

The Ultimate in Precision Pressure Control

Precision Vacuum Regulators

EVR Vacuum Series

Pressure stability across
widely varying flow rates

- Pressure range: 0.4 to 30 inHg
- Standard Body Materials: SS316, PVC
- Diaphragms: PTFE or Viton
- Sizes 1/4" through 3"



3/8" SS316 EB3NL3
w/ electronic set-point



1" EVR-8 PVC w/ manual adjustment

Manual Adjustment

- Uses sensitive manual regulator on top

Computer Automated Control

- Uses electronic pressure regulator to provide set-point

Unique Diaphragm Regulator Technology:

- 5X more Precise than standard Pressure Regulators
- Dome loaded: for Manual or Automated control

- Elegant friction-less design
- Suitable for ultra-pure, and aggressive chemicals

EVR Series Precision Vacuum Regulator

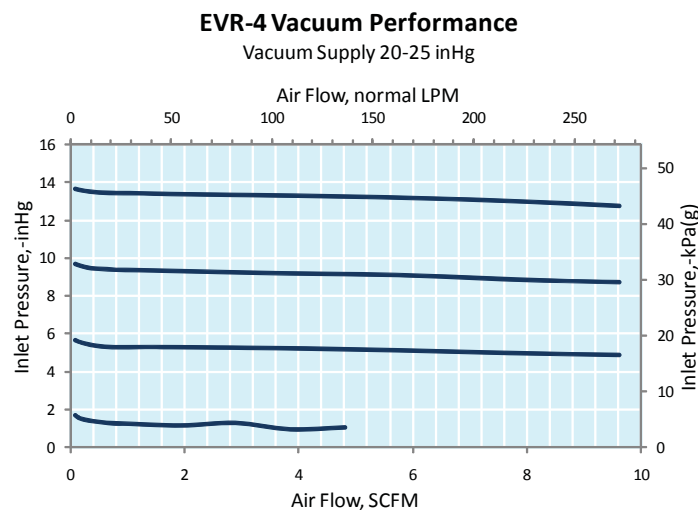
Incredibly stable pressure control

Equilibrar introduces a new type of vacuum regulator with more than 5X the flow stability of traditional spring regulators. That means that your vacuum process can remain stable even as gas flow rate changes over wide ranges.

- Can be used with manual set-point adjustment or computer automation
- Is installed between your vacuum pump and your process
- Does not allow air into your vacuum system*
- Controls in range 0.4 - 30 inHg
- Available sizes 1/4" through 3"
- Available in Stainless Steel, PVC, or other materials

Incredibly stable pressure control

This chart below shows the excellent vacuum stability through various flow rates and pressure ranges. Traditional vacuum regulators have much larger pressure variability with increasing flow rates.



*The base regulators do not allow any air into the process. However, both the manual and electronic set-point regulators function by allowing a very small amount of air into the process.

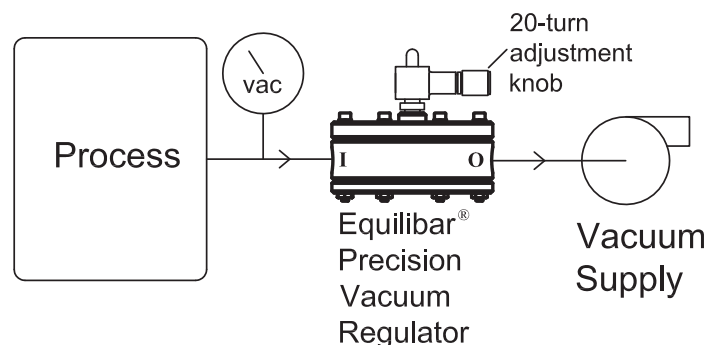


1/2" EVR-4 with SS316 body

Restricts flow to your vacuum pump

Unlike common vacuum breakers or vacuum relief valves, the Equilibrar vacuum regulator restricts flow to your vacuum pump in order to hold your process at the right vacuum pressure.

Simply connect the Outlet of the Equilibrar to your vacuum supply, and the Inlet to your process.

