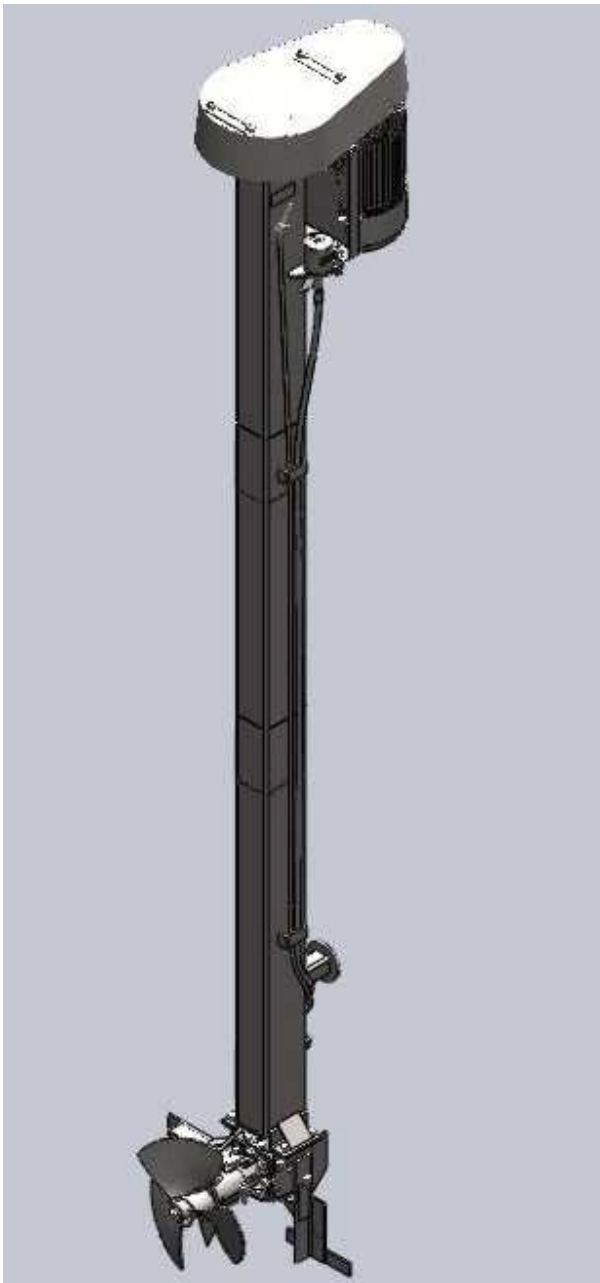


US FARM SYSTEMS

BELT DRIVEN STATIONARY AGITATOR



MAINTENANCE AND REPAIR

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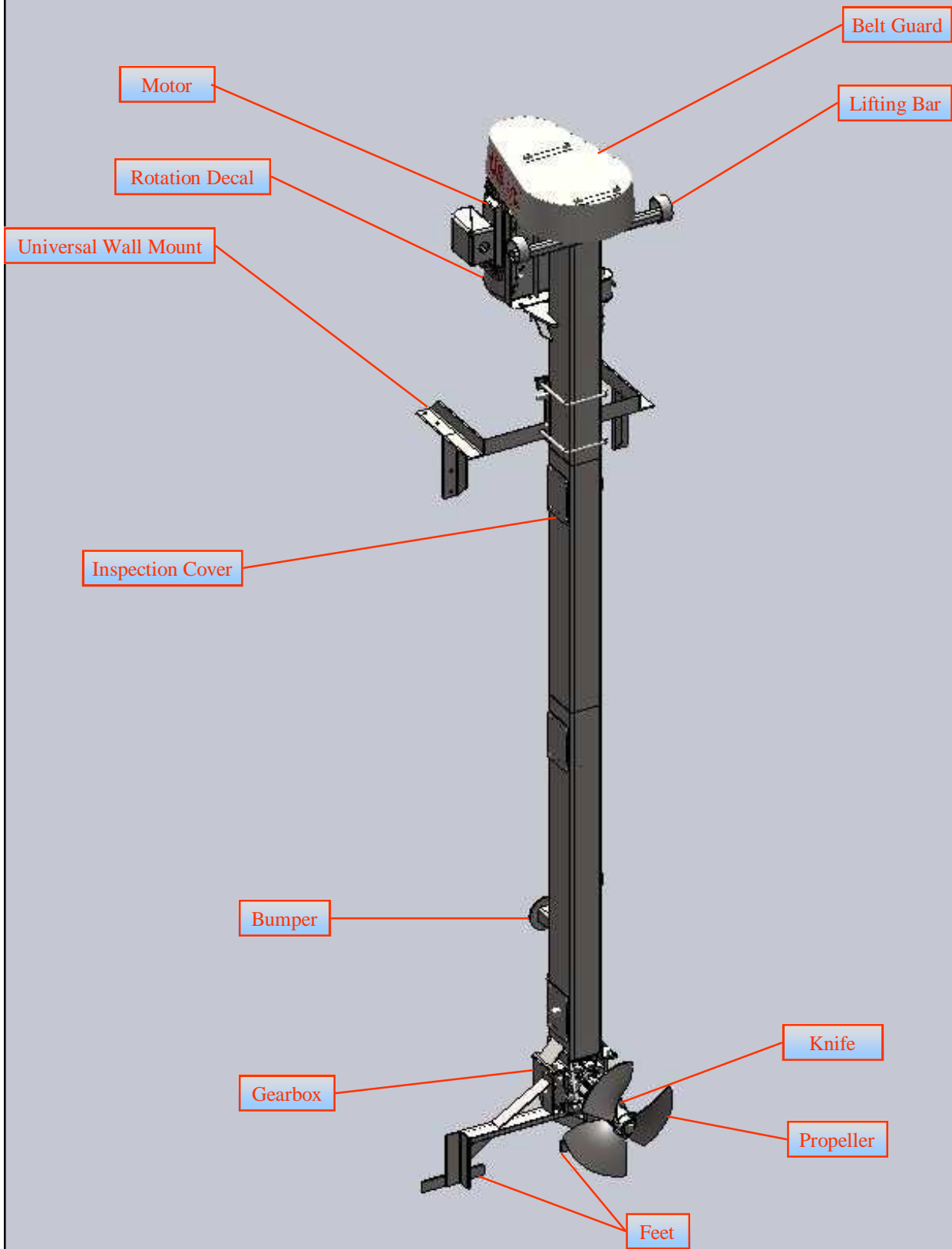
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Stationary Agitator - Belt Driven

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ATTENTION

Installation Instructions

Attach electrical wires and check the direction of agitator rotation before placing it in the water. The agitator must rotate counter clockwise pulley rotation.

Make sure the “feet” on the agitator are resting on the bottom of the pit, and the “bumper” is against the wall, before anchoring the u-bolts (see page 3).

Check the agitator motor amp draw as follows:

NOTE - The more water the agitator moves, the more amps the motor will draw.

1. Check the allowable amps on the placard on the motor.
2. Set-up amp meter and start the agitator.
3. If the amp readings are within the range specified, a qualified electrician should set the overload to 10% above usage to protect the motor.

AMPS Too High

1. It will be necessary to reduce the propeller speed, or size. Call US Farm Systems, 1-800-811-9462. **DO NOT** run the motor if the amp readings are too high. The motor will be damaged and warranty will not cover the loss.

Service

Grease according to the instruction labels on the service points.

Re-tighten the belts after 1 month of operation.

Important Information About US Farm Systems Agitators

Agitator Rotation

When removing and reinstalling an agitator, always try to mark the wires as they are disconnected as this will speed in reconnecting.

Bearings

When disassembling an old agitator, frequently parts will be “seized” to each other. If you use a steel hammer to try to dislodge shafts, yokes and bearings, you will almost certainly damage the bearings. Generally, it is a wise idea to plan on replacing most of the bearings when reassembling an agitator.

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DESCRIPTION

The U.S. Farm Systems Stationary Agitator is designed to mix primary waste pits. Basic construction of these agitators is similar, with the length and motor size being the primary difference.

The gearbox is turned by a series of belt driven shafts connected by u-joints. Each u-joint connection is supported by a bearing. The center of the tube is designed to remain dry to protect bearings and u-joints.

Most major maintenance requires removal of the agitator from the pit.

Important - Many dairymen use a paraffin based, water proof grease. **DO NOT** lubricate any part of the pit agitator with this type of grease. **Use Lubri-plate # 1242 or equivalent.**

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Fig 1 Grease Zerk

Every 100 hours

1. Add 45 shots from grease gun to the remote grease zerk (Fig 1) at the top of the pump support housing.
2. Run the motor and check for noise and vibration.



