

CompQ

Operators Manual



KICE INDUSTRIES, INC.

shall not in any event be liable for consequential or incidental damages and this agreement provides purchaser's sole and exclusive remedy. Any actions for breach of this agreement or warranty must be commenced within one year after the cause of action has occurred.

Drew Kice
President
Kice Industries, Inc.

The only warranty extended under this agreement is the above express warranty and there are no other warranties, express or implied, including warranties of merchantability, fitness for a particular purpose or otherwise which extends beyond the face hereof. The Company and its dealers

For additional information, application assistance or special service, please contact us by phone at 316-744-7151 or email at sales@kice.com. We'll need to know the MODEL and SERIAL NUMBER of your Kice equipment. For ready reference, please record this information and the date of delivery or installation on the lines below. See the General Information section for the location of model and serial number.

[illegible]

CONTENTS

1. Introduction	2
2. Important Information	2
3. General Information	3
4. Hazard Level Icons	5
5. Safety Precautions	5
6. Installation Preparation	8
7. Storage	8
8. Installation	8
9. Startup and Operation	12
10. Maintenance and Service	15
11. Troubleshooting	27
12. Disassembly of Air Power Unit	29
13. Assembly of Air Power Unit	30
14. Special Tools	35
15. Torque Values	36

3. GENERAL INFORMATION

To The Owner

The purpose of this manual is to assist owners and operators in maintaining and operating the Kice equipment. Please read it carefully; information and instructions furnished can help you achieve years of dependable performance. If the manual is not included in your owner's packet, please contact our Customer Service Department.

Using This Manual

General operation and maintenance guidelines are outlined for owners and operators of Kice equipment. Operating conditions vary considerably and cannot be addressed individually. Through experience however, operators should have no difficulty in developing good operating, safety, and monitoring skills.

The terms “**disconnect and lockout**” or “**lockout/tagout**” as used in this manual means that power to the equipment has been disconnected through the use of a padlockable,

manual power cutoff or power lockout switch pursuant to 29 CFR 1910.147.

Photographs and illustrations were current at the time of printing but subsequent production changes may cause your equipment to vary slightly in detail. Kice Industries, Inc. reserves the right to redesign and change equipment as deemed necessary, without notification. If a change has been made to your equipment that is not reflected in this owner's manual or the Illustrated Parts Lists, write or call Kice Industries, Inc. for current information and parts.

Equipment Parts and Service

For service or assistance ordering parts, contact the Customer Service Department or Quick Ship Department.

Kice Industries, Inc.
5500 Mill Heights Drive
Park City, Kansas 67219-2358
Toll Free: (877) 289-5423
Main Phone: (316) 744-7151
Fax: (316) 744-7355

IMPORTANT: Any unauthorized modification, alteration or use of non-approved attachments or drive units voids the warranty and releases Kice Industries, Inc. from any liability arising from subsequent use of this equipment. All Kice equipment is configured to be used in specific situations, handling particular types of material. Using equipment for any purpose other than that for which it was designed could result in personal injury as well as product or property damage.

NOTICE: Kice Industries, Inc. is the only authorized rebuilder of Kice equipment.

Kice equipment is designed and built to provide years of operation. As with any equipment, the following rules are essential for trouble-free operation:

- Proper installation.
- Regular maintenance.
- Correct operation within original design parameters.
- Proper application within a process.

Failure to properly install, maintain or operate Kice equipment can result in a variety of problems, including but not limited to: poor equipment performance, decreased equipment life, equipment failure, or dangerous operating conditions.

Purchased items (such as speed reducers, motors, and positive pressure pumps) are covered by the manufacturer's warranty. If there is a problem with a purchased item, check with the local supplier or service representative.

Model and Serial Number

The equipment model and serial number can be found stamped on the identification plate located on frame structure near the pump.



KICE Industries, Inc.
5500 N. Mill Heights Drive
Wichita, KS 67219
USA

P: (316) 744-7151
www.kice.com

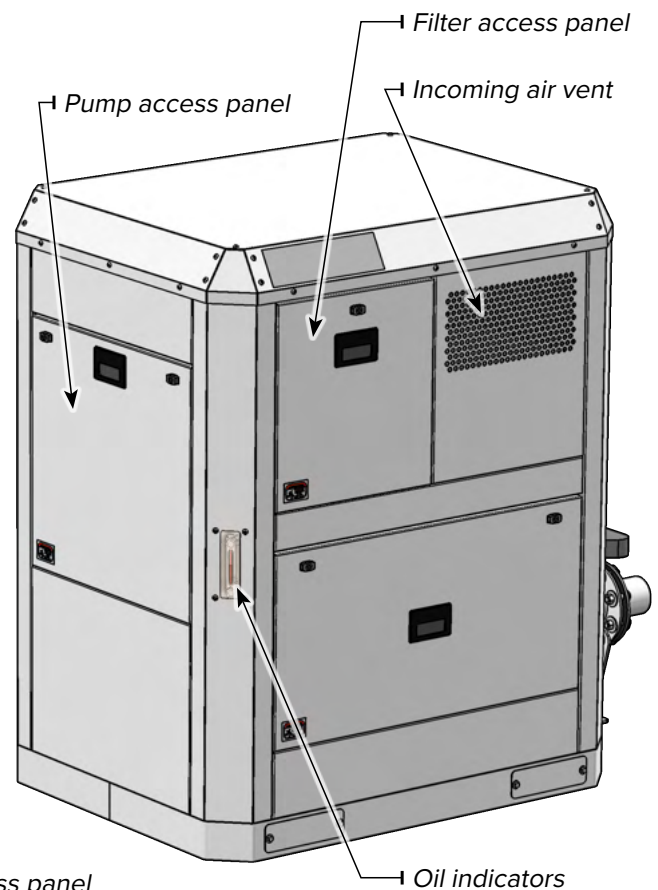
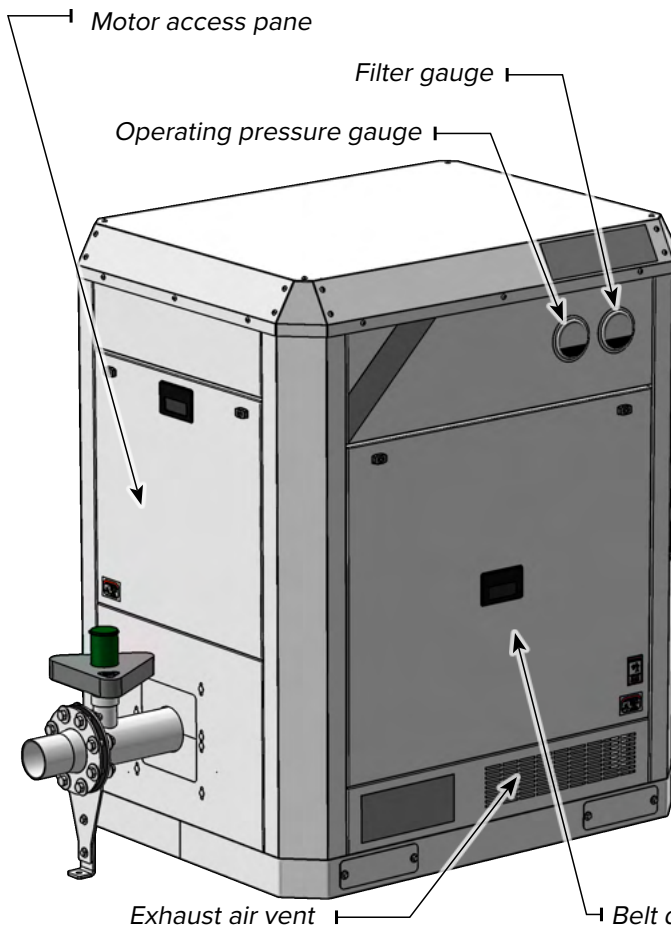
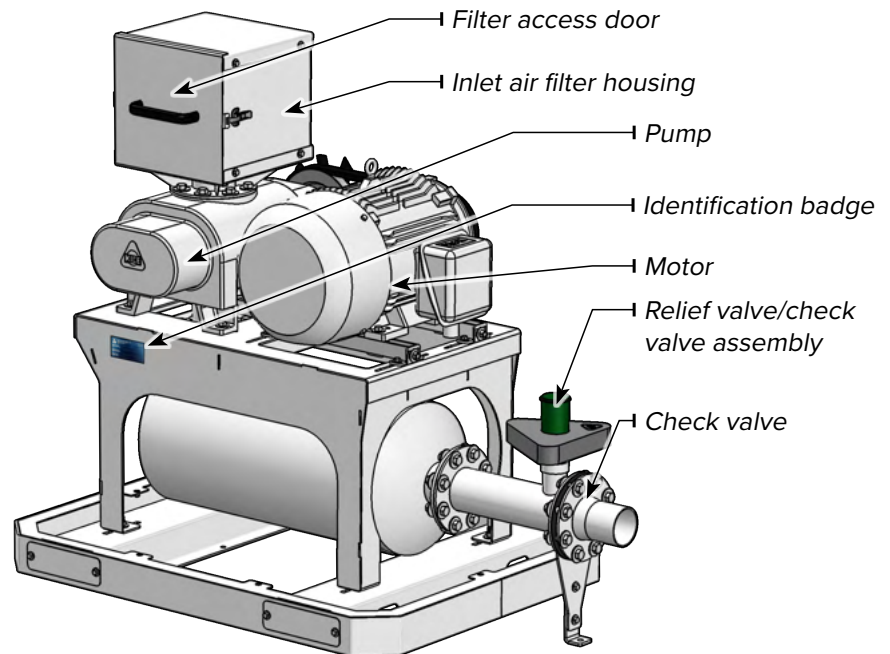
MODEL:

SERIAL:

DATE:

Air Power Unit Terminology

The image below shows some of the standard and optional features of your Kice air power unit. Note that this image is representative only; your machine's appearance may vary depending on the model and installed options.



4. HAZARD LEVEL ICONS

Hazard Levels Symbols - In Manual

Throughout this manual you'll see icons that are specific to hazards or dangers. Refer to these symbols and their respective definitions as you install, maintain, and repair your Kice equipment.



Danger is used to indicate the presence of a hazard that **WILL** cause **SEVERE** personal injury, death or substantial property damage if the warning is ignored.



Warning is used to indicate the presence of a hazard that **CAN** cause **SEVERE** personal injury, death or substantial property damage if the warning is ignored.



Caution is used to indicate the presence of a hazard that **WILL** or **CAN** cause **MINOR** personal injury or property damage if the warning is ignored.



NOTE – This symbol indicates practical tips and guidance that could be helpful.



REFERENCE MATERIAL – This symbol indicates further information is referenced in or outside of this manual.

5. SAFETY PRECAUTIONS

Safety Symbols - On Equipment



This safety alert symbol is used to call your attention to an important safety messages on equipment, safety decals and in manuals, to warn you of possible danger to your personal safety. When you see this symbol, be alert. Your personal safety or the safety of others may be affected. Follow the instructions in the safety message.

On Equipment Safety Decals - On Equipment

Equipment safety decals should not be removed, covered, painted or otherwise become illegible. If this occurs they should be replaced immediately. Contact Kice Industries, Inc. Customer Service Department for replacements.

The following safety decals will be located on the equipment. Look for them!



CAUTION: Blower has been shipped dry!
Do NOT operate motor until oil reservoirs at both end of the blower have been filled to the proper level with one of the lubricants recommended in the Blower Manual





All owners and operators should read this manual and be instructed in safe operating and maintenance procedures before attempting to uncrate, install, operate, adjust or service this equipment.

WORK SAFELY AT ALL TIMES

All energy sources associated with the equipment must be locked and tagged out in compliance with 29 CFR 1910.147, local enforcement authorities, OSHA, and facility safety practices, before removing any protective cover, guard, grate or maintenance gate.

- It is the owner's and employer's responsibility to adequately train each operator in the proper and safe use of the equipment. Written safety programs and formal instruction are essential. All new employees must be made aware of company policies, standard operating procedures (SOPs) and established health and safety procedures.
- Experienced employees should receive refresher training for potential hazards and up to date training records should be maintained at the job site.
- Do not attempt to install, connect power, operate or service the equipment without proper instruction and until you have been thoroughly trained in its operation and use by your employer.
- Before applying power to any equipment, make certain that all personnel are clear of the machine.
- Always operate safely. Use personal protective equipment (PPE) such as hard hats, helmets, gloves, earplugs, protective eye-wear, etcetera when and where appropriate. Keep PPE in good repair and accessible to operator or other affected personnel.
- The equipment is fully encapsulated if properly connected during installation and should only be operated after all pipes and hoses, including upstream and downstream components, have been completely connected to the piping system. This will prevent human access while the machine is running.
- All protective covers, guards, grates, maintenance panels, switches and warning decals must be kept in place and in good repair. Any equipment with a damaged malfunctioning, defective, or missing protective device must be taken out of service until the protective device can be repaired or replaced.
- The equipment is provided with guards for rotating components. Do not connect power to or operate the equipment unless all moving parts are completely enclosed and all supplied guards, grates and maintenance panels are in place and securely fastened.
- Do not abuse, overload, mistreat or misuse the equipment or attempt to operate the equipment if it needs service, lubrication, maintenance or repair.
- The equipment may be installed and programmed to start automatically or be controlled from a remote location. Always keep clear of all moving parts on industrial equipment, until the **POWER IS TURNED OFF AND LOCKED OUT**.
- Do not attempt to work on, clean or service the equipment, open or remove any protective cover, guard, grate, connection or maintenance panel until the **POWER IS TURNED OFF AND LOCKED OUT**. A main disconnect device must be installed to achieve this.
- During installation and operation, make sure the motor and frame of each piece of equipment is effectively and separately grounded in accordance with OSHA safety and health standards, the National Electrical Code, local codes and DIN EN 60204-1 or DIN EN IEC 61439-1 as required for the classified area.
- High voltage and rotating parts can cause series or fatal injury. Only qualified, trained, and experienced personnel should perform installation, operation, and maintenance of electrical machinery.
- If equipped with a maintenance panel incorporating any Protective Interlocking Limit Switch (PLS), the PLS must be interlocked with all electrical controls so that all motors or powered devices on the unit will be de-energized if any protected cover, guard, grate, or maintenance panel is open or removed. Interlock function of the PLS must be tested and logged daily by supervisory personnel.
- Never attempt to manually override or electrically bypass a safety device.
- Any equipment used in the processing of combustible materials or in hazardous environments require evaluation by the owner and regulatory bodies to determine appropriate monitoring equipment, dust control, explosion protection and electrical equipment enclosures. Do not use the equipment in hazardous environments unless properly equipped for the hazard.
- Always keep the workplace clean and free of dirt and dust. Do not attempt to work on slippery or unsafe surfaces, ladders or work platforms when maintenance or repair work is being performed on the equipment.

