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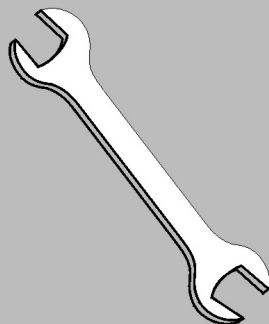
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Kit Instruction—

PK33 0006

PK33 0006A



Please Read

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The front cover displays pertinent identifying information for this manual. Most important, are the published manual number (part number) /ECN (date code). Generally, when a replacement manual is furnished, it will have the same published manual number, but the latest available ECN. This provides the user with the latest information applicable to his machine. Similarly all documents comprising the manual will be the latest available as of the date the manual was printed, **even though older ECN dates for those documents may be listed in the table of contents.**

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References to Yellow Troubleshooting Pages

This manual may contain references to "yellow pages." Although the pages containing troubleshooting procedures are no longer printed on yellow paper, troubleshooting instructions, if any, will be contained in the easily located "Troubleshooting" chapter or section. See the table of contents.

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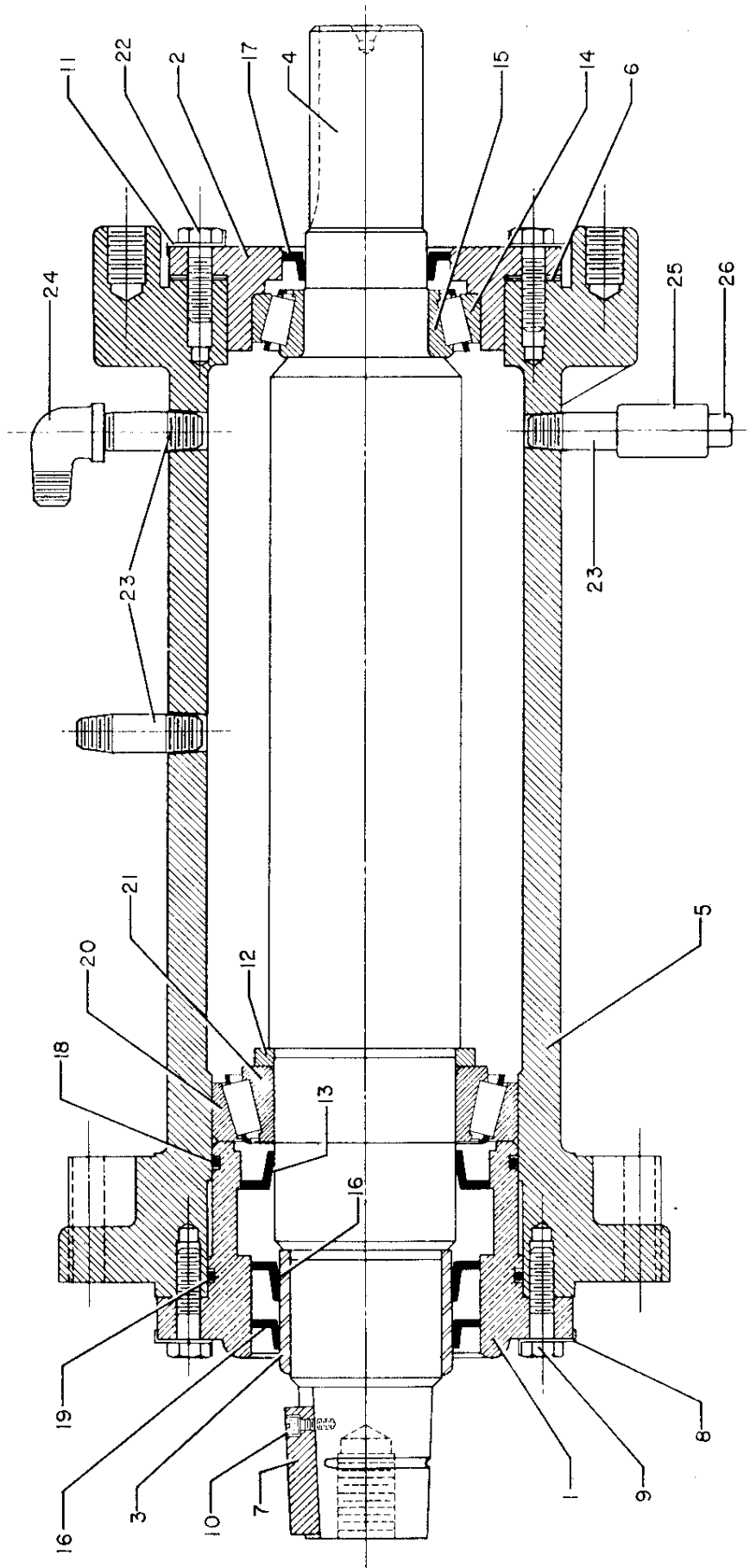
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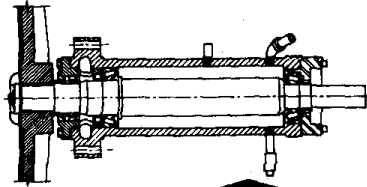


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Maintenance Bulletin

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MAINTENANCE BULLETIN B22MB84006
October 21, 1983

RE: PROPER BELT TENSIONING

Gentlemen:

Proper belt tensioning is important not only to the service life of the belts themselves but also motor and bearing life. Of course, the service life of V belts depends on other normal maintenance functions.

Upon installation, the pulleys should be checked for alignment and that the pulleys are not cocked, chipped or damaged in any way. Also, be sure there is no foreign matter build up inside the grooves.

New V belts will stretch their most during their first 6 to 8 weeks of operation. Therefore, after proper installation, tension should be checked after the first 6 to 8 weeks of operation and at least once a year thereafter. And most certainly if a squeal is detected.

Finally, V belts must be kept relatively clean. This means a periodic check and cleaning by blower, vacuum, etc. of the belts dust, lint, etc. which settle from the air. Liquids of any type (water or oil) should be kept away from belts.

In this regard we are pleased to provide the attached instructions for checking and adjusting V belt tension on MILNOR washer-extractors. These instructions are provided in four different sections, each containing tension tables for various size machines. Only one copy of each is attached but we will provide more upon request at no charge. It is suggested that you order one complete set for each mechanic.

