



New Tech Machinery

# OPERATION and MAINTENANCE MANUAL



U.S Patent NO. 5,394,722

# BG7™

## 7" Commercial Box Gutter Machine

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

## **TABLE OF CONTENTS**

CHAPTER 1.....	SPECIFICATIONS .....	1
CHAPTER 2.....	PRECAUTIONS .....	2
CHAPTER 3.....	GENERAL MAINTENANCE.....	3
	Recommended Lubricants and Fluids.....	4
CHAPTER 4.....	ELECTRICAL CONTROLS AND OPERATION .....	5
CHAPTER 5.....	REEL STANDS, REELS AND EXPANDABLE ARBORS.....	11
CHAPTER 6.....	HYDRAULIC SYSTEMS .....	16
	Maintenance .....	16
	Hydraulic Fluid Troubleshooting.....	16
CHAPTER 7.....	DRIVE SYSTEM.....	19
CHAPTER 8.....	SHEAR ASSEMBLY.....	20
CHAPTER 9.....	ENTRY GUIDE AND DRUM ASSEMBLY .....	23
CHAPTER 10.....	RUN OUT TABLES .....	24
CHAPTER 11.....	POST-FACE KNIFE ROLLER .....	25
CHAPTER 12.....	TROUBLESHOOTING .....	26
APPENDIX A.....	COMPUTER BATCH AND LENGTH CONTROLLER.....	1
	Introduction.....	2
	Manual Operations.....	3
	Production Procedures .....	3
	Administrative Screens and Functions.....	6
	Troubleshooting .....	7
APPENDIX B.....	ELECTRICAL SCHEMATICS .....	1

## **LIST OF FIGURES**

Figure 1: Controls .....	8
Figure 2: Main Control Cable .....	9
Figure 3: Main Control Box Fuse .....	10
Figure 4: QCPP E 1-6 Fuse Location .....	10
Figure 5: Expandable Arbor Set-Up .....	12
Figure 6: Expandable Reel Assembly .....	14
Figure 7: Hydraulic System – Overview .....	17
Figure 8: Hydraulic System – Details .....	18
Figure 9: Hydraulic Fluid Level .....	18
Figure 10: Tightening the Chain .....	19
Figure 11: Shear Height Adjustment .....	20
Figure 12: Shear Left-Right Adjustment and Removal .....	21
Figure 13: Entry Guide Adjustment .....	23
Figure 14: Entry Drum Adjustment .....	23
Figure 15: Run Out Table .....	24
Figure 16: Post Face Knife Roller Adjustment .....	25
Figure 17: Pressure Switch Adjustment .....	26
Figure 18: Limit Switch Adjustment .....	28
<a href="#"><u>Appendices</u></a>	
Figure 19: AMS Box Without Cables .....	1
Figure 20: AMS Box With Cables .....	2
Figure 21: AMS Controls MP465 Controller .....	2

CHAPTER 1  
**BG7 SPECIFICATIONS**

## **SPECIFICATIONS**

<b>BG7 Dimensions:</b>	Length-14' 6"	(4.4m)
	Width-4'	(1.7m)
	Height-4' 3"	(1.3m) w/Over Head Rack
	2' 8"	(.8m) w/o Over Head Rack
	Weight-1800 lbs.	(820kg)
<b>SSQ on Trailer:</b>	Length-21'	(7.7m)
	Width-7'	(2.1m)
	Height-6' 3"	(1.9m) with reel
	Weight-4560 lbs.	(2069kg)
<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 24" (600mm) Back Flange	
<b>Materials Formed:</b>	Painted Steel	26ga. to 22ga. (.4mm to .8mm) Painted, Galvanized, Aluminized
	Painted Aluminum	.032" to .050" (.8mm to 1.3mm)
	Copper	20 oz. to 24 oz. ¾ Hard (.7mm to .8mm)
<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***

**Spray Lube for:**

Shear Blades, Dies, and Entry Guide

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

Catalog No. 11016

**11 oz. Aerosol Can**

**Available from:**

**MSC Supply at 1-800-645-7270**

**Clear Grease for:**

Arbor Cradles

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

Catalog No. 71160

**400 gram container**

**Available from:**

**MSC Supply at 1-800-645-7270**

**EP Grease for:**

Arbor Nuts and Pillow Blocks

Grease - Lubricants Type: Moly Ep Grease

Catalog No. 11335

**14 Ounce Container**

**Available from:**

**MSC Supply at 1-800-645-7270**

**Open Gear Spray Lubricant for:**

Main Drive Gears

Open Gear and Wire Rope Lubricant

Catalog No. 00257659

**11 oz. Aerosol Can**

**Available from:**

**MSC Supply at 1-800-645-7270**

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

Hydraulic Tank

Various Manufacturers

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)

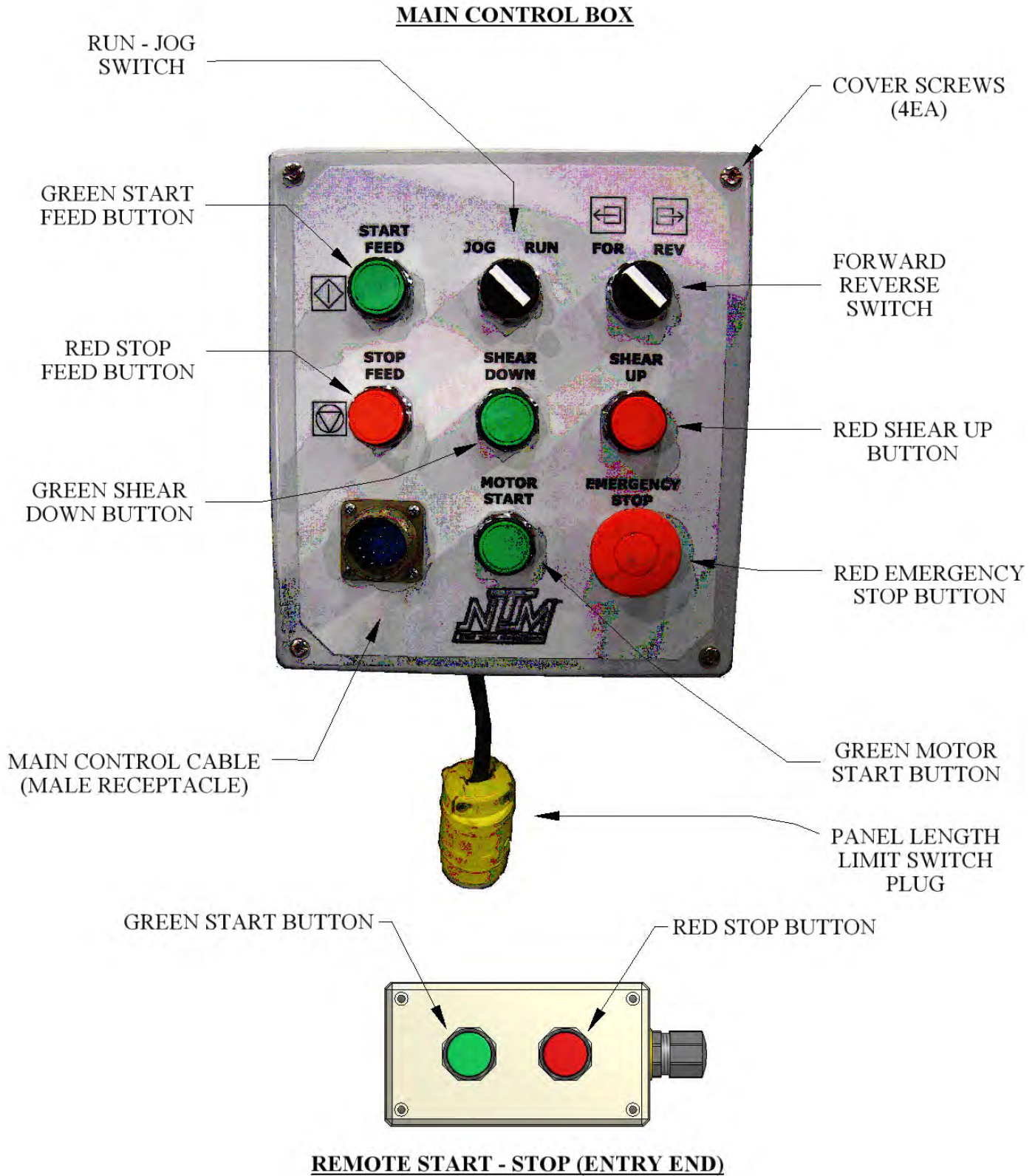
All machines, gas or electric powered, have a 10-amp time delay fuse inside the Electrical Control Panel Assembly. This fuse protects the electrical components. If the fuse is blown, you will lose all functions of the machine except Motor Start. **To replace this fuse:** Loosen all 4 cover screws and 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**



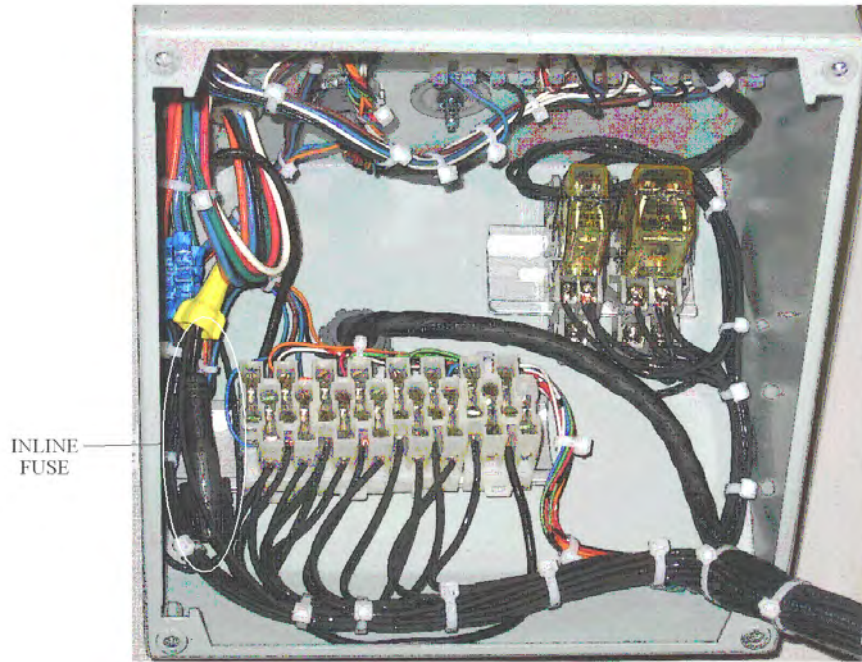
*Figure 1: Controls*

CHAPTER 4  
**ELECTRICAL CONTROLS AND OPERATION**

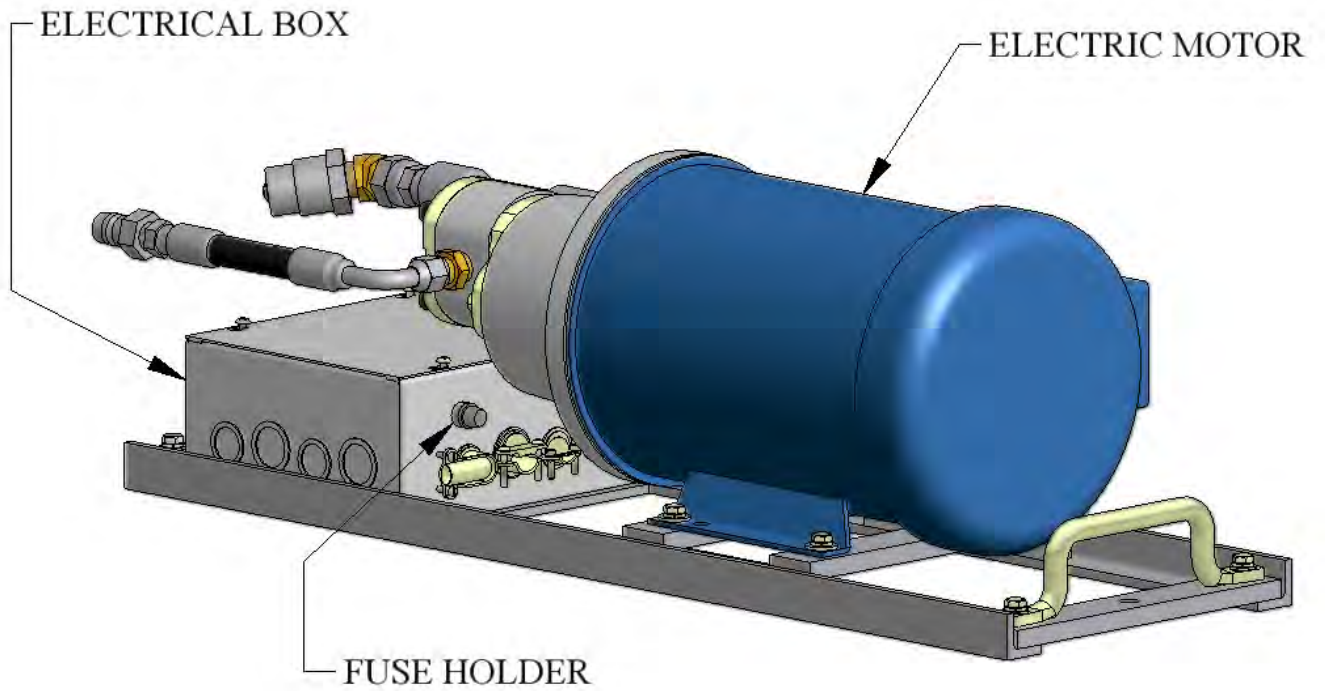


**Figure 2: Main Control Cable**

CHAPTER 4  
**ELECTRICAL CONTROLS AND OPERATION**



*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”.

