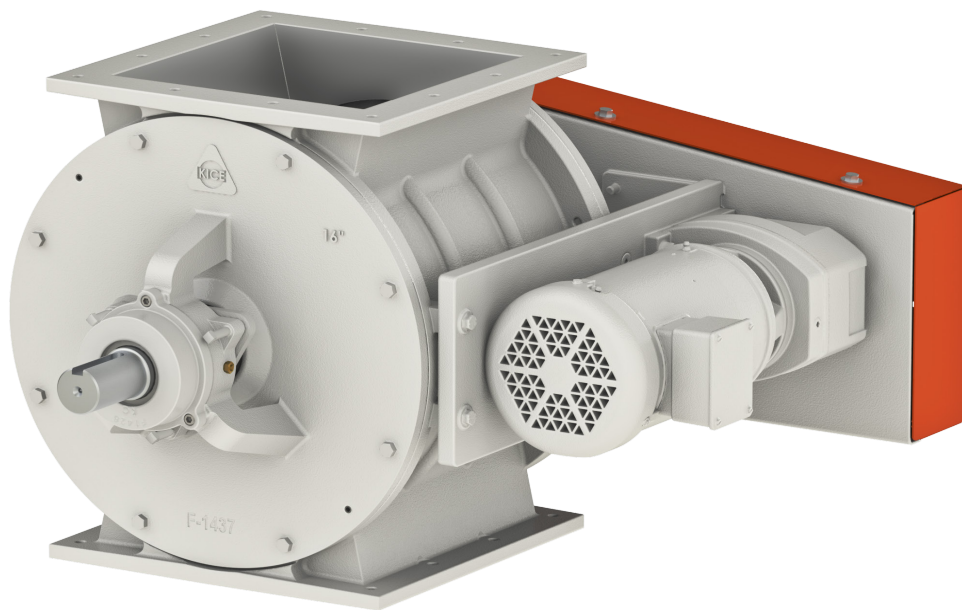


# Rotary Airlocks

## VJOT, VDOT, VPOT, VBOT Series

### Operators Manual



Special execution, intended for use in potentially explosive atmosphere (zone 22) in conformity with category 3 of group II, according to the European ATEX Directive 94/9/EC. The equipment has the following marking:

Inside: II 2D Ex h IIIB T85 °C Db 5 °C ≤ Tamb ≤ 35 °C  
Outside: II 3D Ex h IIIB T85 °C Dc 5 °C ≤ Tamb ≤ 35 °C  
Technical File No. 002/18



II 3 D c

# 1. INTRODUCTION

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

We are proud of our products and the people at Kice who build them. At Kice, we start in our own foundry and follow the design and manufacturing standards that have proven superior for more than 75 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  
Kice Industries, Inc.

## Warranty

The Company (Kice Industries, Inc.) 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 COMPONENT 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 extends 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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## 2. IMPORTANT AIRLOCK INFORMATION

### Important Airlock Information

Write down the MODEL and SERIAL NUMBER of the Kice Rotary Airlock, along with the same information for the auxiliary equipment. (Airlock valves, fans, speed reducers, motors, and sheaves size, type and any special modifications to standard).

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 Rotary Airlock. 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.

Model \_\_\_\_\_

Serial Number \_\_\_\_\_

Date of Delivery or Installation \_\_\_\_/\_\_\_\_/\_\_\_\_

Additional Notes:

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### 3. GENERAL INFORMATION

#### To The Owner

The purpose of this manual is to assist owners and operators in maintaining and operating the Kice airlock. Please read it carefully; information and instructions furnished can help you achieve years of dependable performance. A separate gearmotor or speed reducer manual is included with your owner's packet. It contains additional information that may not be repeated in this manual. You are urged to read it before attempting any operation or repair of the gearmotor or speed reducer. 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 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 terms “**disconnect and lockout**” or “**lockout/tagout**” 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 pursuant to 29 CFR 1910.147.

Directions used in this manual, for example **RIGHT** or **LEFT**, **CLOCKWISE** or **COUNTERCLOCKWISE**, refer to directions when facing the endplate of the airlock to which the equipment tag containing the model and serial number is attached unless otherwise specified.

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 on the equipment tag (Figure 1) on the endplate opposite the drive side, or stamped on the body (Figure 2) opposite the motor.

|                                                                                                                                                                            |                       |                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------|
|  <b>KICE Industries, Inc.</b><br>6500 N. Mill Heights Drive<br>Wichita, KS 67219<br>USA |                       | Technical File No. 2477/16 |
| CE II 3D Ex h IIIB T85 °C Dc 5 °C ≤ Tamb ≤ 35 °C                                                                                                                           |                       |                            |
| CONFIGURATION<br>Multi Aspirator                                                                                                                                           |                       |                            |
| FIGURE-TYPE NO.                                                                                                                                                            | SERIAL NO.            |                            |
| DRAWING / SPEC NO.                                                                                                                                                         | MONTH-YR MANUFACTURED |                            |

Figure 1

|                                                                                                                                                                            |                      |                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------|
|  <b>KICE Industries, Inc.</b><br>6500 N. Mill Heights Drive<br>Wichita, KS 67219<br>USA |                      | P: (316) 744-7151<br>www.kice.com |
| MODEL:                                                                                                                                                                     | <input type="text"/> |                                   |
| SERIAL:                                                                                                                                                                    | <input type="text"/> |                                   |
| DATE:                                                                                                                                                                      | <input type="text"/> |                                   |

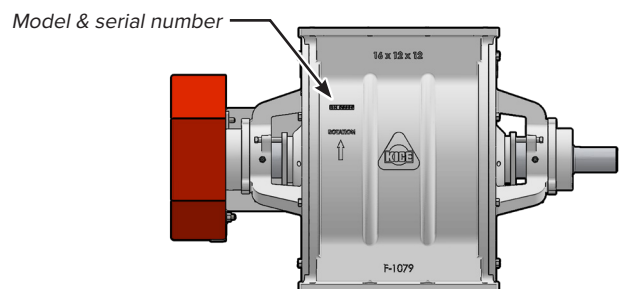


Figure 2

## **GENERAL INFORMATION CONTINUED**

### **Airlock Parts and Service**

Use original Kice rotary 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 shown in the appropriate exploded view
2. Correct model number
3. Correct serial number

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. Each airlock is configured 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 property damage.

**NOTICE:** Kice Industries, Inc. is the only authorized rebuilder of Kice rotary airlocks.

### **Gearmotor/Speed Reducer Parts and Service**

The gearmotor or speed reducer is covered by the original manufacturer's warranty. If there is a question or issue concerning the gearmotor or speed reducer please contact your local supplier or service representative.

## 4. SAFETY PRECAUTIONS

### Safety Symbols



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 others may be affected. Follow the instructions in the safety message.

### Hazard Levels

The following definitions are used to identify hazard levels:



**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.

### Safety Decals

The airlock 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 airlock body, chain guard or motor. Look for them!





**WARNING:** 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.

## SAFETY PRECAUTIONS

### WORK SAFELY AT ALL TIMES

- All energy sources associated with the airlock 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. Removal of transitions which expose hazards such as nip points of an airlock rotor also require lockout and tagout precautions be employed.
- Do not attempt to install, connect power, operate or service an airlock without proper instruction and until you have been thoroughly trained in its use by your employer.
- It is the owner's and employer's responsibility to adequately train each 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, 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.
- 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.
- Do not attempt to open, work on, clean or service an airlock until it has been locked and tagged out and the rotor has come to a complete stop. It is especially important to verify the airlock cannot be started in environments in which equipment is configured to be started remotely.
- 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. If an airlock is not equipped with a factory supplied chain guard, make sure rotating members and moving parts are completely enclosed before connecting power and starting operation.
- 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.
- Do not attempt to start an airlock when loaded.
- Do not abuse, overload, or misuse an airlock or attempt to operate the equipment if in need of service, lubrication, maintenance or repair. Free outlet of the product must be guaranteed at all times. Blockage and severe damage may result, or a dangerous situation may occur.

## SAFETY PRECAUTIONS CONTINUED

- Never place any part of your body under or near rotating members or moving parts of an airlock.
- Never allow any kind of metal or other foreign objects to enter an airlock.
- The rotor of the airlock is built into a housing which has connection flanges for product inlet and product outlet. All airlock inlet and discharge openings must be completely enclosed, or closed to an adequate length, to prevent human access to the rotor when the airlock is operating. They must remain enclosed until POWER IS TURNED OFF AND LOCKED OUT. Keep away from an airlock when it is running.
- Do not manually override or electrically bypass any protective device.
- 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. Make sure the motor and frame of each airlock is grounded in accordance with OSHA, National Electric Code, and all other applicable regulatory bodies, including local codes and EN ISO 60204-1 as required for the classified area.
- Operator/installer must ensure that all piping and connections are laid away from equipment access routes and steps.
- 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. Interlock function of the PLS must be tested and logged daily by supervisory personnel.
- 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) capable of safely relieving motive pressure between the isolation valve and device.
- Any airlocks used in the processing of combustible materials or in hazardous environments require evaluation by the owner and regulatory bodies to determine appropriate airlock monitoring equipment, dust control, explosion protection and electrical equipment enclosures. Do not use an airlock in hazardous environments unless properly equipped for the hazard.
- Operate safely at all times. Use personal protective equipment (PPE) such as hard hats, helmets, gloves, earplugs, protective eyewear, etcetera when and where appropriate. Keep PPE in good repair and accessible to affected personnel.
- Keep the workplace clean and free of dirt and dust at all times. Do not attempt to work on slippery or unsafe surfaces, ladders or work platforms when maintenance or repair work is being performed on an airlock.
- Do not use a ladder or work platform unless it is in good repair and rated for the load required to complete required airlock service. Do not exceed maximum load ratings when installing or servicing an airlock.
- Never stand under any kind of hoists or lifting mechanisms 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 inspected by qualified personnel before each use. Do not use a lifting device to transport an airlock. Never use a lifting device that is damaged, deteriorated or in need of repair.
- 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 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.
- It is ultimately the operator's responsibility to apply the above listed precautions and ensure proper airlock 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.

## WORK SAFELY AT ALL TIMES

## 5. DELIVERY INSPECTION AND INSTALLATION PREPARATION

The airlock has been inspected at Kice and should be in excellent condition upon delivery. A thorough customer inspection of the airlock should be completed upon receipt to verify its condition.

**NOTICE:** 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.

1. Complete a visual inspection paying particular attention to guards, protrusions (i.e. gearmotor or speed reducer, airlock corners, shaft, etc.) and safety decals while the airlock is still secure to the shipping pallet.
2. Inspect the airlock shaft and seals:
  - Remove the shaft cover located on the non-drive end of the shaft and the chain guard (Figure 3).
  - Check both ends of the shaft to see if either end has been bent or damaged. If this is the case, file a claim with the freight company for damages and contact Kice Customer Service Department.
  - Replace the shaft cover and chain guard.
  - Be sure that the cover is firmly in place.
  - Check VJOT packing gland or dynamic seal.



**CAUTION:** The shaft cover must be in place at all times. If the cover is lost in shipment or during airlock operation, contact Kice Customer Service Department for replacement.

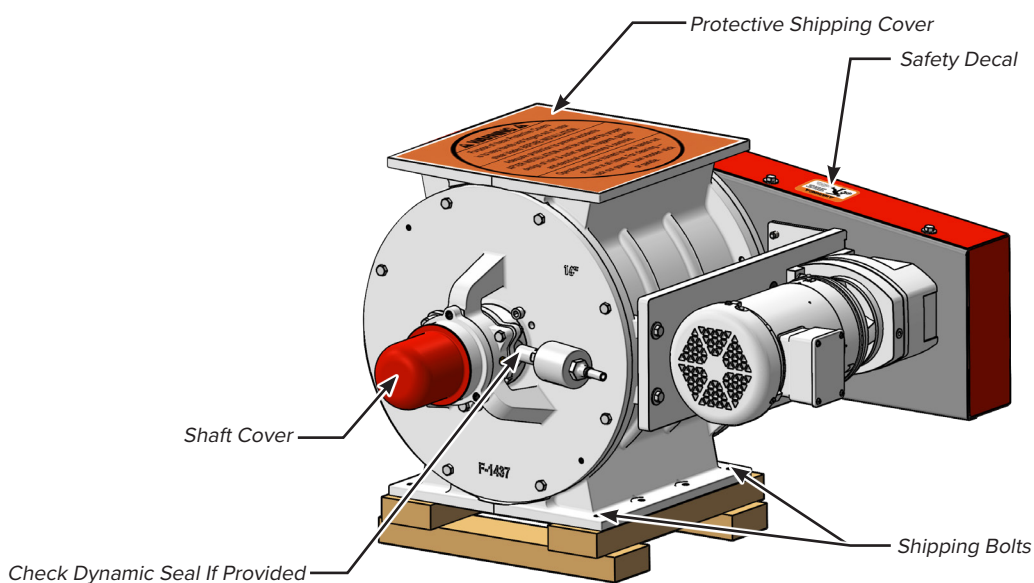


FIGURE 3

## DELIVERY INSPECTION AND INSTALLATION CONTINUED

### 3. Remove the airlock from the shipping pallet

- Remove shipping bolts securing airlock to the shipping pallet (Figure 3)
- Lift the airlock from the pallet using a tool truck, forklift or lifting gear with sufficient lifting capacity. **The airlock should be lifted carefully by the body inlet and/or outlet flange.**
- Set the airlock on a clean, smooth level surface.
- Check all bolts to be sure they are installed securely.



**CAUTION:** Do not use rotor shafts, gear motor, motor mount and guards for lifting. Doing so could affect airlock performance or function.

### 4. Inspect the Rotor

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



**DANGER:** 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. Ensure all personal and foreign objects are clear of the inlet before attempting to turn rotor.

- Verify that the rotor rotates freely and check to make sure each rotor pocket and the interior of the airlock is free of foreign material.
- With the airlock chain not attached, use a soft probe (wood block or brass rod) and mallet to turn the rotor (Figure 4). If the rotor turns freely, the inspection is complete. Refer to the maintenance section of this manual if chain needs disconnected.
- If the rotor does not turn freely or the rotor turns but squeals loudly, refer to the Maintenance section of this manual.



**WARNING:** Always wear proper eye protection and other PPE as required.

### 5. Inspect the gearmotor or speed reducer if supplied

- Read all the materials supplied with the airlock concerning the gearmotor or speed reducer.
- Be sure that the drive is securely mounted to the airlock.
- Kice standard Sumitomo Cyclo 6000 gearmotors will be grease lubricated and require no further action; if other refer to manufacturer manual.
- If the speed reducer is oil lubricated, add the appropriate oil as specified by the manufacturer.