The belt tension tester, mentioned in the instructions, is available from MILNOR under our part number 30T001. Please check with our Parts Department for price.

We are happy to offer these instructions and if there are any questions, please contact anyone in our Service Engineering Department.

Very truly yours,

PELLERIN MILNOR CORPORATION


Leroy J. Leveigne
Supervisor, Service Engineering

LJT/kf

Attachment

V-BELT TENSION ADJUSTMENTS FOR 30" AND 36" B-TYPE MACHINES AND 42" Q-TYPE MACHINES

This instruction is to be used for adjusting the belt tension on the following machine codes:

30016BWE	42026QHE
36021BWE	42026QTG
360326QWE	42026QTH
42026QWE	

A belt tension testing device (Milnor® part number 30T001) and a straight edge are required when using these instructions.

Tension Settings

Set the o-rings on the tension testing device (see FIGURE 1) as follows:

1. Move the upper o-ring to the topmost position, resting against the bottom edge of the cap.
2. Find the proper belt deflection setting (by machine model and belt function) in the appropriate table below.
3. Move the lower o-ring on the tension tester to this deflection setting on the inches scale.

NOTE 1: The tension testing device is marked on the one side in inches and pounds and on the other side in centimeters and kilograms. All values in the tables are marked.

NOTE 2: The instruction sheet provided with the tension testing device should not be used. Use only the instructions provided herein.

NOTE 3: The reference (ref.) codes shown in the tables are for factory use only.

Belt Tension Measurements

1. Place a straight edge along the top edge of the belt to be tested so that it spans both pulleys. Place the tension tester in the center of the belt and press and down on the cap until the lower o-ring is in line with the straight edge, as shown.
2. Read the setting of the upper o-ring on the LBS scale of the tension tester.
3. Compare this value with the acceptable range in the appropriate table. If the belt is brand new (has never been run), use the range in the Initial Tension column. If the belt is not brand new, locate the acceptable range in the Final Tension column.

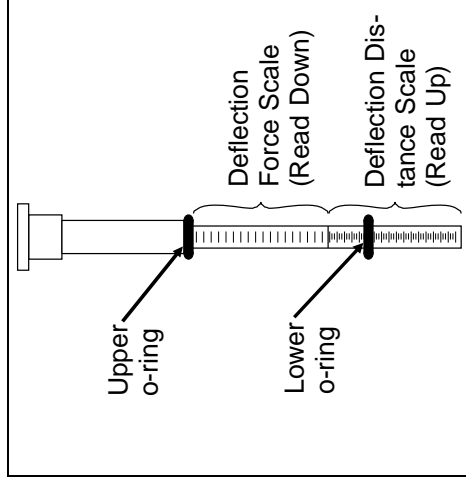


FIGURE 1 (MSSM0204AE)
Tension Tester Scales

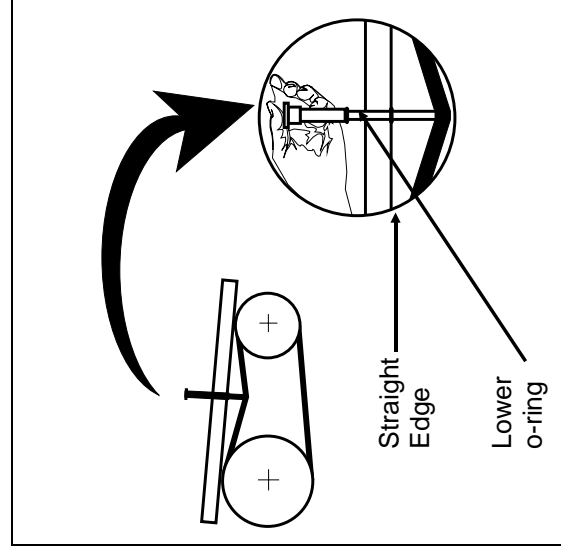


FIGURE 2 (MSSM0204AE)
Taking Measurements with the
Tension Tester

4. If the reading on the tension tester is less than the range shown in the table, the belt is too loose and must be tightened. If the reading is greater than the range shown in the table, the belt is too tight and must be loosened. Adjust the belt until the reading falls within the acceptable range in the table.

30016BWE

36021BWE

	Belt Deflect. (inches)	Initial Tension (lbs.)		Belt Deflect (IN)	Initial Tension (lbs.)		Initial Tension (ref.)
		(lbs.)	(ref.)		(lbs.)	(ref.)	
WASH/2 SPEED WASH	5/16	6.6 – 9.2	KP3	13/32	5.1 – 7.1	KN	2 – 2.4 DN
	11/32	2.4 – 2.84	DP2	13/32	2.0 – 2.4	DN	2 – 2.4 DN
DRAIN	5/16	9.6 – 13.0	MP3	25/64	7.4 – 10.0	MN	7.4 – 10.0 MN
	11/32	2.8 – 4.0	EP2	13/32	2.4 – 3.37	EN	2.4 – 3.4 EN
HIGH SPEED EXTRACT	25/64	10.5 – 14.3	NP3	27/64	8.1 – 11.0	NN	8.1 – 11.0 NN
	25/64	8.0 – 11.0	LP3	27/64	6.2 – 8.5	LN	7.4 – 10.0 MN
LOW SPEED EXTRACT	11/64	9.0 – 13.0	MP3	11/64	7.4 – 10.0	MN	6.6 – 9.2 KP3
	5/32			11/64			5.1 – 7.1 KN

36026QWE

42026QWE

	Belt Deflect. (inches)	Initial Tension (lbs.)		Belt Deflect (IN)	Initial Tension (lbs.)		Initial Tension (ref.)
		(lbs.)	(ref.)		(lbs.)	(ref.)	
WASH/2 SPEED WASH	13/32	2.4 – 2.84	DP2	11/32	2.0 – 2.4	DN	7.4 – 10.0 MN
	13/32			23/64			MP3
DRAIN	25/64	9.6 – 13.0	MP3	23/64	7.4 – 10.0	MN	2.8 – 4.0 EP2
	13/32	2.8 – 4.0	EP2	23/64	2.4 – 3.34	EN	10.5 – 14.3
HIGH SPEED EXTRACT	7/16	9.6 – 13.0	MP3	7/16	7.4 – 10.0	MN	9.6 – 13.0 NP3
	7/16	8.0 – 11.0	LP3	7/16	6.2 – 8.5	LN	9.6 – 13.0 MP3
LOW SPEED EXTRACT	3/16	9.6 – 13.0	MP3	1/4	7.4 – 10.0	MN	7.4 – 10.0 MN
	3/16			1/4			6.6 – 9.2 KP3

