



INTEGRATED  
ENVIRONMENTAL  
SOLUTIONS



Clean just got cool.™



Installation  
Operation  
and  
Maintenance  
Manual



## **READ AND SAVE THESE INSTRUCTIONS!**

**ATTENTION:** *When the SonicAire is received from the trucking company, it is the owner's responsibility to inspect the outside of the box for signs of abuse and possible damage. The owner should also open the top of each box to visually inspect for any obvious damage in transit. **The owner must refuse to receive the shipment of any damaged equipment.***

### **WARNING – TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:**

- Installation work and electrical wiring must be done by qualified persons in accordance with all applicable codes and standards.
- When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.
- Use this unit only in the manner intended by IES. If there are questions about this, contact IES.
- To prevent the risk of fire, electric shock, or injury, disconnect the fan from the power supply before servicing.
- Before servicing or cleaning the unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.
- Any cover, guard, or safety device removed for repair or service must be replaced as originally installed.



## INTRODUCTION

Congratulations on selecting the premier automatic cleaner for keeping your overhead structures and production equipment free of dust and fiber buildup. Integrated Environmental Solutions (IES) designed the SonicAire™ to meet the most demanding needs of today's industrial plant with a minimum amount of maintenance and maximum amount of flexibility and reliability.

The SonicAire fan was originally developed for the traditional textile industry to prevent the accumulation of organic fibers in the overhead area of a weaving, knitting or spinning plant. The buildup of fibers was a major fire hazard and contributed to many textile mills burning to the ground. Today the SonicAire fan is used in every type of industry that produces combustible dust in its operation. This includes, but is not limited to, drycleaning, laundries, bakeries, paper converting, non-wovens, wood working, metal working, refuse processing, textiles, sewing, packaging, food processing, rubber, furniture, cabinetry, soap, aluminum and warehousing.

In 2008 the US House of Representative passed bill HR 5522 which mandated that OSHA issue a standard on combustible dust in all industries and actively enforce the new standards for preventing combustible dust explosions and fires. In 2008 OSHA issued directive number CPL 03-00-008 which required all facilities that produce combustible dust meet NFPA 654 standard "*Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids.*" Clean Fan Technology from IES enables plants to stay in compliance with NFPA 654 continuously.

The SonicAire fan uses high velocity and high mass air flow to prevent the accumulation of fibers, dust or other undesirable waste in overhead structures and on plant process equipment. This is accomplished by preventing airborne particles and waste from accumulating on steel structures, pipes, ducts or process equipment. The SonicAire can also be used to prevent the accumulation of condensation on walls and overhead structures in rooms with high humidity. The SonicAire can de-stratify the buildup of hot air in the ceiling in the winter time which will improve comfort and reduce energy costs. The SonicAire can eliminate spiders and spider webs. The SonicAire can provide ventilation inside semi trailers while loading and unloading. The SonicAire can be used for drying non-porous items such as Dust Mats and Firemen Protective Clothing. The application of the SonicAire to solve other types of problems has been many; so let IES discuss with you whatever need you have and explore the possibility of SonicAire being a part of the solution.

IES is always in the process of improving the SonicAire; therefore, we reserve the right to make change improvements in the design at anytime without notification.



## **INSTALLATION INSTRUCTIONS**

Each SonicAire is shipped in a separate container and is completely assembled. Within the container are the parts required for hanging the unit from the overhead structure in your plant. The kit comes with a standard hanging height support rod and sway braces. The hanging elevation can be reduced by cutting of the support tube and drilling a new support hole for the support bolt which runs through the axel of the SonicAire. The hanging elevation can be increased by purchasing from a local supply company the required ¾" all-thread rod for extending the support tube and ½" all-thread rod for extending the sway braces. Depending on the particular overhead structure, additional support materials (such as angle iron or Unistrut) may be required to support the SonicAire and the sway brace anchors.

Please follow the steps below for a successful design and installation of your SonicAire (SA) system.

**CAUTION:** *IES recommends consulting with a professional engineer before supporting the SA fan from overhead structures.*

1. Locate where the SA is to be mounted. (Contact IES for assistance with fan placement, and help with a layout or system design.) If there are larger obstructions in the overhead area, such as large ductwork or equipment, then locate SA fans on both sides of the object to thoroughly clean. Use a drawing of your facility floor or make a sketch when locating the SA fans; this will ensure that the cleaning distance of the SA fan is not exceeded.
2. Using the included Swivel Flange Hanger (Part # 23189200020, Page 18) as a template, mark and drill the required holes in the overhead support structure to which the SonicAire fan will be supported from (steel beam, concrete, etc.). *If using other optional mounting equipment from IES, consult the provided specific manual for that equipment, or contact IES for assistance.*

**ATTENTION:** *Do not drill through existing building steel without consulting a structural expert or engineer.*

**CAUTION:** *Be certain that the fan will be able to rotate a full 360 degrees without hitting any object in the overhead area. Allow at least 4 inches (100mm) of spacing clearance in all directions for fan operation.*

**CAUTION:** *Do not locate fan near humidifiers or adiabatic coolers which produce free moisture (water) and can accumulate on the fan.*



3. Determine the optimum fan elevation to obtain proper cleaning of objects in the overhead area, such as tops of ductwork, pipes, lights, hangers, beams, etc. The Support Tube Assembly (Part # 23189200018, Page 18), as furnished, will locate the centerline of the SA fan at a position of approximately 5 feet (1.5 m) below the mounting surface.

**WARNING:** *It is recommended that the SA fan be installed so that the bottom of the fan is no less than 8 feet (2.5 m) above the floor or other nearby walking surfaces. If the fan will be less than 8 feet (2.5 m) above the floor or walking surface, contact IES for a Fan Guard Kit (FGK).*

4. If the optimum hanging distance is less than 5 feet (1.5 m) from the mounting surface, then shorten the support tube as shown on Page 9.

If the optimum hanging distance is greater than 5 feet (1.5 m), then obtain the appropriate length of  $\frac{3}{4}$ " all-thread rod to lengthen the support tube. The sway braces should also be lengthened with the use of  $\frac{1}{2}$ " all-thread.  
*Contact IES if there are any questions about this.*

5. Install all additional overhead support members as required to hang the SA fan (160 lbs/73 kg load) in the proper location and attach the two included sway braces to prevent the SA fan from rocking back and forth during startup.
6. Connect (screw in tight) the Support Tube (after shortening or lengthening if required as described above) to the Swivel Flange using the Swivel Nut. (See typical installation drawing on Page 8.) Attach the Swivel Flange to the overhead structure using (owner furnished)  $\frac{1}{2}$ " bolts, washers, lock washers and nuts as shown on Page 8.

**CAUTION:** *Do not penetrate roof with drill or lag screws.*

7. Connect both sway braces to the Support Tube and the overhead structure (after lengthening if required as described). Assemble the tube Clamp, V-bolt, and the two Sway Braces to the support tube assembly. With the support tube plumb, attach the upper ends of the sway braces to the overhead structure with (owner furnished)  $\frac{3}{8}$ " bolts, washers, lock washers and nuts. See Page 8.