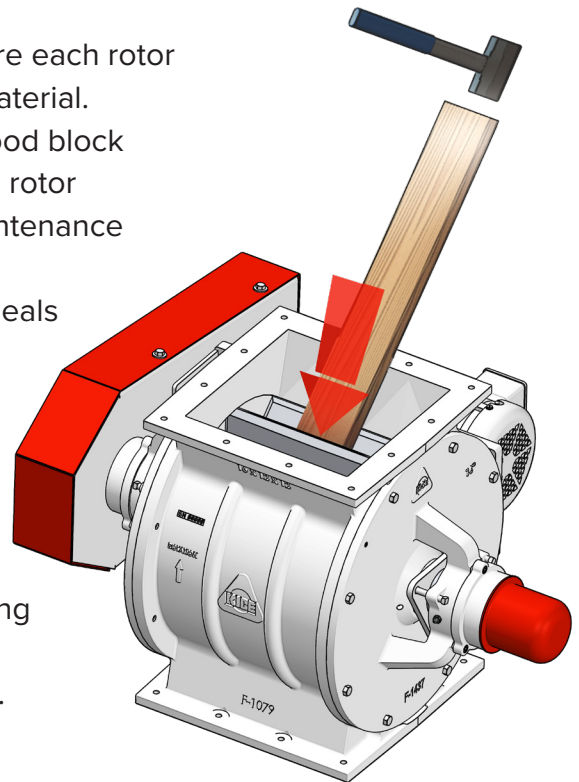


FIGURE 4

## 6. STORAGE

If the airlock will not be installed promptly, certain procedures should be followed to ensure acceptable function upon installation. Below are guidelines which are applicable for standard airlocks. Included manuals for vendor supplied components supersede the guidelines listed below.

Store in a clean, dry location to prevent rust formation or deterioration.

If the airlock must be stored outdoors, the following precautions should be followed.

- Protect from environment as well as possible by covering to keep out dirt and moisture.
- Store on a skid with a fully covered deck to keep the airlock from resting directly on the ground ensuring the outlet is covered and protected.
- Securely cover inlet using the steps below.
  - Remove shipping cover plate.
  - Transfer the position of the airlock flange holes to the shipping cover plate and drill through all holes.
  - Place a gasket on the airlock inlet.
- Bolt shipping cover plate in place by all flange holes.
- Cover motor and drives to prevent ingress of water, dirt and pests.
- If VJOT dynamic seals, plug air hose with appropriate fitting for long term storage.

**NOTICE:** Turn the rotor a minimum of five revolutions monthly to maintain grease distribution within the bearings.

## 7. INSTALLATION



WARNING

**WARNING:** Use appropriate equipment when lifting or moving the airlock. 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 where required.



CAUTION

**CAUTION:** Do not use rotor shafts, gear motor, motor mount and guards for lifting. Doing so could affect airlock performance or function.

1. Move the airlock to the installation area using proper equipment. **The airlock should be lifted carefully by the body inlet and/or outlet flange.**
2. Prepare the mounting surfaces to accept the airlock. Equipment should be securely positioned before accepting an airlock. All mating surfaces should be free of debris, rust and foreign materials.

## INSTALLATION CONTINUED

3. Mount airlock in place.
  - a. If the airlock will be floor mounted (Figure 5.2), secure to the floor using approved anchors and then attach the airlock mounting flange to the system flange using fasteners and supplied gasket(s) (Figure 5).

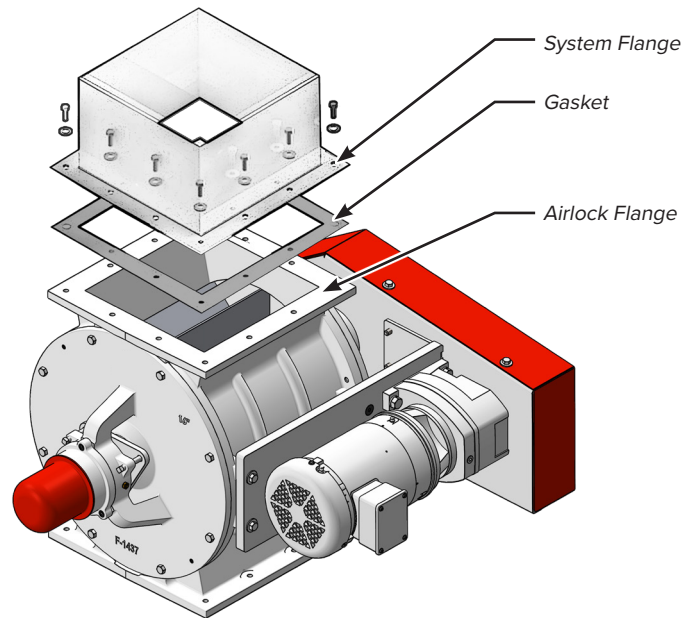


FIGURE 5

- b. If the airlock connects between two pieces of equipment, and is not floor mounted, attach the airlock flanges to system flanges using fasteners and supplied gaskets as shown (Figure 5). The airlock should be attached to the sturdiest equipment first.
4. Tighten all mounting fasteners securely.
5. Connect plant air if equipped. Some outboard airlocks use a pressurized air purge system or a pressurized shaft seal. Either type will be plumbed at Kice to provide a single compressed air connection and must be hooked up in order for the airlock to function properly. For dynamic seal models, the customer will need to supply clean dry air to an air regulator with a maximum pressure range between 0 - 15 psi. Using a regulator with a range greater than this could result in depleting the sealant.

**NOTICE:** If equipped with Air/N<sub>2</sub> air regulator, the customer will need to supply clean dry air to an air regulator with a maximum pressure range between 0 - 30psi. The Air/N<sub>2</sub> Regulator should be set to 7 +/- 1psi over conveying pressure.



**WARNING:** High voltage and rotating equipment can cause serious or fatal injury. Only qualified, trained and experienced personnel should perform installation, operation and maintenance of electrical machinery. Ensure the motor and frame of each airlock is grounded in accordance with OSHA, National Electric Code and all other applicable regulatory bodies and local codes.

## INSTALLATION CONTINUED

6. Connect motor to power source.

7. Test run the airlock. If any unusual noises occur, disconnect and lockout the power source. If the airlock was turning the wrong direction, correct wiring and retest. Refer to Maintenance section below if the problem persists.



**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.

8. The chain tension should be checked after 48 hours of operation. Refer to the appropriate maintenance section for recommended chain tensioning procedures. Repeat this step again after two to three weeks of operation.



**CAUTION:** Kice Industries, Inc. supplies self-lubricated chain on airlocks. Do not oil or otherwise lubricate.

9. On airlocks with outboard bearings which utilize packing, 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 5.1).
- b. Tighten the bolts until the airlock motor is strained.
- c. Then back off the bolts slightly.

10. 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 endplates should be utilized for the air purge system (see Figure 5.1). This conversion can be accomplished by replacing the first (inner) ring of packing in both endplates with a lantern ring, removing the plug from each endplate, and attaching a compressed air line equipped with a pressure regulator to each tapped hole. 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 5.1)

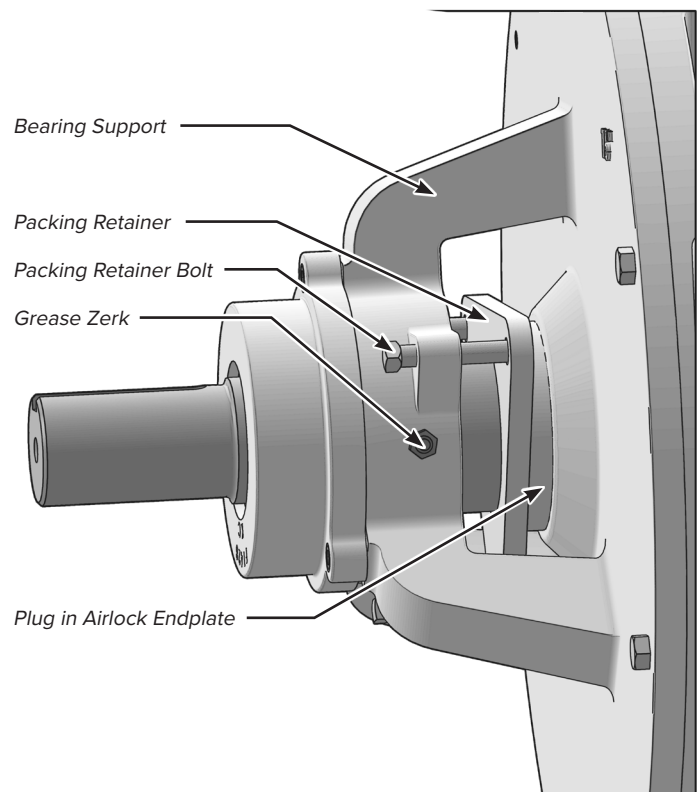


FIGURE 5.1

## INSTALLATION CONTINUED



CAUTION

**CAUTION:** The pressure regulator should be adjusted so that the purge air pressure is approximately double that pressure in the pneumatic conveying line and should be energized prior to handling material. This applies only to lantern ring configurations.

**NOTICE:** If installing airlock with dynamic seals, pressures will need to be verified after a run in period of 2 hours. Check again in 48 hours to confirm correct operation.

## SUPPORT FEET

Support feet are provided on airlock valves with bolt on pans. This allows the airlock to be floor mounted while maintaining clearance between the bolt on pan and the floor. The standard minimum clearance between the bottom of the bolt on pan and the floor is 1.0" as shown below, unless otherwise specified. Support feet also provide a stable base for the shipping and handling of airlocks when bolt on pans are attached. If the airlock will be installed and supported by another piece of equipment the support feet may be removed after installation.

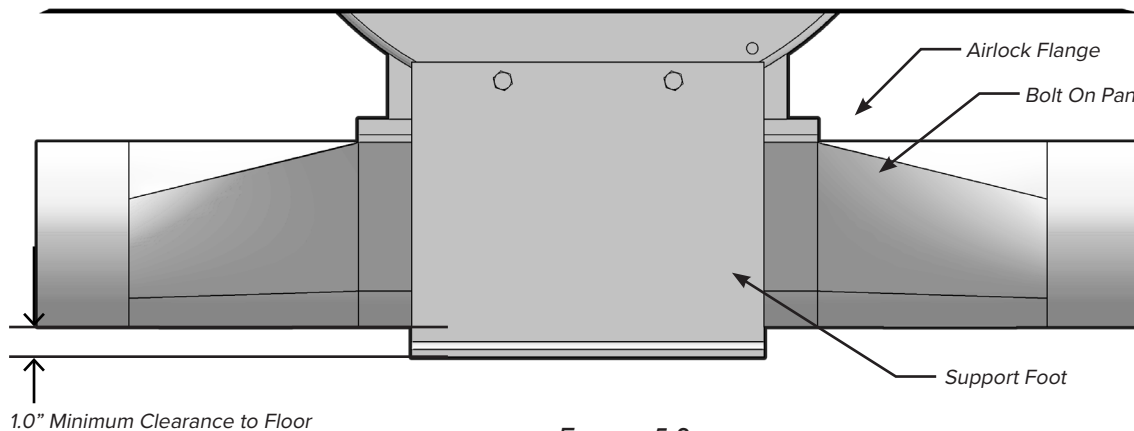


FIGURE 5.2

## 8. MAINTENANCE

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 rotor placement within the airlock body. Inspect the bearings and the drive chain for excessive wear. Finally, service the gearmotor or speed reducer as specified by the original manufacturer.

The majority of airlock operating problems 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 required if the operating problems are to be corrected satisfactorily.

**NOTICE:** 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.

### Recommended Maintenance Schedule – OT Series

| Interval                      | Task                                                                                                                                                                                                                                                         |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Daily                         | Perform a brief inspection. Look and listen for anything out of the ordinary while the airlock is running.                                                                                                                                                   |
| Every month or 200 hours      | Inspect shaft seals and adjust packing retainer.                                                                                                                                                                                                             |
| Every 3 months or 500 hours   | Grease bearings using NLGI 2 Mystik JT-6 Hi-Temp grease.<br> <b>CAUTION :</b> Confirm each grease pressure relief valve operates freely before adding grease to bearings. |
| Biannually                    | Inspect sprockets and chain for wear. Replace packing.                                                                                                                                                                                                       |
| Annually                      | Inspect rotor for position, wear and damage.                                                                                                                                                                                                                 |
| 5 years or every 10,000 hours | Replace bearings, shaft seals, sprockets and chain.                                                                                                                                                                                                          |
| Manufacturer recommended      | Service gearmotor or speed reducer.                                                                                                                                                                                                                          |

**NOTICE:** Severe applications may require adjustments to the maintenance schedule above.

### GENERAL MOTOR SERVICE

**NOTICE:** Not all airlocks use the same motor model. Service instructions and repair components may vary between models.

## MAINTENANCE AND SERVICE CONTINUED

Safety, service and repair information for the gearmotor or speed reducer is provided by the manufacturer. To obtain parts or service for the gearmotor or speed reducer, contact the local dealer or service representative. If difficulty obtaining service or repair components is encountered, please contact the Kice Customer Service Department for assistance.

## GENERAL ROTOR SERVICE

If the rotor becomes blocked, does not turn freely, or begins to squeal, the rotor should be inspected. The following steps describe the process required to complete an inspection.

**NOTICE:** Refer to Appendix 10 for clearance information. Some applications may require greater rotor clearance, please contact Kice Sales for assistance if unsure. Not to exceed 0.0079" clearance to comply with NFPA requirements.



**WARNING:** When performing maintenance, all energy sources associated with the airlock 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. Removal of transitions which expose hazards such as nip points of an airlock rotor also require lockout and tagout precautions be employed.



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



**DANGER:** Never place hands or fingers in an airlock unless it has been disconnected and locked out using wooden blocks and/or probes. These should be placed in the airlock to prevent the rotor from turning in either direction.

**NOTICE:** Use a block or probe robust enough to do the job without damaging or marring the airlock components.

1. Turn off the airlock and remove all potential energy sources following SOPs and lockout/tagout procedures.
2. Remove the airlock from system to obtain unobstructed access to rotor.
3. Place blocks in the airlock to prevent the rotor from turning unexpectedly (Figure 6).
4. Remove rotor blockage
  - a. Using a probe, dislodge the obstruction from the rotor and discard.
  - b. Remove safety blocks.
  - c. Turn the rotor using the probe to inspect for additional foreign material.
5. Check for rotor damage. If rotor does not turn freely:
  - a. Locate rotor damage such as burrs or dents on rotor blades.
  - b. Remove any burrs using a file or emery cloth.
6. If rotor removal is necessary refer to *Rotor Removal* section in this manual.

