



10/18/2012
Robert McDermott
MILLS-WINFIELD ENG SALES INC
2002 Bloomingdale Road
Glendale Heights, IL 60139
USA

Purchase Order #: JJ650
Sales Order #: 0001573246
Line Item: 000010

Please note this documentation has been submitted for informational purposes only, and the order has been released to production in accordance with the design as detailed per the enclosed documentation.

Submitted Date: 10/18/2012
Print Quantity: 01

Document Name	Document Number	Document Revision
Safety Check List	IT-2144	G
Installation Drawing	1573246000010-A	
Machine Assembly Drawing	L-17095	
General Instructions	IT-3695	
Motor Electric Instructions	IT-2588	
Spare Parts List	IT-3712	
Sales Offices	IT-3839	P

Thank You.

For Questions please call: Robert McDermott
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Email: bmcdermott@mills-winfield.com



Lightnin Mixer Model EV5P25

Ship To: COLE-PARMER INSTRUMENT COMPANY
Customer: COLE-PARMER INSTRUMENT CO
PO Number: JJ650

Order: 0001573246 Line: 000010

READ AND UNDERSTAND THIS DOCUMENT PRIOR TO OPERATING OR SERVICING THIS PRODUCT.



Tagging:
C-P# 50310-54 / LIGHTNIN EV5P25T1J60

Table of Contents

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**IMPORTANT: READ THIS SECTION THOROUGHLY
SAFETY INSTRUCTIONS / CHECKLIST**

IF YOU DO NOT UNDERSTAND ANY PORTION OF THESE INSTRUCTIONS **DO NOT** ATTEMPT TO INSTALL OR OPERATE THIS MIXER! CONTACT YOUR **LIGHTNIN®** REPRESENTATIVE FOR ANY QUESTIONS YOU MAY HAVE CONCERNING SAFETY OR THESE INSTRUCTIONS.

Your **LIGHTNIN®** mixer is equipped with safety labels which contain specific instructions pertaining to the safe handling and operation of the mixer. For your protection, you must understand that failure to follow the safety instructions imprinted on the safety labels or failure to follow the safety instructions printed in this instruction manual may result in serious personal injury or death. In addition, failure to adhere to safety instructions may cause damage to property or equipment.

In this publication, and on the mixer safety labels, the words DANGER, WARNING and CAUTION may be used to signify special instructions to be observed by the installer or user. These instructions warn of potential hazards concerning service, installation or operation if the instructions are performed incorrectly, carelessly or are ignored. Safety instructions alone cannot eliminate the hazards they signal. Strict compliance with these special instructions, along with safe work habits and simple "common sense" are major accident prevention measures.

CAUTION - Signals unsafe practices or hazards which could cause minor personal injury or property damage.

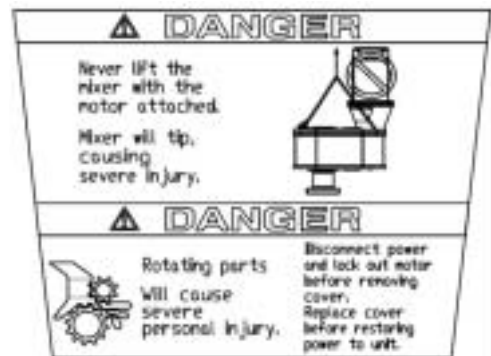
WARNING - Signals unsafe practices or hazards which could cause severe personal injury or death.

DANGER - Signals immediate hazards which will probably cause severe personal injury or death.

This mixer should be equipped with safety or instructional labels similar to those shown below. If any of the labels are missing, damaged or otherwise illegible, **DO NOT** install, service or operate the mixer. Contact your **LIGHTNIN®** representative immediately for instructions.



EXAMPLES:



SAFETY CHECK LIST

IMPORTANT WARNINGS

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 installing, operating or performing maintenance on the mixer. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY. Ensure the use of qualified, quality trained and safety conscious personnel.

1. **WARNING:** When moving, installing or lifting this mixer, always use equipment which is rated to carry the full load of the mixer. Use only the lifting device, if provided, on your unit to install the mixer. Failure to follow these instructions could cause severe injury, death or damage to property. Consult the appropriate section of this manual for lifting and installation instructions.
2. **WARNING:** DO NOT attempt to connect a power source to this mixer unless you are licensed or certified to do so. Failure to follow this instruction could cause severe injury, death or damage to property.
3. **WARNING:** 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**®.
4. DO NOT operate shaft sealing devices at temperatures higher than those specified in the manual or on the nameplates.
5. DO NOT service the mixer until you have followed your "Control of Hazardous Energy Sources" (lockout, tagout procedure) as required by OSHA.
6. **WARNING:** Never touch a mixer, which has an electric motor, or any part of an electrical service line cord or conduit, while your hands or feet are wet or if you are standing on a wet or damp surface. Failure to follow this instruction may result in severe electrical shock or death.
7. **WARNING:** DO NOT touch any part of mixer that has the potential of having a hot surface including the motor, gear drive housing, seal, shafting and flange. When a mixer is running, the motor temperature rises. This is a normal occurrence, but the motor temperature may be high enough to cause burns to the hands or any other part of the body. DO NOT touch a mixer motor until it cools for at least one hour. Failure to follow these instructions may result in severe personal injury.
8. **DANGER:** Never touch any rotating part of a mixer with bare hands, gloved hands or any other part of your body, or with any hand held object. Rotating parts include, but are not limited to, the mixer shaft, impeller(s), set screws, hardware, couplings, mechanical seals and motor fans.
9. **WARNING:** DO NOT operate mixer for service other than its intended use, that being fluid mixing with the mixer attached to a rigid structure and connected to a power source appropriate to operate the mixer drive motor.
10. **WARNING:** Never attempt to move or adjust a mixer while it is running.

