SERVICE INSTRUCTIONS

GEAR DRIVEN SIDE ENTERING MIXERS
MODEL PHG AND PHGS
MANUAL NO. 05-05653
SEAL NO. 05- 47992
REVISED 9/06

CUSTOMER:

P.O. NO.:

ITEM NO.:

MIXER MODEL NO.:

MIXER SERIAL NO.:

MIXER SHAFT SPEED:

DATE:

MIXMOR
3131 CASITAS AVENUE
LOS ANGELES, CA 90039
TELE: 323-660-1941
FAX: 323-660-5677
E-MAIL: info@mixmor.com

TABLE OF CONTENTS

FOREWORD

The information contained in this manual cover MixMor Model PHG and PHGS gear driven side entering mixers.

The Model PHG is a fixed mounted mixer, the Model PHGS is a swivel mounted mixer. The front page of this manual and the mixer certified drawing gives the drive size of your mixer.

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.

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

To mount the model PHG, remove the propeller and bolt the mixer on the tank flange as outlined in the HANDLING INSTRUCTION. Tighten the flange bolts and replace the propeller. To mount the model PHGS, bolt the manhole cover plate to the manhole flange.

GEAR REDUCER

The mixer 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, all MixMor drives do not contain lubricating oil. However, they do have their internal parts protected by a rust preventative lubricant. This protective lubricant does not have to be flushed out before mixer operation. Refer to the LUBRICATION INSTRUCTIONS for information on filling the gear reducer.

FLEXIBLE COUPLING

The mixer uses a flexible coupling to connect the motor output shaft to the gear reducer input shaft. After startup, the mixer should be run until the operating temperatures stabilize. Alignment should then be checked and any necessary corrections made. It is good practice to check the alignment, once more, after operating under a load for two or three weeks.

SHAFT SEAL

The mechanical seal is installed when the mixer is shipped from the factory. The fluid in the tank is used as the seal lubricant. If the mixer is operated with the tank empty, the mechanical seal will be severely damaged. Refer to the START-UP INSTRUCTIONS for additional seal information.

LUBRICATION INSTRUCTIONS

GEAR REDUCER

All mixers are shipped without lubricating oil in them. Oil must be added prior to operation. Lubrication oil in the housing reservoir is automatically directed by a combination of splash and spiral feed shaft to all bearings and gears. Dip stick/fill and drain plug have been provided.

Before operating, remove dip stick and fill gear reducer with an approved lubricant (see chart on next page) to the correct level.

APPROVED LUBRICANTS

MANUFACTURER	LUBRICANT
Esso	Pen-o-Led EP-2
Mobil	Compound BB
Shell	Omala 100
Texaco	Texamist 100

APPROXIMATE OIL CAPACITY

DRIVE SIZE	U.S. QUARTS	LITERS
76	1.7	1.6
77	3.2	3.0
78	4.8	4.5

CHANGING LUBRICANT: After the first 10 hours of operation drain initial oil, preferably while warm. Flush out the gear case with an approved non-flammable, non-toxic solvent and refill. Thereafter, oil should be changed at least every 1500 operating hours or every six months, whichever occurs first. If unit is operating in extremely dirty or high or low temperature environments, change oil more often.

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. Has the gear reducer been filled with oil as outlined in the LUBRICATION section? Before start-up, all MixMor mixer drives must be filled with the type and grade of oil specified.
5. Have all inspection covers on the mixer been closed and properly fastened?
6. Have required electrical connections been made? Units should be wired in accordance with motor manufacturer's wiring diagram on the motor.
7. Have required piping connections been made?

During start-up, the following procedures are recommended to assure years of trouble-free operation:

1. If the reducer is equipped with heaters for cold temperature operation, turn on heaters and allow oil to rise to at least 65°F.
2. Start mixer slowly under as light a load as possible. Check the rotation of the shaft against the rotation arrow on the mixer housing. If necessary, reverse electrical leads on motor to have shaft rotation conform to direction shown on mixer.

3. Open the drain petcock until the fluid in the tank flows out, then close the valve. This will prevent a possible air lock which could prohibit the fluid from lubricating the mechanical seal. (Refer to Figure 1)

4. Prime mover electrical starting equipment should be arranged to start unit slowly to avoid severe impact loads.

5. As the mixer is brought up to normal operating speed, it should be checked continuously for unusual sounds, excessive vibrations, excessive heat or oil leakage. If any of these develop, the unit should be shut down immediately and the cause determined and corrected. The operating temperature of the unit at the hottest point normally should not exceed 200°F.

6. 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.

7. The alignment of the flexible coupling should be checked and any necessary corrections made. It is good practice to check the alignment, once more, after operating under a load for two or three weeks.

8. On the model PHGS swivel mount mixer, check the stuffing box gland for leakage and adjust accordingly. It should be checked every 100 hours of service. (Refer to Figure 1)

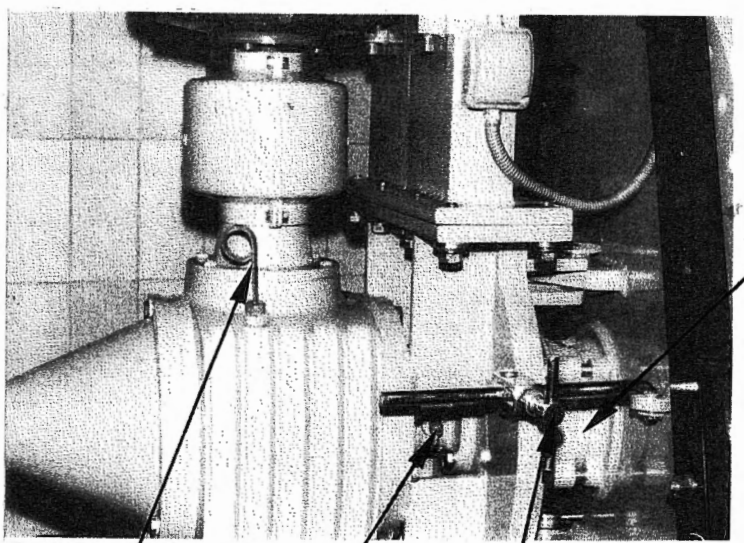


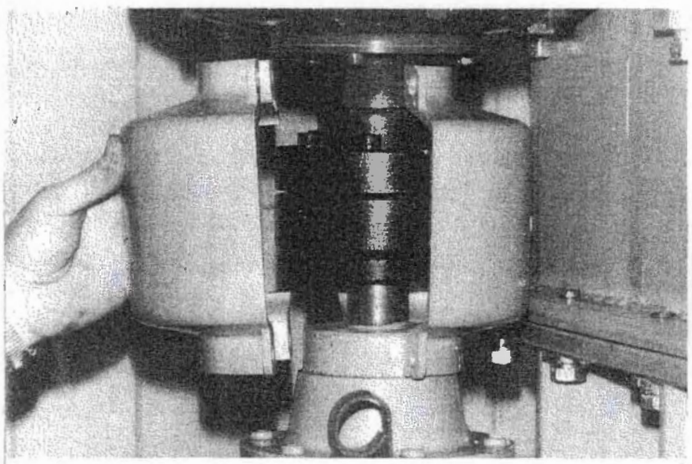
FIGURE 1

MECHANICAL SEAL REPLACEMENT AND GEAR REDUCER REMOVAL

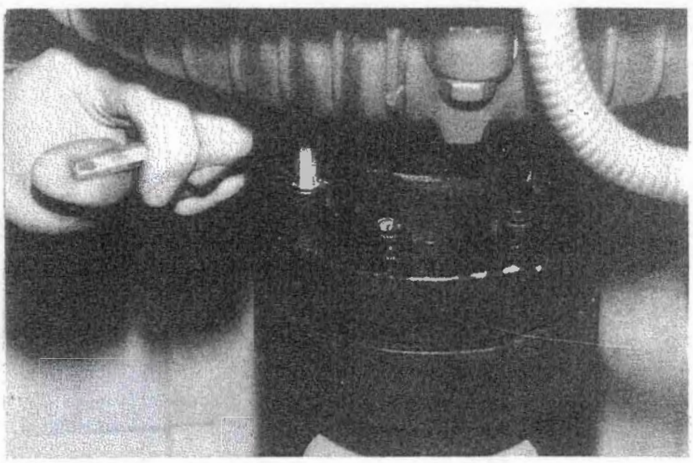
This mixer is designed so that the mechanical seal and or gear reducer can quickly be replaced without draining the tank.

