



# SERVICE INSTRUCTIONS

**MODEL HFG  
GEAR DRIVEN SIDE ENTERING MIXERS  
MANUAL NO. 05-07349  
REVISED 07/2018**

CUSTOMER:

P.O. NO.:

ITEM NO.:

MIXER MODEL NO.:

SHAFT SEAL NO.

MIXER SERIAL NO.:

DATE:

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## **FOREWORD**

The information contained in this manual covers MixMor Model HFG gear driven side entering mixers.

This model is furnished with different types of shaft seals. The front page of this manual and the certified drawing lists the mechanical seal number, which corresponds with the type of seal furnished on your mixer.

We have included information in this manual that covers installation, start-up, service, and troubleshooting to assure years of reliable mixer service. Should questions or problems occur that are not covered in this manual, consult your local representative, or contact MixMor (323) 664-1941.

## **GENERAL INFORMATION**

When apparent or suspected damage has been found on equipment, during transport from factory to user, both the carrier and MixMor must be notified immediately.

When receiving equipment, a check should be made to determine whether all inventoried parts are still in the shipment. Any discrepancy should immediately be reported to both the carrier and MixMor, if claim is to be made.

MixMor mixers do not require the service of a factory engineer upon installation. This service is not included in the price of the unit; therefore, if it is to be furnished, it must be agreed upon, in writing, between MixMor and the purchaser.

MixMor warranty becomes void if the unit sold is not operated within the rating and mixing service conditions for which it was specifically sold. The purchaser shall take all necessary precautions to eliminate all external destructive conditions, including unusual variable loads affecting the critical speeds of the system, severe shock loading, mechanical or thermal overloads and other conditions of which MixMor was not fully advised. The mixer must be installed and maintained in accordance with this service manual.

MixMor must be informed within thirty days, for warranty to cover the mixer in the event of any malfunction during the warranty period.

All personnel directly responsible for operation of equipment must be instructed on proper installation, maintenance and safety procedures.

Design improvements are implemented on a continuous basis. Therefore, we reserve the right to make changes without notice. If any questions arise regarding the data or information in this manual, please contact MixMor in Los Angeles, California.

## **HANDLING INSTRUCTIONS**

### **SAFETY**

When handling or working on a MixMor mixer, safety precautions must always be remembered and followed. The proper tools, clothing and methods of handling should be used to prevent any accidents.

This manual lists a number of safety precautions. Follow them. Insist that your employees do the same. Safety precautions and equipment have been developed from past accidents. Follow and use them for your protection.

### **HANDLING**

Do not support or lift the mixer in a manner, which could create excessive stress on parts or shaft extensions. Never allow shafting to support any weight of the drive assembly. A slightly bent shaft will cause extreme mixer vibration. Support the mixer with a lifting sling to prevent damaging of any external mixer parts.

## **INSTALLATION INSTRUCTIONS**

### **STORAGE**

If installation of the mixer and/or operation is to be delayed for more than one month after factory shipment, special rust preventative precautions should be taken. The precautions may be taken by the user or by the factory if full information concerning storage conditions is provided at the time of ordering. When prolonged storage is unavoidable, it should be indoor and preferable in a dry environment having a relatively constant temperature to avoid condensation problems.

### **LOCATION**

The mounting location of the mixer has a definite effect on the flow pattern within the tank. The recommended location has been made with regard to your particular application and should be carefully followed to obtain optimum results.

### **MOUNTING**

Securely bolt down the mixer to its foundation using proper size bolts, which will fit mounting holes. Bolts should be SAE Grade 5 or equivalent.

### **GEAR REDUCER**

The gear reducer is shipped from the factory with a completely assembled gear drive. Gearing is carefully assembled at the factory to provide proper gear contact. Do not change the setting in any way.

When shipped the gear reducer has been filled with the proper lubricating grease and does not have to be serviced before start-up. We recommend that you read the LUBRICATION INSTRUCTIONS before start-up to familiarize yourself with this mixer.

### **SHAFT SEAL**

The shaft seal must be checked before the mixer is started and/or the tank filled. Refer to the SHAFT SEAL section for detailed instructions.

## LUBRICATION

### GEAR REDUCER

All HFG mixers are shipped from the factory with the gear reducer filled with the proper lubricating grease. The grease should be changed every five years, when used under normal operating conditions, and /or whenever repair work is performed. If the mixer is operating in extremely dirty, or high or low temperature environments, the grease should be changed more often. If you or your lubricant supplier is uncertain as to the frequency of changes, please consult MixMor for the recommendations for your specific environment.

