DESCRIPTION

GENERAL
Powerex Scroll Enclosure Air Compressors are designed to supply continuous oil-free air by using the most advanced scroll technology. These turn-key packages are extremely quiet and offer electronic control that will reduce electrical power consumption.

The Powerex Oil-less Rotary Scroll Air Compressor has advanced scroll compressor technology through the development of a completely oil-less unit. The Powerex Scroll Compressor offers a dynamically balanced air end which insures vibration-free operation. The rotary design permits a continuous 100% duty cycle. No oil separation, oil filtration, or inlet valves are required on the Powerex Scroll unit. The compressor is virtually maintenance free.

The Powerex Oil-less Rotary Scroll Air Compressor is based on the theory of scroll compression. A scroll is a free standing, intricate spiral bounded on one side by a solid, flat plane or base. A scroll set, the basic compression element of a scroll compressor, is made up of two identical spirals which form right and left hand parts. One of these scroll components is indexed or phased 180° with respect to the other so the scrolls can mesh. Crescent-shaped gas pockets are formed and bounded by the spirals and the base plate of both scrolls. As the moving scroll is orbited around the fixed scroll, the pockets formed by the meshed scrolls follow the spiral toward the center and diminish in size. The moving scroll is prevented from rotating during this process so the 180° phase relationship of the scrolls is maintained. The compressor’s inlet is at the outer boundary of the scrolls. The entering gas is trapped in two completely opposite gas pockets and compressed as the pockets move toward the center. The compressed gas is discharged through the outlet at the center of the fixed scroll so no valves are needed.

SPECIFICATIONS

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<th>SE Series Enclosed Scroll Air Compressor</th>
</tr>
</thead>
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<td>Performance Specifications</td>
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</tr>
<tr>
<td>Lubrication</td>
<td>Grease-filled Bearing</td>
</tr>
<tr>
<td>Operating Voltages</td>
<td>3Ø - 208-230/460/575 Volts, 60 Hz</td>
</tr>
<tr>
<td>Compression Cycle</td>
<td>Scroll</td>
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<tr>
<td>Motor Overload Protection</td>
<td>Motor Protector/Circuit Breaker</td>
</tr>
<tr>
<td>Pressure Settings</td>
<td>Cut in: 90 psig Cut out: 116 psig</td>
</tr>
<tr>
<td>(High Pressure Units)</td>
<td>Cut in: 119 psig Cut out: 145 psig</td>
</tr>
<tr>
<td>Overpressure Protection</td>
<td>Safety Valve Factory Set and Sealed</td>
</tr>
<tr>
<td>Outlet Air Connections</td>
<td>See page 2</td>
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<tr>
<td>Tank Sizes</td>
<td>See Page 6, Chart 2</td>
</tr>
<tr>
<td>Drive</td>
<td>3V Belt</td>
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<tr>
<td>Agency Approvals</td>
<td>UL/CSA Certified</td>
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<td></td>
</tr>
<tr>
<td>Operation</td>
<td>Pg 8-11</td>
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SPECIFICATION CHART

<table>
<thead>
<tr>
<th>Model</th>
<th>HP</th>
<th>Max Pressure PSIG</th>
<th>SCFM @ Max Pressure</th>
<th>Voltage</th>
<th>Noise Level dB(A)</th>
<th>Discharge Connection</th>
<th>LxWxH (inches)</th>
<th>Weight (lbs.)</th>
<th>Discharge Air Approach Temp</th>
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<tbody>
<tr>
<td>SED1007</td>
<td>10</td>
<td>116</td>
<td>30.4</td>
<td>208/230/460/575</td>
<td>53</td>
<td>1 Inch</td>
<td>38 x 26 x 61</td>
<td>825</td>
<td>67°F</td>
</tr>
<tr>
<td>SED1007HP</td>
<td>10</td>
<td>145</td>
<td>25</td>
<td>208/230/460/575</td>
<td>53</td>
<td>1 Inch</td>
<td>38 x 26 x 61</td>
<td>825</td>
<td>80°F</td>
</tr>
<tr>
<td>SET1507</td>
<td>15</td>
<td>116</td>
<td>45.6</td>
<td>208/230/460/575</td>
<td>56</td>
<td>1 Inch</td>
<td>38 x 26 x 61</td>
<td>965</td>
<td>67°F</td>
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<td>208/230/460/575</td>
<td>56</td>
<td>1 Inch</td>
<td>38 x 26 x 61</td>
<td>965</td>
<td>80°F</td>
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<td>SEQ2007</td>
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<td>208/230/460/575</td>
<td>58</td>
<td>1 Inch</td>
<td>38 x 26 x 61</td>
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<td>67°F</td>
</tr>
<tr>
<td>SEQ2007HP</td>
<td>20</td>
<td>145</td>
<td>50</td>
<td>208/230/460/575</td>
<td>58</td>
<td>1 Inch</td>
<td>38 x 26 x 61</td>
<td>1125</td>
<td>80°F</td>
</tr>
</tbody>
</table>