The following photographs illustrate the procedure for replacing the mechanical seal, gear reducer and intank sleeve bearing.

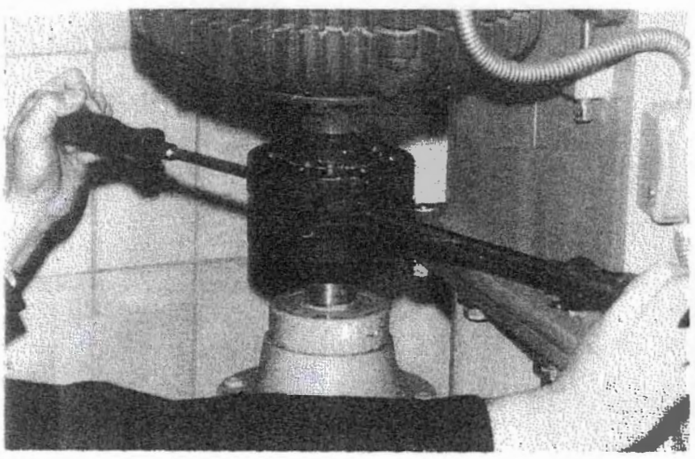
Before working on the mixer, always disconnect power to the motor. Be certain that the mixer cannot be remotely or automatically started.



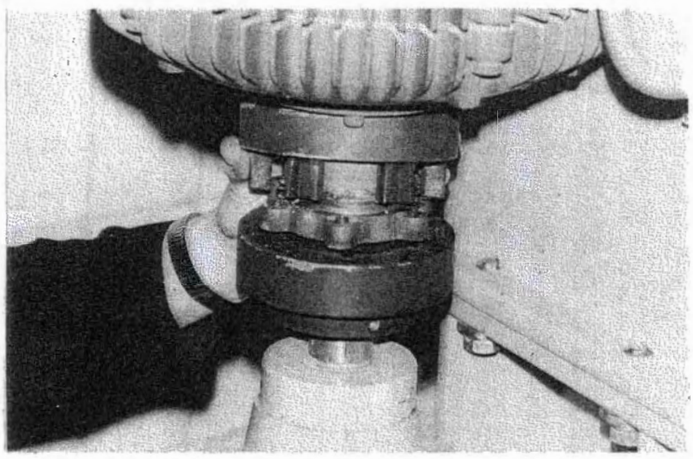
1. Remove coupling cover



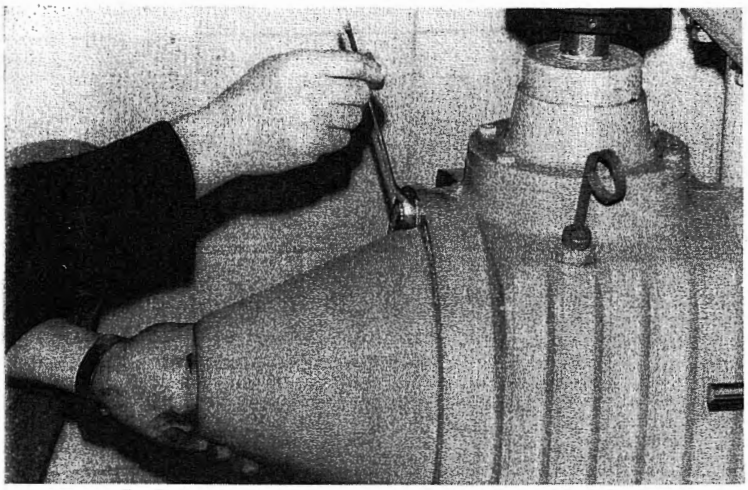
2. Take off bolts of coupling flange



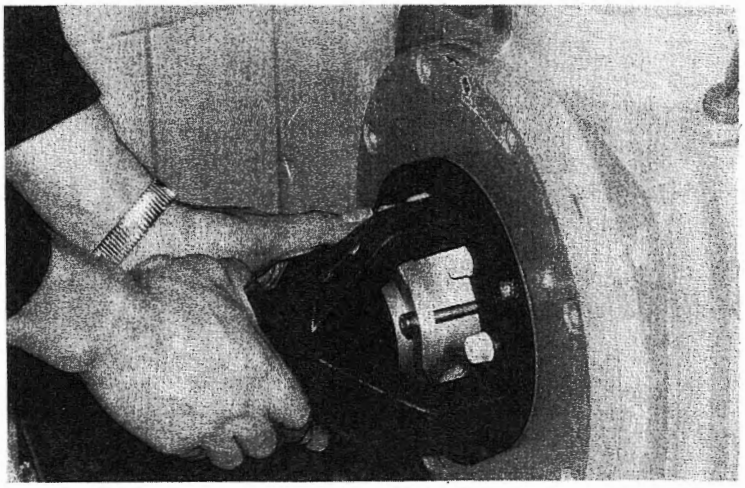
3. Move coupling flange up



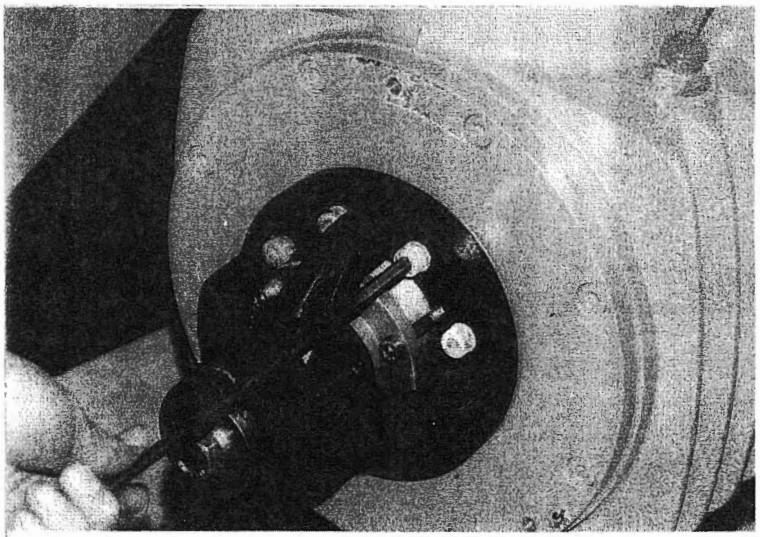
4. Coupling disconnected.
Motor remains in its position