### CHANGING GREASE

Drawing No. 05-00831 (Page 11). Loosen socket head set screws (12) and remove the mixer shaft (15) from the drive. Remove socket head cap screws (48). This will allow the gear reducer assembly to be separated from the pedestal (25). Remove socket head cap screws (54) and separate the output shaft housing (27) from the gear housing (5). Remove all grease and clean all parts with a non-flammable, non-toxic solvent. Refill the gear reducer housing (approximately 2 lb., 12 oz.) with the appropriate grease and reassemble the mixer. Refer to the following chart for the approved lubricant recommendation.

### **APPROVED LUBRICANTS**

LUBRICANT MANUFACTURER	BRAND NAME
Shell	Gadus S2-U1000-1
Texaco	Thermatex EP-1
Chevron	SIL-X NGL1
Esso	Unirex EP1
Castrol	Spheerol EPL 1
Citgo	SEP Grease 1

### GEAR REDUCER BEARINGS

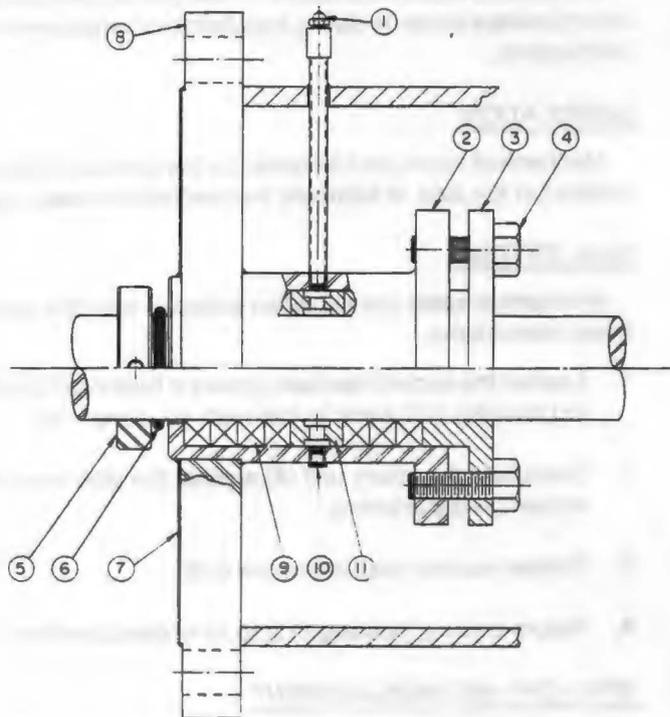
All gear reducer bearings are permanently lubricated, double sealed and do not require additional lubrication.

## STANDARD STUFFING BOX

Dwg. No. 05-07350

ITEM NO.	DESCRIPTION
1	Grease Fitting
2	Stuffing Box
3	Follower*
4	Adjustment Screw
5	Seal Off Collar
6	"O" Ring*
7	Flange Facing
8	Flange
9	Packing*
10	Plug
11	Lantern Ring*