42026QHE, QTG, QTH

	Belt Defl. (inches)	Initial Tension (lbs.)		Belt Deflect (lbs.)	Final Tension (ref.)	
		(lbs.)	(ref.)		(lbs.)	(ref.)
WASH/2 SPEED WASH	19/64	9.62 – 13.0	MP3	7.4 – 10.0		MN
	5/32	10.5 – 14.3		8.1 – 11.0		NN
MAIN	31/64	10.5 – 14.3	NP3	8.1 – 11.0		NN
	15/32					
OPTIONAL LOW SPEED EXTRACT	19/64	8.0 – 11.0	LP3	6.2 – 8.5		LN

V-BELT TENSION ADJUSTMENTS

This instruction is to be used for adjusting the belt tension on the following machine models:

42031WE2	42031SG2	42031WE3	42031SG3
42044WE2	42044SG2	42044WE3	42044SG3

A belt tension testing device (Milnor[®] part number 30T001) and a straight edge are required when using these instructions.

Tension Settings

Set the o-rings on the tension testing device (FIGURE 1) as follows:

1. Move the upper o-ring to the topmost position, resting against the bottom edge of the cap.
2. Find the proper Belt Deflection setting (by machine model and belt function) in the appropriate table in this section.
3. Move the lower o-ring on the tension tester to this deflection setting on the inches scale.

NOTE 1: The tension testing device is marked on one side in inches and pounds and on the other side in centimeters and kilograms. All values in the tables are in inches (in) and pounds (lbs).

NOTE 2: The instruction sheet provided with the tension testing device should not be used. Use only the instructions provided herein.

NOTE 3: The reference (ref) codes shown in the tables are for factory use only.

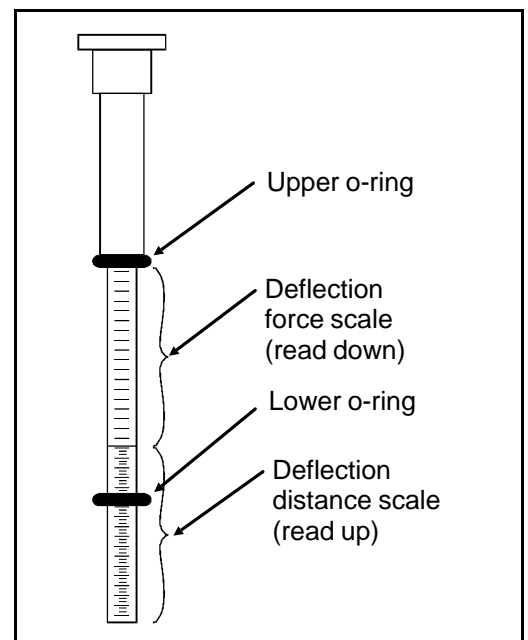


FIGURE 1 (MSSM0301AE)
Tension Tester Scales

Belt Tension Measurements

1. Place a straight edge along the top edge of the belt to be tested so that it spans both pulleys. Place the tension tester in the center of the belt and press down on the cap until the lower o-ring is in line with the straight edge, as shown.
2. Read the setting of the upper o-ring on the lbs scale of the tension tester.
3. Compare this value with the acceptable range in the appropriate table. If the belt is brand new (has never been run), use the range in the Initial Tension column. If the belt is not brand new, locate the acceptable range in the Final Tension column.
4. If the reading on the tension tester is *less* than the range shown in the table, the belt is *too loose* and must be tightened. If the reading is *greater* than the range shown in the table, the belt is *too tight* and must be loosened. Adjust the belt until the reading falls within the acceptable range in the table.

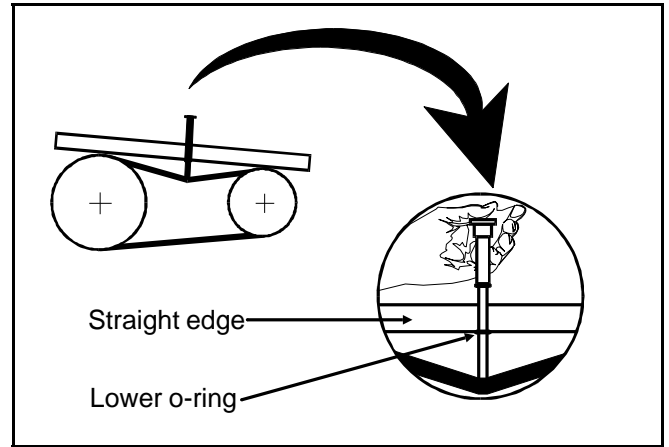


FIGURE 2 (MSSM0301AE)
Taking Measurements with
the Tension Tester

42031WE2/WE3 and 42044WE2/WE3 Belt Tension Measurements

	Belt Deflection (inches)	Initial Tension		Final Tension	
		(LBS)	(REF)	(LBS)	(REF)
Wash/2-Speed Wash	11/64	9.6-13.0	MP3	7.4-10.0	MN
Drain	3/8	8.0-11.0	LP3	6.2-8.5	LN
Main	50Hz	10.5-14.3	NP3	8.1-11.0	NN
	60Hz				

42031SG2/SG3 and 42044SG2/SG3 Belt Tension Measurements

	Belt Deflection (inches)	Initial Tension		Final Tension	
		(LBS)	(REF)	(LBS)	(REF)
Wash/2-Speed Wash	11/64	9.6-13.0	MP3	7.4-10.0	MN
Drain	3/8	8.0-11.0	LP3	6.2-8.5	LN
E1 (optional)	11/32	9.6-13.0	MP3	7.4-10.0	MN
Upper Jackshaft to Lower Jackshaft	50Hz	10.5-14.3	NP3	8.1-11.0	NN
	60Hz				

V-BELT TENSION ADJUSTMENTS FOR 48", 52", 60" AND 72" WASHER-EXTRACTORS

This instruction is to be used for adjusting the belt tension on the following machine models:

48032BHE	48032BTG	48032BTH	48036QHE	48036QTG	48036QTH		
52038WE1	52038WTF	52038WTB	52038WTG	52038WTH			
60036WE2	60036WE3	60036SG2	60036SG3	60044WE2	60044WE3	60044SG2	60044SG3
72044SG2	72044SG3	72044WE2	72044WE3	72044WTB	72044WTG	72044WTH	

A belt tension testing device (Milnor[®] part number 30T001) and a straight edge are required when tensioning unbanded belts.