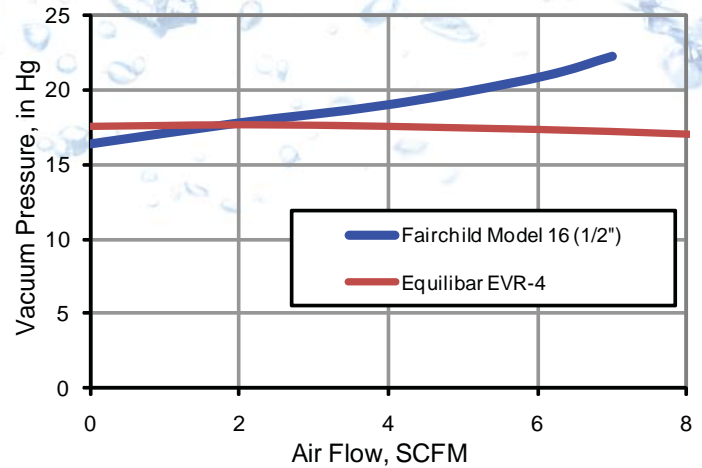


Non-relieving

The Equilibrar vacuum regulator is a non-relieving regulator. In order to lower the vacuum pressure in your process, there will need to be at least a small in-flow of gas. Fortunately, most processes have at least a small gas flow or in-leakage.

EVR Series Precision Vacuum Regulator

1/2" Equilibar® EVR-4 vs. Fairchild Model 16
Vacuum Flow Stability Curve



Dramatic stability improvement

This chart shows the superior flow stability of the 1/2" Equilibar® over the Fairchild 16 vacuum breaker.

Note that the Fairchild works by bleeding air into the vacuum system rather than directly modulating the gas flow, explaining the opposite slope.

Selecting the right size

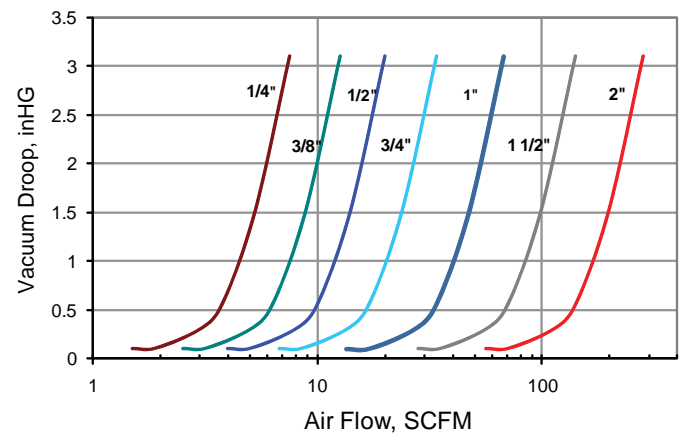
This chart at left shows the projected vacuum performance at various regulator body sizes. For a given regulator size, as flow increases past a critical point, 'droop' increases. Droop is defined as the reduction in vacuum pressure due to friction in the regulator.

In order to select the optimum size for your application, find the smallest regulator that has acceptable pressure variance in your flow range.

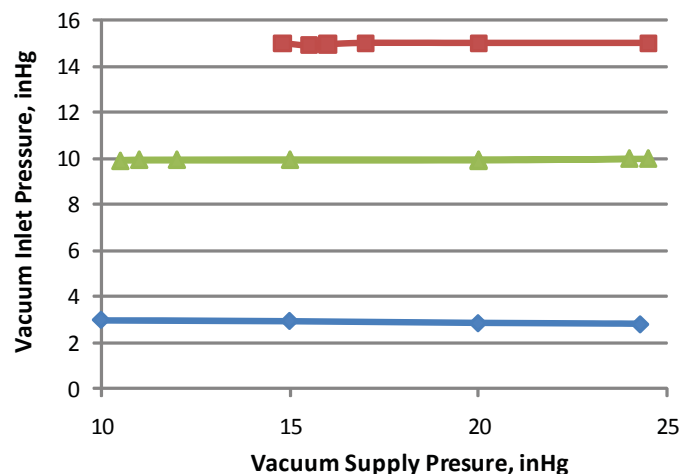
For example, for flow rates between 5 and 20 ACFM, the 3/4" shows only 0.2 psi variance and would be acceptable for most applications. The 1" regulator shows virtually no variance in this range.

If you don't know your flow rates, you can select the Equilibar Vacuum Regulator to match your existing pipe size.

