



New Tech Machinery

## OPERATION and MAINTENANCE MANUAL



U.S Patent NO. 5,394,722

# BG7<sup>TM</sup>

## 7" Commercial Box Gutter Machine

[www.NewTechMachinery.com](http://www.NewTechMachinery.com)

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CHAPTER 1  
**BG7 SPECIFICATIONS**

## **SPECIFICATIONS**

<b>BG7 Dimensions:</b>	Length-17' 10"	(5.4m)
	Width-4' 10½"	(1.5m)
	Height-4' 3"	(1.3m) w/Over Head Rack
	2' 8"	(.8m) w/o Over Head Rack
<b>BG7 on Trailer:</b>	Length-21'	(7.7m)
	Width-7' 2½"	(2.2m)
	Height-6' 3"	(1.9m) with reel
<b>BG7 Weights:</b>	2600 lbs. (1180 kg)	Base Machine with Roller Set and Power Pack
	2200 lbs. (1000 kg)	Trailer
	336 lbs. (152 kg)	Overhead Reel Rack
	80 lbs. (36 kg)	Expandable Arbor, each
	62 lbs. (28 kg)	10-foot Runout Table, each
	60 lbs. (27 kg)	PVC Strippable Film Applicator
<b>Speed:</b>	60 ft./min. Approx.	(18m/min.) Approx.
<b>Drive:</b>	Hydraulically Driven Polyurethane Rollers	
<b>Shear:</b>	Hydraulically Powered, hardened tool steel dies and blades w/Panel Recognition Proximity Sensor	
<b>Hydraulic Fluid:</b>	15 Gallons - 32AW	
<b>Coil Width:</b>	20" (500mm) Straight Back, Hook, Inside Flange	
<b>Materials Formed:</b>	Grade 50 Steel	26ga. to 22ga. (.4mm to .8mm)
	Painted Aluminum	.040" (1.0mm)
<b>Controls:</b>	Standard:	Manual Control Box w/Length Control Limit Switch
	Optional:	Computer Batch and Length Control



CHAPTER 2  
**PRECAUTIONS**

## **PRECAUTIONS**

1. **Make sure the operator of the machine has read and understands this manual in its entirety before attempting to operate this equipment.**
2. **ALWAYS** keep covers, guards and lids mounted to machine during operation
3. **OBSERVE and OBEY** all safety and warning signs affixed to the machine.
4. **ALWAYS** adhere to and follow all local and national safety codes concerning the loading and un-loading of reeled coils.
5. **USE ONLY** properly rated devices for lifting reeled coils into or out of the reel stand assembly.
6. **DO NOT** wear loose clothing, jewelry etc. that could become entangled in the moving parts of the machine when operating.
7. **STOP THE MACHINE** and disconnect the power before attempting to make any adjustments, perform any maintenance or changeover procedures.
8. **AVOID** storing the machine outdoors for long periods of time. Cover with a tarp but provide good ventilation to prevent condensation and rust.
9. **DO NOT USE SOLVENTS TO CLEAN DRIVE ROLLERS!**
10. **ALWAYS EMPTY MACHINE OF MATERIAL BEFORE TRANSPORT AND STORAGE.**

CHAPTER 3  
**GENERAL MAINTENANCE**

## **GENERAL MAINTENANCE**

1. 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.
2. Avoid storage of the machine outdoors for long periods of time. Cover your machine with a tarp to protect it but provide good ventilation to prevent condensation and rust.
3. Keep your machine clean. This will increase the life of the machine and make maintenance easier. A clean machine will provide a clean product.
4. Before operating your machine, visually inspect for foreign objects, debris, or anything unusual. If something doesn't seem correct, inspect and remedy prior to operation.
5. Keep chains properly tensioned. 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.
6. Lubricate the chains a minimum of every 40 hours of operation. It is preferable to use a dry motorcycle chain lube or equivalent.
7. Lubricate the drive gears a minimum of every 30 hours of operation. Use of an Open Gear Spray Lubricant is recommended.
8. Keep Arbor Cradles lubricated with Clear Grease.
9. Lubricate Arbor Nut using a grease gun with EP Grease when threads begin to look dry.
10. Clean Forming Rollers as needed with a Scotch Brite Pad and a small amount of solvent.
11. Clean Drive Rollers with soap and water or mild solvent free spray cleaner. **CAUTION: Do not use harsh chemicals or solvents or damage will occur.**
12. Lubricate both faces of the Shear Blades and Dies a minimum of once daily with Spray Lube. More should be added as needed before the cut edges begin to deteriorate.

CHAPTER 3  
**GENERAL MAINTENANCE**

***Recommended Lubricants and Fluids***

The following lubricants are available from New Tech Machinery.

**Spray Lube for:**

Shear Blades, Dies, Entry Guide, Bead Roller Carriage Shafts, Acme Shafts and Mitre Gears

Super Lube - Multi-Purpose Synthetic Aerosol Lubricant with Syncolon (PTFE)

**NTM PN: LUBE-SPRAY** - 11oz can

**Clear Grease for:**

Arbor Cradles

Synthetic Extreme Pressure, High Temperature Grease with Syncolon (PTFE)

**NTM PN: LUBE-GEL** - 400 gram container

**EP Grease for:**

Arbor Nuts and Pillow Blocks

Grease - Lubricants Type: Moly Ep Grease

**NTM PN: LUBE-GREASE** - 14 Ounce Container

**Open Gear Spray Lubricant for:**

Main Drive Gears

Open Gear and Wire Rope Lubricant

**NTM PN: LUBE-GEAR** - 11 oz. Aerosol Can

**Hydraulic Fluid (32AW) for:**

Hydraulic Tank

**NTM PN: HYD-200-018** - 5 Gallons

(4 Required)

CHAPTER 4  
**ELECTRICAL CONTROLS AND OPERATION**

## **ELECTRICAL CONTROLS AND OPERATION**

### **POWER CORD REQUIREMENTS**

For machines equipped with a QCPP-E 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 you are using 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 USE FOR ELECTRIC MOTOR MACHINES**

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 your 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.**

### **MANUAL CONTROL PANEL OPERATION:**

(Figure 1)

- A. FORWARD-REVERSE Switch  
This selector switch controls the direction of movement of the material through the machine. Select forward to feed material and run panel through the machine.  
**NOTE: For operator safety, your machine will not run continuously in reverse.**
- B. JOG-RUN Switch  
This selector switch allows you to run the machine continuously, or jog material through the machine. Select JOG to load coil into machine and to move material through the machine in small increments until it clears the shear dies. Select run after material has cleared the shear, and you are ready to run panel.  
**NOTE: The LENGTH CONTROL LIMIT SWITCH must be plugged in to the Limit Switch Plug at the bottom of the Manual Control Box Assembly to run continuously.**
- C. START FEED (Green button at Entry and Exit End)  
This button is used to activate the drive system of the machine. (Jog only unless limit switch is plugged in)
- D. STOP FEED (Red button at Entry and Exit End)  
This button acts as an emergency stop for the drive system when using the Length Control Limit Switch. **Pressing either the entry or exit button will stop the drive system of the machine in case of an emergency.**
- E. SHEAR DOWN (Green button)  
Pressing this button once will cycle the shear to the bottom of its stroke and return it back to the top or home position. This is one shear cycle
- F. SHEAR UP (Red button)  
Pressing this button during the down cycle of the shear will immediately send it back to the top or home position.
- G. EMERGENCY STOP-POWER ON (Raised Red Mushroom button)

## CHAPTER 4

# **ELECTRICAL CONTROLS AND OPERATION**

### **Function #1 (Power On)**

Pull this button OUT prior to starting the machine.

### **Function #2 (Emergency Stop-Power Off)**

Once the machine is running, pushing this button in will stop all functions and completely shut down the machine including the engine. If the shear is in the down cycle it will freeze it in position. The shear will default back to the top or home position once the engine or motor is re-started. This button is also used to shut the machine down when not in use. *Failure to push this button in prior to storage, even overnight, could result in a dead battery on gas engine models.*

### **H. MOTOR START (Green button)**

**You must pull the Emergency Stop-Power On button out before the Start Button will function.**

Press this button momentarily to start the Electric Motor machine.

Press and hold this button until the engine starts on a Gas Engine model.

## **MAIN CONTROL CABLE**

(Figure 2)

- A. The main control cable is the communication cable for the Manual Control Panel described above and the PLC Computer Batch and Length Control Computer covered in Appendix B. This cable must be connected to one or the other in order for the machine to operate.
- B. The Main Control Cable exits thru the panel below and under the left corner of the Manual Control Panel. There are three cables there and it is the larger diameter plug of the three. It has a key and slot configuration that must be aligned before the male/female connection can be made on the Manual Control Panel or Batch and Length Control Computer. This prevents misalignment and damage to the pins.

### **Manual Control Panel Connection**

Connect the Female end of the Main Control Cable to the panel mounted male connection located at the bottom left corner of the Manual Control Panel. Make sure that the key and slot are aligned and carefully start the threads on the connection and turn clockwise until snug.

### **Batch and Length Control Computer Connection**

Connect the Female end of the Main Control Cable to the panel mounted male connection located in the bottom of the computer on the right side. Make sure that the key and slot are aligned and carefully start the threads on the connection and turn clockwise until snug.



## CHAPTER 4

# ELECTRICAL CONTROLS AND OPERATION

### FUSES

(Figure 3)

All machines, gas or electric powered, have a 10-amp time delay fuse inside the Electrical Control Panel Assembly. This fuse protects the electrical components. If the fuse is blown, you will lose all functions of the machine except Motor Start. **To replace this fuse:** Loosen all 4 cover screws and open the front panel of the Control Box. Locate the automotive style in-line fuse near the bottom right hand corner. It is a spring loaded twist lock holder. Push together and turn to open. Check the fuse with a continuity tester. If it is bad, replace with a new fuse and re-connect spring loaded holder.

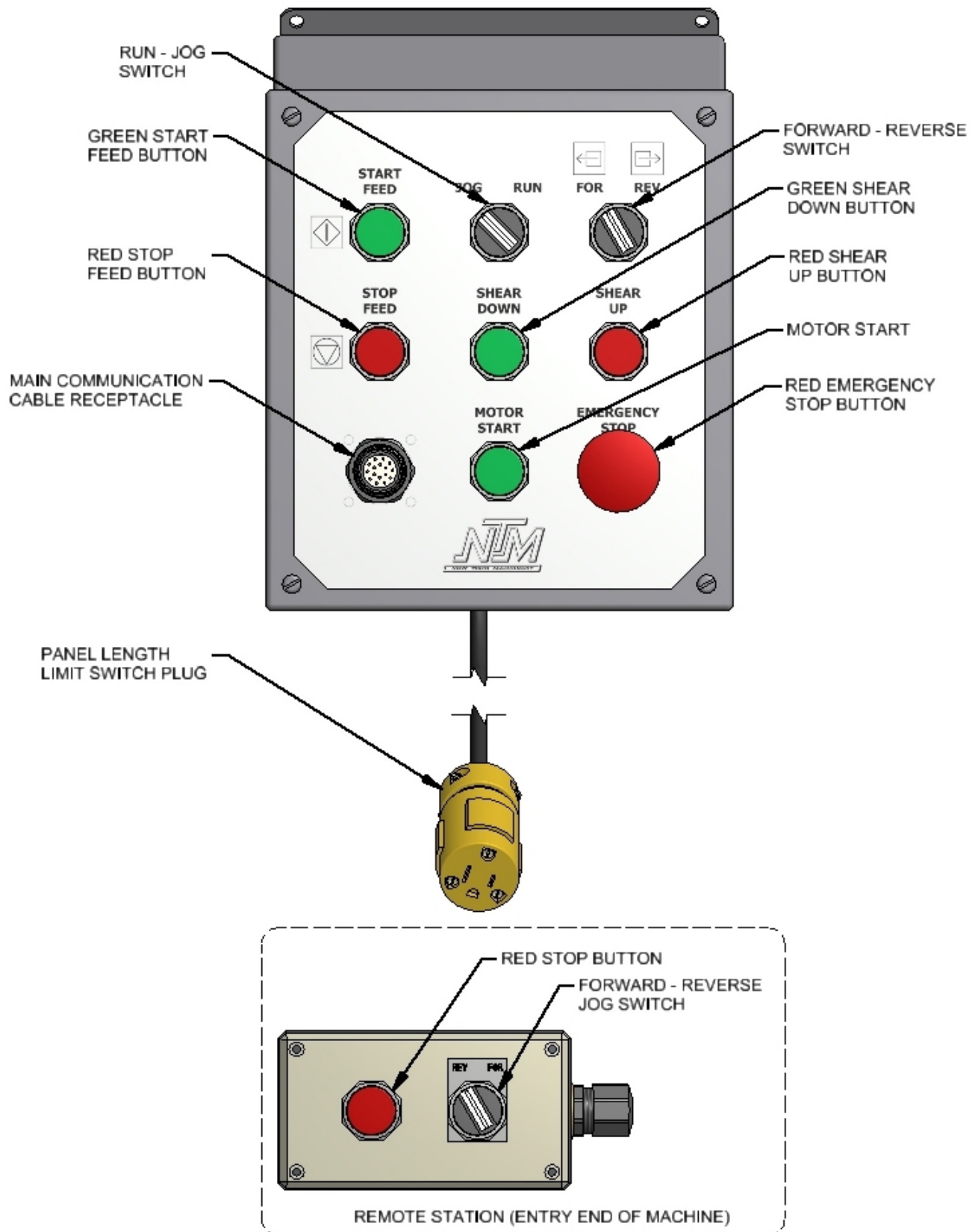
### ELECTRIC MOTOR MACHINES

(Figure 4)

Electric motor machines have an additional 10-amp time delay fuse protecting the logic circuit of the Contactor Box. This fuse holder is mounted in the side or top cover of the contactor box located approximately mid machine on the right side. Access can be gained by removing the center left side cover. This is a panel mounted, spring loaded fuse holder. **To replace this fuse:** Push in on the cap and turn counterclockwise to release fuse. Check fuse with a continuity tester. If the fuse is bad replace with a new fuse. To re-install, insert fuse into cap. Install fuse and cap assembly into receptacle, push down and turn clockwise to lock in place.

# CHAPTER 4

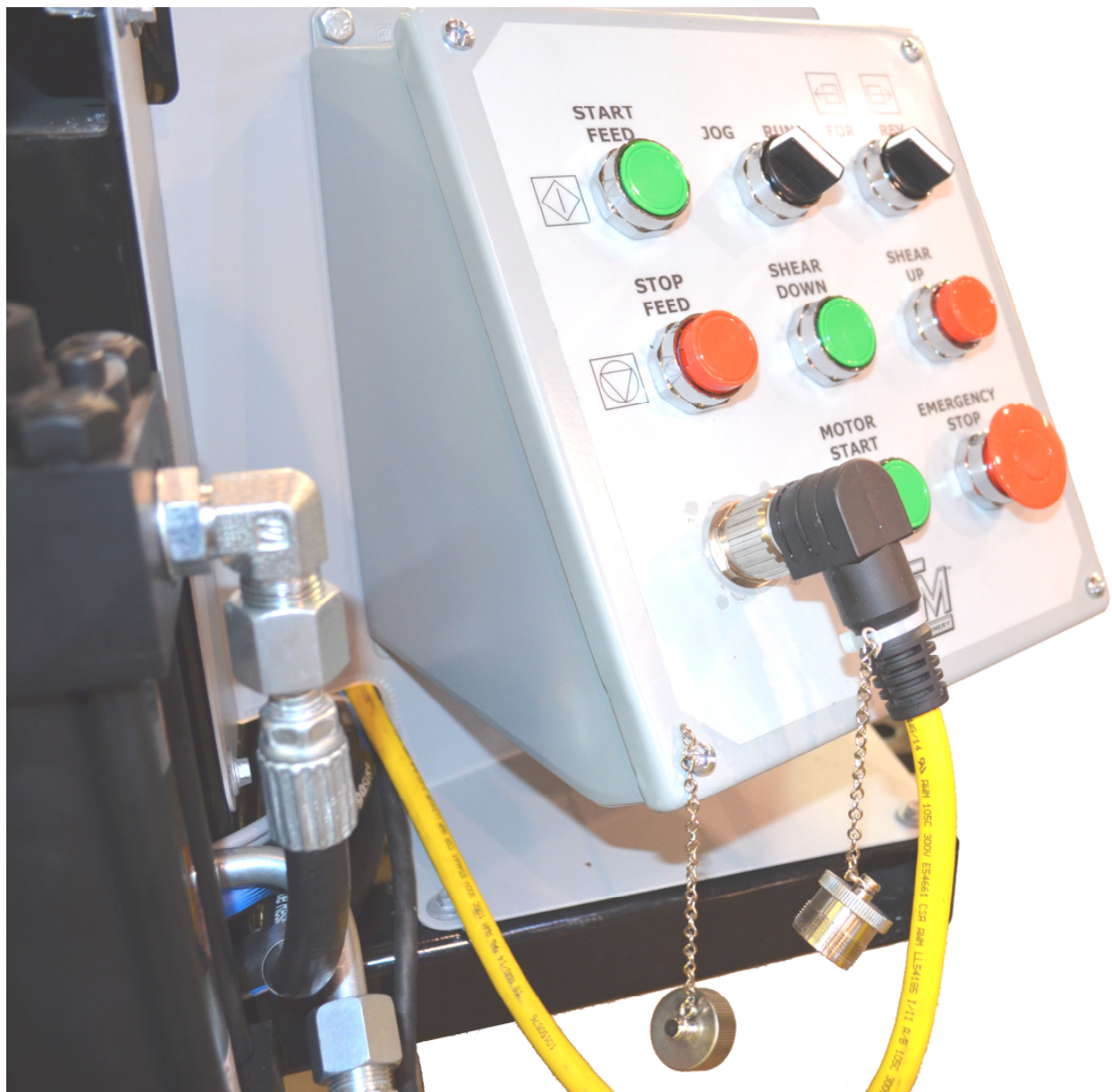
## ELECTRICAL CONTROLS AND OPERATION



**Figure 1: Controls**

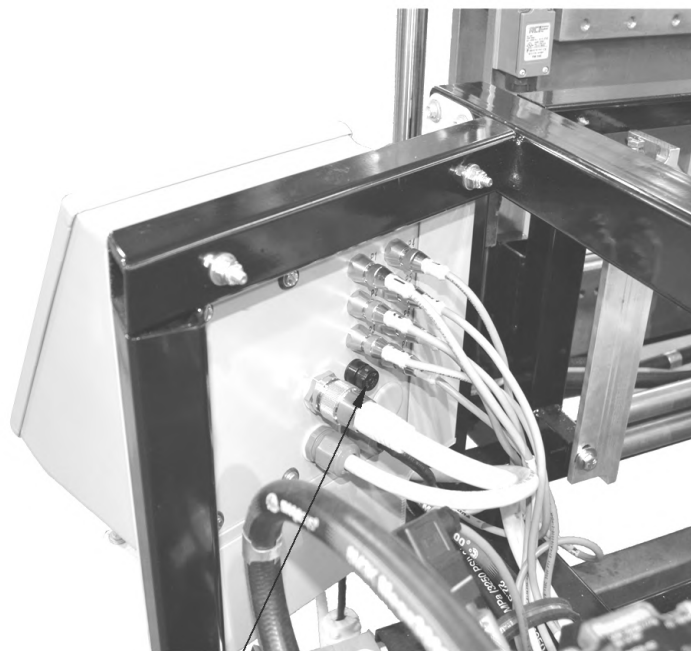
CHAPTER 4

## **ELECTRICAL CONTROLS AND OPERATION**



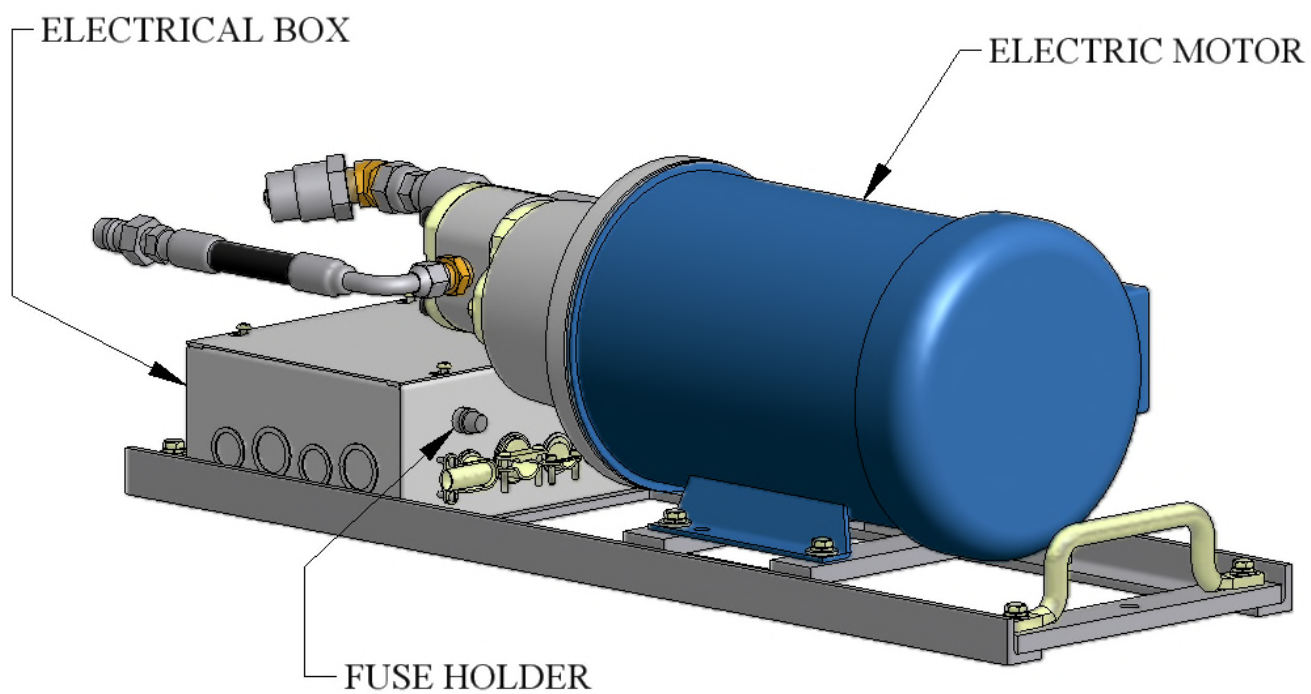
**Figure 2: Main Control Cable**

CHAPTER 4  
**ELECTRICAL CONTROLS AND OPERATION**



FUSE LOCATION

**Figure 3: Main Control Box Fuse**



**Figure 4: QCPP E 1-6 Fuse Location**

CHAPTER 5  
**REEL STANDS, REELS, AND EXPANDABLE ARBORS**

## **REEL STANDS, REELS AND EXPANDABLE ARBORS**

### **EXPANDABLE ARBOR**

(Figure 5)

The Expandable Arbor adjusts to accommodate coils with 16" to 20" inside diameters by expanding into the ID of the coil.

