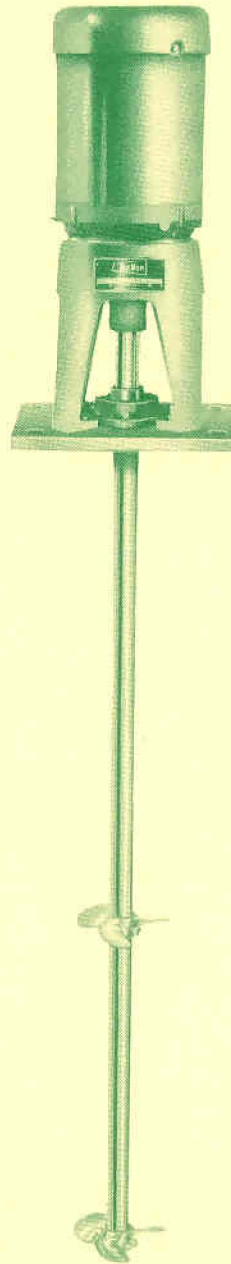


SERVICE INSTRUCTIONS

TOP ENTERING MIXERS



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www.mixmor.com



MIXMOR



SERVICE INSTRUCTIONS

MODEL OD, FDL & FD
DIRECT DRIVE TOP ENTERING MIXERS
MANUAL NO. 05-07685

CUSTOMER:

P.O. NO:

ITEM NO:

MIXMOR MODEL NO:

MIXER SERIAL NO:

MIXER H.P.:

BASEPLATE/SEAL DWG. NO:

MIXER DWG. NO:

5

DATE:

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FOREWORD

The information contained in this service instruction manual covers MixMor Models OD, FDL and FD top entering, fixed mounted, direct drive mixers.

The model is determined by the type of mounting and or seal. The following is a description of the models.

“OD” — Baseplate mounted for channel mounting over open tanks.

“FDL” — Flange mounted mixer with low pressure stuffing box (10 psig maximum) for closed tanks.

“FD” — Flange mounted mixer with high pressure stuffing box (150 psig maximum) for closed tanks.

Throughout this manual it will refer to drawing numbers which identify drives sizes, mounting types, shaft seals, coupling designs, and other mechanical details. The front page of this manual lists all the drawings that apply to your specific 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 phone MixMor at our Los Angeles, California plant, (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.

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 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

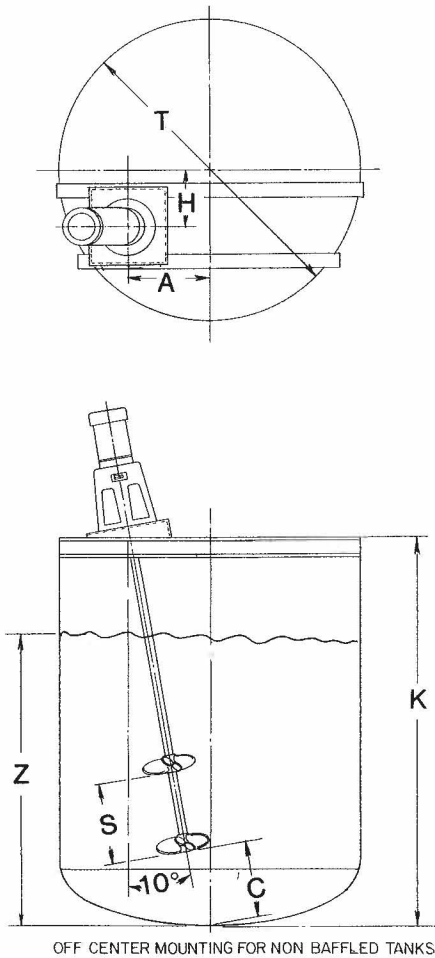
The mounting location of the mixer has a definite effect on the flow pattern within the tank. The recommended location has been made with regard to your particular application and should be carefully followed to obtain optimum results.

When the mixer is vertically mounted on the tank center line the tank must be baffled for most applications. The baffle size and location recommendation is based upon your specific application.

When the mixer is offset and angle mounted use the following chart and drawings for the correct mixer location. The location is based on mixer horsepower and tank geometry. Your mixer horsepower is given on the cover of this manual.