SAFETY CHECK LIST, cont'd.

IMPORTANT WARNINGS, cont'd.

11. **DO NOT** make any field changes or modifications (horsepower, seal material components, output speed, shaft lengths, impellers, etc.) without reviewing the changes with your **LIGHTNIN**® Sales Representative or the **LIGHTNIN**® Customer Service Department.
12. **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.
13. **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.
Guarding of the mixer shaft below the mixer mounting surface is the responsibility of the customer.
 - 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.
14. **DO NOT** enter the mixing vessel UNLESS:
 - A. The mixer power supply is locked out (follow item number 5).
 - 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.
15. **WARNING:** Eye protection must be worn at all times while servicing this mixer. Failure to follow this instructions may result in severe injury or death.
16. **WARNING:** Never attempt to clean or service the mixer, or any part of it, while the mixer is running, or while it is connected to a power source. Always turn the mixer off and disconnect the power before cleaning or servicing.
17. **CAUTION:** When repairing the mixer, or replacing parts, use factory authorized parts and procedures. Failure to do so may result in damage to the mixer or injury to the user.

CE COMPLIANCE

If the mixer nameplate has a CE marking on it, then the equipment furnished conforms to the following directives:

Machinery Directive: 2006/42/EC
Electro-Magnetic Compatibility: 2004/108/EC
Low Voltage Directive: 2006/95/EC
Noise: 2000/14/EC



CAUTION: When applicable specific markings required by Pressure Equipment Directive 97/23/EC (PED) and/or Equipment for Use in Potential Explosive Atmospheres Directive 94/9/EC (ATEX) will be indicated on supporting nameplates. If there is any doubt relating to the intended use of this equipment please contact **LIGHTNIN®** before installation and operation.

Any CE marking and/or associated documentation applies to the mixer only. This has been supplied on the basis that the mixer is a unique system. When the mixer is installed, it becomes an integral part of a larger system which is not within the scope of supply and CE marking is the responsibility of others.

NOISE LEVELS

SOUND PRESSURE LEVELS

Portable Series: ECL, EV - maximum 80 dBA @ 1 meter.

Heavy Series: S10, 70/80, 500/600 - maximum 85 dBA @ 1 meter.

PATENTS

THIS PRODUCT MAY BE COVERED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS:

5152606	5501523	6517233	6860474	7168848	7387431	7550120
5152934	5511881	6517246	6877750	7168849	7407322	7572112
5203630	5568975	6742923	6986507	7278799	7473025	7726946
5344235	5779359	6746147	7001063	7328809	7481573	7753215
5368390	5925293	6789314	7056095	7329065	7488137	7874719
5470152	5988604	6796707	7114844	7331704	7507028	
5480228	6158722	6796770	7168641	7384551	7547135	