- Do not use a ladder or work platform unless it is in good repair and rated for the load required. Do not exceed maximum load ratings when installing or servicing equipment.
- Never stand under any kind of hoists or lifting mechanisms whether or not it is loaded or in operation. Never stand under or near a component when it is being lifted.
- All equipment lifting devices must be inspected by qualified personnel before each use. Do not use a lifting device to transport equipment. Never use a lifting device that is damaged, deteriorated or in need of repair.
- The unit must be lifted by a means with sufficient lifting capacity.
- The operator must ensure that adequate lighting conditions are provided at the location of equipment operation.
- Never allow any kind of metal or other foreign objects to enter the equipment, a filter should always be installed on the raw gas inlet.
- Special attention must be devoted to outside contractors engaged to enter and perform work on the equipment or in the workplace. Particular care must be exercised to ensure all such personnel are fully informed of potential hazards and plant safety procedures. Special emphasis should be placed on the use of explosion proof electrical, cutting, or welding tools where required.
- Free inlet and outlet of air must be guaranteed at all times. Otherwise, blockage and severe damage may result, or a dangerous situation may occur.
- Drive components must be inspected and adjusted after transportation and periodically as required by operating conditions. Check sheave and coupling alignment and spacing, drive belt tension, setscrews, keys, fasteners, bearings, shafts, and motors as appropriate to job conditions.
- It is ultimately the operator's responsibility to apply the above listed precautions and ensure proper equipment use, maintenance and lubrication. Keep these instructions and list of warnings with your machine at all times.
- It cannot be assumed that every acceptable safety procedure is contained herein or that abnormal or unusual circumstances may not warrant or require additional procedures.
- All air power unit discharge openings must be completely connected to the piping system to prevent human access while the equipment is operating, and must remain connected until POWER IS TURNED OFF AND LOCKED OUT. Keep away from the moving parts of the air power unit during operation.
- Stay clear of the blast for pressure relief valves and suction area of the vacuum relief valves.
- Avoid extended exposure in close proximity to machinery with high intensity noise levels.
- Hearing protection may be required depending on silencing capabilities.
- Air power unit casing and associated piping or accessories may become hot enough to cause major skin burns on contact.

6. INSTALLATION PREPARATION

The Kice air power unit has been inspected at Kice prior to shipment and should be in excellent condition upon delivery. A thorough customer inspection of the air power unit and any accessories should be completed upon receipt to verify its condition.

Delivery inspection should be completed before signing carrier's release. When a carrier signs the Kice Industries, Inc. bill of lading, the carrier accepts responsibility for any subsequent shortages or damage, evident or concealed. Therefore any resulting claim must be made against the carrier by the purchaser. Evident shortage or damage should be noted on the carrier's delivery document before signature of acceptance. Inspection by the carrier for damage, evident or concealed, must be requested.

Complete a visual inspection paying particular attention to guards, overall external condition, protrusions (i.e. mating flanges, attachment points, valves, etc.) and safety decals while the Kice air power unit is still secured to the freight platform.

7. STORAGE

Kice air power units are shipped in many different configurations. Some units are completely assembled and skidded when size permits. These units may be handled and moved using good rigging techniques, being careful to avoid concentrated stresses that will distort any of the parts. Items or parts of the air power unit that are shipped knocked down will be clearly labeled for reassemble. If the air power unit is not to be installed promptly, store it in a clean, dry location to prevent rust and corrosion of steel components. If outdoor storage is necessary, protection should be provided. Cover the inlet and outlets to prevent the accumulation of dirt and moisture inside the body.

Long Term Storage

1. Spray the interior (lobes, housing and end plates) with a rust preventative.
2. Fill both end reservoirs with the recommended level of oil.
3. Firmly attach a very prominent tag stating that the end reservoirs contain oil and must be drained and refilled to proper levels prior to startup.
4. Apply rust preventative grease to the drive shaft.
5. Attach a desiccant bag to either of the port fitting caps to prevent condensation from occurring inside the air power unit. Make sure any desiccant bag (or bags)

is attached to the covers that they will be removed when dust cover is removed. It is imperative that these be removed before startup of the air power unit.

6. Store the air power unit in an air-conditioned and heated building if at all possible. At least insure as dry conditions as possible.
7. The pump should be stored with the shaft accessible, so that it can be rotated once or twice every two or three weeks.

8. INSTALLATION

Contact Kice Industries, Inc., for any installation questions. **See following pages for installation details.**

The following hazards are present:



Use appropriate equipment when lifting or moving the air power unit. Make sure all persons and obstructions are clear from the path and installation area. When installing the equipment, make sure the moving parts inside the equipment are not accessible. This also fulfills EN ISO 13857-1 where required.



High voltage and rotating parts can cause serious or fatal injury. Only qualified personnel should perform installation, operation and maintenance of electrical machinery. Make sure that any electric motor and the frame of the air power unit is effectively grounded in accordance with OSHA standards, the National Electrical Code and local codes.

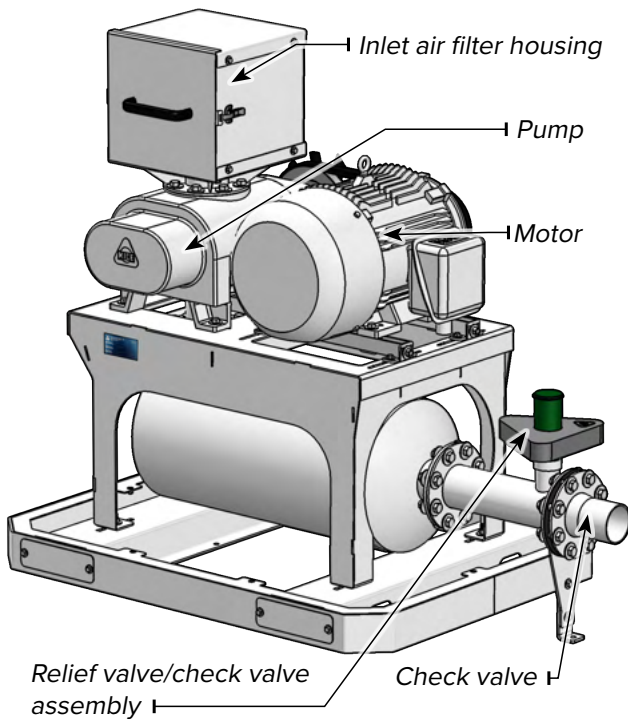
Air Power Unit Assembly Overview

The following information is intended to assist the installer with the assembly and installation of their Kice air power unit but should not be considered a step-by-step instruction due to variations in the supplied product and site location. These variations could be due to application, customer specifications, orientations, etc. Any questions arising before or during installation should be directed to your Kice sales representative for clarification and recommendations.

The image below shows a typical complete installation of the air power unit and accessories, before the enclosure is installed. Note the absence of throttle or shut-off valves in either the inlet or the outlet line.

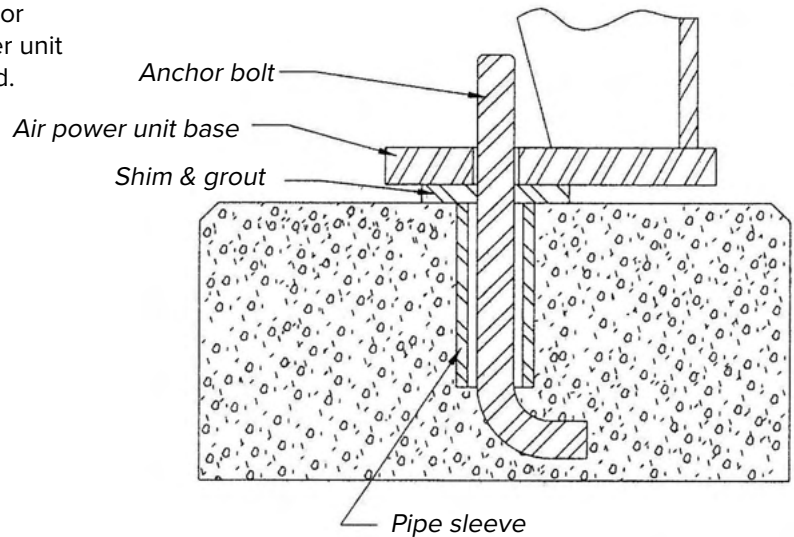
The Kice air power unit should be installed in a protected indoor location, if possible. However, an unprotected outdoor installation will be satisfactory if correct lubrication for expected temperatures is provided (*see lubrication section*). Before starting the installation, remove plugs or covers (shipping seals) from the inlet and discharge connections. Inspect for dirt or foreign objects inside the tubing.

Rotate the air power unit by hand to insure it will rotate freely. Before connecting the discharge to the conveying line, bump the motor and check for proper rotation. For best results, and long life, run the motor and air power unit for 10 to 20 minutes with no load, as a break-in period.



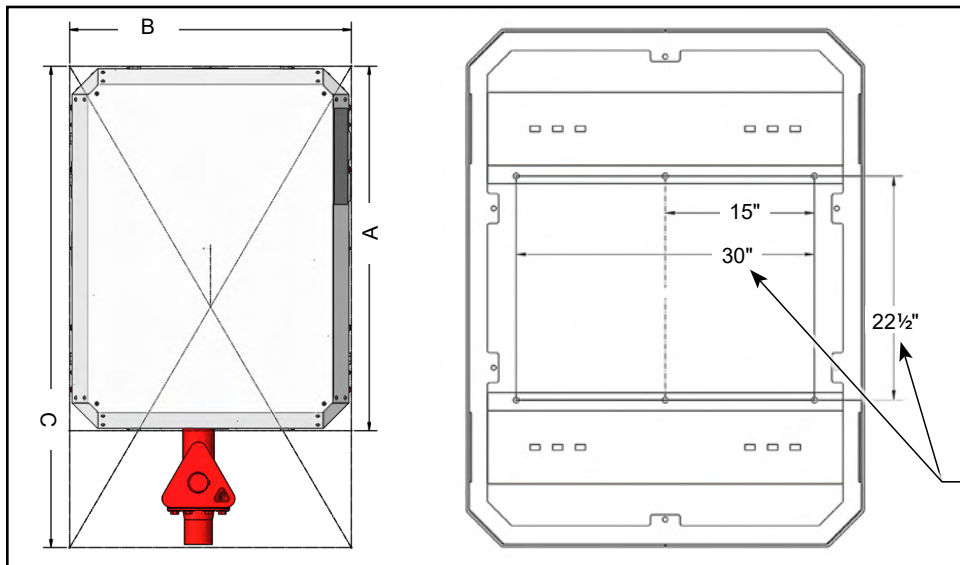
Slab-Mounted Units

A qualified engineer should design the foundation for the air power unit. The mass of the foundation must maintain the air power unit/driver alignment, absorb normal vibration, and resist lateral loads. The overall dimensions of the concrete foundation should extend at least six inches beyond the equipment. The weight of the slab should be two to three times the weight of the air power unit. The foundation requires firmly anchored fasteners such as the anchor bolts shown below. Refer to the drawings provided of your equipment for foot pad locations and equipment weight. Hammer drilled expansion fasteners can be used in less demanding applications.



Note:

This includes anchor leg under the discharge (if supplied). When isolation is used, check the Kice drawing for installation instructions. Note that all isolation pads on the CompQ four base legs are assembled before shipment. The outlet assembly is shipped disassembled.



Step 1

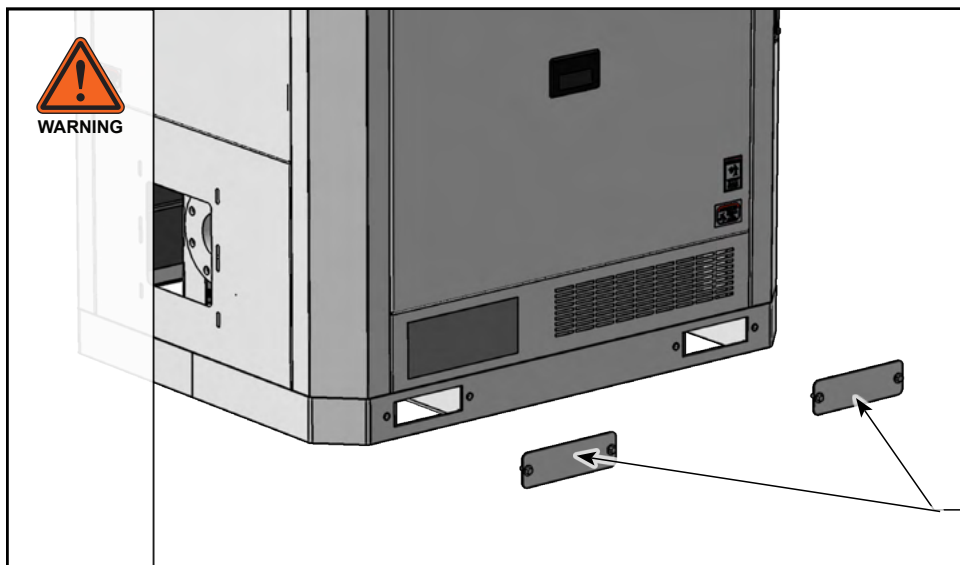
□ Position Layout

Plan and layout frame position on slab. Overall footprint is shown on the table below.

