

Flat Bottom Sweep

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 equipment, you bought a dependable and quality-built product. The range of equipment manufactured by Kice should satisfy nearly every conceivable industrial air-handling 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 equipment 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.

2. IMPORTANT INFORMATION

Write down the MODEL and SERIAL NUMBER of the Kice equipment 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 equipment. 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 equipment. Please read it carefully; information and instructions furnished can help you achieve years of dependable performance. 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 equipment. 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 equipment has been disconnected through the use of a padlockable, manual power cutoff or power lockout switch pursuant to 29 CFR 1910.147. Photographs and illustrations were current at the time of printing but subsequent production changes may cause

your equipment to vary slightly in detail. Kice Industries, Inc. reserves the right to redesign and change equipment as deemed necessary, without notification. If a change has been made to your equipment 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.

Equipment Parts and Service

For service or assistance ordering parts, contact the Customer Service Department or Quick Ship Department.

Kice Industries, Inc.
5500 Mill Heights Drive
Wichita, 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. All Kice equipment is configured to be used in specific situations, handling particular types of material. Using equipment 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 equipment.

Kice equipment is designed and built to provide years of operation. As with any equipment, the following rules are essential for trouble-free operation:

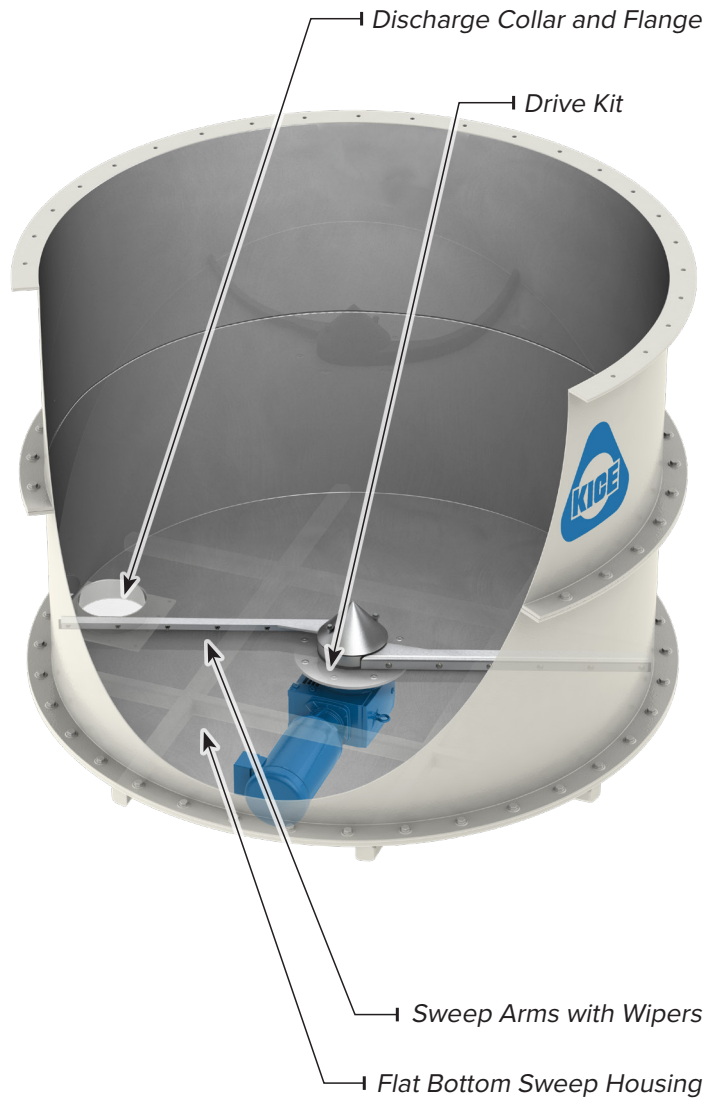
- Proper installation.
- Regular maintenance.
- Correct operation within original design parameters.
- Proper application within a process.

Failure to properly install, maintain or operate Kice equipment can result in a variety of problems, including but not limited to: poor equipment performance, decreased equipment life, equipment failure, or dangerous operating conditions.

Purchased items (such as speed reducers, motors, and positive pressure pumps) are covered by the manufacturer’s warranty. If there is a problem with a purchased item, check with the local supplier or service representative.


Flat Bottom Sweep Terminology

The image below shows some of the standard and optional features of your Kice Flat Bottom Sweep. Note that this image is representative only; your machine's appearance may vary depending on the model and installed options.




Hazard Levels Symbols - In Manual

Throughout this manual you'll see icons that are specific to hazards or dangers. Refer to these symbols and their respective definitions as you install, maintain, and repair your Kice equipment.




DANGER

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

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

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.



NOTE – This symbol indicates practical tips and guidance that could be helpful.



REFERENCE MATERIAL – This symbol indicates further information is referenced in or outside of this manual.

Safety Symbols - On Equipment

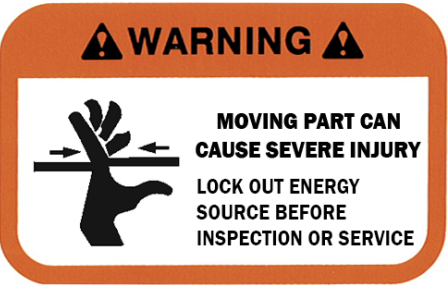


This safety alert symbol is used to call your attention to an important safety messages on equipment, safety decals and in manuals, to warn you of possible danger to your personal safety. When you see this symbol, be alert. Your personal safety or the safety of others may be affected. Follow the instructions in the safety message.