## MAINTENANCE AND SERVICE CONTINUED

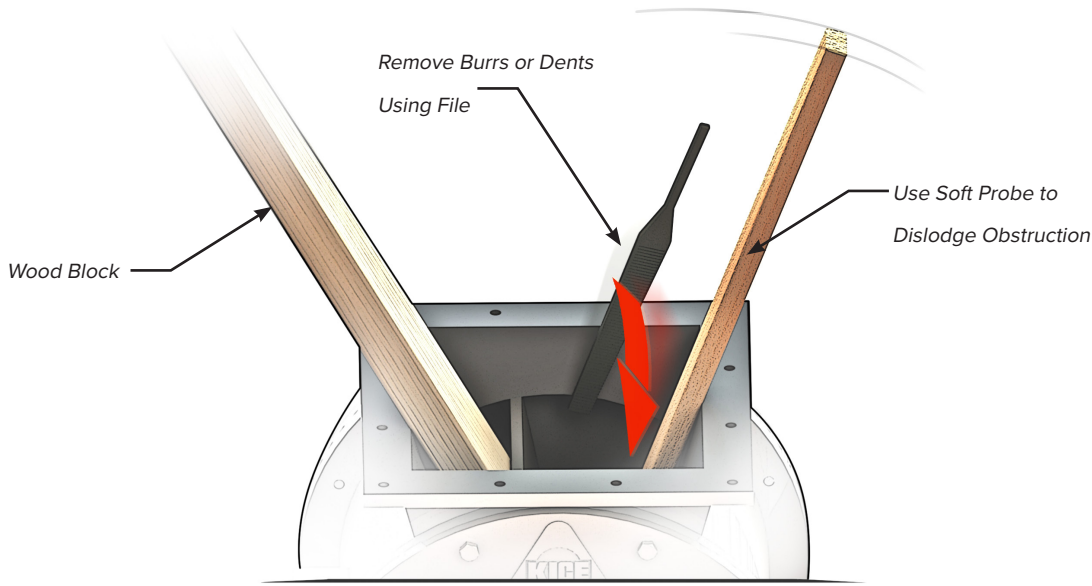


FIGURE 6



CAUTION

**CAUTION:** Remove the minimum amount of material required to eliminate burrs on close clearance faces of the rotor and body. Proper clearance must be maintained between rotor blades and the airlock body to retain appropriate function.

**NOTICE:** Refer to Appendix 10 for clearance information. Some applications may require greater rotor clearance, please contact Kice Sales for assistance if unsure. Not to exceed 0.0079" clearance to comply with NFPA requirements.

## CHAIN MAINTENANCE

**NOTICE:** Refer to Appendix 10 for clearance information. Some applications may require greater rotor clearance, please contact Kice Sales for assistance if unsure. Not to exceed 0.0079" clearance to comply with NFPA requirements.

**NOTICE:** Refer to Appendix 11 for all torque specifications.

Chain service life will be maximized when installed and maintained properly. Most chains require regular lubrication. However, the chain supplied by Kice is factory lubricated and further lubrication is not needed except in extreme applications. Follow the recommended chain maintenance guidelines below.



WARNING

**WARNING:** When performing maintenance, all energy sources associated with the airlock 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. Removal of transitions which expose hazards such as nip points of an airlock rotor also require lockout and tagout precautions be employed.

## MAINTENANCE AND SERVICE CONTINUED



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



**DANGER:** Never place hands or fingers in an airlock unless it has been disconnected and locked out using wooden blocks and/or probes. These should be placed in the airlock to prevent the rotor from turning in either direction.

1. Turn off airlock and remove all potential energy sources following SOPs and lockout/tagout procedures before removing chain guard cover.
2. Remove chain by removing connecting link.
3. Confirm the sprockets are in good condition and teeth are not excessively worn.
4. Confirm the chain is free of grit and debris and is in good condition. Pins and bushings should not have flat surfaces and should release smoothly from each sprocket while in motion.
5. Verify all three sprockets are aligned in the same plane. The idler sprocket will determine the axial alignment plane.
6. Adjust chain tension to allow chain deflection equal to 2% to 3% of shaft center distance.

*Example: Shaft center distance=7 inches → Chain deflection ~ .175 inches*

- a. Loosen nut on idler sprocket.
- b. Push idler sprocket up along the slide path to tighten chain (Figure 7).
- c. Secure idler sprocket position by tightening the idler sprocket nut.

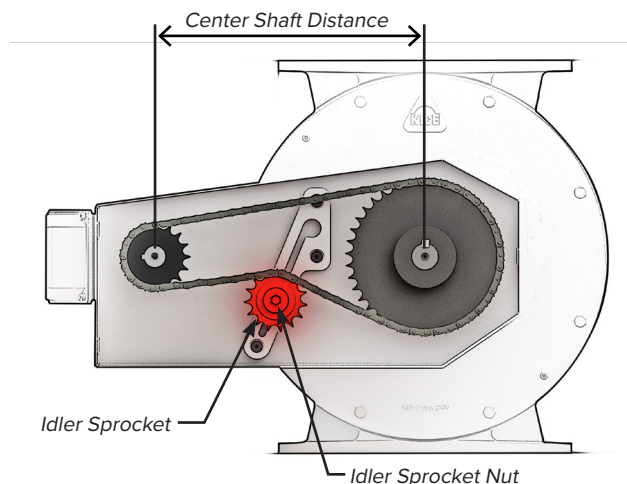


FIGURE 7

**NOTICE:** The chain tension should be checked after 48 hours of operation. Check it again after two to three weeks of operation.

## MAINTENANCE AND SERVICE CONTINUED

### VJOT PACKING GLAND REPLACEMENT (NO LANTERN RING)

**NOTICE:** Before getting started verify if the airlock needs lantern rings; look for an air regulator leading to a fitting near the center of the endplate as this is a clear indication. Note that one lantern ring takes the place of a single packing gland.

#### COMMON PACKING INSTALLATION MISTAKES

| Common Mistakes                                                                                                      | Problem                                                | Solution                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Not keeping <b>ALL</b> sealing surfaces clean during installation and over tightening packing retainer.              | → Airlock rotor seizure.                               | → Check for product compaction against rotor hub and endplate.<br>→ Look for endplate deflection when bearing is tightened down.<br>→ Loosen packing retainer. |
| Not tightening down packing retainer.                                                                                | → Premature seal failure.                              | → Ensure packing retainer is tightened down.                                                                                                                   |
| Airlock rotor shifting and not checking clearances (unlocking both bearings at the same time increase risk of this). | → Airlock rotor seizure.<br>→ Rotor and endplate wear. | → Check all clearances.<br>→ Do only one bearing at a time.                                                                                                    |

**NOTICE:** Refer to Appendix 10 for clearance information. Some applications may require greater rotor clearance, please contact Kice Sales for assistance if unsure. Not to exceed 0.0079" clearance to comply with NFPA requirements.

**NOTICE:** Refer to Appendix 11 for all torque specifications.

**HELPFUL HINT:** Working one side of airlock at a time helps keep the rotor centered. If one bearing is locked at a time, rotor shifting will be limited. If both bearings are loosened rotor will shift from side to side.



**NOTICE:** Imperative to keep all sealing components clean through the duration of replacement.

## MAINTENANCE AND SERVICE CONTINUED

1. Turn off airlock and remove all potential energy sources following SOPs and lockout/tagout procedures.
2. Prepare for packing replacement.
  - a. **For Drive Side**
    - i. Remove the chain guard cover.
    - ii. Loosen idler sprocket to relieve chain tension and remove chain.
    - iii. Remove driven sprocket and sprocket from airlock gearmotor.
    - iv. Remove chain guard backplate.
  - b. **For Non-Drive Side**
    - i. Loosen idler sprocket to relieve chain tension and remove chain.
3. Loosen packing retainer bolts (figure 8).

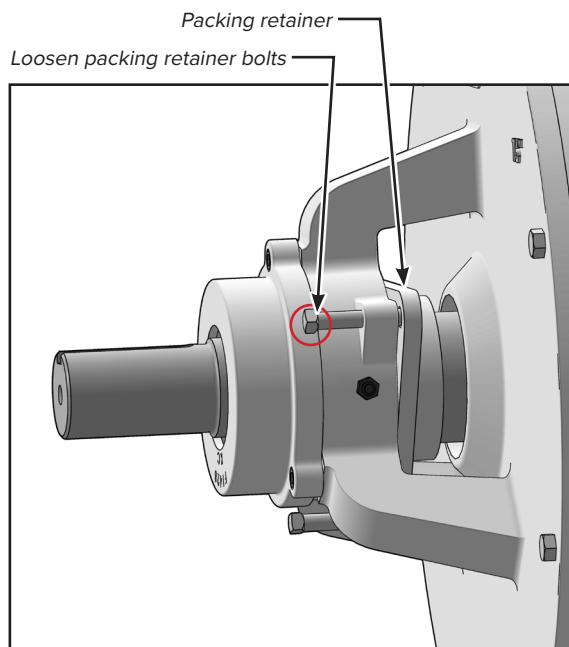


FIGURE 8

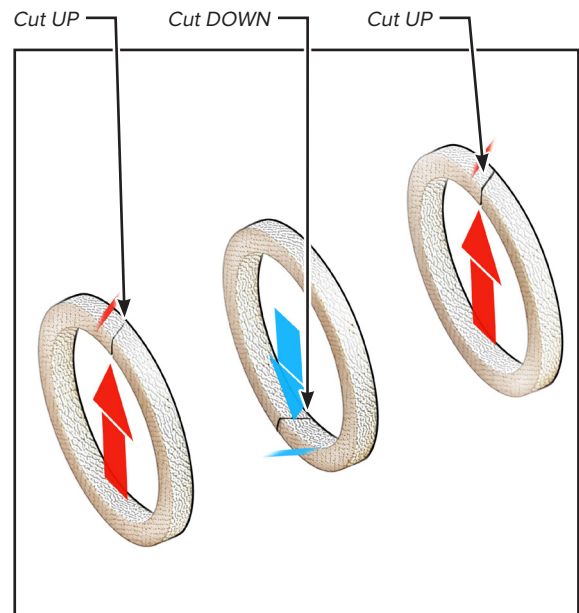


FIGURE 9

4. Slide packing retainer out of the way towards bearing (figure 8) revealing the packing gland pocket.
5. Remove old packing. See packing manufacture instructions as needed.
  - a. Use a flexible packing extractor such as a *Chesterton #253 Flexible Packing Extractor*.
  - b. Engage the extractor tool into the packing then pull out the packing ring.
  - c. Repeat steps (a) through (c) until all packing rings are removed from the endplate.

**NOTICE:** Avoid allowing the extractor tool to contact the rotor shaft. The tool may score the shaft sealing surface.

6. Clean endplate and shaft ensuring all packing fragments and debris are removed.
7. Inspect shaft sealing surface for damage and wear. Small imperfections may be removed with emery cloth.

## MAINTENANCE AND SERVICE CONTINUED

8. Repeat steps 3 through 7 for the opposite endplate.
9. Prepare new rings of packing for installation.
  - a. If available, use a mandrel or shaft that matches the exact size of the rotor shaft.
  - b. Cut packing rings at 45° angle.
  - c. Use a sharp knife. A dull knife will cause the packing to open up making sealing more difficult.



| Airlock Size | Approx. Length | Kice Kit Part#  |
|--------------|----------------|-----------------|
| 8" thru 12"  | 8 ¼"           | AIRLOCKPACKKIT1 |
| 14" thru 20" | 10 ¾"          | AIRLOCKPACKKIT2 |
| 24"          | 12 ⅝"          | AIRLOCKPACKKIT3 |

10. Wrap the first ring around the shaft and note the position of the joint (Figure 9).
11. Push the first ring into the packing gland using the packing retainer.
12. Slide packing retainer out of way to access packing gland pocket.
13. Wrap the second ring around the shaft and offset the joint 180° from the position of the first ring (Figure 9). Push it into the packing gland using the packing retainer then slide packing retainer out of packing gland pocket.
14. Wrap the third ring around the shaft and offset the joint 180° from the second ring (Figure 9). Push it into the packing gland pocket using the packing retainer.
15. Evenly tighten the packing retainer bolts until light pressure is applied to packing.
16. Repeat steps 10 through 15 for the opposite endplate.
17. Reattach drive components and guards in the opposite order they were removed.
18. Restore power to airlock with no material passing through the airlock.
19. Equally tighten the bolts until the motor begins to labor.
20. Back off each retainer bolt 1/8 turn.
21. Repeat steps 19 and 20 **after two hours of run time.**

## MAINTENANCE AND SERVICE CONTINUED

### VJOT BEARING REMOVAL / REPLACEMENT

#### COMMON BEARING INSTALLATION MISTAKES

| Common Mistakes                                                                                                      | Problem                                                | Solution                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Not keeping <b>ALL</b> bearing and sealing surfaces clean during installation.                                       | → Bearing and rotor seizure.                           | → Check for grease and bearing contamination, premature bearing wear.                                             |
| Airlock rotor shifting and not checking clearances (unlocking both bearings at the same time increase risk of this). | → Airlock rotor seizure.<br>→ Rotor and endplate wear. | → Check all clearances.<br>→ Do only one bearing at a time.<br>→ Ensure bearing is tightened and locked properly. |

**NOTICE:** Refer to Appendix 10 for clearance information. Some applications may require greater rotor clearance, please contact Kice Sales for assistance if unsure. Not to exceed 0.0079" clearance to comply with NFPA requirements.

**NOTICE:** Refer to Appendix 11 for all torque specifications.

**HELPFUL HINT:** Working one side of airlock at a time helps keep the rotor centered. If one bearing is locked at a time, rotor shifting will be limited. If both bearings are loosened rotor will shift from side to side.



**NOTICE:** Imperative to keep all sealing components clean through the duration of replacement.

1. Turn off airlock and remove all potential energy sources following SOPs and lockout/tagout procedures.
2. Remove airlock from system to obtain unobstructed access to endplates.
3. Position the rotor so two blades will contact the body once endplates are removed (figure 28).
4. Place blocks in the airlock to prevent the rotor from turning in either direction (figure 6).
5. Remove bearing endcaps from bearing supports as shown (figure 10). **Take care not to damage lip seal in the bearing end cap.**
6. Straighten the bearing lock washer tab engaged with bearing lock nut as shown (figure 11).
7. Using a spanner wrench, remove the bearing lock nut.
8. Slide the bearing lock washer and tongue washer off the rotor shaft.
9. Remove the bolts on **ONE** endplate.
10. Alternately tighten endplate set screws to move endplate free of the body.
11. Remove endplate carefully from rotor shaft taking care not to drop the bearing or packing retainer as they are pulled away from the rotor shaft (figure 12).