Blower Model Number	Dim 'A' (inch)	Dim 'B' (inch)	Dim 'C' (inch)
CompQ 2000 CompQ 2500 CompQ 3000 CompQ 4000	52.9375	40.8125	70.0000
CompQ 5000 CompQ 6000	68.9375	54.9375	90.0000

Critical Dimensions:

1 22½ x 30" Rectangle Layout

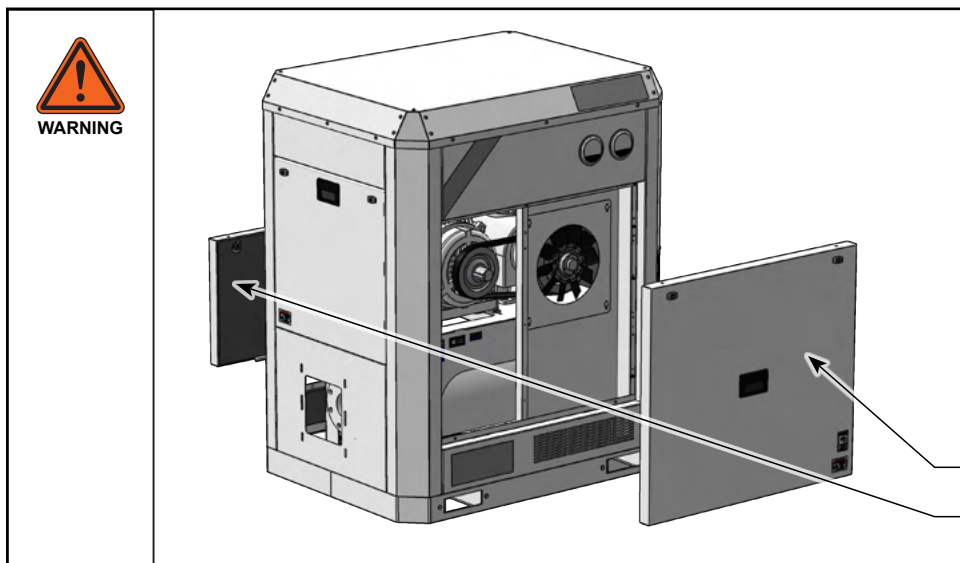


Step 2

□ Move to Install Area

Move the air power unit to install area using proper equipment and rigging. Fork slots can be accessed by removing the four fork covers.

1 Remove x2 fork covers



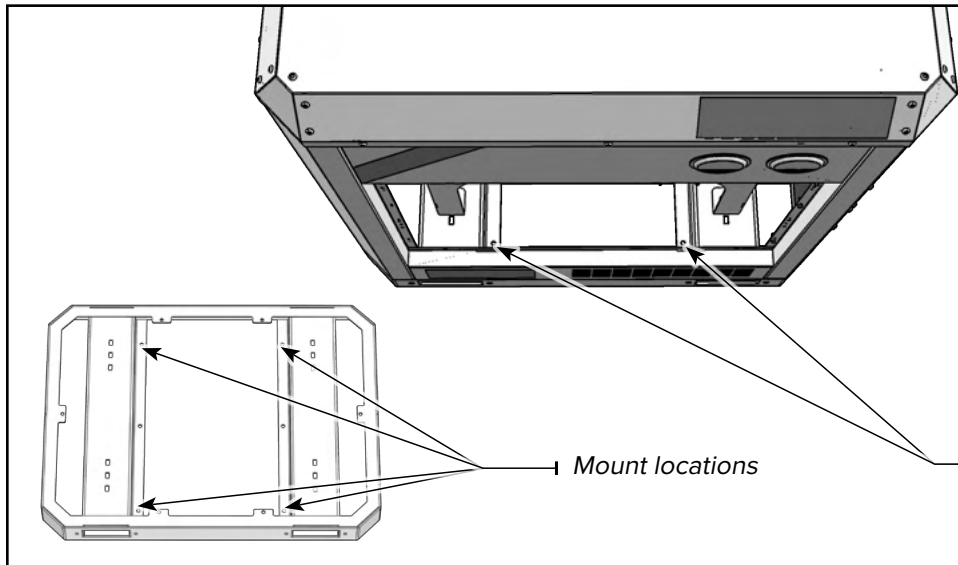
Step 3

□ Set in Place

Set the air power unit in the desired position. Remove the left and right side access panels. Once removed, access to the four mount holes can be achieved.

1 Right access panel

1 Left access panel



Step 4

□ Anchor in Place

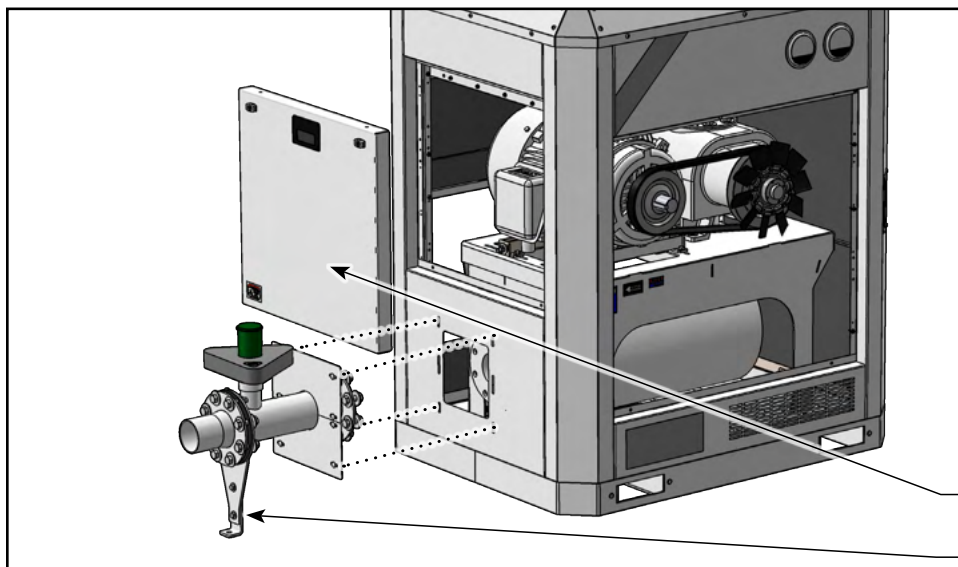
Drill and anchor the air power unit in place using proper hardware. Apply shims as needed to prevent twisting and frame distortion. Any twisting could effect operation.

Slab-Mounted Units

The air power unit has been factory mounted on the base, and the base should be leveled to insure proper lubrication, and even weight distribution. The floor may be uneven; therefore shims may be needed to provide even support and eliminate a soft-foot condition. If the air power unit is twisted or cramped, the lobes may contact the end plates, or the body. Rotating the shaft by hand will confirm if this has happened.

Structural Steel-Mounted Units

When an elevated or suspended structural steel platform is used, it must have sufficient bracing to support the unit load and prevent side sway. The platform should be of welded construction to maintain permanent alignment of all members.



Step 5

□ Install Outlet Pipe

Remove front access panel to gain access to pipe flange. Install outlet pipe and adjustable cover as shown.

Step 6

□ Wire Motor

A qualified electrician should wire the motor as explained in the Electrical Connection heading in the Maintenance section.

Remove front access panel

Set anchor bracket once in place

Step 7

□ Reinstall All Enclosure Parts

Reinstall all parts in reverse order that they were removed beginning with Step 5 and ending with Step 2.

Step 8

□ Install Piping to Air Power Unit

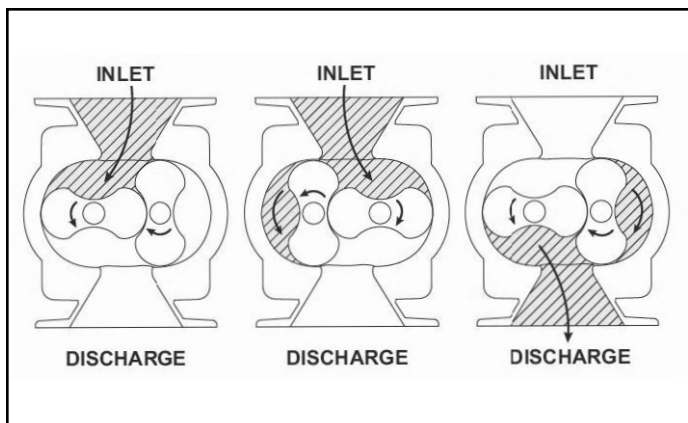
Install piping to air power unit output flange.

9. STARTUP AND OPERATION

The Kice air power unit is a positive displacement type unit, whose pumping capacity is determined by size, operating speed, and pressure conditions. It employs dual lobe rotors rotating in opposite directions within a housing closed at the ends by end plates.

Effective sealing of the air power unit inlet area to the discharge area is accomplished by use of very close operating clearances. Resulting absence of moving contacts eliminates the need for any internal lubrication.

Clearances between the rotors during rotation are maintained by a pair of accurately machined helical timing gears, mounted on the two shafts extended outside the air chamber. The two intermeshing rotary lobes are designed to rotate and trap air or gas between each rotor and the housing. As the rotor lobes rotate past the edge of the suction port the trapped air or gas is essentially at suction pressure and temperature since the air power unit is a constant volume device, the trapped air remains at suction pressure until the leading rotor lobe opens into the discharge port. Immediately, the high-pressure air in the discharge line compresses the low-pressure air to discharge pressure. The rotors continue to rotate and force the air from the air power unit into the discharge line.



It can be seen by the illustration that the air moves not between the rotors but between the rotors and the side of the housings. Also, the rotation of the air power unit can make either side the inlet or discharge.

No attempt should ever be made to control capacity by means of a throttle valve in the intake or discharge piping. This will increase the power load on the drive system, increase the operating temperatures, and can overload and/or seriously damage the air power unit. Likewise, if a possibility exists that flow to the air power unit inlet may be cut off during normal operation of a process, then an adequate vacuum relief valve must be installed near the air

power unit. A pressure type relief valve in the discharge line near the air power unit is also strongly recommended for protection against cut-off or blocking in this line. Check valves should also be used on every air power unit. This is for both safety and operating conditions.

A v-belt drive is employed to obtain the correct air power unit speed. If conditions change from the design criteria, field changes can be made to the drive by changing the diameter of one or both sheaves to obtain the desired capacity and speed. To protect the air power unit from back flushing of material, a check valve in the piping on the air power unit discharge is installed on all applications.

Consult your Kice sales representative if questions arise.

Operation Limits

To permit continued satisfactory performance, the air power unit must be operated within certain approved limiting conditions. The manufacturer's warranty is also contingent on such operation. Maximum limits for pressure; temperature, horsepower, and speed are specified here for various air power unit sizes when operated under the standard atmospheric conditions. Do not exceed any one of these limits.

Example: The listed maximum allowable temperature limit (the limit is a function of the temperature rise as well as the inlet temperature) for any particular air power unit may occur well before the maximum speed or maximum pressure rating is reached. Temperature rise then becomes the limiting condition. In other words, the operating limit is always to be determined by the maximum rating reached first, and it can be anyone of the four:

1. Pressure Differential
2. Discharge Temperature
3. Horsepower
4. Blower Speed

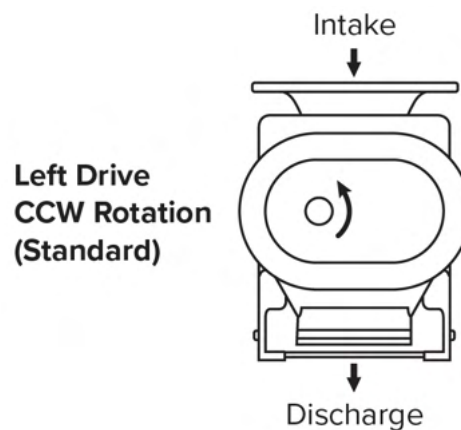
Kice air power units that are for pressure/vacuum service have been selected to provide proper volume within the pressure, temperature, and horsepower range of the machine, to perform as required. The above factors are listed in the following table for Kice air power units.

Operation Limits

Blower Model Number	Maximum Pressure/ Vacuum	Maximum Discharge Temperature	Maximum Break Horsepower	Maximum Blower Speed
CompQ 2000	15 psi g/15' h.g. 1 bar/0.5 bar	280°F 138°C	10 hp 7.5 kW	3600 RPM
CompQ 2500	15 psi g/15' h.g. 1 bar/0.5 bar	280°F 138°C	15 hp 11 kW	3600 RPM
CompQ 3000	15 psi g/15' h.g. 1 bar/0.5 bar	320°F 160°C	30 hp 22 kW	3600 RPM
CompQ 4000	15 psi g/15' h.g. 1 bar/0.5 bar	320°F 160°C	30 hp 22 kW	3600 RPM
CompQ 5000	15 psi g/15' h.g. 1 bar/0.5 bar	280°F 138°C	50 hp 37 kW	3000 RPM
CompQ 6000	15 psi g/15' h.g. 1 bar/0.5 bar	280°F 138°C	60 hp 45 kW	3000 RPM

Flow Direction by Rotation

Kice air power units are standardized top inlet, bottom discharge with left hand shaft location, counter clockwise rotation.