On Equipment Safety Decals - On Equipment

Equipment 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 equipment. Look for them!



5. SAFETY PRECAUTIONS



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.

WORK SAFELY AT ALL TIMES

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- All energy sources associated with the equipment 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.
- It is the owner's and employer's responsibility to adequately train each 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, 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.
- Do not attempt to install, connect power, operate or service the equipment without proper instruction and until you have been thoroughly trained in its operation and use by your employer.
- Before applying power to any equipment, make certain that all personnel are clear of the machine.
- Always operate safely. 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 operator or other affected personnel.
- If it becomes necessary to climb into the filter for service or repair work, adequate securing devices and fall arresters must be worn by personnel.
- The equipment is fully encapsulated if properly connected during installation and should only be operated after all pipes and hoses, including upstream and downstream components, have been completely connected to the piping system. This will prevent human access while the machine is running.
- All protective covers, guards, grates, maintenance panels, switches and warning decals must be kept in place and in good repair. Any equipment with a damaged malfunctioning, defective, or missing protective device must be taken out of service until the protective device can be repaired or replaced.
- The equipment may also have factory supplied guards for rotating components. Do not connect power to or operate the equipment unless all moving parts are completely enclosed and all guards, grates and maintenance panels are in place and securely fastened.
- Do not abuse, overload, mistreat or misuse the equipment or attempt to operate the equipment if it needs service, lubrication, maintenance or repair.
- The equipment may be installed and programmed to start automatically or be controlled from a remote location. Always keep clear of all moving parts on industrial equipment, until the POWER IS TURNED OFF AND LOCKED OUT.
- Do not attempt to work on, clean or service the equipment, open or remove any protective cover, guard, grate, connection or maintenance panel until the POWER IS TURNED OFF AND LOCKED OUT. A main disconnect device must be installed to achieve this.
- The compressed air supply must be disconnected from the system before service and repair work is carried out. The switch-off devices for the compressed air supply, as with the electrical supply, are the responsibility of the distributing company (operator) of the overall system.
- During installation and operation, make sure the motor and frame of each piece of equipment, including the filter, is effectively and separately grounded in accordance with OSHA safety and health standards, the National Electrical Code, local codes and DIN EN 60204-1 or DIN EN 60439-1 as required for the classified area.
- High voltage and rotating parts can cause series or fatal injury. Only qualified, trained, and experienced personnel should

SAFETY PRECAUTIONS CONTINUED

- perform installation, operation, and maintenance of electrical machinery.
- If 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. Interlock function of the PLS must be tested and logged daily by supervisory personnel.
 - Never attempt to manually override or electrically bypass a safety device.
 - Filters must be equipped with a properly functioning Protective Interlocking Electrical Control Switch (PCS), a Pad-lockable Manual Power Lockout Switch, along with the other basic safety equipment listed above. On-Off, interlock and padlock functions of the PCS must be tested and logged periodically 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 equipment used in the processing of combustible materials or in hazardous environments require evaluation by the owner and regulatory bodies to determine appropriate monitoring equipment, dust control, explosion protection and electrical equipment enclosures. Do not use the equipment in hazardous environments unless properly equipped for the hazard.
 - Always keep the workplace clean and free of dirt and dust. Do not attempt to work on slippery or unsafe surfaces, ladders or work platforms when maintenance or repair work is being performed on the equipment.
 - Do not use a ladder or work platform unless it is in good repair and rated for the load required. Do not exceed maximum load ratings when installing or servicing equipment.
 - Never stand under any kind of hoists or lifting mechanisms whether or not it is loaded or in operation. Never stand under or near a component when it is being lifted.
 - All equipment lifting devices must be inspected by qualified personnel before each use. Do not use a lifting device to transport equipment. Never use a lifting device that is damaged, deteriorated or in need of repair.
 - The unit must be lifted by a means with sufficient lifting capacity.
 - The operator must ensure that adequate lighting conditions are provided at the location of equipment operation.
 - Never allow any kind of metal or other foreign objects to enter the equipment while in operation, unless the system is specifically designed as a wire or metal reclaim system. Examined raw materials should be used through the machine to ensure proper and consistent operation. A material separator should be installed on the raw gas inlet.
 - Special attention must be devoted to outside contractors engaged to enter and perform work on the equipment or in the workplace. Particular 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.
 - Free outlet of product must be guaranteed at all times. Otherwise, blockage and severe damage may result, or a dangerous situation may occur.
 - Airflow to the equipment must be switched off long enough (approximately 30 minutes) for dust to settle in the raw gas or dirty air chamber before the service entrance is opened. This is to prevent zone entrainment and mitigate the risk of a potential event outside the system.
 - Drive components must be inspected and adjusted after transportation and periodically as required by operating conditions. Check sprocket, sheave and coupling alignment and spacing, drive belt tension, setscrews, keys, fasteners, bearings, shafts, and motors as appropriate to job conditions.
 - It is ultimately the operator's responsibility to apply the above listed precautions and ensure proper equipment 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

6. INSTALLATION PREPARATION

The flat bottom sweep has been inspected at Kice prior to shipment and should be in excellent condition upon delivery. A thorough customer inspection of the flat bottom sweep and any accessories should be completed upon receipt to verify its condition.