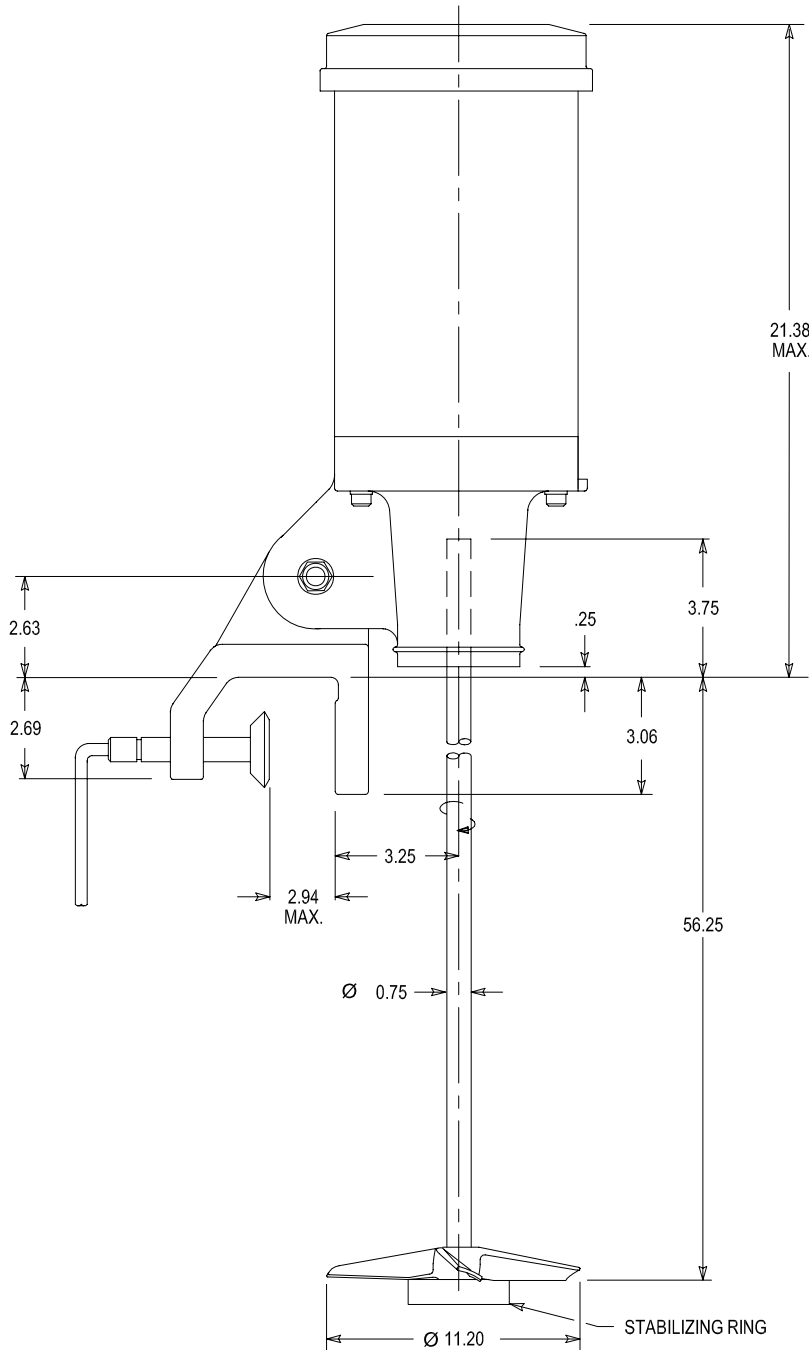
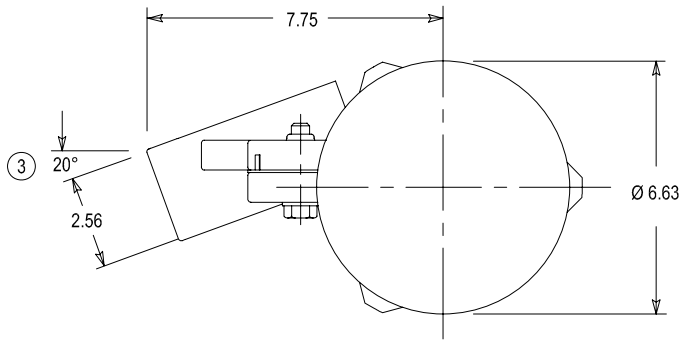
ENVIRONMENTAL NOTICE



Dispose of equipment responsibly at the end of its service, in accordance with local laws and directives. Correct disposal is the responsibility of the end user. If in doubt, consult with local environmental agencies for advice on the best method of disposal.

NOTES:

- ① DIMENSIONS ARE IN INCHES AND ARE MAXIMUM.
- ② WEIGHT (LESS SHAFT AND IMPELLERS): 53 LBS.
- ③ UNIT OFFSET 20° HORIZONTALLY, AND ADJUSTABLE 10° (OR MORE) VERTICALLY. UNIT ALSO AVAILABLE WITH 0° OFFSET.
- ④ MATERIAL OF MIXER PARTS IN CONTACT WITH TANK CONTENTS IS 316SS
- ⑤ MOTOR DATA:
 H.P.: 0.250 R.P.M.: 1725 DUTY: STANDARD DUTY
 VOLTS: 230/460 PHASE: 3 Hz: 60
 ENCLOSURE: TEFC IMPELLER R.P.M.: 350



ALL EQUIPMENT DESIGN AND APPLICATION DATA SHOWN HEREIN AND RELATED KNOW-HOW ARE CONFIDENTIAL AND PROPRIETARY AND REMAIN THE PROPERTY OF SPX CORPORATION. NO USE OR DISCLOSURE THEREOF MAY BE MADE WITHOUT THE WRITTEN PERMISSION OF SPX CORPORATION.