SAFETY GUIDELINES

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols. MAKE SURE EVERYONE OPERATING OR SERVICING THE COMPRESSOR READS AND UNDERSTANDS ALL THE INFORMATION PROVIDED.

DANGER indicates and imminently hazardous situation which, if not avoided, WILL result in death or injury.

WARNING indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

CAUTION indicates a potentially minor or moderate injury.

NOTICE indicates important information, that if not followed, may cause damage to equipment.

GENERAL SAFETY INFORMATION

Since the air compressor makes up a high pressure system, the following safety precautions must be observed at all times.

1. Read all manuals included with this product carefully. Be thoroughly familiar with the controls and the proper use of the equipment.
2. Follow all local electrical and safety codes as well as in the United States, the National Electrical Codes (NEC) and Occupational Safety and Health Act (OSHA).
3. Only persons well acquainted with these rules of safe operation should be allowed to use the compressor.
4. Keep visitors away and NEVER allow children in the work area.
5. Wear safety glasses and use hearing protection when operating the unit.
6. Do not stand on or use the unit as a handhold.
7. Before each use, inspect compressed air system and electrical components for signs of damage, deterioration, weakness or leakage. Repair or replace defective items before using.
8. Check all fasteners at frequent intervals for proper tightness.

BREATHABLE AIR WARNING

This unit is NOT equipped and should NOT be used “as is” to supply breathing quality air. For any application of air for human consumption, you must fit the air compressor with suitable in-line safety and alarm equipment. This additional equipment is necessary to properly filter and purify the air to meet minimal specifications for Grade D breathing as described in Compressed Gas Association Commodity Specification for Air, OSHA, ANSI and/or Canadian Standards Associations (CSA).

DISCLAIMER OF WARRANTIES

IN THE EVENT THE COMPRESSOR IS USED FOR THE PURPOSE OF BREATHING AIR APPLICATION AND PROPER IN-LINE SAFETY AND ALARM EQUIPMENT IS NOT SIMUTANEOUSLY USED, EXISTING WARRANTIES ARE VOID, AND POWEREX DISCLAIMS ANY LIABILITY WHATSOEVER FOR ANY LOSS, PERSONAL INJURY OR DAMAGE.
UNPACKING

After unpacking the unit, inspect carefully for any damage that may have occurred during transit. Make sure to tighten fittings, bolts, etc., before putting unit into service.

Do not operate unit if damaged during shipping, handling or use. Damage may result in bursting and cause injury or property damage.

The compressor nameplate should be checked to see if the unit is the correct model and voltage as ordered.
2. The area should be free of excessive dust, toxic or flammable gases, moisture and direct sunlight.

3. Never install the compressor where the ambient temperature is higher than 104°F or where humidity is high. High humidity will cause electrical short circuit and rusting of components.

4. Clearance must allow for safe, effective inspection and maintenance. A minimum of 24 inches of clearance for sides, 40 inch clearance from the top is required.

5. If necessary, use metal shims or leveling pads to level the compressor. Never use wood to shim the compressor.

VENTILATION
1. If the scroll compressor is located in a totally enclosed room, an exhaust fan with access to outside air must be installed. An exhaust duct may be installed to capture the warm air exiting the compressor enclosure. The opening of the exhaust duct should be about 6 inches larger on each side than the vent openings on the compressor top panel. The duct should not obstruct removal of the top panel for service. Leave between 8 and 12 inches of clearance. The cfm capacity of the cooling fan should be increased to compensate for duct flow losses.

