

## 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 laboratory working areas. The enclosed medical vacuum system package is compliant with the NFPA 99 requirements for Risk Category 3 laboratory systems. Each system is completely tested before shipment and includes:

- Multiple vacuum pumps and associated equipment.
- Sound reducing enclosure.
- AMSE vacuum receiver.
- NEMA 12 multiplex 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. Each pump is considered a “Plex” in the system architecture.

### Claw Vacuum Pump

Each pump shall be a rotary claw type vacuum pump, and shall be direct-driven through a shaft coupling by a C-face, TEFC electric motor.

- Each vacuum pump shall be dry-running, featuring two claw-type, non-contacting rotors and shall not require any sealing fluid in the pumping chamber, assuring virtually maintenance-free operation.
- Each vacuum pump assembly shall include an integral relief valve.
- Each pump within the system shall include a check valve, inlet and discharge flex connectors, a 5 micron inlet filter and a pump isolation valve on the intake connection.

### 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.

### 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.

### Vacuum Receiver

The system shall include an ASME rated vacuum receiver. The tank shall be internally lined for corrosion resistance and equipped with a vacuum gauge, a sight gauge, isolation valves, and a manual drain.

### 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.

### Multiple Enclosures (Triplex through Hexaplex)

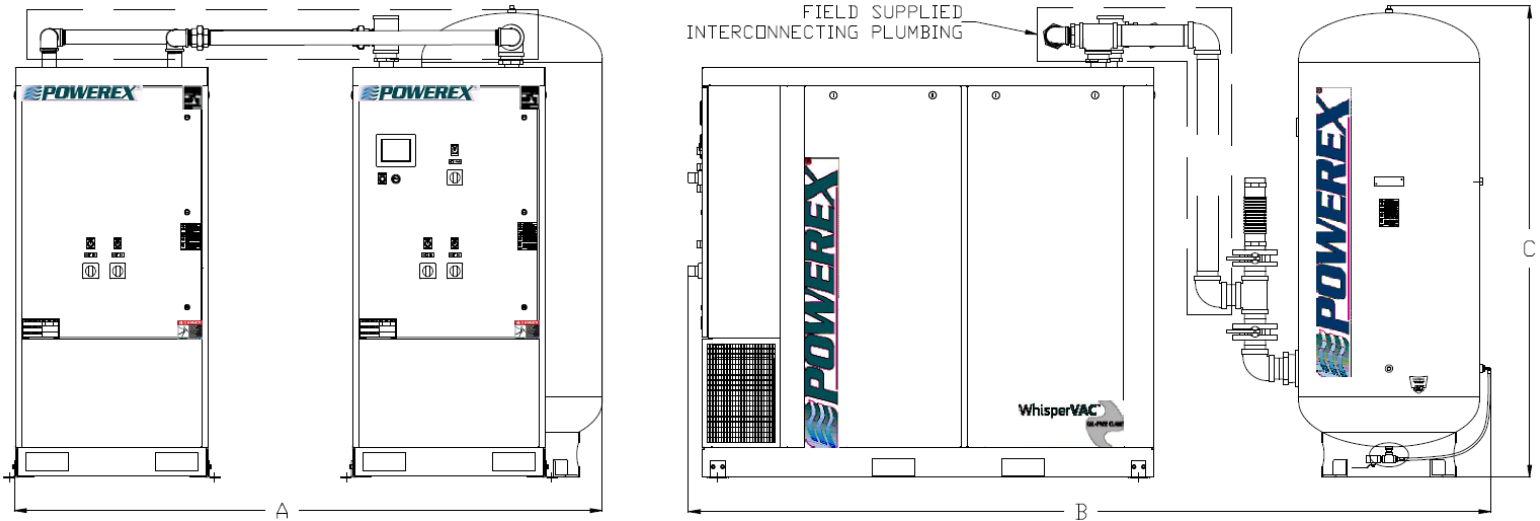
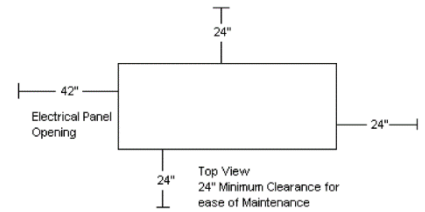
The control system provides automatic lead/lag sequencing and automatic alternation of all pumps in order to equalize the amount of usage among the available vacuum pumps. The Premium NFPA Control panel shall include a gateway server card and all features listed below:

- 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).

| Dimensions |                     |        |        |                    |                     |
|------------|---------------------|--------|--------|--------------------|---------------------|
| Model      | Dim. A <sup>1</sup> | Dim. B | Dim. C | Inlet <sup>2</sup> | Outlet <sup>2</sup> |
| LCEQ0505   | 98"                 | 133"   | 78.5"  | 3"                 | 3"                  |
| LCEQ0705   | 98"                 | 133"   | 78.5"  | 3"                 | 3"                  |
| LCEQ0755   | 98"                 | 133"   | 78.5"  | 3"                 | 3"                  |



| Laboratory Enclosed Claw Quadplex |                 |             |               |                 |        |             |                            |      |      |                           |
|-----------------------------------|-----------------|-------------|---------------|-----------------|--------|-------------|----------------------------|------|------|---------------------------|
| Model                             | Total System HP | Pump HP     | SCFM @ 19" Hg | Tank Size (gal) | BTU/Hr | dB(A) Level | System F.L.A. <sup>3</sup> |      |      | Total System Weight (lbs) |
|                                   |                 |             |               |                 |        |             | 208V                       | 230V | 460V |                           |
| LCEQ0505                          | 20              | 5           | 132           | 200             | 43,200 | 70          | 30.4                       | 28.8 | 15.4 | 4,085                     |
| LCEQ0705                          | 30              | 7.5 (small) | 211.2         | 200             | 60,800 | 70          | 42.4                       | 40.8 | 21.4 | 4,505                     |
| LCEQ0755                          | 30              | 7.5 (big)   | 271.2         | 200             | 65,200 | 70          | 42.4                       | 40.8 | 21.4 | 5,475                     |

Notes:

- 1 – Add 2" for extent of removable mounting bracket
- 2 – (m)NPT each enclosure
- 3 – System F.L.A. values shown for each enclosure unit; each enclosure gets its own individual power feed.
- 4 – 3 Year Limited Warranty