Scroll Enclosure Air Compressors

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

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 Oilless Rotary Scroll Air Compressor has advanced scroll compressor technology through the development of a completely oilless 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.

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.

⚠DANGER ***Danger indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.***

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

⚠CAUTION ***Caution indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.***

NOTICE ***Notice indicates important information, that if not followed, MAY cause damage to equipment.***

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.

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

PRECAUTIONS DURING TRANSPORTATION AND MOVEMENT

TRANSPORTATION BY FORKLIFT

Use openings for forklift under both sides of the unit.

⚠CAUTION ***Avoid damaging the panel with tips of the forklift.***

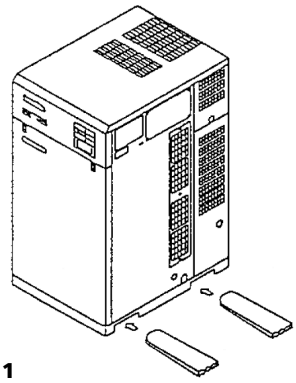


Figure 1

TRANSPORTATION BY CRANE

Use openings at the bottom of the unit and lift up by wire, etc.

⚠CAUTION ***Be sure to use pads in order to protect panels.***

⚠DANGER

Breathable Air Warning

This compressor/pump 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/pump 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 G 7.1 - 1966, OSHA 29 CFR 1910. 134, 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 SIMULTANEOUSLY USED, EXISTING WARRANTIES ARE VOIDED, AND POWEREX DISCLAIMS ANY LIABILITY WHATSOEVER FOR ANY LOSS, PERSONAL INJURY OR DAMAGE.

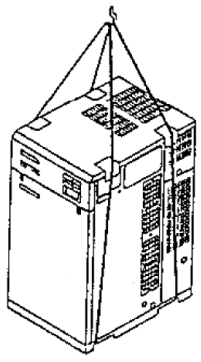


Figure 2

Description (Cont)

The compressor nameplate should be checked to see if the unit is the correct model and voltage as ordered.

⚠CAUTION ***On 10 HP unit (SED1007) remove the shipping bracket located inside of the front panel.***

General Safety Information

The **operator** of this compressor **must** take the necessary precautions to prevent the level of danger indicated by these symbols. The operator is also required to read and understand this instruction manual and all safety warnings, labels, etc.

Any **employer** allowing the use of this compressor in their field of work **must** distribute this instruction manual to all users. The employer must also ensure all users read, understand and follow the instructions as described in the manual, safety warnings, labels, etc.

1. Read and understand all safety warnings and instructions before operating this compressor. Failure to read and follow all safety warnings may result in serious personal injury or death. Property damage and/or compressor damage may also occur if all warnings are not followed.
2. Air used for breathing or food processing must meet O.S.H.A. 29 C.F.R. 1910.134 or C.F.R. 178.3570 regulations.

⚠WARNING

Motors, electrical equipment and controls can cause electrical arcs that will ignite a flammable gas or vapor. Never operate or repair in or near a flammable gas or vapor. Never store flammable liquids or gases in the vicinity of the compressor.

3. Safety Valves or Relief Valves used on this compressor must be in accordance with ANSI/ASME B19 safety standards. Improperly sized Safety Valves will result in serious personal injury or death.

⚠WARNING

Do not remove the panel or try to service the air compressor while the compressor is running or while the air receiver is under pressure. Serious personal injury or death will occur.

4. Never use rubber hoses, plastic piping or soldered joints in any part of the compressed air or gas system. The compressor and system piping must be compatible.
5. The compressor will shutoff when the pressure reaches a predetermined maximum pressure. Care should be used since the compressor may suddenly restart automatically when the pressure drops to the predetermined minimum pressure. Never assume the compressor is ready for service just because the unit is stopped.
6. All pressure must be drained from the compressor and the electrical source must be turned off before attempting to inspect or repair the unit.
7. Keep clear of all moving parts especially if the compressor is operating with the door panel removed for inspection or repair.

⚠CAUTION

Do not touch HOT parts of the compressor such as the air end, discharge pipe, aftercooler, motor, etc.

8. Keep flammable gases away from the compressor. Parts of the compressor become very hot during operation and the vapors from flammable gases may cause the unit to explode.
9. Never use flammable or toxic solvents to clean the compressor or any of the unit's parts.
10. Do not remove or tamper with any safety devices, guards, panels or insulation parts while compressor is in operation. All guards or panels must be in place before starting or operating the compressor.

⚠WARNING

Install a properly sized Safety Relief Valve in the discharge piping ahead of or before a shut-off valve, heat exchanger, orifice, etc. The compressor or part of the system could rupture or explode if a Safety Relief Valve is not installed.

11. Do not change the pressure setting of the Safety Relief Valve. Do not replace the Safety Relief Valve with a plug or restrict the Safety Relief Valve. The system or the compressor may be over-pressurized if the Safety Relief Valve is tampered with in any way.
12. Do not service the compressor or any compressor part while the unit is in operation.
13. Do not remove, disconnect or tamper with the High Temperature Shutdown Switch. The High Temperature Shutdown Switch must be installed on the compressor to protect against high temperatures damaging the compressor.
14. All electrical connections should be made by a qualified electrician.

⚠WARNING

Disconnect all power supplies to the compressor before opening the electrical box or before servicing the unit. High voltage may be present.

15. Never remove or alter any safety warning labels, tags, etc. located on or provided with compressor.
16. Always provide a clean air source for your compressor. Keep all piping direct and short when using an outside air source.
17. Locate compressor inlet system away from possible ingestion of flammable or toxic vapors, water, dirty air or air temperatures exceeding 104°F.
18. Never set the pressure to a higher setting than the one provided from the factory.
19. Check all gauges daily to be sure the compressor is operating correctly.

General Safety Information (Cont)

20 Follow all directions for maintenance. Check all safety devices according to instructions.
21. Never attempt to lift or move the compressor except when using the proper lifting procedures.
22. Make sure all electrical components follow the National Electric code and all state and local codes when installing the compressor.
23 Do not operate the compressor if unusual noise or vibration occurs.
24. Keep all panels in place at all times.
25. Standard motors are not appropriate for dirty, wet or explosive areas.
26. All service should be performed by trained and qualified people only.
27. The Drive Belt tension should be checked often during initial operation of the compressor.
28. Never substitute oil bath or oil wetted filters for the inlet filters provided with the compressor.

Component Description

COMPRESSION CYCLE
The Powerex Oilless 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.

MAGNETIC STARTER
The magnetic starter on model SED1007 is located on the right hand side of the cabinet. For models SET1507 and SEQ2007, the magnetic starter is located inside the electrical box accessible from the front panel.

MOTOR OVERLOAD PROTECTION #
The motor overload protection on the scroll compressor is controlled by an overload relay which is located beneath the magnetic starter. Please refer to the electrical drawings for specifications.

CURRENT SENSOR *
Model SED1007 utilizes current sensors to prevent motor overload. This device is located next to the magnetic starter.

CONTROL TRANSFORMER
The control transformer on the scroll compressor reduces line voltage to 200 volts for operation of the hourmeter, ventilation fan, circuit board and pressure sensor.

THREE PHASE MOTOR
Powerex three phase motors are TEFC, NEMA frame motors suitable for 208V, 230V and 460V operation.

TIP SEAL
The tip seal on the scroll compressor is self-lubricated and allows the unit to operate efficiently without oil and expensive filtration. The tip seal should be replaced every 10,000 hours of operation.

BEARINGS
The bearings on the scroll compressor are regreaseable to allow extended compressor life. Service should be performed every 10,000 hours of operation.

AIR COOLED AFTERCOOLER
The air cooled aftercooler on the scroll compressor is a series of deep alloy cooling fins and a high output cooling fan. These cooling features allow the scroll compressor to provide a maximum discharge air temperature of 60°F above the ambient temperature.

DRY TYPE INLET FILTER
The inlet filter on the scroll compressor assures 99% of particulate free air is admitted to the unit. Change every 2,500 hours or more often in dirty locations. These filters can be accessed from the front panel.

COOLING AIR CLEANABLE FILTER SCREEN
The cooling air cleanable filter screen on the scroll compressor is located on the right hand panel (*) or the rear (#) of the unit and should be cleaned periodically.

DIGITAL HOURMETER
The hourmeter on the scroll compressor indicates the actual number of total run hours of all air ends that have been in operation. The hourmeter is also used to determine maintenance and service timing. The hourmeter is activated when one or more air ends is/are running.

