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Service—

30015/30020/30022 Washer-Extractors

Section
Service and Maintenance

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PREVENTIVE MAINTENANCE

As required by the warranty, to ensure safe operation, and to achieve optimum performance and service life from Milnor[®] washer-extractors, **the schedules, instructions, and precautions herein must be strictly followed.**

Preventive Maintenance Schedule

Component	Procedure	Frequency	Info. Source
Door interlock (coin machines)	Test functioning for safe operation.	daily	MSOP0512AE in Operating and Troubleshooting Manual
Electronic coin counter (coin machines)	Test functioning for safe operation.	monthly	
Main bearing housing	Change lubricant. Check rear bolt tightness and adjust if necessary.	every four months	this section (see FIGURE 1)
Foundation bolts	Check bolt tightness and wear. Adjust or replace if necessary.	every four months	dimensional drawing (see NOTE 1)
Drive train	Check belt tension and wear. Check pulleys and other drive components for wear. Replace if necessary.	every four months	MSSM0706BE (see NOTE 1)
3/5 Compartment Supply injector (if so equipped)	Inspect and clean strainers in water valves, and each compartment. If rust is detected, carefully clean it away once each week.	every four months	BMP770149 BMP920019 (see NOTE 2)
Steam strainer (if so equipped)	Inspect and clean strainer.	every four months	BMP920015 (see NOTE 2)

NOTE 1: See Table of Contents for information not in this section.

NOTE 2: Drawings apply only to 30015Mxx, and Sxx; 30020Mxx; 30022Mxx, and Sxx models.

Main Bearing Housing Preventive Maintenance

⚠ DANGER ⚠



ELECTROCUTION HAZARD—High voltage is present inside electric boxes, motors, and many other components. Power switches on machine disable only control circuit power in certain boxes. You can be killed or seriously injured on contact with high voltage.

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

⚠ 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, except where specifically instructed otherwise in this section.**

☞ **Permit only qualified maintenance personnel to perform these procedures.**

Lubrication Procedures—See the appropriate *main bearing assembly* drawing (if provided) during this procedure (see Table of Contents).

1. Remove the console top by prying out the four plugs from each corner on the top of the machine and removing the four bolts. Remove the belt guard.
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. See “REPLACING MAIN BEARINGS AND SEALS,” if provided (see Table of Contents). Install the drain plug.
3. Locate the two 1/2" plastic tubes secured to the frame. Clean the surrounding area and remove the cork stoppers from each.

⚠ CAUTION ⚠

MALFUNCTION HAZARD—Oil spilled on components may cause machine malfunction.

☞ **Refill bearing housing carefully.**

⚠ CAUTION ⚠



MACHINE DAMAGE HAZARD—Mixing incompatible lubricants will result in severe machine damage.

☞ **DO NOT mix different base lubricants.**

☞ **Before using a non-specified lubricant, consult the lubricant manufacturer to determine compatibility.**

4. Strictly following lubrication specifications, refill the bearing housing. After refilling the bearing housing, reinstall the cork stoppers and clean any excess lubricant from the machine.

Lubrication Specifications

Component	Lubricant/Type	Amount of Lubricant
Main bearing housing	Any high quality SAE 30, 40, or 50 (ISO 100, 140, or 220) single weight heavy duty motor oil, non-detergent if available	22 ounces (623.7 grams)

Bolt Inspection

Check the main bearing support bolts for tightness as shown in FIGURE 1.