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.

7. STORAGE

Kice Flat Bottom Sweeps are shipped in many different configurations. Some units are completely assembled, shipped bolted to hopper or vessel, and skidded when size permits. These units may be handled and moved using good rigging techniques, being careful to avoid concentrated stresses that will distort any of the parts. Items or parts of the flat bottom sweep that are shipped knocked down will be clearly labeled for reassemble. If the flat bottom sweep 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 any openings to prevent the accumulation of dirt and moisture inside the housing. Cover motors with waterproof material. Refer to the motor maintenance information for further storage instructions.

8. INSTALLATION

Use appropriate equipment when lifting or moving the flat bottom sweep. 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 13857-1 where required.

Contact Kice Industries, Inc., for any installation questions. **See following pages for installation details.**

The following hazards are present:



WARNING

Use appropriate equipment when lifting or moving the flat bottom sweep. 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 13857-1 where required.



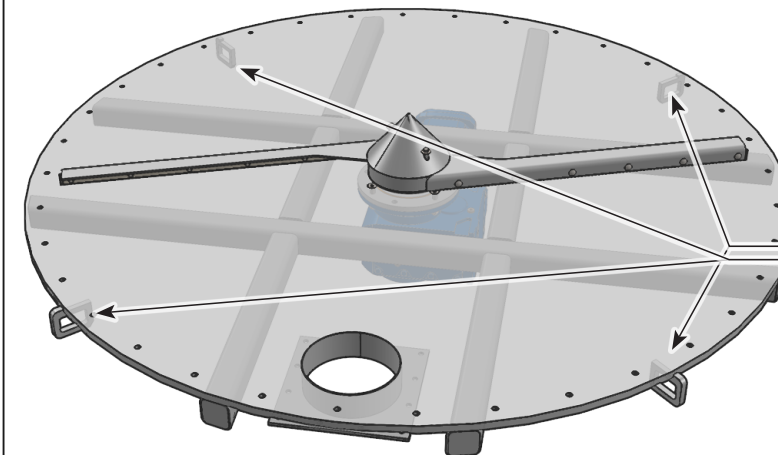
WARNING

High voltage and rotating parts can cause serious or fatal injury. Only qualified personnel should perform installation, operation and maintenance of electrical machinery. Make sure that any electric motor and the frame of the filter is effectively grounded in accordance with OSHA standards, the National Electrical Code and local codes.

INSTALLATION CONTINUED



WARNING

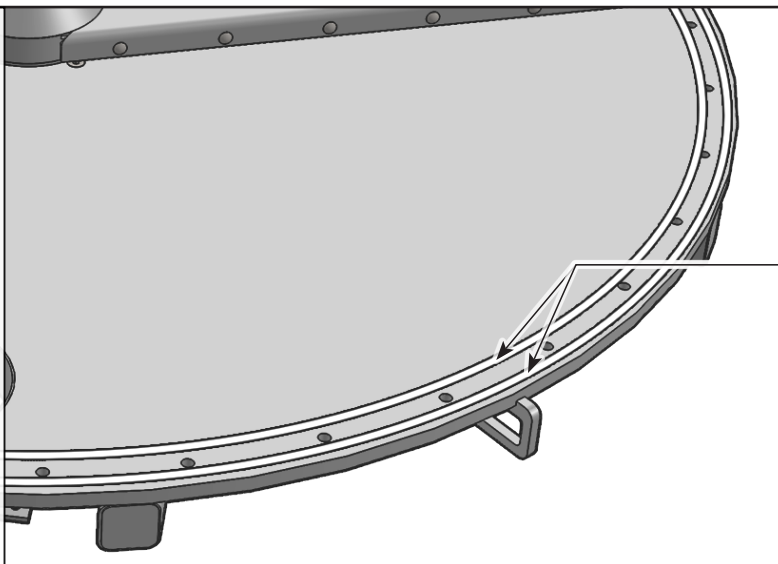


Step 1

☐ Move Sweep to Install Area

Move flat bottom sweep to install area using applicable equipment with proper lifting capacity.

When rigging use supplied lifting lugs.



Step 2

☐ Add Caulking to Flanges

Mating surfaces should be free of any foreign materials. Check all flanges.

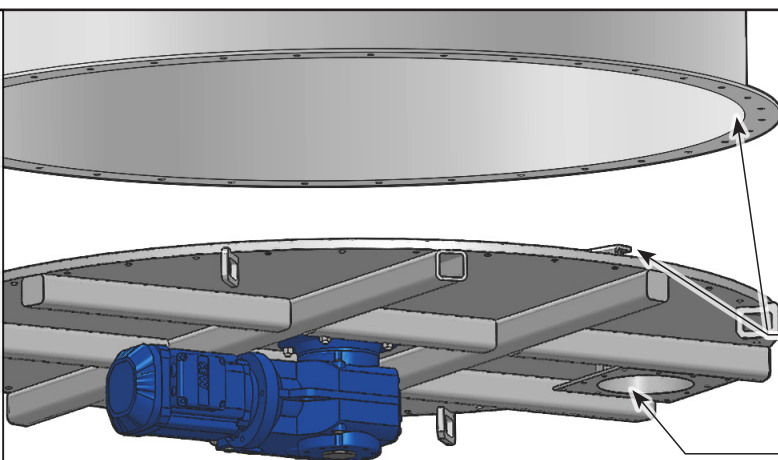
Place two beads of caulking around inside and outside perimeter.

