OPERATION AND MAINTENANCE MANUAL

TPM™
Tapered Panel Machine

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CHAPTER 1

SPECIFICATIONS

SPECIFICATIONS:

TPM Dimensions:
- Length - 13’ 3” (4.04m)
- Width - 2’ 8 1/4” (0.82m) (with entry guide retracted)
- Width - 4’ 0” (1.22m) (with entry guide extended)
- Height - 2’ 2 7/8” (0.69m)
  Add 1’ 8 3/4” (0.53m) for optional legs and casters
- Passline Height - 1’ 5 1/2” (0.44m)
  Add 1’ 8 3/4” (0.53m) for optional legs and casters
- Weight (approx) - 2200 lbs. (800kg)

Speed (approx): 50 ft./min. (15m/min.)

Drive: Electric via chain, sprocket and gear using 6 polyurethane drive rollers and 6 polyurethane idle rollers.

Coil Width: 8” to 33” (200mm to 840mm) approx. (Panel Dependent)

Materials Formed:
- Painted Steel - 30ga. to 22ga. (.3mm to .8mm)
- Painted, Galvanized, Aluminized
- Painted Aluminum - .019” to .040” (.5mm to 1.0mm)
- Copper - 16 oz. to 20 oz. 3/4 Hard (.5mm to .7mm)
- Ternecoat Stainless Steel 26ga. (.5mm)
CHAPTER 2
PRECAUTIONS

PRECAUTIONS:

Make sure the operator of the machine has read and understands this manual in its entirety before attempting to operate this equipment.

ALWAYS OBSERVE and OBEY all safety and warning signs affixed to the machine.

ALWAYS keep covers, guards and lids mounted to machine during operation.

ALWAYS adhere to and follow all local and national safety codes concerning the loading and unloading of reeled coils.

ALWAYS empty machine of material before transport and storage.

ALWAYS keep covers on during operation and storage. The covers are for operator safety, but also protect the internal components of the machine from the environment.

ALWAYS visually inspect for foreign objects debris or anything unusual before operating the machine. If something doesn’t seem correct, inspect and remedy prior to operation.

ALWAYS keep the machine clean. This will increase the life of the machine and make maintenance easier. A clean machine will provide a clean product. Clean forming rollers as needed with a Scotch Brite Pad and a small amount of solvent.

ALWAYS keep chains properly tensioned, lubricated and clean. This will add to the life of the chains and sprockets. The chains should be just snug. An over-tightened chain is just as bad for the machine as a loose chain. Idler sprockets are provided on each chain for this purpose. Lubricate the chains a minimum of every 40 hours of operation. It is preferable to use a dry motorcycle chain lube or equivalent.

ALWAYS stop the machine and disconnect the power before attempting to make any adjustments, perform any maintenance or changeover procedures.

ALWAYS use only properly rated devices for lifting reeled coils into or out of the reel stand assembly.

DO NOT wear loose clothing, jewelry etc. that could become entangled in the moving parts of the machine when operating.

DO NOT use solvents to clean drive rollers. Harsh chemicals will damage the polyurethane drive rollers.

AVOID storing the machine outdoors for long periods of time. Cover with a tarp but provide good ventilation to prevent condensation and rust.
RECOMMENDED LUBRICANTS AND FLUIDS

EP Grease for:
Pillow Blocks
Lubricants Type: Moly Ep Grease
Catalog No. 11335
14 Ounce Container
Available from:
MSC Supply at 1-800-645-7270

Spray Lube for:
Chains
Super Lube - Multi-Purpose Synthetic Aerosol Lubricant with Syncolon (PTFE)
Catalog No. 31110
11 oz. Aerosol Can
Available from:
MSC Supply at 1-800-645-7270
CHAPTER 4
MACHINE LAYOUT

MACHINE LAYOUT

Figure 1: Machine Overview
CHAPTER 4
MACHINE LAYOUT

LEFT SIDE

20 3/8"