<table>
<thead>
<tr>
<th>Model</th>
<th>Exhaust CFM Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>SED1007</td>
<td>2650 885</td>
</tr>
<tr>
<td>SET1507</td>
<td>3885 1415</td>
</tr>
<tr>
<td>SEQ2007</td>
<td>5300 1770</td>
</tr>
</tbody>
</table>

Chart 1
INSTALLATION Cont’d

WIRING

**WARNING**

All wiring and electrical connections must be performed by a qualified electrician. Installations must be in accordance with local and national codes.

**CAUTION**

Overheating, short circuiting and fire damage will result from inadequate wiring.

Wiring must be installed in accordance with National Electric Code and local codes and standards that have been set up covering electrical apparatus and wiring. Consult the codes and standards and observe local ordinances. Be certain that adequate wire sizes are used, and that:

1. Service is of adequate ampere rating.
2. The supply line has the same electrical characteristics (voltage cycles and phase) as the motor.
3. Ensure the line wire is the proper size and that no other equipment is operated from the same line. The chart gives the recommended wire sizes for horsepower of motor provided.

Recommended wire sizes may be larger than the minimum set up by local ordinances. If so, use the large size wire to prevent excessive line voltage drop.

**MINIMUM WIRE SIZE**

**USE 75°C COPPER WIRE**

<table>
<thead>
<tr>
<th>HP</th>
<th>Single Phase 230V</th>
<th>Three Phase 208/230V</th>
<th>460/575V</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>10 AWG</td>
<td>14 AWG</td>
<td>14 AWG</td>
</tr>
<tr>
<td>5</td>
<td>8 AWG</td>
<td>12 AWG</td>
<td>14 AWG</td>
</tr>
<tr>
<td>7.5</td>
<td>8 AWG</td>
<td>10 AWG</td>
<td>12 AWG</td>
</tr>
<tr>
<td>10</td>
<td>N/A</td>
<td>8 AWG</td>
<td>12 AWG</td>
</tr>
<tr>
<td>15</td>
<td>N/A</td>
<td>6 AWG</td>
<td>10 AWG</td>
</tr>
<tr>
<td>25</td>
<td>N/A</td>
<td>3 AWG</td>
<td>8 AWG</td>
</tr>
</tbody>
</table>

The additional wire cost is very small compared with the cost of repairing or replacing a motor electrically “starved” by the use of supply wires which are too small.

GROUNDING

**DANGER**

Improperly grounded electrical components are shock hazards. Make sure all the components are properly grounded to prevent death or serious injury.

This product must be grounded. Grounding reduces the risk of electrical shock by providing an escape wire for the electrical current if short circuit occurs.

10HP - 20HP Scroll Enclosure Air Compressors

All electrical hook-ups must be performed by a qualified electrician. Installations must be in accordance with local and national electrical codes.

1. A service disconnect and fuses or a circuit breaker must be installed to supply electric power to this compressor. Make sure the circuit is sized to handle the full operating load as shown in the table on the wiring diagram. Branch circuit protection must be provided as specified in National Electric Code, Chapter 2, “Wiring Design and Protection,” Article 210, using the applicable article “For Motors and Motor Controllers.” (Article 430)
2. Remove the front panel to access the wiring area.
3. Using the appropriate strain relief and cable management techniques, connect the power cable to the power junction block and the ground wire to the ground bar. Consult your NEC and local codes for wire size.

**OVERHEATING, SHORT CIRCUITING AND FIRE DAMAGE WILL RESULT FROM INADEQUATE WIRING.**

Wiring must be installed in accordance with National Electric Code and local codes and standards that have been set up covering electrical apparatus and wiring. Consult the codes and standards and observe local ordinances. Be certain that adequate wire sizes are used, and that:

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3. Ensure the line wire is the proper size and that no other equipment is operated from the same line. The chart gives the recommended wire sizes for horsepower of motor provided.