\*Recommended Spare Parts

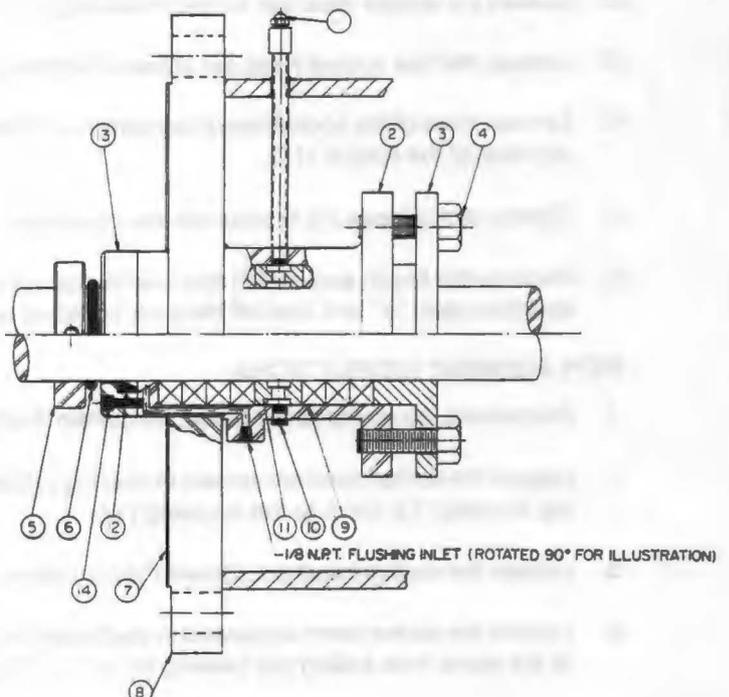


## WATERFLUSH STUFFING BOX

Dwg. No. 05-07351

PART NO.	DESCRIPTION
1	Grease Fitting
2	Stuffing Box
3	Follower*
4	Adjustment Screw
5	Seal-Off Collar
6	"O" Ring*
7	Flange Facing
8	Flange
9	Packing*
10	Plug
11	Lantern Ring*
12	Lip Seal*
13	Seal Housing
14	Soc. Hd. Cap Screw

\*Recommended Spare Parts



**STANDARD STUFFING BOX #05-07350**  
**WATERFLUSH STUFFING BOX #05-07351**

**GENERAL INFORMATION**

The purpose of a stuffing box packing is to limit leakage to a practical level and not to stop leakage completely. If the gland is tightened to prevent all leakage, packing life will be shortened and shaft damage will occur. The stuffing box START-UP instructions should be carefully followed for long packing and shaft life.

The packing type furnished with the mixer is specified on the certified drawing. If the furnished packing is not satisfactory for the service conditions, it should be replaced.

**LUBRICATION**

The stuffing box is shipped without lubricant because of Federal regulations and the danger of using a lubricant that may contaminate the product. The stuffing box is normally furnished with a grease fitting and lantern ring for intermittent lubrication of the packing. If your mixer is furnished with an optional spring or weight loaded lubricator, the following instructions apply.

**SPRING LOADED LUBRICATOR:** (Refer to Dwg. #05-05147) This automatic grease lubricator puts continuous pressure on the lubricant which is forced into the lantern ring (1) for distribution to the packing. The lubricator is supplied with a valve (2) to regulate the flow of lubricant. To fill the grease cup, screw the thumb nut (7) to the right and raise the plunger (4) to the top of the cup. Unscrew the cover (6) and fill with grease. Replace the cover (6) and raise the thumb nut (7) to the top of the stem, allowing the spring (5) to force the plunger (4) down on the grease. To stop the feed, screw the thumb nut (7) down to the cover.

**WEIGHT LOADED LUBRICATOR:** (Refer to Dwg. #05-05148) The primary advantage of this lubricator over the spring loaded is the inherent visual aid of the weight arm (12) in measuring the amount of lubricant remaining in the grease cup. That is, when the arm is all the way down, the grease cup is empty. The amount of grease flow into the lantern ring can be adjusted by the valve (2) in the grease cup and the location of the weight (9) on the weight arm (12). To fill the grease cup, raise the weight arm (12) so that all the pressure is removed from the plunger (4). Unscrew the cover (6) and remove the plunger (4). Fill the cup and replace the plunger (4) and cover (6).

**START-UP INSTRUCTIONS**

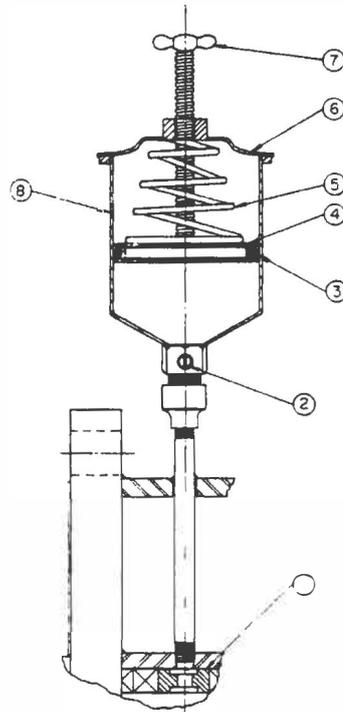
Prior to initial operation, the following procedure should be used to assure a long seal life.

