



Medical Vacuum Systems



Designed &
Manufactured
in the USA

with U.S. and Imported Components

NFPA 99 Medical Vacuum Systems

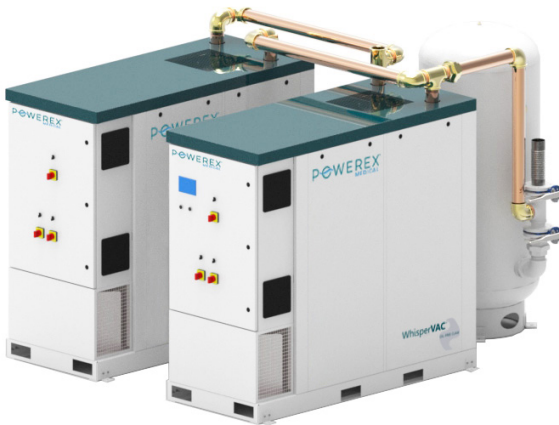


All systems are fully compliant with the latest edition of NFPA 99 and are manufactured in ISO 9001:2015 certified facilities. Powerex has become a leader in vacuum and air systems through our foundation built on engineering, innovation, quality, and service. We are a highly integrated operation, not only assembling systems, but also designing and manufacturing many of the major components. We are proud to say our systems are made in the U.S.A.!

Design Features

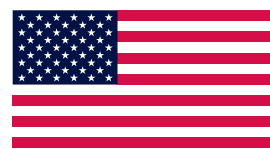
Each medical system includes:

- Multiple vacuum pumps
- ASME receiver
- UL listed control panel
- All interconnecting piping and wiring
- Vibration isolation pads and flex connectors
- Manufactured in ISO 9001:2015 certified facilities



Configuration Types

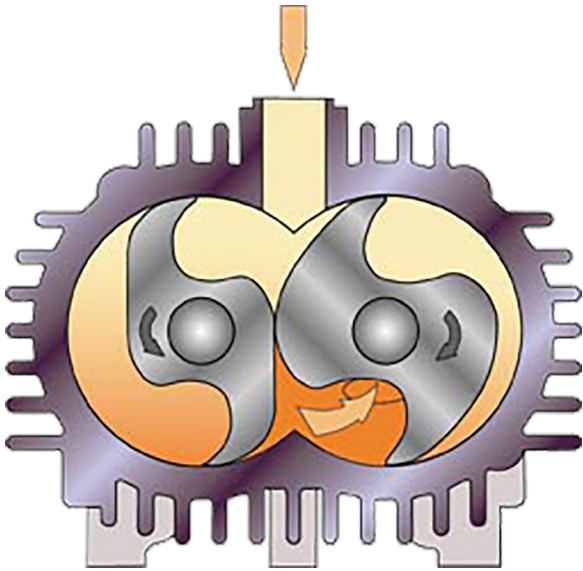
Medical vacuum systems are available in a variety of configuration types, allowing you the flexibility to choose the product that best fits your space. Choose between a skidmount, enclosed, tankmounted, or tank-over package.



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Oil-free Claw Technology



Inside the pump housing, two claw shaped rotors take in air as they rotate in opposite directions. The air is compressed by the rotors, then discharged through a silencer to atmosphere. The pumping chamber is dry. There is no contact between the rotors or the cylinder wall eliminating internal wear and parts to replace. The rotors are synchronized by gears requiring a small amount of oil in the gear housing. Gear oil change requirements are minimal at approximately 20,000 hours.

- Most energy efficient technology
- Oil-free compression chamber
- Extremely low maintenance
- No water or sewage costs
- Air-cooled design
- Optional oxygen prepared pumps available to comply with NFPA 99 5.1.3.8.2.1(2) for WAGD applications