32 1/4"

0"

4X 26"

8X Ø9/16" MOUNTING HOLES

OVERALL MACHINE FOOTPRINT

FRONT

2X 18"

159 7/8"

BACK

2X 101 1/8"

2X 119 1/8"

RIGHT SIDE

Figure 2: Frame Mounting Hole Pattern
CHAPTER 5
POWER REQUIREMENTS

POWER REQUIREMENTS

Input Power
The Tapered Panel Machine input power can be ordered from the factory for either 110VAC/60Hz or 220VAC/50Hz. The machine can be changed from one power input to the other by changing out the electrical contact box as well as the motor.
Option 1:  110VAC/60Hz 11A
Option 2:  220VAC/50Hz 5.5A

Power Cord
It is very important to follow the power cord requirement prescribed by the motor and electrical control manufacturers to maintain their respective warranties. Make sure the cord being used is marked properly. Do not assume that because an extension cord looks heavy enough that it is the right gauge. Use of the wrong gauge extension cord will void the warranty on motor and electrical controls.

Generator
If a generator will be used to power the machine it must be large enough to handle the amp draw requirements of the motor. Contact a local generator supplier for proper sizing and refer to the specification plate on the electric motor. Use of an improperly sized generator will cause a low voltage situation of the electric motor and controls which will void the warranty.

Fuse
There is a 10-amp time delay fuse on the electrical controls box. This fuse protects the electrical components. If the fuse is blown, the machine will lose all functions of the machine. To replace this fuse: Locate the automotive style in-line fuse holder on the electrical controls box. It is a spring loaded twist lock holder. Push the cap in and turn CCW to open. Check the fuse with a continuity tester. If it is bad, replace with a new fuse and re-install the spring loaded cap.

Figure 3: Fuse Location
PENDENT CONTROL

JOG-RUN Switch
This selector switch allows the machine to RUN continuously or JOG material through the machine. Select JOG to load material into machine and to move material through the machine in small increments until it clears all the tooling. Select RUN after material has cleared the end of the machine.

STOP Button
This button acts as an emergency stop for the drive system.

Direction Buttons (Black buttons with arrows)
These buttons are used to activate the drive system of the machine as shown.

Main Control Cable
The main control cable is the communication cable for the Pendent Control described above. This cable must be connected to the receptacle on the front of the machine in order for the machine to operate. The main control cable connects to a receptacle on the front cover of the machine. The cable and receptacle both have a key and slot configuration that must be aligned to connect. This prevents misalignment and damage to the pins.
Figure 5: Receptacle and Cord

Figure 6: Cord Coiled
CHAPTER 6
CONTROLS

Figure 7: Pendent Stored

Figure 8: Pendent Holster
CHAPTER 7

DRIVE SYSTEM

The drive system of the machine consists of six polyurethane top idle rollers and six bottom polyurethane drive rollers. The bottom drive rollers are connected together via chain and sprocket and there are chain tensioners on each assembly. The drive system is powered by a 3/4HP electric motor which transfers power through a gear reducer and sprockets to one of the center drive rollers.

**Drive Rollers**

The polyurethane drive rollers will eventually need cleaning. This will become evident when they start leaving a stripe the width of the drive roller on the formed panels that doesn’t come off easily or if a panel is ran with an oily film on it. Avoid cleaning the drive rollers with harsh chemicals or solvent. These products will attack the polyurethane and cause irreversible damage. **Use of these products will void the warranty on the drive rollers.**

Clean the rollers with mild soap and water and a rag. **Caution must be taken around the moving parts of the machine during the cleaning process.**

Covers should be kept on the machine during operation and storage. Ultraviolet light will attack the polyurethane drive rollers and cause deterioration. Again, this type of damage is not covered under the warranty.

**Chain Tensioners**

There are two different chain tensioners on the Tapered Panel Machine. The main drive chain tensioner assembly is located on the top of the gear reducer. To add tension to the drive chain, slightly loosen bolt “A” and nut “B” then screw in bolt “C”. Re-tighten bolt “A” and nut “B”.