Tension Settings—Unbanded Belts

Set the o-rings on the tension testing device (see FIGURE 1) as follows:

1. Move the upper o-ring to the topmost position, resting against the bottom edge of the cap.
2. Find the proper belt deflection setting (by machine model and belt function) in the appropriate table below.
3. Move the lower o-ring on the tension tester to this deflection setting on the inches scale.

NOTE 1: The tension testing device is marked on one side in inches and pounds and on the other side in centimeters and kilograms. All values in the tables are in inches (in.) and pounds (lbs.).

NOTE 2: The instruction sheet provided with the tension testing device should not be used. Use only the instructions provided herein.

NOTE 3: The reference (ref.) code shown in the tables are for factory use only.

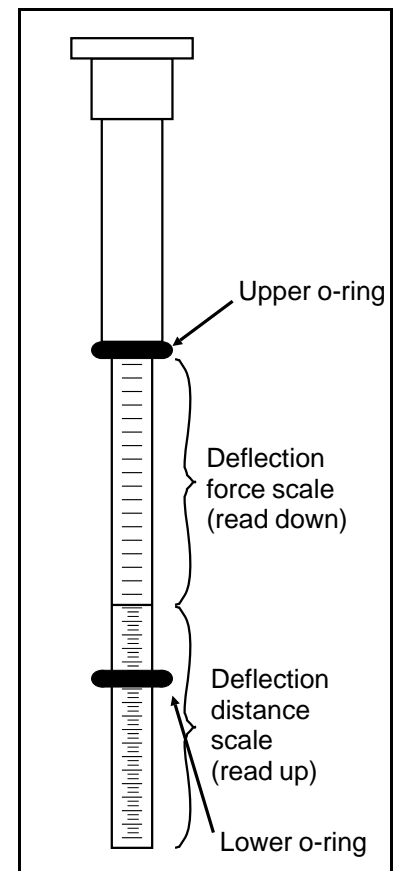


FIGURE 1 (MSSMA405AE)
Tension Settings

Belt Tension Measurements

Unbanded Belts

1. Place a straight edge along the top edge of the belt to be tested so that it spans both pulleys. Place the tension tester in the center of the belt and press down on the cap until the lower o-ring is in line with the straight edge, as shown.
2. Read the setting of the upper o-ring on the lbs scale of the tension tester.
3. Compare this value with the acceptable range in the appropriate table. If the belt is brand new (has never been run), use the range in the Initial Tension column. If the belt is not brand new, locate the acceptable range in the Final Tension column.
4. If the reading on the tension tester is *less* than the range shown in the table, the belt is *too loose* and must be tightened. If the reading is *greater* than the range shown in the table, the belt is *too tight* and must be loosened. Adjust the belt until the reading falls within the acceptable range in the table.

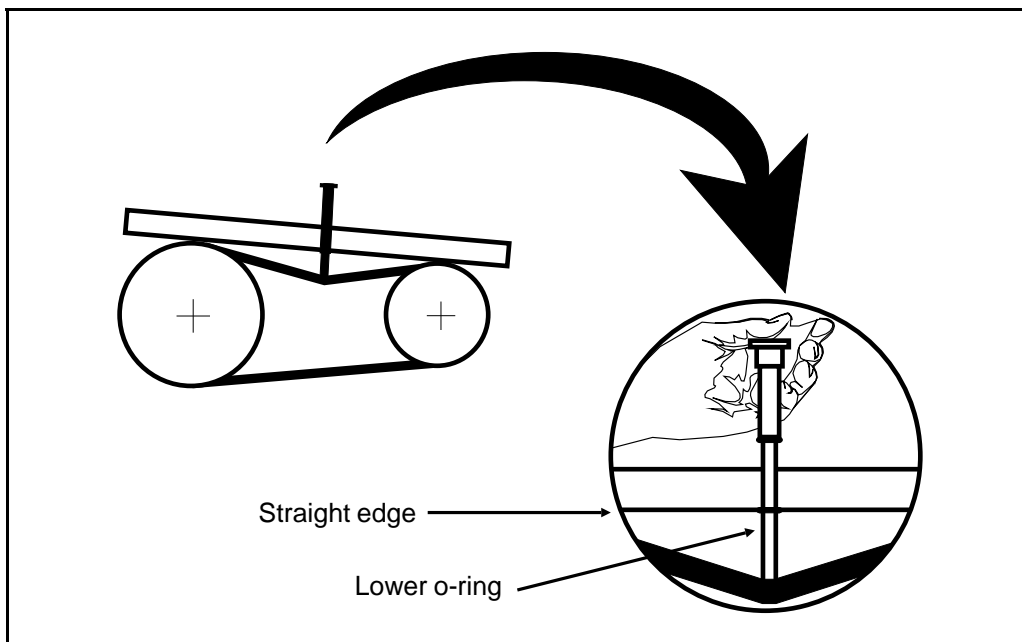


FIGURE 2 (MSSMA405AE)
Measuring Belt Tension

Tensioning Banded Belts

48032BHE, BTG, BTH

48036QHE, QTG, QT

	Belt Deflect. (inches)	Initial Tension		Initial Tension		Belt Deflect (in.)	Initial Tension		Initial Tension	
		(lbs.)	(ref.)	(lbs.)	(ref.)		(lbs.)	(ref.)	(lbs.)	(ref.)
WASH/ 2 SPEED WASH	9/32	6.6 - 9.2	KP3	5.1 - 7.1	KN	5/16	5.7 - 7.6	JP3	4.4 - 5.9	JN
DRAIN	5/32	5.7 - 7.6	JP3	4.4 - 5.9	JN	5/32	6.6 - 9.2	KP3	5.1 - 7.1	KN
MAIN	50C 35/64	10.5 - 14.3	NP3	8.1 - 11.0	NN	17/32	10.5 - 14.3	NP3	8.1 - 11.0	NN
	60C 17/32									
LOW SPEED EXTRACT	13/64	6.6 - 9.2	KP3	5.1 - 7.1	KN	3/16	9.62 - 13.0	MP3	7.4 - 10.0	MN