Note:

If airlock valve is required it should be mounted to the flat bottom sweep discharge flange. Additional support may be required. All duct work or stacks need to be independently supported.



WARNING



Step 3

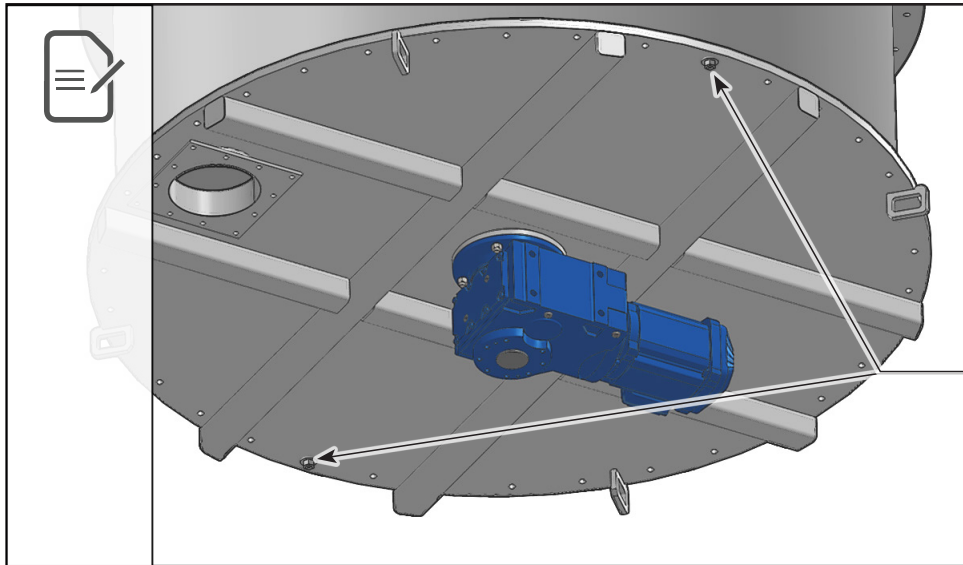
☐ Raise Sweep to Bin Flange

Orient discharge location to correct position. Using proper lifting equipment and rigging techniques, raise flat bottom sweep up-to bin flange.

Verify clearance between wiper arms and bin before mating the two flanges.

Confirm discharge location.

INSTALLATION CONTINUED



Step 4

□ Install Fasteners

Install opposing fasteners first for alignment. Then proceed to install remaining fasteners via staggered pattern. Reposition motor if needed.

Install opposing fasteners first.

Note:
Motor can be rotated in 90° increments if desired. Tighten all fasteners securely.

Electrical Installation

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.

Step 5

□ Verify Direction of Flat Bottom Sweep Rotation and Test Run

Verify wiper arm is rotating in correct direction. Wiper should rotate clockwise when viewed from top of bin. Test run the flat bottom sweep while watching from viewport or door. If any unusual noises occur, disconnect and lock out the power. Verify that the arm wipers are running on the housing bottom surface. The product outlet must remain free and clean at all times; otherwise dangerous operating conditions may occur, causing damage to equipment and/or personnel.

Step 6

□ Verify Airlock Rotation

Some systems will have an airlock valve to be connected. Verify that the airlock rotation direction is correct as marked.

Step 7

□ Reassemble

Remove lock-out for operation.

Step 8

□ Startup

Start empty whenever possible. If large heads of product are expected upon startup please contact Kice Industries, Inc., to discuss application requirements.

9. FLAT BOTTOM SWEEP OPERATION

Kice Flat Bottom Sweeps are all similar in the construction and motor drive components. This class of equipment is driven by slow speed gearmotors with shaft drives. 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 wiper arms of the flat bottom sweep are designed to direct material to the discharge port.

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.

Reference [Page 17 in the Illustrated Parts Section](#) for a complete offering of available drive motors and pressure ratings.

9. FLAT BOTTOM SWEEP MAINTENANCE

The following hazards are present:



WARNING

When performing maintenance, all energy sources associated with the flat bottom sweep 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.

Biannual Flat Bottom Sweep Inspection

Step 1

- Inspect the 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 drive cartridge.

Step 2

□ Remove bearing cartridge. Reference [Page 14 in the Maintenance Section](#) for cartridge removal. Examine each gasket and seal closely. Look for cracks, abrasions and or any deterioration that may lead to failure.

Step 3

□ Inspect wipers. Examine each wiper. Look for cracks, abrasions and or any deterioration that may lead to failure.

Step 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.

Step 5

□ During any routine maintenance, all set screws and bolts should be checked for tightness. Reference [Page 19 in the Torque Values Section](#).

General Flat Bottom Sweep Maintenance

Cleaning:

Periodic cleaning of the flat bottom sweep is desirable. The time between cleaning will vary, depending upon usage and bin availability.

Preventative Maintenance:

Periodic inspection of internal parts, including gaskets and seals, for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any parts that are worn or damaged.

Replacing Wipers

For correct and trouble free operation wipers should be installed as shown in the following instructions.