Fig 2 Grease Zerk

Every 300 hours

1. Remove belt guard and check condition and tension of the belts. Grab the belt midway between the two pulleys and twist the belt. When properly adjusted you should be able to twist the belt 90°. If belts are frayed or worn, then replace. Always replace belts as a matched set. DO NOT add one new belt.
2. Add 4 shots of grease top bearing (Fig 2), just beneath large pulley.
3. For motor maintenance see Worldwide Electric Three-Phase Motors at <http://www.worldwideelectric.net/Brochures/Brochures.html>

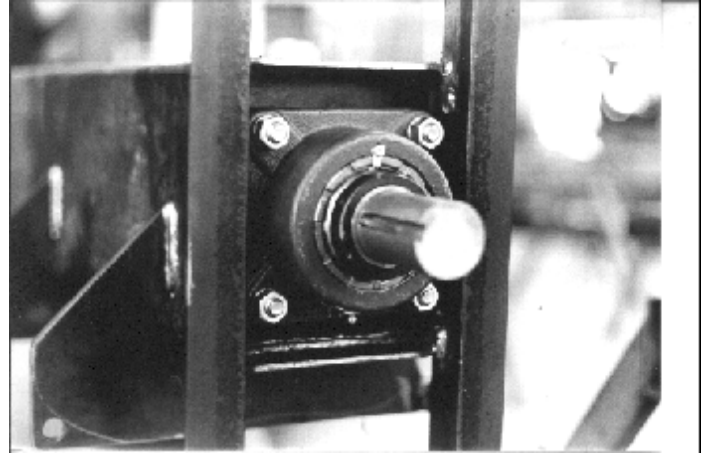


Fig 3 Top Bearing (Pulley Removed)

YEARLY

Before You Start

Yearly maintenance is primarily an inspection process to make sure the bearings, shafts and seals are in good condition.

Check carefully inside the beam. A small amount of condensation can be considered normal but if there is evidence of water contamination then all the bearings should be carefully checked,

Yearly maintenance requires removal of the agitator from the pit. This procedure also requires the following special tools:

- 1 Tube of Clear Silicone
- Stands or blocking to hold agitator.
- Never-Seize
- Loctite 271

Generally agitator that have been in operation for a year will require replacement of some items. Before starting, it's a good idea to have the tools on hand along with replacement parts (propeller, knife, or complete knife holder kit).

Agitator Removal

1. Shut-off the circuit breaker or main switch that supplies power to the agitator motor.

WARNING
DEATH OR INJURY CAN OCCUR
High voltage may be available at the motor
if the power supply is not properly
disconnected.

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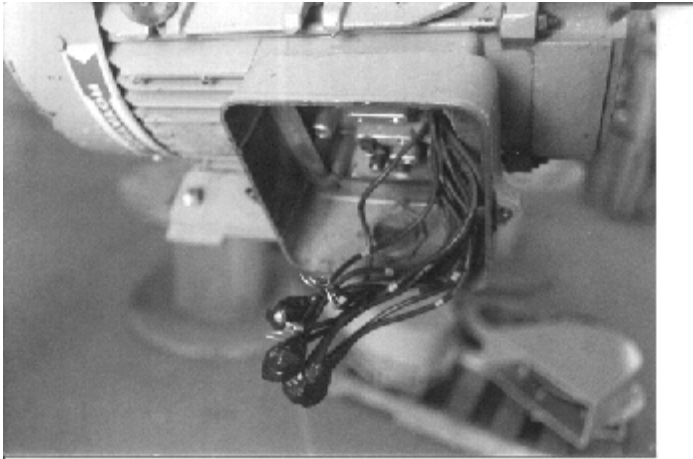


Fig 4 Disconnecting Wires

2. Wires can be disconnected at the main junction box or at the motor. If the wire run to the main box is not too long, disconnect at the main box. Clearly mark each of the three wires for reinstallation. Disconnecting at the motor junction box is possible but you will encounter more wires and it is frequently difficult to remove and reinstall the junction box cover.

WARNING

DEATH OR INJURY CAN OCCUR

Complete pump assemblies can weigh 1500 to 2500 lbs. They are also top heavy on the motor end. Lift with extreme caution.

Make sure you have a lifting device capable of supporting at least 2500 lbs.

3. Removal from the pit.
 - a. Disconnect wiring.
 - b. Attach chains around lifting bar on agitator assembly. Test for secure mounting of lifting chains.
 - c. While lifting chains are tight, loosen and remove the u-bolts attaching the agitator to any anchors.
 - d. Remove from the pit and place across blocking 30" high, motor side down.
Make sure agitator is in a **securely** clamped down position before proceeding.
4. Remove the inspection cover(s) along the side of the beam. Check for any signs of moisture inside the beam. Moisture may indicate failure of bottom seals and can cause failure of bearings inside the beam.

