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MODEL CPO-350-VS PK-PD

AUTOLOADER SYSTEM



www.scotchman.com

CPO-350-VS PK-PD

COLD SAW

24ft LH & RH

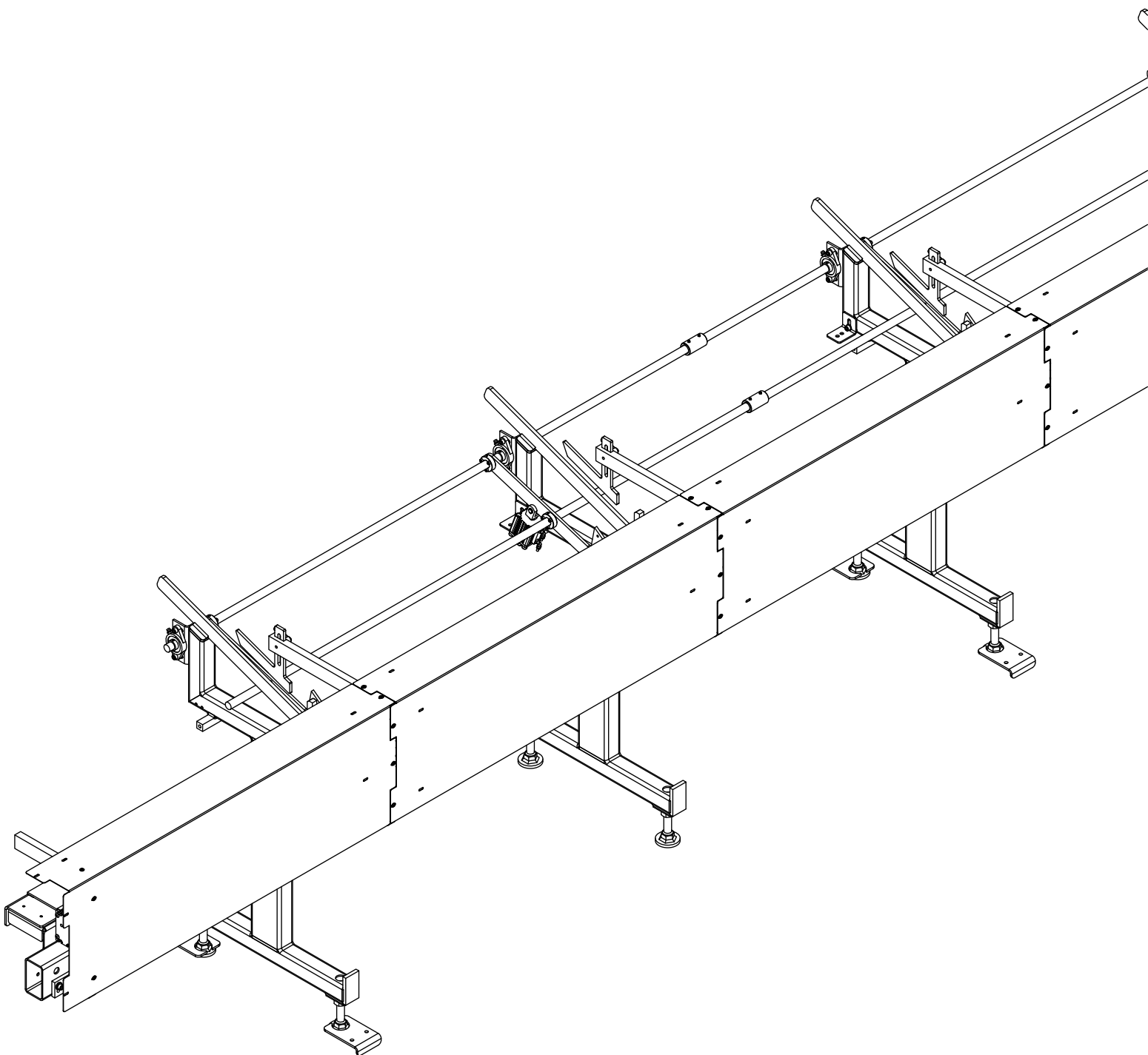
AUTOLOADER

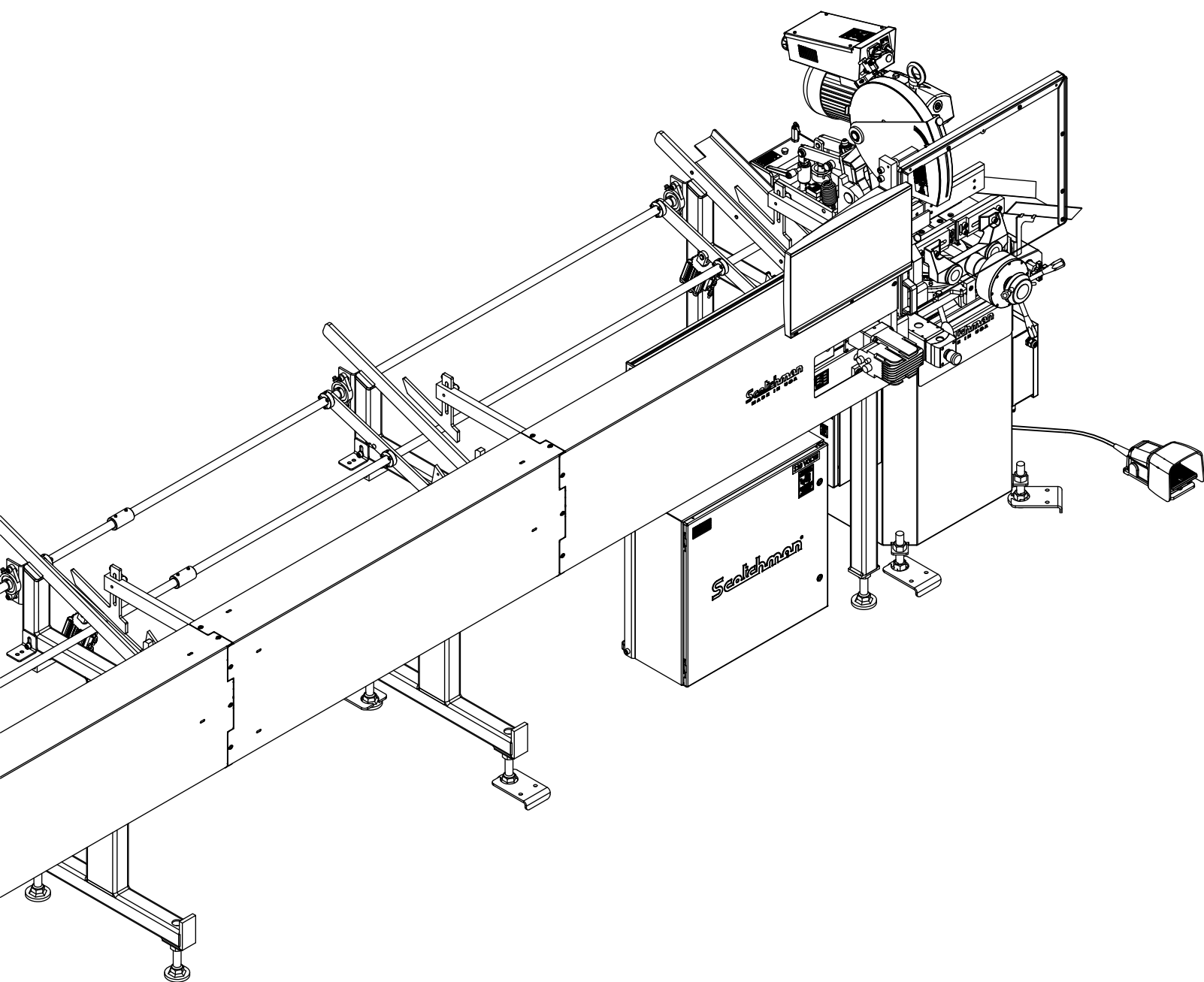
SYSTEM

S/N B12632 & AFTER

VERSION 4 - FEBRUARY 2024

24ft AUTOLOADER SYSTEM





Scotchman[®] Industries, Inc.

180 E US-14 • P.O. BOX 850

PHILIP, SOUTH DAKOTA 57567-0850 USA

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1.0 INTRODUCTION

The Scotchman CPO-350 VS PK-PD Saw with the 24ft Autoloader Supply System is a USA MADE sawing system with a Windows based TOUCH SCREEN CONTROL. Your cutting jobs can be stored along with an unlimited cut lists from 1/2" to 24' lengths. Quick setups and automatic part length change along with the automatic loading and fast reloading of material will save time, reduce scrap and eliminate costly mistakes. Length settings can be set to standard, or metric. This saw can cut solids, tubes, flats and some profiles in grades of material that range from hot and cold rolled steel, annealed tool steels, stainless steel, aluminum, brass, copper, synthetics and some extrusions. Cold sawing is a process similar to a milling process. In most cases the finished cut does not require any secondary machining or deburring. Since milling spindle speeds are used in cold sawing, there are several things that are required to achieve quality results. The selection of the proper pitch (number of teeth) on the blade and the proper spindle speed for the type of material being cut are critical. Proper material clamping and a good quality coolant are also important. Cold sawing has several advantages over band saws and abrasive saws. Besides the mill quality cut, cold saws have the ability to generate faster cutoff times than band saws. There are no sparks and excessive noises that are associated with abrasive cutoff saws. Cold saws also offer the advantage of blades that can be re-sharpened until the diameter of the blade will no longer cut through the material. The variable speed motor control also offers an even greater range of material that can be cut with one machine.

2.0 SAFETY PRECAUTIONS

1. Any individual operating this machine must be qualified, responsible and well instructed. This manual is not intended to teach untrained personnel how to operate equipment.
2. NEVER operate this machine with the guards disconnected or removed.
3. Wear eye protection at all times, when operating or observing this machine in operation.
4. Do not wear loose fitting clothing, gloves, or jewelry when operating this machine.
5. All electrical connections shall be made by a qualified electrician. This machine must be grounded in accordance with the National Electric Code.
6. Disconnect the machine from the power source before performing maintenance or changing blades.

- 7. Practice good housekeeping. Keep the area around the machine clean and dry.**
- 8. When sawing, always support long pieces and make sure that the material is properly clamped.**
- 9. Keep the guard, as well as all other parts of the saw, in good working condition. Replace worn parts promptly.**
- 10. Do not alter or modify this machine in any way without written permission from the manufacturer.**
- 11. This machine must be anchored to the floor.**

2.1 WARRANTY

Scotchman Industries, Inc. will, within one (1) year of the date of purchase, replace F.O.B. the factory or refund the purchase price for any goods which are defective in materials or workmanship, provided the buyer returns the warranty registration card within thirty (30) days of the purchase date and, at the seller's option, returns the defective goods freight and delivery prepaid to the seller, which shall be the buyer's sole and exclusive remedy for defective goods.

Hydraulic, pneumatic, and electric components are subject to their respective manufacturer's warranties.

This warranty does not apply to machines and/or components which have been altered, changed or modified in any way or subjected to abuse and abnormal use, inadequate maintenance and lubrication or subjected to use beyond the seller's recommended capacities and specifications.

In no event shall the seller be liable for labor cost expended on such goods or consequential damages.

The seller shall not be liable to the purchaser or any other person for loss or damage directly or indirectly arising from the use of the goods or from any other cause.

No officer, employee or agent of the seller is authorized to make any oral representations or warranty of fitness or to waive any of the foregoing terms of sale and none shall be binding on the seller.

Any electrical changes made to the standard machine due to local electrical code variation must be paid by purchaser.

As we constantly strive to improve our products, we reserve the right to make changes without notification.

3.0 INSTALLATION AND SETUP

- **CAUTION: THIS SECTION DISCUSSES INSTALLATION AND SETUP PROCEDURES. PLEASE READ THOROUGHLY BEFORE OPERATING THIS MACHINE.**

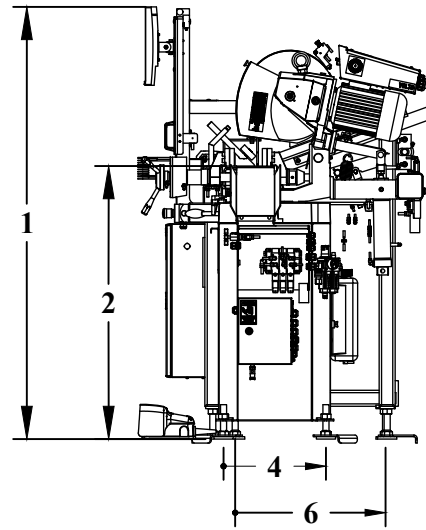
3.1 SPECIFICATIONS

3.1.1 PHYSICAL DIMENSIONS

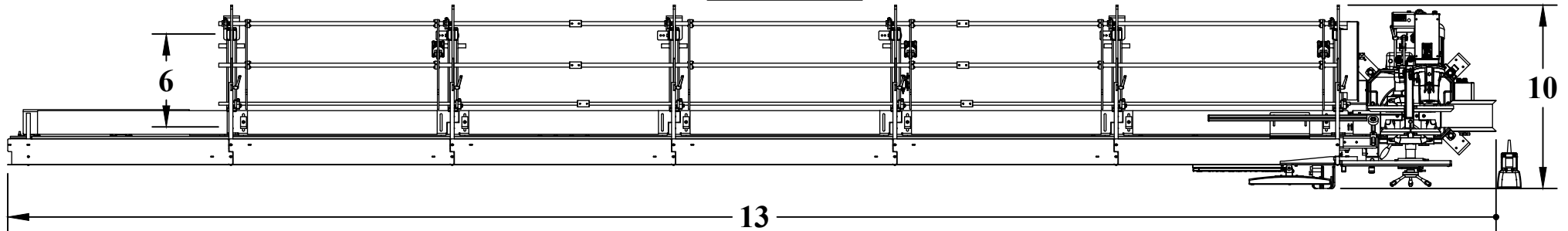
ITEM	DESCRIPTION	INCHES	CM
1	*Height	67-9/16	171.5
2	*Floor to Vise Bed	42-11/16	108.5
3	Saw Base Legs - Width	23-3/8	59.37
4	Saw Base Legs - Depth	16	40.75
5	Auto Track Legs Width	56	142.25
6	Auto Track Legs Front To Back	23-1/2	59.75
7	Last Leg to End of Feed Supply	56-11/16	143.99
8	*Auto Track Height	61.5	156.21
9	Auto Track Length	347-5/16	882.25
10	Auto Track Width	46-3/8	117.75
11	*Auto Track Elec. Box to Floor	9-5/8	24.5
12	*Bottom of Auto Track to Floor	34-5/8	88
13	System Length	376-9/16	956.47
14	Saw Weight	815 LBS	370 KG
15	Auto Track Weight	2000 LBS	820 KG

***Factory Set Height**

SIDE VIEW



TOP VIEW



FRONT VIEW

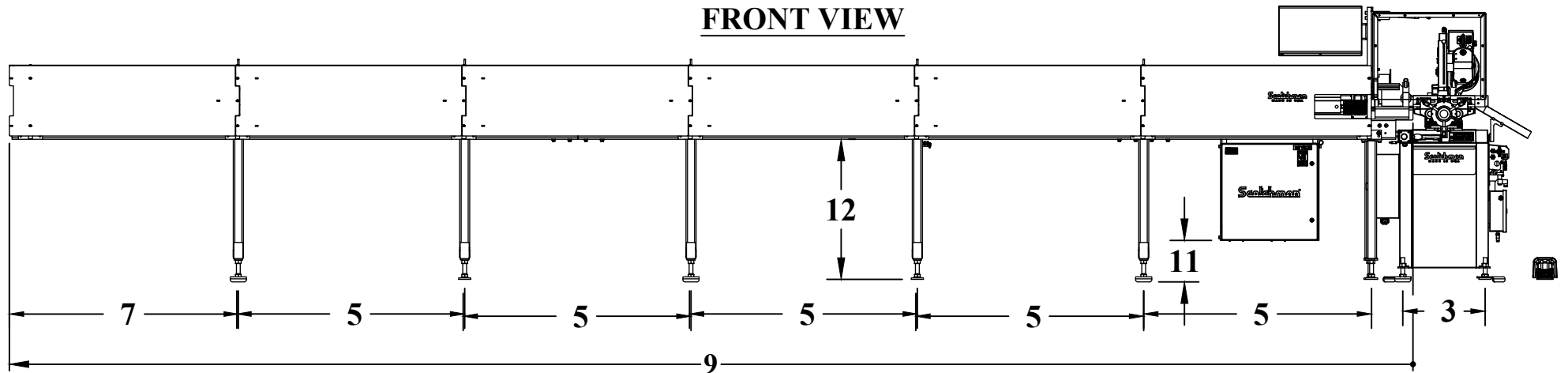


FIGURE 1

3.1.2 SAW CAPACITIES

NOTE: The saw can only be mitered in one direction. The direction depends on whether it is a LEFT SIDE FEED saw or a RIGHT SIDE FEED saw.

NOTE: Standard jaws allow for mitering up to 75°. For mitering angles up to 45°, mitering jaws are necessary. See Section 10.5 MITERING JAWS

PLEASE SEE BELOW:

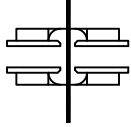
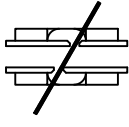
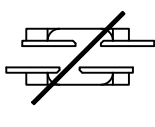
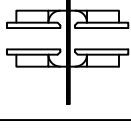
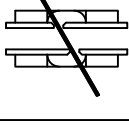
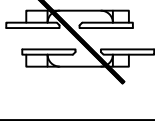




CAPACITIES WITH MAXIMUM DIAMETER BLADES (350 MM) 13- ³ / ₄ "		—▶ <u>LEFT TO RIGHT FEED</u> —▶		
		90° 	60° 	45° 
		◀ <u>RIGHT TO LEFT FEED</u> ◀		
		90° 	60° 	45° 
	INCHES MM	Ø 3 Ø 76	Ø 2 Ø 51	Ø 2 Ø 51
	INCHES MM	3 X 3 76 X 76	2 X 2 51 X 51	2 X 2 51 X 51
	INCHES MM	Ø 1 ³ / ₄ Ø 45	Ø 1 ³ / ₄ Ø 45	Ø 1 ³ / ₄ Ø 45
	INCHES MM	1½ X 1½ 38 X 38	1½ X 1½ 38 X 38	1½ X 1½ 38 X 38

FIGURE 2

3.1.3 AUTO TRACK CAPACITIES

Auto track can handle material ranging from 3/4 in to 3 inches as standard equipment.

Please refer to SECTION 3.1.2 or contact Scotchman for additional capacities.

3.2 PHYSICAL INSPECTION

Any damage to the machine during shipment should be reported to the delivery carrier immediately.

A damage report must be made so that a claim can be placed. The carrier is responsible for shipping damage, but it is the customer's responsibility to report damages, external or internal.

Remove any packing material and draw the saw head to its DOWN position to make sure that the guard opens properly. The guard should close completely when the head is up and open freely as the head travels down.

If the guard is not functioning properly, REFER TO SECTION 4.11.3.

With the head in the UP position, check the oil level in the gear box through the sight glass in the gear box casting. It is located opposite of the saw blade guard on the right side behind the E-Stop. The preferred oil level is in the middle of the sight. If no oil is seen, the gear box must be topped off before use. For the saw head, use a non-EP additive ISO-460 gear oil specified for worm gears. Oils containing EP additives may degrade or damage bronze gears and must be avoided. Mobil 600W Super Cylinder Oil is highly recommended and available from the factory under P/N 075758.

BEFORE turning on the power and hooking up the compressed air - Refer to SECTION 4.1 for instructions for the Filter/Regulator/Lubricator, SECTION 4.10 for the Power Visé and SECTION 4.11 for the Power Down Feed for additional information.

3.3 ELECTRICAL REQUIREMENTS

► **CAUTION** : TO PREVENT DAMAGE TO THE MOTOR AND DANGER TO THE OPERATOR, ALL ELECTRICAL CONNECTIONS MUST BE MADE BY A LICENSED ELECTRICIAN. THIS MACHINE OPERATES WITH LIQUID COOLANT AND MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL ELECTRIC CODES.

This machine is available as 208V, 230V 1PH, 230V and 460V. The motors used on this machine are three phase, dual voltage and will operate on either 208/230V or 460V. A variable speed drive is used to control the motor and also acts as a phase converter for single phase machines. The variable speed drives are voltage specific. If the machine is not the same voltage or phase as your plant supply it will be necessary to replace the variable speed drive, change the primary leads on the transformer, and rewire the motor and the coolant pump, if equipped with optional flood coolant. To ensure satisfactory performance, the supply voltage should be (+ or -) 10% of the motor voltage rating. Check the motor data tag for full load current requirement. For supply lines ten feet (3m) or shorter, we recommend 12-gauge wire. For lines longer than ten feet (3m), we recommend 10-gauge wire. We do not recommend supply lines over twenty feet (6m).

► **NOTE:** For Single Phase applications, we recommend 6-GAUGE supply line as well as a 50 AMP protection device.

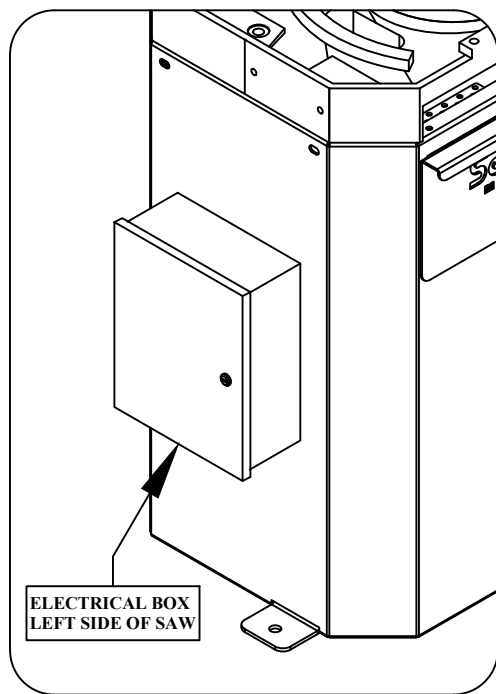
POWER REQUIREMENTS

MOTOR VOLTAGE	FULL LOAD CURRENT
208	18
230 1PH	50
230	17.3
460	11.7

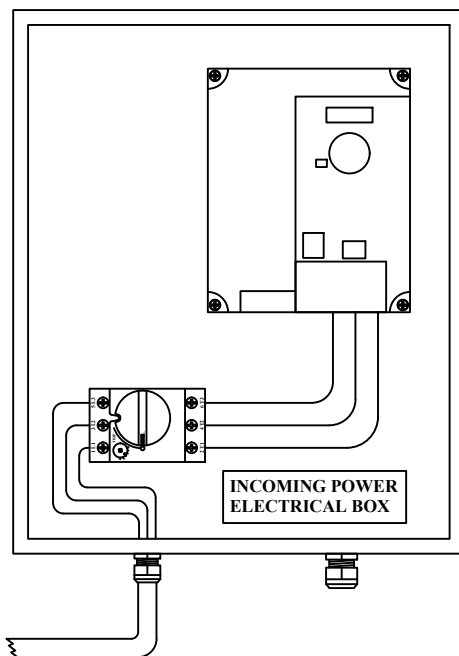
There is an electrical enclosure mounted to the saw base for the incoming 3 phase power. Facing the front of saw, it is mounted on the left side and the power cord enters from the bottom.

There is also another electrical enclosure mounted to the Auto Track that needs to be plugged into a standard 15A 120V outlet.

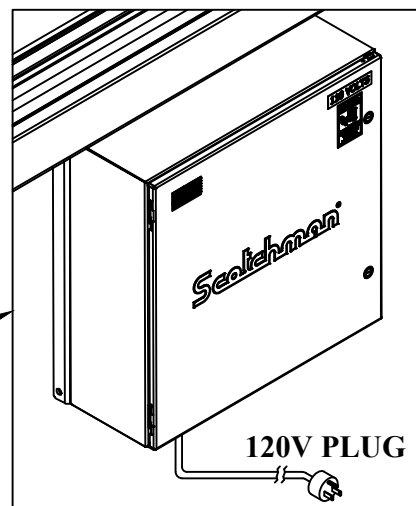
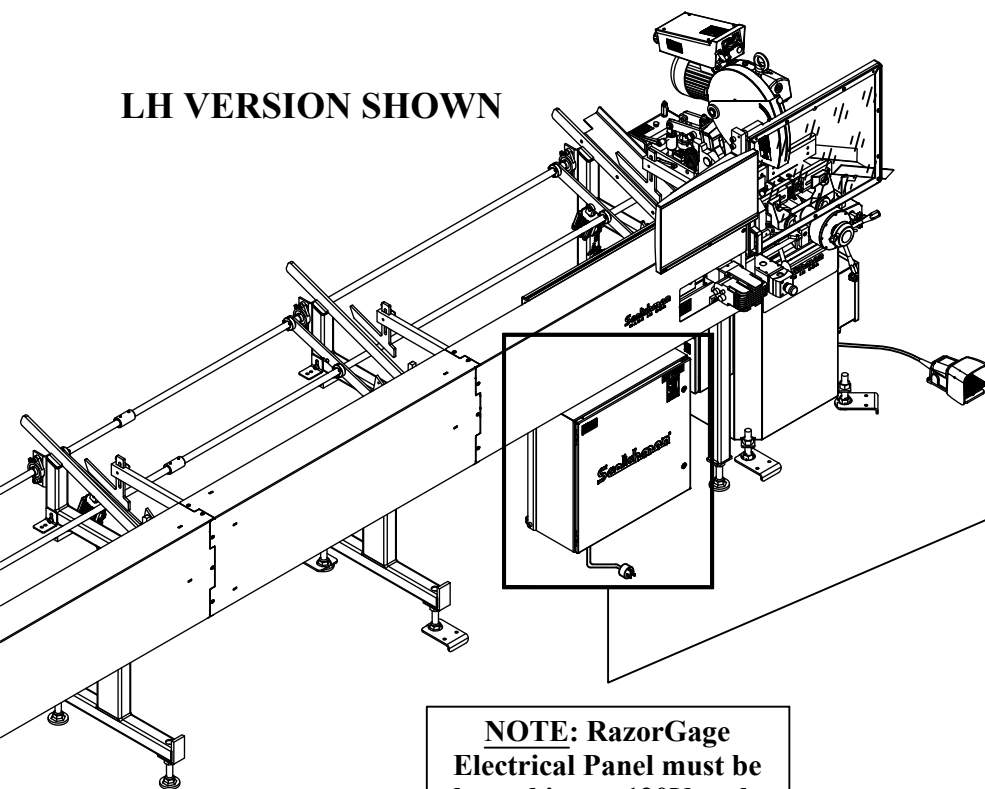
Please see FIGURE 3 on the next page for the location of both electrical enclosures. Electrical Diagrams for this saw are located at the end of this manual in Sect. 13.0 and 14.0.



INCOMING
3-PHASE
POWER



LH VERSION SHOWN



NOTE: RazorGage
Electrical Panel must be
plugged into a 120V outlet.

FIGURE 3

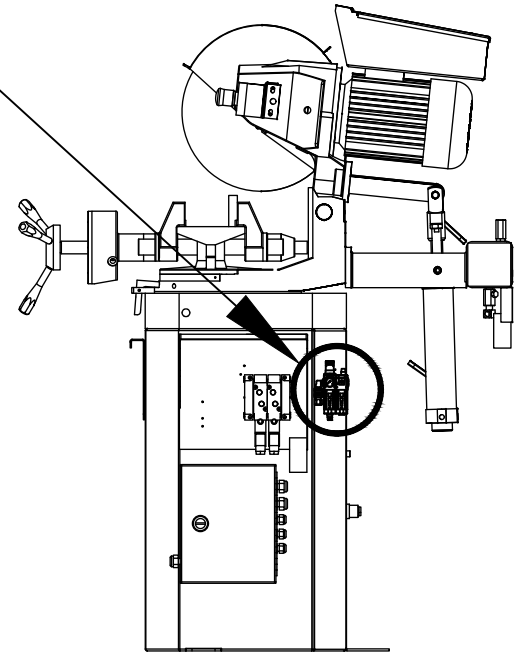
3.4 PNEUMATIC REQUIREMENTS

The incoming supply of compressed air enters the saw via the shuttle valve located on the left side of the FRL. The shuttle valve is used to turn the air to the saw off and on.

The FRL is located on the right side of the saw towards the back.

Do not connect the air supply yet.

SEE SECTION 4.1 & 8.3
FOR DETAILED FILTER
REGULATOR LUBRICATOR
INSTRUCTIONS AND MAINTENANCE



1. Before connecting the air supply to the saw, make sure that the lubricator device is full of oil. The lubricator is on the right side. Oil level can be seen thru the windows on the lubricator. If oil needs to be added, use air line oil and follow the instructions on the right side of PAGE 63.
3. Make sure that the vise is clear and that the saw head is in the UP position.
4. Connect the air supply to the shuttle valve. It's shown on the lower right on PAGE 63.
5. Slide the shuttle valve to open the valve. Whenever the shuttle valve is closed, it bleeds the air pressure out of the system automatically.
6. Adjust the air pressure regulator to 90 PSI (6.2 BAR). This is the minimum operating pressure. 105 PSI (7.2 BAR) is the maximum. If adjustment is needed, follow the instructions on the upper left of SECTION 8.3 on PAGE 63.

NOTE: The regulator has a filter and a water trap. The water trap and the lubricator should be inspected at regular intervals. To empty the water trap, follow the instructions on the left side of SECTION 8.3 on PAGE 63.

3.5 SYSTEM SET UP

- **NOTE:** UPON RECEIVING THE SYSTEM, THE SYSTEM WILL NEED TO BE SET UP BY A TRAINED TECHNICIAN. THE FOLLOWING STEPS OUTLINED BELOW NEED TO BE DONE:

3.5.1 LEVELING THE SYSTEM

- **NOTE:** ONCE THE AUTOLOADER IS IN POSITION, THE SAW AND THE AUTO TRACK MUST BE LEVEL. THEY MUST ALSO BE SQUARE AND LEVEL WITH EACH OTHER. THIS IS VITAL FOR THE SAW TO FUNCTION CORRECTLY AND CUT ACCURATELY.

SEE THE FIGURE 4 ON THE FOLLOWING PAGE

The foot assemblies (1) are threaded into the base of the saw and into the legs of the Auto Track system. The foot assemblies are used to level the saw by adjusting each one in or out. Each foot assembly has a nut (2) that is used to lock the foot into place by tightening it up against the saw base or leg. A well made top quality level should be used for this process. Saw and Auto Track must be level side to side and front to back.

Once the leveling process is completed there are foot clamps (4) that need to be placed on top of the foot and anchored solidly to the concrete floor. These will hold the saw and Auto Track in place. There are two holes in the foot clamp to do this.

3.5.2 ATTACHING SAW TO AUTO TRACK

- **NOTE:** THE SAW AND THE AUTO TRACK MUST BE SOLIDLY ATTACHED TO EACH OTHER. THIS IS DONE WITH THE CONNECTION BRACKET.

SEE FIGURE 5 on PAGE 12.

The connection bracket (1) bolts to the side of the saw casting with two M10 x 30 SHCS bolts (2) and two M10 flat washers (3).

The bracket attaches to a bottom tube on the Auto Track with two M10 x 30 SHCS bolts (2) and two thicker hard washers (4). This end of the bracket has slotted holes to allow for some adjustment.

Leave the bolts loose until saw and Auto Track are level and square. Then final tighten the four bolts.

3.5.1 LEVELING THE SYSTEM

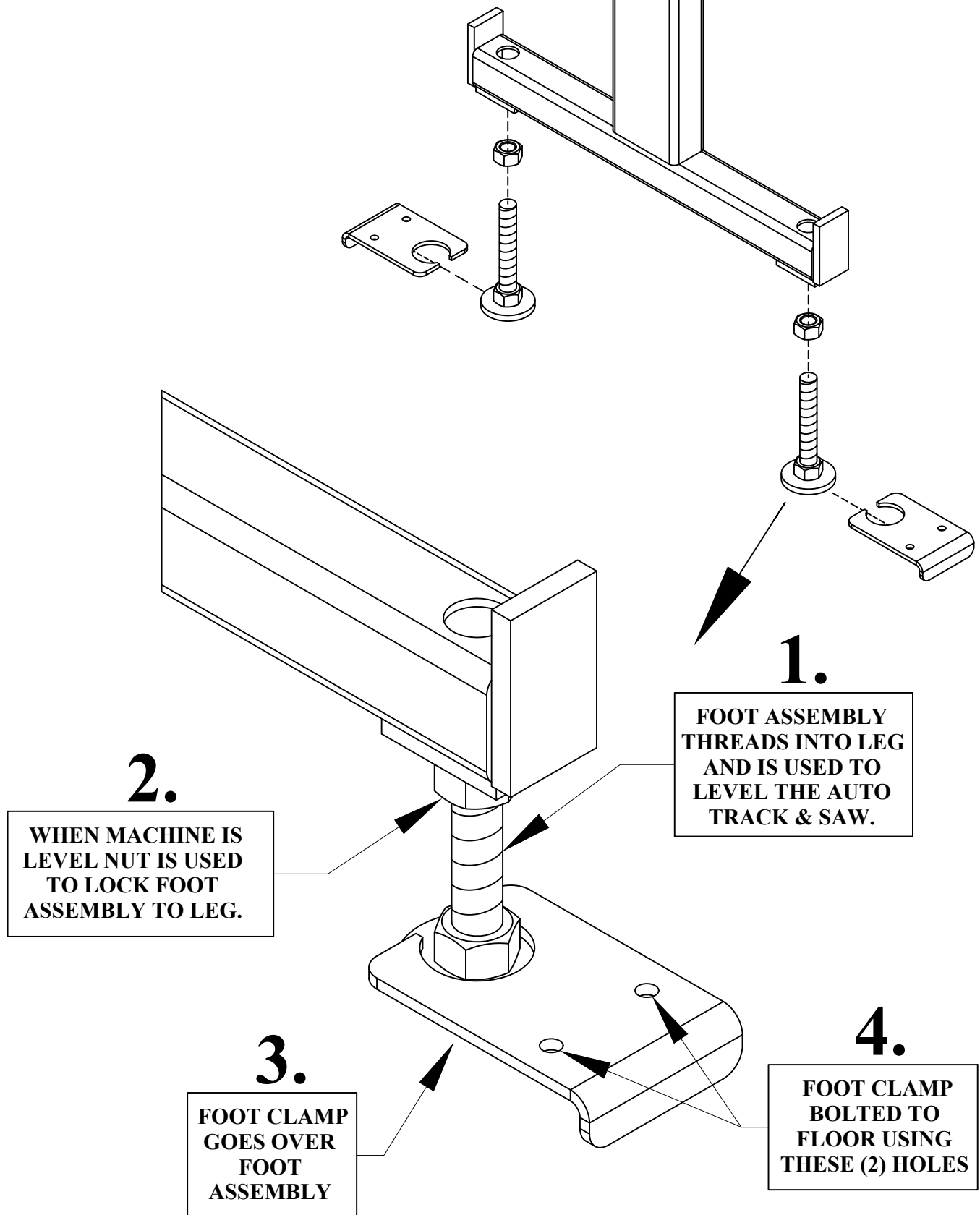


FIGURE 4

**3.5.2 ATTACHING SAW
TO FEED SYSTEM**

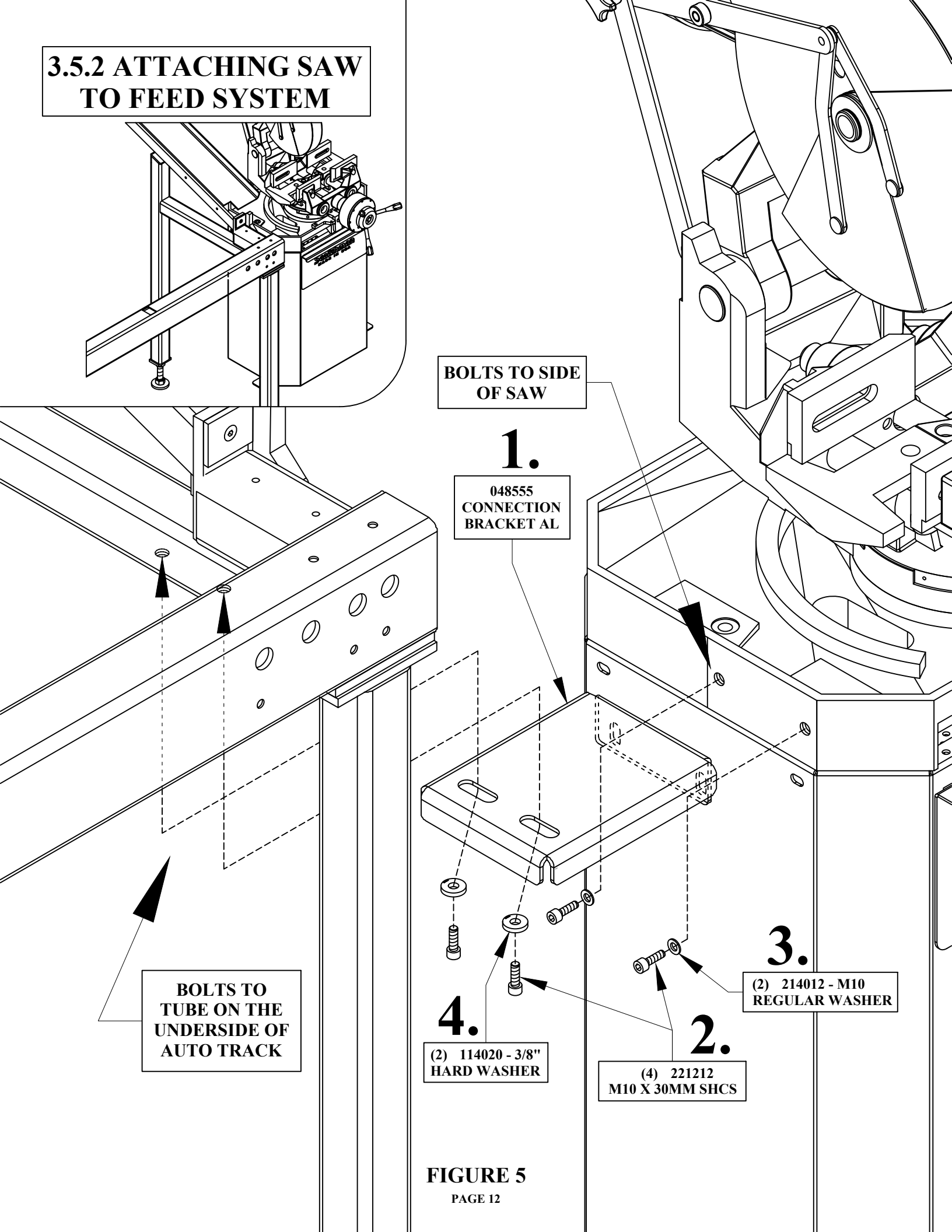


FIGURE 5

3.6 MACHINE START UP

3.6.1 STARTING THE SAW

Before starting this machine, take the time to review the operator's manual thoroughly and familiarize yourself with all of the functions of the machine.

We strongly urge you to follow OSHA directive CFR-1910.147 (effective 09-09-90) regarding lock-out, tag-out procedures. Keep in mind that the directive refers to all hazardous energy sources, not just electrical.

This machine is equipped with a power vise and a power down feed, the air supply must also be disconnected and locked or tagged.

Do not install a blade on the saw until after it has been powered and cycled several times.

To power the saw, open the safety barrier, ensure the blade guard is down, and turn the motor switch to the START position. The switch will remain in the ON position and continue to run until switched OFF, regardless of the safety barrier position. The foot switch can be used to cycle the saw head without starting the motor by leaving the motor switch in the OFF position.