LIGHTNIN[®]
AN SPX BRAND

GENERAL ARRANGEMENT

FOR: **COLE-PARMER INSTRUMENT CO**
 S.O. NO.: 1573246 LINE NO.: 10
 MIXER MODEL: EV5P25 QUANTITY: 1
 CUST. P.O. NO.: JJ650 RATIO: 5:1
 TAG NO.: C-P# 50310-54 / LIGHTNIN EV5P25T1J6
 SERIAL NO.: 1000002805810

REVISION:		BY:		DATE:	
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CERTIFIED DRAWING

© LIGHTNIN
2012
BY:
DATE: 10/17/2012

DRAWING NO.: 1573246000010-A

GENERAL INSTRUCTIONS “EV” SERIES GEAR DRIVE MIXER

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). When gear drive models have been stored for more than one year, the gear lubricant should be replaced (see Lubrication instructions).

SECTION 2 – MIXER INSTALLATION

- 2.1 **WARNING: EYE PROTECTION MUST BE WORN AT ALL TIMES WHILE SERVICING THIS MIXER.**
- 2.2 Refer to Installation drawing for:
 - a . Proper mixer mounting and location.
 - b . Proper minimum impeller off-bottom and relative spacing for dual impeller applications.
- 2.3 Lock-out power before positioning mixer, and review safety instructions before starting mixer.
- 2.4 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.

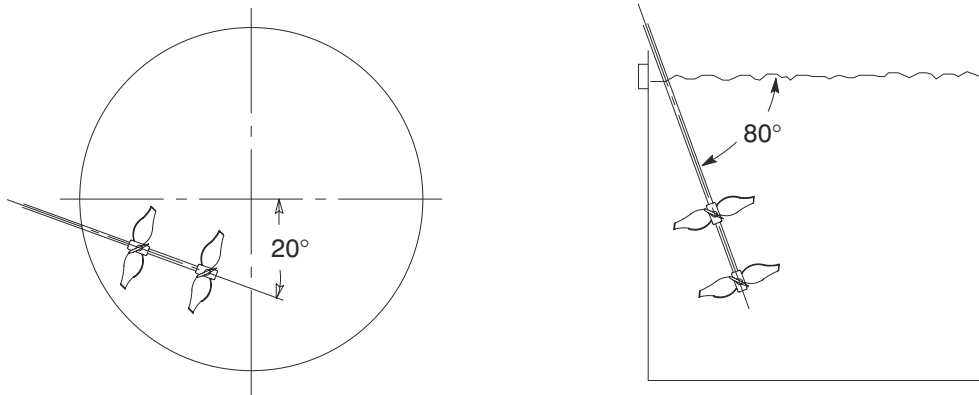


TABLE 1 – Mixer positioning

2.5 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 considerably 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).