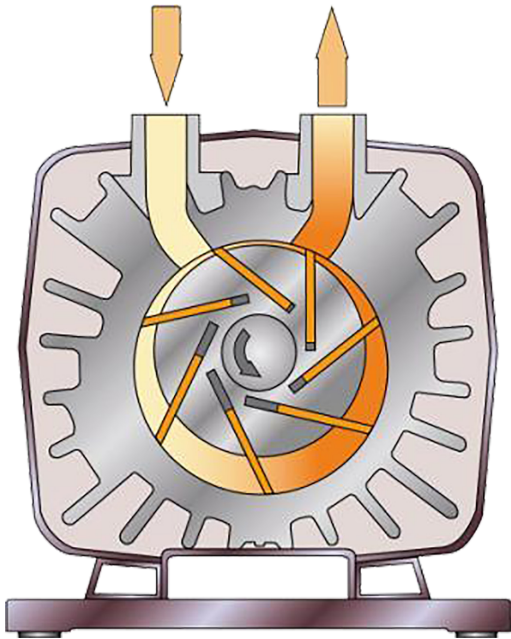
Model	SCFM @ 19" Hg*	HP	Tank (gal)
Duplex Systems – Skidmount			
CVPD0504A	29	4 (2)	120
CVPD0504B	38	5 (2)	120
CVPD0754A	52	6.4 (2)	120
CVPD0754B	65	7.5 (2)	120
CVPD1005	87	10 (2)	200
CVPD1505	129	15 (2)	200
Triplex Systems – Skidmount			
CVPT0504A	58	4 (3)	120
CVPT0504B	76	5 (3)	120
CVPT0755A	104	6.4 (3)	200
CVPT0755B	130	7.5 (3)	200
CVPT1005	174	10 (3)	200
CVPT1505	258	15 (3)	200
Quadplex Systems – Skidmount			
CVPQ0505A	87	4 (4)	200
CVPQ0505B	114	5 (4)	200
CVPQ0755A	156	6.4 (4)	200
CVPQ0755B	195	7.5 (4)	200
CVPQ1005	261	10 (4)	200
CVPQ1505	387	15 (4)	200
Pentaplex Systems – Skidmount			
CVPP1505	516	15 (5)	200

* SCFM listed with one pump in reserve per NFPA 99

Model	SCFM @ 19" Hg*	HP	Tank (gal)
Duplex Horizontal Tankmount			
CVTD0203	16	2 (2)	80
CVTD0303	21	3 (2)	80
CVTD0504A	29	4 (2)	120
CVTD0504B	38	5 (2)	120
Duplex Vertical Tankmount			
CVTD0203V	16	2 (2)	80
CVTD0303V	21	3 (2)	80
CVTD0504AV	29	4 (2)	120
CVTD0504BV	38	5 (2)	120
Duplex Tank-over Skidmount			
CVPDT0502A	29	4 (2)	60
CVPDT0502B	38	5 (2)	60
CVPDT0752A	52	6.4 (2)	60
CVPDT0752B	65	7.5 (2)	60

* SCFM listed with one pump in reserve per NFPA 99

Dry Rotary Vane Technology



A rotor is mounted eccentrically in the pump cylinder and contains several sliding vanes. As the rotor turns, centrifugal force causes the vanes to slide outward creating a seal against the cylinder wall. The vanes are constructed of a self-lubricating graphite composite material which allows them to operate against the cylinder wall without the need for any other sealing or lubricating fluid. As a result of the offset rotor, a succession of variable volumes are formed in the cylinder housing creating the flow of vapor through the pump. Vapor is pulled into the pump inlet which is then compressed and discharged through the exhaust to atmosphere.

- No oil anywhere
- Easy to maintain
- No water and sewage costs
- Suitable for dedicated waste anesthesia (WAGD) systems
- Less routine maintenance (no oil changes)

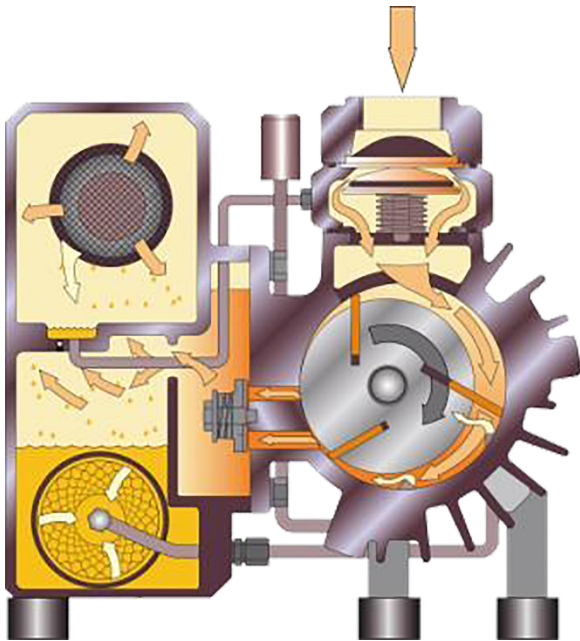
Model	SCFM @ 19" Hg*	HP	Tank (gal)
Duplex Systems - Skidmount			
VOPD0403	17	5 (2)	80
VOPD0503	20	5.6 (2)	80
VOPD0754	30.4	7.5 (2)	120
VOPD1004	56	8.6 (2)	120
Triplex Systems - Skidmount			
VOPT0503	40	5.6 (3)	80
VOPT0754	60.8	7.5 (3)	120
VOPT1004	112	8.6 (3)	120
Quadplex Systems - Skidmount			
VOPQ0505	60	5.6 (4)	200
VOPQ0755	91.2	7.5 (4)	200
VOPQ1005	168	8.6 (4)	200