We do not recommend using the emergency stop switch to turn the machine off during normal operation. If the emergency stop switch is used, it must be manually reset by pulling the switch back out. Every time the emergency stop is used, the Auto Track has to re-home. Use the emergency stop only for emergencies. See Sect. 3.7.2 for details.

Always turn the motor switch to the off position when the saw is not in use.

Once the machine has been powered, check the rotation of the spindle. There is an arrow on the guard showing the proper rotation. The variable speed motor control has a speed range of 11 to 176 RPM.

3.6.2 STARTING THE AUTO TRACK

► **NOTE:** This system has to be plugged into a 120v outlet in addition to the 3 phase power the saw requires.

After the power and air are connected to the saw, make sure the clear barrier is down and Emergency Stop button (1) is pulled out. It is located on the left side of the base, just below the vise handles.

Push the start button (2) located on the side of the larger electrical enclosure bolted to the feed side of the saw. The button will turn green to show you have power. Then push the start button for the computer located next to it. SEE DETAIL (4) BELOW

The switch for the control screen (3) on the bottom or back side of the screen also must be turned on.

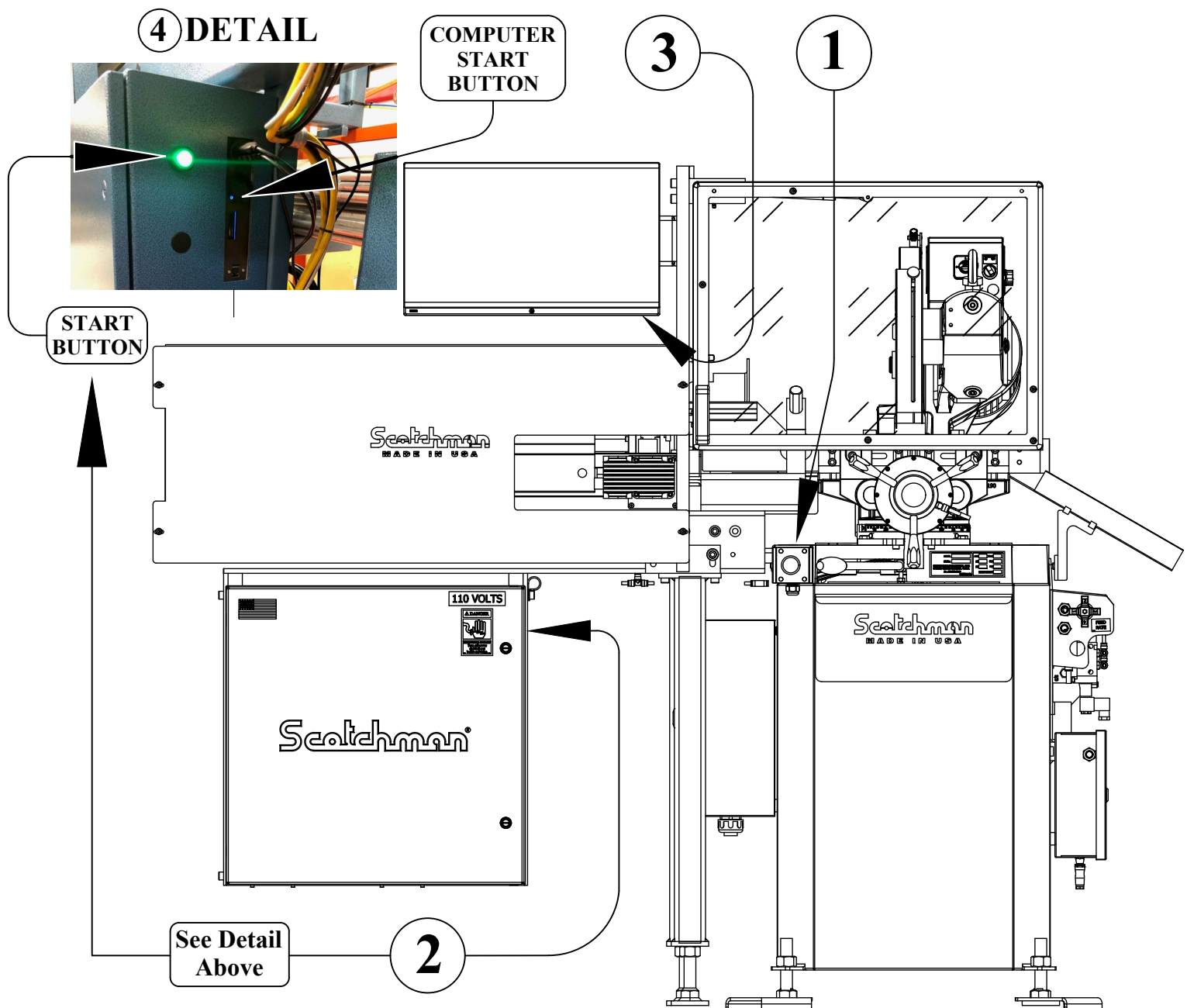


FIGURE 6

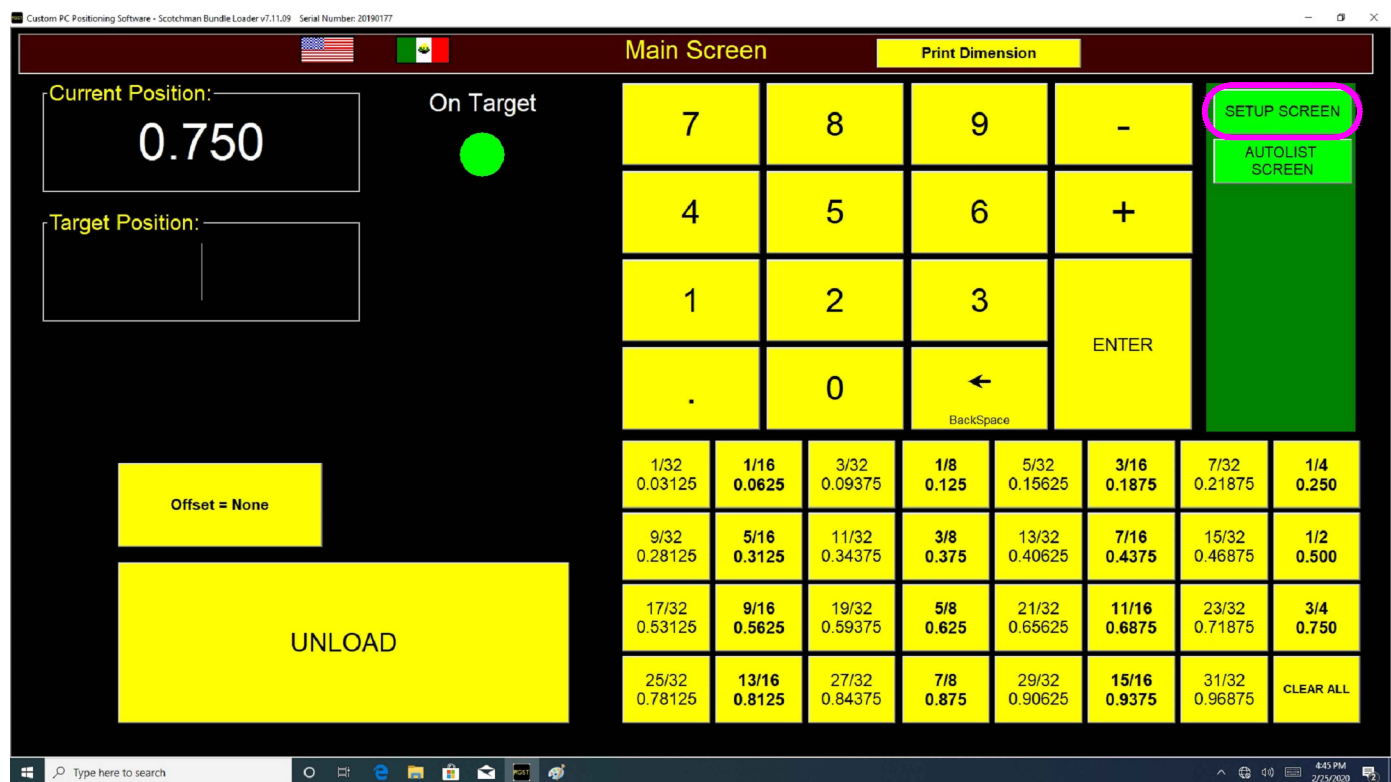
3.7 RAZORGAGE SETUP

3.7.1 RAZORGAGE SETUP SCREEN

From the SETUP SCREEN you can home or recalibrate the RazorGage, and adjust User Parameters as necessary. The RazorGage does home itself every time it is started, so it usually isn't necessary to home it again during operation. Calibration of the RazorGage should only be necessary if the length or location of the pusher was changed or if the saw was disassembled and/or moved. The User Parameters password will need to be entered to calibrate the RazorGage. The User Parameters password is “90210”. This password also unlocks the User Parameters tab for modification. This tab controls the various movement parameters such as speed, deceleration, etc. of the pusher. These parameters are set to the suggested values at the factory, but may need to be adjusted to compensate for certain materials or for optimizing cycle times. The System Parameters Tab is located on the left side of the screen and contains values relating to the setup of the system. These parameters are set during initial setup and will not need to be modified.

3.7.2 HOME FROM THE SETUP SCREEN

1. From the main screen below, tap the SETUP SCREEN button on the upper right.



2. Tap the Home The Positioner button and the RazorGage will home itself by the pusher moving toward the saw and contacting an internal hard stop.

Custom PC Positioning Software - Scotchman Bundle Loader v7.11.09 Serial Number: 20190177

Setup Screen

System Parameters

Stroke: 72.000
Scale: 3465.000
Home Offset: 0.373

☒ Metric

☐ Home Left
☐ Home Right

ST Extrusion ☒

User Parameters

Speed: 10.000
Unload Dist: 5.000
Accel: 30.000
Load Offset: 11.000
Decel: 20.000
Saw Kerf: 0.070
Run Current: 100%
Clamp Offset: 2.000
Load Speed: 30.000
First Move Speed: 10

I/O Option

M-Drive BMI+ (CPO)

Loader ON Sec: 2
Loader OFF Sec: 2

☒ Check to disable out of material switch.

Function Buttons:

- Move to Lower Limit
- Move to Upper Limit
- Controls Test
- Run Index Locator
- Calibrate
- Home The Positioner** (highlighted)
- Run Laser Routine
- Run Break-In
- Printer Setup
- Trigger Loader

Password: _____

Save Changes

3.7.3 RAZORGAGE CALIBRATION

The RazorGage is calibrated when it leaves the factory. Once it's been calibrated it shouldn't need to be calibrated again unless something was changed - such as the location or length of the parts pusher.

If the saw blade was changed to one with a different thickness, that will change the length of the part. Go to the Setup Screen and change the "Saw Kerf" to match the thickness of the saw blade.

The calibration of the RazorGage is done so it knows where it's home is. Home is basically the starting point from where all lengths are referenced from. This is necessary in order for the sawed parts to be cut to the proper length.

Calibrating the RazorGage involves cutting a part and measuring it. This measurement is actually an offset that compensates for the length of the parts pusher and saw blade thickness.

For calibration instructions, see Sect. 6.4.

4.0 SAW OPERATION

4.1 FILTER REGULATOR LUBRICATOR (FRL)

The Filter Regulator Lubricator (FRL) needs to be inspected and adjusted before operating the saw.

SEE FIGURE 7 BELOW:

1. The lubricating device (1) is located on the right side of the FRL. On top of the lubricating device is a clear plastic dome (2) with a small copper tube inside. The copper tube should release one drop of oil every 5 to 10 cycles. If the lubricating device needs to be adjusted, the clear plastic dome has a small brass screw on top where a small straight screwdriver can be used to adjust the amount of oil.
2. To add oil to the lubricating device, disconnect the air supply remove oil reservoir by pressing in the tab on the clear plastic part at the bottom and turning it counter-clockwise till it stops. Then pull reservoir free from the oiler. Fill reservoir with air line oil 1/2"-3/4" from the top and reattach in reverse order.
3. Adjust the air pressure regulator to 90 PSI (6.2 BAR). This is the minimum operating pressure. 105 PSI (7.2 BAR) is the maximum. If adjustment is needed, follow the instructions on the upper left of SECTION 8.3 on PAGE 63.

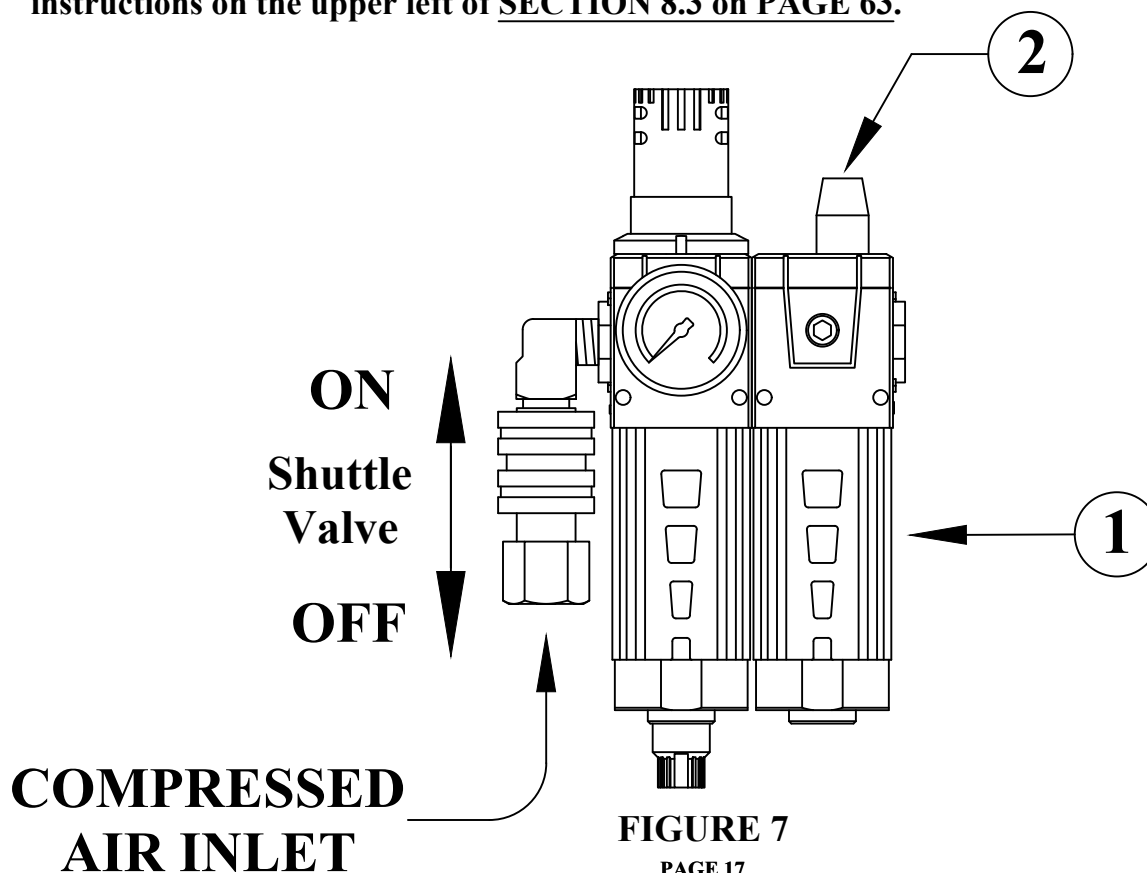


FIGURE 7

4.2 COOLANT SYSTEM

The coolant system on this machine is a pneumatic mist type. We recommend using only pure, synthetic, water soluble cutting oils. One gallon of concentrated coolant is shipped with the saw. For normal cutting, it should be mixed in a ratio of one part coolant to seven parts water. In conditions of heavier cutting, the ratio of water should be reduced to five parts. Pre-mixing the coolant before adding it to the saw is also recommended. We also have a coolant available for use on stainless steel. The pressure regulator for the mister should be set at 15 psi (1 bar). The amount air is regulated by the adjustment knob on top of the mister. The amount of coolant is regulated by the nozzle on the end of the mister unit. The mist spray should be evenly distributed on both sides of the saw blade.

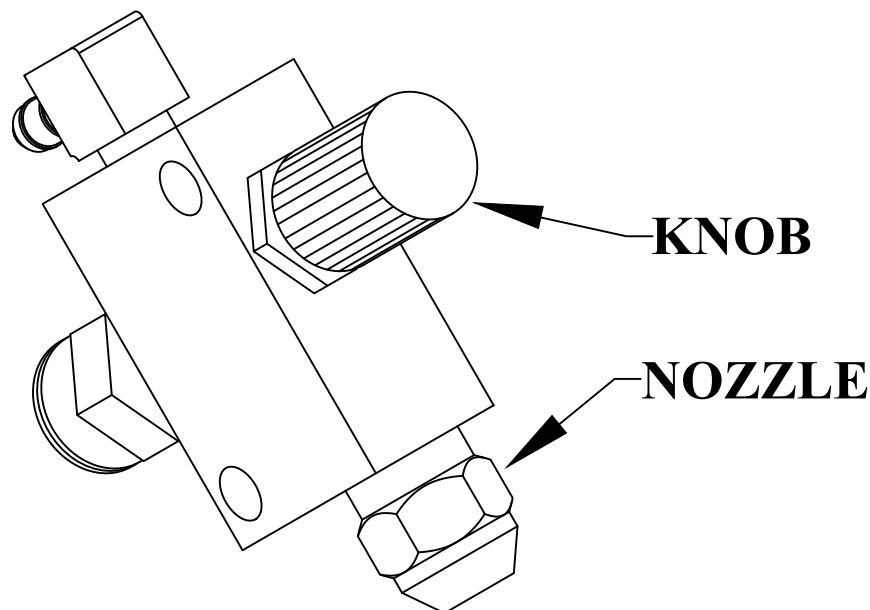
Part numbers for our saw coolant are shown below:

SYNTHETIC SAWING COOLANT

**P/N 075751 - ONE GALLON
P/N 075752 - FIVE GALLONS**

COOLANT FOR STAINLESS STEEL

**P/N 075756 - ONE GALLON
P/N 075757 - FIVE GALLONS**



MISTER UNIT

4.3 EMERGENCY STOP BUTTON

The **EMERGENCY STOP** is located just below and to the left of the vise handles as shown below. It should be used in situations where the saw needs to be stopped immediately. Pushing in the **EMERGENCY STOP** completely stops the saw and the saw head returns to the up position. The screen will show the word "E-Stop" with the background flashing yellow and red behind it.

The saw must be restarted by releasing the emergency stop and by pushing the start button on the side of the large electrical box as shown in SECTION 3.6.2. It will have to home itself and will start back on the main screen. This will also push out any material as it homes. Make sure the reason the saw was stopped is addressed, and any material removed before starting again.

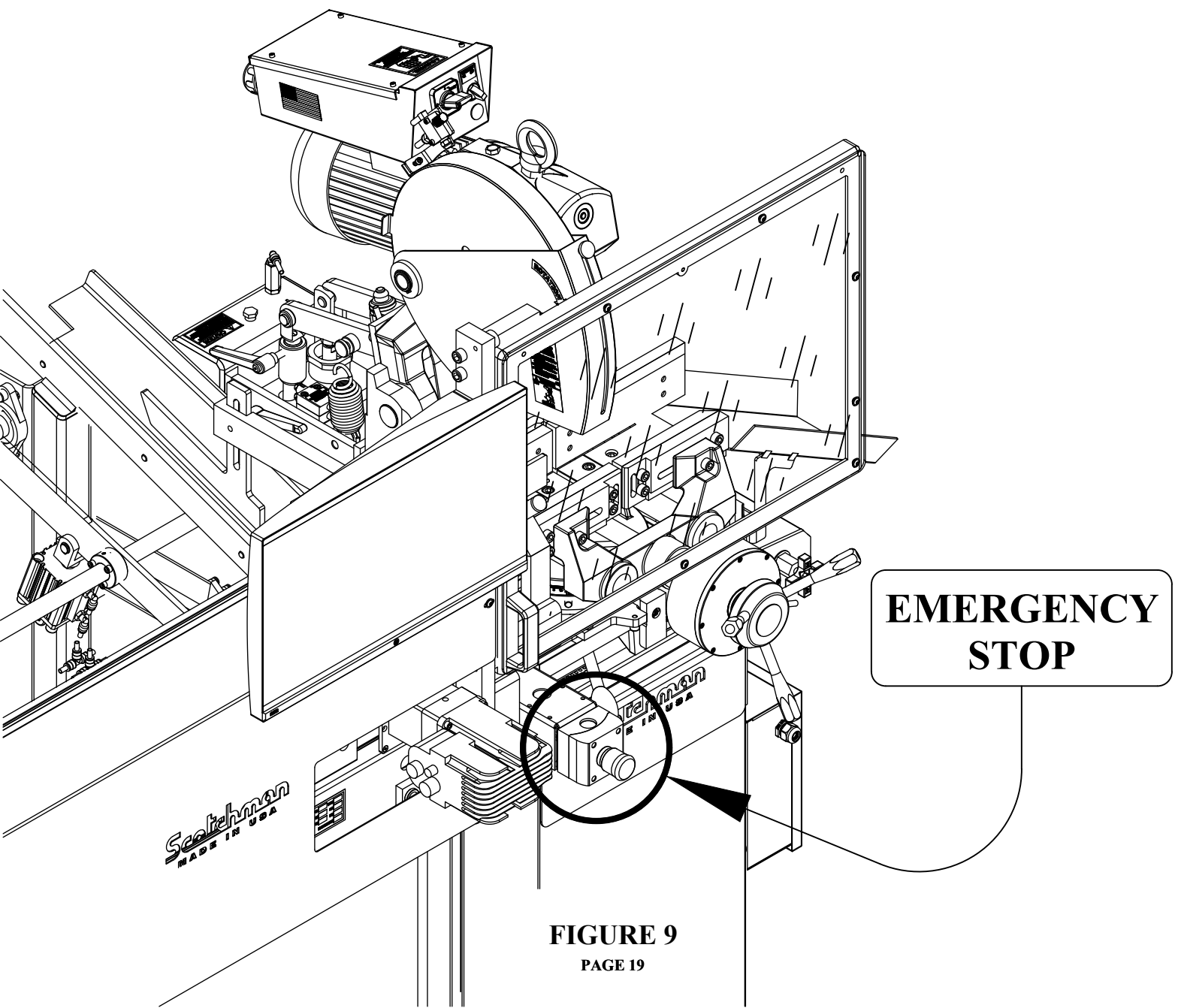


FIGURE 9

4.4 FEED/CLAMP SWITCH

The FEED/CLAMP ON/OFF switch is located in the front of the electrical box on top of the motor. If the FEED/CLAMP switch is in the ON position the saw works normally. If it is in the OFF position the saw vise will clamp and the saw head will not move from the up position. The saw motor is still able to run but the saw will not cycle until the switch is back in the ON position.

The FEED/CLAMP switch is intended for use when setting up the saw. Depending on material, sometimes it is necessary to only apply light clamping pressure (i.e. thin wall tubing) to prevent distortion. The FEED/CLAMP switch is used to manually trigger the vise so that the clamping pressure can be adjusted based on the extension of the cylinder. If finer adjustment is necessary, an optional vise pressure regulator is available. Contact your dealer or the factory for more information.

The FEED/CLAMP switch should only be used during set up. If the saw needs to be stopped during use, the emergency stop should be used.

NOTE: If the EMERGENCY STOP is used to stop the saw it will interrupt the program and the feed system has to find home again before restarting.

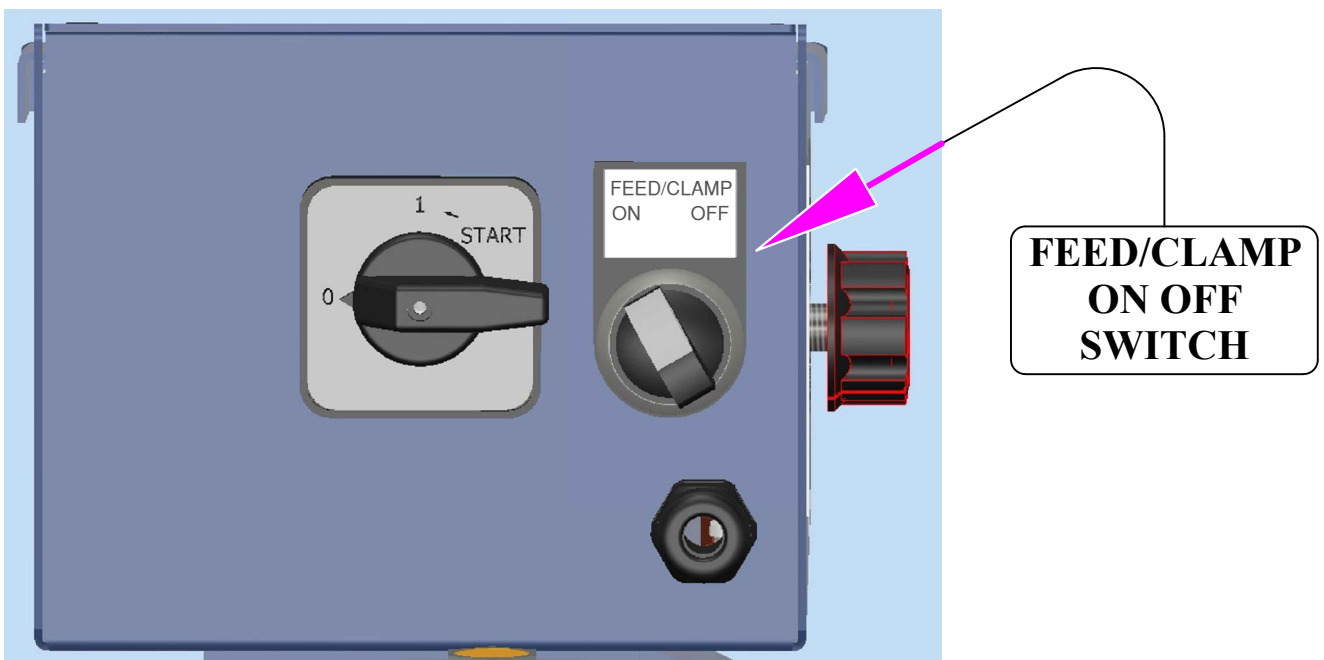
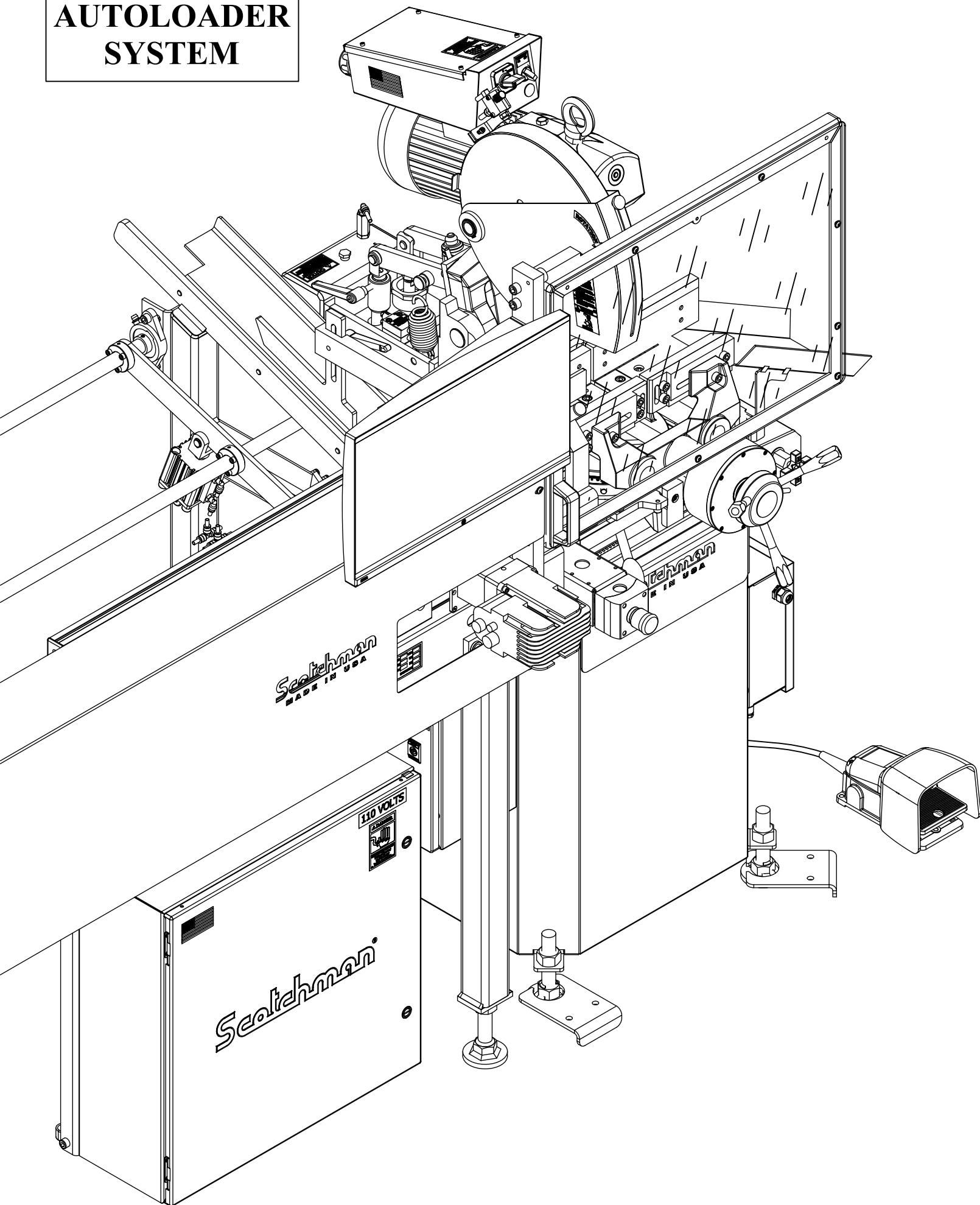


FIGURE 10

AUTOLOADER SYSTEM



4.5 SAFETY BARRIER

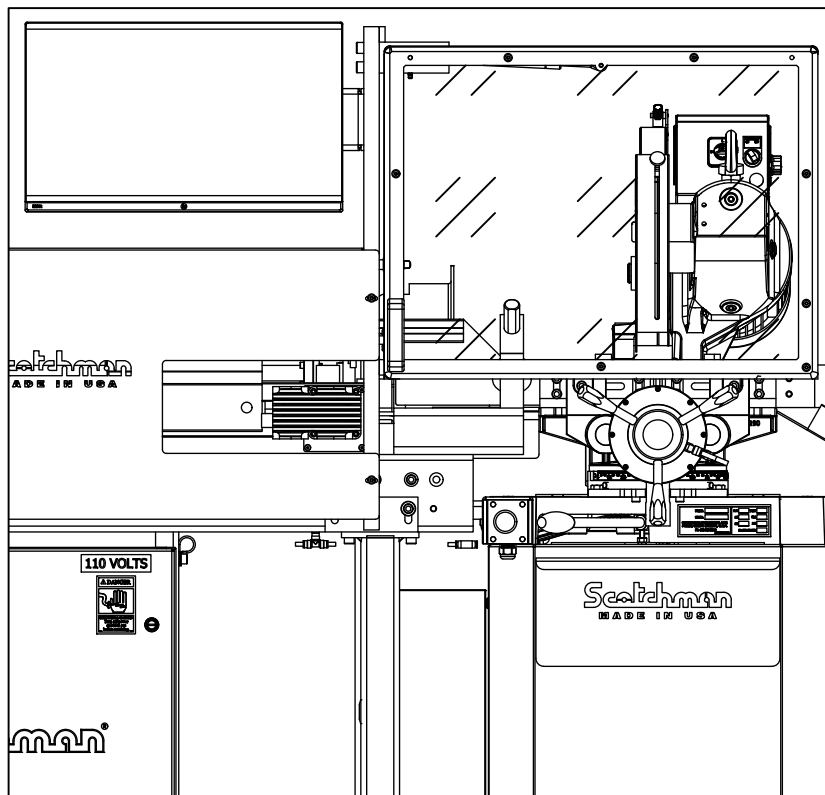
The AutoLoader System features a safety barrier in front of the cutting area. This barrier is meant to prevent inadvertent contact with the blade or vise areas during automatic operation.

The safety barrier is equipped with a safety interlock switch to prevent automatic and semi-automatic use of the saw when the barrier is raised. In the raised position the saw can only be cycled manually by pressing and holding the foot pedal. This is intended for set up purposes only. Always make sure the blade guard is in place and set properly before cycling.

If the RazorGage Program is initiated while the barrier is raised, the pusher will move but the saw will not cycle. The barrier must be lowered and saw cycled manually in this case.

NOTE: RAISING THE BARRIER DURING A CUT WILL CAUSE THE SAW TO ABORT THE CUTTING PROGRESS. THE BARRIER SHOULD NOT BE USED FOR THIS FUNCTION. IF THE SAW NEEDS TO BE STOPPED DURING USE, THE PAUSE RUN OR EMERGENCY STOP SHOULD BE USED.

SAFETY BARRIER IN THE DOWN POSITION.



SAFETY BARRIER IN THE UP POSITION.

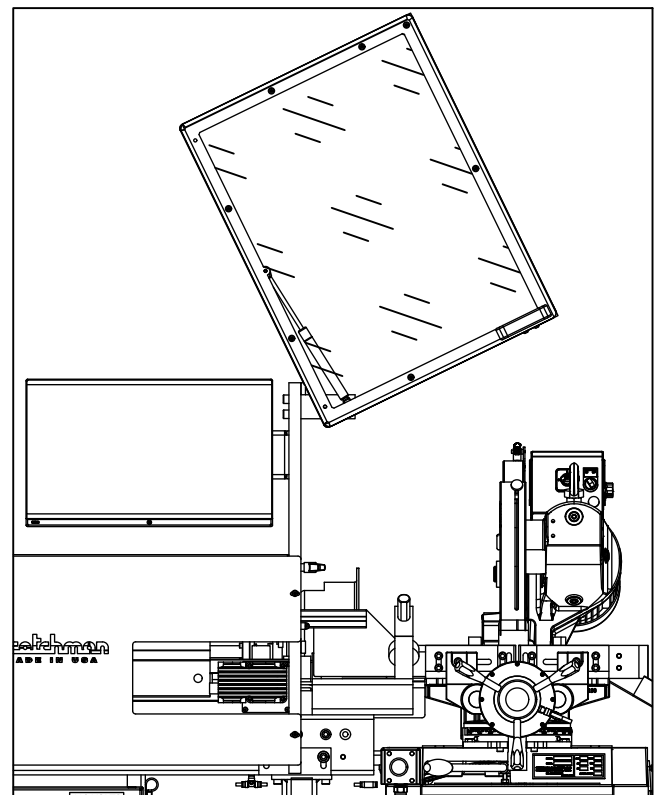


FIGURE 11

4.6 MITER LOCKING DEVICE

SEE VIEWS IN FIGURE 12 ON THE FOLLOWING PAGE.

TO USE THE MITER LOCKING DEVICE:

- 1. Unlock the tension handle (1).**
- 2. Push the miter lock release handle (2).**
- 3. Turn the head in the direction to miter.**

NOTE: SAW WILL ONLY MITER IN DIRECTION TOWARDS THE AUTO TRACK SYSTEM.

- 4. Release the miter lock handle and continue turning the head until the pin snaps into the slot.**
- 5. Then, re-lock the tension handle. When locking the tension handle, do not over tighten.**
- 6. The miter locking device can be fine adjusted if it does not stop at an exact 45 degrees. Loosen the mounting bolts (6) and adjust the complete miter lock, left or right, to the desired position.**

IF YOU WANT TO CUT MITERS OTHER THAN 45 DEGREES:

- 1. Unlock the tension handle (1).**
- 2. Push the miter lock release handle (2) and turn the head to the desired angle by using the scale on the saw.**

**NOTE: THE SCALE IS READ ON THE RIGHT SIDE OF THE VISE AT POINT (3).
NOT IN THE CENTER.**

- 3. Re-lock the tension handle (1).**

**NOTE: THE TENSION HANDLE (1) MAY NEED TO BE ADJUSTED
IF THE HEAD WILL NOT STAY LOCKED IN POSITION.**

HOW TO TIGHTEN THE TENSION HANDLE:

- 1. Move the tension handle (1) to it's unlocked position.**
- 2. Remove the chip drawer from the front of the saw base.**
- 3. Loosen the jam nuts (4) on the adjustment bolts (5) and tighten the bolts finger tight, plus 1/4 of a turn.**
- 4. Work the tension handle several times and re-tighten the adjusting bolts, if necessary.**
- 5. Re-tighten the jam nuts (4).**

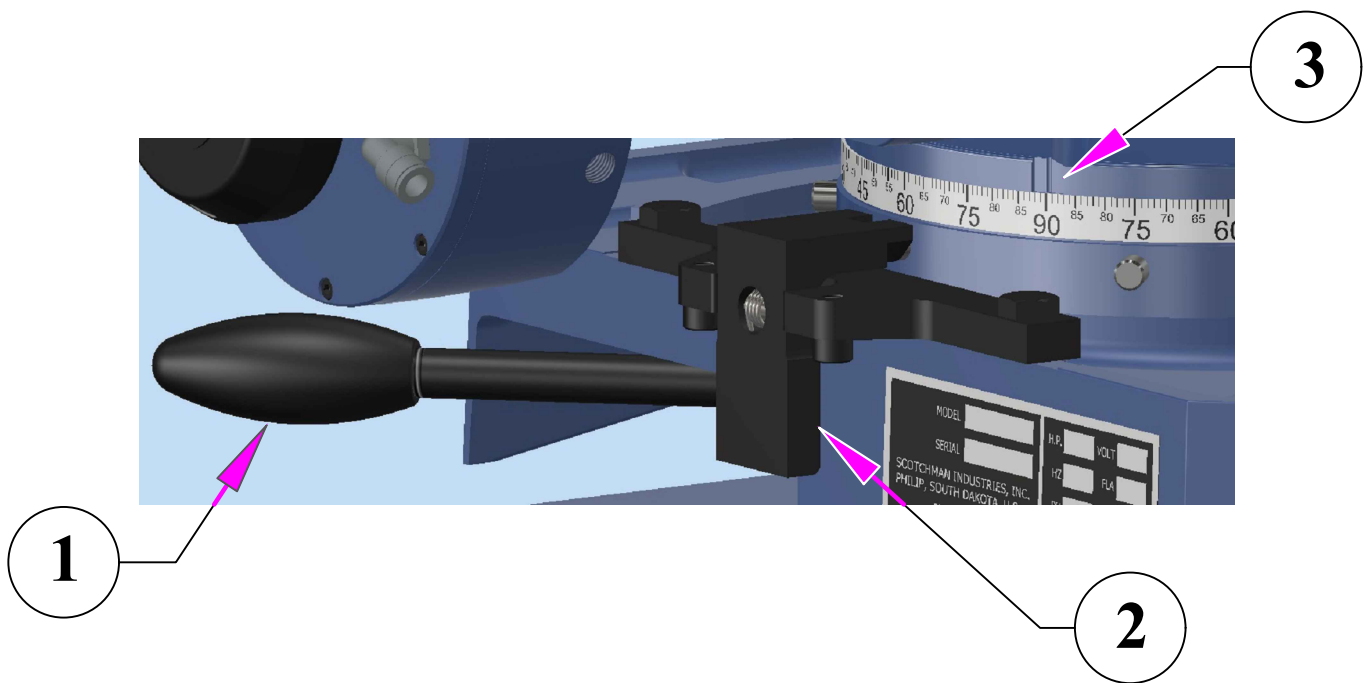
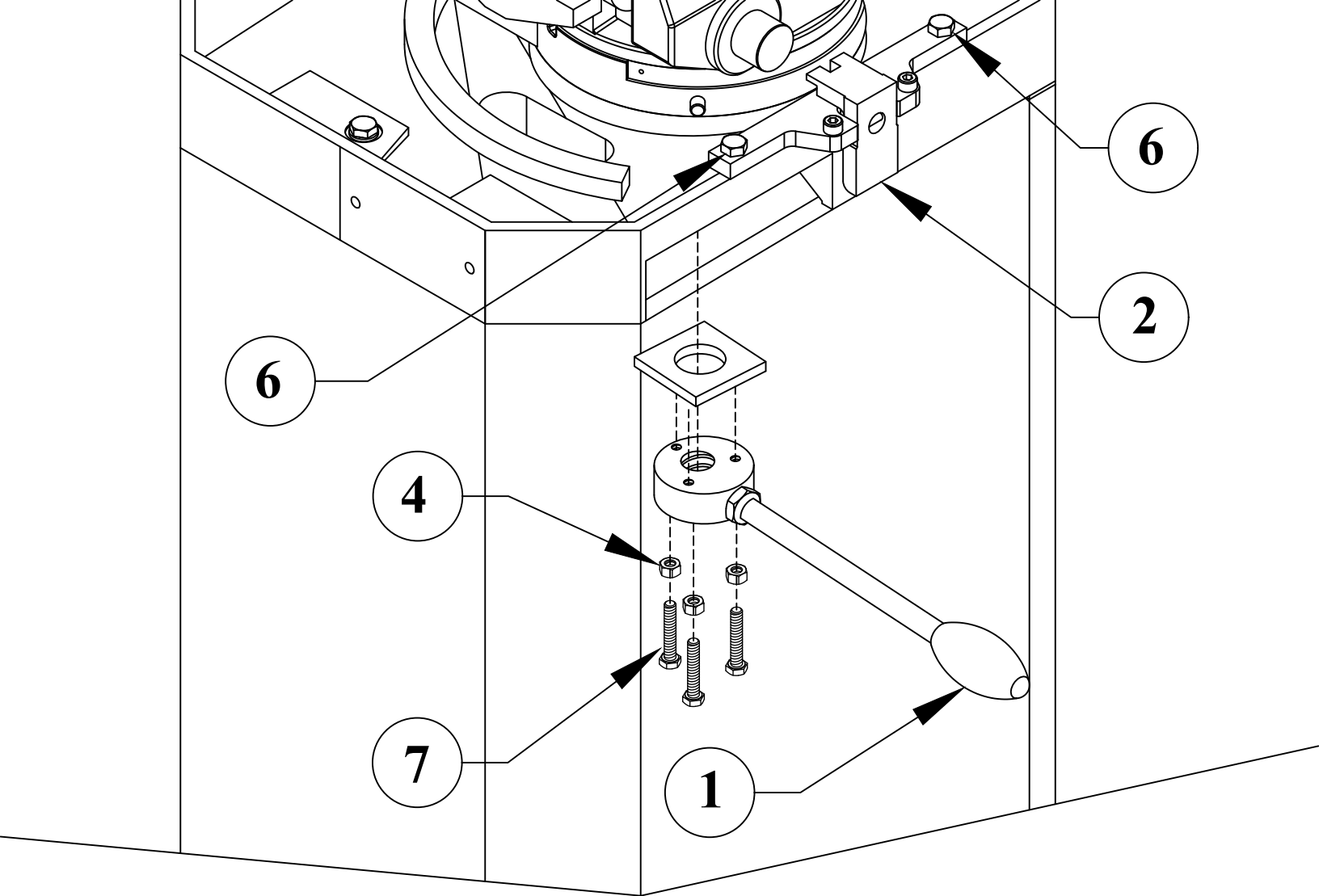


FIGURE 12

4.7 SELECTING THE PROPER BLADE & RPM

There is no such thing as a general purpose cold saw blade. To achieve the best results from your saw, proper blade selection is critical.

