



Scroll Basemount Compressor Operating & Maintenance Manual

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

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 ensures 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.

Compressor Cycle

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 compressed gas is discharged through the outlet at the center of the fixed scroll so no valves are needed.

Tip Seal

The tip seal on the scroll compressor is self-lubricated and allows the unit to operate efficiently without oil and expensive filtration.

Bearings

The bearings on the scroll compressor are regreaseable to allow extended compressor life.

Intended Usage

This Powerex Oil-less Scroll set is intended for use as part of a system. The compressor set provides compressed air from the oil-less scroll pump when the electric motor is powered. The set includes the pump, motor, belt drive, belt guard, aftercooler, check valve, and a pressure relief valve. Do not operate the set with any of these items missing or modified.

The Powerex module may be supplied with an intake filter installed on the pump or the set may be intended for piping to a remote filter. Always make sure that an inlet filter with a maximum filtration of 2 micron is in place and that the inlet air system is not restricted.

Operating the scroll pump with a restricted inlet will result in pump damage. Do not modify or remove the Powerex check valve or relief valve. The relief valve will open if the set is accidentally operated with an isolation valve closed.

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.

NOTE: Note indicates information that requires special attention.

⚠ WARNING 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, 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 SIMULTANEOUSLY USED, EXISTING WARRANTIES ARE VOIDED, AND POWEREX DISCLAIMS ANY LIABILITY WHATSOEVER FOR ANY LOSS, PERSONAL INJURY OR DAMAGE.

Components

Oil-less Scroll Compressor Pumps

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.

Dry Type Inlet Filter

The 2 μ filter provides protection for the precision components within the compressor. This filter must be serviced at regular intervals to maintain compressor performance. See page 4 for the recommended maintenance schedule.

Filter Change Indicator

This unit comes with a flow restriction indicator. As the air filter traps dust and debris, airflow through the filter will be reduced and the piston within the indicator will gradually make its way to the CHANGE FILTER position. Once this has happened, replace the air filter and press the yellow reset button on the indicator.

Isolation Mounts

Isolation mounts are supplied as standard equipment. The installer may substitute mounts of their own choosing. However, it is recommended that this substitution be reviewed with Powerex prior to installation.

Installation

Unpacking & Receiving the Unit

Immediately upon receipt of the compressor system, the unit should be inspected for any damage which may have occurred in shipment. Any shipping damage must be immediately filed with the freight carrier. Repair or replace damaged items before use.

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

Application

When the scroll compressor is to be used in applications other than the compressing of atmospheric air, please contact a Powerex representative for engineering and warranty information at 1-888-769-7979.

Installation Site

1. The scroll compressor must be located in an environment compliant with the compressor's intended use. If being installed in an alternate location, please obtain prior approval for change of location from Powerex.
2. The area should be free of excessive dust, toxic or flammable gases, moisture, water and direct sunlight.
3. Ambient temperatures of -35°F to $+104^{\circ}\text{F}$ are allowed. The upper range of $+104^{\circ}\text{F}$ has a maximum on time of 4 minutes. This is to ensure proper operation and prevent overheating.
4. Clearance must allow for safe, effective inspection and maintenance.
5. Systems supplied without an aftercooler require an approved check valve and safety valve to be installed downstream of the compressor's exhaust.
6. Air receiver(s) or alternate drive devices may be used to ensure that the motor manufacturer's recommended number of starts and stops are not exceeded. Please refer to manufacturer for details.

NOTE: Contact Powerex for evaluation of ambient conditions beyond the parameters above for special reduced duty cycle and product life requirements.

Ventilation

1. If the scroll compressor system is located in an enclosed area, an exhaust fan or other means with access to outside air and make up air must be installed.
2. Never restrict the cooling fan exhaust air.
3. Never locate the compressor where hot exhaust air from other heat generating units may increase the compressor's operating temperature.

⚠ WARNING

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

national electric codes.

Wiring

Use solderless terminals to connect the electric power source provided. Various electrical connections may be provided in accordance with customer requirements. Always ensure the connections are proper and that when installing the final connection that proper rotation of the compressor is witnessed.

Piping

Connect compressed air pipeline to the outlet of the check valve.