* SCFM listed with one pump in reserve per NFPA 99

Model	SCFM @ 19" Hg*	HP	Tank (gal)
Duplex Horizontal Tankmount			
VOTD0755	30.4	7.5 (2)	200
VOTD1006	56	8.6 (2)	240
Duplex Vertical Tankmount			
VVOTD0153	5.3	1.5 (2)	80
VVOTD0203	8	2 (2)	80
VVOTD0303	13.5	3 (2)	80
VVOTD0404	17	5 (2)	120
VVOTD0504	20	5.6 (2)	120

* SCFM listed with one pump in reserve per NFPA 99

Lubricated Rotary Vane Technology



A rotor is mounted eccentrically in the pump cylinder and contains several sliding vanes. As the rotor turns, centrifugal force causes the vanes to slide outward against the cylinder wall, forming chambers between themselves and the housing. Oil is trapped inside these chambers, creating a seal between the vanes and the cylinder wall and lubricating the vanes for reduced wear. Air is pulled into the pump inlet which is then compressed and discharged into the exhaust box. The oil mixed with the air is then passed through several stages of internal oil-and-mist eliminators to remove 99.9% of the lubricating oil before the exhaust is released to atmosphere. The separated oil is then returned to the oil reservoir.

- 30,000 hour vane life
- Semi-synthetic oil-flooded for lubrication and heat dissipation
- Highest ultimate vacuum levels 29.3" Hg
- No water and sewage costs
- Most suitable for high ambient temperatures

Model	SCFM @ 19" Hg*	HP	Tank (gal)
Duplex Systems - Skidmount			
VPD0504	37	5 (2)	120
VPD0754	52	7.5 (2)	120
VPD1004	77	10 (2)	120
VPD1505	111	15 (2)	200
VPD2005	137	20 (2)	200
VPD2505	168	25 (2)	200
Triplex Systems - Skidmount			
VPT0504	74	5 (3)	120
VPT0754	104	7.5 (3)	120
VPT1004	154	10 (3)	120
VPT1505	222	15 (3)	200
VPT2005	274	20 (3)	200
VPT2505	336	25 (3)	200
Quadplex Systems - Skidmount			
VPQ0505	111	5 (4)	200
VPQ0755	156	7.5 (4)	200
VPQ1005	231	10 (4)	200
VPQ1505	333	15 (4)	200
VPQ2005	411	20 (4)	200
VPQ2505	504	25 (4)	200

* SCFM listed with one pump in reserve per NFPA 99

Model	SCFM @ 19" Hg*	HP	Tank (gal)
Duplex Horizontal Tankmount			
VTD0153	7	1.5 (2)	80
VTD0203	11	2 (2)	80
VTD0303	17	3 (2)	80
VTD0404	25	5 (2)	120
VTD0504	37	5 (2)	120
VTD0755	52	7.5 (2)	200
VTD1006	77	10 (2)	240
Duplex Vertical Tankmount			
VVTD0153	7	1.5 (2)	80
VVTD0203	11	2 (2)	80
VVTD0303	17	3 (2)	80
VVTD0403	25	5 (2)	80
VVTD0503	37	5 (2)	80
Duplex Tank-over Skidmount			
VPDT0402	25	5 (2)	60
VPDT0502	37	5 (2)	60
VPDT0752	52	7.5 (2)	60

* SCFM listed with one pump in reserve per NFPA 99

WhisperVAC™ Enclosure Cabinet



Powerex's trademarked enclosure systems offer the lowest noise levels in the industry. Each system is packaged in a rigid steel frame with powder coated panels and lined with sound-deadening insulation. The low noise levels are unmatched in the industry and allow greater flexibility of installation location, while the small footprint simultaneously maximizes floor space.

