

Specification

General

The Powerex Scroll Enclosure Systems are designed to provide medical breathing air for hospital and medical institutions. This system meets NFPA 99 requirements for Risk Category 1 systems. Each system is completely tested before shipment and includes:

- Multiple oil-less scroll air compressors and associated equipment mounted inside a rigid steel sound enclosure (number of compressor modules vary depending on size of system).
- Master control panel.
- Corrosion resistant air receiver.
- Redundant medical desiccant air dryers with purge control.
- Dew point and CO monitors.

System installation requirements:

- Main power connection to master control panel.
- Interconnecting power wiring between master panel, each compressor unit, and tank/dryer skid.
- Control signal wiring between master panel and each compressor unit.
- Remote inlet air connection to each module – minimum 1.5" NPTF (except for models MSED1003 and MSED1004 which have a minimum 1" NPTF).
- Interconnecting plumbing connections between each compressor and tank/dryer skid.

The only field connections required will be system intake, exhaust, power connection at the control panel, and interconnecting piping and wiring. Vibration isolation pads are included with the system.

Oil-less Scroll Compressor Pump

Each compressor shall be belt driven oil-less rotary scroll single stage, air-cooled construction with absolutely no oil needed for operation. Direct drive compressors shall not be used.

- The rotary design shall not require any inlet or exhaust valves and shall be rated for 100% continuous duty.
- Tip seals shall be of a composite PTFE material and be rated for:
 - 10,000 hours operations for 2, 3, and 5 HP pumps
 - 8,000 hours operation for 7.5 and 10 HP standard pressure pumps
 - 4,000 hours operation for 7.5 and 10 HP high pressure pumps
- Compressor bearings shall be external to the air compression chamber and shall all be serviceable for extended compressor life. Bearing maintenance shall not be required until 10,000 run hours. Compressors with bearings that are not accessible for service have a limited life span and shall not be accepted. Compressors shall have an integral radial flow fan for cooling and shall not require any additional electric cooling fans.
- Each compressor shall have flexible connectors on intake and discharge, an electric drive motor, a discharge check valve, an air-cooled aftercooler and a high discharge temperature shut down switch.

- Each compressor module shall have an isolation valve and a moisture separator with automatic drain.

Motor

Each compressor shall be belt driven by a TEFC, NEMA construction motor. Motors are EISA compliant and premium efficient.

Motor Slide Base

Maintenance feature on all models, designed for easy adjustment of belt tension from the motor side on the basemount assembly.

- Robust single screw linear belt tension adjustment.
- Custom compact design.

Air Receiver

The system shall include an ASME air receiver rated for 200 PSI MAWP. The tank shall be equipped with:

- A pressure gauge and a safety relief valve.
- By-pass valves to allow tank isolation without system shutdown.
- An automatic electronic tank drain with manual override.

The receiver shall be internally lined with an FDA approved material for corrosion resistance.

Intake Filters

The system includes a single inlet filter per compressor stack with a pleated element and a canister. The single inlet filter serves all the compressor modules in the stack. Systems with two compressor stacks will have a second inlet filter serving the other half of the compressors in the system.

The inlet filter system shall be located on the compressor package and plumbed up-stream of the compressor pumps.

Desiccant Air Dryers

Each desiccant dryer shall be sized for the peak calculated system demand to provide a pressure dew point to meet NFPA 99 standards.

- Dryer controls shall include a re-pressurization cycle to prevent shocking of the desiccant bed prior to switching towers.
- An integral purge saving control system shall be provided and shall suspend the purge air loss during periods of low demand. When the dryer is in purge control mode, the tower switching valves shall not operate, and only one desiccant bank shall be on-line. Dryers continue to operate the switching valves in the fixed cycle.

Dewpoint Monitor

Dew point monitor equipped with an LCD dew point display and high dew point alarm with dry contacts for remote monitoring. The dew point sensor (probe) shall be installed so that the monitored airflow is downstream of the pressure regulator assembly. The sensor shall include an auto calibration feature to ensure the accuracy of the dew point measurement without the need to return the sensor to the factory for calibration.