Operation / Start Up

Before starting the air power unit for the first time under power, recheck the installation thoroughly to reduce the possibility of problems. Use the following checklist as a guide, but also consider any other special conditions in your installation.

Step 1

☐ Confirm Level Installation

Be certain the air power unit has been installed level, using shims as needed so that the frame is not distorted.

Step 2

☐ No Foreign Materials in Unit

Be certain no bolts, rags or dirt have been left in the air power unit. The enclosure interior should also be kept clean and free of debris.

Step 3

☐ Inlet Free of Debris

Be certain that inlet piping is free of debris. Inlet must be protected with an inlet filter.

Step 4

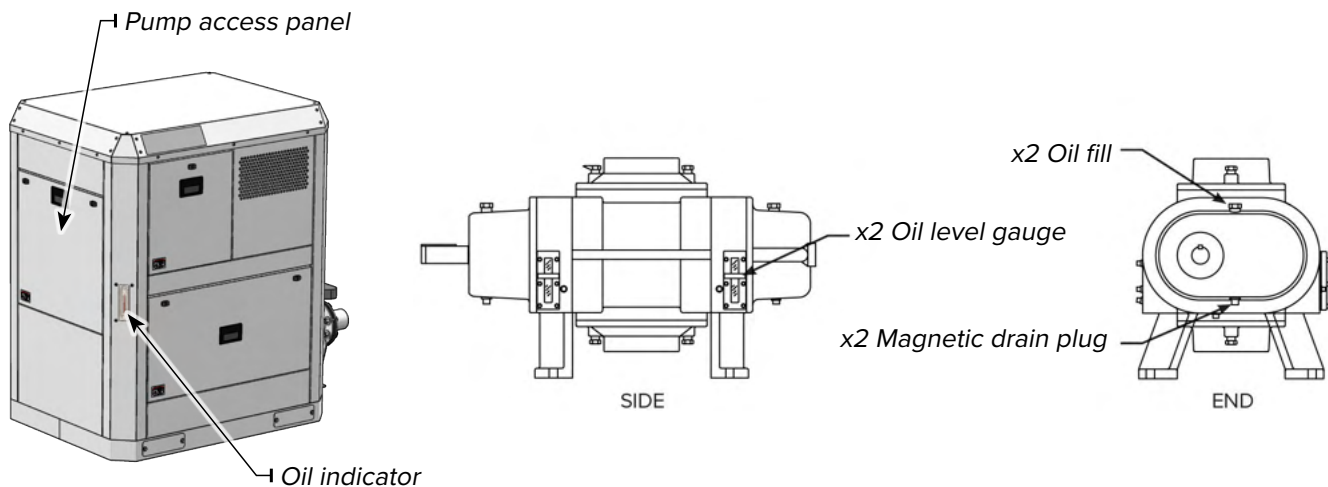
□ Drive Alignment

Check drive alignment, belt tension, and tightness of all mounting bolts to recommended guidelines.

Step 5

□ Check Oil Levels

Be certain that the oil is at the proper level in both ends of the air power unit, when not operating, as further discussed in the Lubrication section on page 23. Access to the oil level gauges can be had through the pump access panel.



Step 6

□ Check Electrical Connections

Be certain that the electrical motor is properly lubricated, and that the starter is set for the proper amperage and voltage.

Step 7

□ Check for Free Rotation

Rotate the air power unit shaft several times by hand to make sure air power unit is rotating freely. Unevenness or tight spots is an indication of a problem.

Step 8

□ Verify Flow Direction

Check motor rotation by momentarily pushing the start button (BUMPING) and check flow direction of the air power unit. Reverse the motor connections if flow is in the wrong direction.

Initial operation should be carried out under “no load” conditions by not starting the airlock valves to feed material into the conveying line, or by disconnecting the discharge of the air power unit from the conveying line and venting the discharge to atmosphere. Start the motor briefly, listen for unusual noises, and check that the air power unit coasts freely to a stop. If any questions exist, investigate before proceeding further.

Assuming all tests are satisfactory, the air power unit will now be ready for continuous full load operation. During the first several days, make periodic checks to determine that all conditions remain acceptable and steady. These checks may be particularly important if the air power unit is part of a process system where conditions will vary. At the first opportunity, stop the air power unit and clean or remove inlet filter. Also, recheck leveling, belt alignment, tension, and mounting bolts for tightness.

10. MAINTENANCE AND SERVICE



High voltage and rotating parts can cause serious or fatal injury. Only qualified personnel should perform installation, operation and maintenance of electrical machinery. Make sure that any electric motor and the frame of the air power unit is effectively grounded in accordance with OSHA standards, the National Electrical Code and local codes.



Review all Safety Precautions noted in the manual before performing maintenance on equipment.



Use appropriate equipment when lifting or moving the air power unit. Make sure all persons and obstructions are clear from the path and installation area. When installing the equipment, make sure the moving parts inside the equipment are not accessible. This also fulfills EN ISO 13857-1 where required.

The key to long and trouble free air power unit operation is good maintenance practices. Periodically inspect the air power unit for damage from foreign materials or wear. Particular attention should be paid to lubrication of timing gears and bearings in accordance with comments under the Lubrication Section of this manual. Also service the drive per manufacture instructions and check belt drive tension. By use of thermometers and gauges, make sure the air power unit operating temperature and pressure remain within allowed limits.

A majority of the operating problems that occur with an air power unit can be traced to improper adjustments and delayed, or neglected, maintenance. A consistently applied maintenance program will prevent many problems.

A thorough understanding of the air power unit is a must if the operating problems are to be corrected satisfactorily. A good rule to follow when troubleshooting a problem is to never make more than one adjustment at a time, thereby isolating the problem by a process of elimination. The cause of a problem is usually simple and is easy to pinpoint if you systematically check each system and function.

When an air power unit is taken out of service, it may require internal protection against rusting or corrosion. The need for such protection must be a matter of judgement based on existing conditions as well as length of down time. Under atmospheric conditions producing rapid corrosion, the air power unit should be protected immediately.

Should adjustments or replacements eventually be needed, contact Kice Customer Service for a rebuild manual and needed parts. Personnel should have a good background with mechanical experience and be thoroughly familiar with these instructions.

Replacement Parts

It is recommended that only Kice supplied replacement parts be used. Kice parts are built to be fully compatible with the original air power unit using specific alloys and tolerances. These parts carry a standard Kice warranty.

When ordering replacement parts, specify the part name, the Kice serial number and the air power unit model and size. Most of this information is on the metal nameplate attached to the air power unit.

Recommended Maintenance Schedule

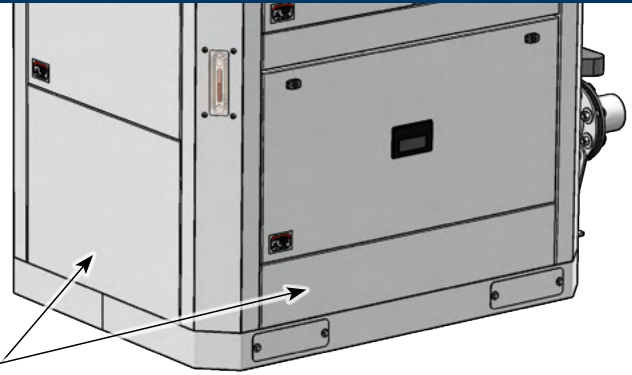
Daily	Weekly	Monthly
<ol style="list-style-type: none"> 1. Check and maintain oil level, and add oil as necessary. 2. Check for unusual noise or vibration. 	<ol style="list-style-type: none"> 1. Clean all air filters. A clogged air filter can seriously affect the efficiency of the blower and cause overheating and oil usage. 2. Check the relief valve to make sure it is operating properly. 	<ol style="list-style-type: none"> 1. Inspect the entire system for leaks. 2. Inspect the condition of the oil and change if necessary. 3. Check drive belt tension and tighten if necessary. 4. Check duct work for proper ventilation.

Note: Over lubrication can be an issue as well as under lubrication.

Electrical Connection / Disconnection

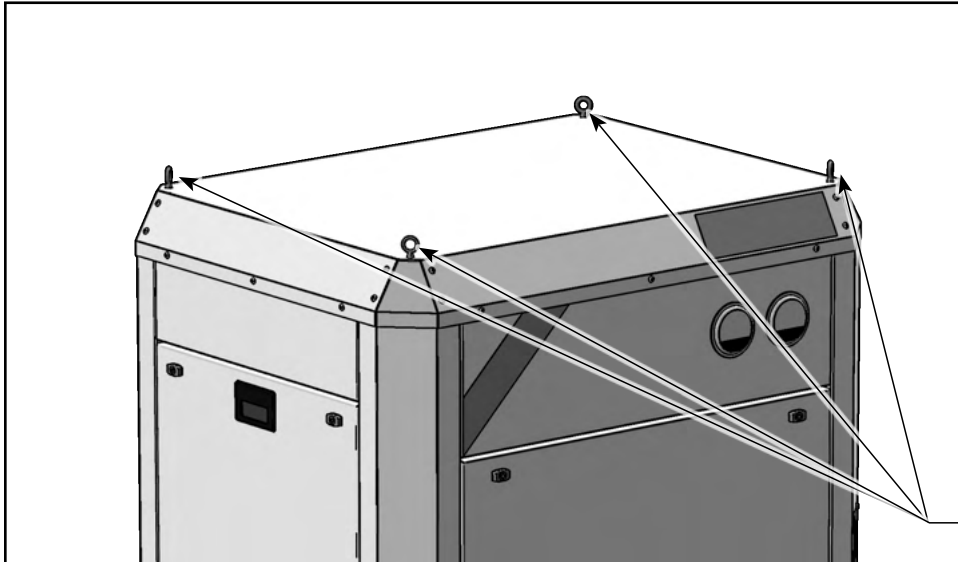
A qualified electrician should penetrate the enclosure on fixed, non removable, sections. During enclosure removal, the electrician should disconnect any conduit and electrical connections that could prevent the enclosure from being lifted up and off of unit.

Electrical feed should enter through fixed, non removable, panels only



Enclosure Removal

For some maintenance and service operations it's recommended, or required, that the outer air power unit enclosure be removed. When removing the enclosure ensure that all enclosure mounting bolts are removed and that the enclosure is free to move in both up/down and twisting directions. This movement is needed to clear parts of the air power unit, specifically the cooling fan shaft and blade.



Step 1

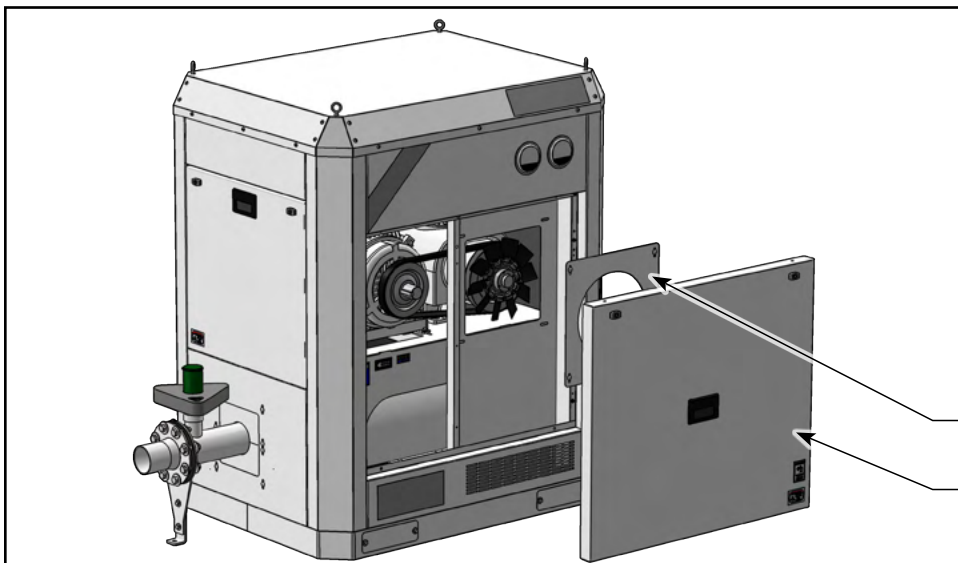
□ Add Eyebolts

Prepare to remove enclosure by replacing existing screws as shown with 5/16-18 threaded eyebolts.

IMPORTANT: Electrician will need to disconnect power from motor and any connections through enclosure.

IMPORTANT: Eyebolts CANNOT be used to lift entire unit. They are provided to lift enclosure only.

Add eyebolts in current screw locations



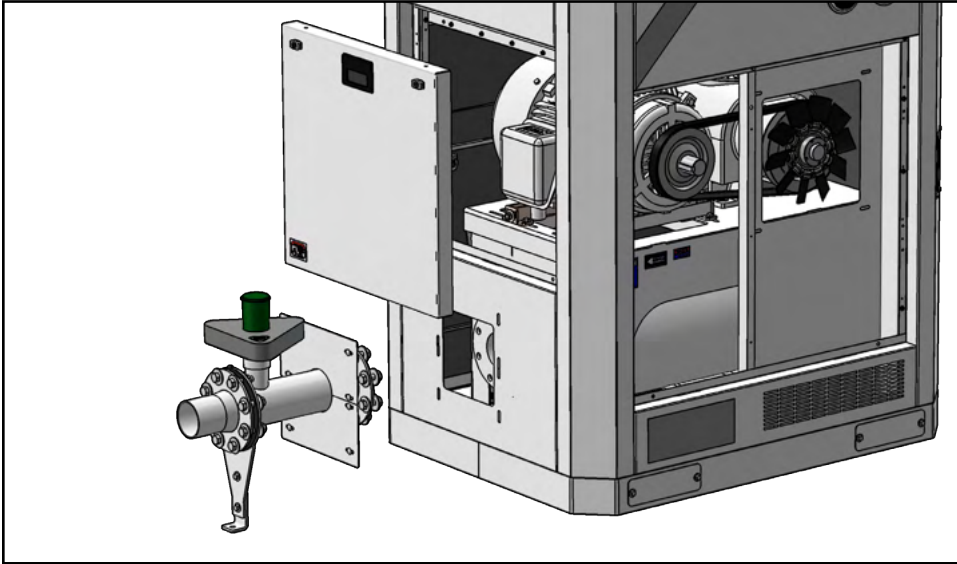
Step 2

□ Remove Fan Shroud

Remove large side panel so as to gain access to the blower cooling fan. Remove fan shroud and set aside.