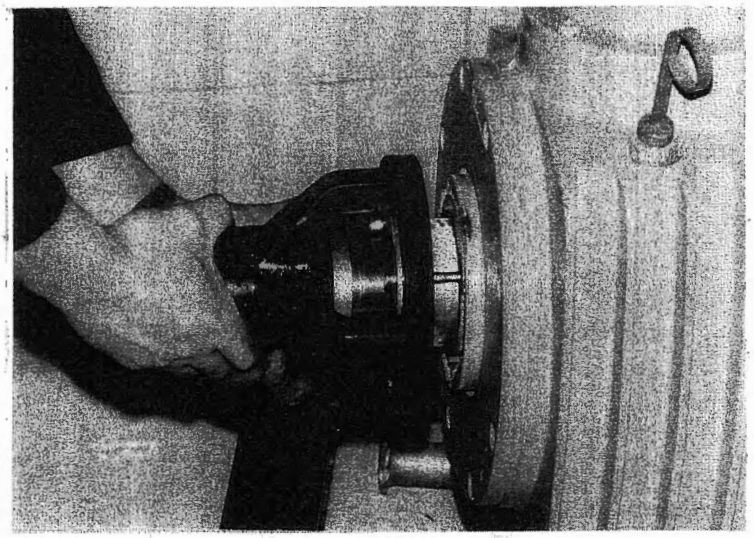
5. Remove yoke cover



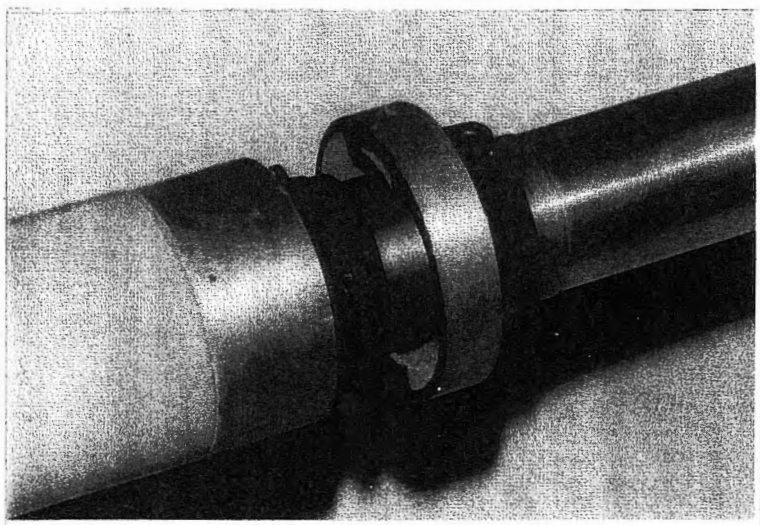
6. Turn yoke until arrow is up



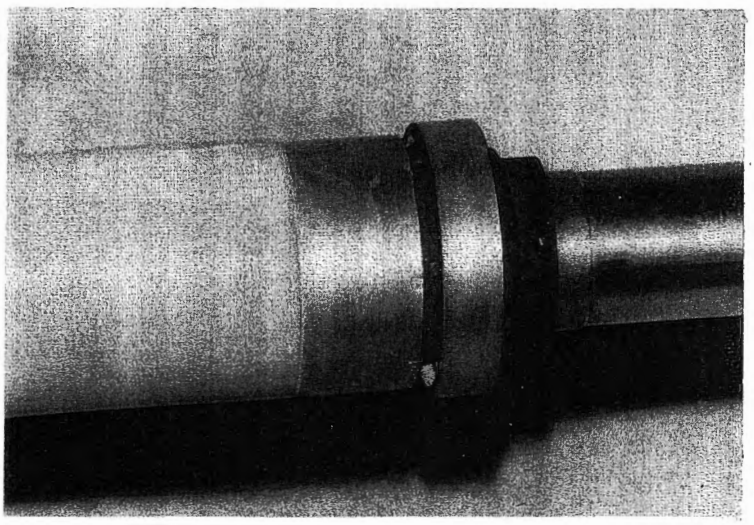
7. Remove yoke screws



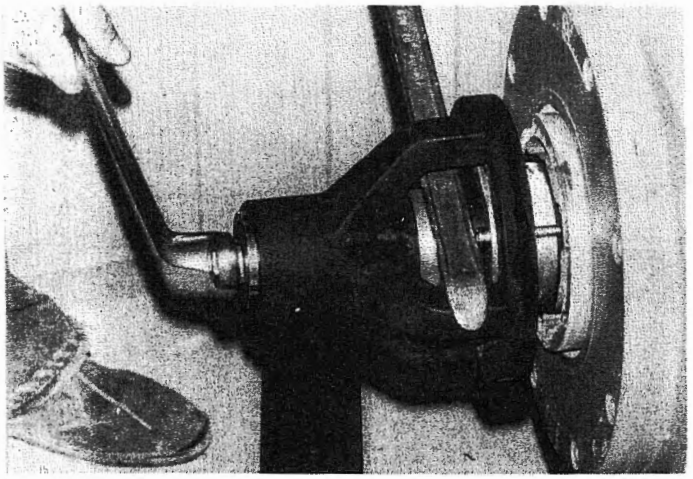
8. Pull yoke and shaft back and turn counter clock wise 1/4 turn for sealing
(see pictures below)



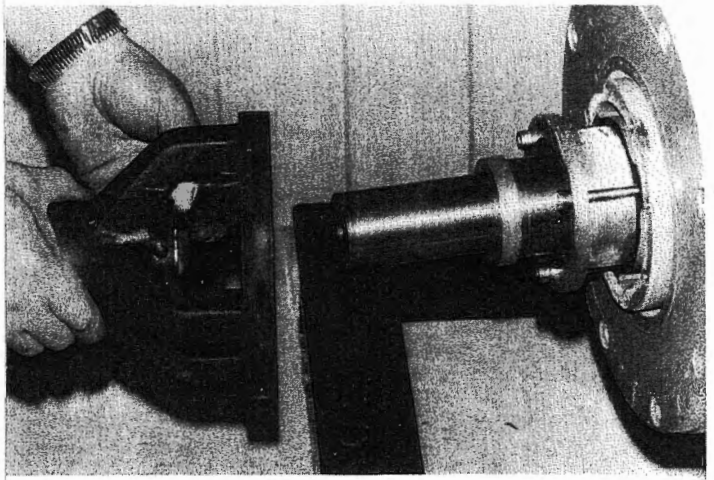
End closure in operating position



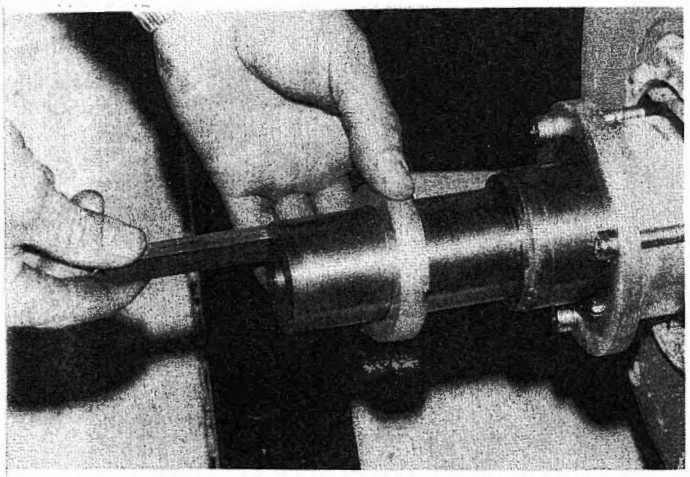
End closure in sealed position



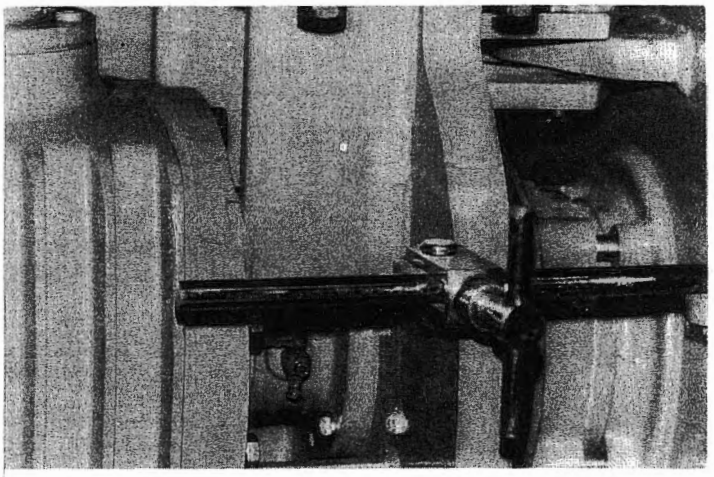
9. Remove yoke from shaft
Attention: left-hand-thread!