The following hazards are present:



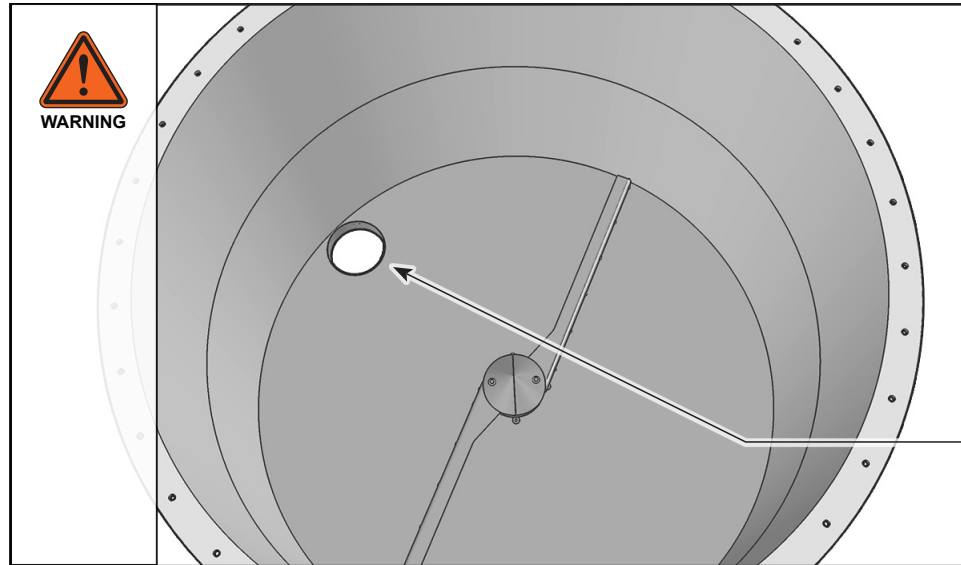
WARNING

When performing maintenance, all energy sources associated with the flat bottom sweep 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.



WARNING

Disconnect power before touching any component part.

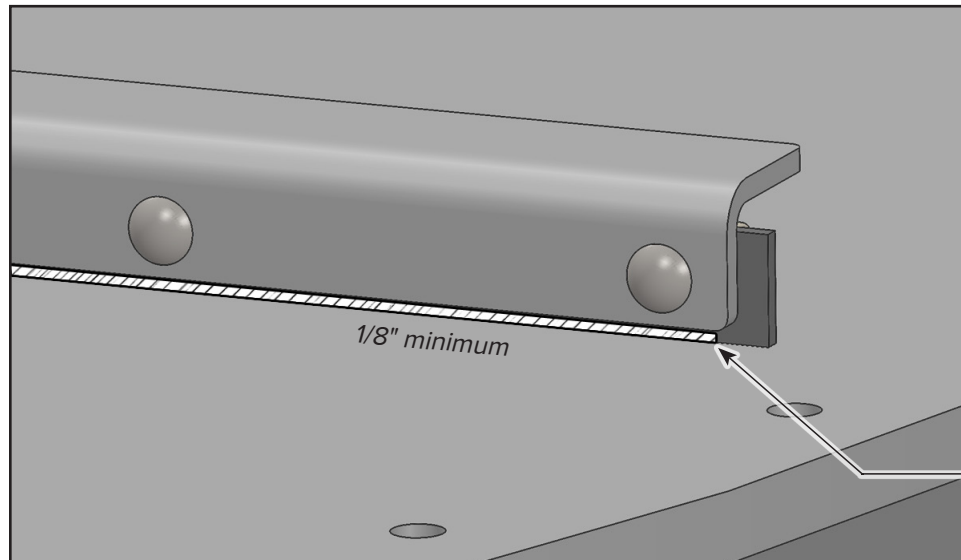


Step 1

□ Access Flat Bottom Sweep

Before accessing, verify wiper arm is not in-line with discharge collar. Once confirmed, access the interior of the bin or vessel.

Wiper should be clear of discharge port.



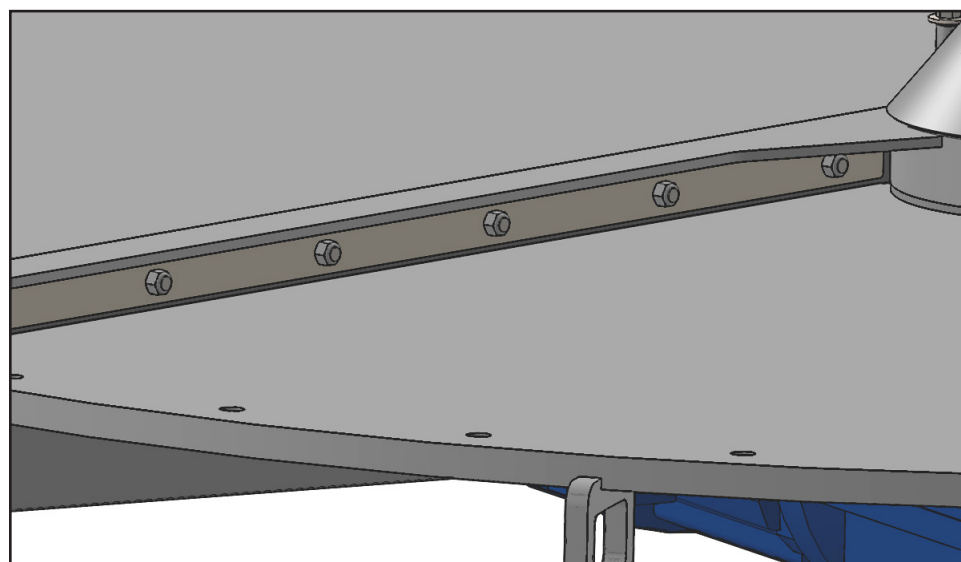
Step 2

□ Inspect Used Wipers

If excessive chipping is evident, or if 1/8" or less is extending below arm, the wiper needs to be replaced.

