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**Service—**

# **30022Fxx Washer-Extractors**

## PREVENTIVE MAINTENANCE FOR THE 30022 SUSPENDED WASHER-EXTRACTOR

As required by the warranty and to achieve optimum performance and service life from Milnor<sup>®</sup> washer-extractors, **the schedules, instructions, and precautions herein must be strictly followed.**

### Main Bearing Housing Preventive Maintenance

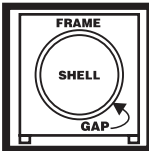
#### ⚠ WARNING ⚠



**ENTANGLE AND CRUSH HAZARD**—Belts and pulleys can entangle and crush body parts.

☞ Lock OFF and tag out power at the wall disconnect before servicing.

#### ⚠ CAUTION ⚠



**PINCH HAZARD**—Vibrating cylinder will pinch fingers caught between shell and frame.

☞ **NEVER** place fingers in gap between shell and frame.

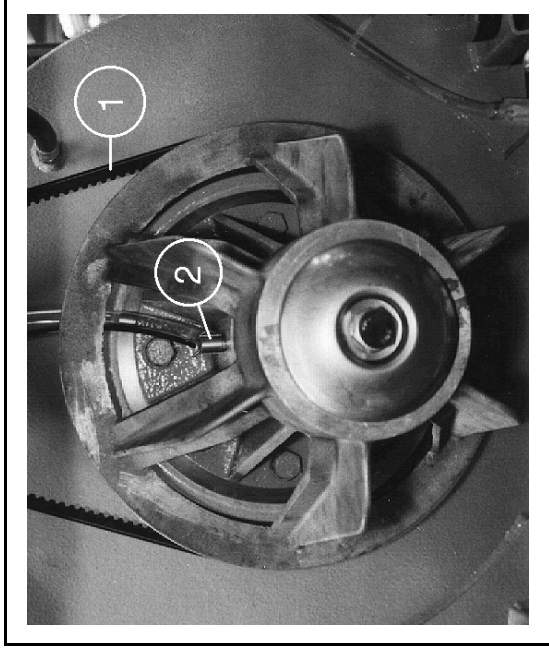
### Lubrication Procedures

1. Remove the rear panel.
2. Remove the drain plug on the bottom of the main bearing housing and allow the bearing housing to drain completely. Inspect the leak-off, drained oil, and magnetic drain plug for water and/or metal particles. Water and/or metal particles can indicate worn or damaged seals and bearings. Reinstall the drain plug.
3. After locating the oil fill plug, refill the bearing housing following lubrication specifications.
4. Reinstall the fill plug and clean excess lubricant from the machine.

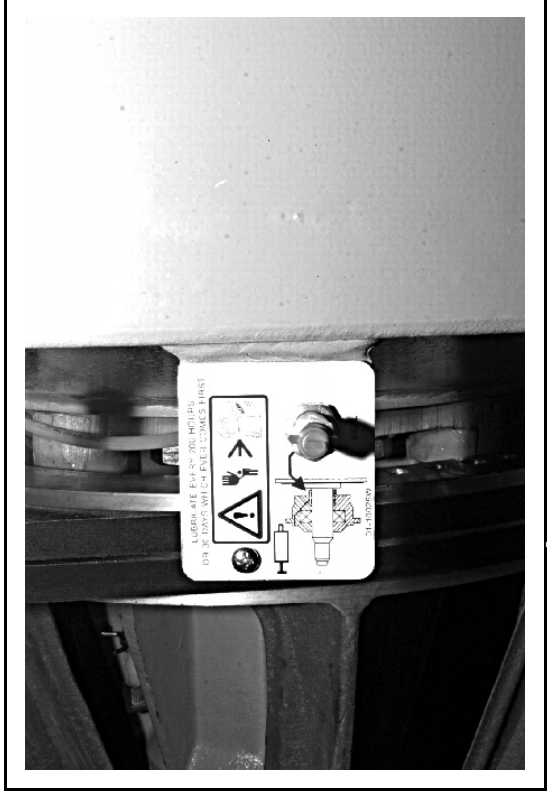
## Preventive Maintenance Schedule

Component	Action	Frequency: Monthly (See NOTE) = M Every four months = F Annually = A	Specifications
		Additional Information	
<b>Main bearing housing</b>	Change lubricant, 22 US ounces (0.65 liter).	FIGURE 1 (Item 2)	F Shell Morlina ISO 220 (SAE 50) or equivalent
<b>Water seals</b>	Slowly grease at one location until grease seeps from grease relief.	FIGURES 2, 3, and BMP980022	M Shell Alvania EP LF (or equivalent)
<b>Foundation bolts</b>	Check bolt tightness and wear. Adjust or replace if necessary.	Dimensional drawing	F
<b>Drive train</b>	Check belt tension and pulleys for wear. Replace if necessary.	FIGURES 1 (Item 1), 6, and 8	F See "Testing Belt Tension" in this section.
<b>Isolators</b>	Check cushions for cracks and deterioration (eight locations).	FIGURE 4 (Items 1 and 2)	M
	Check oil levels.		F
	Replace oil, 3.5 US ounces (0.1 liter) per isolator.		A See the lubricant specification for main bearing housing above.
<b>Shocks</b>	Check for oil leaks, replace as required (two locations).	FIGURE 4 (Item 3)	F
<b>Peristaltic supply (if so equipped)</b>	Check for leaks, observe operation.		F
<b>Cooldown vernier valve (if equipped)</b>	Verify setting. Adjust if required.	FIGURE 5	F
<b>Flushing supply injector (if so equipped)</b>	Inspect and clean the strainers in supply injector water valves and each compartment.	See "Bleach Note" in this section.	F
<b>Inverter fans and vents</b>	Vacuum out inverter vents and verify fan operation.	FIGURE 7	M
<b>Steam strainer (if so equipped)</b>	Inspect and clean strainer.		F

