



# Airlock Maintenance Western District IAOM

**kice.com**

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Presented by Dave Link

# Rotary Airlock Valves





# Topics:

- Inboard/outboard bearings
- Performance
- Troubleshooting
- Maintenance recommendations

## Importance of Airlocks

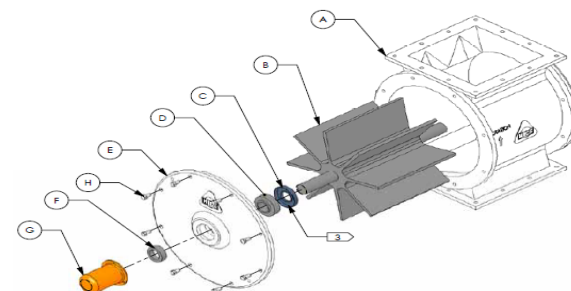
- Tightly machined internal clearances create air seal
- Used to separate two different pressure/vacuum environments
- Allow for proper performance of pneumatic system
  - Often found on the front end and termination point of conveying system
- Offer consistent and even product feed



# Inboard Bearing Airlock

- Most common style of airlock
- Standard roller bearing with double lip seal installed in the inside of the endplate
- Easy to disassemble and reassemble
- Packed bearings for minimal maintenance

BILL OF MATERIAL			
ITEM	DESCRIPTION	MODEL	PART NO. QTY.
A	BODY	-	- 1
B	ROTOR	-	- 1
C	VB DOUBLE LIP SEALS	60-8 THRU 130-12	NT11154.3 2
		150-12 THRU 150-12	NT11154.2 2
		150-12 THRU 24-15	NT11154.4 2
D	LINK BELT BEARING	60-8 THRU 130-12	VB 251 2
		150-12 THRU 150-12	VB 251 2
		150-12 THRU 24-15	VB 251 2
E	END PLATE	-	- 2
F	FOOD SEALER	-	- 2
G	SHAFT COUPLER	-	- 2
H	18X30, 30" X 10 X 1" LG.	-	- 2
		60-8 THRU 130-12	VB 251 2
		150-12 THRU 150-12	VB 251 2
		150-12 THRU 24-15	VB 251 2



GEN. NOTES:  
 1. STANDARD CLEARANCES ROTOR, ENDPLATE, & BODY  
 +.004 ± .001 (60-8 THRU 14x10)  
 +.005 ± .001 (15-12 THRU 24x15)  
 2. SHAFT COVER USED ON NON-DRIVE END ONLY.  
 3. SHAFT SEAL VOID IS PACKED W/ KEystone  
 NEVASTANE (FOOD GRADE) LUBRICANT.

1. UPDATED ITEM D PART #3  
 REV. CHANGE DATE BY

VB, VD, & VJ  
 AIRLOCK  
 DESCRIPTION:



KICE INDUSTRIES, INC.  
 5500 MILL HEIGHTS DR. WICHITA, KANSAS 67219  
 PH: (316) 744-0151 FAX: (316) 744-7555

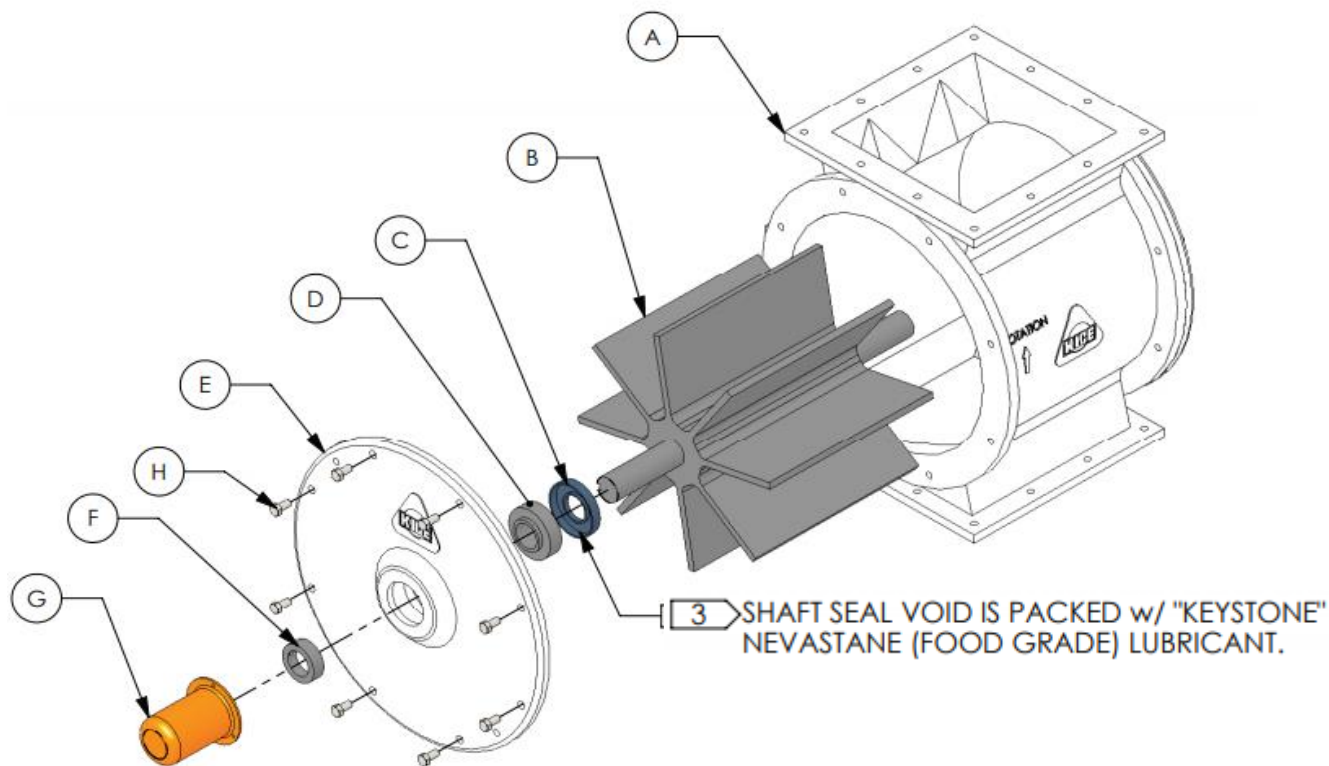
DATE: 2/19/07  
 DWG. NO.: RAY-500801

## VJ Series Airlock Valve

- Inboard Bearings
- Most common option for many applications
- NOT considered a NFPA isolation device



# VJ Series Exploded View





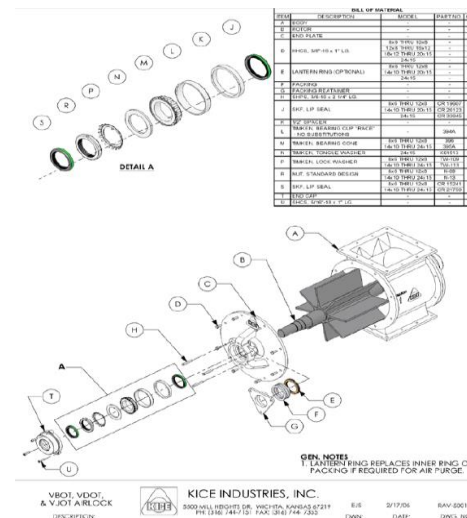
## VJH Series Airlock Valve

- Considered an “Inboard Bearing Airlock”
- Suitable for most common applications
- Apply to higher pressures
- NOT considered a NFPA isolation device



# Outboard Bearing Airlock

- Generally used for high heat applications or where material could migrate through an inboard lip seal
- Uses 3 layers of Teflon packing in the endplate
- Timken Bearing is located on the bearing rack which is removed from the endplate
  - is considered an NFPA isolation device.



## VJX Series Airlock Valve

- Outboard Bearings
- Common for high pressure and abrasion applications
- IS considered a NFPA isolation device



## Airlock Performance

- Clearances must be properly machined to offer an effective seal
- Typical rotor clearances of .004" (+/- .001")
- Static and dynamic leakage always present
  - *Worn clearances will greatly increase leakage*
- Typically rated to 15psi or 15"Hg
- Typically operates from 10-30rpm
  - *Rotation speed can be critical*

**\*\* Generally a low maintenance item \*\***





## Airlock Issues

Bearings/Seals

Wear/clearances

Squeaking/squalling

Bucking

Temperatures

Motor trips/overheats

## Airlock Will Not Turn



Airlock Problem or Motor Issue?