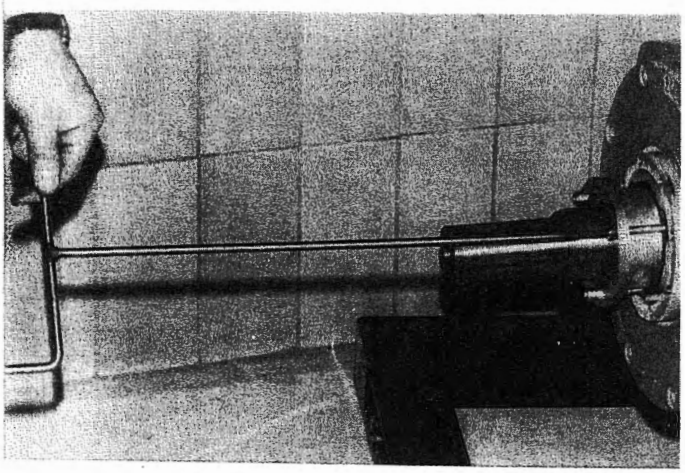
10. Pull yoke

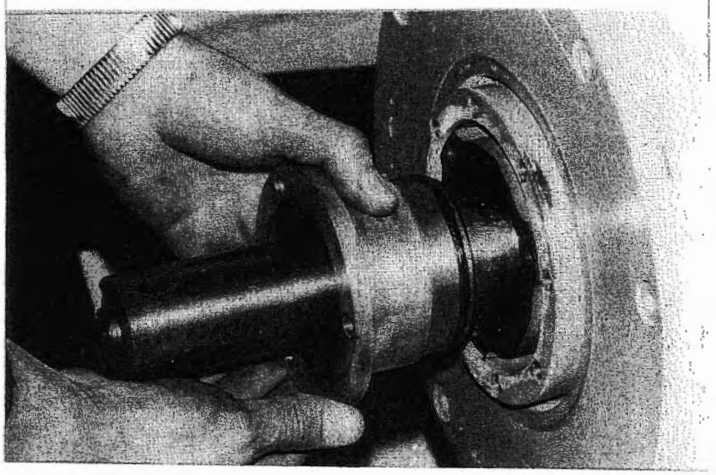


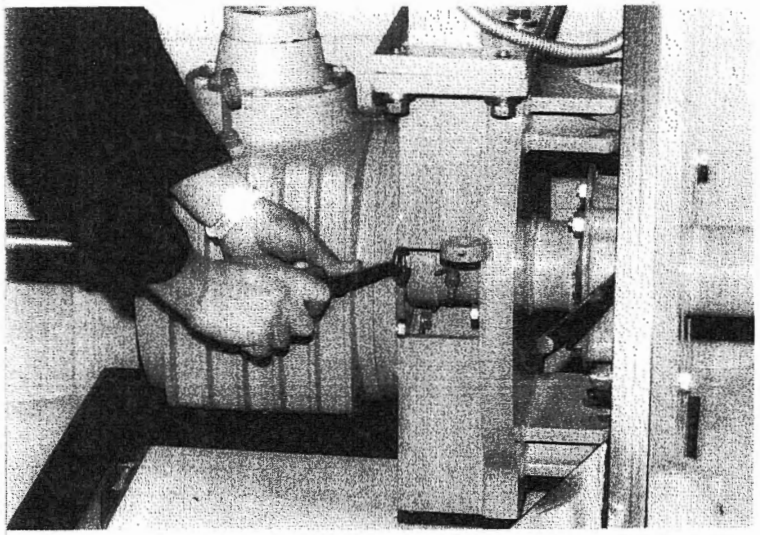
11. Remove key and spacer



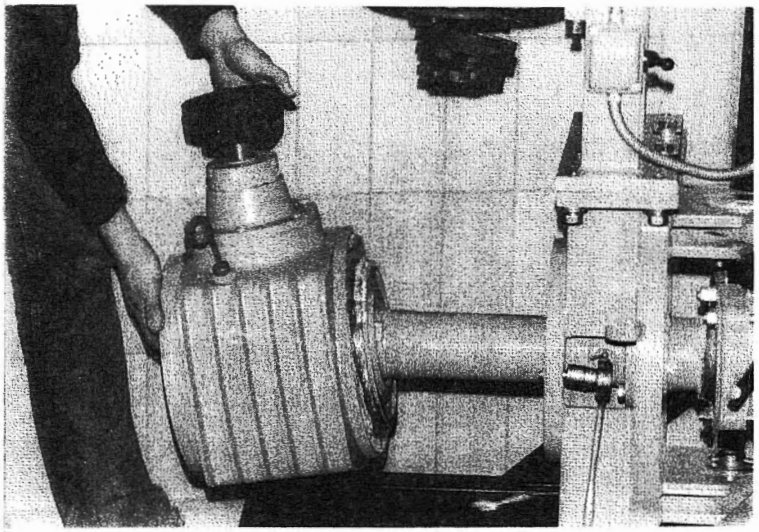
12. Open drain cock



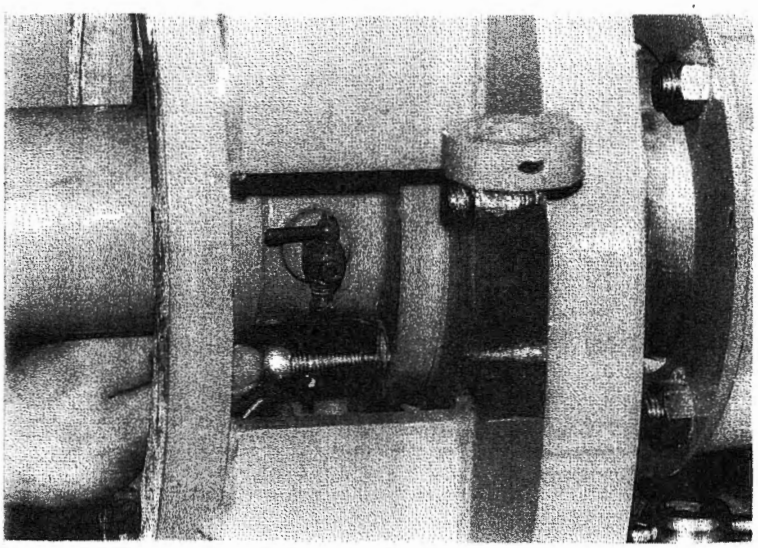




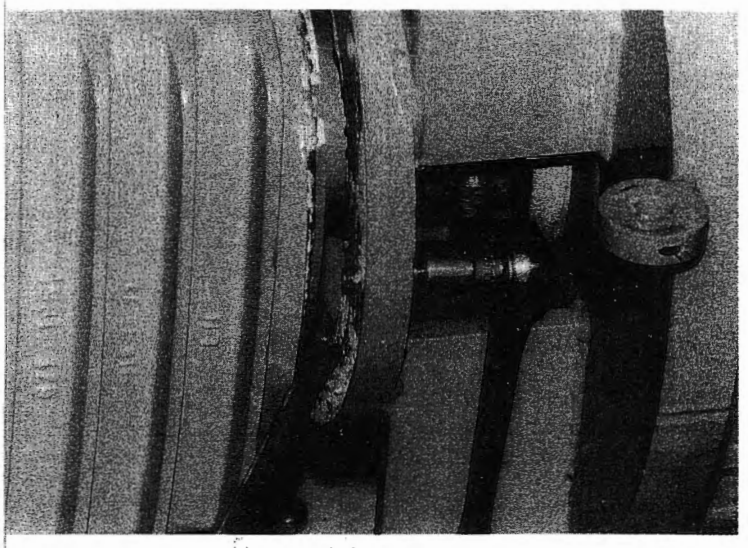
15. Remove screws of gear flange



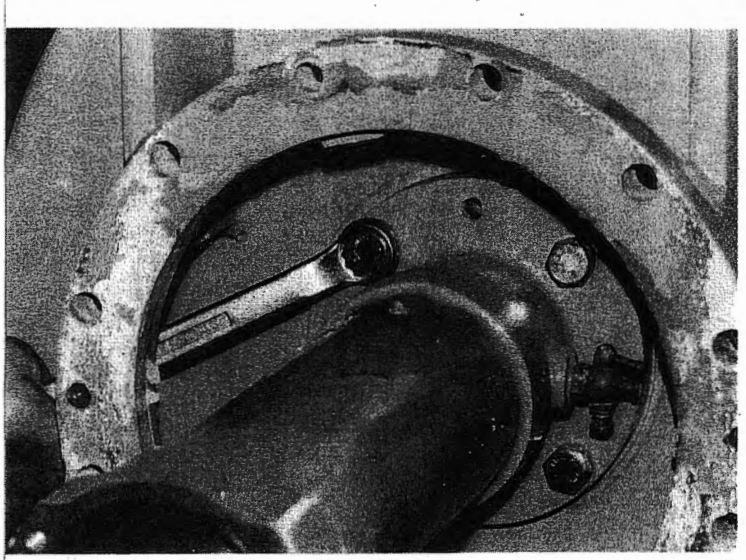
17. Remove gear box



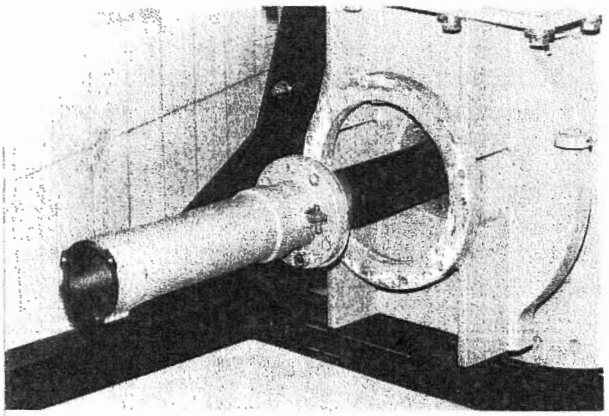
19. Use bolts as jack-screws

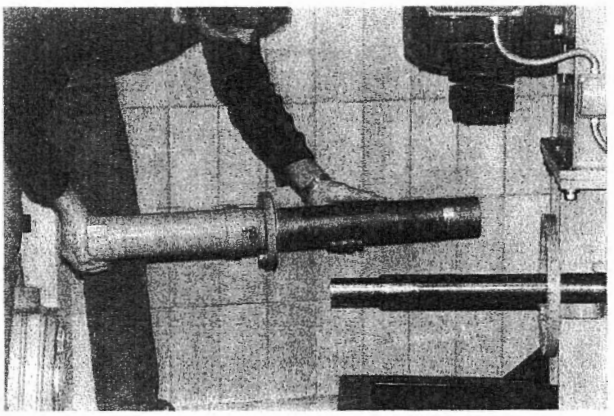


16. Use bolts as jack screws



18. Remove bolts of outer sleeve





20. Remove outer sleeve with integrated inner sleeve

21. Warm up inner sleeve smoothly and insert new bearing insert.

For reassembling of mixer reverse above procedure.

GEAR REDUCER

PREVENTATIVE MAINTENANCE

Keep the shafts and dip stick/vent clean to prevent foreign particles from entering the shaft seals or gear case which could cause premature wear. 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. The lubrication instructions should always be carefully followed. Inspect the reducer periodically for oil leaks. When oil seals are new, a small amount of lubricant leakage may appear until the seals are seated.

Proper maintenance will result in years of trouble-free performance and an extended life.

DISASSEMBLY

Never perform any work on the gear reducer or couplings 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 or skids for storing machined parts in order to prevent damage to machine surfaces. Before starting disassembly, carefully review typical parts list and assembly drawings.

Remove drain plug from bottom of gear case and drain out all lubricant, preferably while it is still warm. Disconnect gear drive from motor, coupling and mixer shaft. Remove gear reducer from the mixer housing. If old seals are to be used again, cover shaft keyways and all sharp edges with tape before removal.

NOTE: Always be sure of arrangement of gearing for later reassembly.

ASSEMBLY

Clean all parts thoroughly. Before assembly, examine components carefully for signs of wear. Replace if necessary.

Make certain gearing is arranged in the same position it was before disassembly. If gear has a chamfer on one end of the bore, this end must go against shaft shoulder. When pressing gear on shaft, check with indicator to determine that gear is square with shaft journal. Gear must be seated firmly against the shaft shoulder.

Bearings having bakelite or nylon roller retainers or sealed bearings cannot be heated for assembly onto shafts; instead, they should be pressed onto shafts at ambient temperatures. Bearings with metal retainers can easily be assembled on shaft, if they are first heated to approximately 250°F. Bearings must not be cocked and should be held against the shaft shoulder while cooling. This can be accomplished by holding the shaft vertically and lowering the bearing onto the shaft. After cooling, carefully tap the inner race of the bearing against the shaft should with bar and hammer. Any bearing locknuts or retainers should be taken up until snug against bearing.