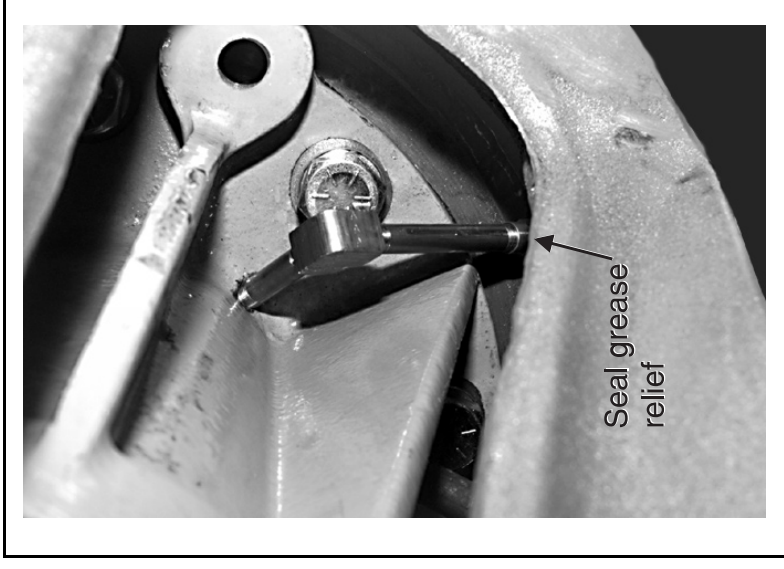
**NOTE: MONTHLY/200 HOURS=** Once a month or once every 200 operating hours, whichever comes first.



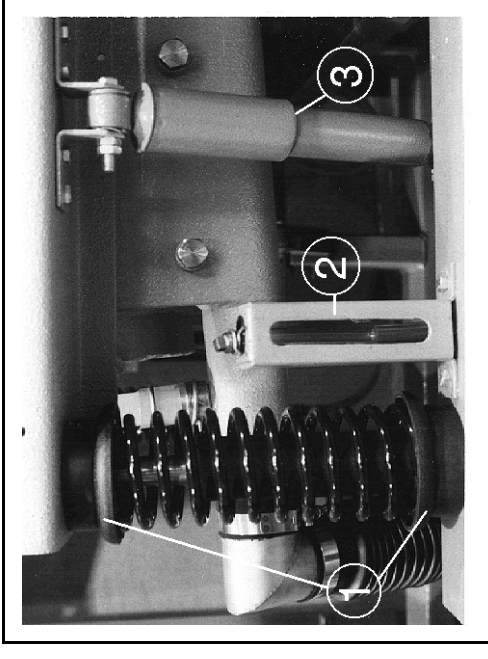
**FIGURE 1** (MSSMA424AE)  
**Main Bearing Housing  
Maintenance Points**



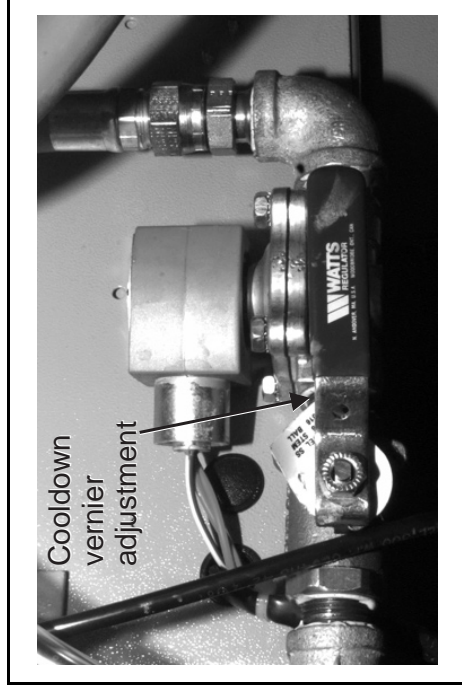
**FIGURE 2** (MSSMA424AE)  
**Water Seal Grease Point**



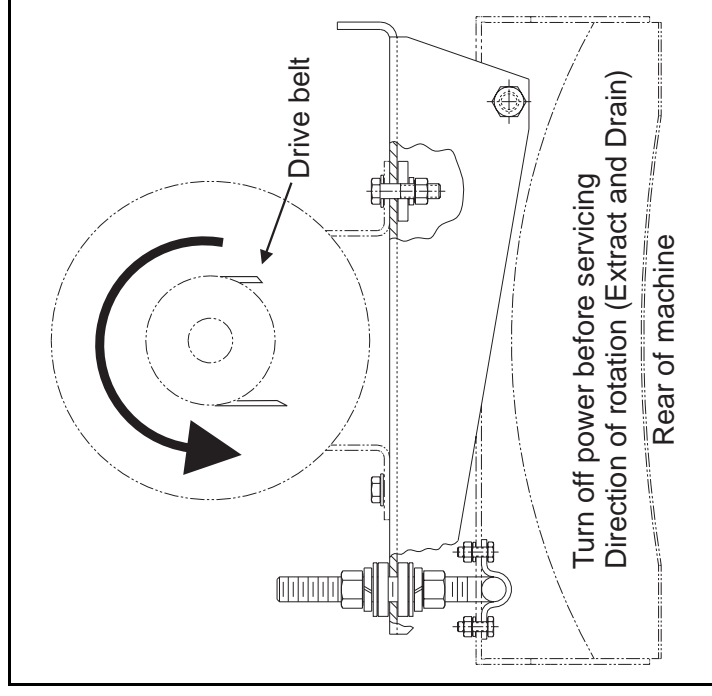
**FIGURE 3** (MSSMA424AE)  
**Water Seal Grease Relief**



