LIGHTNIN

MODELS EV1P25 thru EV1P75 MANUAL

INSTRUCTIONS

INSTALLATION

OPERATION

MAINTENANCE

Book No. 1563

LIGHTNIN

INSTRUCTION MANUAL
MODELS EV1P25 thru EV1P75
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IT-5203

6-27-03

SAFETY CHECK LIST

IMPORTANT

All *LIGHTNIN* Mixers and Aerators are provided with properly designed lifting devices and safety covers to avoid potential injury and/or equipment damage. The following SAFETY CHECK LIST should be THOROUGHLY REVIEWED AND ADHERED TO before operating or performing maintenance on the mixer. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY.

1. Use only the lifting device provided on your unit to install the mixer. Use shouldered eyebolts and tighten securely to handle component parts. We strongly recommend that the hoist rings be of safety swivel type with 360° rotational capability.

2. DO NOT connect the motor to the power source until all components are assembled, the mixer is installed, and all hardware is tightened to the proper torque which is specified in the operation and maintenance manuals supplied by *LIGHTNIN*.

3. DO NOT operate shaft sealing devices at temperatures or pressures higher than those specified in the manual or on the nameplates.

4. DO NOT service the mixer until you have followed your ”Control of Hazardous Energy Sources” (lockout, tagout procedure) as required by OSHA 29 CFR Part 1910.

5. DO NOT touch rotating mixer parts.

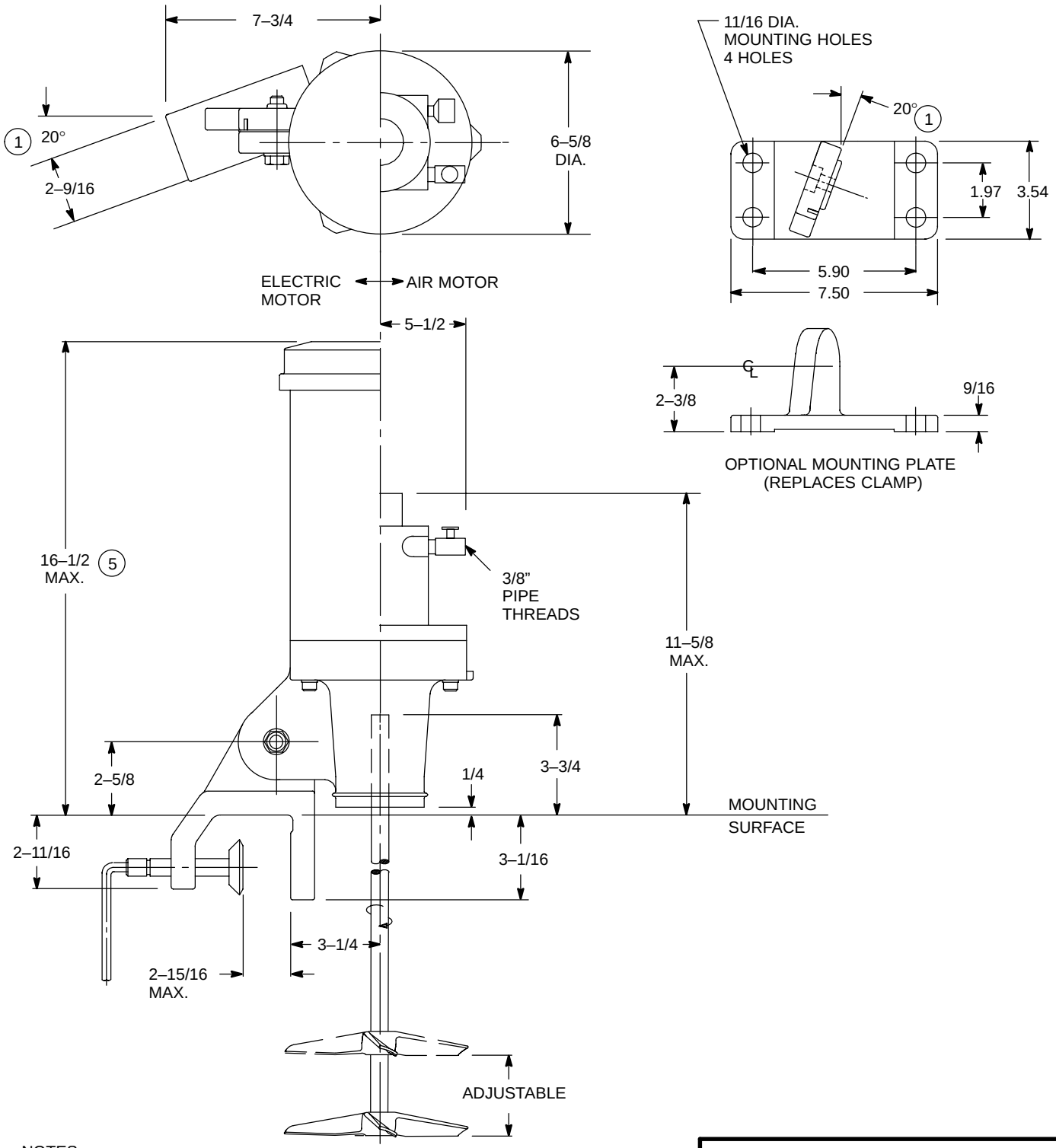
6. DO NOT operate mixer for service other than its intended use.

7. DO NOT make any field changes or modifications (horsepower, output speed, shaft lengths, impellers, etc.) without reviewing the changes with your *LIGHTNIN* Sales Representative or the *LIGHTNIN* Customer Service Department.

8. DO NOT install an aftermarket Variable Frequency Drive without first consulting your *LIGHTNIN* Sales Representative or the *LIGHTNIN* Customer Service Department to determine the compatibility of the existing motor with the Variable Frequency Drive.

9. DO NOT operate mixer until you have checked the following items:
   - A. Make sure the mixer is properly grounded.
   - B. Ensure all protective guards and covers are installed.
   - C. Ensure all detachable components are securely coupled to the mixer.
   - D. Thoroughly REVIEW and ADHERE TO the mixer operating instructions supplied by *LIGHTNIN*.
   - E. Ensure the mixer output shaft rotates freely by hand.
   - F. Ensure all personnel and equipment are clear of rotating parts.
   - G. Ensure all external connections (electrical, hydraulic, pneumatic, etc.) have been completed in accordance with all applicable codes and regulations.

10. DO NOT enter the mixing vessel UNLESS:
    - A. The mixer power supply is locked out (follow Item number 4).
    - B. The mixer shaft is firmly attached to the mixer drive or the shaft is supported securely from below.
    - C. You have followed applicable confined space regulations.



NOTES:

1. UNIT OFFSET 20° HORIZONTALLY AND ADJUSTABLE 10° (OR MORE) VERTICALLY. UNIT ALSO AVAILABLE WITH 0° OFFSET.
2. WEIGHT (LESS SHAFT AND IMPELLERS):
   DIRECT DRIVE WITH ELECTRIC MOTOR : 44 LBS MAX.
   DIRECT DRIVE WITH AIR MOTOR: 29 LBS MAX.
3. DIMENSIONS ARE FOR REFERENCE ONLY UNLESS CERTIFIED.
4. ALL DIMENSIONS IN INCHES.
5. ADD APPROX. 2–1/4" TO HEIGHT WHEN USING 1/4 HP VARIABLE SPEED MOTOR 123998PSP.

LIGHTNIN ®
MIXERS AND AERATORS

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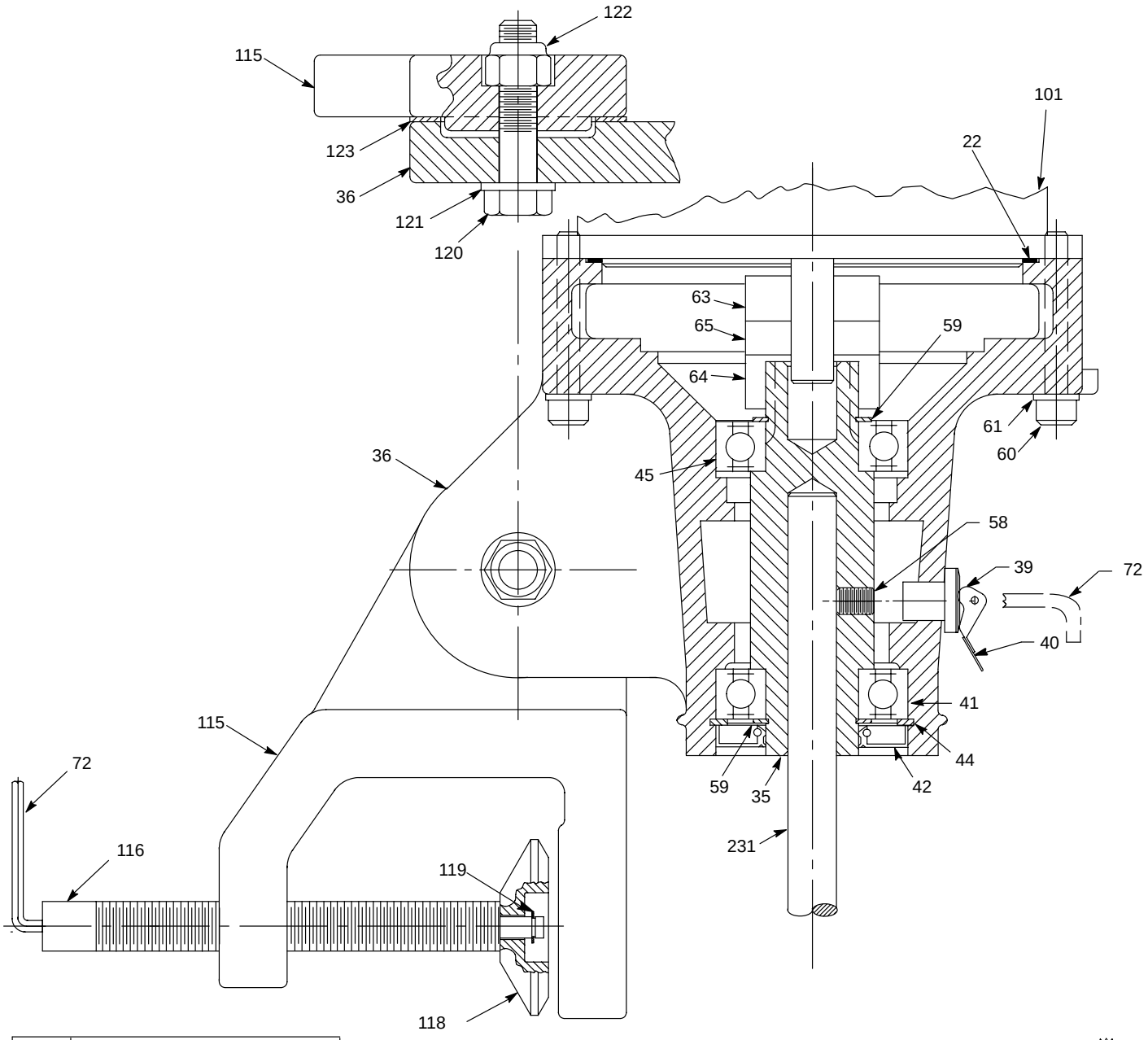
DIMENSION DRAWING

EV "P" SERIES MIXER
DIRECT DRIVE
AIR OR ELECTRIC MOTOR

Certified By _____ Date _____ DRAWING NO. DS–P–70B



ITEM	PART NAME	ITEM	PART NAME
231	MIXER SHAFT		
123	ROTATIONAL INSERT	61	FLAT WASHER (4)
122	HEX LOCKNUT	60	SOCKET HEAD CAP SCREW (4)
121	FLAT WASHER	59	RETAINING RING
120	HEX HEAD CAP SCREW	58	HEX SOCKET SET SCREW – NYLOK
119	RETAINING RING	45	BALL BEARING
118	CUP WASHER	44	RETAINING RING
116	CLAMP SCREW	42	OIL SEAL
115	TANK CLAMP	41	BALL BEARING
101	MOTOR	40	LANYARD
72	HEX WRENCH	39	EXPANSION PLUG
65	MOTOR COUPLING INSERT	36	HOUSING
64	MOTOR COUPLING HALF	35	DRIVE QUILL
63	MOTOR COUPLING HALF	22	GASKET

