

## Specification

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### General

The Powerex enclosed medical vacuum system is designed to create a suction to remove unwanted fluids or gases from hospital working areas. The enclosed medical vacuum system package is compliant with the NFPA 99 requirements for Risk Category 1 systems. Each system is completely tested before shipment and includes:

- Multiple vacuum pumps and associated equipment
- Sound reducing enclosure
- ASME air receiver (optional)
- Medical control panel
- Exhaust silencer(s)

Each pump is factory piped to a common intake manifold and exhaust manifold. Intake isolation valves are included. Each pump-motor assembly is isolation-mounted to the internal frame structure.

### Lubricated Rotary Vane Vacuum Pump

The medical vacuum pumps shall be of the rotary vane air-cooled design. Each vacuum pump shall be direct-driven through a shaft coupling by a TEFC electric motor. Belt drives shall not be permitted. The vacuum pumps shall be mounted on vibration isolators.

- Each vacuum pump shall be air-cooled and have absolutely no water requirements.
- Each pump is equipped with a 10 micron inlet filter for removal of particulates.
- Lubrication shall be provided by an integral, fully recirculating oil supply that is filtered by an automotive-type, spin-on oil filter. Non-recirculating (once-through) or partial re-circulating oil supply systems shall not be permitted. Each vacuum pump shall be capable of operation with ISO 100 viscosity oil.
- The oil separation systems shall be integral and shall consist of no less than three stages of internally installed oil and smoke eliminators through which the exhaust gas stream must pass. This system shall consist of bulk separation, oil mist elimination, and smoke elimination, and shall be capable of removing 99.9+ percent of all oil and smoke particles from the exhaust gas stream.
- Each vacuum pump shall include a built-in, antisuck-back valve, mounted at the pump inlet, and three sliding vanes.

### Motor

The motor is continuous duty, C-face, TEFC, suitable for 208-230, or 460V, 3 phase, 60 hertz electrical operation.

### Sound Reducing Enclosure

The system is constructed with an internal frame and steel base system with an individual vibration isolation mounted vacuum pump-motor module. The electrical controls are located in a NEMA 4/12 cabinet at the front of the unit and are accessed separately from the rest of the enclosure. Enclosure side and back panels are easily removed to perform routine maintenance and inspection. Internal cooling fans are guarded to minimize risk of injury during routine

maintenance and inspection. Enclosure shall reduce noise to a level not to exceed 75 dB(A).

### Heat Management

The pumps shall be arranged in a vertical stack configuration so that each pump has its own individual bay that's isolated with sheet metal dividers. Heated air from the pump and motor will exhaust into the pump bay. Cooling air will enter each pump bay from the front/bottom of the system. An electric cooling fan shall be placed in each pump bay near the pump motor in an orientation that is perpendicular to the pump motor. Heated air will be forced out of each pump bay by the electric cooling fan through an integral duct that connects each pump bay. The integral duct shall include baffling to further reduce the amount of noise that can escape. The heated air leaves the system through the top. The cooling system shall be properly sized and placed so that the vacuum pump motor is kept sufficiently cool under all expected operating conditions.

### Premium NFPA Control Panel

The control system provides automatic lead/lag sequencing and automatic alternation of all pumps in order to equalize the amount of usage among the available vacuum pumps. The Premium NFPA Control panel shall include a gateway server card and all features listed below:

- PLC controller and a color touch screen panel which displays the operating status of the unit
- Building automation communication gateway with BacNet® protocol and Web server features. Web server features include email notifications in case the system is in alarm or has achieved one its maintenance intervals and requires service.
- Ethernet port for connection to BacNet® server or direct connection to facility Ethernet for viewing of system operations and status via device IP-address
- UL508A listed control panel in a NEMA 12 enclosure. The panel door will include: the HMI touch screen, an audible and visual alarms with an acknowledge button, and an HOA switch for each pump
- Magnetic contactors with Motor protector circuit breaks featuring through-the-door operators with lockable control knobs. Motor protector circuit breakers feature high inrush capability.
- Vacuum transducer for process control
- Single point power connection
- Redundant 120Vac control transformers with fused primary and secondary protection
- System overload trip, high temperature conditions or maintenance intervals for the pump will result in visual and audible alarms.

### Optional Vacuum Receiver

The internally lined ASME rated vacuum receiver shall be equipped with a sight gauge, isolation valves, and a manual drain.