EVR Flow Sizing Chart
(10 inHg)



Effect of Vacuum Supply
3/8" EVR-3, 1 SCFH flow rate



Stability with varying Vacuum Supply

The inlet pressure of most vacuum regulators vary significantly with changes in vacuum supply pressure.

The chart at left shows how the EVR holds process vacuum stable even through widely varying supply pressures. Such supply pressure variations are typical where multiple machines share the same vacuum pump or vacuum header.

EVR Series Precision Vacuum Regulator

How it works

Our new vacuum regulator uses the same patented technology as the Equilibar® Precision Back Pressure Regulator, with unmatched precision across varying flow rates.

The base units are actually dome-loaded back pressure regulator. They match your process (Inlet) pressure 1:1 to a pilot set-point pressure. They work to restrict flow between your process and the vacuum pump in order to keep your process very closely matched to the pilot setpoint pressure.

For manual applications, a sensitive 20-turn vacuum regulator is used to supply the set-point (see above right). For computer automation, an electro-pneumatic regulator is used to provide the set-point signal.

Unique Direct-Sealing Diaphragm Technology

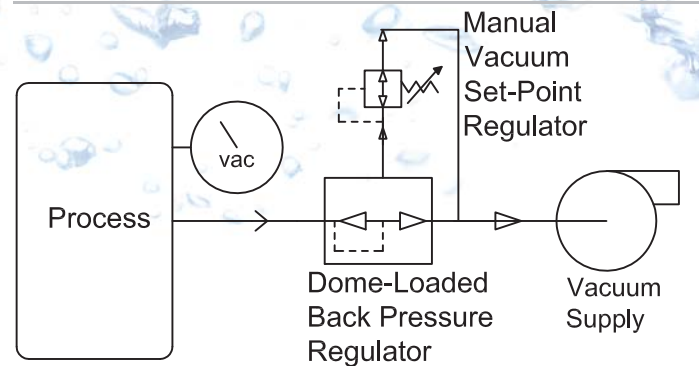
The key to the incredible performance of the Equilibar Vacuum Regulator is the unique direct sealing diaphragm technology used in the back pressure regulator. It works like a fluid transistor by forming a unique force balance on an flexible membrane between three separate pressures.

The fluid inlet pressure and the downstream outlet pressure exist on the wetted side of the membrane, separated by a valve seat. The reference air pressure exists on the non-wetted side.

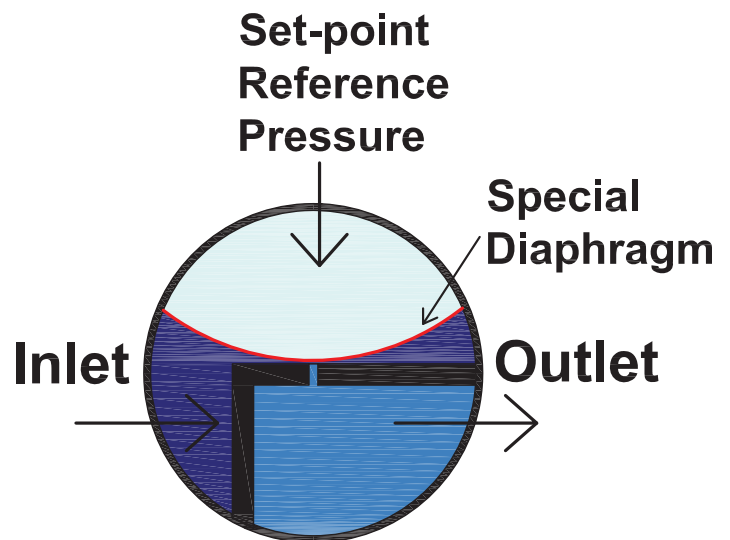
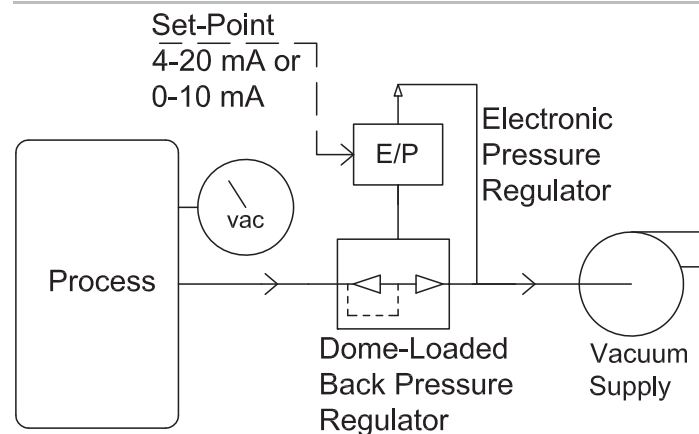
The lower pressure of the outlet tries to hold the membrane in a leak-tight seal with the valve seat. However, any slight excess between the fluid inlet pressure and the reference pressure quickly overwhelms these seating forces and pulls the membrane away from the valve seat.

