

# OPERATION & MAINTENANCE MANUAL

FOR

# SHARPE M5 PORTABLE MIXERS



**READ BEFORE UNPACKING MIXER**



YOUR MIXER HAS BEEN TESTED AND SHAFT STRAIGHTNESS VERIFIED PRIOR TO SHIPMENT. CAREFUL HANDLING OF SHAFT PRIOR TO AND DURING INSTALLATION WILL ENSURE PROPER OPERATION. THE FOLLOWING CRITERIA MUST BE ADHERED TO IN ORDER TO PREVENT DAMAGE TO EQUIPMENT OR SERIOUS INJURY TO OPERATING PERSONNEL:

## WARNING

- HIGH VOLTAGE AND ROTATING PARTS CAN CAUSE SERIOUS OR FATAL INJURY. ONLY EXPERIENCED PERSONNEL MUST OPERATE OR SERVICE THIS EQUIPMENT.
- **NEVER** ENTER TANK WITHOUT LOCKING-OUT POWER TO MIXER.
- LOCKOUT POWER PRIOR TO REMOVING ANY GUARDS OR SERVICING ANY PART OF THIS EQUIPMENT, INCLUDING INITIAL INSTALLATION AND/OR INSPECTION.
- THIS MANUAL MUST FIRST BE FULLY READ AND UNDERSTOOD PRIOR TO INSTALLATION BY ALL PERSONNEL INSTALLING AND/OR OPERATING THIS, OR NEAR THIS EQUIPMENT.
- **NEVER** USE THIS EQUIPMENT FOR ANY USE OTHER THAN DESCRIBED IN THE ORIGINAL PROPOSAL AND APPLICATION BOX ON THE DATA SHEET.
- MODIFICATIONS UNAUTHORIZED BY SHARPE MIXERS TO THIS EQUIPMENT MAY DAMAGE EQUIPMENT OR CAUSE SERIOUS INJURY TO PERSONNEL.

## CAUTION

- **ALWAYS** READ THE SERVICE MANUAL THOROUGHLY BEFORE INSTALLATION AND START-UP.
- OPERATION OF MIXER IN AIR IS NOT RECOMMENDED.
- **ALWAYS** FOLLOW MOUNTING RECOMMENDATIONS DESCRIBED IN ORIGINAL PROPOSAL. MIXER PLATFORM MUST BE STABLE.
- EXTENDED OPERATION OF MIXER WHEN LIQUID LEVEL IS AT OR NEAR BOTTOM IMPELLER IS NOT RECOMMENDED.
- **ALWAYS** ROTATE THE SHAFT BY HAND TO VERIFY STRAIGHTNESS PRIOR TO OPERATION IN LIQUID.
- **ALWAYS** CHECK ASSEMBLY DRAWING AND DATA SHEET FOR SPECIAL OPERATING SPEED REQUIREMENTS IF USING A VARIABLE SPEED DRIVE.
- **ALWAYS** FLUIDIZE SETTLED SOLIDS BEFORE STARTING MIXER.
- **NEVER** LIFT MIXER BY SHAFT.

ANY EXCEPTIONS TO THE ABOVE MUST BE AGREED UPON IN WRITING BY **SHARPE MIXERS** AND NOTED ON THE ASSEMBLY DRAWING.

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# SHARPE MIXERS

SERIAL NO.:



**OPERATION AND MAINTENANCE MANUAL  
FOR  
SHARPE M5 PORTABLE MIXERS**

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# OPERATION and MAINTENANCE INSTRUCTIONS for SHARPE PORTABLE MIXERS

## SECTION 1

### INITIAL INSPECTION, RECEIVING AND STORAGE

1.1 Immediately upon receipt of the equipment check the crating and contents for any damage that may have occurred in transit. Report any damage immediately to the carrier and to Sharpe Mixers. Check against packing slip to be sure that all parts were received. Report missing items to Sharpe Mixers.

1.2 Mixer and impellers are normally packed together. The mixer shaft is packed in a separate container. Impellers are usually banded to mixer drive or lag-bolted to drive skid. If space allows, keep shipping containers for possible future use.

1.3 Storage: Store mixer in a clean dry location, with circulating air free from wide variations in temperature. Electric motors are easily damaged by moisture.

Store the entire unit off the floor, covered with plastic, and use desiccants to reduce moisture build-up. Do not seal the plastic cover as this traps moisture. If the motor shows signs of moisture absorption before start-up, dry the motor out by applying 10% voltage on two leads (if in doubt, measure resistance in windings). This should give approximately 50% rated current. There are also sprays available to help dry out motors. Relubricate motor before start-up when in storage six months or more. When gear drive models have been in storage for more than a year, the condition of the gear lubricant must be inspected (see Section 6, Lubrication).

## SECTION 2 MOUNTING

2.1 Set the mixer drive on the tank mounting surface and tighten the clamp screw until stabilized. Check to see that both the horizontal and vertical mounting surfaces are in even contact. Tighten the clamp screw securely. If the unit is supplied with a cup plate instead of a C-clamp, bolt the cup plate securely in place using four (4) 3/8" hex bolts (see page 6 for cup plate dimensions). Lock washers or double-nutting is recommended to prevent bolts from loosening by equipment vibration.

2.2 Mounting structure must be stable. If mounting to a flexible tank wall or other unstable support, mixer loads may cause dismounting, damage to the tank, or other hazards. A free standing mounting bracket may be fabricated, or ask for Bulletin MS9-6 describing the portable mixer stands we have to offer.

## SECTION 3 INSTALLING THE MIXER SHAFT & IMPELLER

(refer to pages 6 or 7)

**WARNING:** Always lockout power before installing or removing mixer shaft or impeller.

3.1 The mixer shaft will have one end (marked "motor end") ground to fit the drive bearing and coupling. Slide the impeller(s) onto the opposite end with the concave side of the blades facing AWAY from motor end of shaft (for standard clockwise rotation, down pumping only). A single impeller is mounted at the end of the shaft. The upper impeller (if supplied) is normally mounted a minimum of 2 impeller diameters below the liquid surface. Tighten the set screws securely. High horsepower units will have "divots" into which the set screws must be tightened.

