



Medical Vacuum Systems
Product Selection Guide



Non-contacting Dry Claw...

Dry Rotary Vane...

Lubricated Rotary Vane...

Medical Vacuum System Design

General Description

The Powerex medical vacuum system is fully compliant with the latest edition of NFPA99 and includes multiple vacuum pumps, ASME receiver, and control panel. Single point connections are provided for system intake and electrical. All interconnecting piping and wiring is included and operationally tested prior to shipment. Vibration isolation pads and flex connectors are included with the system. Powerex manufactures all systems in ISO9001 UL certified facilities to ensure the highest quality. Systems are available in three configuration types: Modular skid mount, Vertical tank mount, and Horizontal tank mount.



Modular Skid Mount Configuration

Control Panel Standard Features:

The control panel is fully compliant with the latest edition of NFPA99 and is UL508A listed and labeled. The panel is provided in a NEMA 12 enclosure with a main power on light, timed automatic lead/lag pump alternation, reserve pump in-use alarm with visual and audible indicators, and redundant control circuit transformers. Each pump is provided with an externally operable motor circuit breaker, Hand/Off/Auto selector switch, minimum run timer (to prevent short cycling of the pump), run hour meter, and run light. Dry contacts are provided on a labeled terminal strip for remote alarm monitoring. Horn silence and lamp test pushbuttons are standard. The lag vacuum pump(s) will start automatically if the lead vacuum pump fails to operate.



Horizontal Tank Mount Configuration

Powerex Building Management Integrator (PBMI)



Powerex Building Management Integrator (PBMI)

Our state of the art human machine interface (HMI) touch screen panel provides hospital personnel with vital system information at the touch of a button. A built-in webpage with email notification ensures that staff can always be in touch with the medical system's information and alerts. PBMI utilizes BacNet® protocol for the communication gateway to the building automation system which can support hundreds of pre-configured, labeled, and listed individual data points.



Vertical Tank Mount Configuration

Receiver

The system shall include an ASME stamped receiver rated for full vacuum. The tank shall be equipped with a vacuum gauge, block and by-pass valves, and a manual drain valve.

Claw Pump Technology

Dry claw pumps are one of the latest technologies and have become very popular in medical/lab applications in recent years. Claw pumps are extremely efficient with the lowest electrical and maintenance costs. The pumping chambers are completely dry and there are no wearing parts on the rotors. This pump is capable of being operated with variable speed drive which can offer additional benefits in certain applications. Claw pumps do have higher noise levels and lower ultimate vacuum level capabilities than oil sealed rotary vane pumps. This pump type is suitable for use in dedicated waste anesthesia gas disposal systems and is a good choice for many applications.

Model	SCFM @ 19" Hg	HP Each	Tank	L	W	H
Duplex tank mounted horizontal						
CVTD0203	16	2.3	80	71"	42"	55"
CVTD0303	21	3.2	80	71"	42"	55"
CVTD0504A	29	5	120	77"	43"	59"
CVTD0504B	38	6.4	120	77"	43"	59"
Duplex tank mounted vertical						
CVTD0203V	16	2.3	80	56"	35"	82"
CVTD0303V	21	3.2	80	56"	35"	82"
CVTD0504AV	29	5	120	56"	35"	85"
CVTD0504BV	38	6.4	120	56"	35"	85"
Duplex modular skid mount						
CVPD0504A	29	5	120	64"	55"	76"
CVPD0504B	38	6.4	120	64"	55"	76"
CVPD0754A	52	7.0	120	64"	55"	76"
CVPD0754B	65	9.1	120	64"	55"	76"
CVPD1005	77	10.2	200	64"	55"	83"
CVPD1505	129	15	200	90"	71"	88"

Model	SCFM @ 19" Hg	HP Each	Tank	L	W	H
Triplex modular skid mount						
CVPT0504A	58	5	120	64"	55"	85"
CVPT0504B	76	6.4	120	64"	55"	85"
CVPT0755A	104	7.0	200	64"	55"	87"
CVPT0755B	130	9.1	200	64"	55"	87"
CVPT1005	154	10.2	200	64"	55"	87"
CVPT1505	258	15	200	135"	70"	88"
Quadplex modular skid mount						
CVPQ0505A	87	5	200	96"	55"	83"
CVPQ0505B	114	6.4	200	96"	55"	83"
CVPQ0755A	156	7.0	200	96"	55"	83"
CVPQ0755B	195	9.1	200	96"	55"	83"
CVPQ1005	231	10.2	200	96"	55"	83"
CVPQ1505	387	15	200	135"	71"	88"

Variable frequency drive option:

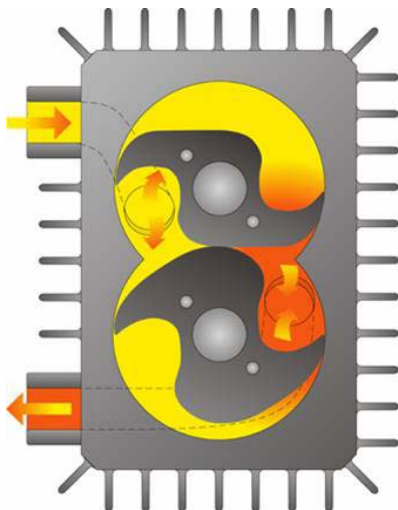
Available on claw pump systems only. Automatically adjusts the pumping speed to maintain a preset vacuum level.