Please download our [Scotchman Cold Sawing Guide](#) and read it!! It is full of valuable information such as helping to select the proper blade, RPM, and coolant. It explains blade geometry and also addresses the most common problems encountered with the cold sawing process. It can be found on our website (www.scotchman.com) under Cold Saws. It is called "[COLD SAW BASICS](#)".

Each saw is also shipped with a Pitch Calculator. Pitch is the distance from the tip of one tooth on the blade to the next, usually in millimeters.

A fine blade (more teeth) is usually used to cut thin wall tube at a higher RPM.

A coarse blade (less teeth) is usually used to cut solid material at a slower RPM.

The Pitch Calculator will help to determine the proper blade for your application.

When sawing flat stock or rectangular solid sections, determine the thickest section that will be cut and use the equivalent solid square size on the pitch calculator to determine the proper blade. Cutting with the smaller side up is always best, if possible.

The CPO-350 Variable Speed saw is designed to use a maximum 350mm (13-3/4") diameter blade. We recommend using smaller diameter blades if possible. The smaller blade provides greater rigidity. The Variable Speed is very helpful to fine tune the RPM to where it works best. Using the smaller diameter blade and adjusting the RPM will reduce vibration and increase blade life. With thin wall tube and lighter material, a higher RPM is usually best. With solids and thick walled tubing a lower RPM usually works best.

The smaller diameter blades that we keep on hand for this machine are a 12 1/2" in (315mm) and a 10-3/4 inch (275mm). For available tooth styles we stock, you can log on to www.scotchman.com or call (1-800-843-8844) if you need assistance in selecting the proper blade. The chart below give the surface feet per minute for various diameter blades.

BLADE DIA.		SURFACE FEET PER MINUTE			
INCH	MM	11 RPM	35 RPM	88 RPM	176 RPM
10-3/4	275	31	99	247	500
12-1/2	315	36	114	287	572
13-3/4	350	41	128	322	646

4.8 SAW BLADE INSTALLATION

SEE FIGURE 13 ON THE FOLLOWING PAGE

- **CAUTION:** USE ONLY HIGH SPEED STEEL BLADES DESIGNED FOR THIS MACHINE. DO NOT MODIFY ANY BLADE TO FIT THIS MACHINE. DO NOT USE BLADES DESIGNED FOR THIS MACHINE ON ANY OTHER EQUIPMENT.

The CPO-350 saw is designed to use a maximum 350mm diameter blade. The arbor size is 40mm with four 12mm pins spaced at 64mm. Pin Spacing is expressed as 4/12/64.

BEFORE INSTALLING THE BLADE, MAKE SURE THE POWER TO THE MACHINE IS DISCONNECTED AND THE AIR SUPPLY IS TURNED OFF.

USE THE FOLLOWING STEPS TO INSTALL A BLADE:

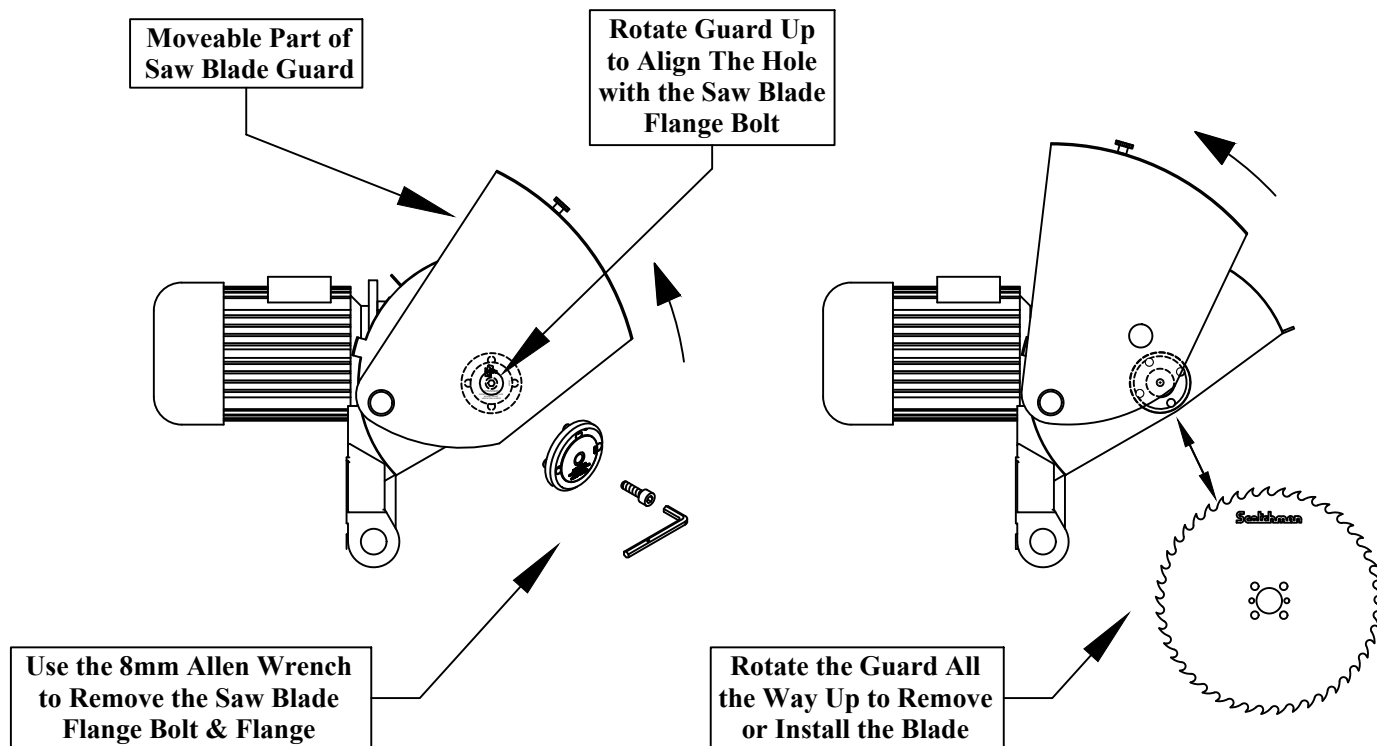
(An 8mm hex key wrench (1), shipped with each machine, is required to change blades.)

1. Release the upper stroke control and allow the head to travel to its full UP position.
2. Raise the movable section of the guard (2) to the Open Position.
3. Remove the blade bolt (3) through the center hole in the blade guard.
4. Remove the blade flange (4).
5. Inspect the spindle seat and flange for debris or residue. Clean thoroughly.
6. Install the blade. Make sure that the pin holes line up to the holes in the spindle.
7. Replace the blade flange and start the bolt into the spindle.
8. Before locking the blade in position, the backlash must be taken up. To take up the backlash, rotate the bottom of the blade upwards (counterclockwise) until it seats against the drive pins.

- **CAUTION:** THE BLADES ARE VERY SHARP AND CARE MUST BE TAKEN WHEN REMOVING THE BACKLASH. DO NOT GRIP THE CUTTING EDGE OF THE BLADE BARE HANDED. THE BACK LASH MUST BE TAKEN UP EVERY TIME A BLADE IS CHANGED.

9. After taking up the backlash, tighten the blade bolt (3).
10. Return the movable guard to the DOWN position and reset the upper stroke control.
11. Break in the saw blade. The teeth on new or re-sharpened blades have a sharp edge and should be fed through the first three or four cuts very slowly before starting normal cutting. Besides taking up the backlash and breaking in the blade, it is very important to keep the blade flange, the spindle and the blade clean. If any metal chips get in between them the blade will not run true. Failure to do any of these things will result in poor performance and broken or damaged blades.

Saw Blade Removal and Installation



NOTE: Make sure the spindle, blade & flange are clean before installing blade and remove backlash before tightening bolt!!

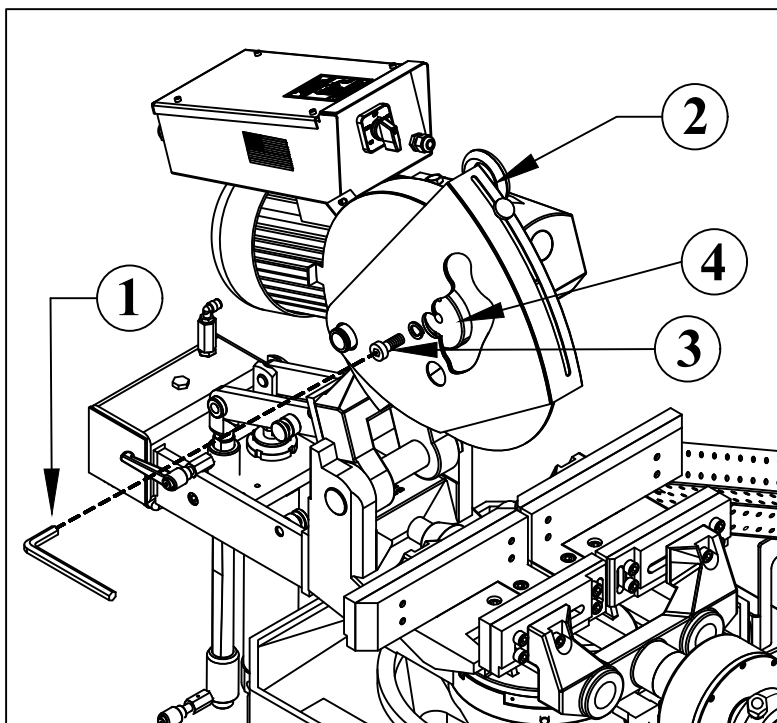


FIGURE 13

4.9 CLAMPING THE MATERIAL

All work pieces must be clamped securely in the vise. Any slippage of the material can result in broken or damaged blades. If thin wall tubing is being cut, special form jaws may be required to help prevent deformation of the material. We recommend cutting square tubing through the diagonal section, standard square tube jaws are available for this application. SEE SECTION 10.4 for more information.

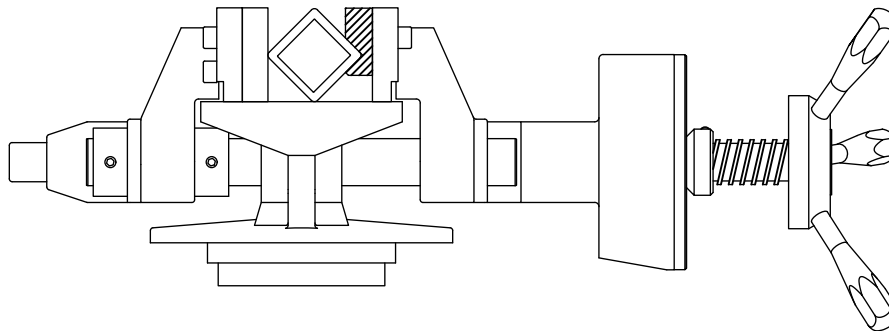
SEE FIGURE 14 BELOW

When setting up the saw to miter cut, cycle the head down before making the first cut, to make sure that the blade clears the vise jaws. The standard flat jaws have slotted mounting holes and can be adjusted for miters up to 75°. For miters up to 45°, mitering jaws are required. SEE SECTION 10.5 MITERING JAWS. The saw can only miter in one direction depending on if the saw is a left hand feed or a right hand feed. SEE SECTION 3.1.2 SAW CAPACITIES.

For more information on form jaws contact your local dealer or call the factory.

ALWAYS ADJUST THE JAWS SO THAT THEY ARE AS CLOSE TO THE BLADE AS POSSIBLE.

SQUARE FORM JAWS



ROUND FORM JAWS

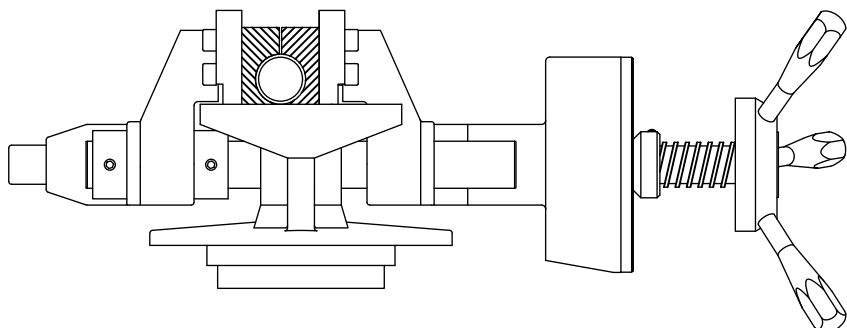


FIGURE 14

4.10 POWER VISE

The power vise automatically clamps when the saw head moves down and automatically releases when the saw head returns to the up position. While the power vise is powered by compressed air, the opening and closing of the power vise is electronically controlled on this machine. There is a FEED/CLAMP ON/OFF switch located in the box on top of the motor that will stop the saw head from feeding and stops the vise in the closed position, SEE FIG. 15.



**FEED/CLAMP
ON OFF
SWITCH**

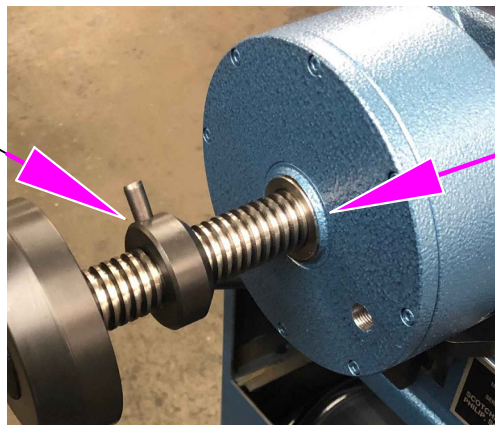
FIGURE 15

4.10.1 POWER VISE SETUP

The power vise has a stroke of approximately 5/16" (8mm). Adjust the vise so the material being cut has about an 1/8" (3mm) of clearance when it is open.

There is a round lock-nut on the spindle that is located between the vise handle boss and the power vise cylinder, SEE FIG. 16. Once the vise is adjusted correctly, the lock nut should be screwed up against the power vise cylinder to lock it into place. There is a roll pin on the lock nut that is used to tighten and loosen it. Do not over-tighten the lock nut and check it occasionally to make sure it stays tight.

**LOCK NUT
WITH
ROLL PIN**



**TIGHTEN
AGAINST
POWER VISE
CYLINDER**

FIGURE 16

4.11 POWER DOWN FEED

This saw has a pneumatic over hydraulic power down feed and features electric controls, electric valves, and an electric remote foot pedal. Stroke is easily adjusted via two handles located on the back of the saw.

4.11.1 POWER DOWN FEED SETUP

SEE FIGURE 17 BELOW.

1. Before powering machine, check the oil level of the power down feed system. The saw head must be in the full up position. The oil reservoir is located on the back of the machine and there is a sight glass that indicates the oil level. Oil capacity is approximately 1.25 quarts.
2. If the oil level is low, the recommended fluid is a SAE 10W (ISO 32) non-foaming hydraulic oil such as Mobil DTE 10 or equivalent.

► **CAUTION:** ALWAYS DISCONNECT THE AIR SUPPLY BEFORE ADDING OIL TO THE POWER DOWN FEED SYSTEM!! IF FILLER PLUG IS REMOVED WHILE CONNECTED TO COMPRESSED AIR - ALL THE OIL WILL BE PURGED THRU THIS OPENING UNDER PRESSURE!!

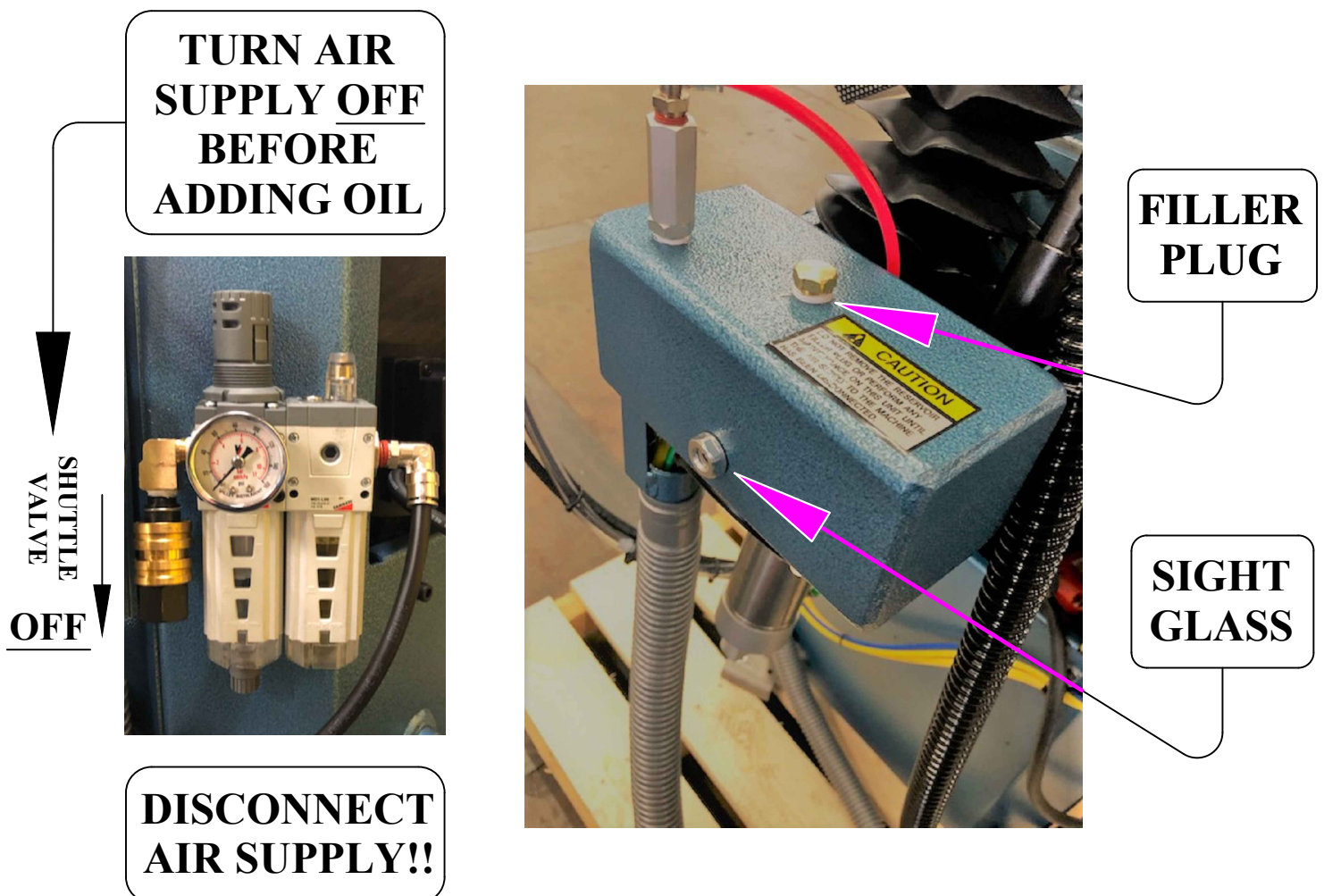


FIGURE 17

4.11.2 STROKE CONTROL ADJUSTMENT

SEE FIGURE 18 BELOW.

► **CAUTION:** WHEN THE SAW BLADE IS CHANGED OR WHEN THE SIZE OF MATERIAL IS CHANGED - THE STROKE MUST BE CHECKED!! FAILURE TO SET THE STROKE ON THIS MACHINE WILL RESULT IN DAMAGE TO THE MACHINE OR BLADES!!

STROKE CONTROL EXPLAINED:

The stroke is the distance the blade travels in relation to the blade diameter and the size of the material being cut and at what speed the material is being cut. The distance (blade travel) is adjusted with two stroke adjustment handles located on the back of the machine and the speed (feed rate) is adjusted with the flow control valve located on the right side of the machine.

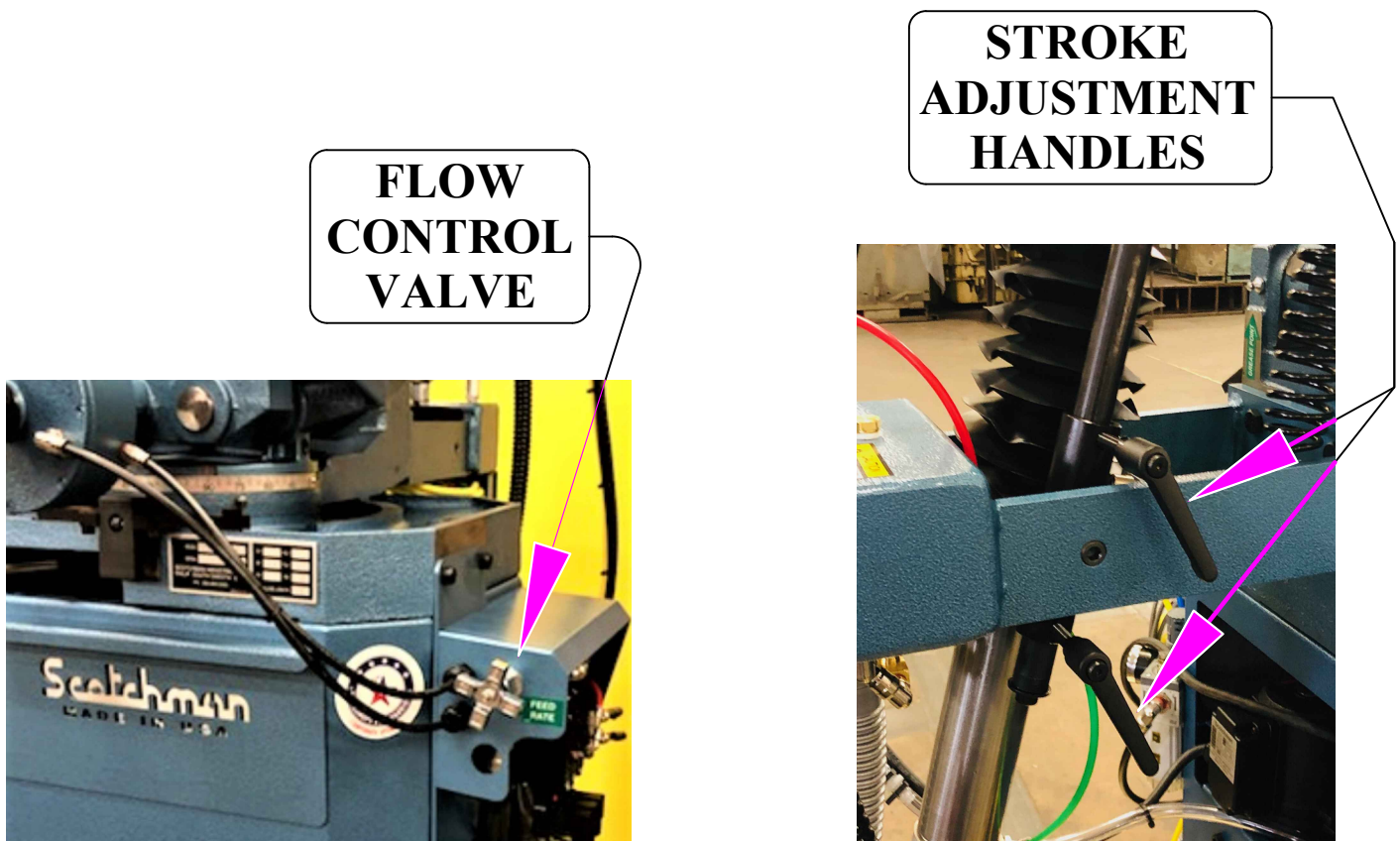
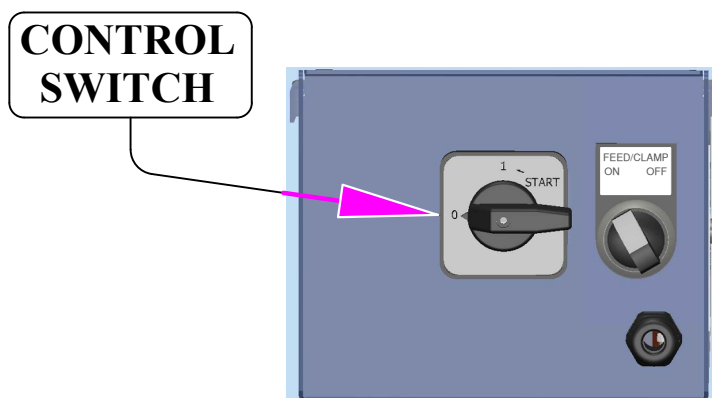


FIGURE 18

The up and down travel of the saw blade must be set before running the saw. The upper limit must be set high enough to allow the material to pass under the saw blade. The lower limit must be set low enough so the blade just cuts through the material, but not so low that the blade cuts into the bed of the saw. SEE FIGURE 19 BELOW.

HOW TO SET THE STROKE:

1. Raise the safety barrier to allow access to the vise and switchbox.
2. The saw blade control switch for the saw blade is located in the electrical box on top of the motor. The stroke is set with this switch in the off or "0" position - Blade does not turn. (See Below)
3. The flow control valve should be turned all the way clockwise so the saw head won't move.
4. Take a piece of material that is to be cut and put it in the vise so it is just off to one side of the blade. It's good to hand-tighten the material in the vise to keep it in place.
5. Lower the Safety Barrier.
6. Step on the foot pedal to cycle the saw. The saw head should not move. Open the flow control valve by turning it counterclockwise to allow the head to slowly travel downward. Stop the head with the flow control valve when the blade is just above the material. Loosen the handle on the upper stroke adjustment and move it down to slightly past where it contacts the lower of the two limit switches and tighten the handle.
7. Open the flow control valve to allow the head to slowly travel downward again. Stop it with the flow control valve when the blade passes just below the material. Take the foot pedal around to the back of the saw. Step on the foot pedal and hold, then loosen the handle on the lower stroke adjustment and move it up to slightly past where it contacts the limit switch then tighten the handle. Keep clear of moving parts and release the foot pedal. The head will return to the up position.
8. Make sure the blade is high enough for the material to pass below the blade after it has returned to the up position. Step on the pedal and watch as the blade travels downward to ensure that it passes below the material before returning to the up position. Make a slight adjustment if needed.



NOTE: If only the size of the material is changed and not the blade, just the upper limit of the stroke needs to be adjusted. If the blade is changed to a different diameter, then both the top & bottom limits need to be adjusted.

FIGURE 19

4.11.3 GUARD ADJUSTMENT

SEE FIGURE 20 BELOW

CAUTION: THE GUARD MUST BE ADJUSTED EVERY TIME THAT THE STROKE OF THE MACHINE IS ADJUSTED.

TO ADJUST THE GUARD:

1. Before adjusting the guard, set the up and down stroke of the machine by following the instructions in SECTION 4.11.2
2. With the saw head un the UP position, loosen the knurled knob (1) in the guard stop (2). The guard stop is behind the movable section of the guard (3)
3. Raise the movable section of the guard (3) so that it just clears the vise jaws by no more that 1/8 of an inch (3mm).
4. Adjust the guard stop (2) until it contacts the stop on the fixed section of the guard and tighten the bolt (1).
5. Without powering the machine, cycle the head of the saw several times to make sure that the adjustment is correct.

NEVER PLACE ANY PART OF YOUR BODY NEAR THE BLADE OR THE GUARD WHILE THE MACHINE IS RUNNING.

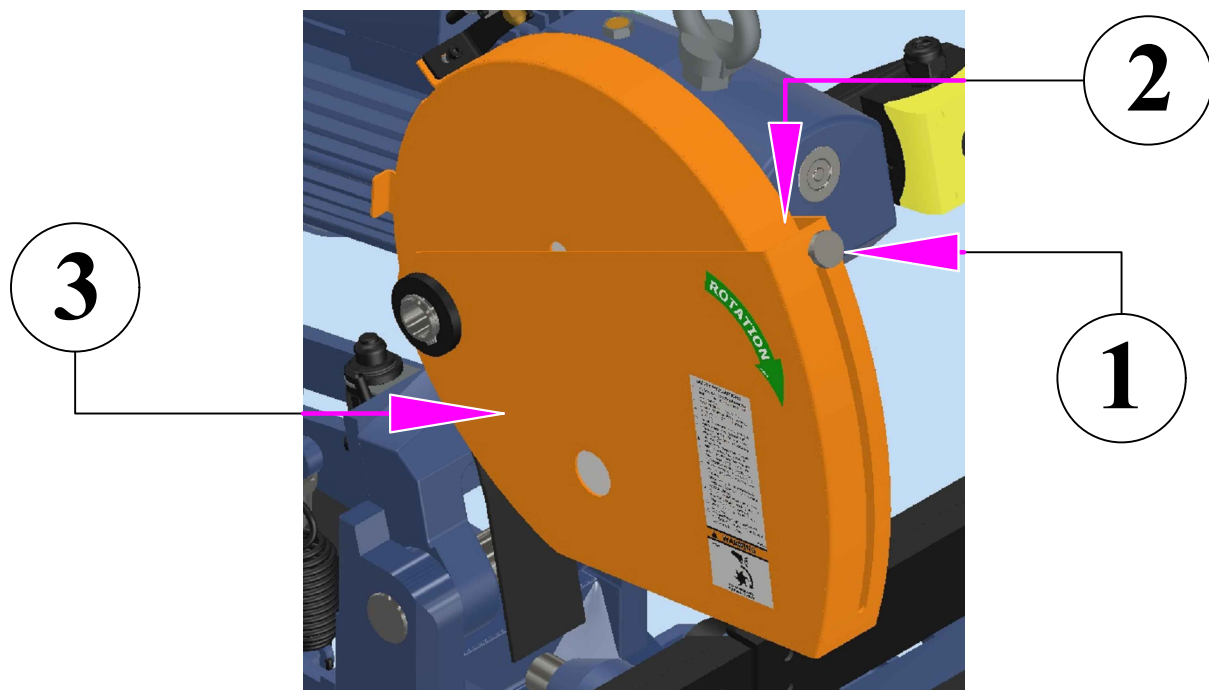


FIGURE 20

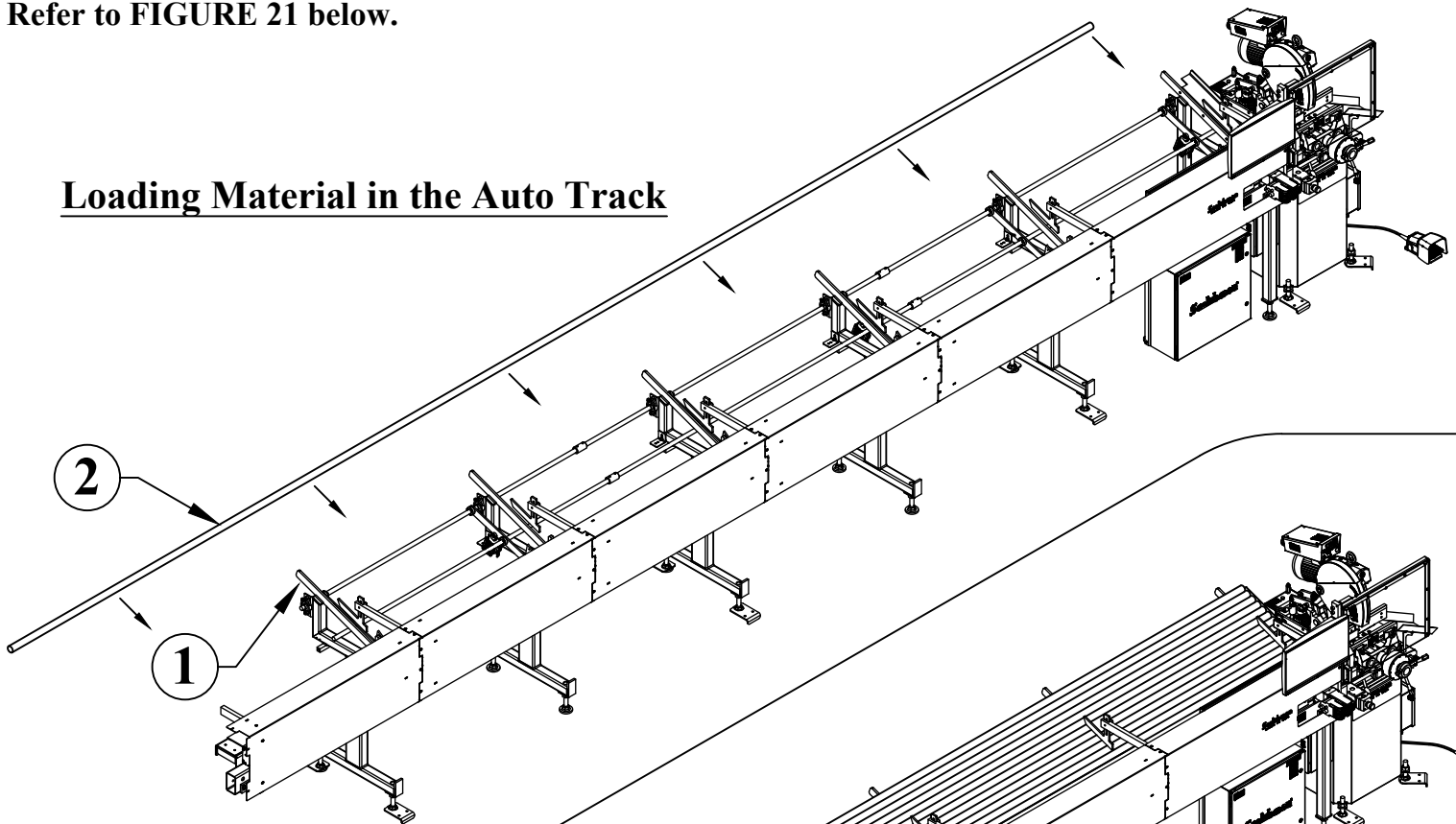
5.0 AUTO TRACK OPERATION

The AutoLoader saw can handle square and round tube up to 3" in diameter, solid round up to 1-3/4" and solid square up to 1-1/2. The 24 foot Auto Track can handle material in up to 24 ft. lengths.

LOADING MATERIAL: The material (bars or tubes) are loaded on the back side of the saw. On top of each stand there is a bar (1) that slants forward & downward. There are six of these on the 24' model. This is called the Auto Track. The material (2) is loaded on the Auto Track and will move to down toward the pusher. Several bars can be stacked here and will be loaded as needed.

Refer to FIGURE 21 below.

Loading Material in the Auto Track



Auto Track Fully Loaded

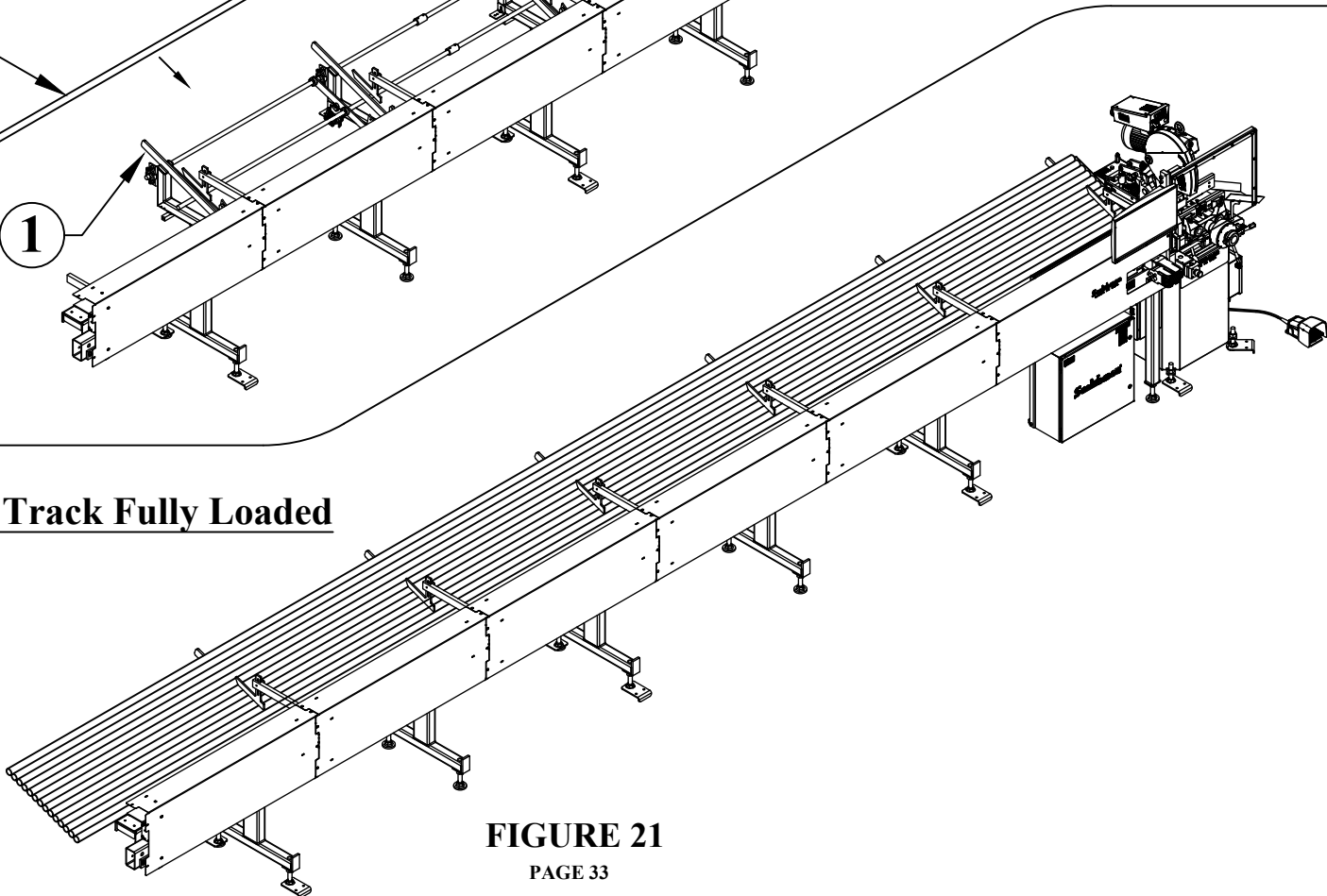


FIGURE 21

5.1 AUTO TRACK COMPONENTS

The Auto Track System has multiple adjustable components that allow sizes of material ranging from 3/4" up to 3" (3/8" with small material guides) to be cut on this system. See FIGURE 22 on the next page.