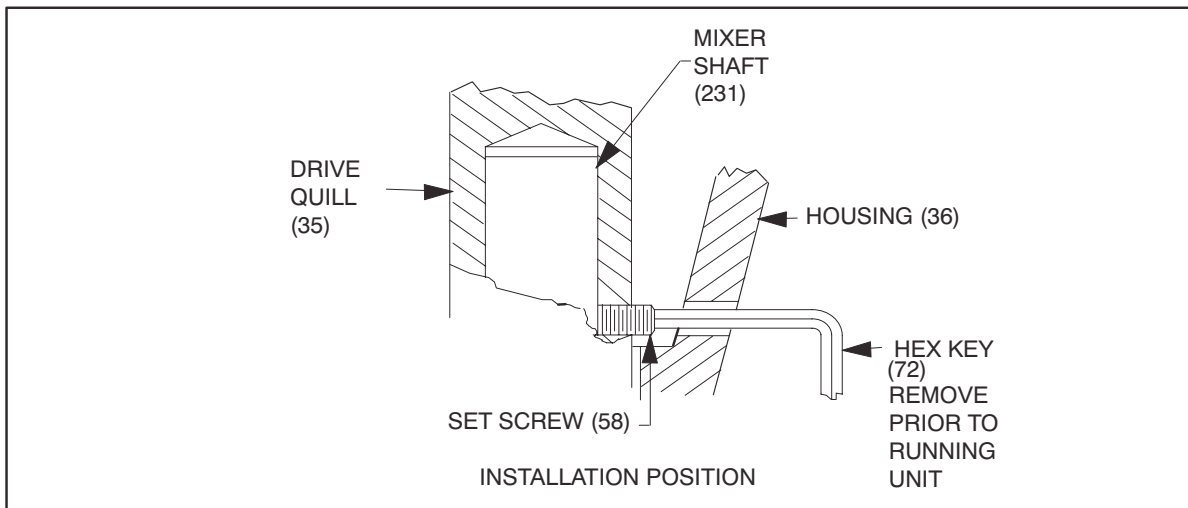


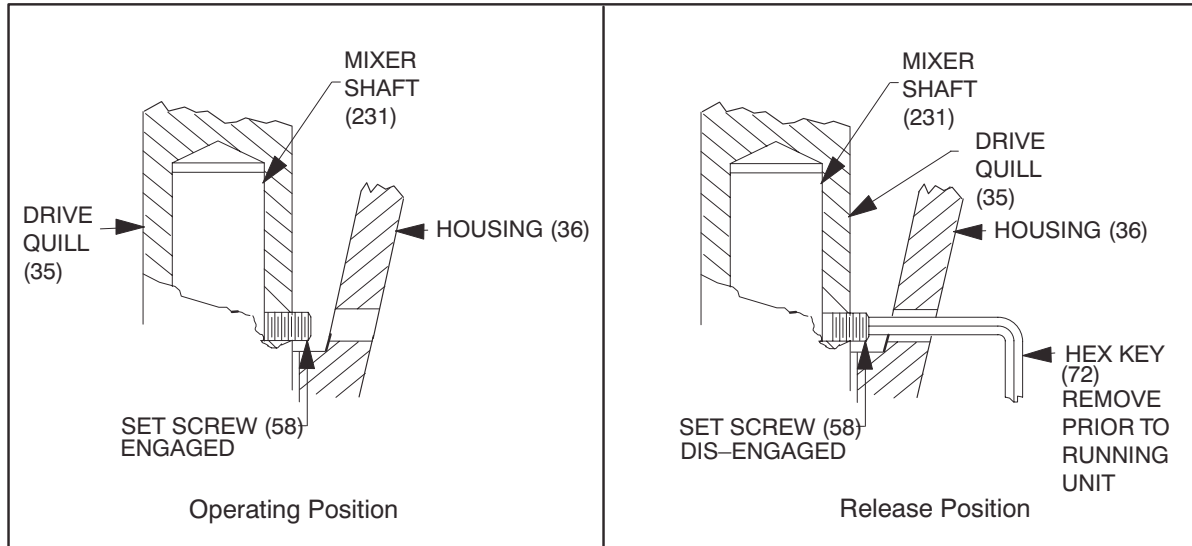
FIGURE 1 – Shaft Installation

- 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

- 4.1 **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.**
- 4.2 It is recommended that the mixer be removed from the tank before shaft or shaft and impeller are removed.
- 4.3 Make sure all electrical power is disconnected.

- 4.4 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.
- 4.5 With hex key (72) loosen set screw (58) and back out two (2) turns. See Figure 2.
- 4.6 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.
- 5.2 Variable speed air drive units should not be operated at the lower shafts natural frequency. At this speed the lower shaft will have excessive runout ($\pm 2^\circ$ T.I.R.) at the end of the shaft while operating in air. Vary the speed $\pm 5\%$ to avoid this speed range.

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

- 5.3 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

- 6.1 Your **LIGHTNIN** mixer has been lubricated at the factory with the correct type and amount of high quality lubricants. Lubricant cleanliness is protected by properly designed closures.
- 6.2 All mixer bearings are the sealed type and are pre-packed with lubricant. Relubrication of these bearings is not necessary.
- 6.3 The gear chamber of this **LIGHTNIN** mixer has been factory filled with a grease suitable for ambient temperature ranges of -20°C to $+50^\circ\text{C}$ (-4°F to $+122^\circ\text{F}$). Under normal operating conditions, this lubricant need not be changed until the unit has been dismantled for some reason. Refer to Table 2 for lubricant specifications.
- 6.4 Under adverse operating conditions, periodic changes of lubricant may be necessary. Adverse conditions are defined as operating in very humid, dust laden, chemical atmospheres, or where wide variations in ambient temperatures occurs. Such adverse conditions can lead to deterioration of lubricant compounds and additives and it is recommended that the condition of the grease be checked within six months of start-up.

Refer to Section 7 for instructions on disassembling the gear unit.

NOTE: THE BEARING HOUSING SHOULD BE FILLED 1/2 INCH FROM THE TOP OF THE BEARING HOUSING. ALL GASKETS SHOULD BE CHECKED FOR INTEGRITY AND REPLACED IF THEY ARE DEFORMED, CUT OR DETERIORATED.