TROUBLE SHOOTING

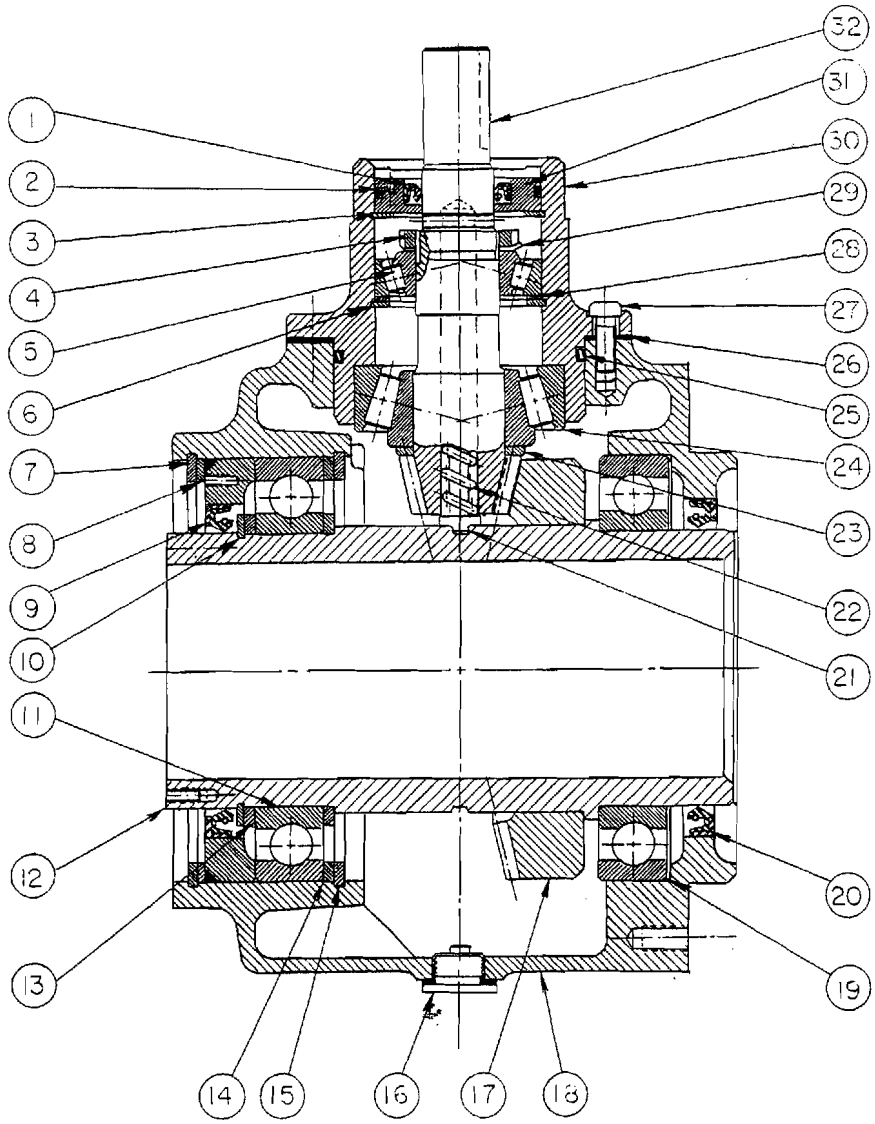
It is advisable to periodically inspect the gear reducer for signs of wear. Spare or replacement parts can often be ordered and obtained before disassembly is necessary, thus minimizing down-time. Most of the following observations can be visually inspected without disassembly and may, in some cases, 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) Flexible coupling alignment	Check alignment of high-speed flexible coupling and condition of flexible member.
	4) 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 oil. Modify maintenance schedule to increase frequency of oil changes.
OVERHEATING	1) Incorrect oil	Refer to Lubricating Instructions for correct oil. Flush drive and refill with correct oil.
	2) Oil level	Check oil level and add or drain to correct level
	3) Oil condition	Check to see if oil is oxidized, dirty, or of high sludge content. Change oil.
	4) Amount of grease in bearing	Refer to Lubrication Instructions. Make sure bearing does not have an insufficient or excessive amount of grease in it.
	5) Wrong type of bearing grease	Refer to Lubrication Instruction. If incorrect grease has been used, flush housing with grease.
	6) Bearing adjustment	Adjustable tapered bearings must be set to proper axial play. All shafts should turn freely when not under load.
	7) Breather	Breather must be free of any obstruction. Clean breather as required.
	8) 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.
NOISE	1) Bearing failure	Replace bearings
	2) Rust inside drive	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 **OVERHEATING,** Source No. 8
	5) Refer to **VIBRATION,** Source No.'s 3 & 4	
	6) Refer to **OVERHEATING,** Source No.'s 1, 2, 3, 4, 5 & 6	
OIL LEAKING	1) Worn oil seals	Replace defective seals
	2) Oil in drywell leaking at output shaft	During storage or when mixer is being installed, with oil in the reducer, oil can flow over the drywell and through the output shaft seal. Check if oil level is too high. Remove lower bearing assembly and drain drywell.
	3) Plugged breather	Breather must be free of any obstructions. Clean breather as required.
	4) Gear case/ cap joints	Tighten fasteners. If this does not stop leakage, remove covers or caps, clean surfaces and replace gaskets or apply new sealing compound.
	5) Drain plugs, sight glasses or pipe fittings	Remove and clean all fittings. Apply a pipe joint sealant and re-install fittings.

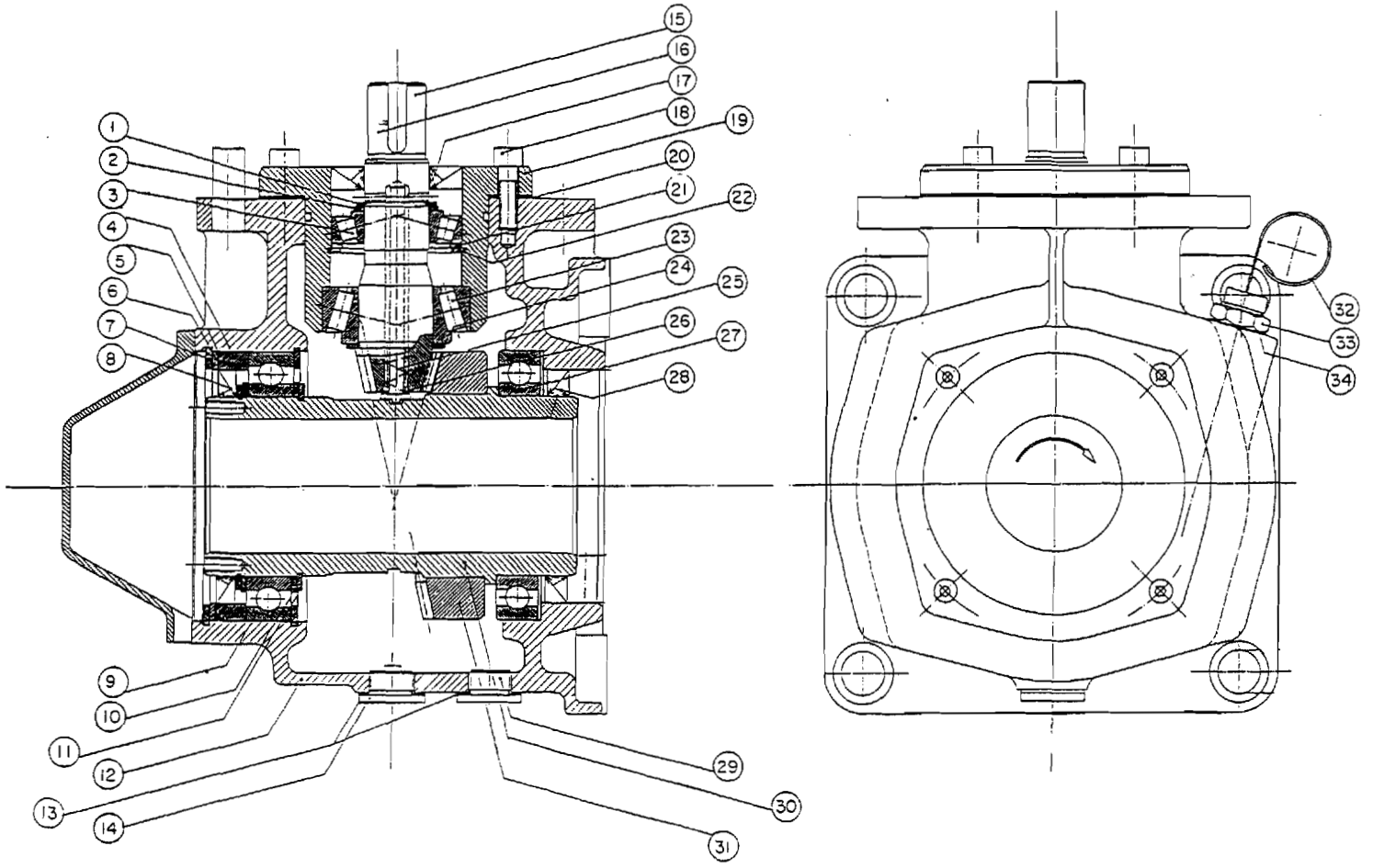
H77 & H78 REDUCER PARTS LIST
Dwg. No. 05-06540