### **THREADED NUT**

The threaded nut should always be on the right side of the machine and the tail of the coil should always be routed over the top and pointing toward the exit or shear end of the machine.

This threaded nut is used to increase or decrease the outside diameter of the arbor. Turning the nut clockwise will increase the outside diameter of the arbor, and counter-clockwise rotation will decrease the arbor size. There is a grease zerk in the collar of the threaded nut that should be lubricated at least twice a year, or whenever grease is not visible on the threads of the shaft.

### **END COLLAR**

The End Collar has two positions.

Position "A" is used for coils with inside diameters of 16".

Position "B" is used for coils with inside diameters of 20".

To adjust from one position to the other, remove 2 screws "C" until end collar is free to slide. Slide it to the inside position for 20" ID or outside position for 16" ID coil. Align it to the respective threaded holes in the reel shaft. Re-insert and tighten "C" bolts to lock the end collar to the shaft.

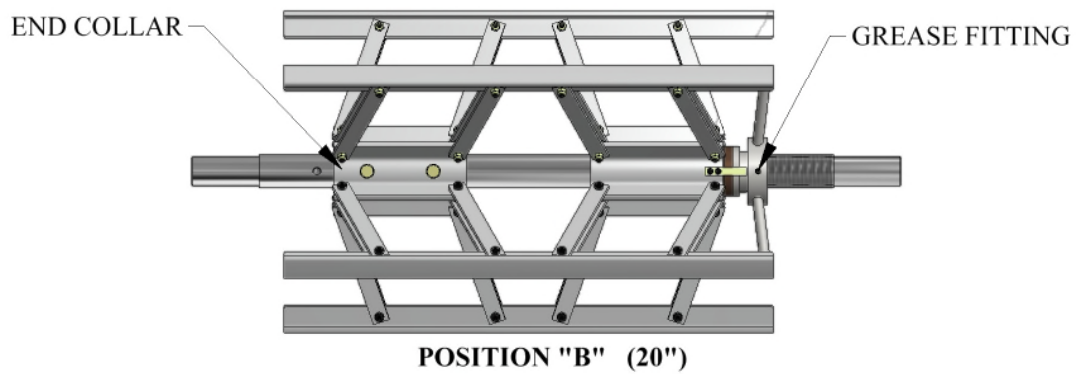
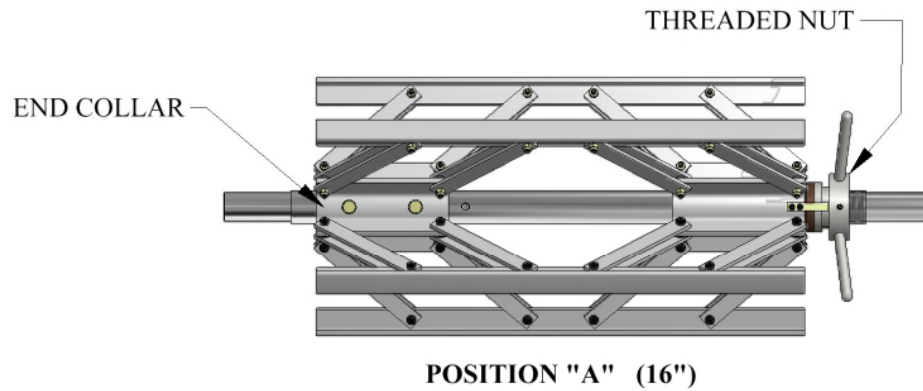
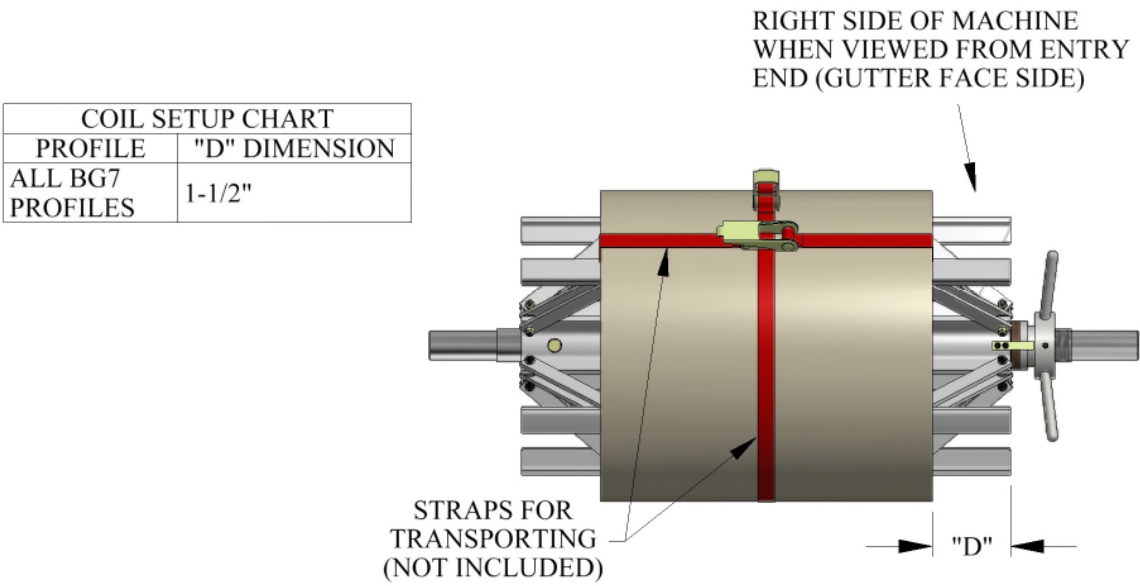
### **LOADING EXPANDABLE ARBORS WITH COIL**

1. Using the Threaded Nut, collapse the arbor small enough to fit into the inside diameter of the coil.
2. Slide the Expandable Arbor into the center of the coil making sure the threaded nut is on the right and the tail of the coil is over the top and pointed toward the entry end of the machine.
3. Turn the Threaded Nut clockwise until the Support Bars on the arbor are just snug against the inside of the coil.
4. Using the Reel Set Up Chart, (Figure 5), find the "D" dimension that corresponds to the profile you are using.
5. Slide the arbor left or right to get the correct "D" dimension measuring from the edge of the coil to the end of the Support Bar on the Threaded Nut side.
6. Finish by rotating the Threaded Nut clockwise until the Support Bars are very tight against the inside of the coil. Verify that dimension "D" is correct, and re-adjust if necessary. The Coil and Arbor are now ready for loading. (see LOADING REELED COIL on page 15)



# REEL STANDS, REELS, AND EXPANABLE ARBORS

COIL SETUP CHART	
PROFILE	"D" DIMENSION
ALL BG7 PROFILES	1-1/2"



**Figure 5: Expandable Arbor Set-Up**

## **REEL STANDS, REELS, AND EXPANABLE ARBORS**

**CAUTION: Always use properly rated lifting devices to load and unload coils.**

Maximum Capacity / Reel: **3,000 lbs.**

Total Capacity for Reel Stand: **6,000 lbs.**

1. The reel shafts must rest in the cradles on the reel rack. Keep the cradles lubricated with synthetic lube to minimize wear. (Figure 6)
2. Use the Hold Down Bars on each cradle to secure the coil and reel to the reel stand during both operation and transit of the machine. The Hold Down Bracket should be used to keep the coil from uncoiling too fast during the fabrication of panels. Apply just enough drag to keep coil tensioned. (Figure 6)

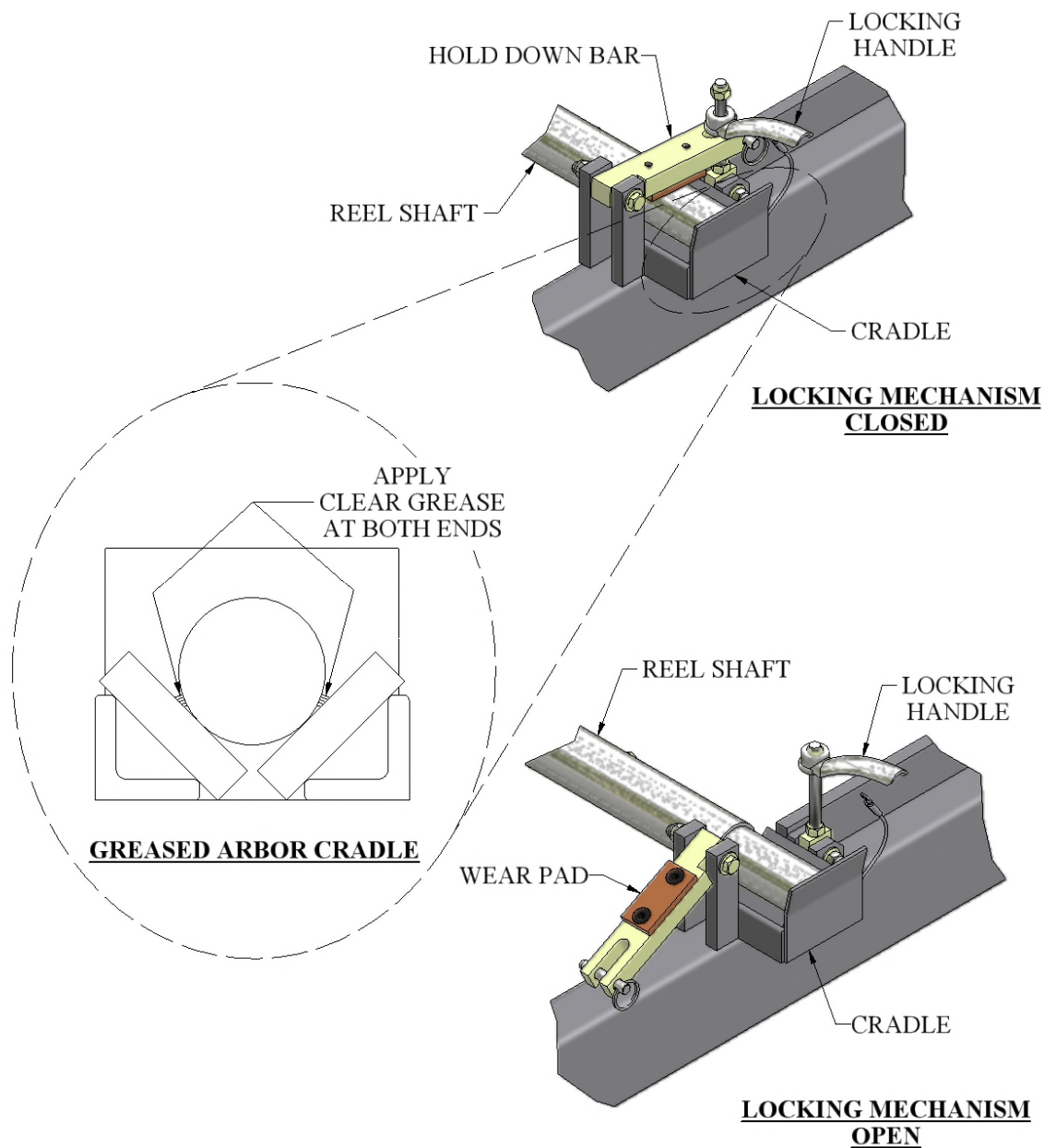
**Caution: Do not over tighten Hold Down Bars during machine operation.** This will cause excessive load on the drive and electrical systems and premature failure will result.

**Do tighten Hold Down Bars** tightly prior to transport of the machine.

3. If a Remote Decoiler is used it should be placed 8 to 10 feet behind the machine. Align it as close as possible to the Right Side Entry Guide line of fire, making the side of the coil and reel parallel to the machine. NOTE: The closer the Decoiler and reel are set to the machine, the more critical this alignment becomes.

CHAPTER 5

## **REEL STANDS, REELS, AND EXPANABLE ARBORS**



**Figure 6: Expandable Reel Assembly**

CHAPTER 5  
**REEL STANDS, REELS, AND EXPANABLE ARBORS**

## **LOADING REELED COIL**

**Caution:**

**Always use a forklift or other approved lifting device to load or unload Fixed Reels or Expandable Arbors loaded with coil.**

**The Lifting Holes in the Fixed Reel sides are provided to make loading safer and easier.**

**DO NOT use lifting straps through the lifting holes as the sharp edges may cut the straps.**

1. Prepare the reel stand by making sure the Hold Down Bars are in the unlocked and open Position (Figure 6).
2. Using an approved lifting device, lift the reeled coil into the cradles on the reel stand making sure that the tail of the coil is in the correct position then remove the lifting device.
3. Rotate the Hold Down Bars (Figure 6) to the closed position and thread the handle onto the hold down bolt. If you are going to run panel from this coil, tighten the left and right handle just snug. Final adjustment of tension should be made while running a panel to keep reel from unwinding material too fast. As the coil becomes smaller, re-adjustment will need to be made.  
**Caution: Do Not over tighten Hold Down Bars. Drive and/or electrical system failure may occur.**
4. If you are going to transport the machine after loading coil, tighten the Hold Down Bars securely to keep coil from unwinding during transport, and secure the loose end of the material to the coil.
5. Before transporting the loaded Expandable Arbor, you should also secure the coil around the outside edges through the inside diameter using a strap, rope, etc. to prevent the coil from telescoping (Figure 5).

**NOTE: Make sure Hold Down Bars are tightened securely and coil is properly tied off before transporting machine.**

CHAPTER 6  
**HYDRAULIC SYSTEMS**

## **HYDRAULIC SYSTEMS**

### ***Maintenance***

(Figure 7)

The hydraulic system for your machine is a very durable and reliable system. It must be properly maintained to ensure trouble free operation and longevity. The factory has installed a 32 weight AW hydraulic fluid. Because this equipment is used primarily outdoors and exposed to the elements, it is recommended that the oil be changed annually. Hydraulic oil will degrade if it remains stagnate in the system for long periods of time. Check the fluid level weekly. It should be approximately 5” below the top of the filler neck. When checking the fluid level, also note the color and condition of the fluid. It should be clear in color.

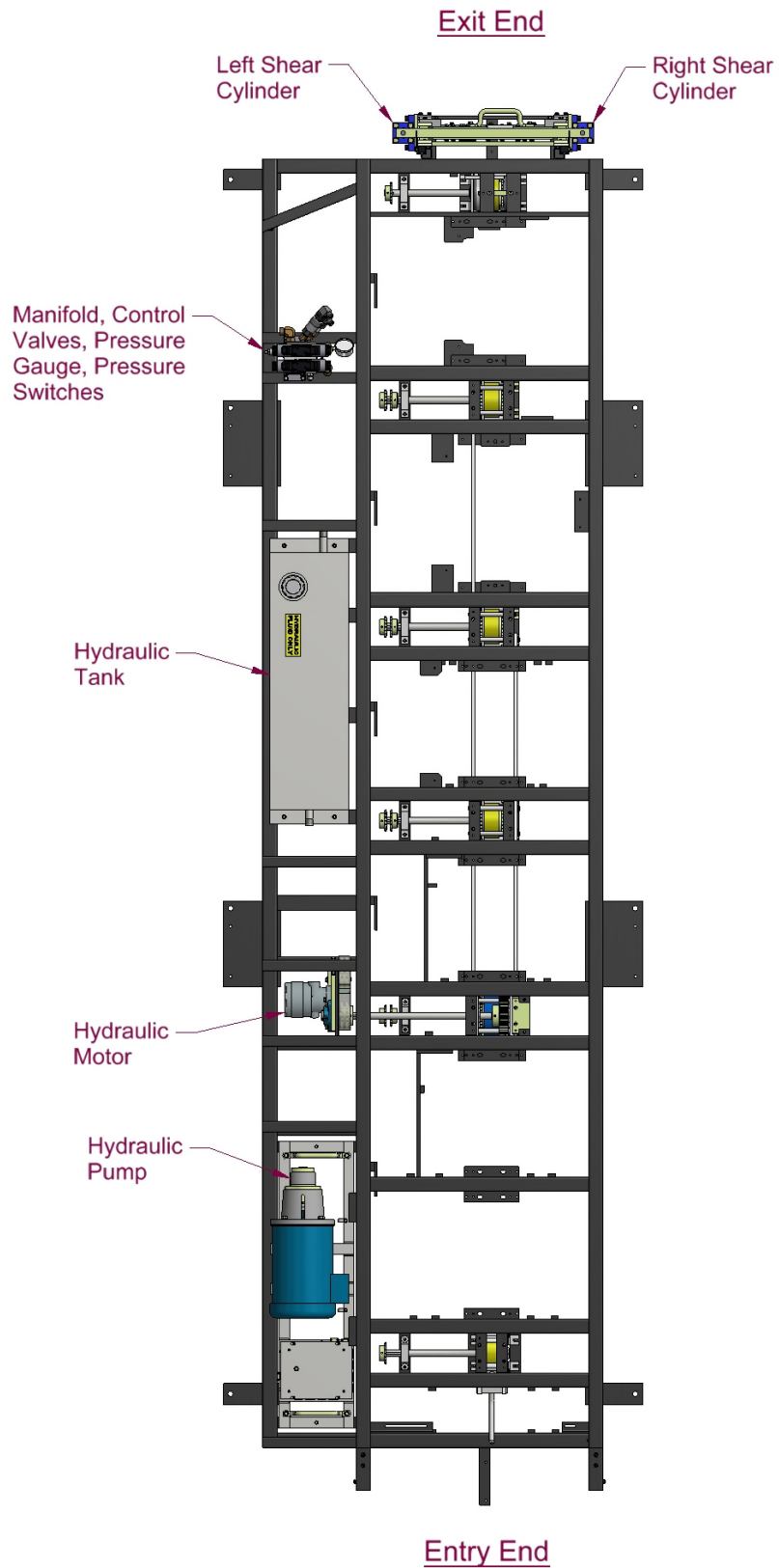
### ***Hydraulic Fluid Troubleshooting***

CONDITION	SOLUTION
1 White milky color indicates water contamination.	Change the fluid.
2 Dark fluid usually indicates a dirty oil filter.	Replace the oil filter.
3 Foamy fluid will cause a noisy pump and slow erratic operation of the system. The cause is usually low oil level or air in the system.	Check fluid level and bleed off air by pushing the shear down button and holding for 10 seconds.
4 Machine runs slow after continuous operation. Check hydraulic fluid temperature, it should be no more than 140°F (60°C).	Allow to cool down. Move to a shaded area if possible.