# SAFTEY FIRST



- Do NOT attempt to work on, clean, service valve, open, or remove any protective cover, guard, grate or maintenance panel until the POWER and/or AIR has been turned off and LOCKED OUT

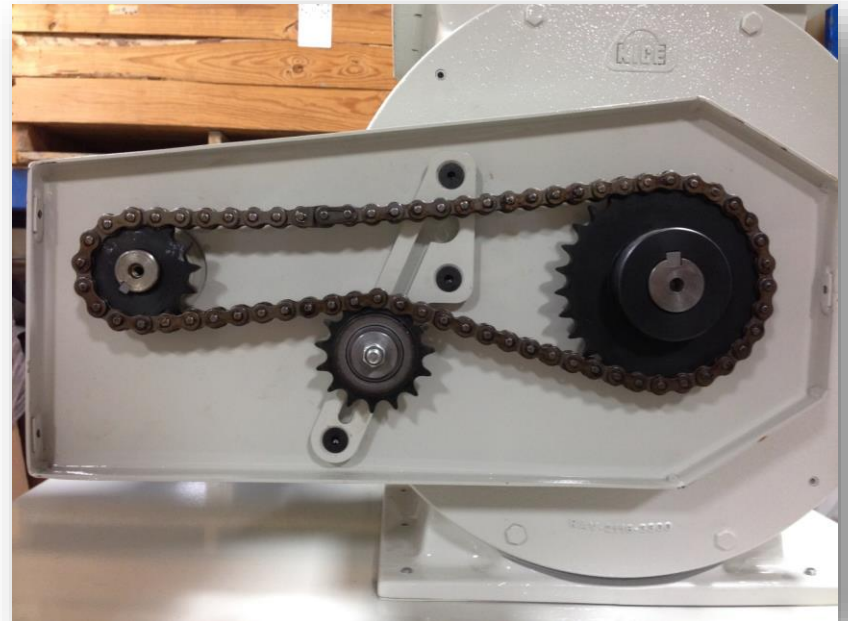
- Never place any part of your body under or near rotating or moving parts of valve



# Troubleshooting

Remove Guard & Detach Chain

Can the Rotor Spin Freely?





# Troubleshooting

Yes:

Airlock is Good

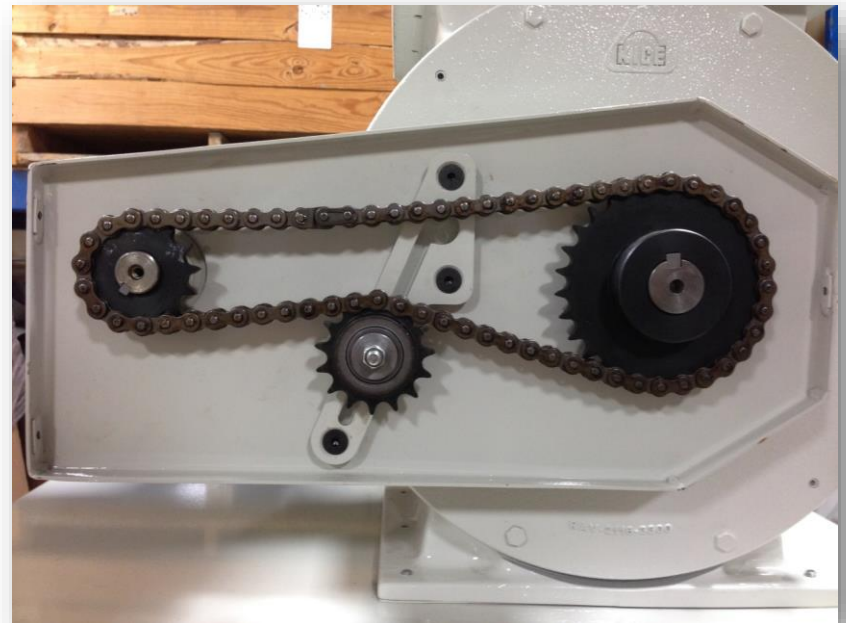
Motor heater settings?

Enough HP?

Gear Reducer?

No?

Time to work on your Airlock!

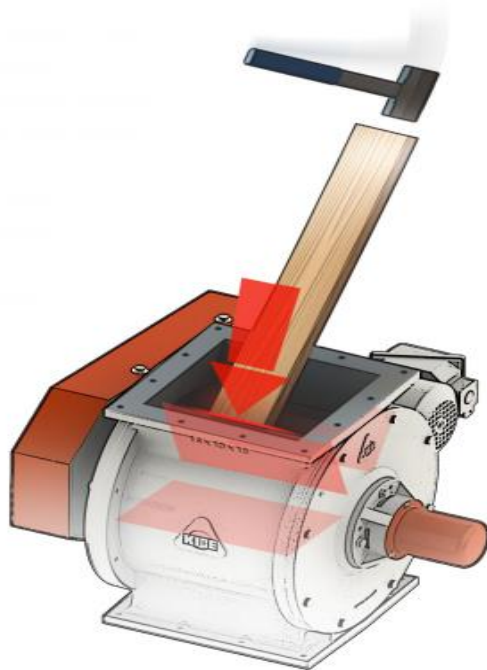


# Troubleshooting

- Product build-up, wrench, bolts, sticks, etc.
- Rotor shifted
- Product binding
- Check for correct application, T.E.R., chrome body & end plates