52038WE1, WTF, WTB, WTG, WTH

60036 + 60044WE2 + WE3

	Belt Deflect. (inches)	Initial Tension		Initial Tension		Belt Deflect (in.)	Initial Tension		Initial Tension	
		(lbs.)	(ref.)	(lbs.)	(ref.)		(lbs.)	(ref.)	(lbs.)	(ref.)
WASH/ 2 SPEED WASH	25/64	10.5 - 14.3	NP3	8.1 - 11.0	NN	3/16	5.7 - 7.6	JP3	4.4 - 5.9	JN
DRAIN	5/32	10.5 - 14.3	NP3	8.1 - 11.0	NN	13/32	6.6 - 9.2	KP3	5.1 - 7.1	KN
E1	1/4	6.6 - 9.2	KP3	5.1 - 7.1	KN	17/64	6.6 - 9.2	KP3	5.1 - 7.1	KN
E2	1/2	6.6 - 9.2	KP3	5.1 - 7.1	KN	11/32	6.6 - 9.2	KP3	5.1 - 7.1	KN
MAIN	50C 11/16	18.2 - 26.0	SP3	14.0 - 20.0	SN	43/64	16.9 - 20.8	RP3	13.0 - 16.0	RN
	60C 23/32	16.9 - 20.8	RP3	13.0 - 16.0	RN	45/64				

48032BHE, BTG, BTH

48036QHE, QTG, QT

	Belt Deflect. (inches)	Initial Tension		Initial Tension		Belt Deflect (in.)	Initial Tension		Initial Tension	
		(lbs.)	(ref.)	(lbs.)	(ref.)		(lbs.)	(ref.)	(lbs.)	(ref.)
WASH/ 2 SPEED WASH	1/4	5.7 - 7.6	JP3	4.4 - 5.9	JN	17/64	5.7 - 7.6	JP3	4.4 - 5.9	JN
DRAIN	3/64	6.6 - 9.2	KP3	5.1 - 7.1	KN	33/64	6.6 - 9.2	KP3	5.1 - 7.1	KN
E-1	9/32	6.6 - 9.2	KP3	5.1 - 7.1	KN	17/64	6.6 - 9.2	KP3	5.1 - 7.1	KN
E-2	39/64	6.6 - 9.2	KP3	5.1 - 7.1	KN	5/8	6.6 - 9.2	KP3	5.1 - 7.1	KN
UPPER JACK TO LOWER JACK LOWER JACK TO UPPER JACK	BANDED BELTS NEED SPECIAL INSTRUCTIONS					BANDED BELTS NEED SPECIAL INSTRUCTIONS				

52038WE1, WTF, WTB, WTG, WTH

60036 + 60044WE2 + WE3

	Belt Deflect. (inches)	Initial Tension		Initial Tension		Belt Deflect (in.)	Initial Tension		Initial Tension		
		(lbs.)	(ref.)	(lbs.)	(ref.)		(lbs.)	(ref.)	(lbs.)	(ref.)	
WASH/ 2 SPEED WASH	15/64	5.7 - 7.6	JP3	4.4 - 5.9	JN	15/64	5.7 - 7.6	JP3	4.4 - 5.9	JN	
DRAIN	13/32	6.6 - 9.2	KP3	5.1 - 7.1	KN	25/64	6.6 - 9.2	KP3	5.1 - 7.1	KN	
E1	17/64	6.6 - 9.2	KP3	5.1 - 7.1	KN	17/64	6.6 - 9.2	KP3	5.1 - 7.1	KN	
E2	5/16	6.6 - 9.2	KP3	5.1 - 7.1	KN	5/16	6.6 - 9.2	KP3	5.1 - 7.1	KN	
MAIN	50C	45/64	16.9 - 20.8	RP3	13.0 - 16.0	RN	3/4	16.9 - 20.8	RP3	13.0 - 16.0	RN
	60C	11/16	16.9 - 20.8	RP3	13.0 - 16.0	RN	23/32	16.9 - 20.8	RP3	13.0 - 16.0	RN

REPLACING MAIN BEARINGS AND SEALS ON 30015, 30020, 30022Cxx, Kxx, Sxx, AND Mxx MODELS

⚠ DANGER ⚠



ELECTROCUTION HAZARD—High voltage is present inside electric 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 by qualified, authorized service personnel.**

Oil or water dripping from the leak-off, or water in the bearing oil indicates leaking seals. Bearing oil containing metal particles indicates damaged bearings. Ordinarily, only the shell front and cylinder need to be removed to replace the seals and bearings. Replacing the entire bearing housing assembly or a major bearing housing component requires removal of the shell.

Maintenance procedures require:

- Cylinder puller kit P/N PK33-008 (or equivalent) available from Milnor[®] on a rental or purchase basis.
- Loctite 242, 271, and 504 adhesives, Dow Corning RTV 732, and Permatex 2 (or equivalents).
- Shell clamps.

Removing the Shell Front and Cylinder

Refer to “CYLINDER + SHELL + BEARING + CONSOLE INSTALLATION . . .” (see Table of Contents) and proceed as follows:

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 attachments including pipes, hoses, and optional equipment. Drain 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 allen screws covering the puller mounting holes. Mount the puller and remove the cylinder.

Replacing Seals with Bearing Housing In Place

NOTE: See the appropriate bearing assembly drawing.

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 with Bearing Housing in Place” below.