Remove fan shroud

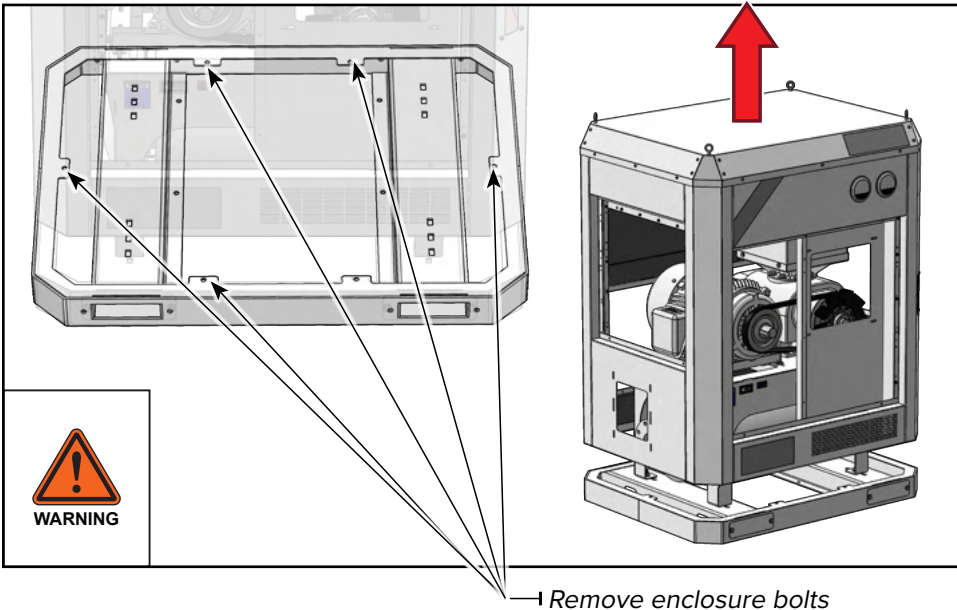
Remove side panel



Step 3

□ Remove Outlet Pipe

Remove front access panel to gain access to pipe flange. Unbolt the four fasteners connecting the oil level indicator plate from the enclosure. Disconnect ducting from system and remove outlet pipe and adjustable cover as shown.



Step 4

□ Remove Enclosure

Enclosure fasteners are located on the bottom skid plate. Access to the enclosure bolts can be gained through the side panels.

Remove the five enclosure fasteners and set aside. Then lift the enclosure directly up being careful not to bump or damage the air power unit or enclosure.

Note:

Enclosure may need to twist slightly to clear fan shaft.

Step 5

□ Reinstall All Enclosure Parts

Reinstall all parts in reverse order that they were removed.

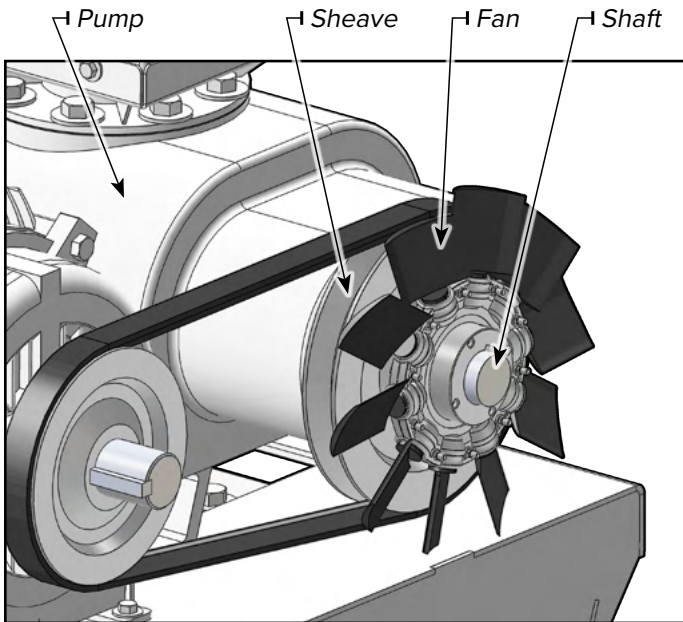
Step 6

□ Install Piping to Air Power Unit

Install piping to air power unit output flange.

V-Belt Drive Mounting

The v-belt drives are factory installed. In some cases the drives are removed to facilitate the installation of the air power unit. The following procedure should be used to mount the v-belt drives. Note that the cooling fan is mounted on the driven shaft as shown below.



Step 1

□ Remove Access Panel

Obtain access to drive belt through large side panel.

Step 2

□ Remove Fan Shroud

Remove the four carriage bolts holding the fan shroud in place.

Step 3

□ Remove Cooling Fan

Loosen the set screw located on the fan hub. Pull fan from shaft and set aside.

Step 4

□ Prepare Shafts

Remove all foreign material and burrs from the air power unit and motor shafts. Coat both shafts with machine oil for easier mounting.

Step 5

□ Mounts Sheaves on Shafts

Mount sheaves on the shafts, checking sheave bores and bushings for nicks or burrs. Avoid using force. If resistance is encountered, lightly polish the shaft with crocus cloth until the sheave slides on freely. Tighten tapered bushing bolts sequentially, multiple times, to ensure the torque matches the specifications provided with the bushing.

Step 6

□ Adjust Motor Position

Adjust the motor on its base to a position closest to the air power unit shaft. Install belts by working each one over the sheave grooves until all are in position. Never pry the belts into place. On Kice air power units, sufficient motor adjustment is provided for easy installation of the proper size belts.

Step 7

□ Check Shaft Face Planes

Adjust sheaves and the motor shaft angle so that the sheave faces are in the same plane. Check this by placing a straightedge across the faces of the sheaves. A laser alignment tool can also be used for belt alignment. Any gap between the edge and sheave faces indicates misalignment.

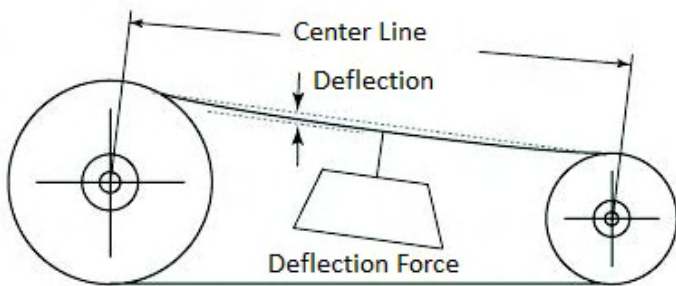
IMPORTANT: This method is only valid when the width of the surface between the belt edge and the sheave face is the same for both sheaves. When they are not equal, or when using adjustable pitch sheaves, adjust so that all belts have approximately equal tension. Both shafts should be at right angles to the center belt.

V-Belt Tensioning

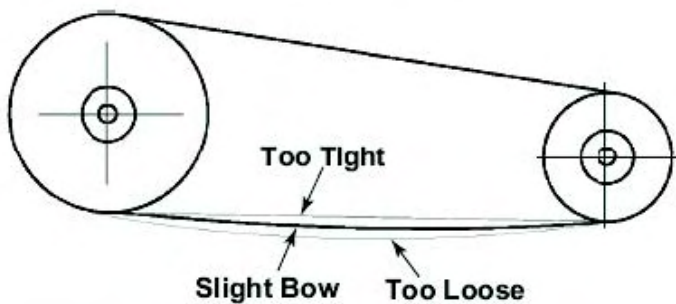
Step 8

□ Verify Belt Tension

Check belt tension with a tensioning gauge and adjust using the motor slide base. Excess tension shortens bearing life while insufficient tension shortens belt and bearing life. Insufficient tension belts can have adverse effects on air power unit performance and may cause vibration. The lowest allowable tension is that which prevents slippage under full load. Belts may slip during start up, but slippage should stop as soon as the air power unit reaches full speed. For more precise tensioning methods, consult the drive manufacturer's literature.



Properly Tensioned V-belt



Improperly Tensioned V-belt

Step 9

□ Check for Interference

Recheck belt alignment and bushing set screws tightness, rotate the drive by hand and check for rubbing.

Reassemble

Step 10

□ Install Fan

Slide fan onto shaft. If resistance is encountered, lightly polish the shaft with crocus cloth until the fan slides on freely. Tighten set screw once in place.

Step 11

□ Install Fan Shroud

Reinstall shroud and four carriage bolts. Ensure shroud is free and clear of fan blade so as to not interfere during operation.

Step 12

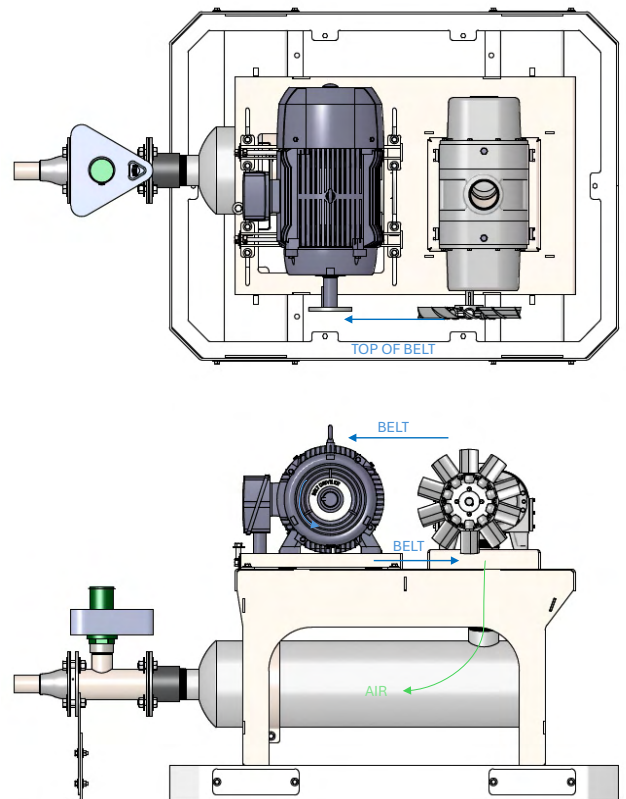
□ Recheck Tension

Belts tend to stretch somewhat after installation. Recheck tension after several days of operation. Check sheave alignment as well as setscrew and/or bushing bolt tightness.

Step 13

□ Install Access Panel

Reinstall access panel and lock in place.



Electric Motor Replacement

After extended use it may become necessary to replace the electric motor. For specific items related to motor refer to the manufacturers specifications or contact our Customer Service Department for additional information.

Step 1

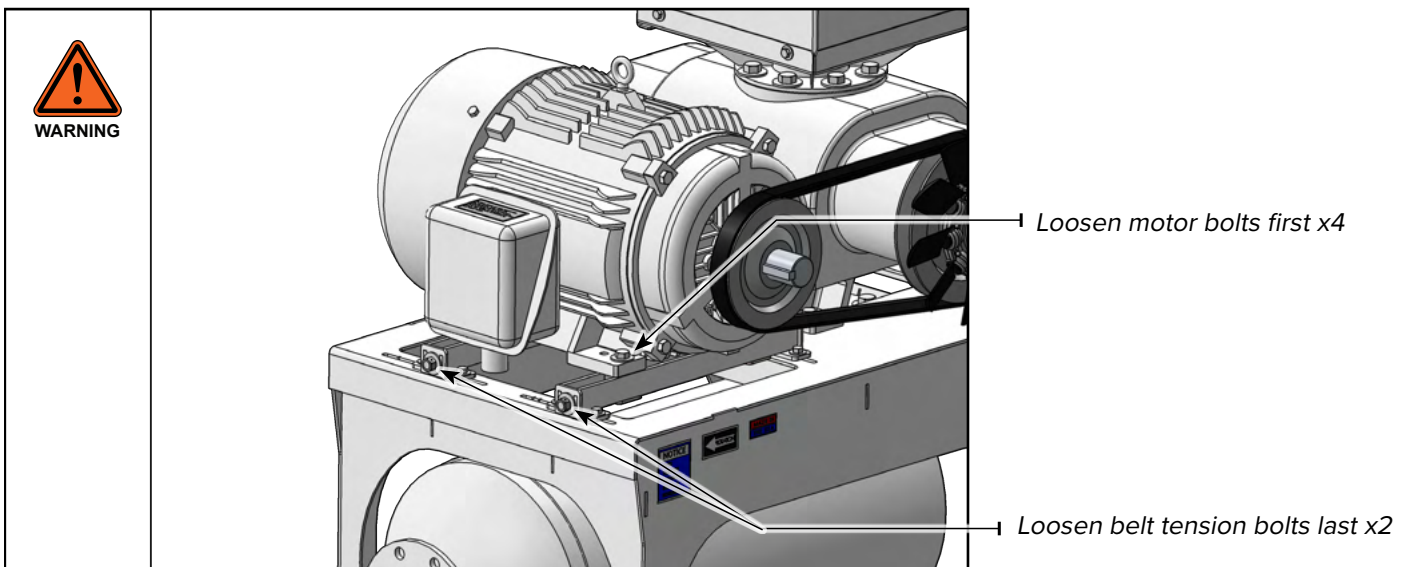
□ Disconnect Power and Remove Enclosure

See electrical disconnect and enclosure removal process on [page 16](#). Electrical disconnect and all motor wiring should be performed by qualified electrician.