## Airlock Maintenance



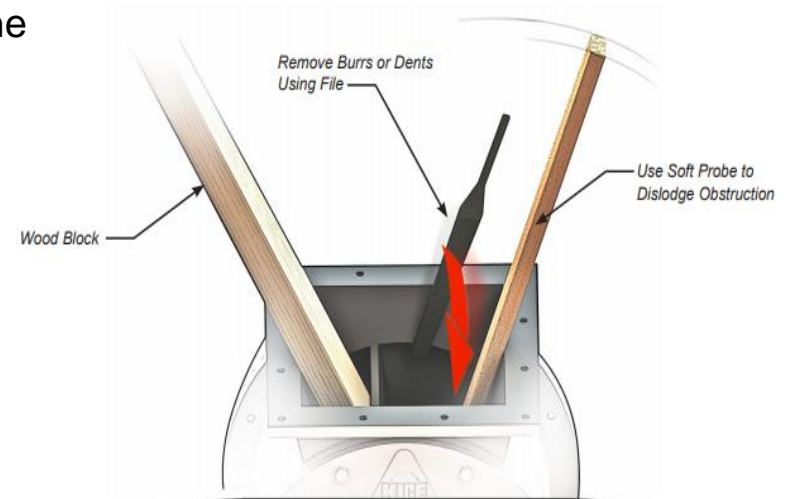
- Remove the airlock from system to obtain unobstructed access to rotor.
- Place a block in the airlock to prevent the rotor from turning unexpectedly



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

## Airlock Maintenance

- Remove rotor blockage
  - a. Using a probe, dislodge the obstruction from the rotor and discard.
  - b. Remove safety block.
  - c. Turn the rotor using the probe to inspect for additional foreign material.
- 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.



## VJ Airlock Maintenance



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



**CAUTION:** Only insert punch in the unthreaded lock collar hole which is intended for this purpose to prevent irreparable lock collar damage.

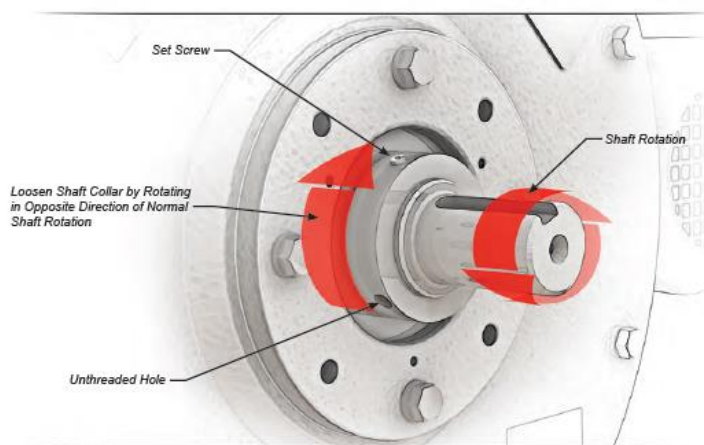


FIGURE 9.2

## VJ Airlock Maintenance

### 1. Remove the end plate

*\*\*If both end plates are removed, they should be marked so that each end plate can be reinstalled on the same end of the airlock body\*\**

### 2. Place the end plate on wooden blocks with the machined surface down.

### 3. Tap the bearing and shaft seal through the end plate using a brass rod and discard both the bearing and the shaft seal.