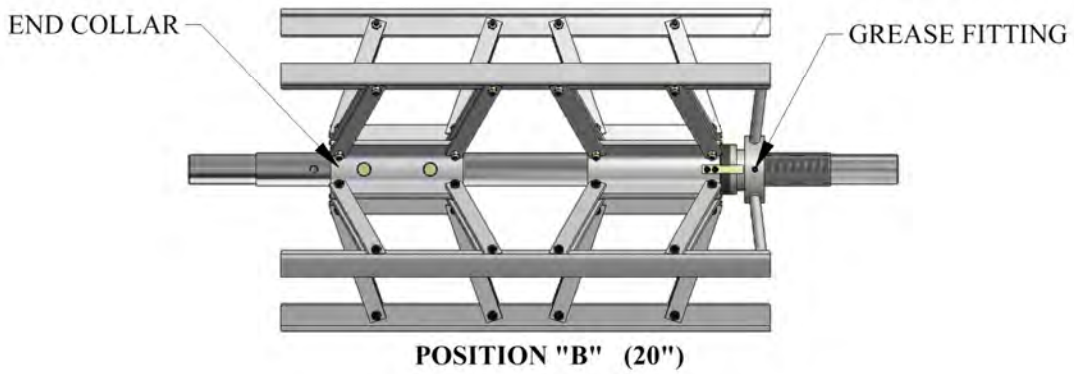
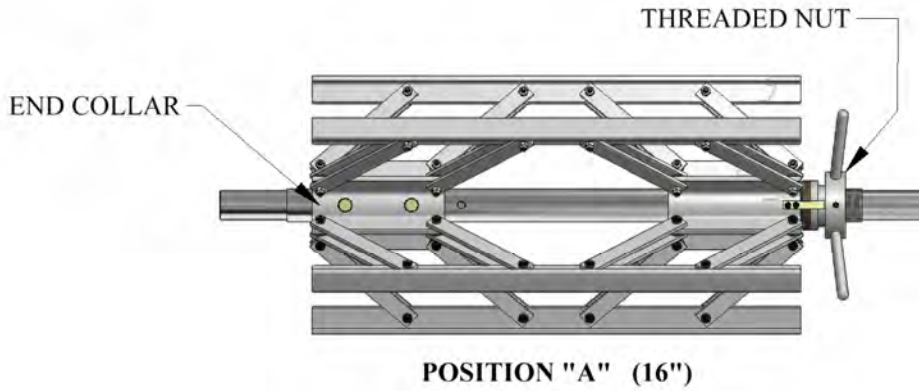
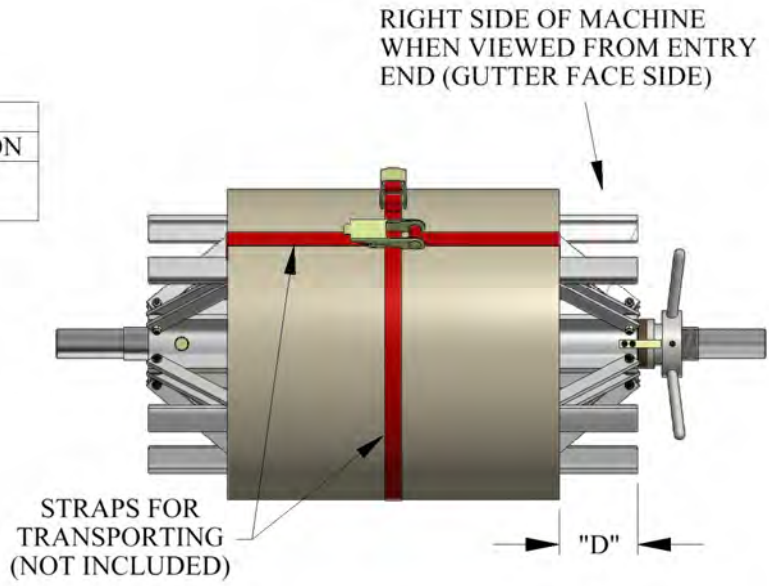
To adjust from one position to the other, remove 2 screws “C” until end collar is free to slide. Slide it to the inside position for 20” ID or outside position for 16” ID coil. Align it to the respective threaded holes in the reel shaft. Re-insert and tighten "C" bolts to lock the end collar to the shaft.

### **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.**

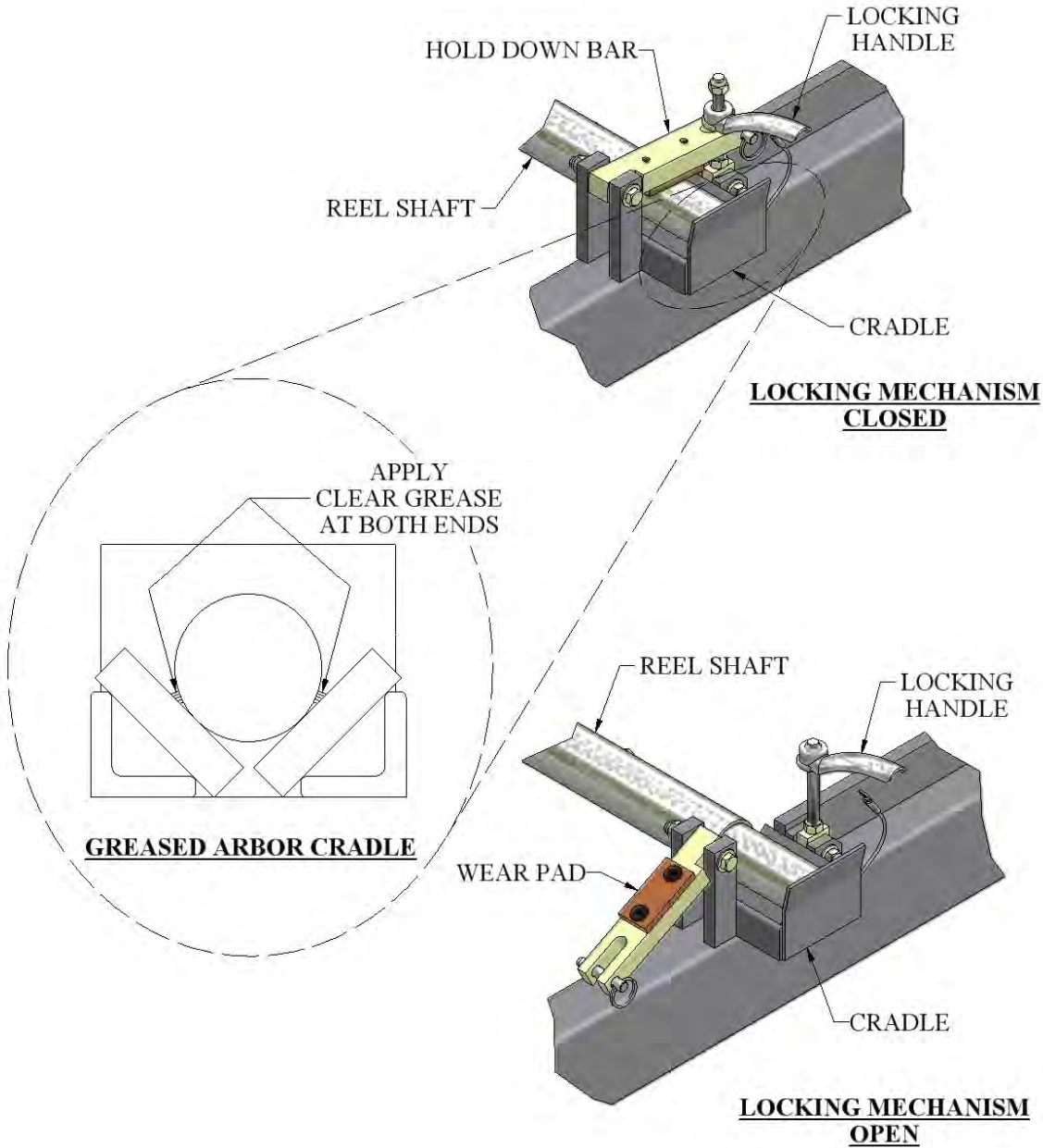
Maximum Capacity / Reel: **3,000 lbs.**

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*

## **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***

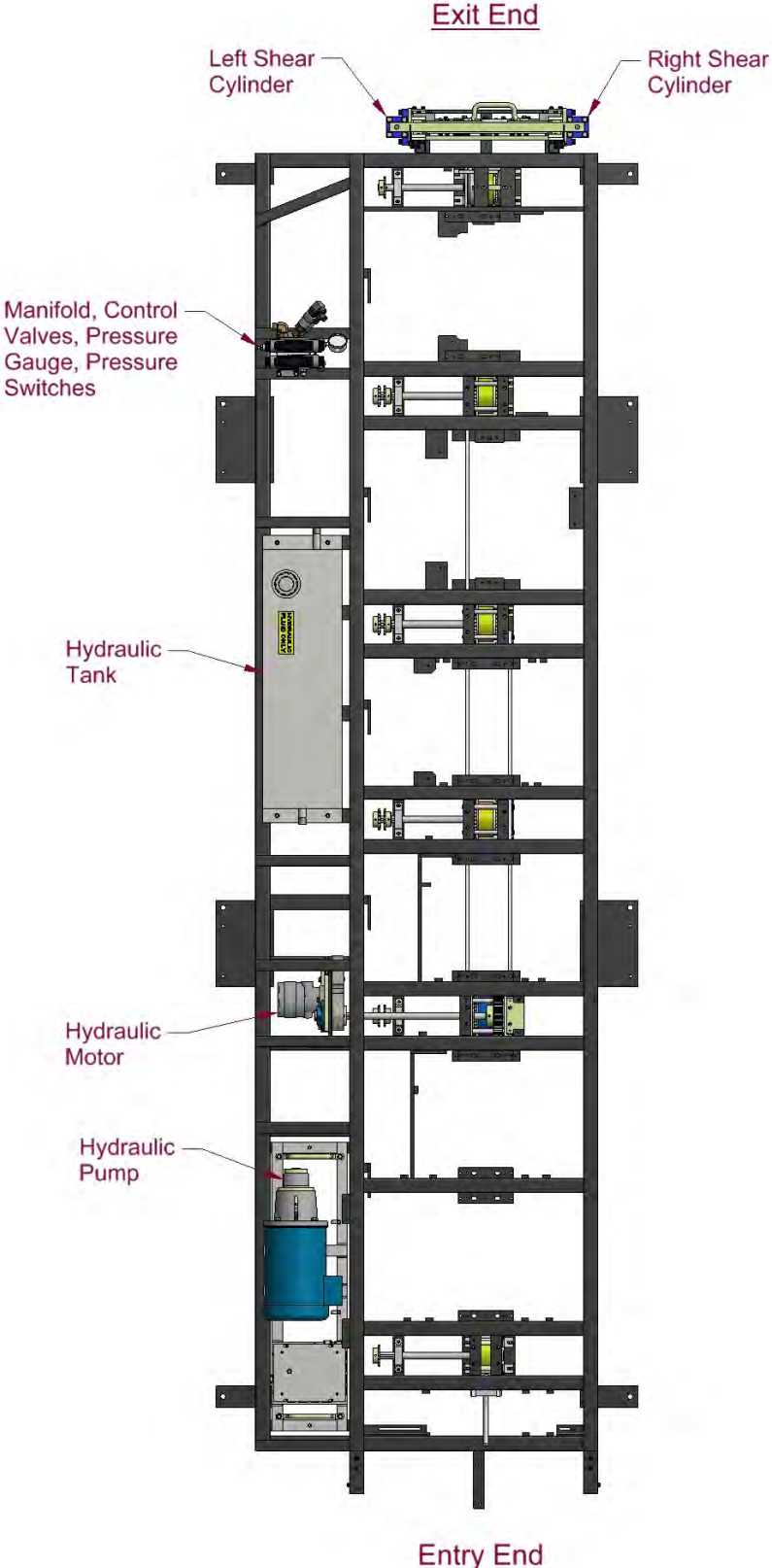
(Figure 7)

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***

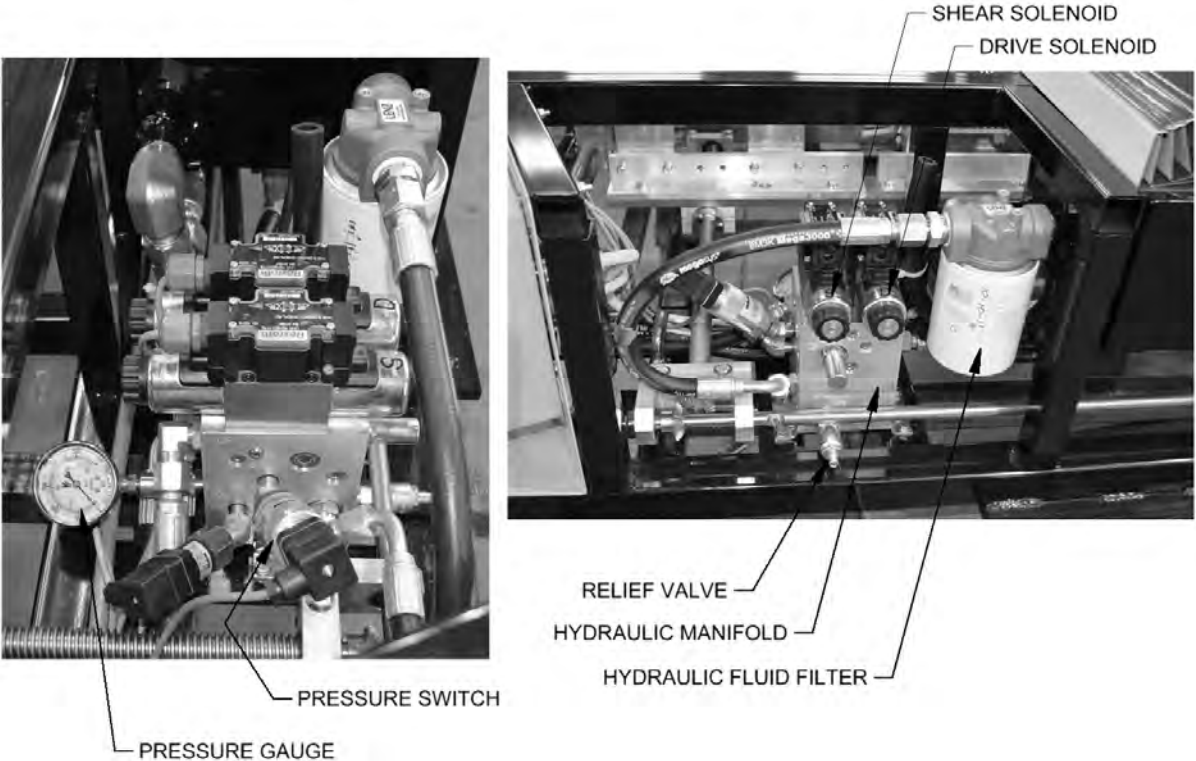
CONDITION	SOLUTION
1 White milky color indicates water contamination.	Change the fluid.
2 Dark fluid usually indicates a dirty oil filter.	Replace the oil filter.
3 Foamy fluid will cause a noisy pump and slow erratic operation of the system. The cause is usually low oil level or air in the system.	Check 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**

