



## Rotary Airlock Valve

Operators Manual

## **CONGRATULATIONS...**

When you purchased your new Kice Airlock, you bought a dependable and quality-built product. The ten basic series of airlocks manufactured by Kice, and the range of options and materials, should satisfy nearly every conceivable industrial airlock need.

We are proud of our products and the people at Kice who build them. At Kice, the manufacturing process starts in our own foundry by following the construction standards and manufacturing techniques that have proven superior over the last 60 years.

This owner's manual is intended as a guide for proper installation, operation and maintenance to keep your Kice airlock operating safely and efficiently on the job. Service and factory reconditioning information is also included for your benefit.

Sincerely,

Drew Kice  
President & C.E.O.  
Kice Industries, Inc.

## **WARRANTY**

The company warrants the equipment manufactured by the Company to be free of defects in material and workmanship for a period of one year from the date of shipment. Company agrees to repair or replace, at its option, any parts found to be defective in the opinion of the Company. Company is not liable for any costs in connection with the removal, shipment or reinstallation of said parts. This warranty does not apply to abrasion, corrosion, or erosion.

Purchaser agrees to look to the warranty, if any, of the manufacturer or supplier of equipment manufactured by others and supplied to the Company for any alleged defects in such equipment and for any damages or injuries caused thereby or as a result thereof. PURCHASER SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ELECTRICAL MANUFACTURER'S RECOMMENDATIONS, UNDERWRITERS CODE AND ALL SAFETY PRECAUTIONS.

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 extend beyond the face hereof. The Company and its dealers 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.

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### **IMPORTANT: WRITE DOWN THE MODEL AND SERIAL NUMBER OF YOUR AIRLOCK.**

For additional information, application assistance or special service, you should contact your service representative or the factory. We will need to know the model and serial number of your airlock. For ready reference, please record them and the date of delivery or installation on the lines below. See the General Information section for the location of the model and serial number.

**Model:**

---

**Serial Number:**

---

**Date of delivery or installation:**

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This manual applies to Kice Airlock Models VB, VD, VJ, VBOT, VDOT, VJOT, and VPOT.

O designates outboard bearings.

B & J series are drop-thru.

D series is an injector.

T designates Timken bearings.

# 1. GENERAL INFORMATION

## **TO THE OWNER**

The purpose of this manual is to assist owners and operators in maintaining and operating the Kice airlock and attachments. Please read it carefully; information and instructions furnished can help you achieve years of dependable performance. A separate drive motor and speed reducer manual should be included with your owner's packet. They contain additional information that may not be repeated in this manual. You are urged to read it before attempting any operation or repair of the motor or speed reducer. If these manuals are not included in your owner's packet, contact our customer service department.

## **USING THIS MANUAL**

General operation, adjustment and maintenance guidelines are outlined for owners and operators of Kice airlocks. 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 term "disconnect and lockout" as used in this manual means that power to the airlock has been disconnected through the use of a padlockable, manual, power cutoff, or power lockout switch.

Directions used in this manual, for example RIGHT or LEFT, CLOCKWISE or COUNTERCLOCKWISE, refer to directions when facing the end of the airlock that has the metal identification plate attached to it containing the model and serial number.

Photographs and illustrations were current at the time of printing, but subsequent production changes may cause your airlock to vary slightly in detail. Kice Industries, Inc., reserves the right to redesign and change the airlock as deemed necessary, without notification. If a change has been made to your airlock 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.

## **MODEL AND SERIAL NUMBER**

The airlock model and serial number can be found at two locations:

1. Stamped on the metal identification plate located on the airlock end plate opposite the drive mechanism (see Figure 1).



Figure 1

2. Stamped on the left side of the airlock body below the inlet (see Figure 2).

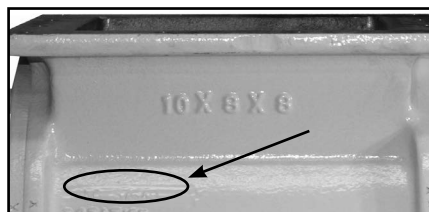


Figure 2

## **GENERAL INFORMATION CONTINUED**

On all airlocks that have been rebuilt, you will find a letter “R” stamped on the housing following the serial number. Each time the airlock is rebuilt, an additional “R” is added. The bodies of Kice airlocks are deliberately built thick enough to allow several rebuilds.

### **FOR AIRLOCK PARTS AND SERVICE**

Use original Kice airlock replacement parts only. These parts are available from Kice Industries, Inc., only. To obtain prompt, efficient service, always provide the following information when ordering parts:

1. Correct part description and number, as given in the Illustrated Parts Lists section of this manual.
2. Correct model number.
3. Correct serial number.

For assistance in service or ordering parts, contact the customer service department at:

Kice Industries, Inc.  
5500 Mill Heights Drive  
Wichita, KS 67219-2358  
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. Each type of airlock is designed to be used in specific situations, handling particular types of material. Using an airlock for any purpose other than that for which it was designed could result in personal injury, as well as, product or proper damage.

### **FOR MOTOR AND SPEED REDUCER PARTS AND SERVICE**

The motor and speed reducer are covered by the manufacturer’s warranty. If there is a problem, check with the local supplier or service representative.

## 2. SAFETY PRECAUTIONS



This safety alert symbol is used to call your attention to an important safety message 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 other persons is involved. Follow the instructions in the safety message.

The following definitions for identifying hazard levels are:



**DANGER (RED)** – 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 (ORANGE)** – 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 (YELLOW)** – 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.

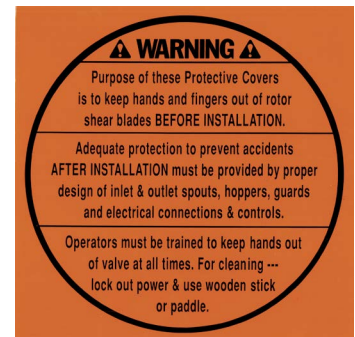


**WARNING:** All owners and operators should read this manual, or be instructed in safe operating and maintenance procedures, before attempting to uncrate, install, operate, adjust, or service this equipment.

### SAFETY DECALS

The airlock safety decals should not be removed, covered over, painted, or otherwise become illegible. If this occurs, they should be replaced immediately. Contact our customer service department for replacements.

The following safety decals will be located on the airlock body, chain guard or motor. Look for them!