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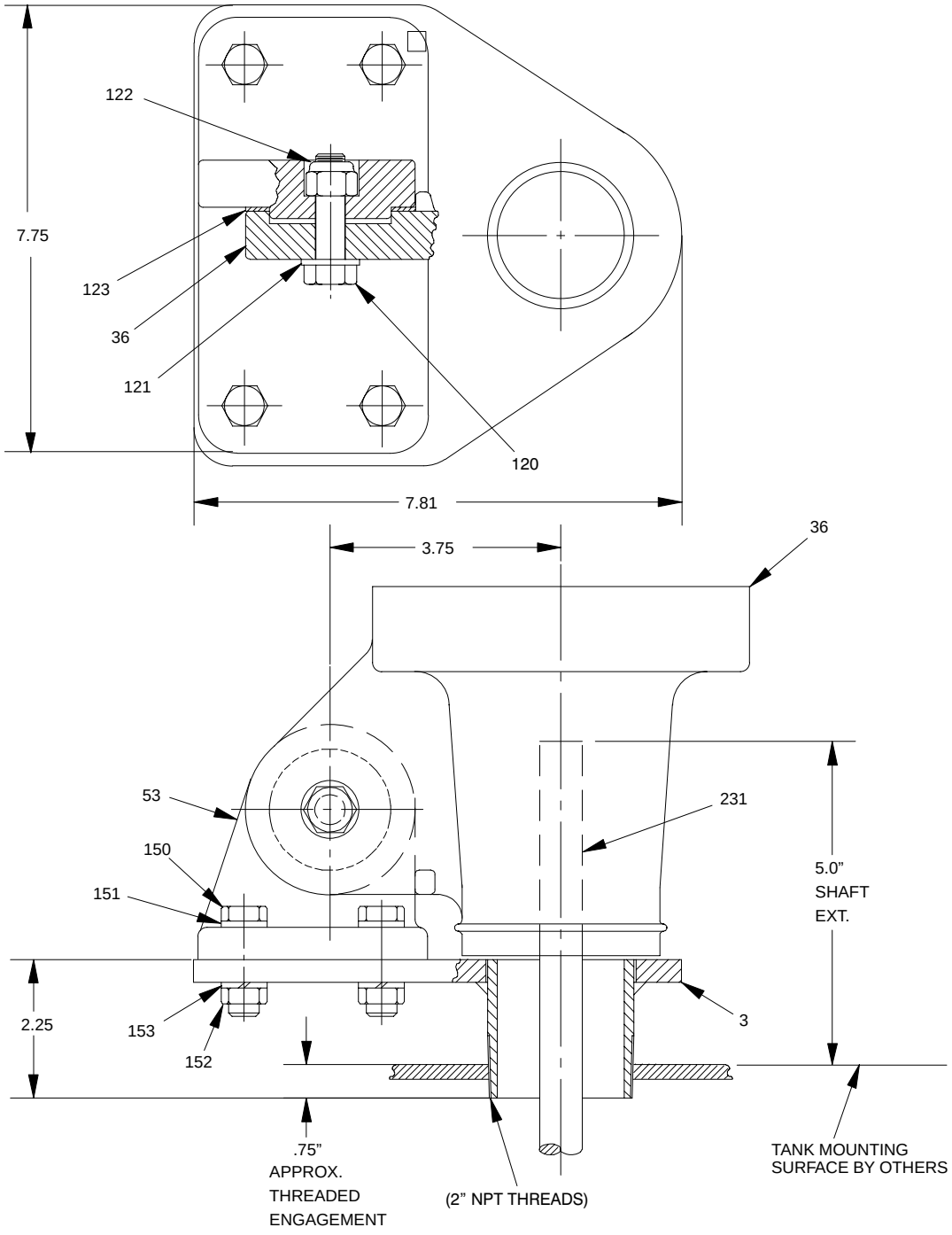
LIGHTNIN ®
MIXERS AND AERATORS

ASSEMBLY DRAWING

EV "P" SERIES MIXER DIRECT DRIVE BEARING HOUSING ASSEMBLY

DRAWING NO. L–17094B



ITEM	PART NAME
231	MIXER SHAFT
153	LOCKWASHER
152	HEX NUT
151	PLAIN WASHER
150	HX HD CAP SCREW
123	INSERT
122	LOCK NUT
121	PLAIN WASHER
120	HX HD CAP SCREW
53	MOUNTING PLATE
36	HOUSING
3	BUNG ADAPTER

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ALL DIMENSIONS IN INCHES.

LIGHTNIN

MIXERS AND AERATORS
DIMENSION DRAWING

"EV" SERIES MIXER BUNG ADAPTER

Certified By _____ Date _____

DRAWING NO. DS–P–72A

GENERAL INSTRUCTIONS
”EV” SERIES MIXERS
DIRECT DRIVE

SECTION 1 – INITIAL INSPECTION, SHIPPING ARRANGEMENTS

1. 1 Check the shipping crates and your ***LIGHTNIN*** equipment for possible shipping damage. Report any damage immediately to the carrier and our factory.

1. 2 The mixer and impellers are packed together. The mixer shaft, if over 48 inches long, is packed in a separate container.

1. 3 Do not remove any protective coatings or wrappings until the mixer is ready to be put into service. If the mixer is to be stored, store only in an indoor, clean, dry location with controlled temperatures of 15° C to 40° C (59° F to 104° F).

SECTION 2 – MIXER INSTALLATION

2. 1 Refer to Installation drawing for:

a. Proper mixer mounting and location.

b. Proper minimum impeller off–bottom and relative spacing for dual impeller applications.

2. 2 Lock–out power before positioning mixer, and review safety instructions before starting mixer.

2. 3 The clamp and beamplate are cast offset at recommended 20° horizontal plane and adjustable 0–10° in the vertical plane. Clamp and beamplate are also available with zero degree offset in the horizontal plane and adjustable 0–10° in the vertical plane. Refer to Table 1 for recommended angular positions.

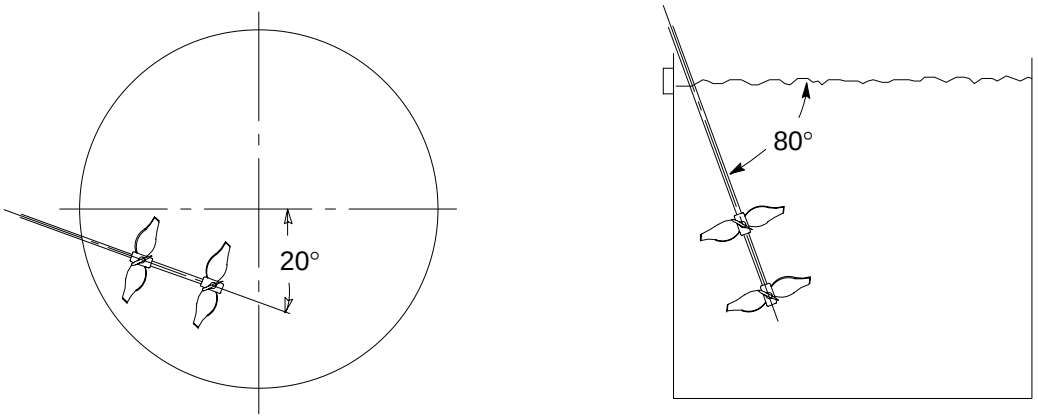


Table 1 – Mixer positioning

2. 4 BOLT TIGHTENING TORQUE RECOMMENDATIONS

a. Inadequately or improperly tightened hardware can loosen due to vibration or the reactions imposed by fluid forces. This can result in reduced equipment service life or damage and failure.

b. Recommended torques for tightening the bolts and screws on your ***LIGHTNIN*** mixer are listed with assembly instructions. Use of a torque wrench is recommended to ensure compliance with torque recommendations.

c. The amount of torque required to maintain a tight connection can vary considerable for bolts of the same size under different operating conditions. Variations such as basic joint design, compression factors, type and strength of base and hardware material, surface finish of mating parts and lubrication are only some of the factors that influence the tightness of bolted connections for given torque values.

d. All bolts should be coated with oil, grease, or an anti–seize compound whenever possible. The threads and bearing face of bolt heads and/or nuts should be lubricated.

e. **ALL BOLTS SHOULD BE RETIGHTENED AFTER THE UNIT HAS BEEN RUN UNDER LOAD FOR TWO (2) WEEKS, AND AT EACH SCHEDULED SHUT–DOWN THEREAFTER.**

f. Unless otherwise specified, it is recommended that metric commercial standard class 8.8 bolts and screws, and class 8 nuts be used for all bolted connections. For inch hardware use GR5.

SECTION 3 – SHAFT AND IMPELLER INSTALLATION

3. 1 Install the impeller(s) on the mixer shaft (231) by tightening the set screws in the impeller hub. Refer to the installation drawing for recommended dual impeller spacing if two impellers are supplied. Refer to Impeller Assembly drawing for general impeller orientation.

3. 2 Clean the mixer shaft (231) end and drive quill (51) thoroughly.

3. 3 Orient the drive quill so that the set screw (58) aligns with the hole in the bearing housing (36). Align quill shaft by inserting lower shaft (231) into quill and rotate quill manually.

3. 4 Grasp mixer shaft approximately 20 inches below the shaft top and insert the mixer shaft completely into the drive quill, until it contacts the top of the quill bore. Align flat on shaft with set screw (58). Tighten set screw (58).

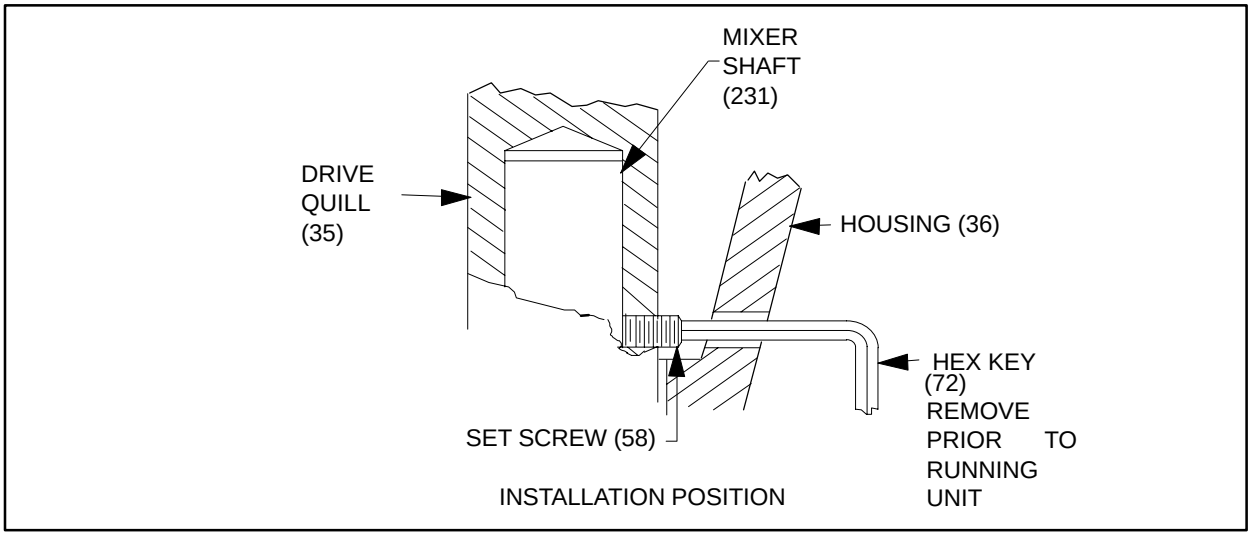


Figure 1 – Shaft Installation

3. 5 DRIVE QUILL ORIENTATION

a. NORMAL LIGHT CONDITIONS – Rotate the drive quill until the set screw (58) aligns with the access hole in the housing (36). Rotate drive quill by inserting lower shaft into drive quill and rotating by hand.

b. LOW LIGHT CONDITIONS – If the mixer shaft is being installed in low light conditions, the drive quill can be oriented by feel. Insert lower shaft into drive quill and rotate the drive quill (35) by hand until the set screw (58) can be felt with the hex wrench through the access opening.

3. 6 With the drive quill oriented, insert the 7/32" hex key (72) provided into the housing opening and tighten the set screw (58) to (15–30 ft–lbs). **DO NOT IMPACT THE WRENCH OR USE AN EXTENSION.**

3. 7 Check for free movement of all components by rotating the mixer shaft.

SECTION 4 – SHAFT REMOVAL

CAUTION: THE UPPER PORTION OF THE MIXER SHAFT (231) MAY BE HOT TO THE TOUCH. ONCE REMOVED FROM THE DRIVE QUILL (35), DO NOT GRASP THE UPPER 20" OF THE MIXER SHAFT.

It is recommended that the mixer be removed from the tank before shaft or shaft and impeller are removed.

a. Make sure all electrical power is disconnected.

b. Grasp impeller by hand (or shaft with a strap wrench) and rotate mixer shaft (231) until the drive quill set screw (58) aligns with the access hole in the housing (36). See Caution above.

c. With hex key (72) loosen set screw (58) and back out two (2) turns. See Figure 2.

d. Remove mixer shaft from quill. See Caution above.