1. Remove front shaft seal holder (push-off holes are provided).
2. Inspect the shaft seal sleeve for nicks, gouges, or excessive wear. If a replacement is necessary, heat and tap the damaged sleeve off of the shaft. Before installing the new sleeve, ensure that the shaft and sleeve are clean and free from oil. Apply Loctite 271 to the inside of the sleeve, tap sleeve onto the shaft, then remove excess Loctite.
3. Replace the seals and o-rings. Apply Loctite 271 to the outside of the seals and install in shaft seal holder. Ensure that the new seals are parallel within the shaft seal holder. Use Loctite 242 when re-installing the front seal holder bolts.

Replacing Bearings with Bearing Housing In Place

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

Often, the bearing housing does not need to be removed to change the bearings. Remove the shell and bearing housing only if insufficient space exists for the following procedures, or if the bearing housing (or housing major components) 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 shims under the rear seal/bearing holder. **The shims must be installed exactly as removed.**
2. Remove the main shaft, front bearing, and bearing cup 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 rear seal/bearing holder.
4. Press a new front bearing on the shaft then guide the 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. The shaft should turn in the housing.

Setting Clearances

NOTE: This procedure is required only when a major bearing housing component is replaced. See “Removing and Re-installing the Shell and Bearing Housing” below.

1. Remove all shims from the rear seal/bearing holder. Install the rear seal/bearing holder. Leave a small gap between the bearing housing and the rear seal/bearing holder.
2. Insert a lead wire (e.g., soldering 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. Add .002" (.050 millimeters) to the thickness of the lead wire and install the rear seal/bearing holder using this amount of shims. The shaft should turn in the housing.

Removing and Re-installing the Shell and Bearing Housing

Replacing the entire bearing housing assembly or a major bearing housing component requires removal of the shell.

Removing the Shell

NOTE 1: 30015 front bearing housing bolts are provided with self-locking nuts.

NOTE 2: 30020 and 30022 shell back clamp rings have three push-off holes to aid in removal. Replace the three plastic set screws with three bolts then tighten evenly to separate the ring from the shell.

1. Clamp the shell to the frame before removing the shell bolts (as shown in FIGURE 1).
2. Remove the self-locking nut and clamp used to secure the level switch sensor hose to the shell mounting screw. Remove all shell bolts, front bearing housing bolts (do not remove the rear bearing housing bolts), and shell back clamp ring, then remove the shell (and bearing housing reinforcing plate if so equipped) from the frame.
3. Remove the belt guard and the top console cover by prying out the four plugs and removing the bolts. Loosen and remove the main drive belts (and *centrifugal switch* if so equipped), and the main drive pulley. For further information see “DRIVE TRAIN SERVICE” (see Table of Contents).