MODEL OD

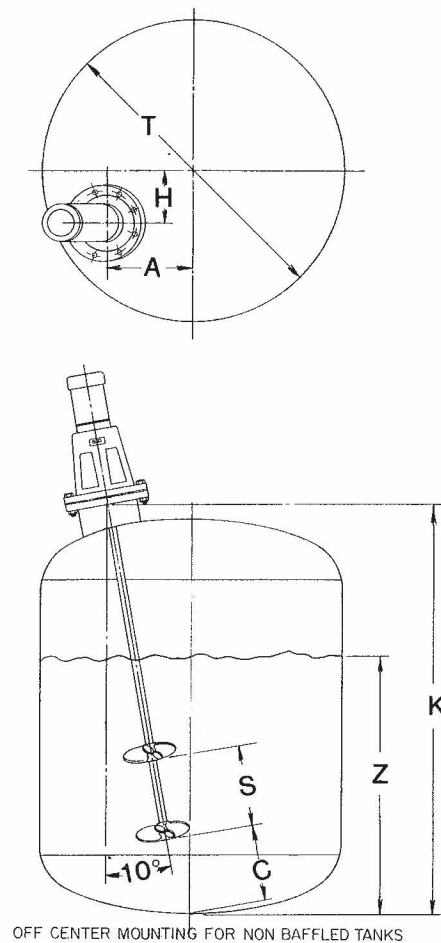
DWG. NO. 05-00780



$$S = \frac{Z-C}{2}$$

MODEL FDL & FD

DWG. NO. 05-00779



$$S = \frac{Z-C}{2}$$

LOCATION CHART

"T" TANK DIA.	MIXER HORSEPOWER					
	1/4 THRU 3/4			1 THRU 5		
	"A"	"H"	MAX. "K" TANK DEPTH	"A"	"H"	MAX. "K" TANK DEPTH
24	6¼	3¾	35	5	3	27
27	7½	4½	43	6¼	3¾	35
30	8¾	5	48	7½	4¼	42
33	9¾	5¾	55	8½	5	48
36	11	6½	62	9¾	5¾	55
39	12¼	7	68	11	6¼	61
42	13¼	7¾	75	12	7	68
45	14½	8½	82	13¼	7¾	74
48	15½	9	87	14¼	8¼	81
51	16¾	9¾	94	15½	9	87
54	17¾	10¼	100	16½	9½	93
57	19	11	107	17½	10¼	100
60	20¼	11¾	114	19	11	106
63	21¼	12¼	120	20	11½	113
66	22¼	13	126	21	11¼	119
69	23½	13½	132	22¼	11¾	125
72	24½	14¼	132	23½	13½	132
75	25¾	15	132	24½	14¼	139
78	27	15½	132	25½	14¾	145
81	28	16¼	132	26¾	15½	151
84	29¼	17	132	28	16¼	164
87	30½	17½	132	29	16¾	171
90	31½	18¼	132	30¼	17½	178
93	32¾	19	132	31¼	18¼	184
96	34	19½	132	32½	18¾	190
99				33½	19½	197
102				34¾	20	197
105				35¾	10¾	197
108				37	21½	197
111				38¼	22	197
114				39¼	22¾	197
117				40½	23¼	197
120				42¼	24	197
126				44	25½	197
132				46¼	26¾	197
138				48½	28	197
144				51	29¼	197

All Dimensions are in Inches

MOUNTING

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

MIXER SHAFT

Handle the shaft carefully and always place it in a horizontal position, supporting it at several points. Check the shaft for nicks or burrs. When inserting the shaft into Models FDL and FD care must be taken to prevent damaging the shaft packing (refer to Dwgs. No. 05-00904 or 05-00905). Slide the shaft through the mounting flange or baseplate and into the mixer rigid coupling. Depending on your mixer model and horsepower, one of the following drawings should be referred to for connecting the shaft to the drive. The drawing no. for your mixer is listed in the front of this manual.

Mixer Drawing No. 05-06629: Align the shaft keyway with key (2) or the flats on the shaft with the set screws (3) and slide the mixer shaft into coupling (8). Tighten socket head set screw (3) and the socket head set screw in the bearing (4).

