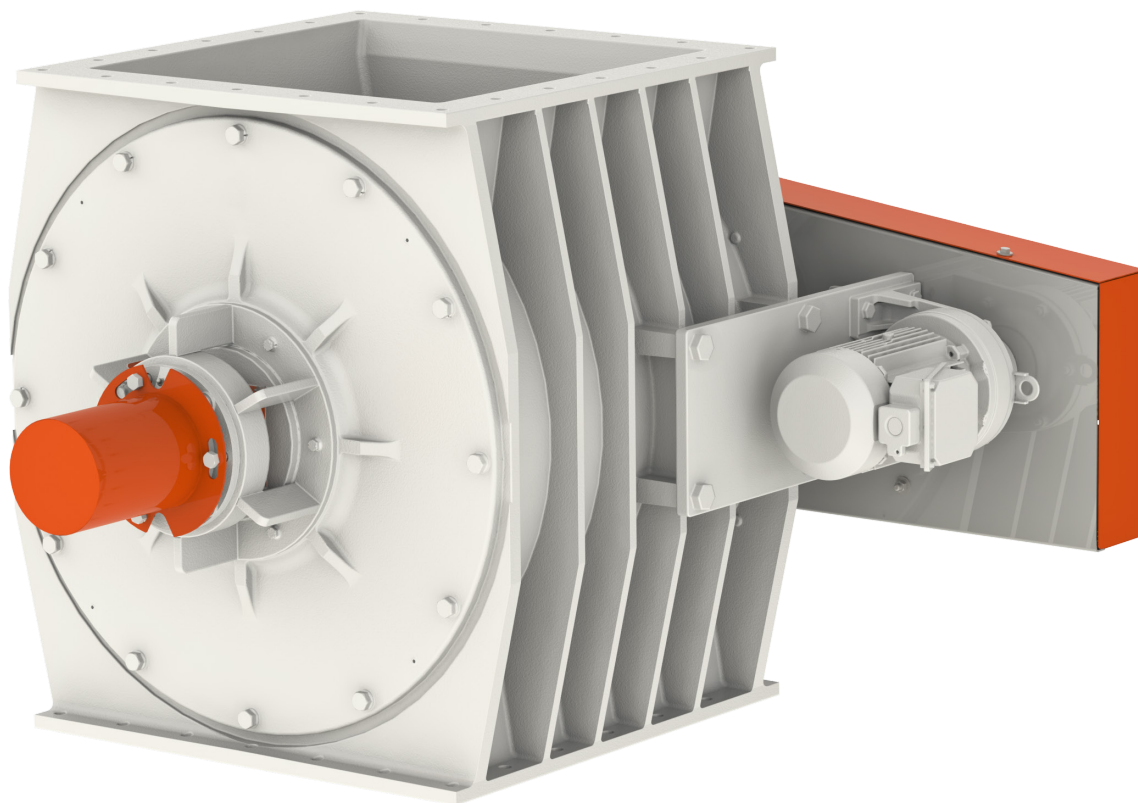


Rotary Airlock VJO Series

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:



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.

TABLE OF CONTENTS

1. INTRODUCTION	2
WARRANTY	2
2. IMPORTANT AIRLOCK INFORMATION	4
3. GENERAL INFORMATION	5
4. SAFETY PRECAUTIONS	7
5. DELIVERY INSPECTION AND INSTALLATION PREPARATION	10
6. STORAGE	12
7. INSTALLATION	12
8. MAINTENANCE	16
General Motor Service	16
General Rotor Maintenance	17
Packing Gland Replacement	20
Bearing Removal / Replacement	23
Adjusting Airlock Clearances	26
Removing Airlock Rotor	27
9. Standard Rotor Clearances	29
10. Torque Values for Maintenance and Installation	30

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:

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.



Figure 1

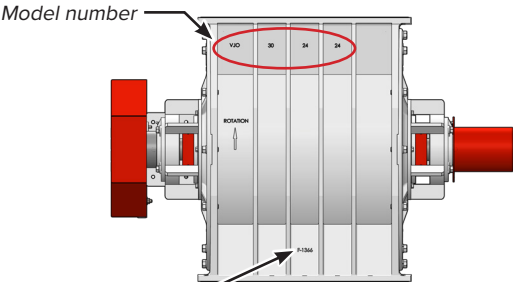


Figure 2

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.