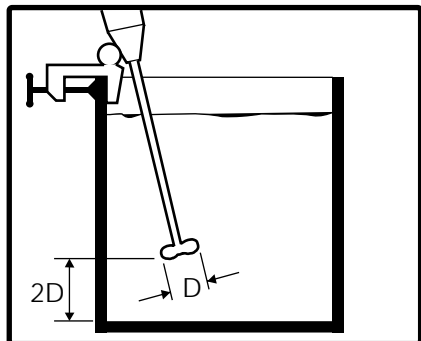
3.2 Remove the service window (512) from the mixer nosecone so the bearing and coupling are visible (see page 6 or 7). Rotate the coupling until the two clamping bolts (651) are accessible. Install the mixer shaft (with the end marked "motor end") up through the lip seal, bearing, and into the drive coupling (650). Do not use oil to aid in assembly or slippage may occur. Using the 3/16" hex wrench supplied, **TIGHTEN THE TWO BOLTS IN THE COUPLING (651)**, gripping the mixer shaft in position. Tighten **SECURELY** as these bolts transmit the mixer torque. **TIGHTEN THE TWO BEARING SET SCREWS (310)**, using the 1/8" hex wrench provided.

## SECTION 4 POSITIONING

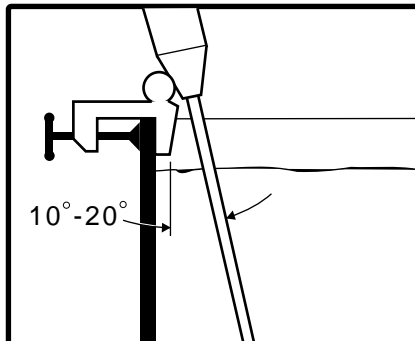
4.1 The “ball and socket” mounting design allows for 360° rotation of the mixer drive, and 90° adjustment of the shaft angle. The best positioning for your particular application depends on your tank shape and process requirements. Refer to the illustrations below:

4.2 Rotate the mixer shaft by hand to assure that the impeller runs free of any obstructions in the tank, i.e., baffles or heating coils, etc.

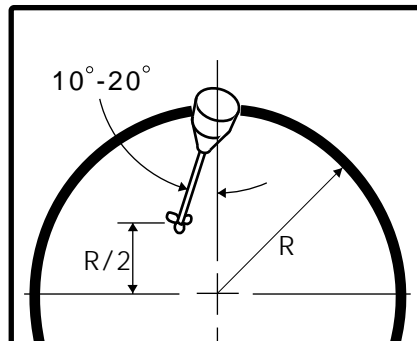
*See page 5 for instructions on adjusting the M5 Quick-Release Mounting System*



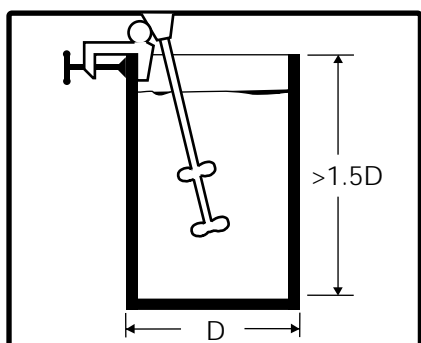
4.3 If tank diameter is approximately equal to liquid depth, use one propeller, placed at least 2 propeller diameters from the bottom of the tank.



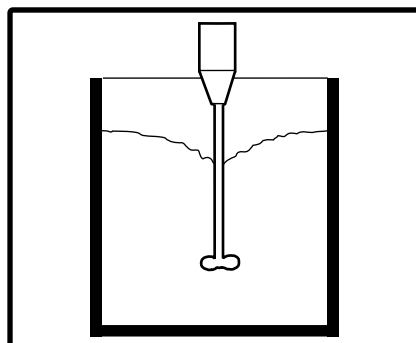
4.4 Position the mixer shaft 10° to 20° off vertical.



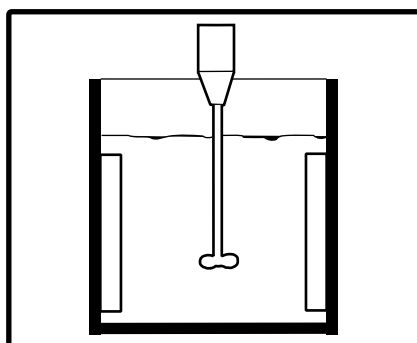
4.5 Pivot mixer clockwise until shaft points 10° to 20° off tank centerline, and the propeller is about halfway from center to edge of tank.



4.6 If tank height is greater than 1.5 x the diameter, use two props. Position lower prop at least 2 prop diameters from bottom. Place upper prop halfway between bottom and top of liquid level.



4.7 For drawing down light powders, position mixer in center of tank to create a vortex. A vortex may not be recommended for other products. Depth of propeller will vary vortex.



4.8 Baffles may be used to prevent vortexing when mixer is mounted on center. Baffling may not be required with more viscous products.

## SECTION 5 MOTOR CONNECTIONS

**WARNING:** High voltage and rotating parts can cause serious or fatal injury. Electric machinery can be hazardous. Installation, operation, and maintenance of electric machinery should be performed by qualified personnel. Familiarity with NEMA safety standards, National Electric Code and local building codes are required.

5.1 **Wiring:** Starting and overload control devices must be matched to motor rating. Follow control manufacturer's instructions for proper connections and installation.

5.2 Electrical connections must conform to National Electrical code and all local regulations. Line voltage and wire capacity must match motor rating stamped on motor nameplate.

5.3 **Electric motors - single phase:** If your mixer is supplied with a single phase motor it will normally be wired by the factory with a ten foot cord and an on/off switch. If no cord or switch is provided refer to the wiring diagram on the motor for correct connections. Check that the switch is in the off position before plugging the cord into a 110 volt outlet. *Check rotation!*

5.4 **Electric motors - 3 phase:** Motors requiring 3 phase power must be wired according to the wiring diagrams on the motor. Interchange lines if necessary for proper rotation. Size heaters for correct amperage ( see motor nameplate ) to provide overload protection.

5.5 **Electric Variable Speed:** Electric motors using an SCR or variable frequency controller must be wired

following the instructions supplied with the controller. Many adjustments are often required to the controller and instructions must be read carefully before applying power. Adjust the controller to limit the maximum speed to the motor nameplate R.P.M. ( or refer to the motor speed in the data sheet at the front of this manual ).

5.6 **Air motors:** Air driven mixers must always have a filter, lubricator, and moisture trap installed in the air

line ahead of the motor to prevent damage. Use the same or one pipe size larger than intake port of motor. A regulator may be used to govern the mixer speed. Install the air line in the proper port to provide proper rotation. These accessories are available from Sharpe Mixers.

**WARNING:** Damage to equipment or serious injury to personnel can result if speed limitations are not followed.

## SECTION 6 LUBRICATION

6.1 Your mixer has been lubricated at the factory with the proper type and amount of lubrication for normal service (gear drive units only). This lubricant needn't be changed under normal conditions for a period of 3 years. Under extreme conditions it is recommended that the lubricant in the gear box be changed more

frequently. Remove motor to repack gearbox. Refer to the chart below for the lubricant recommended for temperatures in your area. (When changing to a different lubricant, clean gearbox with mineral spirits before repacking.)