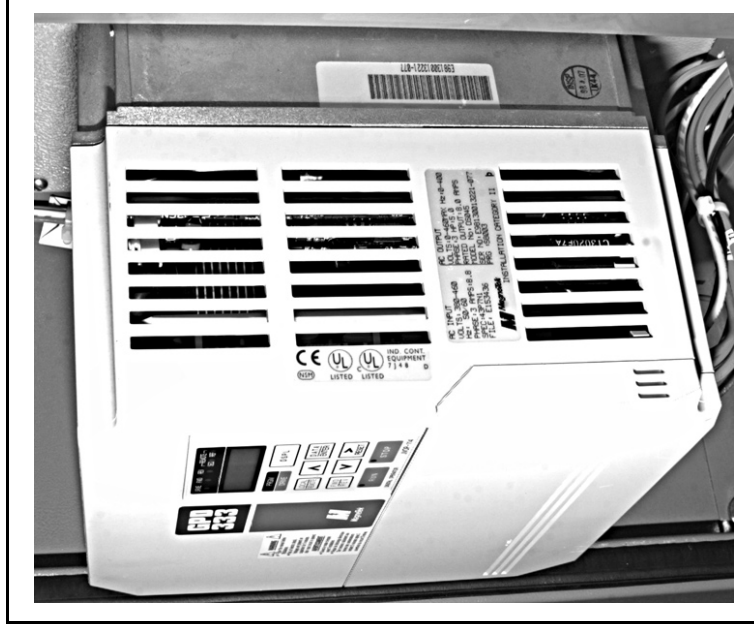
**FIGURE 4** (MSSMA424AE)  
**Isolator and Shock  
Maintenance Points**



**FIGURE 5** (MSSMA424AE)  
**Cooldown Vernier Valve**



**FIGURE 6** (MSSMA424AE)  
**Rotation Direction**

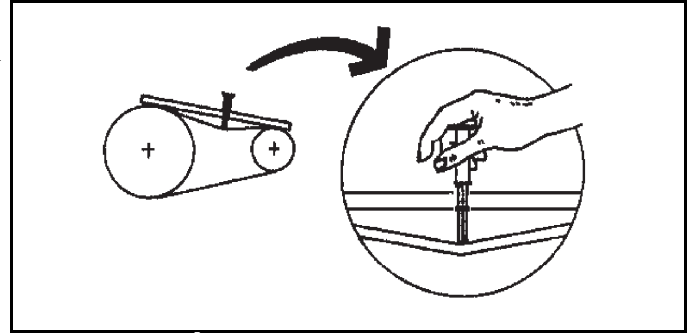


**FIGURE 7** (MSSMA424AE)  
**Inverter**

## Testing Belt Tension

**NOTE: Do not refer to instruction sheet provided with tension testing tool.** Use the “Initial tension” column when adjusting belts that have never been used. Use the “Final tension” column when adjusting belts that have been used.

Check belt tension (see FIGURE 8) when replacing and adjusting drive train components. A belt tension testing tool (Milnor® part number 30T001), straight edge, and Belt Tension Specification table is required when setting belt tension. Check tension for new belts according to the following schedule.



**FIGURE 8** (MSSMA424AE)  
**Testing Belt Tension**

- **After 24 hours operation (three eight-hour shifts)**
- **After 80 hours operation (ten eight-hour shifts)**
- **After 160 hours operation (twenty eight-hour shifts)**

Set belt tension as follows:

1. Move upper O-ring on tension testing tool to uppermost position (resting against bottom edge of sliding cap).
2. Determine belt deflection for the tested belt (see FIGURE 1, Item 1 for the belt location, and Table below for the setting). Move lower O-ring to the correct setting (inches or centimeters) on scale. Read the bottom edge of the O-ring.
3. Place a straight edge along the top edge (pulley to pulley) of the belt to be tested. Depress the tension testing tool by sliding the cap against the middle of the belt span until the bottom edge of the lower O-ring aligns with the straight edge as shown in FIGURE 8.
4. Read the top of the upper O-ring position and determine if it is within specified range.
  - See specifications in the “Initial tension” column for **belts that have never been used**.
  - See specifications in the “Final tension” column for **belts that have been used**.
5. If reading is below specified range, belt must be tightened. If reading is above specified range, belt must be loosened. Adjust belt and repeat Steps 1 through 4 until tension is within specified range.

### Belt Tension Specification

Belt	Belt deflection inches (millimeters)	Hertz	Initial tension pounds (kilograms)	Final tension pounds (kilograms)
Drive	24/64 (9.5)	All	6.7 - 9.8 (3.0 - 4.4)	5.2 - 7.6 (2.4 - 3.4)

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**About Belts**—All V-belts are not alike. So called “Super” or “High Capacity” belts frequently have considerably higher capacities than “Standard” belts. Sometimes a particular manufacturer’s V-belt will be more suitable for a certain application, and another manufacturer’s V-belt may be suitable for a different application. This may occur in spite of the fact that both manufacturer’s V-belts are reputedly “interchangeable”. Because of this, it is always best to purchase replacement belts from the original manufacturer of the equipment. If you do not wish to do this, we suggest that when you replace the belts, you purchase the exact style and type belts with which the machine was originally equipped. This is the best way to achieve belt life on your replacement belts equal to the life of the original set. (If you are not satisfied with the life of the original set, you should ask our factory if a better belt has been developed for the specific application).