Carefully inspect each wiper for signs of uneven wear. If uneven wear is evident inspect flat bottom for protrusions or foreign material. Repair as needed prior to installing new wipers.

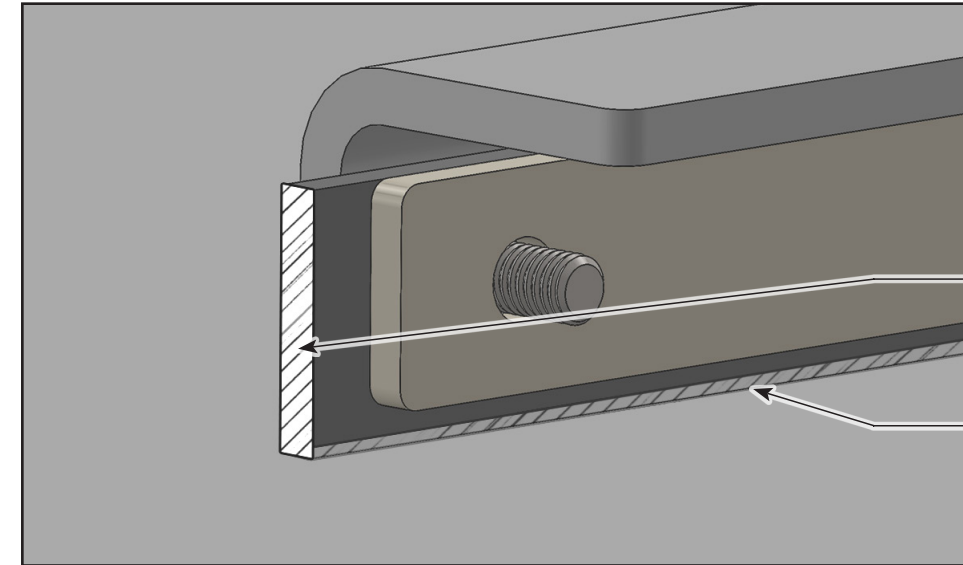
A minimum of 1/8" should extend down beyond arm.



Step 3

□ Remove Carriage Bolts

If wiper needs replaced, carefully loosen locknuts and remove carriage bolts. Take care as to not drop any fasteners or tools into the discharge port.



Step 4

□ Install New Wipers

Install new wiper and tighten each carriage bolt location once proper clearance has been confirmed.

Outer edge should touch, or interfere, with vessel wall.

Lower edge should rest on sweep housing plate.

Step 5

□ Verify Wiper Installation and Test Run

Test run the flat bottom sweep while watching from viewport or entry door. If any unusual noises occur, disconnect and lock out the power. Verify that the arm wipers are running on the housing bottom surface. The product outlet must remain free and clean at all times; otherwise dangerous operating conditions may occur, causing damage to equipment and/or personnel.

Step 6

□ Reassemble

Remove lock-out for operation.

Step 7

□ Startup

Start empty whenever possible. If large heads of product are expected upon startup please contact Kice Industries, Inc., to discuss application requirements.

Replace / Inspect Bearing Cartridge

Kice Flat Bottom Sweeps utilize a bearing cartridge containing the bearing and shaft seals. The cartridge is common to flat bottom sweeps. To replace the cartridge:

The following hazards are present:



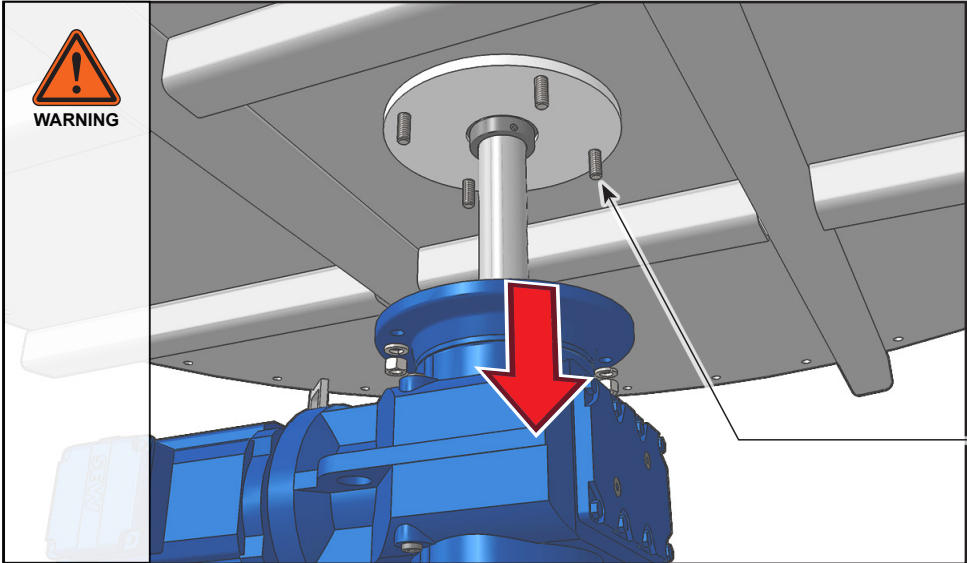
WARNING

When performing maintenance, all energy sources associated with the flat bottom sweep 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.