SERVICE	LUBRICANT	CHEVRON EQUIVALENT
32°F (0°C) and up	Oil based EP Semi fluid grease	Black Pearl NLGI 1 (standard from factory)
Down to -20°F (-29°C) and up to 300°F (149°C)	Synthetic EP	ULTI-PLEX synthetic grease EP
Food grade	Food grade EP-2	Chevron FM grease EP2

6.2 **Electric motor bearings** are usually sealed and need no relubrication. If zirc fittings are present relubricate a No. 2 consistency lithium soap base and petroleum compound every 6 months to 3 years depending on usage. Open and clean drains. Add grease until new grease is forced out drain. Remove excess grease and replace input plugs. Run motor

one half hour before replacing drain plugs. Mixer shaft bearings are sealed and need no relubrication.

6.3 **Air motor lubrication:** The lubricator needs to be adjusted to feed one drop of oil for every 50 -75 CFM of air through the motor. Use a detergent SAE #10 automotive engine oil.

## SECTION 7 OPERATION

**WARNING:** High voltage and rotating parts can cause serious or fatal injury. Lockout power before servicing.

7.1 Rotate mixer shaft by hand to check shaft straightness and to assure that the impeller is free of any obstructions in the tank.

7.2 **Never operate mixer without the lower impeller immersed** in the liquid by at least one prop diameter. Never operate mixer if fluid falls below this level.

7.3 Unless otherwise indicated on the DATA SHEET in front of this manual, the **propeller** rotates clockwise (pumping down) when viewed from above. Opposite rotation may cause overload and inefficient mixing.

7.4 Optimum mixing is achieved by following the positioning recommendations in Section 4. Vortexing may occur if liquid level is too close to the upper impeller. This will cause aeration of the product and

excessive vibration of the equipment. When mixing products of dissimilar viscosities and/or specific gravities the lighter or less viscous material should be introduced first. Gradually add the heavier material or powders into the center of the tank while the agitator is running. Never dump large amounts of powder or solids into the mixing tank. This may create clotting or "sanding in" of impeller and cause damage to the equipment.

**CAUTION:** Do not start mixer with impeller buried in solids or with liquid solution solidified. Damage will occur.

7.5 If impeller is buried in solids prior to starting mixer, solids must be dispersed. This may be achieved with an air hose, a recirculating pump, or a large stirring stick if necessary.

7.6 Shaft vibration is normal with a portable mixer. The rubber vibration pad in the mixer mount is designed to allow shaft vibration without damaging the mixer drive.

Excessive vibration may be caused by a shaft or impeller which has been bent, possibly in shipment. Consult factory for recommendations.

7.7 Keep motors free from oil, dust, dirt, water, and chemicals. Keep air intakes and outlets free from foreign material. Electric motors supplied, although designed for outdoor use, may be damaged due to weather. A rain hood or similar protection may be necessary to prolong motor life.

7.8 Do not drive air motors above 1750 R.P.M.. See Figure 7.1 and 7.2 for proper air consumption and pressure. See DATA SHEET for motor size.

7.9 Regular maintenance is the best assurance of trouble free, long life mixer operation. Inspect and relubricate at regular intervals. Frequency and thoroughness depends on operation, nature of service, and environment.

4 AM AIR MOTOR @ 1750 R.P.M.					
H.P.	0.25	0.5	0.75	1.0	1.2
C.F.M.	14	22	30	39	48
P.S.I.	20	40	60	80	100

FIGURE 7.1

6 AM AIR MOTOR @ 1750 R.P.M.					
H.P.	0.5	1.0	1.6	2.2	2.6
C.F.M.	23	39	53	68	82
P.S.I.	20	40	60	80	100

FIGURE 7.2

**7.10 Start-Up Checklist**

Prior to and during start-up please check that the following things have been done:

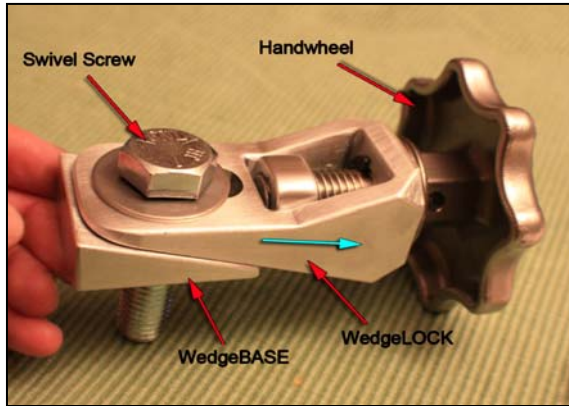
- a. Manual has been read and followed
- b. Shaft coupling bolts tight (3/16" hex "tee" wrench)
- c. Bearing setscrews tight (1/8" hex allen wrench)
- d. Sufficient weather protection for motor (if outdoors)
- e. Wiring correctly installed, grounded and insulated
- f. Correct heaters installed for overload protection
- g. All mounting bolts tight
- h. Impeller bolts tight
- i. Impeller(s) installed correctly (see Section 3)
- j. Impellers spaced correctly (if two or more) for maximum and minimum liquid level (see Section 3)
- k. Impeller immersed in liquid
- l. Proper type and amount of lubricant (when serviced; see Section 6)
- m. Proper shaft rotation (clockwise looking down, unless otherwise noted)
- n. Correct voltage/amperage upon starting (check against motor nameplate data)
- o. Excessive noise after start-up? Record: \_\_\_\_\_ db @ 3ft
- p. Excessive vibration of tank or support?

Record: \_\_\_\_\_ Volts \_\_\_\_\_ Amps

Record: \_\_\_\_\_ db @ 3ft

INSPECTOR \_\_\_\_\_ DATE \_\_\_\_\_

Sharpe Mixers' M5 Quick-Release Mounting System is relatively simple to assemble, but it won't work properly if not installed & adjusted correctly. The following procedure will help this installation:



1)- "Loosen" the handwheel fully counterclockwise until it stops, pulling the WedgeLOCK in the direction of the gray arrow, as shown.



2)- Install the assembly with the Swivel Screw through the slot in the nosecone swivel mount. Install the Vibration Pad over the screw, and thread the screw into the Clamp.



3)- Push the nosecone into the Clamp to stretch the Vibration Pad enough so the Screw will reach the tap in the Clamp. Continue to push the Nosecone into the Clamp and tighten the Swivel Screw until all slack is removed and the bolt is finger tight.



4)- The Swivel Screw must be loose enough at this point so the Nosecone can still be rotated and moved around in the Clamp.



5)- Turn the Handwheel clockwise to tighten the WedgeLOCK and secure the mixer in position.