## CHAPTER 6

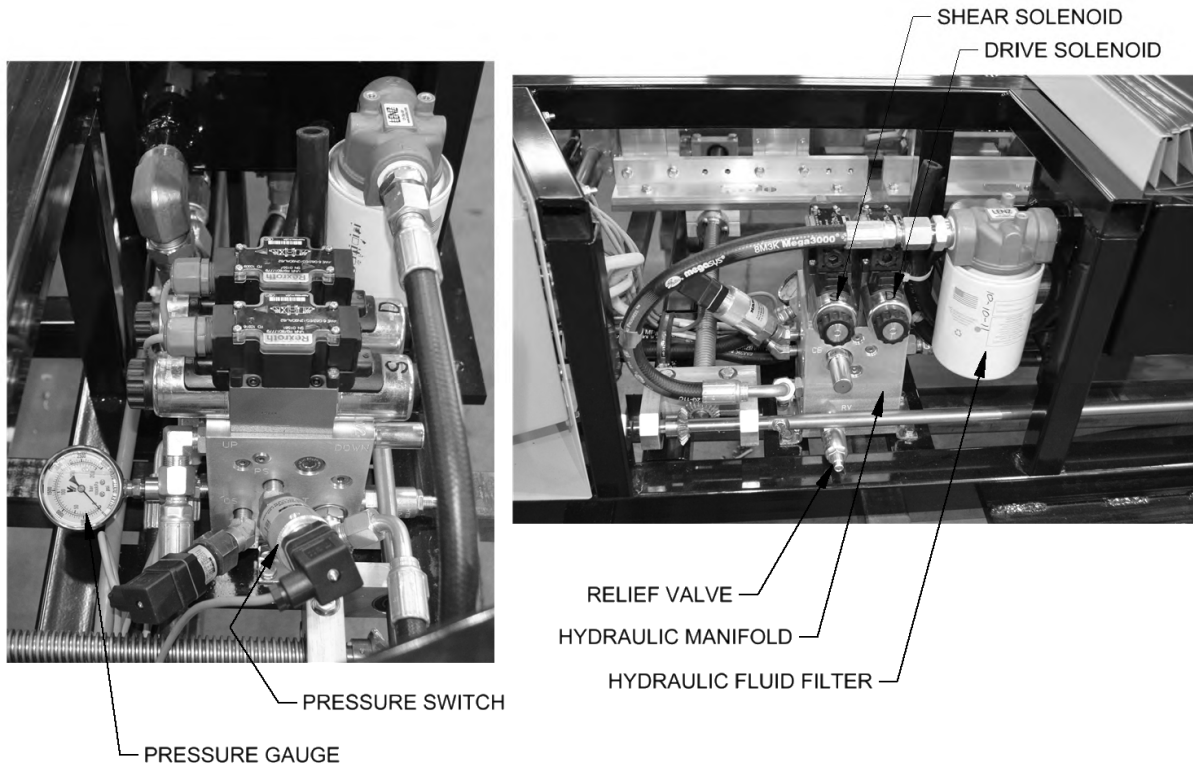
# HYDRAULIC SYSTEMS



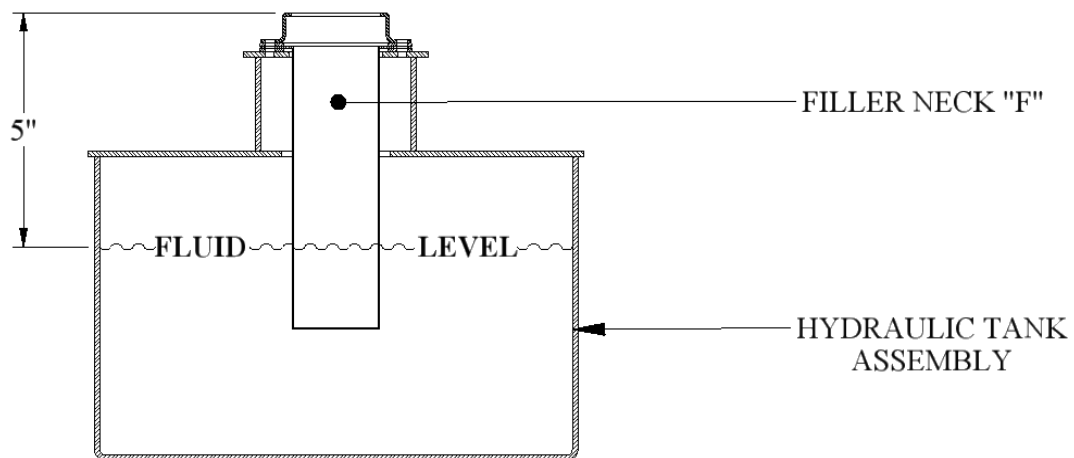
**Figure 7: Hydraulic System – Overview**

## CHAPTER 6

# HYDRAULIC SYSTEMS



**Figure 8: Hydraulic System – Details**



**Figure 9: Hydraulic Fluid Level**

## CHAPTER 7

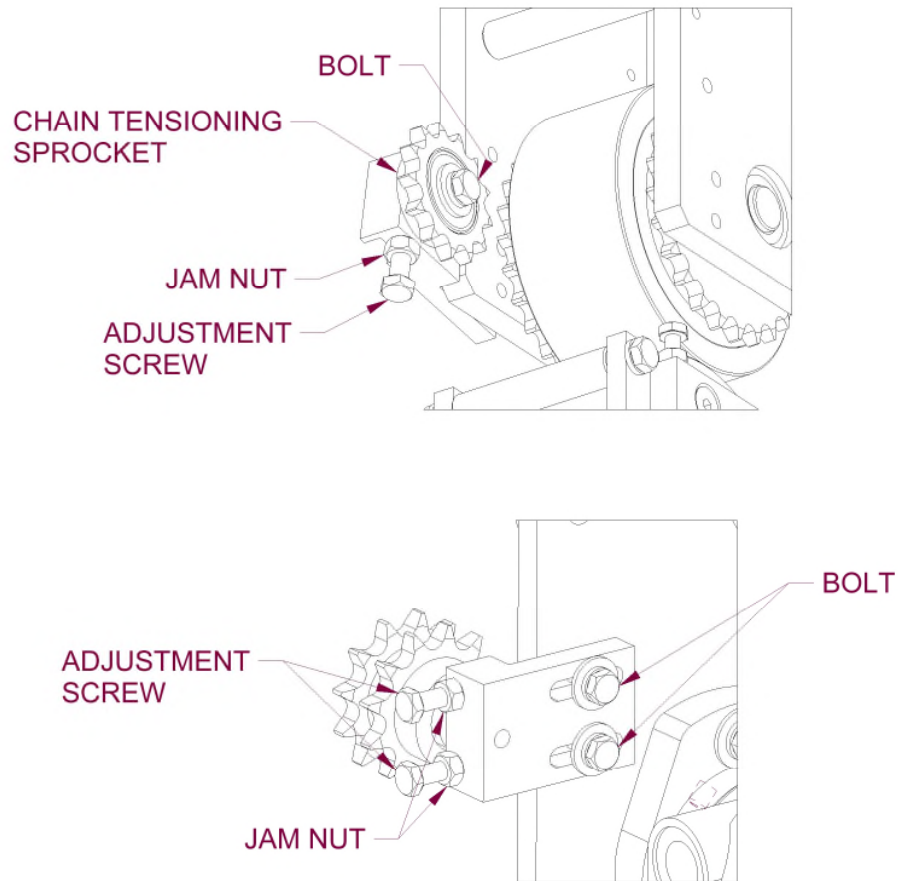
# **DRIVE SYSTEM**

## **DRIVE SYSTEM**

The drive rollers are set at the factory and should not need adjustment. Over time, the chains will wear down causing them to get longer and the chain tensioning sprockets will need to be adjusted to keep the chain tight. If the chain is loose, follow the procedure below to tighten.

Chain tightening procedure:

1. Loosen the bolt(s) and jam nut(s) that secure the idle sprocket.
2. Tighten the adjustment screw(s) until the slack has been removed from the chain. Do not over-tighten the chain.
3. Re-tighten the bolt(s) and jam nut(s).



**Figure 10: Tightening the Chain**

## CHAPTER 8

# SHEAR ASSEMBLY

## SHEAR ASSEMBLY

### OPERATION

Push the **SHEAR DOWN** button to activate the shear cycle and cut material. **IN CASE OF AN EMERGENCY:** Push the **SHEAR UP** button during the down cycle to immediately send the shear up to the home position.

The shear is electrically activated and hydraulically driven.

The two Top Limit Switches and single Bottom Pressure Switch control the cycle of the shear.

The Top Limit Switches electronically lock out the drive system when the shear is in motion.

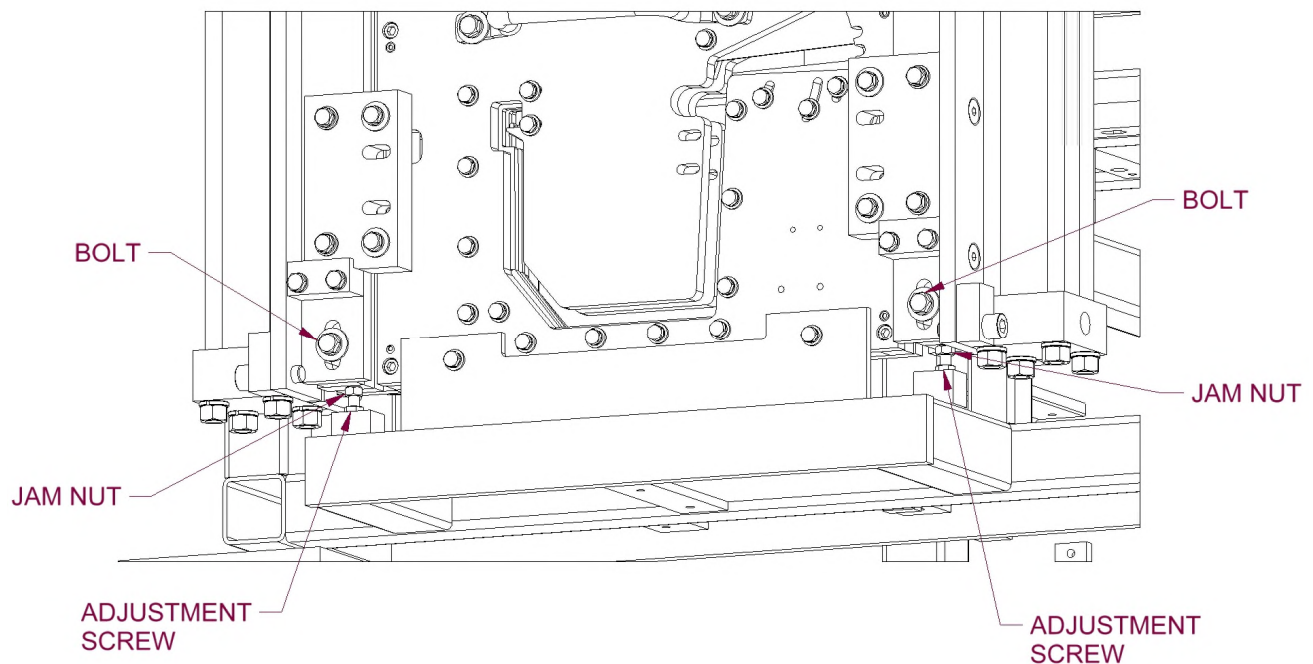
The Bottom Pressure Switch sends the shear back up once the set pressure is reached.

### SHEAR ADJUSTMENTS

The shear is adjusted at the factory, but it may become necessary to move the shear to better match the location of the gutter as it exits the machine.

Adjusting the height of the shear:

1. Shut off power to the machine.
2. Loosen the two jam nuts and two bolts shown in the figure, but do not remove.
3. Turn the two adjustment screws to raise or lower the shear.
4. Re-tighten the bolts and jam nuts.



**Figure 11: Shear Height Adjustment**

## CHAPTER 8

# **SHEAR ASSEMBLY**

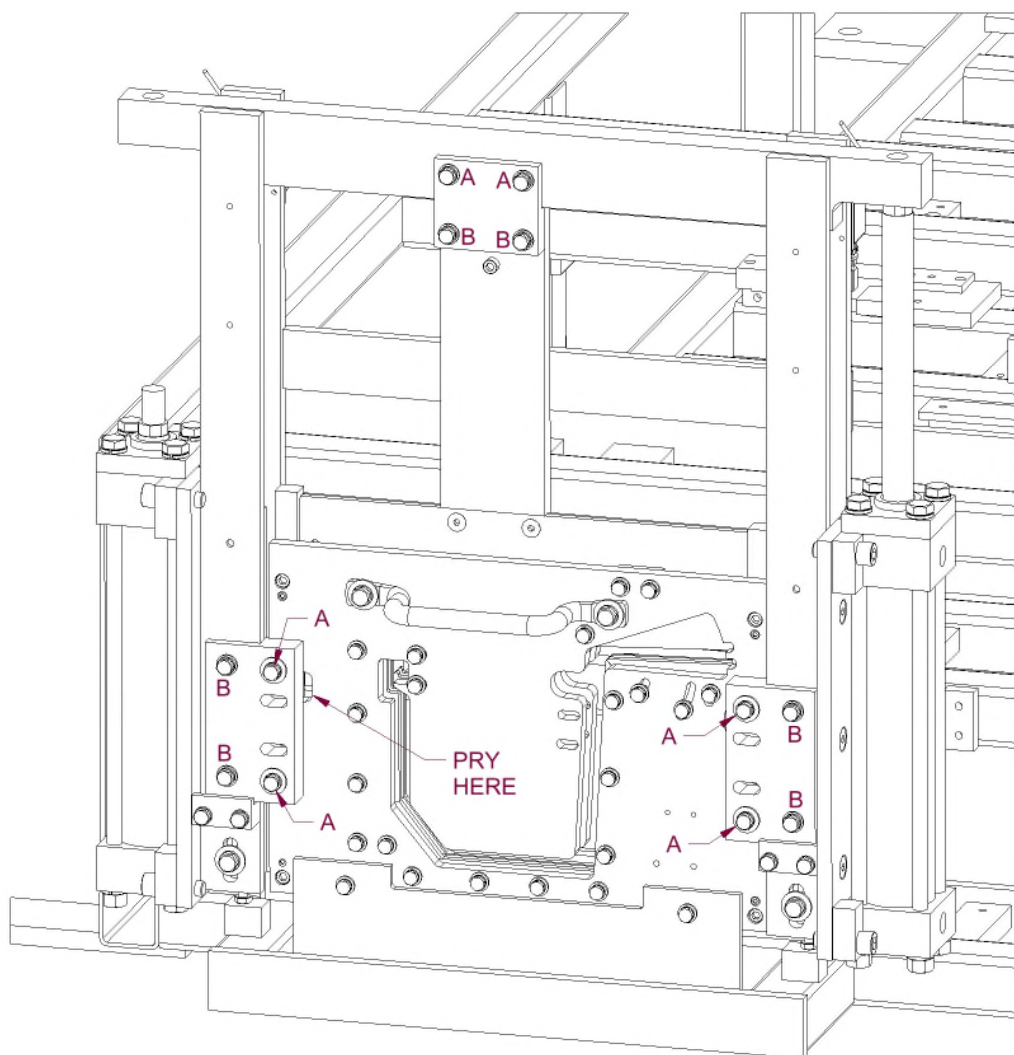
Adjusting the left-right position of the shear:

1. Shut off power to the machine
2. Remove the shear cover, then loosen the six “A” bolts but do not remove.
3. Use a large screwdriver to pry on the slots (Figure 12) until the shear is located correctly.
4. Re-tighten the “A” bolts, and replace the cover.

Removing the shear body:

If the gutter becomes damaged during forming it may be necessary to remove the shear body in order to get the gutter out of the machine. Follow the steps below.

1. Shut off power to the machine.
2. Remove the shear cover, then remove the six “B” bolts.
3. Grasp the handle and remove the shear body.
4. To re-install, replace the shear body and the six “B” bolts. Tighten the bolts. Replace the cover.



**Figure 12: Shear Left-Right Adjustment and Removal**



CHAPTER 8  
**SHEAR ASSEMBLY**

**SHEAR MAINTENANCE**

1. Clean and lubricate the Top Blades, Bottom Dies, and Male/ Female dies at least once a day during normal use, or whenever cutting surfaces look dry. Proper lubrication is essential to clean cuts, rust prevention and longevity.

**Spray Lube for:**

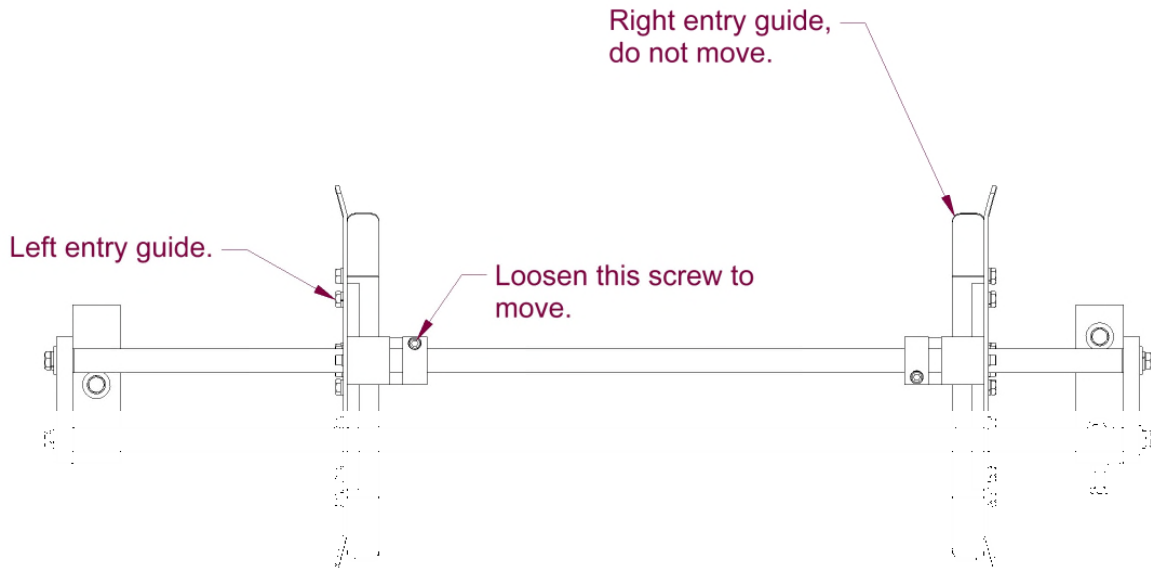
Shear Blades, Dies, Entry Guide, Bead Roller Carriage Shafts, Acme Shafts and Mitre Gears  
Super Lube - Multi-Purpose Synthetic Aerosol Lubricant with Syncolon (PTFE)