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.

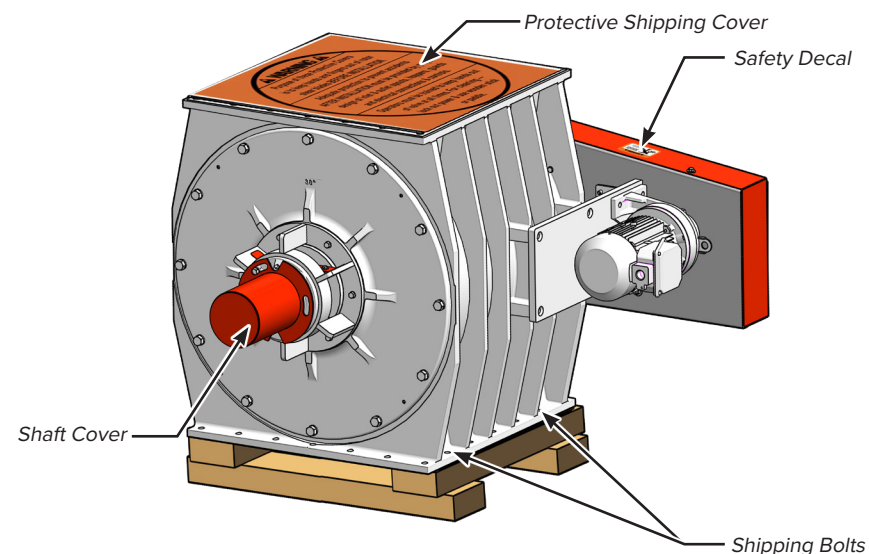


FIGURE 3

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.

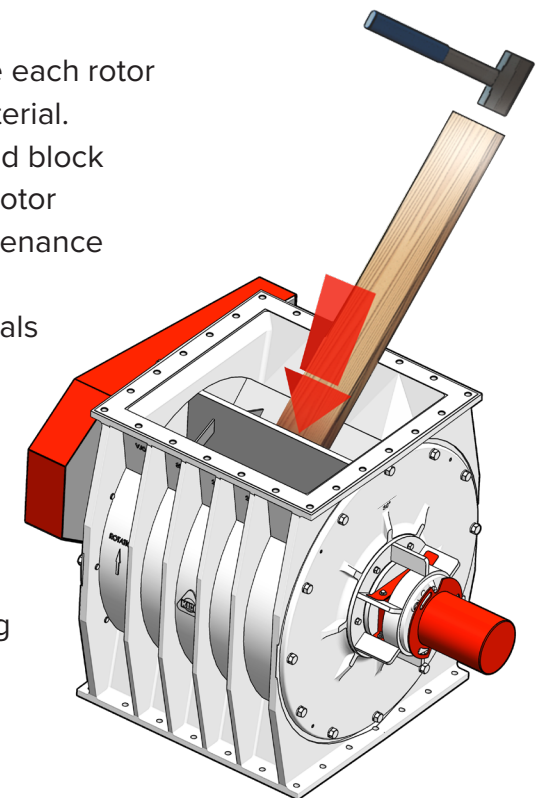


FIGURE 4

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.

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

7. INSTALLATION



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: 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).