Mixer Drawing No. 05-02005: Align the shaft keyway with the key (13) or the flats on the shaft with the set screws (5) and slide the mixer shaft into the coupling (4). Tighten socket head set screws (5).

If your mixer is a Model OD, the set screws (5) in the baseplate bearing (1) must be tightened. Refer to Drawing No. 05-00906 or 05-00907.

IMPELLER

When mixers are furnished with two impellers the upper impeller should be positioned midway between the lower impeller and the normal liquid level. If one of the impellers has a stabilizing ring on it, it must be used as the lower impeller and attached to the end of the shaft with the stabilizing ring down. Position the impellers on the shaft and tighten the hex head set screws. Depending on the severity of the application, it may be advisable to spot drill the shaft for the impeller set screws.

LUBRICATION INSTRUCTIONS

MODEL OD & FD, 1/4 THRU 3/4 H.P.

PEDESTAL BEARING LUBRICATION INSTRUCTIONS — Refer to Dwg. No. 05-06629, P/N 4.

The bearing should contain as much grease as practical, since a full bearing with consequent slight leakage is the best protection against entrance of foreign material. When establishing a re-lubrication schedule, note that a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals. A good starting point to establish a relubrication schedule is to relubricate the bearing weekly. If the mixer is operated in a clean, dry environment, the bearings will have to be relubricated less frequently.

Abnormal bearing temperatures may indicate faulty lubrication. Normal temperatures may range from "cool to warm to the touch" up to a point "too hot to touch for more than a few seconds", depending upon the bearing size and surrounding conditions. High temperature with no grease showing at the seals, particularly if the bearing seems noisy, usually indicates too little grease. Unusually high temperature accompanied by excessive leakage of grease at the seals indicates too much grease. Normal temperature and a slight showing of grease at the seals indicates proper lubrication.

Many ordinary cup greases are not suitable for lubrication. The bearing has been lubricated at the factory with No. 2 consistency lithium base grease which is suitable for normal operating conditions. Relubricate with lithium base grease or a grease which is compatible with original lubricant and suitable for ball bearing service. In unusual or doubtful cases, consult with a reputable grease manufacturer.

MODEL OD

GENERAL INFORMATION

This model mounts on a square baseplate. The mixer baseplate incorporates a heavy-duty self-aligning ball bearing for additional shaft support. The following lubrication instructions apply.

BASEPLATE BEARING LUBRICATION - REFER TO DWG. NOS. 05-00906 OR 05-00907

The bearing should contain as much grease as practical, since a full bearing with consequent slight leakage is the best protection against entrance of foreign material. When establishing a re-lubrication schedule, note that a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals. A good starting point to establish a relubrication schedule is to relubricate the bearing weekly. If the mixer is operated in a clean, dry environment, the bearings will have to be relubricated less frequently.

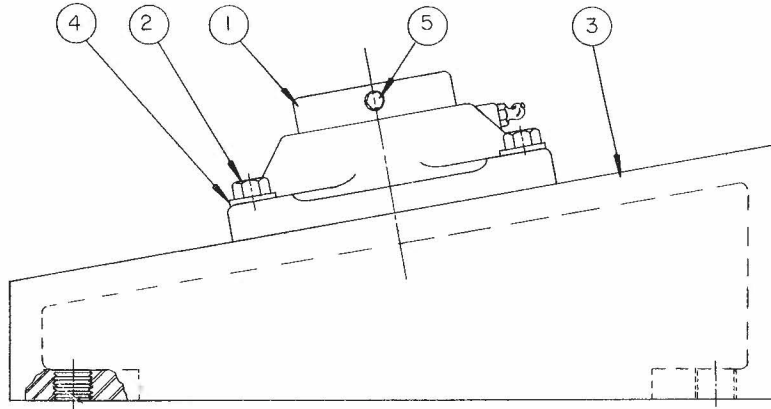
Abnormal bearing temperatures may indicate faulty lubrication. Normal temperatures may range from "cool to warm to the touch" up to a point "too hot to touch for more than a few seconds", depending upon the bearing size and surrounding conditions. High temperature with no grease showing at the seals, particularly if the bearing seems noisy, usually indicates too little grease. Unusually high temperature accompanied by excessive leakage of grease at the seals indicates too much grease. Normal temperature and a slight showing of grease at the seals indicates proper lubrication.