## MAINTENANCE AND SERVICE CONTINUED

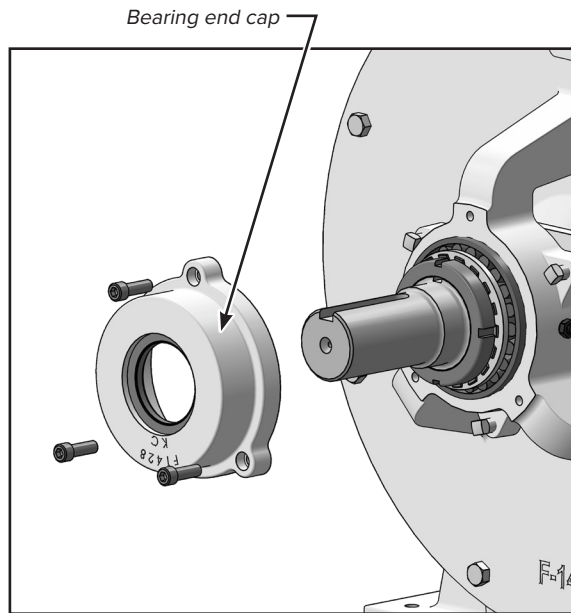


FIGURE 10

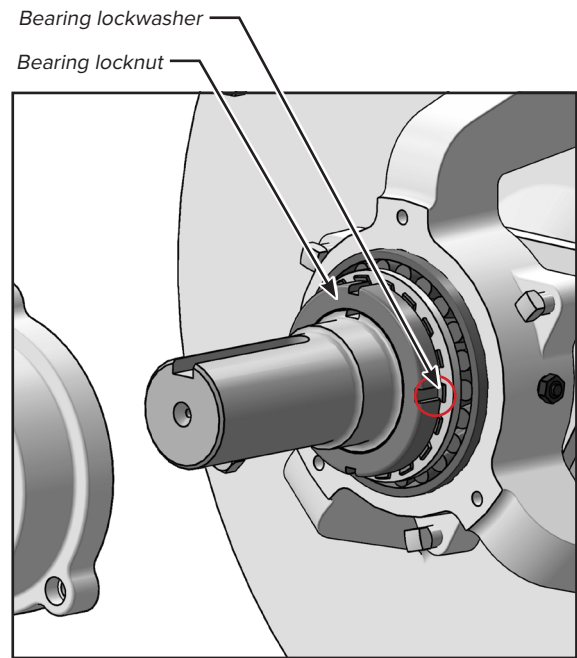


FIGURE 11

12. Pull bearing from endplate bearing support (figure 13).
13. Slide bearing spacer out of bearing support (figure 13).
14. Press used radial shaft seal out of bearing support and dispose of properly.
15. Clean endplate and shaft ensuring all packing fragments and debris are removed.
16. Inspect shaft sealing surface and endplate for damage and wear. Small imperfections may be removed with emery cloth.
17. Verify the grease zerk accepts grease and is clean by pushing a few pumps of grease through the zerk.
18. Confirm the grease pressure relief valve operates freely.

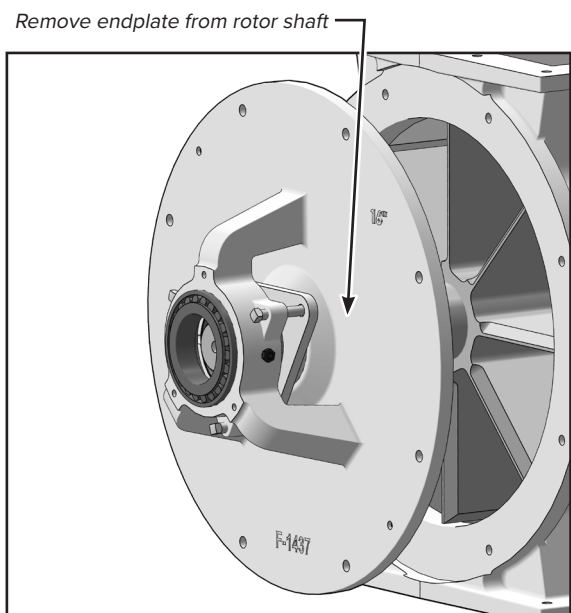


FIGURE 12

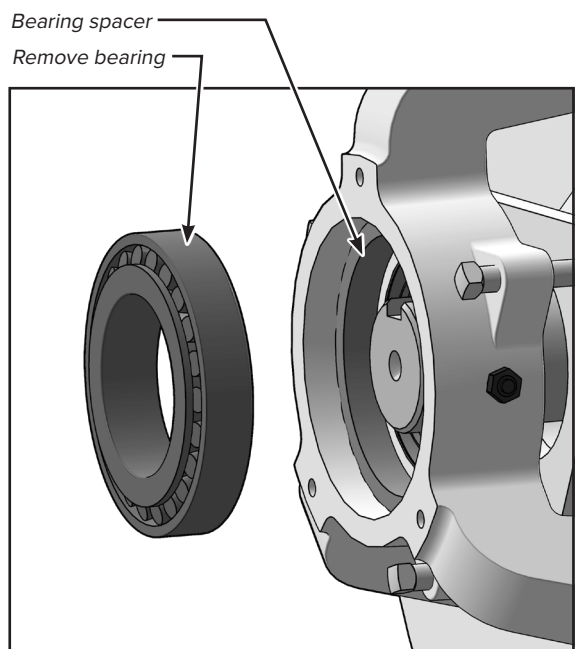


FIGURE 13

## MAINTENANCE AND SERVICE CONTINUED

19. Thoroughly clean interior surfaces of the bearing support and packing gland.
20. Install a new radial shaft seal in bearing support.
21. Loosen the endplate push out set screws positioning them below the endplate mating flange face.
22. Position packing retainer between bearing support and packing gland.
23. Reinstall endplate with the same caution with which it was removed.
24. Thoroughly clean bearing spacer and slide it into bearing support.
25. Install new bearing until it is firmly in contact with bearing spacer and bearing spacer is pushed against bearing support step.

**NOTICE:** TIMKEN bearings must be replaced with the **EXACT SAME PART NUMBER**. No substitutions allowed.

**NOTICE:** The bearing does not require the assistance of tools to install when properly aligned. Please refrain from striking the bearing to prevent bearing damage which will decrease service life.

26. Work grease into all bearing cone voids and push into bearing cone.
27. Slide tongue washer and bearing lock washer over shaft with respective tabs in shaft keyway until tongue washer contacts the bearing.
28. Hand tighten bearing locknut against bearing lock washer.
29. Repeat steps 4 through 28 for the opposite endplate.
30. **Verify clearance using feeler gauges that ensure the rotor turns freely (figure 14).**
31. Install a new radial shaft seal in the bearing end cap.
32. Install bearing end cap.

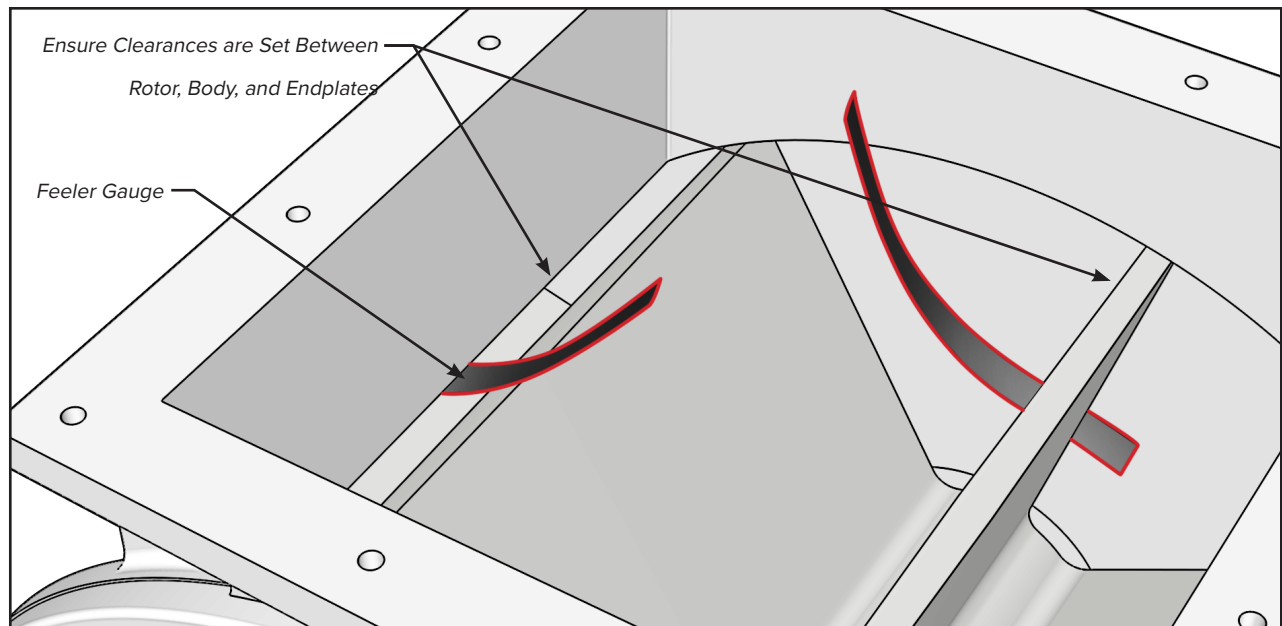


FIGURE 14

## MAINTENANCE AND SERVICE CONTINUED

**NOTICE:** The rotor can shift during bearing replacement. Rotor clearance must be verified after replacement. Less than minimum recommended clearance can cause premature wear or failure. Always verify clearances before operation.

**NOTICE:** Confirm each grease pressure relief valve operates freely before adding grease to bearings.

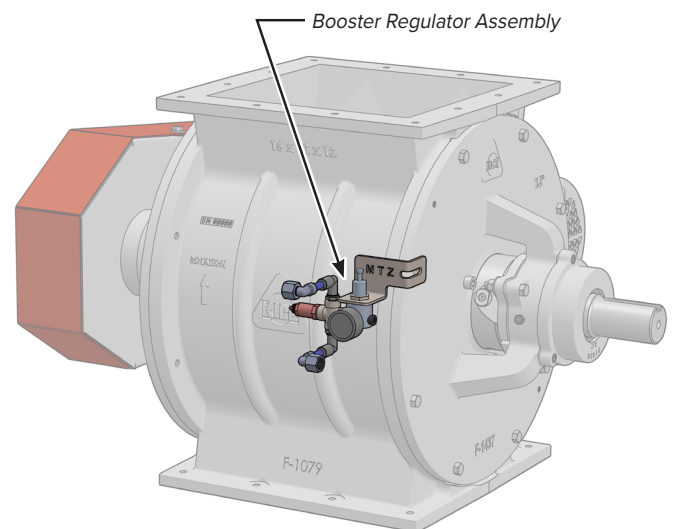
33. If necessary, install new packing following the Packing Gland Replacement instructions (see page 20).

34. Reattach drive components and guards in the opposite order they were removed.

## BOOSTER REGULATOR MAINTENANCE

**NOTICE:** The booster regulator assembly is standard.

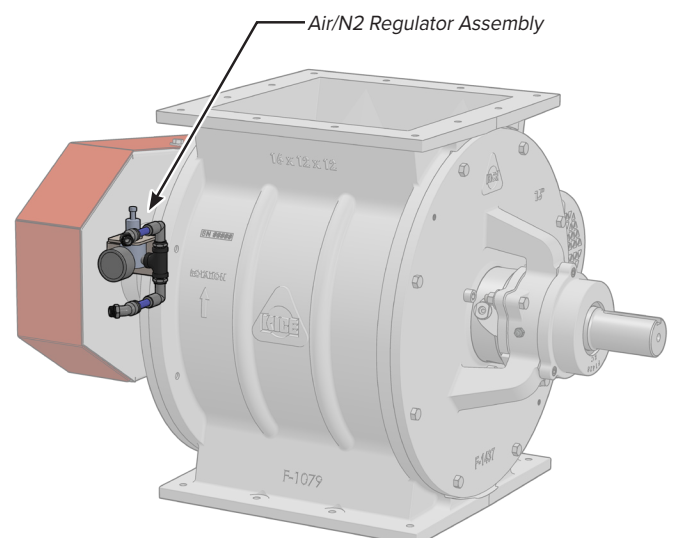
Clean dry air is to be supplied to the air regulator. The Booster regulator should have a maximum pressure range between 0 - 15psi. The booster Regulator should be set to a constant pressure of around 7psi.



## Air/N2 MAINTENANCE

**NOTICE:** The Air/N2 Regulator Assembly does not come standard. This can be added as an option.

Clean dry air is to be supplied to the air regulator. The Air/N2 regulator should have a maximum pressure range between 0 - 30psi. The Air/N2 Regulator should be set to 7 +/- 1psi over conveying pressure.



## MAINTENANCE AND SERVICE CONTINUED

### LANTERN RING SEAL MAINTENANCE

Optional lantern ring seals are used when purge air is applied to sweep debris from the rotor shaft and are sealed on the back side with two rings of braided packing. Because the air is added to the product stream, it should be clean dry air and some installations may require sterile air.



**WARNING:** Failure to supply plant air to seals before allowing material to pass through the airlock will result in premature seal failure and shaft damage.

Inspect and **adjust packing retainers as needed after two hours of operation** then about every month or 200 hours thereafter using the following steps.

1. Verify the plant air pressure supplied by the regulator is at least 2 psig greater than conveying pressure.
2. With an open-end wrench alternately tighten the packing retainer bolts 1/8 turn at a time as shown (Figure 8).
3. Equally tighten the bolts until the motor begins to labor.
4. Back off each retainer bolt 1/8 turn.
5. With no material passing through the airlock, confirm plant air is being delivered to the lantern ring.



**CAUTION:** Proper compression of the packing will prevent shaft damage. Loose packing may allow plant air to leak to atmosphere rather than being directed towards the rotor and cause debris to accumulate in the lantern ring thereby scoring the rotor shaft. Conversely, excessively tight packing may cause the packing itself to wear grooves into the rotor shaft.

### LANTERN RING SEAL REPLACEMENT

#### COMMON LANTERN RING SEAL REPLACEMENT MISTAKES

| Common Mistakes                                              | Problem                                  | Solution                                                                                            |
|--------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Improper lantern ring air, start process, or poor to no air. | → Lantern ring blinds over with product. | → Verify air regulation and quality. Verify lantern ring is purging air prior to beginning process. |

**NOTICE:** Refer to Appendix 10 for clearance information. Some applications may require greater rotor clearance, please contact Kice Sales for assistance if unsure. Not to exceed 0.0079" clearance to comply with NFPA requirements.

**NOTICE:** Refer to Appendix 11 for all torque specifications.

## MAINTENANCE AND SERVICE CONTINUED

**HELPFUL HINT:** Working one side of airlock at a time helps keep the rotor centered. If one bearing is locked at a time, rotor shifting will be limited. If both bearings are loosened rotor will shift from side to side.



**NOTICE:** Imperative to keep all sealing components clean through the duration of replacement.

1. Turn off airlock and remove all potential energy sources following SOPs and lockout/tagout procedures.
2. Remove airlock from system to obtain unobstructed access to endplates.
3. Prepare for lantern seal ring replacement.

**a. For Drive Side**

- i. Remove the chain guard cover.
- ii. Loosen idler sprocket to relieve chain tension and remove chain.
- iii. Remove driven sprocket and sprocket from airlock gearmotor.
- iv. Remove chain guard backplate.

**b. For Non-Drive Side**

- i. Loosen idler sprocket to relieve chain tension and remove chain.