## VJ Airlock Maintenance



- Turn the end plate over and install a new bearing using a brass driver

- Pack the bearing void and shaft seal using Keystone Nevastane HT/AW-2 grease



## VJ Airlock Maintenance



- Seat the seal by slightly tapping with soft hammer
- Reinstall the endplate
- Check rotor clearance before tightening Locking Collars

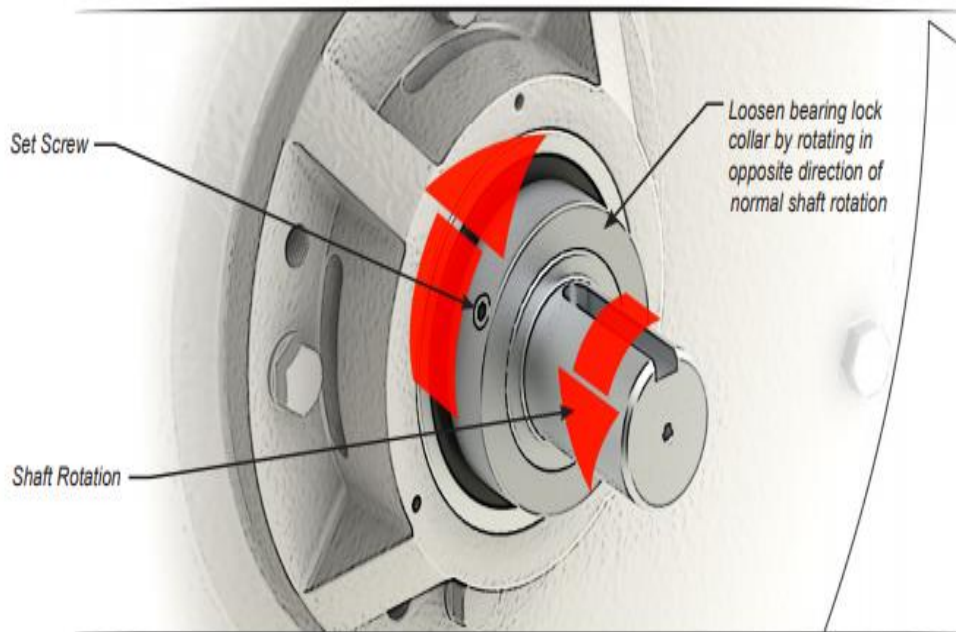




**NEW! Kice Maintenance videos**

[www.kice.com/products/airlocks/vjx/](http://www.kice.com/products/airlocks/vjx/)

## VJX Cartridge



- Loosen bearing lock collar set screw by turning counter clockwise.
- Disengage bearing lock collar from bearing by turning it using a punch and hammer.

## Noisy Airlock Valve

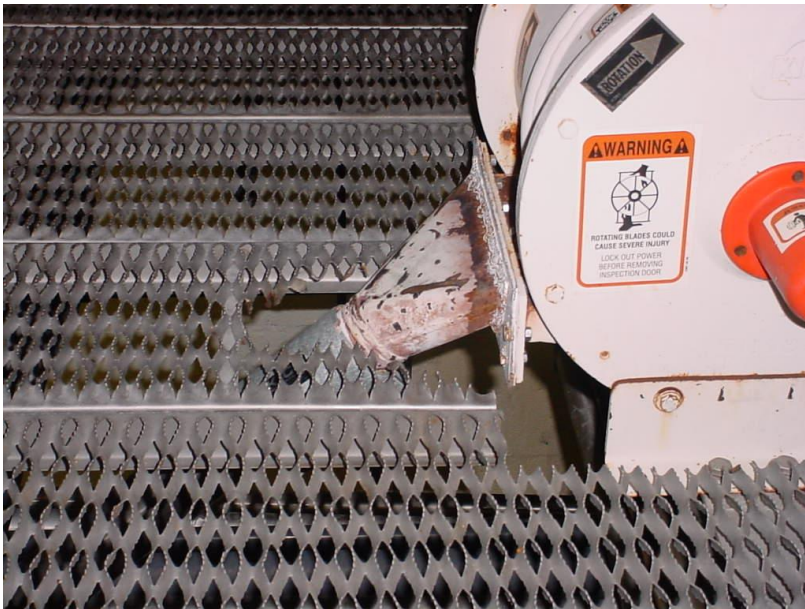




## Noisy Airlock Valve

- Is something stuck inside?
- Is your Motor/Airlock turning in correct direction?
- Has there been a major temperature change?

## Don't forget what is around your Airlock





## Long Term Storage

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's corner holes to the shipping cover plate and drill through holes.
- Place a gasket on the airlock inlet.
- Bolt shipping cover plate in place.
- 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

# Types of Kice Airlock Valves



VJ Series



VJH Series



VJX Series



VBS Series



VD Series



VL Series



## In Closing.....

- Understand the equipment that you have in operation
  - *Understand system behavior in both optimal and upset conditions*
- If in doubt or confused, rely on the manufacturer for advice
- Learn to identify and resolve issues before failures
- Regular and effective maintenance pays off
- BE SMART / BE SAFE

Always work smartly and practice safety!!







Thank you for the opportunity to speak today