HIGH TEMPERATURE SHUTDOWN SWITCH
The high temperature shutdown switch on the scroll compressor protects the unit when an unusually high temperature in the air end is detected. The compressor will shutdown when this high temperature is detected.

* - Only available on 10 HP units (SED1007)
\# - Only available on 15 & 20 HP units (SET1507, SEQ2007)

Installation

INSTALLATION SITE

1. The scroll compressor must be located in a clean, well lit and well ventilated area. Contaminated area can clog intake filter and/or intake metal mesh.
2. The area should be free of excessive dust, toxic or flammable gases and moisture.
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. 24" of clearance for sides, 40" clearance from the top is recommended.
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.
2. Never restrict the cooling fan exhaust air.
3. Vent the exhaust air outside to prevent the compressor from operating at high temperatures and shutting down.
4. Never locate the compressor where hot exhaust air from other heat generating units may be pulled into the unit.

SUGGESTED VENTILATION SYSTEM

1) The following ventilation capacity is designed to keep the temperature rise inside the room to be max. 10°F. Since the calculation is based on zero static pressure, the actual ventilation capacity should be larger than the figure in Chart 1.
2) Install the exhaust duct in order to minimize the pressure lost of the ducting. Keep the distance between the inlet duct and the compressor exhaust to be at least 12 inches for ease of maintenance. Intake section of the duct should be larger than the dimension of compressor exhaust shown below:

Model	10 HP	15 HP	20 HP
Ventilation Capacity (cfm)	2825	3885	5300

Exhaust Dimension for all Models 13" x 5.6"

Chart 1

WIRING

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

1. Use solderless terminals to connect the electric power source.
2. For 15 - 20 HP remove front panel. For 10 HP see upper right side of enclosure, remove rectangle panel.
3. For 15 - 20 HP remove the rectangle electrical box cover located beneath air inlet filter on the right front of the unit.
4. Connect the power inlet cable to the inlet power junction block located on the inlet side of all starter connections.

Consult your NEC and local codes for wire size

PIPING

These units do not include air receivers. Air receiver can be purchased separately. Please consult our distributors. Use Chart 2 as a guideline for sizing the air receiver.

HP	Air Receiver Min. Capacities
10	20 gallons
15	30 gallons
20	40 gallons

Chart 2

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.

SAFETY VALVES

Tank mounted compressors are shipped from the factory with safety valves installed in the air receiver manifold. The flow capacity of the safety valve is equal to or greater than the capacity of the compressor.

1. The pressure setting of the safety valve must be at least 10 psi less 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.

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 correctly installed.
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. Confirm that the drain valve is closed.

Operation (Cont)

11. Visually check the rotation of the compressor pump. The rotation should be counterclockwise if viewing the compressor from the pulley or belt side of the motor or the air end. If the rotation is incorrect, have a qualified electrician correct the motor wiring.

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 breaker.
3. Make sure electric source lamp lights up and that the caution code or alarm code does not show up on the display on the PLC.

Note: The alarm lamp light will come on if a temperature sensor is not connected. If the sensor is not connected, have a qualified service person reconnect the sensor.

4. Open the discharge valve completely.
5. Push ON button and check that the compressor operates without excessive vibration, unusual noises or leaks.
6. Close the discharge valve completely.
7. **If the pressure does not rise on a three phase unit, turn the unit off. Have a qualified electrician switch the breaker OFF and exchange the L_1 and L_2 connections (two out of three phases of electric source) inside the magnetic switch.**
8. Check the discharge pressure. Also make sure the air pressure rises to the designated pressure setting by checking the discharge pressure gauge.

Control Logic: Since these compressors are designed using multiple air-ends, they are using multiplex controller. The controller will start and stop each air-end according to the pressure and air consumption.

10HP CONTROLLER (SED1007)

1) 10HP unit consists of two air ends. One is the lead air end, and the other is the lag air end. These two units will alternate every 30 running minutes (this default value can be changed, see instruction on "Set Mode".
2) After the ON button is activated, both air end will start and pressure gauge on the control panel rises.
3) When the pressure reaches 107.6 psig the lag air end will stop. When the pressure rises reaches 113.1 psig the lead air end will also stop.
4) As the discharge pressure drops down to 100.3 psig the lead air end will start again. The lag air end will start when the pressure drops down to 93.0 psig.
5) The status of each air end can be monitored from the control panel.

15 AND 20HP CONTROLLER (SET1507, SEQ2007)

1) Alternating Control:
The controller will equalize the operating hours on each air-end. It will alternate between the air end with the most running time and the air end with the lowest running time.
2) Prevention of long term operation:
When an air-end has been operating longer than the set-time, the controller will alternate to the air-end with the lowest running time. This will prevent one air end from running continuously for too long and will equalize the running time between the available air ends.

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.

STOPPING THE COMPRESSOR DURING NORMAL OPERATION

1. Close the discharge valve.
2. Allow the air pressure to build and the compressor to stop.
3. Turn the compressor off by pushing the OFF button.

STOPPING THE COMPRESSOR DURING EMERGENCY OPERATION

1. Stop the compressor by pushing the OFF button or by turning the power off at the main disconnect panel.

Operating Panel

Explanation of operating panel:

Bottom Unit Light*: Lights up when it displays information on bottom air end.

Top Unit Light*: Lights up when it displays information on top air end.

Comp. Operating Lamp: Lights up when ON switch is pushed.

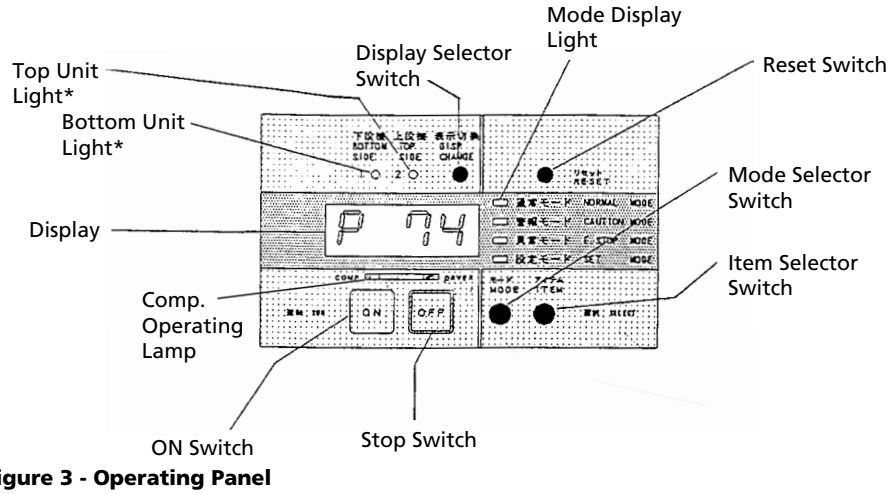


Figure 3 - Operating Panel

* - Only available on 10 HP units (SED1007)

\# - Only available on 15 & 20 HP units (SET1507, SEQ2007)

Operating Panel (Continued)

Display Selector Switch: Selects display of top or bottom air end.

Items Selector Switch: Selects the information to be displayed.

Mode Display Light: Indicates selected display mode.

Mode Selector Switch: Selects the mode to be displayed.

ON Switch: Starts the unit.

Reset Switch: Performs various resettings.

Stop Switch: Stops the unit.

DISPLAY MODE

There are four modes of display: Normal, Caution, Emergency Stop and Setup.

1. NORMAL MODE (Default Mode) - To toggle between display, push item selector switch. You can obtain operating information (pressure, current, temperature, hours, operating conditions) which are useful for daily maintenance and inspection. It functions whether compressor operates or stops. (See Chart 3).
2. CAUTION MODE - In order to select Caution Mode, push Mode Selector Switch so that Caution Mode light is illuminated. By Item Selector Switch, you can determine causes and conditions when problems occur as indicated in Chart 4. It functions only when compressor stops.