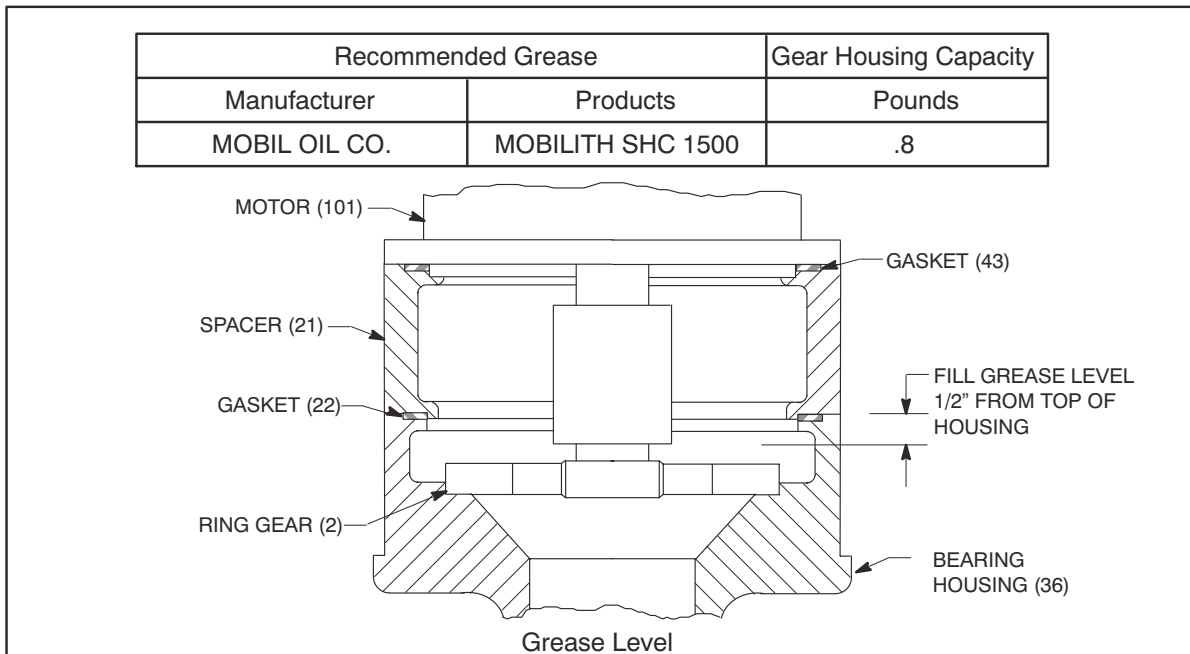


TABLE 2 – Lubricant Recommendations & Capacity

6.5 CHANGING GEAR LUBRICANT

- a . Remove all old grease from the gear chamber and wipe clean.
- b . Pack the chamber with fresh grease. See Table 2. Paddle the grease to fill voids and remove air pockets, rotating the shaft and shaking the housing while paddling.
- c . Check for free movement of all components by rotating the drive shaft.

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 reassemble 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 MOTOR REMOVAL

- a . Remove the mixer from the tank.
- b . Remove mixer shaft (231) from mixer quill drive as explained in Section 4.
- c . Set the mixer upright on a clean work surface.
- d . Remove the (4) socket head cap screws (60) holding the bearing housing (36) and spacer (21) to the motor (101).
- e . Lift the motor (101), motor coupling assembly (102) and sun gear (9) (Figure 4) off the spacer (21). It may be necessary to tap the bearing housing (36) gently with a rubber mallet to get the bearing housing to separate from the spacer and motor.
- f . Remove the sun gear (9) from the motor coupling (102) and examine for wear. If "reuseable" replace sun gear in gear mesh.
- g . Remove the drive coupling (102) from the motor if necessary.

7.9 BEARING HOUSING DISASSEMBLY

- a . Remove grease from gear chamber of bearing housing (36).
- b . Remove sun gear (9) and gear carrier assembly (1) as an assembly. Tape these parts together to prevent the sun gear from accidental removal. Remove any remaining old lubricant.
- c . Remove hardware (7,8) and remove ring gear (1) from bearing housing (36).
- d . Remove upper retaining ring (59).
- e . Place housing motor end down and remove oil seal (42) from drive quill (35). This seal will be damaged and must be replaced.
- f . Remove lower retaining ring (44).
- g . Place the bearing housing upright in a press, and press out drive quill (35) and lower bearing (41).
- h . Remove lower retaining ring (59) and bearing (41) from the drive quill (35).
- i . Remove upper bearing (41) and oil seal (38) from bearing housing (36).
- j . Inspect bearing (41) for excessive wear. Replace if necessary.

SECTION 8 – ASSEMBLY INSTRUCTIONS**8.1 QUILL ASSEMBLY**

- a . Insert the set screw (58) into the drive quill (35) until it is flush with the bore of the quill.
- b . 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.
- c . Install the lower external retaining ring (59).

8.2 BEARING MODULE ASSEMBLY

- a . Mount the housing (36) in an arbor press, large end up.
- b . Press the upper oil seal (38), sealing lip upward, to the shoulder in the housing bore and lubricate the seal lip.
- c . Press the upper bearing (41) to the shoulder in the housing bore.
- d . Invert the housing, large end down. Using a sleeve type fixture that supports the upper bearing by the inner race with clearance that allows the quill to be pressed thru, press the drive quill assembly into the bearing housing (36) from the bottom until the bearing seats on the housing shoulder.
- e . Install lower retaining ring (44).
- f . Press oil seal (42) in place 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.