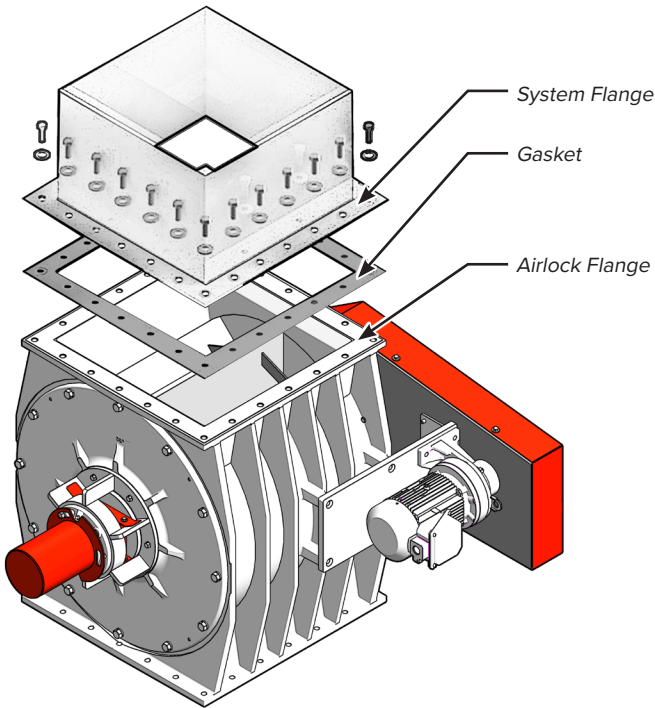


FIGURE 5

- 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.



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.

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.

INSTALLATION CONTINUED



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 continuous grease system. 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)

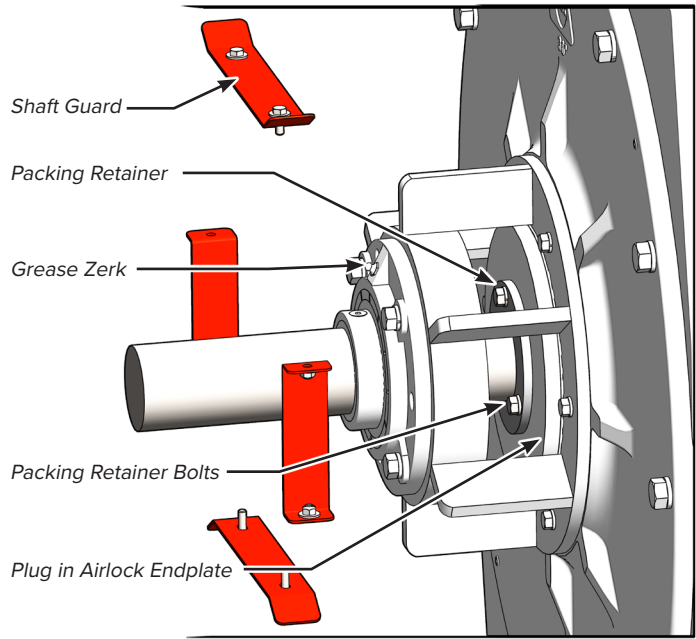


FIGURE 5.1

INSTALLATION CONTINUED

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.

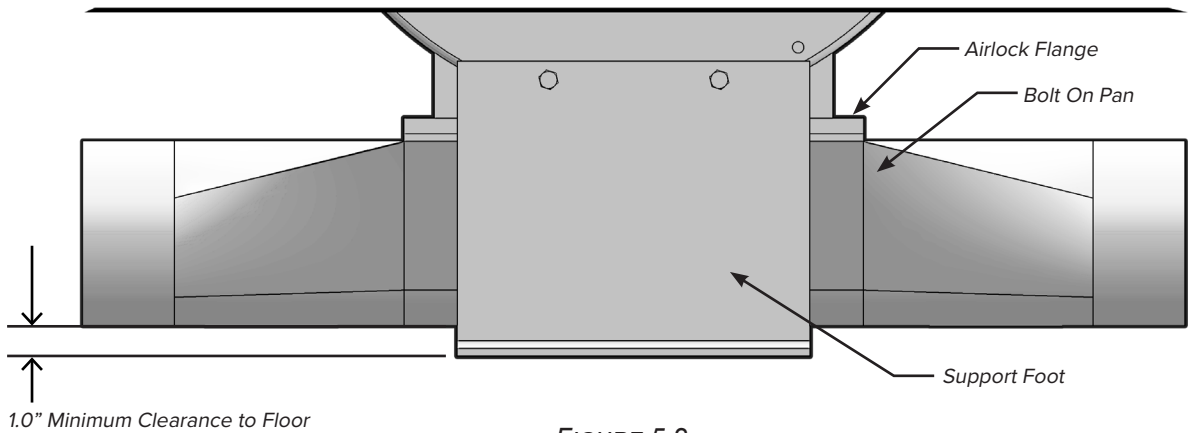


FIGURE 5.2

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 - VJO SERIES

Interval	Task
Daily	Perform a brief inspection. Look and listen for anything out of the ordinary while the airlock is running. Adjust VJO packing retainer as needed.
Biannually	Inspect sprockets and chain for wear. Adjust VJO packing retainer as needed.
Annually	Inspect rotor for position, wear and damage.
5 years or every 10,000 hours	Replace 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.