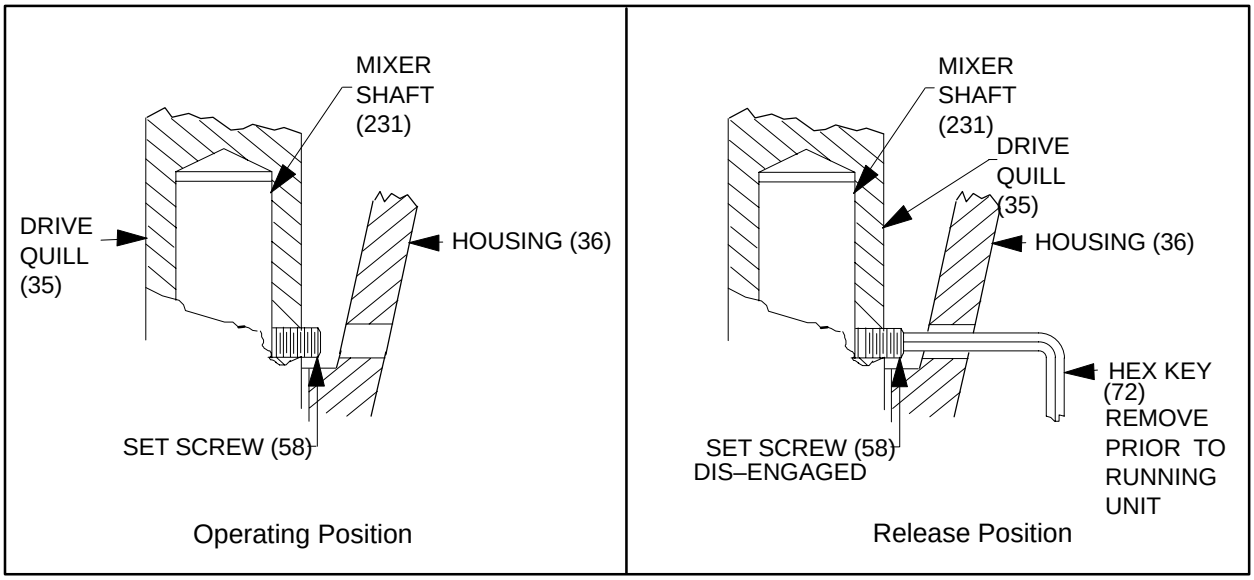


Figure 2 – Shaft Removal

SECTION 5 – MIXER OPERATION

5. 1 This ***LIGHTNIN*** mixer is designed for continuous operation and normally needs no additional maintenance.

CAUTION: IT IS NOT RECOMMENDED TO OPERATE THE MIXER WITH EXTREME VORTEXING OR SURGING OF THE LIQUID BEING MIXED.

5. 2 At the end of two weeks service, check all hardware for tightness.

WARNING: AT THE END OF THE MIXING CYCLE, IT IS GOOD PRACTICE TO TURN OFF THE MIXER BEFORE THE TANK HAS BEEN DRAINED TO A LEVEL WHICH WILL RESULT IN EXCESSIVE SPLASHING. THIS MAY RESULT IN SHAFT DAMAGE.

SECTION 6 – LUBRICATION

All mixer bearings are the sealed type and are pre–packed with lubricant. Relubrication of these bearings is not necessary.

SECTION 7 – DISASSEMBLY INSTRUCTIONS

WARNING: DISCONNECT MOTOR LEADS OR OTHERWISE LOCK–OUT POWER SUPPLY BEFORE SERVICING THE MIXER. EYE PROTECTION MUST BE WORN.

7. 1 This mixer is precision manufactured and assembled to provide long trouble free service when properly maintained. If it becomes necessary to disassemble the unit, careful precise reassembly is necessary.

7. 2 Refer to the assembly drawings for location of parts.

7. 3 Equipment that will be required to service the mixer, in addition to standard mechanics tools is, a rubber mallet, retaining ring pliers, metric and ”inch” allen wrenches, arbor press and torque wrench.

7. 4 When disassembling the mixer, clean external surfaces adjacent to prevent dirt from entering the housings.

7. 5 It is recommended that oil seals and gaskets be replaced when the mixer is disassembled.

7. 6 SEAL REPLACEMENT

Inspect oil seals and gaskets for nicks, gouges and deformities. When replacing seals:

a. Coat the lips of seals with bearing grease.

b. Install oil seal with lip facing up as shown in Figure 3.

c. Coat the section of shaft sealing surface with oil.

7. 7 BEARING REPLACEMENT

a. Old bearings can be removed with a puller or an arbor press.

b. New bearings can be pressed on the shafts. Be careful to apply load only to the inner race.

c. Make sure the bearings are tightly seated against the shaft or housing shoulders with no clearance.

7. 8 SHAFT REMOVAL

Loosen set screw (58) and remove mixer shaft (231) as outlined in Section 4.

7. 9 MOTOR REMOVAL

a. Remove the mixer from the tank and remove the mixer shaft (231) as outlined in Section 4.

b. Tip the mixer upside down on a workbench.

c. Remove the four socket head cap screws (60) holding the bearing housing (36) to the motor (101).

d. Lift the bearing housing off the motor. It may be necessary to tap the bearing housing GENTLY with a rubber mallet to get the bearing housing to separate from the motor.

e. Remove motor coupling half (63) and insert (65) from motor shaft.

7. 10 BEARING MODULE DISASSEMBLY

a. Remove the oil seal (42) from the drive quill (35). This oil seal will be damaged and a new oil seal must be installed when reassembled.

b. Remove retaining ring (44).

c. Remove upper retaining ring (59).

d. Place the bearing housing upright in a press, and press out the drive quill (35) and lower bearing (41).

e. Remove lower retaining ring (59) and bearing (41) from the drive quill (35).

f. Remove upper bearing (41) from housing (36).

g. Inspect bearing (41) for excessive wear. Replace if necessary.

SECTION 8 – ASSEMBLY INSTRUCTIONS

8. 1 QUILL ASSEMBLY

Insert the set screw (58) into the drive quill (35) until it is flush with the bore of the quill.

8. 2 BEARING MODULE ASSEMBLY

a. Press the lower bearing (41) onto the drive quill (35) bearing journal. The bearing must seat against the drive quill shaft shoulder with no visible gap.

b. Install the lower external retaining ring (59).

c. Press the drive quill assembly into the bearing housing (36) from the bottom until the bearing seats on the housing shoulder.

d. Install lower retaining ring (44).

e. Press oil seal (42) in place with the seal cavity facing as shown in Figure 3. Make sure the oil seal has the internal spring removed. This is a non–lubricated seal, and will run hot and have a shortened life if the spring is not removed.

f. Turn the bearing housing over, support the assembly on the quill shaft (35) and install the upper bearing (45) by pressing it into the bearing housing and onto the quill shaft.

g. Install the upper retaining ring (59).

h. Support the bearing housing assembly in an upright position and press the drive quill downward until the bearing (41) shoulders on the retaining ring (59). This will relieve any locked in axial load on the bearing created during assembly.

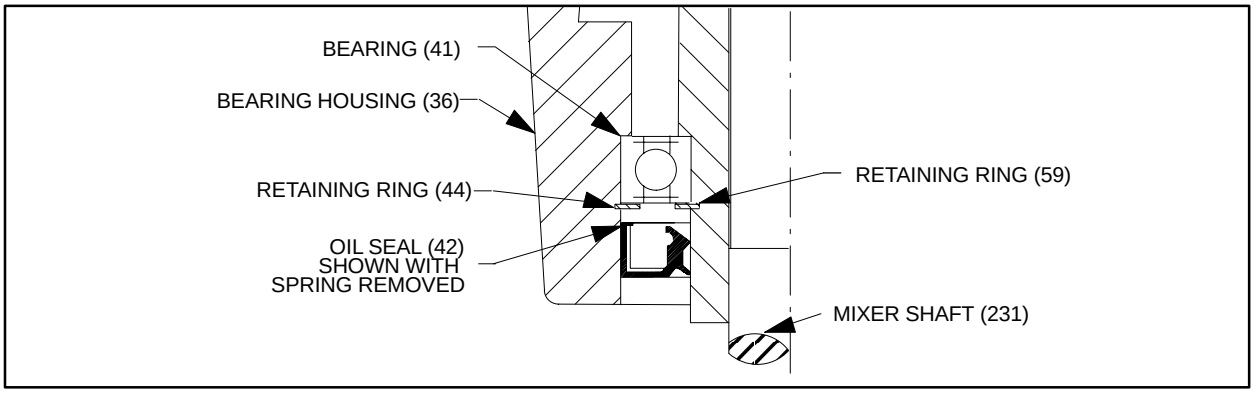


Figure 3– Oil Seal Installation

8. 3 FINAL ASSEMBLY (Refer to assembly drawing L–17094).

a. Install gasket (22) around the bearing housing (36).

b. Assemble mixer coupling hub (64) to the quill shaft (35), until it seats against the upper retaining ring (59). Tighten the mixer hub set screw to 5 ft–lbs. Install the insert (65) on the mixer hub.

c. With the motor upside down on a workbench, assemble the motor coupling hub (63) to the motor shaft as shown in Figure 4. Align motor coupling hub keyway 180° opposite motor output shaft keyway. Motor coupling hub set screw is tightened against motor output shaft (key is not used in the assembly). Tighten the motor hub set screw to 5 ft–lbs.

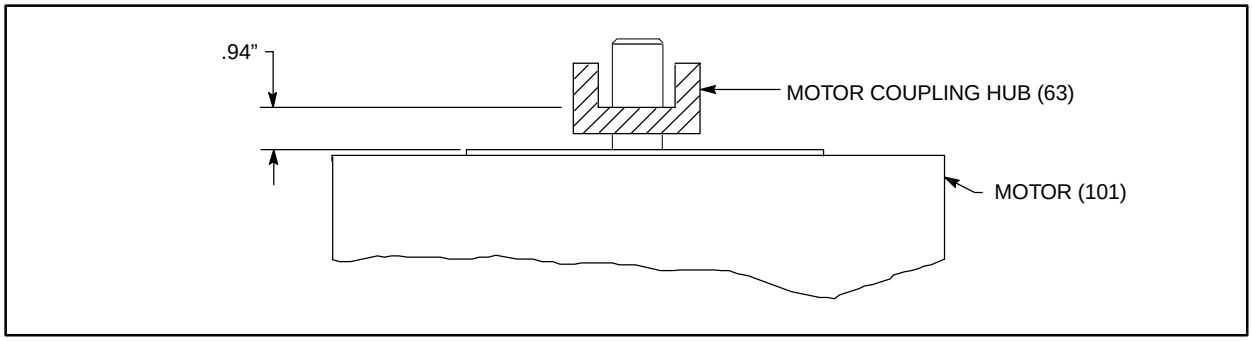


Figure 4 – Motor Coupling Hub Installation

d. Align coupling hubs and assemble the bearing housing to the motor, using care so as not to damage the flexible element (65) or the gasket (22).

e. Bolt the bearing housing (36) to the motor (101), using socket head cap screws (60) and washers (61). Alternately tighten the hardware to 9 ft–lbs to ensure that all components are drawn evenly together.

f. Install mixer shaft (231) as outlined in Section 3.

SECTION 9 – AIR MOTOR REQUIREMENTS

Be sure your compressor has capacity for both pressure and the proper cubic feet per minute air displacement. Wet air, and low pressure will cause sticking of the motor, requiring hand starting. It is important to use an air filter and moisture trap near the motor for removal of foreign matter. Maximum recommended operating pressure is 100 P.S.I.

AIR PRESSURE / AIR CONSUMPTION GUIDE
FOR AIR MOTOR DRIVEN MIXER
(AIR MOTOR OPERATING AT 1800 RPM)

			PRESSURE CONSUMPTION REQUIRED	
H.P.	GAST MOTOR #	SHAFT RPM	* (PSIG)	** (CFM FREE AIR)
1/3	#2	1800	60	15
1/3	#2	360	60	15
1	#4	1800	85	30
1	#4	360	85	30

* Live pressure should be approximately 1–1/2 times the operating pressure of the air motor. The full line pressure will then be available for overloads and startup.

** CFM free air refers to air at atmospheric conditions measured at the inlet of the compressor.

Table 2

SECTION 10 – AIR MOTOR LUBRICATION

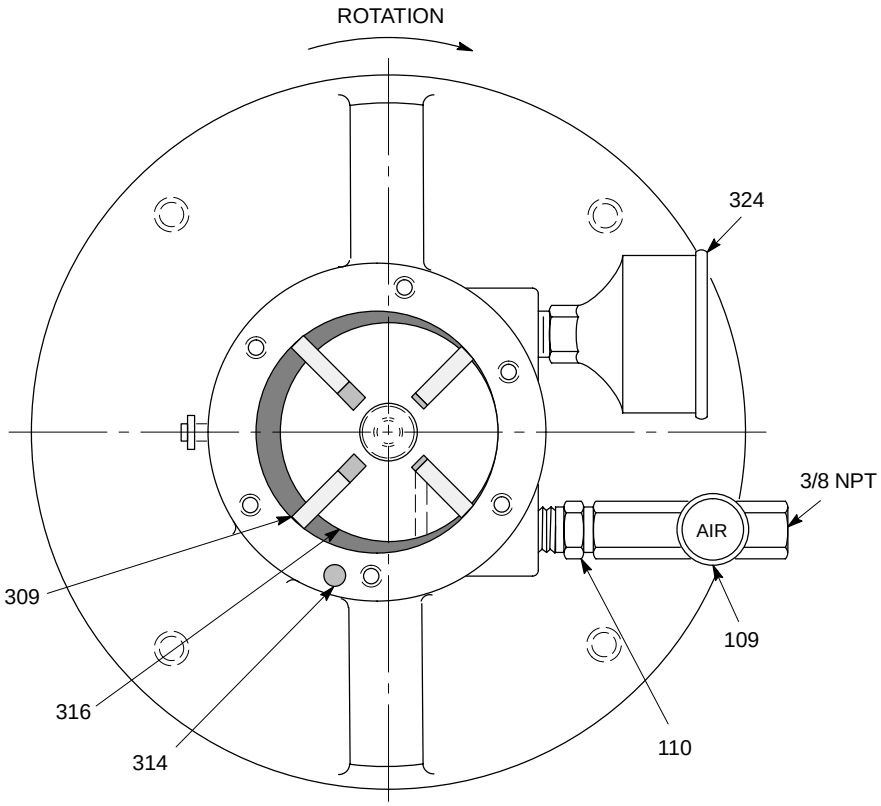
10. 1 Use only a high detergent lubricant of the recommended viscosity. Recommended oils are shown in Table 3.