Do not modify check valve or replace with any other type. The scroll compressor does not require a discharge pressure release valve for shut down unloading. When the electric motor is de-energized, the compressed air in the outlet pipe and after cooler will self relieve by driving the pump in reverse a few turns. This is normal operation.

Do not modify or restrict the air flow to or from the after cooler without review by Powerex Engineering. Improper cooling could lead to damage of the scroll pump.

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 and are the correct voltage for the motor.
4. Be sure all pressure connections are tight.
5. Check to be certain all pressure relief valves, check valves, etc. are correctly installed.
6. Check that all fuses, circuit breakers, etc. are the proper size.
7. Make sure the inlet filter is properly installed.
8. Once power is connected to the unit, visually check the rotation of the compressor pump. If the rotation is incorrect, have a qualified electrician correct the motor wiring. Motor should turn clockwise opposite shaft end.

Start Up & Operation

The scroll basemount set is capable of operating at 100% duty at full load. For most applications, the set will be controlled in response to pressure. Start-stop control is to be used. The low pump inertia minimizes the start up amp surge associated with other compressor types. Tank size and pressure settings must be selected to keep the starts per hour below 16 and to allow at least 12 seconds of off time between starts.

Factory installed sheaves are sized to achieve the appropriate speed for the installed pump. Changing sheave size is not recommended.

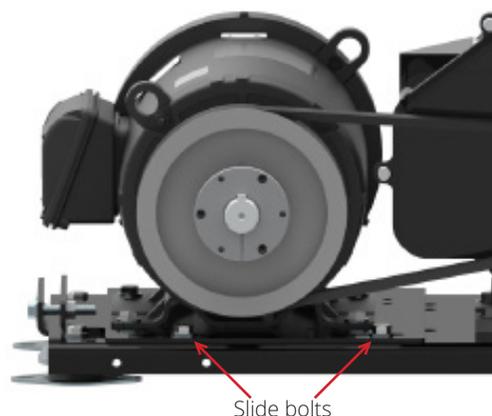
Adjusting Belt Tension

⚠ WARNING Moving Parts! Lock out power before servicing unit!

After the first 200 to 500 running hours, or at any time chirping is heard on startup, check the belt tension. If tension is below 25 pounds on either belt, increase the center distance using the motor slide base so that belt tension is 45 to 50 pounds. Follow the Belt Replacement Procedure below, skipping steps 3 and 4 to make this adjustment.

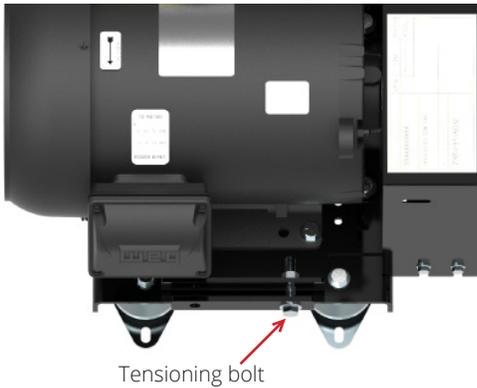
Belt Replacement Procedure

1. Remove the belt guard.
2. Loosen the two slide bolts near the motor pulley and the two slide bolts on the front edge of the base. Loosen the bolts just enough to allow the slide base to move. Do not fully remove the slide bolts.





3. Loosen the tensioning bolt until enough slack is available to remove the old belts.



4. Replace the old belts with new ones. Additional loosening of the tensioning bolt may be required to install the new belts.
5. Tighten the tensioning bolt using a torque wrench to 45 inch pounds. This will bring the belts to the proper tension.
6. Tighten the slider bolts, the two on the front edge of the base, then the two slider bolts closest to the motor pulley.
7. Re-install the belt guard.

Maintenance Schedule

The scroll compressor set requires minimal maintenance. Follow the chart below.