**NOTE:** *The two sway braces should be mounted approximately 90° away from each other. The braces should be mounted at approximately a 45° angle from horizontal by slipping the tube clamp along the support tube and tightening at the proper position. The sway braces should be connected as close to the axle of the SA fan as practical.*



8. The SonicAire is set from the factory to either STANDARD oscillation (from 70 degrees above horizontal to 5 degrees below horizontal) or MAXIMUM oscillation (from 70 degrees above horizontal to 60 degrees below horizontal). Attach the connecting rod to the fan support arm as shown on Page 13. For oscillation through a different range (such as a lower bottom angle to clean plant equipment or a higher bottom angle to prevent disturbing a process or worker), adjust the length of the adjustable connecting rod and the position to which the rod is attached on the extended crank arm as described on Page 10.

**WARNING:** *Installing the connecting rod too long or too short will cause the gearmotor to stall and fail. Warranty does not cover failures caused by installation of a connecting rod which is too long or too short. Call IES if there are any questions about the length and connection position on the crank arm.*

9. With an appropriate means (such as a scissor lift, man lift, articulating lift, duct lift, chain hoist, etc.), raise the SA fan to the support tube as previously installed. It is recommended to support the fan from the bottom of the box as it is packaged when possible, or by a lifting strap(s) around the top of the Yoke (Part # 23189200016, Page 18).

**ATTENTION:** *Do not lift the fan by the Top Gear (#23189200017, Page 18).*

10. Feed the power cable from the axle through the support tube and out through the threaded hole ½" FPT (20mm) in the support tube. Line up the support tube and axle so that support tube slides inside of the axle. Line up the bolt holes in the axle with the bolt holes in the support tube so that the eye-bolt passes all the way through and secure it with the locknut and eye-nut included in the Safety Cable Kit (SCK). When inserting the eye-bolt take care not to damage any conductor wires inside the tube. Use a small screw driver or punch to hold over the wires on one side while passing the support bolt through on the other side. Tighten the locknut and eye-nut on the eye-bolt.

11. Install a (owner furnished) junction box outside the support tube to connect the equipment wires to the building power wires.

**ATTENTION:** *Each SonicAire fan must be protected by a Local Disconnect Switch or another individual circuit protection device. Failure to use individual circuit protection for each fan will void the manufacturer's warranty.*

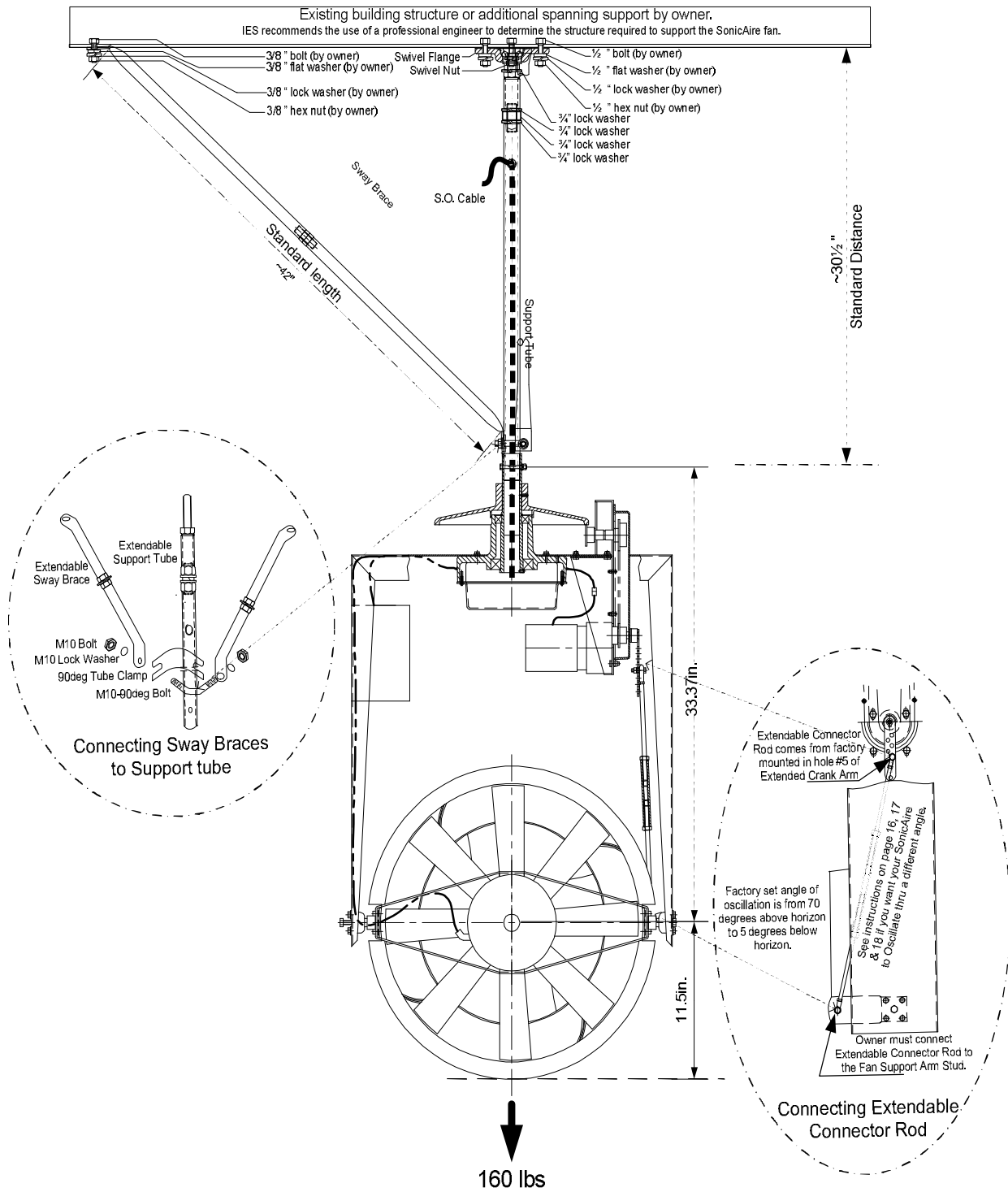
**CAUTION:** *All electrical wiring (by the owner) must be designed and installed in accordance with local and national codes (such as NEC and IBC).*