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.

MAINTENANCE AND SERVICE CONTINUED

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 Section 9 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

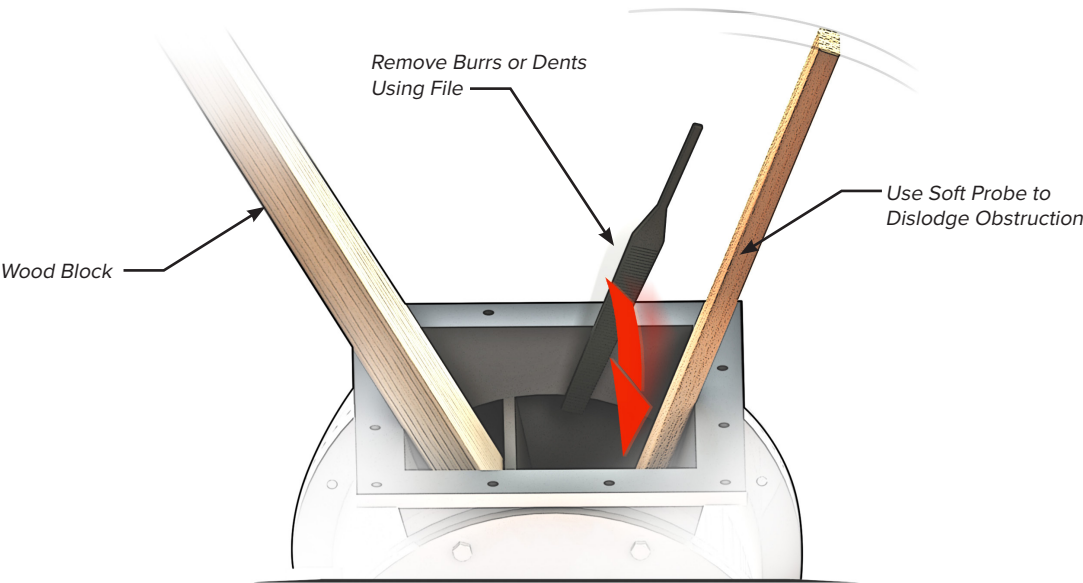


FIGURE 6



CAUTION: 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 Section 9 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 Section 10 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: 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 loosening the idler sprocket and 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.

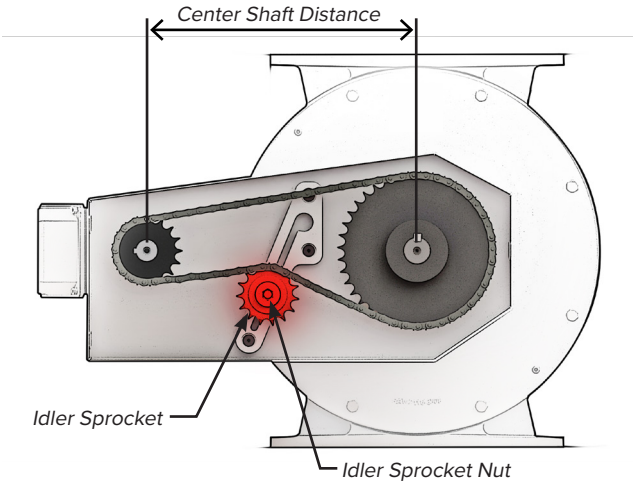


FIGURE 7

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

VJO PACKING GLAND REPLACEMENT

COMMON PACKING INSTALLATION MISTAKES

Common Mistakes	Problem	Solution
Not keeping ALL sealing surfaces clean during installation and over tightening packing retainer.	→ Airlock rotor seizure.	→ Check for product compaction against rotor hub and endplate. → Look for endplate deflection when bearing is tightened down. → 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. → Rotor and endplate wear.	→ Check all clearances. → Do only one bearing at a time.