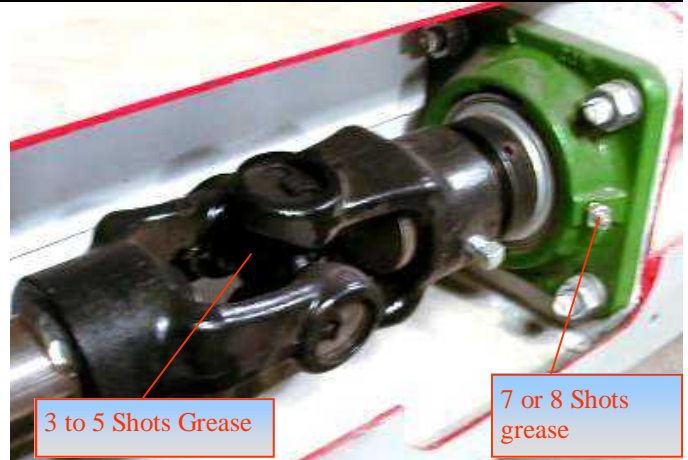


Fig 5 Grease Bearings and U-joint

5. Grease each bearing and u-joint. **DO NOT use paraffin based water proof grease.** Do not reinstall covers at this time.

Note:

1. Loosen the drive belts and rotate the shaft to check for free movement. If the shaft turns freely continue. If shaft is hard to turn or has a hard spot locate the source of this problem before continuing.
2. Install inspection covers with liberal coating of silicone seal.
3. Reinstall agitator. **See Agitator Reinstallation Instructions.**

Propeller and Knife Condition and Fit

1. Replace propeller if cracks, excessive wear, or bent blades appears.
2. If knife has excessive wear to area between propeller and knife so bolts protrude into propeller, replace knife. If dull, sharpen with grinder.

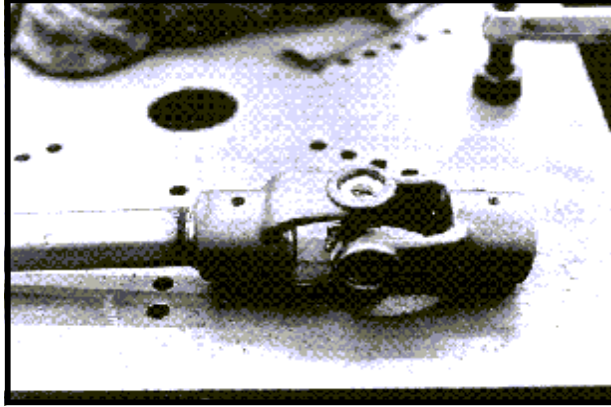
Driveshaft Removal

Before You Start

The shafts, u-joints and bearings inside the beam are all slip fit and keyed when installed at the factory. All parts are coated with Never-Seize when assembled. Bolts and set screws use Loctite 271. However, it is not unusual for these parts to "seize" and become very difficult to remove. Hammering and prying on these components subjects the u-joint bearings and flange bearings to high loads and will usually cause bearing failure.

Fig 10 Drive Shaft & U-Joint

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Sometimes heating a u-joint yoke will loosen it enough for removal but you run the risk of damaging the u-joint bearings. Flange bearings can be especially difficult to remove from the shaft and they cannot be heated without damaging them.

U-joints can be removed by using a cutting torch to cut each side of the yoke and then use a hammer and chisel to split the yoke. Try not to damage the shaft while doing this.

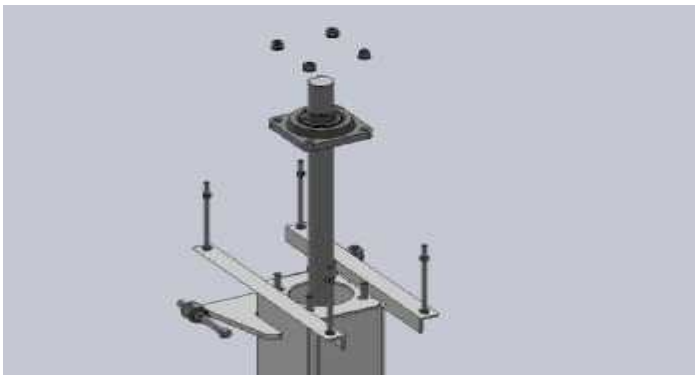
There is not an easy way to remove a bearing that has seized to the shaft. Heat or hammer blows will destroy the bearing. Again a cutting torch can be used to remove the bearing but use care to not damage the shaft.