1. Tighten the gland nuts (4) to "finger tightness".
2. Start the mixer and run it until the stuffing box (2) has reached a constant operating temperature. Stop the mixer and tighten opposite nuts (4). Note: When tightening the nuts be careful to avoid cocking the follower (3). Even tightening the follower will seat the packing (9) while it is warm and pliable.
3. Loosen gland nuts (4) to finger tightness and re-start the mixer. Leakage may be excessive but do not tighten the nuts for the first 20 to 30 minutes.
4. If leakage is excessive after this initial run-in period, adjust the follower by tightening the nuts evenly, one flat or a sixth of a turn at a time. This should be done every 30 minutes until leakage is reduced to a normal level.
5. Adjustments must always be done gradually and held to a minimum tightness. Although this procedure may take several hours, it will pay dividends in increased packing and shaft life.

### SPRING LOADED LUBRICATOR

Dwg. No. 05-05147

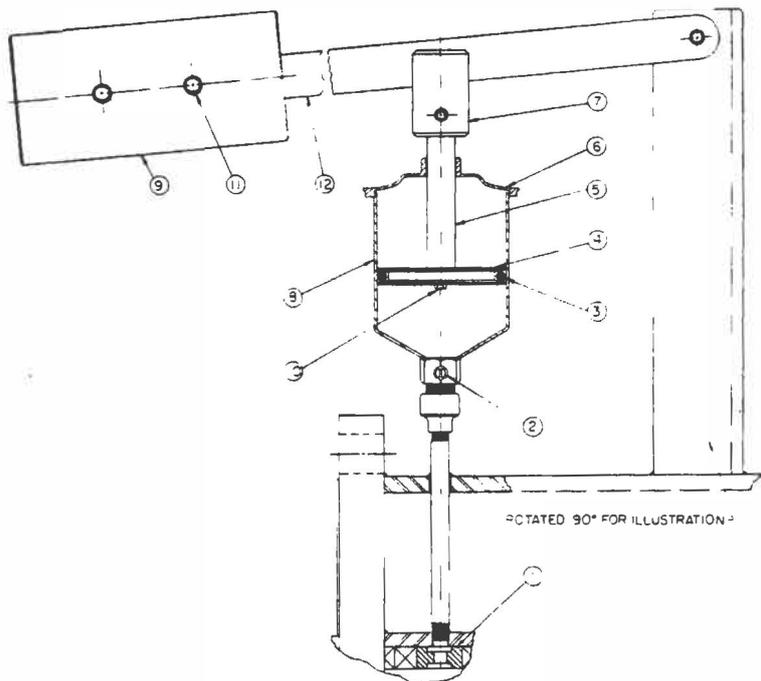
PART NO.	DESCRIPTION
1	Lantern Ring
2	Valve
3	"O" Ring
4	Plunger
5	Compression Spring
6	Cover
7	Thumb Nut
8	Grease Cup



### WEIGHT LOADED LUBRICATOR

Dwg. No. 05-05148

PART NO.	DESCRIPTION
1	Lantern Ring
2	Valve
3	"O" Ring
4	Plunger
5	Shaft
6	Cover
7	Arm Guide
8	Grease Cup
9	Weight
10	Hex. Head Cap Screw
11	Socket Head Cap Screw
12	Weight Arm



## SEAL-OFF INSTRUCTIONS (Refer to Mixer Parts Dwg. #05-00831)

The stuffing box is designed so that the shaft can be sealed off and the packing replaced with a full tank.

1. Disconnect the power to the motor. Be certain that the mixer cannot be remotely or automatically started.
2. Loosen three of the socket head cap screws (30) approximately  $\frac{1}{8}$ ". Remove the fourth screw to allow for removal of the spacer (14).
3. Tighten the jack screws (29) to separate the couplings (10 & 11) and remove the spacer.
4. Replace the fourth screw (30) and evenly tighten all four screws. This will pull the mixer shaft (15) back approximately  $\frac{1}{8}$ " and seal off the tank contents with "O" ring (38).
5. The packing can now be replaced as described in the following **REPACKING PROCEDURE** Instructions.
6. Return the shaft to its original position by reversing the above instructions before starting up mixer.