- Vacuum pumps are enclosed within sound-reducing panels
- Sound intensity is reduced by an average of 14 dBA over comparable open frame systems – 4x sound reduction
 - All systems are well within NIOSH limits of 8 hour exposure
 - Helps protect the hearing of healthcare facility employees
 - Improves working environment near the medical vacuum system
 - Helps avoid disturbing patients and/or hospital employees
- Ultimate sound reduction achieved when packaged with Powerex WhisperAIR™ enclosed scroll medical air systems – *the quietest source equipment in the industry!*
- Patent-pending internal pump cooling system ensures vacuum pumps operate well within acceptable temperature ranges



Hearing Loss Prevention

Occupational hearing loss is the most commonly recorded occupational illness, accounting for 1 in 9 recordable illnesses. Powerex WhisperVAC™ technology provides a real solution for workers operating in loud mechanical rooms, as well as any facility employees who are ever in close proximity to the compressor system.

Hearing loss is a significant cost that is preventable!

Enclosed Claw Vacuum Systems

Medical Vacuum Enclosed Claw - MVEC*				
Model	System HP	SCFM @ 19" Hg	Tank (gal)	dB(A) Level
Duplex - Enclosure				
MVECD0203	2 (2)	16	80	64
MVECD0303	3 (2)	21	80	64
MVECD0404	4 (2)	29	120	68
MVECD0504	5 (2)	38	120	68
MVECD0604	6 (2)	52	120	68
MVECD0754	7.5 (2)	65	120	68
MVECD1005	10 (2)	87	200	70
MVECD1505	15 (2)	129	200	72
Triplex - Enclosure				
MVECT0404	4 (3)	58	120	70
MVECT0504	5 (3)	76	120	70
MVECT0605	6 (3)	104	200	70
MVECT0755	7.5 (3)	130	200	70
MVECT1005	10 (3)	174	200	72
MVECT1505	15 (3)	258	200	74

Model	System HP	SCFM @ 19" Hg	Tank (gal)	dB(A) Level
Quadplex - Enclosure				
MVECQ0405	4 (4)	87	200	72
MVECQ0505	5 (4)	114	200	72
MVECQ0605	6 (4)	156	200	72
MVECQ0755	7.5 (4)	195	200	72
MVECQ1005	7.5 (4)	261	200	74
MVECQ1505	15 (4)	387	200	76
Pentaplex - Enclosure				
MVECP0505	5 (5)	152	200	73
MVECP0755	7.5 (5)	260	200	73
MVECP1505	15 (5)	516	200	77
Hexaplex - Enclosure				
MVECH0505	5 (6)	190	200	74
MVECH0755	7.5 (6)	325	200	74
MVECH1505	15 (6)	645	200	78

*Table specifications are defined at sea level conditions with reserve pump(s) on standby per NFPA 99.

Enclosed Lubricated Vane Vacuum Systems

Medical Vacuum Enclosed Vane - MVEV*				
Model	System HP	SCFM @ 19" Hg	Tank (gal)	dB(A) Level
Duplex				
MVEVD0404	4.6 (2)	25	120	60
MVEVD0504	5 (2)	37	120	62
MVEVD0754	7.5 (2)	52	120	64
Triplex				
MVEVT0504	5 (3)	74	200	64
MVEVT0755	7.5 (3)	104	200	66
Quadplex				
MVEVQ0505	5 (4)	111	200	66
MVEVQ0755	7.5 (4)	156	200	68

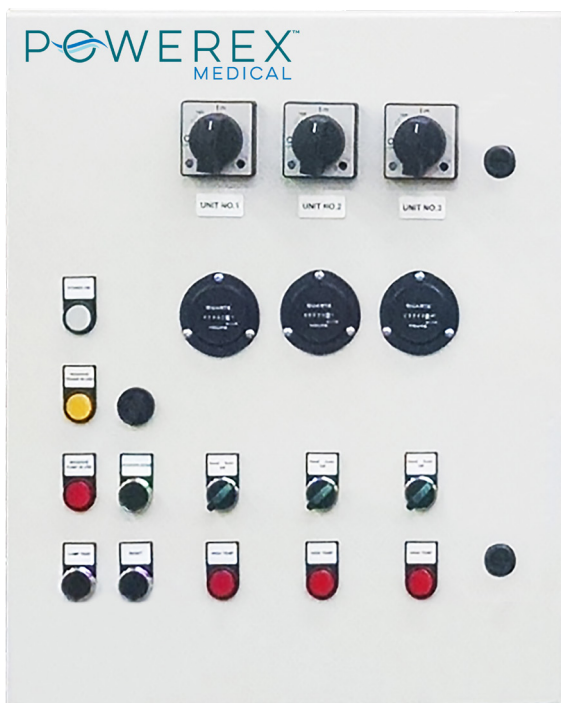
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Control Panel Options