**NOTE:** If the mixer is still loose when the handwheel is tightened, loosen the handwheel fully counter-clockwise and re-tighten the Swivel Bolt. This adjustment is especially necessary when the Vibration Pad is new and is not yet formed to fit into the Clamp.

## SECTION 9 DIRECT DRIVE DISASSEMBLY

8.1 Disconnect power from mixer.

**WARNING:** High voltage and rotating parts can cause serious or fatal injury. Lockout power before servicing.

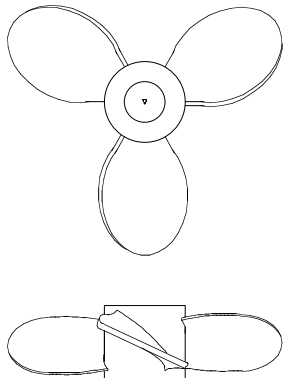
8.2 Remove the service window (512). Loosen the two bearing setscrews (310) and the two lower coupling bolts (651) and remove the mixer shaft. Remove the four 3/8" bolts mounting the motor to the nosecone and then the two may be separated.

8.3 Bearing and seal removal: Place the mixer nosecone in a bench press with the motor mounting face down. Use a 1-1/2" diameter arbor in the press on top of the lip seal (360) and press the lip seal and the bearing (301) down and out of the nosecone.

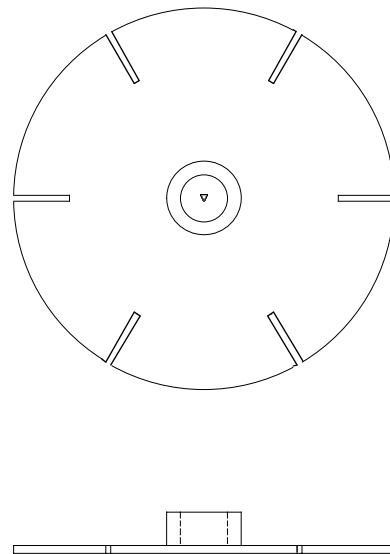
8.4 Reinstall the bearing from the **inside** of the nosecone, using a LOCTITE sealant (271 or better) to hold the bearing in place. The lipseal (360) must be installed from the **outside** of the nosecone into position as shown in the drawing.

8.5 To reassemble, reverse procedure, being sure shaft has full engagement in the split coupling (650) and all fasteners are tight.