### REPACKING PROCEDURE

1. Remove the follower (3), all packing (9) and lantern ring (11). Carefully avoid scoring the shaft with the packing hook or removal tool.
2. Inspect the shaft and lantern ring (11). Lantern ring, lubrication channel and holes must be free of packing and dirt. Minor shaft wear should be worked smooth. Where excessive wear exists, the shaft should be built-up and remachined to give a smooth finish or it should be replaced. Clean stuffing box (2) thoroughly, checking to insure the lubrication holes are free and clear.
3. The location of the lantern ring (11) should be predetermined for proper alignment between lubrication holes and grease lines or fittings.
4. Insert first ring of packing (9) into the box. Install a split spacer (preferably of wood) into the box against packing so that packing ring is firmly seated and spread to make a good seal against the inside walls of the box and the shaft. When tightening the follower, pull it up evenly so each ring will be packed squarely into the box, assuring a good seal. Repeat this procedure for each ring. The individual packing joints must be staggered at  $90^\circ$ .
5. After the box has been completely packed, replace the follower, tightening the screws (4) to finger tightness.
6. Start the mixer and run it until the stuffing box (2) has reached a constant operating temperature. Stop the mixer and tighten the screws. When tightening, be careful to avoid cocking the follower. Even tightening of the follower will seat the packing (9) while it is warm and pliable.
7. Again, loosen the screws to finger tightness. Do not tighten the screws for the first 20 to 30 minutes, even though leakage may be excessive.
8. If leakage is excessive after this initial run-in period, adjust the follower by tightening the screws. This should be done every 30 minutes until leakage is reduced to a normal level.
9. Adjustments must always be done gradually, over several hours and held to a minimum tightness to increase packing life.

### WATERFLUSH OPERATION (Refer to Dwg. #05-07351)

The waterflush stuffing box is designed to assist in keeping solids that are in the product from entering the stuffing box and causing premature shaft and/or packing failure due to abrasion. This design facilitates a constant flow of water through the seal (12) and into the tank. This constant flow will keep most of the solids out of the stuffing box. As much water as your process will permit should be allowed to flow through the seal. The greater the flow the better the system will work. The stuffing box has a  $\frac{1}{8}$ " NPT female fitting for attachment of the water line.

## **START-UP INSTRUCTIONS**

When starting up any new piece of equipment, it is wise to proceed cautiously. Even though the best installation practices are followed, the possibilities of errors or omissions always exist. MixMor recommends that before the initial start-up, the following checklist should be followed:

1. Has all accessory equipment such as: breathers, level indicators, pressure gauges, switches, etc., been mounted? It is often necessary to box these items separately to prevent damage or loss in shipment.
2. Are mounting bolts tight? Check all external bolts, screws, accessories, etc., to make sure they have not become loose in shipping and handling.
3. Have couplings been tightened properly? Have necessary guards and safety devices been installed at all hazardous locations?
4. Have required electrical connections been made? Units should be wired in accordance with motor manufacturers' wiring diagram on the motor.
5. Have required piping connections been made?
6. Have mixer shaft seal instructions been followed?

Mixers are test run at the factory. However, during start-up, the following procedures are recommended:

1. Start unit slowly under as light a load as possible. Check rotation of the shaft against rotation arrow on the mixer housing. If necessary, reverse electrical leads on motors to have shaft rotation conform to direction shown on mixer.
2. Prime mover electrical starting equipment should be arranged to start unit as slowly as possible to avoid severe impact loads.
3. As the mixer is brought up to normal operating speed, it should be checked continuously for unusual sounds, excessive vibrations, excessive heat or leakage. If any of these develop, the unit should be shut down immediately and the cause determined and corrected...
4. If possible, the mixer should be operated under a light load (approximately half-load) for one or two days to allow final breaking-in of gears. After this period, the unit can be operated under normal load.
5. After the first 48 hours of operation, all external housing and mounting fasteners should be checked for tightness. Loose fasteners can cause alignment problems and excessive wear.

## GEAR REDUCER

### PREVENTATIVE MAINTENANCE

Keep shafts and vent plug clean to prevent foreign particles from entering seals or gear case. Never paint the vent plug. Check coupling set screws and all fasteners for tightness. Loose fasteners will cause alignment problems and excessive wear. Check end play in shaft. Noticeable movement might indicate service or parts replacement.

When lip seals are new, a small amount of lubricant leakage is sometimes noted until the seals seat on the shaft. This condition is normal. However, if leakage persists, this indicates a damaged seal and it must be replaced.

### TROUBLE SHOOTING

It is advisable to periodically inspect your gear drive for signs of wear. Spare or replacement parts can often be ordered and obtained before disassembly is necessary, thus, minimizing downtime. The following symptoms can be visually inspected without disassembly and may, in some cases, require repair work.