**NTM PN: LUBE-SPRAY** - 11oz can

CHAPTER 9  
**ENTRY GUIDE & DRUM ASSEMBLY**

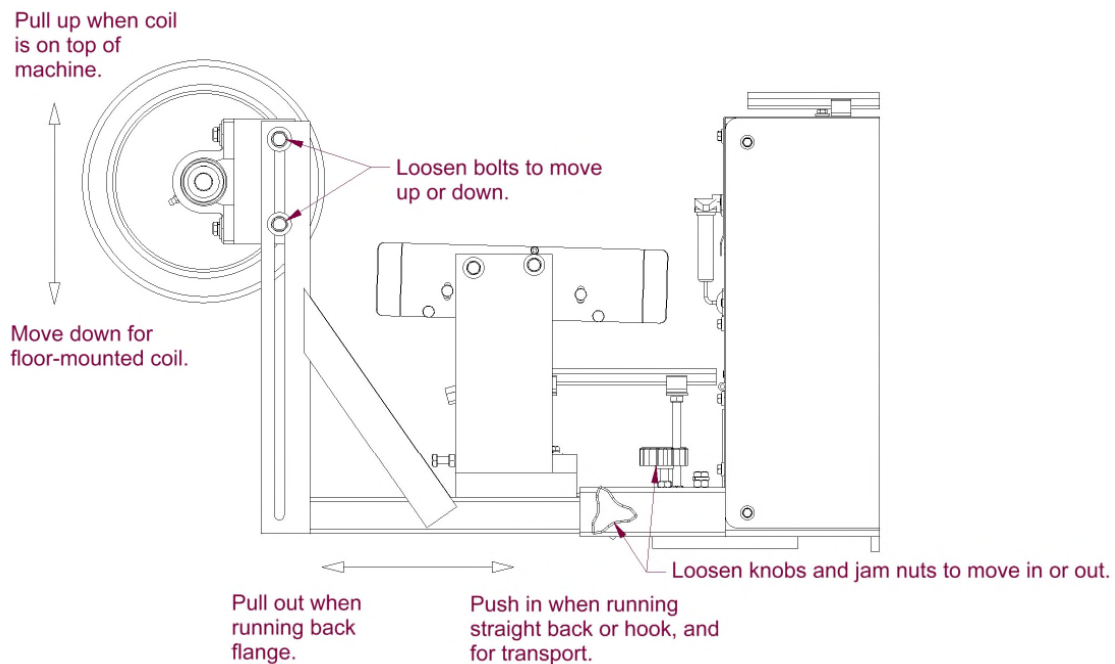
## ENTRY GUIDE AND DRUM ASSEMBLY

### ENTRY GUIDE ADJUSTMENT



*Figure 13: Entry Guide Adjustment*

### ENTRY DRUM ADJUSTMENT



*Figure 14: Entry Drum Adjustment*

## CHAPTER 10

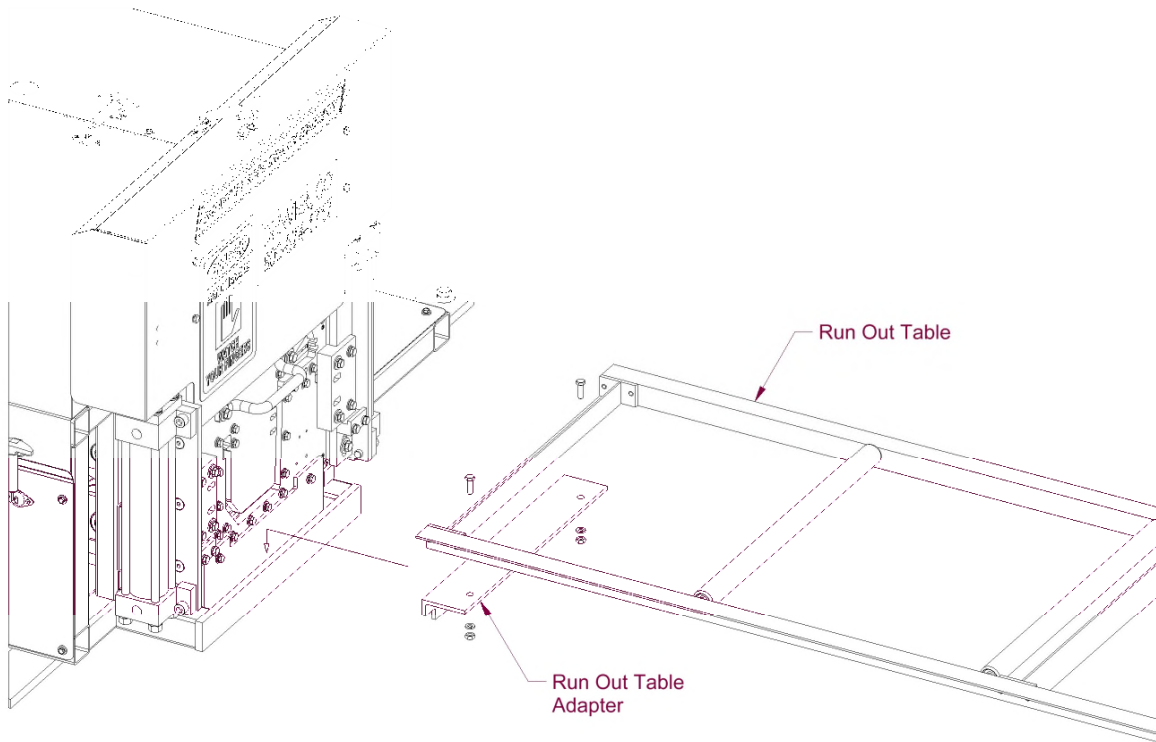
# **RUN OUT TABLES**

## **RUN OUT TABLES**

(Figure 15)

The Run-Out Table attaches to the Exit End of the Shear assembly, and is used to support the gutter as it exits the machine. It is 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 Table on its side and in front of the machine with the leg assembly away from the shear.
2. Open the leg assembly and attach the Run-Out Table Adapter angle to the table.
3. Lift the attachment end of the table and insert the Run-Out Table adapter angle into the gap between the shear and the frame.
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.
5. Repeat the above procedures for each succeeding table and attach it to the bracket on the end of the previous table.



**Figure 15: Run Out Table**

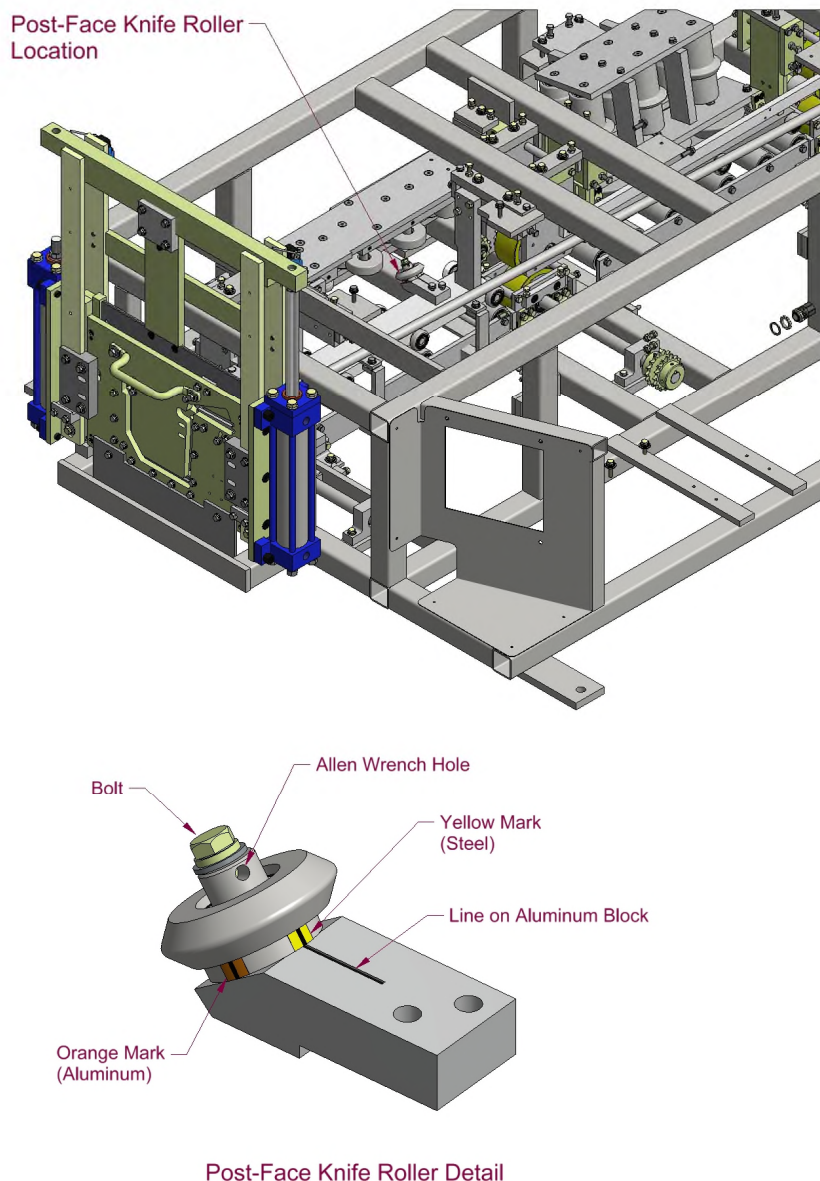
CHAPTER 11  
**POST-FACE KNIFE ROLLER ADJUSTMENT**

## POST-FACE KNIFE ROLLER

(Figure 16)

When changing the coil from steel to aluminum, or vice-versa, the post-face knife roller needs to be adjusted in order to maintain a quality gutter. To do this, follow the procedure below.

1. Remove the top cover closest to the shear.
2. Locate the post-face knife roller.
3. Loosen the bolt, insert a 5/32" allen wrench into the allen wrench hole in the shaft, and rotate the shaft until the black line on the shaft lines up with the black line on the aluminum block. The black line in the yellow paint is for steel, and the black line in the orange paint is for aluminum.
4. Re-tighten the bolt, and replace the cover.



**Figure 16: Post Face Knife Roller Adjustment**

## CHAPTER 12

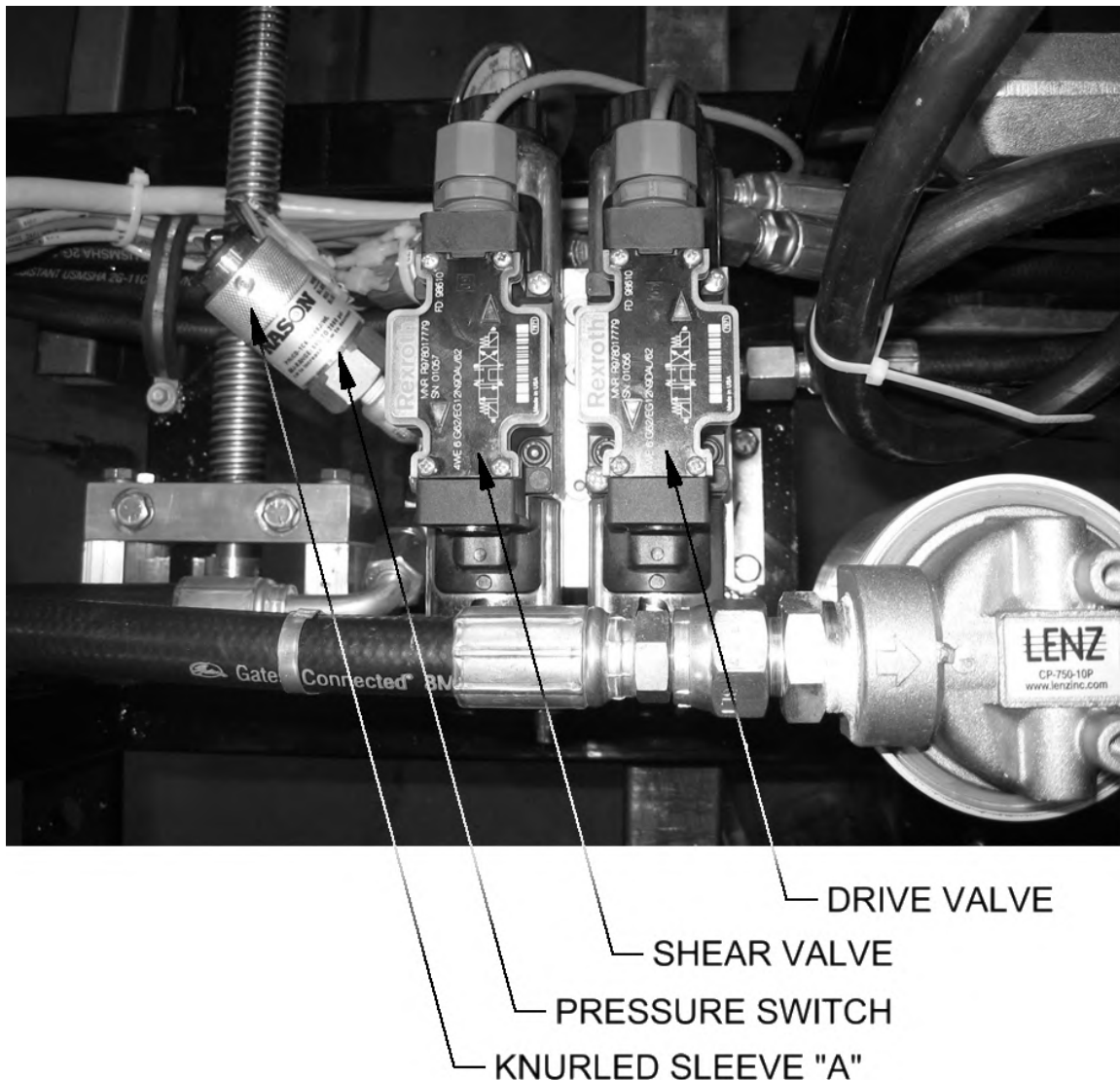
# TROUBLESHOOTING

## TROUBLESHOOTING

The hydraulic system operates the Shear and Drive assemblies. They are interfaced together and electronically activated. The hydraulic system pressure is factory set at 2000 psi and should not be changed. Some of the common problems that occur and their solutions follow below.

1. Shear travels to the bottom of the stroke and does not return to the top of the stroke. You can hear the hydraulic system laboring and pushing the Red Shear Up Button does not return it to the top of stroke.

**SOLUTION:** Adjust the pressure switch (Figure 17) by turning the silver knurled sleeve "A" **counterclockwise** until the shear goes up. **Note:** If you turn the sleeve to far CCW, you will get problem #2 below on the next cut made.



*Figure 17: Pressure Switch Adjustment*

CHAPTER 12  
**TROUBLESHOOTING**

- 2. Shear travels to the bottom of the stroke and returns to the top of the stroke without cutting the panel completely through.**

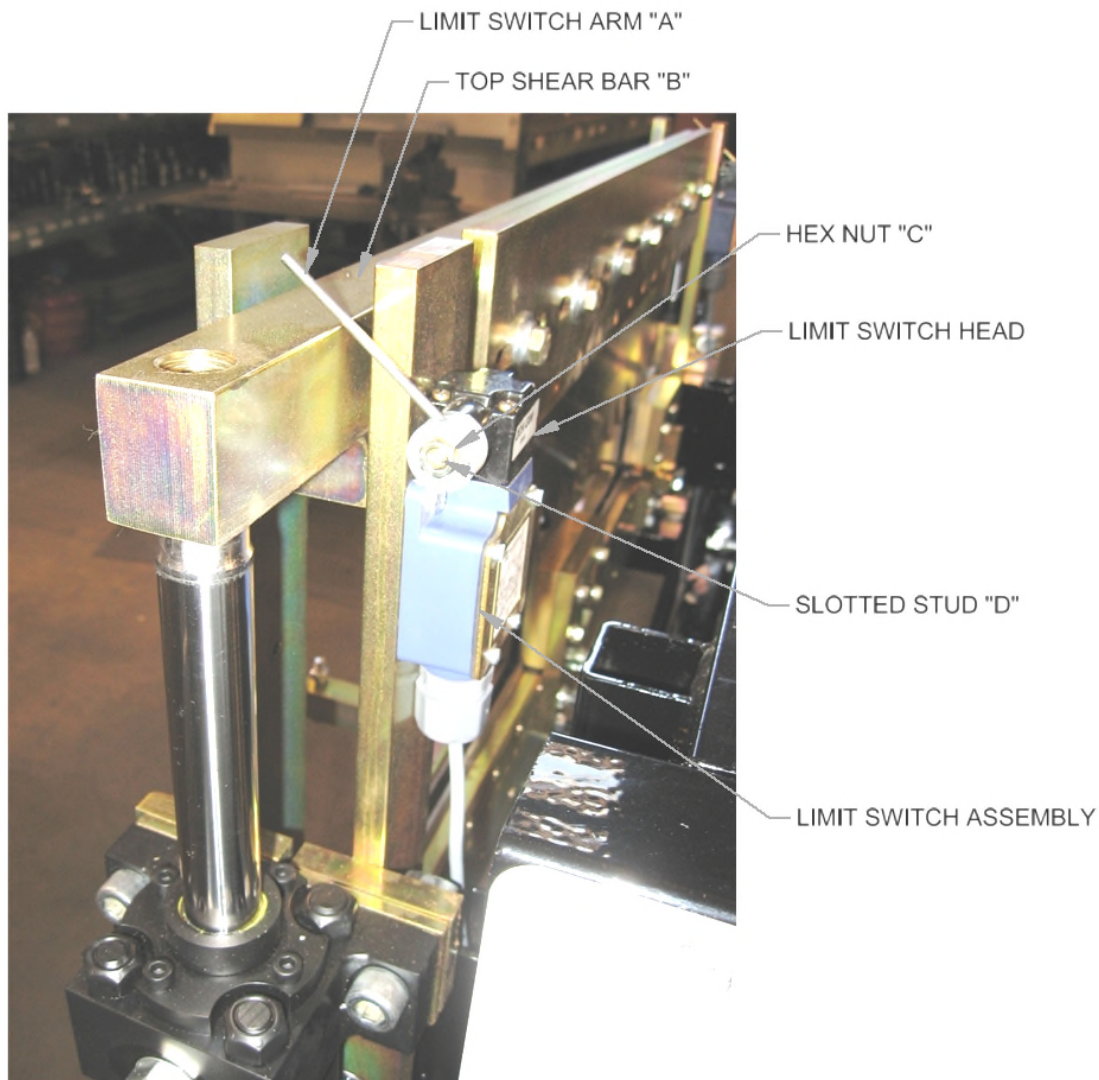
SOLUTION: Press and hold the Green Shear Down Button until the panel is cut off. Remove the cut panel and jog material out 2 or 3 inches past the shear. Adjust the pressure switch (Figure 17) by turning the silver knurled sleeve "A" clockwise 1/8 of a turn. Press the Shear Down Button again. Check to see if the panel is cut off completely. If not, repeat this procedure until the cut is made with one stroke of the shear. Note: If you turn the knurled sleeve too far CW you will experience problem #1 above.

- 3. Shear is at the top of the stroke, you can hear the hydraulic system laboring and you cannot run the next panel.**

SOLUTION: Remove the Shear Cover. Note the 2 Limit Switch Arms "A" (Figure 18). Lift the arms one at a time. If one of them stops the hydraulic system laboring then that Limit Switch arm needs to be adjusted. If neither of them stops it, lift both arms at the same time to see if it stops. If it does then both arms need adjusting. ADJUSTMENT: Tape one or both Limit Switch Arms "A" to the Top Shear Bar "B". Loosen Hex Nut "C" until spring tension is released. Using a small flat tipped screwdriver, turn Slotted Stud "D" toward the entry end of the machine until you hear a click and stop. Repeat this a few times until you can stop right when the click occurs. While holding this position, tighten Hex Nut "C" to lock in adjustment. Adjust one or both sides as required from test above. Start the engine. If the adjustment/adjustments were done correctly, the hydraulic system should no longer be laboring and you should be able to run the next panel.

## CHAPTER 12

# **TROUBLESHOOTING**



**Figure 18: Limit Switch Adjustment**

#### **4. Manual Control Panel buttons do not work.**

**SOLUTION #1:** Check fuse inside of Manual Control Box. Replace if blown with a 10-amp time delay fuse (Figure 3 on page 10).

**SOLUTION #2:** If you have a gasoline engine, check the condition of the battery. The control system requires 12 volts to operate properly. Replace or charge battery as required.