### STANDARD DIRECT DRIVE IMPELLERS



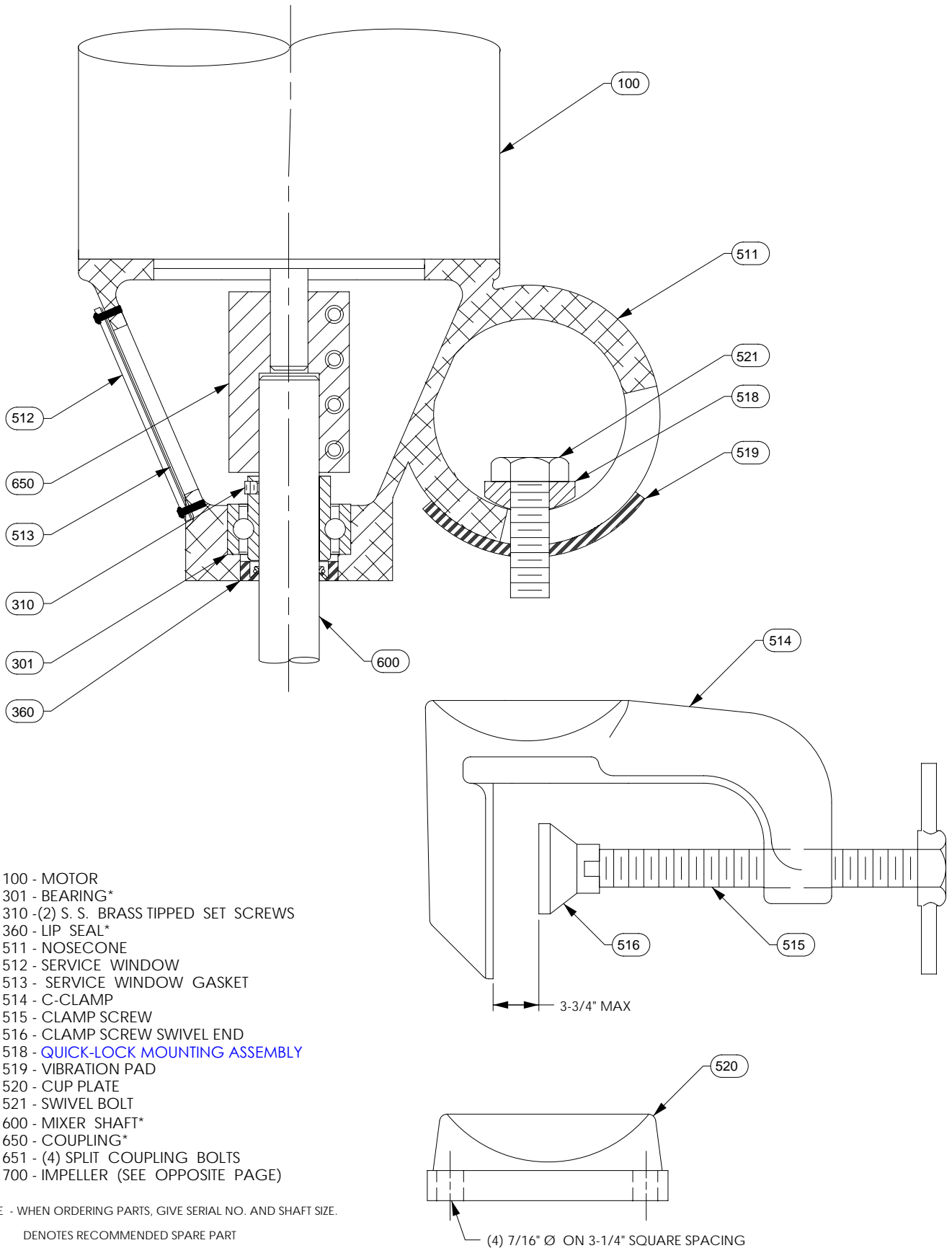
MARINE PROPELLER



HIGH SHEAR



# DIRECT DRIVE PARTS LIST

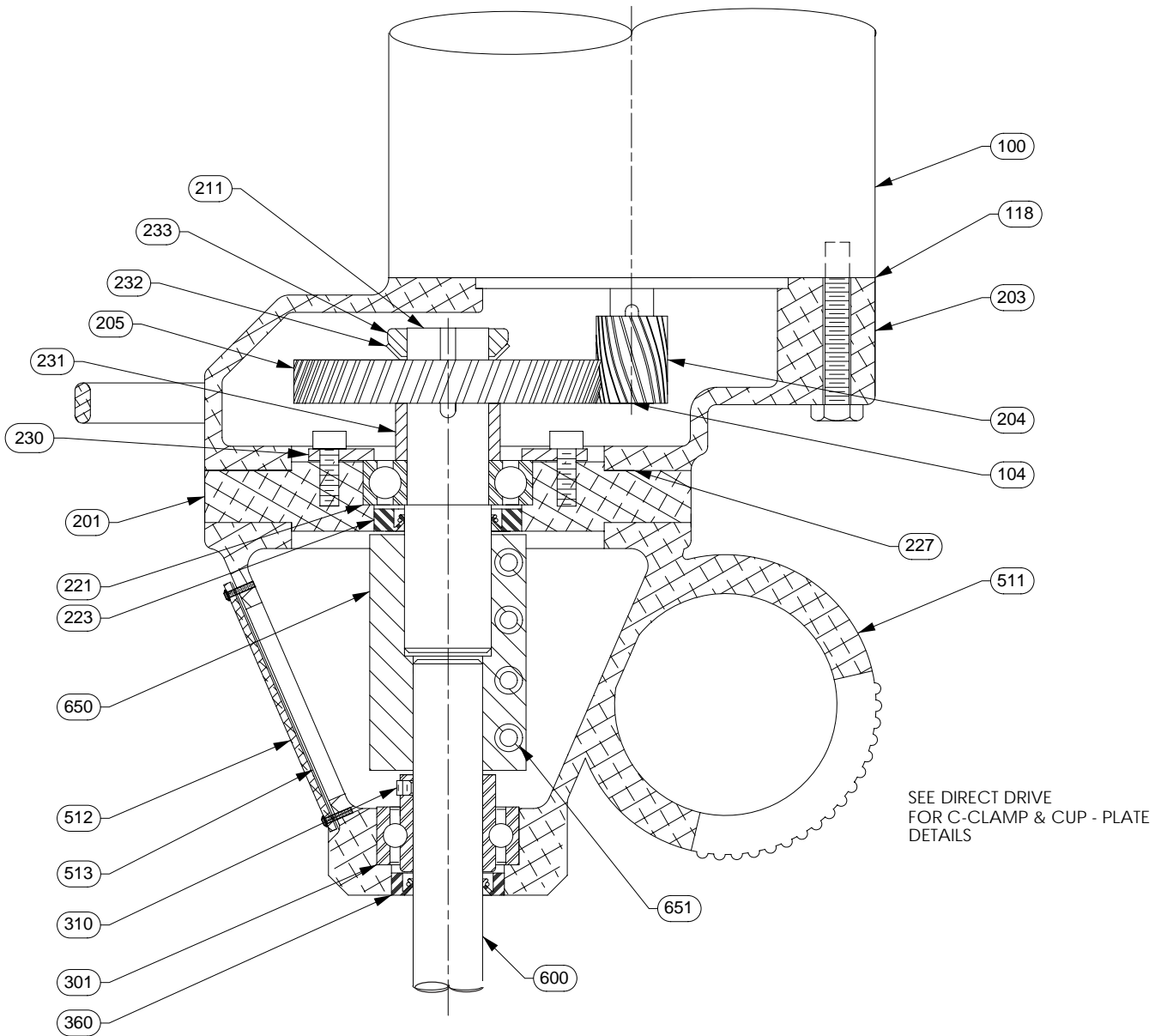


- ▽ 100 - MOTOR
- ▽ 301 - BEARING\*
- ▽ 310 - (2) S. S. BRASS TIPPED SET SCREWS
- ▽ 360 - LIP SEAL\*
- 511 - NOSECONE
- 512 - SERVICE WINDOW
- 513 - SERVICE WINDOW GASKET
- 514 - C-CLAMP
- 515 - CLAMP SCREW
- 516 - CLAMP SCREW SWIVEL END
- 518 - QUICK-LOCK MOUNTING ASSEMBLY
- 519 - VIBRATION PAD
- 520 - CUP PLATE
- 521 - SWIVEL BOLT
- 600 - MIXER SHAFT\*
- 650 - COUPLING\*
- 651 - (4) SPLIT COUPLING BOLTS
- 700 - IMPELLER (SEE OPPOSITE PAGE)

\* NOTE - WHEN ORDERING PARTS, GIVE SERIAL NO. AND SHAFT SIZE.

▽ DENOTES RECOMMENDED SPARE PART

# GEAR DRIVE PARTS LIST



- ▷ 100 - MOTOR
- ▷ 104 - PINION GEAR KEY
- ▷ 118 - C-FACE GASKET
- ▷ 201 - BEARING PLATE
- ▷ 203 - GEAR HOUSING
- ▷ 204 - PINION GEAR
- ▷ 205 - HELICAL GEAR
- ▷ 211 - GEAR SHAFT
- ▷ 221 - GEARBOX BEARING
- ▷ 223 - LIP SEAL
- ▷ 227 - GEARBOX GASKET
- ▷ 230 - BEARING RETAINER
- ▷ 231 - GEAR SPACER RING
- ▷ 232 - STAR WASHER
- ▷ 233 - GEAR NUT

- ▷ 301 - SHAFT BEARING\*
- ▷ 310 - (2) S. S. BRASS TIPPED SET SCREWS
- ▷ 360 - SHAFT LIP SEAL\*
- ▷ 511 - NOSECONE
- ▷ 512 - SERVICE WINDOW
- ▷ 513 - SERVICE WINDOW GASKET
- ▷ 600 - MIXER SHAFT\*
- ▷ 650 - COUPLING\*
- ▷ 651 - (4) SPLIT COUPLING BOLTS

\* NOTE - WHEN ORDERING PARTS, GIVE SERIAL NO. AND SHAFT SIZE.

▷ DENOTES RECOMMENDED SPARE PART

## SECTION 10 GEAR DRIVE DISASSEMBLY

9.1 Disconnect power from mixer.

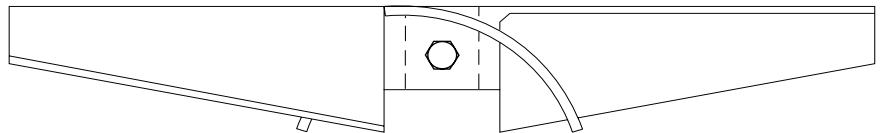
**WARNING:** High voltage and rotating parts can cause serious or fatal injury. Lockout power before servicing.

9.2 Remove the service window (512). Loosen the two bearing setscrews (310) and the two lower coupling bolts (651) and remove the mixer shaft.