The aluminum extrusion (1) bolts to the pusher plate (2) on the RazorGage, and a pusher foot (3) is then attached to this extrusion with two bolts on the backside. These components and connections allow for adjustment in all three directions as needed, and are typically adjusted during initial setup. The set screw (4) on the end of the pusher foot is intended primarily for pushing of small tubing. This setscrew can be screwed into the pusher so it stays flush with the end. When cutting small tube (with the optional small material guides), the set screw will stick out and insert into the end of the tube, capturing it and keeping it from wandering. See SECTION 5.1.1 for more details.

The material guide (5) is used to prevent material from stacking or twisting over each other. The adjustable guide arm (6) is set in conjunction with the material guide (5). The intent is for the arm (6) to be adjusted with a gap between it and the guide (5) so that only one piece of material sits between them. This allows the lifting arm to only pick up and load one piece of material at a time. The nylon ramps (7) are used to secure the material against the nylon backing plate after it has been loaded. See SECTION 5.1.2 for more details.

The hold-down roller (8) is used to keep friction on the material, making sure it stays seated against the pusher foot as the Auto Track advances. It is also used to keep the material against the vise floor and the back jaw. See SECTION 5.1.3 for more details.

A capacitive sensor (9) is located in the material bed for sensing if material was loaded by the loading system. Its location and height can be adjusted as well as its sensitivity for varying material sizes. See SECTION 5.1.4 for more details.

AUTO TRACK COMPONENTS

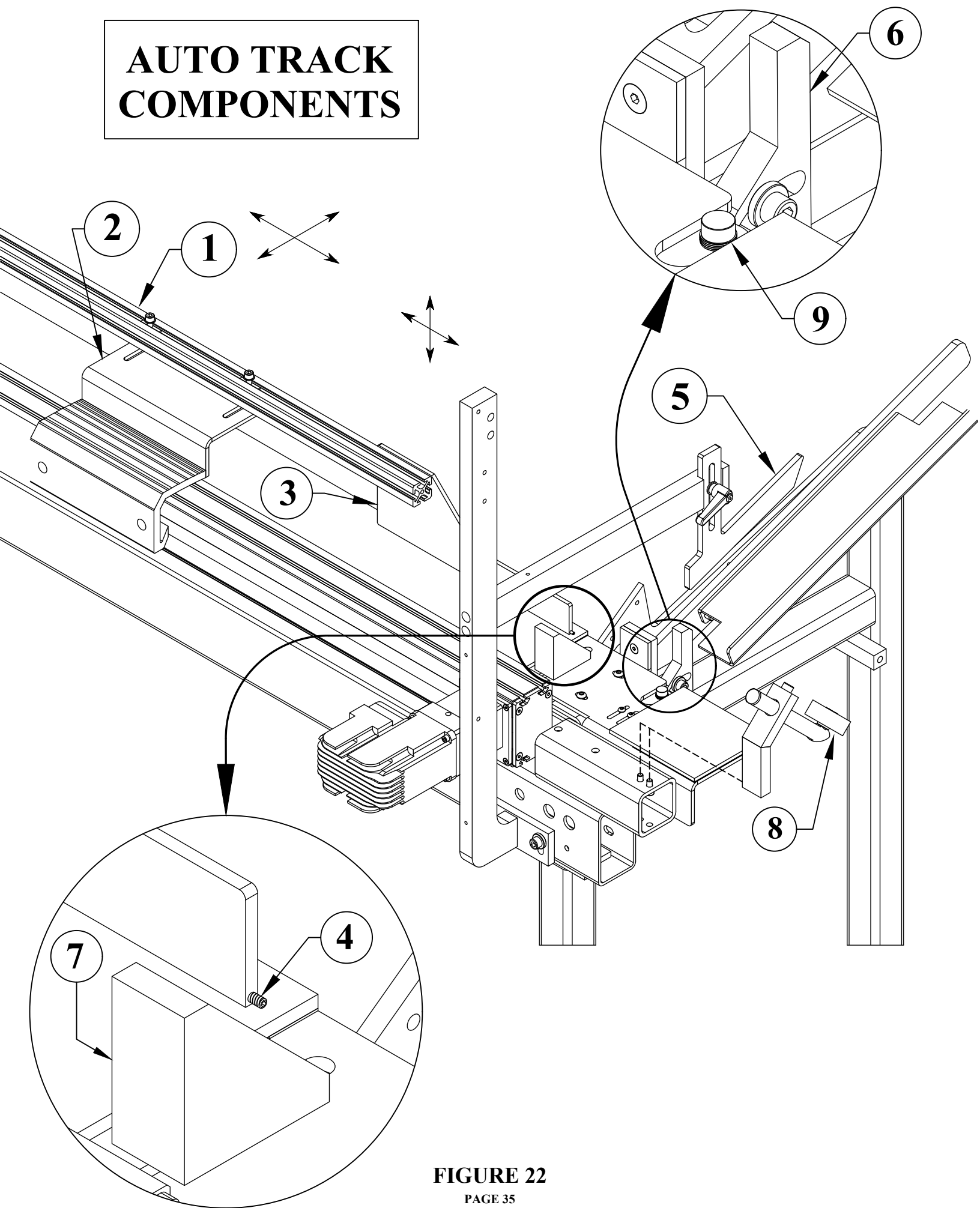


FIGURE 22

5.1.1 PUSHER ADJUSTMENT

See FIGURE 23 below.

The Pusher pushes the material to the saw. It is mounted to a square slotted aluminum extrusion, with two bolts on the back side. This connection allows for adjustment forward and back as well as up and down. The aluminum extrusion is mounted to the pusher plate of the RazorGage with two bolts on the bottom of the pusher plate. This allows for adjustment forward and back, as well as left to right.

Once the Auto Track has been installed and the pusher set to a material size range, the pusher configuration should not need adjusted except in cases where the material has changed significantly from the original setup (i.e. much larger or smaller). This can normally be avoided by planning for all possible sizes to be cut on this system during initial setup.

M4 SET SCREW:

For smaller thin-wall tubing, the Pusher has a small M4 set-screw located down low on the end of the pusher, toward the saw. The smaller thin-wall tubing can flex slightly when it's being pushed and slide off the pusher to one side or the other. This set screw can be adjusted to stick out of the Pusher and stick inside the smaller sized thin-wall tubing as the pusher moves it. When cutting small tube, the small material guides are recommended for the best pushing performance. See Section 10.3 for more details.

CAUTION: IF ADJUSTMENTS ARE NECESSARY TO THE ALUMINUM EXTRUSION, THE PUSHER FOOT, OR POSSIBLY THE SET SCREW, THE RAZORGAGE WILL NEED TO BE RECALIBRATED. SEE SECTION 3.7.3 RAZORGAGE CALIBRATION.

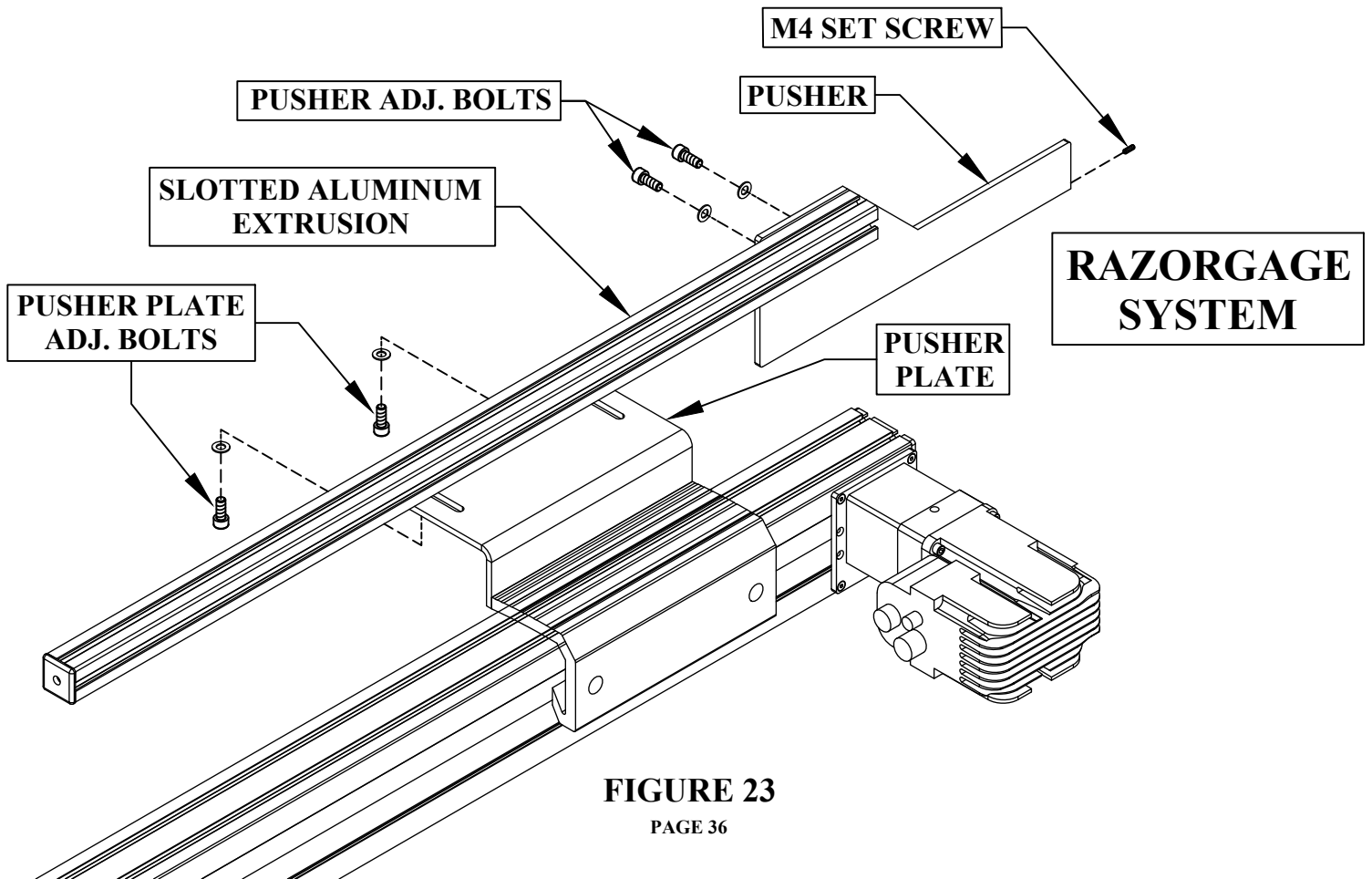


FIGURE 23

5.1.2 LOADER ADJUSTMENT

SEE FIGURE 24 BELOW

The Auto Track must be setup to work with the size of the material. When the size of the material is changed, adjustments to the feed table need to be made to accommodate it. When properly setup, the feed system will load one bar of material at a time to the bed of Auto Track. The bed will properly position the material as it's fed to the saw with the pusher.

AUTO TRACK ADJUSTMENTS:

The Auto Track material guides (1) need to be adjusted so the distance between the guide and the table arm (2) are slightly larger than the size of the material. If adjusted too tight, the material will not pass through. If too loose, the material may stack up and feed more than one bar and cause the machine to jam.

The adjustable guide arm (3) must also be adjusted to work with the material. Each Auto Track leg has a guide arm. The guide arm has a slot with a bolt holding it in place. Loosen the bolt on every guide arm and rotate the bar that they're attached to below and adjust all of them together. Adjust them so the lifting arms (4) will only contact & lift one piece of material at a time and then tighten the bolts.

Across from each guide arm (3) there is a nylon ramp (5) to position the material in the bed of the Auto Track. The ramps are adjust by loosening the bolt on the topside and moving them back and forth. They must be adjusted so the material is touching both the back fence and the bottom of the Auto Track.

Optional turnover devices are available for cutting square and profiles. These are used in place of the nylon ramp. For more information see Section 10.4 or call the factory at 1-800-843-8844.

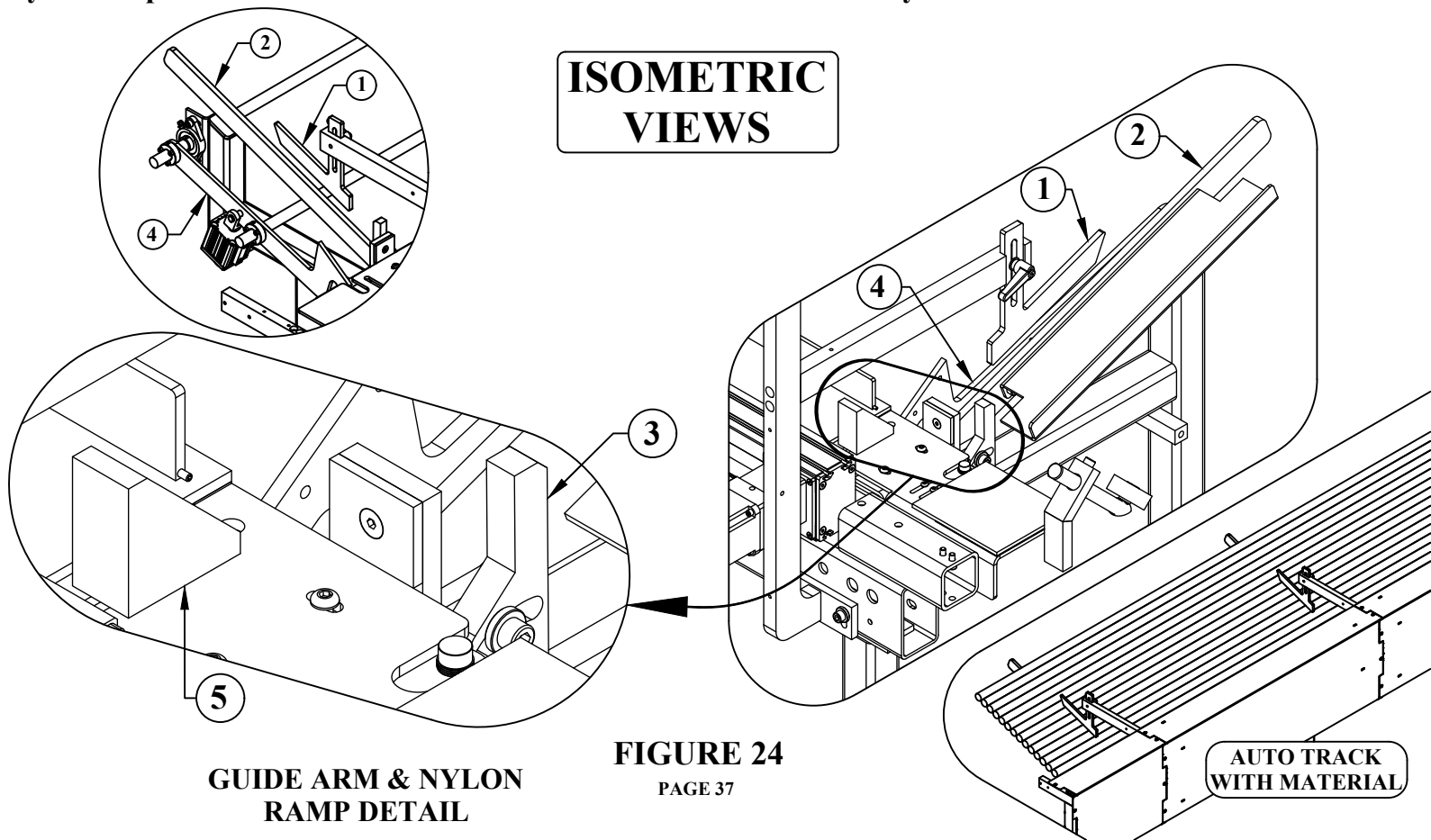


FIGURE 24

5.1.3 ROLLER ADJUSTMENT

The hold down roller is located on the in feed side of the main vise, next to the saw. The hold down roller is designed to prevent bent or warped material from hitting the blade and to ensure material is against the vise base and the rear jaws. SEE FIGURE 25 below.

TO SET THE ROLLER HOLD DOWN:

1. Loosen the bolt (1) that locks the roller in place.
2. Adjust the roller shaft (2) so the roller (3) just touches the material.

NOTE: Make sure the roller is lightly touching the material. If the roller is too tight against the material this could affect the length of the part being cut.

NOTE: The roller hold down can only contact 3/4" and larger diameter material. For smaller material a different hold down will be needed.

See Section 10.3 SMALL MATERIAL GUIDES.

3. Re-tighten the lock bolt (1).

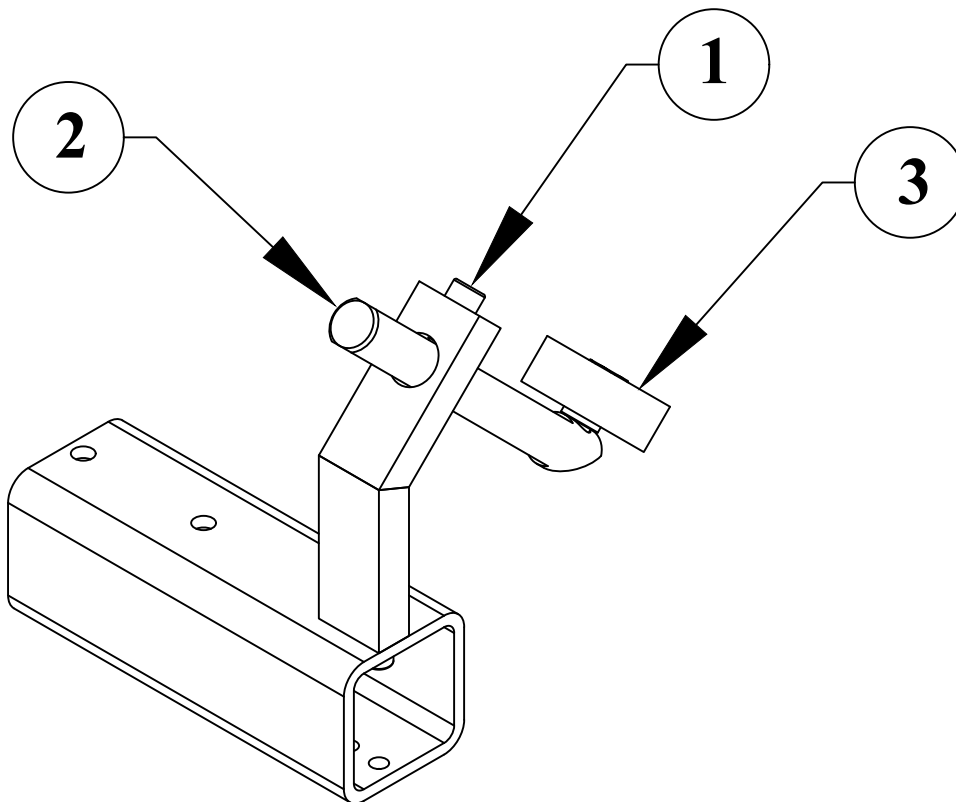


FIGURE 25

5.1.4 MATERIAL SENSOR ADJUSTMENT

Please see FIGURE 26 on the next page.

The material sensor tells the RazorGage if the Auto Track has loaded material. If it senses that the Auto Track has loaded material, it will allow the saw to cycle. If it senses that it is out of material, the Auto Track & saw will stop cycling. But the saw motor will stay on - The saw blade will keep turning.

The material sensor is located next to the nylon ramp that is closest to the saw. The LH version is shown on the next page. The sensor is threaded into a bracket and held in place by a lock-nut as shown in (1) on the next page. The sensor & bracket assembly is mounted via two M6 button head screws to the two slotted holes in the steel bed of the Auto Track as shown in (2) on the next page. These slotted holes allow the sensor to be adjusted front to back and the threads in the bracket allow adjustment up and down.

The sensor should be adjusted so it is just below the the nylon tables. If height needs to be adjusted, the sensitivity may need to be adjusted as well. Once the height of the sensor is set, place a sample piece of material over the sensor and make sure that the indicator light illuminates (3). If it does not, use a small flat bladed screwdriver and turn the screw (clockwise to increase sensitivity) until it illuminates. Remove the sample material and ensure the light goes out. Test the load function of the system to verify the sensor will always read the material.

If the sensor remains illuminated even when material is removed, it is sensing the surrounding nylon/steel surfaces, indicating the sensitivity is too great. Re-adjust the location, height, and sensitivity of the sensor until it performs as it should.

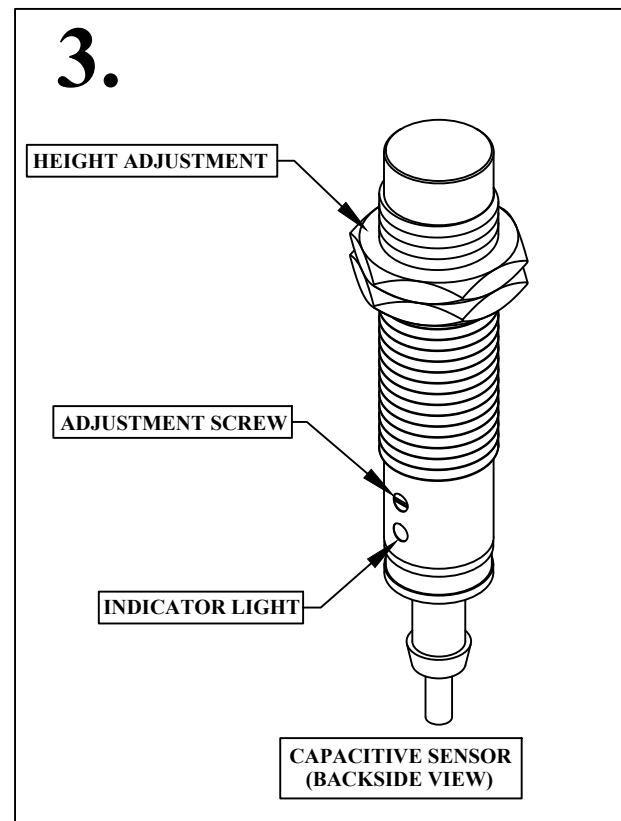
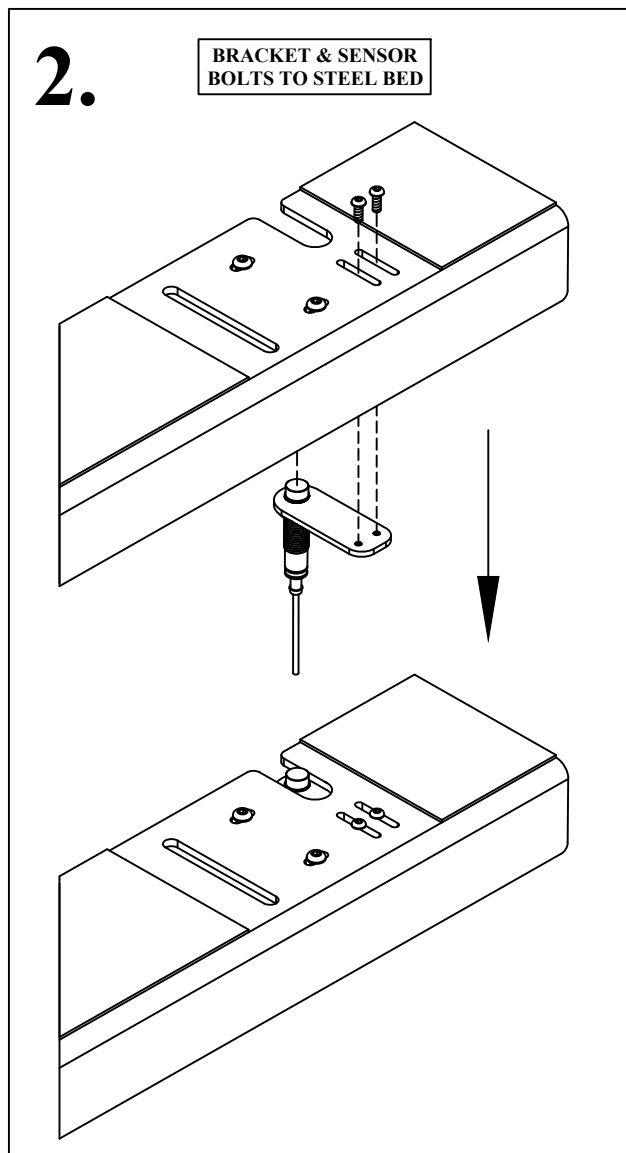
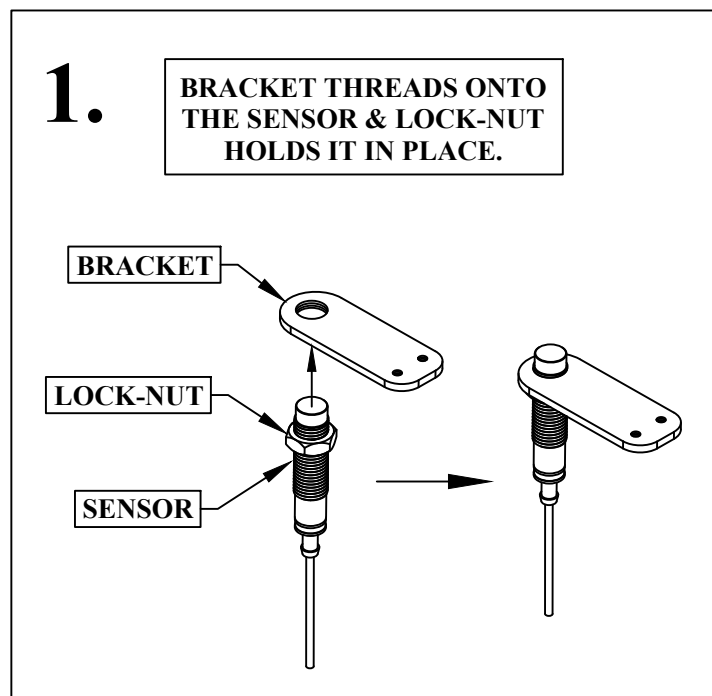


FIGURE 26

6.0 RAZORGAGE OPERATION

6.1 RAZORGAGE START-UP

The screens below are shown in the order that they will appear.

1. Turn on computer
Turn M-Drive on
Double Tap the "RGST" icon



2. When the "MDRIVE - CONNECTED TO COMM 3" (# varies) line turns green, tap the "OK" icon



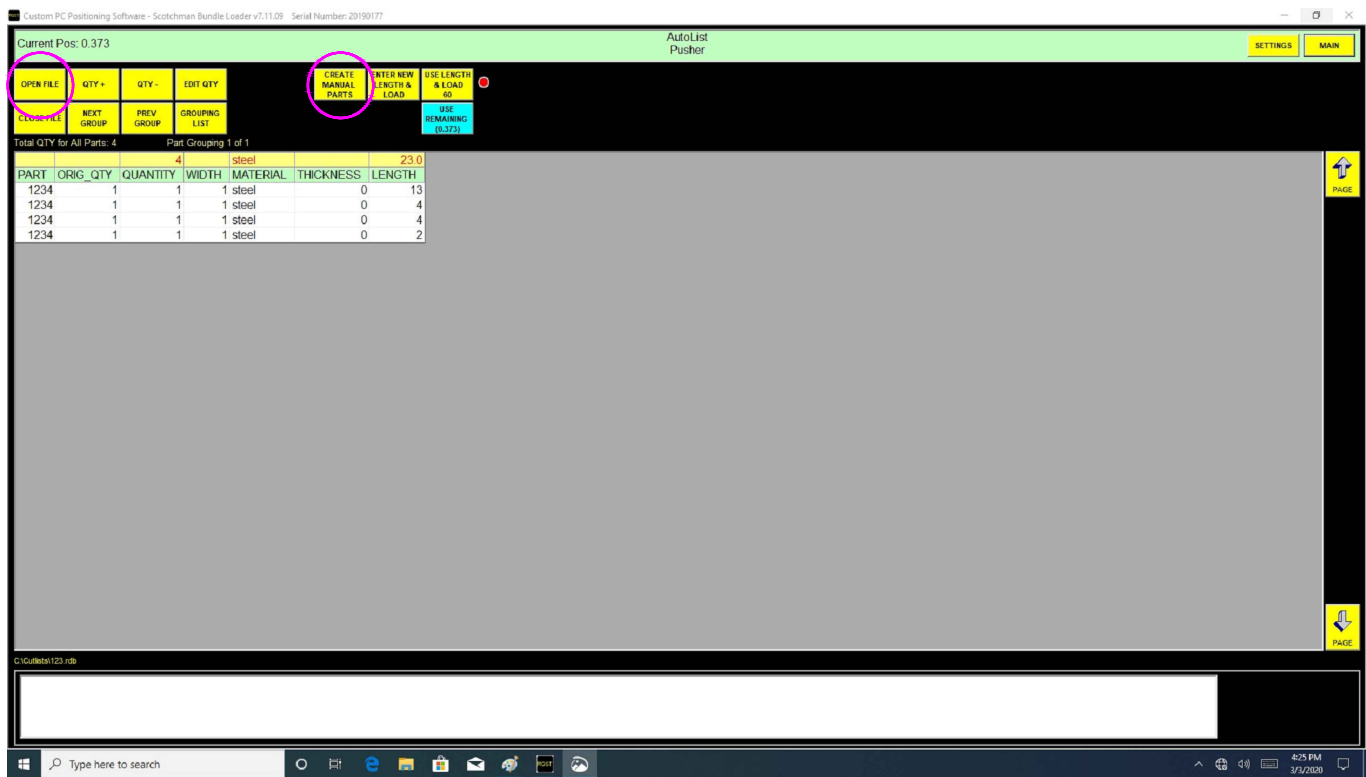
After pressing "OK" on the 2nd screen the RazorGage will go through several self-check screens. It will then home itself by the pusher moving toward the saw and contacting an internal hard stop.

3. This is the Main Screen. From this screen you can access all the other screens including the SETUP SCREEN and AUTOLIST SCREEN (upper right) and it always shows the Current Position (upper left) of the Auto Track. Tap AUTOLIST SCREEN.

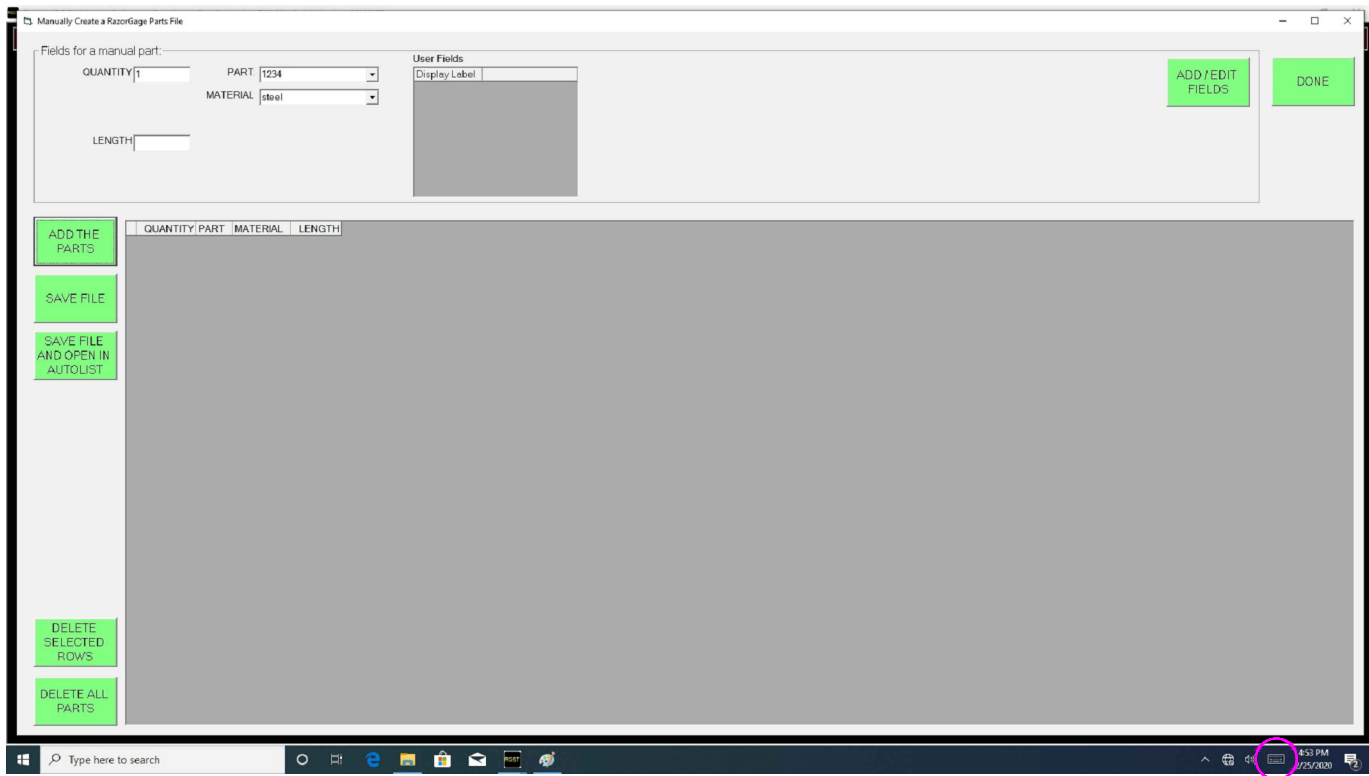


6.2 WRITING AN AUTOLIST PROG. LOCALLY

1. This is the AUTOLIST SCREEN. If you need to create a new program, tap the **CREATE MANUAL PARTS** button and go to STEP 2.

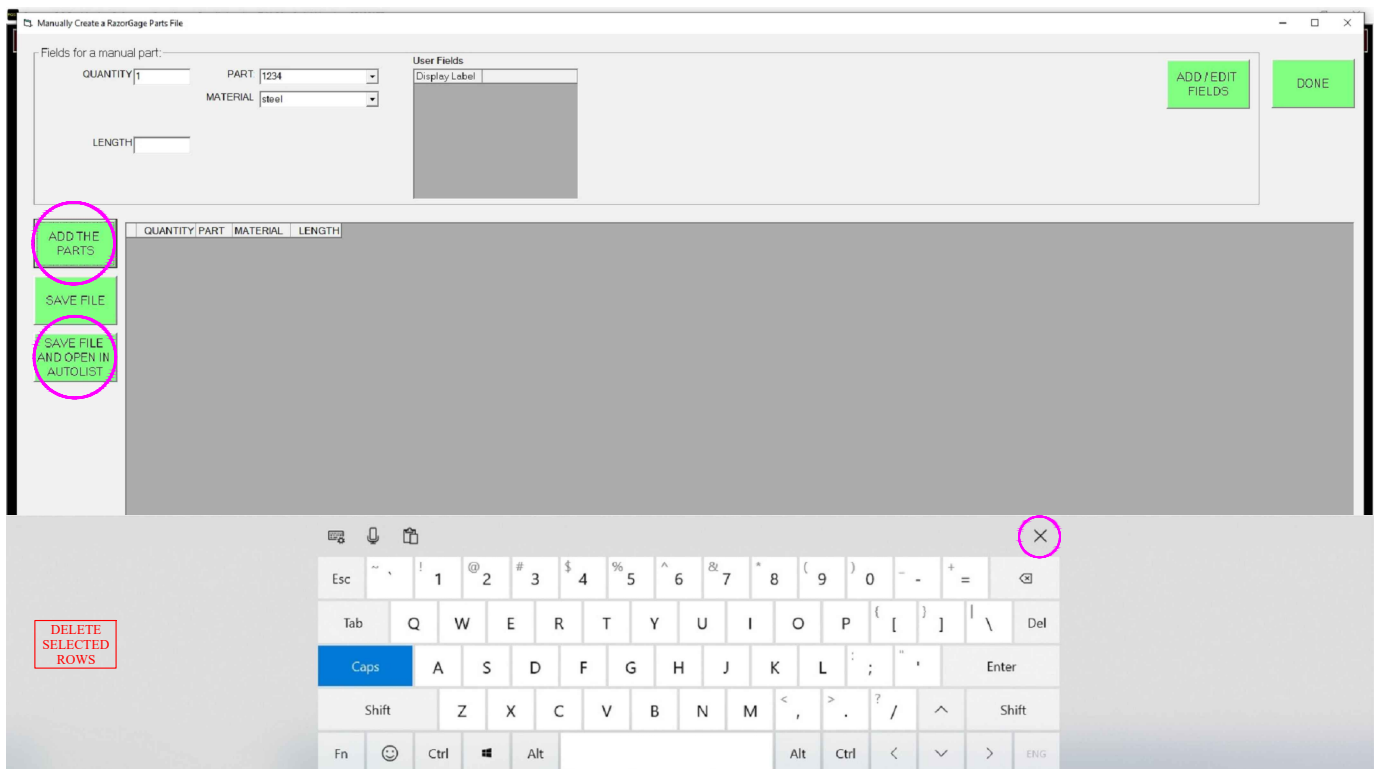


2. This is the Manually Create a RazorGage Parts File screen. This is where you write a program for the saw. Tap the small keyboard icon in the lower right corner.

