Installing the Milnor® Diaphragm in the Single Stage Press

This document applies to models MP160Axx, MP1604xx, MP1603xx, MP1602xx single stage presses and any MP1601xx press manufactured after date code 99323 (see the machine nameplate). These presses are supplied with a brown diaphragm manufactured by Milnor. MP1601xx models manufactured on or before 99323 are equipped with white diaphragms manufactured by Passat and require document MSSM0953AE "Installing the Passat Diaphragm in the MP1601xx Single Stage Press".

These procedures use manual operation as explained in the reference manual.

1. Preparations

WARNING 1: Crush and Sever Hazards—The powerful can and ram move independently and without warning. They can also drift down with power off. Gaps close with any movement and will crush or sever body parts.

- Use the door interlock bypass key switch in strict accordance with the instructions.
- Lockout/tagout power before reaching into, or working near the can and ram.
- Install the safety supports before working under the raised can or ram.
- Ensure that personnel and equipment are clear before operating the machine.
- Be prepared to use emergency stop switches.

1.1. Obtain a diaphragm replacement kit from Milnor.—For an MP1601xx, MP1602xx, MP1603xx, or MP1604xx, you will probably need kit KYSSPMRA01, or for an MP160Axx, kit KYSSPMRA02. These kits include a new diaphragm, bolts and washers, o-ring, sealant, Scotch-Brite™ pads, Loctite thread locker 242™, Loctite® Gasket Eliminator 515 (Loctite 518 optionally), Loctite Cleaner/Degreaser, Loctite Chisel Gasket Remover, Loctite Primer N and other necessary parts for installation. These kits have the necessary materials for newer style platens with hex head diaphragm bolts as well as older style platens with 16 recessed socket cap bolts. Other kits are also available, depending on the specific need. Contact the Milnor Parts department for more information.

Notice 2: Use Fresh Materials—Because it is necessary to establish a reliable seal between the platen and the diaphragm, all cleaning and sealing chemicals (provided with the kit) must be fresh. Do not obtain these materials far in advance of the work.

1.2. Have the necessary tools on hand.—These may include:

- 3/8 - 16 tap (available from Milnor as part number 97C058T)
- 3/8 - 16, extra long pulley tap (available from Milnor as part number 97C058AT)
- Socket wrench set, including a torque wrench for newer style platens with hex head bolts or a hex head wrench set, including a torque wrench for older style platens with socket cap bolts.

1.3. Have two service technicians on hand.—The diaphragm weighs 135 pounds (61.4 kg) or more, depending on model. It is advisable for two people to handle it. At least one technician must be familiar with the *Manual* mode (manual operation) as explained in the reference manual. Both must understand press safety, as explained in the safety manual and this instruction.

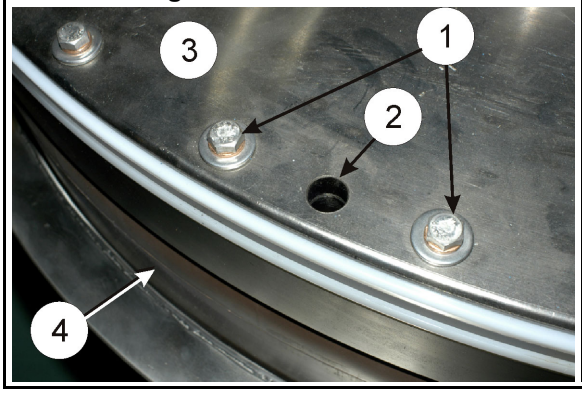
2. Removing the old diaphragm.

The press must be empty. If the press is operating, allow any goods to transfer out of the machine automatically, then take the machine off-line. Using the *Manual* mode (manual operation):

1. Raise the load/unload doors (if so equipped) and secure them in place. Open the side doors and use the door interlock bypass key switch (in strict compliance with its instructions) to enable operation with the side doors open.
2. Lower the can first, then the ram onto the press bed. Now raise the can fully. This sequence minimizes dragging between the can and ram.
3. Raise the diaphragm approximately two to three inches above the press bed. **Lockout/tagout power** at the external disconnect switch and **install the can safety stands.**
4. Making sure fingers are not under the diaphragm, remove all of the diaphragm bolts (Figure 1) and **discard them**. Two push-off holes that accept a 3/8 - 16 bolt are provided if diaphragm weight alone does not free the diaphragm from the platen.
5. After the diaphragm is free of the platen, restore power and raise the ram. With the ram fully up, **lockout/tagout power and install the diaphragm safety bars.**
6. Pull the old diaphragm free of the bed.
7. If this is the older style platen with recessed socket cap bolts, an o-ring is used between the platen and diaphragm mating surfaces. The o-ring is held in a channel on the the bottom of the platen. Remove the old o-ring.