WARNING

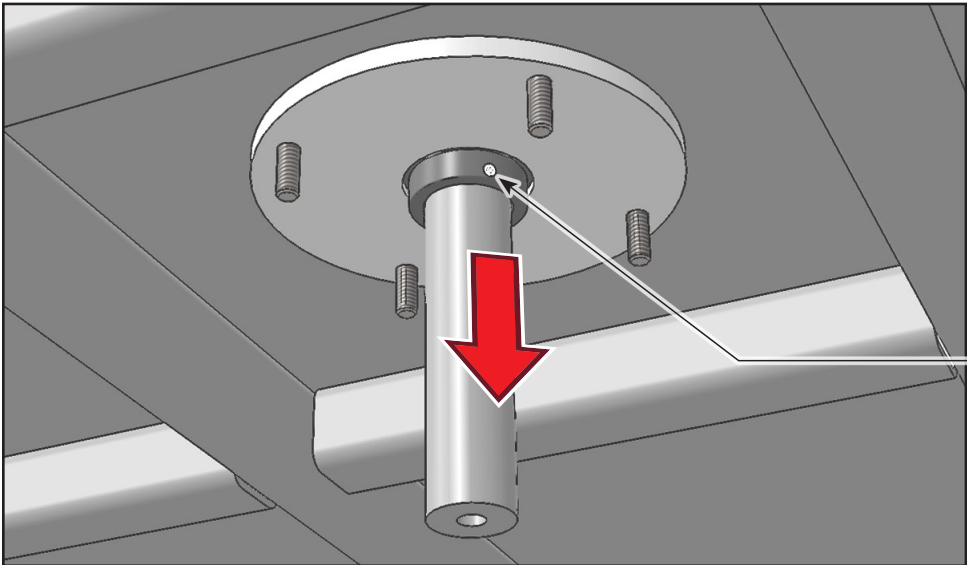
Disconnect power before touching any component part.



Step 1
□ Remove Motor

Loosen and remove motor mount bolts and lock washers. Remove motor entirely from shaft and set aside.

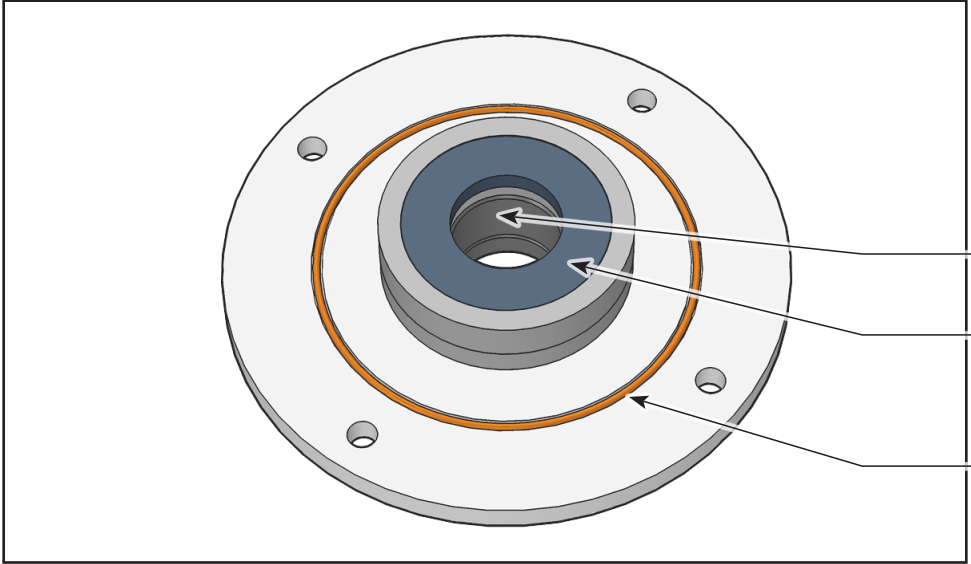
Motor mount bolts (x4).



Step 2
□ Remove Bearing Cartridge

Loosen cartridge setscrew and slide bearing cartridge off of shaft.

Setscrew location.



Step 3
□ Inspect / Replace Cartridge

Examine all parts of the bearing cartridge. If any excessive wear is evident replace bearing cartridge.

Cartridge bearing.

Cartridge seal.

Cartridge o-ring.

Step 4
□ Reassemble

Reassemble in order as removed. Be sure to properly align keyed shaft with motor.

11. TROUBLESHOOTING - COMMON PROBLEMS

The following hazards are present:



When performing maintenance, all energy sources associated with the flat bottom sweep 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.



Disconnect power before touching any component part!



Testing and troubleshooting the circuit board with a grounded test instrument or applying any external voltage to pressure switch terminals will cause serious damage to circuit board components. Failure to comply will void any warranty.