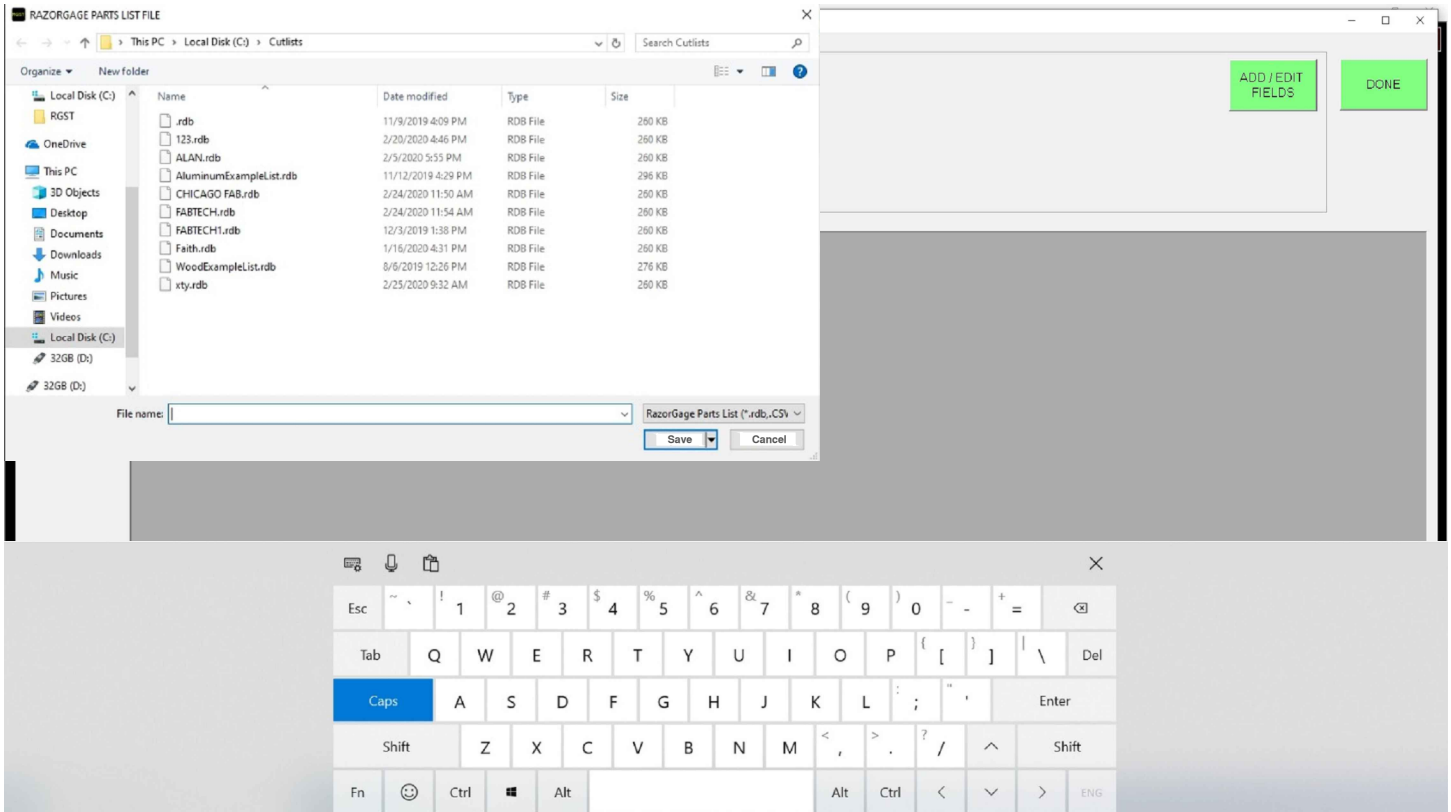


3. At the top left there are boxes to enter the length, quantity and material. Name the program using the **PART** box. More information can be added via the User Fields box. Tap the box & and enter the info. When you're done entering the information, tap the **ADD THE PARTS** button then the **SAVE FILE AND OPEN AUTOLIST** button.

► **NOTE:** If you need to delete a line from the program, close the keyboard by tapping the X as it covers the **DELETE SELECTED ROWS** button (location shown in red below) on the lower left.



4. The program will bring up a save prompt for the Cutlist folder.



6.3 WRITING AN AUTOLIST PROG. EXTERNALLY

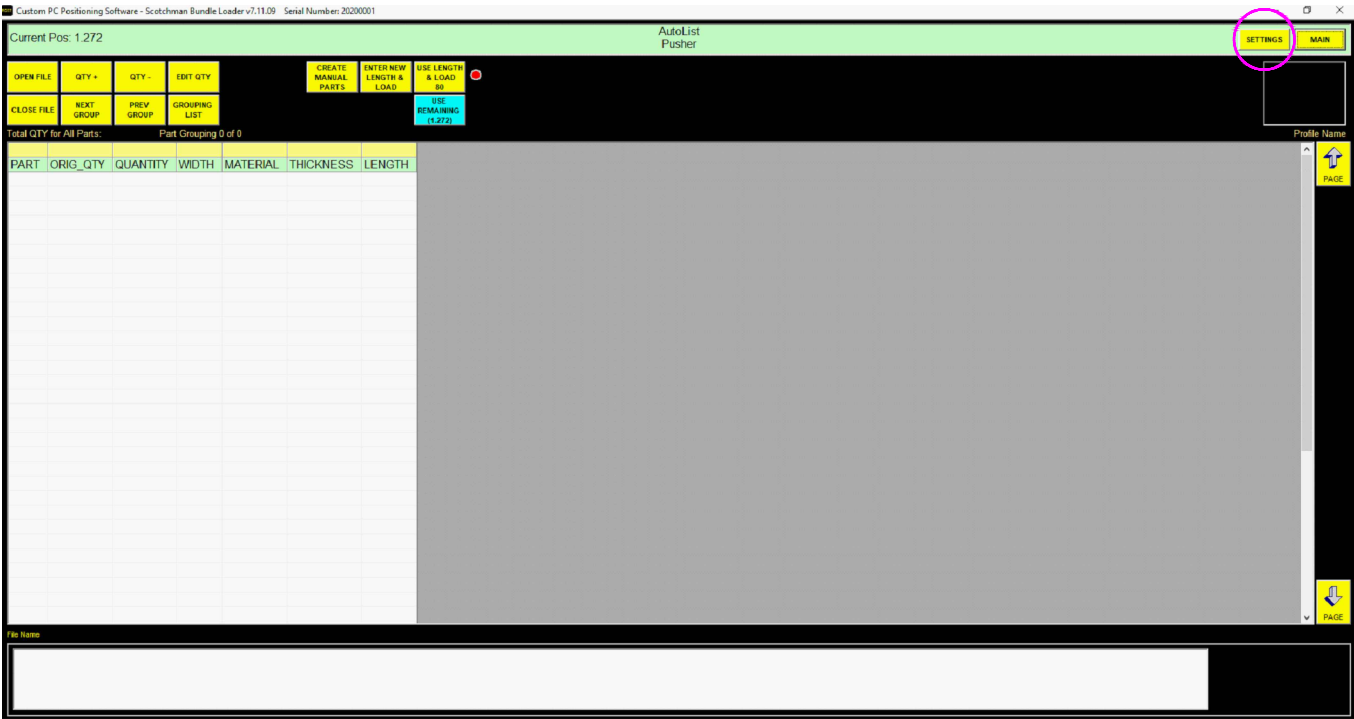
Programs can be written elsewhere and uploaded to the RazorGage controller via a USB flash drive (thumb drive), a network cable, or a wi-fi connection. Data for cutlists will need to be formatted into a .csv (comma separated variable) file, then converted to the proper format for the controller using the integrated Parts List Processor (PLP) software.

1. Write a program using a preferred spreadsheet or word editor program. Below are two examples of the same program. The only required elements for the program to function are values for QUANTITY and LENGTH. Multiple other data columns can be put into the program as needed up to a total of 27. These extra columns will be explained in step 6.

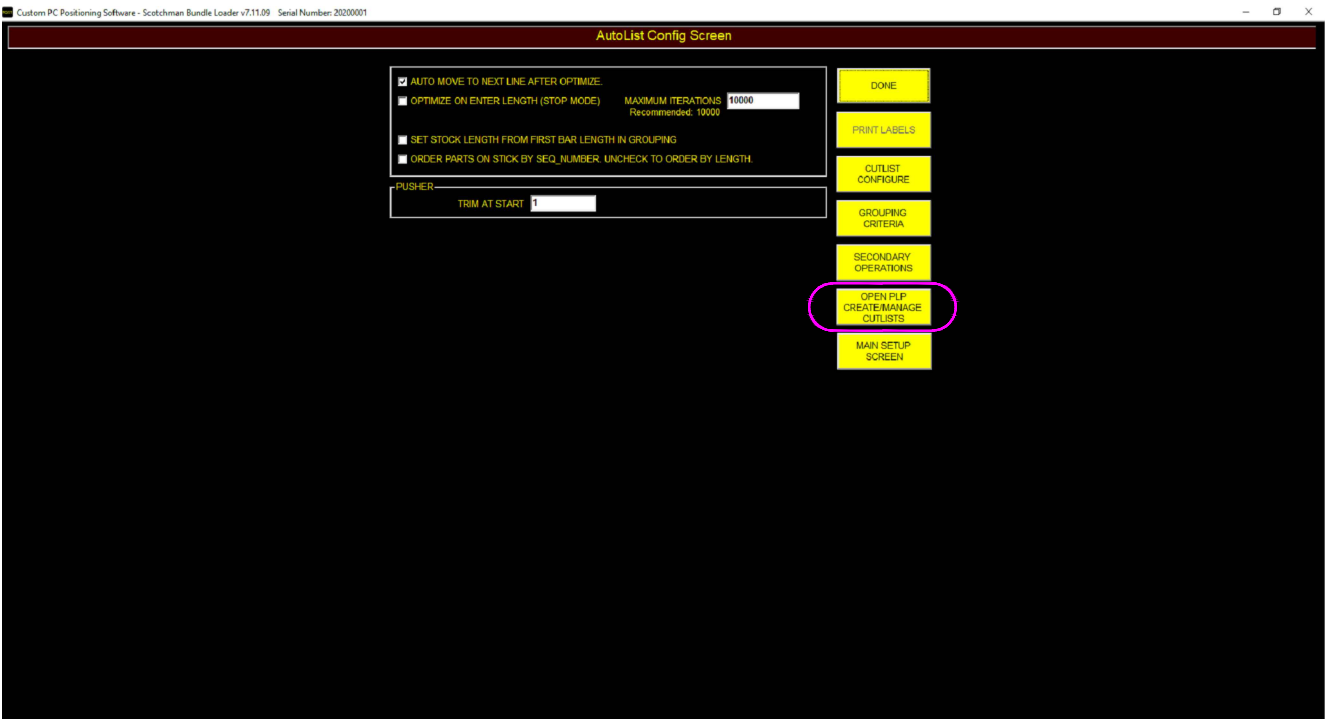
	A	B	C	D	E	F
1	Part Name	QTY	MATERIAL	LENGTH	WIDTH	THICKNESS
2	BRACKET	1	STEEL	18	1.5	0.375
3	PUSHER	3	STEEL	14	1.5	0.375
4	FRONT PLATE	8	STEEL	8	1.5	0.375
5	SIDE RAIL	16	STEEL	4	1.5	0.375
6	REAR PLATE	10	STEEL	2	1.5	0.375
7						
8						
9						
10						

PART NAME,QTY,MATERIAL,LENGTH,WIDTH,THICKNESS
 BRACKET,1,STEEL,18,1.5,0.375
 PUSHER,3,STEEL,14,1.5,0.375
 FRONT PLATE,8,STEEL,8,1.5,0.375
 SIDE RAIL,16,STEEL,4,1.5,0.375
 REAR PLATE,10,STEEL,2,1.5,0.375

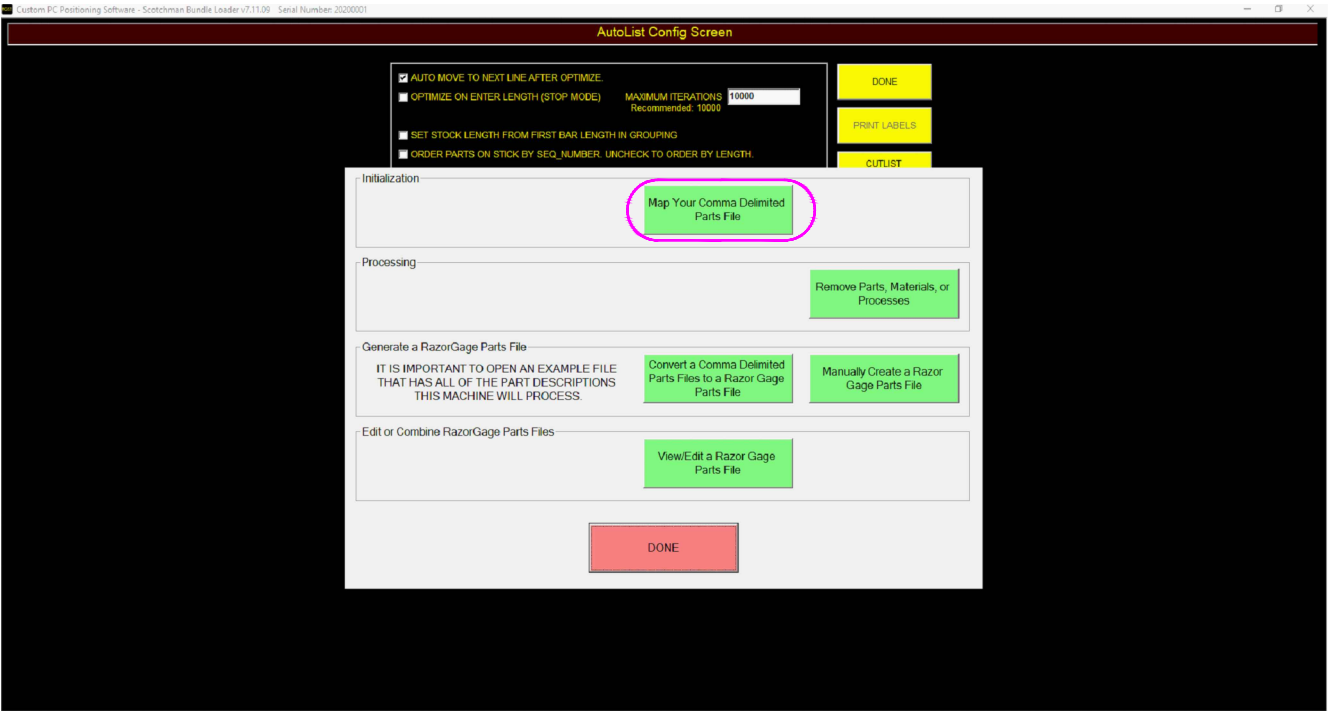
2. Enter the AUTOLIST screen and press the SETTINGS button in the top right corner of the screen.



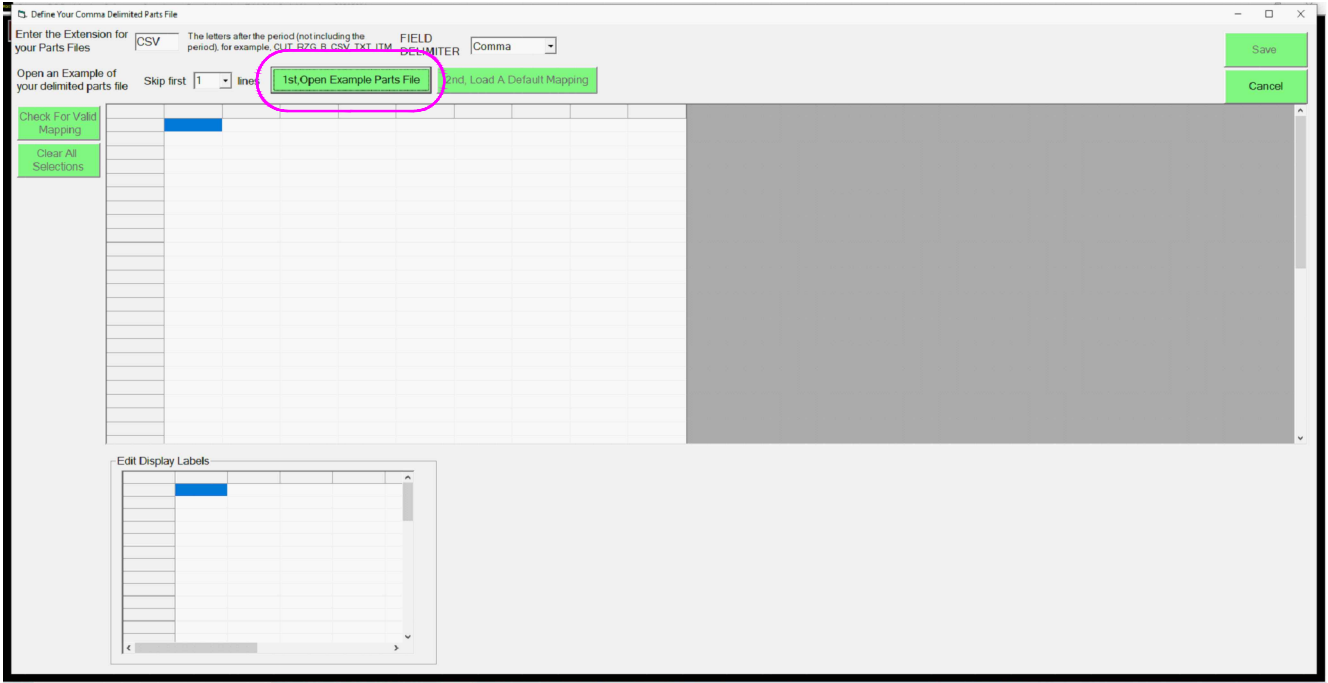
3. Open the Parts List Processor (PLP) menu on the right side of the screen.



4. The PLP menu will open in the center of the screen. Begin the initialization process by pressing the **MAP YOUR COMMA DELIMITED PARTS FILE** button at the top of the menu.

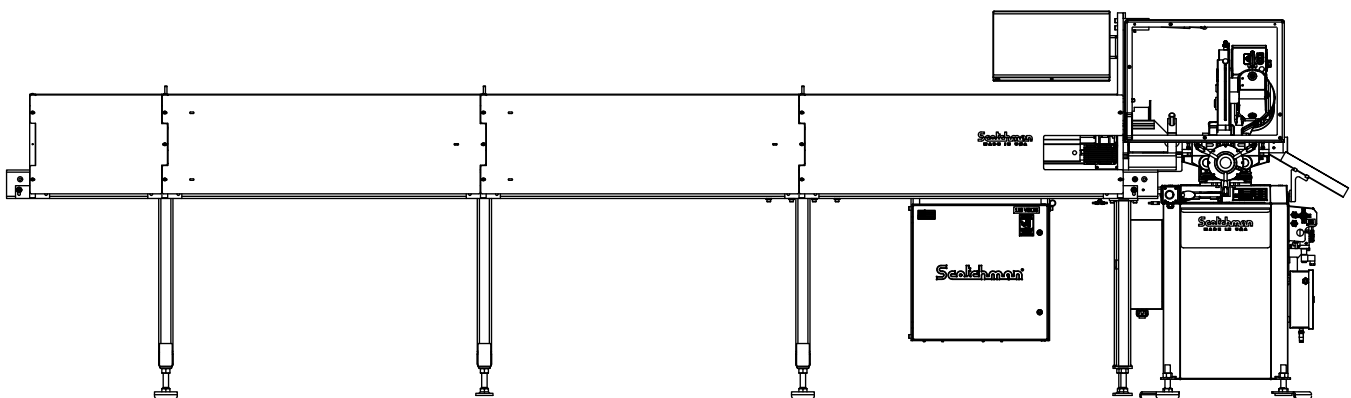
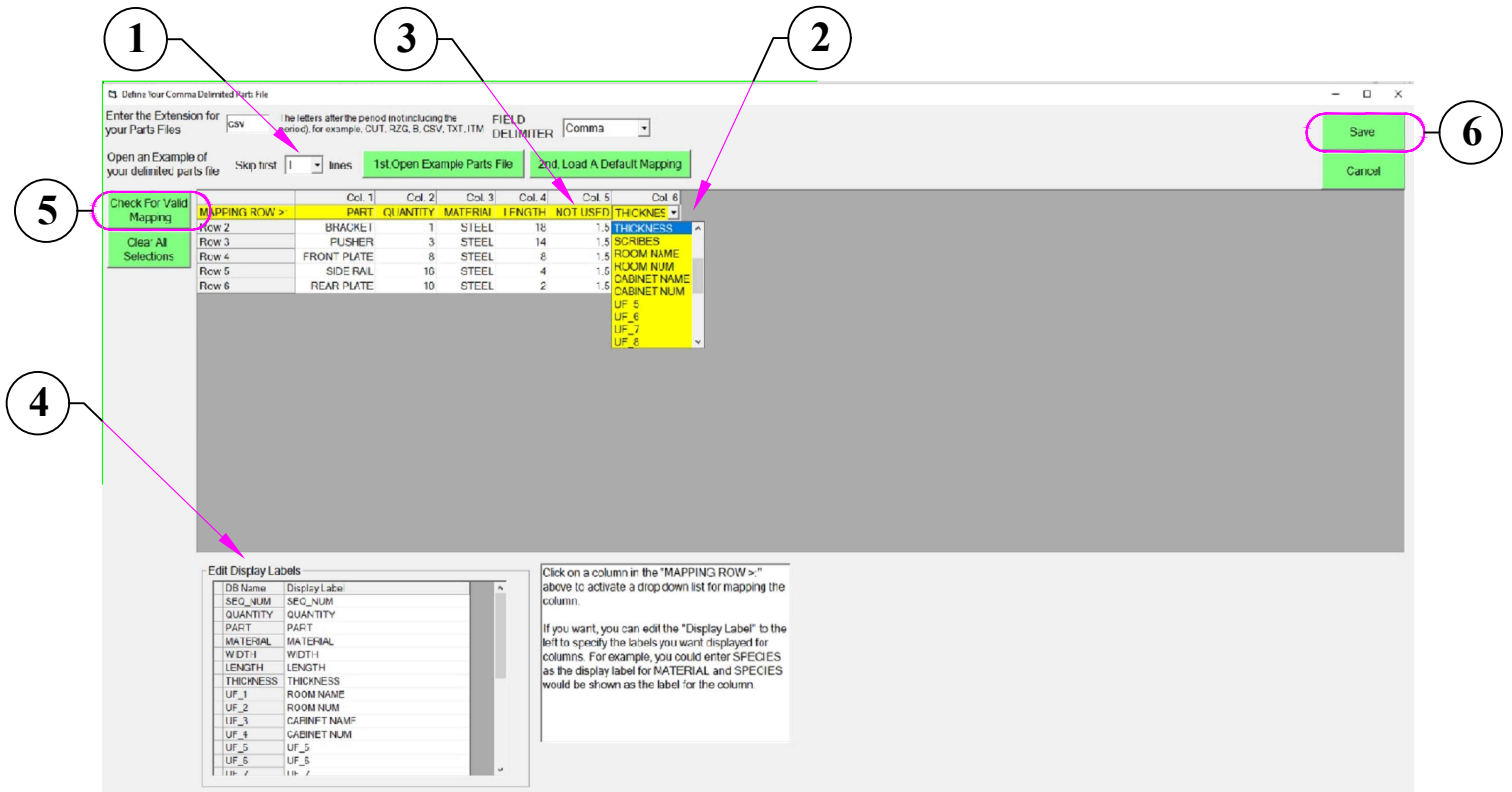


5. The program mapping page will open, and the program you have written will need to be loaded in. Press the "1st, OPEN EXAMPLE PARTS FILE" button, and locate the file you have written. The location of this will vary depending on how the file was transferred to the system.

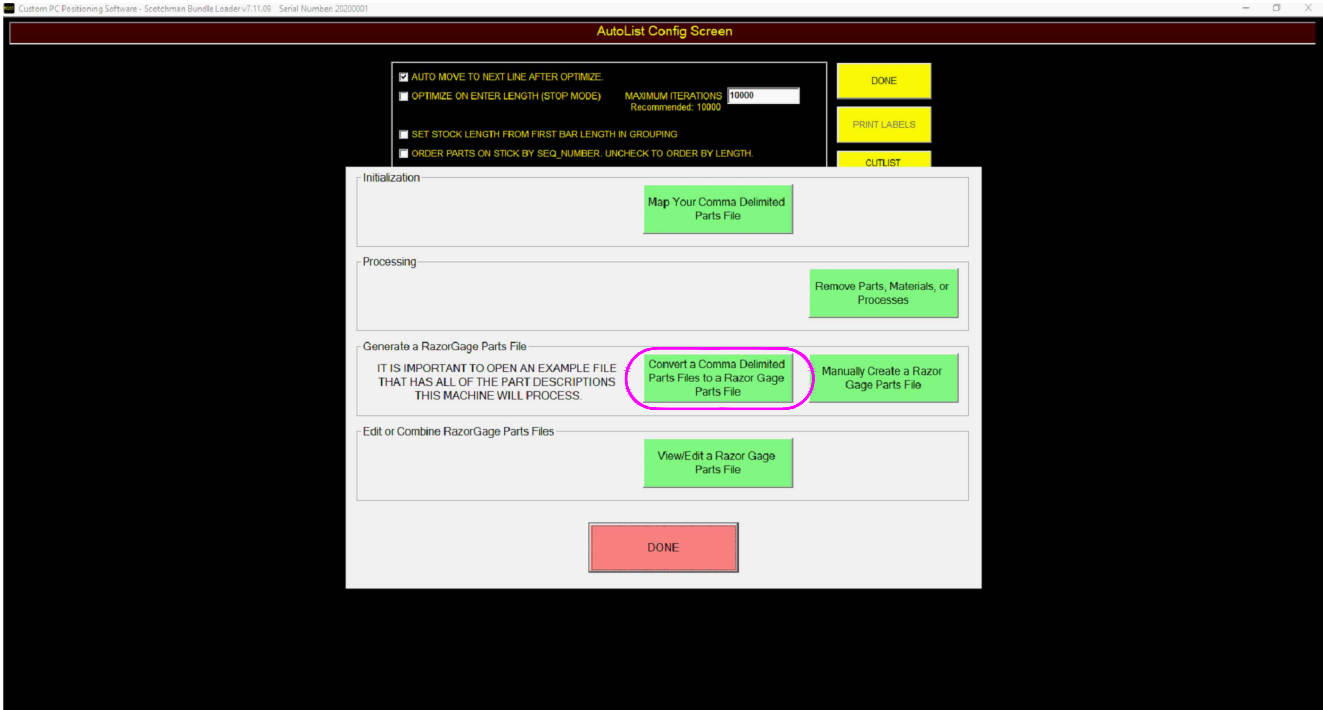


6. The example program from before is loaded into the picture below. Because the first row is made up of headings, make sure the first line is skipped (1). For each column, click on the yellow cell at the top and a drop-down list will appear (2). Select the proper heading for that column. If you want the PLP to ignore a column select NOT USED (3). The User Defined headings can be edited by pressing on the name in the bottom left corner (4). Once all columns have been mapped, press the CHECK FOR VALID MAPPING (5) button to verify the program, and press SAVE (6).

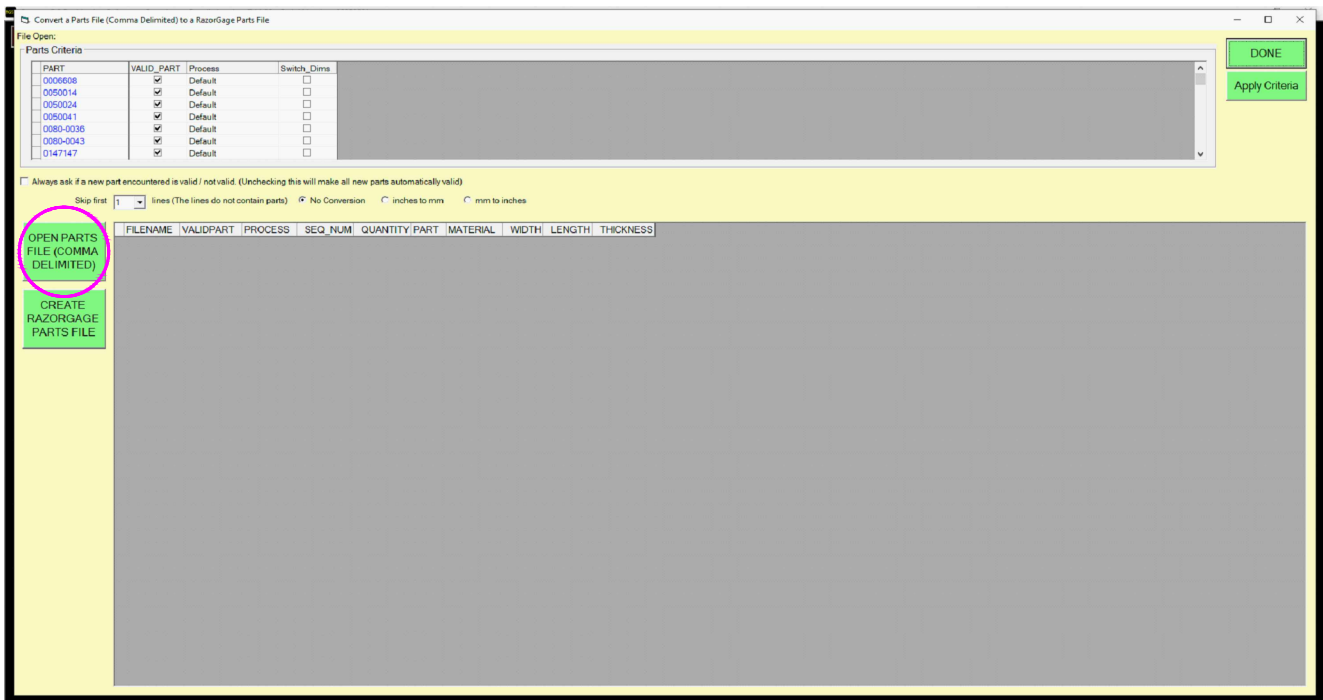
NOTE: THE SOFTWARE WILL RETAIN THE PREVIOUS MAPPING, SO THIS STEP MAY BE SKIPPED IF USING THE SAME COLUMN FORMAT BETWEEN PROGRAMS.



7. You will be returned to the PLP menu. Now it is time to generate a RazorGage parts file by pressing the button in the center of the screen.

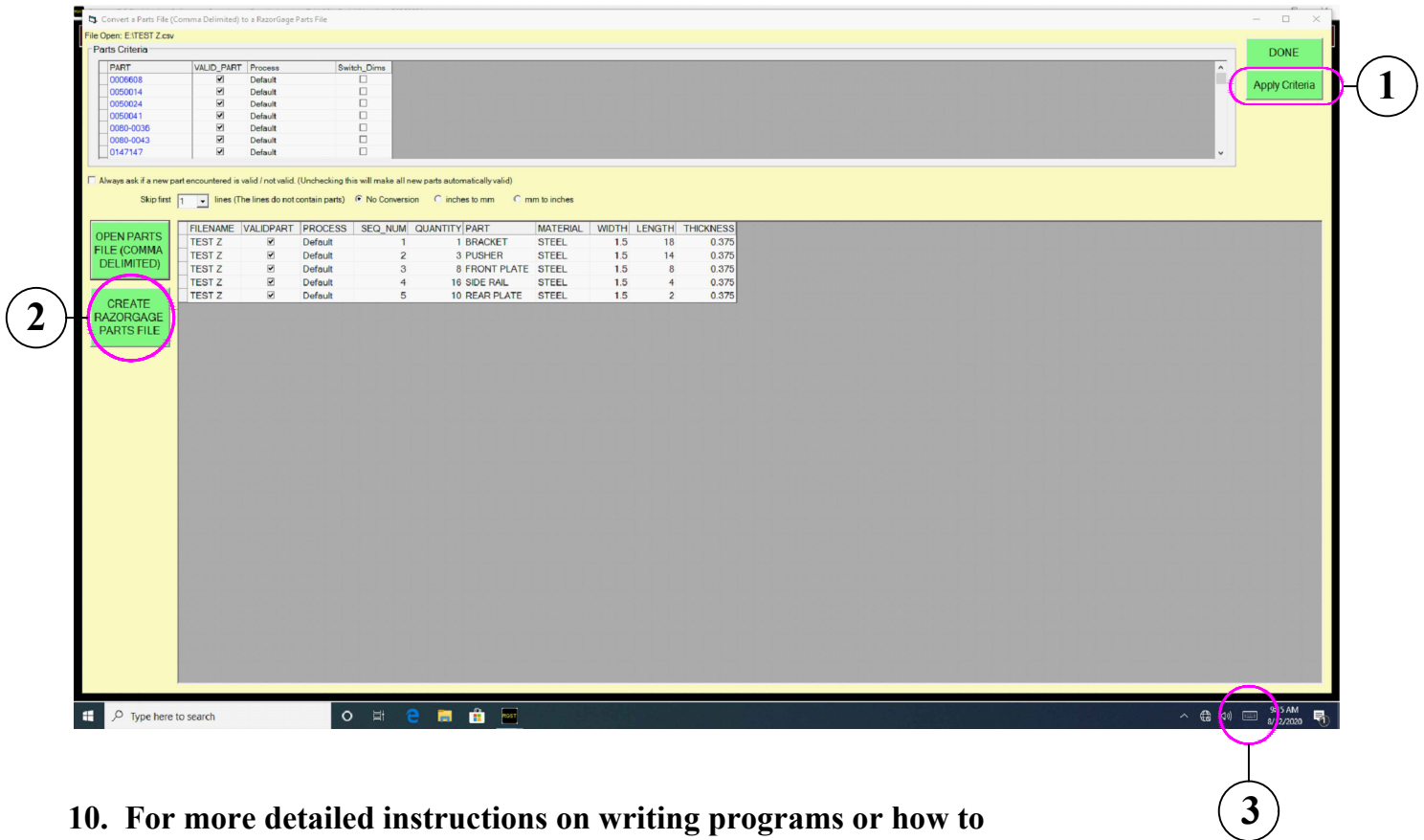


8. This will open the conversion page. Press the OPEN PARTS FILE button on the left side of the screen and import the file that you just mapped.



9. The file previously mapped will appear on screen. Verify that the columns headings are correct. If not, repeat STEPS 4-6. You can also convert units at this stage, or skip more lines if necessary. If everything appears correct, press **APPLY CRITERIA** (1), then press **CREATE RAZORGAGE PARTS FILE** (2). Use the onscreen keyboard (3) to change the file name as desired, and save the file in the CUTLISTS folder on the (C:) drive.

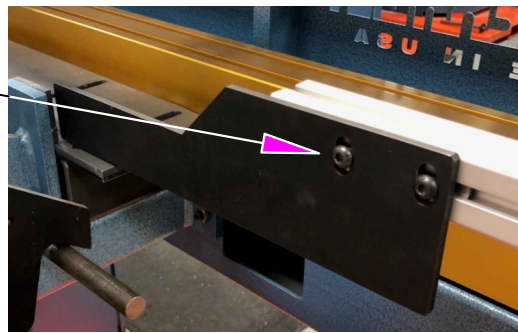
NOTE: IF THE FILE IS NOT SAVED IN THE (C:) DRIVE, AN ERROR MESSAGE WILL APPEAR WHEN LOADING THE CUTLIST INTO THE AUTOLIST SCREEN.



6.4 CALIBRATING THE RAZORGAGE

The main reasons for recalibrating the RazorGage would be if the saw was disassembled and/or moved or the pusher length changed - possibly either from the pusher bolts loosening or not tight enough or some type of "crash" involving the pusher. The following are steps to calibrate the RazorGage.

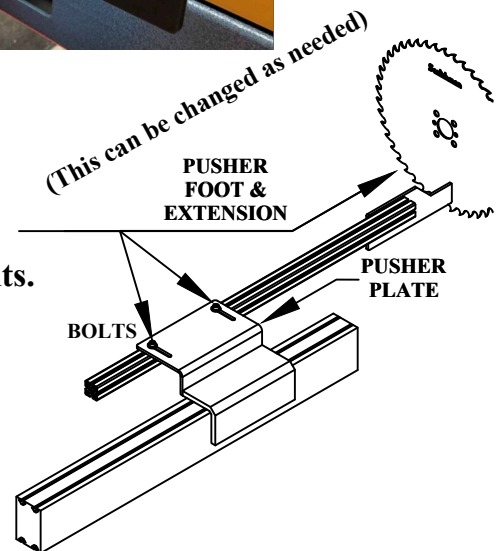
Adjustment bolts for
Pusher Foot are on the
back side



1. If the machine is on, close the RazorGage program by tapping on the small "x" on the upper right of the screen. Then push in the Emergency Stop button to turn the machine off and pull it back out.
2. Carefully push or pull the parts pusher carriage by hand towards the saw until you feel it stop solidly against the internal stop.
3. Loosen the two bolts that hold the pusher extension and move it so the pusher foot is 1 - 2 inches away from the saw blade & tighten bolts.

NOTE: Check the bolts on the pusher foot & pusher plate too.

4. Restart the Auto Track. See [Section 3.6.2](#) Starting The Auto Track
5. Open the RazorGage program. See [Section 6.1](#) RazorGage Start Up
6. In the upper right corner of the Main Screen, push the SETUP SCREEN button. The user parameters password is required. (90210) Tap the keyboard icon (bottom of screen, right side of taskbar) and type the password. Then tap the ENTER button.
7. On the SETUP SCREEN in the lower center, push the Calibrate button and that will take you to the Calibration Screen shown on the next page. Follow the instructions shown on this screen.



v7.11.09 Serial Number: 20190177

Calibration Screen

STEP 1

STEP 2

First thing to do is set the Home Offset. To do this, you will need to cut a short piece that you can measure with Calipers.

NOTE: If the Home Offset has already been set, press the "Use Current Home Offset" button to continue to the next step.

A) Enter a distance in the 'Target Position' (For Example: 6")

B) Press 'Move to Target'

C) Cut The Part.

D) Measure the part and enter into the 'Part Measurement' box.

Use The Current Home Offset

Target Position:

Move to Target

Cycle Saw

Part Measurement:

Save the Home Offset And Exit.

Continue to Next Step
(Calibrate the Scale Factor)

Current Pos: 0.373 ON Target ●

7	8	9
4	5	6
1	2	3
.	0	← Backspace

Move to Low Limit
(0.373)

Move to High Limit
(72.373)

Cancel and Return To Main

CALIBRATION SCREEN

Cut a part and measure it and enter this measurement in the "Target Position" box. This needs to be a length you can measure with a caliper. Somewhere in the 1 - 5 inch range is ideal. The more accurately you can measure this part the better. Once you have decided on the length, enter the number in the Target Position box.

Tap the "Move To Target" box and the RazorGage will move to where it thinks this length is.

Take a piece of the material that is to be cut and push it thru the vise and hold it against the pusher on the RazorGage and tighten it in the vise just enough to hold it. Make sure everything is clean!! The end of the material must be square, long enough to be clamped properly and sitting flat in the vise bed. Otherwise you may get a false or bad measurement.

Cut this part and measure it. Enter this measurement in the "Part Measurement" box.

Tap "Save the Home Offset and Exit" button and the "Press OK to Home" screen will appear.

DO NOT PRESS THE "CONTINUE TO NEXT STEP" BUTTON!!

This will cause the system scale factor to change.

When the "MDRIVE-CONNECTED TO COMM 3" line is green, tap the "OK" button and the RazorGage will again move toward the saw and contact the internal stop to find it's home.

The Main Screen will appear next. Cycle the saw to cut a part or two and measure to confirm that the saw is calibrated properly.

7.0 SYSTEM OPERATION

7.1 SYSTEM PREPARATION

The Auto Track and saw are now ready to be used as a joint system. First, verify that all components of the system have been started (saw power, air supply, M-Drive power, computer power, safety systems ready for use, and program loaded). Refer to SECTION 3.6 for any questions regarding startup procedures.

Before processing material can begin, the system must be tested as a whole to verify components are adjusted correctly and that all systems are working properly.

7.1.1 TRIGGERING LOADER

Before loading material into the AutoLoader, check that the Auto Track is functioning properly by manually triggering the loader. Make sure that the Auto Track is free of obstructions and all operators are out of the way before proceeding.

The “Trigger Loader” button (see below) is located on the setup screen. Pressing it will manually cycle the loading arms up.