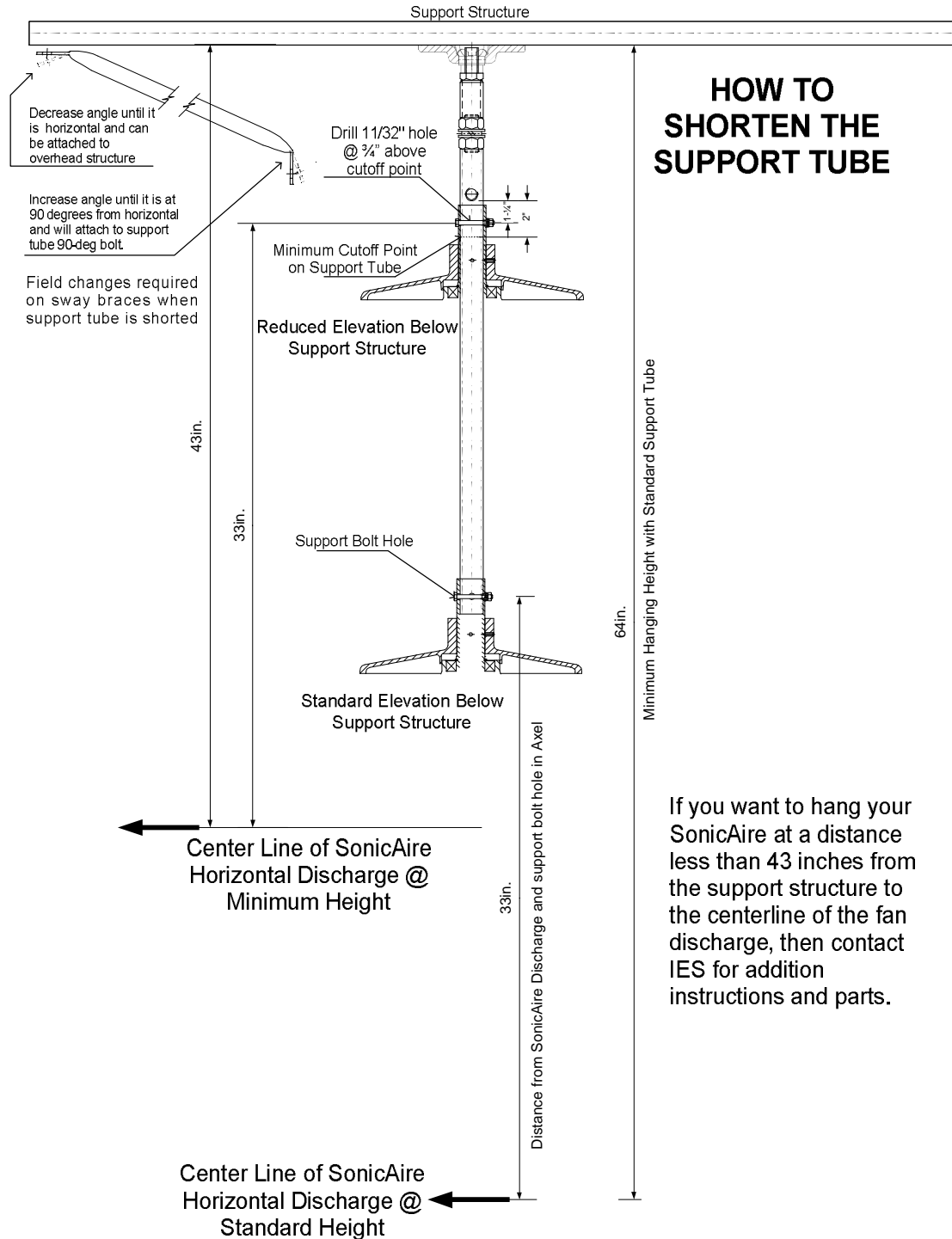
12. Turn ON the power to each SA fan (one at a time) and check for proper rotation of the fan blades. If the air is not blowing out of the fan discharge, then change two of the electrical leads, at the local disconnect switch to change the direction of the fan rotation. Allow the fan to go through one complete oscillation cycle and ensure the connecting rod is not too short or too long.
13. Your SonicAire fan is now ready for operation.



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TYPICAL INSTALLATION DRAWING FRONT VIEW





## **CHANGING THE OSCILLATION ANGLE OF THE SONICAIRE FAN**

When changing the oscillation angle in the field, care must be taken not to adjust the connecting rod too long or too short for the particular setting on the crank arm. See Page 12 for the minimum and maximum connecting rod lengths (centerline to centerline distances) for each of the eight (8) crank arm positions. If the connecting rod is too long or too short it will cause the gearmotor to bind which will either burn out the motor or strip the gears. Warranty does not cover misadjusting the connecting rod.

First decide the maximum upper angle required and the maximum lower angle required which will provide the performance and cleaning desired. Because there are only eight (8) fixed radiuses in the crank arm, determine if the upper or lower angle is most critical.

Using the chart on Page 11, draw a straight line across the graph at the desired upper angle. The upper slanted lines for the same crank arm position show the length of rod required, in each of the eight crank arm positions, to achieve the desired upper angle. The drawn line may pass through several upper lines for the various positions on the crank arm. Next draw a line down from where it intersects the upper slanted line until it crosses through the lower slanted line of the same crank arm position. Next, draw a straight line back to the axis on the chart which gives the angle of the fan discharge. This angle will be the corresponding lower angle for the given connecting rod length in the given crank arm position. If the lower angle is not what is desired, then do the same for the other slanted lines which the upper desired angle of oscillation passes through. Select the connecting rod length and crank arm position which gives the upper and lower angles closest to what is desired.

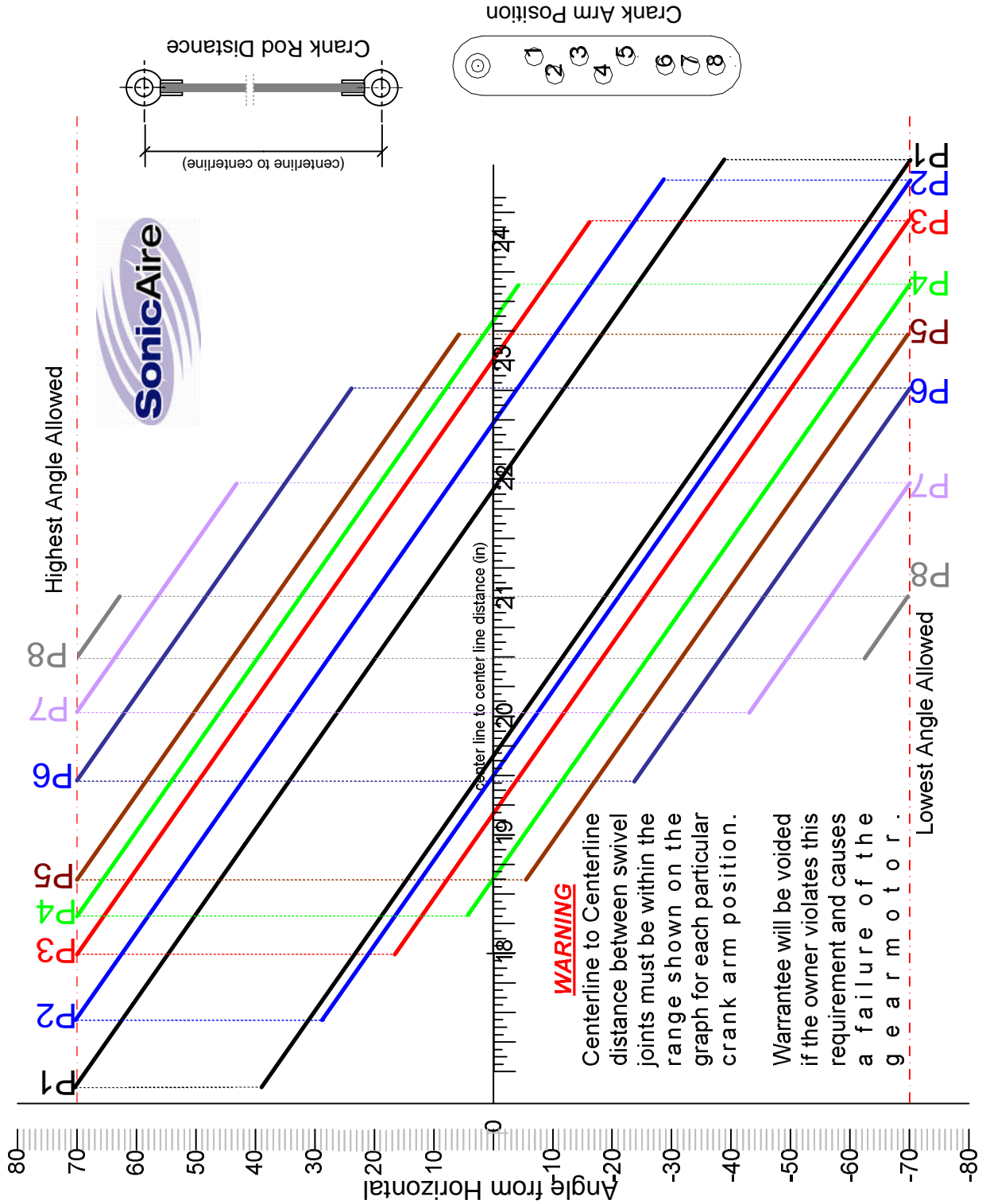
If the lower angle is more critical than the upper angle then start by drawing a straight line across the graph showing all of the intersection points with the lower slanted lines at the desired lower angle. Next, draw a line up from each lower slanted line to the upper slanted line of the same crank arm position, this will show the corresponding upper angle for a given rod length and crank arm positions which gives the desired lower angle. Select the rod length and crank arm position which gives the upper and lower angles closest to what is desired.