Standard Premium Control Panel

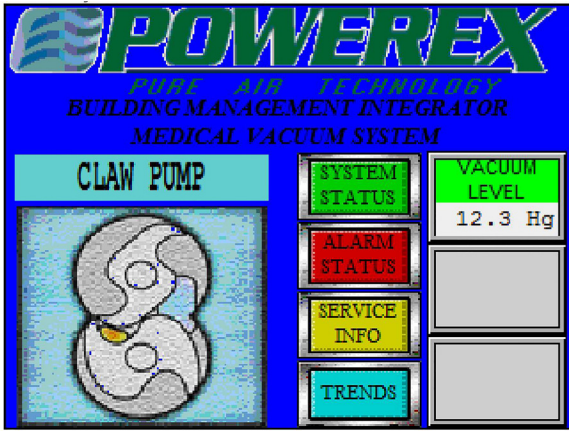
- PLC controller and 6" color HMI touch screen displays the operating status of the unit
- Building automation gateway with BacNet over IP protocol
- UL508A listed and labeled, NEMA 4/12 enclosure
- Visual and audible alarms for:
 - System overload trip
 - High temperature conditions
 - Service intervals
- Panel door includes:
 - Visual and audible alarms
 - HOA switch for each pump



Optional Non-HMI Control Panel

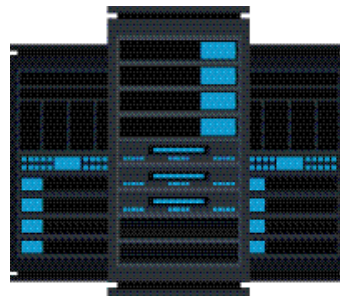
- UL508A listed and labeled, NEMA 4/12 enclosure
- Timed lead/lag alternation
- Visual and audible reserve in use alarm
- Redundant control circuit transformers
- Dry contacts for remote alarm monitoring
- Each vacuum pump provided with:
 - Hand/Off/Auto selector switch
 - Magnetic starter with 3 leg overload protection
 - Visual and audible high temperature shut down
 - Hour meter

BACnet



Standard in Powerex's premium control panel.

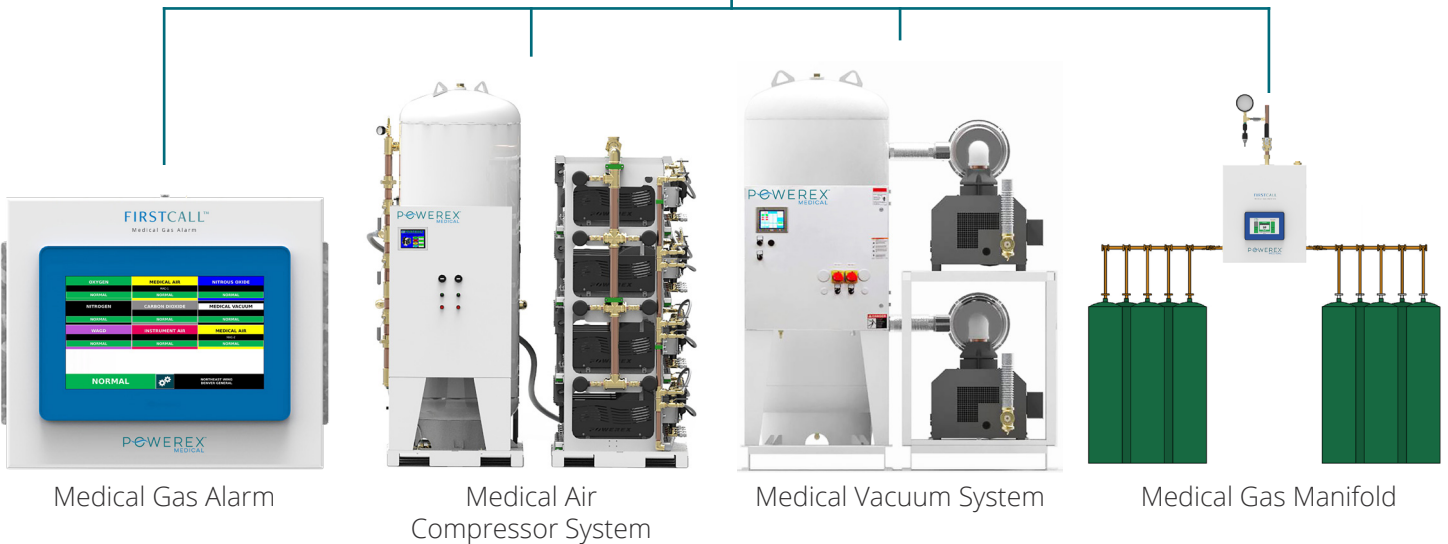
- Seamlessly connect to your building management system via Ethernet using BACnet over IP protocol
- Centrally monitor medical gas equipment along with all other facility equipment