## Optional VFD Control Panel

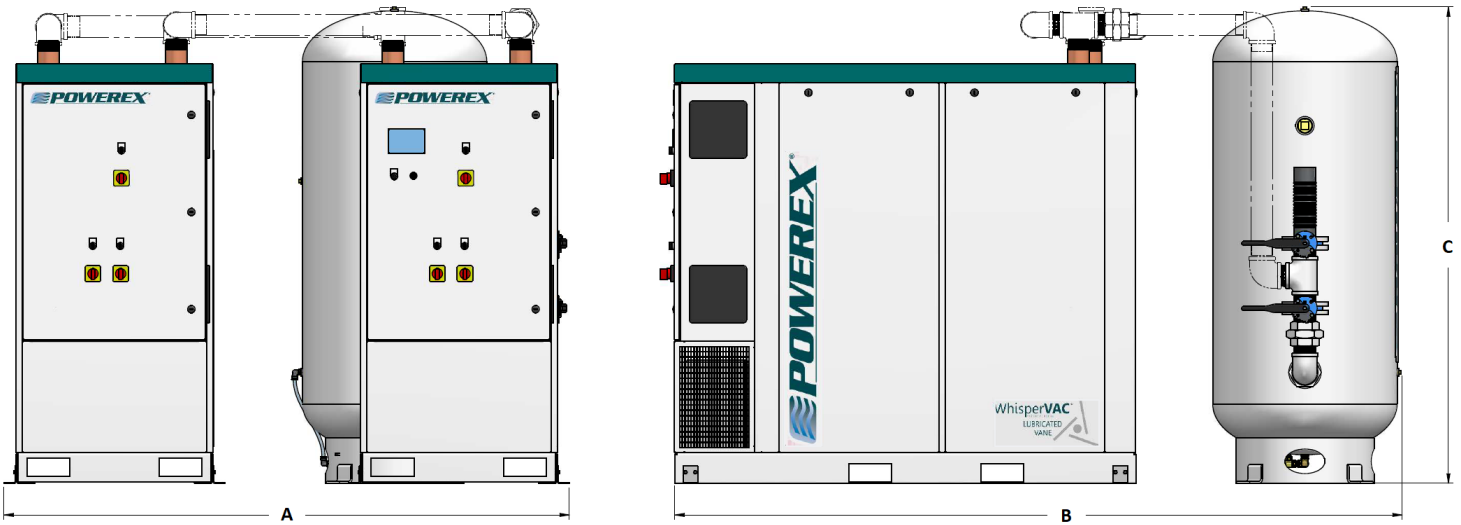
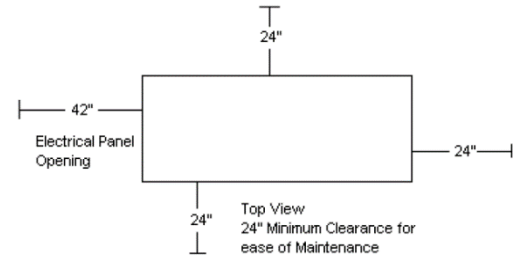
Variable Frequency Drive (VFD) control improves efficiency over a conventional “on/off” demand based system by more closely matching the pump speed to the changing load requirements. All VFD systems come standard with a Premium NFPA Control panel. The VFD and Premium NFPA Control Panel shall include a gateway server card and all features listed below:

- PLC controller and a color touch screen panel which displays the operating status of the unit
- Building automation communication gateway with BacNet® protocol and Web server features. Web server features include email notifications in case the system is in alarm or has achieved one its maintenance intervals and requires service.
- Ethernet port for connection to BacNet® server or direct connection to facility Ethernet for viewing of system operations and status via device IP-address
- UL508A listed control panel in a NEMA 12 enclosure. The panel door will include: the HMI touch screen, audible and visual alarms with an acknowledge button, VFD start/stop switch and an HOA switch for each pump
- Magnetic contactors with motor protector circuit breakers featuring through-the-door operators with lockable control knobs. Motor protector circuit breakers feature high inrush capability.
- Vacuum transducer for process control
- Single point power connection
- Redundant 120Vac control transformers with fused primary and secondary protection
- System overload trip, high temperature conditions or maintenance intervals for the pump will result in visual and audible alarms.

## Multiple Enclosures (Triplex through Quadplex)

- Each Enclosure requires its own 3 phase electrical connection.
- The controls of multiple enclosures shall be based on Primary – Subordinate logic. The Primary enclosure shall include the HMI and the Primary PLC. The Primary PLC contains all logic to run the entire system.
- The Subordinate PLC contains the minimal amount of logic to respond to Primary PLC commands and operate independently in fail-safe mode.
- The only connection between Enclosures shall be an Ethernet cable.
- If inter-Enclosure connection is broken, each Enclosure shall operate independently. The Primary Enclosure will run the same as if it were connected and the Subordinate Enclosure will operate using a backup vacuum switch. Each PLC will attempt to reconnect multiple times per second. Once connection is re-established, the entire system shall operate normally.
- All Enclosed Vacuum systems shall be easily expandable to up to 6 pumps (2 pumps per Enclosure).
- VFD – a VFD controller shall be included with each Enclosure.

Dimensions						
Model	Dim. A	Dim. B	Dim. C	Inlet	Outlet	Tank Outlet
MVEQ0505	92"	125"	78"	3"	3"	3"
MVEQ0755	92"	125"	78"	3"	3"	3"



Medical Lubricated Vane Enclosed Vacuum Systems										
Model	Total System HP	Pump HP	SCFM @ 19" Hg <sup>3</sup>	Tank Size (gal)	BTU/Hr <sup>1</sup>	dB(A) Level <sup>1</sup>	System F.L.A.			System Weight (lbs)
							208V	230V	460V	
MVEQ0505	15	5 (4)	112	200	32,514	67	64.8	56.8	28.4	3,420
MVEQ0755	22.5	7.5 (4)	147	200	48,768	75	96	84.8	42.4	4,320

**Notes:**

- 1 – BTU/HR and dB(A) Levels are shown with reserve pump(s) on standby per NFPA 99.
- 2 – Final system dimensions dependent upon installation configuration. Maintenance clearance must be maintained in installation configuration.
- 3 – 3 Year Limited Warranty