## **Bleach Note**

Dry bleaches may cause the inside of the supply injector to show evidence of mild rusting. If this condition occurs, be certain to carefully clean away the rusting at least once a week. Always inject dry bleach from the cup or scoop. **Never allow the dry bleach to come in direct contact with the stainless steel components of the supply injector.**

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## REPLACING 30Fxx MAIN BEARINGS

### ⚠ DANGER ⚠



**ELECTROCUTION HAZARD**—High voltage is present inside electrical boxes, motors, and many other components, even when Master switch is *off* and/or any emergency stop is *off*. You can be killed or seriously injured on contact with high voltage.

- ☞ **Lock OFF and tag out power at the wall disconnect before servicing.**
- ☞ **Maintenance must be performed only by qualified, authorized service personnel.**

**NOTE:** A cylinder puller kit (P/N PK33-008) is available from Milnor<sup>®</sup> on a rental basis.

Maintenance procedures require:

- The proper cylinder puller
- The specified lubricant
- Loctite 271, anti-seize, Loctite silicone sealant, Loctite PST stainless steel pipe sealant and Permatex 2 adhesive (or their equivalents).

Oil or water dripping from the leak-off, or water in the bearing oil indicates leaking seals. Metal particles in the bearing oil indicates damaged bearings. Ordinarily, only the shell front and cylinder need to be removed to replace seals and bearings.

### Removing the Shell Front and Cylinder

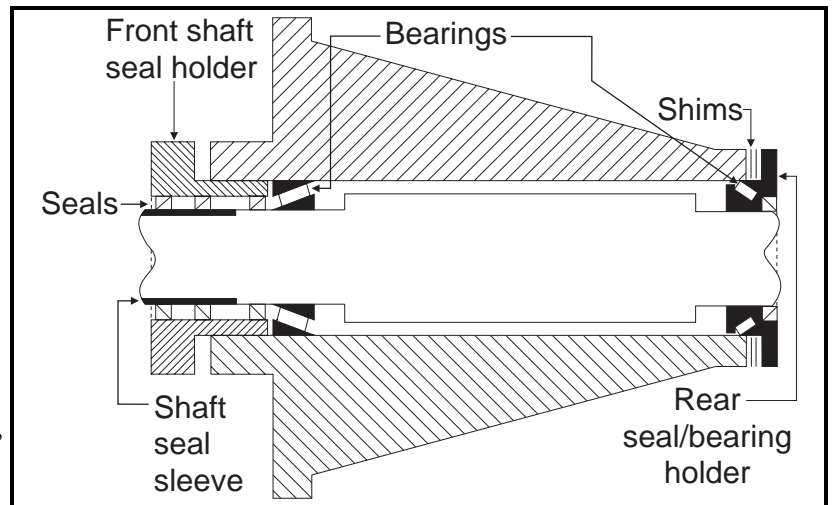
1. Remove the door interlock housing cover. Mark the terminal position of the wires and remove the wires from the *interlock switch*. Loosen the two conduit connections and move the conduit so the shell front can be removed.
2. Remove all shell front attachments including pipes, hoses, and optional equipment. Drain the oil from the bearing housing and inspect.
3. Remove the shell mount ring clip guard located on the top of the shell clamp ring, then mark the position of the shell front with respect to the shell.
4. Support the shell front and remove the bolts, shell clamp ring, rubber extrusion, and shell front.
5. Remove the shaft retainer bolt, cover, spacer, and the two screws covering the puller mounting holes. Mount puller and remove the cylinder.

# Replacing Seals, Bearings, and Bearing Housing

**NOTE:** See FIGURE 1 during the following procedures.

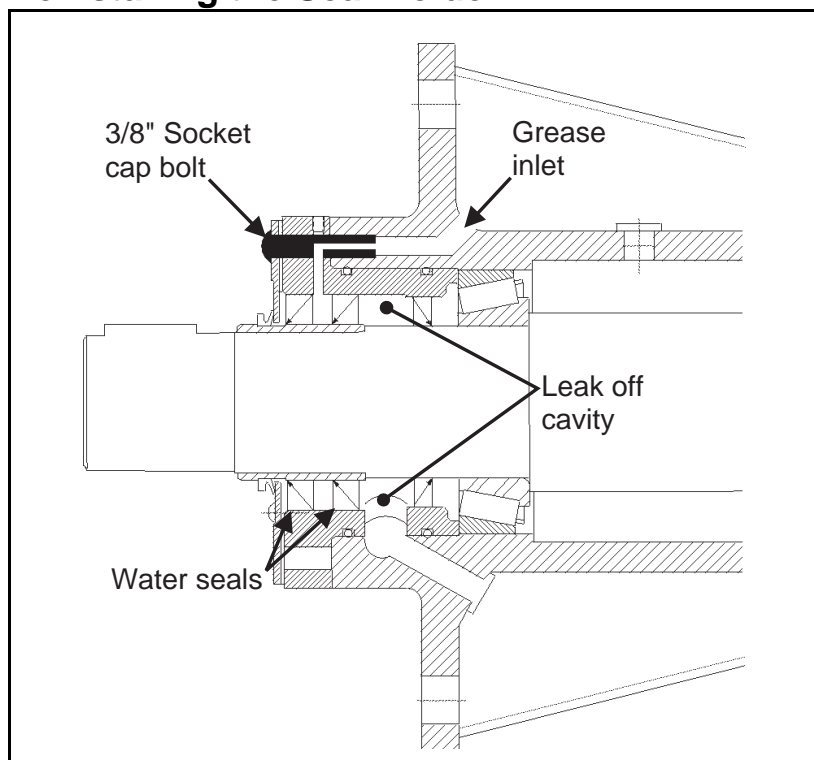
**Replacing Seals**—If no water or metal particles are present in drained oil, replace seals and O-rings as follows. If bearing oil contains water or metal particles, see “Replacing Bearings” in this section.