CHECKLIST		
OBSERVATION	POSSIBLE SOURCE	ACTION
VIBRATION	1) Loose hardware	Be certain all external housing and mounting fasteners are tight.
	2) Bearing failure	Replace bearings
	3) Foreign particles in bearings and gears	Foreign particles will cause excessive wear. Take steps to prevent entrance of particles. Thoroughly flush drive and refill with new grease.
OVERHEATING	1) Breather	Breather must be free of any obstruction. Clean breather as required.
	2) Overloaded	Check mixer speed and impeller diameter against certified drawing. Has the specific gravity and/or viscosity of the product increased? Inspect for material build-up on impeller. Check shaft rotation against rotation arrow.
	3) Bearing failure	Replace bearings
	4) Reducer grease	Check grease level and condition and add or change as required.

NOISE	1) Bearing failure	Replace bearings
	2) Rust	Rust can be caused by entrance of water or humidity. Flush and thoroughly clean drive. Take steps to prevent further entrance of water and use a lubricant with good rust-inhibiting properties.
	3) Extended shut-down or improper storage	When drives are not properly prepared for extended shut-down or storage in a moist atmosphere or a temperature condition which will cause condensation, destructive rusting of bearings, gears and shafts/seals will take place. Clean and replace parts as required.
	4) Overloaded	Overloading can cause excessive separation of gear teeth and loud operation. Refer to OVER-HEATING, Source No. 2.
	5) Refer to VIBRATION, Source No. 3	
	6) Refer to OVER-HEATING, Sources No.'s 1, 2, 3 & 4	
GREASE LEAKINGS	1) Worn lip seals	Replace defective seals.
	2) Plugged breather	Breather must be free of any obstructions. Clean breather as required.
	3) Gear case joints	Tighten fasteners or remove and recoat with Lock-tite before tightening. If this does not stop leakage, remove housing, clean surfaces and replace gas-kets or apply new sealing compound.

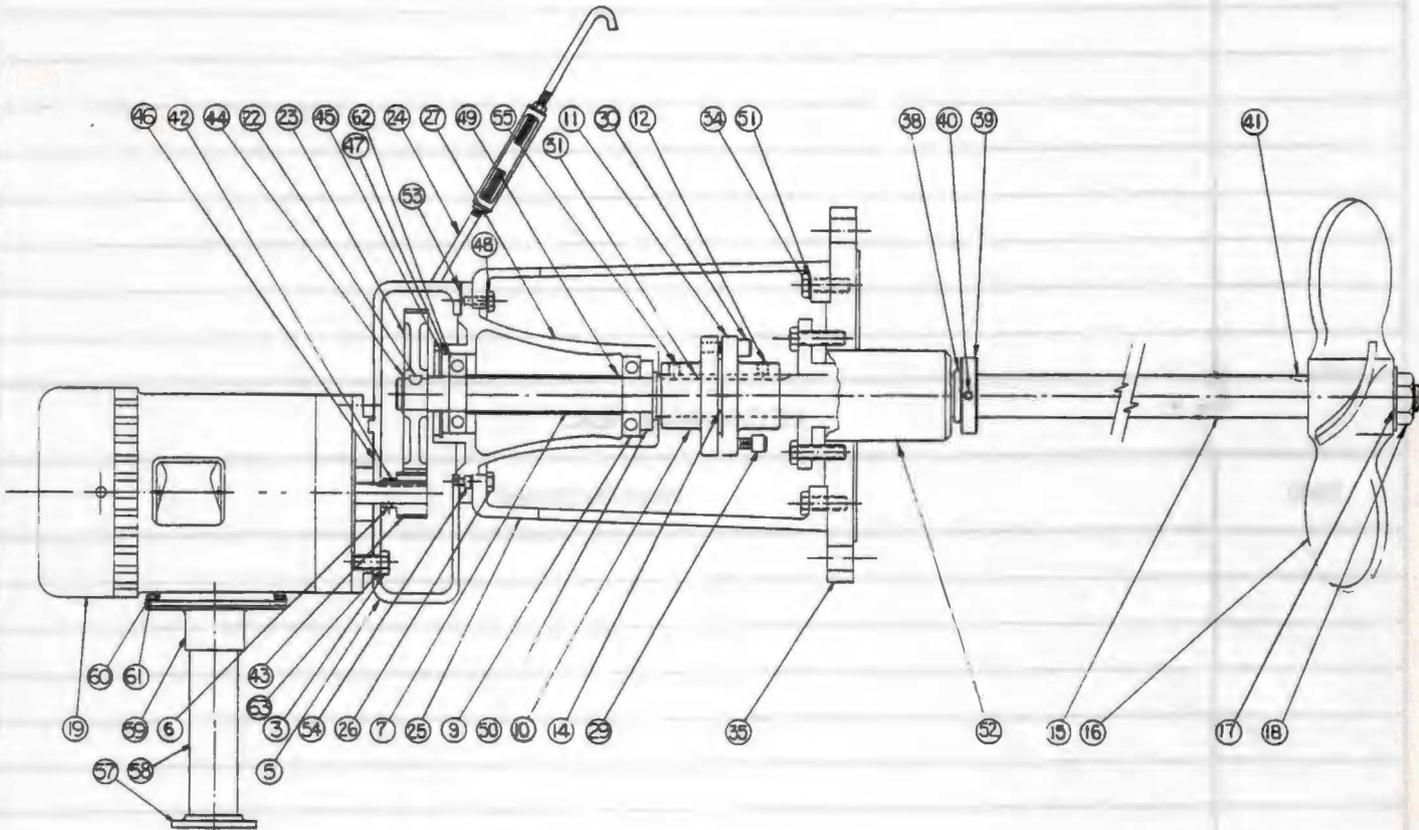
**DISASSEMBLY AND ASSEMBLY (Refer to Dwg. #05-00831)**