Item	Action Needed	Operating Hours						Remarks
		500	2500	5000	10000	15000	20000	
Inlet Air Filter	Inspect, Replace	o	Δ					Replace every 2500 hours
Blower Fan	Clean			o	o	o	o	Clean blades
Fan Duct	Clean			o	o	o	o	Clean duct
Compressor Fins	Clean		o					Every 2500 hours or less
Bearings (116 psig scroll units)	Grease				o		o	Grease every 10000 hours on 116 psig pumps
Bearings (145 psig scroll units)	Grease			o	o	o	o	Grease every 5000 hours on 145 psig pumps
Tip Seal (116 psig scroll units)	Replace				Δ		Δ	
Bearings (145 psig scroll units)	Replace			Δ	Δ	Δ	Δ	
Dust Seal	Replace				Δ		Δ	Replace every 10000 hours on 116 psig pumps; replace every 5000 hours on 145 psig pumps
V-Belt	Replace				Δ		Δ	See Note 3
Check Valve	Replace				Δ		Δ	
Heat Insulation Pipe	Replace				Δ		Δ	Replace every 10000 hours on 116 psig pumps; replace every 5000 hours on 145 psig pumps

Legend

o Inspect/Clean

Δ Replace

NOTES:

1. Inspect and perform maintenance periodically according to the 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. Belts require no attention unless slippage is detected. (Chirping sound on start up or while running.) Retension as indicated when tip seals are replaced for the first time. Proper belt tension should be 0.25 inch deflection when 6 pounds of force is applied on the center of the belt span.
4. For standard pressure pumps (116 psig), if the pumps reach 4 years and have not yet accumulated 10,000 hours, perform the greasing operation for the bearings, with the number of pumps reduced by 25%. (See details of pump grease operation.) Tip seals do not require early replacement, but must be done before or at 10,000 hours of run time for standard pressure pumps or 5,000 hours of run time for high pressure pumps. For high pressure pumps (145 psig), if the pumps reach 2 years and have not yet accumulated 5,000 hours, perform the greasing operation for the bearings, with the number of pumps reduced by 25%.

Troubleshooting Guide

Problem	Corrective Action
Motor does not run, runs slowly or is excessively noisy	<ol style="list-style-type: none"> 1. Check wiring—make sure voltage and Hz matches motor specification and lead wiring pattern. Correct as needed. 2. Check to make sure motor is not overloaded. Remove belts and determine if no-load operation of motor is correct. Check rotation of pump by hand. It should turn smoothly. If not, check for pump damage or obstruction in the pump.
Pump is noisy or rough, or puts too much load on the motor	<ol style="list-style-type: none"> 1. If amp draw and vibration are normal, allow the pump to run for a few minutes and determine if noise diminishes and disappears. If not, contact Powerex at 1-888-769-7979. 2. Check to make sure isolation valves are open. Open the pressure relief valve on the compressor. Stop unit and correct valve installation or setting. 3. Check to make sure that the pump is open to intake air. If isolation valves are used on intake and are accidentally closed when pump is running, pump damage can occur. This is not covered under warranty. Powerex recommends using a three way valve if isolation is desired so that no matter the valve position, a path to intake air is always open.
Amp draw is high	<ol style="list-style-type: none"> 1. Check wiring—make sure voltage and Hz matches motor specification and lead wiring pattern. Correct as needed. 2. Check to make sure motor is not overloaded. Remove belts and determine if no-load operation of motor is correct. Check rotation of pump by hand. It should turn smoothly. If not, check for pump damage or obstruction in the pump.
Compressor vibrates excessively	<ol style="list-style-type: none"> 1. Check for damage. If the motor shaft becomes bent due to shipping, the mass of the pulley will be off center and generate vibrations. Replace the motor. 2. If the pump is damaged, the fan may rub and cause noise. It is possible to replace just the fan. Contact Powerex at 1-888-769-7979 for instructions. 3. Some variation in vibrations profile is normal.
Pump rotates in reverse for more than a few seconds when power is off	<ol style="list-style-type: none"> 1. Check valve is leaking, allowing compressed air to vent through the pump. If allowed to continue, pump damage may occur. Replace check valve.

Powerex Limited Warranty - Applicable to OEM Customers Only

Warranty and Remedies.