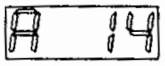
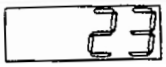
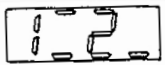
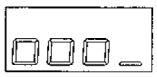
Item	Display	Contents
Pressure		Shows outlet pressure of compressor in psig. (Display on the left means 78 psig.)
Current*		Shows current in ampere. (This display means 14A.) Display selector switch selects display of top or bottom air end.
Temperature*		Shows temperature of air end in °C, (This display means 58°C.) Display selector switch selects display of top or bottom air end.
Operating Time		Shows operating time in x 10 hours. (This display means 230 hours.)
Operating Conditions*		Shows operating condition of top and bottom air ends and their relationship. Means Lead Air End — 2nd Set (Top) 1st Set (Bottom) O Means In Operation — Means That It Stops
Operating Conditions#		Displays the present operating conditions of air end No. 1 through No. 4. From left to right, they indicate air end No. 1 • 2 • 3 • 4. Means emergency when "hyphen" lights up ○ means in operation Compressor stops when "underline" lights up. In the above example, air end No. 1 and No. 3 are in operation, air end No. 2 is in emergency stop and air end No. 4 is not operating. Since SET1507 has not air end No. 4 the far right display will always be underlined.

Chart 3 - Display Selection

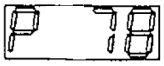
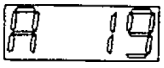
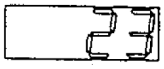
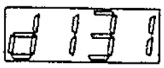
Item	Display	Contents
Caution Code	 *  #	Shows the Caution Code. (Refer to Chart 5 regarding details.)
Pressure		Shows Pressure in psig when caution displays. (Display means 78 psig.)
Current*		Shows Current in ampere when caution displays. (This display means 19A.)
Temperature		Shows Temperature of air end in °C when caution displays. (This display means 58°C.) When air end temperature is less than 15°C or other failure like cut of temperature sensor occurs,  displays.
Operating Time		Shows Operating Time in x 10 hours when caution displays. (This display means 230 hours.)
Operating Mode		Shows Operating Mode in number when caution occurs. (Refer to Chart 9 for Operating Mode.)

Chart 4 - Caution Mode

* - Only available on 10 HP units (SED1007)

\# - Only available on 15 & 20 HP units (SET1507, SEQ2007)

Operating Panel (Continued)

3. EMERGENCY STOP MODE - In order to select Emergency Stop Mode, push Mode Selector Switch so that Emergency Stop Mode light is illuminated. By Item Selector Switch, you can determine causes and conditions when problems occur, as indicated in Chart 6. It functions only when compressor stops.

Caution Code	Description
CA 21	High temperature of air end
CA 22	Failure of temperature sensor
CA 31	High current
CA 91	Maintenance time 1: Intermediate inspection and maintenance. Refer to page 9.
CA 92*	Maintenance time 2: Intermediate inspection and maintenance. Refer to page 9.

Chart 5 - Caution Code

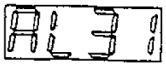
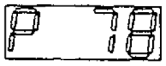
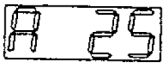
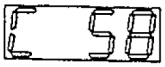
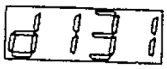
Item	Display		Contents
Emergency Code Number		*	Shows causes for emergency code numbers. (Refer to Chart 7 regarding details.)
		#	
Pressure			Shows Pressure in psig when emergency stops occur. (Display means 78 psig.)
Current*			Shows Current in ampere when emergency stop displays. (This display means 25A.)
Temperature			Shows Temperature of air end in °C when emergency stop occurs. (This display means 58°C.) When air end temperature is less than 15°C or other failure like cut of temperature sensor occurs, displays.
Operating Time			Shows Operating Time in x 10 hours when emergency stop occurs. (This display means 230 hours.)
Operating Mode			Shows Operating Mode in number when emergency stop occurs. (Refer to Chart 9 for Operating Mode.)

Chart 6 - Emergency Stop Display Mode

Emergency Code No.	Description
AL 21	Sudden temperature rise of air end
AL 22	High temperature of air end
AL 31*	Sudden rise of current
AL 32	High current
AL 33*	Low current
AL 91	Maintenance time 1: Intermediate inspection and maintenance. Refer to page 9.
AL 92*	Maintenance time 2: Intermediate inspection and maintenance. Refer to page 9.

Chart 7 - Emergency Code Number

* - Only available on 10 HP units (SED1007)

\# - Only available on 15 & 20 HP units (SET1507, SEQ2007)

Operating Panel (Continued)

4. SET MODE - Push Mode Selector Switch so that Set Mode light is illuminated. Item Selector Switch can show each of the set contents as shown in Chart 8. It functions only when compressor stops.

CHANGING MINIMUM AND MAXIMUM PRESSURE SETTING

See Figure 4.

1. Change to Set Mode by utilizing Mode Switch.
2. Display maximum pressure or minimum pressure by utilizing Item Switch.
3. You can decrease set pressure by pushing OFF button and Item Button at the same time.
4. You can increase set pressure by pushing Off button and Mode Button at the same time.

Restrictions:

- Maximum pressure does not exceed figure initially set at our plant.
- Pressure difference between maximum and minimum pressure is14.5 psig or over.
- Minimum pressure is 29 psig.

* The display will round all pressure increments to the nearest psi.

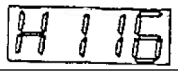
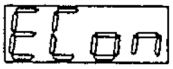
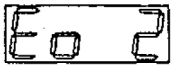
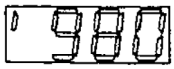
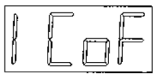
Item	Display	Contents
Max. Pressure		Shows Max. Set Pressure in psig. (This display means 116 psig.)*
Min. Pressure		Shows Min. Set Pressure in psig. (This display means 93 psig.)*
Time to Change Operating Air End		Shows Time to Change Operating Air End and prevents the same air end from operating for a long time. 1 on display means 15 minutes. (This display means 2 x 15 minutes - 30 minutes.)
External Operation		 means that external operation is set.  means that external operation is canceled. (When either displays, it can be changed by pushing reset switch.)
External Output		Shows set situation of external output.  displays when emergency stop occurs.  displays when emergency stop or caution occurs. (When either displays, it can be changed by pushing reset switch.)
Maintenance Time 1		Shows remaining time till intermediate maintenance and inspection in terms of 10 hours. The first figure is 980 (9800 hours) and decreases as operating time becomes longer.
Group Control		Shows set situation of Group Control.  means that Group Control mode OFF is set.  means that Group Control mode ON is set. (When either displays, it can be changed by pushing reset switch.)

Chart 8 - Set Mode

Caution Signal

1. When Caution is being signalled by the unit, caution number shown in Chart 5 flashes on display section (compressor does not stop). When caution condition goes away, display will stop flashing and the latest caution information is being memorized inside the printed circuit board.
2. You can check caution information by going to Caution Display Mode.
3. When caution occurs, cut off circuit breaker, solve the problem and switch on breaker again. Caution condition will be cancelled.

Caution Troubleshooting Guide

CA 21: Temperature of air end is high - When the temperature of air end becomes high, CA 21 will be displayed. See Chart 10.

CA 22: Failure on temperature sensor - See Chart 11.

CA 31: Current is High - When current is high, CA 31 is displayed. See Chart 12.

CA 91, CA 92: Intermediate Maintenance and Inspection - It shows that maintenance time (remaining time to intermediate maintenance and inspection) is 0. Refer to Set Mode on page 8 for details. It is time for grease up, replacement of tip seal, etc. Contact our distributor and ask them to do intermediate maintenance and inspection.

Operating Mode	Operating Situation
d 110	Initial stage of stop
d 111	Normal stop
d 112	Dryer preliminary start-up
d 120	Initial stage of start
d 121	Start 1
d 122	Start 2
d 130	Initial stage of load
d 131	Normal load

Chart 9 - Detail of Operating Mode

Item	Causes
Ambient temperature	Ambient temperature is high
Failure of cooling	1. Intake metal screen is clogged 2. Exhaust outlet is clogged 3. Aftercooler fins are dirty 4. Defective exhaust fan on compressor side.
	5. Damaged intake hose 6. Cooling passage of compressor is clogged

Chart 10 - Troubleshooting Guide: CA 21

Item	Causes
Sensor	1. Temperature sensor cords are not properly connected 2. Temperature sensor cords are cut 3. Defective temperature sensor
Ambient temperature	When it is less than about 10°C

Chart 11 - Troubleshooting Guide: CA 22

Item	Causes
Electric source	1. R phase or T phase is not connected well 2. Voltage is unstable 3. Deterioration of wiring 4. Low voltage
Exhaust pressure too high	1. Set pressure is wrong 2. Pressure sensor cord is disconnected or is not contacted 3. Defective pressure sensor 4. Clogged control piping due to freezing
Air end	Failure
Electric motor	Failure
V belt	Tension is too tight

Chart 12 - Troubleshooting Guide: CA 31

Emergency (Alarm) Signals

1. In case of emergency stop, emergency (alarm) code shown in Chart 7 flashes on display section and the associated compressor (air end) will stop. The normal air end with no problem continues to operate.
2. You can check the emergency information by going to Emergency Display Mode.
3. In case of Emergency Stop, study the information, find the cause and take necessary measures. Then push Reset Switch on operating panel to cancel flashing emergency number. If you cannot find a reason or remedy, consult with our technical service team or our service centers.