Carbon Monoxide Monitor

Carbon monoxide (CO) monitor in an enclosure with LCD display of CO concentrations. The monitor shall continuously display the CO content of the discharge air and shall provide audible and visual high CO alarms. High alarm is set at 10 ppm per NFPA99. Dry contacts are provided for remote monitoring of the high CO alarm.

Filtration and Pressure Reducing Station

Each filter/dryer/regulator assembly shall be plumbed with bypass valves to enable service without disrupting air flow to the facility. Each assembly also includes a sample air port. The filtration systems consist of two stages of filtration.

- The first stage of filtration shall include dual pre-filters with element change indicators and automatic condensate drains, installed up-stream of the air dryers.
- The second stage shall include dual particulate filters with element change indicators installed downstream of the air dryers.
- A dual set of pressure reducing valves with pressure gauges shall be installed downstream of the final filters and shall be adjusted to an outlet pressure of 55 psig.

Compressor Cabinet Controls

The controls shall be integrated with the compressor cabinet from the factory. The controls will operate and continuously monitor the system and provide information and alarms to the user through the HMI display. Features include display of system pressure, pump run status, pump fault conditions (high temperature shutdown, motor overload fault), maintenance counters and warnings and system trends. System setup mode allows user to reset alarms and reset maintenance counters. Each compressor pump is automatically staged on or off individually based on actual system demand. Dry contacts are provided for remote monitoring of compressor fault conditions.

The Scroll Enclosure Controls come standard with a PLC that includes an Ethernet port with BACNet over IP standard for connection to the BACNet server or direct connection to facility Ethernet for viewing of system operations and status via device IP address. This PLC connects to the 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 of its maintenance intervals and requires service.

NFPA Compliant Master Controller

The system shall include a UL listed master control panel to automatically alternate the lead/lag status of each compressor cabinet and to provide the required NFPA 99 alarms. The control panel shall include a NEMA 12 enclosure with a single point electrical connection, C/B disconnect switches for each compressor cabinet and controls, duplexed 120V control transformers, PLC controlled alternation, lighted HOA switch for each compressor cabinet, and reserve compressor in use alarm. A general compressor fault alarm with audible and visual indicators is provided for indication of high temperature shutdown or motor overload fault conditions. All alarms shall have dry contacts on a labeled terminal strip for remote

monitoring. All control and alarm functions shall remain energized while any compressor in the system remains electrically on-line. The lag compressor shall be able to start automatically if the lead compressor fails to operate.

Summary of features:

- NEMA 12 enclosure.
- Power distribution block.
- C/B Disconnect switches (one for each unit).
- Duplexed control transformers with primary and secondary protection.
- PLC controlled alternation.
- Lighted (LED) HOA switches.
- Alarm horn with acknowledge pushbutton.
- Back-up transformer in use light (LED).
- Reserve unit in use light (LED) and dry contacts.
- CO and dew point monitor power and alarm connections.
- Power connection for tank drain.
- General compressor fault light (LED) to indicate high temperature/motor overload.
- General fault dry contacts for connection to master alarm.
- Terminal blocks for connection of field devices and remote alarm signals.

Air-cooled Aftercooler

Aftercoolers are provided for each compressor pump. Each unit is constructed of copper tubing with metal headers and is to be mounted integral to the compressor enclosure.

Moisture Separator

A liquid separator with automatic float condensate drain is provided to be installed at the final discharge of each air compressor cabinet and prior to the tank/dryer assembly.

Optional Free-standing Aftercooler

Aftercooler is provided for each scroll enclosure system to reduce discharge temperatures. Core consists of aluminum fins on copper tubes. The motor is dual rated to operate at both 115V/60Hz/1P (115 volt, 60 Hertz, single phase) and 230V/50Hz/1P (230 volt, 50 Hertz, single phase).