(a) General. Powerex warrants each Compressor System, Vacuum System, Vacuum Pump, Compressor Air-End, or Powerex branded Accessory (collectively “Products”, individually each a “Product”) to be free from defects in material and workmanship (“Defects”) at the date of shipment. This warranty shall apply only to Products that are purchased by Original Equipment Manufacturers (OEMs) and the applications for which are approved in advance in writing by Powerex’s Director of Engineering. If the applications for the Products are not approved in advance in writing by Powerex’s Director of Engineering then Powerex makes no warranties regarding the Products. EXCEPT AS SET FORTH BELOW, NO OTHER WARRANTY, WHETHER EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL EXIST IN CONNECTION WITH THE SALE OR USE OF SUCH PRODUCTS. TO THE EXTENT PERMITTED BY LAW, ANY AND ALL IMPLIED WARRANTIES ARE EXCLUDED. All warranty claims must be made in writing and delivered to Powerex in accordance with the procedures set forth on its website (www.powerexinc.com), or such claim shall be barred. Upon timely receipt of a warranty claim, Powerex shall inspect the Product claimed to have a Defect, and Powerex shall replace any Product which it determines to have had a Defect; provided, however, that Powerex may elect, upon return of the Product, to refund to buyer any part of the purchase price of such Products paid to Powerex. In no circumstances will Powerex be required or obligated to pay for labor costs to repair any Defect. Freight for returning Products to Powerex for inspection or for shipping warranty parts shall be paid by buyer where permitted by applicable law. Powerex is not responsible for any import fees, taxes, duties, licenses or other fees imposed by any governmental authority upon the production, sale, shipment and/or use of Products covered hereunder. The warranties and remedies herein are the sole and exclusive remedy for any breach of warranty or for any other claim based on any Defect, or non-performance of the Products, whether based upon contract, warranty or negligence.

(b) (i) Standard Period of Warranty – Parts Only (No Labor). The purchase of any system includes Powerex’s standard warranty. Powerex warrants and represents all Products shall be free from Defects for the first eighteen (18) months from the date of shipment by Powerex, or twelve (12) months from the documented date of startup, or five thousand (5,000) hours of use, whichever occurs first. During such warranty period, Powerex shall be liable for all Defects in the Products (the “Product Defects”). Supplier’s repair or replacement of any Product shall not extend the period of any warranty of any Product. This warranty applies to the exchange of part(s) found to be defective by an Authorized Powerex Service Representative only.

(ii) Premium Period of Warranty – Parts Only (No Labor). In order to be eligible for premium warranty coverage, a premium warranty for each system must be purchased when order is placed. Powerex warrants and represents all Products shall be free from Defects for the first thirty (30) months from the date of shipment by Powerex, or twenty-four (24) months from the documented date of startup, or seven thousand five hundred (7,500) hours of use, whichever occurs first. During such warranty period, Powerex shall be liable for all Defects in the Products (the “Product Defects”). Supplier’s repair or replacement of any Product shall not extend the period of any warranty of any Product. This warranty applies to the exchange of part(s) found to be defective by an Authorized Powerex Service Representative only.

(c) Replacement Pumps – Parts Only (No Labor). Parts Only (No Labor). For any replacement Air-End or Vacuum Pumps installed on a Powerex manufactured system or unit after any initial warranty period has expired or where another warranty does not apply for any reason, Powerex warrants that the Air-End or Vacuum Pumps shall be free of Defects for a period of twelve (12) months from the date of shipment by Powerex or five thousand (5,000) hours of use, whichever comes first.

(d) Replacement Motors – Parts Only (No Labor). For any replacement motor installed on a Powerex manufactured system or unit after any initial warranty period has expired or where another warranty does not apply for any reason, Powerex warrants that the replacement motor shall be free of Defects for the first twelve (12) months from the date of shipment by Powerex. For any replacement motor installed on a system or unit that was not manufactured by Powerex after any initial warranty period has expired or where another warranty does not apply for any reason, Powerex warrants that the replacement motor shall be free of Defects for the first ninety (90) days from the date of shipment by Powerex. Supplier’s repair or replacement of any Product shall not extend the period of any warranty of any Product. This warranty applies to the exchange of part(s) found to be defective by an Authorized Powerex Service Representative only.