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

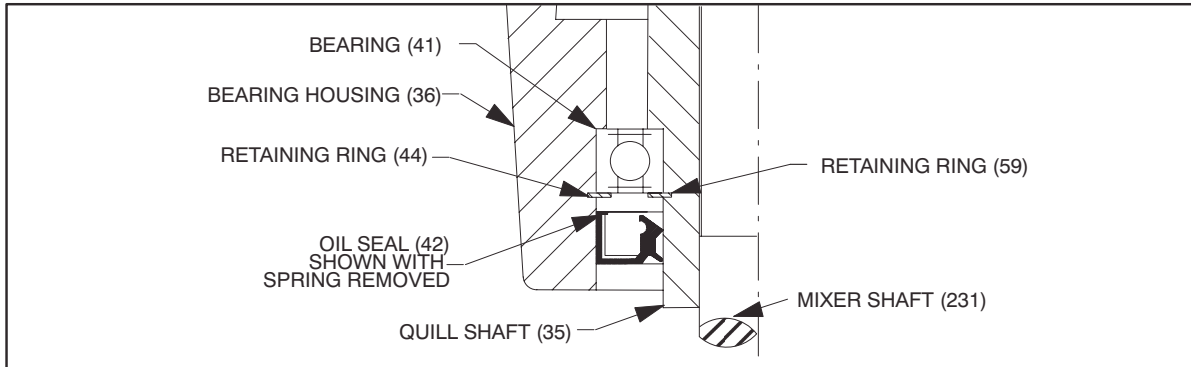


FIGURE 3 – Oil Seal Installation

- i . **PACK THE GEAR CARRIER (1)** with grease and rotate the gears several times to distribute the grease to the needle bearings. Refer to Section 6 for lubricant recommendations.
- j . Align the flats on the inside of the gear carrier (1) with the flats on the drive quill (35). Place the gear carrier and sun gear (9) assembly onto the drive quill.
- k . Install the ring gear (2), hollow pins (5), and hardware (7,8) in bearing housing (36).
- l . Install gasket (22) in its groove on the bearing housing, and gasket (43) in its groove in the spacer.
- m . Remove the sun gear (9) from the gear carrier (1).
- n . Place the drive coupling (102) on the motor shaft if necessary.
- o . Install the sun gear (9) into the drive coupling (102) until it shoulders against the drive coupling. Tighten the two set screws to 7 ft–lbs.
- p . Set the elevation of the sun gear to the dimension shown in Figure 4 and tighten the remaining two coupling set screws to 7 ft–lbs.

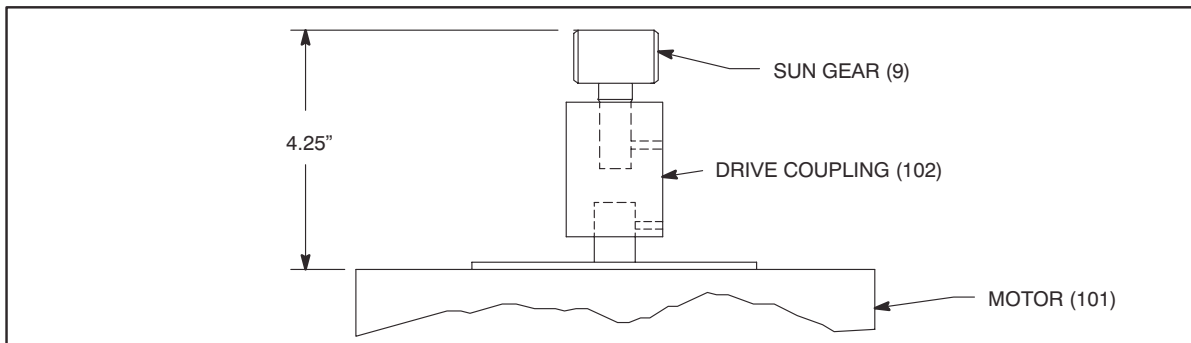


FIGURE 4 – Sun Gear Placement

- q . Fill the bearing housing with lubricant to approximately 1/2" from the top. Refer to Section 6 for lubricant recommendations.

8.3 FINAL ASSEMBLY

- a . Bolt the bearing housing (36) and spacer (21) 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.
- b . 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.

**TABLE 3 – AIR PRESSURE / AIR CONSUMPTION GUIDE FOR
AIR MOTOR DRIVEN MIXER
(AIR MOTOR OPERATING AT 1800 RPM)**

H.P.	GAST MOTOR #	SHAFT RPM	PRESSURE CONSUMPTION REQUIRED	
			* (PSIG)	** (CFM FREE AIR)
1/3	#2	1800	60	13
1/3	#2	360	60	13
1	#4	1800	80	40
1	#4	360	80	40

* 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.

SECTION 10 – AIR MOTOR LUBRICATION

- 10.1 Use only a high detergent lubricant of the recommended viscosity. Recommended oils are shown in Table 4.
- 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 4 – Motor Lubrication

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 megohmmeter. 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.