## **SAFETY PRECAUTIONS CONTINUED**

### **ADDITIONAL SAFETY PRECAUTIONS:**

- Do not attempt to install, connect power to, operate or service an airlock without proper instruction and until you have been thoroughly trained in its use by your employer.
- Do not manually override or electrically bypass any protective device.
- Do not connect power to or operate an airlock unless all moving parts are covered and all covers, guards, grates, and maintenance panels are in place and securely fastened.
- Do not abuse, overload, mistreat or misuse an airlock or attempt to operate it if it is in need of service, lubrication, maintenance or repair. Do not attempt to start an airlock when loaded.
- Never place any part of your body under or near rotating members or moving parts of an airlock.
- If an airlock is not equipped with a factory supplied chain guard, rotating members and moving parts must be completely enclosed before connecting power and before operation.
- If an airlock is 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. Never attempt to manually override or electrically bypass the PLS safety device. The interlock function of the PLS must be tested and logged daily by supervisory personnel.
- Many airlocks are installed and wired to start automatically or be controlled from remote locations. Keep away from such airlocks at all times.
- An airlock must be equipped with a properly functioning Protective Interlocking Electrical Control Switch (PCS), a Padlockable Manual Power Lockout Switch, and with the other basic safety equipment listed above. On-off, interlock and padlock functions of the PCS must be tested and logged daily by supervisory personnel.
- It is the owner's and the employer's responsibility to adequately train the employee-operator in the proper and safe use of airlocks. Written safety programs and formal instruction are essential. All new employees must be made aware of company policies and operating rules, especially the established safety and health procedures. Refresher training of experienced employees in the potential hazards of the job is important. Up-to-date training records must be maintained at the job site.
- Special attention must be devoted to outside contractors engaged to enter and perform work on an airlock or in the workplace. Special care must be exercised to insure all such personnel are fully informed of the potential hazards and follow plant rules – with special emphasis on explosion proof electrical tools and cutting or welding in unsafe environments.
- Keep the workplace cleaned up and free of dirt and dust at all times. Do not attempt to work on slippery or unsafe ladders or work platforms when maintenance or repair work is being performed on an airlock.
- Do not climb on ladders or work on platforms unless maximum load rating is posted. Do not exceed maximum load ratings when installing or servicing an airlock.
- Never allow any kind of metal or other foreign objects to enter an airlock.
- All airlock inlet and discharge openings must be completely enclosed to prevent human access when airlock is operating, and must remain enclosed until POWER IS TURNED OFF AND LOCKED OUT. Keep away from an airlock when it is running.
- Operate safely at all times. Use personal protective equipment when and where appropriate, such as hard hats, helmets, gloves, earplugs, and eye protection devices. Keep personal protective equipment in good repair and convenient to the operator.
- Drive components must be inspected and adjusted after transportation and periodically as required by operating conditions. Check sprocket and coupling alignment and spacing, chain tension, setscrews, keys and other fasteners, bearings, shafts, gear reducers and motors, as appropriate to job conditions.
- High voltage and rotating parts can cause serious or fatal injury. Only qualified, trained, and experienced personnel should perform installation, operation and maintenance of electrical machinery. Make sure that the motor and the frame of each airlock is effectively grounded in accordance with OSHA safety and health standards, the National Electrical Code and local codes.
- Never stand under any kind of hoist or lifting mechanism, whether or not it is loaded or in operation. Never stand under or near an airlock or component when it is being lifted.
- All airlock lifting devices must be carefully inspected by qualified personnel before each use. Never use a lifting device to transport an airlock. Never use a lifting device that is damaged, deteriorated, or in any way in need of repair.
- All protective covers, guards, grates, maintenance panels, switches and warning decals must be kept in place and in good repair. Any airlock with a damaged, malfunctioning, defective, or missing protective device must be taken out of service until the protective device can be repaired or replaced.
- Any device powered by air or hydraulic pressure must be equipped with a properly functioning Padlockable Manual Pressure Lockout and Internal Pressure Relief Valve (PLV).
- Any airlock that is used in the processing of explosive materials in hazardous environments requires an evaluation on the part of the user and operator of proper and adequate airlock monitoring equipment, dust control, explosion relief venting, and electrical equipment enclosures. Do not use your airlock in hazardous environments unless it has been properly equipped for the hazard.
- It is ultimately the operator's responsibility to implement the above listed precautions and insure proper airlock use, maintenance and lubrication. Keep these instructions and list of warnings with your machine at all times.

### **WORK SAFELY AT ALL TIMES**

- Do not attempt to work on, clean or service an airlock, or open or remove any protective cover, guard, grate or maintenance panel until the POWER has been turned off and LOCKED OUT, and the airlock has come to a complete stop. Please ensure all the local, state, and OSHA laws are followed.
- All electrical or electronic maintenance and service should be performed only by trained and authorized technicians.
- Assume at all times that power is "on." Treat all conditions as live. This practice ensures a cautious approach that may prevent an accident or injury.
- Before applying power to any equipment, make certain that all personnel are clear of the machine.
- Compliance with the lockout/tagout standard (29 CFR 1910.147): This standard covers the servicing and maintenance of machines and equipment in which the unexpected energization or startup of the machines or equipment, or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous energy.

# 3. PRE-INSTALLATION PREPARATION

## INSPECTING AND UNCRATING AFTER DELIVERY

1. Inspect the airlock shaft while the airlock is still secured to the shipping pallet.

- **To inspect the airlock shaft:**

- A. If damaged, remove the shaft cover located on the non-drive end of the shaft and the chain guard (see Figure 3).
- B. Check both ends of the shaft to see if they have been bent or damaged. If this is the case, file a claim with the freight company for damages and contact our customer service department.
- C. Replace the shaft cover and the chain guard.
- D. Be sure that the cover is firmly in place.



**CAUTION:** The shaft cover must be in place at all times. If the cover is lost in shipment or lost during airlock operation, contact our customer service department for a replacement at no charge.

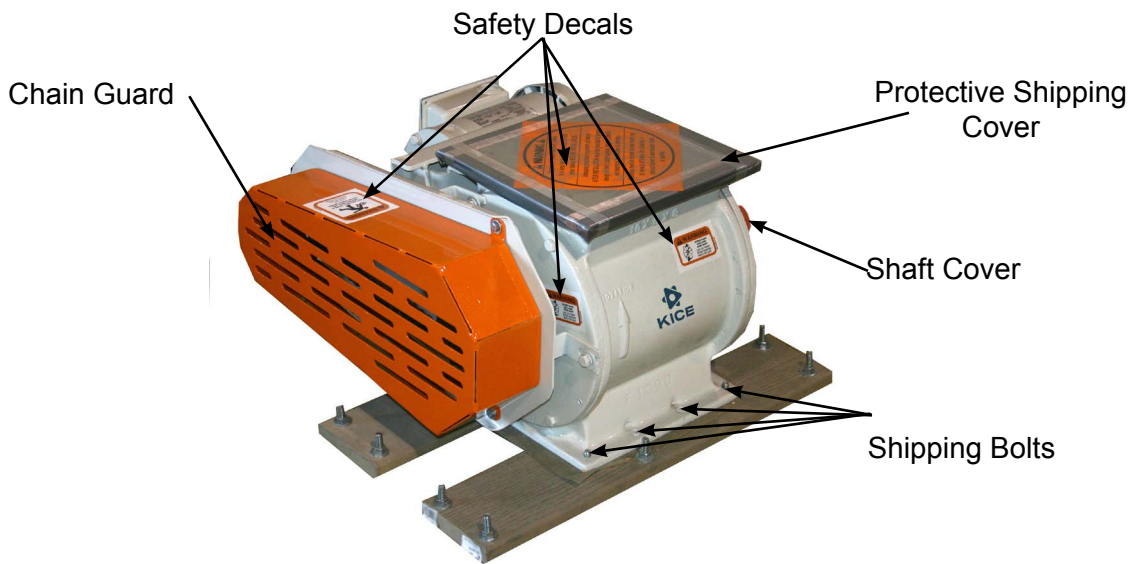


Figure 3

2. Remove the airlock from the shipping pallet.

- **Uncrate the airlock in the following manner:**

- A. Remove the shipping bolts securing the airlock to the shipping pallet (see Figure 3).
- B. Lift the airlock from the pallet using a tool truck or forklift.
- C. Set the airlock on a smooth level surface.
- D. Check all the bolts to be sure they are installed securely.

3. Inspect the rotor.

- **To inspect the rotor:**

- A. Locate and read all safety decals (see Figure 3).
- B. Remove the protective shipping cover (see Figure 3).



**CAUTION:** When the protective shipping cover is removed from the airlock, do not place hands in the airlock or attempt to turn the rotor by hand. Personal injury could occur.