1. Remove the front shaft seal holder.
2. Inspect the shaft seal sleeve for nicks, gouges, or excessive wear. If replacement is necessary, heat and tap the damaged sleeve off of the shaft. Before installing the new sleeve, ensure shaft and sleeve are clean and free from oil. Apply Loctite 271 to the inside of the sleeve, then tap sleeve on the shaft, and remove excess Loctite.
3. Replace the seals and O-rings. Ensure that the new seals are parallel within the shaft seal holder.

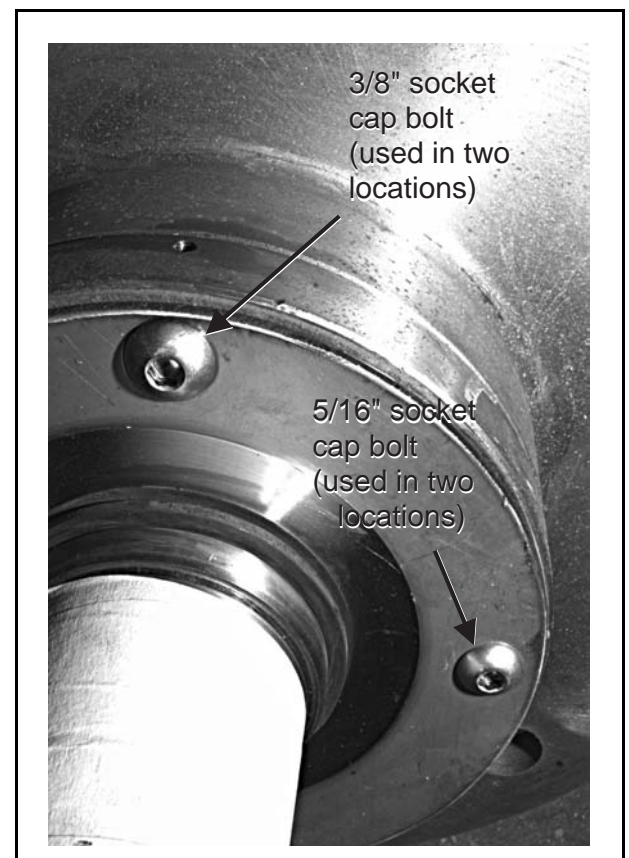


**FIGURE 1 (MSSM0261BE)**  
**Bearing Housing Components**

## Reinstalling the Seal Holder



**FIGURE 2 (MSSM0261BE)**  
**Seal Holder Details**



**FIGURE 3 (MSSM0261BE)**  
**Installed Socket Cap Bolts**

## NOTICE

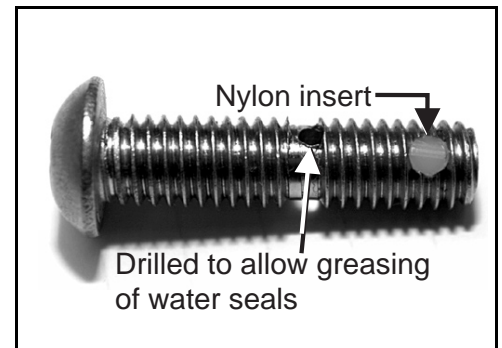
**Bolts can break off and the seal holder can leak or loosen.**

- ☞ **Follow seal holder installation instructions carefully.**
- ☞ **Do not over tighten bolts.**

**NOTE:** The two 3/8" socket cap bolts are drilled to facilitate greasing the water seals (see BMP980022, FIGURE 2, and FIGURE 4).

Initially, grade 8 hex head bolts are used to seat the seal holder, clamping it in place. After these bolts are torqued to specifications, the hex head bolts are replaced one at a time with socket cap bolts (FIGURE 2 and 3). Use anti-seize instead of threadlocker on the socket cap bolts during installation, since these bolts use a nylon insert as a threadlocker.

1. Reinstall seal holder using hex head 3/8" and 5/16" bolts. Torque bolts to the torque values provided in MSSM0101AE.
2. Remove one of the 5/16" hex head bolts. Using anti-seize, install a new 5/16" socket cap bolt, then tighten to 80 inch-pounds. **Do not use the torque values listed in MSSM0101AE.** Remove other 5/16" bolt and repeat the step.
3. Remove one of the 3/8" hex head bolts. Using anti-seize, install a new 3/8" socket cap bolt. Tighten this bolt to 150 inch-pounds (16.9 Newton meters). Remove other 3/8" bolt and repeat procedure.



**FIGURE 4** (MSSM0261BE)  
**Details of 3/8"**  
**Socket Cap Bolts**

## Replacing Bearings

**NOTE:** Set bearing clearance only if major components of the original bearing housing (front shaft seal holder, rear seal/bearing holder, shaft, or shims) are replaced. See "Setting Bearing Clearances" in this section after replacing major components.

The bearing housing does not need to be removed to change the bearings. Remove the bearing housing only if insufficient room exists for the following procedures, or if the bearing housing (or a major housing component) must be replaced.