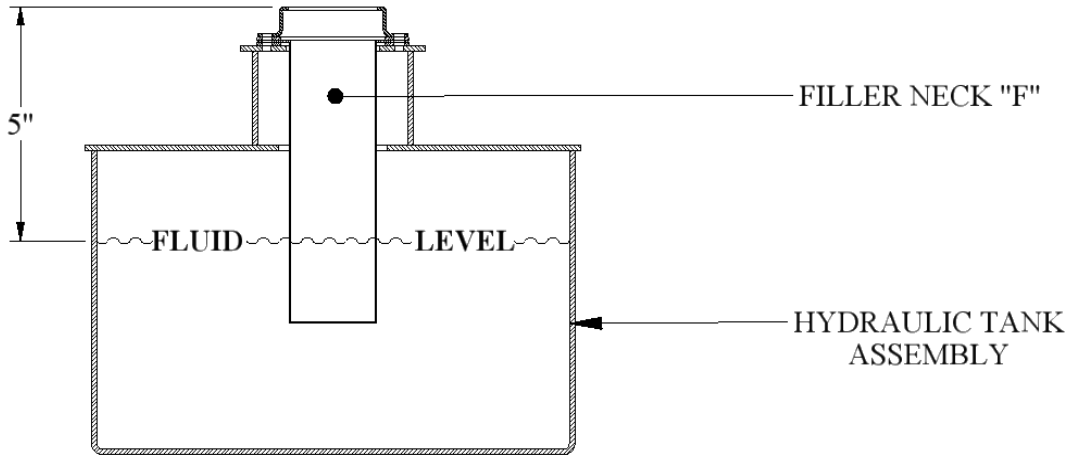


**Figure 7: Hydraulic System – Overview**

CHAPTER 6  
**HYDRAULIC SYSTEMS**



**Figure 8: Hydraulic System – Details**



**Figure 9: Hydraulic Fluid Level**

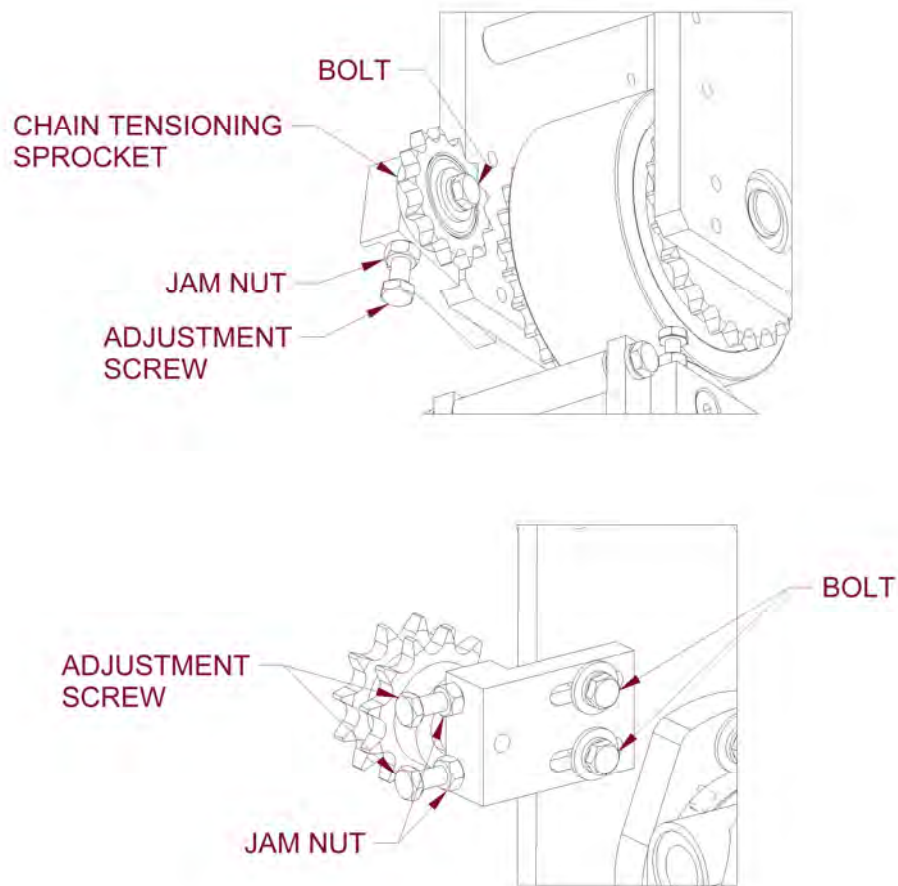
CHAPTER 7  
**DRIVE SYSTEM**

## **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.

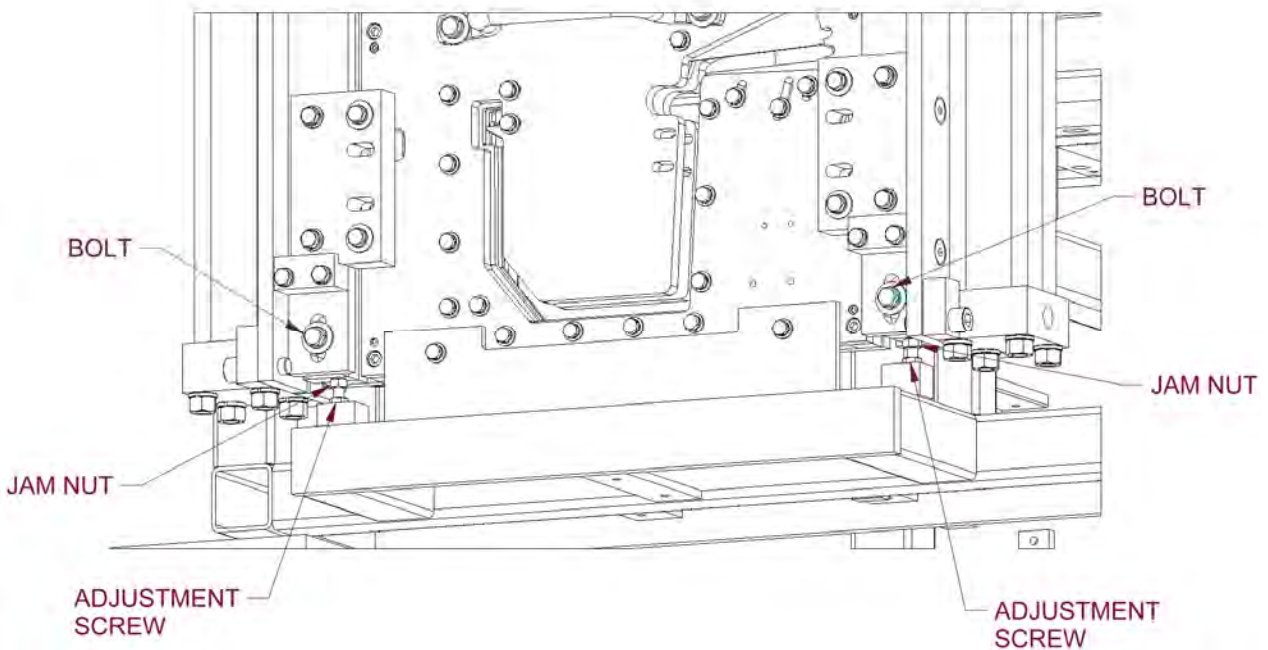
The Bottom Pressure Switch sends the shear back up once the set pressure is reached.

### **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**

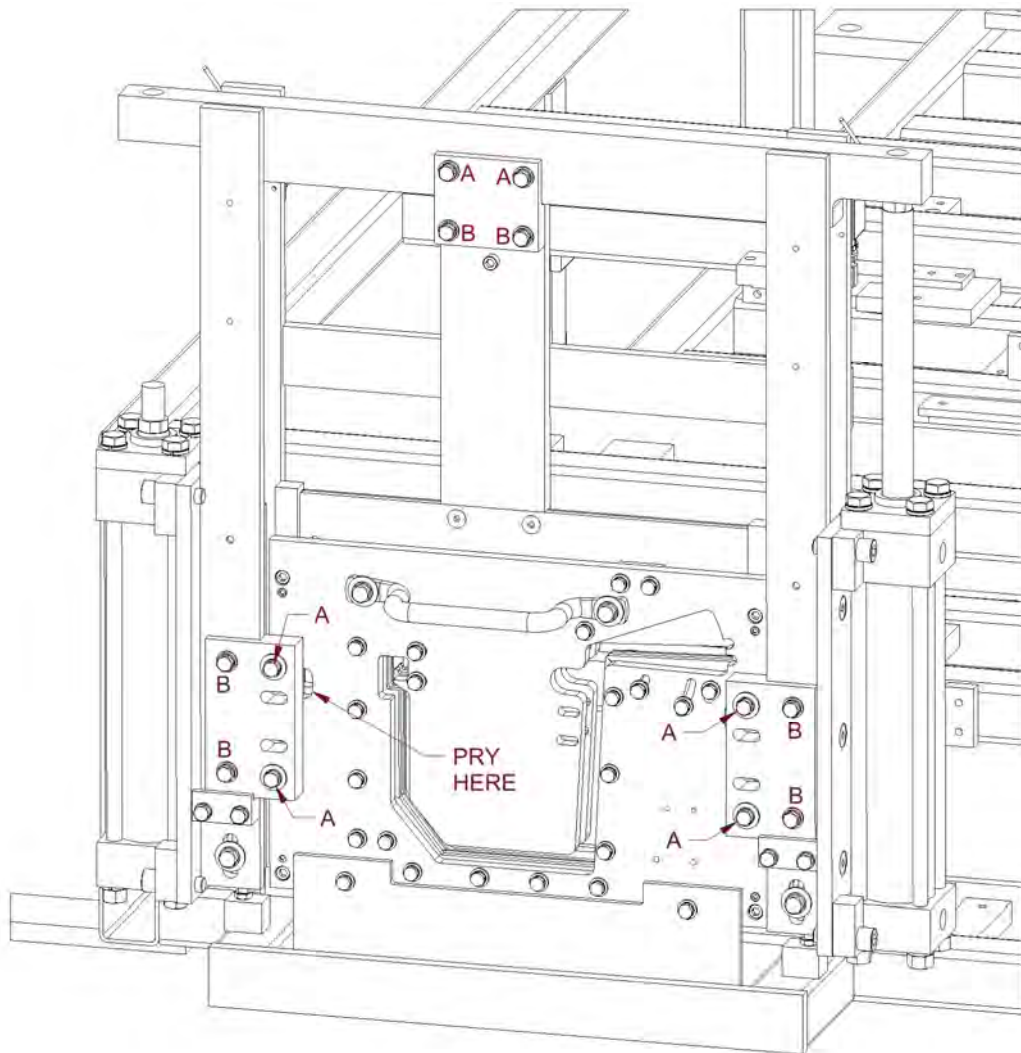
Adjusting the left-right position of the shear:

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.

