

Rotary Vane Feeder

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

INTRODUCTION

When you purchased your Kice Rotary Vane Feeder you bought a machine that has proven its reliability based on hundreds of installations and years of dependable service.

We're proud of our products and the people at Kice Industries who craft them. At Kice, we use manufacturing standards and processes to produce the highest quality products, which have been a trademark of our organization for over 60 years.

The present design of the Kice Rotary Vane Feeder is the result of input from our development work and many customers.

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

Sincerely,

Drew Kice
President
Kice Industries, Inc.

WARRANTY

The Company warrants the equipment manufactured by the Company to be free of defects in material and workmanship for a period of one (1) year from the date of shipment. Kice agrees to repair or replace, at its option, any parts found defective in the opinion of the Company. Kice 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, erosion abuse or misuse of the product. Assistance by Kice in system layout or selecting equipment does not imply Kice's responsibility.

Buyer agrees to look to the warranty, if any, of the manufacturer or supplier of equipment manufactured by others and supplied by Kice for any alleged defects in such equipment and for any damages or injuries caused thereby or as a result thereof. Where work is made to measurements or specifications furnished by the Buyer, Kice does not assume any responsibility for the accuracy of Buyer's specifications. Kice will not assume responsibility for alteration or repairs unless the same are made with the written consent and approval of Kice.

PURCHASER SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ELECTRICAL MANUFACTURER RECOMMENDATIONS, UNDERWRITER'S CODE AND ALL SAFETY PRECAUTIONS.

Kice extends no other warranty for any of its products other than the above express warranty and there are no other warranties, express or implied, including warranties of merchantability, fitness for a particular purpose, or otherwise which extend beyond the above limited expressed warranty. Kice and its dealers shall not in any event be liable for consequential or incidental damages and the terms and conditions stated herein provide the Buyer's sole and exclusive remedy. Any actions for breach of this agreement or warranty must be commenced within one year after the cause of action has occurred.

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IMPORTANT

Write down the MODEL and SERIAL NUMBER of the Kice Rotary Vane Feeder, along with the same information for the auxiliary equipment (i.e., fan, filter, airlock valve, etc.).

For additional information, application assistance or special service, you should contact the factory. We will need to know the MODEL and SERIAL NUMBER of your Rotary Vane Feeder. 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 the model and serial number.

MODEL _____

SERIAL NUMBER _____

Date of delivery or installation _____ / _____ / _____

2. GENERAL INFORMATION

TO THE NEW OWNER

The purpose of this manual is to assist owners and operators in maintaining and operating a Kice Rotary Vane Feeder. Please read it carefully; information and instructions furnished can help you achieve years of dependable performance. Separate manuals may be included for auxiliary equipment that make up a system, such as discharge airlock valves, Rotary Vane Feeders and fans, these manuals contain additional information which is not in this manual. You are urged to read all manuals before attempting any operation or repair of the equipment in the system. If any manuals are not included in your owner's packet contact our customer service department.

USING THIS MANUAL

Equipment receiving information, installation, general operation, and adjustment and maintenance guidelines are outlines for owners and operators of Kice Rotary Vane Feeders. Operating conditions vary considerably and cannot be addressed individually. Through experience however, operators should find no difficulty in developing good operating, safety and monitoring skills.

The term "**disconnect and lock-out**" or "**lockout/tagout**" as used in this manual means that power to the equipment has been disconnected through the use of a lockable, manual, power cut-off, or power lockout switch.

Directional references are used in this manual, for example RIGHT or LEFT or CLOCKWISE or COUNTERCLOCKWISE, refer to the directions when facing the drive end of the machine. The metal identification plate, containing the model, serial number and date is attached to the outside of the housing under the door.

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

MODEL AND SERIAL NUMBER

The model of the Rotary Vane Feeder, serial number, and date of manufacture can be found engraved on the metal identification plate located on the outside of the housing.