NOTICE: Refer to Section 9 in this manual 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 Section 10 in this manual 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.
3. Remove shaft guard.
4. Loosen packing retainer bolts (figure 8).

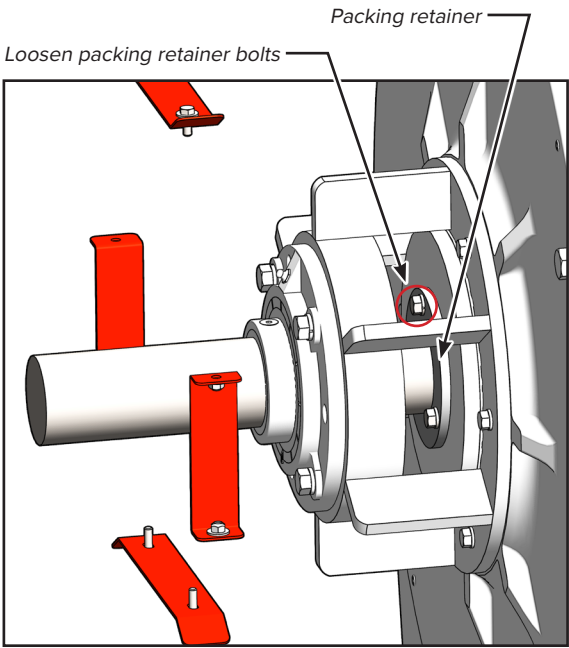


FIGURE 8

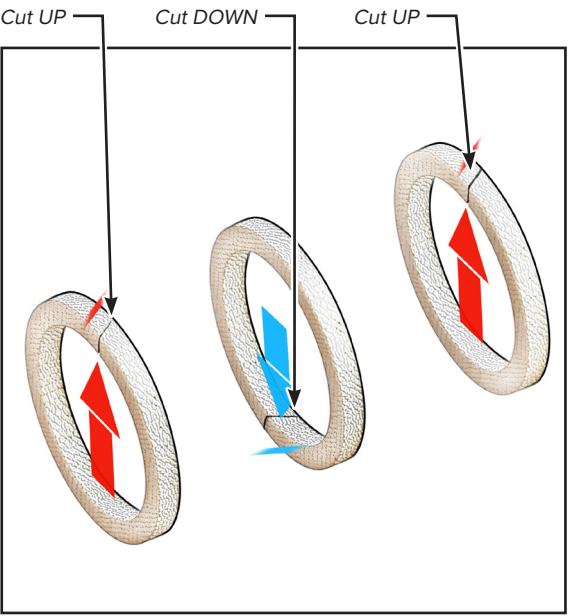


FIGURE 9

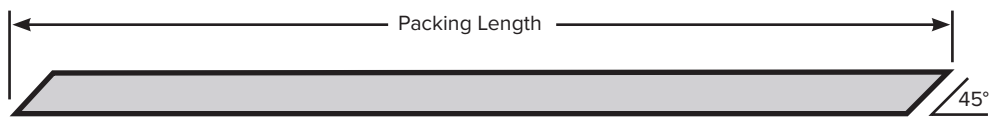
5. Slide packing retainer out of the way towards bearing (figure 8) revealing the packing gland pocket.
6. Remove old packing. See packing manufacture instructions as needed.
 - a. Use a flexible packing extractor such as a *Chesterton #253 Flexible Packing Extractor*.
 - b. Engage the extractor tool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

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

MAINTENANCE AND SERVICE CONTINUED

- 9. Repeat steps 3 through 7 for the opposite endplate.
- 10. 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#
30"	11"	AIRLOCKPACKKIT4

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

MAINTENANCE AND SERVICE CONTINUED

VJO BEARING REMOVAL / REPLACEMENT

COMMON BEARING INSTALLATION MISTAKES

Common Mistakes	Problem	Solution
Not keeping ALL 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. → Rotor and endplate wear.	→ Check all clearances. → Do only one bearing at a time. → Ensure bearing is tightened and locked properly.