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

Catalog No. 11016

11 oz. Aerosol Can

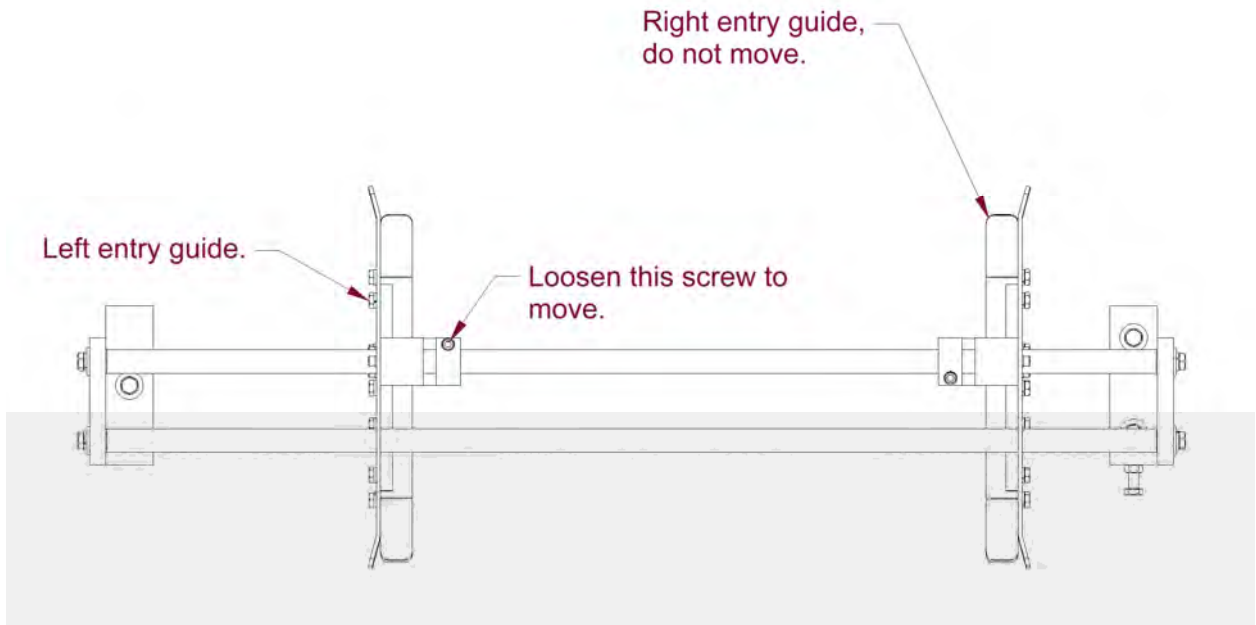
Available from:

**MSC Supply at 1-800-645-7270**

CHAPTER 9  
**ENTRY GUIDE & DRUM ASSEMBLY**

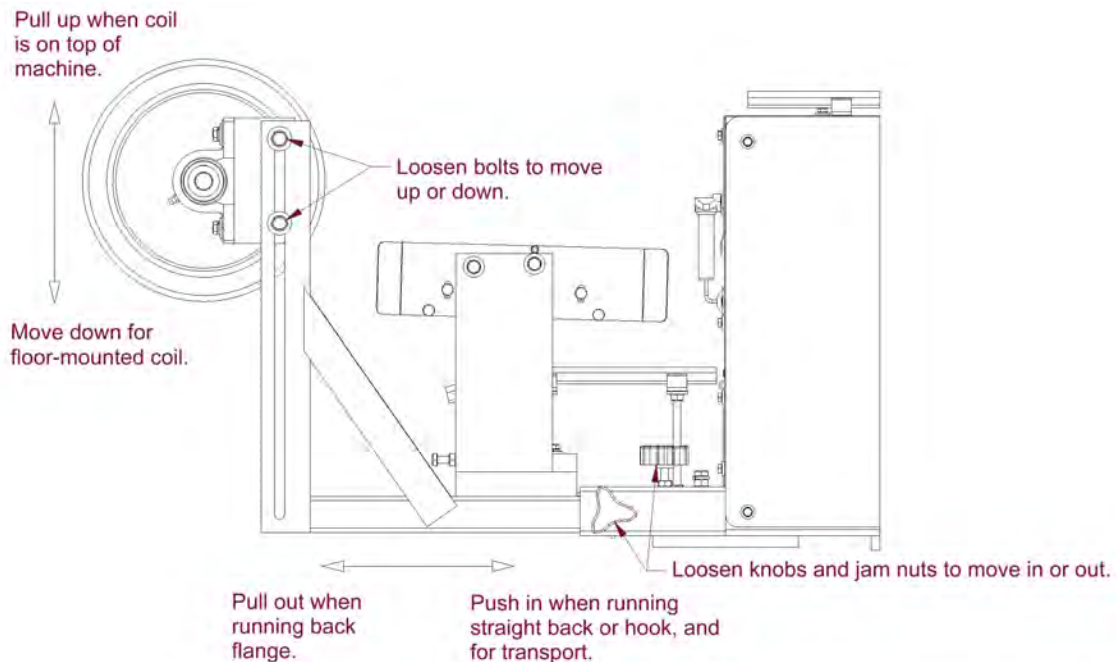
## ENTRY GUIDE AND DRUM ASSEMBLY

### ENTRY GUIDE ADJUSTMENT



*Figure 13: Entry Guide Adjustment*

### ENTRY DRUM ADJUSTMENT



*Figure 14: Entry Drum Adjustment*

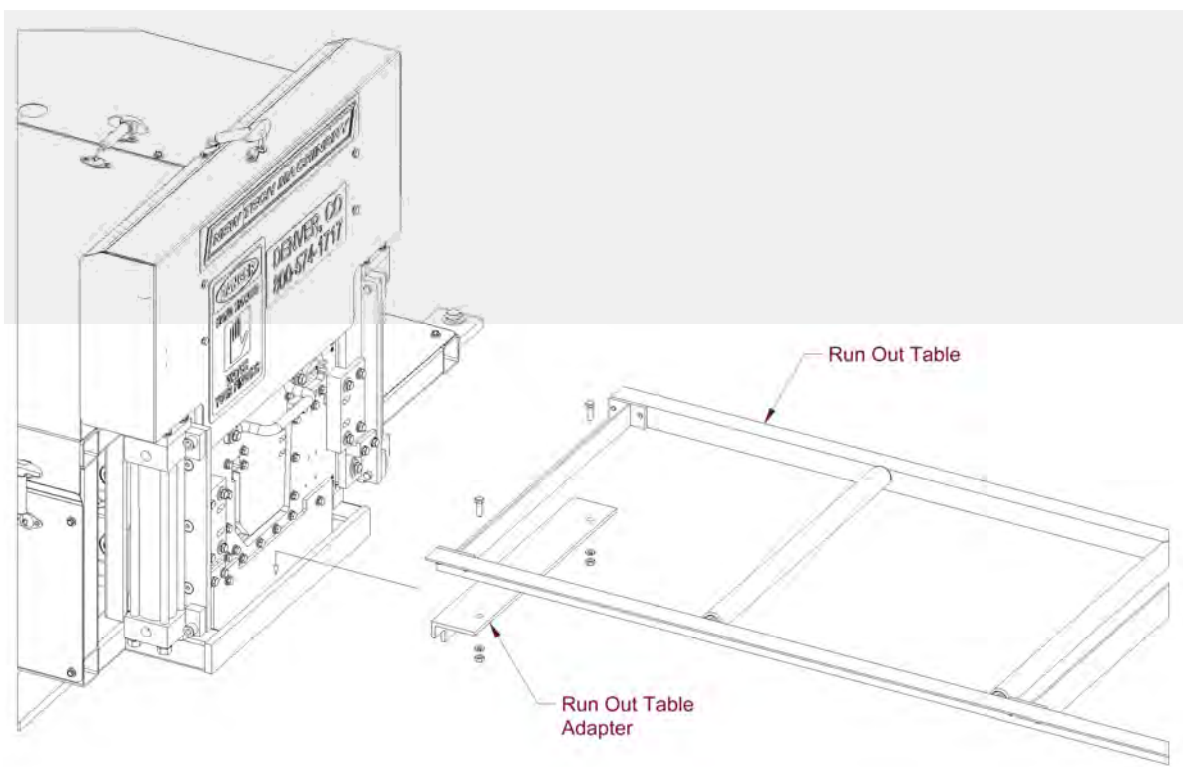
CHAPTER 10  
**RUN OUT TABLES**

## **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**



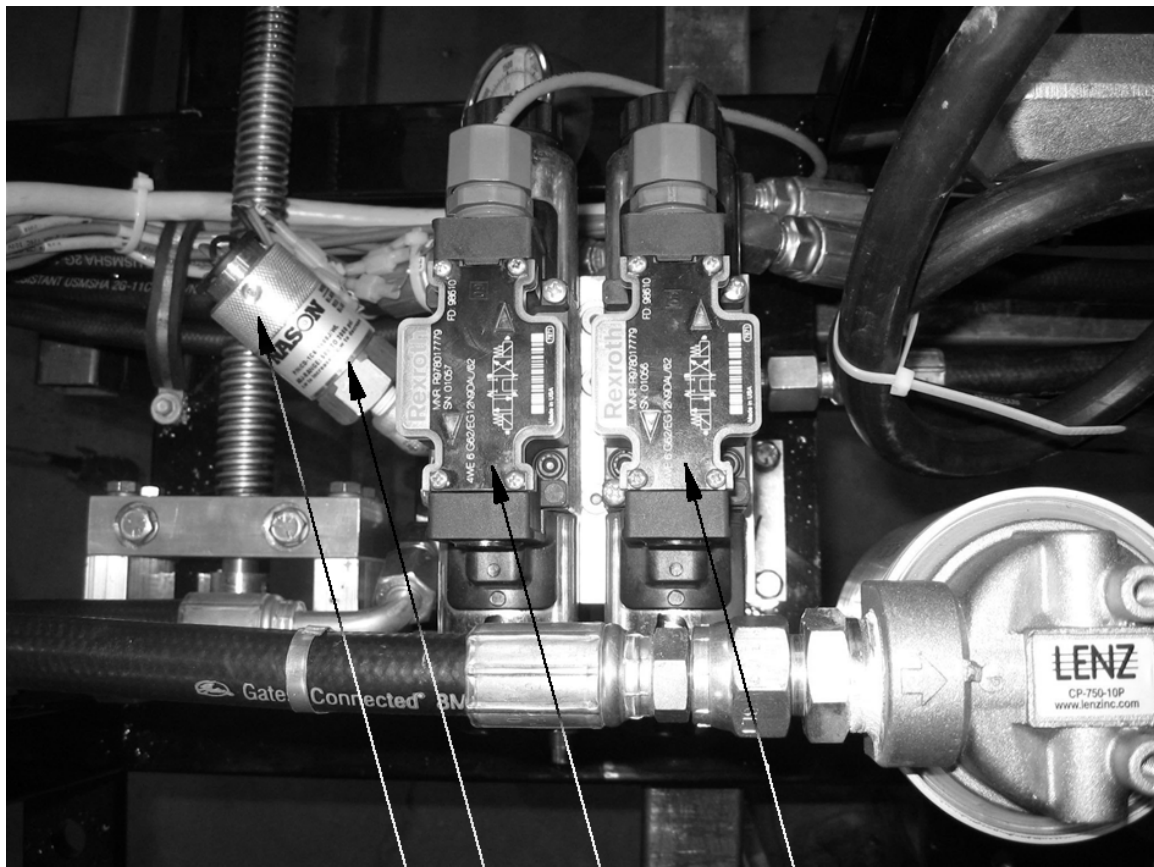
CHAPTER 12  
**TROUBLESHOOTING**

## 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.



- DRIVE VALVE
- SHEAR VALVE
- PRESSURE SWITCH
- KNURLED SLEEVE "A"

**Figure 17: Pressure Switch Adjustment**

CHAPTER 12  
**TROUBLESHOOTING**

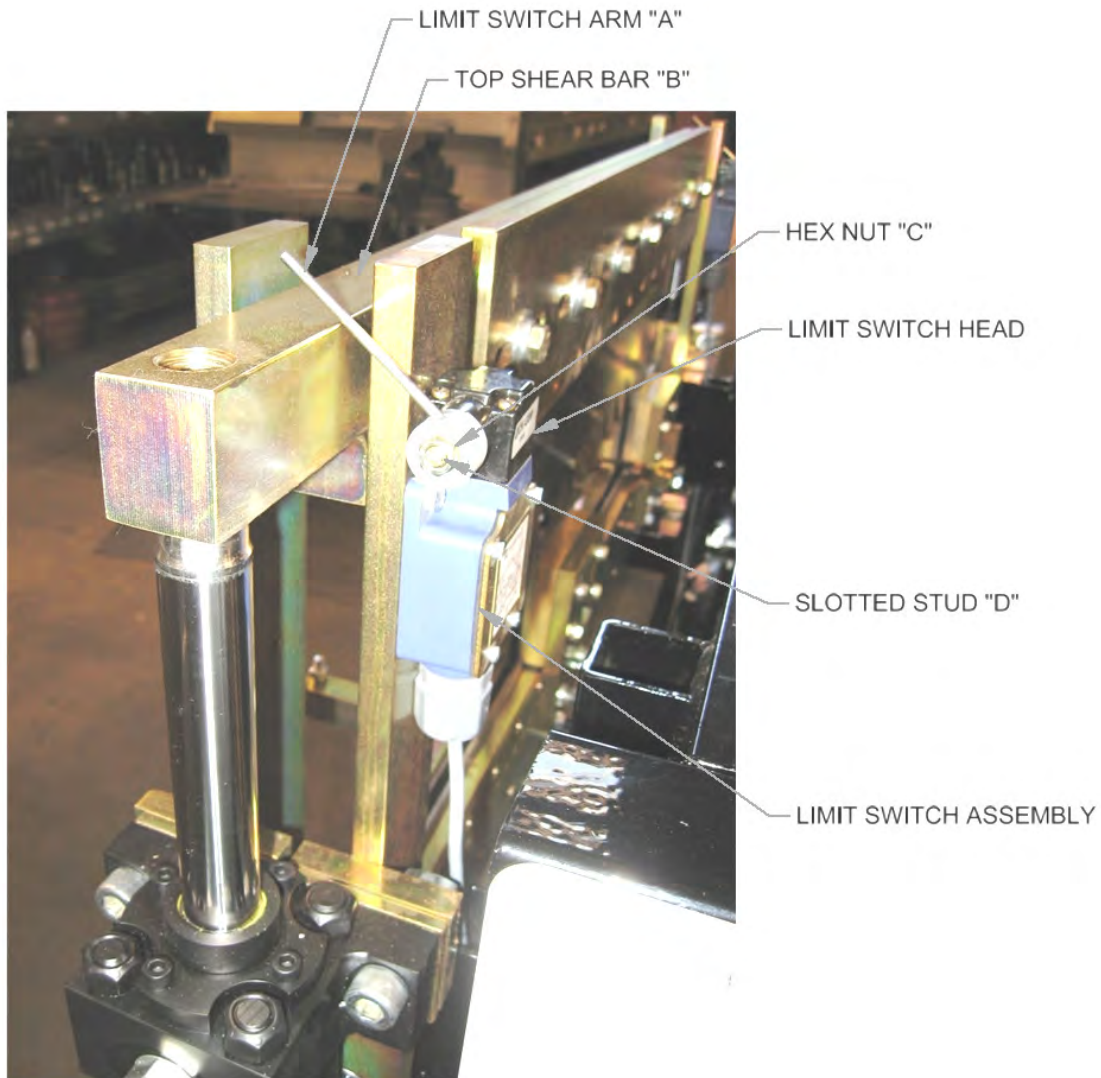
- 2. Shear travels to the bottom of the stroke and returns to the top of the stroke without cutting the panel completely through.**

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.