MIXER PARTS

UNIT SIZE: EV "P" SERIES GEAR 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						
1		GEAR CARRIER ASSEMBLY - 6:1 RATIO (Includes item 9)	1	869617PSP		
		GEAR CARRIER ASSEMBLY - 5:1 RATIO (Includes item 9)	1	869616PSP		
2		RING GEAR	1	290901PSP		
3		BUNG ADAPTER	1	271787PSP		
5		HOLLOW PIN	4	291612STL		
7		SOCKET HEAD CAP SCREW	4	291556PSP		
8		FLAT WASHER	4	291613STL		
21		SPACER	1	271751ALF		
22*		GASKET	1	271795PSP		
35		3/4" DRIVE QUILL (INCLUDES ITEM 58)	1	871381PSP		
36		HOUSING	1	271753ALF		
38*		OIL SEAL	1	290706PSP		
39*		EXPANSION PLUG	1	271868PSP		
40		LANYARD	1	271869PSP		
41*		BALL BEARING	2	290151PSP		
42*		OIL SEAL	1	290701PSP		
43*		GASKET	1	271795PSP		
44*		RETAINING RING	1	270822PSP		
53		MOUNTING PLATE @ 0 DEGREES	1	272099ALM		
		MOUNTING PLATE @ 20 DEGREES	1	272098ALM		
58		SET SCREW - NYLOK (INCLUDED W/ ITEM 35)	1	271757STL		
59*		RETAINING RING	2	291592PSP		
60		SOCKET HEAD CAP SCREW	4	271758CPS		
61		FLAT WASHER	4	112005316		
72		HEX WRENCH	1	127210BPF		
101		MOTOR	Contact LIGHTNIN Representative			
102		COUPLING	1	292248PSP		
115		TANK CLAMP @ 0 DEGREES	1	271782ALM		
		TANK CLAMP @ 20 DEGREES	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

REVISION

K

IT-3712

**FOR AN UP TO DATE REPRESENTATIVE LIST
PLEASE GO TO: www.lightnin-mixers.com**

-OR-

**CALL: 1-888-649-2378
1-888-MIX-BEST**

Notes

LIMITED WARRANTY

Unless otherwise noted on the face hereof, SPX goods, auxiliaries and parts thereof are warranted to the original purchaser against defective workmanship and material for a period of twelve (12) months from date of installation or (18) months from date of shipment from factory, whichever expires first. If the goods or services do not conform to the warranty stated above, then as Buyer's sole remedy, SPX shall, at SPX's option, either repair or replace the defective goods or re-perform defective services. Third party goods furnished by SPX will be repaired or replaced as Buyer's sole remedy, but only to the extent provided in and honored by the original manufacturer's warranty. Unless otherwise agreed to in writing, SPX shall not be liable for breach of warranty or otherwise in any manner whatsoever for: (i) normal wear and tear; (ii) corrosion, abrasion or erosion; (iii) any good or services which, following delivery or performance by SPX, has been subjected to accident, abuse, misapplication, improper repair, alteration, improper installation or maintenance, neglect, or excessive operating conditions; (iv) defects resulting from Buyer's specifications or designs or those of Buyer's contractors or subcontractors other than SPX; or (v) defects resulting from the manufacture, distribution, promotion or sale of Buyer's products.

THE WARRANTIES CONTAINED HEREIN ARE THE SOLE AND EXCLUSIVE WARRANTIES AVAILABLE TO BUYER AND SPX HEREBY DISCLAIMS ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE FOREGOING REPAIR, REPLACEMENT AND REPERFORMANCE OBLIGATIONS STATE SPX'S ENTIRE AND EXCLUSIVE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS.



TECHNICAL SERVICES

The Lightnin brand dedicated after sales support teams are on hand to offer advice and support. With more than 85 years' experience in the manufacture and supply of agitation equipment, we know what parts need to be on hand to support our customer base so that your downtime is minimized. Our team of highly experienced field service technicians is on call to support the on-site servicing of equipment, or supervise and train your maintenance staff in best practice care of equipment.

INSTALLATION AND COMMISSIONING

Proper installation of your Lightnin mixer is critical to its long term performance and reliability. To ensure that installation

procedures are followed, a certified technician will:

- Audit the equipment
- Supervise job-site contractors
- Perform a final inspection

SERVICE SUPPORT & REFURBISHMENT

The equipment audit is specifically designed to identify potential mechanical problems before they occur. Using many forms of modern technology and drawing on our mixer manufacturing experience, our technicians can identify the onset of bearing and gear failures, misalignment and system problems without the need to interrupt production. Factory gearbox exchange and refurbishment programs offer a fast and cost-effective route to extending equipment life.

SPX FLOW TECHNOLOGY

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Rochester, NY 13511

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F: (585) 436-5589

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SPX reserves the right to incorporate our latest design and material changes without notice or obligation.

Design features, materials of construction and dimensional data, as described in this bulletin, are provided for your information only and should not be relied upon unless confirmed in writing.

Please contact your local sales representative for product availability in your region. For more information visit www.spx.com.

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