4. Loosen packing retainer bolts (figure 8).

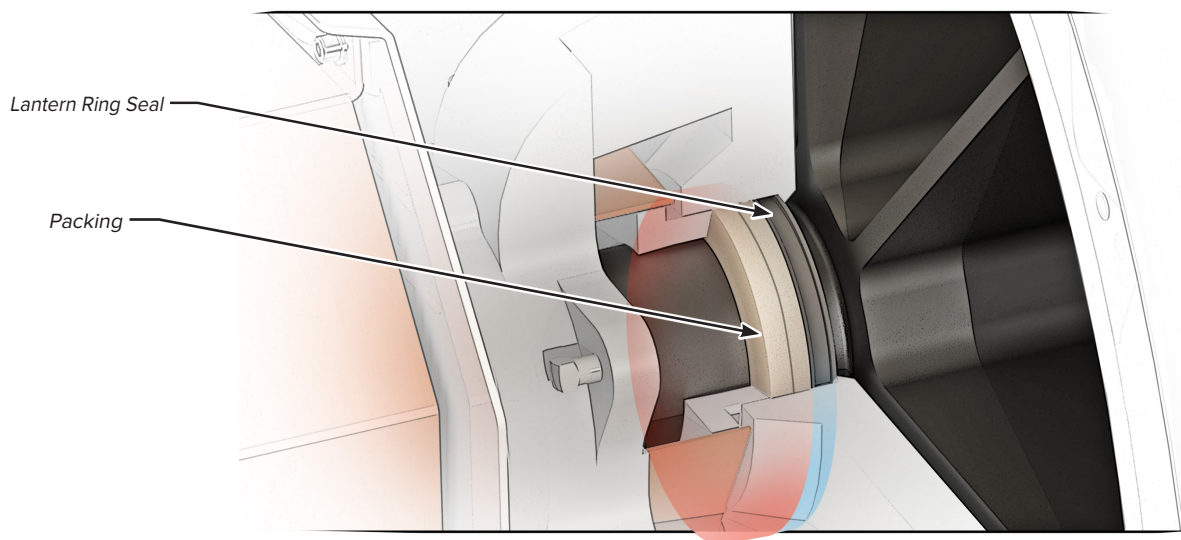


FIGURE 15

5. Slide packing retainer out of the way towards bearing (figure 8) revealing the packing gland pocket.
6. Remove old packing. See packing manufacture instructions as needed.
  - a. Use a flexible packing extractor such as a *Chesterton #253 Flexible Packing Extractor*.
  - b. Engage the extractor tool into the packing then pull out the packing ring.
  - c. Repeat steps (a) through (c) until all packing rings are removed from the endplate.

## MAINTENANCE AND SERVICE CONTINUED

**NOTICE:** Avoid allowing the extractor tool to contact the rotor shaft. The tool may score the shaft sealing surface.

7. Position the rotor so two blades will contact the body once endplates are removed (Figure 28).
8. Place blocks in the airlock to prevent the rotor from turning in either direction (figure 6).



**DANGER:** Never place hands or fingers in an airlock unless it has been disconnected and locked out using wooden blocks and/or probes. These should be placed in the airlock to prevent the rotor from turning in either direction.

9. Remove bearing endcaps from bearing supports as shown (figure 10). **Take care not to damage lip seal in the bearing end cap.**
10. Straighten the bearing lock washer tab engaged with bearing lock nut as shown (figure 11).
11. Using a spanner wrench, remove the bearing lock nut.
12. Slide the bearing lock washer and tongue washer off the rotor shaft.
13. Remove the bolts on **ONE** endplate.
14. Alternately tighten endplate set screws to move endplate free of the body.
15. Remove endplate carefully from rotor shaft taking care not to drop the bearing or packing retainer as they are pulled away from the rotor shaft (figure 12).
16. Remove used lantern ring from the endplate and dispose of properly.
17. Clean packing gland and shaft ensuring all packing fragments and debris are removed.
18. Inspect shaft sealing surface and packing gland for damage and wear. Small imperfections may be removed with emery cloth.
19. Insert new lantern ring into packing gland with the chamfered edge facing the rotor (Figure 15). A stamped “R” may additionally be found on the rotor facing side of the lantern ring.
20. Remove the endplate push out set screws so that they do not protrude out of the endplate mating flange face.
21. Reinstall endplate with the same caution with which it was removed.
22. Follow instructions provided to set Rotor Clearance – OT Series.
23. Prepare **two** new rings of packing for installation.

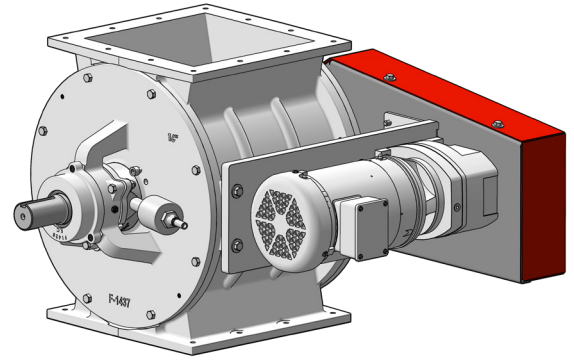
**NOTICE:** One lantern ring takes the place of a single packing gland.

24. Follow Packing Replacement – see page 20.
25. Repeat steps 4 through 23 for the opposite endplate.
26. Supply plant air to lantern rings.

## MAINTENANCE AND SERVICE CONTINUED

### VJOT DYNAMIC SEAL MAINTENANCE

The Kice VJOT Airlock with dynamic seal is designed and tested to the most demanding conditions. To keep the VJOT dynamic seal in service for as long as possible, the seal should be inspected and checked per the maintenance schedule below. Should a repair be needed for the dynamic seal the unit can be disassembled from the airlock and shipped back to Kice for repair or rebuild.



### MAINTENANCE SCHEDULE FOR VJOT DYNAMIC SEAL

| Interval   | Task                                                                                                                                                                                  |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Daily      | Perform a brief inspection. Look and listen for anything out of the ordinary while the airlock is running. Look for leaks from the dynamic seal booster's air pipe to the air source. |
| Biannually | Check to see if dynamic seal booster needs recharged or reset. If yes, follow recharge instructions.                                                                                  |
| 2 years    | Inspect and rebuild dynamic seal (Kice is the only authorized seal re-builder).                                                                                                       |

### DYNAMIC SEAL REMOVAL & REPLACEMENT

#### COMMON SEAL REPLACEMENT MISTAKES

| Common Mistakes                                                                                                                           | Problem                                                                                                     | Solution                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Not keeping <b>ALL</b> sealing surfaces clean during installation, loose seal flange, or protruding seal bolts past the endplate surface. | → Airlock rotor seizure.                                                                                    | <ul style="list-style-type: none"><li>→ Check for product compaction against rotor hub and endplate.</li><li>→ Look for endplate deflection when bearing is tightened down.</li><li>→ Tighten seal flange securely.</li><li>→ Insuring fasteners don't extend beyond inboard side of the endplate.</li></ul> |
| Not locking seal to rotor shaft.                                                                                                          | → Premature seal failure.                                                                                   | → Ensure seal is fastened to rotor shaft.                                                                                                                                                                                                                                                                    |
| Airlock rotor shifting and not checking clearances (unlocking both bearings at the same time increase risk of this).                      | <ul style="list-style-type: none"><li>→ Airlock rotor seizure.</li><li>→ Rotor and endplate wear.</li></ul> | <ul style="list-style-type: none"><li>→ Check all clearances.</li><li>→ Do only one bearing at a time.</li></ul>                                                                                                                                                                                             |
| Too much air pressure on seals.                                                                                                           | → Booster sealant depletes prematurely.                                                                     | <ul style="list-style-type: none"><li>→ Ensure regulator before seals has a set range no greater than 0 - 15 psi.</li><li>→ Ensure pressure is a constant pressure of approximately 7 psi.</li></ul>                                                                                                         |

## MAINTENANCE AND SERVICE CONTINUED

**NOTICE:** Refer to Appendix 10 for clearance information. Some applications may require greater rotor clearance, please contact Kice Sales for assistance if unsure. Not to exceed 0.0079" clearance to comply with NFPA requirements.

**NOTICE:** Refer to Appendix 11 for all torque specifications.

**HELPFUL HINT:** Working one side of airlock at a time helps keep the rotor centered. If one bearing is locked at a time, rotor shifting will be limited. If both bearings are loosened rotor will shift from side to side.



**NOTICE:** Imperative to keep all sealing components clean through the duration of replacement.

1. Turn off airlock and remove all potential energy sources following SOPs and lockout/tagout procedures.
2. Prepare for packing replacement.

### a. For Drive Side

- i. Remove the chain guard cover.
- ii. Loosen idler sprocket to relieve chain tension and remove chain.
- iii. Remove driven sprocket and sprocket from airlock gearmotor.
- iv. Remove chain guard backplate.

### b. For Non-Drive Side

- i. Loosen idler sprocket to relieve chain tension and remove chain.

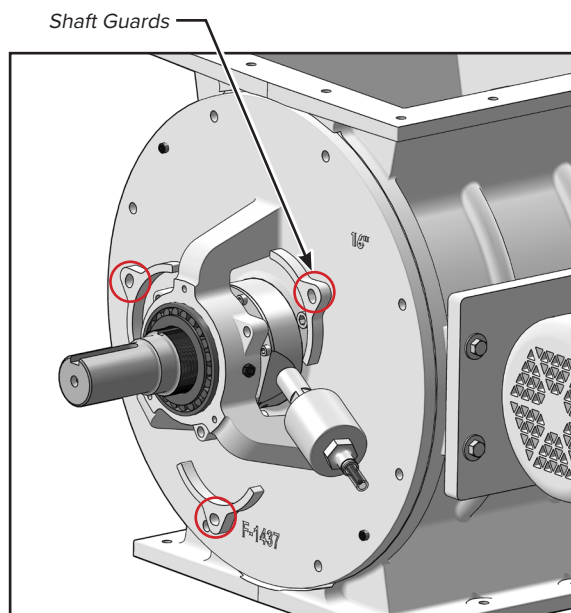


FIGURE 16

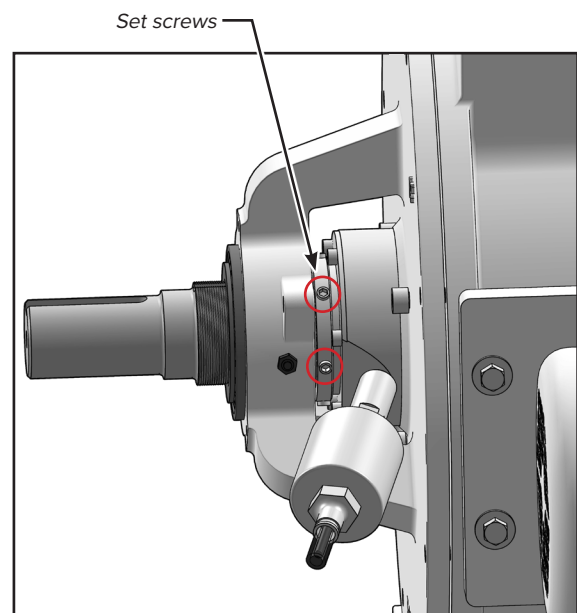


FIGURE 17

## MAINTENANCE AND SERVICE CONTINUED

3. Shutoff / disconnect plant air to seals.
4. Remove shaft guards to gain access to set screws (figure 16).
5. Loosen all set screws (figure 17).
6. Remove the endplate from the airlock (figure 18).
7. Remove air flush nozzle from dynamic seal (figure 19).
8. Remove booster/cylinder assembly from the dynamic seal (figure 19).
9. Remove the three dynamic seal mount bolts from the airlock endplate (figure 20).
10. Remove the dynamic seal from the endplate (figure 21).
11. Send dynamic seal to Kice Industries for any major repairs or for a complete rebuild.

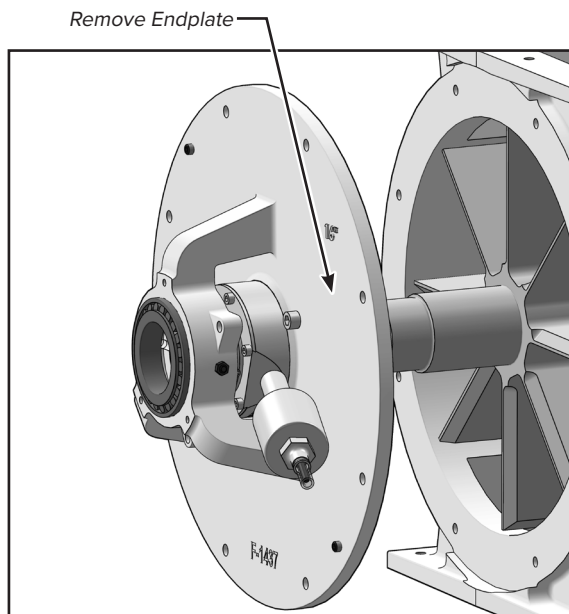


FIGURE 18

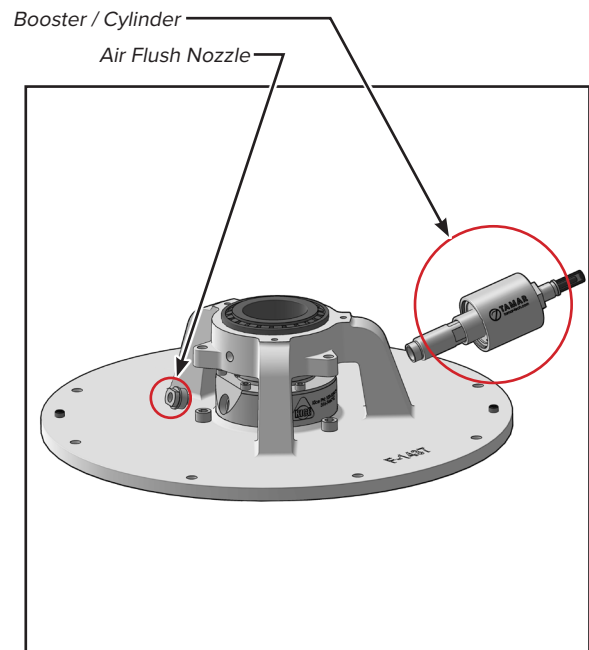


FIGURE 19

12. Thoroughly clean interior surfaces of the endplate and flange area for dynamic seal.
13. Install new or rebuilt dynamic seal from the inside face of the endplate. Verify that O-rings are in place for both shaft (inner diameter) and the gland O-ring that forms the seal on the inside face of the endplate. Lightly lubricate each O-ring to prevent damage or rolling during assembly. **Insure PTFE ring is properly seated and flush with seal flange** before continuing installation (figure 21).

**NOTICE:** Make sure orientation of dynamic seal will allow for the booster and air flush nozzle to be installed.

14. Install mount bolts from endplate to dynamic seal (figure 20). Cross tighten the three bolts.
15. Remove the endplate push out set screws so that they do not protrude out of the endplate mating flange face.
16. Reinstall endplate with the same caution with which it was removed.