The second chain tensioner is similar to the drive chain tensioner. These tensioners are located on the assemblies on the end of each drive shaft. These add tension to the chain the same way; slightly loosen bolt “A” and nut “B” then screw in bolt “C”. Re-tighten bolt “A” and nut “B”.

Figure 9: Main Drive Chain Tensioner

Figure 10: Chain Tensioner
CHAPTER 7
DRIVE SYSTEM

Chains
The chains used in this system are #40 roller chain. The drive chain is a double #40 chain.

Figure 11: Chains
ENTRY GUIDE
When forming one leg of a panel at a time such as a tapered panel, pressure must be applied to the free side of the panel to assist in guiding it into and keeping it in the forming rollers. Due to the unique nature of a tapered panel, the entry guide must be capable of moving as the panel width changes. While the entry guide changes to accommodate for the width of the panel, it also must maintain a constant pressure against the edge of the panel.
There is an entry guide assembly on both ends of the machine in order to run material in both directions through the machine.

Figure 12: Entry Guide Overview
Entry Guide Procedure

Static/Stationary Guide
The material guide that is on the back of the machine is called the Static Guide. This guide is aligned with the forming rolls and locked down into place. Depending on what machine the tooling is being used from (SSR, SSH, or SSQ), align the entry guide in a similar fashioned as that machine. To adjust the position of the static guide, simply loosen the lock down handle and move the guide in or out until the alignment block lines up with the marker plate on the tooling.

Loading Material
The tapered panel machine is quite diverse in the types of panels that it is able to create. As a result, the entry guide can be configured in many different ways. In order to load a blank sheet of material, plug in the flat panel guide (Guide #1) into the dynamic guide assembly.

To load the material into the entry guide, switch the pawl bar over to the left to activate the ratcheting latch. Pull the dynamic guide out away from the machine enough to clear the material to be loaded. Slide the material into the static guide and then pull on the dynamic guide to relieve the pressure on the pawl then release the pawl by switching the bar back to the right. Allow the dynamic guide to slide back and engage the material.

TIPS:
To make engaging the material slightly easier, turn the flat panel guide at an angle as the dynamic guide assembly slides towards the material.
When running straight panels, reengage the pawl by switching the pawl bar to the left after the guide has made contact with the material. By reengaging the pawl, the guide will act much softer on the trailing edge of the material.

When forming the second leg on a panel, remove the flat panel guide and install one of the two different guides with rollers depending on which profile has already been formed on the first leg.
Use Guide #2 for the 1 1/2" and 2" female legs and Guide #3 for all others.

Figure 17: Guide #2 with Applicable Profiles
PROFILE CHANGEOVER

CAUTION: Always make sure the machine is shut down prior to making any adjustments.

The tapered panel machine is able to accept all tool from the SSR (Multipro Jr), SSH (Multipro), and SSQ machines with the appropriate mounting bars. The Tapered Panel Machine has a base rail assembly and the SSR, SSH, and SSQ tooling mounting bars (sold separately) attach on the top of the base rail assembly.

Unlatch the eight latches, remove the four top covers and set them aside.

Figure 18: Tooling Base Rail

Figure 19: Covers to Remove
CHAPTER 9
PROFILE CHANGEOVER

Using a ½” wrench, remove the bolts holding the tooling rails to the tooling mounting bars. Store the tooling and set the hardware near the machine for use when installing the next profile. Note: the SS100, SS150, SS450/450SL, and profiles all share the same left-side rollers.

Figure 20: Removing Tooling Rails

SSQ Changeover Procedure
The setup for tooling is similar to the SSQ machine. The rails on the Tapered Panel Machine need to be moved inward and outward to accommodate the different profile. Use the stamped identification marks in the base rail and on each tooling mounting bar shown below to locate the bars correctly.