Flow is automatically controlled at a level that maintains pressure equilibrium between the Inlet and Reference ports.

Manual control schematic



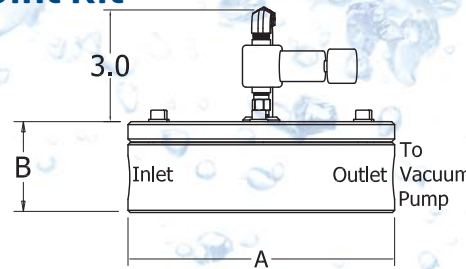
Computer automation schematic



Vacuum Regulators 1/4" through 1"

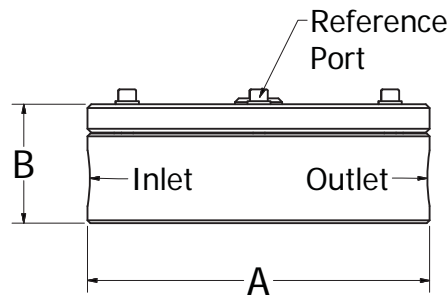
Regulators w/ Integrated Set-Point Kit

For manually adjusted applications, our integrated set-point kit provides for maximum convenience. A sensitive 20-turn set-point regulator is provided for easy installation and adjustment.



Dome-loaded regulator only (computer automation)

For computer automated applications, or for remote manual adjustment, the dome-loaded vacuum regulator can be purchased separately. The set-point pressure is applied to the reference port from a manual or electronic regulator.



Metallic Vacuum Regulators 1" and smaller

Integrated Set-Point Kit	Dome Loaded Regulator Only	Inlet /Outlet Port	Reference Port	Standard Body Materials	Dim A	Dim B	Cv Range (precision)		Available End Fittings	
Model Number			(Dome loaded)		(inch)		Min ¹	Max	Std	Available
EVR-2	GS2	1/4"	1/8"	SS316 (std) carbon steel (black oxide)	3.0	1.1	1E-3	1.0	NPT	Vacuum Flange BSP VCO style VCR style
EVR-3	GS3	3/8"			3.5	1.4	1E-3	1.8		
EVR-4	GS4	1/2"			4.5	1.6	1E-3	3.0		
EVR-6	GS6	3/4"			6.0	2.0	1E-2	6.2		
EVR-8	GS8	1"			7.0	2.5	1E-2	9.9		

Polymeric EVR Regulators 1" and smaller

Manual Adjust	Computer Adjust	Inlet/Outlet Port	Reference Port	Standard Body Materials	Dim A	Dim B	Cv Range (precision)		Available End Fittings	
Model Number			(Dome loaded)		(inch)		Min ¹	Max	Std	Available
EVR-2	GS2	1/4"	1/4"	PVC (std) PTFE	3.0	1.1	1E-3	1.0	NPT	BSP Pipe Flange (PVC, CPVC)
EVR-3	GS3	3/8"			3.5	1.4	1E-3	1.8		
EVR-4	GS4	1/2"			4.5	1.6	1E-3	3.0		
EVR-6	GS6	3/4"		CPVC PVDF Acetal	6.0	2.1	1E-2	6.2		
EVR-8	GS8	1"			7.0	2.7	1E-2	9.9		

Available Diaphragms

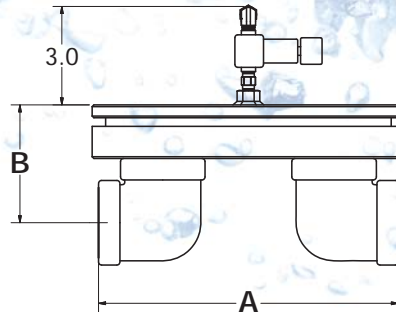
Material
PTFE
Viton (reinforced)