APPENDIX A  
**COMPUTER BATCH AND LENGTH CONTROLLER**

## **COMPUTER BATCH AND LENGTH CONTROLLER**

The optional Batch and Length Control Computer is used to control number and length of panels that your machine produces. It uses an Encoder and Wheel assembly that runs on the bottom of the panel for measurement. The Encoder assembly is located between the 4<sup>th</sup> and 5<sup>th</sup> bottom Drive Rollers of the machine and the Encoder Cable exits thru the end cover under the Manual Control Panel assembly.

### **Batch and Length Controller Connection** (Figure 19 & Figure 20)

1. Connect the Main Control Cable (larger connector) to the panel mounted male connector “A” 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. Turn clockwise until snug. Caution: **DO NOT rotate the cable clamp on the back of the plug to tighten this connection. You must turn the threaded ring of the plug only, or damage will occur.**
2. Connect the Encoder Cable (smaller cable) to the panel mounted Female connector “B” located in the bottom of the computer on the left side. Again, make sure that the key and slot are aligned and carefully start the threads on the connection. Turn clockwise until snug and **DO NOT rotate the cable clamp on the back of the plug to tighten this connection. You must turn the threaded ring of the plug only, or damage will occur.**
3. Refer to instructions that follow for computer operation.



**Figure 19: AMS Box Without Cables**



APPENDIX A  
**COMPUTER BATCH AND LENGTH CONTROLLER**

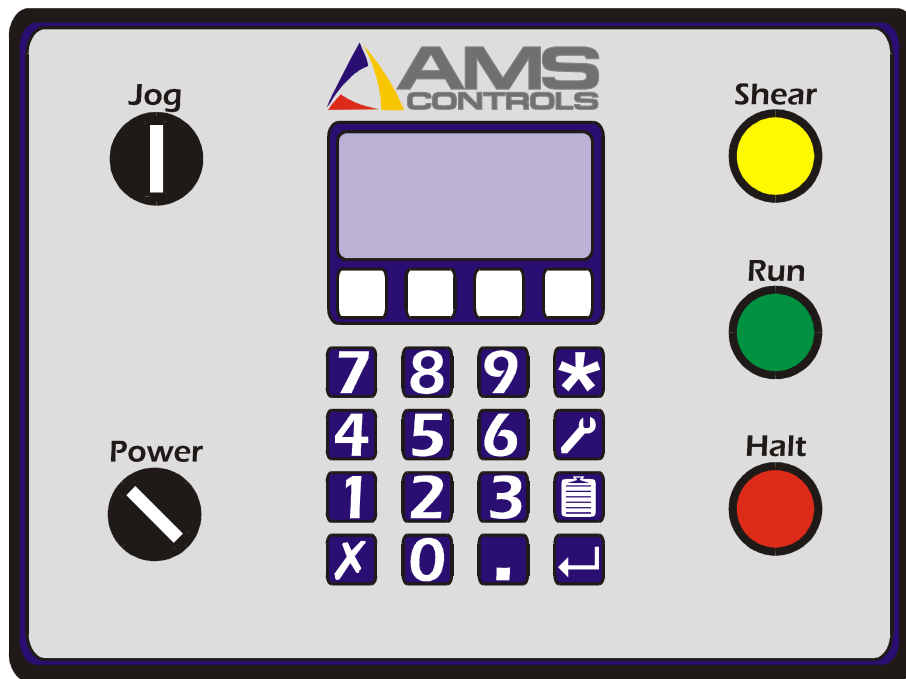


**Figure 20: AMS Box With Cables**

***Introduction***

**Overview**

The AMS Controls MP465 is an industrial controller used to control cut-to-length machinery. Figure 21 shows the front panel of MP465.



**Figure 21: AMS Controls MP465 Controller**

APPENDIX A  
**COMPUTER BATCH AND LENGTH CONTROLLER**



**Features**

The MP465 controller's features include:


- Accurate length control
- Simple programming
- Easy calibration


***Manual Operations***

**Jogging Material**

- To jog material forward using the MP465, turn the jog switch  on the controller to the right (clockwise).
- To jog material in reverse using the MP465, turn the jog switch  on the controller to the left (counter-clockwise).

**Manual Shear**

To fire the shear manually, press the shear button .






 **Note:** The controller must be in Manual mode.

***Production Procedures***

**Screen Navigation**

**Keypad**




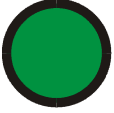


The keypad uses hot keys to enable quick entry into certain screens.


	Program	Press [Program] to program a Job Number, Quantity, and Length; press it again to specify the next job to run.
	Status	Press [Status] to exit the current screen and return to the Status screen.
	Calibration	Press [Calibration] to calibrate the length management system; by pressing it again you can display other screens like the Production Totalizer and Stopping Reaction.
	Enter	Press [Enter] to enter or store the current value. [Enter] can also be used to move to the next value.
	Clear	Press [Clear] ( <i>clear entry</i> ) to clear or set an entry back to its

APPENDIX A  
**COMPUTER BATCH AND LENGTH CONTROLLER**

original value.


### Push Button and Front Panel Selector Switches


<b>Shear</b>	Shear	Press [Shear] to manually activate the shear.
		 <b>Note:</b> The MP465 controller allows this switch to operate when the machine is stopped.
<b>Halt</b>	Halt	Select [Halt] to load a coil and to stop the machine
		
<b>Run</b>	Run	Select [Run] to start the machine after a job has been programmed
		
<b>Jog</b>	Jog (Forward and Reverse)	When the machine is in manual mode (i.e., the Run button is not lit), turn and hold the Jog switch clockwise to jog the material forward, turn and hold the Jog switch counter-clockwise to jog the material in reverse. This switch is inactive when the Run switch is lit.
		
<b>Power</b>	Power	This switch turns the controller on and off.
		<ul style="list-style-type: none"><li>• Turn the switch to the right to apply power to the controller unit</li><li>• Turn the switch to the left to remove power</li></ul>

 **Note:** If the controller unit has been wired to by-pass this switch, the position of the switch will have no effect on the controller.

### Program a Job

Jobs are composed of a quantity of a specified length. You can program up to 50 different quantities and lengths into the controller. To program a job,

1. Select [**Program**] . The current data entry field highlights; once new data has been entered, the data field starts blinking.


 **Note:** Pressing [**Clear**] while the data field is blinking re-loads the original value into the data field. Pressing [**Enter**] saves new data and highlights the next field.

2. In the **Job Number** field, enter a number to assign to this job (a value between 1 and 50).
3. In the **Quantity** field, enter the number of parts you want to create (up to 999).

## COMPUTER BATCH AND LENGTH CONTROLLER



4. In the **Length** field, up to 999 feet and 11.999 inches.
5. The controller displays the message “*Pause After Job xx?*” (Where xx is the job number assigned in step 1). Select:
  - **Yes** to have the machine halt automatically after the selected job number is finished.
  - **No** to have the machine change lengths “on-the-fly” and run the job following the selected job without first stopping.

 **Note:** To restart the machine after an automatic halt, press [**Run**].


 **Note:** To increase productivity, additional jobs can be programmed while the machine is running previously programmed jobs.

### Automatic Operation


The MP465 runs all programmed jobs automatically.

- To start the machine after all desired jobs have been programmed, press [**Run**] .
- To stop the machine at any time, press [**Halt**] .


The machine halts automatically when all programmed jobs are completed.

 **Note:** If the encoder is counting in the negative direction, change the encoder direction in the Setup Screen as described previously.

### Length Calibration

 **Note:** Calibration is typically required only during machine commissioning or after changing coil stock.



Length calibration adjusts for errors in the size and tracking of the measuring wheel and is expressed as a percentage, with 100% being no correction. Increasing the correction factor causes the parts to become longer and decreasing the value shrinks the parts. The MP465 controller’s length calibration feature automatically computes a new correction factor by comparing the desired (Programmed) length to the actual (Measured) length. Length Calibration should be used any time part lengths are incorrect in a consistent manner (e.g., all parts 1mm too long, etc.). Length calibration will not fix a situation where parts are inconsistent (e.g., parts vary +10 to -10mm).


 **Note:** When calculating the correction factor, make several parts and use the average of these parts for the part length. The first part produced should not be used in this calculation since it may be inaccurate due to shear reaction or other variances.

To calibrate the MP465 controller,


6. The controller can be calibrated anytime the measured part length is not matching programmed part length.

## **COMPUTER BATCH AND LENGTH CONTROLLER**

7. With the controller powered on, press [**Calibration**]  until the screen title says “CALIBRATE-1”. The display shows you the current correction factor. Press [**Clear**]  to begin the calibration process.
8. When the prompt “ENTER PROGRAM LENGTH” displays, enter the part length of the part you are attempting to produce.

 **Note:** The longer the part is that you attempt to calibrate on, the more accurate the calibration will be.

9. When the prompt “ENTER MEASURED LENGTH” displays, enter the part length of the part you actually measured. Using an average of several measured parts will provide the most accurate result.
10. The screen title will change to “CALIBRATE-4 and show the OLD and NEW correction factors. The controller is now calibrated.


 **Note:** If the computed correction factor is greater than 110% or less than 90%, the “Calibration Out of Range” error message displays and the calibrate cycle is ignored.

### **Clear Controller Memory**

A quick way to clear out all of the Jobs from the controller is to clear its memory. All of the controllers other internal settings like correction factor and stopping reaction time will be preserved.

To reset the memory on the controller,


11. Turn the device off, and then back on.
12. Press [**5**] while the startup screen is showing.

 **Caution:** Clearing the controller memory clears out *all* jobs that are programmed into your controller!




### **Administrative Screens and Functions**

#### **Calibration**


Length calibration is accomplished using an internal parameter called correction factor. The correction factor is used compensate for wear and manufacturing tolerances in the encoder wheel and variations in material surfaces.




The calibration can be viewed in two screens. Press and release the [**Calibration**]  key until the screen title displays “CALIBRATE-1” or “CALIBRATE-7”.

## **COMPUTER BATCH AND LENGTH CONTROLLER**

 **Note:** To reset the correction factor to 100% press [Clear] . When the prompt “ENTER CODE TO CLEAR TOTAL” displays; enter 1984 and press [Enter] .


### **Production Totalizer**


Total production of the machine is counted by the controller. You can view the production counter by pressing and releasing the [Calibration]  key until the screen title displays “PRODUCTION-1”.

 **Note:** To reset the totalizer to zero press [Clear] . When the prompt “ENTER CODE TO CLEAR TOTAL” displays; enter 1984 and press [Enter] .

### **Reaction Time**

Stopping Reaction is an internal parameter that the controller calculates over the span of several parts. It is used to compensate for the time it actually takes for the machine to stop after the controller tells it to.

The stopping reaction can be viewed by pressing and releasing the [Calibration]  key until the screen title displays “REACTION-1” will allow you to display the controllers stopping reaction time value.

**Note:** To reset the reaction time to zero press [Clear] . When the prompt “ENTER CODE TO CLEAR REACTION” displays;

### **Troubleshooting**

- 1. When running machine with the Batch and Length Control Computer: The drive will not start the next panel programmed after cutting the first panel of a job. (If machine is equipped with a Photo Eye, see Error! Reference source not found.)**

SOLUTION #1: The Photo Eye lens is dirty. Clean debris from lens.

SOLUTION #2: The Photo Eye is aimed toward the shear. Loosen mounting bolts and aim lens away from shear.

- 2. Batch and Length Control Computer shows erratic behavior.**

SOLUTION #1: Check battery condition. System requires 12 volts to operate correctly. Charge or replace battery as required.

## **COMPUTER BATCH AND LENGTH CONTROLLER**

SOLUTION #2: Check condition of Main Communication Cable. Tighten cable connection or replace cable as required.

SOLUTION #3: Clear memory on computer. Turn power off at computer. Turn power back on and push the #5 button while the boot screen is on.

**CAUTION: CLEARING THE MEMORY WILL CLEAR ANY JOBS PREVIOUSLY PROGRAMMED.**

### **3. Computer runs by programmed length and does not stop.**

SOLUTION #1: Check Encoder direction on set up screen. It should read counterclockwise. Turn power off on computer. Turn power back on and press the #9 button while the boot screen is on. If direction is set to CCW press the enter button. To change from CW, use arrow button to scroll down until direction is highlighted. Press any numbered key to toggle between CW and CCW. Set to CCW and press the enter button. Press program button (clipboard) and continue.

SOLUTION #2: Check encoder cable connection. If loose, tighten. If damaged replace.

SOLUTION #3: Check Encoder Wheel for tightness to shaft. If loose, use Allen-Wrench to tighten.