In each case, you will have to use your own judgment as to the best possible way to disassemble these parts.

Top Bearing Removal

1. Remove belt guard and drive belts.
2. Remove pulley.
3. Loosen bearing lock collar
4. Remove four retaining nuts and lock washers from bearing.

Fig 11 Top Bearing Removal



5. At the first inspection hole, loosen the set screw on the bottom portion of the u-joint and remove first shaft and u-joint through the top of the housing with the top bearing attached.

Note: The top yoke of the u-joint is welded to the top shaft. The bottom yoke is held in place by a set screw and key. It is not welded to the second shaft. In some cases, the u-joint slides easily off the bottom shaft. If this is not the case, pushing and prying on the yoke and/or pulley may help. If you beat on the shaft with a metal hammer, the flange bearing just below the u-joint will be damaged.

If all else fails, try heating the yoke but try not to over-heat the yoke bearings or the flange bearing just below the yoke. If the u-joint will not release from the shaft, use a cutting torch to split the bottom yoke in half.

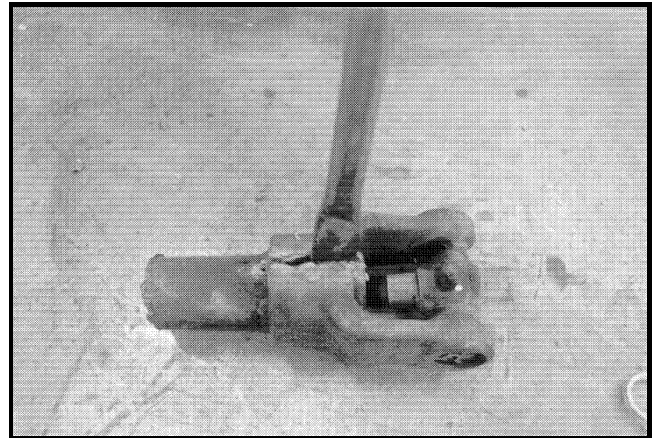


Fig 12 Splitting Yoke (Shown on Bench)

6. Loosen the set screw in the flange bearing eccentric lock collar and remove the collar. Lock collar rotates opposite the direction of shaft rotation. Loosen the four retaining nuts on the flange bearing and remove the bearing by sliding it over the shaft.

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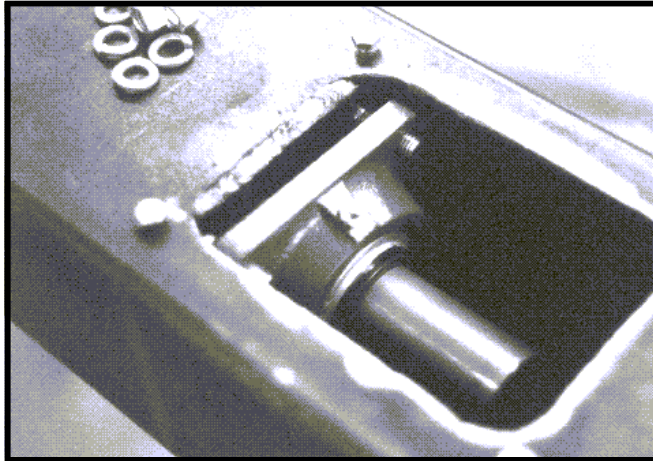


Fig 13 Removing Flange Bearing

Note- Clean the shaft and remove burrs before attempting to remove bearing. If you beat on the bearing housing with a metal hammer, you will damage the bearing. In extreme cases, use a cutting torch to remove the bearing.

7. Go to the next lower inspection hole (if applicable) and repeat the same procedures as Step 4. The bottom shaft has 6-spline yoke welded to end of shaft so it will slide on spline end of gearbox. There is no bottom bearing or seals as gearbox contains bearings and seals to prevent leakage.
8. Once all shafts and bearings are removed, check each for wear and damage. Questionable parts and gearbox to beam seal should be replaced.
9. Re-assemble in reverse order. Flange bearing lock collars rotate in the direction of shaft rotation when installing. Apply a *liberal* coating of Never Seize to all sliding parts and use Loctite 271 on all bolts. Once installed, grease all bearings and u-joints .
10. Rotate shaft and check for free movement.
11. Re-install and re-tension belts. See **Agitator Reinstallation and Testing**.