10. 2 For continuous duty or high speed operation, it is recommended that an automatic lubricating device in the air line be provided to feed 1 to 3 drops per minute to the motor. If required request optional air–line lubricator (part # 151030psp).

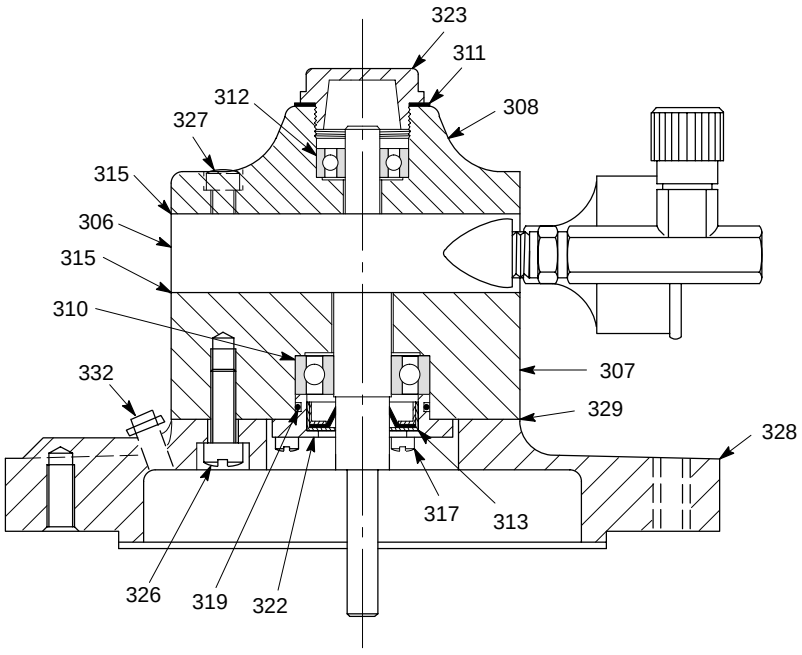
10. 3 For manual oiling, remove the oil cap at the top of the motor, and add one squirt of oil at the end of each 8 hours of operation.

RECOMMENDED LUBRICANT	AMBIENT TEMPERATURE	GRADE OF OIL
GAST AD 220 (SAE #10) OR A HIGH DETERGENT AUTOMOTIVE ENGINE OIL DESIGNED FOR ANY ONE OR MORE OF THE FOLLOWING API SERVICE RATINGS SB, SC, SD, SE, CB, CC, CD.	BELOW 32° F	DILUTE SAE #10 OIL WITH 25% KEROSENE
	32° F TO 100° F	SAE #10 OIL
A HIGH DETERGENT AUTOMOTIVE ENGINE OIL DESIGNATED FOR ANY ONE OR MORE OF THE FOLLOWING API SERVICE RATINGS – SB, SC, CD, CE, CB, CC, CD.	101° F TO 200° F	SAE #20 OIL

Table 3 – Motor Lubrication



SECTION THRU ROTOR HOUSING



(1) FURNISHED ON 2 SIZE DIRECT DRIVE UNITS ONLY.

WHEN ORDERING PARTS, SPECIFY: MOTOR SERIAL NO., ITEM NO. AND DRAWING NO.

ITEM	PART NAME
332	PRESSURE RELIEF VALVE
329	GASKET
328	FLANGE
327	FILLISTER HEAD MACHINE SCREW
326	FILLISTER HEAD MACHINE SCREW
324	MUFFLER
323	END CAP ASSEMBLY
322	BEARING RETAINER
319	O–RING
317	FILLISTER HEAD MACHINE SCREW
316	ROTOR & DRIVE SHAFT ASSY
315	GASKET
314	DOWEL PIN
313	SHAFT SEAL
312	UPPER BALL BEARING
311	GASKET
310	BALL BEARING
309	ROTOR VANE (4 REQ'D)
308	UPPER BEARING HOUSING
307	LOWER BEARING HOUSING
306	ROTOR HOUSING
110	PIPE NIPPLE
109	NEEDLE VALVE

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LIGHTNIN

MIXERS AND AERATORS
ASSEMBLY DRAWING

MODEL NO. 2 AND 4 AIR MOTOR DRIVE

NON–LUBRICATED AIR MOTOR INSTRUCTIONS

WARNING: MOTOR CANNOT EXCEED 1800 RPM.

WARNING: To prevent explosive hazard, DO NOT drive this air motor with combustible gases. Injury and/or property damage can result.

WARNING: DO NOT USE KEROSENE OR OTHER COMBUSTIBLE SOLVENTS.

WARNING: EYE PROTECTION IS REQUIRED. Keep face away from exhaust port, and DO NOT flush unit with any flammable solvent.

WARNING: Foreign material exiting the air motor can be hazardous.

CAUTION: Do not drive the air motor in excess of recommended speeds.

SECTION 1 – AIR MOTOR REQUIREMENTS

1.1 In order to insure maximum performance and life from this motor, it is essential that the following points be observed.

1.2 Be sure your compressor has capacity for both pressure and the proper dm^3/s (CFM) air displacement. Wet air, and low pressure will cause sticking of the motor. It is important to use an air filter and moisture trap in the air line ahead of the motor for removal of foreign matter.

1.3 Maximum operating pressure is 550 kPa (80 PSI).

1.4 This motor may be operated at any altitude, provided adequate air line lubrication is supplied. Being totally enclosed, it can be used in any environment within the temperature limits of –7° C to +80° C (+20° F to +175° F).

1.5 The speed of the air motor increases as the load is reduced. Shaft vibration may occur while operating under light load, such as running in air. If excessive vibration occurs, adjust the speed up or down with the air valve until the vibration diminishes. Running the motor at no load and excessive speeds can also cause excessive internal heat build–up. Loss of internal clearances and rapid motor damage will result.

1.6 Motor may be run continuously at speeds up to the rated running conditions shown in the performance data sheets. These sheets give the output power – torque based on running conditions with the actual pressure measured at the motor inlet ports.

1.7 Before final connection to the motor, blow out the air lines to remove any loose scale, swarf or abrasive dust which may be present.

1.8 A muffler is supplied with the motor. Do not operate the air motor with the exhaust port either unguarded or without a muffler. When the muffler is installed, ensure that condensation cannot run back into the motor port.

1.9 The air supply must be clean and relatively dry. Excessive moisture in the air line can cause rust formation in the motor and might also cause ice to form in the muffler. An air line filter should be fitted in the air supply line and located before the first control valve of the system.

1.10 For short length pipe runs, (for example up to 1800mm / six feet), the supply lines should be the same size as the inlet and exhaust ports, and larger for longer runs.

1.11 Refer to Table 1 for air pressure / air consumption guide for air driven motors.

H.P.	SPEED CODE (1)	REQUIRED PRESSURE CONSUMPTION (2) (3)			
		kPa	PSIG	dm^3/s FREE AIR	CFM FREE AIR
1/4	EV1	415	60	7	14
1/3	EV5				
1/2	EV6	415	60	17	35
3/4					

(1) SPEED CODE / MIXER OUTPUT RPM
EV1 = 1725
EV5 = 350
EV6 = 280

(2) LINE PRESSURE SHOULD BE APPROXIMATELY 1.5 TIMES THE OPERATING PRESSURE OF THE AIR MOTOR. THE FULL LINE PRESSURE WILL THEN BE AVAILABLE FOR OVER-LOADS AND STARTUP.

(3) dm^3/s (CFM) FREE AIR REFERS TO AIR AT ATMOSPHERIC CONDITIONS, MEASURED AT THE INLET OF THE COMPRESSOR.

TABLE 1 – Air Pressure/ Air Consumption Guide (Air Motor Operating at 1725 RPM)

1.12 Air line filtration for lubricated service:

a . Use 64 micron filter or better.

b . The air line filter should be drained regularly and the element examined for signs of clogging.

1.13 Air motor lubrication requirements:

The air motor will operate with or without lubrication, and generally speaking, performance will improve with lubrication.

1.14 SERVICING

If the motor is sluggish or inefficient, flush it with solvent (refer to Table 2 for recommended solvents). To flush a unit, disconnect air line and muffler and add several teaspoons of solvent directly into the motor. Rotate the shaft by hand in both directions for a few minutes, reconnect the air line, and SLOWLY apply pressure until there is no trace of solvent in the exhaust air. FLUSH UNIT IN A WELL VENTILATED AREA. Relubricate the motor with a squirt of oil in the chamber. If the vanes need replacing, or foreign materials are present in the motor chamber, an experienced mechanic may remove the end plate opposite the drive shaft end. DO NOT PRY WITH A SCREWDRIVER. It will dent the surface of the plate and body, causing leaks. A puller tool should be used which will remove the end plate while maintaining the position of the shaft. New vanes should have the edge with the corners cut on an angle facing towards the bottom of the vane slot.

MANUFACTURER	PRODUCT
GAST	FLUSHING SOLVENT #AH255 or AH255A
W.W. GRAINGER, INC.	DEM–KOTE 2X726
LOCTITE CORP.	LOCTITE SAFETY SOLVENT
PENETONE CORP.	INHIBISOL SAFETY SOLVENT
DOW CHEMICAL	CHLOROTHANE

TABLE 2 – Recommended Flushing Solvent

SECTION 2 – USE OF AIR MOTORS IN HAZARDOUS ATMOSPHERES

2.1 At the present time, there are no known standards governing the operation of air motors in hazardous atmospheres. However, there are several points regarding the safety of air motors.

2.2 An air motor is not a source of electric sparks. However, it is possible that an article which is not part of the air motor (e.g., wrenches, hammers, etc.) could create a spark by sharply impacting a cast iron or aluminum case or the steel shaft of the air motor. Note that electric motor enclosures for both Class I and II hazardous locations can be made of iron, steel, copper, bronze or aluminum.

2.3 An air motor housing is not designed to contain an internal explosion as is an explosion–proof electric motor. The only possible internal source of ignition in an air motor is a contact between the stationary housing components and the rotating elements that might create a spark. The likelihood of this occurring is reduced by the fact that the contact must be made at precisely the same time as a flammable or explosive gas is introduced into the air motor in a sufficient quantity to achieve a flammable or explosive mixture, while overcoming the positive pressure of the driving gas. In other words, although highly improbable, an internal explosion in an air motor is possible.

2.4 An air motor is designed to be operated by compressed air, the expansion of which in normal operation creates a cooling effect. As a result, the temperature of the air motor will not exceed the higher of the temperatures of the surrounding atmosphere or the air delivered to the inlet.

2.5 ***LIGHTNIN***® does not guarantee the safety of every application, but to ensure the safe operation of an air motor in your application, always follow the product directions and consult your ***LIGHTNIN***® representative.

ELECTRIC MOTOR INSTRUCTIONS

SECTION 1 – INITIAL INSPECTION

1.1 Care is taken at the factory to assure that the motor arrives at its destination in first class condition. If there is evidence of rough handling or damage in shipment, file a claim at once with the carrier and notify our factory.

Examine the outside of the motor carefully for damage, with particular attention to the conduit box, fans and covers. Check nameplate for correct speed, kilowatt, voltage, hertz and phase for conformance with power supply. See Section 1.3 for warning on explosion–proof motors.

1.2 GENERAL DATA:

a .Single phase totally enclosed motors are wired at our factory for correct rotation.

b .All three phase and explosion-proof motors must be field wired for proper rotation. If rotation does not agree with nameplate, reverse any two line leads.

c .Dual voltage motors must be wired for the desired voltage. Refer to the connection diagrams provided on the motor nameplate, inside the conduit box cover or in this manual.

d .Refer to Section 2 for motor maintenance and storage instructions.

1.3 WARNING

- EXPLOSION–PROOF MOTORS – These motors are constructed to comply with the U.L. Label Service Procedure manual. When repairing and reassembling a motor that has an Underwriter's Label, it is imperative that the unit be reinspected and;

a .All original fits and tolerances must be maintained

b .All plugs and hardware to be securely fastened

c .Any part replacements, including hardware, be accurate duplicates of the originals

REPAIR WORK ON EXPLOSION–PROOF MOTORS CAN ONLY BE DONE BY THE ORIGINAL MANUFACTURER. VIOLATIONS OF ANY OF THE ABOVE ITEMS WILL INVALIDATE THE SIGNIFICANCE OF THE U.L. LABEL.