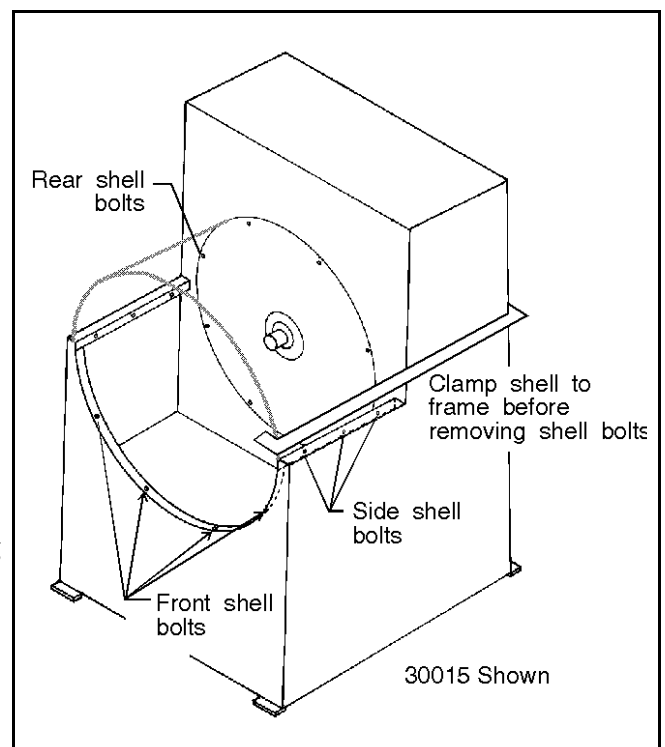


FIGURE 1 (MSSM0708BE)
Clamping the Shell

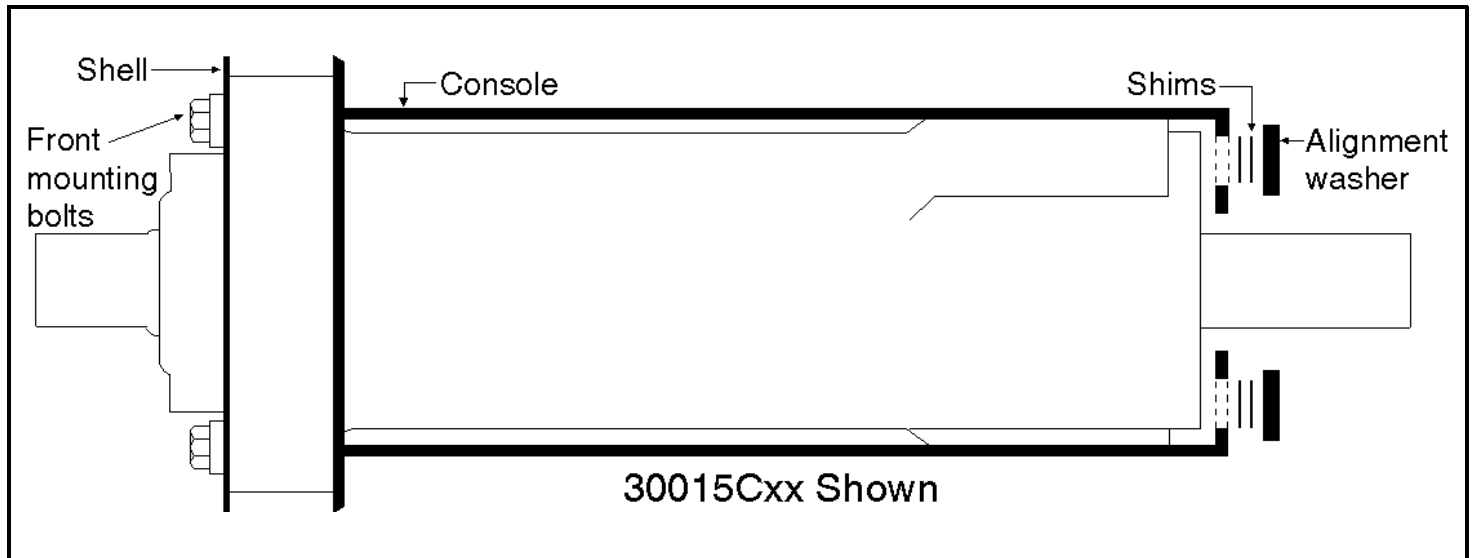


FIGURE 2 (MSSM0708BE)
Typical Main Bearing Mounting

Removing the Bearing Housing

NOTE 1: Shims (shown in FIGURE 2) are factory installed between the bearing housing and the alignment washers. **These shims must be removed and replaced in their exact original positions.**

NOTE 2: 30015M6 models are equipped with a rear reinforcing plate (see FIGURES 4 and 6). Use 30020 and 30022 instructions when removing and installing the bearing housings on these models.

Drain the oil from the bearing housing and remove all fittings and connections from the top and bottom of the bearing housing; then follow the procedure for your machine.

On 30015 Machines—Considerably loosen, but do not fully remove the two rear bearing housing mounting bolts.

1. Pry the bearing housing out of the console until the rear mounting bolts bottom out.
2. Remove the rear mounting bolts one at a time and catch the shims with your fingers through the holes in the rear console member (next to the bearing housing). **Note the position of the shims; they must be replaced in the same position.**
3. Remove the bearing housing from the frame. Grind off the alignment washers as shown in FIGURE 3 and discard old alignment washers.
4. Grind the rear console smooth in preparation for main bearing re-installation.

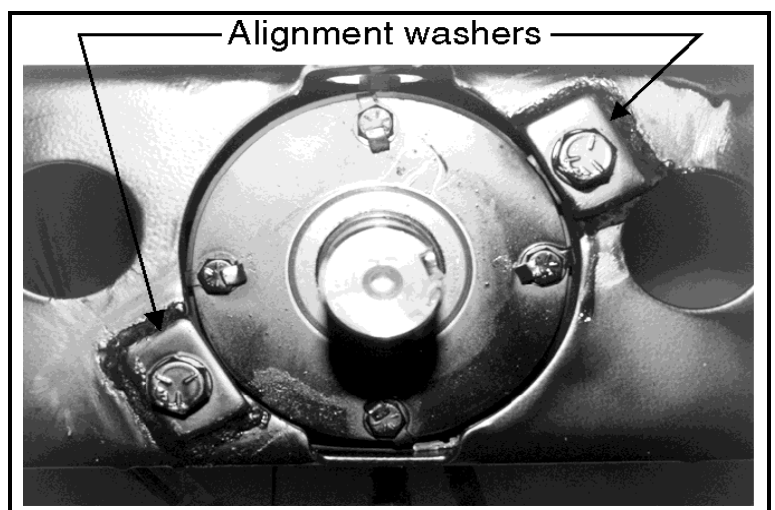


FIGURE 3 (MSSM0708BE)
Alignment Washers
30015 Models (see Note 2 above)

On 30020 and 30022 Machines—Remove the rear bearing housing and rear reinforcing plate mounting bolts.

1. Remove the rear reinforcing plate very carefully, noting the position of bearing support tap strips and shims. **Note the position of the shims; they must be replaced in the same position.**
2. Remove the bearing housing from the frame. Remove plate and grind off the alignment washers (as shown in FIGURE 4). and discard old alignment washers.
3. Grind rear reinforcing plate smooth in preparation for main bearing re-installation.

Installing the Bearing Housing and Shell

NOTE 1: Use new bolts when reassembling the machine.

NOTE 2: Apply Permatex 2C adhesive (or equivalent) to both sides of the new bearing housing gaskets.

NOTE 3: Install a new NYLTITE washer and nut gasket on each new shell bolt (see FIGURE 5).

On 30015 Machines—Replace the four J-type nuts along the rim of the front console with new clips.

1. Determine that all threaded holes are clean and in good condition by screwing a new bolt into each hole (if necessary, tap out any damaged threads).
2. Position the bearing housing in the console.
3. Mount the gasket on the front of the bearing housing.
4. Determine that the shell is clean and free from any old gasket material, then mount the shell onto the console using new shell bolts (FIGURE 5).
5. Using drift pins, install the rear shell bolts first (FIGURE 1), then tighten to draw the shell into place.
6. Install all other shell bolts and tighten evenly. Liberally apply Dow Corning RTV 732 sealant over the inside shell bolts and washers.
7. Mount the gasket and the new ring to the inside of the shell.
8. Install the front bearing mounting bolts through the ring and bearing housing, and tighten front bolts. Install new alignment washers and original shims on rear mounting bolts (FIGURE 2). **Replace the shims on rear mounting bolts exactly as removed.**