CHAPTER 13  
**HOOK ASSEMBLY (OPTIONAL)**

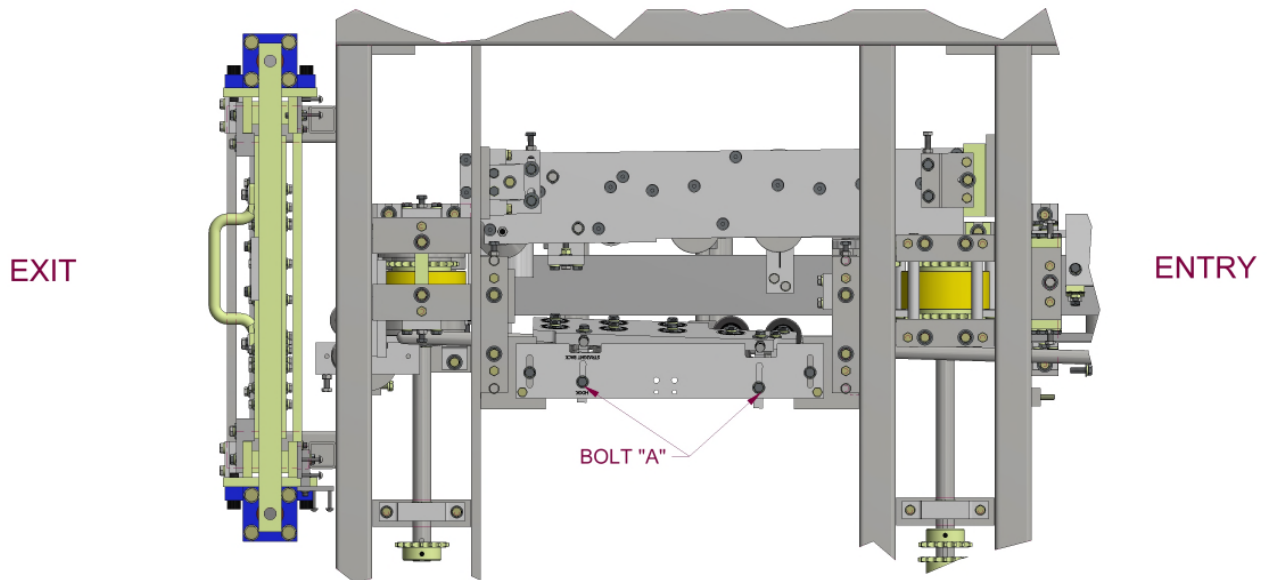
## **HOOK ASSEMBLY (OPTIONAL)**

(Figure 19)

The Hook Assembly is a self-contained assembly which can be added to a gutter machine. The New Tech machine is capable of running a straight back (with a bead) or hook type gutter profile from the same machine. The hook assembly and bead roller assembly can be moved in or out of position depending on the type of gutter desired.

### ***Engaging or disengaging the hook***

Before changing profiles, empty material from the forming area of the machine. To engage or disengage the hook assembly, simply loosen both “A” bolts. Slide the hook assembly toward the center of the machine to make a straight back profile or toward the back guide rod to make a hook profile. Retighten the “A” bolts.



***Figure 19: Hook Assembly Adjustment***

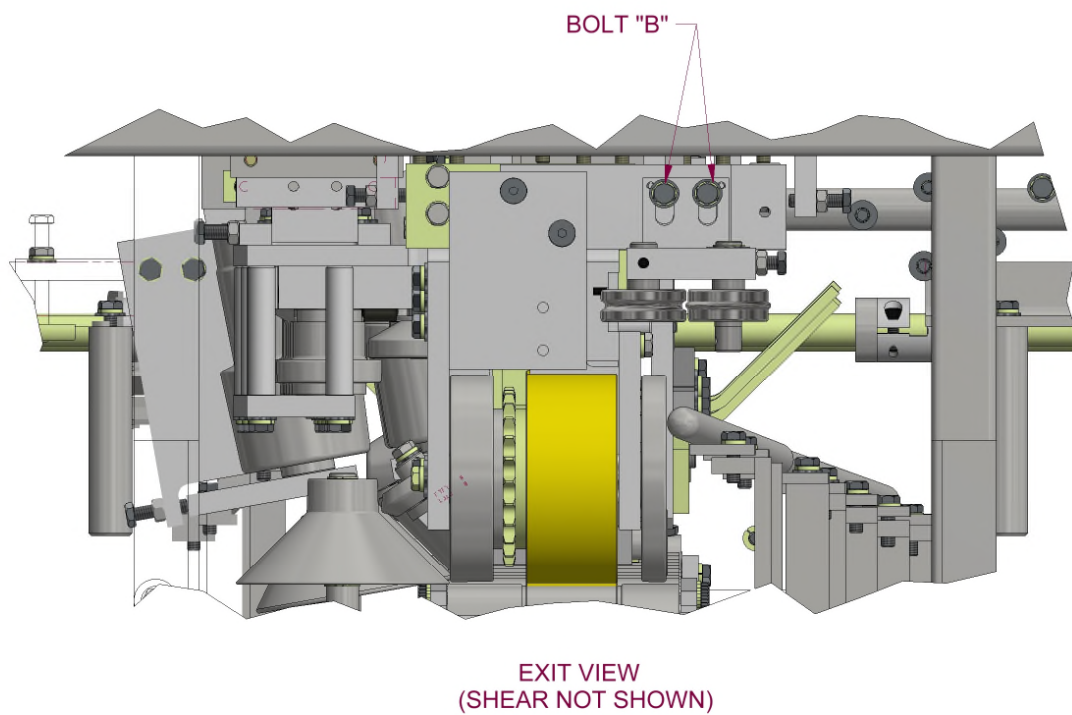
### ***Move the bead roller***

(Figure 20)

The bead roller assembly must be moved up and out of the way for the hook profile on the mounting plate for a straight back profile. To move the bead roller assembly, loosen both bolt “B” and move the assembly up when running the hook profile and down when running the straight back profile. Retighten “B” bolts.



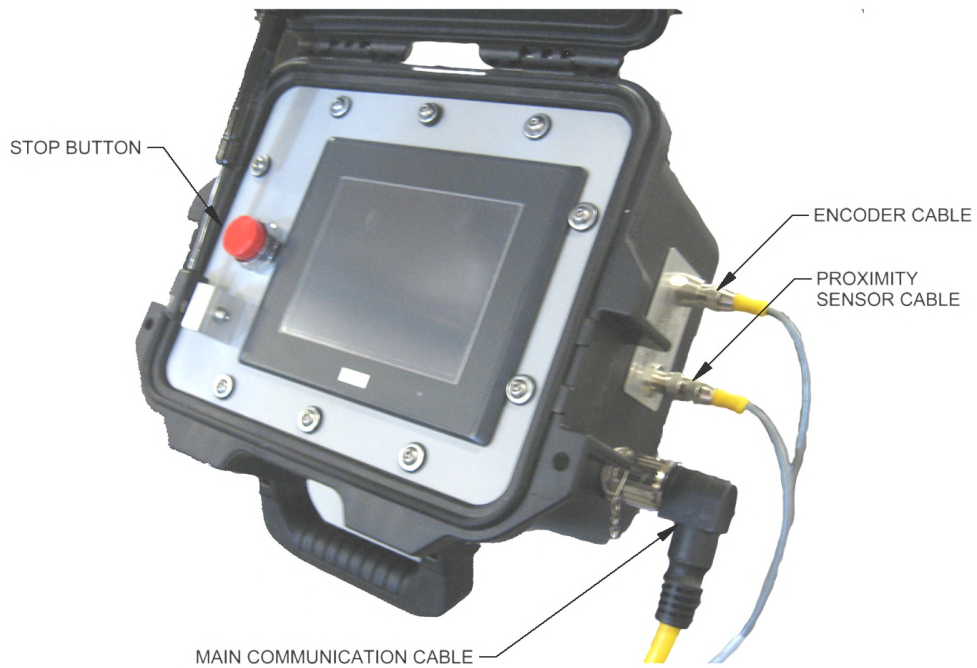
CHAPTER 13  
**HOOK ASSEMBLY (OPTIONAL)**



***Figure 20: Bead Roller Adjustment***

APPENDIX A  
**PLC CONTROLLER**

## PLC CONTROLLER



**Figure 21: PLC Assembly**



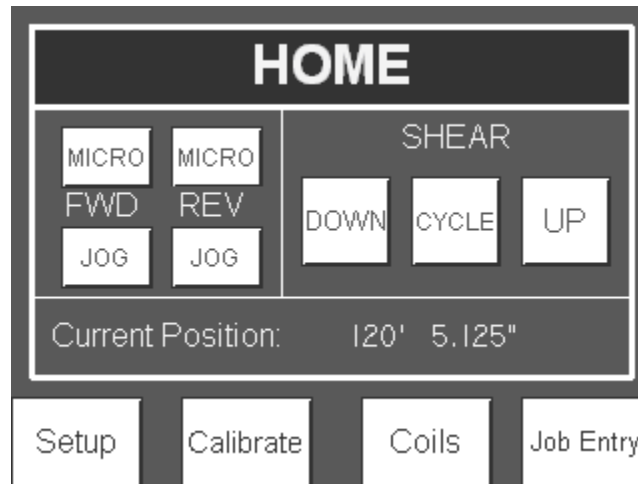
**Figure 22: Serial Number Plate**

## APPENDIX A

# PLC CONTROLLER

### **Home**

When the controller is turned on, it will automatically go to the home screen.



**Figure 23: Home Screen**

### **Manual Operation**

The machine can be manually operated from the home screen by pressing the Jog and Shear buttons.

#### **JOG:**

FWD and REV JOG buttons will jog the machine forward and reverse as long as the button is depressed. When the JOG buttons are released, the action will stop. The FWD and REV MICRO buttons will jog the material approximately  $\frac{1}{4}$ " each time the button is pressed.

#### **SHEAR:**

The shear UP and DOWN buttons are momentary and will act in a similar manner as the jog buttons. The SHEAR CYCLE button only needs to be pressed once and the shear will go to the bottom of the stroke and back up to the top. At any time during the shearing cycle, the UP button on the display or red stop button next to the screen can be pressed to return the shear to the top. **CAUTION:** The shear will stop **without** returning to the top if the E-Stop pushbutton on the manual control box below the PLC is pressed. This button shuts off all power to the machine and machine controls. Upon start-up, the shear will return to the top.

### **Automatic Operation**

The pre-run sequence must be completed in the correct order before automatic operation can be utilized.

## APPENDIX A

# PLC CONTROLLER

### Pre-Run Sequence:

1. Jog the material forward using the manual FWD JOG or MICRO buttons on the Home screen or the JOG switch at the entry end of the machine. The material must exit the shear and be detected by the panel detection sensor.
2. Shear the material using the Shear Cycle button. At that point, the machine will be fully loaded with material, the length counter will be reset and the controller will be ready to run in automatic mode.

If the machine goes forward or reverse and the encoder does not detect movement, the pre-run sequence will be reset and the controller will not run in automatic mode. This would happen if the material was cut at the entry end of the machine at the end of a job or at the end of a coil. This could also happen if the encoder did not have proper tension on the material.

### **Job Entry**

Jobs can be programmed to run automatically. From the Home screen, press the Job Entry button to enter the Job Entry Screen.

The screenshot shows a 'JOB ENTRY' screen with the following elements:

- Job Number:** A display showing '6' with 'Prev.' and 'Next' buttons on either side.
- Quantity:** A display showing '1 of 10'.
- Length (ft/in):** A display showing '150' with a decimal point and '6' and '8' buttons.
- Pause At End Of Job:** A display with 'No' and 'Yes' buttons.
- Bottom Navigation:** Four buttons labeled 'Home', 'Clear Job', 'Clear All', and 'Run Mode'.

**Figure 24: Job Entry Screen**

### **Programming Jobs**

The controller can store up to ninety nine jobs or lengths, called: Job Numbers. Press the Previous and the Next buttons to change the Job Number. The Job Number display is also an input in order to skip many jobs at a time. Press the Job Number display and enter the desired job number to program or run.

Enter in the quantity of parts to run and the length of the part.

Specify if the machine will pause at the end of job. If Yes is selected, the machine will stop after the job is done running. The user can then press Start to run the next job or return to the Job Entry. If No is selected, the machine will run the current job and automatically start running the next job. If yes is selected and there is no job

## APPENDIX A

# PLC CONTROLLER

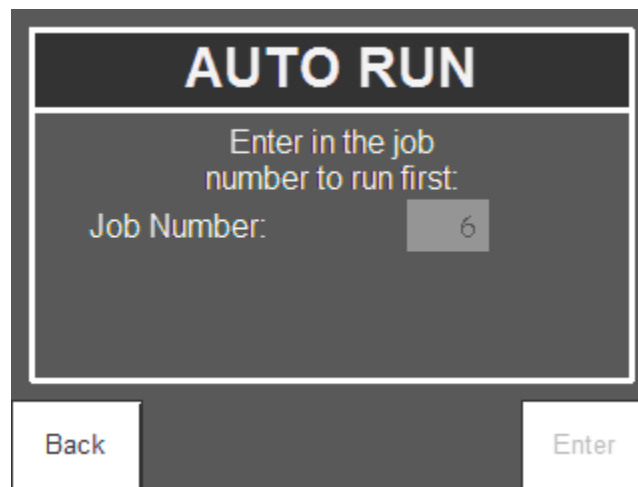
programmed after the current job, the controller will stop and return to the Job Entry screen.

### ***Clear Jobs***

To clear the current job on the screen press Clear Job. To clear all the jobs in the controller, press Clear All. The next screen will confirm the Clear All command, press Yes to clear all jobs.

### ***Auto Run***

Press the Run Mode button to run the jobs that are programmed. Type in the job number to run first (if different than the job that was just programmed).



**AUTO RUN**

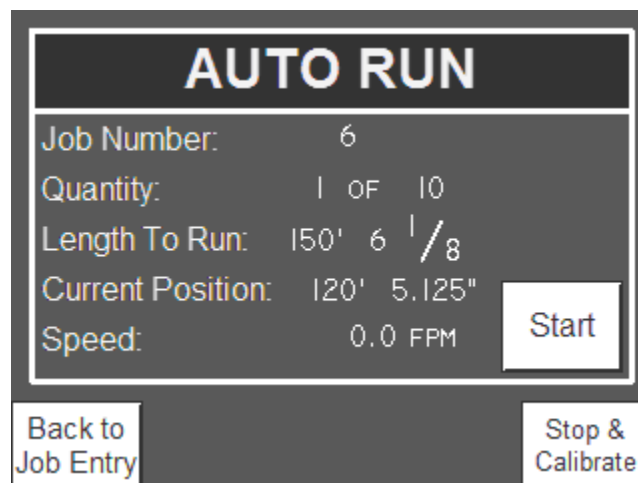
Enter in the job  
number to run first:

Job Number: 6

Back Enter

**Figure 25: Specify Job to Run First**

Then hit Enter to continue to the Auto-Run mode.



**AUTO RUN**

Job Number: 6

Quantity: 1 OF 10

Length To Run: 150' 6 <sup>1</sup>/<sub>8</sub>

Current Position: 120' 5.125"

Speed: 0.0 FPM

Start

Back to Job Entry Stop & Calibrate

**Figure 26: Auto-Run Screen**

## APPENDIX A

# PLC CONTROLLER

### ***Automatic Operation***

In the Auto Run screen, the current job and progress are displayed. Press the Start button to begin running the job. When the current job is complete the next job will start if the No button for pause was pressed for the current job. If the Yes button was pressed for pause or if there is no next job programmed, the controller will return to the Job Entry screen after the current job is completed.

### ***On the Fly Calibration***

The controller can be calibrated at any time while the machine is running to improve accuracy of the parts being run. If the machine is consistently making parts too short or too long, press Stop & Calibrate to bring up the Calibration screen.



The image shows a digital display for the 'CALIBRATION' screen. At the top, the word 'CALIBRATION' is in large, bold, white letters on a black background. Below this, the text 'Length of Last Part Produced:' is followed by the value '150' 6 1/8"'. Underneath, the text 'Enter Actual Measured Length:' is followed by a series of input fields containing '150'', '6', '3', and '16"', separated by a slash and a space. At the bottom of the screen, there are three buttons: 'Cancel', 'Help', and 'Enter'.

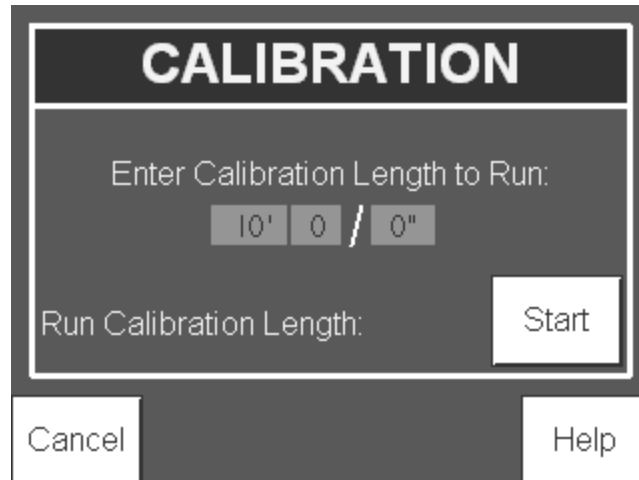
***Figure 27: Calibration Screen***

The length of the last part will automatically populate to the length that the controller 'thought' was run. Measure the length of the part, enter in the actual measured length and press Enter to re-calibrate the controller. Or press cancel to return to the Auto-Run screen. Press Start on the Auto-Run screen to continue operation.

### ***Calibration***

The controller can also be calibrated from the Home screen by pressing the Calibrate button. On the calibration screen, enter in the desired part length to use to calibrate the controller. A length of over 12" is required and a length of 36" or more is recommended. Press the Start button to run the specified part.

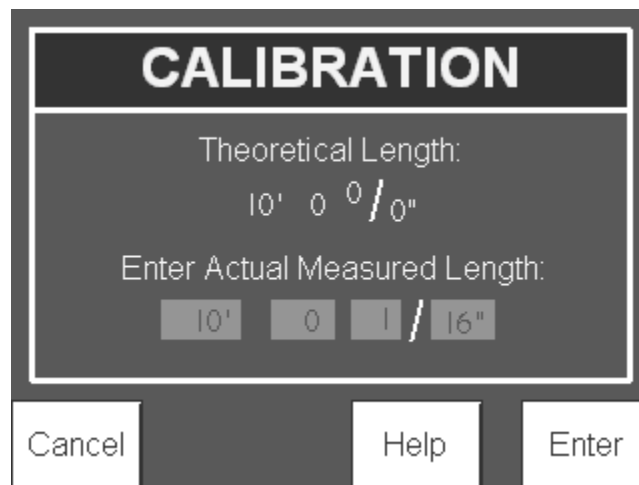
APPENDIX A  
**PLC CONTROLLER**



The screen displays the title "CALIBRATION" in a dark header. Below the header, the text "Enter Calibration Length to Run:" is followed by a numeric input field showing "10' 0 / 0\"/>

**Figure 28: Calibration Screen**

The controller will display the theoretical length of the part after it is produced. The theoretical length may be slightly different than the intended calibration length due. Measure the length of the part and input the length in the Actual Measured Length fields. Press Enter to re-calibrate the controller or Cancel to return to the Home screen without making any changes to the controller.



The screen displays the title "CALIBRATION" in a dark header. Below the header, the text "Theoretical Length:" is followed by a numeric input field showing "10' 0 0 / 0\"/>

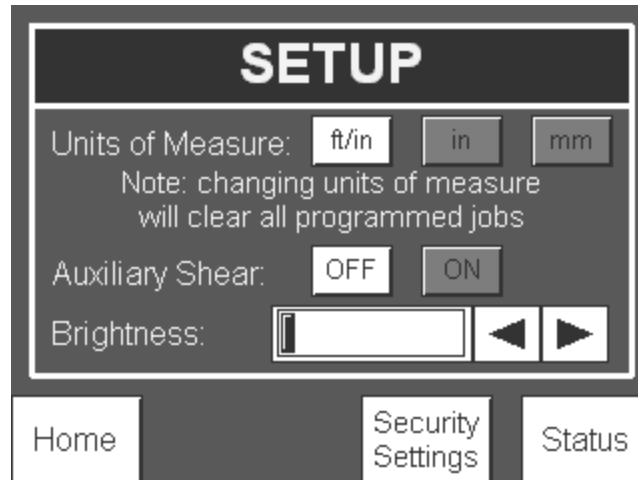
**Figure 29: Calibration Screen**

**Setup:**

From the Home screen, press the Setup button to make setting changes to the controller.

## APPENDIX A

# PLC CONTROLLER



**Figure 30: Setup Screen**

In the Setup screen, the Units of Measure can be changed to Imperial units in either feet and inches (ft/in) or only inches (in) or Metric units (mm).