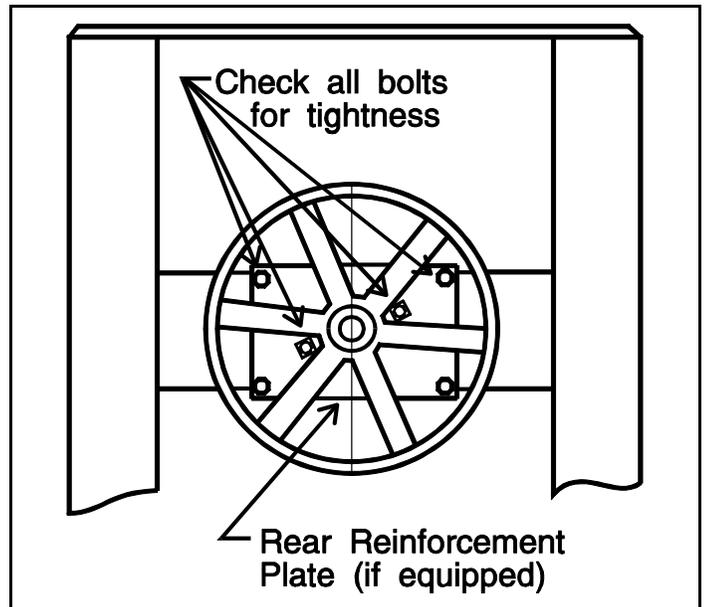


FIGURE 1 (MSSM0705CE)
**Main Bearing Housing
Bolt Locations**

Testing Belt Tension

NOTE: Use the “Initial Tension” column (Table A or B below) when adjusting belts that have never been used. Use the “Final Tension” column when adjusting belts that have been used.

Check belt tension (FIGURE 3) when replacing and adjusting drive train components. Belt tension testing tool (Milnor® part number 30T001), straight edge, and Belt Tension Tables are required when setting belt tensions. **Do not refer to instruction sheet provided with tension testing tool.** Check tensions for new belts according to the following schedule:

- After 24 hours of operation (three eight-hour days)
- After 80 hours of operation (ten eight-hour days)
- After 160 hours of operation (twenty eight-hour days)

1. Move upper O-ring on the tension testing tool to the uppermost position (resting against the bottom edge of sliding cap).
2. Determine deflection for the tested belt (see FIGURES 1 and 2 for the belt location and Tables A and B for the setting range). 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 (FIGURES 1 and 2). 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 3.
4. Read the top edge of the upper O-ring position and determine if it is within the specified range. If the readings are below the specified range, tighten the belt. If the readings are above the specified range, loosen the belt. Adjust the belt and repeat steps one through four until tension is within the specified range.

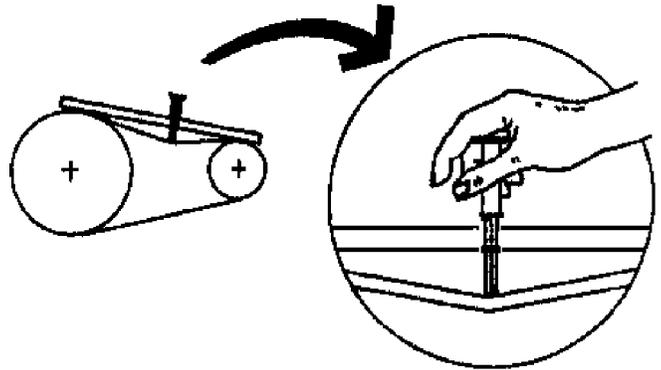


FIGURE 3 (MSSM0706BE)
Testing Belt Tension

**Table A—Belt Tension Specifications—All Belts on Dual Motor Machines
Except Main Drive Belts**

Belt Application	Belt Deflection inches (millimeters)	Initial Tension pounds (kilograms)	Final Tension pounds (kilograms)
Wash	3/16 (4.76)	5.1-6.6 (2.5-3.0)	3.9-5.1 (1.7-2.5)
Drain	5/32 (3.97)	3.7-4.9 (1.6-2.1)	2.9-3.8 (1.0-1.7)
Extract	5/32 (3.97)	5.1-6.6 (2.5-3.0)	3.9-5.1 (1.7-2.5)
Centrifugal switch (M4P, M5P, M6P, and M7P only)	17/64 (6.75)	3.6 (1.5)	3.1 (1.1)