9.3 Remove the three motor bolts and the motor may be lifted off the gear head assembly. Remove the four (4) 3/8" gear head assembly bolts and lift off the gearbox housing (203). The bearing plate (201) may now be removed with the gear, gear shaft and coupling assembled. Clean the assembly of grease and rinse with mineral spirits. Handling the gear shaft sub-assembly is best accomplished using a piece of round bar the same diameter as the mixer shaft. Clamp the round bar in a bench vise and tighten the drive coupling (650) onto the round bar. If a round bar is not available clamp the coupling in the vise using two pieces of wood so as not to damage the coupling. To remove the gear nut (233) first bend down the locking tab on the star washer from the slot in the gear nut. Using a spanner wrench, loosen the gear nut from the shaft. Remove the gear nut and the star washer. The slow speed gear (205) may be removed using a gear puller if it is too tight to remove by hand. Gear teeth are hardened and are easily chipped. Use care when handling. Loosen the upper two coupling bolts and remove the gear shaft/bearing plate assembly from the coupling. Place the subassembly in a press with the threaded end of the shaft pointing up. Remove the spacer ring (231) from the gear shaft. Press the gear shaft (211) down, out of the bearing plate. Remove the four 1/4" cap screws and the bearing retaining ring (230). Turn the bearing plate upside down so that the lip seal (223) is on top. Using a 2" diameter arbor press the lip seal and the bearing out of the bearing plate. See Section 8.2 for removal of bearing and lip seal in the nosecone.

9.4 To remove pinion gear (204) from the motor shaft, first clean the pinion gear and motor shaft of grease. Support the motor shaft with a soft block to prevent damage when removing the pinion gear. The pinion gear may be removed from the motor shaft using a gear puller. Use care to not chip the teeth of the hardened gear. Apply heat to break the adhesion of the Loctite®.

9.5 To reassemble a new gear on an existing motor, clean all parts and trial fit the pinion gear on the shaft. Never pound the pinion gear into place. Assemble gear and key flush with the end of the motor shaft using Loctite® # RC-680 compound. Remove any excess Loctite® from the gear, especially from the gear teeth. If replacing both the motor and pinion gear, Sharpe Mixers will normally supply the motor with the pinion gear installed. Pack the gearbox full with the appropriate lubricant (see Section 6).



HYFLO II ENERGY EFFICIENT IMPELLERS ARE  
STANDARD ON GEAR DRIVE PORTABLE MIXERS

Always reference mixer serial number when making a parts inquiry or placing an order. This serial number is located on the Sharpe Mixer nameplate and on the front cover of the service manual.

**SECTION 11**  
**TROUBLE SHOOTING GUIDE**

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
• Shaft will not fit into drive	<ul style="list-style-type: none"> <li>• Wrong end of shaft (only one end fits)</li> <li>• (2) bearing set screws (310) extend into bearing bore</li> <li>• (2) coupling bolts (651) too tight</li> <li>• Shaft over size (proper dia. 0.001" - 0.002" under nominal dia.)</li> <li>• Wrong size shaft (600), coupling (650), or bearing (301)</li> <li>• Damaged shaft (600), coupling (650), or bearing (301)</li> </ul>	<ul style="list-style-type: none"> <li>• Install end marked "motor end"</li> <li>• Loosen set screws</li>   <li>• Loosen bolts</li> <li>• Measure and consult factory</li>   <li>• Consult factory</li>   <li>• Consult factory</li> </ul>
• Mixer will not start	<ul style="list-style-type: none"> <li>• Incorrect wiring</li> <li>• Loose connections</li> <li>• Blown fuse</li> <li>• Incorrect voltage</li> <li>• Mechanical jamming</li> <li>• Water damage to motor</li> <li>• Wrong size heaters in starter</li> </ul>	<ul style="list-style-type: none"> <li>• Check wiring diagram and wire correctly</li> <li>• Check and tighten connections</li> <li>• Replace fuse</li> <li>• Wire for correct voltage</li> <li>• Free all debris for rotation</li> <li>• Service or replace motor</li> <li>• Replace heaters</li> </ul>
• Mixer will not reach correct speed	<ul style="list-style-type: none"> <li>• Overload of motor</li> <li>• Loose drive coupling bolts (651)</li>   <li>• Air motor vanes/ports dirty</li>   <li>• Insufficient pressure for air motor</li>   <li>• See "Mixer will not start"</li> </ul>	<ul style="list-style-type: none"> <li>• Check amperage against nameplate data</li> <li>• Check coupling bolt tension (coupling and/or shaft maybe damaged if mixer has been run with slipping coupling)</li> <li>• Flush air motor with non- combustible solvent &amp; relubricate</li>   <li>• increase air line, compressor size, decrease air compressor distance from air motor</li> </ul>
• Motor runs hot	<ul style="list-style-type: none"> <li>• Low or high voltage</li> <li>• Amperage overload</li> <li>• Product too viscous</li>   <li>• Restricted ventilation</li> <li>• Frequent starting and stopping</li>   <li>• Unbalanced voltage between phases</li> <li>• Incorrect rotation</li>   <li>• Air motor not lubricated properly</li> <li>• Impeller(s) upside-down</li>   <li>• Exceeding maximum speed</li> </ul>	<ul style="list-style-type: none"> <li>• Wire for correct voltage</li> <li>• Contact factory</li> <li>• Check viscosity and specific gravity of product (consult factory)</li>   <li>• Clear vents</li> <li>• Check with factory - a special motor may be required</li> <li>• Consult electrician</li>   <li>• Change motor leads per nameplate instructions</li> <li>• Lubricate (see Section 6)</li> <li>• Reinstall in correct position</li>   <li>• Adjust variable speed drive to limit R.P.M.</li> </ul>