Emergency Troubleshooting Guide

AL 21: Sudden temperature rise of air end

AL 22: Temperature rise of air end

If the temperature rises more than set temperature, compressor (air end) stops. See Chart 13.

AL 31: Sudden rise of current

AL 32: Rise of current

If current becomes very high, AL 31 or AL 32 displays and compressor stops. See Chart 14.

AL 33: Low motor current - If motor current becomes very low, AL 33 displays and the compressor stops. Open phase of S phase is considered to be a cause.

AL 91 and AL 92: Intermediate maintenance and inspection is over - If you do not conduct intermediate maintenance when your compressor reaches its time and continue operation for a further 200 hours with CA 91 or 92 not canceled, and stop operation; AL 91 or AL 92 will display when you switch on circuit breaker again.

When AL 91 or AL 92 displays, contact our distributor and ask them to do the intermediate maintenance and cancel AL.

As a temporary measure, you can continue operation by pushing reset switch, but the manufacturer is not responsible for any failure or problem after AL 91 or AL 92 displays.

⚠CAUTION ***When AL 91 or AL 92 displays, contact our distributor and do the intermediate maintenance and inspection soon.***

Item	Causes
Ambient temperature	Ambient temperature is high
Failure of cooling	1. Intake metal screen is clogged 2. Exhaust outlet is clogged 3. Aftercooler fins are clogged 4. Defective exhaust fan on compressor side. 5. Damaged intake hose

Chart 13 - Troubleshooting Guide: AL 21 and AL 22

Item	Causes
Electric source	Open phase of R or T phases, low voltage
Air end	Failure
Electric motor	Failure

Chart 14 - Troubleshooting Guide: AL 31 and AL 32

Specifications

Compressor

Model Number	Air End	Control System	Discharge Pressure (PSIG)	Air Delivery (SCFM @ 100 psig)	Compressor Speed (RPM)	Driving System	Discharge Air Temp. °F	Discharge Air Outlet	Noise Level (1.5m from front)
SED1007	SLAE05	Solid State Pressure Driven Control	95-115	29.4	3150	V-belt	< Intake temp. +58°F	3/4”	53
SET1507	SLAE05	Solid State Pressure Driven Control	95-115	44.1	3150	V-belt	< Intake temp. +54°F	1”	56
SEQ2007	SLAE05	Solid State Pressure Driven Control	95-115	58.8	3150	V-belt	< Intake temp. +58°F	1”	58

Motor

Model Number	Type	Horsepower	Voltage	Starting System	Overload Relay	High Temp. Shut Down	Dimensions (W x L x H)
SED1007	3 Phase, TEFC	10 (2 x 5)	208 - 230/460	Magnetic starter	Current sensor	Installed	25 x 24.2 x 49.6
SET1507	3 Phase, TEFC	15 (3 x 5)	208 - 230/460	Magnetic starter	Installed	Installed	28.3 x 44 x 62.6
SEQ2007	3 Phase, TEFC	20 (4 x 5)	208 - 230/460	Magnetic starter	Installed	Installed	28.3 x 44 x 62.6

Chart 15 - Specifications for Compressors and Motors

Maintenance Schedule

Item	Action needed	Operating Hours 500	2500	5000	10,000	20,000	Remarks
Intake Filter	Clean, replace	●	▲				
Ventilation Screen	Clean	●					
Air End/ Blower Fan	Clean			●			
Fan Duct	Clean			●			
Compressor Fins	Clean			●			
Compressor	Grease				▲	▲	Use genuine Powerex grease
Tip Seal	Replace				▲		
Dust Seal	Inspect, replace			●	▲		
V-belt	Inspect, replace	*Readjust ●			▲		
Temperature Sensor		Confirm operation			●		
Pressure Sensor	Confirm operation				●		
Current Sensor	Confirm operation				●		
Magnetic Starter	Inspect				●		Replace if contact points deteriorated
Check Valve	Replace				▲		
Safety Valve	Confirm operation				●		
Ventilation Fan	Inspect	●			●		Replace if malfunctions
Pulley	Inspect groove				●		Repair if abnormal wear is detected
Motor	Inspect				●	●	Replace if abnormal noise is detected
Intake Hose	Replace				▲		
Air Hose	Inspect, replace		●		▲		
After Cooler	Clean outside		●		●		
O-Ring	Replace				▲		
Operating Panel	Inspect monitor display	Daily					
Piping	Inspect for leakage		●		●		
Compressor	Overhaul				●	▲	Consult factory

● Inspect
▲ Replace

NOTES:
1. Inspect and perform maintenance periodically according to maintenance schedule.
2. The maintenance schedule relates to the normal operating conditions. If the circumstances and load condition are adverse, shorten the cycle time and perform maintenance accordingly.
3. * Marked "Readjust" means the tension of the V-belt should be adjusted during the initial stage and inspected every 2,500 hours afterwards.

Chart 16

Scheduled Maintenance

INTAKE FILTER

1. Remove the front panel of the unit.
2. Remove the air inlet housing, the wing nut and the inlet filter element.
3. Clean the inlet filter element with compressed air or replace with a new element.

NOTE: Never clean filter element with solvents or water.

VENTILATION SCREEN

1. Remove the ventilation screen located at the rear of the unit (#) or the right hand panel (*).
2. Clean with compressed air or soap and water, if necessary.

INSPECT V-BELT TENSION

1. Check V-Belt tension with tension gauge.
2. Adjust to the specifications listed in Chart 17.

GREASE COMPRESSOR BEARINGS

1. Remove the plastic dust cap (Key #69) from the air end. See Figure 4.
2. Move the compressor pulley until the grease fitting is visible through the dust cap hole.
3. Use a grease gun extension adapter to engage the grease fitting and supply the proper volume of grease as indicated on the grease delivery chart. See Chart 18.

⚠CAUTION ***Use only Powerex genuine grease. (Part # IP600000AV). Pump grease gun before feeding to eliminate air from grease passage of the needle adapter.***

GREASE PIN CRANK BEARING

1. Remove the V-Belt and the fan cover (Key #24).
2. Remove the air end pulley with a gear puller.
3. Remove the fan duct (Key #22).
4. Remove the three grease caps (Key #72). Do not attempt to loosen or tighten the bolt (Key #71).
5. Grease all three pin crank bearings.

⚠CAUTION ***The grease fitting, located in the center of the pin crank bearing, feeds only the orbit scroll side bearing. Use a needle adapter to supply grease to the housing side bearing. Pump grease gun before feeding to eliminate air from grease passage of the needle adapter. Hold grease gun for 5 - 10 seconds after feeding to prevent grease blowback from the grease fitting.***

Model	New Belt Load ± Deflection Kg / 10 mm	Existing Belt Load ± Deflection Kg / 10 mm
SLP05	6 ± 0.5	5.5 ± 0.5

Chart 17

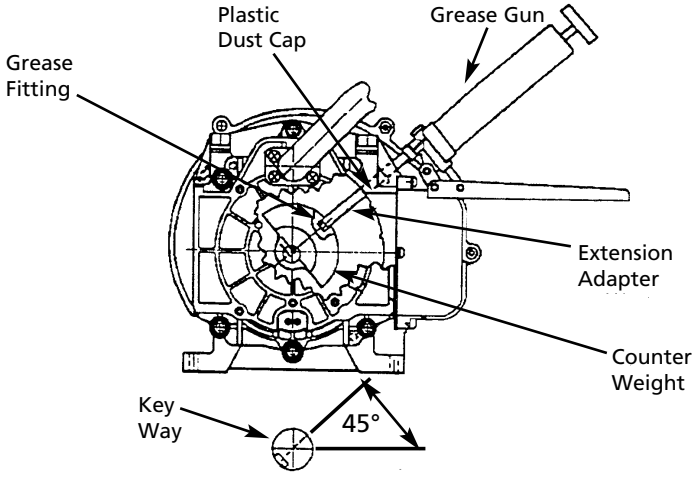


Figure 4 - Air end. To locate the grease fitting on the counter weight, place the key way on the crankshaft as shown.