- **EXPLOSION-PROOF MOTORS ARE EQUIPPED WITH AN INTERNAL CIRCUIT INTERRUPTING DEVICE WHICH TRIPS WHEN OVER HEATING OCCURS. THIS THERMAL PROTECTION CIRCUIT WILL RESET AUTOMATICALLY WHEN UNIT COOLS.**
- If the thermal protector continues to trip, some abnormal condition exists. This condition must be corrected before motor will operate normally.
- **ALWAYS DISCONNECT POWER LINE BEFORE SERVICING ANY PART OF THE MIXER**. Unexpected motor start-up may occur after the thermal protection circuit trips.

1.4 After unpacking and inspection to see that all parts are in good condition, turn the shaft by hand to be sure there are no obstructions to free rotation. Equipment which has been in storage should be tested prior to being put into service.

a .It is best to check the insulation resistance of the stator winding with a megohmeter. If resistance is lower than one megaohm, consult ***LIGHTNIN***®.

b .Motors are shipped from the factory with sealed, shielded bearings properly packed with grease and ready to operate. Bearings are not regreaseable.

1.5 WIRING – Examine the nameplate data to see that it agrees with the power circuit to which the motor is to be connected. The motor is guaranteed to operate successfully with frequency not more than 5% and voltage not more than 10% above or below the nameplate data, or combined variation of voltage and frequency of not more than 10% above or below nameplate data. Efficiency, power factor and current may vary from nameplate data.

1.6 Connect the motor leads to a power source that matches the line voltage and wiring diagram specified on the motor nameplate.

1.7 Check impeller shaft rotation by jogging the motor until it is determined that rotation is correct.

1.8 **CAUTION**

Repeated trial starts can overheat the motor (particularly for across-the-line starting). If repeated trial starts are made, allow sufficient time between trials to permit heat to dissipate from the windings or rotor to prevent overheating. Starting currents are several times running currents, and heating varies as the square of the current. Do not exceed 12 starts per hour.

1.9 **WARNING**

The frames and other metal exteriors of motors should be grounded to limit their potential to ground in the event of accidental connection or contact between live electrical parts and the metal exteriors. All motors should be grounded through the conduit box. Explosion–proof motors have an integral ground lead for grounding.

1.10 **WARNING**

Before starting motor, remove all unused shaft keys and loose rotating parts to prevent them from flying off.

1.11 Start motor and operate at minimum load prior to filling the tank or basin. Look for any unusual condition.

The motor should run smoothly with little noise. If the motor should fail to start and produces a decided hum, it may be that the load is too great for the motor or that it has been connected improperly. Shut down immediately and investigate for trouble.

SECTION 2 – MOTOR MAINTENANCE AND STORAGE

Electric motors or other prime movers are not prepared by ***LIGHTNIN***® for indoor storage beyond 12 months in a dry ambient atmosphere with controlled temperatures, or 6 months in a dry ambient atmosphere with no temperature control. OUTDOOR STORAGE OF ELECTRIC MOTORS IS NOT RECOMMENDED BY ANY MOTOR MANUFACTURER. For information on storage periods beyond those shown, consult ***LIGHTNIN***®.

2.1 To insure continued reliable operation of electric motors, the following basic rule applies: **KEEP THE MOTOR CLEAN AND DRY.** Motors should be inspected, and output shaft rotated, at a minimum of 6 month intervals with increased frequency as needed depending upon the type of motor and the service.

2.2 Terminal connections and assembly hardware may loosen from vibration during service and should be tightened.

2.3 Insulation resistance should be checked at operative temperature and humidity conditions to determine possible deterioration of insulation due to excessive moisture or extremes in operating environment. If wide variations are detected, motors should be reconditioned.

2.4 LUBRICATION - The ball bearing has deep grooved, double shielded sealed bearings with sufficient lubricant packed into the bearings by the manufacturer for “life lubrication”. The initial lubricant is supplemented by a supply packed into larger reservoirs in the end shield at time of assembly. No grease fittings are provided, as the initial lubrication is adequate for up to 10 years of operation under normal conditions.

2.5 **STORAGE REQUIREMENTS FOR MOTORS –** These extended storage requirements must be followed to allow the submission of a valid warranty claim.

a .The motors, if not mounted, are to be stored in the original containers in a clean, dry, protected warehouse.

b .The storage area is to be free from any vibration and from extremes in temperature.

c .Windings to be megged at the time equipment is put in storage. At the time of removal from storage, the resistance reading must not have dropped more than 50% from the initial reading. Any drop below this point, consult ***LIGHTNIN***®.

d .All external parts and motors subjected to corrosion should be protected by a corrosive resistant coating.

OPERATING INSTRUCTIONS FOR *LIGHTNIN*® VARI-MIX DRIVE (VM SERIES)

1/3 & 3/4 FRACTIONAL HORSEPOWER TOTALLY ENCLOSED 50 & 60 CYCLE MOTORS ONLY

SECTION 1 – GENERAL

1.1 This supplement pertains to specifications and operation of the ***LIGHTNIN*** "Vari-Mix" motor and control only. For complete mixer installation, operation and maintenance, refer to the instruction manual furnished with the unit.

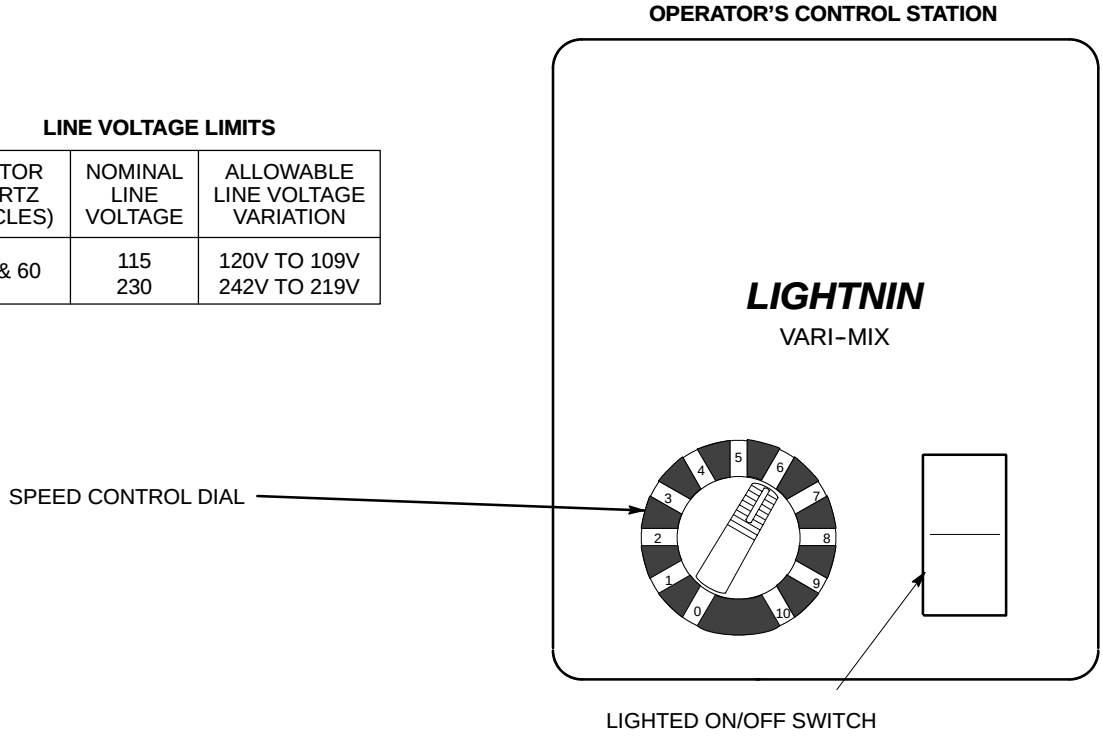
1.2 The motor and control are not watertight and should not be exposed to rain, snow or water sprays. Outdoor use is not recommended unless protection from rain and snow is provided. Maximum ambient temperature is not to exceed 100° F.

SECTION 2 – SPECIFICATIONS

2.1 A.C. line voltage must be within the allowable limits shown in the table. If the performance of the unit is not satisfactory, measure the line voltage. Maximum voltages shown in the table are peak voltages and should not be exceeded. Step up transformers can be obtained from local electrical supply houses if proper line voltages cannot be maintained.

LINE VOLTAGE LIMITS

MOTOR HERTZ (CYCLES)	NOMINAL LINE VOLTAGE	ALLOWABLE LINE VOLTAGE VARIATION
50 & 60	115 230	120V TO 109V 242V TO 219V



2.2 Power Connections:

To insure extended motor and mixer life and satisfactory performance, the precautionary measures noted should be followed.

a. DO NOT connect the drive to an AC line that also services heavy motors, starters and contactors. These devices produce transients that can damage the operator control station. Transient voltages can be eliminated by using isolation transformers.

b. Do not over voltage (5% maximum above nameplate voltage) drive on the AC side.

c. It is recommended that a switch (not provided by ***LIGHTNIN***) be installed in the line between the power source and the control station. On 3/4 HP motors, the windings are at full voltage even though the speed control is in the off position. The line switch should be turned off or line plug disconnected if the unit is not operated for periods of one hour or more.

d. DO NOT attempt to reverse the drive by means of an external switch.

e. If the unit is to serviced, disconnect the line to the power source. Turning the speed control to the off position does not isolate the motor or control.

2.3 Mixer Shaft Nominal Speed Ranges:

Direct drive models – 100 to 1750 RPM

Gear drive models – 20 to 350 RPM

Exact speed range depends on AC voltage.

SECTION 3 – INSTALLATION & OPERATION

3.1 A power supply cord is furnished by ***LIGHTNIN***. All motors are wired for the correct shaft rotation.

3.2 Before starting the unit:

a. Make sure the mixer is properly located with relation to tank centerlines and angular requirements or offsets shown in the instruction booklet.

b. Fill the mixing vessel so that the liquid level is at least two impeller diameters above the lower impeller.

c. IMPORTANT: Before applying AC power to the operator's control station, make sure the speed control dial is in the off position. Switching on the AC line with the speed control dial in the on position can cause control failure.

3.3 To start the unit:

a. Plug the drive into the correct power source as noted in Section 2.1.

b. Turn the speed control dial in a clockwise direction to the desired speed. The lighted switch indicates power is on.

c. To select a new speed, adjust the speed control dial.

3.4 To stop the drive, turn the rocker switch off. Leaving the control dial on without the motor shaft turning will cause motor damage.

3.5 115V MODELS HAVE A 4A BUSSMAN or LITTLEFUSE 312004 rectifier fuse located in the external fuse receptacle which protects the control electronics from overload. If the unit does not operate, check the fuse and replace if necessary.

3.6 230 volt models have an A5 fuse and an additional 10A fuse to protect the boafd components. If the unit does not operate, check the fuses and replace them if necessary.

3.7 Precautions during operation:

a. While operating fixed mounting type units in air or during draw–off, the following maximum speeds are not to be exceeded:

All Direct Drive Models – 400 Impeller RPM Max.

All Gear Drive Models – 500 Motor RPM or 100 Impeller RPM Max.

b. XD or XJ Series – Clamp mounted portable mixer shafts may vibrate at certain speeds. If the shaft vibration is excessive, adjust the speed up or down until the vibration diminishes.

c. DO NOT operate under the following adverse conditions unless the control station is protected:

1. Open outdoor service without protection from rain and snow.
2. Ambient temperatures over 100° F.
3. Hot, humid atmospheres such as steam vapors.

OPERATING INSTRUCTIONS
LIGHTNIN® VARI–MIX DRIVE (VM SERIES)

1/3 & 3/4 FRACTIONAL HORSEPOWER TOTALLY ENCLOSED
50 & 60 CYCLE MOTORS ONLY

SECTION 1 – GENERAL

1.1 This supplement pertains to specifications and operation of the ***LIGHTNIN***® "Vari–Mix" motor and control only. For complete mixer installation, operation and maintenance, refer to the instruction manual furnished with the unit.

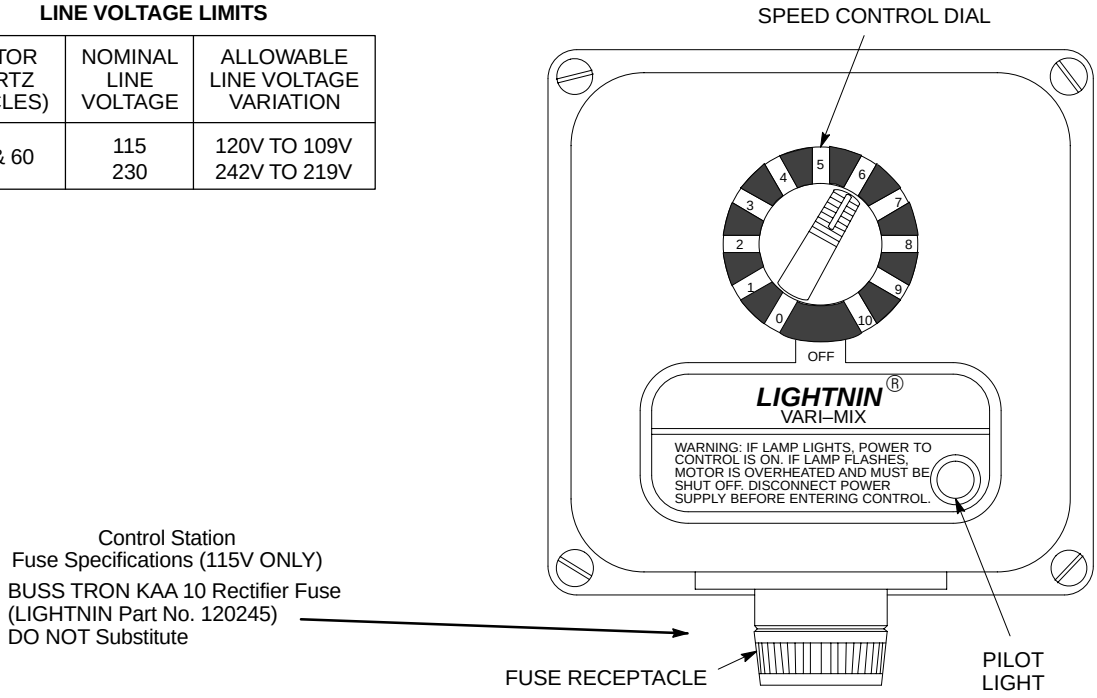
1.2 The motor and control are not watertight and should not be exposed to rain, snow or water sprays. Outdoor use is not recommended unless protection from rain and snow is provided. Maximum ambient temperature is not to exceed 100° F.