Example:

ft/in: 10' 4 1/16"

in: 124 1/16"

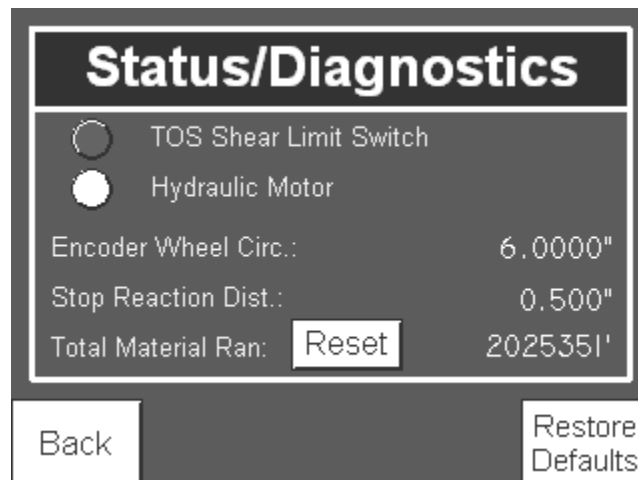
mm: 3,151mm

The shear operation can be turned on and off if an auxiliary shear such as the Swenson Snap Table will be utilized.

The brightness of the display can also be adjusted up or down by pressing the right and left arrow buttons.

### ***Status/Diagnostics:***

In order to help troubleshoot the machine, press the Status button found in on the setup screen to bring up the status of the machine as seen from the controller.



**Figure 31: Status Screen**



## APPENDIX A

# **PLC CONTROLLER**

The Status 1 screen shows the condition of the Hydraulic Pressure Switch and the Top of Stroke Limit Switch. If one or both of the TOS Shear Limit Switches are not activated the TOS Shear Limit Switch light will be on. Refer to the Shear section in the machine manual for limit switch adjustment.


If the motor is not on or if the pressure switch is not activated then the Hydraulic Motor light will be on.

The Status screen lists the Encoder Wheel Circumference. This value is changed automatically when the controller is calibrated. The Stop Reaction Distance is also automatically changed by the controller as the machine runs. In order to reset these values, press the Restore Defaults button. NOTE: Calibration should be initiated following the defaults restore. The Total Material Ran through the machine with the controller on is shown on this screen. The Total Material Ran can be reset by pressing the Reset button. If the security is turned on, the password will be required to reset the Total Material Ran.

Press Back to return to the Setup Screen.

### ***Security:***

From the Setup screen press the Security Settings button to enter the security screen. The default password is: 1234.



The screenshot shows a screen titled "SECURITY". Below the title, it says "Security Features:" followed by two buttons: "OFF" and "ON". The "ON" button is highlighted. Below this, there are two password fields. The first is labeled "Current Password:" and shows "1 2 3 4". The second is labeled "New Password:" and also shows "1 2 3 4". At the bottom of the screen, there are two buttons: "Enter" and "Help".

**Figure 32: Security Screen**

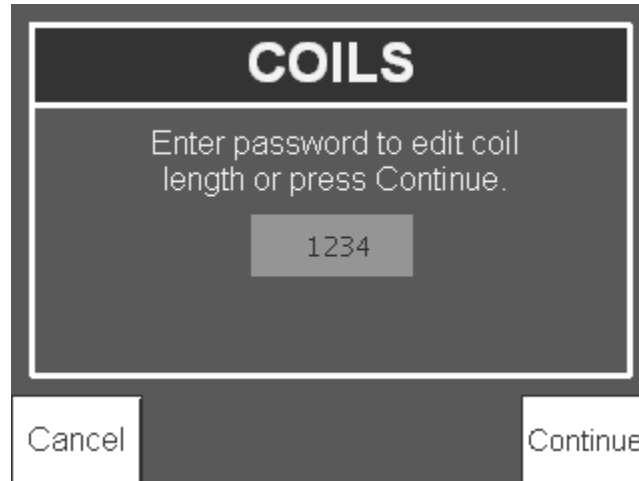
If the security is turned on, the password will be required to change the stored coil lengths and colors or to reset the Total Material Ran value (totalizer). If security is turned off, no password is needed to make changes to these values. With security turned off the Security screen displays the current password which can be changed by entering a new password and pressing the enter button. Once this is done, the new password will be needed to make any changes to the coil lengths and colors or to reset the Total Material Ran.

## APPENDIX A

# PLC CONTROLLER

### ***Coil Tracking:***

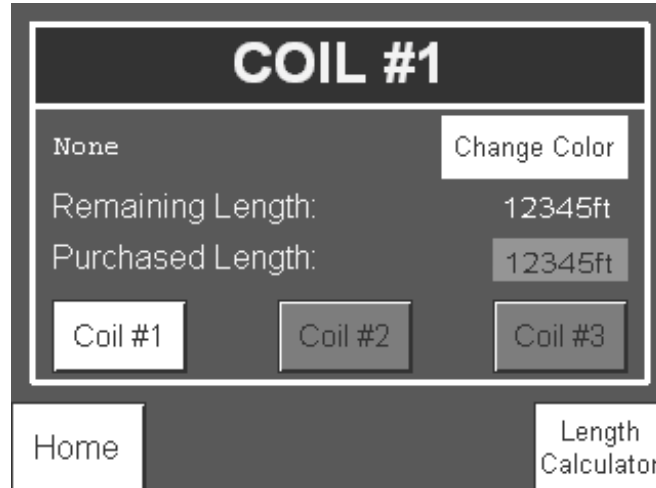
From the Home screen, press the Coils button to change the coil of material to track. If the security is turned on, a password must be entered if changes to the stored coils are necessary. If security is turned off, the controller will display the current coil screen and changes can be made without the password.



The screen displays the title "COILS" at the top. Below it, a message reads "Enter password to edit coil length or press Continue." A text input field contains the password "1234". At the bottom, there are two buttons: "Cancel" on the left and "Continue" on the right.

**Figure 33: Coils Password Access Screen**

Without the password, press Continue to view the Coils screen.



The screen displays the title "COIL #1" at the top. Below it, there are two buttons: "None" on the left and "Change Color" on the right. Below these, there are two labels: "Remaining Length:" and "Purchased Length:". To the right of "Remaining Length:" is the value "12345ft". To the right of "Purchased Length:" is a text input field containing "12345ft". Below these, there are three buttons: "Coil #1", "Coil #2", and "Coil #3". At the bottom, there are two buttons: "Home" on the left and "Length Calculator" on the right.

**Figure 34: Coils Screen**

The controller has the ability to track the length of three different coils of material. Press Coil #1, 2 or 3 to change the coil to be run through the machine. When a new coil is purchased, press the Purchased Length numerical display to input the length of the coil into the controller. The Remaining Length will reset to the new purchased length. As material is run through the machine, the controller will subtract material from the remaining length. The coil (#1, 2 or 3) that is displayed when the Home button is pressed will be the coil that the controller subtracts material from as the machine is run.

## APPENDIX A

# PLC CONTROLLER

### Example:

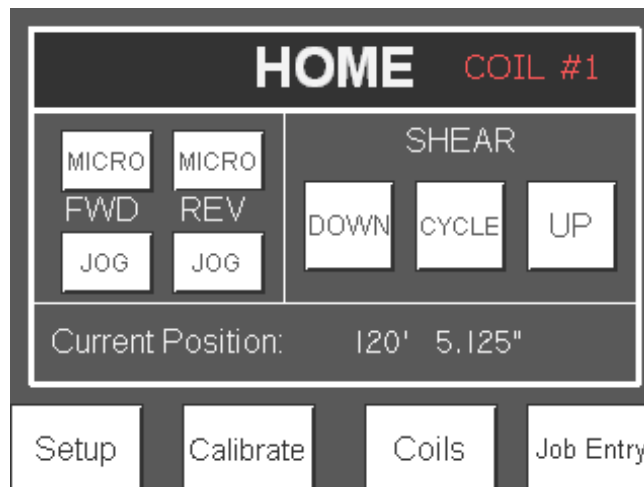
The controller is set to run a black coil designated as Coil #2 and the user changes to a white coil designated by Coil #1. From the Home screen, press the Coils button which will bring up the Coil #2 information. Press the Coil #1 button and then the Home button.

If the remaining length reads negative then the machine has tracked more material than the purchased length.

### Example:

If a purchased length of 100' is input into the controller then 115' of material is ran through the machine before the coil is gone, the controller will read a remaining length of -15'.

There is an indicator on the top right of the Home screen that indicates which coil is being tracked.



**Figure 35: Coil Indicator**

## Colors

Press the Change Color button to select the color of the coil. Press the Cancel button to avoid changing the color of the coil.

APPENDIX A  
**PLC CONTROLLER**



**Figure 36: Coils Color Screen**

***Coil Length Calculator***

The controller has a built in calculator to estimate the length of a coil based on the dimensions of the coil. From the Coils screen, press Length Calculator button.

**WEIGHT TO LENGTH CALCULATOR**

Material:

24 GAUGE STEEL

ID of Coil:

20"

Width of Coil:

18"

Thickness of Coil:

2.625"

Estimated Length:

676 FT

Done

The calculated values are estimates and as such New Tech Machinery can assume no liability with the use of this calculator.

**Figure 37: Length Calculator Screen**

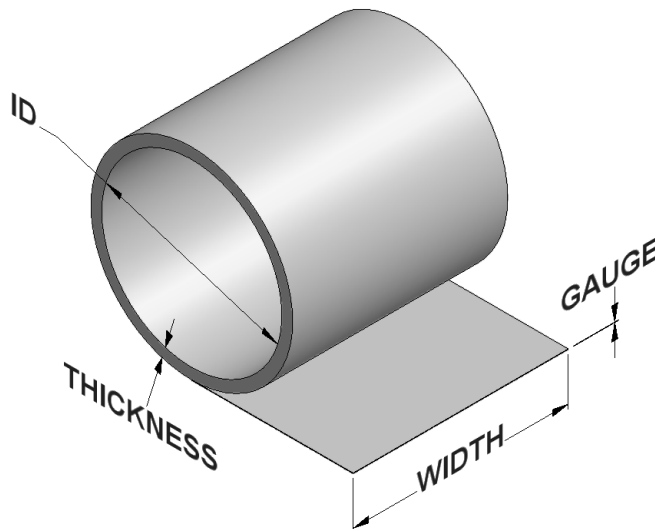
Press the Select Material button to select the thickness and type of material.

APPENDIX A  
**PLC CONTROLLER**

<b>MATERIAL THICKNESS</b>		
Aluminum:	Steel:	Copper:
0.027"	22 Gauge	16 Gauge
0.032"	24 Gauge	20 Gauge
0.040"	26 Gauge	
0.050"	28 Gauge	
	30 Gauge	

**Figure 38: Material and Thickness Screen**

Then enter in the Inside Diameter of the Coil, Width of the coil and thickness of the coil. The thickness of the coil is the difference between the Inside Diameter (ID) and the Outside Diameter (OD). When all the fields are populated, the calculator estimates the length of the coil. Press the Done button to return to the Coils screen.

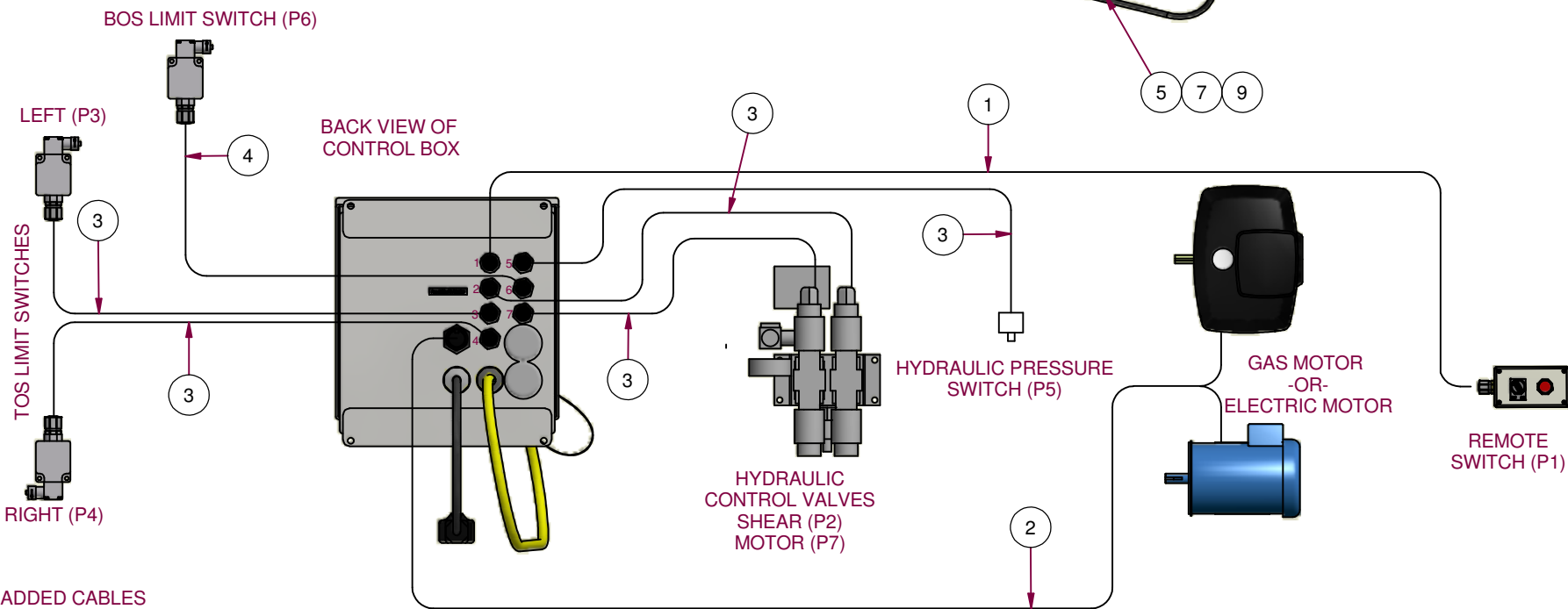
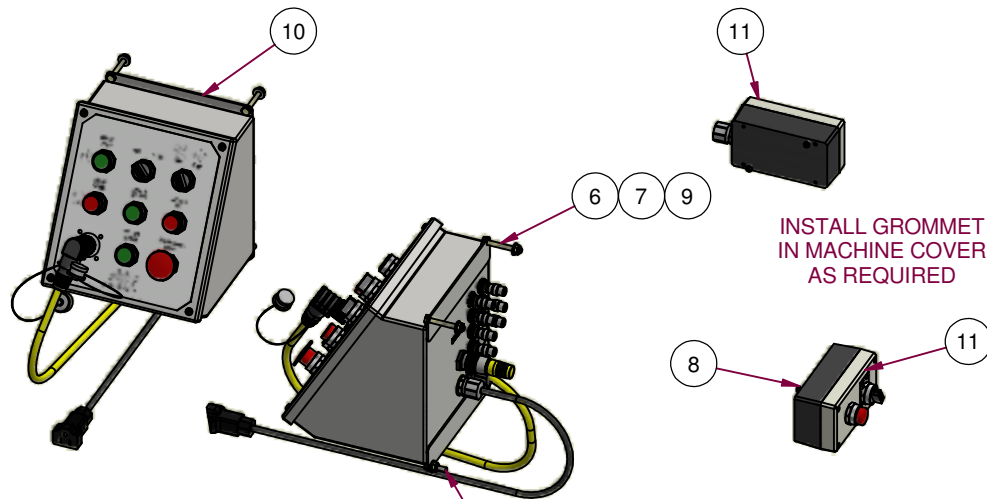


**Figure 39: Coil Dimensions**

# ELECTRICAL SCHEMATICS

<u>Drawing Number</u>	<u>Sheet Number</u>	<u>Description</u>
PLC-380-000	1	Electrical Assembly – Parts List
PLC-380-000	2	Electrical Assembly – Wiring Details
PLC-381-000	1	Control Box Assembly – Parts List
PLC-381-000	2	Control Box Assembly – Outside & Inside Views
PLC-381-000	3	Control Box Assembly – Wiring Schematic
PLC-381-000	4	Control Box Assembly – Ladder Logic 1
PLC-381-000	5	Control Box Assembly – Ladder Logic

Parts List			
ITEM	QTY	PART NUMBER	TITLE
1	1	ELC-100-015	CABLE, 5 PIN, MALE X 6M
2	1	ELC-400-101	CABLE, 6 PIN, MALE/FEMALE X 4M
3	5	ELC-400-105	CABLE, 4 PIN, MALE X 2M
4	1	ELC-400-106	CABLE, 3 PIN, MALE X 2M
5	1	FAS-HC5-118	HEX HEAD CAP SCREW, 1/4-20 x 1" LG.
6	2	FAS-HC5-278	HEX HEAD CAP SCREW, 1/4-20 x 2" LG.
7	3	FAS-NUY-188	NYLOC HEX NUT, #1/4-20
8	2	FAS-SRM-207	SCREW, PAN HEAD, 8 x 1/2", PHIL, SELF-TAPPING
9	3	FAS-WSF-260	WASHER, FLAT, 1/4" SAE
10	1	PLC-381-000	CONTROL BOX ASSEMBLY
11	1	PLC-382-000	REMOTE PUSH BUTTON BOX



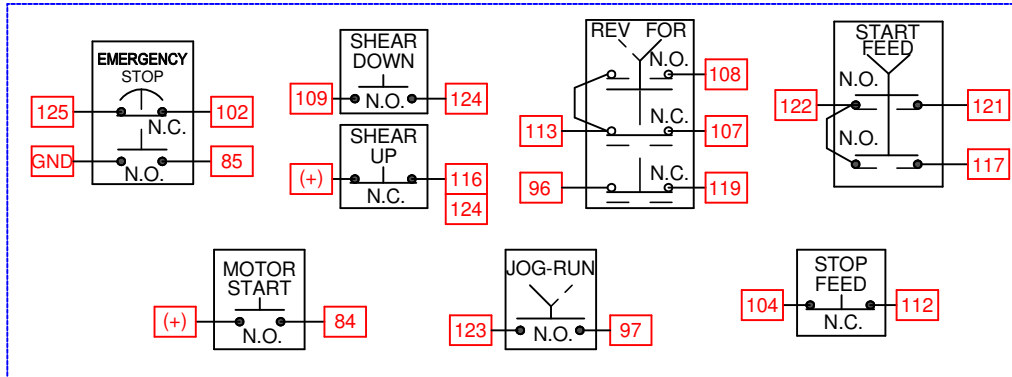
1 ADDED CABLES

NOTE: UNLESS OTHERWISE SPECIFIED.  
1. R=.015

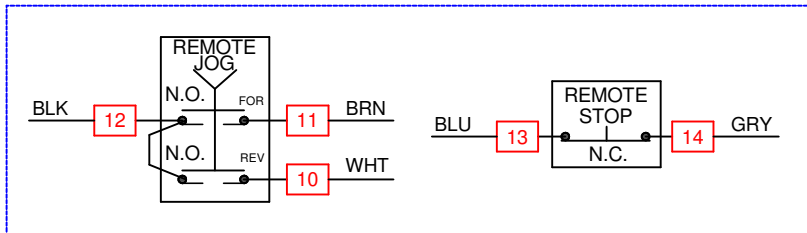
MATERIAL		LENGTH		FINISH	
SEE BOM		-		NONE	
REVISION HISTORY	REV	ECR NO.	DATE	RELEASED BY	TOLERANCES
	0	R-1757	10/25/2011	AJB	.XX = ± .01
	1	R-2114	01/22/2015	BT	.XXX = ± .005
					FRACTION = ± 1/32"
					ANGLE = ± 1/2°

NEW TECH MACHINERY CORP.			
DRAWN BY BT		PART NAME ELECTRICAL ASSEMBLY	
DATE 01-27-2011		PART NUMBER PLC-380-000	
CHECK BY AJB		SHEET 1 OF 2	
DATE 10/25/2011		REVISION 1	