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<table>
<thead>
<tr>
<th>HP</th>
<th>Single Phase 230V</th>
<th>Three Phase 208/230V</th>
<th>460/575V</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>10 AWG</td>
<td>14 AWG</td>
<td>14 AWG</td>
</tr>
<tr>
<td>5</td>
<td>8 AWG</td>
<td>12 AWG</td>
<td>14 AWG</td>
</tr>
<tr>
<td>7.5</td>
<td>8 AWG</td>
<td>10 AWG</td>
<td>12 AWG</td>
</tr>
<tr>
<td>10</td>
<td>N/A</td>
<td>8 AWG</td>
<td>12 AWG</td>
</tr>
<tr>
<td>15</td>
<td>N/A</td>
<td>6 AWG</td>
<td>10 AWG</td>
</tr>
<tr>
<td>25</td>
<td>N/A</td>
<td>3 AWG</td>
<td>8 AWG</td>
</tr>
</tbody>
</table>

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3. Using the appropriate strain relief and cable management techniques, connect the power cable to the power junction block and the ground wire to the ground bar. Consult your NEC and local codes for wire size.

**GROUNDING**

Improperly grounded electrical components are shock hazards. Make sure all the components are properly grounded to prevent death or serious injury.

This product must be grounded. Grounding reduces the risk of electrical shock by providing an escape wire for the electrical current if short circuit occurs.

**WARNING**

Never use plastic (PVC) pipe for compressed air. Serious injury or death could result.

Any tube, pipe or hose connected to the unit must be able to withstand the temperature generated and retain the pressure. All pressurized components of the air system must have a pressure rating higher than or equal to the ASME safety valve setting. Incorrect selection and installation of any tube, pipe or hose could result in bursting and injury.

**MINIMUM PIPE SIZE FOR COMPRESSED AIR LINE**

<table>
<thead>
<tr>
<th>CFM</th>
<th>25’</th>
<th>50’</th>
<th>100’</th>
<th>250’</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1/2”</td>
<td>1/2”</td>
<td>1/2”</td>
<td>3/4”</td>
</tr>
<tr>
<td>20</td>
<td>3/4”</td>
<td>3/4”</td>
<td>3/4”</td>
<td>1”</td>
</tr>
<tr>
<td>40</td>
<td>3/4”</td>
<td>1”</td>
<td>1”</td>
<td>1”</td>
</tr>
<tr>
<td>60</td>
<td>3/4”</td>
<td>1”</td>
<td>1”</td>
<td>1”</td>
</tr>
<tr>
<td>100</td>
<td>1”</td>
<td>1”</td>
<td>1”</td>
<td>1”</td>
</tr>
</tbody>
</table>

The additional wire cost is very small compared with the cost of repairing or replacing a motor electrically “starved” by the use of supply wires which are too small.

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This product must be grounded. Grounding reduces the risk of electrical shock by providing an escape wire for the electrical current if short circuit occurs.
**INSTALLATION Cont’d**

*WARNING*

Never install a shut-off valve between a compressor pump and the tank without an appropriate safety valve. Personal injury and/or equipment damage may occur. Never use reducers in discharge piping.

When creating a permanently installed system to distribute compressed air, find the total length of the system and select pipe size from the chart. Bury underground lines below the frost line and avoid pockets where condensation can gather and freeze.

Apply air pressure to the piping installation and make sure all joints are free from leaks BEFORE underground lines are covered. Before putting the unit into service, find and repair all leaks in the piping, fittings and connections.

Select the size of the air receiver so that the combined volume of the air receiver and facility piping results in a long enough cycle time to keep any individual motor from starting more than once every 3.43 minutes. Selecting the widest possible spread between high and low system set point pressure along with the largest differential for each pump interval will reduce the starting frequency.

The table below shows the recommended tank size in gallons per model. Some conditions of air usage may require additional volume.

<table>
<thead>
<tr>
<th>Differential*</th>
<th>SED</th>
<th>SET</th>
<th>SEQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>80</td>
<td>120</td>
<td>200</td>
</tr>
<tr>
<td>Standard</td>
<td>60</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>Max</td>
<td>30</td>
<td>60</td>
<td>80</td>
</tr>
</tbody>
</table>

* Pressure setting selected on control panel

1. Make sure the piping is lined up without being strained or twisted when assembling the piping for the scroll compressor.  
2. Appropriate expansion loops or bends should be installed at the compressor to avoid stresses caused by changes in hot and cold conditions.  
3. Piping supports should be anchored separately from the compressor to reduce noise and vibration.  
4. Never use any piping smaller than the compressor connection.  
5. Use flexible hose to connect the outlet of the compressor to the piping so that the vibration of the compressor does not transfer to the piping.

