standard control knob | | | | |
| 0 - 200 mL | FC30AV1K | FC30AS1K | FC30SV1K | FC30SS1K |
| 0 - 300 mL | FC30AV2K | FC30AS2K | FC30SV2K | FC30SS2K |
| 0 - 800 mL | FC30AV3K | FC30AS3K | FC30SV3K | FC30SS3K |
| 0 - 1.6 L | FC30AV4K | FC30AS4K | FC30SV4K | FC30SS4K |
| With Spectrol 3-digit dial | | | | |
| 0 - 200 mL | FC30AV1S3 | FC30AS1S3 | FC30SV1S3 | FC30SS1S3 |
| 0 - 300 mL | FC30AV2S3 | FC30AS2S3 | FC30SV2S3 | FC30SS2S3 |
| 0 - 800 mL | FC30AV3S3 | FC30AS3S3 | FC30SV3S3 | FC30SS3S3 |
| 0 - 1.6 L | FC30AV4S3 | FC30AS4S3 | FC30SV4S3 | FC30SS4S3 |
| With Spectrol 4-digit dial | | | | |
| 0 - 200 mL | FC30AV1S4 | FC30AS1S4 | FC30SV1S4 | FC30SS1S4 |
| 0 - 300 mL | FC30AV2S4 | FC30AS2S4 | FC30SV2S4 | FC30SS2S4 |
| 0 - 800 mL | FC30AV3S4 | FC30AS3S4 | FC30SV3S4 | FC30SS3S4 |
| 0 - 1.6 L | FC30AV4S4 | FC30AS4S4 | FC30SV4S4 | FC30SS4S4 |
| With screwdriver adjustable operator | | | | |
| 0 - 750 mL | FC31AV1 | | | |

MORE INFORMATION

Male pipe adapters
Internal..... page 38
External..... 39

Micrometering Valves

Micrometering (needle) valves combine the ease of connection associated with Valco zero dead volume fittings with convenient bulkhead mounting. The very low internal volume and precision design make this valve ideal for use as a gas control valve in chromatographic systems.

The Viton® model is rated at 225°C, while a version with Kalrez™ seals is capable of continuous operation at 315°C. This allows a needle valve to be mounted directly within a heated oven, facilitating control of flow

switching in multidimensional systems while keeping the gases at oven temperature.

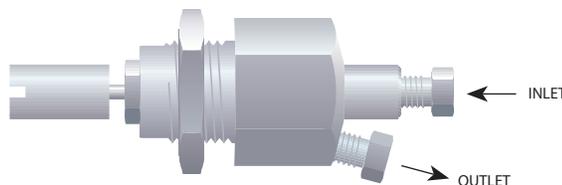
Valves are rated for maximum of 1000 psi gas. They are individually tested on a mass spectrometer leak detector to a helium leak rate specification of $< 1 \times 10^{-8}$ atm cc/sec.

An unlubricated version with a specially polished seat was designed to be used with our pulsed discharge detectors, and should be used upstream of any ultrapure gas system. There is also a 1/16" tube version.

1/16" micrometering valves

with Valco fittings

| Seal | Lubrication | Prod No |
|--|----------------|------------|
| Standard: 2–225 ml/min@ 15 psi N ₂ inlet | | |
| Viton | Lubricated | ZBNV1 |
| Viton | Non-lubricated | ZBNV1-D |
| Kalrez | Non-lubricated | ZBNV1-KZ |
| Fine control: 2–175 ml/min@ 15 psi N ₂ inlet | | |
| Viton | Lubricated | ZBNV1F |
| Viton | Non-lubricated | ZBNV1F-D |
| Kalrez | Non-lubricated | ZBNV1F-KZ |
| Low flow: 2–90 ml/min@ 40 psi N ₂ inlet | | |
| Viton | Lubricated | ZBNV1LF |
| Viton | Non-lubricated | ZBNV1LF-D |
| Kalrez | Non-lubricated | ZBNV1LF-KZ |



1/16" micrometering valves

with 18" tubes

| Seal | Lubrication | Prod No |
|--|----------------|-----------|
| Standard: 2–225 ml/min@ 15 psi N ₂ inlet | | |
| Viton | Lubricated | BNV1 |
| Viton | Non-lubricated | BNV1-D |
| Kalrez | Non-lubricated | BNV1-KZ |
| Low flow: 2–90 ml/min@ 40 psi N ₂ inlet | | |
| Viton | Lubricated | BNV1LF |
| Viton | Non-lubricated | BNV1LF-D |
| Kalrez | Non-lubricated | BNV1LF-KZ |



Combo Pressure Regulators



The Vici combo regulator is a combination regulator and shut-off valve. The pressure is set using the screwdriver adjustment in the center of the on/off knob. Turning the knob counterclockwise provides positive shutoff, while clockwise rotation restores gas pressure to within 0.05 psi of the setpoint.

The regulator is machined from aluminum bar stock and then hard-anodized to provide contamination-free service. It features a stainless steel diaphragm and Viton®-sealed stainless steel poppet. The compact size (3" x 1.125"

diameter) saves panel space and permits installation anywhere that an 11/16" hole can be located. Mounting hardware is supplied.

Available with outlet pressure ranges of 0-15 psi, 0-30 psi, or 0-60 psi, these regulators can be ordered with 1/16" or 1/8" Valco internal fittings or 1/8" external fittings. Other configurations are available in OEM quantities.

Maximum operating temperature is 100°C, and maximum supply pressure is 250 psig. The influence of supply pressure on outlet pressure is less than 0.1 psi per 10 psi change in supply pressure.

Combo pressure regulators

SPECS

Maximum inlet pressure:
250 psi

Maximum temperature:
100°C

Wetted materials:
 ■ Anodized aluminum
 ■ Stainless steel
 ■ Viton

| | | Valco internal fittings 1/16" | Valco internal fittings 1/8" | External fittings 1/8" |
|--|------------------------|----------------------------------|---------------------------------|---------------------------|
| | <i>Pressure range:</i> | <i>Prod No</i> | <i>Prod No</i> | <i>Prod No</i> |
| | 0-15 psi | PR50A15Z1 | PR50A15Z2 | PR50A15E2 |
| | 0-30 psi | PR50A30Z1 | PR50A30Z2 | PR50A30E2 |
| | 0-60 psi | PR50A60Z1 | PR50A60Z2 | PR50A60E2 |

ADAPTERS USED FOR VALCO AND CONDYNE CONTROL DEVICES



| <i>Prod No</i> | <i>Price</i> | <i>Used for</i> | <i>Description</i> |
|----------------|--------------|---|---|
| ZAOR11 | \$14 | Diaphragm valve; optional on on/off valves | Valco 1/16" internal to 10-32 female |
| ZAOR12 | 14 | Optional for Model 100 and 300 flow controllers | Valco 1/16" internal to 5/16-24 O-ring seal |
| ZAOR22 | 14 | Optional for Model 100 and 300 flow controllers | Valco 1/8" internal to 5/16-24 O-ring seal |
| EAOR21 | 14 | Air actuated prime/purge and on/off valves | External 1/8" to 10-32 O-ring seal |
| EAOR22 | 14 | Standard on Model 100 and 300 flow controllers | External 1/8" to 5/16-24 O-ring seal |