PART NO.	DESCRIPTION
1	Lip Seal*
2	"O" Ring*
3	Retaining Ring*
4	Lock Nut
5	Tapered Roller Bearing*
6	Retaining Ring*
7	Retaining Ring*
8	Spacer
9	Lip Seal*
10	Retaining Ring*
11	Ball Bearing*
12	Hollow Shaft
13	Spacer
14	Spacer
15	Retaining Ring*
16	Drain Plug
17	Bevel Gear
18	Housing
19	Ball Bearing
20	Lip Seal*
21	Cam
22	Spiral Feed Pump
23	Spacer
24	Tapered Roller Bearing*
25	"O" Ring*
26	Gasket
27	Soc. Hd. Cap Screw
28	Spacer
29	Lock Washer
30	Pinion Housing
31	Seal Retainer
32	Pinion Shaft

*Recommended Spare Parts



H176 REDUCER PARTS
Dwg. No. 05-47672

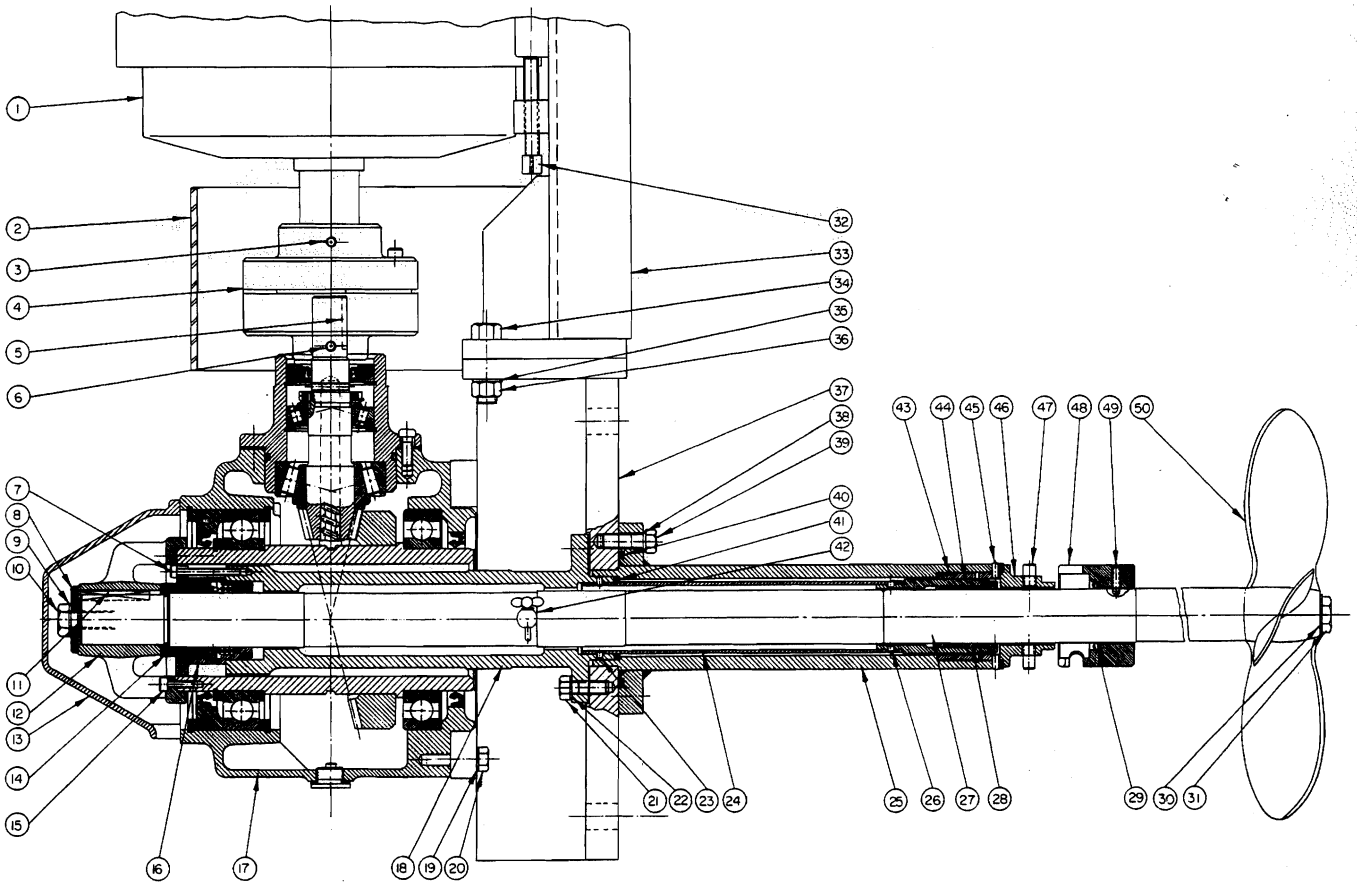


PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
1	RETAINING RING •	13	SEAL RING	25	SLIDING BLOCK with SPRING
2	WASHER	14	MAGNETIC DRAIN PLUG	26	WASHER
3	UPPER PINION BEARING •	15	SOCKET HEAD CAP SCREW	27	BALL BEARING •
4	RING •	16	PINION SHAFT	28	LIP SEAL •
5	'O' RING •	17	LIP SEAL •	29	DRAIN PLUG
6	SHIMS •	18	SOCKET HEAD CAP SCREW	30	HOLLOW SHAFT
7	RETAINING RING •	19	PINION SHAFT HOUSING	31	BEVEL GEAR
8	LIP SEAL •	20	SPACER	32	DIP STICK
9	BALL BEARING •	21	WASHER	33	CONNECTOR FITTING
10	SHIMS •	22	RETAINING RING •	34	SEAL RING •
11	RETAINING RINGS •	23	LOWER PINION BEARING •		
12	GEAR HOUSING	24	WASHER		