Available Options:

- PBMI
- High temperature alarm
- Internal tank lining
- Variable Frequency Drive (VFD)
- Oxygen prepared pumps (WAGD systems)

How it works:

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.



Pros:

- Most efficient technology
- Lowest maintenance
- No water and sewage costs
- Suitable for dedicated waste anesthesia (WAGD) systems

Cons:

- Lower ultimate vacuum levels compared to some technologies
- Higher noise levels than some technologies
- Higher initial cost than some other types
- Cannot ingest liquids

Oil-less Rotary Vane Technology

Oil-less rotary vane pumps are a cost effective solution for applications where oil in the pumping chamber or oil mist in the exhaust may not be desirable. This simple design requires less routine maintenance than an oil flooded type pump, but does require periodic vane replacement. This pump type is suitable for use in dedicated waste anesthesia gas disposal systems.

Model	SCFM @ 19" Hg	HP Each	Tank	L	W	H
Duplex tank mounted horizontal						
VOTD0404	15.4	5	120	76"	29"	59"
VOTD0504	22.1	5	120	76"	34"	60"
VOTD0755	30.4	7.5	200	85"	38"	66"
VOTD1006	55	10	240	90"	48"	72"
Duplex tank mounted vertical						
VVOTD0153	5.3	1.5	80	28"	40"	71"
VVOTD0203	8.2	2	80	28"	40"	71"
VVOTD0303	12.5	3	80	34"	42"	80"
VVOTD0404	15.4	5	120	52"	43"	82"
VVOTD0504	22.1	5	120	53"	44"	84"

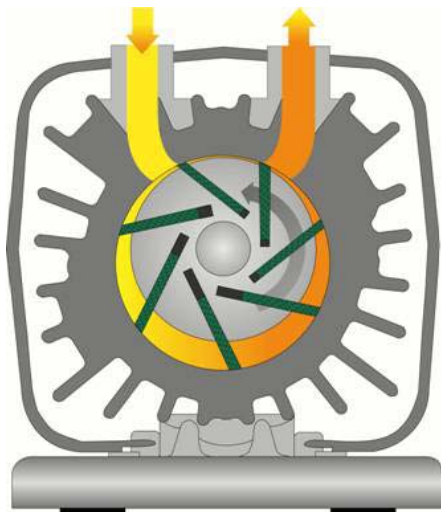
Model	SCFM @ 19" Hg	HP Each	Tank	L	W	H
Duplex modular skid mount						
VOPD0403	15.4	5	80	64"	55"	60"
VOPD0503	22.1	5	80	64"	55"	61"
VOPD0754	30.4	7.5	120	64"	55"	76"
VOPD1004	55	10	120	64"	55"	76"
Triplex modular skid mount						
VOPT0503	44.2	5	80	64"	55"	88"
VOPT0754	60.8	7.5	120	64"	55"	88"
VOPT1004	110	10	120	96"	55"	75"
Quadplex modular skid mount						
VOPQ0505	66.3	5	200	96"	55"	83"
VOPQ0755	91.2	7.5	200	96"	55"	83"
VOPQ1005	165	10	200	96"	55"	83"

Available Options:

- PBMI
- High temperature alarm
- Internal tank lining
- Tank sight gauge

How it works:

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.



Pros:

- Suitable for dedicated waste anesthesia (WAGD) systems
- No water and sewage costs
- Less routine maintenance (no oil changes)
- Lower initial cost compared to other dry pump designs

Cons:

- Short vane life
- Cannot ingest liquids
- Lower ultimate vacuum levels than some other types
- Lower efficiency than some other technologies

Oil Sealed Rotary Vane Technology

Oil sealed rotary vane pumps are durable long lasting pumps that have been widely used in hospital and laboratory applications for many years. This is one of the simplest and most reliable pump types available. The use of oil benefits the pump in higher efficiencies, lower operating temperatures, and lower sound levels. Oil sealed rotary vane pumps are a good choice for most applications.