Figure 21: SSQ – Left Tooling Mounting Bars
When the right or left bars are positioned in the machine, bolt the tooling to the mounting bars similar to the SSQ machine.

**Special Instructions for the SS100, SS150 and the SS450 profiles:**
The Left #1 Tooling Rail Assembly (L1-1) for these profiles can be mounted in one of two possible positions based on the required height of the male leg. When mounting this tooling rail assembly for use with the **SS150** profile, pull it toward the outside of the machine until the two tooling rail spacers “D” contact the face of the side of the mounting rail #1. When mounting the tooling rail assembly for use with the **SS100** or **SS450** profiles push it toward the center of the machine until the Tooling Rail Backstops "E" contact the left side fixed Mount rail #1. Once it is positioned properly, tighten the two Mounting Bolts "F" using a 1/2” wrench.
Cut a 1” triangle of material off of the leading corner and feed it into the entry guides.

With the pendent control switch to Jog, use the direction button(s) jog the material through the machine 6 to 8 inches at a time until it exits the last forming station. Continue jogging the material until it comes
in contact with the run-out stand. Be sure that the run-out stand is at the proper height, switch the control to RUN and press the directional arrow button to run the entire panel.

**SSH/R Changeover Procedure**

Arrange the tooling mounting bars in the correct orientation shown below. The bars will mount to different pads depending on which leg, right or left, is being formed.

![SSH/R Mounting Bar Orientation](image)

**Figure 25: SSH/R Mounting Bar Orientation**

The SSH and SSR use similar tooling mounting bars and tooling. However, the SSH features alignment locators that assist in alignment of the tooling on top of the mounting bar.
After the tooling mounting bars (above) are bolted in the Tapered Panel Machine in the correct orientation, bolt on and align the tooling using the same procedure used on the SSH and SSR machines.

1. Bolt the tooling to the mounting bars.
2. Set the edge of the aluminum base block to dimension C when forming the right side of the panel or dimension D when forming the left side of the panel. See the following figures in order to set the entry guide.
3. Move the first tooling mounting bar in and out as needed to align the scale on the marker plate to the edge of the bar coming from the entry guide. Set the marker plate to dimension A when forming the right side or dimension B when forming the left side.
CHAPTER 9
PROFILE CHANGEOVER

Figure 27: SS100 Profile Setup
Figure 28: SS150 Profile Setup
Figure 29: SS450 Profile Setup
RUN-OUT STANDS (ROS)
The Run-Out Stands attach to both ends of the machine and are used to support the panel as it enters and exits the machine. They are available in 10 ft. long sections that fasten together and have adjustable legs so they can be set to the correct height.

1. Set the first run-out stand on its side and in front of the machine with the leg assembly away from the end of the machine.
2. Open the leg assembly and set it upright on the ground.
3. Lift the attachment end of the table and drop it over the 2 threaded bolts on the run-out stand bolt “A” shown in the figure below.
4. Loosen the 2 knob-handles on the leg assembly and allow the legs to fall free. Sight the height of the table on the left and right side adjusting it level to the machine using the knob-handles to lock the legs in place. See Figure 31 for correct and incorrect set up and details.
5. Loosen the adjustment knob (shown Figure 30) and align the run-out stand mounting bolt carriage as needed.
6. Repeat steps 1-4 for each succeeding run-out stand and attach it to the bracket on the end of the previous table.
Figure 30: Run-Out Stand Mounting Bolts
Figure 31: Run-Out Stand Height Alignment
Figure 32: SS100 Roller System
Figure 33: SS100 Panel Profile
Figure 34: SS150 Roller System
Figure 35: SS150 Panel Profile
Figure 36: SS200/210A Roller System
Figure 37: SS200 Panel Profile
Figure 38: SS210A Panel Profile
Figure 39: SS450 Roller System
Figure 40: SS450 Panel Profile
Figure 41: SS450SL Panel Profile
Figure 42: Wiring Schematic