## PRE INSTALLATION PREPARATION CONTINUED

C. Using a soft probe, check the rotor and the interior of the airlock for foreign material.

- **For airlocks without the drive motor attached:**

D. Using a soft (brass or wood) probe, turn the rotor (see Figure 4). If the rotor turns freely, the inspection is complete.



Figure 4

- **For airlocks with the drive motor attached:**

E. Connect the airlock motor to the power source. If the rotor turns freely, disconnect the power source; the inspection is complete.



**DANGER:** Do not place hands or feet in the airlock while the power source is connected to the motor.



**WARNING:** Always wear proper eye protection.

F. If the rotor does not turn freely or the rotor turns but squeals, refer to Maintenance and Service (section 5 of this manual) for proper procedures.



**CAUTION:** If the motor or speed reducer produces an unusual noise, disconnect the power and lockout. Then check rotation to be sure motor is not wired backwards.

4. Inspect the motor.

- **Inspect the airlock motor in the following manner:**

A. Read all the materials supplied with the airlock concerning the motor.

B. Be sure that the motor is securely mounted to the airlock.

5. Inspect the speed reducer.

- **Inspect the speed reducer in the following manner:**

A. Read all the materials supplied with the airlock concerning the speed reducer.

B. Determine whether the speed reducer is grease lubricated (Kice standard) or oil lubricated.

C. If the reducer is grease lubricated, do nothing. It has been filled with grease at the factory and is ready for use.

D. If the reducer is oil lubricated, add the appropriate oil as specified by the manufacturer.

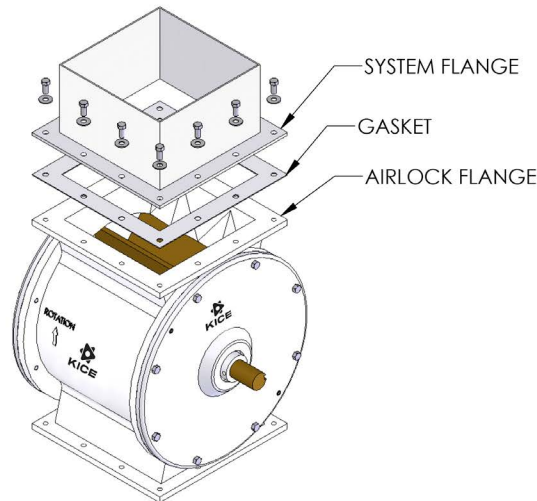
## 4. INSTALLATION



**CAUTION:** Use proper equipment when lifting or moving the airlock. Make sure all persons and obstructions are clear from path and installation area.

After uncrating and inspection has been completed, install the airlock in the following manner:

1. Move the airlock to the installation area using proper equipment.
2. Check the mounting surfaces of the airlock and any adjoining system components. They should be free of foreign materials.
3. Mount the airlock in place.
  - A. If the airlock is a floor-mounted model, secure to the floor using lag bolts or approved anchors and then attach the airlock mounting flange(s) to the system flange(s) using fasteners and the supplied gasket(s) (see Figure 6). Be certain that a gasket is installed between the airlock flange(s) and the system flange(s).



**AIRLOCK MOUNTING SYSTEM**

Figure 6

B. If the airlock is mounted into a system, but is not floor mounted, attach the airlock flange(s) to the system flange(s) using fasteners and the supplied gasket(s) (see Figure 6). The airlock should be attached to the sturdiest element first. Be certain that a gasket is installed between the airlock flange(s) and the system flange(s).

**NOTE:** Airlocks with cast bodies require only bolts and washers for mounting, since the mounting holes have been tapped. Airlocks with fabricated bodies require bolts, washers, and nuts.

4. Tighten all mounting fasteners securely.



**WARNING:** High voltage and rotating parts can cause serious or fatal injury. Only qualified, trained, and experienced personnel should perform installation, operation and maintenance of electrical machinery. Make sure that the motor and the frame of the airlock is effectively grounded in accordance with OSHA safety and health standards, the National Electrical Code, and local codes.

5. Connect the power source to the airlock motor.

## INSTALLATION CONTINUED

6. Test run the airlock. If any unusual noises occur, disconnect and lockout the power source, and check the wiring hook-ups to the motor. If the airlock rotor was turning in the wrong direction, reverse the wiring hook-ups to the motor, and retest.

7. On airlocks with outboard bearings, after approximately two hours of operation, the packing retainers will need to be retightened. This can be done in the following manner:

- A. Use an open-end wrench to tighten the packing retainer bolts (see Figure 7).
- B. Tighten the bolts until the airlock motor is strained.
- C. Then back off the bolts slightly.

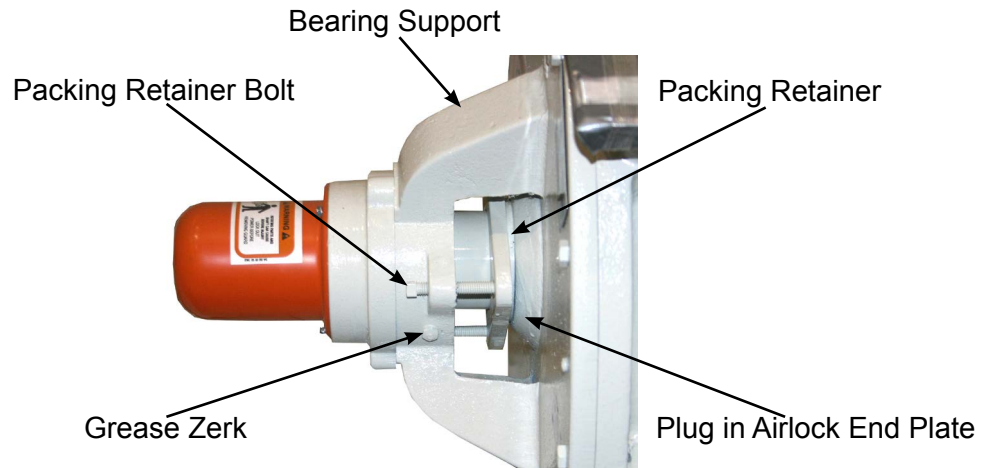


Figure 7

8. After approximately 48 hours of operation, the drive chain tension will need to be checked. Refer to Maintenance and Service (section 5 of this manual) for proper procedures. Repeat this step again in two to three weeks.



**CAUTION:** The airlock drive chain is a special self-lubricated chain. Do not oil or otherwise lubricate.

9. Some outboard bearing airlocks can benefit from the use of a pressurized air purge system or a continuous grease system. The tapped and plugged hole in both airlock end plates should be utilized for the air purge system (see Figure 7). This conversion can be accomplished by replacing the first (inner) ring of packing in both end plates with a lantern ring, removing the plug from each end plate, and attaching a compressed air line equipped with a pressure regulator to each tapped hole. The pressure regulator should be adjusted so that the purge air pressure is approximately double the pressure in the pneumatic conveying line. To convert an airlock to a continuous grease system, remove the grease zerk located on both of the bearing supports and replace with a grease line (see Figure 7).

## 5. MAINTENANCE AND SERVICE

The key to long and trouble-free airlock operation is good maintenance practices. Periodically inspect the rotor for damage caused by foreign material and for proper placement within the airlock body. Inspect the bearings and the drive chain for excessive wear. Finally, service the motor and the speed reducer as specified by the manufacturer.

The majority of operating problems that occur with an airlock 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 system is a must if the operating problems are to be corrected

## MAINTENANCE AND SERVICE CONTINUED

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.