### **4. Panel lengths are consistently long or short when using Batch and Length Control Computer. I.e. all panels are 1/2" long or 1/2" short.**

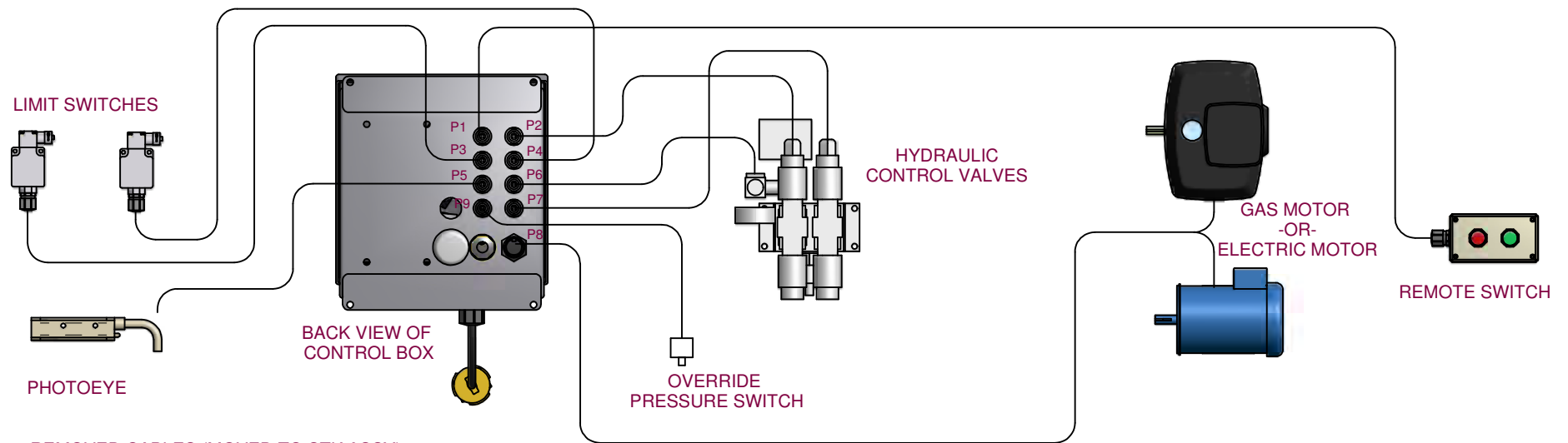
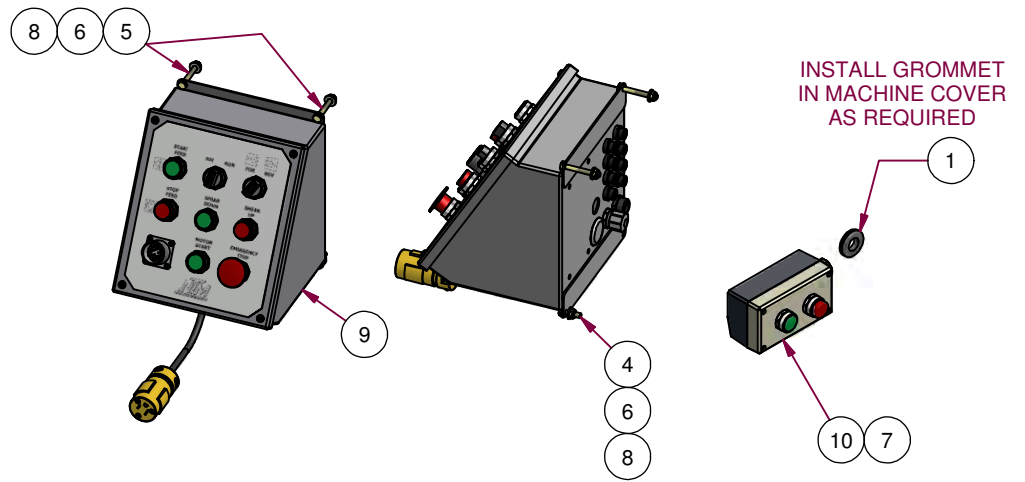
SOLUTION: Run calibration sequence

# ELECTRICAL SCHEMATICS

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



Parts List			
ITEM	QTY	PART NUMBER	TITLE
1	1	ELC-300-138	GROMMET, 3/4" ID, 1-1/2" OD
2	3	ELC-400-075	18Ga MALE DIS/CONN 3M
3	3	ELC-400-076	18Ga FEMALE DIS/CONN 3M
4	1	FAS-HC5-118	HEX HEAD CAP SCREW, 1/4-20 x 1" LG.
5	2	FAS-HC5-278	HEX HEAD CAP SCREW, 1/4-20 x 2" LG.
6	3	FAS-NUY-188	NYLOC HEX NUT, #1/4-20
7	2	FAS-SRM-207	SCREW, PAN HEAD, 8 x 1/2", PHIL, SELF-TAPPING
8	4	FAS-WSF-260	WASHER, FLAT, 1/4" SAE
9	1	FWM-381-000	CONTROL BOX ASSEMBLY
10	1	FWM-382-000	REMOTE PUSH BUTTON BOX



4 REMOVED CABLES (MOVED TO STK ASSY)  
REPLACED REMOTE PARTS WITH REMOTE  
ASSEMBLY FWM-382-000 TO MATCH DBA

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

MATERIAL		LENGTH	FINISH	TOLERANCES	
SEE BOM		-	NONE	.XX = ± .01	
REV		ECR NO.	DATE	RELEASED BY	.XXX = ± .005
1	R-1394	12/18/06		JK	FRACTION = ± 1/32"
2	R-1714	02/15/10		AJB	ANGLE = ± 1/2'
3	R-1685	05/04/2011		JD	
4	R-1771	06/10/2011		JD	



**NEW TECH MACHINERY  
CORP.**

DRAWN BY JD		PART NAME <b>ELECTRICAL ASSEMBLY</b>	
DATE 01/05/05		PART NUMBER <b>FWM-380-000</b>	
CHECK BY JD		SHEET 1 OF 2	
DATE 06/10/2011		REVISION <b>4</b>	

ELC-400-105

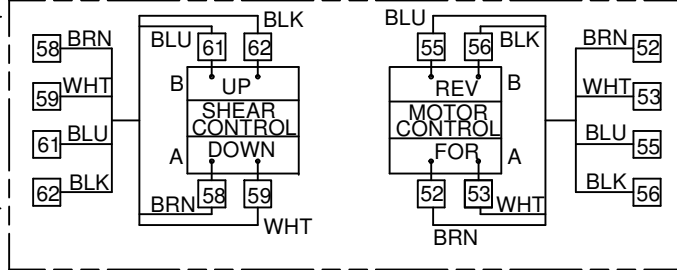
SSP-340-000  
SHEAR TOP OF STROKE  
LIMIT SWITCH ASSEMBLY

FWM-440-000, SSH-440-000, BG7-440-000, 5VC-440-000

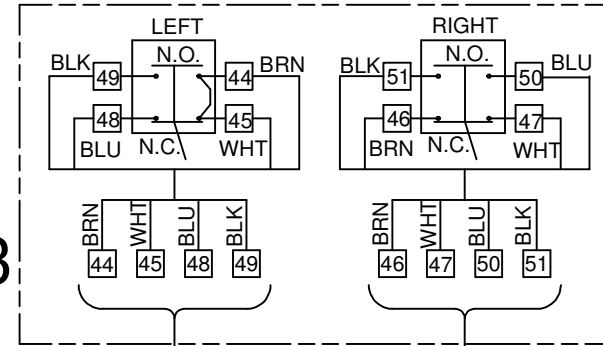
P2

CONTROL VALVES  
(HYDRAULIC COMPONENTS)

P7



P3



P4

ELC-400-105

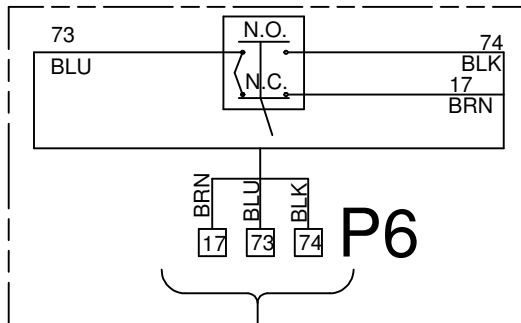
ELC-400-105

ELC-400-105

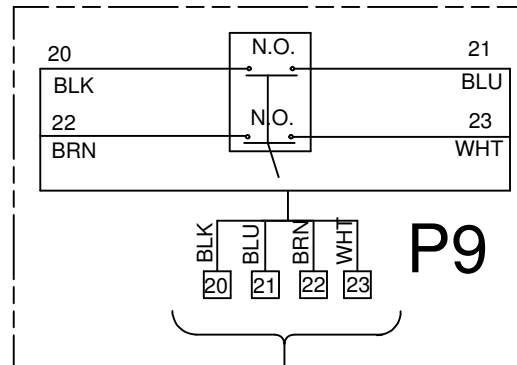
BOTTOM OF STROKE  
PRESSURE SWITCH  
(HYDRAULIC COMPONENT)

PRESSURE LINE  
OVERRIDE SWITCH  
(HYDRAULIC COMPONENT)

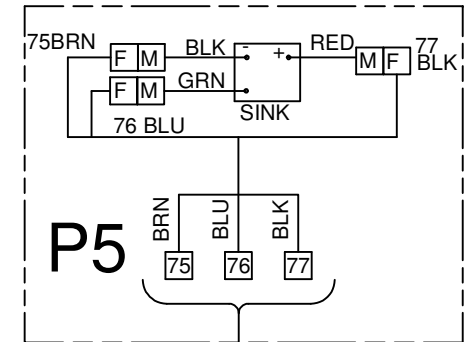
ELC-402-056  
PHOTO EYE



P6



P9



P5

ELC-400-106

ELC-400-106

ELC-400-105

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

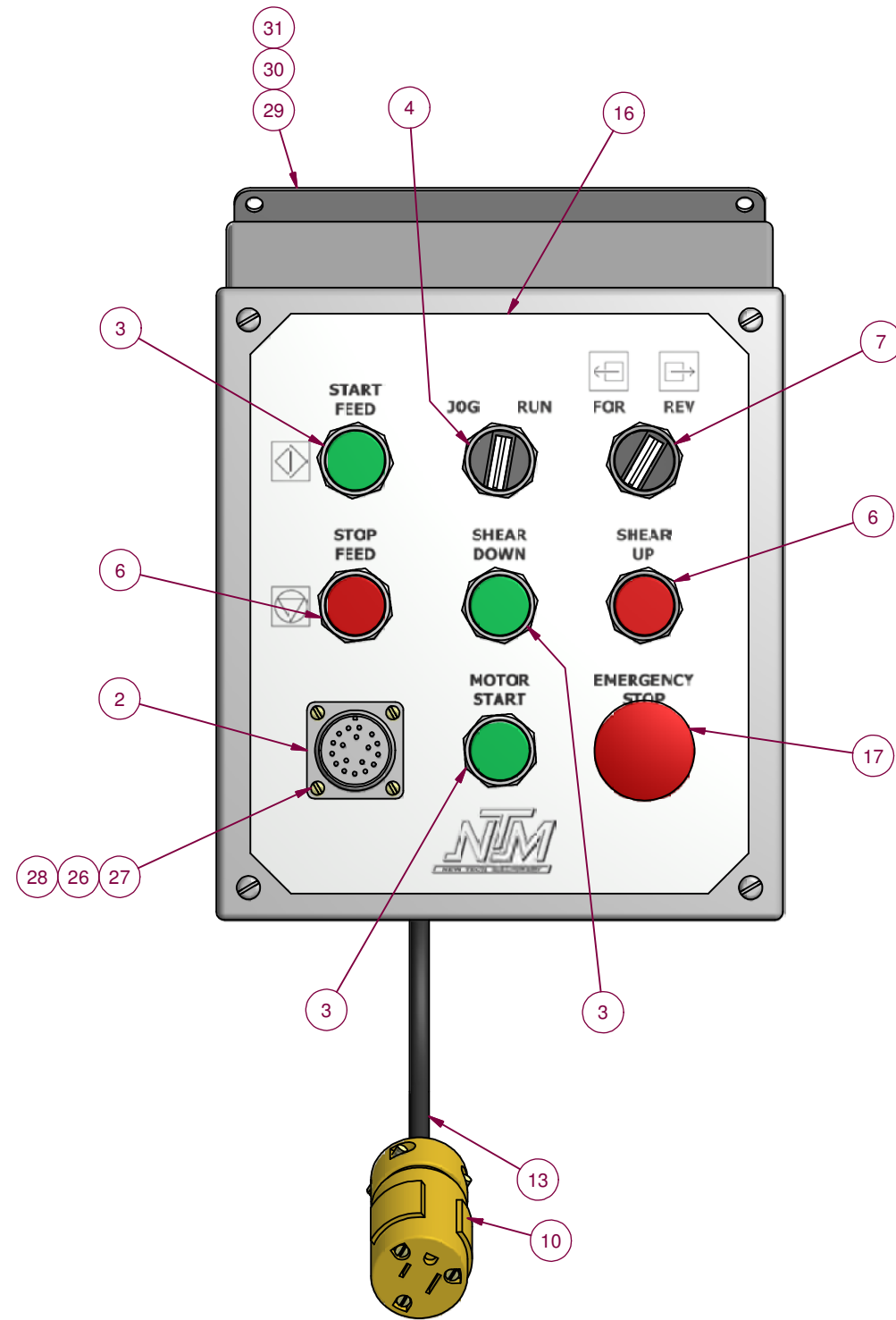
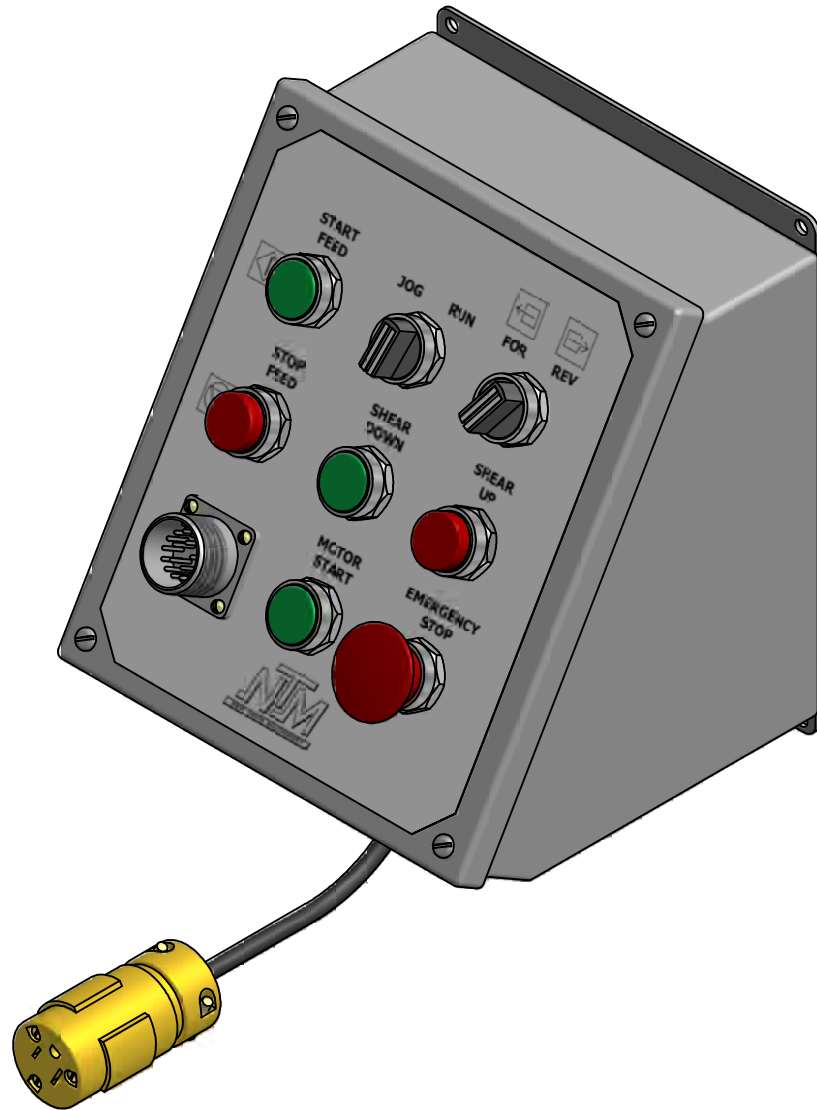
MATERIAL	LENGTH	FINISH		
SEE BOM				
REV	ECR NO.	DATE	RELEASED BY	TOLERANCES
				.XX = ± .01
				.XXX = ± .005
				FRACTION = ± 1/32"
				ANGLE = ± 1/2'