Model	SCFM @ 19" Hg	HP Each	Tank	L	W	H
Duplex tank mounted horizontal						
VTD0153	7	1.5	80	71"	29"	55"
VTD0203	11	2	80	70"	28"	55"
VTD0303	17	3	80	70"	31"	55"
VTD0404	26	5	120	77"	32"	59"
VTD0504	41	5	120	77"	39"	58"
VTD0755	52	7.5	200	85"	44"	64"
VTD1006	77	10	240	90"	50"	65"
Duplex tank mounted vertical						
VVTD0153	7	1.5	80	44"	30"	75"
VVTD0203	11	2	80	44"	30"	75"
VVTD0303	17	3	80	54"	34"	85"
VVTD0403	26	5	80	54"	34"	85"
VVTD0503	41	5	80	54"	42"	89"

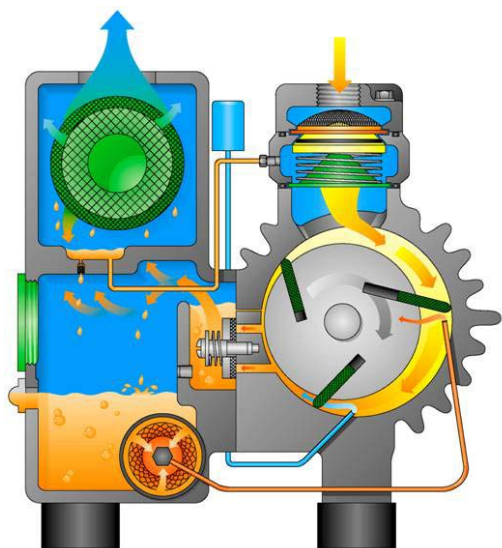
Available Options:

- PBMI
- High temperature alarm
- Internal tank lining
- Oil temperature gauges
- Tank sight gauge
- Synthetic oil

Model	SCFM @ 19" Hg	HP Each	Tank	L	W	H
Duplex modular skid mount						
VPD0754	52	7.5	120	64"	55"	76"
VPD1004	77	10	120	64"	55"	76"
VPD1505	111	15	200	90"	70"	87"
VPD2005	137	20	200	90"	70"	87"
VPD2505	168	25	200	90"	71"	87"
Triplex modular skid mount						
VPT0504	74	5	120	64"	55"	88"
VPT0754	104	7.5	120	64"	56"	88"
VPT1004	154	10	120	64"	56"	88"
VPT1505	222	15	200	135"	70"	87"
VPT2005	274	20	200	135"	70"	87"
VPT2505	336	25	200	135"	71"	87"
Quadplex modular skid mount						
VPQ0505	111	5	200	96"	55"	83"
VPQ0755	156	7.5	200	96"	55"	83"
VPQ1005	231	10	200	96"	55"	83"
VPQ1505	333	15	200	135"	70"	90"
VPQ2005	411	20	200	135"	70"	90"
VPQ2505	504	25	200	135"	70"	90"

How it works:

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. Oil is injected into the pumping chamber to create a seal between the vanes and the cylinder wall and to lubricate the vanes for reduced wear. As a result of the offset rotor, a succession of variable volumes is formed in the cylinder housing creating the flow of air through the pump. Air is pulled into the pump inlet which is then compressed and discharged into the exhaust box. At this point oil is mixed with the air and is 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.



Pros:

- Lowest initial cost
- Highest ultimate vacuum levels
- Long vane life
- No water and sewage costs
- Most suitable to high ambient temperatures
- Lower noise levels compared to other types

Cons:

- Not suitable for dedicated waste anesthesia (WAGD) systems
- Higher maintenance (oil & filter changes, vanes)
- Cannot ingest liquids

WHY POWEREX?

Powerex is a highly integrated operation where we not only assemble systems but we also manufacture many of the major components. From pumps, UL control panels, desiccant dryers, and monitors, to air receivers, we control quality at every stage of design and manufacturing. All of our facilities are ISO 9001 certified.

Powerex combines design, performance, quality, and service to fulfill its commitment to its customers to provide the best value in compressed air and vacuum systems.

Powerex has an extensive network of trained sales and service dealers — over 220 authorized service centers throughout the USA and Canada.

Powerex ensures complete NFPA99 compliance. We have been building medical systems since 1988 and assume all liability for NFPA99 compliance.

ACCESSORIES AND OPTIONS

- **Powerex Building Management Integrator (PBMI)**
- Receiver sizes 20— 600 Gallon
- Corrosion resistant tank lining
- Exhaust silencers
- Synthetic oil
- High temperature alarm
- Oil temperature gauges
- Laboratory system packaging
- Auto purge systems for laboratories
- Activated carbon filters
- Bacterial filters
- Knock out separators
- Variable frequency drive (claw only)



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