SECTION 2 – SPECIFICATIONS

2.1 A.C. line voltage must be within the allowable limits shown in the table. If the performance of the unit is not satisfactory, measure the line voltage. Maximum voltages shown in the table are peak voltages and should not be exceeded. Step up transformers can be obtained from local electrical supply houses if proper line voltages cannot be maintained.

LINE VOLTAGE LIMITS

MOTOR HERTZ (CYCLES)	NOMINAL LINE VOLTAGE	ALLOWABLE LINE VOLTAGE VARIATION
50 & 60	115 230	120V TO 109V 242V TO 219V



OPERATOR'S CONTROL STATION

2.2 Power Connections:

To insure extended motor and mixer life and satisfactory performance, the precautionary measures noted should be followed.

a . DO NOT connect the drive to an AC line that also services heavy motors, starters and contactors. These devices produce transients that can damage the operator control station. Transient voltages can be eliminated by using isolation transformers.

b . Do not over voltage (5% maximum above nameplate voltage) drive on the AC side.

c . It is recommended that a switch (not provided by ***LIGHTNIN***®) be installed in the line between the power source and the control station. On 3/4 HP motors, the windings are at full voltage even though the speed control is in the off position. The line switch should be turned off or line plug disconnected if the unit is not operated for periods of one hour or more.

d . DO NOT attempt to reverse the drive by means of an external switch.

e . If the unit is to serviced, disconnect the line to the power source. Turning the speed control to the off position does not isolate the motor or control.

2.3 Mixer Shaft Nominal Speed Ranges:

Direct drive models – 100 to 1750 RPM

Gear drive models – 20 to 350 RPM

Exact speed range depends on AC voltage.

SECTION 3 – INSTALLATION & OPERATION

3.1 An 8 foot power supply cord is furnished by ***LIGHTNIN***®. All motors are wired for the correct shaft rotation.

3.2 Before starting the unit:

a . Make sure the mixer is properly located with relation to tank centerlines and angular requirements or offsets shown in the instruction booklet.

b . Fill the mixing vessel so that the liquid level is at least two impeller diameters above the lower impeller.

c . IMPORTANT: Before applying AC power to the operator's control station, make sure the speed control dial is in the off position. Switching on the AC line with the speed control dial in the on position can cause control failure.

3.3 To start the unit:

a . Plug the drive into the correct power source as noted in Section 2.1.

b . Turn the speed control dial in a clockwise direction to the desired speed. The pilot light indicates the switch is on.

c . To select a new speed, adjust the speed control dial.

3.4 To stop the drive, turn the speed control full counterclockwise to the off position unit a click is heard and the pilot light goes out. Leaving the control dial on without the motor shaft turning will cause motor damage.

3.5 If the pilot light flashes, the motor is overheated. Stop the drive or reduce speed and allow to cool. Should the pilot light continue to flash, check for overload conditions and/or measure line voltage.

3.6 115V MODELS HAVE A BUSS TRON KAA10 rectifier fuse located in the external fuse receptacle which protects the control electronics from overload. If the unit does not operate, check the fuse and replace if necessary. NOTE: Only BUSS TRON KAA10 fuses are to be used. There are no substitutes. These fuses are available from our factory as ***LIGHTNIN***® Part Number 120245.

3.7 230 volt models have an ABC10 fuse. If the unit does not operate, check the fuse and replace if necessary.

3.8 Precautions during operation:

a . While operating fixed mounting type units in air or during draw–off, the following maximum speeds are not to be exceeded:

All Direct Drive Models – 400 Impeller RPM Max.

All Gear Drive Models – 500 Motor RPM or 100 Impeller RPM Max.

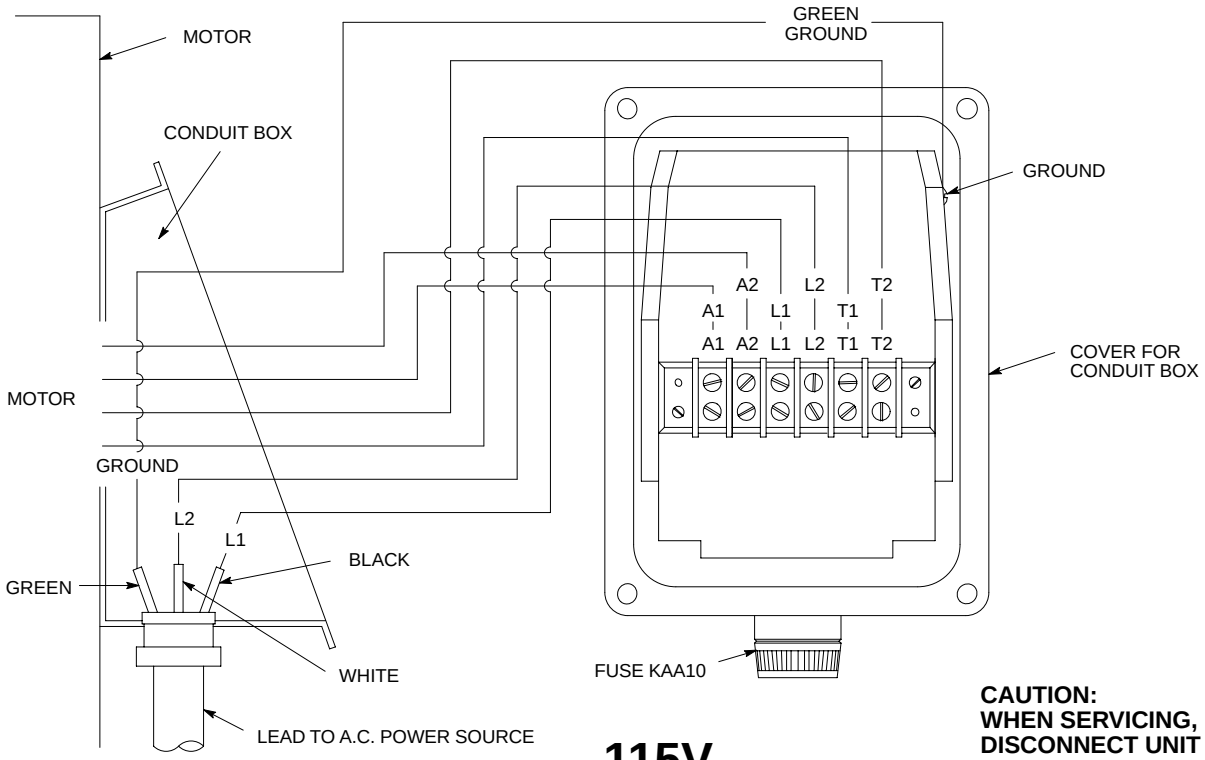
b . XD or XJ Series – Clamp mounted portable mixer shafts may vibrate at certain speeds. If the shaft vibration is excessive, adjust the speed up or down until the vibration diminishes.

c . DO NOT operate under the following adverse conditions unless the control station is protected:

1 . Open outdoor service without protection from rain and snow.

2 . Ambient temperatures over 100° F.

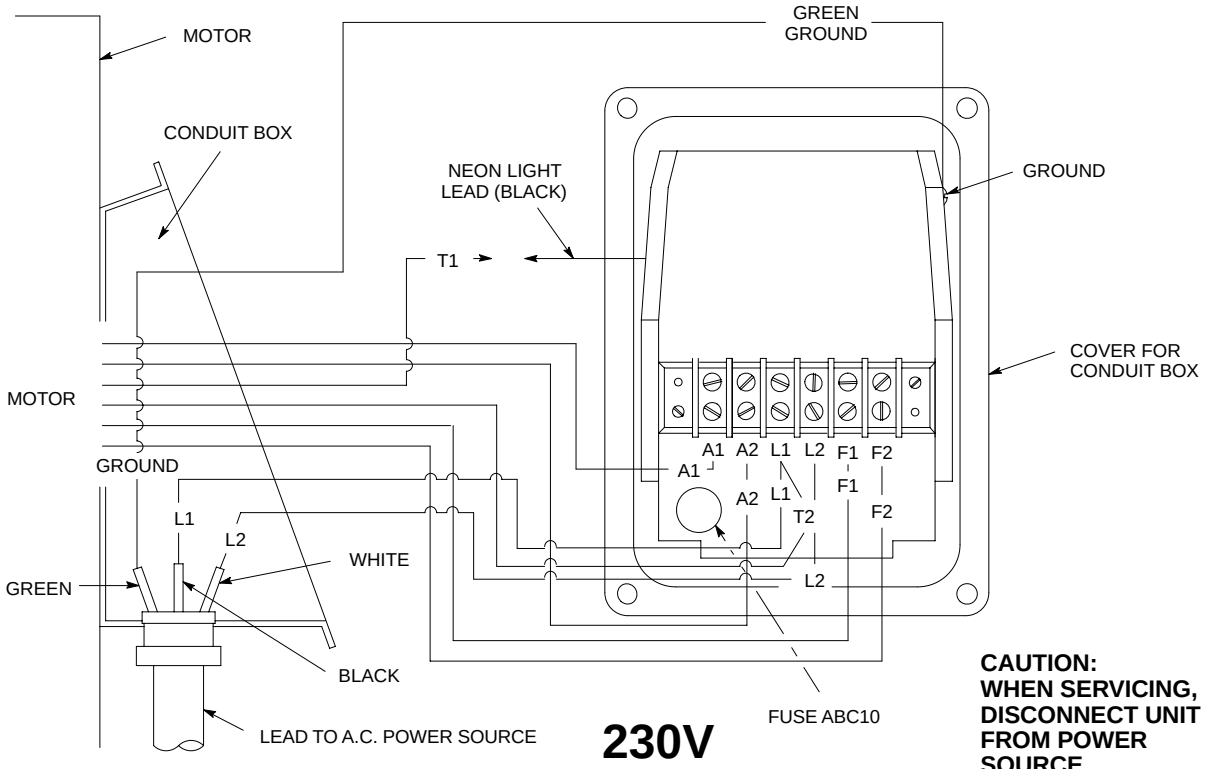
3 . Hot, humid atmospheres such as steam vapors.