Bearing	SLP05 1st TIme	SLP05 2nd Time
O.S. Bearing	6 times	4 times
Pin Crank Bearing O.S. Side	6 times	4 times
Pin Crank Bearing Housing Side	6 times	4 times

Chart 18 - Grease Delivery

⚠CAUTION ***Use only Powerex genuine grease, (Part #IP600000AV), or equivalent.***

NOTE: Each pump of the grease gun equals 0.65g of grease. The volume of grease is less after the 2nd pump since some of the grease supply will remain in the grease passage.

Scheduled Maintenance (Cont)

REPLACE TIP SEAL

1. Remove the six nuts (Key #60).
2. Remove the stationary scroll housing (Key #1).
3. Take out the old tip seal from the orbiting scroll housing and stationary scroll housing.
4. Remove the old dust seals from both housings.

Install the new tip seals and dust seals in the stationary and orbiting scroll housings in the following manner:

1. Blow off any dust from both scroll housings.
2. Install the high pressure, or shorter tip seal, from the center of the scroll and extend the tip seal outward in the seal channel.

NOTE: The side and bottom lip notches face inward and down into the channel.

3. Install the low pressure, or longer tip seal, in the same way, but make sure there is no gap between the high and low pressure seals.

⚠CAUTION ***Do not attempt to remove the orbit scroll from the housing.***

⚠CAUTION ***After installing half of the low pressure seal, carefully remove the seal from the channel and make sure the seal is properly locking onto the channel indentations located just past the high pressure seal.***

NOTE: The indentations are machined into the seal channel to prevent the low pressure seal from moving.

4. Blow off any dust caused by removing the seal from the seal channel.
5. Install the low pressure seal completely. Make sure the side and bottom lip notches are facing inward and down into the seal channel.

NOTE: The lip notches must not be distorted in the seal or torn off.

6. Install backup tube in the dust seal channel.
7. Place dust seal over the backup tube.

⚠CAUTION ***The backup tube must meet at the bottom of the housing in the six o'clock position. The dust seal must meet on the right side of the housing, or in the three o'clock position.***

8. Install the stationary scroll housing onto the orbiting scroll housing and reassemble the unit.
9. Make sure when reassembling the unit, the Pulley Belt and the Housing Nut follow the specifications as detailed in Chart 19 below.

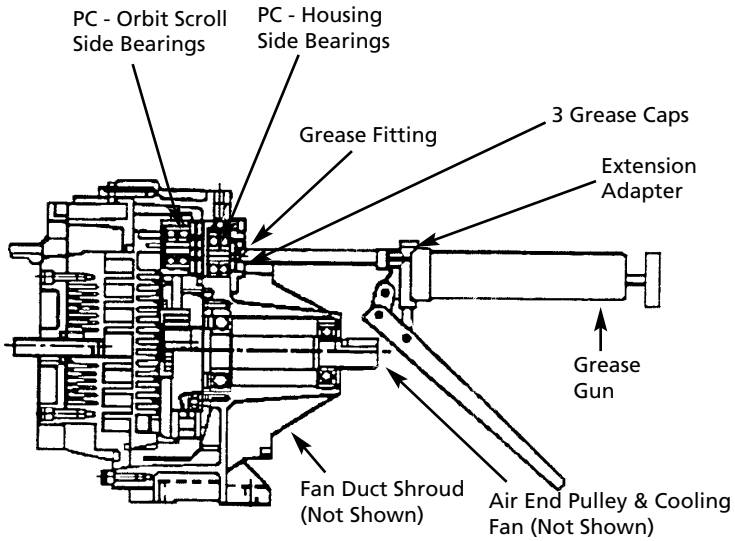


Figure 5

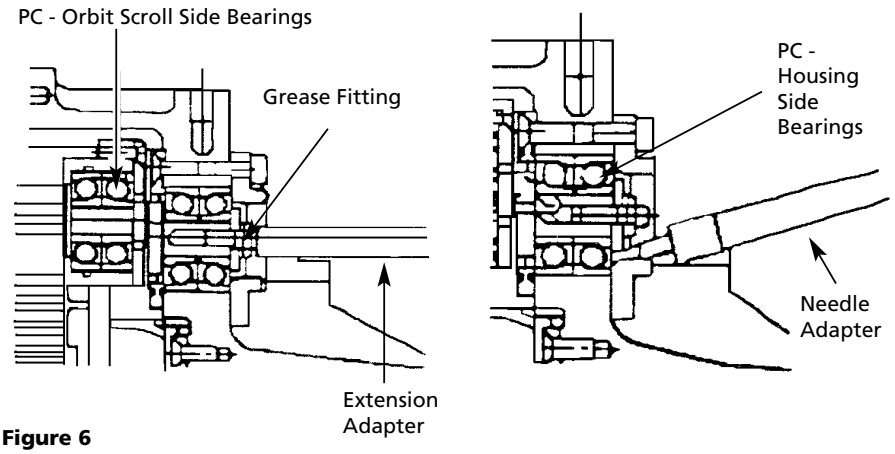
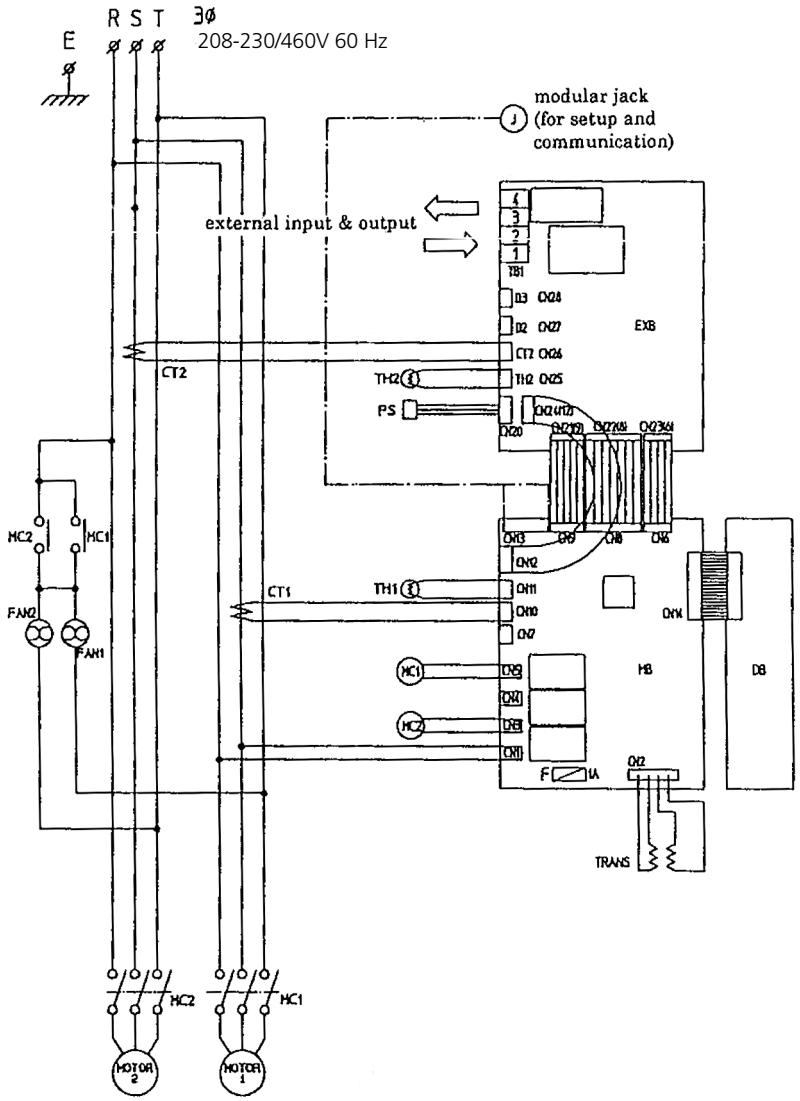


Figure 6

Model	Pulley Belt Key #65 Size	Pulley Belt Key #65 Torque	Housing Nut Key #60 Size	Housing Nut Key #60 Torque
SLP03	M8	175	M8	175
SLP05	M8	175	M10	260

Chart 19 - Belt Torque (In. - lbs.)