NOTICE: Refer to Section 9 in this manual 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 Section 10 in this manual 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 13).
- 4. Place blocks in the airlock to prevent the rotor from turning in either direction (figure 6).
- 5. Loosen both setscrews (figure 10).
- 6. Remove bearing mount bolts (figure 10).
- 7. Remove the bearing from the bearing support using the jack bolt locations (figure 11). Tighten jack bolts alternately so bearing does not seize on shaft.
- 8. Slide the bearing off the rotor shaft.

MAINTENANCE AND SERVICE CONTINUED

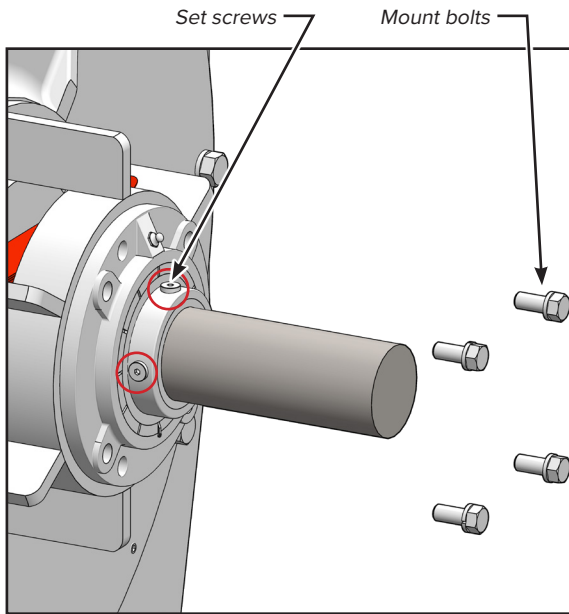


FIGURE 10

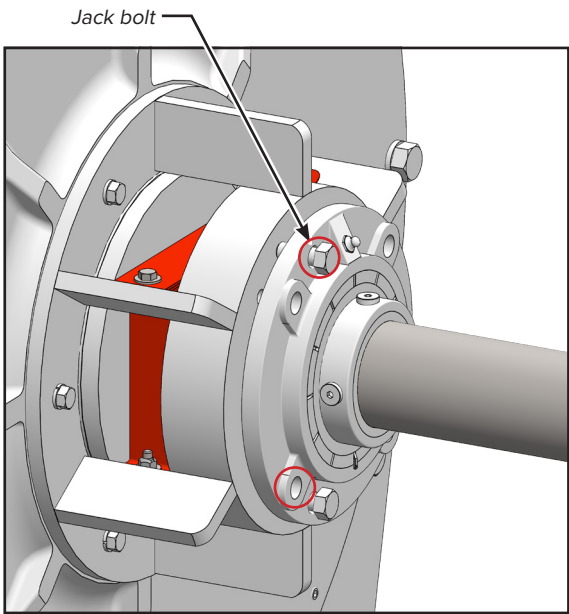


FIGURE 11

- 9. Inspect shaft sealing surface and bearing support for damage and wear. Small imperfections may be removed with emery cloth.
- 10. Thoroughly clean interior surfaces of the bearing support and shaft.
- 11. Carefully slide new bearing onto shaft until it is in contact with bearing support.

NOTICE: REXNORD bearings must be replaced with the **EXACT SAME PART NUMBER (PN:ZBR-2215)**. No substitutions allowed.