Step 2

□ Loosen Motor Bolts

Loosen the four motor bolts affixing motor to frame.



Step 3

□ Loosen Belt Tension

First loosen motor bolts, then loosen tension until belt clears motor sheave. Remove sheave from shaft.

Step 4

□ Remove Mount Bolts

Remove the four motor mount bolts. Use proper lifting equipment to remove the motor from the frame.

Step 5

□ Install New Motor

Use proper lifting equipment to lower and mount new motor to frame.

Step 6

□ Mount Sheave, V-Belt

Mount sheave, v-belt and apply tension as specified on [page 18-19](#).

Step 7

□ Drive Alignment

Check drive alignment, belt tension and tightness of all mounting bolts.

Step 8

□ Check Oil Levels

Be certain that the oil is at the proper level in both ends of the air power unit, when not operating. Access to the oil level gauges can be had through the pump access panel.

Step 9

□ Check Electrical Connections

Be certain that the electrical motor is properly lubricated, and that the starter is set for the proper amperage and voltage.

Step 10

□ Check for Free Rotation

Rotate the air power unit shaft several times by hand to make sure air power unit is rotating freely. Unevenness or tight spots is an indication of a problem.

Step 11

□ Verify Flow Direction

Check motor rotation by momentarily pushing the start button (BUMPING) and check flow direction of the air power unit. Reverse the motor connections if flow is in the wrong direction.

Initial operation should be carried out under “no load” conditions by not starting the airlock valves to feed material into the conveying line, or by disconnecting the discharge of the air power unit from the conveying line and venting the discharge to atmosphere. Start the motor briefly, listen for unusual noises, and check that the air power unit coasts freely to a stop. If any questions exist, investigate before proceeding further.

Assuming all tests are satisfactory, the air power unit will now be ready for continuous full load operation. During the first several days, make periodic checks to determine that all conditions remain acceptable and steady. These checks may be particularly important if the air power unit is part of a process system where conditions will vary. At the first opportunity, stop the air power unit and clean or remove inlet filter. Also, recheck leveling, belt alignment, tension, and mounting bolts for tightness.



WARNING

High voltage and rotating parts can cause serious or fatal injury. Only qualified personnel should perform installation, operation and maintenance of electrical machinery. Make sure that any electric motor and the frame of the air power unit is effectively grounded in accordance with OSHA standards, the National Electrical Code and local codes.

V-Belt Troubleshooting

If problems occur with v-belt installation, use and wear refer to the table below for potential solutions.

Problem	Possible Causes	Solution
Belts slip (sidewalls glazed)	Not enough tension	Replace belts; apply proper tension
Drive squeals	Shock load	Apply proper tension
	Not enough arc of contact	Increase center distance
	Heavy starting load	Increase belt tension
Belt(s) turned over	Broken cord caused by prying on sheave	Replace set of belts and install correctly
	Overloaded drive	Redesign drives
	Impulse loads	Apply proper tension
	Misalignment of sheave and shaft	Re-align drives
	Worn sheave grooves	Replace sheaves
	Excessive belt vibration	Check drive design Check equipment for solid mounting Consider use of banded belts
Mismatched belts	New belts installed with old belts	Replace belts in matched sets only
Breakage of belt(s)	Shock loads	Apply proper tension; recheck drive
	Heavy starting loads	Apply proper tension; recheck drive Use compensator starting
	Belt pried over sheaves	Replace set of belts correctly
	Foreign objects in drives	Provide drive guard
Rapid belt wear	Sheave grooves worn	Replace sheaves
	Sheave diameter too small	Redesign drives
	Mismatched belts	Replace with matched belts
	Drive overloaded	Redesign drives
	Belt slips	Increase tension
	Sheaves misaligned	Align sheaves
	Oil or heat condition	Eliminate oil. Ventilate drives
Belts smoking at start	Drive turning wrong direction	Reverse drive direction

Lubrication

Every Kice air power unit is shipped dry to its installation point. Both independent oil reservoirs (one on each end of the air power unit) must be filled to proper level before operation.

Shaft bearings at the gear end of the air power unit are splash lubricated by one or both gears dipping into the oil reservoir formed in the end plate and cover. A slinger assembly dipping into the oil reservoir lubricates shaft bearings at the free end of the air power unit. Before starting the air power unit, fill sumps as instructed below:

Step 1

□ Remove Access Panel

Remove large access panel located on opposite side of discharge piping.

Step 2

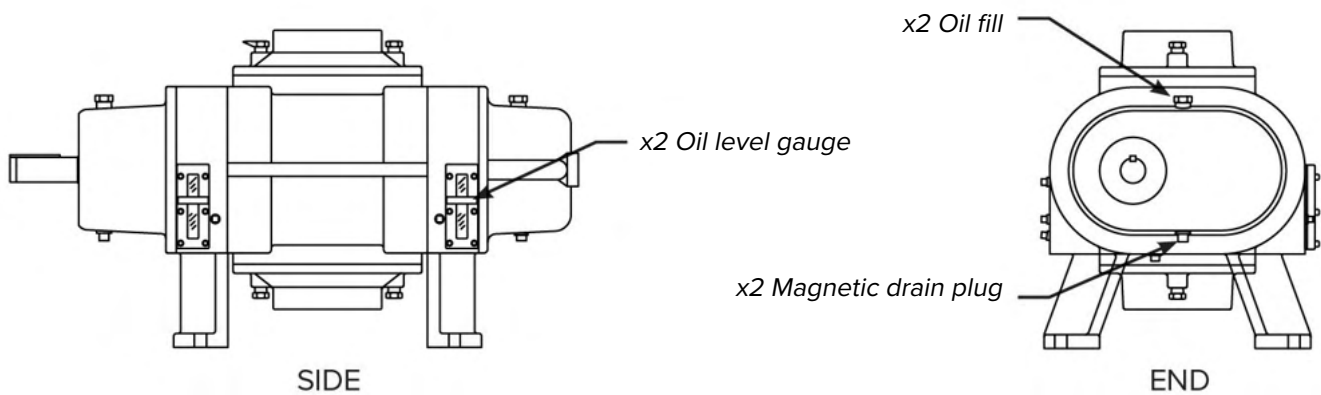
□ Remove Fill Plugs

Remove fill plugs from gear end and free end covers.

Step 3

□ All Proper Oil Level

Pour oil through fill hole slowly until oil appears in oil sight glass. Slowly bring oil up to proper level.



Step 4

□ Replace Fill Plugs

Replace plugs in end covers.

Note: Kice recommends the use of MD full synthetic food grade oil.

Approximate Oil Capacities - Total Per Unit			
Model	Capacity	Model	Capacity
CompQ 2000	3/4 Qt.	CompQ 2500	3/4 Qt.
CompQ 3000	1-3/4 Qt.	CompQ 4000	1-3/4 Qt.
CompQ 5000	2-3/4 Qt.	CompQ 6000	2-3/4 Qt.

Note: Lubrication should be checked regularly. The fill line is based on the level when the pump is not operating. Note and maintain the operating oil level after filling the oil to the correct level with the pump off. Time lapse between oil changes will have to be determined for each individual installation and normally will be between 800-1200 operating hours.



WARNING

Never attempt to change or add oil while air power unit is running. Failure to heed this warning could result in damage to the equipment or personal injury.

Blower Model	Kice Lube Kit Part Number	Fill Points	Gear End (oz)	Free End (oz)	Total (oz)	Filter Replacement Part Number (Typical)
CompQ 2000 / 2500	BlowerlubeKit1	2	12	12	24	1-1156-03
CompQ 3000 / 4000	BlowerlubeKit2	2	28	28	56	1-1156-03
CompQ 5000 / 6000	BlowerlubeKit3	2	44	44	88	1-1156-04

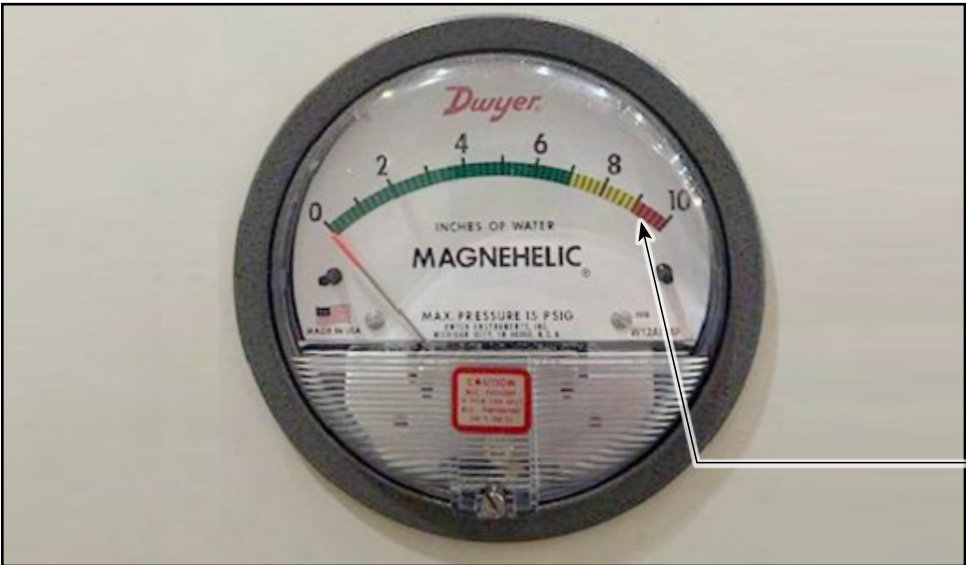
Inlet Air Filter Maintenance

The inlet air filter will need to be changed once the pressure gauge indicates it's too dirty or is no longer filtering properly. To change the filter follow the steps below.



WARNING

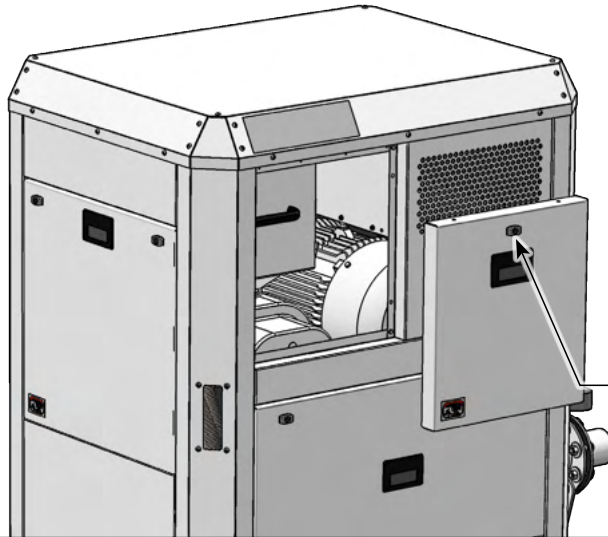
Never attempt to change filter while air power unit is running. Failure to heed this warning could result in damage to the equipment or personal injury.



Step 1 □ Pressure Gauge Reading

The filter must be replaced or cleaned if the pressure differential is too high. A reading of 9 or above indicates a clogged or saturated filter that should be changed or cleaned immediately.

Change or clean filter if above 9 psi.

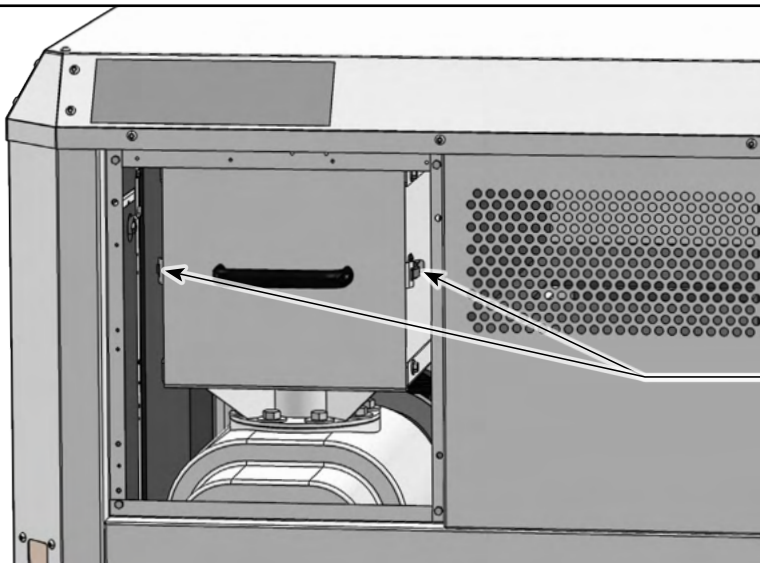


Step 2

□ Remove Side Access Door

Unlock panel using 5/16 allen head key. Remove the small access door located next to the air intake grill and set aside.

1 5/16 Allen head key required for latch-lock

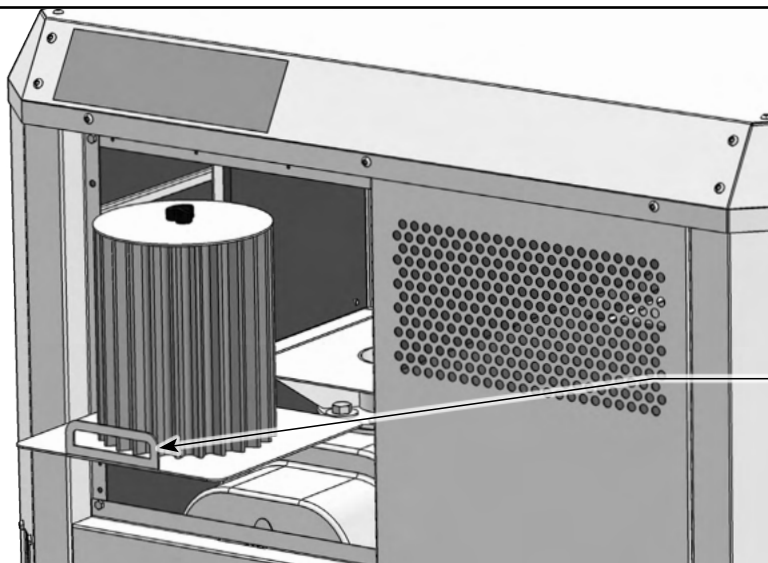


Step 3

□ Unhook Latches

Two draw latches are located on sides of door. Unhook both and remove interior access door.