Identification Plate Examples

GENERAL INFORMATION CONTINUED

ROTARY VANE FEEDER PARTS AND SERVICE

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

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

For assistance in service or ordering parts, contact the customer service department at Kice Industries, Inc., 5500 Mill Heights Drive, Wichita, KS 67219-2358, Phone 316-744-7151, and Fax 316-744-7355.

IMPORTANT: Any unauthorized modification, alteration or use of non-approved attachments or drive units voids the warranty and releases Kice Industries, Inc. from any liability arising from subsequent use of this equipment. Each type of Rotary Vane Feeder is designed to be used in a specific type of system. Using the Kice Rotary Vane Feeder for a purpose other than what it was designed for could result in personal injury as well as product or property damage.

FOR MOTOR AND DRIVE PARTS AND SERVICE

Purchased items such as speed reducers, motors, and drives are covered by the manufacturer's warranty. Problems with these components should be referred to your local supplier or service representative.

3. SAFETY PRECAUTIONS



This safety alert symbol is used on equipment, safety decals and in manuals to call your attention to an important safety message warning you of possible danger to your personal safety. When you see this symbol, be alert; your personal safety or the safety of other persons involved. Follow the instructions in the safety message.

HAZARD LEVELS

The following definitions for identifying hazard levels are:



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



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



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



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

SAFETY DECALS

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

SAFETY PRECAUTIONS CONTINUED

ADDITIONAL ROTARY VANE FEEDER SAFETY PRECAUTIONS

1. Do not attempt to install, operate or service your new Rotary Vane Feeder without proper instruction and until you have been thoroughly trained in its use by your employer.
2. The unit must be lifted by a means with sufficient lifting capacity.
3. The Rotary Vane Feeder is fully encapsulated if properly connected during installation.
4. Operate the Rotary Vane Feeder (including upstream and downstream components) only after all system components have been connected.
5. When installed, the unit must be separately grounded.
6. Do not manually override or electrically bypass any protective device.
7. If the Rotary Vane Feeder is equipped with a maintenance panel or access door incorporating a Protective Interlocking Limit Switch (PLS), the PLS must be interlocked with all electrical controls. This is to prevent all motors or powered devices associated with the unit from being energized if any protective cover, guard, grate or maintenance panel is open or removed. Never attempt to manually override or electrically bypass a safety device. The interlock function of the PLS must be tested and logged daily by supervisory personnel.
8. It is the owner's and the employer's responsibility to adequately train the employee-operator in the proper and safe use of the equipment. Written safety programs and formal instruction are essential. All new employees must be made aware of company policies and operating rules, especially the established safety and health procedures. Refresher training of experienced employees in the potential hazards of the job is important. Up-to-date training records must be maintained at the job site.
9. Special attention must be devoted to outside contractors engaged to enter and perform work on equipment or in the workplace. Special care must be exercised to insure all such personnel are fully informed of the potential hazards and follow plant rules – with special emphasis on explosion proof electrical tools and cutting or welding in unsafe environments.
10. Keep the workplace cleaned up and free of dirt and dust at all times. Do not attempt to work on slippery or unsafe ladders or work platforms when maintenance or repair work is being performed on the Rotary Vane Feeder.
11. Do not climb on ladders or work on platforms unless maximum load rating is posted. Do not exceed maximum load ratings when installing or servicing the Rotary Vane Feeder.
12. Never allow any kind of metal or other foreign objects to enter a Rotary Vane Feeder while in operation, unless the system is specifically designed as a wire or metal reclaim system.
13. Operate safely at all times. Use personal protective equipment when and where appropriate, such as hard hats, helmets, gloves, earplugs, and eye protection devices. Keep personal protective equipment in good repair and convenient to the operator.
14. When carrying out cleaning, service or maintenance activities a dust mask should be worn.
15. The operator of the Rotary Vane Feeder must ensure that adequate lighting conditions are provided at the set-up location.
16. It is ultimately the operator's responsibility to implement the above listed precautions and insure proper equipment use, maintenance and lubrication. Keep these instructions and list of warnings with your machine at all times.
17. There is a separate ignition source analysis for the Rotary Vane Feeder, where all dangers concerning explosion protection are considered.