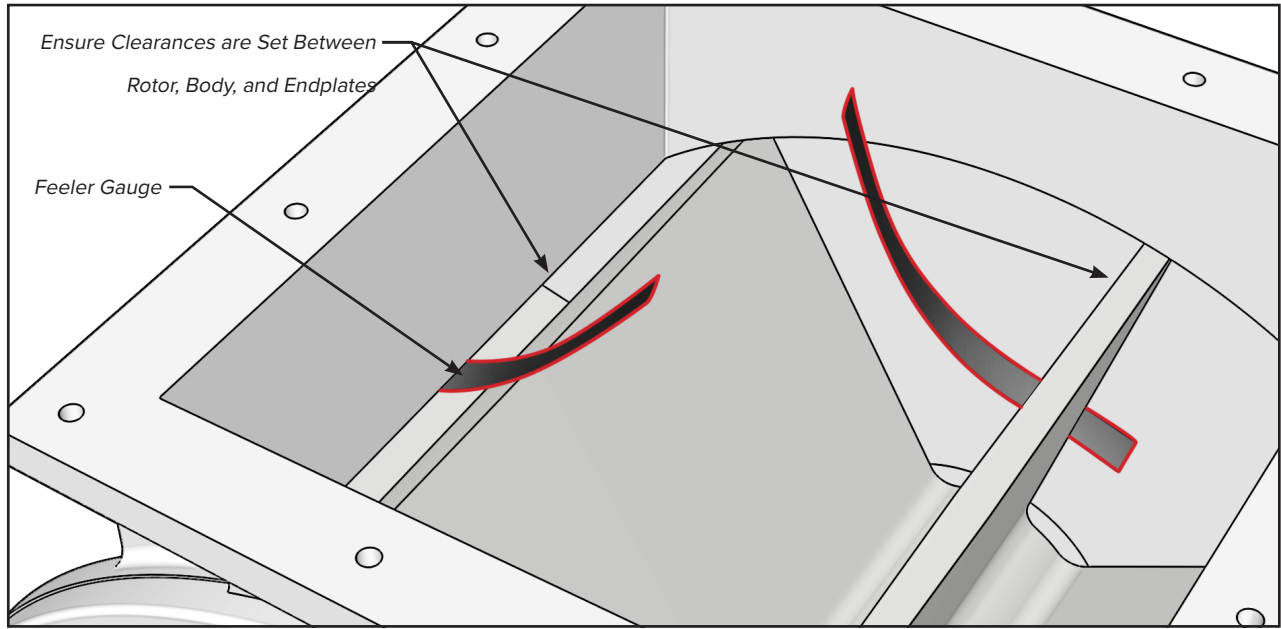


FIGURE 12

MAINTENANCE AND SERVICE CONTINUED

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.

- 12. Tighten mount bolts alternately drawing bearing firmly into bearing support recess (figure 10).
- 13. Tighten both set screws (figure 10).
- 14. Repeat steps 4 through 13 for the opposite endplate.
- 15. **Verify clearance using feeler gauges that ensure the rotor turns freely (figure 12).**

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.

- 16. If necessary, install new packing following the Packing Gland Replacement instructions (see page 20).
- 17. Reattach drive components and guards in the opposite order they were removed.

ADJUSTING AIRLOCK CLEARANCES

NOTICE: Refer to Section 9 in this manual 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 12). There should be minimum clearance of 0.003". Refer to Section 9 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. Using a soft hammer and feeler gauge, set the proper clearance between the rotor and the end plate on either end by tapping on the shaft. Set the lock collar on this end of the rotor.
5. Now check the clearance at the other end of the rotor. It should have a minimum of .003" to .004" clearance. Extra clearance is acceptable.
6. Set the remaining lock collar. Be sure to set the collar opposite the collar on the other end of the rotor shaft.
7. Turn the rotor with the probe to see that it turns freely and quietly.
8. Clean the grease from the bearing assemblies.
9. When the desired internal clearance is achieved, bend down the lock washer tabs to lock the nuts in place.
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 Section 9 in this manual 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 Section 10 in this manual 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 13).
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 protude 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 23](#).
17. Using a feeler gauge, check the clearance between the rotor and the airlock end plates (Figure 12).
18. Reattach drive components and guards in the opposite order they were removed.