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MODEL OD, ANGLE RISER BASEPLATE

Dwg. No. 05-00906

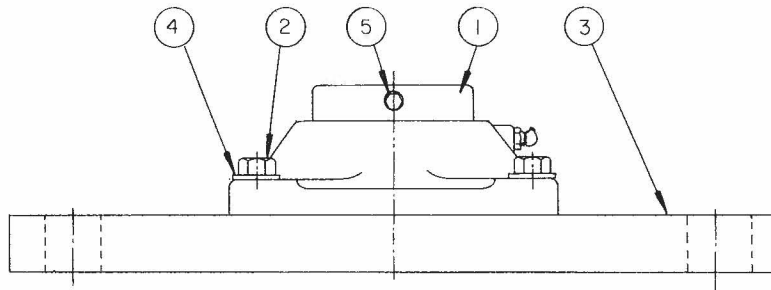
PART NO.	DESCRIPTION
1	Bearing
2	Hex Head Screw
3	Baseplate
4	Lock Washer
5	Set Screw



MODEL OD, FLAT BASEPLATE

Dwg. No. 05-00907

PART NO.	DESCRIPTION
1	Bearing
2	Hex Head Screw
3	Baseplate
4	Lock Washer
5	Set Screw



MODEL FDL AND FD STUFFING BOX INSTRUCTIONS

REFER TO DWG. NOS. 05-00904 OR 05-00905

GENERAL INFORMATION

The purpose of a stuffing box is to limit leakage to a practical level and not to stop leakage completely. If the gland is tightened to prevent 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 high pressure stuffing box (Model FD Dwg. No. 05-00905) 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. The low pressure stuffing box (Model FDL Dwg. No. 05-00904) is furnished with packing that has been impregnated with a lubricant and is not supplied with a lantern ring for intermittent lubrication.

START-UP INSTRUCTIONS

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

1. Tighten the adjustment nuts (2) to "finger tightness".
2. Start the mixer and run it until the stuffing box has reached a constant operating temperature. Stop the mixer and tighten opposite nuts (2). Note: When tightening the nuts, be careful to avoid cocking the follower (1). Even tightening of the follower will seat the packing (5) while it is warm and pliable.
3. Loosen gland nuts (2) 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 minimum tightness. Although this procedure may take several hours, it will pay dividends in increased packing and shaft life.

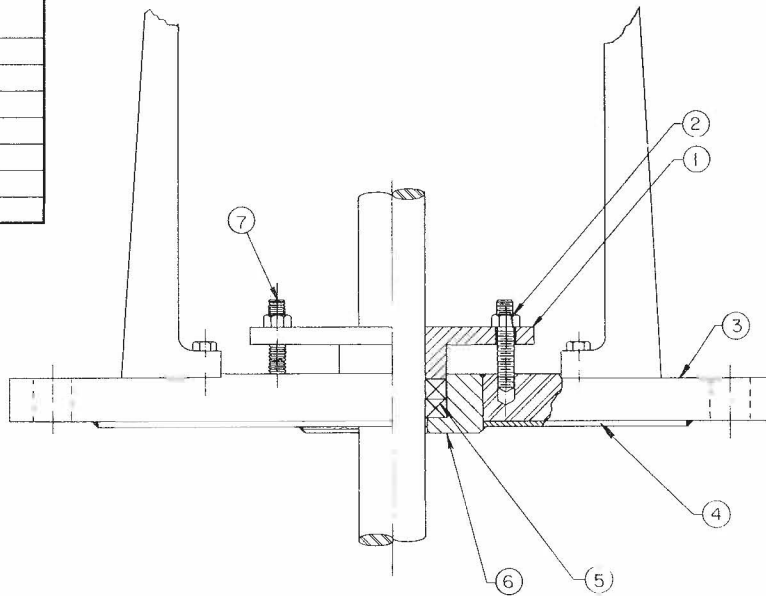
REPACKING PROCEDURE

Note: These instructions cover both the Model FDL and FD. The Model FDL will not have a lantern ring.