Custom PC Positioning Software - Scotchman Bundle Loader v7.11.09 Serial Number: 20190177

Setup Screen

System Parameters	User Parameters	Navigation
Stroke: 72.000 Scale: 3465.000 Home Offset: 0.373 <input type="checkbox"/> Metric <input type="radio"/> Home Left <input type="radio"/> Home Right ST Extrusion <input type="checkbox"/>	Speed: 10.000 Accel: 30.000 Decel: 20.000 Run Current: 100% Load Speed: 30.000 First Move Speed: 10 Unload Dist: 5.000 Load Offset: 11.000 Saw Kerf: 0.070 Clamp Offset: 2.000	7 8 9 RETURN 4 5 6 Help 1 2 3 PC Software Manual . 0 ← ENTER Backspace

I/O Option

M-Drive BMI+ (CPO)
Loader ON Sec: 2 Loader OFF Sec: 2
☐ Check to disable out of material switch.

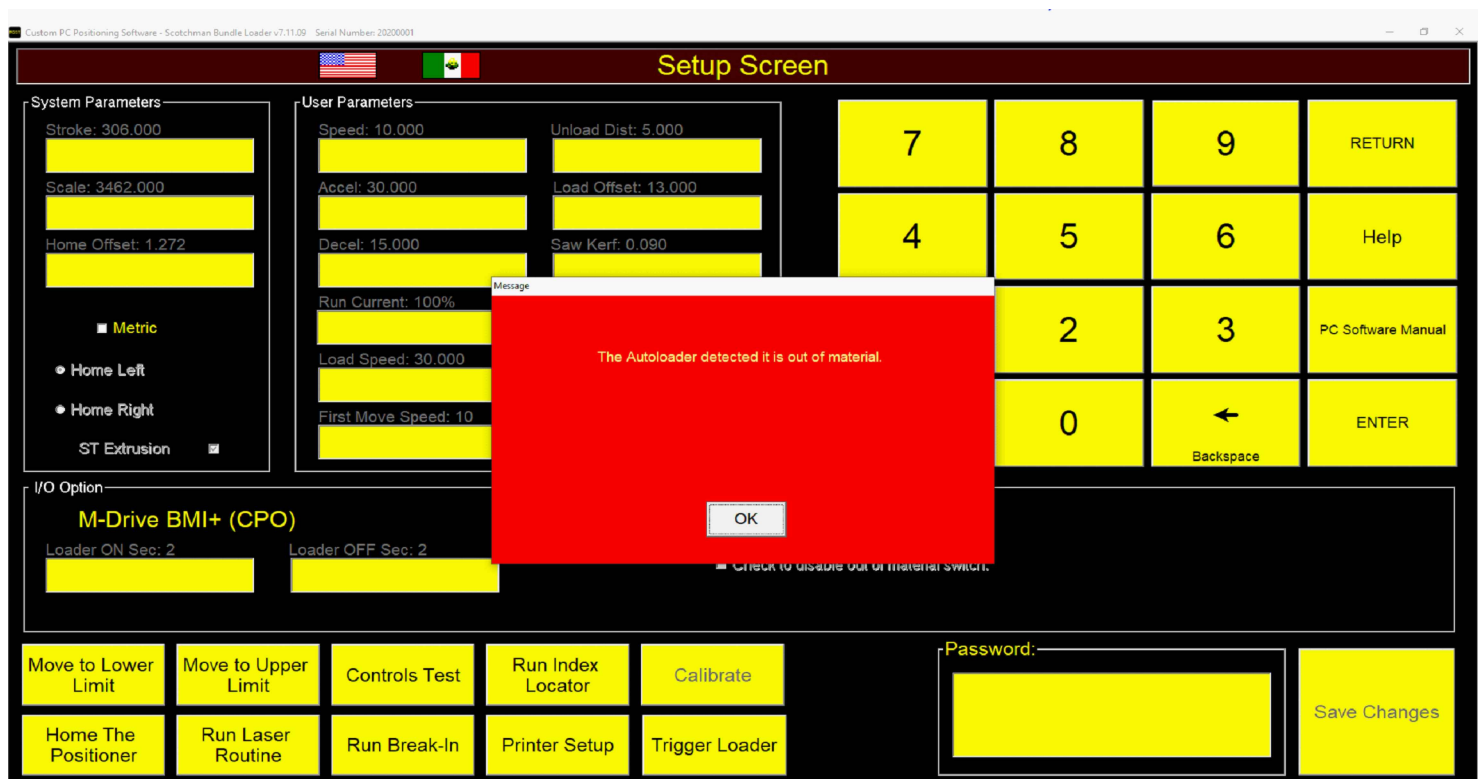
Move to Lower Limit	Move to Upper Limit	Controls Test	Run Index Locator	Calibrate
Home The Positioner	Run Laser Routine	Run Break-In	Printer Setup	Trigger Loader

Password: XXXXXX Save Changes

7.1.2 LOADING MATERIAL & ADJUSTMENTS

Select the material to be cut and measure the total length of the piece. From the RazorGage Main Screen, type a length 2-6” longer than the material to be cut and press ENTER. The RazorGage will move to position that will leave room to load material in front of it.

Load a few pieces of material into the Auto Track and make necessary adjustments for the particular material as detailed in SECTION 7.1.1. Use the “Trigger Loader” feature to test the loading system and ensure adjustments were made properly. If the material sensor is out of adjustment, an error will appear during this process as shown below. Re-adjust components as necessary and repeat until the material loads without issue.



7.1.3 ENABLE/DISABLE MATERIAL SENSOR

For testing or troubleshooting purposes the material sensor may be disabled.

WARNING: IF THE MATERIAL SENSOR IS NOT TURNED BACK ON BEFORE PRODUCTION BEGINS, THE RAZORGAGE WILL NOT BE ABLE TO RECOGNIZE THAT THE LOADING SYSTEM IS OUT OF MATERIAL. THE SYSTEM WILL CONTINUE TO CYCLE AS IF MATERIAL IS PRESENT UNTIL THE JOB IS COMPLETE.

To turn the material sensor on or off, enter the User Parameters password (90210) and tap the ENTER button. The Out of Material button is located in the center of the screen. It is small. Press the checkbox and the checkmark beside it will change. Press “Save Changes”.

Custom PC Positioning Software - Scotchman Bundle Loader v7.11.09 Serial Number 20190177

Setup Screen

System Parameters
Stroke: 72.000
Scale: 3465.000
Home Offset: 0.373
☐ Metric
☐ Home Left
☐ Home Right
ST Extrusion ☐

User Parameters
Speed: 10.000
Accel: 30.000
Decel: 20.000
Run Current: 100%
Load Speed: 30.000
First Move Speed: 10
Unload Dist: 5.000
Load Offset: 11.000
Saw Kerf: 0.070
Clamp Offset: 2.000

7	8	9	RETURN
4	5	6	Help
1	2	3	PC Software Manual
.	0	←	ENTER
			Backspace

I/O Option
M-Drive BMI+ (CPO)
Loader ON Sec: 2
Loader OFF Sec: 2
☐ Check to disable out of material switch.

Move to Lower Limit	Move to Upper Limit	Controls Test	Run Index Locator	Calibrate
Home The Positioner	Run Laser Routine	Run Break-In	Printer Setup	Trigger Loader

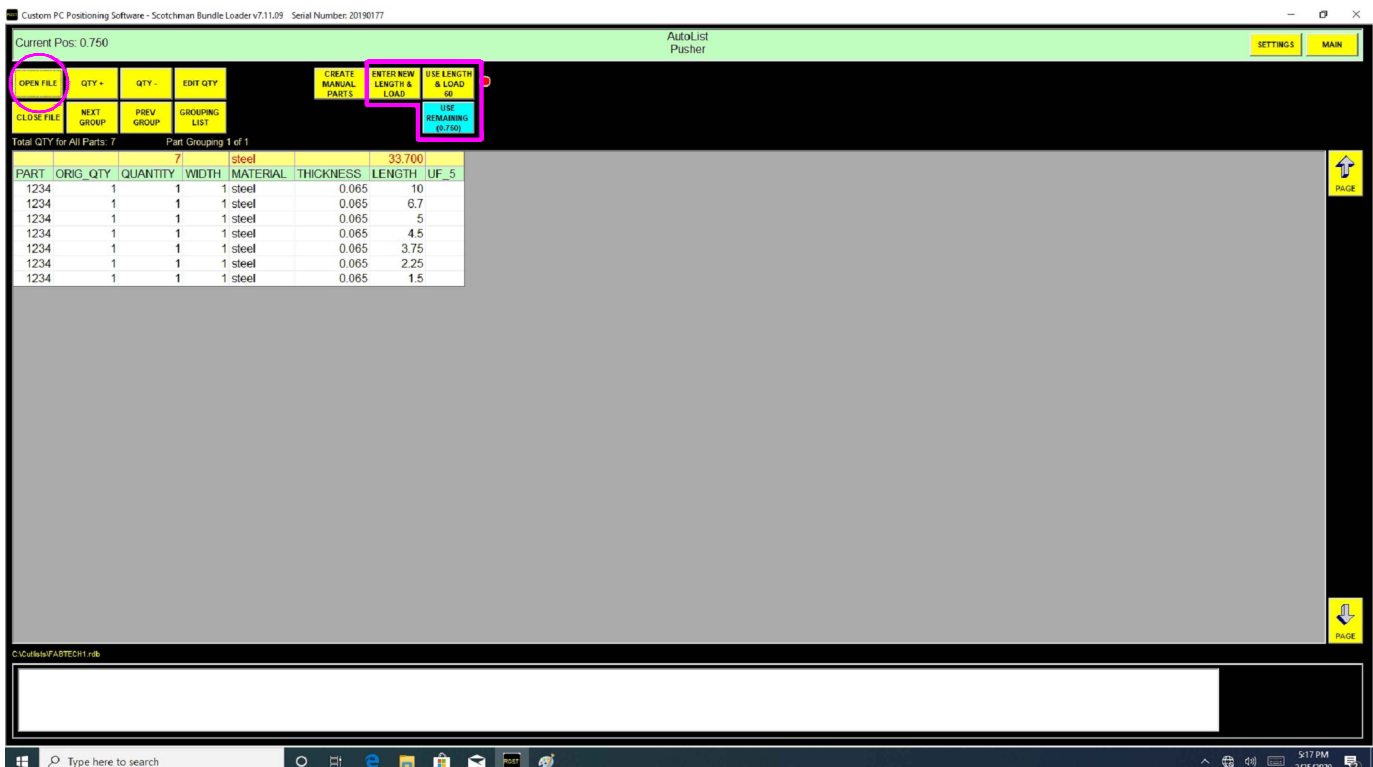
Password:
XXXXXX
Save Changes

7.1.4 DRY FEEDING

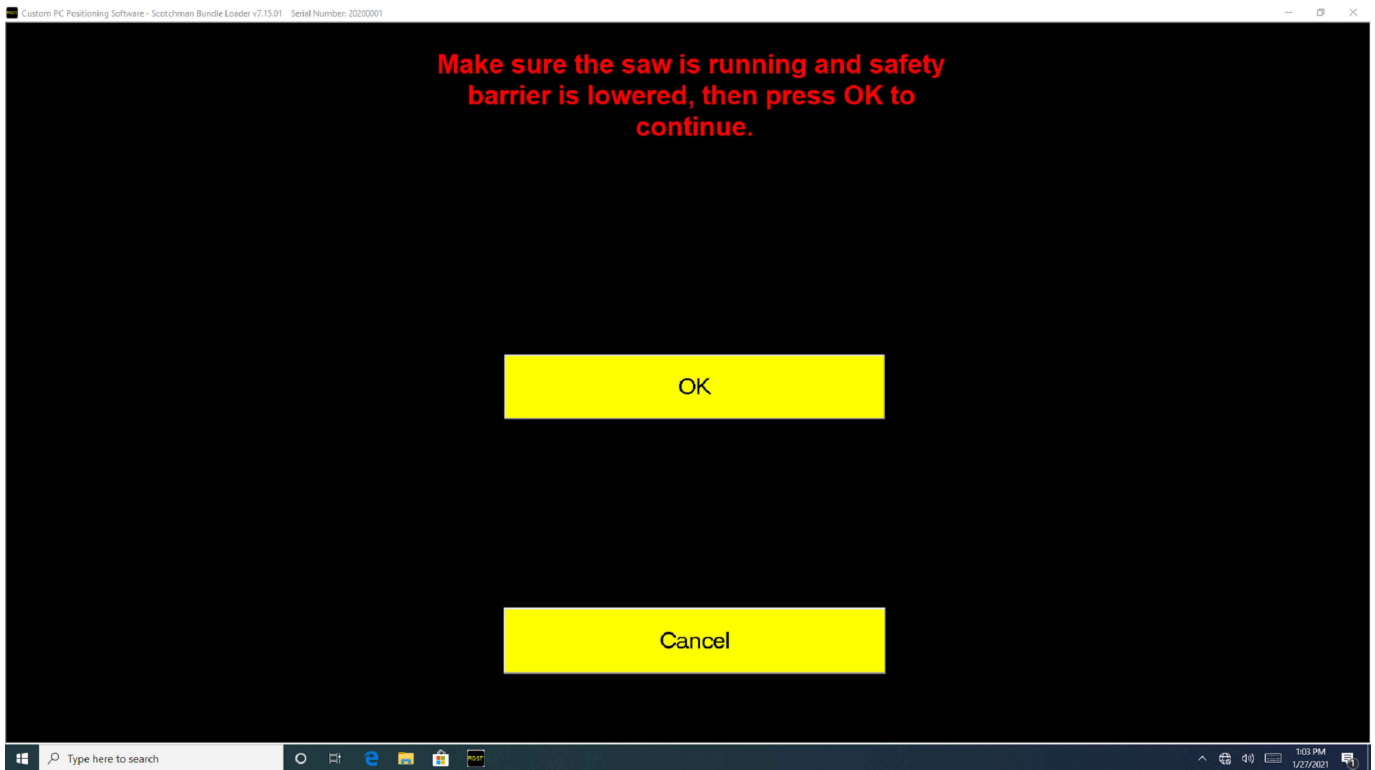
Before running a production job, a piece of test material should be "dry run" through the Auto Track to ensure no hang-ups or obstructions occur. To do so, move the RazorGage to position and load a piece of test material as detailed in SECTION 7.1.2. On the MAIN SCREEN, begin incrementally feeding the material into the saw by manually typing in values smaller than the current position of the RazorGage. Moving the pusher 10-12" at a time is suggested. Inspect the adjustment of the ramp blocks and the hold down roller, as well as the fore/aft position of the pusher. On smaller materials, the fore/aft position of the pusher may need to be re-adjusted to maintain contact with the material as it feeds through the system. If everything is adjusted and the material feeds correctly, the machine is now ready to begin processing AUTOLIST programs.

7.2 RUNNING AN AUTOLIST PROG.

1. Open the AutoList screen from the Main Menu and press OPEN FILE in the top left corner. Select the correct cutlist program to be processed, and press OK to load the desired program.
 - **NOTE:** The standard length of the bars must be entered by tapping ENTER NEW LENGTH & LOAD button.
 - **NOTE:** To put an odd length of material in the saw by hand, measure it then go to the Main Screen. Enter that length in the Target Position box and tap ENTER. The pusher will go to that length. Put the bar in the saw bed and make sure it is up against the pusher. Go to the AutoList screen and tap the USE REMAINING button.



2. This screen appears next and is to help remind the operator to make sure the saw motor is turned on and the safety barrier is down as the saw will cycle with the saw motor off. Some places where the saw would be cycled with the saw motor off would be to test run a new program or adjust the stroke after a saw blade change or if a different size material is to be cut. A switch (shown below) on top of the saw motor turns it off or on. Tap the OK tab and the saw will cycle.

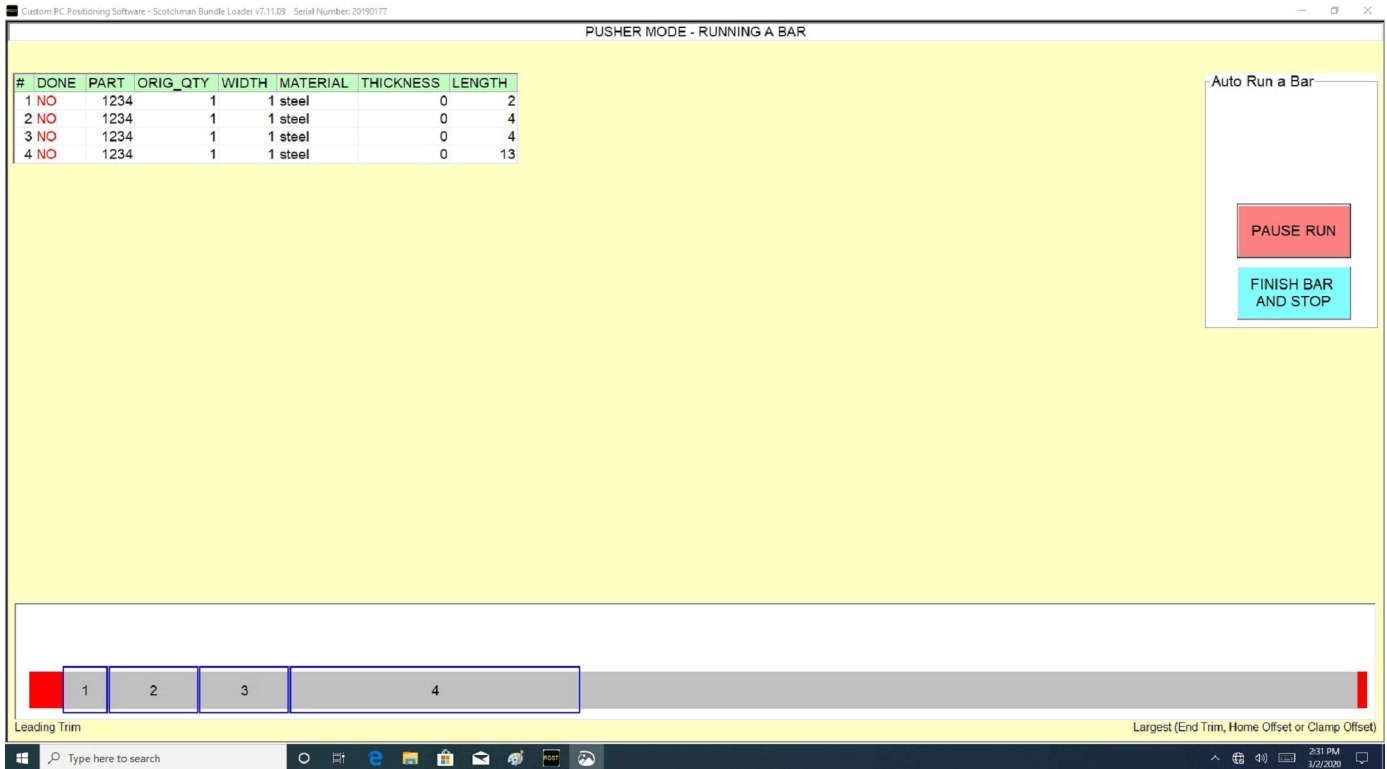


Saw Motor Switch

**Feed/Clamp Switch
Must Be "ON"**

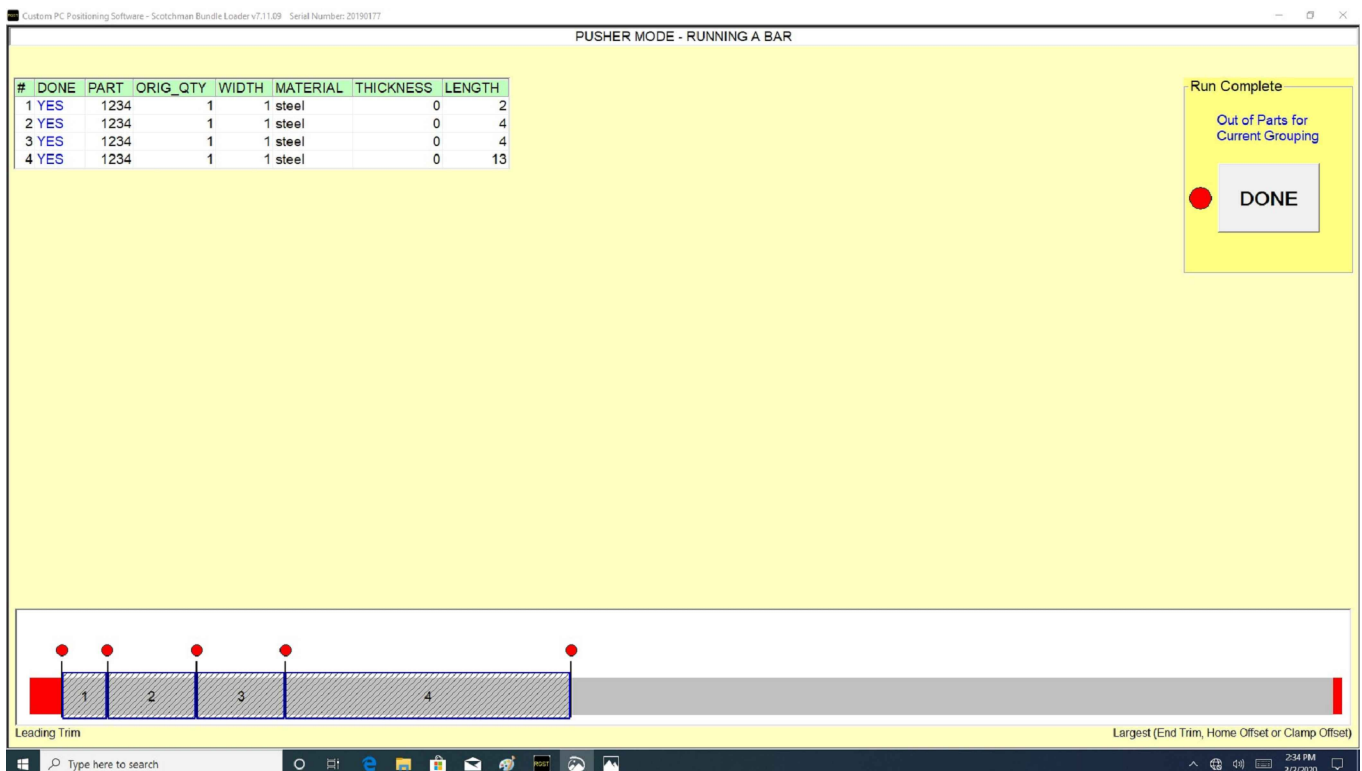


- 3.** This screen appears while the saw is running. See at the bottom where it shows the order and lengths it will cut, including the trim cuts. On the right is the PAUSE RUN button. It will stop the saw when it finishes the cut it is making and resume when tapped again.

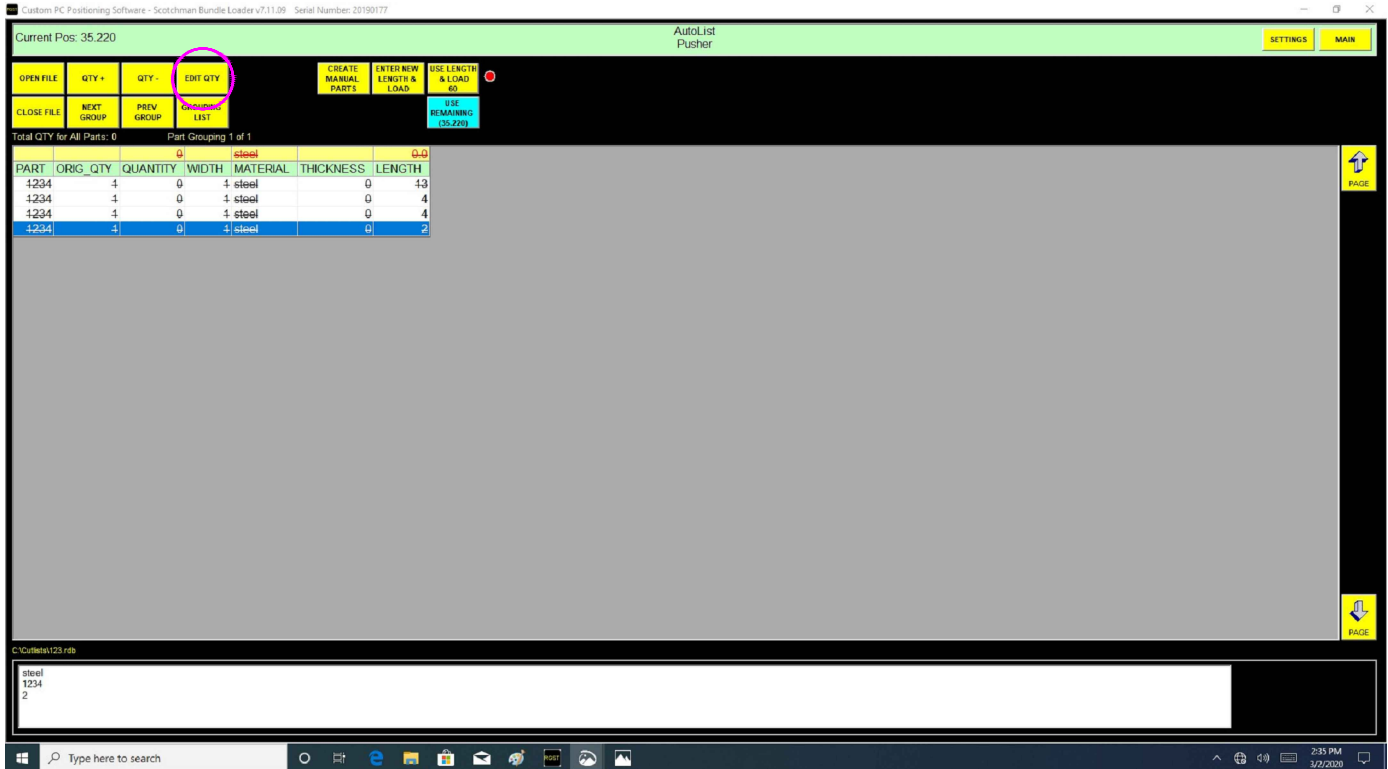


The AutoLoader will cut a trim piece to start with and then cut the parts to the length specified in the program. It will figure out how to get as many good parts as possible with the smallest amount of waste. This is a unique time saving feature of the AutoLoader and is a great benefit for the user.

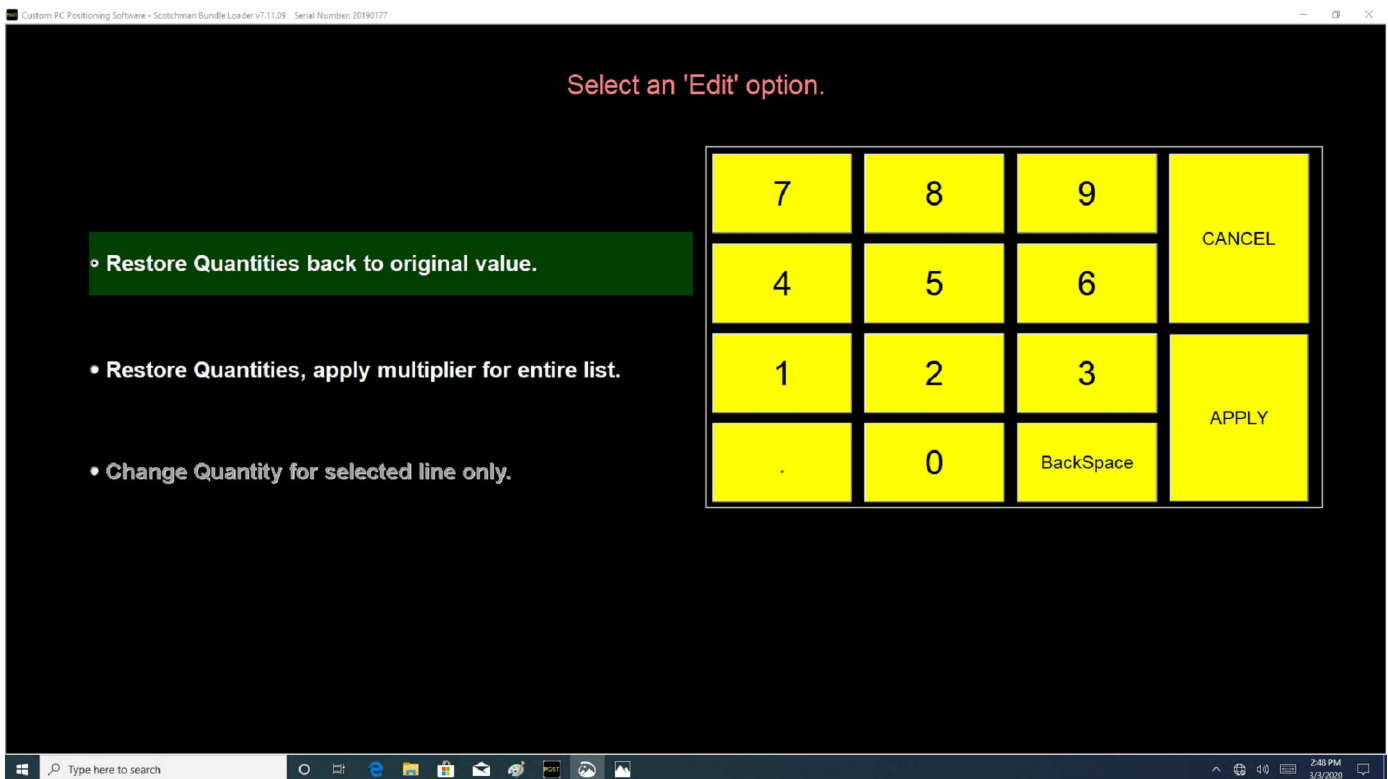
- 4.** In the parts list under the DONE row, it changes from NO to YES on each line as each part is cut, along with the red color below. The DONE button appears on the right when finished.



5. This screen appears when the program is done and the saw stops. The cut list has a line through each box. Tap the EDIT QTY button to restore the quantities.



6. Restore Quantities back to original value will be highlighted. Tap apply and the screen from Step 8 will appear and the program will be ready to run again.



7.3 USING RAZORAGE AS A GO-TO STOP

This machine can be used as a manual Go-To Stop for leftover remnant material or small volume applications.

- 1. Ensure that the vise is set for the material to be cut and the hold down roller and ramp blocks have been adjusted out of the way. Adjust the stroke control of the saw for the material selected. See SECTION 4.8.2.**
- 2. From the Main Screen, type the desired length to be cut and press ENTER. The pusher will go to that length. Put the material in the saw bed and make sure it is up against the pusher.**
- 3. Check that the FEED/CLAMP switch is in the “ON” position, and turn the saw motor switch to the “START” position to start the saw. Make sure the safety barrier is in the down position.**
- 4. Making sure the flow control valve is closed, step on the foot pedal to cycle the saw. The saw head should not move initially. Open the flow control valve to allow the head to travel downward and set at the desired feed rate.**
- 5. When the saw has reached the bottom of the stroke the head will return to the top position and the vise will unclamp. Remove the part and remnant from the vise.**
- 6. Repeat process as necessary, changing part lengths as needed.**

8.0 MAINTENANCE & LUBRICATION

8.1 SCHEDULED MAINTENANCE

A program of scheduled maintenance should be set up and documented according to your application and the frequency you use this machine. The following is a list of some important things that should be included in a scheduled maintenance program.

<u>EVERY 8 HOURS OR DAILY</u>	<u>EVERY 25 HOURS OR WEEKLY</u>
<ul style="list-style-type: none">1. Lubricate As Detailed In Section 8.22. Check Coolant Level3. Clear Chips And Debris From Saw4. Check FRL Oil and Water Level	<ul style="list-style-type: none">1. Lubricate As Detailed In Section 8.22. Check Oil Level In Gearbox As Detailed In Section 8.2.13. Check Oil Level In Power Downfeed As Detailed in Section 4.11

1. Every 250 Hours or 3 Months:

Drain the coolant reservoir and flush it out. Refill the coolant reservoir with new coolant.
See Section 4.2 or 10.1 for more information.

2. Every 500 Hours or 6 Months:

- Remove breather next to the lifting eye on top of the saw head.
- Remove the drain plug on the bottom of the saw head and drain the gear oil.
- Flush the saw head (gearbox) out with a petroleum product and reinstall the drain plug.
- The procedure for properly adding gear oil is shown in Section 8.2.1
- Check the condition of the pivot pin for the head and the guard.
- Check the complete saw for loose connections in the electrical and air systems.
3. Since every application is different, each user must design and implement a scheduled maintenance program that fits their application.

8.2 LUBRICATION

See Section 11.14 for list of recommended lubricants

DAILY LUBRICATION (8 HOURS)

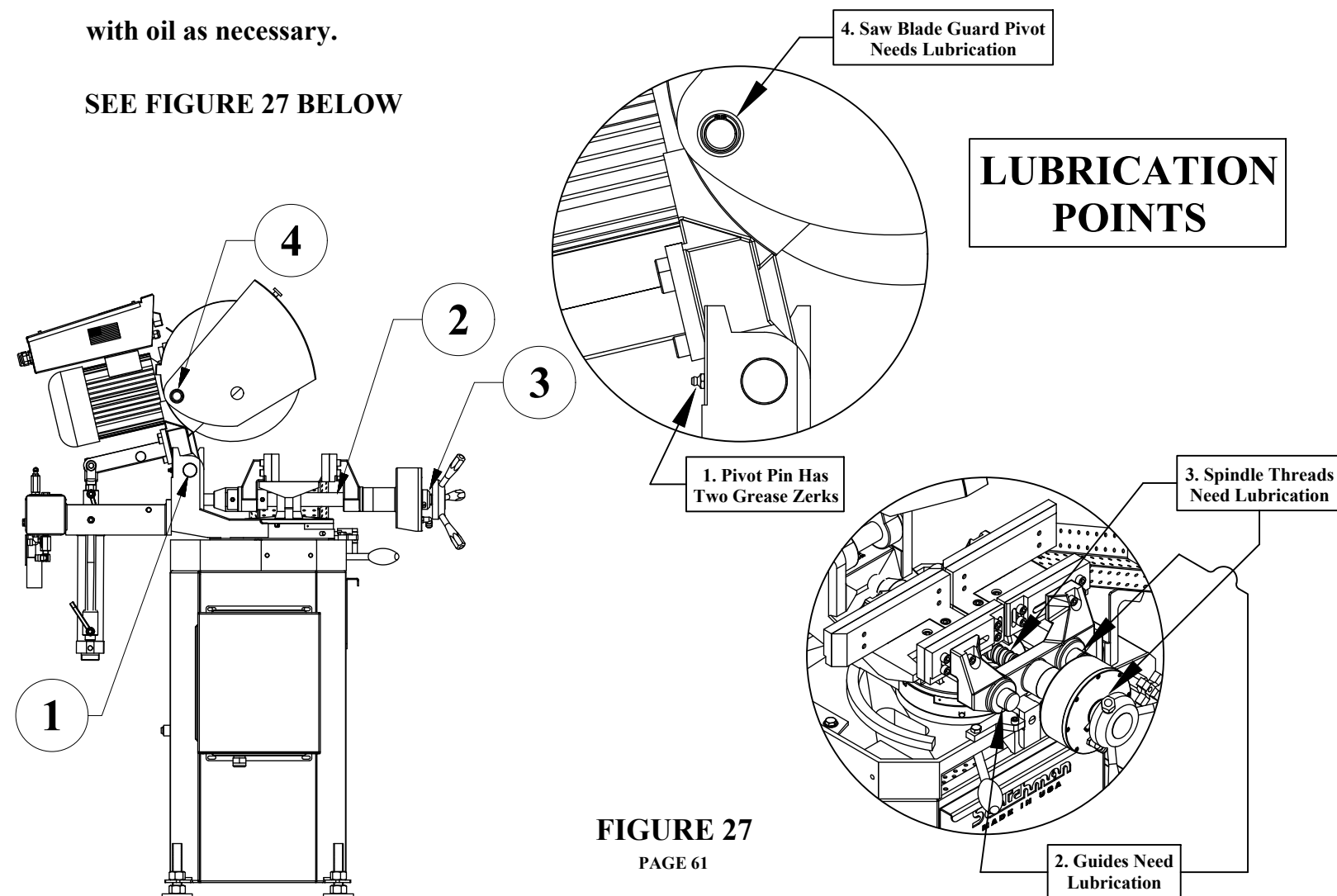
Grease the saw head pivot pin (1) with a quality multipurpose grease. Apply penetrating oil to the two guide shafts (2) and to the vise spindle (3).

Do not allow chips to build up on the saw. It's best to clean the chips out of the vise at least once per day, and more often if needed. Clear the chips with a vacuum, a brush, or similar device. **DO NOT** use compressed air.

WEEKLY LUBRICATION (25 HOURS):

Apply penetrating oil to the pivot of the saw blade guard (4). Lubricate the safety barrier pivot pin with oil as necessary.

SEE FIGURE 27 BELOW

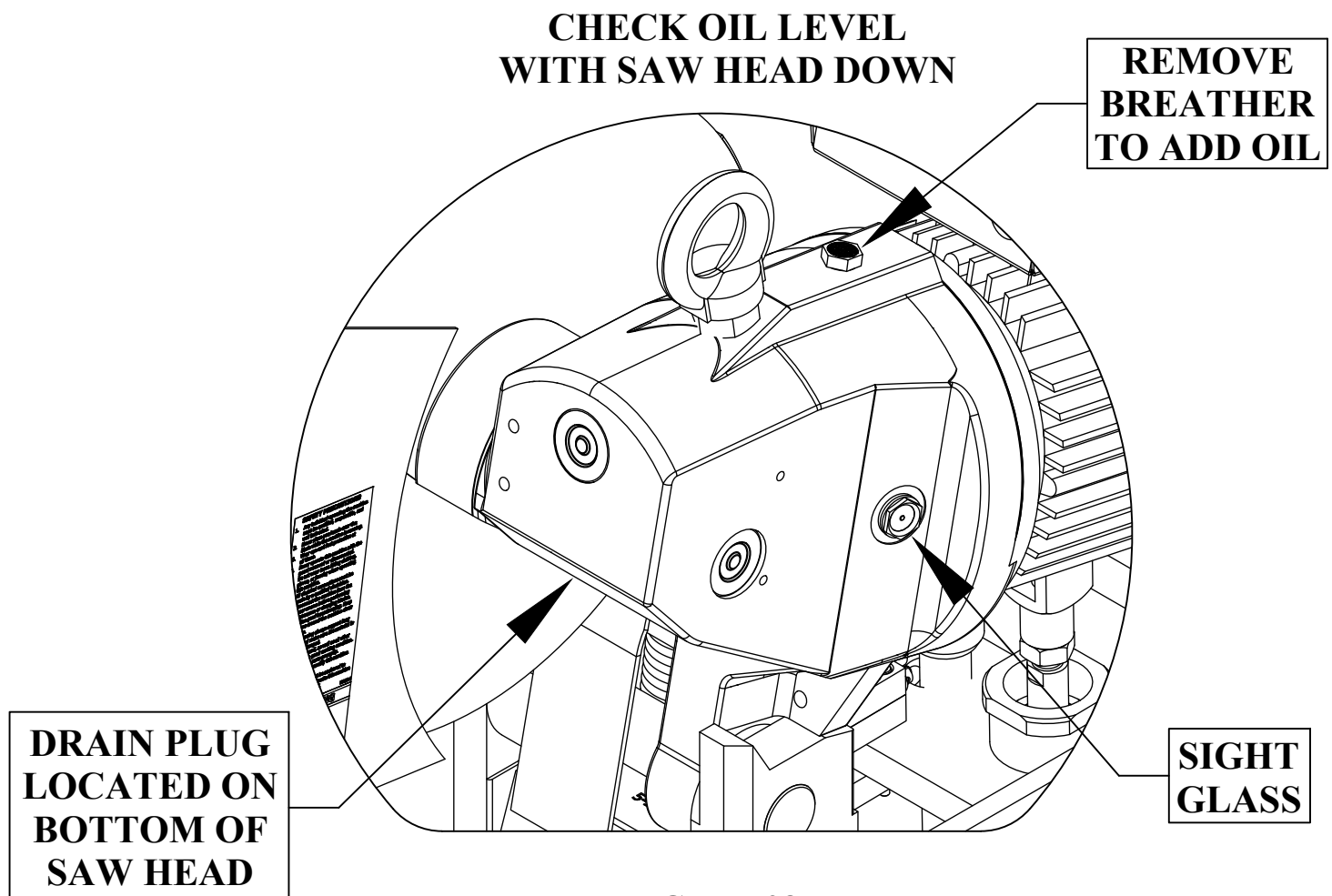


8.2.1 SAW HEAD GEAR OIL

SEE FIGURE 28 BELOW

Before initially operating the saw and once a week thereafter: With no saw blade on the machine and with the saw head down - Check the oil level in the saw head (gearbox) by looking at the sight glass on the right front of the head casting. The proper oil level is in the center of the sight glass.