115V

VARI–MIX WIRING DIAGRAM

CAUTION:
WHEN SERVICING, DISCONNECT UNIT FROM POWER SOURCE



230V

VARI–MIX WIRING DIAGRAM

CAUTION:
WHEN SERVICING, DISCONNECT UNIT FROM POWER SOURCE

MIXER PARTS **UNIT SIZE: EV "P" SERIES DIRECT DRIVE**

For service and repair, call 1-888-MIX BEST (1-888-649-2378)

ITEM NO.	IDENT. CODE ♦		DESCRIPTION	QTY.	PART NO.	PRICE (EACH)	SHIPMENT (WEEKS)
NOTE: See mixer nameplate or spec. sheet for unit size & ratio. See Assembly Drawing for item no. identifier							
			DRAWING: L-17094				
3			BUNG ADAPTER	1	271787PSP		
22*			GASKET	1	271795PSP		
35			DRIVE QUILL - 3/4"	1	271781316		
			DRIVE QUILL - 5/8"	1	271754316		
36			HOUSING	1	271838ALF		
39*			EXPANSION PLUG	1	271868PSP		
40			LANYARD	1	271869PSP		
41*			BALL BEARING	1	290151PSP		
42*			OIL SEAL	1	290701PSP		
44*			RETAINING RING	1	270822PSP		
45*			BALL BEARING	1	290158PSP		
53			MOUNTING PLATE @ 0 DEG.	1	272099ALM		
			MOUNTING PLATE @ 20 DEG.	1	272098ALM		
58			SET SCREW - NYLOK	1	271757STL		
59*			RETAINING RING	2	291592PSP		
60			SOCKET HEAD CAP SCREW	4	271778GR5		
61			FLAT WASHER	4	112005316		
63			COUPLING HALF	1	292267PSP		
64			COUPLING HALF	1	292269PSP		
65			COUPLING INSERT	1	292256PSP		
72			HEX WRENCH	1	127210BPF		
101			MOTOR	Contact ***LIGHTNIN*** Representative			
102			COUPLING	1	292248PSP		
115			TANK CLAMP @ 0 DEG.	1	271782ALM		
			TANK CLAMP @ 20 DEG.	1	271755ALM		
116			CLAMP SCREW	1	105413CPR		
118			CUP WASHER	1	112409CPS		
119			RETAINING RING	1	205445PSP		
120			HEX HEAD CAP SCREW	1	100147316		
121			FLAT WASHER	1	112009316		
122			HEX LOCKNUT	1	107407PSP		
123*			ROTATION INSERT	1	291619PSP		

♦ **IDENTITY CODE:**

Blank code denotes common parts

* Recommended spare parts

MIXER PARTS **UNIT SIZE: EV "P" SERIES DIRECT DRIVE**

For service and repair, call 1-888-MIX BEST (1-888-649-2378)

ITEM NO.	IDENT. CODE ♦		DESCRIPTION	QTY.	PART NO.	PRICE (EACH)	SHIPMENT (WEEKS)
NOTE: See mixer nameplate or spec. sheet for unit size & ratio. See Assembly Drawing for item no. identifier							
231			MIXER SHAFT	Contact ***LIGHTNIN*** Representative			
			TANK CLAMP ASSEMBLY @ 20 DEG.	1	871277PSP		
			CONSISTING OF ITEMS 72, 115, 116, 118, 119, 121, 122 & 123				
			BEAM PLATE @ 20 DEG.	1	871278PSP		
			CONSISTING OF ITEMS 53, 72, 121, 122 & 123				
			TANK CLAMP ASSEMBLY @ 0 DEG.	1	871383PSP		
			CONSISTING OF ITEMS 72, 115, 116, 118, 119, 121, 122 & 123				
			TANK CLAMP ASSEMBLY @ 0 DEG.	1	871383PSP		
			CONSISTING OF ITEMS 72, 115, 116, 118, 119, 121, 122 & 123				

♦ **IDENTITY CODE:**

Blank code denotes common parts

* Recommended spare parts

FOR PROMPT SERVICE, CALL YOUR *LIGHTNIN* SALES ENGINEER

He can save you time and money, and provide you with mixers and aerators guaranteed to do the job.

LIGHTNIN® U.S. SALES OFFICE DIRECTORY

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Bessemer, AL 35022
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800-828-8167
Fax: 205-481-3118

ARIZONA, PHOENIX
Quadna
2803 E Chambers Street
Phoenix, AZ 85040-3736
Phone: 602-323-2370
Fax: 602-305-6485

CALIFORNIA, CARLSBAD
(Municipal Only)
The Coombs-Hopkins Company
5411 Avenida Ecinas
Suite 250
Carlsbad, CA 92008
Phone: 760-931-0555
Fax: 760-931-9115

CALIFORNIA, LOS ANGELES
Leonard Engienered Products
11354 Burbank Blvd
P O Box 868
No. Hollywood, CA 91603-0868
Phone: 818-760-4100
Fax: 818-760-3254

CALIFORNIA, SAN FRANCISCO
Milton S. Frank Co., Inc.
180 A Mason Circle
Concord, CA 94520
Phone: 925-609-1400
Fax: 925-609-1406

COLARADO, GOLDEN
Centennial Equipment
15760 W. 6th Avenue
Golden, CO 80401
Phone: 303-278-8400
Fax: 303-278-1822

FLORIDA, CLEARWATER
Arroyo Process Equip. Inc.
13750 Automobile Blvd
Clearwater, FL 33762
Phone: 727-573-5294
FL only: 800-445-2630
Fax: 727-573-0217

FLORIDA, JACKSONVILLE
Arroyo Process Equip. Inc.
1105 North Lane Ave
Jacksonville, FL 32254
Phone: 904-783-6000
FL only: 800-342-0436
Fax: 904-781-0522

FLORIDA, MULBERRY
Arroyo Process Equip. Inc.
1351 State Road 60 West
Mulberry, FL 33860-8571
Phone: 863-425-1145
Fax: 863-425-2936

FLORIDA, SEBRING
(Municipal Only)
Envirosales of Florida Inc.
1101 U. S. 27 South
Sebring, FL 33870-2171
Phone: 863-314-0616
Fax: 863-314-0617

GEORGIA, ATLANTA
GPM Inc.
1000 Holcomb Wood Parkway
Suite 418
Roswell, GA 30076
Phone: 770-998-1956
Fax: 770-998-0119

ILLINOIS, CHICAGO
Mills-Winfield Engineering Sales, Inc.
2004 Bloomingdale Road
Glendale Heights, IL 60139
Phone: 630-924-1208
Fax: 630-924-1380

INDIANA, INDIANAPOLIS
Canaley Process Equip. Co.
120 N. Rangeline Road
Carmel, IN 46032
Phone: 317-846-6104
Fax: 317-844-5869

IOWA, CEDAR RAPIDS
J W Moore Process Equip. Co
710 32nd Ave. S.W.
Cedar Rapids, IA 52404
Phone: 319-362-7273
Fax: 319-362-8204

LOUISIANA, BATON ROUGE
(Municipal Only)
Environmental Technical Sales Inc.
7731 Office Park Blvd
Baton Rouge, LA 70809
Phone: 225-295-1200
Fax: 225-295-1800

LOUISIANA, BATON ROUGE
Ford-Gelatt & Associates, Inc.
18359 Petroleum Avenue
Baton Rouge, LA 70809
Phone: 225-752-0267
Fax: 225-751-3016

MASSACHUSETTS, BOSTON
(Municipal Only)
New England Environmental Equipment, Inc.
One DeAngelo Drive
Bedford, MA 01730
Phone: 781-275-1001
Fax: 781-275-1002

MASSACHUSETTS, BOSTON
M. A. Olson Co., Inc
414 Old Boston Rod
Topsfield, MA 01983
Phone: 978-887-2384
Fax: 978-887-3234

MICHIGAN, DETROIT
Mattoon & Lee Equipment, Inc.
23943 Industrial Park Drive
Farmington, MI 48335
Phone: 248-478-4070
Fax: 248-478-4074

MINNESOTA, MINNEAPOLIS
Trident Process, Inc.
Valley Office Park
10800 Lybndale Ave. So.
Bloomington, MN 55420
Phone: 952-881-7271
Fax: 952-881-4219

MISSOURI, KANSAS CITY
Technical Equipment Co., Inc.
810-A N.W. Main Street
Lee's Summit, MO 64086-9353
Phone: 816-525-1350
Fax: 816-525-3844

MISSOURI, ST. LOUIS
Hagedorn & Gannon Co., Inc.
550 Axminister Drive
Fenton, MO 63026-2904
Phone: 636-349-3370
Fax: 636-349-3460

MISSOURI, INDEPENDENCE
(Municipal Only)
Fluid Equipment Company, Inc.
4224 N.E. Port Ste. 100
Lee's Summit, MO 64064-1773
Phone: 816-795-8511
Fax: 816-795-8926

MISSOURI, FENTON
(Municipal Only)
VanDevanter Engineering
1617 Manufacturers Drive
Fenton, MO 63026
Phone: 636-343-8880
Fax: 636-343-1720

NEW JERSEY / NYC
Process Equipment Sales & Service, Inc.
11 Melanie Lane, Unit 2
East Hanover, NJ 07936-1101
Phone: 973-884-4111
800-526-2209
Fax: 973-884-4551

NEW YORK, ROCHESTER
Siewert Equipment Co.
175 Akron Street
Rochester, NY 14609
Phone: 585-482-9640
Fax: 585-482-4149

N. CAROLINA, CHARLOTTE
Robert E Mason Company
1726 N. Graham Strreet
P O Box 33424
Charlotte, NC 28233
Phone: 704-334-3700
Fax: 704-375-6104

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He can save you time and money, and provide you with mixers and aerators guaranteed to do the job.

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Charlotte, NC 28273
Phone: 704-583-2305
Fax: 704-583-2900

NEBRASKA, OMAHA
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Mellen & Associates Inc
2304 South 24th Street
Omaha, NE 68108
Phone: 402-345-4566
Fax: 402-345-6557

OHIO, CINCINNATI
Surkamp & Rowe, Inc.
4757 Cornell Road
Cincinnati, Ohio 45241-2432
Phone: 513-489-2850
Fax: 513-489-2854

OHIO, CLEVELAND
David Industrial Sales, Inc.
3763 Brecksville Road
P O Box 483
Richfield, OH 44286
Phone: 330-659-3157 (Richfield)
419-874-1359 (Toledo)
Fax: 330-659-4871 (Richfield)
419-872-7450 (Toledo)

OKLAHOMA, TULSA
Vanco Engineering Company
7033 East 40th Street
Tulsa, OK 74145-4523
Phone: 918-627-1920
Fax: 918-627-6742

PENNSYLVANIA, PHILADELPHIA
Harrington-Robb Co.
41 Twosome Drive, Unit #4
Moorestown, NJ 08057
Phone: 856-642-9605
Fax: 856-642-9606

PENNSYLVANIA, PITTSBURGH
PCF Sales Corporation
Suite 195 Twin Towers
4955 Steubenville Pike
Pittsburgh, PA 15205
Phone: 412-788-6800
Fax: 412-788-6808

TENNESSEE, CHATTANOOGA
Rodgers-Turner & Assoc. Inc.
5751 Uptain Road
Suite 105, Uptain Bldg 37411-5671
P O Box 8266
Chattanooga, TN 37414
Phone: 423-894-2958
Fax: 423-899-6874

TENNESSEE, MEMPHIS
Clements & Associates
P O Box 24757
Bartlett, TN 28184-0757
Phone:901-382-8700
Fax: 901-377-9061

TEXAS, DALLAS
Rodgers Equipment Co., Inc.
11882 Greenville Ave., Suite 130
P O Box 744125 (Zipcode 75374)
Dallas, TX 75243
Phone: 972-238-1919
Fax: 972-238-1995

TEXAS, HOUSTON
Hstik-Baymont, Inc.
2525 West Bellfort, Suite 200
P O Box 26657
Houston, TX 77207-6657
Phone: 713-661-1177
Fax: 713-661-3681

TEXAS, TOMBALL
(Municipal Only)
Hartwell Environmental Corp
22115 Hufsmith Kohrville Road
Tomball, TX 77375
Phone: 281-351-8501
Fax: 281-351-8323

UTAH, SALT LAKE CITY
Nibley & Company
1333 East 3300 So
Salt Lake City, UT 84106
Phone: 801-487-8200
Fax: 801-487-5222

VIRGINIA, RICHMOND
Engineering Equipment Co.. Inc.
711 Moorefield Park Dr.
P O Box 35076, Suite L
Richmond, VA 23235-0076
Phone: 804-323-6100
Fax: 804-323-7400

WASHINGTON, SEATTLE
Whitney Equipment Co. Inc.
21222 30th Drive SE, Suite 110
Bothell, WA 98021
Phone: 425-486-9499
Fax: 425-485-7409

WASHINGTON, VANCOUVER
Whitney Equipment Co. Inc.
7017 NE Hwy 99, S-216
Vancouver, WA 98665
Phone: 360-694-9175
Fax: 360-695-2389

W. VIRGINIA, PARKERSBURG
G&W Industrial Sales, Inc.
915 Emerson Avenue
Parkersburg, WV 26104
Phone: 304-422-4755
Fax: 304-422-4751

WISCONSIN, MILWAUKEE
Adlam-Zeman LLC
6577 North Sidney Place
Wilwaukee, WI 53209
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Fax: 262-781-4515

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Tucuman 255
1049 Buenos Aires
Phone: 54-11-4311-7882
Fax: 54-11-4311-1969

ARUBA
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AUSTRALIA
Lightnin Mixers Pty Ltd
Unit 5, Block C, 391 Park Road
Regents Park Estate
Regents Park N.S.W. 2143
Sydney, Australia
Phone: 61-2-9645-2999
Fax: 61-2-9645-2433

MAILING ADDRESS
P O Box 200
Regents Park N.S.W. 2143

Lightnin Sales & Service Centre
63 Kurnall Road
Welshpool, WA 6106
Phone: 61-8-9458-9700
Fax: 61-8-9458-9766

Victoria
Lightnin Mixers Pty Ltd
13 Healy Road
Dandenong South
Victoria 3175
Phone: 61-3-9768-2111
Fax: 61-3-9768-2188

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BAHAMAS
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BELGIUM
Mervers NV
Samberstraat 57-2060
Antwerpen Belgium 2630
Phone: 32-3-2339649
Fax: 32-3-2329501

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BRAZIL
Equiprom
Av. Afonso Pena, 3111-SALA 1011
Bairro Funcionarios CEP 30130-008
Belo Horizonte, MG-Brasil

CANADA

Toronto, Ontario
T. D. Rooke Associates Ltd
21 Vulcan Street
Etobicoke, Ontario
M9W 1L3
Phone: 416-248-0555
Fax: 416-248-8163

Montreal, Quebec
Nortec S.G.S. Inc
Suite 230
3300 Cavendish Boulevard
Montreal, Quebec
H4B 2M8
Phone: 514-487-1055
Fax: 514-487-0058