Table B—Main Drive Belt Tension Specifications

Model	Cycle	Belt Deflection inches (millimeters)	Initial Tension pounds (kilograms)	Final Tension pounds (kilograms)
30015, 30018, 30020, and 30022 (Single motor drive)	All	15/64 (5.9)	5.1-6.6 (2.5-3.0)	3.9-5.1 (1.7-2.5)
30015 (Dual motor drive)	All	1/4 (6.35)	5.1-6.6 (2.5-3.0)	3.9-5.1 (1.7-2.5)
30020 and 30022 (Dual motor drive)	50	15/64 (5.9)	4.3-5.6 (1.9-2.7)	3.3-4.3 (1.2-1.8)
	60	15/64 (5.9)	5.1-6.6 (2.5-3.0)	3.9-5.1 (1.7-2.5)

Removing Pulleys

Replace the pulleys if the side walls are chipped, broken, or excessively worn. Remove the console top and belt guards, then remove the appropriate belts, dirt, or paint from the shaft end. Determine the type of pulley to be removed and see the appropriate instructions below.

Straight Bore Pulleys

1. Loosen set screws at the bottom of the pulley groove and remove the pulley. Retaining compound was used during factory installation; it may be necessary to heat the shaft while applying pressure with a puller.
2. Determine that the shaft and inside bore are dry and free of dirt, burrs, and old adhesives.
3. Place the key in the shaft and pulley to check key fit. Key must fit snugly, if not, replace the key or pulley.
4. Apply retaining compound (Loctite 609) to the pulley bore and shaft, being careful not to over-apply. Turn the pulley back and forth while installing to evenly distribute Loctite. Align the pulley with the corresponding pulley (see “Aligning Pulleys” in this section) and wipe off any excess Loctite.
5. Tighten the set screws. Always use new set screws. To adjust the belt tension, see “Testing Belt Tension” in this section. **Allow Loctite to cure for six hours before placing the machine in service.**

Taper Lock Bushing Pulleys

▲ CAUTION ▲

DO NOT use lubricants, “Loctite” or other compounds on taper lock bushings, pulleys, or shafts.

1. Loosen and remove all three bushing screws. Thread two screws into the push-off holes in the bushing (FIGURE 4) and alternately tighten them until the bushing and pulley separate and can be removed from the shaft.
2. Remove the burrs from the shaft, then clean and polish shaft. Clean tapered surfaces of bushing and inside bore of pulley. Determine that inside bore of bushing is clean and clear.

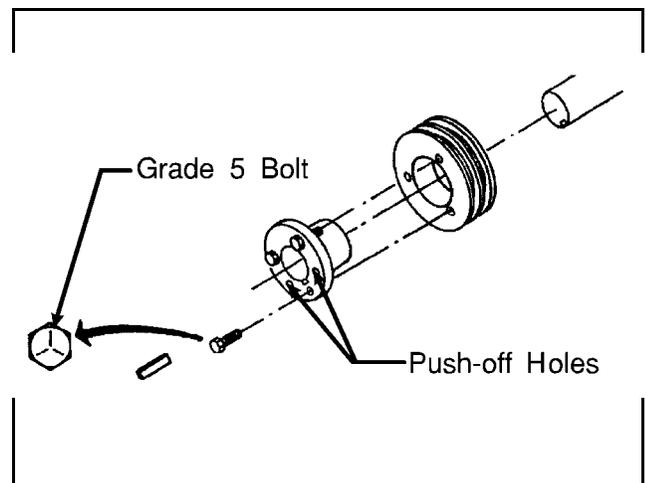


FIGURE 4 (MSSM0706BE)
Taper Lock Bushing

3. Place the key in shaft. Check for a proper fit. Key must fit snugly; if not, replace the key or bushing.
4. Insert the bushing loosely into the pulley and start all three screws. Install the pulley on the shaft and approximately align it with the corresponding pulley.
5. Gradually tighten the grade 5 bolts in an alternating pattern until the bushing is seated within the pulley (use the “Initial Torque” in Table C below). Rotate the pulley and check for wobble or runout.
6. Install the belt(s), adjust out all slack, and align the pulleys (see “Aligning Pulleys” in this section).
7. Tighten the bushing bolts to the “Final Torque” value in Table C below, and adjust the belt tension according to “Testing Belt Tension” in this section.