### **MOTOR AND SPEED REDUCER SERVICE**

To obtain parts or service for the airlock motor or speed reducer, contact the local dealer or service representative for the particular make of motor or speed reducer used on the airlock. Not all airlocks use the same make.

#### **1. Motor**

The motor manufacturer has supplied you with safety, service, and repair information. If you have difficulty obtaining service or repair parts, contact our customer service department.

#### **2. Speed Reducer**

The speed reducer manufacturer has supplied you with safety, service, and repair information. If you have difficulty obtaining service or repair parts, contact our customer service department.



**WARNING:** Never place hands or fingers in an airlock, unless it has been disconnected and locked out, and a wooden block has been placed in the airlock to prevent the rotor from turning.

### **ROTOR**

If the rotor becomes blocked, does not turn freely, or begins to squeal:

- **First**

1. Disconnect and lockout power.
2. Gain access to the rotor.
3. Place a block in the airlock to prevent the rotor from turning (See Figure 8).

- **Then, for blockage in rotor**

4. Using a probe, dislodge the obstruction from the rotor and discard (See Figure 8).
5. Remove the block and, using the probe, turn the rotor to inspect for additional foreign material.

- **For rotor damage – rotor does not turn freely**

6. Locate the rotor damage, such as burrs or dents in the rotor vanes.
7. Remove any burrs or dents using a file (see Figure 8).

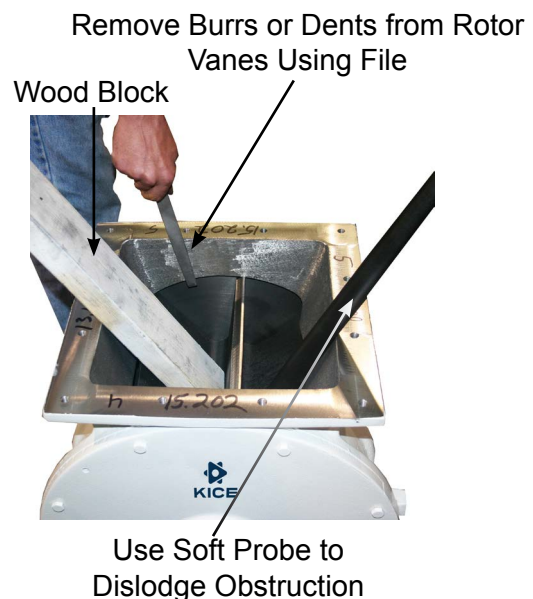


Figure 8

## MAINTENANCE AND SERVICE CONTINUED



**CAUTION:** When removing burrs or dents, remove only the damage. Proper clearance (.004" ± .001" in smaller airlocks and .005" ± .001" in larger airlocks) must be maintained between the rotor vanes and the airlock body.

### **AIRLOCK VALVES WITH INBOARD BEARINGS**

- **For rotor adjustment – rotor squeals during operation**

8. Using a feeler gauge, check the clearance between the rotor and the airlock end plates (see Figure 9) There should be a minimum of .003" to .004" standard clearance.

9. If adjustment is needed, remove the chain guard, shaft cover, drive chain, sprockets and bushing, chain guard backplate, and both lock collars.

10. Using a soft hammer and feeler gauge, set the proper clearance between the rotor and the end plate on either end by tapping on the shaft. Set the lock collar on this end of the rotor.

11. Now check the clearance at the other end of the rotor. It should have a minimum of .003" to .004" clearance. Extra clearance is acceptable.

12. Set the remaining lock collar. Be sure to set the collar opposite the collar on the other end of the rotor shaft.

13. Turn the rotor with the probe to see that it turns freely and quietly.

14. Reinstall the chain guard backplate along with the sprocket and bushing on the airlock shaft and the sprocket on the motor shaft. Align the sprocket on the motor shaft with the sprocket on the airlock shaft and reinstall the drive chain.

15. Reinstall the chain guard and the shaft cover.

16. Reconnect power.

- **To remove the rotor:**

1. Disconnect and lock out power.

2. Remove the chain guard and shaft cover.

3. Remove the drive chain.

4. Remove the sprockets and bushing and the chain guard backplate.

5. Remove both lock collars and dress the shaft using a file and emery cloth (see Figure 10).

Use Feeler Gauge to Check Clearance Between Rotor and Endplate

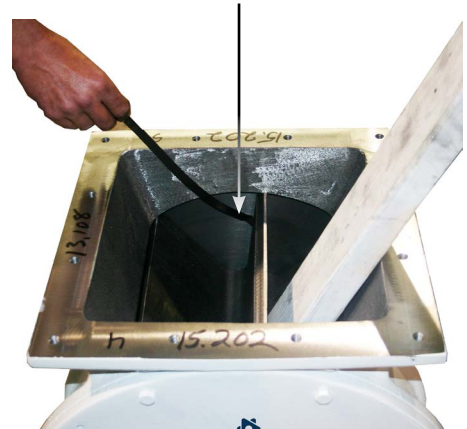


Figure 9



Figure 10



**CAUTION:** Burrs or dents must be removed from the rotor shaft before attempting bearing removal to prevent scoring of inner race.

## MAINTENANCE AND SERVICE CONTINUED

7. Remove the bolts on one end plate (see Figure 11).
8. Tap on the rotor shaft using a soft hammer (see Figure 11).
9. Remove the end plate (see Figure 11).
10. Remove the rotor by pulling it out of the airlock body.
11. To replace or reinstall the rotor, follow the above steps in reverse order.

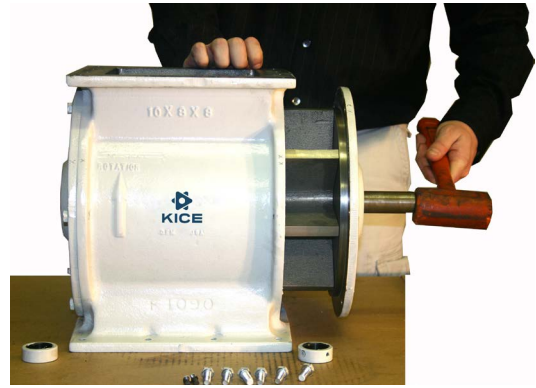


Figure 11

## BEARINGS

When replacing bearings, use Kice replacement parts only. Other bearings may fit, but will not function properly. If the bearings are removed from the airlock for any reason, they must be replaced, not reinstalled.



**CAUTION:** Bearings not purchased from Kice are standard high-speed bearings. Special low-speed, close tolerance bearings are used in all Kice airlocks.

### • To remove inboard bearings:

1. Remove the end plate as stated above. If both end plates are removed, they should be marked so that each end plate can be reinstalled on the same end of the airlock body from which it was removed.
2. Place the end plate on wooden blocks with the machined surface down.
3. Tap the bearing and shaft seal through the end plate using a brass rod and discard both the bearing and the shaft seal (see Figure 12).



Figure 12

4. Turn the end plate over and install a new bearing using a brass driver (see Figure 13).



Figure 13

## MAINTENANCE AND SERVICE CONTINUED

5. Pack the bearing void and shaft seal using Keystone Nevastane HT/AW-2 grease (see Figure 14).



Figure 14

6. Seat the seal by lightly tapping with a soft hammer (see Figure 15).



Figure 15

7. Reinstall the end plate.

### **OUTBOARD BEARING AIRLOCK VALVES (WITH TIMKEN BEARINGS)**

#### **GENERAL:**

Kice airlock valves can be disassembled and reassembled in the field using tools and abilities found in all maintenance departments. Following are suggested step-by-step procedures.