**REMOTE INTAKE PIPING**

Powerex compressor systems with pipe thread connectors on the intake filters are intended for installation with remote air intake. Piping for the remote intake system should be installed at the final operating site. Under some conditions, the intake piping may facilitate the condensation of humidity in the intake air stream into liquid water.

THE INTAKE FILTERS SUPPLIED BY POWEREX WILL NOT STOP INGESTION OF LIQUID WATER BY THE PUMPS. LIQUID WATER GOING INTO THE PUMPS WILL DAMAGE THE PUMPS AND VOID THE WARRANTY.

**NOTICE**

Always install drip legs with sufficient capacity to capture liquid water in the intake piping before the air filters. Drip legs must be sized with low enough air velocity to make sure they are effective at capturing liquid water in the intake air and must be maintained (drained) at frequent intervals to make sure they remain effective.

**SAFETY VALVES**

Safety Valves must be installed on every receiver. The flow capacity of a safety valve should be equal to or greater than the capacity of the compressor.

1. The pressure setting of the safety valve must not be greater than the maximum working pressure of the air receiver.
2. Safety valves should be placed ahead of any possible blockage point in the system, i.e. shutoff valve.
3. Avoid connecting the safety valve with any tubing or piping.
4. Manually operate the safety valve every six months to avoid sticking or freezing.

**CHECK VALVES**

Do not install a check valve between the compressor and the air receiver or facility piping. If a check valve is installed, the compressor pressure sensor will see rapid pressure drops and cause short cycling of the motors and other control problems.

**ISOLATION VALVES**

An isolation valve should be installed between the compressor and an external air receiver to facilitate maintenance and control air flow out of the unit. Make sure the valve is open when operating the compressor. A second isolation valve should be installed between the air receiver and the facility piping.

**TANK MOUNTING**

Bolt an external air receiver on a flat, even, concrete floor or on a separate concrete foundation. Use vibration isolators between the tank leg and the floor. After placing unit on vibration pads, do not draw bolts tight. Allow the pads to absorb vibrations. Install a flexible hose or coupling between the tank and service piping.
INSTALLATION Cont’d

CONTROL PANEL - DISPLAY AND INPUT

The Powerex scroll enclosure air compressor has a power control switch and a touch screen or HMI panel on the front to allow operation and monitoring of the unit. See Controls section for details on operating the unit using the touch screen.

The PUMP INFO screen is shown below. Press the “JOG” button to jog pumps.

Use the < arrow button to go back and select the next pump.

If the SYSTEM STATUS screen is not visible, go back to the MAIN screen and select SYSTEM STATUS. (see below)

The switch below the screen controls power to the motor starters. When the system is energized the HMI screen will be lit and active, but the motors will not run until the ON button is pushed. When ON is pushed, the center section of the switch will illuminate, enabling PLC control of the system, and will remain lit until the OFF button is pushed. The OFF button on the switch may be used to stop the compressors at any time. The switch does not turn off power to the panel so be sure to lock out the power source before opening the panel for service.

NOTE: The “Jog” function on the HMI screen overrides the ON switch. The motors will operate if the Jog button is continually depressed. To reach "JOG" press the SYSTEM STATUS button, then press PUMP INFO for the pump module you want to jog.
OPERATION

BEFORE START UP

1. Make sure all safety warnings, labels and instructions have been read and understood before continuing.
2. Remove any shipping materials, brackets, etc.
3. Confirm that the electric power source and ground have been firmly connected.
4. Check the belts for tightness.
5. Be sure all pressure connections are tight.
6. Check to be certain all safety relief valves etc., are the proper size.
7. Securely mount all panels and guards.
8. Check that all fuses, circuit breakers etc., are the proper size.
9. Make sure the inlet filter is properly installed.
10. Secure the area in front of the compressor to prevent unauthorized access during this check. Remove the front access panel so that the motor pulley on each set is visible.

INITIAL START UP AND SETUP OF THE CONTROL

The control is programmed at the factory and default settings are installed. To access certain control functions you will need to enter a seven digit authorization code. You may select your own code. We recommend using the last seven digits of the unit serial number.

To enter the code, from the SYSTEM STATUS screen touch SELECT SETPOINT.

Go to PG 2 of the SELECT SETPOINT screen.

The second page of the SETUP screen will appear.