1. Remove the follower (1), all packing (5) and lantern ring (8). Carefully avoid scoring the shaft with the packing hook or removal tool.
2. Inspect the shaft and lantern ring (8). 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 (6) thoroughly, checking to insure the lubrication holes are free and clear.
3. The location of the lantern ring (8) should be predetermined for proper alignment between lubrication holes and grease lines or fittings.
4. Insert first ring of packing (5) 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°.
5. After the box has been completely packed, replace the follower, tightening the nuts (2) to finger tightness.
6. Refer to the preceding start-up instructions for packing adjustment procedure.

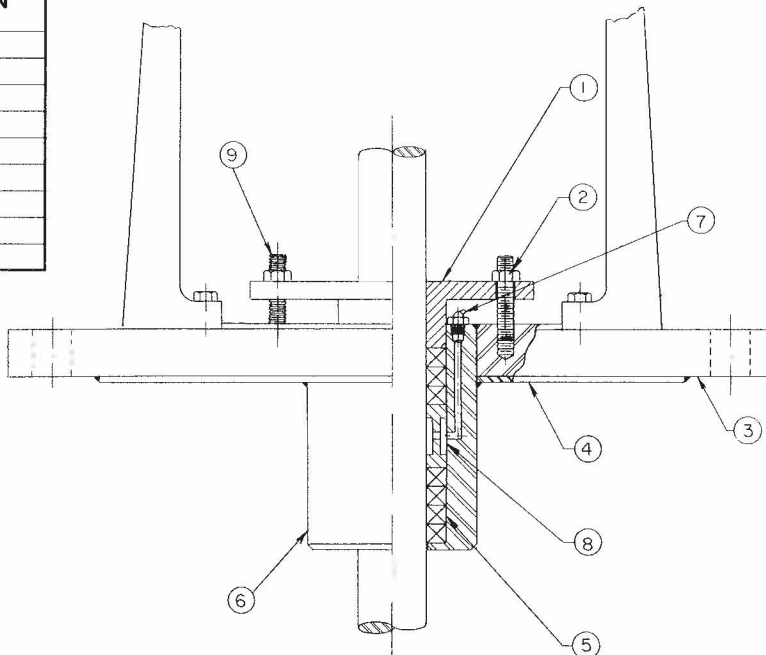
MODEL FDL
Dwg. No. 05-00904

PART NO.	DESCRIPTION
1	Follower
2	Adjustment Nut
3	Flange
4	Flange Facing
5	Packing
6	Stuffing Box
7	Stud



MODEL FD
Dwg. No. 05-00905

PART NO.	DESCRIPTION
1	Follower
2	Adjustment Nut
3	Flange
4	Flange Facing
5	Packing
6	Stuffing Box
7	Grease Fitting
8	Lantern Ring
9	Stud



STEADY BEARING

REFER TO DWG. NO. 05-05513

Mixers with exceptionally long shafts or mixers used in severe applications may be supplied with a steady bearing. If your mixer is supplied with a steady bearing, the following instructions should be followed.

INSTALLATION

The steady bearing must be centered on the mixer shaft's axis of rotation. To assure that the steady bearing is properly located and to minimize bearing preload, it must be installed after the mixer is mounted onto the tank and after the shaft is installed.

To find the shaft's axis of rotation, attach a marker that will contact the tank bottom to the end of the shaft. Remove the motor fan cover and rotate the motor fan. This will draw a circle on the tank bottom. Install the steady bearing in the center of this circle.