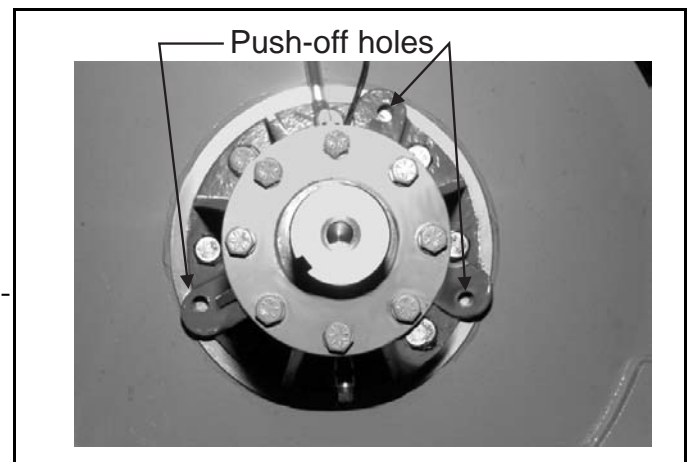
1. Remove the front shaft seal holder and rear seal/bearing holder (containing the rear bearing). Note the position and number of the shims between the rear seal/bearing holder and bearing housing. **The shims must be installed exactly as removed.**
2. Remove the shaft, bearing cup, and bearing through the front of the bearing housing. Remove and discard used bearings, cups, seals, and O-rings.
3. Install a new seal, bearing, and cup in the rear seal/bearing holder. Install the shims and the rear seal/bearing holder.
4. Press a new front bearing on the shaft, then guide shaft into the rear seal/bearing holder. **Do not scrape the new bearings against the inside of the bearing housing.**

5. Center the shaft within the housing, then gently tap in the front bearing cup. Install the front shaft seal holder.
6. The shaft should turn in the housing.

## Setting Bearing Clearances

**NOTE:** This procedure is required only if a major bearing housing component is replaced. See “Replacing Bearings” in this section.

1. Set the clearance by removing all shims from the rear seal/bearing holder. Install the rear seal/bearing holder. Leave a small gap between the bearing housing and rear seal/bearing holder.
2. Insert a lead wire in the gap between flanges. Tighten each bolt slowly while turning the shaft. Stop tightening when the shaft just begins to drag or bind. Remove the rear seal/bearing holder, being careful not to mark or damage the lead wire.
3. Using a micrometer, measure the thickness of the lead wire.
4. Add shims to the thickness of the lead wire to obtain a total thickness of 0.004" - 0.005" (0.102 - 0.127 millimeters). Install the rear seal/bearing holder using this amount of shims.
5. The shaft should turn in the housing.



**FIGURE 5** (MSSM0261BE)  
**Push-off Holes**  
 (Pulley Removed for Clarity)

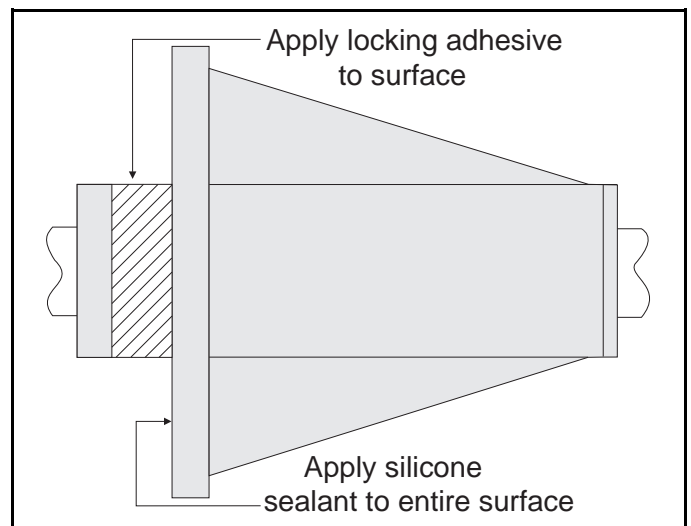
## Removing the Old Bearing Housing

Remove all fittings and connections from the bearing housing. Tighten three 1/2 - 20 x 2 inch (50) long bolts evenly into the push-off holes to separate the bearing housing from the shell.

## Installing the New Bearing Housing

**NOTE:** Use new bolts when reassembling the machine.

After determining that the shell is clean and free from old adhesives and sealants, install the bearing housing, using Loctite 271 and Loctite silicone sealant on bearing housing mounting surface (as shown in FIGURE 6). Remove any excess compounds from machine. Install all of the original lubrication fittings and connections.



**FIGURE 6** (MSSM0261BE)  
**Bearing Housing Installation**

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## Reinstalling the Cylinder and Shell Front

1. Screw two new allen screws into the puller mounting holes.
2. Determine that the main shaft is clean and free from any foreign materials and that the main shaft key is properly seated on the shaft.
3. Slide the cylinder onto the shaft, and install a new 3/4" inch long 3/4-10 grade 8 zinc plated bolt and washer. Carefully tighten this bolt, using it to pull the cylinder up the tapered main bearing shaft. After cylinder is in place, torque the bolt to 282 foot pounds (382 Newton meters).

Remove the grade 8 bolt and replace with a new 3/4" inch 18-8 stainless steel retainer bolt and washer with the original cover and spacer. Torque the retainer bolt to 150 foot pounds.

4. Determine that the shell front and the front lip of the shell are clean and free from burrs, sharp edges, and sealants.