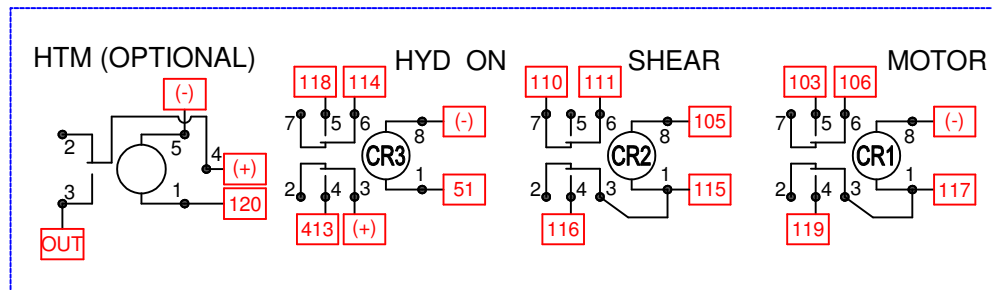
## MAIN CONTROL BOX



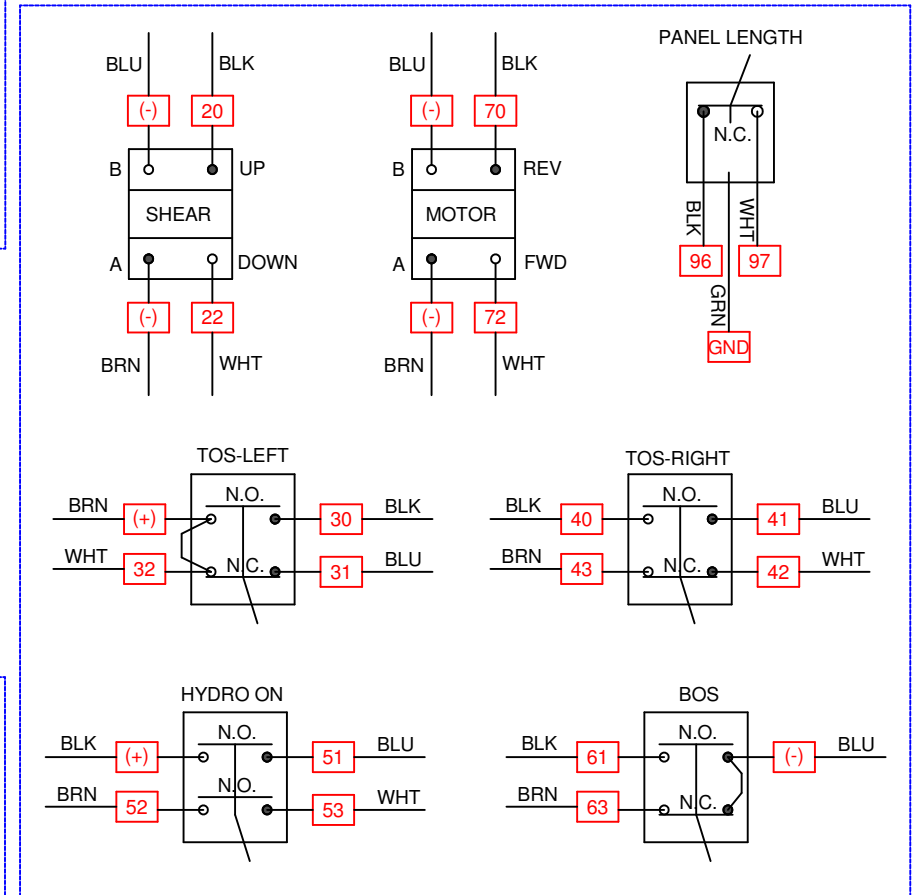
## ENTRY END/REMOTE CONTROL



## CONTROL RELAYS



## COMPONENTS



NOTE: UNLESS OTHERWISE SPECIFIED.  
1. R=.015

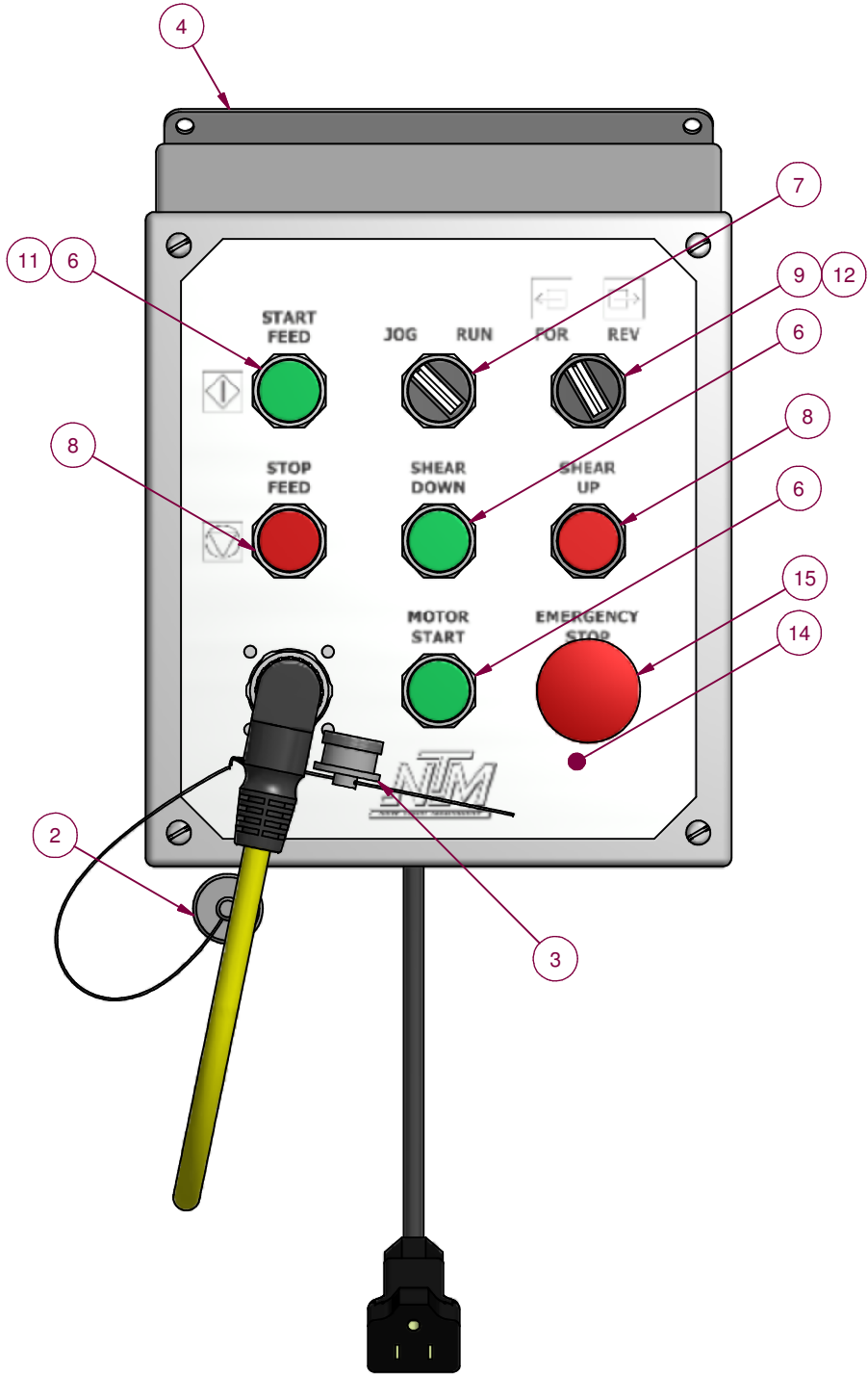
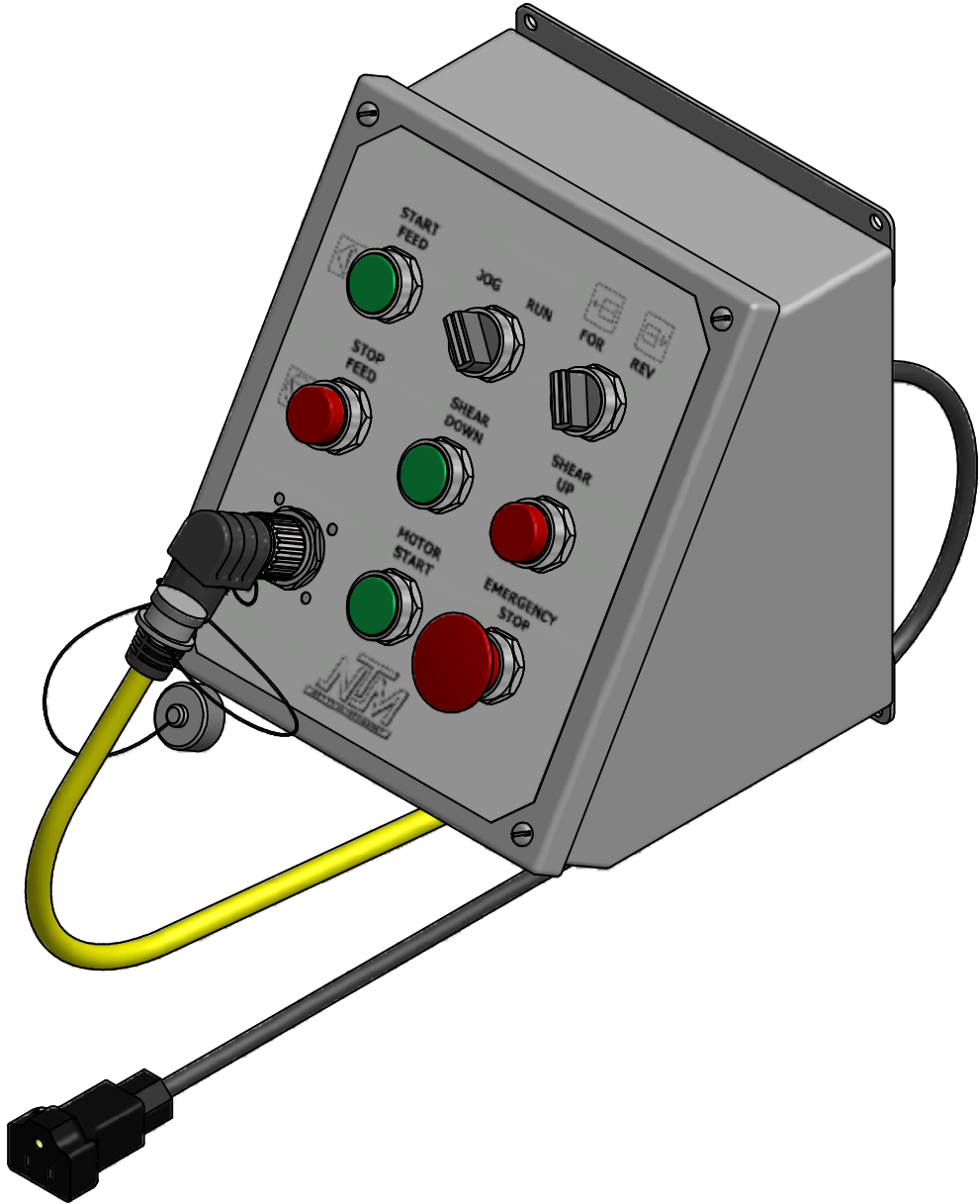
MATERIAL				LENGTH		FINISH		NEW TECH MACHINERY CORP.			
SEE BOM											
REVISION HISTORY	REV	ECR NO.	DATE	RELEASED BY	TOLERANCES		DRAWN BY	PART NAME			
					.XX = ± .01		DATE	ELECTRICAL ASSEMBLY			
					.XXX = ± .005						
					FRACTION = ± 1/32"		CHECK BY	PART NUMBER		SHEET	REVISION
					ANGLE = ± 1/2'		DATE	PLC-380-000		2 OF 2	1



PARTS LIST			
ITEM	QTY	PART NUMBER	TITLE
1	1	DCL-100-017	DECAL, ASSEMBLED IN MEXICO
2	1	ELC-100-017	FEMALE CLOSURE CAP
3	1	ELC-100-018	MALE CLOSURE CAP
4	1	ELC-100-021	ENCLOSURE
5	1	ELC-110-000	TERMINAL BLOCK/RELAY ASSEMBLY
6	3	ELC-300-103	PUSH BUTTON, GREEN
7	1	ELC-300-104	SELECTOR SWITCH, W/1 N.O.
8	2	ELC-300-107	PUSH BUTTON, RAISED RED
9	1	ELC-300-109	SELECTOR SWITCH, 2 POS,1 N.O. 1 N.C.
10	2	ELC-300-114	1" MOUNTING BASE (NOT SHOWN)
11	1	ELC-400-017	IDEC #HW-C10 N/O CONTACT BLOCK
12	1	ELC-400-018	IDEC #HW-C01 N/C CONTACT BLOCK
13	2	ELC-400-045	HOLE SEAL, 1/2" KO
14	1	ELC-400-046	LEXAN OVERLAY, PANEL
15	1	ELC-400-061	BUTTON, MUSHROOM, PUSH/PULL
16	1	ELC-425-020	STRAIN RELIEF, 1/2" NPT
17	1	ELC-450-006	STRAIN RELIEF, 1/2" NPT .10-.30"
18	4	FAS-NUY-186	NYLOC HEX NUT, #10-32
19	1	FAS-SRM-201	PHILLIPS PAN HEAD SCREW, 10-32 x 3/8"
20	4	FAS-WSF-344	WASHER, FLAT, #10 SAE
21	1	PLC-390-000	PUSH BUTTON BOX WIRE KIT (NOT SHOWN)

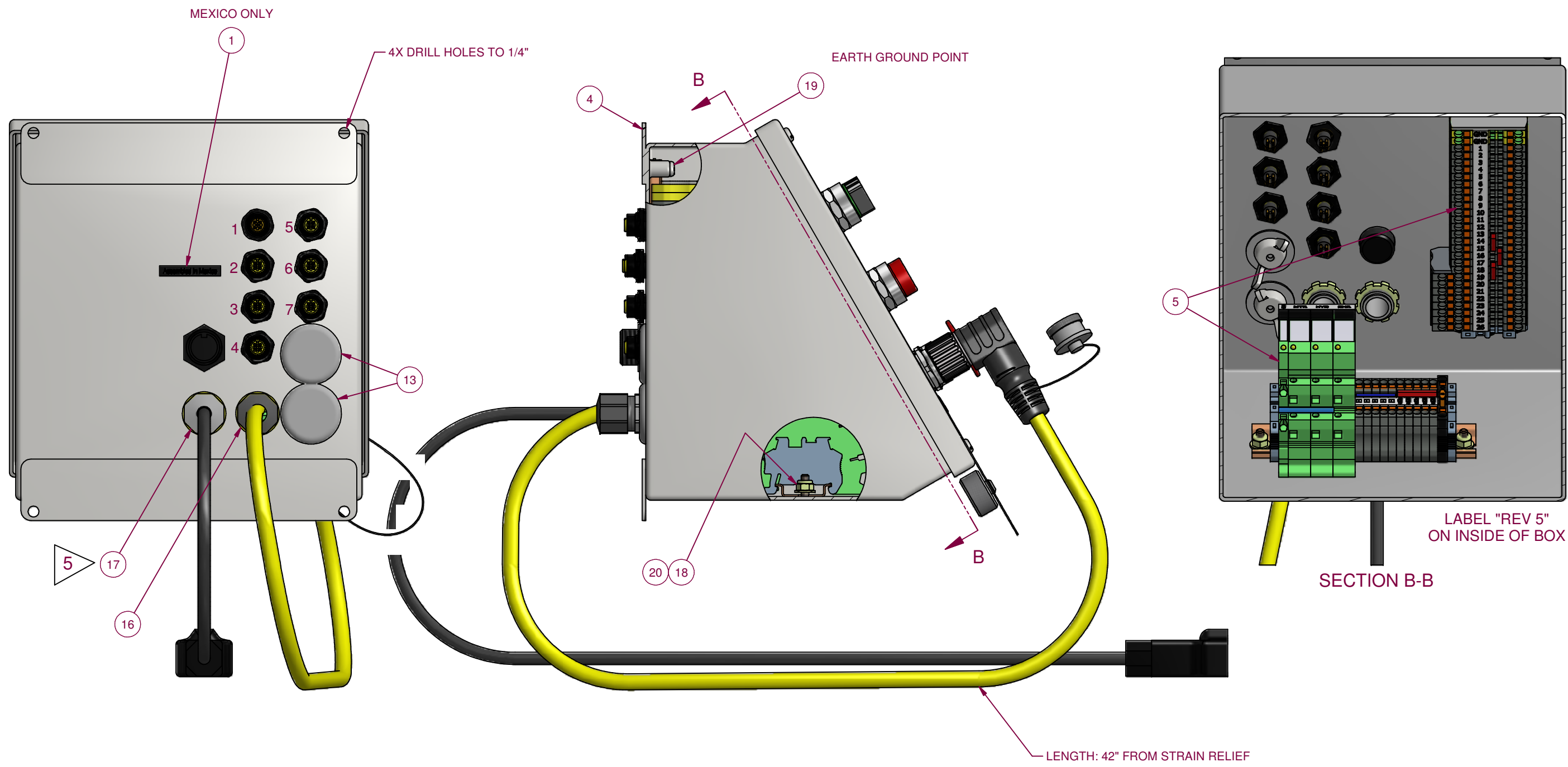
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REPLACED  
(1) ELC-425-020 WITH (1) ELC-450-006

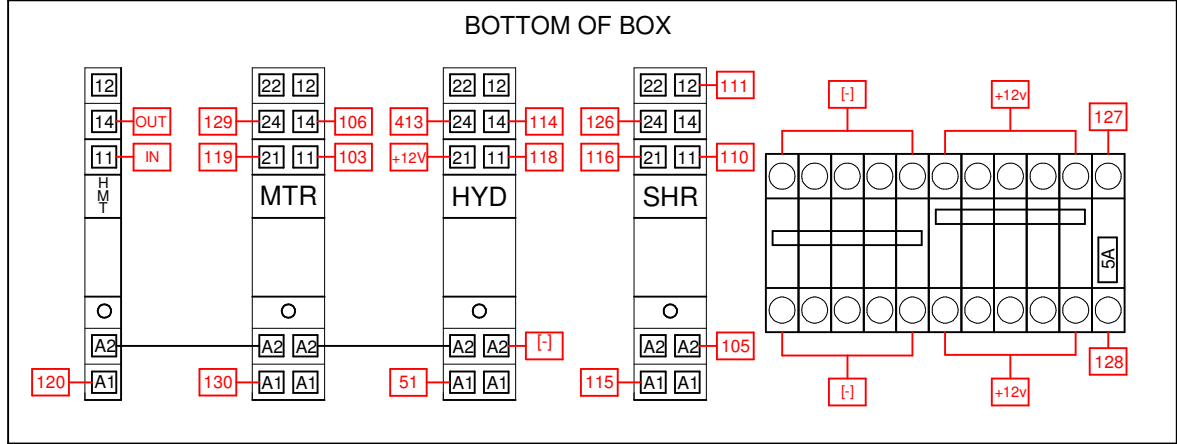


MATERIAL		SEE BOM		LENGTH	N/A	FINISH	NONE
REVISION HISTORY	REV	ECR NO.	DATE	RELEASED BY		TOLERANCES	
	0	R-1757	UNK	UNK		.XX = ± .01	
	1	R-1800	10/20/2011	AJB		.XXX = ± .005	
	2-3	R-1781	3/28/2013	BT		FRACTION = ± 1/32"	
	4	R-1915	08/22/2013	BT		ANGLE = ± 1/2°	
	5	R-1909	09/26/2014	BT			

		<b>NEW TECH MACHINERY CORP.</b>		
DRAWN BY BT	PART NAME			
DATE 01-26-2011	CONTROL BOX ASSEMBLY			
CHECK BY AJB	PART NUMBER	SHEET	REVISION	
DATE 10/20/2011	PLC-381-000	1 OF 6	5	



MATERIAL					LENGTH	FINISH	 <b>NEW TECH MACHINERY CORP.</b>			
REVISION HISTORY	SEE BOM						CONTROL BOX ASSEMBLY			
	REV	ECR NO.	DATE	RELEASED BY	TOLERANCES		DRAWN BY	PART NAME		
					.XX = ± .01		DATE			
					.XXX = ± .005		CHECK BY	PART NUMBER	SHEET	REVISION
					FRACTION = ± 1/32"		DATE	PLC-381-000	2 OF 6	5
					ANGLE = ± 1/2'					