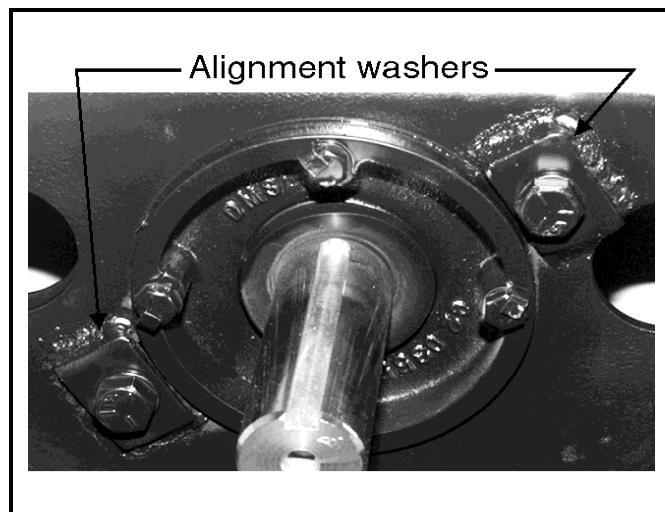


FIGURE 4 (MSSM0708BE)
Alignment Washers
30020 and 30022 Models

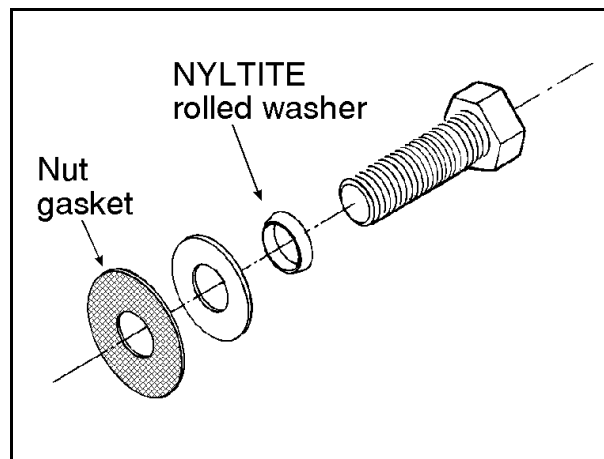


FIGURE 5 (MSSM0708BE)
Shell Bolt

9. Tighten bolts. Insure there is approximately .0625 inch (1.6 mm) clearance between the alignment washers and the console as shown in FIGURE 7. Add or subtract shims as required to obtain the specified clearance. Weld the new alignment washers to the console.
10. Install all of the original lubrication fittings and connections to the new bearing housing.
11. Secure the level switch sensor hose using a new clip and self-locking nut.

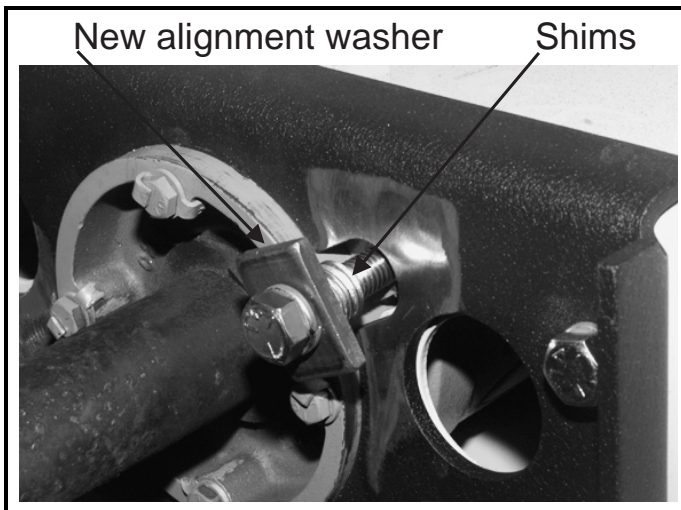


FIGURE 6 (MSSM0708BE)
Installing New Alignment Washers

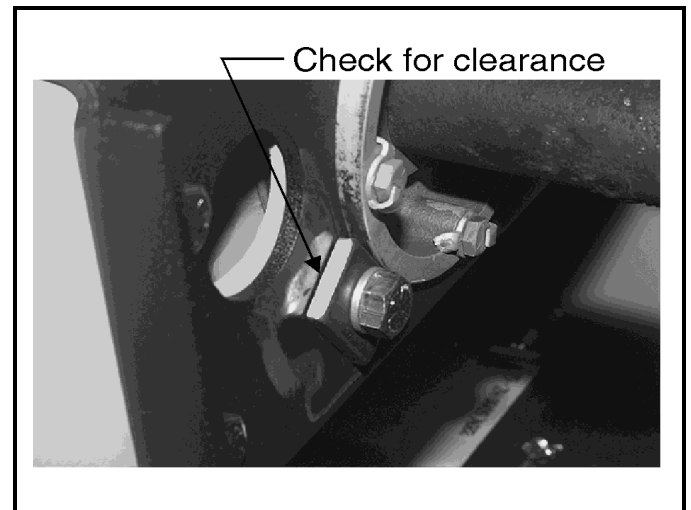


FIGURE 7 (MSSM0708BE)
Alignment Washer to Console

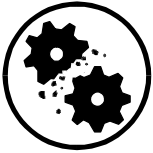
On 30020 and 30022 Machines—Replace the four J-type nuts and determine that all threaded holes are clean and in good condition.

1. Position the bearing housing in the console.
2. Mount the gasket, housing reinforcing plate, and second gasket.
3. Determine that the shell is clean and free from any old gasket material, then using new shell bolts (FIGURE 5), mount the shell onto the console.
4. Mount the gasket and ring to the inside of the shell.
5. Using Loctite 504, install the front bearing housing bolts and lockstraps through the ring and the bearing housing. Tighten the bolts and bend the lockstraps as applicable.
6. Pre-position the two bearing support tap strips, then install the rear reinforcing plate. Install new alignment washers and original shims on rear mounting bolts (FIGURE 6). **Replace the shims on rear mounting bolts exactly as removed.**
7. Tighten bolts. Insure there is approximately .0625 inch (1.6 mm) clearance between the alignment washer and the reinforcing plate as shown in FIGURE 7. Add or subtract shims as required to obtain specified clearance. Weld the new alignment washers to the reinforcing plate.
8. Install all of the original lubrication fittings and connections to the new bearing housing.
9. Secure the level switch sensor hose.

Installing the Cylinder and Shell Front

1. Screw two new allen screws into the cylinder puller mounting holes; **do not obstruct the shaft retainer spacer seat.**
2. Determine that the main shaft is clean and free from any foreign material and that the key is properly seated.

▲ CAUTION ▲



Failure to properly install cylinder may cause it to loosen during machine operation. This will cause damage to the cylinder, shell, and main bearing shaft surfaces.

☞ **Carefully follow cylinder installation step below.**

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 front lip of the shell is clean and free from burrs, sharp edges, or sealants.

▲ CAUTION ▲

A metal hammer can crack stainless steel components.

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

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 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, two inches on both sides of the shell weld.
7. Install the new rubber extrusion starting at the 10 o'clock position. Trim off 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. See "DRIVE TRAIN SERVICE" (see Table of Contents) to replace pulleys, belts, and to set belt tension.