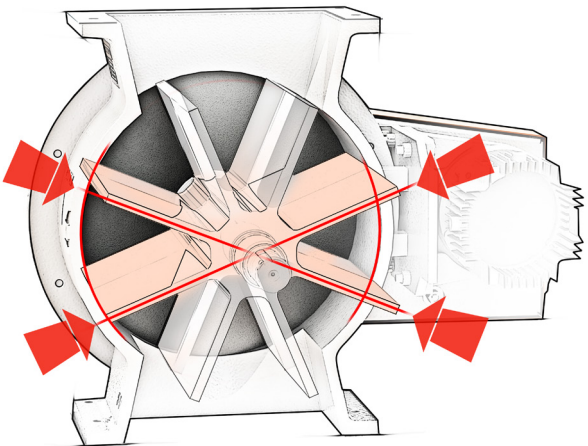
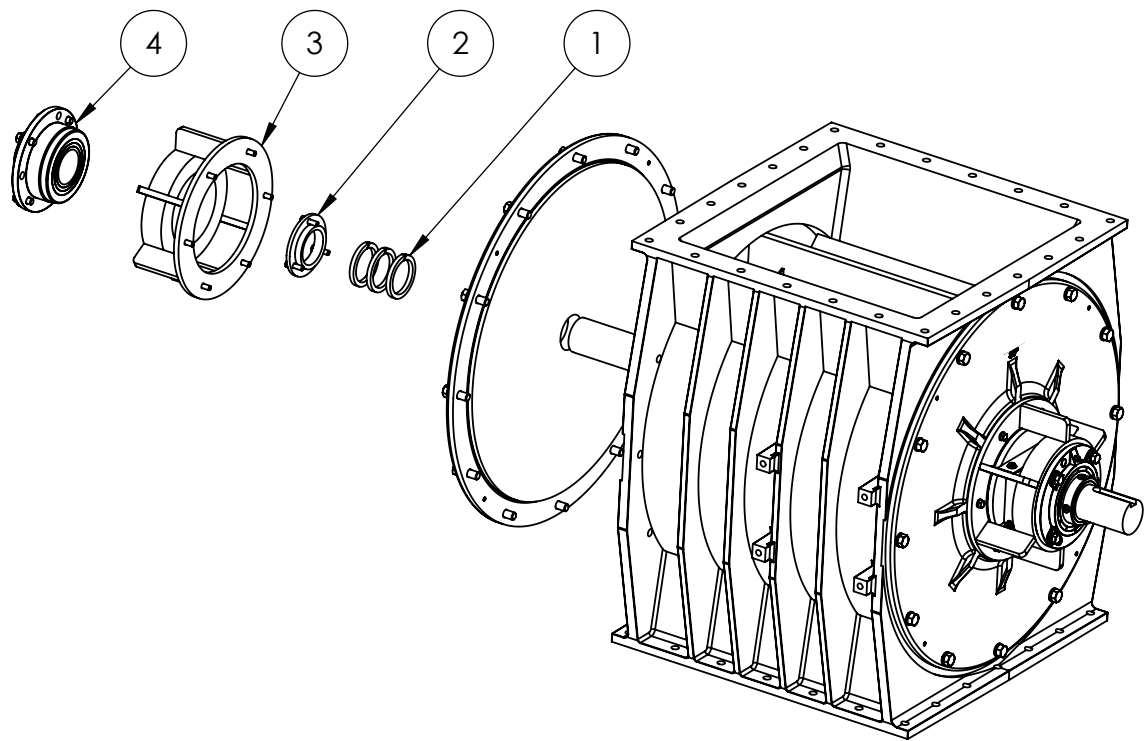


FIGURE 13

EXPLODED VIEW - VJO SERIES

Drives are not shown for VJO 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.

Balloon	Description
1	Large Airlock Body Packing
2	Large Airlock Body Packing Retainer
3	Bearing Outrigger Weldment
4	Flange Bearing



PACKING KITS

Airlock Size	Approx. Length	Kice Kit Part#
30"	11"	AIRLOCKPACKKIT4

9. STANDARD ROTOR CLEARANCE
FOR KICE VJO AIRLOCKS

Carbon Steel / Cast Iron Valves

Airlock Series	Size Range	Standard Clearance (± 0.001")	
		Rotor - Tip	Rotor - Endplate
VJO	30x24	.013"	.013"

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.

10. TORQUE VALUES FOR MAINTENANCE AND INSTALLATION

Recommended U.S. BOLT TORQUE* Coarse thread only							
		SAE Grade 5	SAE Grade 5	SAE Grade 8	SAE Grade 8	Socket head cap screw	Socket head cap screw
Bolt Dia.	Thread Size	lb – ft	N – m	lb – ft	N – m	lb – ft	N – m
1/4	20	8.4	11	12	16	11	15
5/16	18	17	24	25	33	23	31
3/8	16	31	42	44	59	41	55
7/16	14	49	67	70	95	65	89
1/2	13	74	100	110	140	100	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.							

KICE INDUSTRIES, INC.



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

kice.com