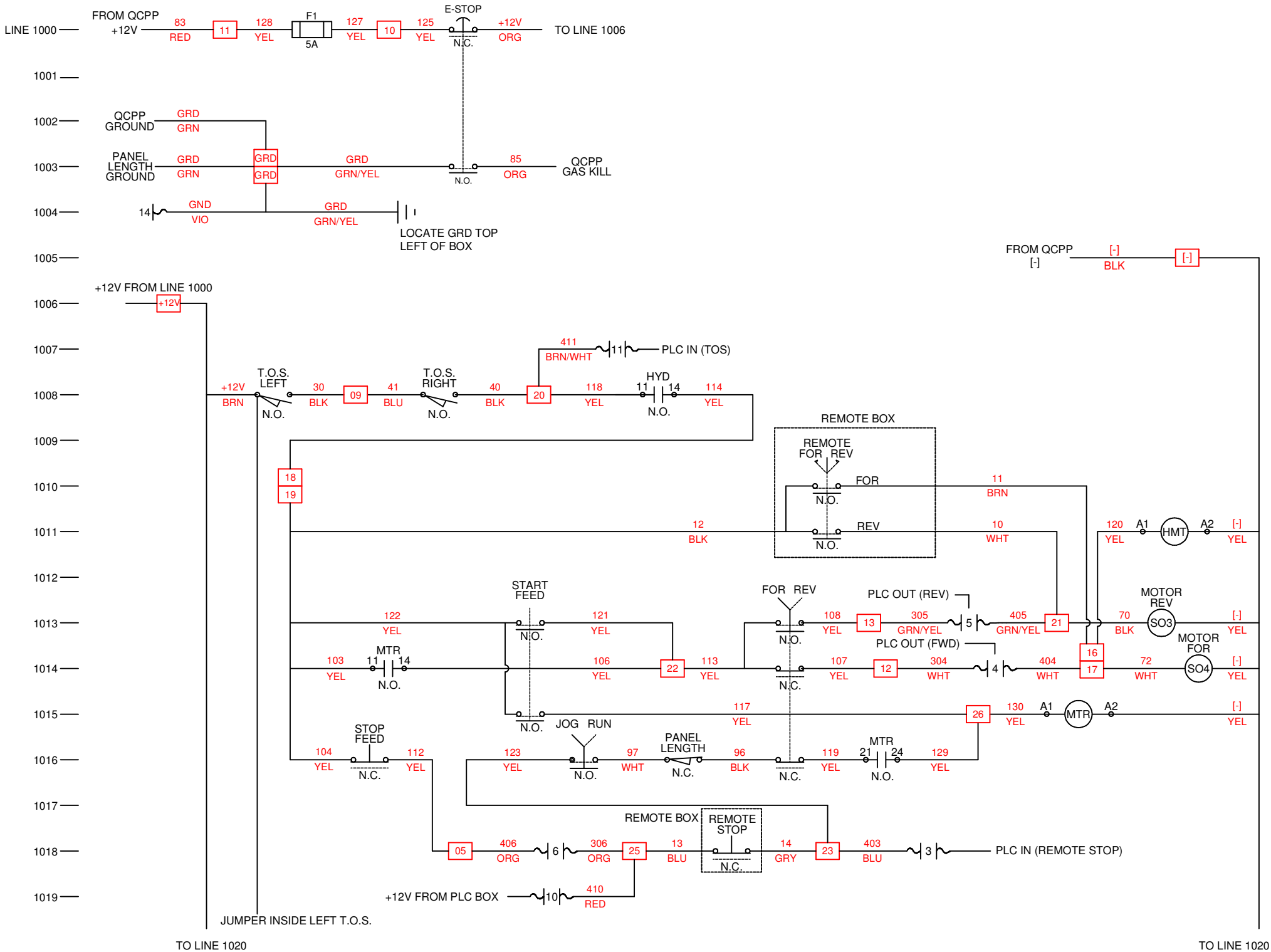


MATERIAL		LENGTH		FINISH	
SEE BOM					
REVISION HISTORY	REV	ECR NO.	DATE	RELEASED BY	TOLERANCES
					.XX = ± .01
					.XXX = ± .005
					FRACTION = ± 1/32"
					ANGLE = ± 1/2°

**NEW TECH MACHINERY  
CORP.**

DRAWN BY	PART NAME		
DATE	CONTROL BOX ASSEMBLY		
CHECK BY	PART NUMBER	SHEET	REVISION
DATE	PLC-381-000	3 OF 6	5

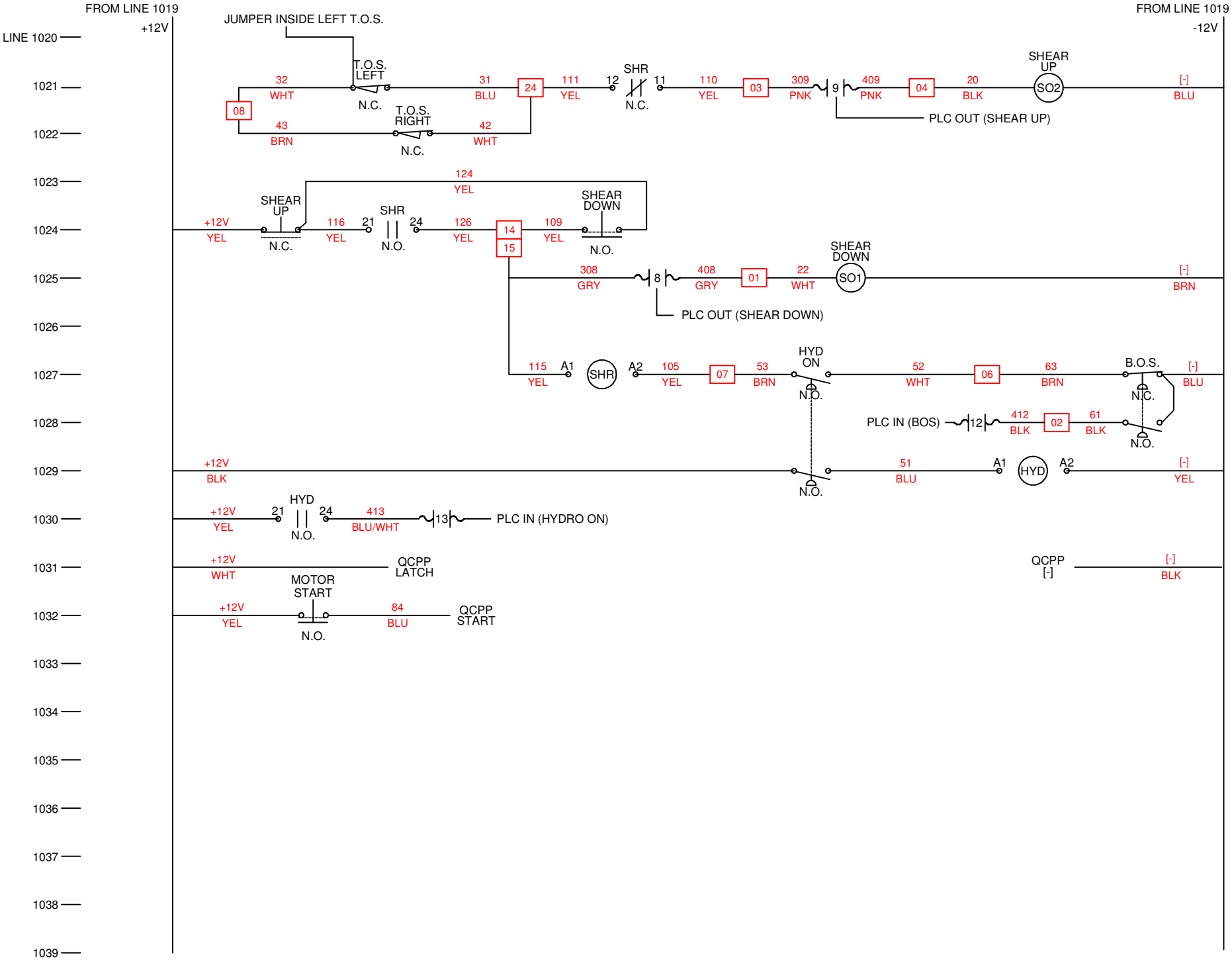
LEGEND	
	TERMINAL BLOCK
	PIN NUMBER
	FUSE
	CONTACT (N.O.)
	CONTACT (N.C.)
	MUSHROOM HEAD PUSH BUTTON (N.O.)
	MUSHROOM HEAD PUSH BUTTON (N.C.)
	PUSH BUTTON (N.O.)
	PUSH BUTTON (N.C.)
	LIMIT SWITCH (N.O.)
	LIMIT SWITCH (N.C.)
	PRESSURE SWITCH (N.O.)
	PRESSURE SWITCH (N.C.)
	CONTROL RELAY COIL
	SOLENOID RELAY COIL
	SELECTOR SWITCH
	SPRING RETURN SELECTOR SWITCH
	MOMENTARY SWITCH
	ROTARY ENCODER



MATERIAL			LENGTH	FINISH	
SEE BOM					
REVISION HISTORY	REV	ECR NO.	DATE	RELEASED BY	TOLERANCES
					.XX = ± .01
					.XXX = ± .005
					FRACTION = ± 1/32"
					ANGLE = ± 1/2'

		NEW TECH MACHINERY CORP.	
DRAWN BY	PART NAME	CONTROL BOX ASSEMBLY	
DATE			
CHECK BY	PART NUMBER	PLC-381-000	
DATE			
SHEET		4 OF 6	REVISION
			5

LEGEND	
	TERMINAL BLOCK
	PIN NUMBER
	FUSE
	CONTACT (N.O.)
	CONTACT (N.C.)
	MUSHROOMM HEAD PUSH BUTTON (N.O.)
	MUSHROOMM HEAD PUSH BUTTON (N.C.)
	PUSH BUTTON (N.O.)
	PUSH BUTTON (N.C.)
	LIMIT SWITCH (N.O.)
	LIMIT SWITCH (N.C.)
	PRESSURE SWITCH (N.O.)
	PRESSURE SWITCH (N.C.)
	CONTROL RELAY COIL
	SOLENOID RELAY COIL
	SELECTOR SWITCH
	SPRING RETURN SELECTOR SWITCH
	MOMENTARY SWITCH
	ROTARY ENCODER



MATERIAL			LENGTH		FINISH	
SEE BOM						
REVISION HISTORY	REV	ECR NO.	DATE	RELEASED BY		TOLERANCES
						.XX = ± .01
						.XXX = ± .005
						FRACTION = ± 1/32"
						ANGLE = ± 1/2'

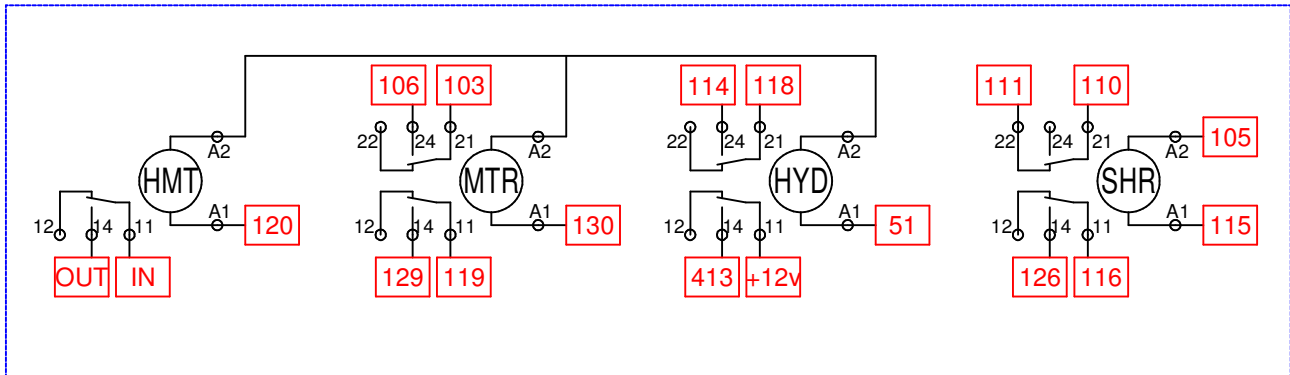


**NEW TECH MACHINERY  
CORP.**

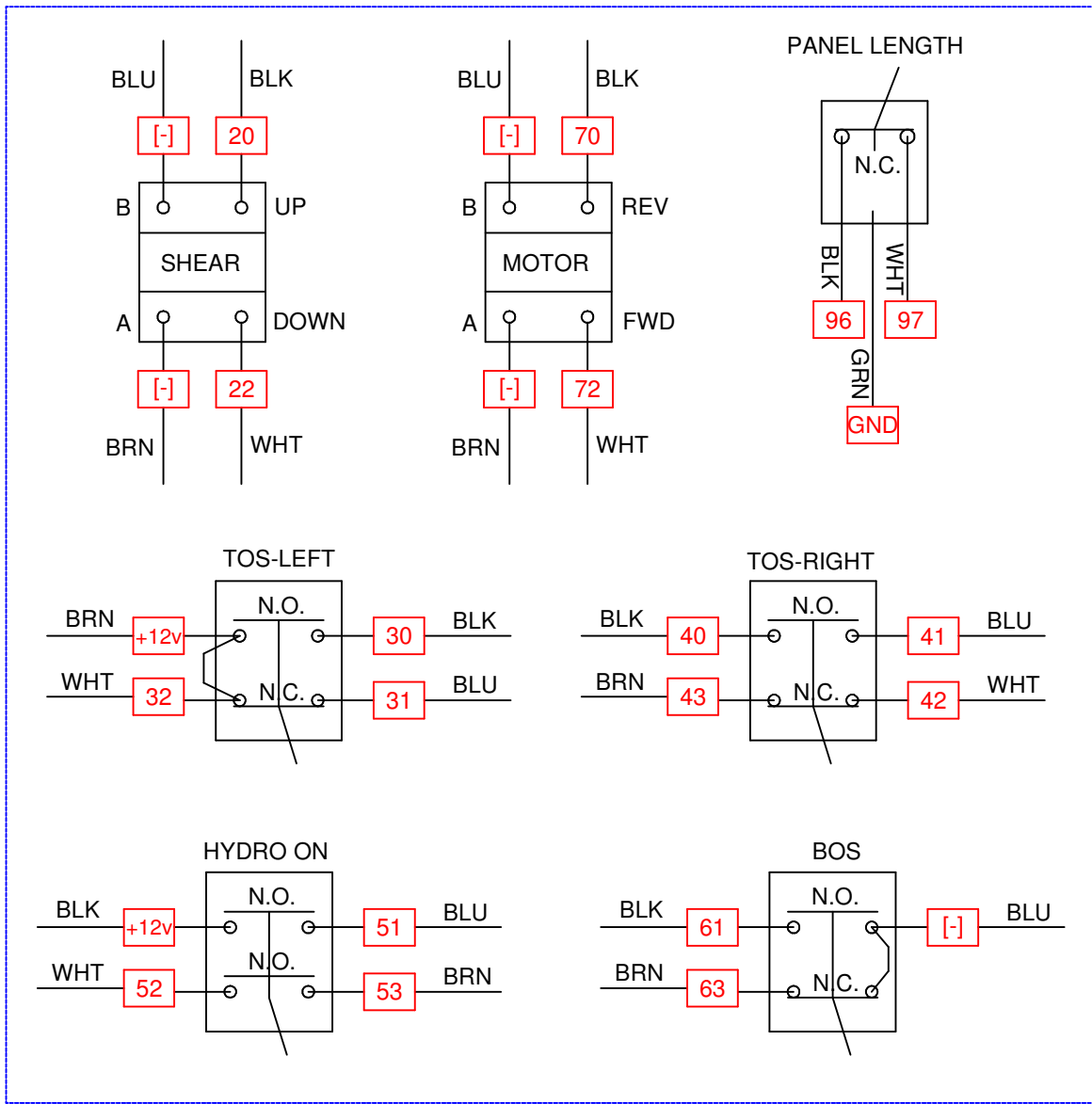
DRAWN BY	PART NAME	CONTROL BOX ASSEMBLY	
DATE			
CHECK BY	PART NUMBER	PLC-381-000	SHEET
DATE			5 OF 6
			REVISION
			5



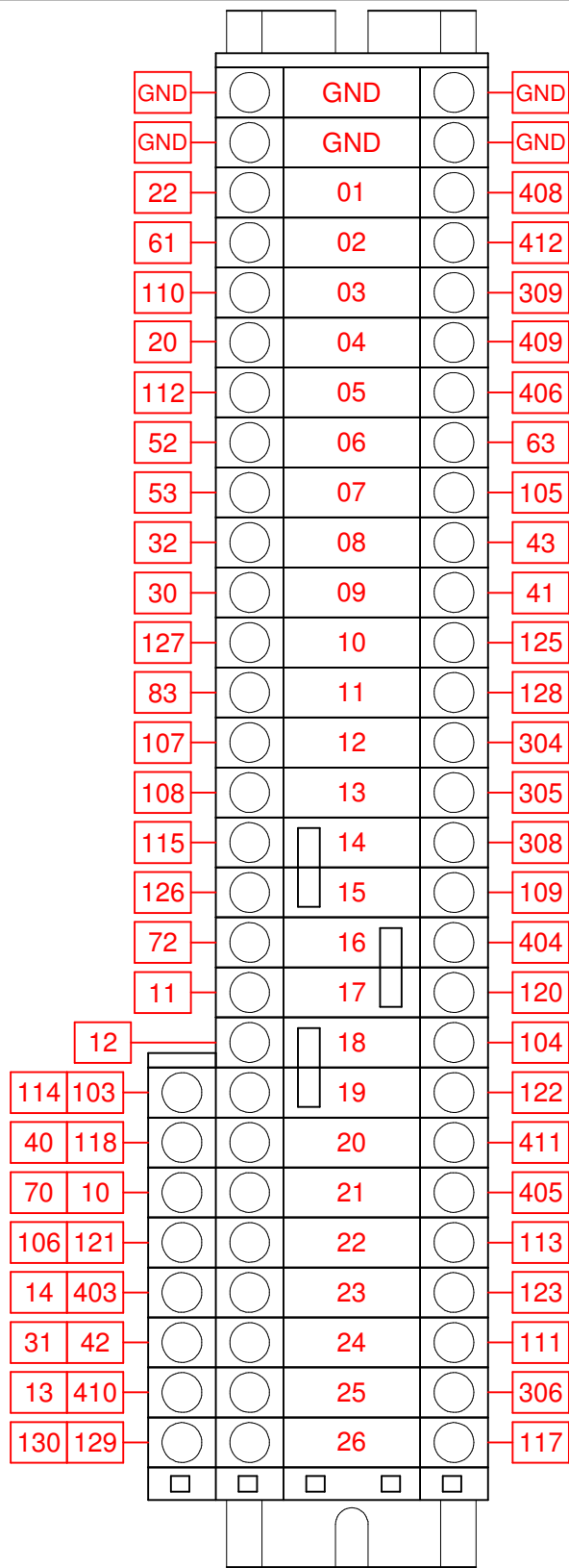
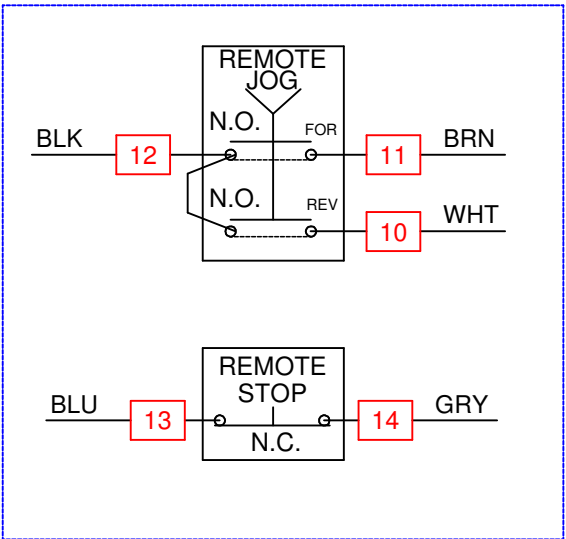
CONTROL RELAYS



COMPONENTS



ENTRY END/REMOTE CONTROL



REVISION HISTORY	MATERIAL	SEE BOM	LENGTH	FINISH	TOLERANCES .XX = ± .01 .XXX = ± .005 FRACTION = ± 1/32" ANGLE = ± 1/2'
	REV	ECR NO.	DATE	RELEASED BY	

**NEW TECH MACHINERY  
CORP.**

DRAWN BY	PART NAME
DATE	<b>CONTROL BOX ASSEMBLY</b>
CHECK BY	PART NUMBER
DATE	<b>PLC-381-000</b>

SHEET	REVISION
<b>6 OF 6</b>	<b>5</b>





**New Tech Machinery**  
A MAZZELLA COMPANY

16265 E. 33rd Dr. Ste 40 | Aurora, CO 80011

303-294-0538 | 800-574-1717 | Fax: 303-294-9407

[www.NewTechMachinery.com](http://www.NewTechMachinery.com)

BG7-MAN-PLC | Revision 4 | 08-03-2023