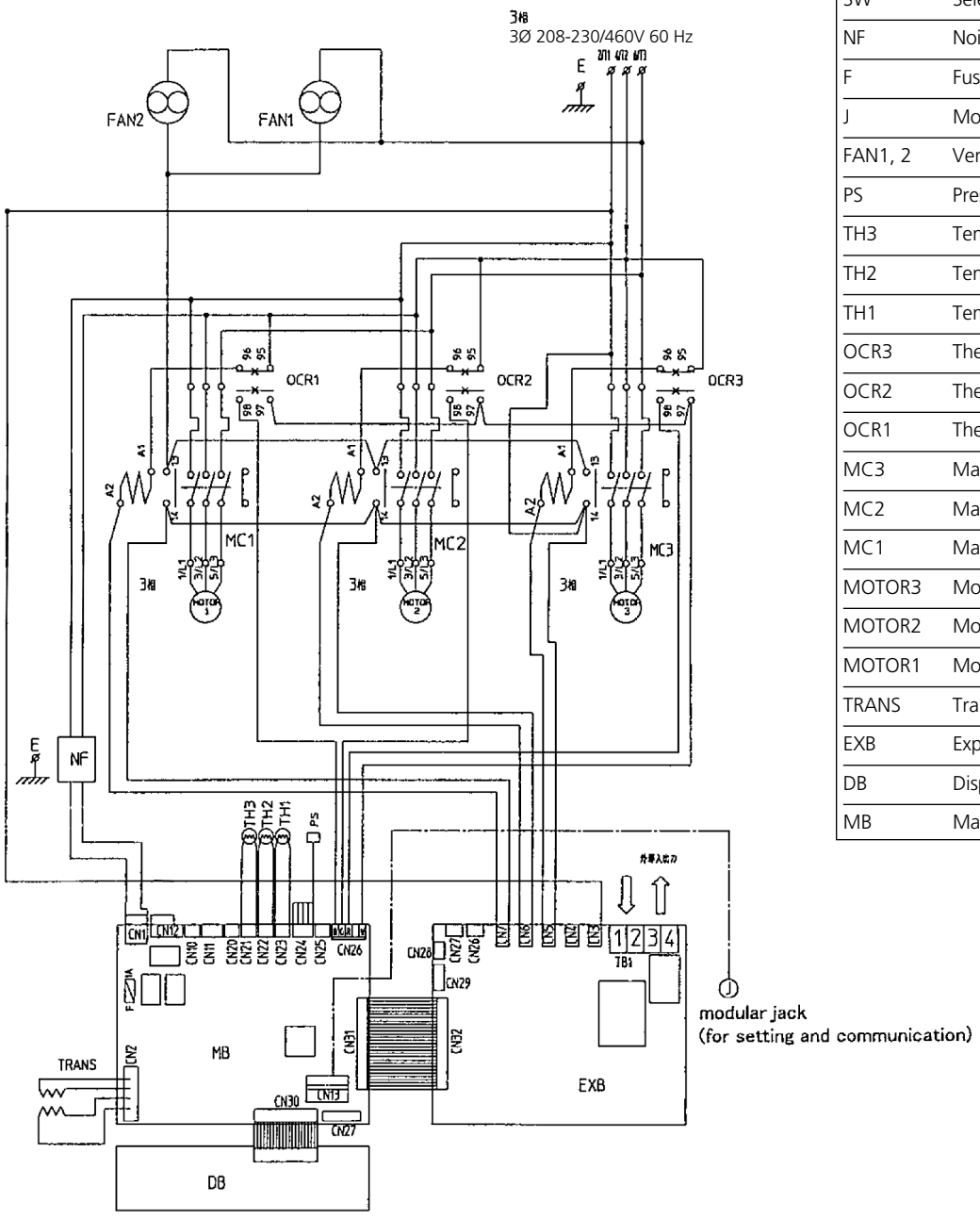
Electrical Diagram - SED1007 (10 HP)



F	Fuse	Compressor
J	Modular jack	Compressor
Fan 1,2	Exhaust fan	Compressor
PS	Pressure sensor	Compressor
TH2	Temperature sensor	Compressor
TH1	Temperature sensor	Compressor
CT2	Current sensor	Compressor
CT1	Current sensor	Compressor
MC2	Magnet contactor	Compressor
MC1	Magnet contactor	Compressor
MOTOR2	Motor	Compressor
MOTOR1	Motor	Compressor
TRANS	Transformer for PCB	Compressor
EXB	Expansion PCB	Compressor
DB	Display Board	Compressor
MB	Main PCB	Compressor

Figure 7

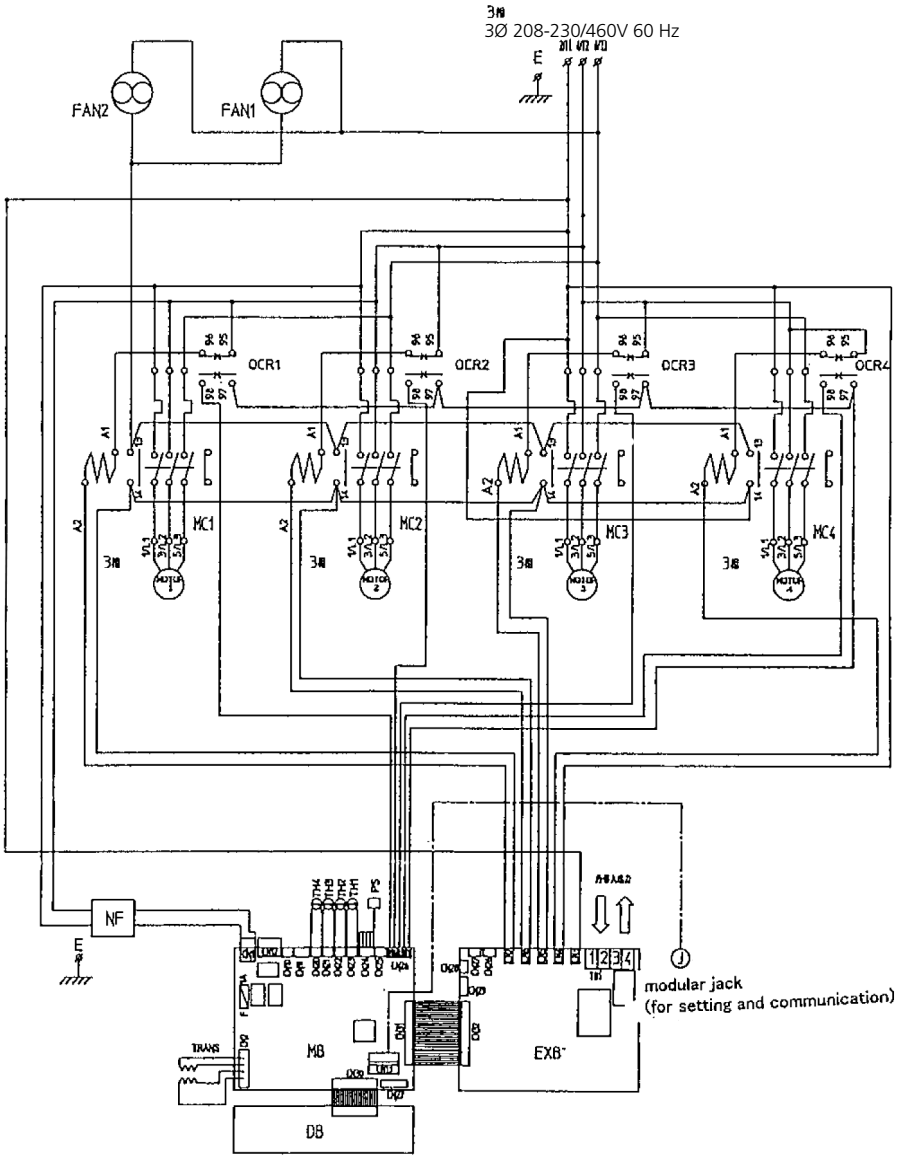
Electrical Diagram - SET1507 (15 HP)



PCR	Power relay
FC	Fan controller
R	Relay
FM	Fan motor
SW	Selector switch (3 notches)
NF	Noise filter
F	Fuse
J	Modular jack
FAN1, 2	Ventilation fan
PS	Pressure sensor
TH3	Temperature sensor
TH2	Temperature sensor
TH1	Temperature sensor
OCR3	Thermal relay
OCR2	Thermal relay
OCR1	Thermal relay
MC3	Magnet contactor
MC2	Magnet contactor
MC1	Magnet contactor
MOTOR3	Motor
MOTOR2	Motor
MOTOR1	Motor
TRANS	Transformer for PCB
EXB	Expansion PCB
DB	Display board
MB	Main PCB