## MAINTENANCE AND SERVICE CONTINUED

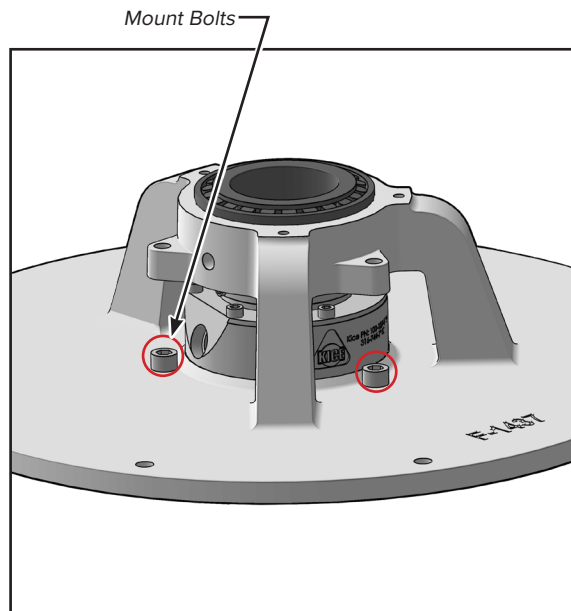


FIGURE 20

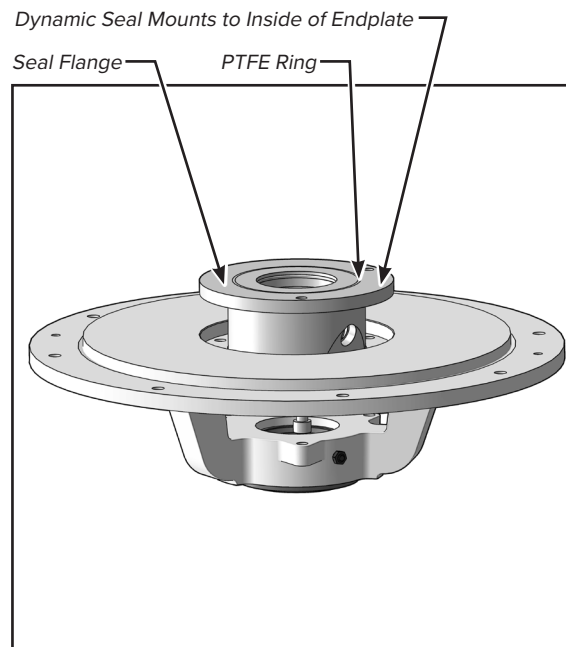


FIGURE 21

17. **Verify clearance using feeler gauges that ensure the rotor turns freely (Figure 22).**
18. Once clearances are verified, alternatively tighten the setscrews on the dynamic seal (figure 17).
19. Reinstall air flush nozzle and booster/cylinder assembly (figure 19).
20. Reinstall shaft guards (figure 16).
21. Turn on / connect plant air to seals.
22. Reattach any drive components and guards in the opposite order they were removed.

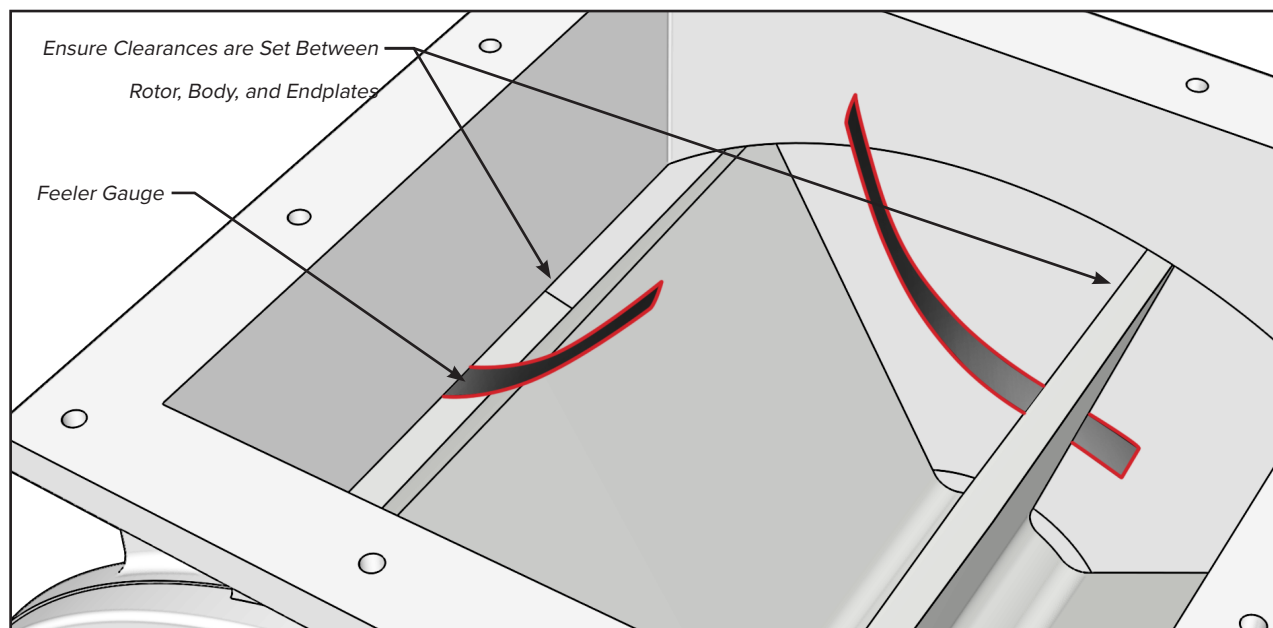


FIGURE 22

## MAINTENANCE AND SERVICE CONTINUED

### VISUAL INSPECTION OF DYNAMIC SEAL BOOSTER

If the gauge rod has minimal visibility this indicates a booster recharge is needed (figure 23). If gauge rod is visible than no further action is needed.

**NOTICE:** Booster sealant should not deplete quicker than 4-6 Months (depending on application). If depletion is occurring in the case verify air regulator has at a maximum service range between 0 - 15 psi and pressure constant around 7 psi.

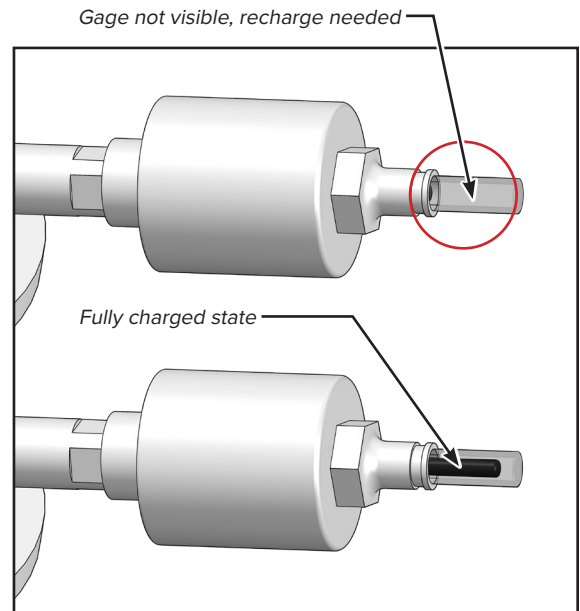


FIGURE 23

### DYNAMIC SEAL BOOSTER RECHARGING

The booster on the dynamic seal should be checked every 6-months for possible sealant recharging. If a recharge is needed the gauge will not be visible (figure 23). Follow the steps below to recharge the booster.

1. Disconnect supply air to dynamic seal. Note the airlock can stay running during recharge.
2. Remove the clear protective tubing (figure 24).
3. Un-thread the booster/cylinder from the booster pipe (figure 25).
4. Fill the empty booster pipe with PTFE putty or replace empty booster pipe with new pre-filled one (figure 26).

#### PTFE SEALANT OPTIONS

| Description                      | Kice Kit Part# |
|----------------------------------|----------------|
| Prefilled Sealant Pipes          | 100-131-331    |
| 1000ML Tub of Food Grade Sealant | 100-131-330    |
| 200ML Tub of Food Grade Sealant  | 100-131-329    |

## MAINTENANCE AND SERVICE CONTINUED

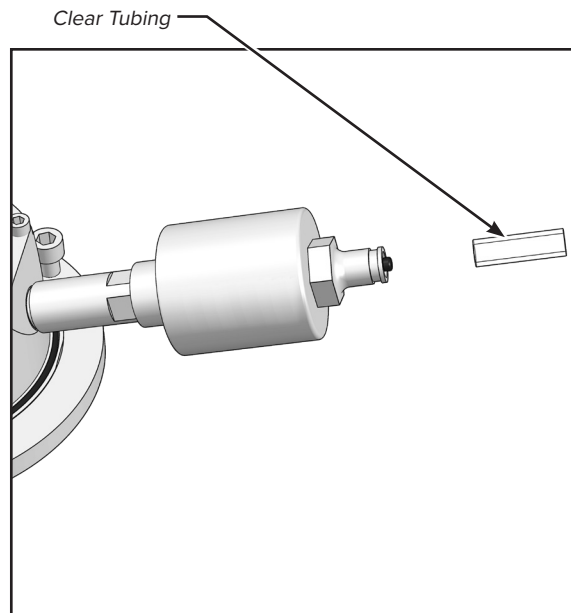


FIGURE 24

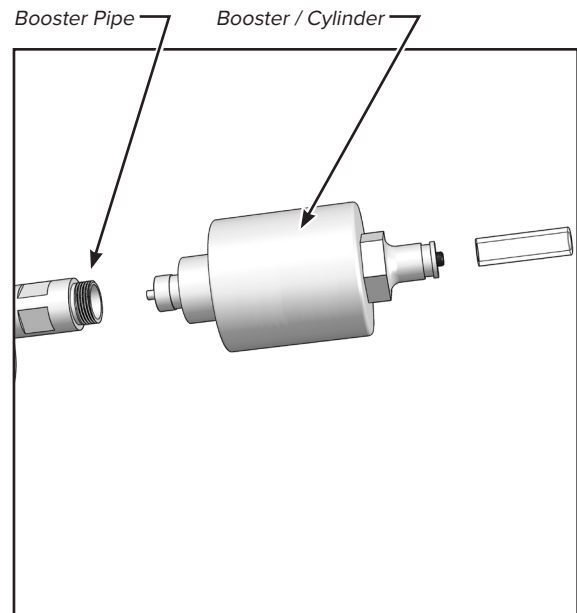


FIGURE 25

5. Manually push the cylinder back into the housing. The gauge rod should now be visible (figure 27).
6. Thread booster/cylinder back onto booster pipe.
7. Reconnect protective clear tubing.
8. Re-supply air to dynamic seals.

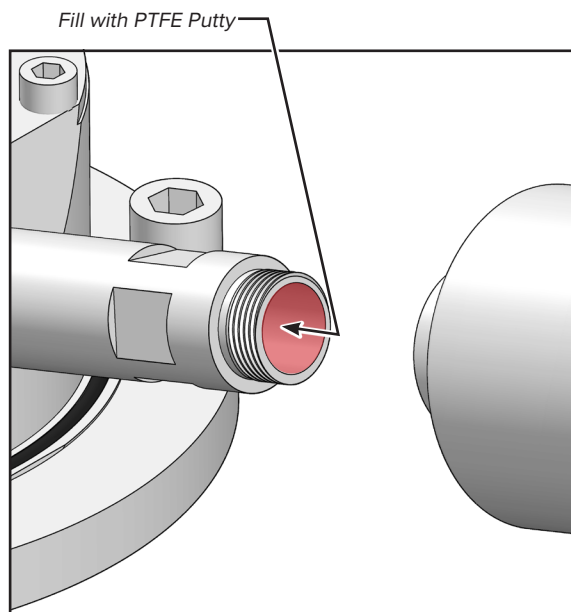


FIGURE 26

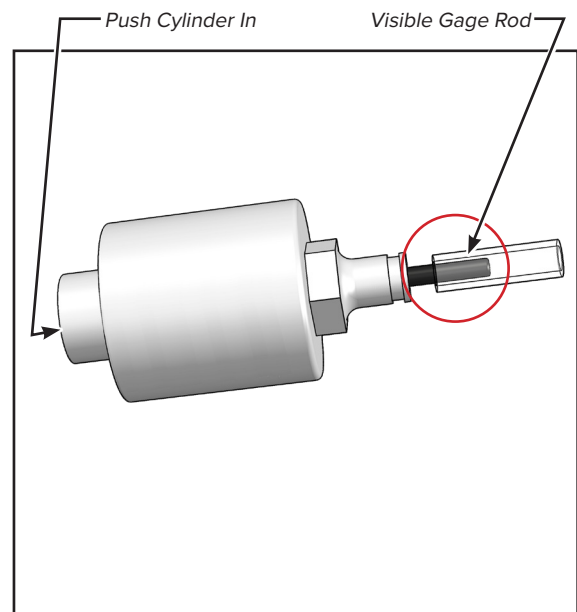


FIGURE 27

### ADJUSTING AIRLOCK CLEARANCES

**NOTICE:** *Refer to Appendix 10 for clearance information.* Some applications may require greater rotor clearance, please contact Kice Sales for assistance if unsure. Not to exceed 0.0079" clearance to comply with NFPA requirements.

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

1. Turn off airlock and remove all potential energy sources following SOPs and lockout/tagout procedures.
2. Using a feeler gauge, check the clearance between the rotor and the end plates (figure 22). There should be minimum clearance of 0.003". Refer to Appendix 10 for clearance information as these may vary depending on operating temperature and valve size.
3. Remove the chain guard, the drive chain, the sprocket and the bushing on the airlock shaft, the sprocket on the reducer shaft, the chain guard backplate, and the shaft cover.
4. Remove both end caps from the bearing supports.
5. Clean the grease from the bearing assemblies.
6. Straighten the lock washer tab from the slot on both adjusting nuts.
7. Using a spanner wrench, loosen one adjusting nut while tightening the other. To increase the 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 after packing void with fresh grease.
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.

### REMOVING ROTOR

**NOTICE:** Refer to Appendix 10 for clearance information. Some applications may require greater rotor clearance, please contact Kice Sales for assistance if unsure. Not to exceed 0.0079" clearance to comply with NFPA requirements.

**NOTICE:** Refer to Appendix 11 for all torque specifications.

To remove the rotor:

1. Turn off airlock and remove all potential energy sources following SOPs and lockout/tagout procedures.
2. Remove airlock from system to obtain unobstructed access to rotor through the inlet of the airlock.
3. Place a block in the airlock to prevent the rotor from turning unexpectedly (Figure 6).
4. Prepare drive side.
  - a. Remove the chain guard cover.
  - b. Loosen idler sprocket to relieve chain tension and remove chain.
  - c. Remove drive sprocket and sprocket from airlock rotor.
  - d. Remove chain guard backplate.
5. Remove shaft cover opposite the drive side.
6. Match mark each endplate and body flange to ensure they are installed in the same position from which they were removed.
7. Position the rotor so two blades will contact the body on each side while being removed (Figure 28).
8. Remove both bearings as noted in the Bearing Replacement – section above.
9. Remove the bolts on one endplate.
10. Alternately tighten endplate push out set screws to move endplate free of the body.
11. Remove endplate taking care not to hit rotor shaft to prevent damage. Complete a visual inspection for wear and damage.
12. The rotor may be pulled from the body. If additional assistance is required, use a rawhide hammer to firmly rap on the rotor shaft protruding through the opposite endplate.
13. Visually inspect the body bore for wear and damage.
14. Remove the endplate push out set screws so that they do not protrude out of the endplate mating flange face.
15. Reinstall the rotor and endplate with the same caution with which they were removed.
16. Install bearings as noted in the Bearing Replacement Section – see page 24.
17. Using a feeler gauge, check the clearance between the rotor and the airlock end plates (Figure 22).
18. Reattach drive components and guards in the opposite order they were removed.