**NOTE:** Contact IES for assistance if you are not certain about your selection or simply want a confirmation of your selection process.

When adjusting the centerline distance of the connecting rod, it should be removed from the fan support arm and the crank arm. Lay the rod with both self aligning swivel bearings on a flat surface. Adjust the connect rod length until the centerline to centerline distance between the two bearings is at the desired length. Secure the rod length with the two jam nuts on the rod. Do not change the distance the connecting rod is screwed inside each swivel bearing.

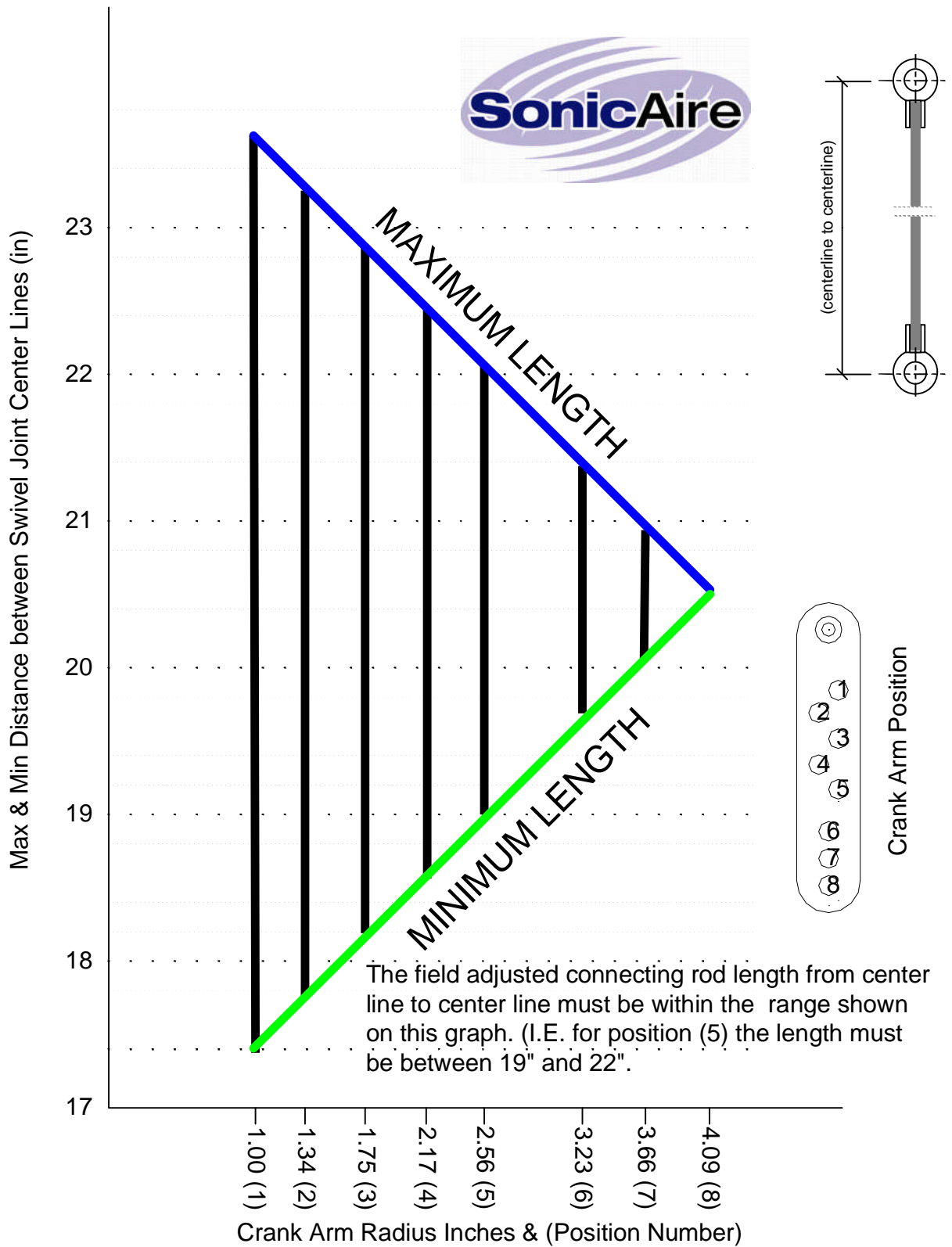


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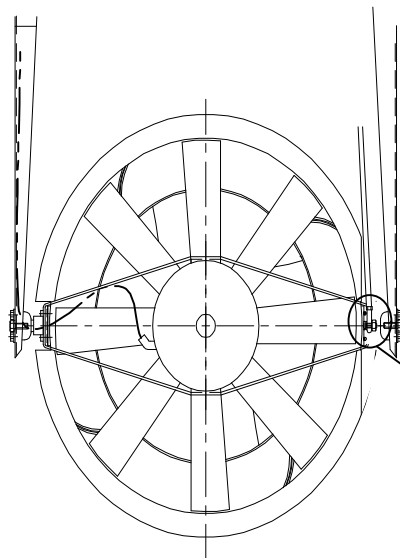
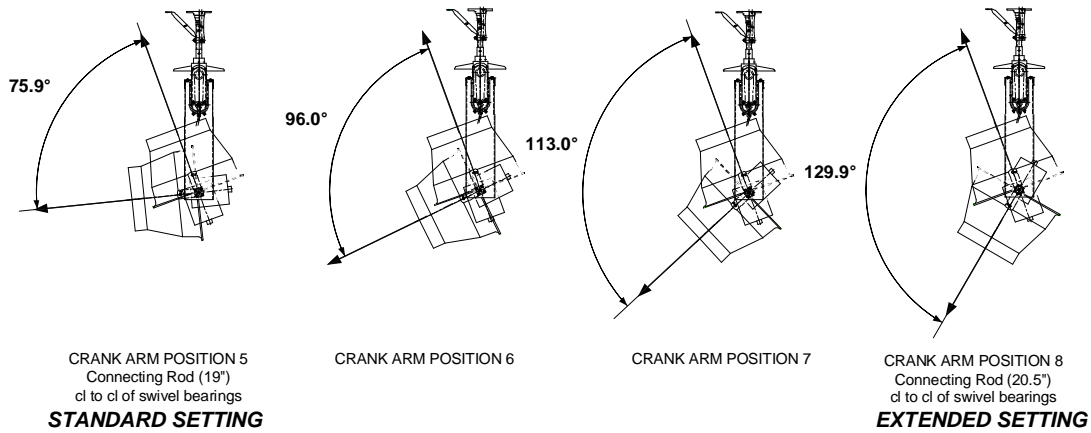
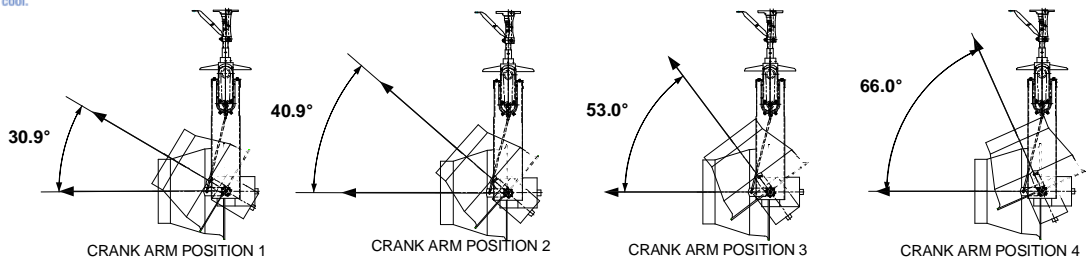


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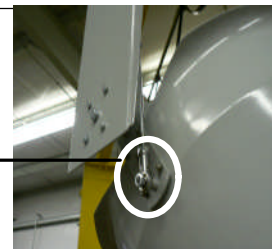




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- When attaching connector rod swivel to fan support arm:
1. Slip two flat washers on stud to space connecting rod away from acorn nuts on fan housing.
  2. Slip the rod end swivel bearing on the bolt stud.
  3. Tighten 8mm lock nut fully against bearing.