Building Automation System



BACnet
over IP



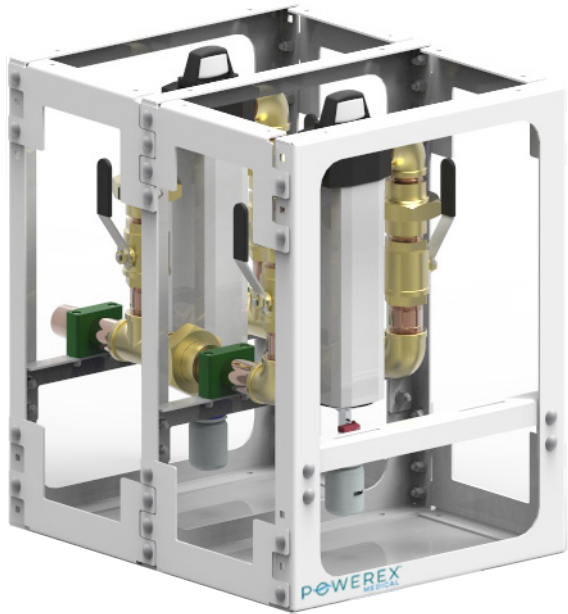
Medical Gas Alarm

Medical Air
Compressor System

Medical Vacuum System

Medical Gas Manifold

Medical Vacuum Filter Assembly



Powerex Medical Vacuum Filter Assemblies are designed to protect the service professionals who perform maintenance on the vacuum systems. The filters remove solid, liquid, and bacterial contamination as small as 0.3 micron with 99.995% efficiency through HEPA-grade filters.

These systems must be used in conjunction with a medical vacuum system to be compliant with the 2018 revision of NFPA 99 (5.1.3.7.4), which requires the addition of inlet bacteriologic filtration at the medical vacuum source.

The filter systems include:

- Multiple filters mounted to a metal frame
- Single point connections for inlet and outlet pipes
- Isolation valves on source side and patient side for each filter
- Clear Borosil glass flask to easily detect liquid accumulation



Optional Variable Frequency Drive

Variable Frequency Drive (VFD) controls improve efficiency over a conventional “on/off” demand-based system by more closely matching the pump speed to the changing load requirements.

The control system calculates the frequency to speed up or slow down the pump based on changes to the demand versus the set-point. Pump speeds matched to demand will result in lower amp draws, prolonged motor life, prolonged bearing life, and reduced energy costs.

VFD controls are an available option for all Powerex duplex through quadplex Medical Oil-free Claw Vacuum systems. VFD systems come standard with a premium HMI touch screen control panel.

Pump without VFD*

Operating Parameters	Oil-free Claw Pump
Motor HP	7.5
Run Hours/Year	8,000
Motor Efficiency	90%
\$/kWh	\$0.16
Total Yearly Cost°	\$7,954

* Comparison of pump technologies to deliver 150 ACFM @ 150 Torr (24" Hgv)

° Yearly cost = [(HP x .7457 x kWh cost) / Motor Efficiency x 8,000 run hours]

Pump with VFD

System Demand	ACFM @ 150 Torr	Motor Frequency	Brake HP	Operating Hours	Yearly Cost*
100%	150	58 Hz	6.8	800	\$722
75%	112.5	47 Hz	5.4	3,200	\$2,290
50%	75	36 Hz	4.0	2,400	\$1,272
25%	37.5	23 Hz	2.8	1,600	\$594
Totals				8,000	\$4,878

*Based on \$0.16 per kWh and 90% motor efficiency





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150 Production Drive • Harrison, OH 45030 • USA
T 1.888.769.7979 • F 513.367.3125 • www.powerexinc.com
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