Figure 8

Electrical Diagram - SEQ2007 (20 HP)



PCR	Power relay
FC	Fan controller
R	Relay
FM	Fan motor
SW	Selector switch (3 notches)
NF	Noise filter
F	Fuse
J	Modular jack
FAN1, 2	Ventilation fan
PS	Pressure sensor
TH4	Temperature sensor
TH3	Temperature sensor
TH2	Temperature sensor
TH1	Temperature sensor
OCR4	Thermal relay
OCR3	Thermal relay
OCR2	Thermal relay
OCR1	Thermal relay
MC4	Magnet contactor
MC3	Magnet contactor
MC2	Magnet contactor
MC1	Magnet contactor
MOTOR4	Motor
MOTOR3	Motor
MOTOR2	Motor
MOTOR1	Motor
TRANS	Transformer for PCB
EXB	Expansion PCB
DB	Display board
MB	Main PCB

Figure 9

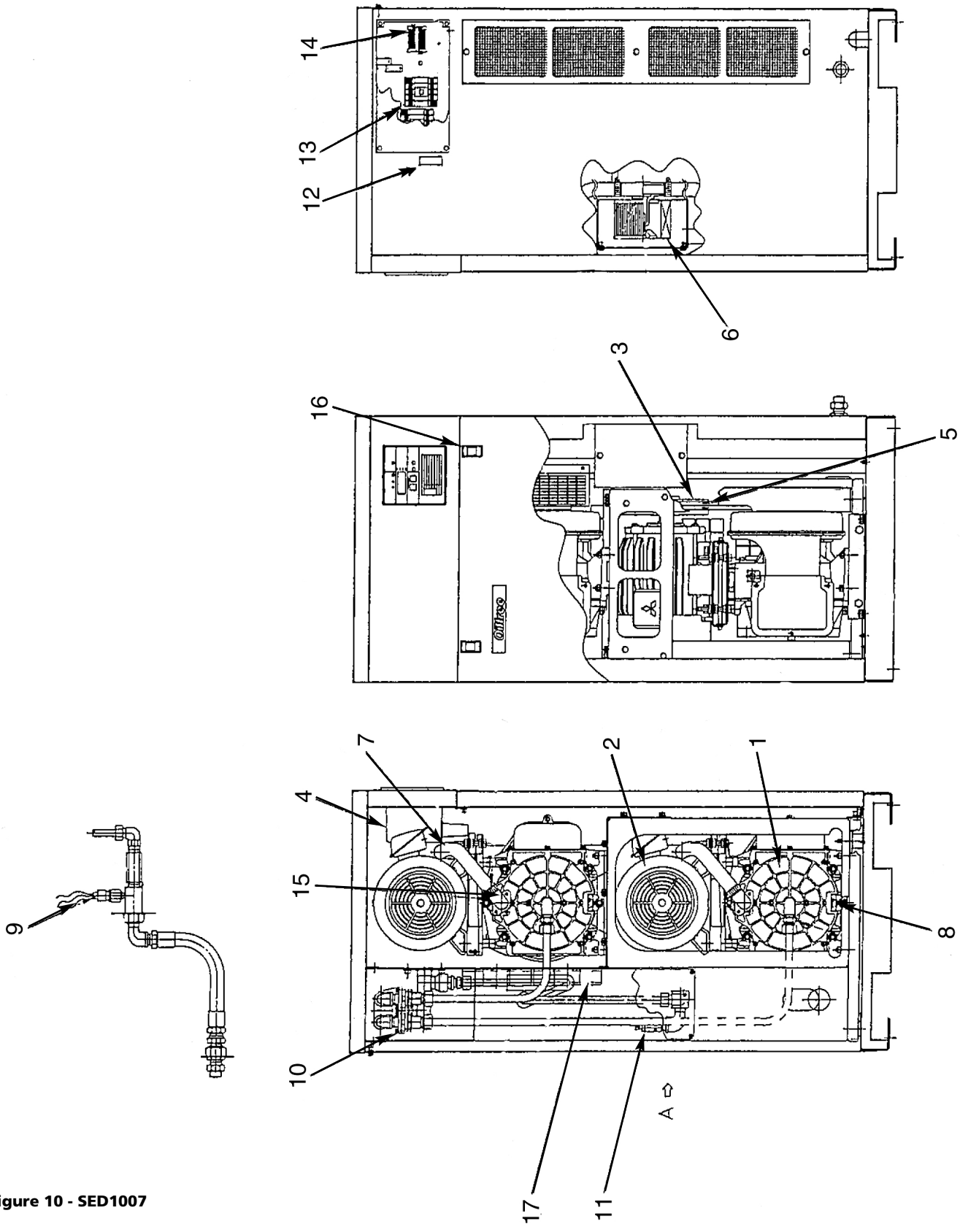


Figure 10 - SED1007

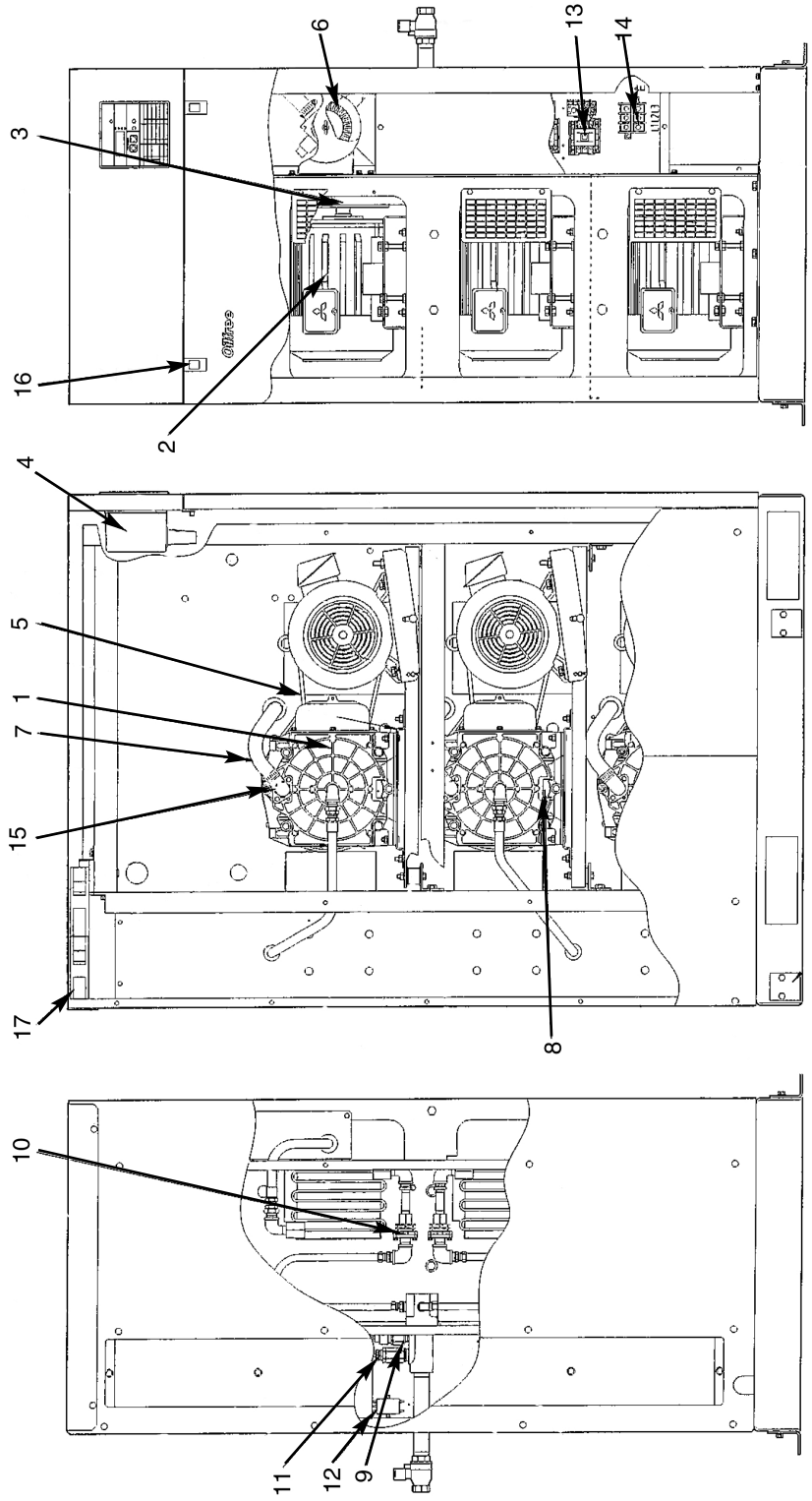


Figure 11 - SET1507

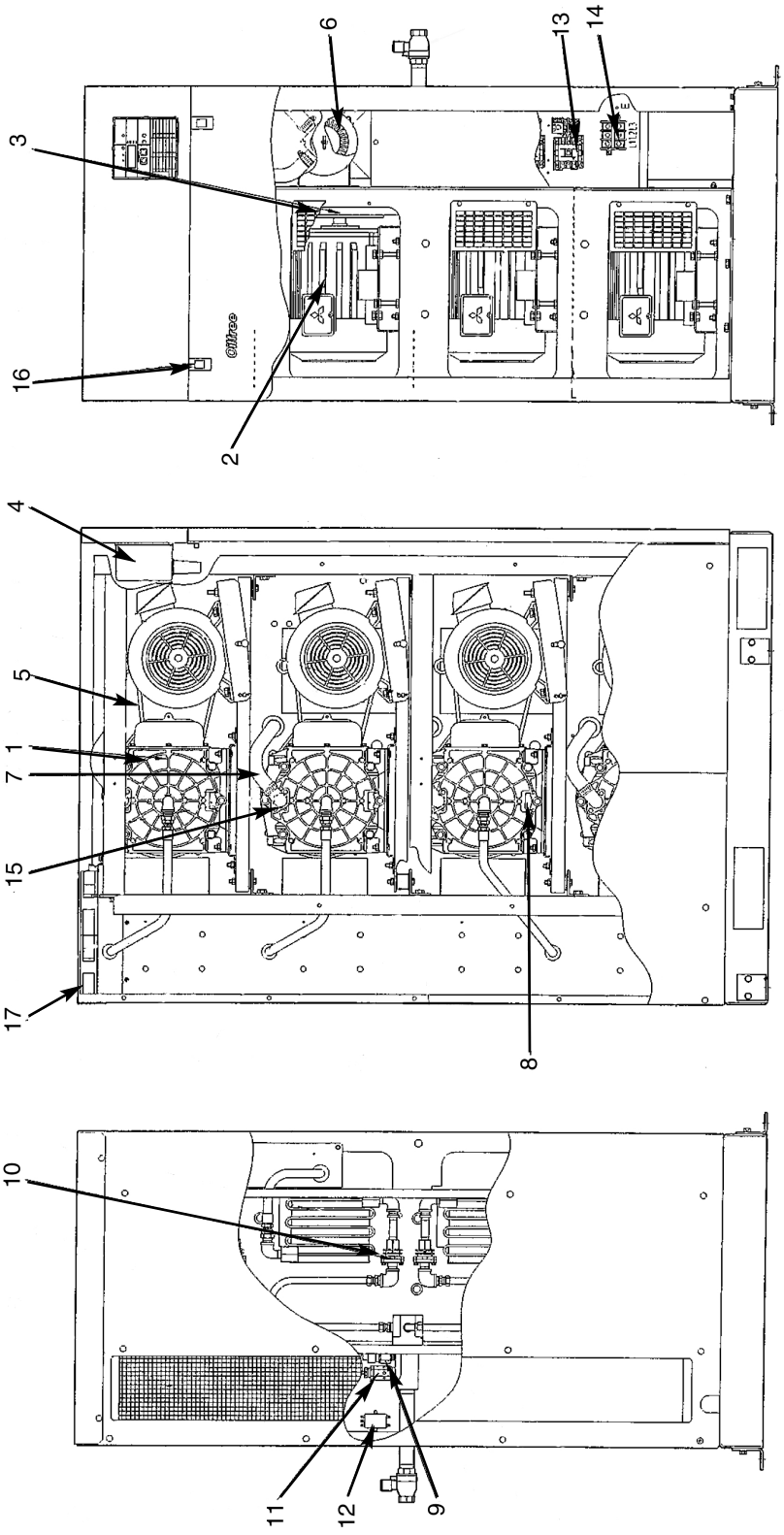


Figure 12 - SEQ2007

Replacement Parts List

Ref. No.	Description	10 HP SED1007	15 HP SET1507	20 HP SEQ2007	Qty.
1	Air end	SL016500AJ	SL016500AJ	SL016500AJ	2, 3, 4
2	Motor	MC022397AV	MC022397AV	MC022397AV	2, 3, 4
3	Motor pulley	PU009792AV	PU009792AV	PU009792AV	2, 3, 4
4.1	Main circuit board	02701090 (230V)	02703090	02704050	1
		02702090 (460V)	—	—	
4.2	Display circuit board	92598010	92598010	92598010	1
4.3	Printed circuit board	92510080	92510080	92510080	1
4.4	Transformer	92599010	92599010	92599010	1
5	V-belt	BT009000AV	BT012000AV	BT012000AV	2, 3, 4
6	Intake filter	IP052000AV	91353690	91353690	1
7	Intake hose	02570040	02643041	02643041	2, 3, 4
8	Temperature sensor	02801001	02801001	02801001	2, 3, 4
9	Pressure sensor	97992133	97992133	97992133	1
10	Check valve	IP051200AV	IP087700AV	IP087700AV	2, 3, 4
11	Safety valve	SVB-7B-88	SVB-7B-88	SVB-7B-88	1
12	Electrical noise filter	07992186	07992186	07992186	1
13	Magnetic contactor	07009908	07005360 (230V)	07005360 (230V)	2, 3, 4
		—	02705050 (460V)	02705050 (460V)	
14	Terminal	07482010	07481130	07481130	1
15	O-ring	IP603200AV	IP603200AV	IP603200AV	2, 3, 4
16	Handle	06991808	06991808	06991808	2
17	Exhaust fan set	97450022	97450022	97450022	2

Notes

Service Record

Compressors

Date	Maintenance Performed	Replacement Components Required

Powerex Limited Warranty

Powerex 3 Year / 10,000 Hour Extended Parts Limited Warranty - Powerex warrants each Compressor Pump or Scroll Air-End against defects in material or workmanship from the date of purchase for a period of **Three years or 10,000 hours**, whichever may occur first. This warranty applies to the exchange of part(s) of the compressor pump or air-end found to be defective by an Authorized Powerex Service Center.