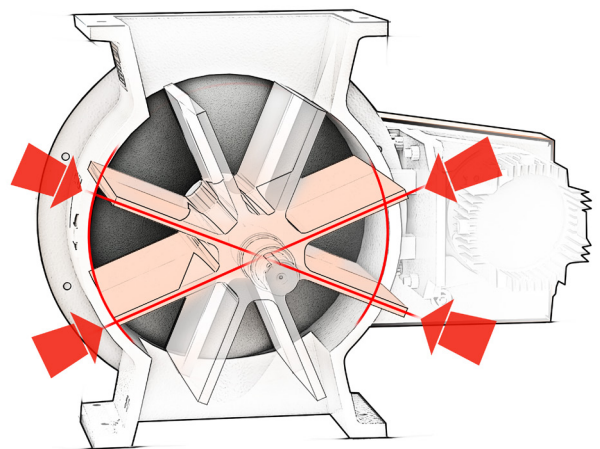
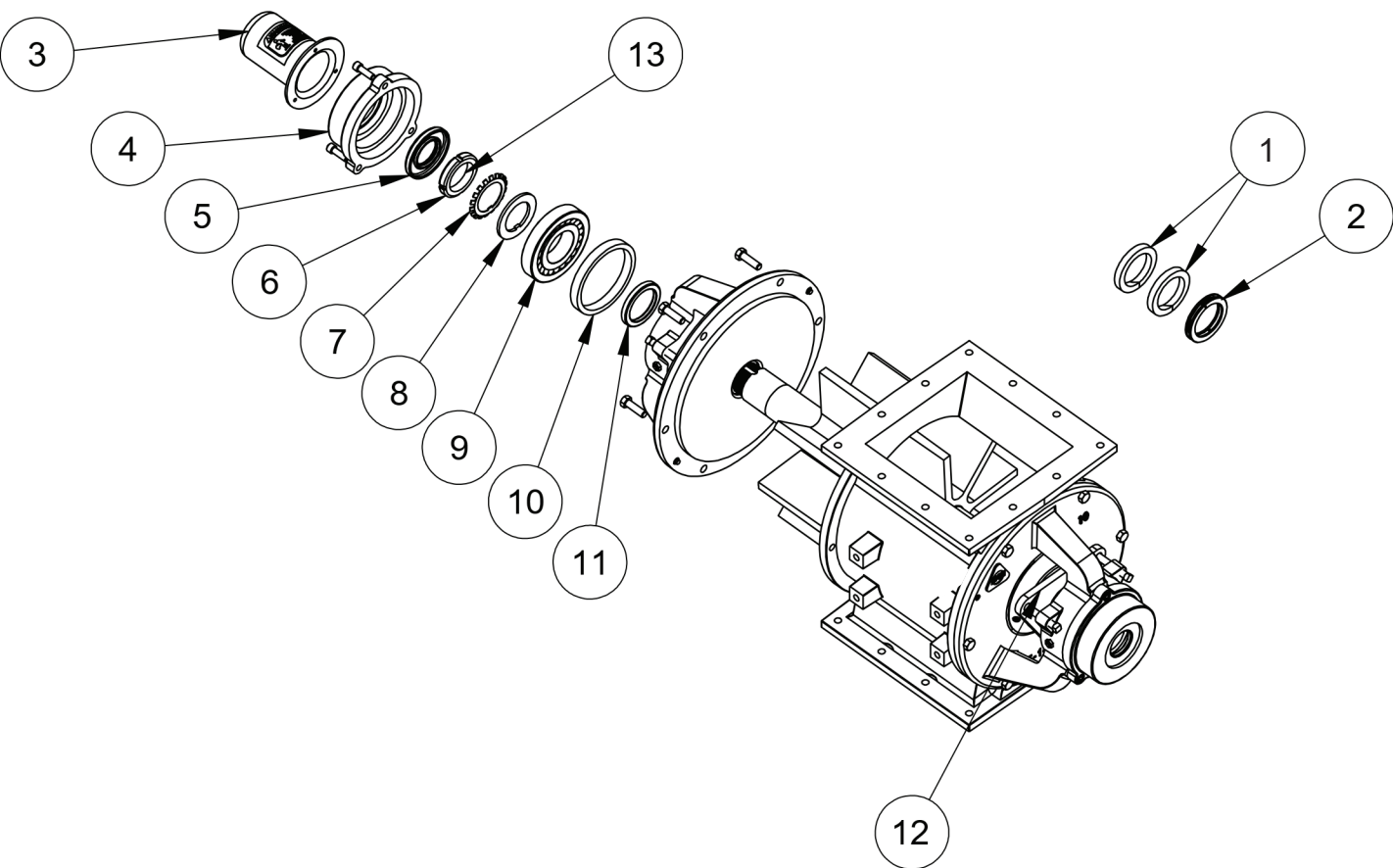


FIGURE 28

EXPLODED VIEW - OT SERIES

Drives are not shown for VJOT airlocks due to historic variations in selection. Please contact Kice Industries, Inc. for drive related questions and provide the representative the airlock job number, serial number and any known post production modifications.



PACKING KITS

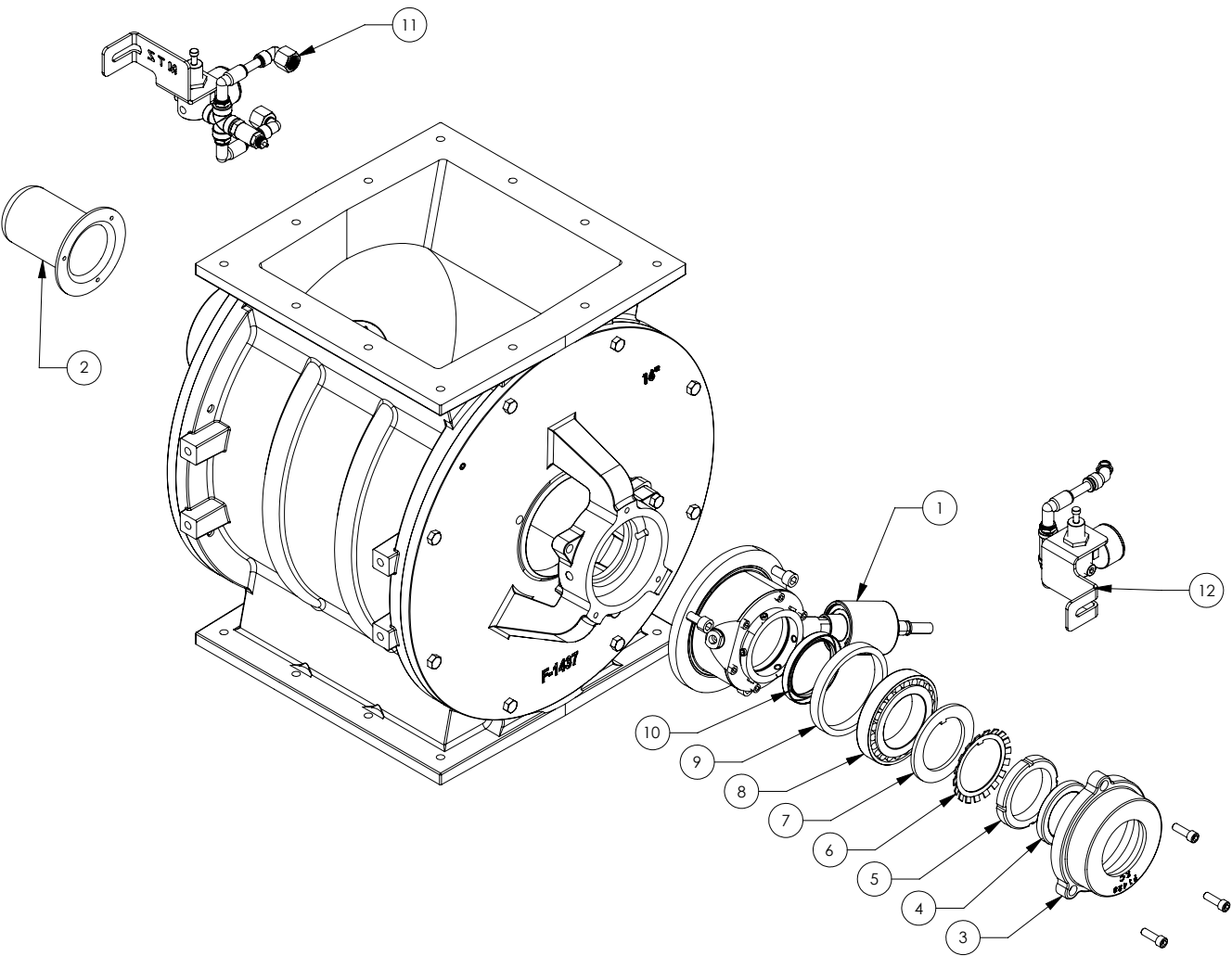
| Airlock Size | Approx. Length | Kice Kit Part#  |
|--------------|----------------|-----------------|
| 8" thru 12"  | 8 1/4"         | AIRLOCKPACKKIT1 |
| 14" thru 20" | 10 3/4"        | AIRLOCKPACKKIT2 |
| 24"          | 12 5/8"        | AIRLOCKPACKKIT3 |

## MAINTENANCE AND SERVICE CONTINUED

| Balloon | Description                                | Kice Part#                 | Applicable Sizes |
|---------|--------------------------------------------|----------------------------|------------------|
| 1       | SMALL BODY AIRLOCK PACKING                 | AIRLOCKPACKKIT1            | 8" thru 12"      |
|         | MEDIUM BODY AIRLOCK PACKING                | AIRLOCKPACKKIT2            | 14" thru 20"     |
|         | LARGE BODY AIRLOCK PACKING                 | AIRLOCKPACKKIT3            | 24"              |
| 2       | SMALL BODY AIRLOCK LANTERN RING            | RAV-2908-2120              | 8" thru 12"      |
|         | MEDIUM BODY AIRLOCK LANTERN RING           | RAV-2914-2120              | 14" thru 20"     |
|         | LARGE BODY AIRLOCK LANTERN RING            | RAV-2918-2120              | 24"              |
| 3       | SHAFT GUARD W ROTATING PARTS WARNING DECAL | SO Shaft Guard<br>EMC253X2 | 8" thru 12"      |
|         | SHAFT GUARD W ROTATING PARTS WARNING DECAL | LO SHAFT GUARD<br>EMC253X2 | 14" thru 24"     |
| 4       | END CAP                                    | F-1428M                    | 8" THRU 24"      |
| 5       | END CAP RADIAL SHAFT SEAL                  | CR15241                    | 8" thru 12"      |
|         |                                            | CR21759                    | 14" thru 24"     |
| 6       | BEARING LOCK NUT                           | N-09                       | 8" THRU 12"      |
|         |                                            | N-13                       | 14" THRU 24"     |
| 7       | BEARING LOCK WASHER                        | TW109                      | 8" THRU 12"      |
|         |                                            | TW-113                     | 14" THRU 24"     |
| 8       | TONGUE WASHER                              | K-91509                    | 8" THRU 24"      |
|         |                                            | K-91513                    | 14" THRU 24"     |
| 9       | BEARING ASSEMBLY                           | 394A-396                   | 8" THRU 24"      |
|         |                                            | 394A - 395A                | 14" THRU 24"     |
| 10      | BEARING SPACER                             | RAV-2900-2320              | 8" THRU 24"      |
| 11      | BEARING SUPPORT RADIAL SHAFT SEAL          | CR19607                    | 8" thru 12"      |
|         |                                            | CR26123                    | 14" thru 20"     |
|         |                                            | CR33645                    | 24"              |
| 12      | SMALL BODY AIRLOCK PACKING RETAINER        | F-1430M-1                  | 8" thru 12"      |
|         | MEDIUM BODY AIRLOCK PACKING RETAINER       | F-1430M-2                  | 14" thru 20"     |
|         | LARGE BODY AIRLOCK PACKING RETAINER        | F-1430M-3                  | 24"              |

EXPLODED VIEW - OT WITH DYNAMIC SEAL SERIES

Drives are not shown for VJOT with dynamic seals airlocks due to historic variations in selection. Please contact Kice Industries, Inc. for drive related questions and provide the representative the airlock job number, serial number and any known post production modifications.



PTFE SEALANT OPTIONS

| Description                      | Kice Kit Part# |
|----------------------------------|----------------|
| Prefilled Sealant Pipes          | 100-131-331    |
| 1000ML Tub of Food Grade Sealant | 100-131-330    |
| 200ML Tub of Food Grade Sealant  | 100-131-329    |

## MAINTENANCE AND SERVICE CONTINUED

| Balloon | Description                                                  | Kice Part#                 | Applicable Sizes |
|---------|--------------------------------------------------------------|----------------------------|------------------|
| 1       | SMALL BODY AIRLOCK DYNAMIC SEAL                              | 100-130-833                | 8" thru 12"      |
|         | MEDIUM BODY AIRLOCK DYNAMIC SEAL                             | 100-127-119                | 14" thru 20"     |
|         | LARGE BODY AIRLOCK DYNAMIC SEAL                              | 100-130-834                | 24"              |
| 2       | SHAFT GUARD W ROTATING PARTS WARNING DECAL                   | SO Shaft Guard<br>EMC253X2 | 8" thru 12"      |
|         | SHAFT GUARD W ROTATING PARTS WARNING DECAL                   | LO SHAFT GUARD<br>EMC253X2 | 14" thru 24"     |
| 3       | END CAP                                                      | F-1428M                    | 8" THRU 24"      |
| 4       | END CAP RADIAL SHAFT SEAL                                    | CR15241                    | 8" thru 12"      |
|         |                                                              | CR21759                    | 14" thru 24"     |
| 5       | BEARING LOCK NUT                                             | N-09                       | 8" THRU 12"      |
|         |                                                              | N-13                       | 14" THRU 24"     |
| 6       | BEARING LOCK WASHER                                          | TW109                      | 8" THRU 12"      |
|         |                                                              | TW-113                     | 14" THRU 24"     |
| 7       | TONGUE WASHER                                                | K-91509                    | 8" THRU 24"      |
|         |                                                              | K-91513                    | 14" THRU 24"     |
| 8       | BEARING ASSEMBLY                                             | 394A-396                   | 8" THRU 24"      |
|         |                                                              | 394A - 395A                | 14" THRU 24"     |
| 9       | BEARING SPACER                                               | RAV-2900-2320              | 8" THRU 24"      |
| 10      | BEARING SUPPORT RADIAL SHAFT SEAL                            | CR19607                    | 8" thru 12"      |
|         |                                                              | CR26123                    | 14" thru 20"     |
|         |                                                              | CR33645                    | 24"              |
| 11      | BOOSTER REGULATOR KIT 0 TO 10 PSI (STANDARD)                 | 100-135-187                | 8" thru 24"      |
| 12      | SMALL AIRLOCK AIR FLUSH REGULATOR KIT (OPTIONAL)             | 100-141-517                | 8" thru 12"      |
|         | MEDIUM AIRLOCK AIR FLUSH REGULATOR KIT (OPTIONAL)            | 100-141-524                | 14" thru 20"     |
|         | LARGE AIRLOCK AIR FLUSH REGULATOR KIT (OPTIONAL)             | 100-141-525                | 24"              |
| 13      | AUTOMATED INDICATION FOR PREVENTATIVE MAINTENANCE (OPTIONAL) | 100-137-627                | 8" thru 24"      |

## 9. SPECIAL ATEX INFORMATION

The outside of the Rotary Airlock Valve is intended for use in areas in which explosive atmospheres caused by air/dusts mixtures are unlikely to occur or, if they do occur, are likely to do so only infrequently and for a short period only.