Touch the rectangle to enter the Authorization Code and enter seven digits using the keypad that appears. Powerex suggests using the last seven digits of the serial number.

START-UP AND OPERATION

1. Follow all the procedures under “Before start-up” before attempting operation of the compressor.
2. Switch on the electric source.
3. Verify the display screen is lit.
4. If an isolation valve is installed between the compressor unit and the air receiver, make sure it is open. Close the isolation valve between the air receiver and the facility piping.
5. Pushing the ON button below the touch screen will allow unit to start and operate automatically. Pushing the OFF button will stop the motors, but the HMI screen will remain active.
6. If the pressure does not rise, turn the unit off, the unit is running backwards. Have a qualified electrician switch the breaker OFF and exchange two out of the three phases of electrical source. If pressure is rising, allow the compressor unit to run. Each compressor motor will automatically turn off as the pressure rises and the maximum operating pressure is reached. Pressure settings may be adjusted as described below.
7. Open the isolation valve between the air receiver and the facility piping. The compressor will start and stop each pump as needed to maintain the pressure between the high and low set points.
8. After a few hours and again after a few days, check the display screen to see if the ALARM screen has appeared. If a HIGH TEMPERATURE or MOTOR OVERLOAD condition occurs, the alarm screen will appear and the affected pump-motor will be taken out of service. If the chosen settings are causing the motors to start too frequently, the ALARM screen will appear and the MOTOR WARNING indicator will illuminate. Motor warning will not take the motor out of service, but the user should take action to prevent motor overload and damage. To reduce motor starting frequency, adjust the set points to a wider range between High and Low and possibly increase the differential. If starting is still too frequent, a larger or additional air receiver will be needed.
OPERATION Cont’d

MULTI-STAGE CONTROL
As this compressor uses plural air ends, it employs multi-stage control. It can start and stop each air end according to pressure and air consumption, automatically select the number of air ends in accordance with air consumption and achieve optimum and uniform operation at all times as well as energy-saving and labor-saving operation.

1. Multi-stage control - Among air ends which are operating under group control, it stops the air end which has been operating for a longer time and restarts the air end whose operating time has been shorter, thus resulting in equalization of operating time of each air end and operation with a min.

STOPPING THE COMPRESSOR DURING EMERGENCY OPERATION
Stop the compressor by pushing the OFF button or by turning the power off at the main disconnect panel.

SHUT-DOWN
1. Stop the compressor by pushing the OFF button.
NOTE: If the compressor rotates in reverse for more than five seconds, the check valve needs to be cleaned or replaced. 2. Switch the breaker OFF if the compressor is not to be used for a long period of time.

The chart below shows the relationship between pressure and the quantity of air ends operating for an SEQ model. The same concept is applied to 3 air ends for an SET and 2 for an SED. 2. Automatic Alteration: When air demand allows one or more air ends to remain idle, the control will automatically shift operation to equalize usage after 10 minutes. If air demand increases and pressure drops, the control will energize additional air ends as needed, starting the one with the longest off time first. The control will also de-energize air ends as pressure rises.
3. The control allows the user to adjust the pressure settings. To minimize power consumption, the user should select the lowest maximum pressure that is suitable for the operations being performed. The smallest gap between minimum and maximum pressure that avoids too frequent motor starting should also be selected.

4. The control will automatically prevent multiple motors from starting simultaneously by inserting a three second delay.

The sequence is an example of operation of SEQ2007.
SET1507 operate 3 air ends, SED1007 operate 2 air ends.
OPERATION Cont’d

OPERATING PANEL & SETTINGS

The Scroll Enclosure Air Compressor is controlled by a PLC programmed at the Powerex factory. The operating status is displayed on the HMI—touch screen panel on the front of the compressor unit. The touch screen allows the user to select operating parameters within predetermined limits set at the factory. The touch screen also allows the user to change the display to get more information about the operation of the individual compressor modules and to take action based on alarms and warnings. This enclosed scroll system utilizes a PLC for alternation and will change the pump sequence (Lead, Lag1, Lag2 etc) after every start or after 10-minutes, which ever happens first. The HMI offers a MIN and MAX system setpoint and three calculated pressure differential settings. (Standard, Min and Max)

The factory default settings for HIGH and LOW Operating Pressures are:

<table>
<thead>
<tr>
<th>Models</th>
<th>Pressure Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Models</td>
<td>90-116 PSIG</td>
</tr>
<tr>
<td>High Pressure Models</td>
<td>119-145 PSIG</td>
</tr>
</tbody>
</table>

Differential setting default is STANDARD

Limits to difference between HIGH and LOW setpoints:

<table>
<thead>
<tr>
<th>Differential Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Differential</td>
<td>50 PSIG</td>
</tr>
<tr>
<td>Minimum Differential</td>
<td>16 PSIG</td>
</tr>
</tbody>
</table>

The control automatically divides the range between HIGH and LOW Operating Pressure into equal operating intervals. The differential for the operating intervals may be adjusted by selecting STANDARD, MIN or MAX on the set up screen.

In STANDARD, the differential will be automatically set to have a slight overlap between the individual pump intervals. Each interval will be 135% of the possible minimum value.

In MIN, the differential will be automatically set to divide the available range into equal intervals with no overlap. The selection will result in the most frequent starting of the electric motors for a given Operating Pressure range.

NOTE: more frequent motor starting can lead to reduced motor life. Exceeding 17.5 starts per hour will cause a warning display.

In MAX, the differential will be automatically set to increase the overlap as compared to the Standard setting. Each interval will be 235% of the possible minimum interval. Select this mode to minimize the frequency of motor starts. Motor start frequency can be reduced by using larger air receiver tanks, selecting a wider range between HIGH and LOW Operating Pressure and by selecting the widest differential.

To minimize power consumption, select the lowest possible HIGH operating pressure and the smallest differential that avoids exceeding the motor start frequency limit.

PERFORMING PRESSURE ADJUSTMENTS

The above display is the SYSTEM STATUS screen. (For SED and SET models, only two and three sets of buttons/indicators will be shown).

To adjust pressure settings, touch the SELECT SETPOINT button. The screen will change to this display:

Touch the screen at either the HIGH SET or LOW SET button/indicator. A key pad display will be shown. Enter the desired pressure setting using the key pad and touch ENT.

CLR is clear, use it to backspace one digit.
CAN or Cancel, voids the whole input, use it to start over.

Pressure settings must be entered as whole numbers, no decimal or factions. The individual intervals will be calculated and shown in the display boxes on the right side of the setting screen. If number are entered that are out of the allowed range, the input will be scaled back to the range limit.
OPERATION Cont’d

ALARM SIGNALS

The PLC control for the scroll enclosure compressor will display the ALARM screen and activate the GENERAL FAULT indicator on the alarm screen display if either of the two conditions occurs:

1. High temperature at the sensor located at the after cooler inlet. Each compressor module has its own sensor. A high temperature condition will result in the power to that motor being shut off. The GENERAL FAULT alarm display will stay on until the circuit will stay off even after the sensor cools, and can only be restored when the alarm is cleared by a user. If a high temperature condition occurs, the reason should be determined and corrected before restarting the circuit as un-repairable damage to the scroll pump may result from operation with repeated high temperature alarms.

2. Motor Overload, if the current to the motor exceeds the setting of the adjustable motor protector, the contactor associated with that motor is de-energized, and that motor will not run. The alarm display and condition is maintained until the alarm is cleared and the motor protector reset. The circuit will be restarted as needed. If a motor overload occurs, the root cause should be determined and corrected or motor damage may result.

The user can activate the acknowledge function (button labeled ACKN) to allow the display to go back to SYSTEM STATUS or any other screen. Touch the VIEW button to advance to a screen showing which pump-motor assembly is in fault and for what reason. The fault will display and the affected pump-motor will be disabled until the RESET button is pushed.

The PUMP MAINT indicator will activate when the running hours of any pump accumulates to a required maintenance interval. Use ACKN to allow the STATUS screen or other screens to be displayed. Touch the VIEW button to advance to the next screen. Consult the maintenance schedule and scroll air compressor manual for details of what maintenance needs to be performed. To reset the PUMP MAINT indicator for an individual pump, open the PUMP INFO screen for that pump, hit the TO RESET button, and use the keypad display to enter the authorization code when prompted.