1 Draw latches

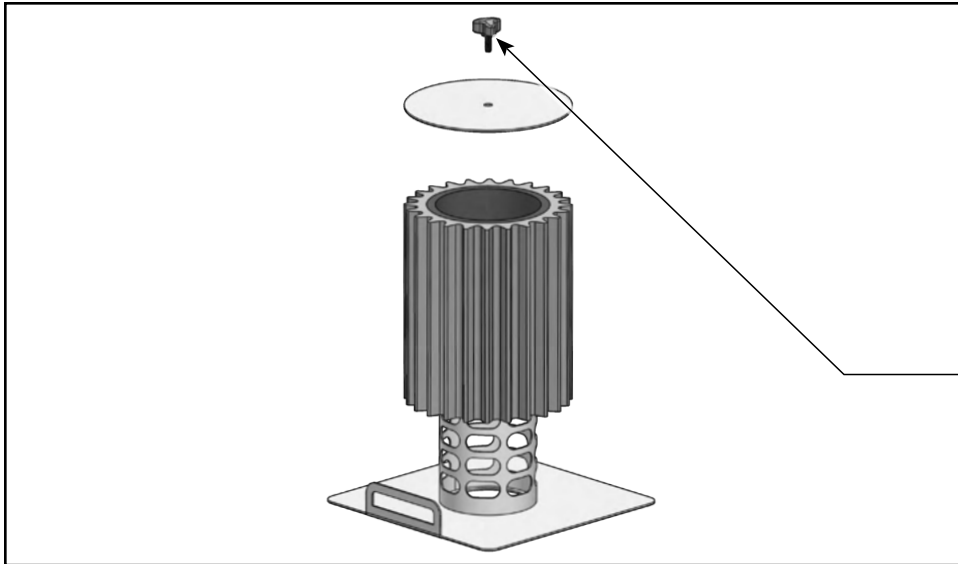


Step 4

□ Remove Filter Tray

Using the grab handle, pull the filter tray directly out of the enclosure.

1 Grab handle



Step 5

□ Replace or Clean Filter

Remove knob and top panel. The filter can then be pulled up and off of the filter tray. Replace or clean as needed.

Remove knob and top panel

Step 6

□ Reassemble

Reassemble in reverse order. Ensure all doors and panels are seated properly and that access panel is fully locked.

11. TROUBLESHOOTING



WARNING

Review all safety precautions noted in the manual before performing maintenance on equipment.

Modification to the unit may void the equipment warranty.

Symptom	Probable Cause	Remedies
Loss of oil	Gear housing not tightened properly	Tighten gear housing bolts
	Insufficient sealant	Remove gear housing and replace sealant
	Lip seal failure	Disassemble and replace lip seal
	Loose drain plug	Tighten drain plug
Excessive bearing or gear wear	Improper lubrication	Correct oil level. Replace dirty oil
	Excessive belt tension	Check belt manufacturer's specifications for tension and adjust accordingly
Lack of volume	Slipping belts	Check belt manufacturer's specifications for tension and adjust accordingly
	Worn lobe clearances	Check for proper clearances
	Speed too low	Increase blower speed within limits
	Obstruction in piping	Check system to ensure an open flow path
Knocking	Blower out of time	Re-time
	Distortion due to improper mounting or pipe strains	Check mounting alignment and relieve pipe strains
	Excessive pressure differential	Reduce to manufacturer's recommended pressure, examine relief valve and reset if necessary
	Worn gears	Replace timing gears
Oil coming out of breather caps	Breather caps not installed	Install breather caps
	Breather port not aligned correctly	Verify the oil level with the blower not operating. Rotate the breather 90 degrees and check if the problem is resolved.
	Improper lubrication	Correct oil level. Replace dirty oil
Oil coming out of vent ports	Improper lubrication	Correct oil level. Replace dirty oil

Symptom	Probable Cause	Remedies
Excessive blower temperature	Too much or too little oil in gear reservoir	Check oil level
	Too low operating speed	Increase blower speed within limits
	Clogged filter or silencer	Remove cause of obstruction
	Excessive pressure differential	Reduce pressure differential across the blower
	Elevated inlet temperature	Reduce inlet temperature, clean filter
	Worn lobe clearances	Check for proper clearances
Rotor end or tip drag	Insufficient assembled clearances	Correct clearances
	Case or frame distortion	Check mounting and pipe strain
	Excessive operating pressure	Reduce pressure differential
	Excessive operating temperature	Reduce pressure differential or reduce inlet temperature
Vibration	Belt or coupling misalignment	Check carefully. Re-align if necessary
	Lobes rubbing	Check cylinder for hot spots, and then check for lobe contact at these points. Correct clearances
	Worn bearings or gears	Check condition of gears and bearings. Replace if necessary
	Unbalanced or rubbing lobes	Possible build-up on casing or lobes, or inside lobes. Remove build-up and restore clearances.
	Driver or blower loose	Check mounting and tighten if necessary
	Piping resonance	Check pipe supports, check resonance of nearby equipment, and check foundation

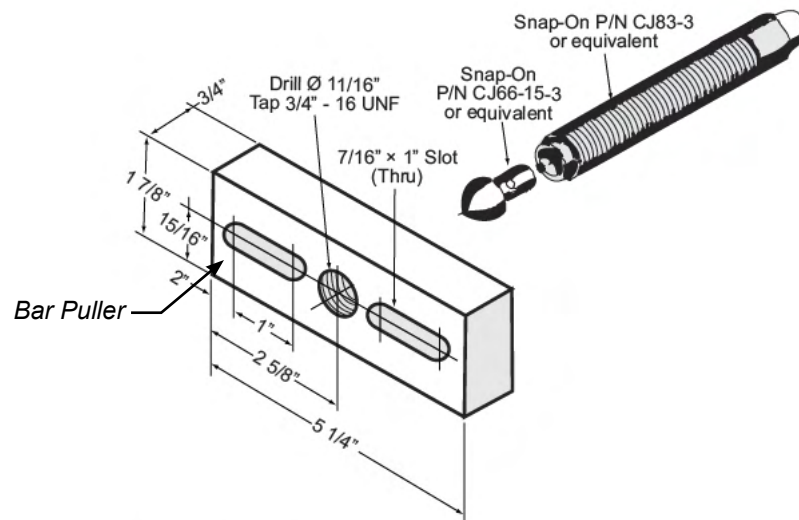
12. DISASSEMBLY OF AIR POWER UNIT



WARNING: When performing maintenance, all energy sources associated with the air power unit must be locked and tagged out in compliance with 29CFR1910.147, local enforcement authorities, OSHA, and facility safety practices, before removing any protective cover, guard, grate or maintenance gate. Removal of transitions which expose hazards such as nip points of an air power unit also require lockout and tagout precautions be employed.



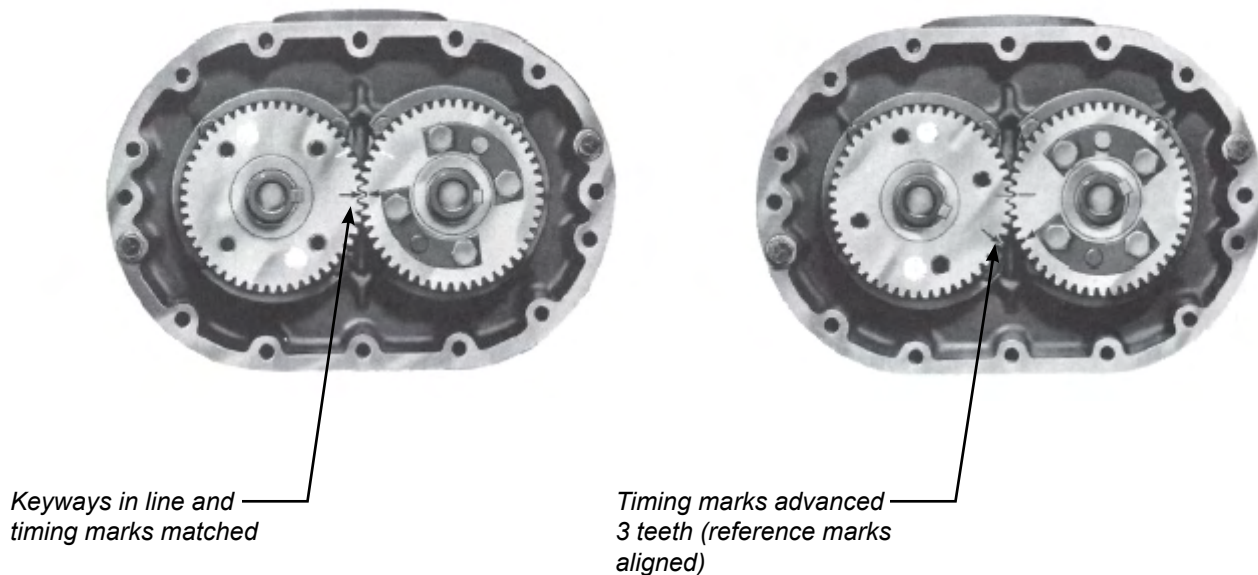
WARNING: Review all Safety Precautions noted in the manual before performing maintenance on equipment.



Disassembly of Air Power Unit

1. Make sure that all oil is drained from air power unit and remove the port fittings.
2. Remove the spanner lock nut, dust washer, screws, and seal adapter housing. Tap out the seal and discard O-rings. Remove the spacers and discard the O-ring.
3. Remove the cap screws from the gear end cover.
4. Remove the gear end cover using the beveled chisel and hammer, unless jackscrew holes have been provided.
5. Remove the snap ring from drive shaft.
6. Using the gear pullers, remove the drive shaft bearing.
7. Remove the drive shaft.
8. Remove the gear lock nuts and locks.
9. Align the timing marks.
10. Rotate the drive gear in a clockwise rotation approximately 4 or 5 teeth and mark this location. This gear position is necessary so rotors will clear and not jam. Do not allow the reference marks to change location while the driven gear is being removed
11. Using the gear pullers, pull the driven gear first. 12. After removal of the driven gear, continue with pulling the driver gear.
13. Remove the gear end bearing retainer rings, exposing the bearings.
14. Remove the cap screws and free the end cover, exposing the oil slinger assembly.
15. Remove the flat-head socket screw from the oil slinger and gently pry the oil slinger from the shaft (on some models).

16. Remove the flat-head socket screw and washer from the opposite rotor.
17. Use the bar pullers and attach to free end plate bores. Using the bar pullers, pull the free end plate from rotor shafts.
18. Attach the bar puller to the gear end plate bore and push out the rotors, one at a time.
19. Using a rubber mallet, tap the end plate from the housing.
20. Using a soft metal punch and a mallet, tap out the bearings from the end plate bores.
21. Using a bevel chisel, remove the seals from end plate bores.
22. On air power units with labyrinth seals installed, remove the labyrinth seals with a beveled chisel and hammer, if necessary.
23. Inspect all parts for wear and serviceability.



NOTICE: Position of timing marks is for removing or installing the driven gear. To remove the drive gear, advance three teeth in the opposite direction.

13. ASSEMBLY OF AIR POWER UNIT

Assembly of Air Power Unit

The assembly procedure is generally the same for all models. Dowel pins are used to locate end plates, housing and end covers in their proper location relative to each other. Be sure they are in place.

It is recommended that the gear end rotor shaft bearings be purchased from Kice, as they are specially ground to locate the rotors with correct end clearance relative to the gear end plate.

Make sure all parts are clean and free of any nicks or buns caused by disassembly. Refer to Special Tools section of this manual (Section 14) for pressing tools as well as other assembly tools required.

It is suggested that long feeler gauges (12") be used to check the interlobe timing. Preferably (2) .006, (1) .005, (1) .004, and (1) .003. This will give you all the combinations from .003 to .024.



CAUTION – All Hex head cap screws used on Kice Air Power Units are metric. The use of anything other than metric cap screws will result in thread damage. All pipe plug holes are American Standard Pipe Thread.

Preparation of End Plate and Rotors for Assembly

1. In air power units that have labyrinth seals, position the labyrinth seals with the slots pointing up and press one seal into each end plate bore.
2. In air power units that use lip seals as a means of sealing, apply a smooth coating of Permatex #2 or silicone sealer to the outer diameter (OD) edge of the seal shell. Press a lip seal into each end plate bore, making sure the seal "lip" is facing up, or toward the oil. Apply grease to lip seals only.
3. In air power units that require mechanical seals, apply a smooth coating of silicone to the OD of the seal shell as in step 2. Position the mechanical seal with the carbon face up and press the seal into each end plate bore. Wipe the carbon with soft tissue and acetone or similar cleaner. Make sure the seal is fully seated and the shell is not deformed. Make sure the carbon is not scarred or cracked. Mating rings will be seated later in the assembly procedure.