• RECOMMENDED SPARE PARTS

MIXER MODEL PHG - PARTS LIST

Dwg. No. 05-08336



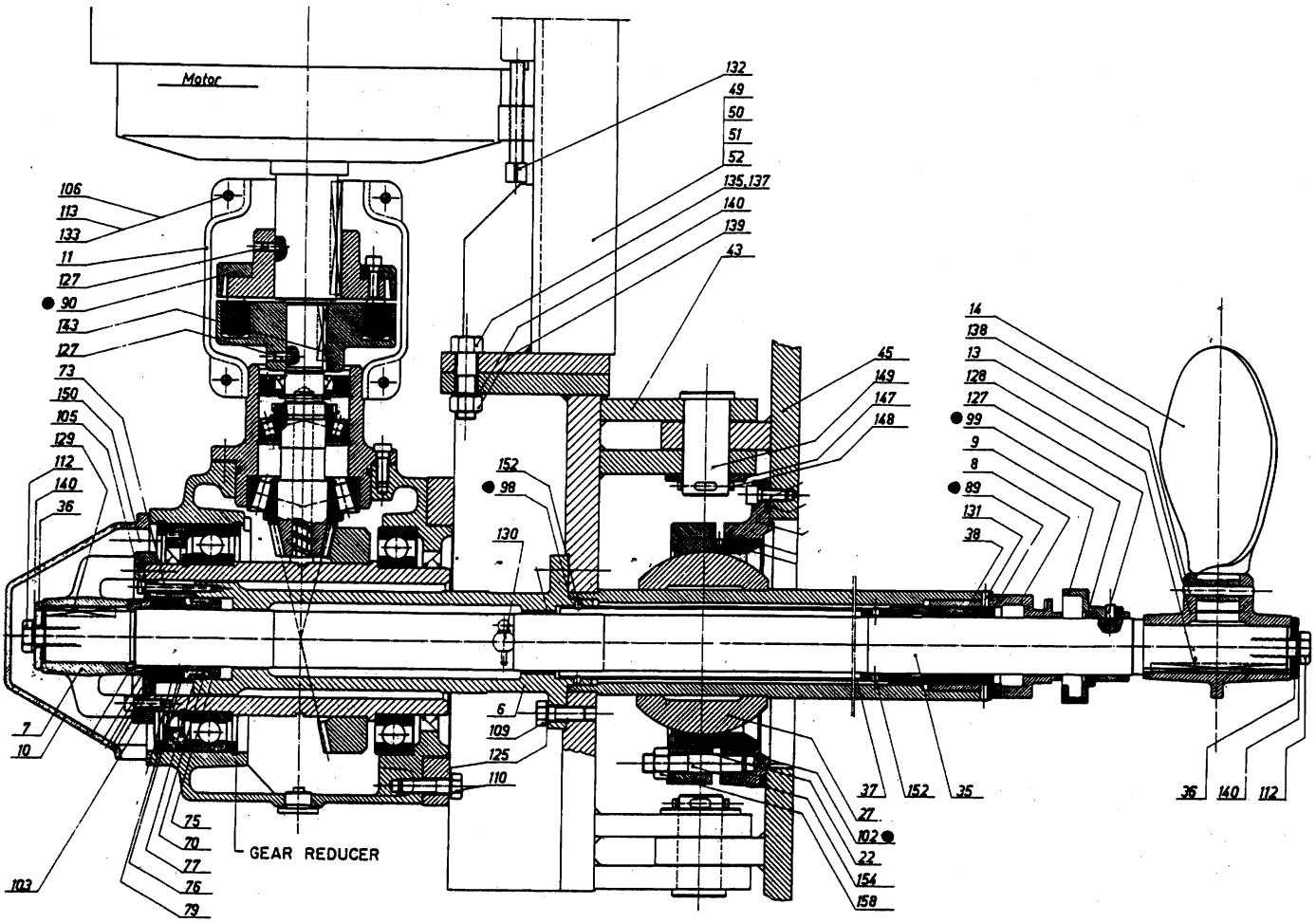
PART NO.	DESCRIPTION
1	MOTOR
2	COUPLING GUARD
3	SOCKET HEAD SET SCREW (2)
4	FLEXIBLE COUPLING
5	KEY
6	SOCKET HEAD SET SCREW (2)
7	SOCKET HEAD CAP SCREW (8)
8	SPACER
9	WASHER
10	HEX HEAD CAP SCREW
11	KEY
12	YOKE
13	YOKE COVER
14	SPACER
15	SOCKET HEAD CAP SCREW (8)
16	MECHANICAL SEAL
17	GEAR BOX

PART NO.	DESCRIPTION
18	MECHANICAL SEAL TUBING
19	WASHER (12)
20	HEX HEAD CAP SCREW (12)
21	HEX HEAD CAP SCREW
22	WASHER
23	PIN (2)
24	PULLER
25	MECHANICAL SEAL CHAMBER
26	PIN (2)
27	SHAFT
28	WEAR BUSHING
29	"O" RING •
30	WASHER
31	HEX HEAD CAP SCREW
32	SOCKET HEAD CAP SCREW (2)
33	MOTOR SUPPORT
34	HEX HEAD CAP SCREW (4)

PART NO.	DESCRIPTION
35	WASHER (4)
36	NUT (4)
37	MOUNTING FLANGE
38	WASHER (6)
39	HEX HEAD CAP SCREW (6)
40	"O" RING •
41	"O" RING •
42	DRAIN COCK VALVE
43	SLEEVE BUSHING •
44	BEARING CARRIER
45	PIN (4)
46	LOCK PIN COLLAR
47	SOCKET HEAD SHOULDER SCREW
48	LOCK COLLAR
49	SOCKET HEAD SET SCREW
50	PROPELLER

• RECOMMENDED SPARE PARTS

MIXER MODEL PHGS – PARTS LIST
Dwg. No. 05-05655



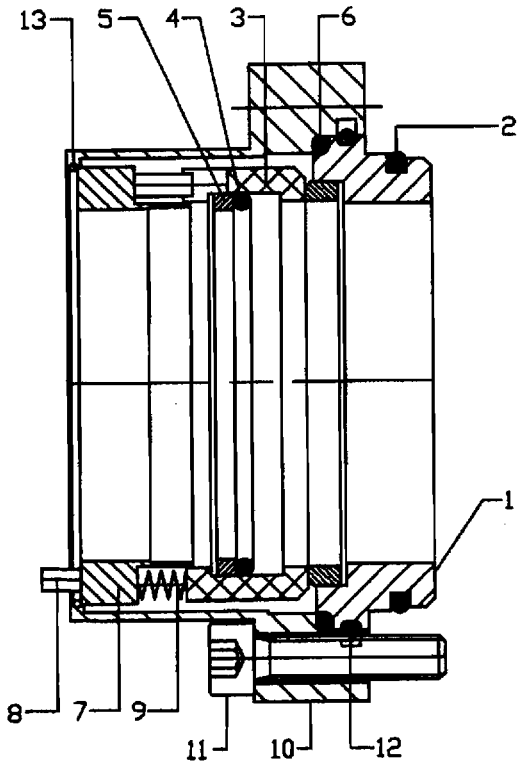
PART NO.	DESCRIPTION
6	MECHANICAL SEAL TUBE
7	YOKE
8	LOCK PIN COLLAR
9	LOCK COLLAR
10	YOKE COVER
11	COUPLING GUARD
13	PIN
14	IMPELLER
22	GLAND FOLLOWER
27	SWIVEL BALL
35	SHAFT
36	WASHER
37	PULLER
38	BEARING CARRIER
43	SWIVEL HINGE
45	MOUNTING FLANGE
49	MOTOR SUPPORT ASSM.
50	MOTOR SUPPORT ASSM.
51	MOTOR SUPPORT ASSM.
52	MOTOR SUPPORT ASSM.

PART NO.	DESCRIPTION
70	SEAL HOUSING
73	SEAL RING
75	"O" RING
76	SEAL WASHER
77	SEAL SPRING
79	SEAL PIN
89	BEARING •
90	FLEXIBLE COUPLING •
98	"O" RING •
99	"O" RING •
102	PACKING •
103	SOCKET HEAD CAP SCREW
105	SOCKET HEAD CAP SCREW
106	SCREW
109	HEX HEAD CAP SCREW
110	HEX HEAD CAP SCREW
112	HEX HEAD CAP SCREW
113	HEX NUT
125	LOCK WASHER
127	SOCKET HEAD SET SCREW

PART NO.	DESCRIPTION
128	KEY
129	KEY
130	DRAIN COCK VALVE
131	PIN
132	SOCKET HEAD CAP SCREW
133	WASHER
135	HEX HEAD CAP SCREW
137	HEX HEAD CAP SCREW
138	PIN
139	HEX NUT
140	LOCK WASHER
143	KEY
147	WASHER
148	COTTER PIN
149	HINGE PIN
150	HEX HEAD CAP SCREW
152	PIN
154	STUD
158	HEX HEAD CAP SCREW

• RECOMMENDED SPARE PARTS

MECHANICAL SEAL ASSEMBLY
Dwg. No. 05-47992



PART NO.	DESCRIPTION
01	SEAL RING
02	'O' RING
03	SEAL RING
04	'O' RING
05	SUPPORT RING
06	'O' RING
07	SPRING HOUSING
08	STATIONARY 'O' RING
09	SPRING
10	HOUSING
11	HEX HEAD CAP SCREW
12	SPRING RING
13	SPRING RING

MAINTENANCE RECORD

DATE	WORK PERFORMED

NOTES