**NOTE:** Letters shown in parentheses ( ) correspond to item designations in the Itemized Parts List.

#### **ADJUSTING AIRLOCK CLEARANCE BETWEEN THE ROTOR AND THE END PLATES:**

1. Use standard "Lockout and Tagout Procedures" on the electric motor BEFORE STARTING ANY maintenance.

**NOTE:** The serial number is stamped into the body on the drive end side opposite the motor and speed reducer.

2. Using a feeler gauge, check the clearance between the rotor and the end plates. There should be a minimum clearance of .003" to .004". Clearances may vary depending on operating temperature and valve size.

3. Remove the chain guard, the drive chain, the sprocket and bushing on the airlock shaft, the sprocket on the reducer shaft, the chain guard backplate, and the shaft cover.

4. Remove both end caps (T) from the bearing supports.

5. Clean the grease from the bearing assemblies.

6. Straighten the lock washer (P) tab from the slot on both adjusting nuts (R).

7. Using a spanner wrench, loosen one adjusting nut while tightening the other. To increase the

## **MAINTENANCE AND SERVICE CONTINUED**

internal clearance between the rotor and the near side end plate, loosen (CCW) the adjusting nut on the near side while tightening the adjusting nut on the far side. To decrease the internal clearance between the rotor and the near side end plate, perform the operation in reverse.

8. When the desired internal clearance is achieved, bend down the lock washer tabs to lock the nuts in place.

9. Reinstall the end caps onto the bearing supports.

10. Reinstall the chain guard backplate, the sprocket and bushing on the airlock shaft, the sprocket on the reducer shaft, the drive chain, the chain guard, and the shaft cover.

## **ROTOR REMOVAL FROM BODY**

1. Use standard "Lockout and Tagout Procedures" on the electric motor **BEFORE STARTING ANY** maintenance.

2. Remove the shaft cover, the chain guard, the drive chain, the sprocket and bushing on the airlock shaft, the sprocket on the reducer shaft, and the chain guard backplate.

3. Remove both end caps (T) from the bearing supports.

4. Clean the grease from the bearing assemblies.

5. Straighten the lock washer (P) tab from the slot on both adjusting nuts (R).

6. Using a spanner wrench, loosen both adjusting nuts and remove the nuts and lock washers from the shaft.

7. Pick the most accessible end plate (C) and remove all the bolts holding the end plate to the body.

8. Loosen the packing gland retainer by turning the three square head setscrews (H), located on the bearing support, 1 to 1 ½ turns.

9. Pull the end plate off by tapping the opposite rotor shaft (B) with a soft mallet. The bearing (M) will come out of the bearing cup (L).

10. When the step along the circumference of the end plate is out of the body, the end plate may be removed from the shaft.

11. There is a spring inside the inner lip seal (J) to keep the seal tight against the shaft. When the end plate is removed, the threads on the rotor shaft may cause the spring to come out of the seal. If so, reinstall the spring prior to reassembly.

12. The rotor is now partially out of the body. Completely remove the rotor from the body.

13. Check the spring inside the inner lip seal of the opposite shaft (reference step 11).

14. Match mark one end of the rotor to one end plate, so that the rotor can be reassembled in the same direction as originally built.

15. Now that the rotor is removed from the body, care should be taken to avoid damaging the rotor tips and ends, shaft threads, and bearing cone (M).

16. If both end plates are removed, they should be match marked to the side of the body, so that they can be reassembled to the original position.

17. Make necessary repairs and reassemble per the following instructions. Care should be taken to install the rotor back to the original direction.



## **MAINTENANCE AND SERVICE CONTINUED**

### **REASSEMBLY**

1. Check the lip seal on the inside of both bearing supports. If the seals (J) need to be replaced, they need to be changed before the end plates are installed on the body.
2. To change the seal, the spacer, bearing cup and the bearing (K, L & M) need to be removed before the seal (J) can be replaced.
3. Reinstall the parts per drawing RAV-5001 or RAV-5002. CARE should be taken to install the components in the proper order.
4. Pick the most accessible end plate (C) and install and tighten all the bolts holding the end plate to the body.
5. Reinstall the rotor in the body. As the rotor is installed, make sure that the packing retainer (G) is in place before sliding the shaft through the bearing. Care should be taken to install the rotor back to the original direction.
6. Reinstall the other end plate on the body. As the end plate is installed, make sure that the packing retainer (G) is in place before sliding the shaft through the bearing.
7. Install and tighten all the bolts holding the end plate to the body.
8. Reinstall the lock washers and adjusting nuts (P & R) on both sides of the airlock valve, but do not tighten.
9. Using a feeler gauge and a spanner wrench, tighten one adjusting nut while loosening the other until the rotor moves to the proper clearance. Reference step 7 in the section entitled Adjusting Airlock Clearance.
10. When the desired internal clearance is achieved, bend down the lock washer tabs to lock the nuts in place.
11. Using a grease gun, pack the bearings with grease. When grease starts to come through the rollers, reinstall both end caps (T) onto the bearing supports.
12. Reinstall the chain guard backplate, the sprocket and bushing on the airlock shaft, the sprocket on the reducer shaft, the drive chain, the chain guard, and the shaft cover.

**NOTE:**

**TIMKEN BEARING CUP 394A (item L)  
MUST BE REPLACED WITH EXACT SAME PART NUMBER!!!  
NO SUBSTITUTIONS!!!**

## MAINTENANCE AND SERVICE CONTINUED

### DRIVE CHAIN

After approximately 48 hours of initial operation, check the drive chain tension. Check it again in 2 to 3 weeks. The following procedures should be followed if the drive chain needs adjusting or replacing.



**CAUTION:** The airlock drive chain is a special self-lubricated chain. Do not oil or otherwise lubricate.

#### Drive Chain Tension

When pressed down midway between the sprockets, the drive chain should have a deflection of approximately 0.5 to 1 times the chain thickness (see Figure 16).

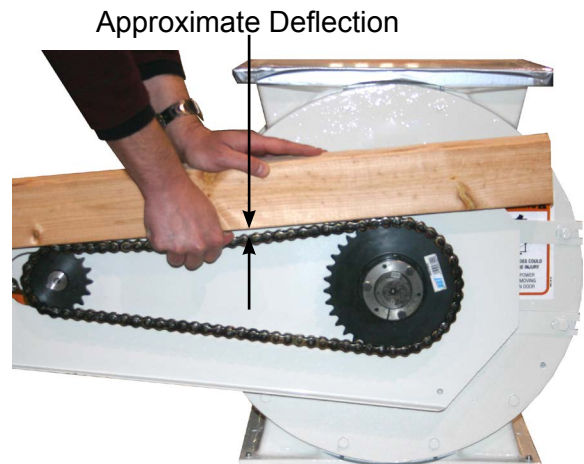


Figure 16

- **Adjust the drive chain tension in the following manner:**

1. Disconnect and lock out power.
2. Remove the chain guard.
3. Loosen the mounting bolts (see Figure 17).

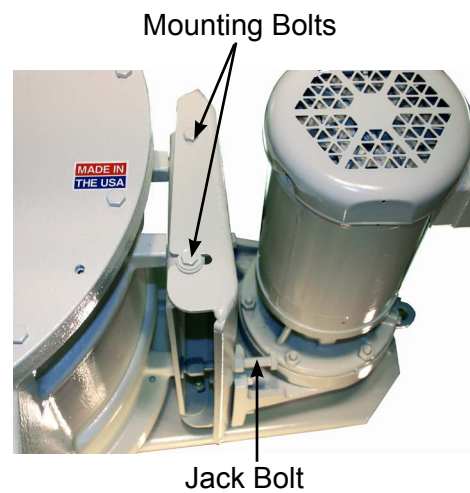


Figure 17

**NOTE:** If the drive chain is to be replaced, remove it at this time by removing the connecting link and install a new drive chain. Then proceed with the remaining procedures.