(e) Replacement Parts – Parts Only (No Labor). For other replacement parts besides motors, Air-End or Vacuum Pumps installed on a Powerex manufactured system or unit after any initial warranty period has expired or where another warranty does not apply for any reason, Powerex warrants that such replacement parts will be free from Defects for the first twelve (12) months from the date of shipment by Powerex. For other replacement parts besides motors, Air-End or Vacuum Pumps installed on a system or unit that was not manufactured by Powerex after any initial warranty period has expired or where another warranty does not apply for any reason, Powerex makes no warranties. Supplier’s repair or replacement of any Product shall not extend the period of any warranty of any Product. This warranty applies to the exchange of part(s) found to be defective by an Authorized Powerex Service Representative only.

(f) Replacement Parts – Parts Only (No Labor). For other replacement parts besides motors, Air-End or Vacuum Pumps installed on a Powerex manufactured system or unit after any initial warranty period has expired or where another warranty does not apply for any reason, Powerex warrants that such replacement parts will be free from Defects for the first twelve (12) months from the date of shipment by Powerex. For other replacement parts besides motors, Air-End or Vacuum Pumps installed on a system or unit that was not manufactured by Powerex after any initial warranty period has expired or where another warranty does not apply for any reason, Powerex makes no warranties. Supplier's repair or replacement of any Product shall not extend the period of any warranty of any Product. This warranty applies to the exchange of part(s) found to be defective by an Authorized Powerex Service Representative only.

(g) Coverage. The warranty provided herein applies to Powerex manufactured units or systems only.

(h) Exceptions. Notwithstanding anything to the contrary herein, Powerex shall have no warranty obligations with respect to Products:

(i) That have not been installed in accordance with Powerex's written specifications and instructions;

(ii) That have not been maintained in accordance with Powerex's written instructions;

(iii) That have been materially modified without the prior written approval of Powerex; or

(iv) That experience failures resulting from operation, either intentional or otherwise, in excess of rated capacities or in an otherwise improper manner.

(i) The warranty provided herein shall not apply to: (i) any defects arising from corrosion, abrasion, use of insoluble lubricants, or negligent attendance to or faulty operation of the Products; (ii) ordinary wear and tear of the Products; or (iii) defects arising from abnormal conditions of temperature, dirt or corrosive matter; (iv) any OEM component which is shipped by Powerex with the original manufacturer's warranty, which shall be the sole applicable warranty for such component.

Limitation of Liability. NOTWITHSTANDING ANYTHING TO THE CONTRARY HEREIN, TO THE EXTENT ALLOWABLE UNDER APPLICABLE LAW, UNDER NO CIRCUMSTANCES SHALL POWEREX BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, PUNITIVE, SPECULATIVE OR INDIRECT LOSSES OR DAMAGES WHATSOEVER ARISING OUT OF OR IN ANY WAY RELATED TO ANY OF THE PRODUCTS OR GOODS SOLD OR AGREED TO BE SOLD BY POWEREX TO BUYER. TO THE EXTENT ALLOWABLE UNDER APPLICABLE LAW, POWEREX'S LIABILITY IN ALL EVENTS IS LIMITED TO, AND SHALL NOT EXCEED, THE PURCHASE PRICE PAID.

Warranty Disclaimer. Powerex has made a diligent effort to illustrate and describe the Products in its literature, including its Price Book, accurately; however, such illustrations and descriptions are for the sole purpose of identification, and do not express or imply a warranty that the Products are merchantable, or fit for a particular purpose, or that the Products will necessarily conform to the illustrations or descriptions.

Product Suitability. Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of Products for certain purposes, which may vary from those in neighboring areas. While Powerex attempts to assure that its Products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a Product, please review the Product applications, and national and local codes and regulations, and be sure that the Product, installation, and use will comply with them.

Claims. Any non-warranty claims pertaining to the Products 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. Powerex shall not be liable for any delay or failure arising out of acts of the public enemy, fire, flood, or any disaster, labor trouble, riot or disorder, delay in the supply of materials or any other cause, whether similar or dissimilar, beyond the control of Company. All shipments are carefully inspected and counted before leaving the factory. Please inspect carefully any receipt of Products 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 Products 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, THE TERMS AND CONDITIONS CONTAINED IN THIS LIMITED WARRANTY 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 will not control. All orders are subject to acceptance by Powerex.