Powerex 1 Year / 5,000 Hour Inlet to Outlet Limited Warranty - Powerex warrants each Compressor Unit, System, Pump, or Air-End against defects in material or workmanship from the date of purchase for a period of **One Year or 5,000 Hours,** whichever may occur first. This warranty applies to the exchange of defective component part(s) and labor performed by an Authorized Powerex Service Center.

The above mentioned warranty applies to POWEREX manufactured units or systems only.
Items listed in the operator's manual under routine maintenance are not covered by this or any other warranty.

THERE IS NO OTHER EXPRESS WARRANTY. IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO ONE YEAR FROM THE DATE OF PURCHASE: AND TO THE EXTENT PERMITTED BY LAW, ANY AND ALL IMPLIED WARRANTIES ARE EXCLUDED. THIS IS THE EXCLUSIVE REMEDY AND LIABILITY FOR CONSEQUENTIAL DAMAGES UNDER ANY AND ALL WARRANTIES IS EXCLUDED TO THE EXTENT EXCLUSION IS PERMITTED BY LAW.

All claims pertaining to the merchandise in this schedule, with the exception of warranty claims, must be filed with POWEREX within 6 months of the invoice date, or they will not be honored. Prices, discounts and terms are subject to change without notice or as stipulated in specific product quotations. All agreements are contingent upon strikes, accidents, or other causes beyond our control. All shipments are carefully inspected and counted before leaving the factory. Please inspect carefully any receipt of merchandise noting any discrepancy or damage on the carrier's freight bill at the time of delivery. Discrepancies or damage which obviously occurred in transit are the carrier's responsibility and related claims should be made promptly directly to the carrier. Returned merchandise will not be accepted without prior written authorization by POWEREX and deductions from invoices for shortage or damage claims will not be allowed. **UNLESS OTHERWISE AGREED TO IN WRITING, THESE TERMS AND CONDITIONS WILL CONTROL IN ANY TRANSACTION WITH POWEREX** any different or conflicting terms as may appear on any order form now or later submitted by the buyer. All orders are subject to acceptance by POWEREX.