4. Tighten the drive chain by turning the jack bolt clockwise (see Figure 17).
5. When proper chain tension is achieved, retighten the mounting bolts.
6. Reinstall the chain guard.
7. Reconnect power.

## MAINTENANCE AND SERVICE CONTINUED

### Drive Chain Sprockets

If a sprocket becomes worn, it will need to be replaced.

- **To replace the driven sprocket:**

1. Disconnect and lock out power.
2. Remove the chain guard.
3. Remove the drive chain (see above procedure).
4. Remove the sprocket. The sprocket is mounted to the airlock shaft using a QD bushing.

- **To remove the QD bushing:**

- A. Loosen the setscrew on the QD bushing (see Figure 18).
- B. Loosen and remove all the mounting cap screws.

Remove Setscrew



Mounting Cap Screws

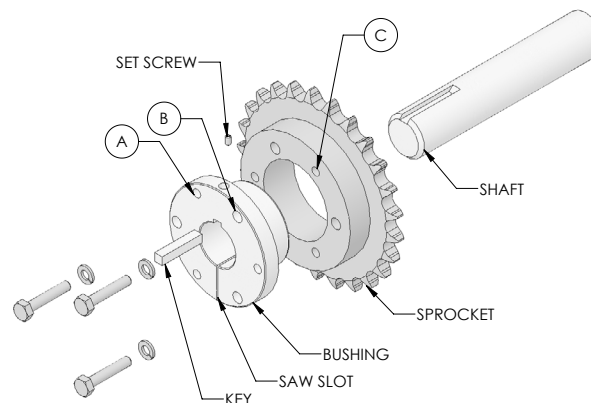
Figure 18

- C. Insert the cap screws into all the threaded jackscrew holes ("A" in Figure 19).
- D. Start with the screw farthest from the bushing saw slot and tighten all the jackscrews in small, equal amounts until the tapered surfaces of the bushing and sprocket disengage.



**CAUTION:** Excessive or unequal pressure on the jackscrews can break the bushing flange, making removal nearly impossible.

- E. When the sprocket has been loosened from the bushing, the bushing may be frozen to the shaft. To loosen the bushing from the shaft, insert a screwdriver into the bushing saw slot and tap lightly. The bushing will free itself from the shaft.



SPROCKET & BUSHING ASSEMBLY

Figure 19

## **MAINTENANCE AND SERVICE CONTINUED**

5. Remove the sprocket by slipping it off the shaft.
6. Install a new sprocket onto the airlock shaft.
7. Reinstall the QD bushing.
  - A. Remove all the cap screws from the jackscrew holes.
  - B. Line up the unthreaded holes in the QD bushing (“B” in Figure 19) with the threaded holes in the sprocket (“C” in Figure 19) and insert the cap screws with the lock washers. Engage only two or three threads.
  - C. With the key in the shaft keyway, slide the loosely assembled bushing and sprocket onto the shaft and position for good chain alignment. Use no lubricants or anti-seize compounds on the threads or the tapered surfaces.
  - D. Carefully tighten the cap screws alternately and progressively until the tapers are seated (at approximately half the recommended torque).
  - E. Continue careful alternate and progressive tightening of the cap screws. Torque to 6 ft-lbs.

**NOTE:** When properly mounted, there will be a gap between the bushing flange and the sprocket after the cap screws are fully tightened.



**CAUTION:** Use of lubricants and/or excessive screw torque can cause breakage.

- F. Tighten the setscrew to hold the key securely during operation.

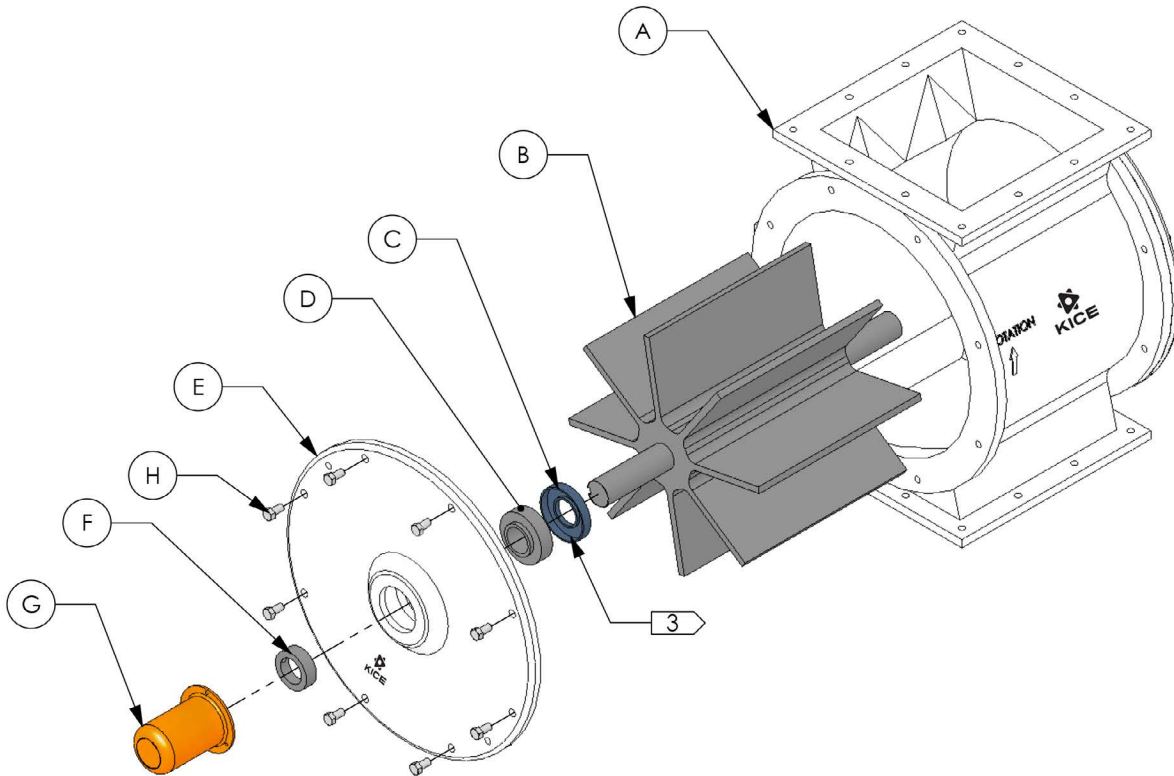
**NOTE:** After the cap screws are installed (step 7C), but before they are tightened, align the sprockets by sighting from the driven sprocket (mounted to the airlock shaft) along the chain to the driver sprocket (mounted to the speed reducer shaft). The driven sprocket and bushing should be free on the shaft at this point. As the cap screws are tightened, the sprocket may pull out of alignment. A little practice will show how to allow for this, so that when the cap screws are tight, the sprockets will be aligned. When the QD bushing is tight on the shaft, tighten the setscrew in the bushing flange.

- G. Align the driver sprocket on the speed reducer shaft with the driven sprocket on the airlock shaft.