### **▲ CAUTION ▲**

**Do not use a metal hammer to seat the shell front or install the ring.**

☞ **A metal hammer can crack stainless steel components.**

5. Using clamps, mount and support the shell front in place (align it with the mark made before it was removed). If necessary, use a rubber or rawhide maul to strike the shell front so it seats within the shell. After the shell front is seated properly on the shell, check the gap between the shell front and the lip on the shell. If necessary, use a rubber maul or rawhide maul on the shell lip to close the gap.
6. Pack a small amount of Permatex 2 adhesive (or similar) into the top center gap of the shell front and shell, along two inches on both sides of the shell weld.
7. Install the new rubber extrusion starting at the 10 o'clock position. Trim any excess.
8. Install the shell clamp ring on the shell front with the ring gap at the top center of the shell. Tap around the ring (bottom to top) with a rubber maul until a clamp can be installed on the ends of the shell clamp ring. Repeat this procedure and tighten the clamp until the bolt can be installed. Tap around the ring again, and tighten the bolt. Install the shell mount ring clip guard.
9. Reconnect door interlock conduit and wires.
10. Lubricate machine as described in "PREVENTIVE MAINTENANCE . . ." (see Table of Contents).

## REPLACING ISOLATOR CUSHIONS

### **A WARNING**



**CRUSH AND SEVER HAZARD**—Frame can slip and/or fall during procedure, crushing and/or severing body parts.

- ☛ Maintenance must be performed by qualified, authorized service personnel.
- ☛ Lock OFF and tag out power at the wall disconnect before servicing.
- ☛ Follow procedures carefully.

### Preparing to Replace Cushions

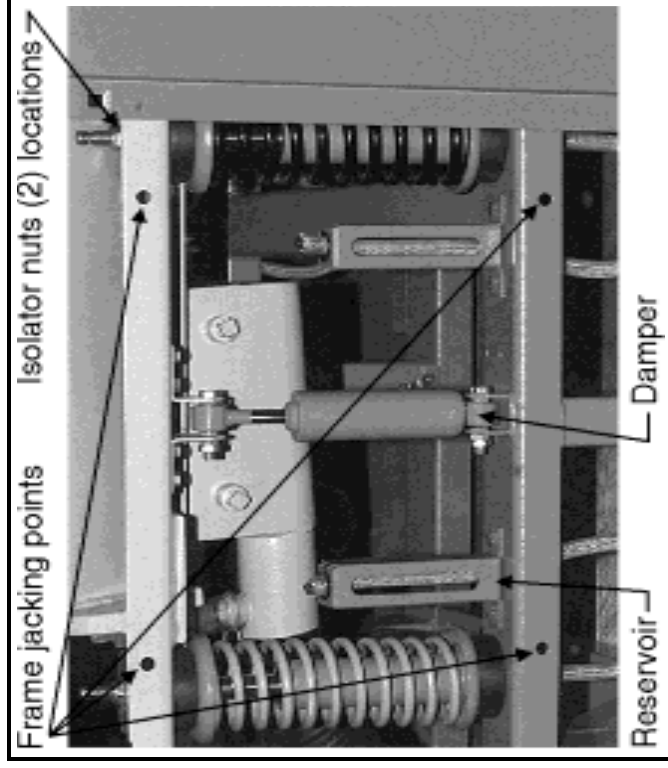
This procedure requires two suitably sized turnbuckles of minimum 3/4" (19) diameter and a wooden block (as shown in FIGURE 5).

1. Remove the damper and upper damper brackets as shown in FIGURE 1.

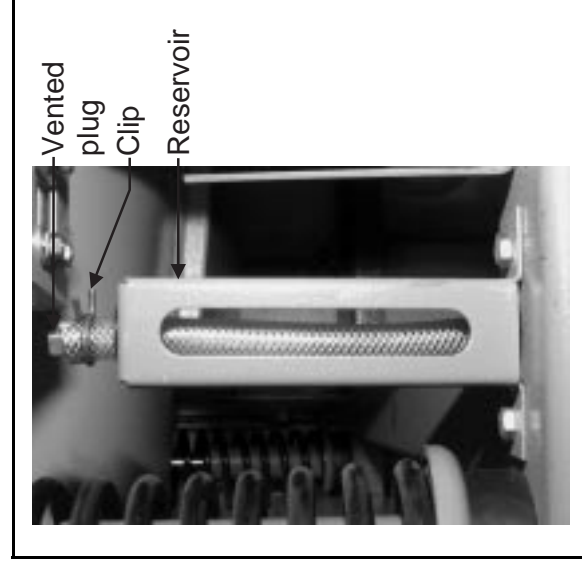
2. Remove the clip and vented plug from the end of the reservoir tube as shown in FIGURE 2. Temporarily plug the end of the tube and pull tube down through the lower frame. Remove the temporary plug and drain the oil. Remove reservoir.

3. Securely attach turnbuckles with bolts, nuts, and washers as shown in FIGURE 3 to the frame jacking points (shown in FIGURE 1).

4. Slowly jack the frames apart with the turnbuckles. Stop periodically and check that the top of the shell front does not strike either electrical boxes or cosmetics. Stop when the