Amherst, Nova Scotia
Marathon Fluid Systems
P O Box 672 (Mailing Address)
Amherst, Nova Scotia B4H 4B8
194 Halifax Street (Ship Address)
Moncton, New Brunswick
E1C 9S2
Phone: 506-860-7867
Fax: 506-867-8826

Vancouver, Brit. Col.
Black & Baird Ltd
1641 Welch Street
North Vancouver, BC
V7P 3G9
Phone: 604-986-1640
Fax: 604-986-1675

Winnipeg, Manitoba
Nothart Eng. Sales Ltd.
C-1420 Clarence Ave
Winnipeg, Manitoba
R3T 1T6
Phone: 204-452-6411
Fax: 204-477-1089

Calgary, Alberta
Zazula Process Equip. Ltd
1526 10th Avenue S.W
Calgary Alberta T3C 0J5
Phone: 403-244-0751
Fax: 403-245-5808

CHILE
BAFCO Procesos S.A.
Panamericana Norte 18.900
(Km.19)
Lampa Santiago, Chile
Phone: 56-2-738-7373
Fax: 56-2-738-7198

CHINA
Lightnin China Mixers Ltd HQ
1189 Li An Road
Minhang District
Shanghai 201100, China
Phone: 86-21-5495-5616
Fax: 86-21-5495-5626

Beijing Regional Office
Room 102-103, Haowei Building
No. 25 Beitaipingzhuang Road
Haidian District
Beijing 100088, P.R. China

CHINA (continued)

Chengdu Regional Office
Block G, 27/F, Vancouver Plaza
Third Section West,
Yiuan Avenue
Chengdu 610072, China
Phone: 86-21-771-2350
Fax: 86-21-773-2056

Guangzhou Regional Office
Room 602, 132 Yau district
Dongpudama Road Tian He
Guangzhou 510660, China
Phone: 86-20-8231-7797
Fax: 86-20-8231-7799

COLUMBIA
HEP (Herman Escobar Posada
Representationes Ltda)
Carrera 11A N93-94, OF.201
Santafe De Bogata, D.C.
Colombia, S.A.
Phone: 57-1-621-9711
Fax: 57-1-621-9860

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CURAZAO
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DENMARK
AxFlow A/S
Solvang 6
3450 Allerod
Denmark
Phone: 45-7010-3550
Fax: 45-7010-3555

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ECUADOR
ETECO Del Ecuador SA
Empresea Tecnica y Comercial
Av. 9 de Octubre y Av. Patria
P O Box 1717-589
Quito, Ecuador
Phone: 593-225-61177
Fax: 593-229-07406

EGYPT
Engineer for Tech Representatives
122 El Gala street
P O Box 2456
Cairo, Egypt
Phone: 20-2-574-5373
Fax: 20-2-579-5326

ENGLAND
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EL SALVADOR
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FIGI
See Lightnin Mixers Pty Ltd
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FINLAND
Oy Jarlas AB
Mettisvaarantie 7 A 2
FIN-97420
Lohiniva
Finland
Phone: 358-16-766761
Fax: 358-16-766762

FRANCE
Bran+Luebbe Sarl
87 Rue Des Poiriers
Parc Sainte Apolline
BP 72
78372 Plaisir Cedex
France
Phone: 33-1-30-68-4141
Fax: 33-1-30-68-4100

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GERMANY
Turbo Misch-und Verfahrenstechnik
Vertriebs-und Service GmBH
Im Westfeld 8
29336 Nienhagen
Phone: 49-5144-9898
Fax: 49-5144-4807

J. W. Stevens
P O Box 1508
D-61366 Friedrichsdorf
Germany
Phone: 49-6172-71861
Fax: 49-6172-71685

GREECE
Aero-Dynamics Ltd
8 km National Rd Athens-Lamia 18
Gaitenaki Street 14342-N
Philadelfia P O Box 8415
Athens 10010, Greece
Phone: 30-1-252-0065
30-1-252-0988
30-1-252-6207
Fax: 30-1-252-6207

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INDIA
Rathi Lightnin Mixers PVT Ltd
1162/2 Shivajinagar
Behind Observatory
Poona 411 005
India
Phone: 91-20-55-35384
91-20-55-325215
Fax: 91-20-553-3229

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No. 1, -D Cinere Jakarta
Selatan, 16514 Indonesia
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Fax: 62-21-754-3881

IRAN
Aramrange Engineering Corporation
P O Box 15875-6418
Tehran, Iran
Phone: 98-21-875-5413
Fax: 98-21-875-7521

IRELAND, REPUBLIC & NORTHERN
App & Company
Blackhall, Dunboyne
Co. Meath.
Ireland
Phone: 353-1-825-3000
Fax: 353-1-825-3070

ISRAEL
Lightnin Israel Ltd
P O Box 28
#1 Hamasger Office 101
43 100 Raanana, Hasharon, Israel
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Fax: 972-9-741-1951

ITALY
Lightnin Italia SRI
Via Delle Tuberose No. 14
10146, Milano, Italy
Phone: 39-02-484-63432
Fax: 39-02-484-01926

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KOREA
World Bridge Industrial Co. Ltd.
459-26, Majo-ri
Hasung-Myun,.
Kimpro City Kyungki-do, Korea
Phone: 82-341-988-0700
Fax: 82-341-988-0701

KUWAIT
Al Moaeef Trading Co
P O Box 4675
Hawalli, 32077
Hawalli, Kuwait
Phone: 965-4839911
Fax: 965-481-5498

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MALAYSIA
Arachem (M) Sdn Bhd
85A Jalan ss 21/60
Damansara Utama
47400 Petaling Jaya
Malaysia
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Fax: 02-03-719-66723

MEXICO
Lightnin Mexico
Mitla #442
Colonia Vertiz Narvarte
Mexico DF CP 03600
Phone: 52-55-2595-1630
Fax: 52-55-2595-1635

NEW CALEDONIA
See Lightnin Mixers Pty Ltd
Sydney, Australia

NEW GUINEA
See Lightnin Mixers Pty Ltd
Sydney, Australia

NEW ZEALAND
Foster & Associates LMI Ltd
3 Gloucester Park Road
Onehunga N.Z.
P O Box 11280
Auckland, 1005 N.Z.
Phone: 64-9-622-18358
Fax: 64-9-622-1836

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NORWAY
Maskin as Argo
Blakstadmarka 26
1370 Asker Norway
Phone: 47-6698-7550
Fax: 47-6698-7580

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PERU
ABL Corporation
Los Tilos 124, Salamanca de
Monterrico
Lima-3, Peru
Phone: 51-1-437-6796
51-1-437-4765
51-1-435-5982
Fax: 51-1-435-0312

PHILIPPINES
Charles Searby Trading
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163 Legaspi Street
Legaspi Villiage
Makati City 1200, Philippines
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Fax: 63-2-8106751

PORTUGAL
Rebel
Rua Joaquim
Antonia de Aguilar 45 3 Dt
P-1000 Lisboa
Portugal
Phone: 351-21-384-1040
Fax: 351-21-384-1049

PUERTO RICO
Coneco de Puerto Rico
P O Box 1150
San Juan, Puerto Rioc
00922-1500
Phone: 787-276-6969
Fax: 787-276-6951

SAUDI ARABIA
Salah & Abdulazia
Abahsain Co. Ltd
P O Box 209
Al Khobar 31952
Saudi Arabia
Phone: 966-3-8984045
Fax: 966-3-8990114

P O box 1300
Jeddah 21381
Phone: 966-2-6820944
Fax: 966-2-6833124

P O Box 42127
Riyadh 11541
Phone: 966-1-4742538
Fax: 966-1-4762660

P O Box 690
Al-Bahr Yanbu
Phone: 966-4-3224200
Fax: 966-4-3227877

SCOTLAND
Clyde Associates Engineers
Block 5, 76 Beardmore Way
Clydebank Industrial Estate
Clydebank G81 4Ht
Phone: 44-141-954-1331
Fax: 44-141-951-3460

SINGAPORE
Lightnin Pte Ltd
5 Pioneer Sector Walk
Singpaore 627896
Phone: 65-6264-4366
Fax: 65-6265-9133

Jakarta Representative Office
Geolung Aria, 3rd Floor
51 Gorgolargdia Lama No. 40
Menteng, Jakarta Pusat
Indonesia
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Fax: 65-6392-4981

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Bergvlei
2012 Transvaal
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Fax: 27-11-608-0503

Lightnin Africa
Durham Kwazulu Natal
P O Box 684
New Germany 3620
South Africa
Phone: 27-31-701-5563
Fax: 27-31-702-8735

Lightnin Africa
P O Box 3278
Cape Town 8000
South Africa
Phone: 27-21-221228
Fax: 27-21-221230

SURINAME
See United States Rochester

SWEDEN
Bergius Trading AB
Box 4091, S-181 04 Lidingo
Larsbergstorget 5
Stockholm Sweden
Phone: 46-8-731-5800
Fax: 46-8-797-2993

SWITZERLAND
Alfa Laval GM
Flow Division
Industriestrasse 31
Postfach 31
CH-8305 Dietlikon, Switzerland
Phone: 41-1-807-1440
Fax: 41-1-807-1442

TAIWAN
ProMix Technique Inc
5f-2, No. 191, Fu-Hsing North Road
Taipei, Taiwan ROC
Phone: 886-2-2719-8559
Fax: 886-2-2719-8556

THAILAND
R.J.C. Associates Co. Ltd
96 Samsen Road
Bangkok 10200
Phone: 66-2-281-5540
66-2-282-5249
Fax: 66-2-281-0615

TOBAGO & TRINIDAD
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UNITED ARB EMIRATES
Systems & Equipment
P O Box 45381, Hamdan Street
Abu Dhabi U.A.E.
Phone: 97-12-741296
Fax: 97-12-741297

UNITED KINGDOM
Bran+Luebbe Limited
Ironstone Way
Brixworth, Northampton
England NN99UD
Phone: 44-1604-88-0751
Fax: 44-1604-88-0145

URUGUAY
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VENEZUELA
Ortiz & Mejia C.A.
Av. Nueva Granada con Av. La.
Linea/Torre A, Local 1
Caracas 1040, Venezuela
Phone: 58-2-632-4733
Fax: 58-2-632-1732

VIETNAM
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WEST INDIES
Lewis & Company
P O Box 725
Mandeville, Manchester, Jamaica
West Indies
Phone: 876-962-0640
Fax: 876-962-8749

LIGHTNIN

REPAIR & SERVICE GUIDE

LIGHTNIN Process Equipment Services (LPES): The fastest route to uptime.

Expertise: LPES technicians are the backbone of our dedicated service organization. They're uniquely qualified to keep your LIGHTNIN mixers running right.

Lightnin Certified Technicians: All LPES technicians are certified via training courses to ensure that the work they do meets the highest standards for consistency and reliability.

Genuine LIGHTNIN Parts: All LPES repairs follow original design specs and use only factory-authorized replacement parts.

Full LIGHTNIN Factory Warranty: We're so confident we'll do the job right that all LPES repair and service work is covered by a full factory warranty. What we repair, we guarantee – 100%.

Repair Services: *LIGHTNIN provides quick, reliable repair services – using only certified technicians and factory-authorized replacement parts – on gearboxes, mechanical seals (seal cartridge and seal assembly), steady bearings, machine assemblies, impellers, shafts and all portable units. This service can be provided either at your site or at a LIGHTNIN Service Center location. All work is backed by LIGHTNIN's full warranty on all parts and service.*

Exchange Services: *By eliminating repair time, LIGHTNIN Exchange Services offer the fastest way to get up and running when a breakdown occurs. LPES keeps selected speed reducers, portable units and mixer subassemblies in stock – and available for immediate exchange – at regional service centers. Simply call and we will configure the appropriate assembly and ship it to you within 24 hours. Then send the damaged assembly back to us within 30 days – to ensure you receive a discounted price.*

Equipment Upgrade Services: *Preventive maintenance is your best defense against costly unplanned downtime and repairs associated with old or obsolete equipment. The full range of LPES upgrade services give you a convenient and cost-efficient way to address problems before they happen by converting older equipment to the latest, most reliable LIGHTNIN designs.*

Additional LPES Services: *In addition to minimizing downtime and repair costs when equipment failure occurs, LPES offers a comprehensive range of services for maximizing productivity through every stage of the equipment life cycle.*

- **Installation and Start-up**
- **Maintenance and Repair**
- **Asset Management**

LIGHTNIN Process Equipment Services Warranty

When repairs to your LIGHTNIN mixer are needed, we guarantee the results for one full year. This exclusive warranty covers all parts and labor. Talk to your LIGHTNIN sales representative for more information.

Call:

The LIGHTNIN Experts

When your need is urgent and after normal business hours call our 24-hour response team hotline at 1-888-MIX-BEST (U.S. and Canada). Your request will be promptly processed and directed to your nearest LPES team member. For more information visit our website at: www.lightninmixers.com.

Factory Service Center Locations

Chicago, Illinois
Houston, Texas
Mulberry, Florida
Reading, Pennsylvania
Rochester, New York
San Francisco, California
Wytheville, Virginia

Authorized Service Center Locations

Baton Rouge, Louisiana
Concord, Ontario, Canada
East Hanover, New Jersey
Macon, Pooler, Roswell, Georgia