Capacity is approximately 1.25 quarts. To add oil, remove the breather plug next to the lifting eye and fill with a non-EP additive ISO-460 gear oil specified for worm gears. Oils containing EP additives may degrade or damage bronze gears and must be avoided. Mobil 600W Super Cylinder Oil is highly recommended and available from the factory under P/N 075758.



8.3 FRL MAINTENANCE

CAMOZZI FRL
(Filter/Regulator/Lubricator)

DISCONNECT AIR SUPPLY!!

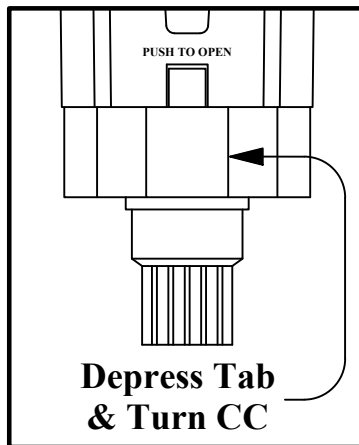
**AIR PRESSURE
ADJUSTMENT HERE**
Pull up knob to adjust pressure
Push down to lock in place

TO CHECK REGULATOR WATER-TRAP FILTER

Remove the water trap by pressing in the tab on the clear plastic part at the bottom and turning it counter-clockwise until it stops. Then pull water trap free. Filter can be removed by squeezing the tabs on top together, to allow for cleaning. When done, snap filter back into place and reattach in reverse order.

- See "DETAIL" below -

DETAIL



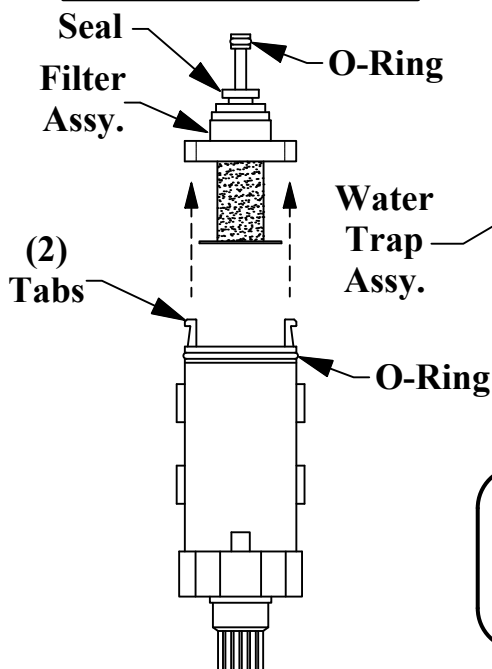
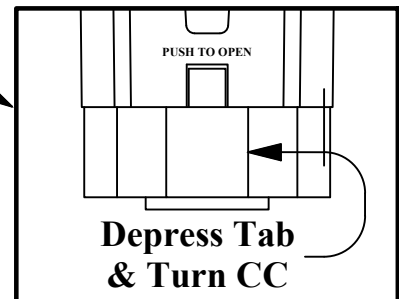
OILER ADJUSTMENT HERE
Use a small straight screwdriver to Increase or Decrease the amount of oil used.

Scotchman Air Line
Lubricant is recommended
Qt. 075753 - Gal. 075759

TO ADD OIL TO OILER
Remove oil reservoir by pressing in the tab on the clear plastic part at the bottom and turning it counter-clockwise till it stops. Then pull reservoir free from the oiler. Fill reservoir with oil a 1/2"-3/4" from the top and reattach in reverse order.

- See "DETAIL" below -

DETAIL



Water Trap usually more difficult to remove

Shuttle Valve

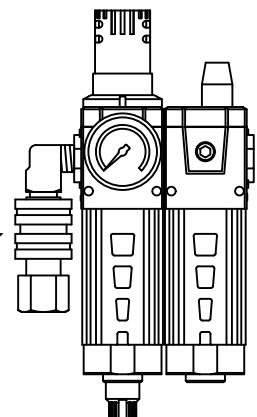


FIGURE 29

8.4 REPLACING THE AIR VISE SPINDLE

SEE FIGURE 30 ON THE FOLLOWING PAGE

- 1. Disconnect the machine's power and air supply.**
- 2. Remove the two air lines (1) from the front of the cylinder by pushing in the collar on the end of the fitting and pulling the air line out of the fitting.**
- 3. Next remove the two guide pins (2) out through the back of the vise. This is done by loosening the set screw on ONLY the front two locking rings (3) and removing the two bolts (4) from the vise base (5) that hold the guide pins in place. Then loosen the head of the saw and rotate it (as if making a miter cut) to remove the guide pins.**
- 4. Next remove the two bolts (6) that hold the aluminum support block (7) in place in the center of the vise base (5) and remove the aluminum support block. The filling block (8) under the aluminum support block also needs to be removed.**
- 5. Carefully lift the complete spindle assembly off of the machine and set it down on a table or workbench.**
- 6. The rear cast grip cheek (9) should slide off of the spindle.**
- 7. Remove the black plastic cover (10) from the center of the vise boss (11) and remove the RH thread M20 jam nut (12). Then remove the RH thread vise boss.**
- 8. The LH threaded lock nut (13) can be removed. Note that the tapered end goes toward the power vise cylinder**
- 9. The LH thread vise spindle (14) can now be carefully screwed out of the power vise cylinder.**
- 10. Now would be a good time in inspect the seals (15) in the front and rear grip cheek castings. They are located where the spindle enters the castings. These seals help to keep metal chips from entering the casting and increase the life of the casting and spindle. Replace if necessary.**
- 11. To install the new vise spindle reverse the above instructions.**

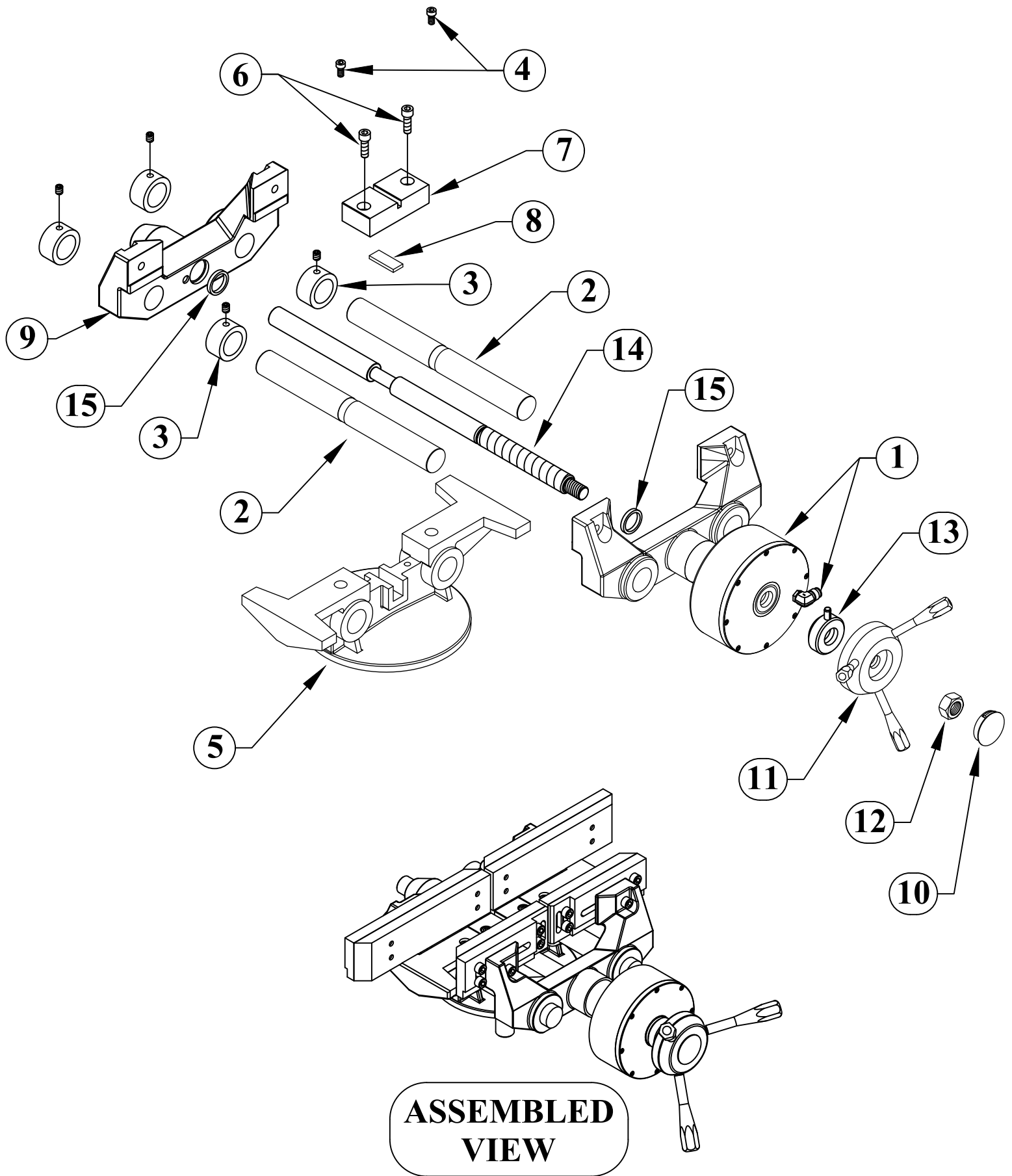


FIGURE 30

8.5 REPLACING THE AIR VISE SEALS

SEE FIGURE 31 ON THE FOLLOWING PAGE.

- 1. See Section 8.4 "REPLACING THE AIR VISE SPINDLE" to remove the vise assembly from the saw in order to get to the power vise air cylinder.**

- 2. Our P/N 076371 is the Seal Kit for this cylinder. It contains four o-rings and an oil seal.**

NOTE: Make sure to keep track of the location of the air ports!! The cylinder should be assembled with these ports located in the same place.

- 3. Once the power vise cylinder is removed, remove the eight small M4 screws (1) around the outside of the power vise cylinder lid (2) and carefully remove the lid. Try to keep the lid "even" while removing it - don't tip it side to side too much. It is a tight fit and may be difficult to remove.**

NOTE: There is a locating roll pin (see Figure 31) in the power vise piston (3) that sticks into the power vise lid. This keeps the piston from turning.

- 4. Next, remove the power vise piston (3) from the power vise body (4). It is also a tight fit and may be difficult to remove. It might help to thread the spindle into the piston and use it to help push or pull the piston out of the vise cylinder body. Use extreme caution!! Be careful to not damage any of the power vise parts.**

- 5. Remove the old seal (5) and o-ring (6) from the power vise lid (2).**

- 6. Remove the two smaller o-rings (7) and the large o-ring (8) from the power vise piston (3).**

- 7. Clean the the lid, piston and vise body. Make sure the inside of vise body is smooth and clean. If the surfaces are rough or unclean, it will damage the o-rings during use or not seal properly. Make sure the o-ring grooves are clean and there are no sharp edges on the lid, piston and vise body.**

- 8. Note that the small o-rings are both the same size and so are the large o-rings.**

- 9. Carefully install the new seal (5) in the front of the lid (2) and lubricate the inside of it.**

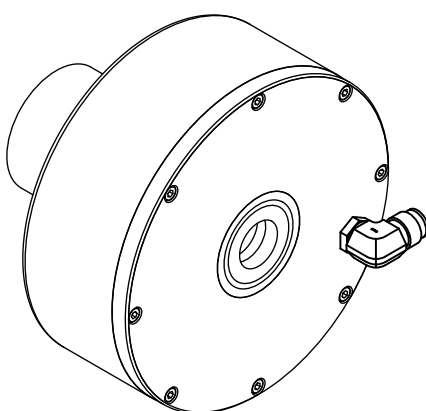
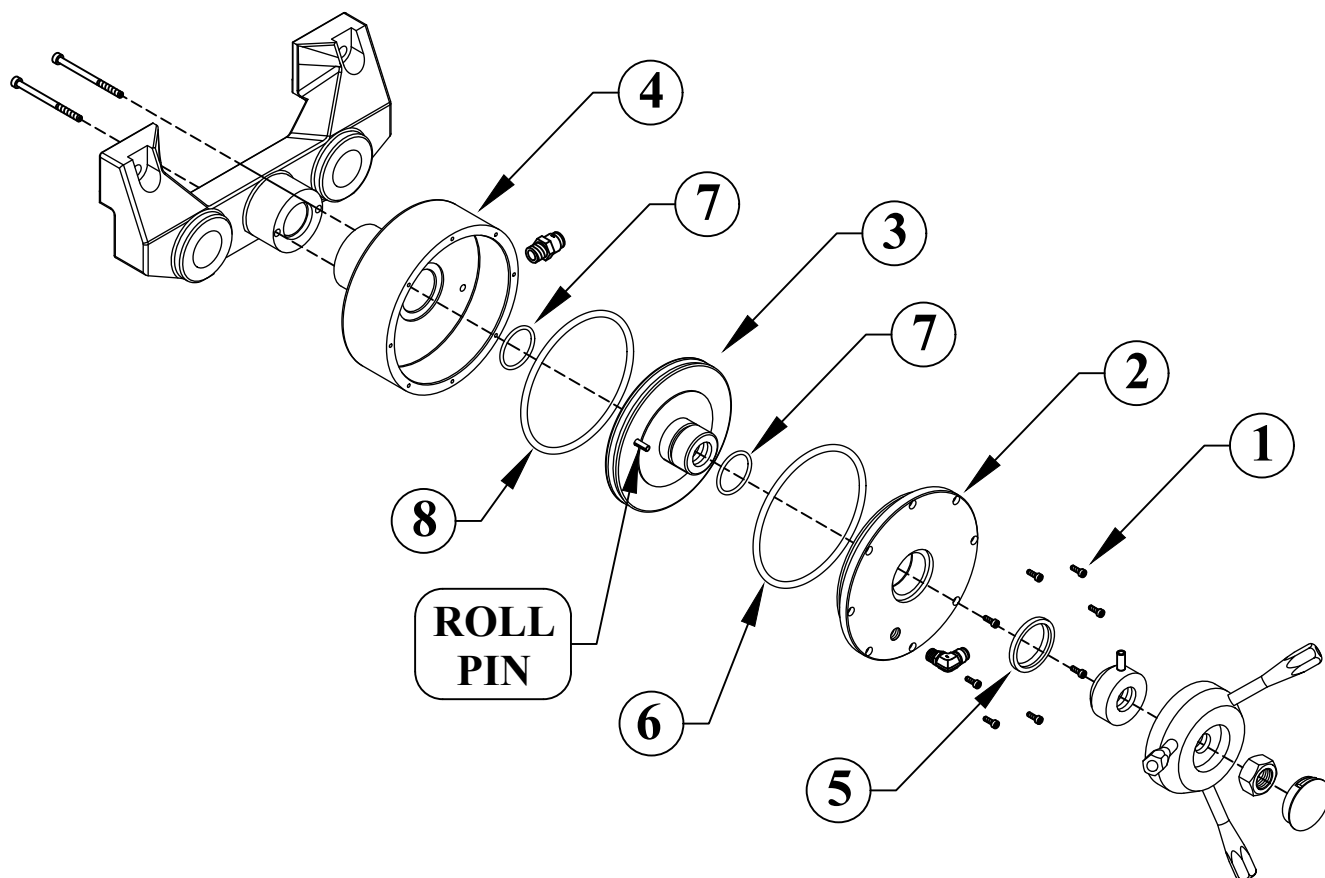
- 10. Using lubrication that is compatible with o-rings such as ATF, lubricate a large o-ring and the o-ring groove in the lid (2) and install the o-ring in the groove.**

- 11. Lubricate the three o-ring grooves in the piston (3). Lubricate each o-ring and install them in the o-ring grooves.**

- 12. Lubricate the roll pin that sticks out of the piston (3) and lubricate the hole it goes into in the lid (2) and the center hole in the lid too. Align the roll pin to the hole and slide the lid onto the piston.**

- 13. Completely lubricate the two surfaces inside of vise body (4) where the o-rings go.**

- 14. Take the lid/piston and set it on the vise body. It is important to make sure that the air ports are in the correct position and that the holes for the eight M4 bolts (1) are aligned before installing the and piston into the vise body.**



**ASSEMBLED
CYLINDER**

FIGURE 31

8.6 SAW HEAD GEAR REPLACEMENT

SEE FIGURE 32 ON THE FOLLOWING PAGE.

- 1. Remove the drain plug (1) from the head casting and allow the fluid to drain.**
- 2. Remove the motor from the head.**
- 3. Remove the four bolts (2) from the bearing retainer (3).**
- 4. Remove the worm shaft assembly (4). The worm shaft has a 10mm threaded hole in the end of it for a slide hammer. This is the preferred method of removing the shaft. If you do not have a slide hammer, the shaft can be removed by driving it out from the other end with a brass drift pin. See NOTE below.**
- 5. Inspect the worm shaft, drive gear and bearings for wear.**
- 6. After the worm shaft has been removed, remove the three bolts (5) from the bearing housing (6).**
- 7. Remove the spindle shaft (7) with a slide hammer. This is the preferred method of removing the shaft. If you do not have a slide hammer, the shaft can be removed by driving it out from the other end with a brass drift pin. See NOTE below.**
- 8. Remove the snap ring (8).**
- 9. The brass worm gear (9) can now be pressed off of the shaft.**
- 10. Check the condition of the bearings and the seals before re-assembling the head.**
- 11. Check the condition of the key (10) and the key-way in the gear and the spindle shaft before pressing the new gear onto the shaft.**
- 12. Replace any worn or damaged parts as necessary.**
- 13. Reassemble in the reverse order of above.**
- 14. Refill saw head with oil as detailed in Section 8.2.1.**

NOTE: IF A BRASS DRIFT PIN IS USED TO REMOVE THE SHAFTS, THE NEEDLE BEARINGS (11) MUST BE REPLACED.

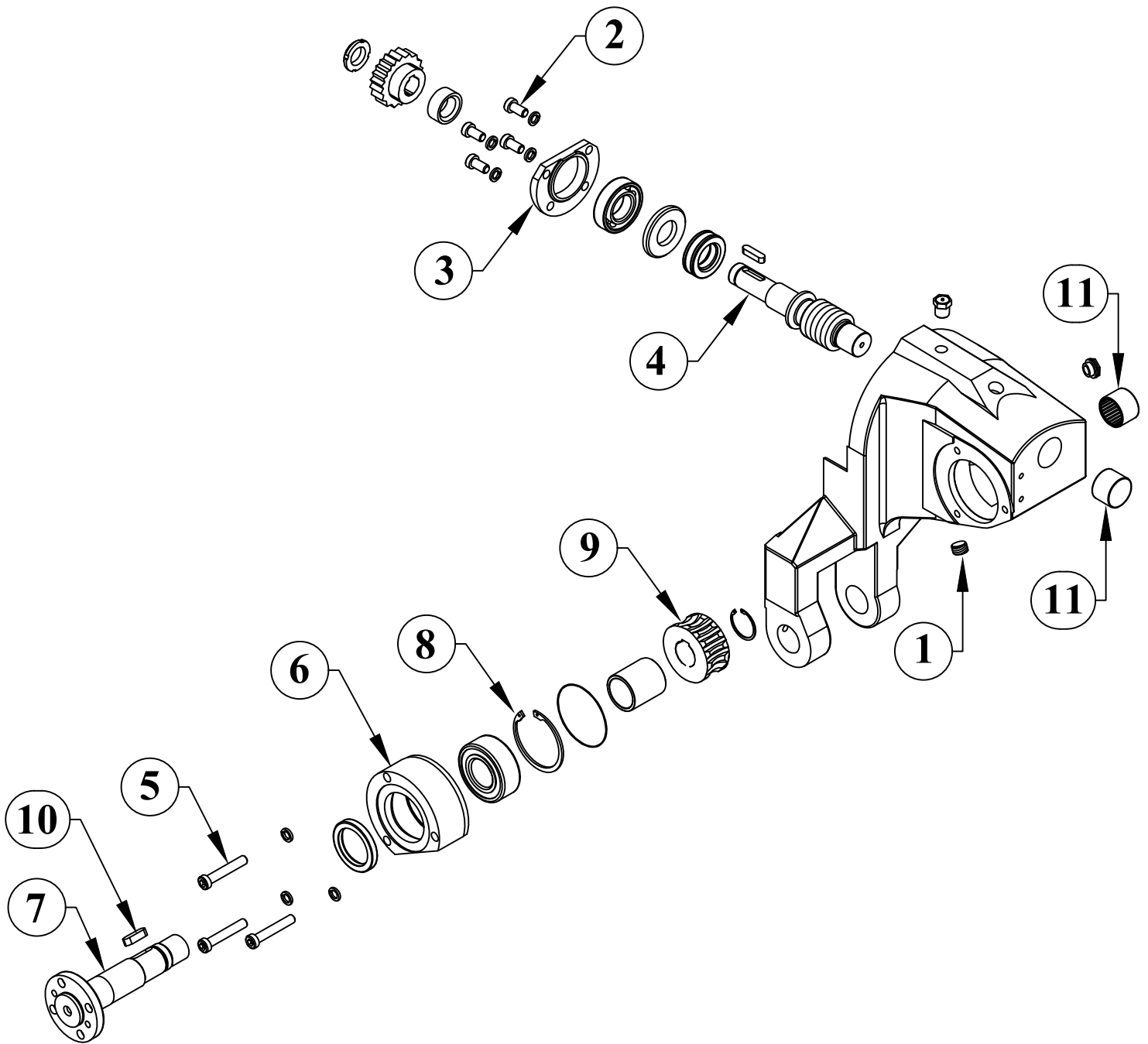


FIGURE 32

8.7 AUTO TRACK TABLE REPLACEMENT

SEE FIGURE 33 BELOW

The AutoLoader saw has a plastic covered feed table that helps the saw to feed material smoothly. They are considered to be "wear items" and will need to be replaced occasionally. The plastic is attached to the (1) Steel Bed with 1" wide Acrylic Double Sided Foam Tape (2). The plastic has only two sizes. There is a short piece (3) that attaches closest to the saw. The longer pieces (4) are all the same size and the 24' version has six of them.

NOTE: When replacing these plastic parts it is important to remove all of the old foam tape from the Steel Bed and make sure it is clean so the new foam tape will adhere properly.

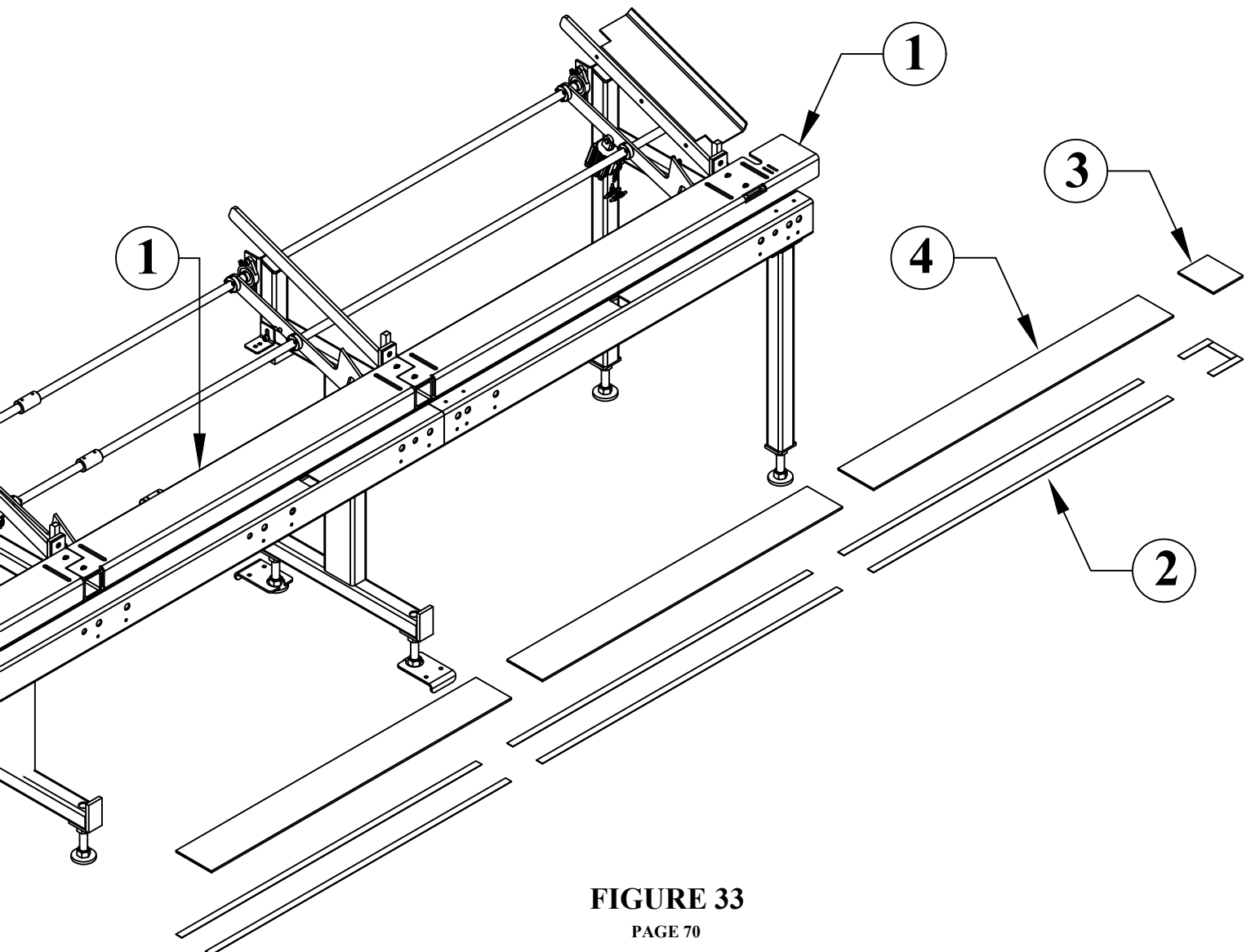


FIGURE 33

9.0 TROUBLESHOOTING

9.1 ELECTRICAL TROUBLESHOOTING

1. THE MOTOR WILL NOT RUN

- A. Check the Variable Speed drive to see if it has a fault on it. If the drive has a fault, disconnect the power to the machine for a full minute. Reconnect the power to see if the fault clears.**
- B. Check the fuses; make sure you have power to the controls.**
- C. Also, check the supply voltage to the saw to make sure that it is the same as the motor voltage. If the supply voltage is correct, the switch energizes and the motor still will not run, contact your local dealer or the factory.**

2. THE SAW MOTOR RUNS BUT DOES NOT HAVE ADEQUATE POWER:

- A. Make sure that the supply voltage and phase correspond to the saw motor's voltage and phase.**
- B. Disconnect the machine from the power source and check for any loose or disconnected wires.**
- C. The supply lines to the machine must be of adequate size to handle the load. For recommended sizes and lengths, SEE SECTION 3.3.**
- D. The worm gears in the head may be damaged. With the power to the machine disconnected, check the blade spindle for any free travel. If free play is present, drain the oil from the head and remove the motor. Check both worm gears for wear and replace. If either gear shows wear we recommend replacing the worm gears as a set. For instructions refer to Section 8.6**

9.2 PNEUMATIC TROUBLESHOOTING

THE MOST COMMON PNEUMATIC/HYDRAULIC PROBLEMS ARE:

- A. Low levels of fluid in the reservoir: The fluid level in the power down feed reservoir should be approximately 2-1/2 inches below the top of the reservoir when the head is in the up position.**
- CAUTION: THE AIR SUPPLY TO THE MACHINE MUST BE DISCONNECTED BEFORE YOU REMOVE THE FILLER PLUG FROM THE RESERVOIR. FAILURE TO DISCONNECT THE AIR WILL CAUSE THE FLUID TO BE PURGED OUT THROUGH THE OPENING UNDER PRESSURE!**
- B. Worn seals in the vise, Auto Track cylinders or down feed cylinder: For seal kit installation instructions for the air vise cylinder, REFER TO SECTION 8.5. Auto Track cylinders and down feed cylinder are not serviceable and must be replaced.**
- C. Loose connections in the air lines: All of the air lines on this machine are the push in connector type. To remove the hose, turn off air supply and push in on the slide connector & pull out the hose. To reconnect the hose, simply push the hose into the connector as far as it will go.**

The valve bank and power down assembly have many plastic air hoses. If you have any questions on where the hoses connect: REFER TO SECT. 15 PNEUMATIC DIAGRAM for more information.

9.3 RAZORGAGE TROUBLESHOOTING

1. MONITOR SHOWS E-STOP SCREEN

- A. Check that the M-Drive is ON. Press the green button on the right side of the RazorGage control box to start the M-Drive. The button should illuminate and the error screen should disappear.**

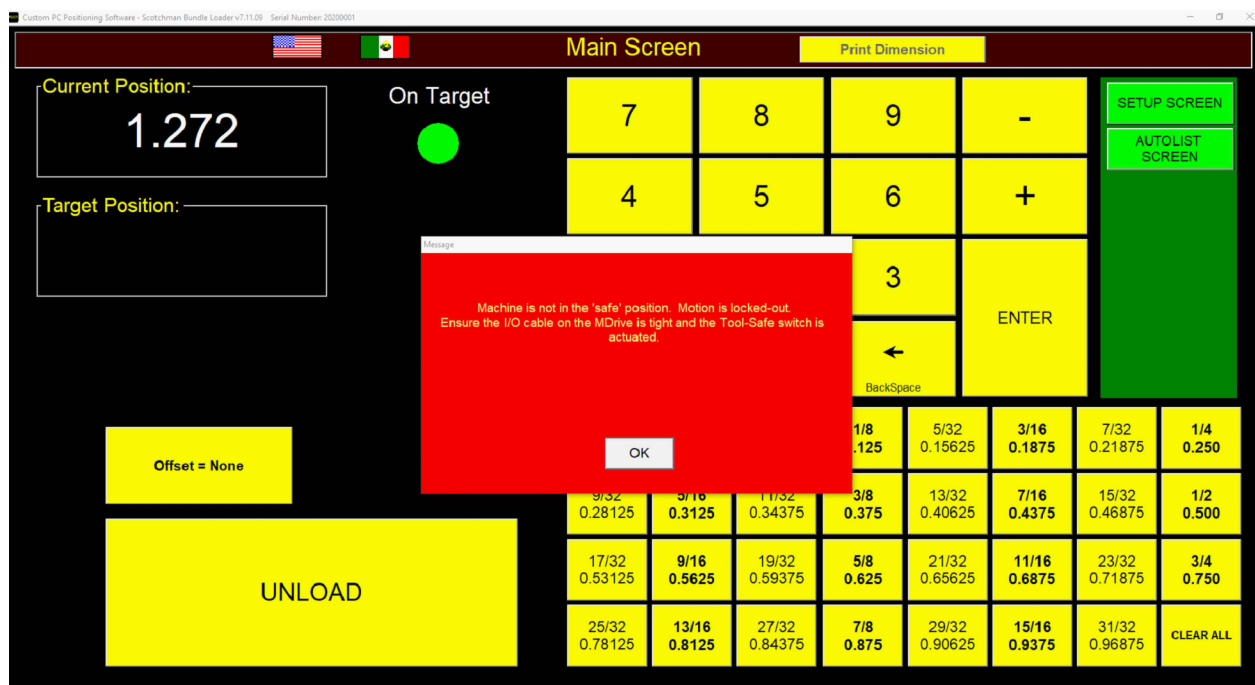
- B. Check the E-STOP button on the saw and ensure it is pulled out. Press the green button on the right side of the RazorGage control box to start the M-Drive. The button should illuminate and the error screen should disappear.**

- C. Check yellow 4 pin cable connecting the saw to the RazorGage. Check the screw connection in the middle and verify that it is tight. Press the green button on the right side of the RazorGage control box to start the M-Drive. The button should illuminate and the error screen should disappear.**

- D. If the connection is good, the E-STOP is pulled and the E-STOP screen is still displayed, contact your local dealer or the factory.**

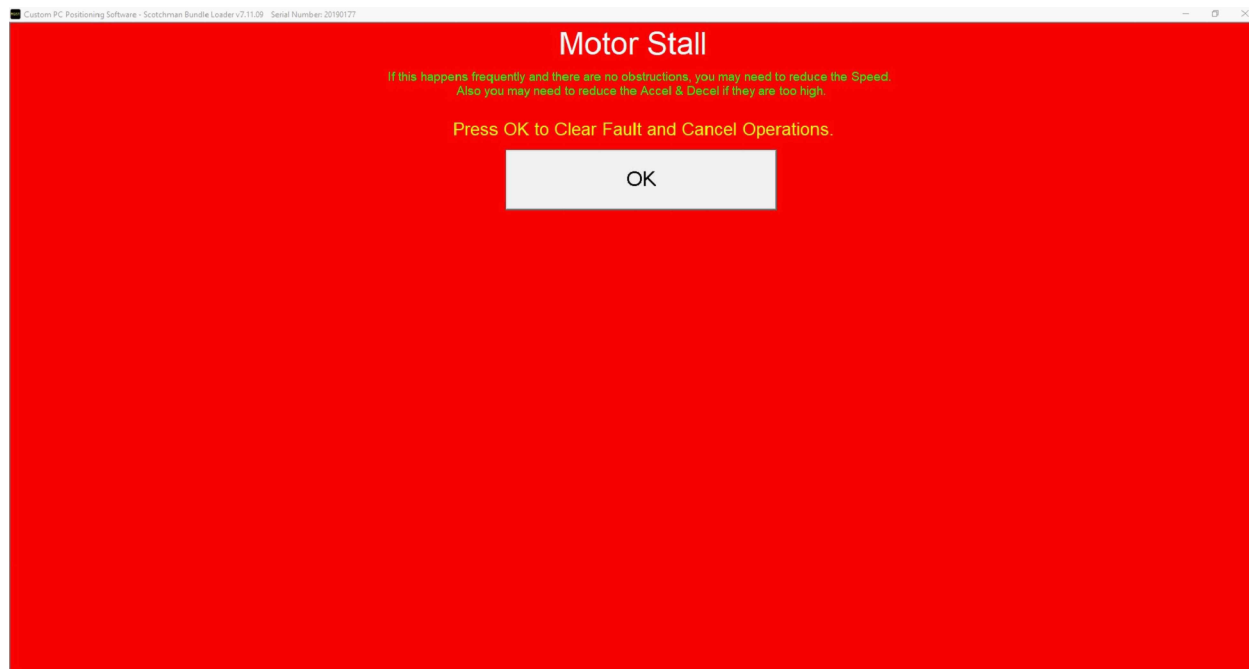
2. MACHINE IS NOT IN THE “SAFE” POSITION

- A. Check that the saw is at the top limit and both upper limit switches are actuated.**
- B. Check connection of Tool Safe cord between the RazorGage and the saw and verify that it is tight. The cord is a small black cable that plugs into a port located in the bottom right corner of the Power Down electrical box located on the right side of the saw.**
- C. Check the cables connecting to the side of the M-Drive and verify they are tight. It may be necessary to wiggle the cord as you tighten. If the problem persists, contact your local dealer or the factory.**



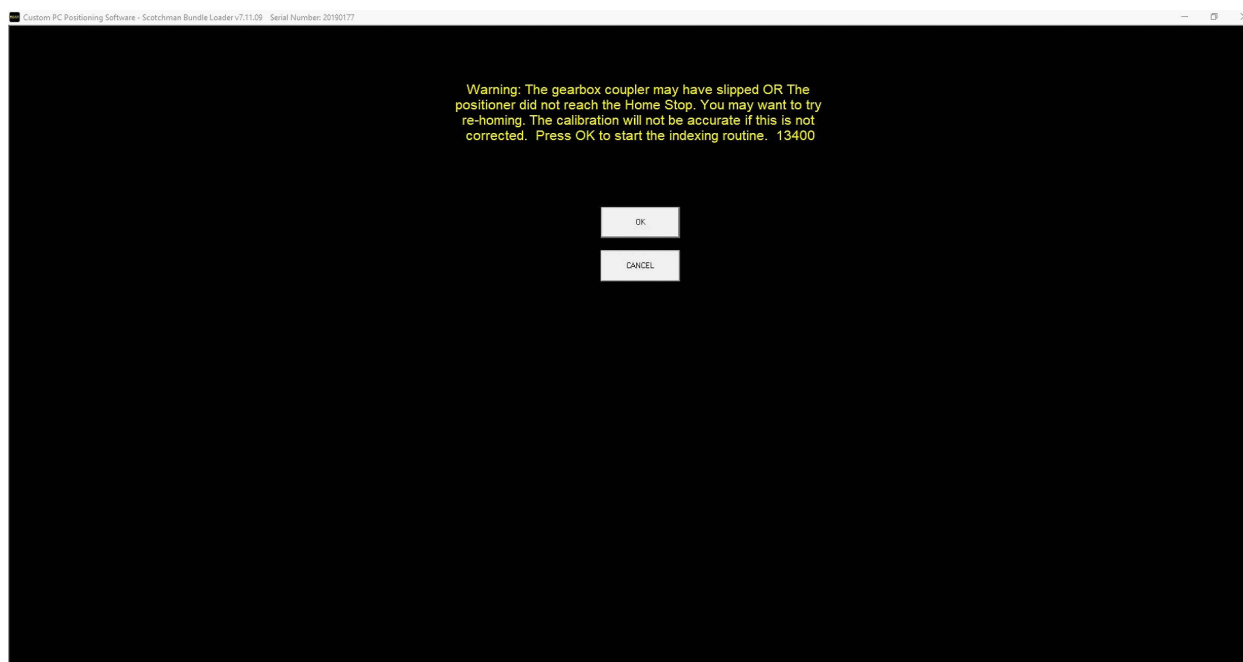
3. MOTOR STALL

- A. If the pusher collides with an obstruction while moving, the error screen below will be displayed. Press “OK” and it will return to the main screen. Address the issue before continuing operation.**



4. M-DRIVE GEARBOX HAS SLIPPED

- A. If the event of a sudden hard stall, the M-Drive gearbox may slip in the shaft coupler, losing its position. The error screen below will be displayed. Press “OK” and follow the on-screen instructions prompts to address the problem.**



9.4 POWER DOWN FEED TROUBLESHOOTING

SEE FIGURE 34 BELOW

1. THE HEAD FEEDS DOWN FULL SPEED WITH THE FLOW CONTROL TURNED OFF.
Bad check valve (1) Clean or replace it.
2. THE HEAD FEEDS FAST WITH NO CONTROL, HEAD BANGING UP.
Low oil level - Add hydraulic oil to the reservoir (2). (*turn air OFF before removing plug!!*)
3. THE HEAD STOPS AND DOES NOT FEED THROUGH THE MATERIAL.
Adjust the air pressure regulator (3) to a higher setting. (90-105 PSI)
4. THE HEAD FEEDS DOWN BUT DOES NOT RETURN.
Check the lower switch (4) located on the back of the saw.