**FASTENING ADJUSTABLE CONNECTION ROD TO FAN SUPPORT ARM**

**WARNING:** failure to properly tighten locknut onto the fan support arm stud bolt may result in the connector rod dropping into the fan blades and damaging the fan hub assembly!



**OPERATING INSTRUCTIONS**

The SonicAire is designed such that it can operate on a full time basis. The fan motor bearings are rated for 40,000 hour L-10 life.

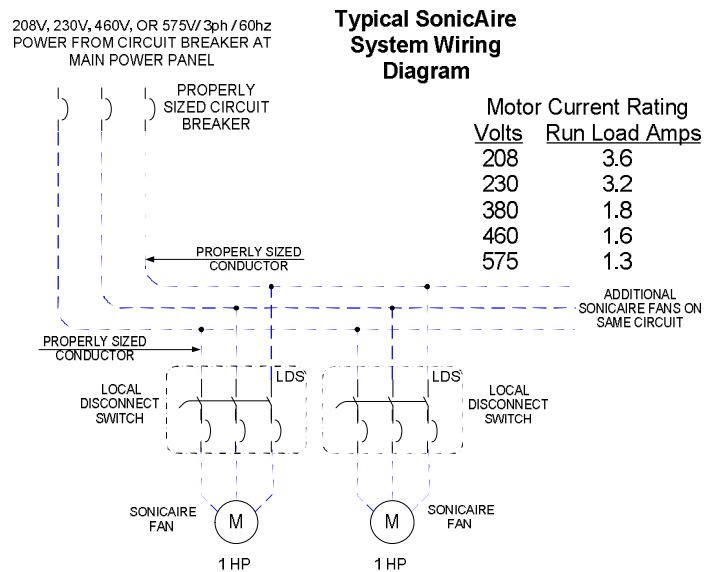
The SonicAire is designed to rotate continuously through a full 360 degree circle. At the same time the fan is rotating it will oscillate the fan discharge through the chosen angle (as determined by connecting rod length and crank arm hole location). Since the oscillation of the fan discharge and the rotation of the fan are not synchronized, the SA fan is directing air at a different angle each time it passes through a complete 360 degrees of rotation (approximately every 15 minutes). This design assures that all of the overhead structures (and plant equipment if desired) are thoroughly cleaned.

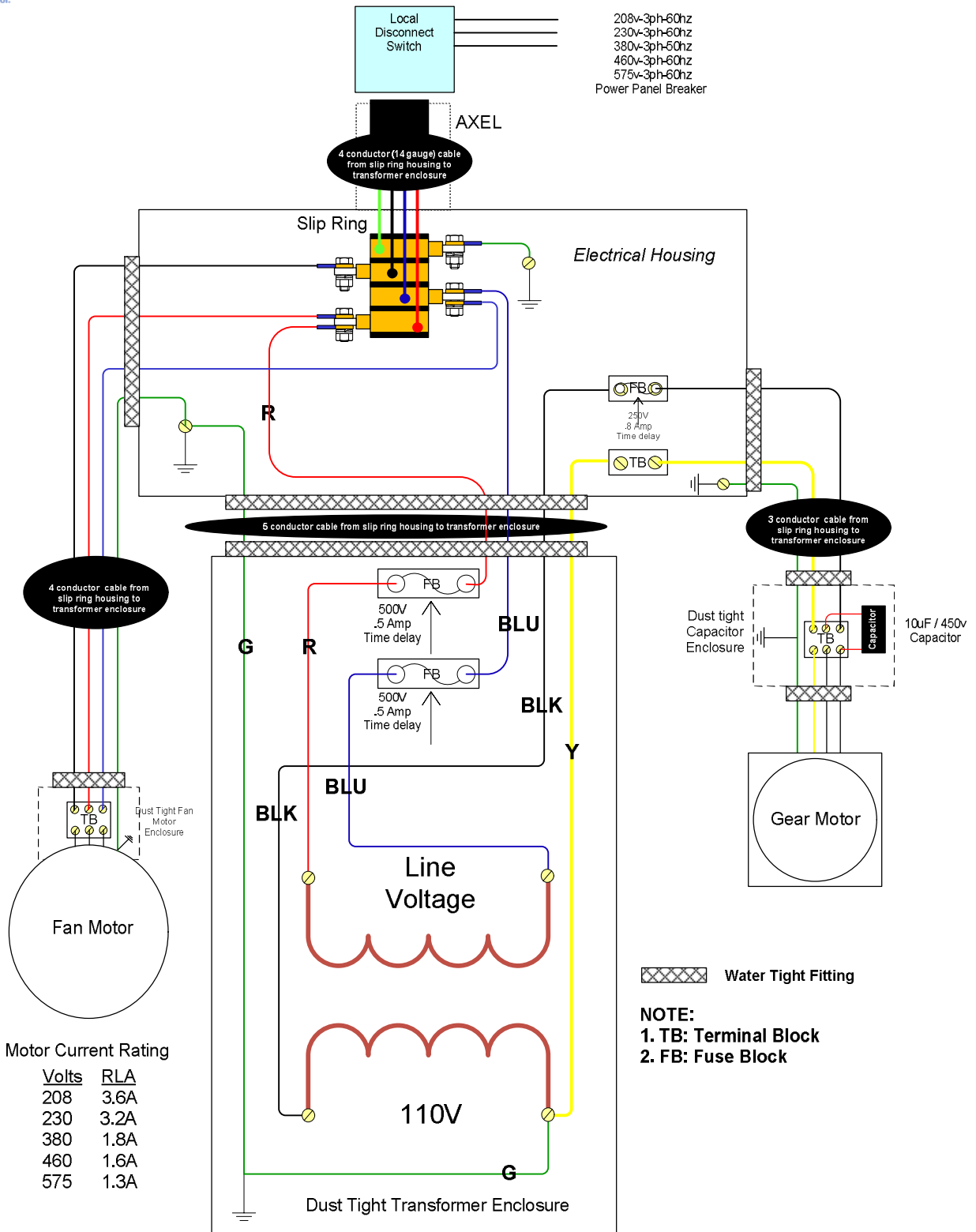
The SA fan may be set to operate through various angles of oscillation by varying the connecting rod length and using the various holes (positions 1 thru 8) in the extended crank arm. See Page 10 for setting up the angles of oscillation.