8. Reinstall the drive chain.
9. Reinstall the chain guard.
10. Reconnect power.

## 6. ILLUSTRATED PARTS LIST - SERIES VB, VD, AND VJ

BILL OF MATERIAL				
ITEM	DESCRIPTION	MODEL	PART NO.	QTY.
A	BODY	-	-	1
B	ROTOR	-	-	1
C	NTI, DOUBLE LIP SEALS	6x6 THRU 12x8	NTI1154-3	2
		14x10 THRU 16x12	NTI1154-2	
		18x12 THRU 24x15	NTI1154-1	
D	LINK BELT BEARINGS	6x6 THRU 12x8	WB 219-U	2
		14x10 THRU 16x12	WB 223-U	
		18x12 THRU 24x15	WB 231-U	
E	END PLATE	-	-	2
F	LOCK COLLAR (SUPPLIED w/ BEARING)	-	-	2
G	SHAFT COVER	-	-	1
H	HHCS, 3/8"-16 x 1" LG.	6x6	-	8
		8x6 THRU 10x8		12
		12x8 THRU 16x12		16
		18x12 THRU 20x15		24
		24x15		32



### GEN. NOTES.

- STANDARD CLEARANCES ROTOR, ENDPLATE, & BODY  
 - .004 ± .001 (6x6 THRU 14x10)  
 - .005 ± .001 (16x12 THRU 24X15)
- SHAFT COVER USED ON NON-DRIVE END ONLY.
- SHAFT SEAL VOID IS PACKED w/ "KEYSTONE" NEVESTANE (FOOD GRADE) LUBRICANT.

VB, VD, & VJ  
AIRLOCK  
DESCRIPTION:



KICE INDUSTRIES, INC.

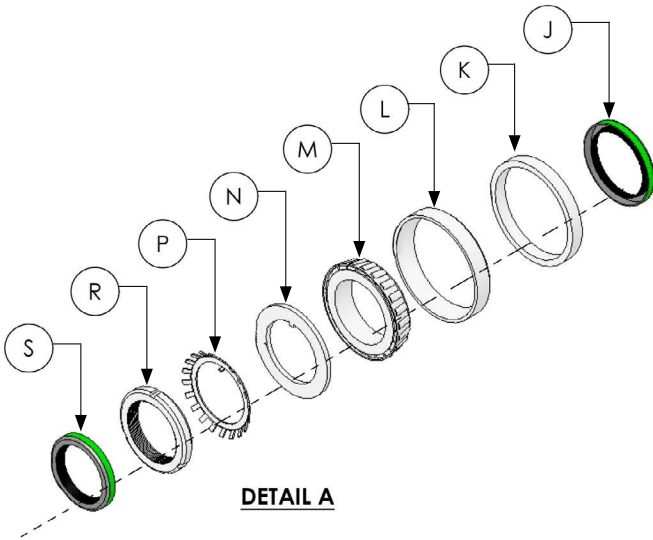
5500 MILL HEIGHTS DR. WICHITA, KANSAS 67219  
PH: (316) 744-7151 FAX: (316) 744-7355

EJS  
DWN:

2/19/07  
DATE:

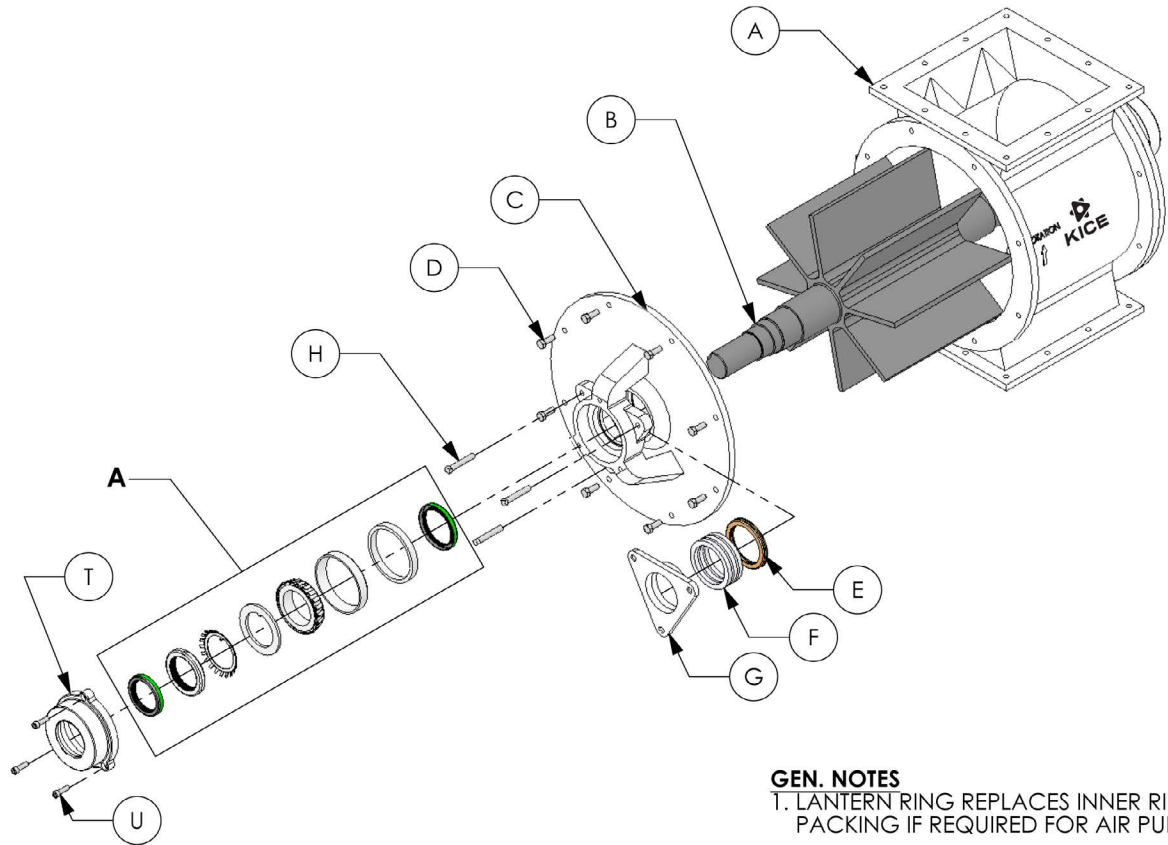
RAV-5000  
DWG. NO.

# 7. ILLUSTRATED PARTS LIST - SERIES VBOT, VDOT, AND VJOT



**DETAIL A**

BILL OF MATERIAL				
ITEM	DESCRIPTION	MODEL	PART NO.	QTY.
A	BODY	-	-	1
B	ROTOR	-	-	1
C	END PLATE	-	-	2
D	HHCS, 3/8"-16 x 1" LG.	8x6 THRU 10x8	-	12
		12x8 THRU 16x12	-	16
		18x12 THRU 20x15	-	24
		24x15	-	32
E	LANTERN RING (OPTIONAL)	8x6 THRU 12x8	-	2
		14x10 THRU 20x15	-	-
		24x15	-	-
F	PACKING	-	-	6
G	PACKING RETAINER	-	-	2
H	SHPS, 3/8-16 x 2 1/4" LG.	-	-	6
J	SKF, LIP SEAL	8x6 THRU 12x8	CR 19607	2
		14x10 THRU 20x15	CR 26123	-
		24x15	CR 33645	-
K	1/2" SPACER	-	-	2
L	TIMKEN, BEARING CUP "RACE" - NO SUBSTITUTIONS	-	394A	2
M	TIMKEN, BEARING CONE	8x6 THRU 12x8	396	2
		14x10 THRU 24x15	395A	-
N	TIMKEN, TONGUE WASHER	24x15	K91513	2
P	TIMKEN, LOCK WASHER	8x6 THRU 12x8	TW-109	2
		14x10 THRU 24x15	TW-113	-
R	NUT, STANDARD DESIGN	8x6 THRU 12x8	N-09	2
		14x10 THRU 24x15	N-13	-
S	SKF, LIP SEAL	8x6 THRU 12x8	CR 15241	2
		14x10 THRU 24x15	CR 21759	-
T	END CAP	-	-	2
U	SHCS, 5/16"-18 x 1" LG.	-	-	6