**FIGURE 1** (MSSM0260AE)  
Identifying Components  
(3002Fxx shown)



**FIGURE 2** (MSSM0260AE)  
Reservoir Details

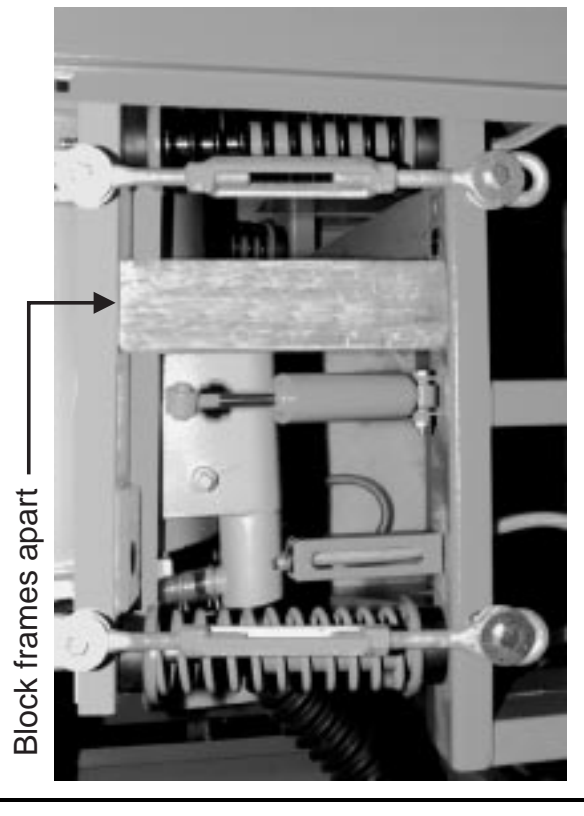
side of the shell front contacts the side cosmetic as shown in FIGURE 4. Securely block the upper frame (shown in FIGURE 5) before continuing. For additional safety, leave the turnbuckles in place until repairs are complete.

### Replacing Cushions

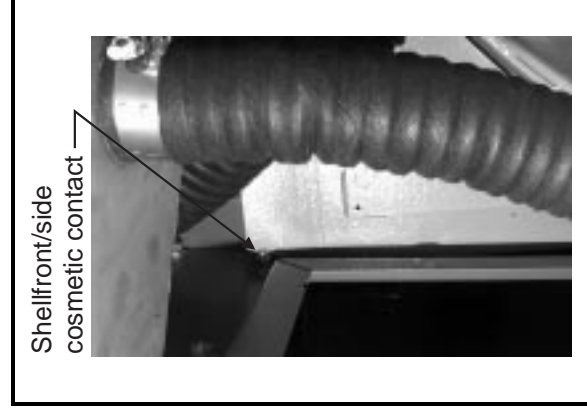
Replace the cushions on each isolator as follows.

**NOTE:** See FIGURE 6 during the following procedure.

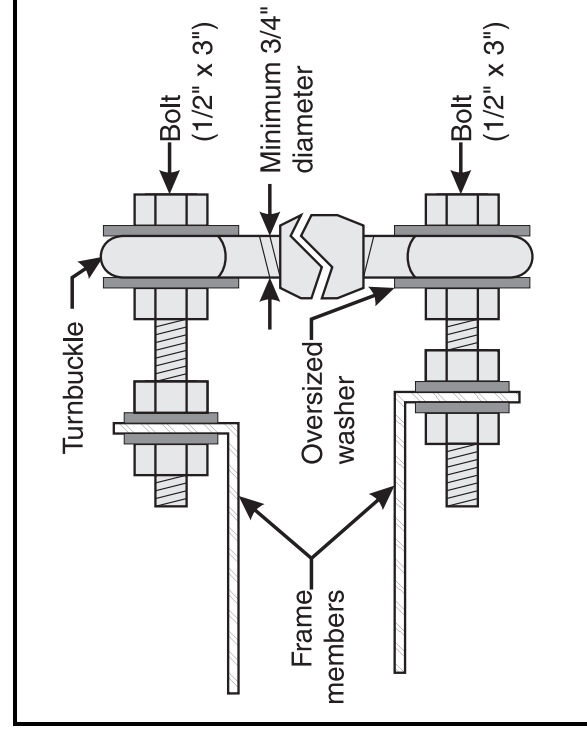
1. Using a wrench at the isolator shaft flat, hold the shaft stationary and remove the isolator shaft nut (shown in FIGURE 1), washer, and outer cushion.
2. Press the isolator shaft as far down as possible into the isolator body. Depress spring by hand, then remove inner cushion, spring seat and spring. Unbolt and remove isolator body.
3. Replace the isolator body inner and outer cushions then reassemble isolator in reverse order.
4. Torque upper and lower isolator shaft nuts to 190 - 220 inch pounds (8.0 - 9.3 newton meters)



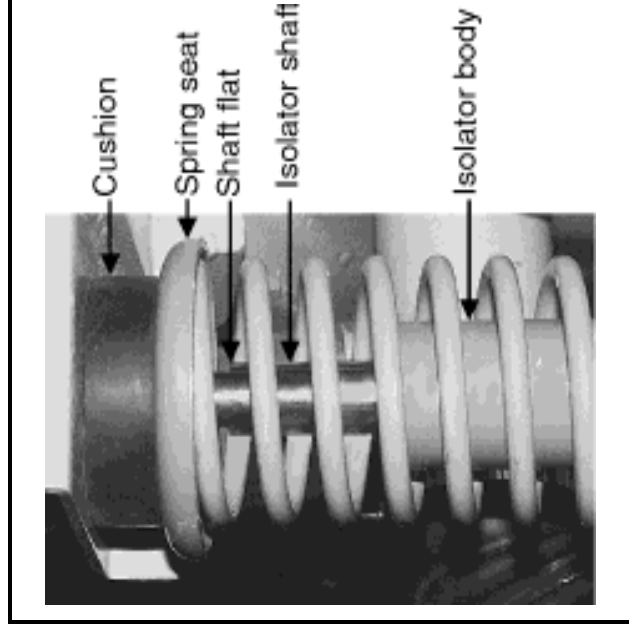
**FIGURE 5** (MSSM0260AE)  
Preparing to Remove Cushions



**FIGURE 4** (MSSM0260AE)  
Where to Stop Jacking



**FIGURE 3** (MSSM0260AE)  
Turnbuckle Details



**FIGURE 6** (MSSM0260AE)  
Isolator Details