**ELECTRICAL**

**CAUTION:** All owner furnished electrical service and components must meet the requirements of the local and national electric codes. All SonicAire fans must have individual circuit protection provided by the included Local Disconnect Switch. The Local Disconnect Switch is a manual motor starter with circuit and overload protection inside a dust-tight enclosure.

The SonicAire fan motor is a three phase .75kw/1 hp motor. The motor operates at 1725 rpm at 60 Hz. The indexing gearmotor is 110 volt and runs at 1 RPM (at 60 Hz), is self-lubricating and rated at 40W. A transformer reduces the primary voltage (208V, 230V, 460V, or 575V) down to (110v). Power is transmitted to the fan motor and gearmotor through a 30 amp slip ring mounted in the housing assembly.







## **MAINTENANCE**

The fan rotation, oscillation, and rod end bearings are self lubricated and require no additional lubrication.

Check all electrical connections for proper tightness once per year. It is recommended to use an infrared thermometer to determine if any electrical components are operating at an abnormally high temperature.

It is recommended that every three to six months the SA fans be visually inspected and blown off with compressed air as required. At this time, also verify that all fasteners (bolts, nuts, etc.) are tight, and inspect the gear motor for any oil leakage. Tighten all bolts, nuts and screws as required. If anything is determined to be abnormal or questionable, contact IES immediately for assistance.

## **PARTS FOR SONICAIRE FANS**

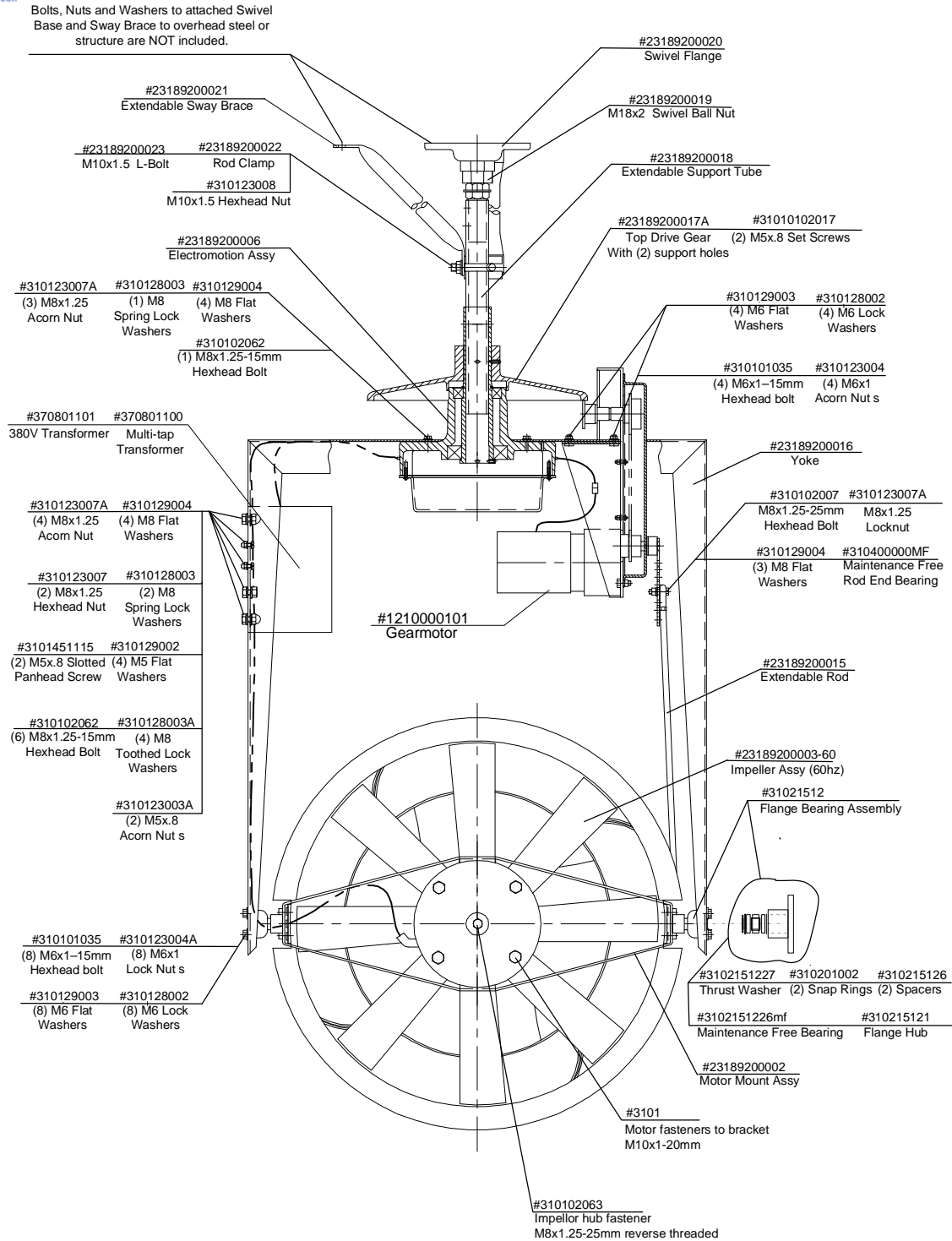
The SonicAire is an extremely reliable and durable piece of equipment. It should run for many years without any requirement for replacement parts. However should a replacement part be needed, 4 illustrations are provided which identify the key parts and part numbers. If there are any questions about troubleshooting or repairing your SonicAire, please contact IES.