Never perform any work on the gear reducer or coupling until you are absolutely certain that the prime mover cannot be remotely or automatically started. Clean up area around unit before disassembly to keep parts clean and to keep them in proper order for reassembly. Keep in mind that parts usually go back together in reverse order of disassembly. Also note any match marks which may aid reassembly. Provide wooden blocks for storing machined parts in order to prevent damage to machine surfaces. Before starting disassembly carefully review typical parts list and assembly drawing of unit.

1. Disconnect the power to the motor. Be certain that the mixer cannot be remotely or automatically started.
2. If your mixer is a model HFGM refer to the mechanical seal instruction to remove the seal.
3. Loosen socket head set screws (12) and remove shaft (15) from coupling (11).
4. Remove socket head cap screws (26) and remove the gear reducer assembly from pedestal (25).
5. Remove socket head cap screws (54) and remove reducer shaft housing (27) with the shaft assembly from the gear housing.
6. Loosen socket head set screws (55) and remove coupling (10) from reducer shaft (7). Remove retaining ring (45) and pull gear (23) off of reducer shaft (7). Remove retaining ring (45). The reducer shaft (7), with bearings and seals, can now be pressed out of the housing(27).
7. Remove hex head cap screws (3) and remove motor (19) from gear housing (5). Loosen socket head set screws (6) and remove pinon (43) from motor shaft.
8. Clean all parts thoroughly. Before assembly, examine components carefully for signs of wear and replace if necessary.
9. Reverse the preceding instructions for assembly.

**MIXER PARTS**  
Dwg. #05-00831

Note: Mixer shown does not include shaft seal parts. Refer to the correct seal drawing for seal parts.



PART NO.	DESCRIPTION
3	Hex Head Cap Screw
5	Gear Housing
6	Soc. Head Set Screw
7	Reducer Shaft
9	Bearing ●
10	Reducer Coupling
11	Shaft Coupling
12	Soc. Head Set Screw
14	Spacer
15	Shaft
16	Propeller
17	Washer
18	Hex Nut
19	Motor
22	Key
23	Gear ●
24	Tie Rod Assembly

PART NO.	DESCRIPTION
25	Pedestal
26	Socket Head Cap Screw
27	Shaft Housing
29	Jack Screw
30	Soc. Head Cap Screw
31	Key
34	Hex Head Cap Screw
35	Flange
38	'O' Ring ●
39	Seal-Off Ring
40	Soc. Head Set Screw
41	Key
42	Key
43	Pinion ●
44	Retaining Ring ●
45	Retaining Ring ●
46	Gasket ●

PART NO.	DESCRIPTION
47	Lip Seal ●
48	Lock Washer
49	Bearing Spacer
50	Lip Seal ●
51	Lock Washer
52	Shaft Seal
53	Gasket ●
54	Soc. Head Cap Screw
55	Soc. Head Cap Screw
57	Flange Base
58	Pipe Leg Support
59	Coupling Mount
60	Hex Head Cap Screw
61	Lock Washer
62	Bearing ●
63	Lock Washer

● Recommended Spare Parts