Gear End Assembly

4. Stand the rotors on the free end in the arbor press. Make sure both keyways are in line and point to the right. Two-lobe rotors include two keyways on each shaft. When positioning the rotors, two keyways (one on each rotor) should point in the same direction, to the right.
5. Place the gear end plate with the seals installed on the rotor shafts. Make sure the threads on the rotor shafts do not damage the seals.
6. Air power units with mechanical face seals must have mating rings installed. Make sure the surface is clean, and gently place a few drops of clean oil on the seal face for lubrication. Install the mating ring (lapped surface) against the carbon face.
7. Lightly coat the rotor shaft with anti-seize compound or equivalent.
8. Using flush-ground bearings on the gear end only, press the bearings onto the rotor shafts.



CAUTION – These bearings have flush ground faces and should be installed with manufacturer numbers up (toward gear). If no numbers appear on either side, look for a black dot (acid mark) on the inner race. Install with dot up. Do not use bearings that have not been flush ground to within a .001" (.025 mm) tolerance.

9. Install the oil retainer (4000 models only).
10. Install the bearing retainer ring and lock plates on all series air power units.
11. Check the clearance between the gear end plate and rotor lobe ends. Correct clearances are listed in Assembly Clearances on page 34.

NOTICE: Position of timing marks is for removing or installing the driven gear. To remove the drive gear, advance three teeth in the opposite direction.

12. Stand the rotors on the arbor press with the gear end shafts up and both keyways facing to the right. The drive rotor should be on the left.
13. Install the gear end plate, making sure the feet are facing in the correct direction, over the rotor shafts and coming to rest on top of the rotor lobes. Be careful not to damage the seals.
14. In air power units that have mechanical face seals, check the lapped surface of the seal mating ring to be sure it is perfectly clean. Use soft tissue and cleaning agent (acetone) if necessary. Place a few drops of lubricating oil on its surface and install on the shaft with the lapped surface coming to rest on top of the carbon. Gently press with fingers to make sure compression is taking place and the ring is not hung up for any reason.
15. Lubricate the shafts and press the double row ball bearings on the rotor shafts and into the end plate bores. Secure with retainer rings and screws.

NOTICE: These bearings have been flush ground at the factory. The inner race will have a black dot etched on the surface. This dot must be up and visible when the bearings are installed.

16. Check clearance between the face of the end plate and the rotor lobes. If clearances are not within specifications, recheck the parts to find and correct the cause of improper clearances before proceeding.
17. Install spacer (0.260 in. [6.60 mm] thickness) and oil slinger on the other shaft.

NOTICE: Oil slinger and its spacer should always be mounted on either shaft for vertical flow units.

18. Install the timing shim in the same location as found in disassembly. This does not necessarily ensure the air power unit will be in proper time. Adjustments can be made later in the assembly process.
19. Insert the gear keys into the rotor shaft keyways. Loose fits are not acceptable.
20. Lubricate the shafts and install the drive gear (right hand helix) on the drive rotor (left side). To install the driven gear, align the reference marks. Install the driven gear carefully to avoid mashing any teeth when engaging the opposite gear.
21. Install the washers and flat-head allen screws.
22. Remove the assembly from the press and stand it on the work table with the gears down. Place blocks under the end plate to prevent the assembly from falling over. The drive gear should remain on the left side.
23. Place a small bead of an RTV silicone type sealer around the periphery of the end plate and encircling each bolt hole.
24. Install the rotor housing and secure with four screws evenly spaced.
25. Check clearances between the end of the lobes and the housing using a flat bar and feeler gauges or a depth micrometer. See Assembly Clearances list for free end clearances.

Free End Assembly

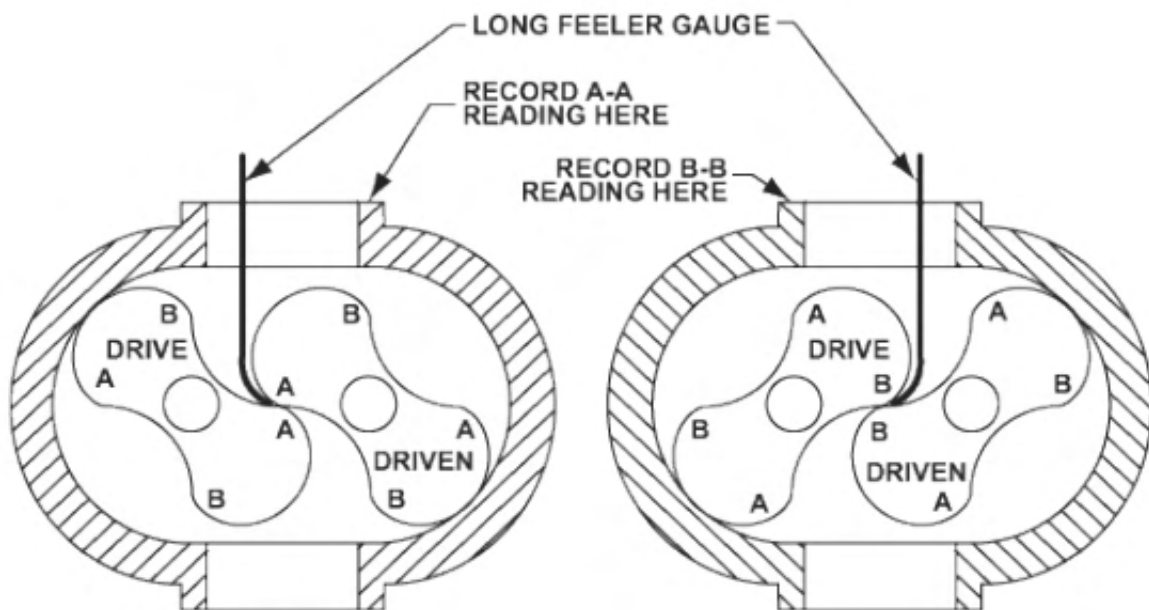
26. On single and double envelope series, put sealer on the free end plate (same as step 15).
27. Install the free end plate and secure it with 4 screws.
28. On single and double envelope series, repeat step 7.
29. In air power units that have mechanical face seals, install the bearing spacers (0.063 in. [0.06 mm] thickness) on each shaft. Lubricate the shafts and tap on the bearings.
30. Install the oil retainer rings with button-head screws.
31. Install the oil slinger on lower rotor (either shaft on vertical-flow air power units), spacer on the opposite shaft, washers, and screws.

Adjusting Rotor Interlobe Clearance

32. Lay the air power unit down with the drive gear on the left. Using feeler gauges, take interlobe readings and record on each side of housing. By removing or adding shim behind the helical gear, it rotates as it is moved in or out and the driven rotor turns with it, thus changing the clearance between rotor lobes. Changing the shim thickness 0.006 in. (0.16 mm) will change the rotor lobe clearance one-half the amount: 0.003 in. (0.08 mm).

EXAMPLE: Check the clearance at AA (left-hand reading) and BB (right-hand reading). If AA reading is 0.003 in. (0.08 mm) and BB reading is 0.009 in. (0.24 mm), by removing 0.006 in. (0.16 mm) of shim, the readings will change one-half the amount removed or 0.003 in. (0.08 mm). AA should then read 0.006 in. (0.16 mm) and BB should read 0.006 in. (0.16 mm). The final readings should be within 0.002 in. (0.05 mm) of each other.

To determine the amount of shim to add or remove, subtract the smaller figure from the larger. If the right side reading is higher than the left side, remove shim. If the right side reading is lower, add shim.



33. Install the drive shaft and secure with allen screws. Check drive shaft runout at the seal journal. Do not exceed 0.002 in. (0.05 mm) TIR. Install the lockwire.

34. Install the bearing on the drive shaft and secure with the retaining ring. The shield side of the bearing must face outward.

35. Remove the temporary cap screws from each end plate and install the cover gasket and gear end cover. Make sure the dowel pins are in place. Sealer is not required on factory supplied gaskets. Secure with cap screws and washers.

36. Coat the OD of the drive shaft seal with sealer, and grease the ID. Install carefully over the keyway and tap into the cover.

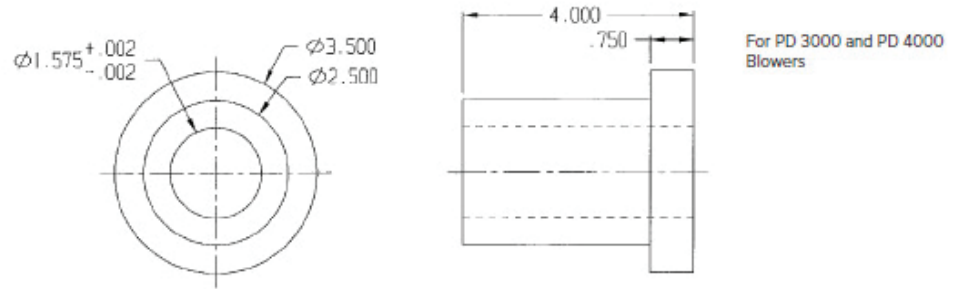
37. Install the free end cover with gasket, and secure with cap screws and washers.

38. Install the port fittings, gaskets, and secure with cap screws and washers.

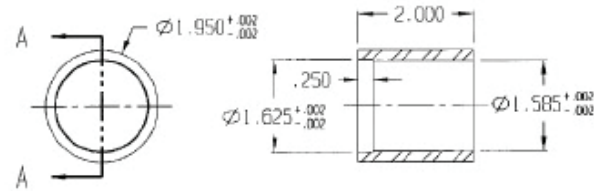
Assembly Clearances

	Gear End	Free End	Total End	Tip-Port	Tip-Dowel	Interlobe
	Min/Max	Min/Max	Min/Max	Min/Max	Min/Max	Min/Max
CompQ 2000	0.003	0.005	0.011	0.003	0.006	0.006
	0.006	0.011	0.014	0.007	0.010	0.010
CompQ 2500	0.003	0.007	0.013	0.003	0.006	0.006
	0.006	0.013	0.016	0.007	0.010	0.010
CompQ 3000	0.004	0.005	0.013	0.003	0.007	0.008
	0.008	0.014	0.018	0.009	0.009	0.012
CompQ 4000	0.004	0.007	0.015	0.003	0.007	0.008
	0.008	0.014	0.018	0.009	0.009	0.012
CompQ 5000	0.004	0.010	0.018	0.003	0.007	0.010
	0.008	0.017	0.021	0.009	0.009	0.014
CompQ 6000	0.004	0.011	0.019	0.003	0.007	0.010
	0.008	0.018	0.022	0.009	0.009	0.014

14. SPECIAL TOOLS

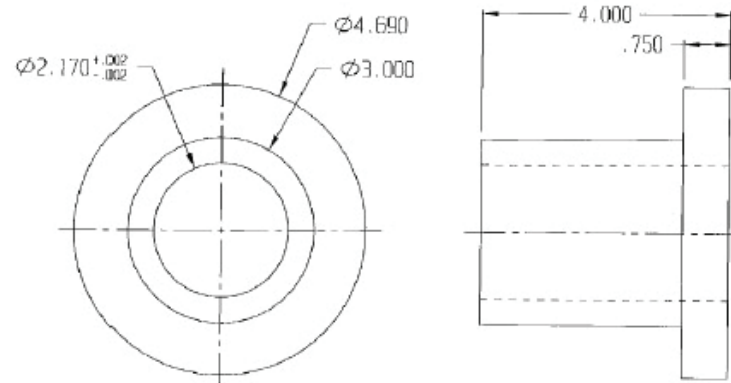


LIP SEAL AND BEARING PRESSING TOOL

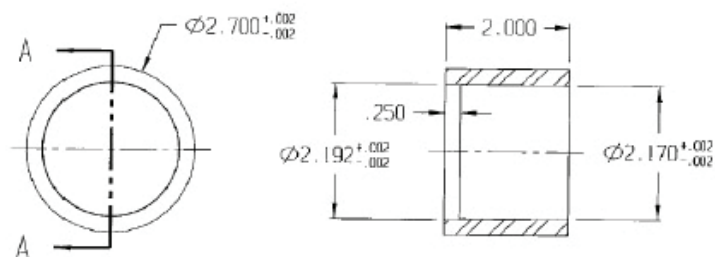


SLEEVE PRESSING TOOL
(USE WITH BEARING PRESSING TOOLS)

For PD 5000 and PD 6000 Blowers



LIP SEAL AND BEARING PRESSING TOOL



SLEEVE PRESSING TOOL
(USE WITH BEARING PRESSING TOOLS)

15. TORQUE VALUES

Recommended U.S. BOLT TORQUE*							
<i>Coarse thread only</i>							
		SAE Grade 5	SAE Grade 5	SAE Grade 8	SAE Grade 8	Socket head cap screw	Socket head cap screw
Bolt Dia.	Thread Size	lb – ft	N – m	lb – ft	N – m	lb – ft	N – m
1/4	20	8.4	11	12	16	11	15
5/16	18	17	24	25	33	23	31
3/8	16	31	42	44	59	41	55
7/16	14	49	67	70	95	65	89
1/2	13	74	100	110	140	100	130
9/16	12	100	140	150	210	140	200
5/8	11	140	190	210	290	200	270
3/4	10	240	330	380	510	350	480
7/8	9	390	520	610	820	570	770
1	8	570	780	910	1100	850	1200
1-1/8	7	790	1100	1300	1700		
1-1/4	7	1100	1500	1800	2500		
1-3/8	6	1500	2000	2400	3200		
1-1/2	6	1900	2600	3200	4300		
1-5/8	5.5	2400	3300	4300	5900		
1-3/4	5	3000	4100	5000	6800		
2	4.5	4500	6100	7500	10000		

*Values above are approximations; consult with the manufacturer for torque data.
Significant variation may exist within the same grade and size between manufacturers.

KICE INDUSTRIES, INC.



5500 N. Mill Heights Dr.
Park City, KS 67219-2358
(P) 316.744.7151
(F) 316.744.7355
sales@kice.com

kice.com