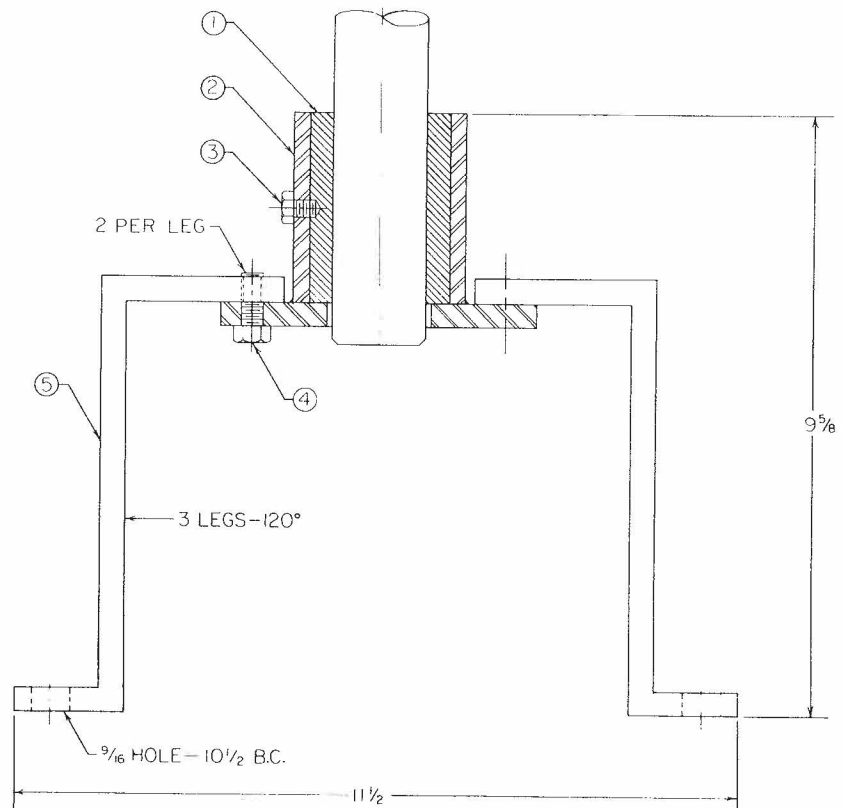
The shaft runout will differ on all mixers depending upon the shaft length.

STEADY BEARING

Dwg. No. 05-05513

PART NO.	DESCRIPTION
1	Bushing*
2	Cartridge
3	Retaining Screw
4	Screw
5	Leg

*Recommended Spare Parts



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: 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 all inspection covers on the mixer been closed and properly fastened?
4. Have required electrical connections been made? Units should be wired in accordance with motor manufacturer's wiring diagram on the motor.

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

1. 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.
2. Prime mover electrical starting equipment should be arranged to start unit slowly 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, or excessive heat. 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.
4. 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.

TROUBLESHOOTING

It is advisable to periodically inspect your mixer 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 2) Bearing failure 3) Foreign particles in bearings.	Be certain all external housing and mounting fasteners are tight. Replace bearings Foreign particles will cause excessive wear. Take steps to prevent entrance of particles.
OVERHEATING	1) Overloaded 2) Bearing failure	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. Replace bearings.
NOISE	1) Bearing failure 2) Rust 3) Extended shut-down or improper storage 4) Overloaded 5) Refer to VIBRATION, Source No. 3 6) Refer to OVER-HEATING, Sources No.'s 1 & 2.	Replace bearings. Rust can be caused by entrance of water or humidity. Thoroughly clean drive. Take steps to prevent further entrance of water and use a lubricant with good rust-inhibiting properties. 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 and shafts/seals will take place. Clean and replace parts as required. Overloading can cause loud operation. Refer to OVER-HEATING, Source No. 1.

DISASSEMBLY AND ASSEMBLY

Never perform any work on the mixer driver 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.

If your mixer is a Model OD, the set screws (5) in baseplate bearing (1) must be loosened. Refer to Drawing No. 05-00906 or 05-00907.