WORK SAFELY AT ALL TIMES

4. RECEIVING, HANDLING, AND INSTALLATION

RECEIVING AND INSPECTION

Kice Industries Inc. has prepared your new Vane Feeder for shipment in accordance with the Uniform Freight Classification, we have thoroughly inspected this unit at the factory and, barring damage in transit should be in perfect condition upon arrival.

The Kice Rotary Vane Feeder and accessories should be inspected on receipt for any shipping damage. Check all accessories for free operation of all moving parts.

When a carrier signs the Kice Industries Inc., bill of lading the carrier accepts the responsibility for any subsequent shortages or damage evident or concealed, and the purchaser must make any claim against the carrier. Evident shortage or damage should be noted on the carrier's delivery document before signature of acceptance. Inspection by the carrier of damage evident or concealed must be requested. After inspection, issue a purchase order for necessary parts or arrange for return or the equipment to Kice Industries Inc. factory for repair.

HANDLING AND STORAGE

Kice Rotary Vane Feeders are shipped in many different configurations. All units are completely assembled and skidded ready for assembly. These units must be handled and moved using good rigging techniques, being careful to avoid concentrated stresses that will distort any of the parts. This equipment is designed to be installed with a minimum of assembly on the part of the user. Speed reducers may be shipped less lubrication; this should be checked before running.

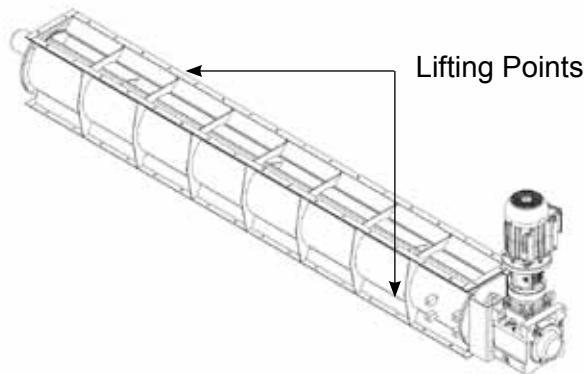
If the Kice Rotary Vane Feeder is not to be installed promptly, store it in a clean, dry location to prevent rust and corrosion of steel components. If outdoor storage is necessary, protection should be provided. Cover the components to prevent the accumulation of dirt and moisture in the housing. Cover motors with waterproof material. Refer to the motor maintenance information for further storage instructions.

CAUTION: Use proper equipment when lifting or moving the Vane Feeders. Make sure all persons and obstructions are clear from path and installation area. See below for details.

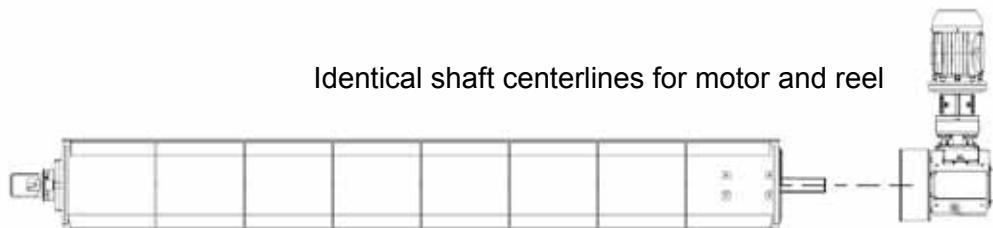
RECEIVING, HANDLING, AND INSTALLATION CONTINUED

INSTALLATION

1. Installation of the Rotary Vane Feeder (which may include the motor), is completed by the operator. When installing the equipment, please make sure that the moving parts in the inside of the equipment are not accessible. This also fulfils EN ISO 13857-1 where required.
2. Move the Kice Rotary Vane Feeder to the installation area using proper equipment, tool truck or fork lift with the proper lifting capacity. The Rotary Vane Feeder can also be lifted by the inlet or outlet flange with equipment that is necessary for lifting the device such as hoists, ropes, shackles or clevises. These must be attached at multiple points for safety. Using lifting points other than those specified, and/or using equipment with insufficient capacity may compromise human safety as well as the structural integrity of the machine itself. See figure.