**NEW TECH MACHINERY  
CORP.**

DRAWN BY JD	PART NAME <b>ELECTRICAL ASSEMBLY</b>	SHEET <b>2 OF 2</b>	REVISION <b>4</b>
DATE 11/28/06	PART NUMBER <b>FWM-380-000</b>		
CHECK BY			
DATE			

PARTS LIST			
ITEM	QTY	PART NUMBER	TITLE
1	1	AMS-450-005	3812Y-4 CABLE
2	1	AMS-450-006	3812BHNT-4 CABLE
3	3	ELC-300-103	PUSH BUTTON, GREEN
4	1	ELC-300-104	SELECTOR SWITCH, W/1 N.O.
5	1	ELC-300-105	FUSE, 10A, 250V, TIME DELAY
6	2	ELC-300-107	PUSH BUTTON, RAISED RED
7	1	ELC-300-109	SELECTOR SWITCH, 2 POS,1 N.O. 1 N.C.
8	1	ELC-400-018	IDEC #HW-C01 N/C CONTACT BLOCK
9	4	ELC-400-019	NDNV4 4 POLE TERM BLOCK
10	1	ELC-400-021	CORD CAP, FEMALE
11	2	ELC-400-036	EURO STRIPS
12	40 FT	ELC-400-040	WIRE, 18 Ga., AWG 600v, TFFN BLK
13	3 FT	ELC-400-041	WIRE, 18 Ga., 3 COND.
14	18 IN	ELC-400-044	TAPE, DOUBLE COATED FOAM x 1"
15	1	ELC-400-045	HOLE SEAL, 1/2" KO
16	1	ELC-400-046	LEXAN OVERLAY, PANEL
17	1	ELC-400-061	BUTTON, MUSHROOM, PUSH/PULL
18	1	ELC-400-085	FUSEHOLDER BUS HRK
19	1	ELC-400-100	RECEPTACLE, 6 PIN, MALE X 1M
20	8	ELC-400-104	RECEPTACLE, 4 PIN FEMALE X 2M
21	1	ELC-400-122	1 POLE RELAY BASE
22	1	ELC-400-123	2 POLE RELAY BASE
23	1	ELC-400-124	1 POLE RELAY, 12VDC
24	1	ELC-400-125	2 POLE RELAY, 12VDC
25	2	ELC-425-020	STRAIN RELIEF, 1/2" NPT
26	4	FAS-NUM-394	HEX NUT, #4-40
27	4	FAS-SPN-396	SCREW, SLOTTED PAN HEAD, #4-40 x 3/4" ,
28	4	FAS-WSL-398	#4 SPLIT LOCK WASHER
29	1	FWM-381-001	ENCLOSURE
30	1	FWM-381-003	DIN RAIL, 3" LONG
31	1	SSR-381-072	DIN RAIL, 5.50 LONG



NOTE: NOT ALL ITEMS SHOWN.

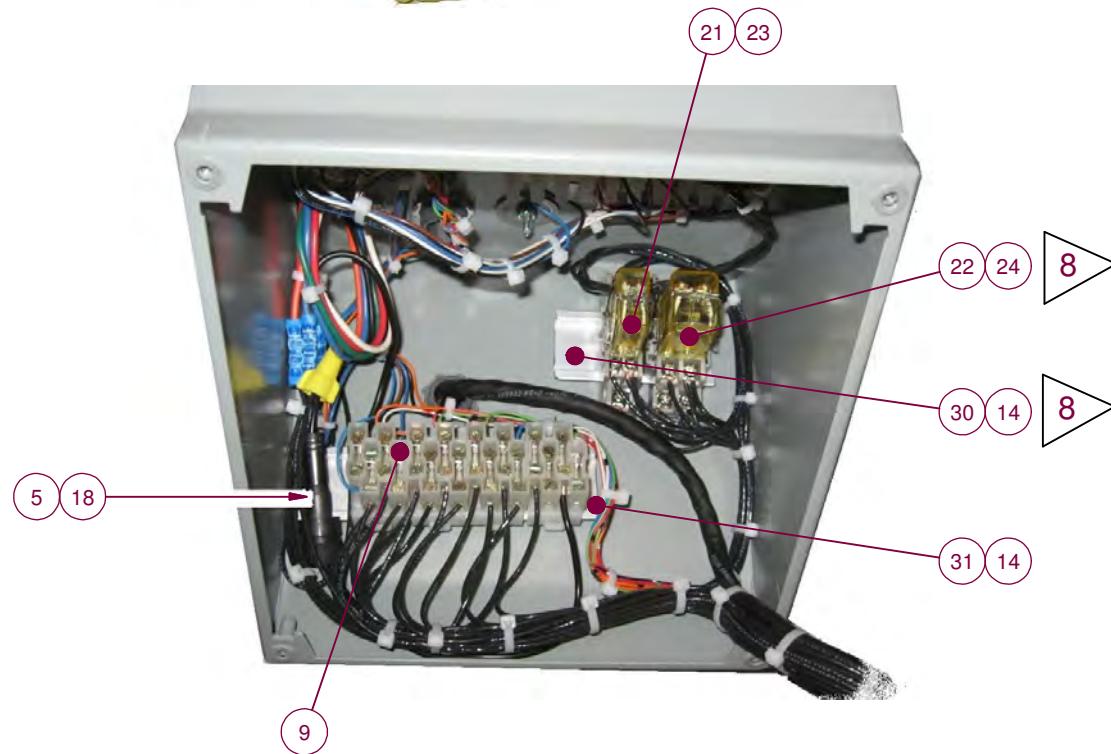
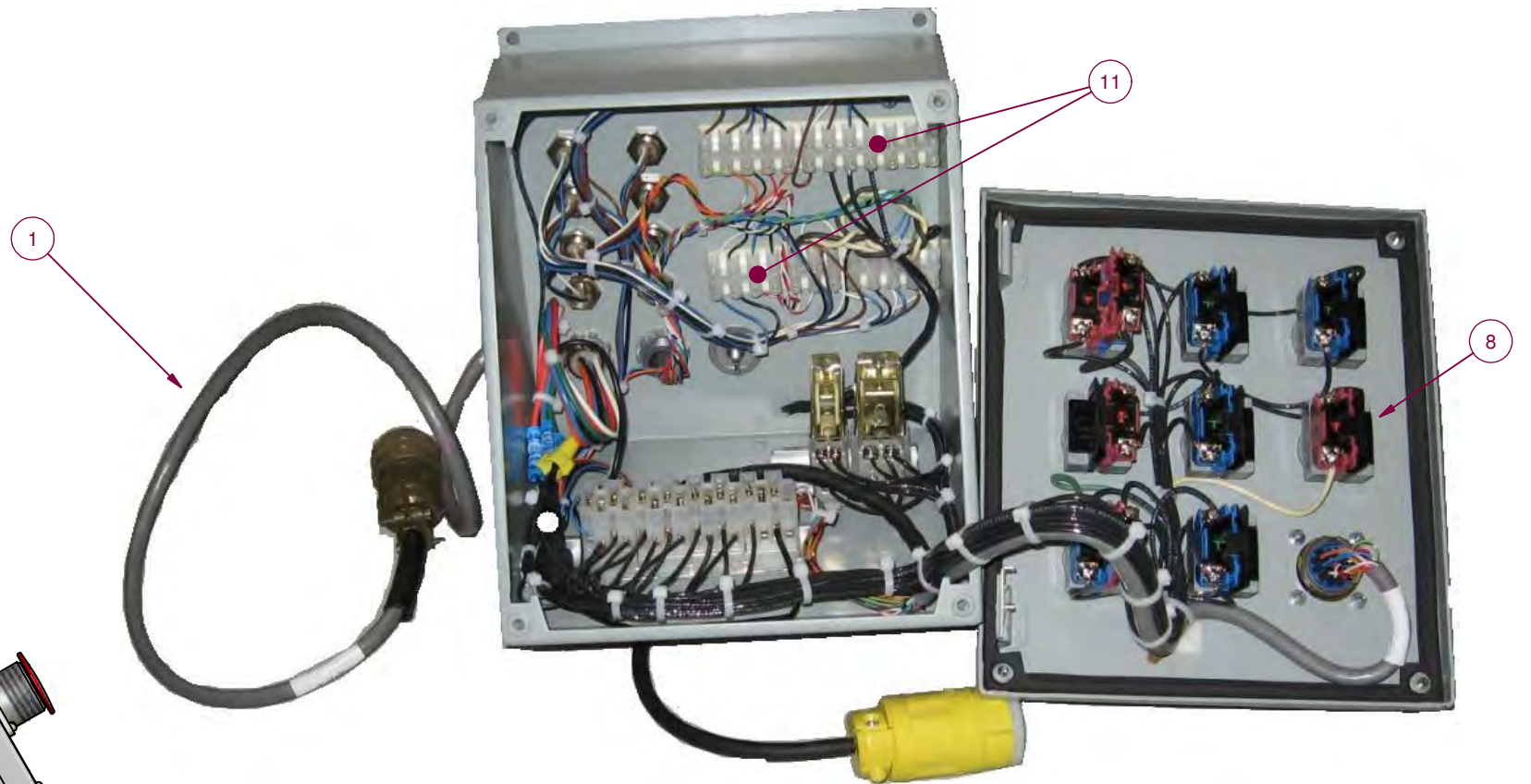
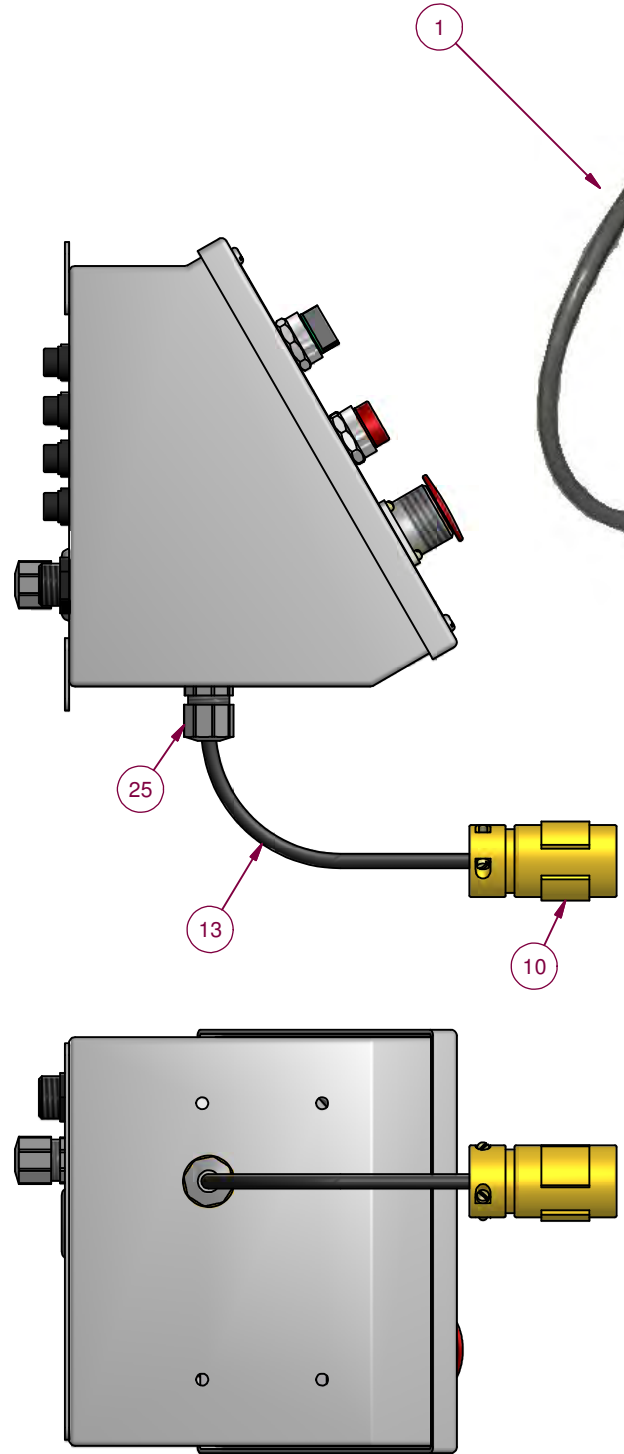
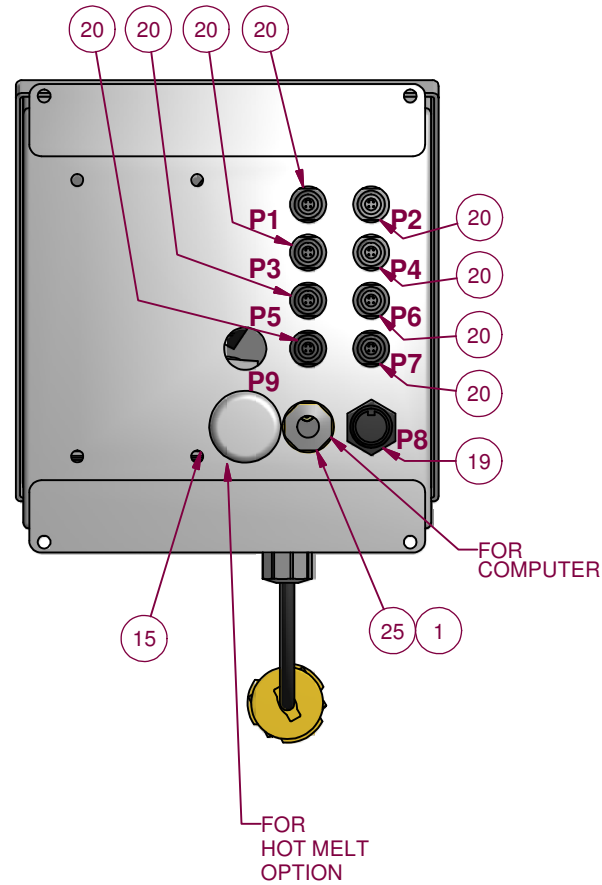
8 REPLACED PART NUMBERS:  
ELC-400-022, ELC-400-023, ELC-400-024,  
ELC-400-025, ELC-400-026 & ELC-400-027  
WITH:  
ELC-400-122, ELC-400-123,  
ELC-400-124 & ELC-400-125