- Based on 2-piece GS Series back pressure regulators
- Two wetted components (Body + Diaphragm)
- No wetted o-rings
- Two plugged access ports on back side
- ¹Minimum Cv dependant on diaphragm and set-point pressure
- Dimensions and Cv values subject to change

Vacuum Regulators 1.5" and larger

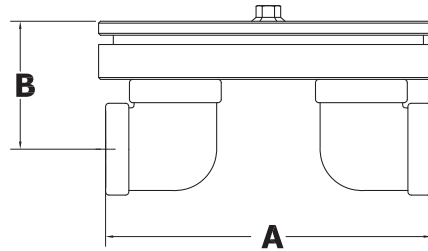
Regulators w/ Integrated Set-Point Kit

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Dome-loaded regulator only (computer automation)

For computer automated applications, or for remote manual adjustment, the dome-loaded vacuum regulator can be purchased separately. The set-point pressure is applied to the reference port from a manual or electronic regulator.



Metallic Vacuum Regulators 1.5" and larger

Integrated Set-Point Kit	Dome-Loaded Regulator Only	Inlet /Outlet Port	Reference Port	Standard Body Materials	Dim A	Dim B	Cv Range (precision)		Available End Fittings	
							Min ¹	Max	Std	Available
Model Number			(Dome-loaded)							
EVR-12	EBN8NLB12	1 1/2"	1/8"	SS316 (std)	8.8	3.1	1E-2	14.3	NPT	Vacuum Flange BSP
EVR-16	EB10NLB16	2"		carbon steel (black oxide)	10.8	4.1	1E-2	30.2		
EVR-24	EB14NLB24	3"			12.7	6.1	1E-1	60		

Polymeric EVR Regulators 1" and smaller

Integrated Set-Point Kit	Dome-Loaded Regulator Only	Inlet /Outlet Port	Reference Port	Standard Body Materials	Dim A	Dim B	Cv Range (precision)		Available End Fittings	
							Min ¹	Max	Std	Available
			(Dome-loaded)		(inch)					
EVR-12	EB8NLB12	1 1/2"	1/4"	PVC	9	4.3	1E-2	14.3	NPT	BSP Pipe Flange
EVR-16	EB10NLB16	2"			11	3.0	1E-2	30		
EVR-20	EB12NLB24	2 1/2"		CPVC	13	3.5	1E-2	34		
EVR-24		3"			17	4.0	1E-1	60		

Available Diaphragms

Material
PTFE
Viton (reinforced)

- Based on NLB back pressure regulators with welded external elbows.
- Two Viton wetted o-rings
- ¹Minimum Cv dependant on diaphragm and set-point pressure
- Dimensions and Cv values subject to change

Contact our Engineers

At Equilibar, your application's unique requirements will be carefully addressed by one of our trained application engineers. Please contact us if you have any questions or special requirements.

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About Equilibar

Equilibar, LLC manufactures and markets our specialized products worldwide. Equilibar branded products are made in the USA, and protected by US and foreign patents.

All of our products are assembled, inspected and tested by trained technicians in Fletcher, NC.

Application Engineering . . . How we are different

Unlike mass-market regulator distributors, everything about Equilibar is focused on you, the scientist or engineer with a unique pressure control challenge.

We assign an Application Engineer to you, typically within moments of your call. We work with you closely to identify the optimum model, trim, and diaphragm to best meet your challenge. You can stay in touch with your Application Engineer by email, telephone, mobile phone, or fax.

After installation, if there are any unexpected issues, your Application Engineer is still available to support you with start-up information or (if needed) expedited replacement parts.

Other products from Equilibar



Back Pressure Regulators

Our Equilibar® dome-loaded back pressure regulators are used from ultra low pressure applications (down to 0.02 psi, 0.14 kPag) up to 1000 psig (7000 kPag).



Instrument Series BPRs

Our new Instrument Series dome loaded back pressure regulators offer performance up to 5000 psig and temperatures up to 327°C with the use of SS316 diaphragms and Kalrez o-rings.