3. Check all mounting surfaces on the floor, equipment mounting pads, and the Kice Feeder inlet flange. All should be free of any foreign materials. The mounting surface should be level, using shims where applicable to ensure proper installation of the equipment. The feeder should be installed on a steel structure mechanically intended for this purpose so that it is adequately supported. The Rotary Vane Feeder must also be separately grounded and installed on steel construction intended for this purpose to mitigate the risk of an electrostatic charge.
4. Place two beads of caulking on the inlet and discharge flanges, on each side of the bolt holes and around each hole.
5. Tighten all mounting fasteners securely. Refer to the table in this manual for correct torque values. To insure proper operation, the Kice rotary Vane Feeder must be adequately supported and properly installed. All ductwork or gravity spouting should be independently supported and placed away from access routes and steps.
6. All duct work and required machinery must be assembled to the Rotary Vane Feeder, fully enclosing it for proper use and quality operation. The unit should only be turned on once it is properly connected and fully encapsulated. This will also prevent personnel from reaching into the machine during operation.
7. When assembling the motor, coupling, and/or drives, exact alignment of the shafts must be ensured to eliminate failure modes and safety risks. See figure.



RECEIVING, HANDLING, AND INSTALLATION CONTINUED

8. The motor controls and starter can be mounted in any convenient location. Distance or location of the controller does not affect its performance.



WARNING: High voltage and rotating parts can cause serious or fatal injury. Only qualified personnel must perform installation, operation and maintenance of electrical machinery. Make sure that any motor and the frame of each Kice Rotary Vane Feeder are effectively grounded in accordance with OSHA standards, the National Electric Code and local Codes.

9. Electrical conduit, junction tees, safety switches, motor starters and sometimes motors are not furnished by Kice Industries, Inc. A local electrician familiar with industrial equipment and local codes should install the electrical items. Wiring from the controls to the motor and switches should be sized for the amperage rating on the electrical device. All electrical components must be in accordance with current guidelines and codes.
10. Some systems will have additional equipment to wire and check. All items must be checked to insure proper direction of rotation, which is marked on the housing.
11. Test-run the Kice Rotary Vane Feeder. If any unusual noises occur, disconnect and lock-out the power. Open the equipment, manually rotate the rotor and inspect for touching or rubbing. The product outlet must remain free and clean at all times; otherwise dangerous operating conditions may occur, causing damage to equipment and/or personnel.
12. Reassemble items removed during inspection and remove lock-out for operation.

5. OPERATION AND START-UP PROCEDURE

Kice Rotary Vane Feeders are all similar in the construction and motor drive components. This class of equipment is driven by slow speed gearmotors with chain or shaft drives and guards. We can make many modifications to the standard design, such as material of construction and drive components, but the overall operation and startup procedures remain the same.

The discharge of the Rotary Vane Feeder is designed to produce a uniform spread of product across the entire width of the machine.

Standard material of construction for all of the above equipment is carbon steel. Optional material includes stainless steel, with any combination of carbon or stainless steel for the internal parts. Aluminum is not recommended.

It is the responsibility of owner/employer to provide the necessary training for operating personnel in the proper and safe use of equipment. Written safety programs and formal instruction are essential. All new employees must be made aware of company policies and operating rules, especially the established safety and health procedures. Refresher training of experienced employees in the potential hazards of the job is important. Up-to-date training records must be maintained at the job site.