A. Discharge Rate Has Decreased or Stopped

Probable Cause/Suggested Remedies:

- 1. Check that product is still being fed into attached vessel.
- 2. Check that motor is still running (electrical connections may have come loose).
 - a. Check power supply or controller as these may have been interrupted.
 - b. Verify that arms are turning. Built-up product or foreign object can cause a jam. Misalignment in the hopper may also cause interference with vessel wall.
- 3. Check that arms are turning.
 - a. Built-up product or foreign object can cause a jam. Misalignment in the hopper may also cause interference with vessel wall.
 - b. Fasteners on motor, drive cartridge, and hub may be loose; loose connections may interfere with power transfer and motion. All fasteners should be properly tightened.
 - c. Bearing may have wear or deterioration that inhibits proper rotation of the shaft.
 - d. Keyed connection between shaft and gearmotor may have been damaged.
- 4. Check that the discharge outlet isn't packed with product.
- 5. Check that hub is running level; wobbling may be caused by bent or misaligned shaft.

B. Product and/or Air is Leaking

Probable Cause/Suggested Remedies:

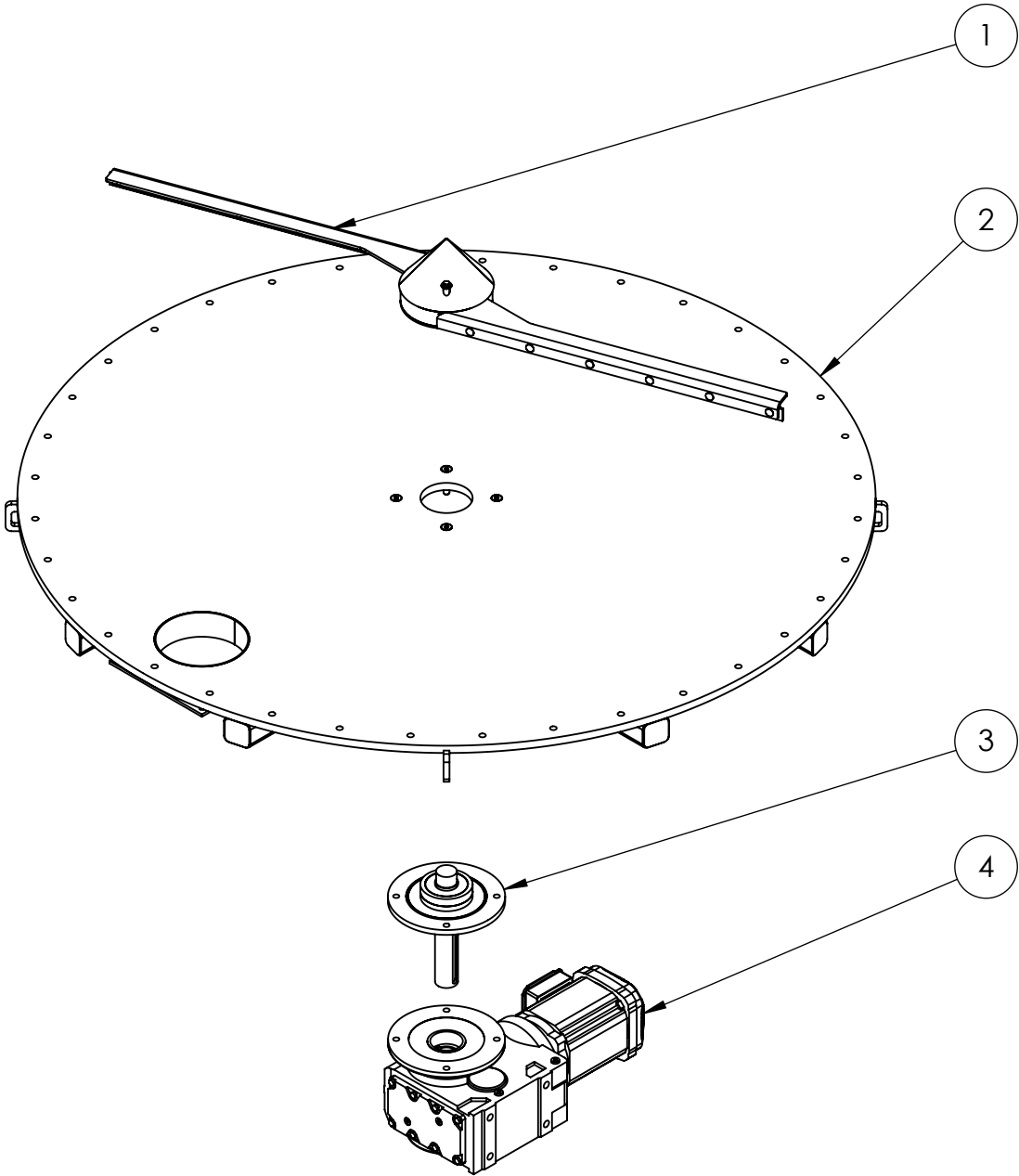
- 1. Check that fasteners on motor and drive cartridge are properly tightened.
- 2. Check shaft seal and cartridge O-ring for wear or deterioration.

Replacement Parts

It is recommended that only Kice supplied replacement parts be used. These parts carry a standard Kice warranty.

12. ILLUSTRATED PARTS LIST

Balloon #	Description
1	SWEEP ARM
2	BOTTOM HOUSING
3	DRIVE KIT
4	MOTOR / REDUCER



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	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