Figure 1: Diaphragm Bolts and Push-off Hole

Looking Down onto Part of Platen



Legend

1. Diaphragm bolts (newer style platen with hex head bolts shown)
2. One of two push-off holes
3. Platen
4. Diaphragm

3. Cleaning the Platen and the New Diaphragm

The platen and diaphragm mating surfaces must be clean to form a reliable seal. The bolt holes must be clear of debris, such as Loctite or rubber.

1. Spray the platen sealing surface with a heavy coat of Loctite Chisel Gasket Remover and allow to foam for five minutes. Wipe off with a rag. Repeat as necessary. After cleaning, scrub the platen sealing surfaces and the diaphragm ring with the supplied Scotch-Brite pads to remove rust and other contaminants.
2. Clean the platen bolt holes of residual Loctite and debris before sliding the new diaphragm under the platen.
3. If this is an older style platen, install the new o-ring supplied with the kit.
4. Using the 3/8 - 16 tap, clean out the bolt hole threads in the new diaphragm. This will help prevent diaphragm bolts from seizing or shearing off during installation. **Do not run the tap deeper than 5/8" (16 mm) to avoid damaging the diaphragm material.**

4. Aligning the Diaphragm with the Platen

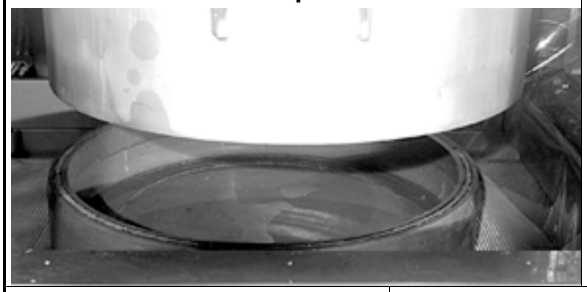
Tip: Cover the press bed with paper or cardboard to make diaphragm and platen alignment easier.

Referring to Figure 2:

1. Slide the new diaphragm into place. Visually align the platen and the new diaphragm. Remove diaphragm safety bars and restore power to the machine.
2. Use the *Manual* mode to slowly lower the platen to within 1" (25 mm) of the diaphragm then **lockout/tagout power** to the machine.
3. Insert an all-thread rod (supplied with the kit) through one of the platen bolt holes, as a guide. Position the diaphragm so that the rod aligns with a bolt hole in the diaphragm and thread the rod into the diaphragm. Repeat this with the three remaining all-thread rods at quarter points around the platen.
4. Restore power and use the *Manual* mode to carefully lower the platen until it makes contact with the diaphragm.
5. Test-fit all diaphragm bolts (hex head bolts or socket cap bolts), adjusting the diaphragm position as needed.
6. Remove the diaphragm bolts and rods.
7. Raise the platen, **lockout/tagout power and install the diaphragm safety bars**.

Figure 2: Aligning the Diaphragm with the Platen

Step 1

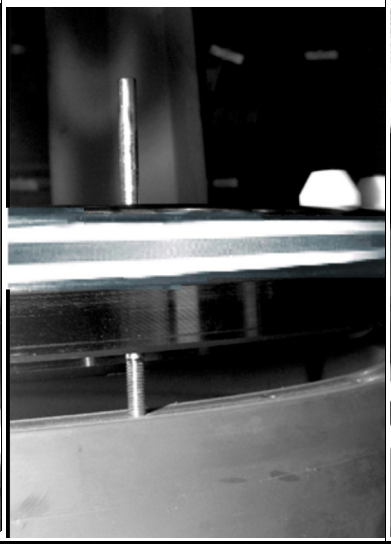


Legend

1. At left: Place diaphragm under platen.
2. Lower left: Lower platen to within 1" of the diaphragm.
3. Lower middle: Insert all-thread rods through platen and thread into diaphragm (four locations).
4. Lower right: Lower platen onto diaphragm.

Step 2

Step 3



Step 4

5. Prepare the platen and diaphragm sealing surfaces

1. Inspect and check the expiration dates on the supplied Loctite products. Replace any questionable materials with fresh product to ensure a reliable seal.
2. Spray the bolt areas of the platen and diaphragm with Loctite ODC-Free Cleaner/Degreaser then wipe off with a clean cloth. **Do not touch surfaces after cleaning.**
3. Spray the sealing surface on the underside of the platen with Loctite Primer N. Allow primer to dry for three to five minutes before continuing.
4. Apply a generous bead of Loctite 515 (Loctite 518 optionally) along the metal diaphragm ring (Figure 3). **Do not allow the Loctite 515 to enter bolt holes.** Excess Loctite 515 will squeeze out of the joint as the diaphragm bolts are tightened.