The inside of the Rotary Airlock Valve is intended for use withstanding an atmosphere where dust clouds are likely to be present occasionally during normal operation. The Rotary Airlock Valve is not allowed to process conductive dusts.

**When installing an electric motor and other electric or non-electric equipment on the rotary airlock valve, be sure that all those components are suitable for being operated in zone 22, meaning they must fulfil the ATEX-requirements for Group II category 3D equipment.**

| Potentially dangerous situation during installation and initial start up                                                   | Measures that must be applied by the user during installation and initial start up                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sparking in the event of transport accidents.                                                                              | The rotary airlock valve or the components of the rotary airlock valve must not be dropped during transport – not only because of the risk of personal injury but also due to the risk of sparks being produced.   |
| Welding as a source of sparks.                                                                                             | Welding is not permitted in zones 0, 1 or 2. Bolted connections must be used instead.                                                                                                                              |
| Overheat situation of the rotary airlock valve.                                                                            | The maximum permitted rotation speed of the rotary airlock valve is 30 r.p.m. (or relative contact speed must be < 1 m/s). An overheat situation due to increased friction in zone 22 must be avoided in any case. |
| Use of non-explosion protected tools when dismantling or assembling the rotary airlock valve.                              | Only explosion-protected, non-sparking tools must be used when dismantling or assembling the rotary airlock valve.                                                                                                 |
| Build-up of electrostatic charges at all non-earthed (non-grounded) enclosure parts.                                       | During on-site installation, an external grounding wire must be connected to the rotary airlock valve.                                                                                                             |
| Danger of sparking inside the rotary airlock valve when foreign particles, such as stones, metal pieces enter the machine. | Only clean product may be used. Foreign particles such as stones, ferromagnetic metal pieces and nonferromagnetic metal pieces NEVER may pass the rotary airlock valve.                                            |

| Potentially dangerous situation during operation                                                                                                                                                                                                                                                                                                             | Measures that must be applied by the user during operation                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| In some installations where combustible dust is present, it can deposit and build up on the external surfaces or in narrow gaps of the rotary airlock valve. That can have an insulating effect and prevent heat produced inside the rotary airlock valve from adequately dissipating from its surfaces. The combustible dust could ignite as a consequence. | The exterior surfaces of the rotary airlock valve must be cleaned periodically, when it is located in a dusty environment. Cleaning is to be done either with a vacuum cleaner approved for use in explosive zones, or with a damp cloth. Solvents or dry wool cloths (risk of sparking) must never be used. |

## SPECIAL ATEX INFORMATION CONTINUED

| Potentially dangerous situation during maintenance and repair                                                                                                                                                                                                                                                                                                                                                                        | Measures that must be applied by the user during maintenance and repair                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Hazard: When components and connecting parts fail to function properly during their expected service life. The following parts must be replaced at certain intervals:</p> <ul style="list-style-type: none"><li>• Replacing the bearings in the rotary airlock valve.</li><li>• Replace the bearings in the electric motor.</li><li>• Replace the clutch between motor and rotary airlock valve (in case there is one).</li></ul> | <p>The bearings must be replaced after having finished 90% of their lifetime: this is every 12,000 hours of operation, preferably by authorized KICE service personnel. Those exchange intervals are calculated to ensure that overheating or sparking as a result of a defective wearing part can be practically excluded. It is recommended that the User installs an operating hour counter in the control cabinet if the operating hours cannot be easily determined by other means.</p> <p>The bearings must be replaced according to the specifications of the manufacturer of the electric motor.</p> <p>The clutch must be replaced according to the specifications of the manufacturer of the clutch.</p> |
| <p>Danger of sparking inside the rotary airlock valve when foreign particles, such metal pieces are inside the machine.</p>                                                                                                                                                                                                                                                                                                          | <p>When replacing parts inside the rotary airlock valve, all bolts and nuts should be locked with Loctite® or a similar adhesive.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

### Installation Requirements

When installing equipment, make sure that the moving parts inside the rotary airlock valve are not accessible so that EN ISO 13857 is fulfilled.

Free outlet of the product must be guaranteed at all times, otherwise blockage and severe damage is possible.

Examined raw materials must be used; only pre-cleaned product that has passed a non-ferrous metal separator, a magnet separator and a contaminant separator may be used.

### Electrical Requirements

Electrical installation must be executed according to EN ISO 60204-1 (a lockable all-phase power switching device must be provided, so the device can be switched off and secured before performing repair work).

Construction of the control system must be done under consideration of EN ISO 13849-1.

Electrical components must be mounted by EMC skilled specialists.

## INSTALLATION REQUIREMENTS CONTINUED

### Installation Requirements

The operator or manufacturer of the facility must install an Emergency Stop circuit near the equipment, which is capable of turning off the machine immediately and securely under consideration of EN 13850. The safety circuit “EMERGENCY STOP button -> safety relay -> safe shut down of the drive motor (e.g. by means of motor protection switch)” must at least have performance level PL r=c according to EN ISO 13849-1.

During installation, an electrical repair switch must be installed in order to disconnect the motor, on all poles, from the power supply for service and maintenance activities to eliminate any personnel hazard. The safety circuit “repair switch -> safe shutting down of the drive motor (e.g. by means of motor protection switch)” must at least have performance level PL r=c according to EN ISO 13849-1.

Unless otherwise specified, the airlock speed sensor is provided by the customer.

### Grounding (Earthing) of Conducting Parts

It is normally sufficient to separately ground the static parts of the airlock when installed. If necessary, shaft grounding systems may be used. (This is to avoid any electrostatic charge and potentially dangerous situation).

### Markings

The nameplate shall be fixed permanently to the airlock and indicate: Name and address of the manufacturer, date of construction, designation or type of airlock, serial or identification number, the CE mark and classification markings.



Inside: II 2D Ex h IIIB T85 °C Db 5 °C ≤ T<sub>amb</sub> ≤ 35 °C  
Outside: II 3D Ex h IIIB T85 °C Dc 5 °C ≤ T<sub>amb</sub> ≤ 35 °C  
Technical File No. 002/18

## 10. STANDARD ROTOR CLEARANCE FOR KICE VJOT AIRLOCKS

### Carbon Steel / Cast Iron Valves

| Airlock Series | Size Range      | Standard Clearance ( $\pm 0.001''$ ) |                  |
|----------------|-----------------|--------------------------------------|------------------|
|                |                 | Rotor - Tip                          | Rotor - Endplate |
| VJOT, VBOT     | 14x10 & smaller | .004"                                | .004"            |
|                | 16x12, 18x14    | .005"                                | .005"            |
|                | 20x12, 20x15    | .006"                                | .006"            |
|                | 24x15, 24x20    | .0069"                               | .0069"           |

### Stainless Steel Valves

| Airlock Series | Size Range      | Standard Clearance ( $\pm 0.001''$ ) |                  |
|----------------|-----------------|--------------------------------------|------------------|
|                |                 | Rotor - Tip                          | Rotor - Endplate |
| VBOST          | 14x10 & smaller | .005"                                | .005"            |
|                | 16x12, 18x14    | .006"                                | .006"            |
|                | 20x12, 20x15    | .006"                                | .006"            |
|                | 24x15, 24x20    | .0069"                               | .0069"           |

**NOTICE:** Some applications may require greater rotor clearance, please contact Kice Sales for assistance if unsure. Not to exceed 0.0079" clearance to comply with NFPA requirements.

## 11. TORQUE VALUES FOR MAINTENANCE AND INSTALLATION

| Recommended U.S. BOLT TORQUE* |                |                   |                   |                   |                   |                                |                                |
|-------------------------------|----------------|-------------------|-------------------|-------------------|-------------------|--------------------------------|--------------------------------|
| <i>Coarse thread only</i>     |                |                   |                   |                   |                   |                                |                                |
|                               |                | SAE<br>Grade<br>5 | SAE<br>Grade<br>5 | SAE<br>Grade<br>8 | SAE<br>Grade<br>8 | Socket<br>head<br>cap<br>screw | Socket<br>head<br>cap<br>screw |
| Bolt<br>Dia.                  | Thread<br>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                            | 140                            |
| 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.

## 12. ILLUSTRATED PARTS LIST - 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"<br>- 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

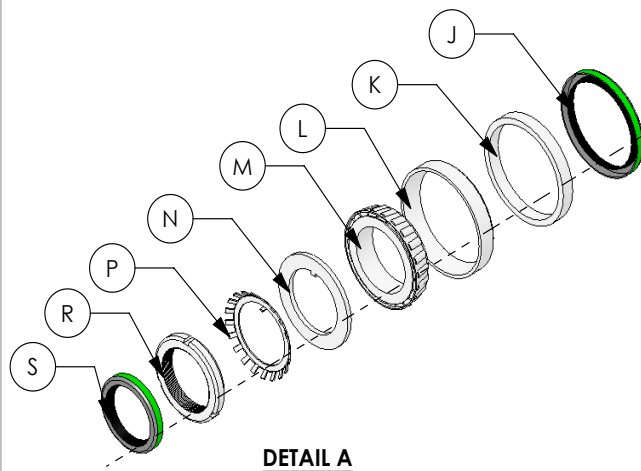
DWN:

2/17/06

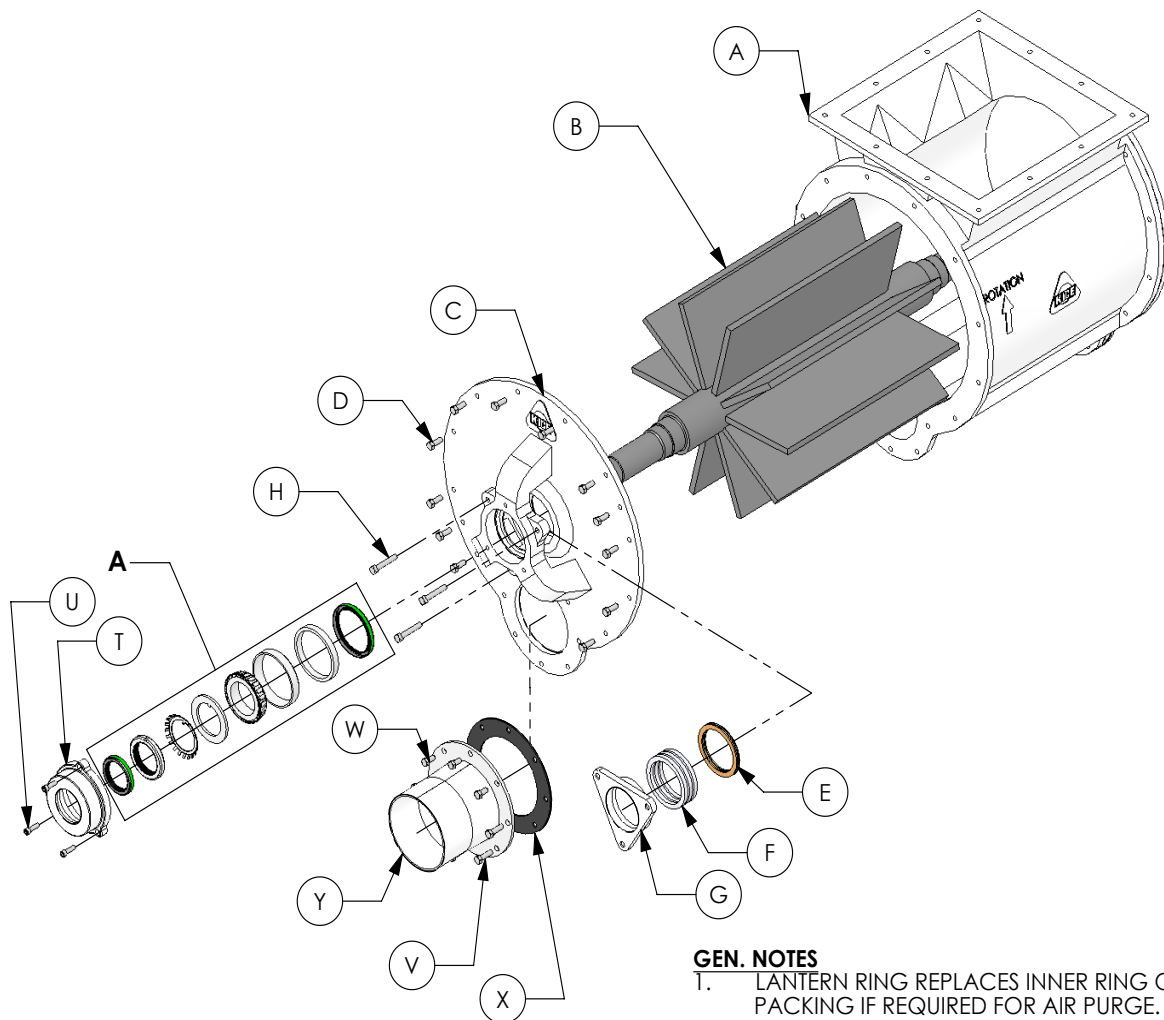
DATE:

RAV-5001

DWG. NO.



| 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<br>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<br>18x15 THRU 24x18 | CR 26123<br>CR 33645 | 2      |
| K                | 1/2" SPACER                                      | -                                   | -                    | 2      |
| L                | TIMKEN, BEARING CUP "RACE"<br>- 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<br>18x15 THRU 24x18 | -                    | 4      |
| W                | HHCS, 3/8"-16 x 3/4" LG.                         | 10x8 THRU 16x15<br>18x15 THRU 24x18 | -                    | 2<br>4 |
| X                | GASKET                                           | -                                   | -                    | 2      |
| Y                | TUBE ADAPTER                                     | -                                   | -                    | 2      |



VPOT AIRLOCK  
DESCRIPTION:



**KICE INDUSTRIES, INC.**

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EJS  
DWN:

2/19/07  
DATE:

RAV-5002  
DWG. NO.



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