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
<ul style="list-style-type: none"> <li>• Noisy</li> </ul>	<ul style="list-style-type: none"> <li>• Loose drive coupling bolts (651) or bearing set screws (310)</li> <li>• Insufficient lubricant</li> <li>• Foreign material in lubricant</li> <li>• Incorrect lubricant</li> <li>• Worn or faulty bearings / gears</li> <li>• Dry lip seal (360) in spool</li> </ul>	<ul style="list-style-type: none"> <li>• Check and tighten coupling bolts and set screws</li> <li>• Fill proper amount of lubricant</li> <li>• Change lubricant</li> <li>• Change to correct lubricant</li> <li>• Check bearings/gears replace if necessary</li> <li>• Apply lubricant to lip seal</li> </ul>
<ul style="list-style-type: none"> <li>• Bearing failure</li> </ul>	<ul style="list-style-type: none"> <li>• High temperature product</li> <li>• Excessive overhung load</li> <li>• Water damage</li> <li>• See all items under "Noisy"</li> </ul>	<ul style="list-style-type: none"> <li>• Provide heat shield</li> <li>• Consult factory</li> <li>• Replace bearing (check all other parts)</li> </ul>
<ul style="list-style-type: none"> <li>• Gear failure</li> </ul>	<ul style="list-style-type: none"> <li>• Excessive loading (check amps)</li> <li>• Lack of (or improper) lubrication</li> <li>• Start-stop-start loading (product burying impeller with solids)</li> <li>• Foreign material in lubricant</li> </ul>	<ul style="list-style-type: none"> <li>• Consult factory</li> <li>• Fill with recommended lubricant or equivalent (see Section 6)</li> <li>• Free impeller of any solids at start-up (pre stir with air hose or paddle)</li> <li>• Replace lubricant</li> </ul>
<ul style="list-style-type: none"> <li>• Oil leakage</li> </ul>	<ul style="list-style-type: none"> <li>• Excessive lubricant</li> <li>• Damaged/broken gasket</li> <li>• Loose bolts around side plates</li> <li>• Seals worn or damaged</li> </ul>	<ul style="list-style-type: none"> <li>• Check manual for proper amount lubricant and drain excess</li> <li>• Replace gasket</li> <li>• Check and tighten bolts</li> <li>• Replace seals</li> </ul>
<ul style="list-style-type: none"> <li>• Shaft vibration</li> </ul>	<ul style="list-style-type: none"> <li>• Impeller not immersed in liquid</li> <li>• Impeller too close to surface</li> <li>• Bent mixer shaft</li> <li>• Unstable mounting platform</li> <li>• Bent or uneven impeller blades</li> <li>• Worn or damaged drive bearings or coupling</li> <li>• Operating at critical speed</li> </ul>	<ul style="list-style-type: none"> <li>• Fill tank</li> <li>• Fill tank or lower impeller (see Section 3)</li> <li>• Consult factory</li> <li>• Reinforce platform</li> <li>• Consult factory</li> <li>• Replace damaged parts</li> <li>• Consult factory</li> </ul>

## Accessories and Options



### MIXER STANDS

Sharpe Mixers manufactures a wide variety of adjustable-height mixer stands, in sizes from 24" to 72" tall. Manufactured from plate steel & heavy-wall pipe, these stands are built for rugged service. Available in mild steel or stainless.



### PARTS KITS

After years of service, your Sharpe Mixer can be rebuilt with a Mixer Fixer Kit. All the right high quality parts are included in one efficient package. Includes all wearing parts and shaft coupling (not shown).



### STAND OPTIONS

Heavy-duty, ratchet type nylon tank straps optional to hold the stand tight to the tank. Casters are also available for easy movement of the stand from tank to tank.



### BUNG MOUNTS

Mounting adapters for 2" barrel bungs are available for both the Thrifty and Direct-Drive portable mixers. Folding impellers pass thru 2" opening.



### TOTE BIN MOUNTS

Sharpe's Tote Bin Mixers are designed specifically for portable tote-bin tanks. Sturdy three-point base with vibration mounts can be bolted to the tank roof, or directly to the threaded cover so it can be moved from tank to tank.



### F. R. L. KITS

Top-quality Filter / Regulator / Lubricator kits offer the best protection and control for air-driven mixers. Needle valves are also available for economical speed control.



### COATINGS AND SPECIAL ALLOYS

Sharpe Mixers offers a wide variety of coating options including Halar™, Kynar™, Teflon™, FRP and rubber covering. Special alloys such as Titanium or Alloy 20 are also available.



### POLISHING

#4 polished impellers are available from stock, with finer finishes down to 5 Ra, and all-welded & blended assemblies optional.

# SHARPE MIXERS, INC.

## STANDARD TERMS & CONDITIONS OF SALE

In consideration of the mutual promises and agreements contained herein, the buyer ("Buyer") and SHARPE MIXERS, INC. ("SHARPE" or "WE") hereby agree to the following terms and conditions; provided, that the terms and conditions (including the price quotations) shall only become binding on SHARPE upon the mailing or other transmission of SHARPE's Acknowledgment Form as described in Section 6 Below.

### 1. Warranty

We warrant that we shall repair or replace, without additional charge, or refund the price of, the products provided to the Buyer herewith (collectively "Mixer") if the Mixer (a) is defective in materials or workmanship, (b) fails to provide the process results specified in SHARPE's proposal ("Proposal"), or (c) if no process results are specified in SHARPE's proposal, Mixer fails to provide the process results described in Buyer's written specifications. While we warrant that the Mixer is made from the materials specified in the Proposal or its commercial equivalent, WE DO NOT GUARANTEE THE MIXER AGAINST CHEMICAL ATTACK OR OTHER DETERIORATION DUE TO EXPOSURE.

**THE FOREGOING WARRANTIES EXTEND ONLY FOR TWELVE (12) MONTHS AFTER FIRST INSTALLATION OF THE MIXER AT BUYER'S FACILITY OR FOR EIGHTEEN (18) MONTHS AFTER ITS SHIPMENT FROM SHARPE'S FACILITY, WHICHEVER PERIOD IS SHORTER. ADDITIONALLY, SUCH WARRANTIES ARE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, ORAL OR WRITTEN, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF SHARPE. THESE WARRANTIES SHALL NOT APPLY TO FAILURES RESULTING FROM (A) NORMAL WEAR AND TEAR, (B) ACCIDENT, NEGLIGENCE, ALTERATION, ABUSE, MISUSE OR USE INCONSISTENT WITH ANY INSTRUCTIONS PROVIDED AS TO STORAGE, HANDLING, MAINTENANCE, LUBRICATION, INSTALLATION, STARTUP, OPERATION AND SAFETY, (C) IMPROPER INSTALLATION AND/OR (D) INACCURATE AND/OR INCOMPLETE SPECIFICATIONS, DESIGN CONDITIONS OR OTHER DATA FURNISHED BY OR ON BEHALF OF BUYER. WE MAKE NO WARRANTY WHATSOEVER WITH RESPECT TO ACCESSORIES OR PARTS NOT SUPPLIED BY SHARPE.**

### 2. LIMITATION OF REMEDIES

Buyer's remedy for breach of any of the foregoing warranties shall be limited to those set forth in Section 1 above; provided, WE will not be responsible for removal, loading, installation, freight or similar related expenses in connection with any replacement, repair or return. The determination of which such remedy shall be applicable shall be determined by SHARPE, in its sole discretion. THE ABOVE STATED REMEDIES ARE SHARPE'S ENTIRE AND EXCLUSIVE LIABILITIES AND BUYER'S EXCLUSIVE REMEDIES FOR ANY CLAIM FOR DAMAGES IN CONNECTION HEREWITH. By way of illustration and not limitation, in no event shall we be liable for any direct, indirect, special or consequential damages or delay whatsoever or loss of use, and SHARPE'S liability under no circumstance will exceed the contract price for the Mixer for which liability is claimed. All claims for breach of any of SHARPE'S warranties shall be barred unless Buyer notifies SHARPE in writing within 30 days of discovery of the breach. WE shall not be responsible for any repairs performed by third parties unless the extent, terms and costs of such repairs are authorized by SHARPE in writing in advance. Buyer shall be solely responsible for any agreement that Buyer makes with its customers which is contrary to the foregoing provisions.