MATERIAL	SEE BOM	LENGTH	N/A	FINISH	NONE
REV	ECR NO.	DATE	RELEASED BY	TOLERANCES	
4	R-1394	12/18/06	JK	.XX = ± .01	
5	UNK	-	-	.XXX = ± .005	
6	R-1416	05/09/07	S.B.	FRACTION = ± 1/32"	
7	R-1509	05/22/08	JD	ANGLE = ± 1/2'	
8	R-1638	05-21-2009	JD		

**NEW TECH MACHINERY CORP.**

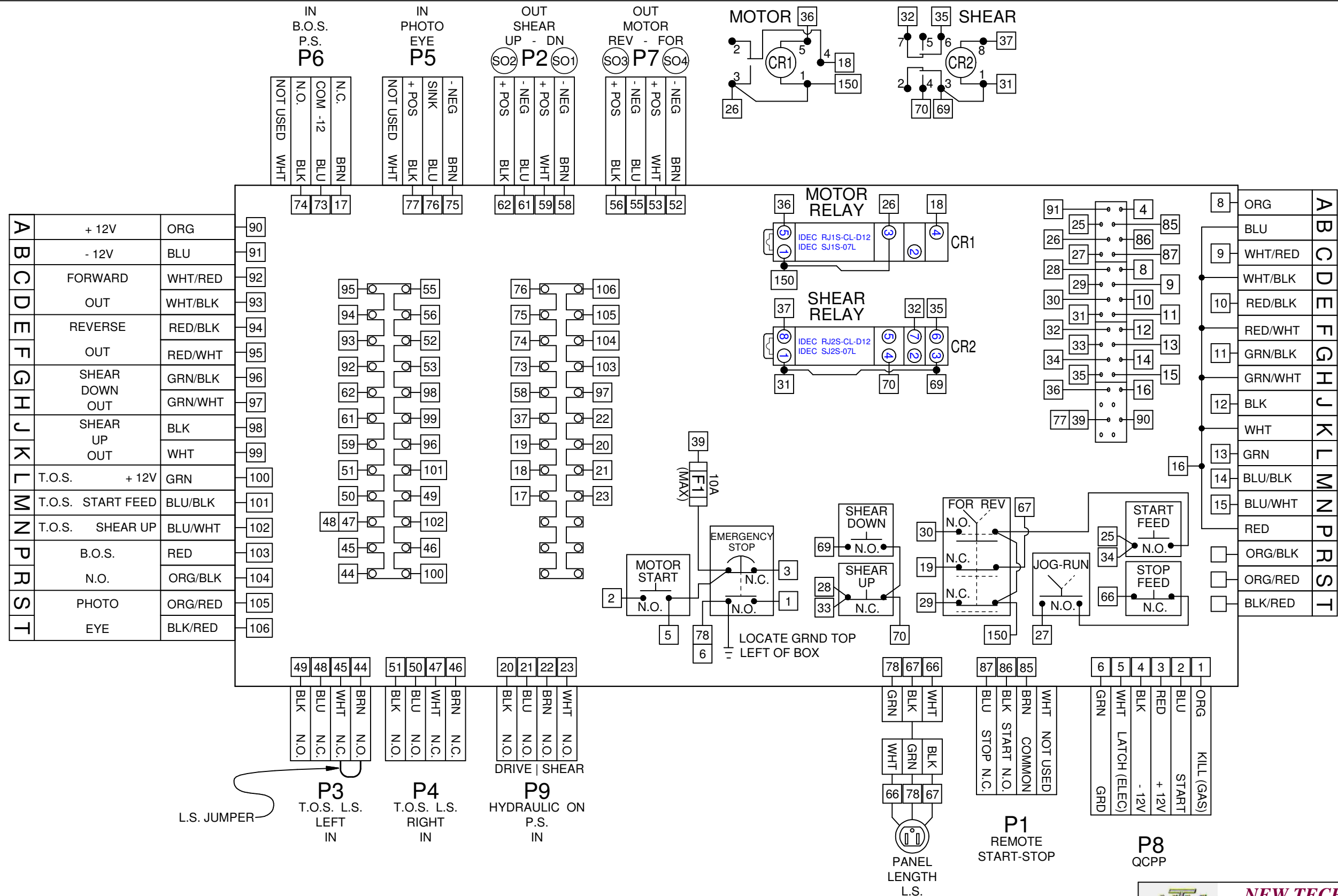
**CONTROL BOX ASSEMBLY**

DRAWN BY Fry	PART NAME CONTROL BOX ASSEMBLY	SHEET 1 OF 4	REVISION 8
DATE 10/11/04	PART NUMBER FWM-381-000		
CHECK BY J.D.			
DATE 08/30/04			



MATERIAL		SEE BOM	LENGTH	N/A	FINISH	NONE
REVISION HISTORY	REV	ECR NO.	DATE	RELEASED BY	TOLERANCES	
					.XX = ± .01	
					.XXX = ± .005	
					FRACTION = ± 1/32"	
					ANGLE = ± 1/2'	


**NEW TECH MACHINERY CORP.**  
**CONTROL BOX ASSEMBLY**  
 DRAWN BY Fry  
 DATE 06/24/04  
 CHECK BY  
 DATE  
 PART NAME  
**FWM-381-000**  
 PART NUMBER  
 SHEET 2 OF 4  
 REVISION 8



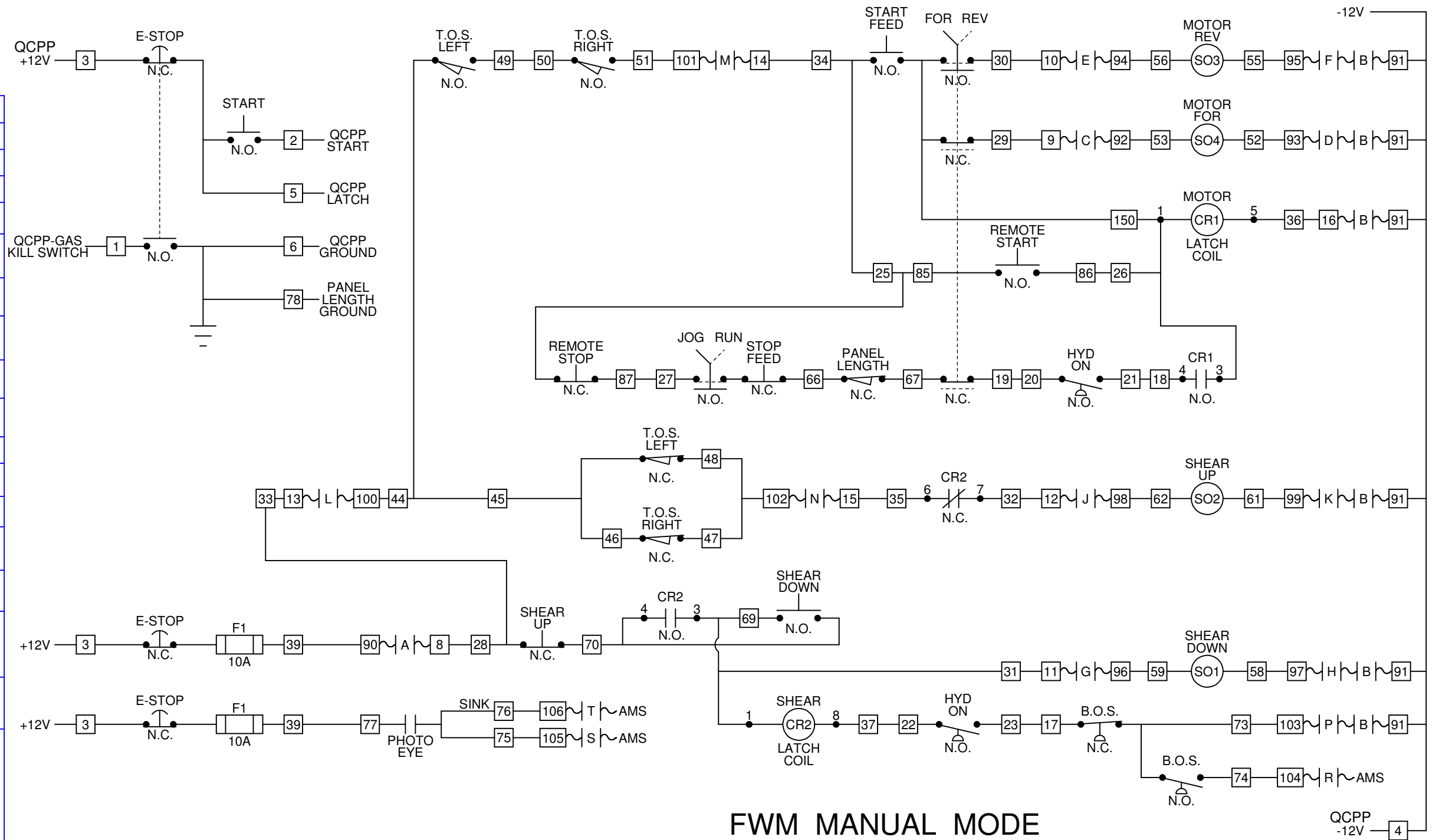
MATERIAL SEE BOM		LENGTH -	FINISH NONE
TOLERANCES		.XX = ± .01	
		.XXX = ± .005	
		FRACTION = ± 1/32"	
		ANGLE = ± 1/2"	

DRAWN BY GDP		PART NAME	
DATE 04/01/2009		CONTROL BOX ASSEMBLY	
CHECK BY	PART NUMBER	SHEET	REVISION
	FWM-381-000	3 OF 4	8

**NEW TECH MACHINERY CORP.**

**LEGEND**

	WIRE NUMBER
	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
	PUSH BUTTON 2-POSITION
	SELECTOR SWITCH 2-POSITION
	SELECTOR SWITCH 3-POSITION



**FWM MANUAL MODE**

MATERIAL	SEE BOM	LENGTH	N/A	FINISH	NONE
REV	ECR NO.	DATE	RELEASED BY	TOLERANCES .XX = ± .01 .XXX = ± .005 FRACTION = ± 1/32" ANGLE = ± 1/2"	

**NEW TECH MACHINERY CORP.**

**CONTROL BOX ASSEMBLY**

DRAWN BY GDP DATE 04/01/2009 CHECK BY DATE	PART NAME <b>CONTROL BOX ASSEMBLY</b> PART NUMBER <b>FWM-381-000</b>	SHEET <b>4 OF 4</b>	REVISION <b>8</b>
---	---	------------------------	----------------------



**New Tech Machinery**

1300 40th Street | Denver, Colorado 80205  
303-294-0538 | 800-574-1717 | Fax: 303-294-9407

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

**BG7-MAN-AMS | Revision 0 | 12-06-2012**