6. MAINTENANCE AND SERVICE

1. Inspect the speed reducer and motor: Inspect the Feeder motor in the following manner.
 - a. Read all materials supplied with the equipment concerning the motor.
 - b. Be sure that the motor is securely mounted to the speed reducer.
2. Inspect the speed reducer
 - a. Read all materials supplied with the equipment concerning the speed reducer.
 - b. Identify speed reducer type, grease lubrication or oil lubricated.
 - c. If the unit is oil lubricated it is normally shipped dry. Add the appropriate oil as specified by the manufacturer.
 - d. If the unit is Grease lubricated do nothing. These are sealed units and ready for operation.
3. Inspect the drive.
 - a. Look at the drive, one side is the tight side the other side is the loose. Make sure the loose side maintains 2-3% of the shaft centerline distance below a straight line from the drive sprocket teeth.
 - b. Inspect the sprockets for excessive wear. If either sprocket is worn, replace BOTH sprockets and the chain.
4. When re-assembling the motor, coupling, and/or drives, exact alignment of the shafts must be ensured to eliminate failure modes and safety risks.
5. During any routine maintenance, all set screws and bolts should be checked for tightness. Refer to the table in this manual for correct torque values.

7. TORQUE VALUES FOR MAINTENANCE AND INSTALLATION

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

8. TROUBLESHOOTING

Kice Industries Inc. is careful to insure that each Feeder is properly assembled prior to shipment; however, there may be other causes for malfunction, the following items are presented for your information and as an aid to help your new machine achieve the highest level of efficiency possible.

Problem	Possible Cause
Excessive Vibration	<ol style="list-style-type: none">1. Loose mounting bolts, set screws, bearings or couplings.2. Misalignment or excessive wear of bearings.3. Loose set screw in one of the rotor hubs or bearings.4. Misaligned motor.5. Bent shaft due to mishandling or material impact.6. Accumulation of foreign material on the rotor.7. Excessive wear or erosion of the rotor.8. Externally transmitted vibration.
Inadequate Performance	<ol style="list-style-type: none">1. Feeder rotor rotating in the wrong direction.2. Feeder rotor running too slow – wrong sprockets.3. Incorrect testing procedures or calculations, resulting in improper sizing.4. Foreign material may be built up on the feeder.
Excessive Noise	<ol style="list-style-type: none">1. Vibration originating elsewhere in the system.2. Inadequate or faulty design of structural supports.3. Nearby sound reflecting surfaces.4. Loose accessories or components.5. Loose chain drive or worn sprockets.6. Worn bearings.
Uneven Feed	<ol style="list-style-type: none">1. Rotor running too fast.2. Material feed into machine entering at an angle.3. Multiple inlets with one or more choked.4. Foreign object obstructing flow to the rotor.
Material Backing Up	<ol style="list-style-type: none">1. Motor not running.2. Broken drive assembly.3. Rotor running too slow – (sprockets reversed).4. Rotor running backwards.5. Rotor worn out from abrasion.6. Foreign object blocking the feeder.
Premature Component Failure	<ol style="list-style-type: none">1. Prolonged or major vibration.2. Inadequate or improper maintenance.3. Abrasive or corrosive elements in the product.4. Misalignment or physical damage to rotating components or bearings.5. Excessive speed.6. Foreign object jamming the rotor.

TROUBLESHOOTING CONTINUED

It is recommended that only Kice Manufactured supplied replacement parts be used. Kice Rotary Vane Feeder parts are built to be fully compatible with the original equipment, using specific alloys and tolerances. These parts carry a standard Kice warranty.

When ordering replacement parts, specify the part name,

Kice Serial Number _____,

Feeder model # _____ & size _____,

Bearing size or shaft size _____.

Most of this information is on the metal nameplate attached to the Rotary Vane Feeder housing.

Suggested replacement parts include:

- 2 sets of bearings
- 2 sets of seals

9. SPECIAL CE INFORMATION



WARNING: The Rotary Vane Feeder is not suitable for operation in ATEX classified zones (explosive atmospheres or areas).

ADDITIONAL SAFETY 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).

ADDITIONAL INSTALLATION REQUIREMENTS

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

Electrical components must be mounted by EMC skilled specialists.

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.

10. ILLUSTRATED PARTS LIST

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