Figure 3: Loctite 515 Applied to Diaphragm Ring

6. Bolting the Diaphragm

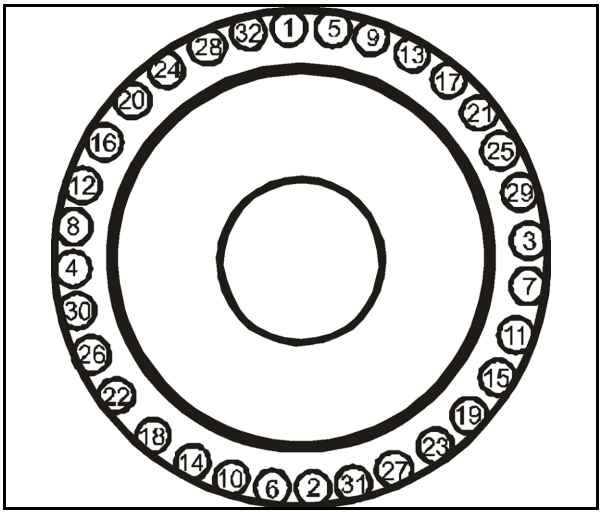
CAUTION 3: Risk of Bolt Failure—Use only the new diaphragm bolts provided with the kit, not the old bolts which have been stressed. In the case of the hex head bolts, the old bolts, which may be stainless steel, must be replaced with the chrome plated bolts supplied with the kit to meet the torque requirements herein.

1. Restore power and remove diaphragm safety bars. Using the *Manual* mode, slowly lower the platen until it touches the diaphragm, then **lockout/tagout power.**
2. Referring to Figure 4, apply Loctite 242 (or equivalent) to, and install each new diaphragm bolt (either the socket cap bolts for the older design or the hex head bolts and flat washers for the newer design). Add bolts in an alternating pattern such as that shown in Figure 5. Use a wrench just to fully seat the bolt. If a bolt starts to seize, remove it, clean the bolt hole with the pulley tap to avoid the risk of breaking, then re-install the bolt. Wipe off excess Loctite.
3. Torque all bolts to **10 foot-pounds** using the same alternating pattern as before. Wipe off excess Loctite.

4. Re-torque all bolts using the same alternating pattern, as follows:
   - Newer platen with hex head bolts—**44 foot-pounds**
   - Older platen with recessed socket cap bolts—**30 foot-pounds**
5. Insert the plastic buttons provided with the kit in the push-off holes and, if the older platen with socket cap bolts, the bolt hole recesses.
6. Apply tag B2T2001042 (provided with the kit) to the press as a reminder that the bolts need to be tightened after one week (40 hours) of operation, and explain this to the operator.
7. Wait one hour before filling the diaphragm. This allows Loctite to cure. Fill the diaphragm as explained in document BIPPMM10 "How to Fill and Maintain the Diaphragm", then secure the press for operation and return the machine to service.

Figure 4: Applying Loctite 242 to Bolts

Figure 5: Typical Bolting and Torque Pattern



7. Re-tightening the Diaphragm Bolts After One Week (40 Hours)

CAUTION 4: Risk of Rapid Diaphragm Wear—Diaphragm bolts may loosen slightly during the first week of operation, resulting in leakage.

- Check and re-tighten all diaphragm bolts following one week (40 hours) of service.
- Perform the diaphragm filling procedure weekly per the preventive maintenance schedule.

The press must be empty. If the press is operating, allow any goods to transfer out of the machine automatically, then take the machine off-line. Using *Manual* mode (manual operation):

1. Raise the load/unload doors (if so equipped) and secure them in place. Open the side doors and use the door interlock bypass key switch (in strict compliance with its instructions) to enable operation with the side doors open.
2. Lower the can first, then the ram onto the press bed. Now raise the can fully. This sequence minimizes dragging between the can and ram.
3. **Lockout/tagout power** at the external disconnect switch and **install the can safety stands.**
4. Re-torque all bolts using an alternating pattern like that shown in Figure 5, as follows:
   - Newer platen with hex head bolts—**44 foot-pounds**
   - Older platen with recessed socket cap bolts—**30 foot-pounds**
5. Secure the press for operation and return the machine to service.

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