### 3. DELIVERY / SHIPMENTS

Unless otherwise quoted, shipments are F.O.B. shipping point. Risk of loss and damage to the Mixer shall pass to Buyer upon delivery to the carrier and at such time, Buyer shall be solely responsible for the Mixer. We will make every effort to ship on the date specified in the contract; provided, that such dates are approximations only. We will not be liable for or penalized as a result of delays in shipment, for any cause, including but not limited to delays that are beyond our control.

Buyer may not defer shipments beyond the specified shipment date after commencement of manufacture without SHARPE's written consent. When shipping is deferred for Buyer's convenience, due to lack of shipping instructions, failure to complete credit arrangements satisfactory to SHARPE or late delivery of customer supplied material, Buyer agrees to pay reasonable storage charges, interest and any other expenses incurred by SHARPE due to the delay. Orders on which delivery is deferred shall be invoiced upon completion of manufacture and are subject to finance charges of 1.5% per month.

### 4. CHANGES

Any changes requested by Buyer and approved by SHARPE with respect to the Mixers shall be subject to adjustments to the delivery schedule and/or

price of the Mixer, as shall be determined by SHARPE, in its sole discretion.

### 5. PRICES / PAYMENT

Price quotations set forth on any Proposals from SHARPE are for informational purposes only and represent an estimate of the prices that will be available to Buyer. Such price quotations are not binding upon SHARPE until an authorized representative of SHARPE (at SHARPE's home office in Seattle, Washington) accepts and confirms in writing any offer to purchase submitted by the Buyer by way of a Contract Acknowledgment. Prices set forth on SHARPE's Acknowledgment Form shall be binding with respect to the order described therein; provided, that orders placed "on-hold" or held over 3 months or more (i.e., awaiting Buyers approval) are subject to price adjustments.

Upon approval of Buyer's credit by SHARPE, unless stated otherwise on the face hereof (in which case such terms shall control), terms are net 30 days, F.O.B. Seattle, WA-Freight Collect; provided, that if, in the sole discretion of SHARPE, (a) the order is for a customized or otherwise unique Mixer or is of a substantial magnitude or for any other reason, or (b) Buyer's credit is not approved or the financial condition of Buyer becomes such that it does not justify continuance of production, shipment or delivery on the terms of payment specified, we may require full or partial payment in advance or payment upon delivery. Prices do not include customs, duties or taxes such as sales, use, excise, retailer's occupation or similar taxes, and if, in connection with this transaction, SHARPE is subject to any such customs, duties or taxes, the same will be added to the purchase price to be paid by Buyer. If payment is not made when due, Buyer shall pay SHARPE a finance charge of 1.5% per month and (ii) ALL WARRANTIES PROVIDED BY SHARPE HEREUNDER SHALL IMMEDIATELY BE NULL AND VOID. All price lists and discount schedules are subject to change without notice.

### 6. ACCEPTANCE

All orders by Buyer are subject to acceptance by SHARPE's authorized representative at SHARPE's main office; provided, that any terms or conditions which are additional or different to the terms and conditions set forth herein or which may have been included in any communication between Buyer and SHARPE, whether written or oral, are hereby objected to by SHARPE and shall not be effective or binding upon SHARPE unless specifically assented to by a duly authorized officer of SHARPE in Writing. No waiver, alteration or modification of any of the provisions hereof shall be binding on SHARPE unless made in writing and signed by a duly authorized officer of SHARPE. Buyer's acceptance of delivery of the Mixer shall constitute full acceptance of all of the terms and conditions set forth herein. The failure of either party to enforce any of its rights hereunder shall not constitute a waiver of such rights or of any other rights hereunder. The terms and conditions of the Acknowledgment contain the entire agreement of the parties. Clerical and typographical errors are subject to correction.

### 7. CANCELLATION CHARGES

Orders placed by Buyer may not be canceled without SHARPE's written consent. Buyer agrees to indemnify SHARPE against all loss, damage or expense incurred due to cancellation including, but not limited to the cost of special materials, non-resalable goods, completed or in process, labor, freight, engineering time, overhead and profit. A minimum charge of 20% will be applied in the event of a cancellation.

### 8. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

WE do not warrant or represent that any of SHARPE's products by themselves or in a system or with other equipment will conform to or comply with the provisions of the Occupational Safety and Health Act of 1970 and the standards and regulations thereunder, or any other federal, state, or local law or regulation of the same or similar nature.

### 9. PATENTS

SHARPE certifies that to its knowledge the Mixer does not infringe upon any patents granted to others by the United States of America. WE do not assume any responsibility or liability for any claim of infringement brought against the Buyer, its successors, assigns, customers or users of the Mixer.

### 10. ATTORNEY FEES

In the event an arbitration, suit or action is brought by any party under this agreement to enforce or interpret any of its terms, or in any appeal therefrom, it is agreed that the prevailing party shall be entitled to reasonable attorneys fees to be fixed by the arbitrator, trial court, and/or appellate court. Buyer shall be responsible for any and all costs of collection incurred by SHARPE in connection herewith, including attorney's fees and costs.

### 11. JURISDICTION/VENUE

This agreement shall be binding upon the successors and assigns of SHARPE and Buyer, and shall be deemed entered into at Seattle, Washington, and shall be governed by and construed in accordance with the laws of the State of Washington. In the event of litigation between the parties to enforce any terms of the agreement, the parties agree that venue shall be the Superior Court of the State of Washington for King County. \_\_\_\_\_



Sharpe Mixers manufactures a full line of liquid mixing equipment including top and side entry mixers and custom designs to meet specific requirements. Contact your local representative or visit our web site to find out more



## Applications

- FOOD AND BEVERAGE
- PHARMACEUTICAL
- PULP AND PAPER
- PETROLEUM
- CHEMICAL
- MUNICIPAL
- WASTE TREATMENT
- MINING

Built with pride in the United States of America

*Sharpe Mixers' strength originates from the teamwork and energy of our people - experienced and innovative employees dedicated to providing exactly what our customers demand: superior equipment, excellent service and timely delivery at a competitive price.*

**SHARPE  
MIXERS**

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