The SonicAire comes with a 1 year parts only warranty. The warranty begins one month after the unit is shipped to the customer. This should give sufficient time for transportation and installation. Any misapplication, abuse or improper installation by the owner or subcontractor will void the warranty.

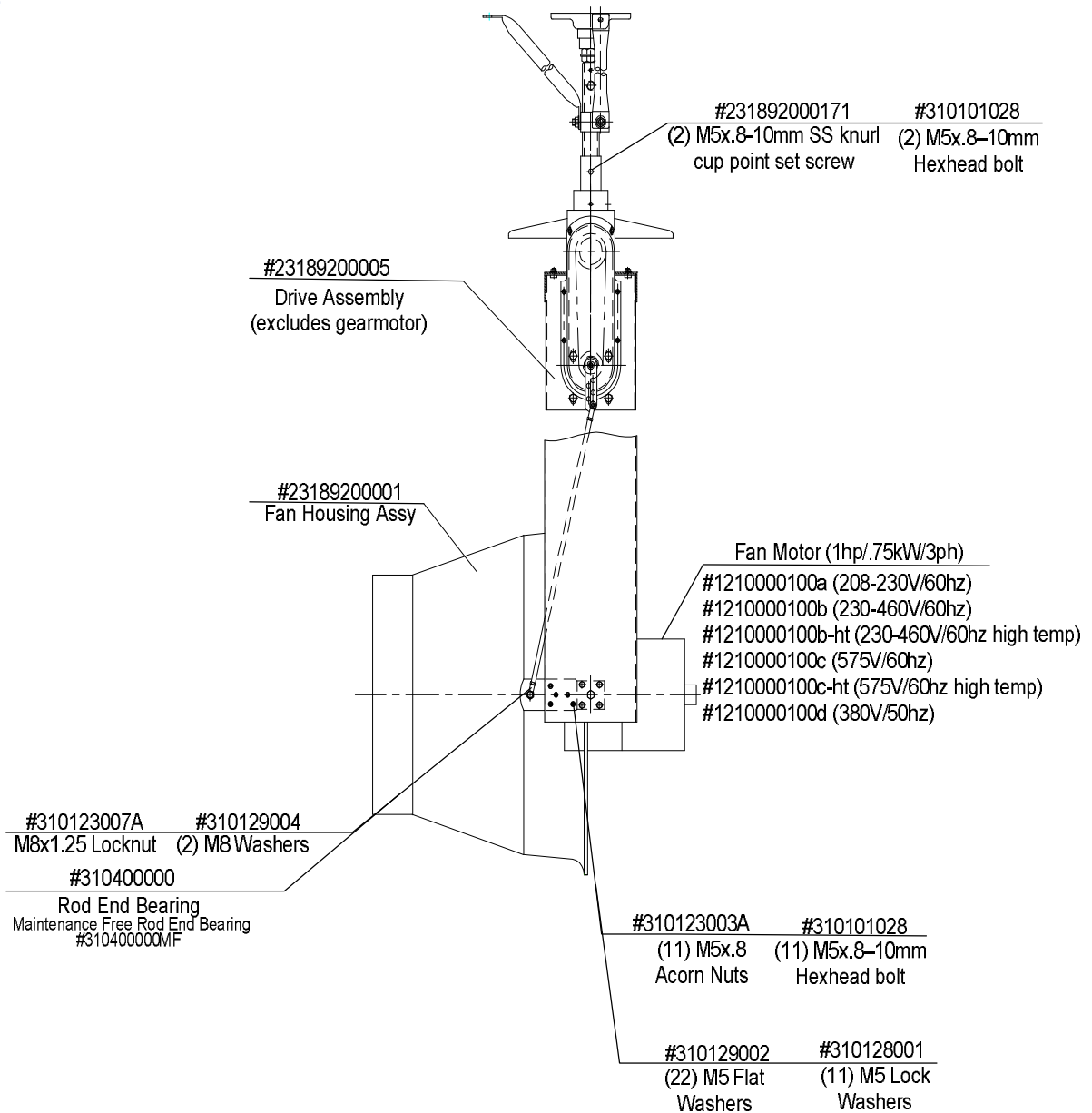
**WARNING:** *If changes are made to the angle of oscillation on the SonicAire the directions in the owner's manual must be precisely followed (Page 10). A connecting rod length which is too long or too short for a particular setting on the crank arm will bend the connecting rod or cause the gearmotor to fail. Such failure is not covered by the warranty.*



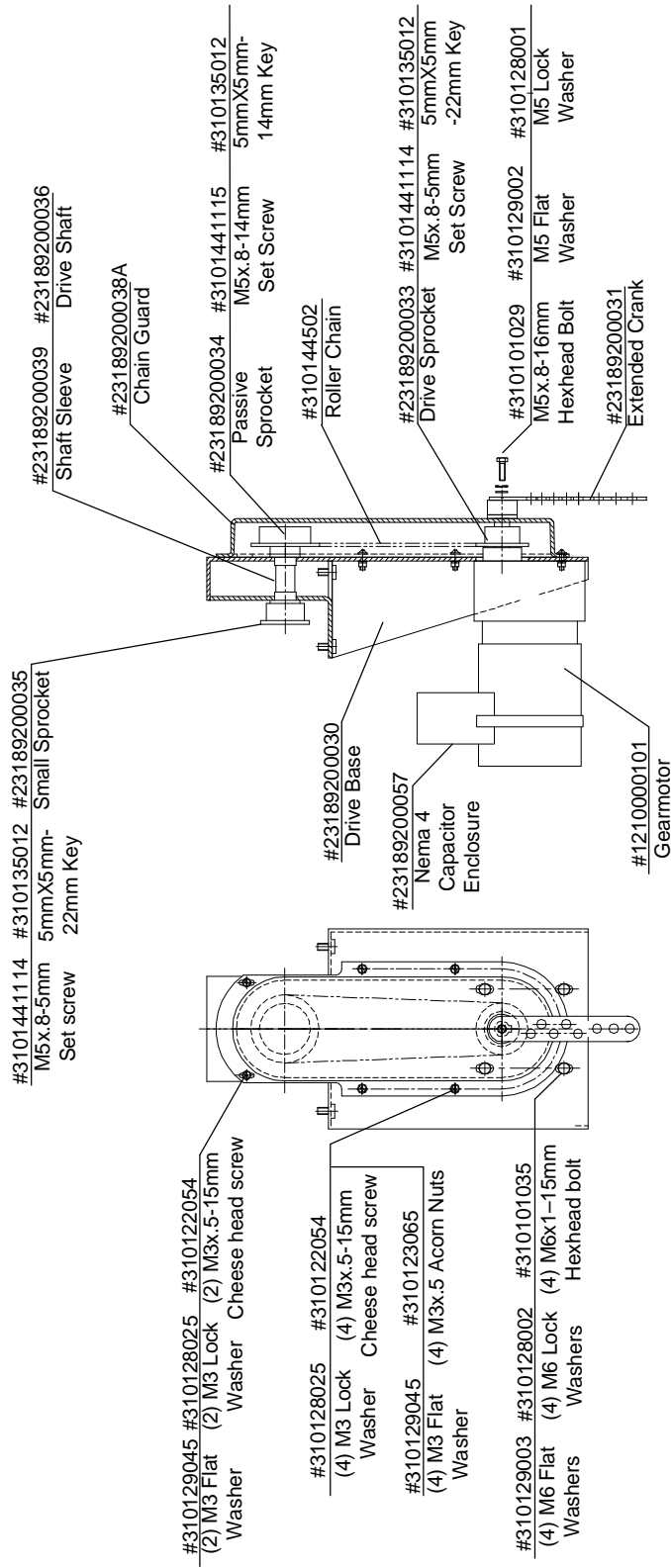
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TOTAL ASSEMBLY