1/4 THRU 3/4 H.P., DWG. NO. 05-06629

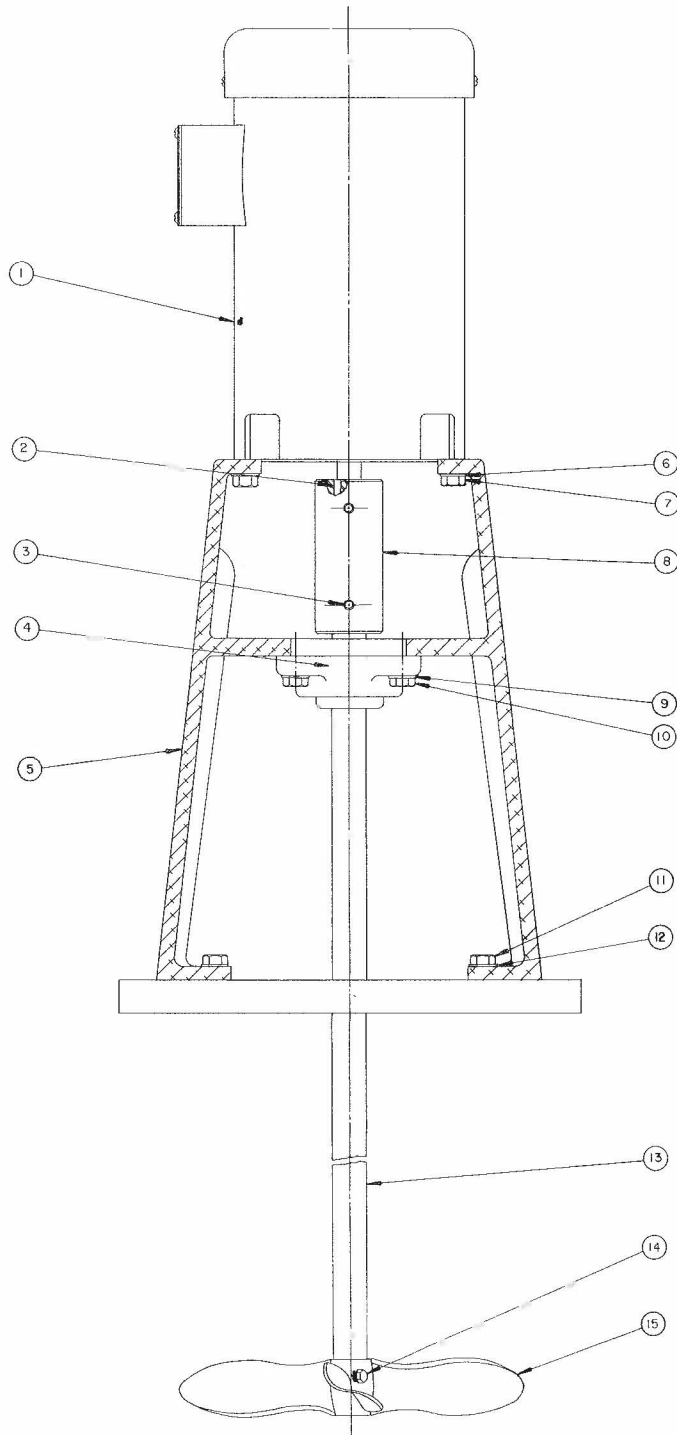
1. Disconnect the power to the motor. Be certain that the mixer cannot be remotely or automatically started.
2. Loosen socket head set screws (3) and socket head set screws in bearing (4) and remove shaft (13).
3. Remove hex head cap screws (11) and disconnect baseplate/flange.
4. Remove hex head cap screws (10) and bearing (4).
5. Remove hex head cap screws (7) and motor (1).
6. Reverse the preceding instructions for assembly.

1 THRU 5 H.P., DWG. NO. 05-02005

1. Disconnect the power to the motor. Be certain that the mixer cannot be remotely or automatically started.
2. Loosen socket head set screws (5) and remove shaft (7).
3. Remove hex head cap screws (6) and disconnect baseplate/flange.
4. Remove hex head cap screws (2) and motor (1).
5. Reverse the preceding instructions for assembly.

MODEL OD & FD MIXER PARTS, 1/4 THRU 3/4 H.P.

Dwg. No. 05-06629



PART NO.	DESCRIPTION
1	Motor
2	Key
3	Socket Head Set Screw (4)
4	Bearing •
5	Pedestal
6	Lock Washer (4)
7	Hex Head Cap Screw (4)
8	Coupling
9	Lock Washer (4)
10	Hex Head Cap Screw (4)
11	Hex Head Cap Screw (4)
12	Lock Washer (4)
13	Shaft
14	Hex Head Cap Screw (2)
15	Propeller

• RECOMMENDED SPARE PARTS