Pulley Removal - Shaft & Motor

The pulley on the motor and shaft, are both installed with taper lock bushings. If they need to be removed, proceed as follows:

1. Remove the belt guard and belts.
2. Remove the bolts in the taper lock bushing.



Figure 16 Pulley Removal

3. Install the bolts in the **THREADED** holes in the top of the bushing. Tighten these bolts until they just contact the pulley.
4. Tighten each bolt one quarter turn at a time, until the bushing is free. A few light taps with a hammer may assist in removing bushing.
5. When reinstalling the bushing tighten each bolt 1/4 turn at a time, to the maximum torque listed below. Tap the face of the bushing with a metal hammer and recheck torque.

Agitator Reinstallation

Type	Bolt Size	Torque (Ft Lbs)
SH	1/4	9
SD	1/4	9
SK	5/16	15
SF	3/8	30
E	1/2	60

Fig 17 Torque Chart

Important Note

Make sure power is off.

If you did not label the wires when removing, connect wires and check for proper rotation before installing.

1. Place the agitator in the pit. Make sure the "agitator feet" are resting on the bottom of the pit and the bumper is against the wall.
2. If you labeled the wires prior to removal, make sure power is off and reconnect the wires.

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3. Once all wiring is connected, run the agitator and check for unusual noise and vibration.
4. Once the agitator is moving water, check the amp draw on each leg of the wiring. The amp draw is only accurate if the agitator is moving water as it would under normal operation. If the amp draw exceeds the specifications listed on motor, do not continue to run the pump. This will result in motor failure.
5. Causes of excessive amp draw can be:
 - Propeller too large
 - Defective motor

Note: If there is excessive amp draw, call US Farm Systems.

Propeller and Knife Removal

As you disassemble, always check propeller, knife and shaft for abnormal signs of wear. A worn, out-of-balance propeller can destroy seals and bearings in just a few hours of operation.

1. Remove welds, flatten washer and remove center bolt.
2. Remove propeller and key stock by sliding off shaft or with slide hammer.
3. Loosen side bolts on knife holder and remove fittings for grease line from side of knife holder.
4. Slide knife and knife holder off gearbox.
5. Remove 4 bolts holding knife to holder.
6. Remove weld between knife and knife holder.
7. Remove welds around reinforcement washer and clean surface between washer and propeller.

Gearbox Removal

1. Remove gear oil line and grease line from gearbox.
2. Remove bottom inspection cover from side of beam.
3. Set support under gearbox with clearance .
4. With propeller and knife holder removed, remove 4 bolts and welds on ends of angle on gearbox to beam mount.
5. Loosen gearbox shaft to u-joint.
6. Slide gearbox away from beam and out of u-joint.
7. Remove welds on side of gearbox bolts attaching leg weldment to gearbox.
8. Remove 6 mounting bolts attaching leg weldment to gearbox and detach from gearbox.

Gearbox Reinstallation

1. After inspecting gearbox and cleaning gearbox shaft and u-joint.
2. Bolt leg weldment to gearbox.
3. Place new gearbox to beam seal.
4. Align gearbox shaft to spline yoke.
5. Slide gearbox shaft through bottom of beam and into u-joint while insuring compression of seal between gearbox and beam.
6. Replace 4 bolts and nuts on gearbox mount angles (grade 8) and tighten.
7. Insure seal compression.
8. Weld ends of mount angles together and tack weld bolts to angles on gearbox.
9. Replace gear oil line to gearbox and refill reservoir.

Propeller and Knife Reinstallation

1. Clean and remove debris from parts.
2. Inspect parts for cracks, bends and wear.
3. Replace all damaged parts.
4. Set knife holder in place with adjusting bolts loose.
Adjustment can only be made within the distance between grease fitting and clearance hole.
5. Place knife on knife holder. Tighten 4 bolts securing knife to knife holder.
6. Replace grease line fitting.
7. Install propeller and key stock.
8. Install bolt, flat washer, and reinforcement washer. Weld reinforcement washer to propeller.
9. Inspect propeller clearance. Propeller should just clear knife.
10. Adjust knife to propeller and tighten adjustment bolts and bolts on both sides of knife holder.
11. Weld washer to reinforcement washer on opposite sides then bend flat washer up around center bolt on two sides.