Table C—Bushing Bolt Torque Specifications

Size Code (Stamped on bushing)	Bolt Size	Initial Torque inch pounds (kilogram/meters)	Final Torque inch pounds (kilogram/meters)
H or SD (30015) (Dual motor drive)	1/4" x 20	54 (.62)	108 (1.24)
P1 (30020 and 30022) (Dual motor drive)	5/16" x 18	96 (1.10)	190 (2.18)
SD (All single motor drive)	1/4" x 20	54 (.62)	110 (1.26)

Electric Clutch Pulleys—Do not use a pulling tool to remove the clutch. Remove the clutch by removing the center mounting bolt and gently tapping the clutch off.

Aligning Pulleys

After replacing the drive train components, check the pulley alignment according to FIGURE 5.

Wash and Drain Belt Pulleys (Dual motor machines only)

1. Stretch a string from the wash clutch on the jackshaft to the rear pulley on E2/Drain (large) motor. Position the string similar to FIGURE 5, but with the string touching the pulley faces *on the motor side*.
2. Adjust E2 motor and/or rear pulley position, until the string touches points A, B, C, and D. Secure E2 motor and/or rear pulley. Now check the pulley on the E1/Wash (small) motor for alignment with E2 motor pulley.
3. Stretch a string from E1 motor pulley to E2 motor pulley. Adjust E1 motor and/or pulley position until the string touches A, B, C, and D. Secure E1 motor and/or pulley.

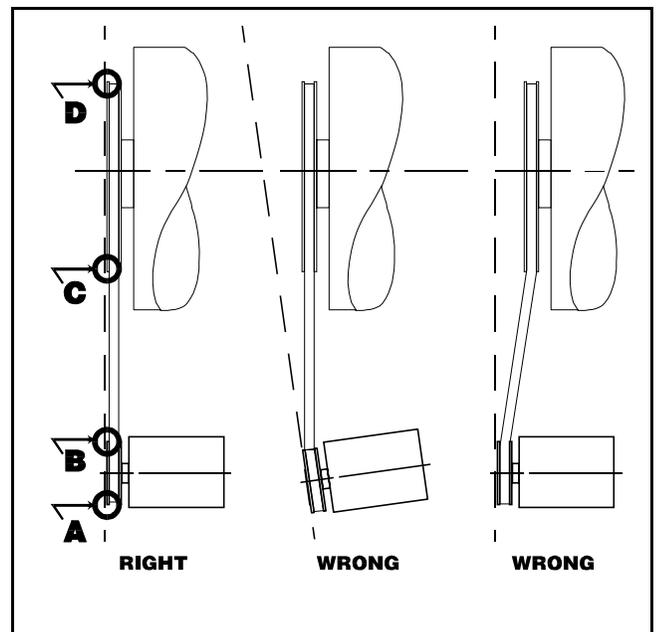


FIGURE 5 (MSSM0706BE)
Aligning Pulleys

C Main Drive and Centrifugal Switch Belt Pulleys For Single Motor Drive

B See FIGURE 5 during the following procedures:

1. Stretch a string from the motor pulley to the main drive pulley as shown on FIGURE 5.
2. Adjust the position of the main drive pulley until the string touches *A*, *B*, *C*, and *D*. Secure the main drive pulley.

C Extract, Main Drive, and Centrifugal Switch Belt Pulleys For Dual Motor Drive

See FIGURE 5 during the following procedures:

1. Stretch a string from the Extract Clutch on E2/Drain (large) motor to the pulley on the jackshaft as shown on FIGURE 5.
2. Adjust the position of the jackshaft pulley until the string touches *A*, *B*, *C*, and *D*. Secure the jackshaft pulley.
3. Check the main drive pulley for alignment with the jackshaft pulley. Stretch a string from the jackshaft pulley to the main drive pulley.
4. Adjust the main drive pulley position if necessary. Now check the centrifugal switch pulley (M4P, M5P, M6P, and M7P models only) alignment.

⚠ WARNING ⚠



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

 **Insure belt and pulley guards are in place before operating machine.**

Testing Belt Alignment—After aligning the belts, observe the belts with the machine operating. **If an adjustment is necessary, lock OFF and tag out power before proceeding.**