**GEN. NOTES**  
 T. LANTERN RING REPLACES INNER RING OF PACKING IF REQUIRED FOR AIR PURGE.

VBOT, VDOT,  
 & VJOT AIRLOCK  
 DESCRIPTION:

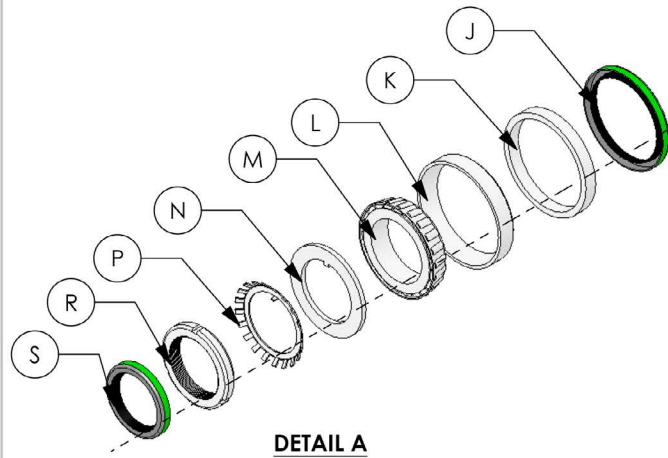


**KICE INDUSTRIES, INC.**

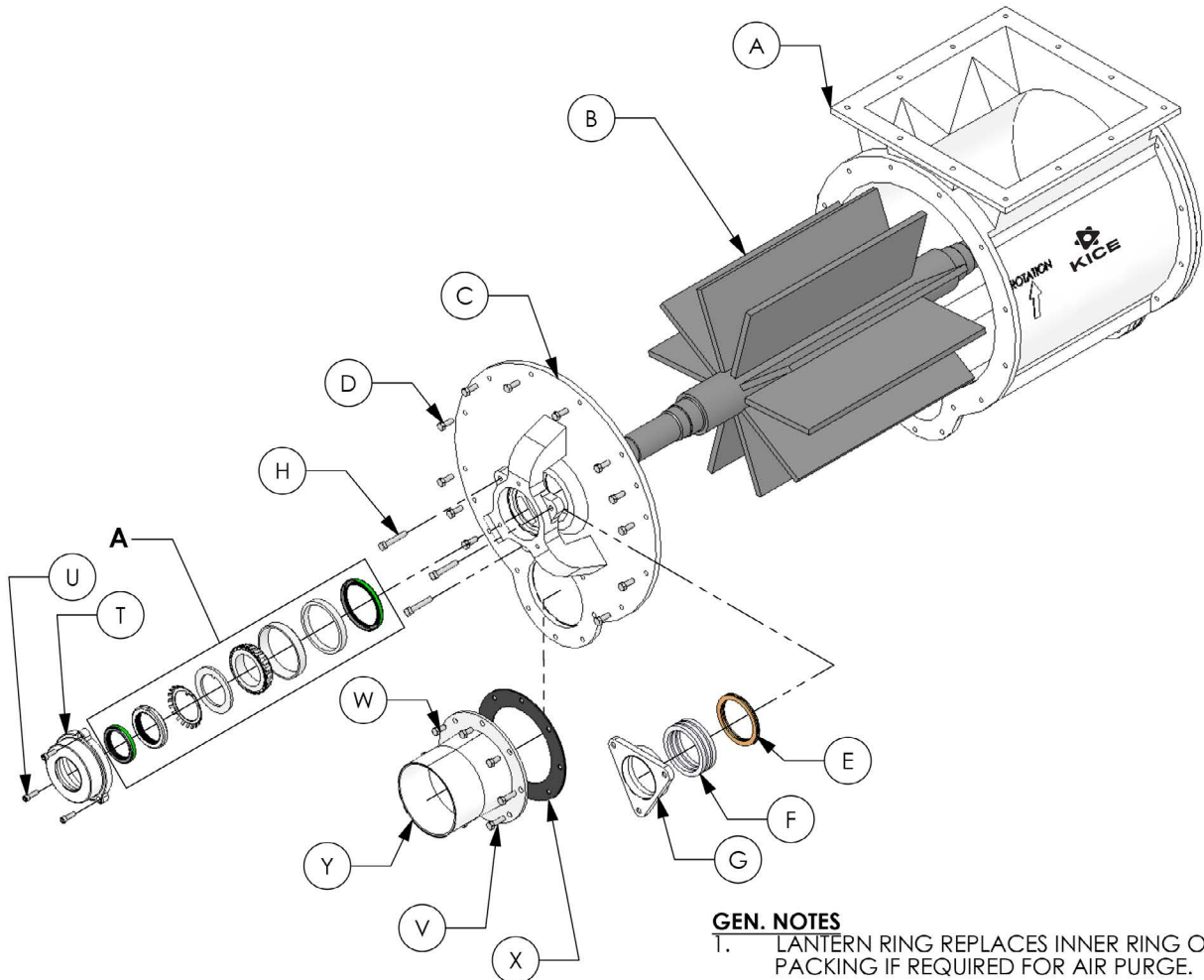
5500 MILL HEIGHTS DR. WICHITA, KANSAS 67219  
 PH: (316) 744-7151 FAX: (316) 744- 7355

EJS 2/17/06 RAV-5001  
 DWN: DATE: DWG. NO.

# 8. ILLUSTRATED PARTS LIST - SERIES VPOT



BILL OF MATERIAL				
ITEM	DESCRIPTION	MODEL	PART NO.	QTY.
A	BODY	-	-	1
B	ROTOR	-	-	1
C	END PLATE	-	-	2
D	HHCS, 3/8"-16 x 1" LG.	-	-	16
E	LANTERN RING (OPTIONAL)	10x8 THRU 16x15 18x15 THRU 24x18	-	2
F	PACKING	-	-	6
G	PACKING RETAINER	-	-	2
H	SQCS, 3/8-16 x 2 1/4" LG.	-	-	6
J	SKF, LIP SEAL	10x8 THRU 16x15 18x15 THRU 24x18	CR 26123 CR 33645	2
K	1/2" SPACER	-	-	2
L	TIMKEN, BEARING CUP "RACE" - NO SUBSTITUTIONS	-	394A	2
M	TIMKEN, CONE	-	395A	2
N	TIMKEN, TONGUE WASHER	18x15 THRU 24x18	K91513	2
P	TIMKEN, LOCK WASHER	-	TW-113	2
R	NUT, STANDARD DESIGN	-	N-13	2
S	SKF, LIP SEAL	-	CR 21759	2
T	END CAP	-	-	2
U	SHCS, 5/16"-18 x 1" LG.	-	-	6
V	HHCS, 3/8"-16 x 1 1/4" LG.	10x8 THRU 16x15 18x15 THRU 24x18	-	4
W	HHCS, 3/8"-16 x 3/4" LG.	10x8 THRU 16x15 18x15 THRU 24x18	-	4
X	GASKET	-	-	2
Y	TUBE ADAPTER	-	-	2



VPOT AIRLOCK  
 DESCRIPTION:



**KICE INDUSTRIES, INC.**

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EJS 2/19/07 RAV-5002  
 DWN: DATE: DWG. NO.

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