Motor Warning: The control also tracks how many times per hour an individual motor is called on to start. If the starts per hour exceed 17.5, there is an increased risk of motor damage. The warning is displayed, but the system is not shut down. The user can select a wider operating pressure differential to reduce the starts per hour or install a larger air receiver. The ACKN button, which will have to be pressed for each motor in alert, allows the display to be shifted back to SYSTEM STATUS or any other screen before the warning automatically resets itself at the end of the hour. The RESET button will not clear the warning.

ALARM LOG

A record of all alarm or warning events is kept in the alarm log. Reset status is tracked as well. The alarm log is maintained as long as the unit is powered and for up to three days after power is removed from the control.

The following additional information is available by selecting the SYSTEM TRENDS from the MAIN screen:

The control tracks the amount of time the pumps are in use and compares that to the available time. The ratio is displayed. The LOAD FACTOR is displayed for the most recent 24 hour period.

AUTOMATIC RESTART

When power is applied to the Powerex scroll enclosure compressor control, the display will illuminate and go to the SYSTEM STATUS screen. Settings will be retained from the last time the system had power. The motors will not energize until the ON button is pushed on the control switch below the display. (Only the JOG function will override the ON button). In the event of a loss of power, the user must push the ON button to restore the compressors to operation. If automatic restart is desired, go to the SYSTEM SETUP screen PG2 and select ENABLE AUTO RESTART. To disable, use the other button.
MAINTENANCE
ADJUSTING BELT TENSION

Moving Parts! Lock out power before servicing unit!

After the first 200 to 500 running hours or at any time chirping is heard on start up, check the belt tension. If tension is below 25 pounds on any belt, increase the center distance using the motor slide base so that belt tension is 45 to 50 pounds. The motor slide base details are shown below. If installing new belts see the procedure below:

NEW BELT INSTALLATION PROCEDURE
1. Loosen the two slide bolts near the motor pulley and the two slide bolts on the front edge of the base. Keep enough torque on them to take up any slack between the slider and the main base, but enough slack to allow the slider to move.
2. Tighten the belt adjustment bolt using a torque wrench to 45 inch pounds. This will bring the belts to the proper tension.
3. Tighten the slider bolts, the two on the front edge of the base, then the two slider bolts closest to the motor pulley so the belt tension is 45 to 50 pounds.
## BRANCH CIRCUIT PROTECTION TABLE

<table>
<thead>
<tr>
<th>System Type</th>
<th>Motor Size (HP) Each</th>
<th>Power (V/PH)</th>
<th>Motor Load Each (FLA)</th>
<th>Panel Load Total (FLA)</th>
<th>(B) Branch Circuit Protection (provided by installer)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Non-time Delay Fuse</td>
</tr>
<tr>
<td>10HP System</td>
<td>5 (x2)</td>
<td>208V/3</td>
<td>14.2</td>
<td>31</td>
<td>60A</td>
</tr>
<tr>
<td></td>
<td>5 (x2)</td>
<td>230V/3</td>
<td>12.8</td>
<td>29</td>
<td>60A</td>
</tr>
<tr>
<td></td>
<td>5 (x2)</td>
<td>460V/3</td>
<td>6.4</td>
<td>15</td>
<td>30A</td>
</tr>
<tr>
<td></td>
<td>5 (x2)</td>
<td>575V/3</td>
<td>5.1</td>
<td>13</td>
<td>25A</td>
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<tr>
<td>15HP System</td>
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<td>14.2</td>
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<td>75A</td>
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<tr>
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<td>5 (x3)</td>
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<td>12.8</td>
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<td>70A</td>
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<tr>
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<td>6.4</td>
<td>21</td>
<td>35A</td>
</tr>
<tr>
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<td>5 (x3)</td>
<td>575V/3</td>
<td>5.1</td>
<td>18</td>
<td>30A</td>
</tr>
<tr>
<td>20HP System</td>
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<td>14.2</td>
<td>60</td>
<td>90A</td>
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<td>5 (x4)</td>
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<td>12.8</td>
<td>54</td>
<td>80A</td>
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<tr>
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<td>5 (x4)</td>
<td>460V/3</td>
<td>6.4</td>
<td>28</td>
<td>45A</td>
</tr>
<tr>
<td></td>
<td>5 (x4)</td>
<td>575V/3</td>
<td>5.1</td>
<td>23</td>
<td>35A</td>
</tr>
</tbody>
</table>