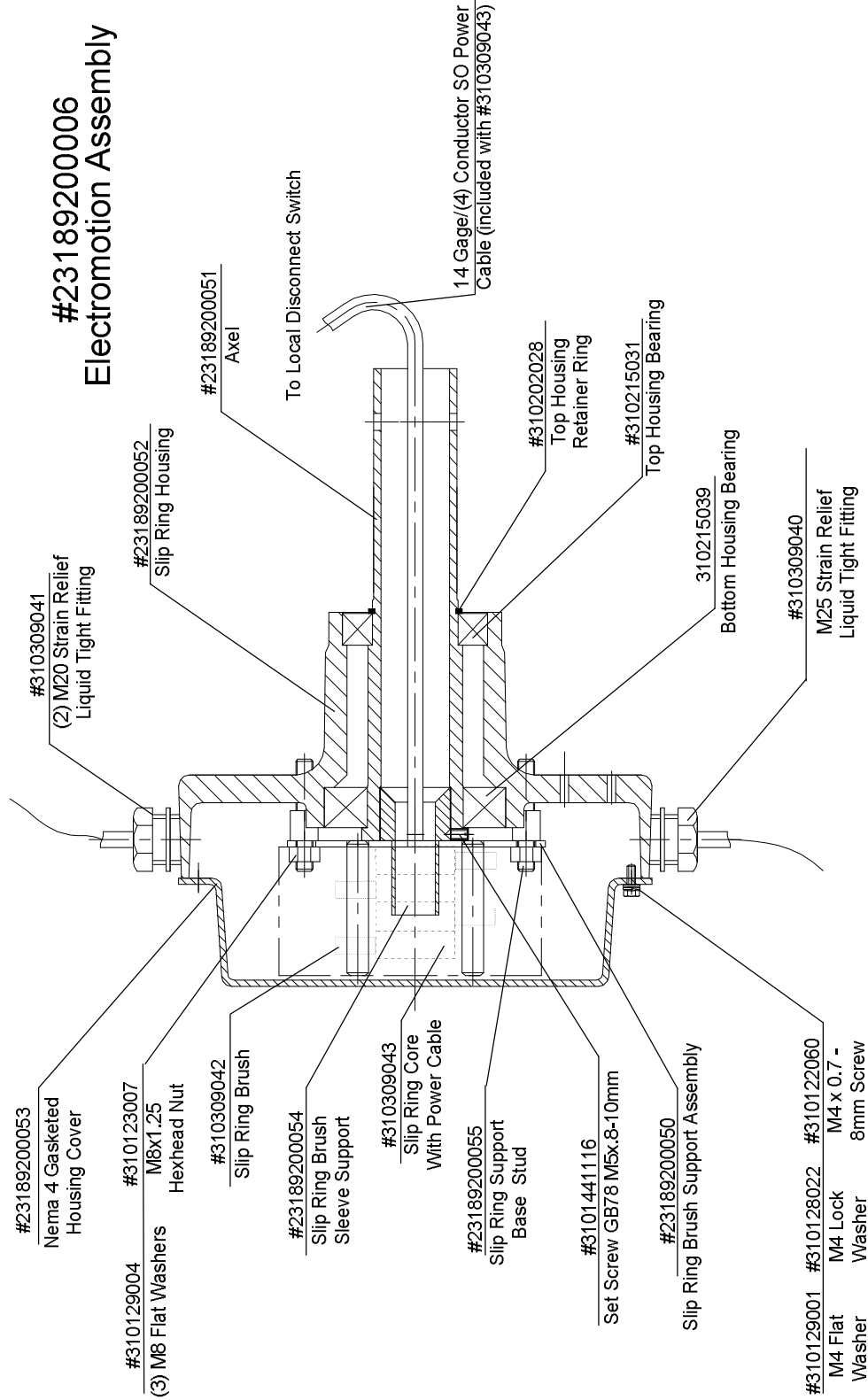
TOTAL ASSEMBLY SIDE VIEW



**DRIVE ASSEMBLY**  
**#23189200005**



# #23189200006 Electromotion Assembly





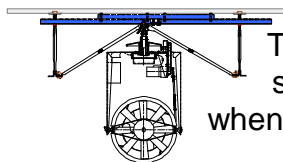
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**OPTIONS**



**UNIVERSAL MOUNTING PLATFORM 'UMP'**

The UMP-L simplifies the installation of the SonicAire when overhead flanged support (roof) steel is going to be used for hanging the fan. The UMP mechanically clamps to the beam flanges with (2) special beam clamps.



**BAR JOIST SPANNING SUPPORT 'BJS'**

The BJS allows an owner to mount the SonicAire fan from the top of the roof support bar joists. This may be required in either a low ceiling application or when you want to mount the fan above a bridge crane or other piece of equipment.



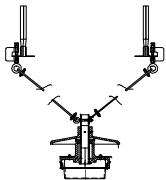
**INCLINED BEAM MOUNT 'IBM'**

The IBM allows for fan installation on inclined flanged surfaces, such as A-frame roof trusses and other support beams.



**LOCAL DISCONNECT SWITCH 'LDS':**

The LDS is a very compact Manual Motor Starter with circuit overload protection for each SonicAire. The MMS is mounted in a NEMA enclosure with an E-Stop button. The LDS meets the NEC and other local disconnect code requirements.



**SAFETY CABLE KIT 'SCK'**

The SCK provides two cable attachments from the SonicAire axel to the overhead structure. In the event that fastener becomes loose from the overhead structure, then the SCK cables would support the SonicAire fan in the ceiling.



**EMERGENCY FIRE CONTROL & VARIABLE SPEED CONTROL 'EFC-VSC'**

The EFC-VSC control enables an owner to reduce the SonicAire fan speed such that it can be used for general ventilation during the work day. Then during the unoccupied period at night the speed can be increased to 100% for the cleaning of the plant and equipment. All fans are turned OFF when there is a fire alarm or the local E-Stop is pressed in.



**FAN GUARD KIT 'FGK'**

The FGK provides protection on both the inlet and outlet side of the fan. Whenever the fan discharge is less than 8 ft. above the floor, then a fan guard kit is required by OSHA.



**REVERSE CONTROL KIT 'RCK'**

The RCK enables the fan rotation to be limited to less than 360 degrees. The rotation angle can be adjusted from 30 degrees to 330 degrees.



INTEGRATED ENVIRONMENTAL SOLUTIONS

Clean look and feel™

# Installation, Operation and Maintenance Manual



INTEGRATED ENVIRONMENTAL SOLUTIONS



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Changes in the design, materials and specifications may be made without notice to customers.