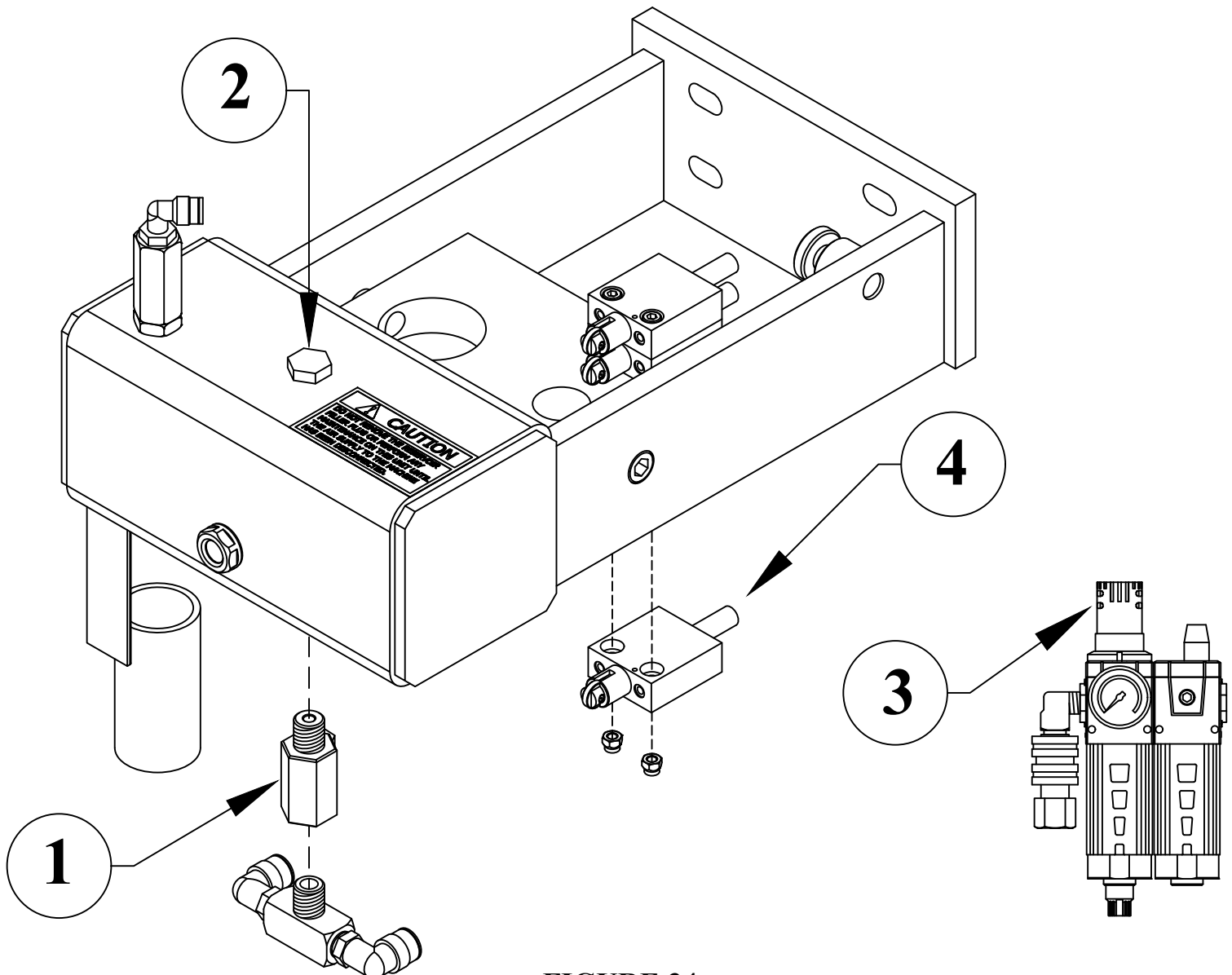


FIGURE 34

9.5 PART LENGTH/SQUARENESS NOT CONSISTENT

1. **SAW BLADE** - The saw blade has to be properly sharpened, it has to have the correct number of teeth, and has to be turning at an ideal RPM for the material being cut. An improperly sharpened saw blade or a dull blade can cause problems. If excessive force is used on a dull blade, it can cause it to cut poorly. A blade that is too fine or too coarse for the material being cut will also cause problems. It's highly recommended that dull saw blades are returned to Scotchman Ind. for resharpener. Also, a smaller diameter blade is more rigid than a larger diameter blade. It will cut better and be more consistent. Call the factory if you have questions about blade application. 1-800-843-8844
2. **DIRTY FLANGE** - A Dirty Flange is where the saw blade was changed and metal chips were allowed in between the flange and/or saw spindle when the blade was mounted. It's like bolting a wheel on to a hub and putting a rock in between them before tightening the wheel to the hub... This will cause the saw blade to "wobble" and appear to have excessive run-out. A saw blade cannot run true and cut properly with a Dirty Flange. Make sure the saw blade, saw flange, and spindle are absolutely clean before the saw blade is put on the saw. This is probably one of the most overlooked things in cold sawing.
2. **AIR PRESSURE** - This machine requires a minimum of 90 PSI to function properly. When cutting solid materials, the pressure may have to be set as high as 130 PSI to prevent the material from slipping in the jaws. Look for kinked, loose or leaking air hoses.
3. **CHIP BUILDUP** - Check for chip buildup in and around the vise, the jaws, and anywhere it might interfere with the operation of the saw. Clear the chips with a vacuum, a brush, or similar device. DO NOT use compressed air.
4. **AUTO TRACK** - Make sure the Auto Track is correctly aligned in both height and fore/aft. Check the rollers and guides. They shouldn't be too tight or too loose.
5. **LOOSE PARTS** - Check the bolts that hold the jaws in the vise. Make sure the pusher and related parts are tight. Inspect Auto Track and saw for worn parts and replace as needed.
6. **SET SCREW** - The lower front of the pusher has an M4 set screw to help with small thin-walled tubing. When it is adjusted so it sticks out, it is supposed to go inside the tube to keep small thin walled tube from slipping off the pusher. When not needed, it should be screwed in the pusher just below the surface. If it is left exposed when cutting a solid or thick walled tube, it may be causing inaccurate lengths.
7. **AIR VISE** - The material must be clamped solidly. As mentioned above, it may be necessary to set the air pressure as high as 130 PSI. If that doesn't help, the air vise itself may need maintenance. Moisture can cause corrosion in the saws pneumatic system, especially the air vise. This corrosion can damage the seals in the air vise and cause it to not clamp the material as tightly as it should. The Filter Regulator Lubricator (FRL) needs to be checked on a regular basis. The water trap on the air pressure regulator should be checked daily & emptied as needed & add oil to the reservoir for the oiler. Make sure air is **OFF** before servicing the FRL!! SEE SECT. 8.3 FRL MAINTENANCE

9.6 BREAKAGE/EXCESSIVE DULLING OF BLADES

Many things explained in the previous section can also contribute to saw blade breakage. The three things explained below are the three most common causes for a broken blade.

CHANGING BLADES - The first two things need to be done every time a blade is changed. They are the most overlooked by saw operators and cause the most problems. We call them **Backlash** and **Dirty Flange**.

NOTE: Once a new or resharpened blade is properly mounted, it needs to be "broken-in" with several cuts at a reduced feed rate. This removes the sharp edge on a new or resharpened blade which will help the blade cut better and last longer.

1. **BACKLASH** - The saw blade is driven by the pins in the flange. When changing blades, the backlash must be removed or "Taken-Up" and is very simple to do. When the blade is put on the machine, and before the bolt on the flange is final-tightened, lift up on the front of the blade and hold it there until the bolt is tight. This keeps the pin-holes in the blade against the pins in the flange. If a blade breaks through a pin-hole it is because the backlash was not removed.
2. **DIRTY FLANGE** - This has been explained in the previous section and can contribute to other problems - **Especially Pick-Up**.
3. **PICK-UP** - This is where the metal being cut has bonded itself to both sides of a tooth making it wider or thicker than the saw blade. Every time that thicker tooth passes through the material it will grab the material and cause the saw head to jump, generally with a loud sound. It will be a steady "clunk – clunk – clunk". The pick-up gets worse every time it passes through the material. Often it is thought that the saw blade is "out-of-round" because of the way it feels during the cut. At some point, the pick-up will jam the blade in the material and either rip a chunk out of the blade or break the blade into several pieces. Pick-up can also cause the material to move during the cut, either it will roll or move and force the blade off to one side and shatter it. Pick-up can be felt by dragging a finger-nail over the side of the tooth. If you hear or feel pick-up on the blade, **STOP** using it or you risk a broken blade. If pick-up is caught early, is best removed by rubbing it off with a hand-held hone-stone, NOT with a power tool!! If you take too much off, then you make the blade thinner in that spot, which is not good either. Often, a short time later, you will get pick-up again in the same place as the black oxide coating on the blade has been compromised.

The **ONLY WAY** to properly get rid of pick-up is to have the saw blade resharpened.

LIST OF THINGS THAT CAN CAUSE PICK-UP:

- | | |
|--------------------------|--------------------------|
| 1. A dirty flange | 4. Using the wrong blade |
| 2. Using a dull blade | 5. Using the wrong rpm |
| 3. Weak or wrong coolant | 6. Too much down force |

10.0 OPTIONAL EQUIPMENT

10.1 FLOOD COOLANT OPTION

Flood coolant is available as an option for applications that require more cooling or lubrication than the standard mist can offer. A pump is mounted semi-submerged in the built-in coolant reservoir located in the base of the saw. The pumps are voltage specific, and must be ordered to match the machine voltage.

We recommend using only pure, synthetic, water soluble cutting oils in the coolant system. The coolant reservoir has a capacity of 8 gallons. For normal cutting, the coolant should be mixed in a ratio of one part coolant to seven parts water. In conditions of heavier cutting, the ratio of water should be reduced to five parts. Pre-mixing the coolant before adding it to the saw is also recommended.

It is recommended to drain the coolant reservoir and flush it out every 250 hours or 3 months. Refill the coolant reservoir with new coolant. Make sure the suction port of the pump is clear of debris and flush it if necessary. This will extend the life of the coolant pump considerably.

FLOOD COOLANT OPTION DIAGRAM

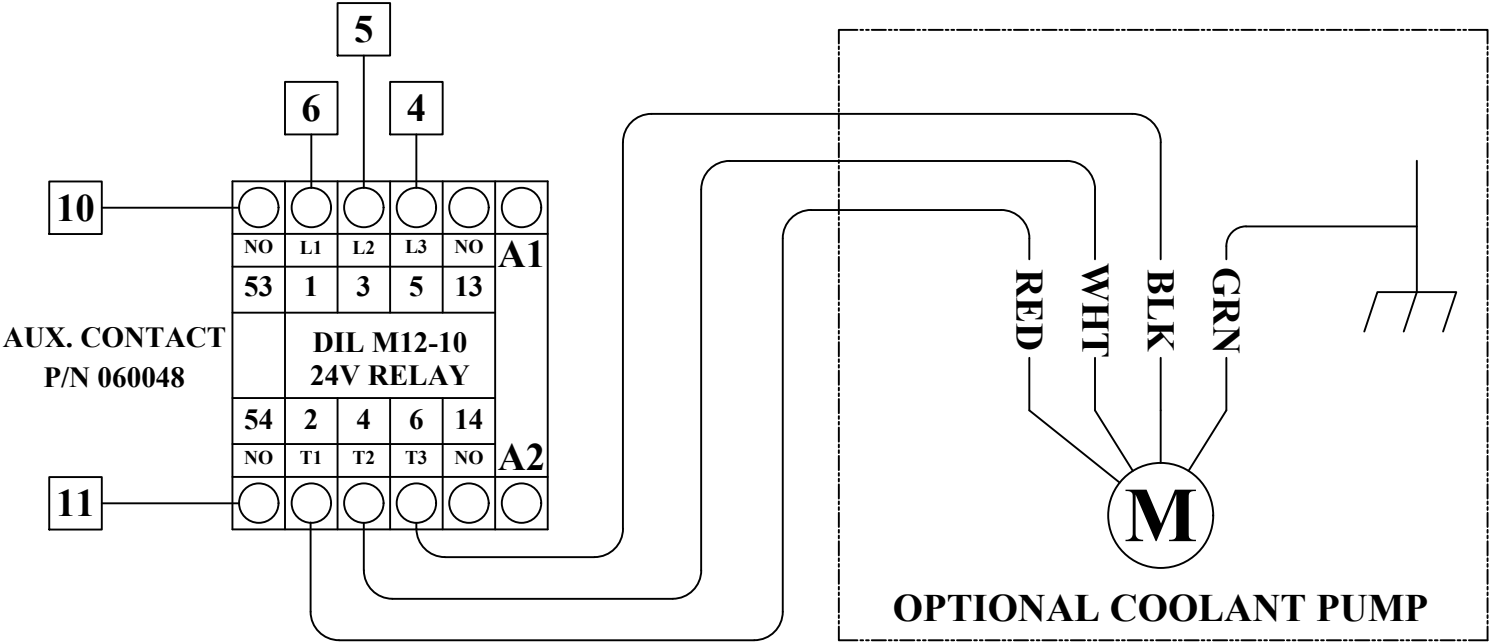


FIGURE 35

10.1 FLOOD COOLANT OPTION

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	060150	230V PUMP 3 PHASE
1.1	1	060166	230V PUMP 1 PHASE
1.2	1	060158	460V PUMP 3 PHASE
1.3	1	060160	575V PUMP 3 PHASE
2	4	046300	RATCHET HOSE CLAMP
3	1	060048	AUXILIARY CONTACT BLOCK
4	1	060140	9/16X85" COOLANT LINE
5	1	060149	PUMP SCREEN REV. E
6	1	069998	COOLANT SPLITTER ASS'Y
7	2	073420	M8 X 16 SHCS
8	1	077154	125HBL-6-2HOSE BARB 108
9	1	077155	SHUT OFF VALVE
10	1	077545	CHECK VALVE
11	1	077650	350PD GUARD-RAW
12	1	077770	1/8" NPT HEX CLOSE NIPPLE
13	5	077864	M5 X 12 SHCS
14	1	214005	M5 SMALL WASHER
15	2	215013	M8 DIN985 GREER NUT
16	1	760115.8	PUMP MOUNTING BRACKET
17	1	045371	ASSEMBLY

FLOOD COOLANT OPTION

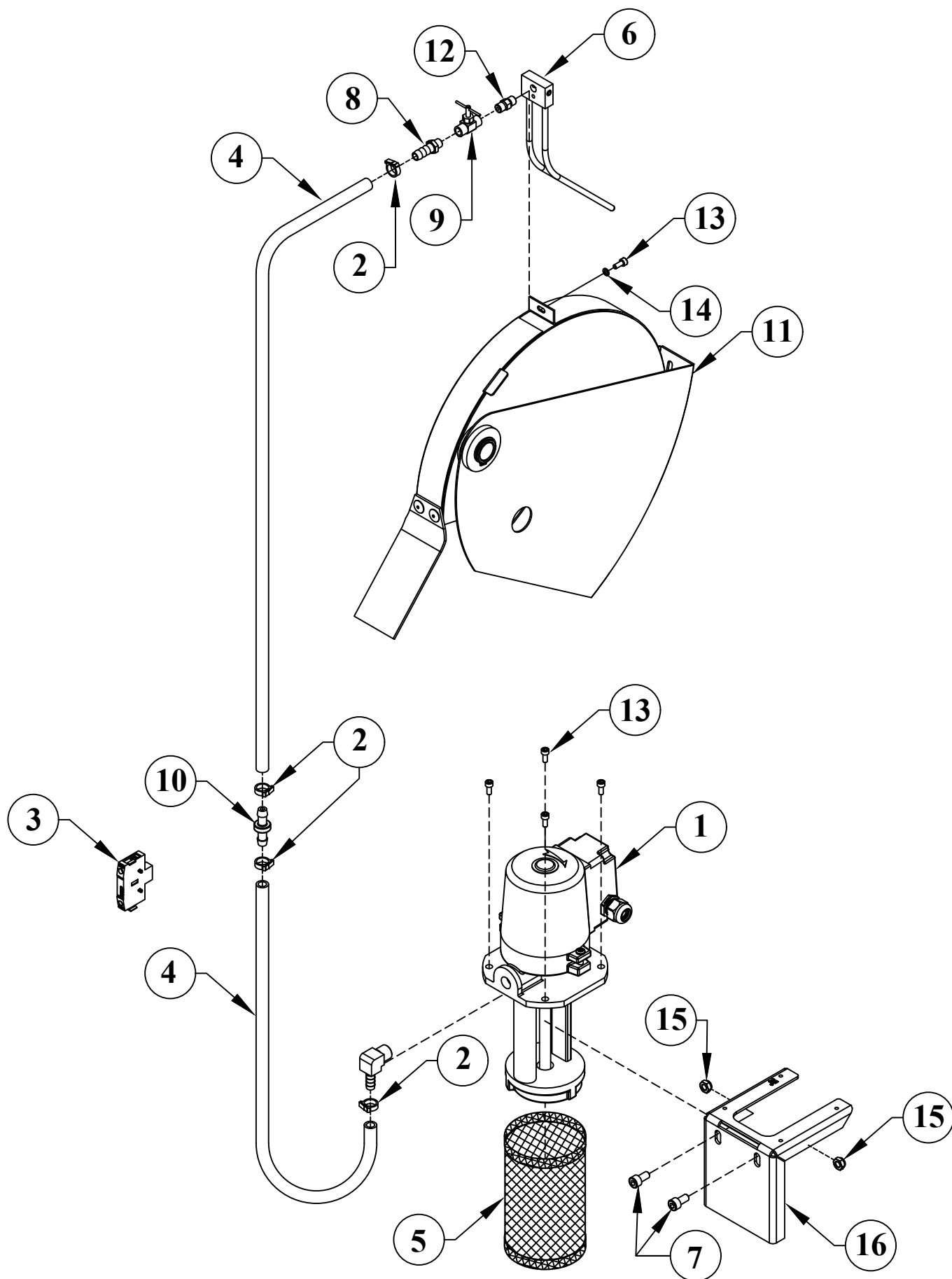


FIGURE 36

10.2 NON-MARRING LIFT KIT

P/N 048573 - AL NON-MARRING LOAD KIT 24'

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	162	047926	5/8" HALF RD
2	6	048561	NYLON ADJUSTABLE GUIDE ARM
3	6	048562	NYLON MATERIAL REST
4	6	204222	M10 X 55MM DIN931 HHCS
5	6	208012	M10 DIN 934 HEX NUT
6	6	214012	M10 DIN125 REGULAR WASHER
7	12	220025	M8 X 16MM 7380-10.9 BHCS

**NOTE: ONLY ONE INSTANCE OF PARTS
IS SHOWN (EXCLUDING WASHERS).**

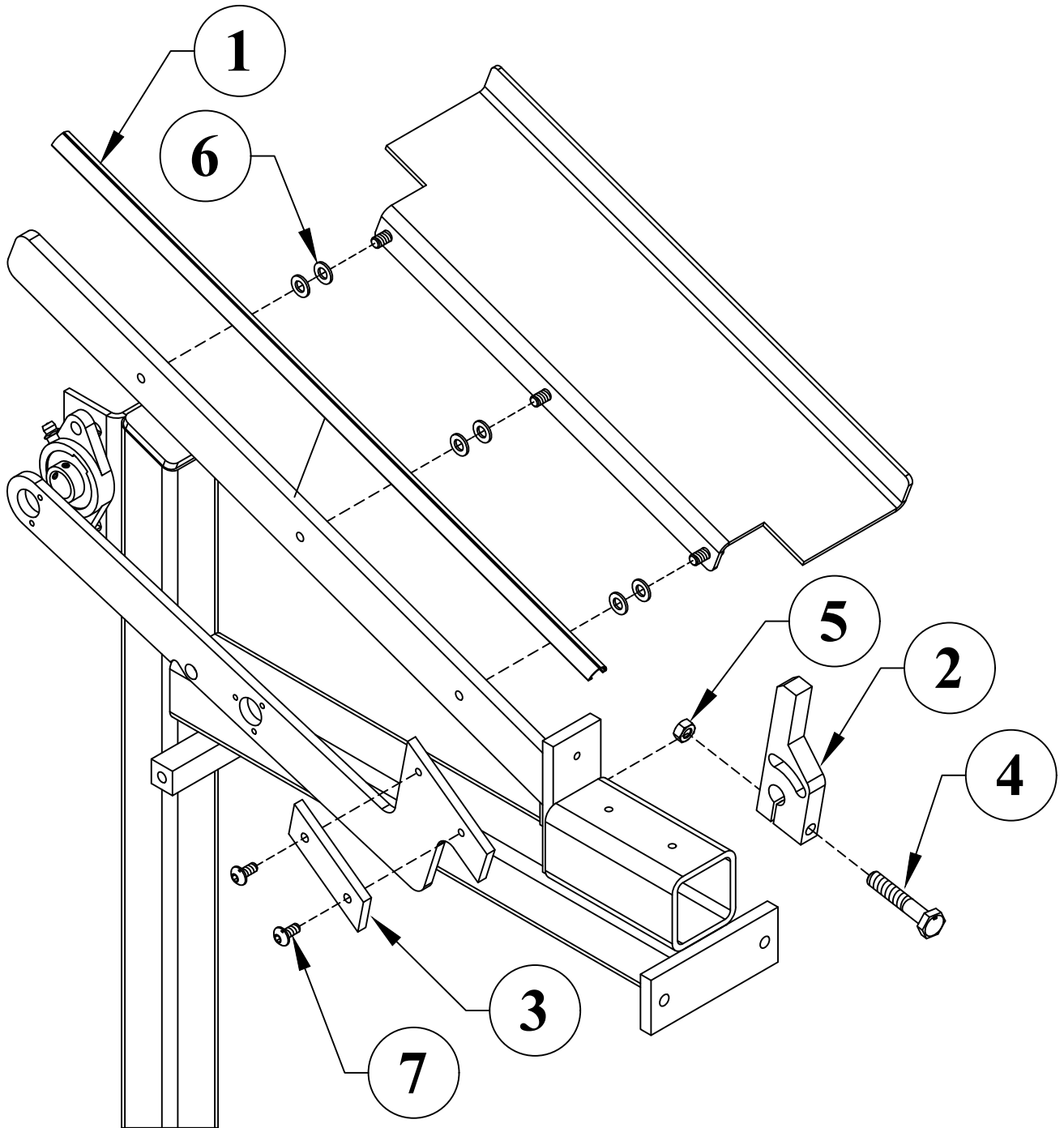


FIGURE 37

10.3 SMALL MATERIAL GUIDES

**NOTE: THE SMALL MATERIAL GUIDES ARE
USED FOR 3/8" TO 1" SIZED MATERIAL**

P/N 048577 - AL SMALL TUBE GUIDES (24')			
PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	10	026619	SMALL TEE NUT (M10)
2	5	048566	AL SMALL TUBE MOVABLE FENCE
3	5	048568	AL SMALL TUBE FIXED FENCE
4	5	048569	AL FIXED FENCE NYLON
5	5	048570	AL MOVABLE FENCE NYLON
6	1	048571	AL SMALL TUBE HOLDDOWN MCH
7*	750	048600	1" ACRYLIC FOAM
8	11	073626	M10 X 20MM DIN912 SHCS
9	10	214011	M8 DIN125 REGULAR WASHER
10	10	220026	M8 X 12MM ISO 7380 BHCS

*** SOLD IN INCHES**

**NOTE: ONLY PARTS CALLED OUT ARE
INCLUDED IN THE PACKAGE.**

ONLY FIRST SECTION IS SHOWN.

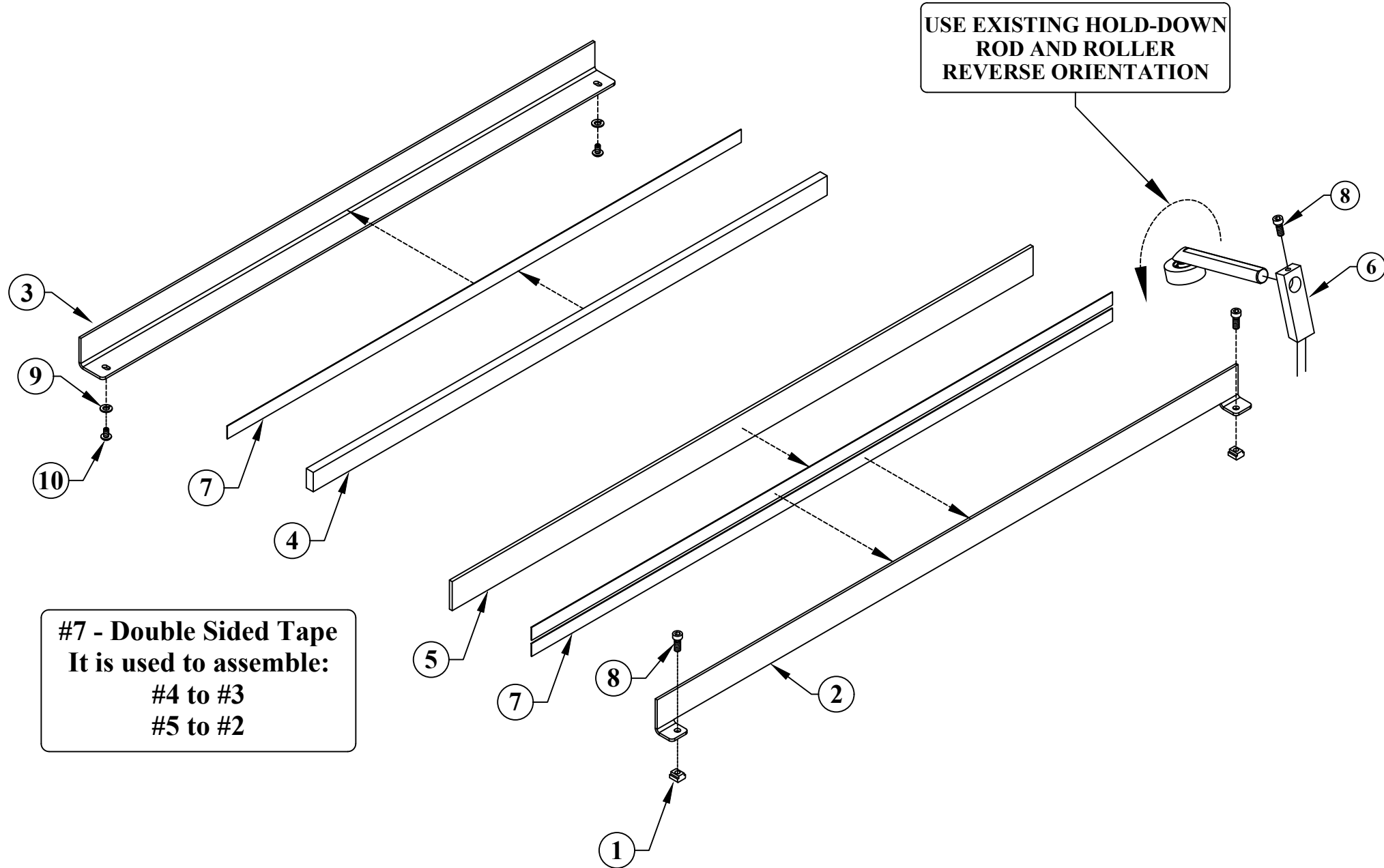


FIGURE 38

10.4 SQUARE JAW/GUIDE SET

SEE FIGURE 39 BELOW & FIGURE 39A ON THE NEXT PAGE

We offer a kit for cutting square shapes diagonally from 7/8" to 2-1/4" in size. The kit includes square tube jaws that take the place of the standard jaws on the power-vise and guides that replace the standard guides that are bolted to the steel bed on the Auto Track. Square Tube Guides & Jaws must be adjusted in accordance to the size of the tubing.

048575 - AL SQUARE JAW/GUIDE SET 24'			
PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	6	048564	SQUARE TUBE GUIDE
2	2	073460	M10 X 16MM DIN912 SHCS
3	2	076907	SQ TUBE JAW - 350
4	4	214012	M10 DIN125 REGULAR WASHER
5	2	221212	M10 X 30MM DIN912 SHCS

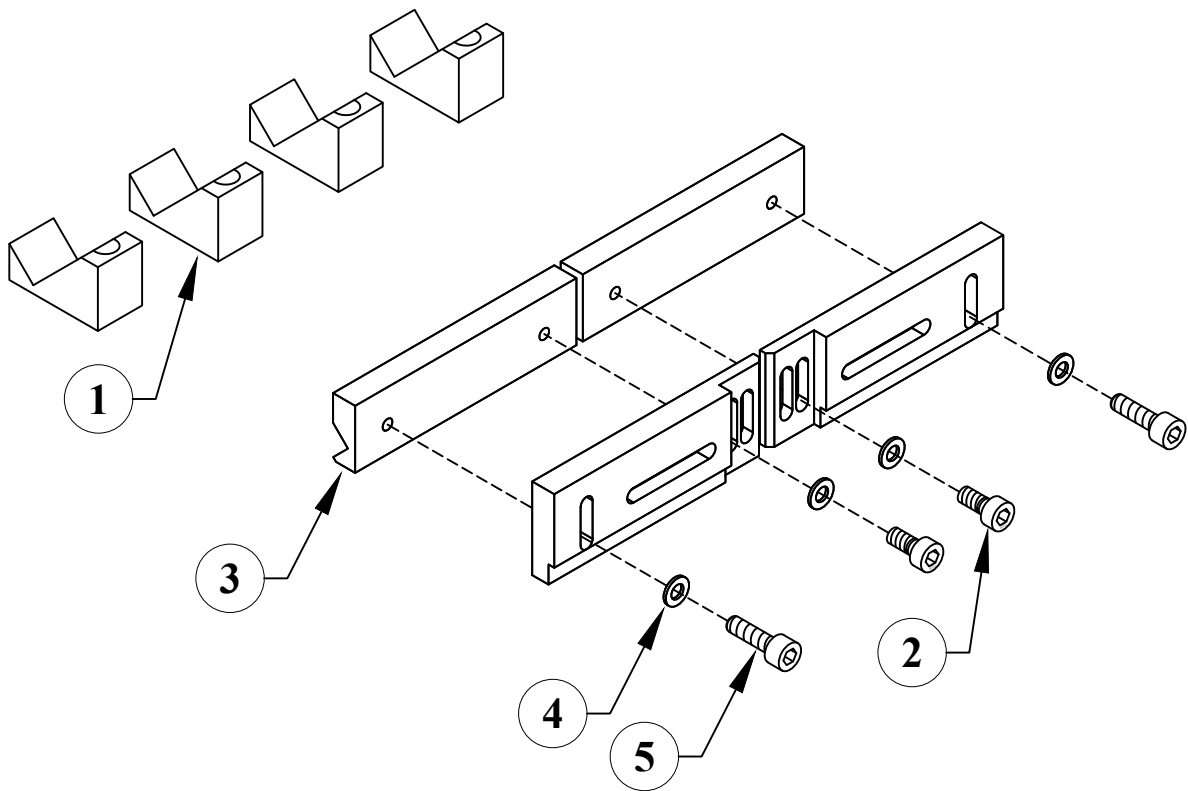


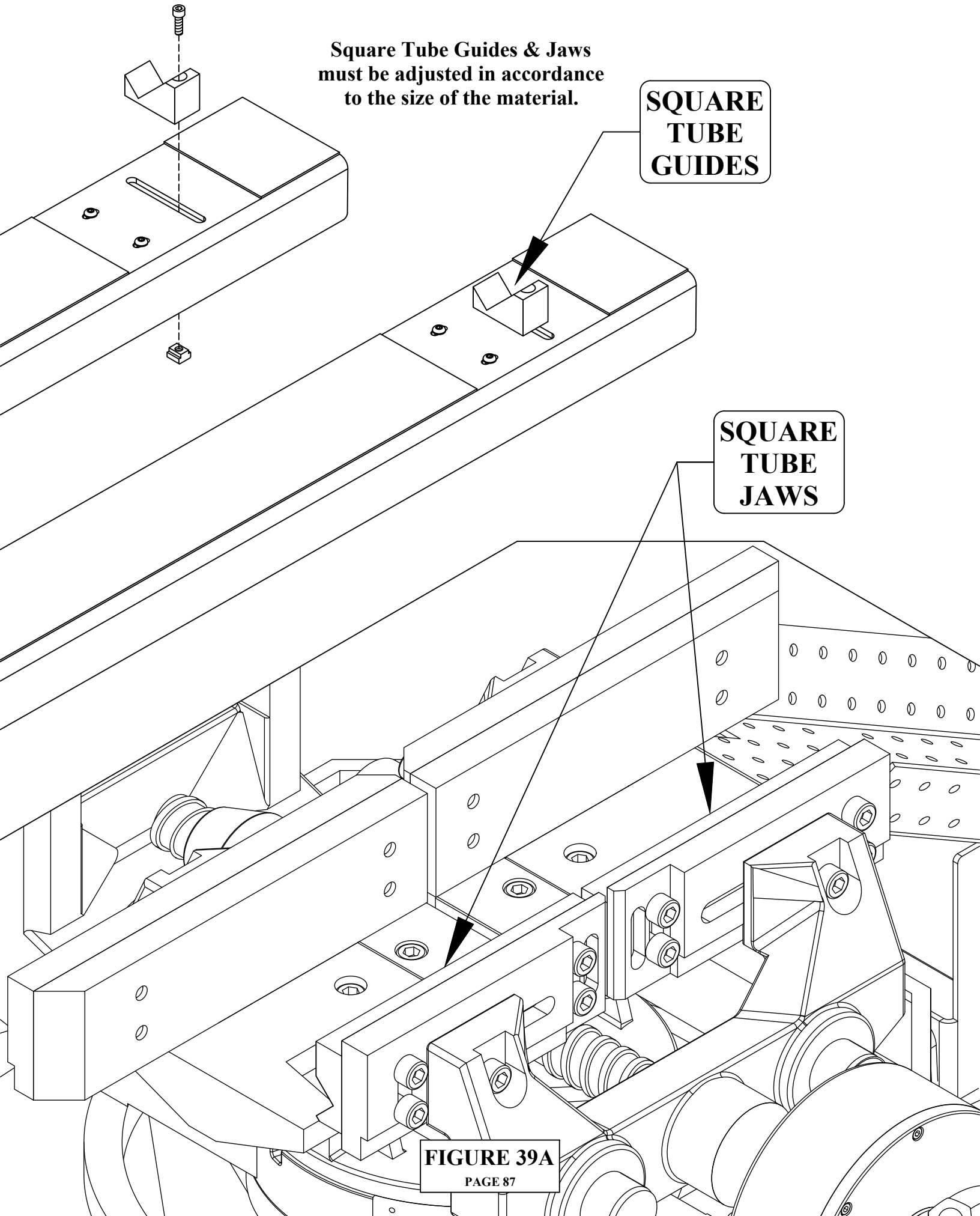
FIGURE 39

**Square Tube Guides & Jaws
must be adjusted in accordance
to the size of the material.**

**SQUARE
TUBE
GUIDES**

**SQUARE
TUBE
JAWS**

FIGURE 39A



10.5 MITERING JAWS

Due to the close proximity of the hold down roller to the vise assembly, the standard jaws of the Autoloader saw do not allow for full mitering capabilities. Standard jaws allow for mitering up to 75°. To miter up to 45° and to achieve the best mitering results in all instances, using a mitering jaw is recommended. The mitering jaw replaces the front jaw in the direction of mitering. (Front right on RH system, front left on a LH). The jaw has three tapped mounting holes to allow for various cuts from 45° to 90°. The standard hardware is reused in mounting.

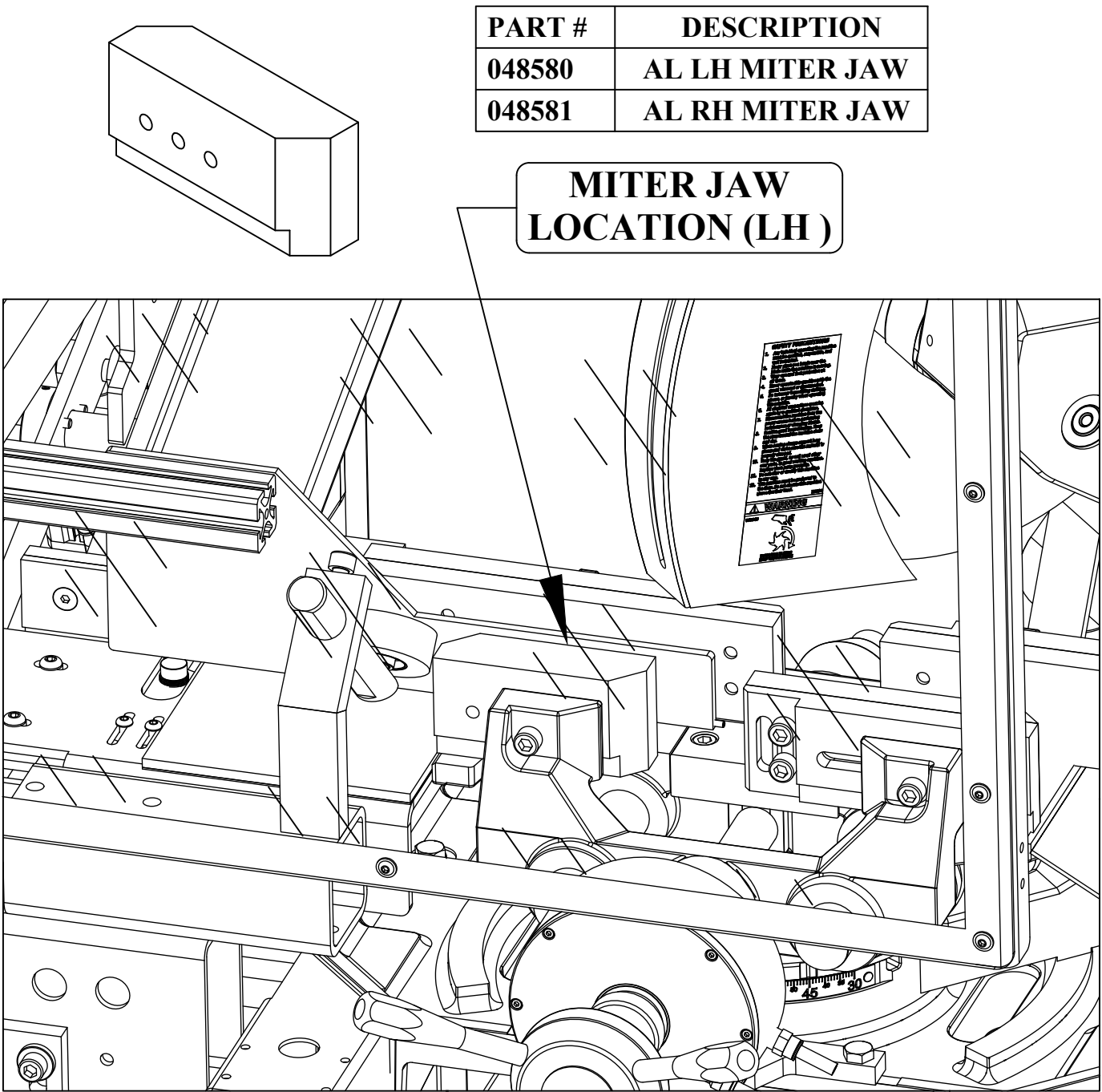


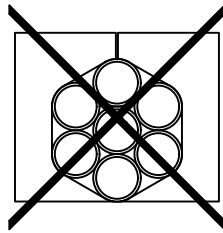
FIGURE 40

10.6 SPECIAL FORM JAWS

Material must be clamped securely in the vise. Any slippage of the material can result in broken or damaged blades. The material should be clamped so that the contact surface between the material and the blade is as small as possible. For this reason, when cutting flat stock material, we recommend standing it up and cutting it through the thinnest section, whenever possible. We also recommend cutting square tubing through the diagonal section and angle iron with the web up.

Since the Auto Track pushes the material through the saw, it is not possible to use bundle jaws to "bundle cut" with the AutoLoader. This can only be done with our hitch-feed HFA saws.

Bundle cutting (shown below) is NOT possible with an AutoLoader.

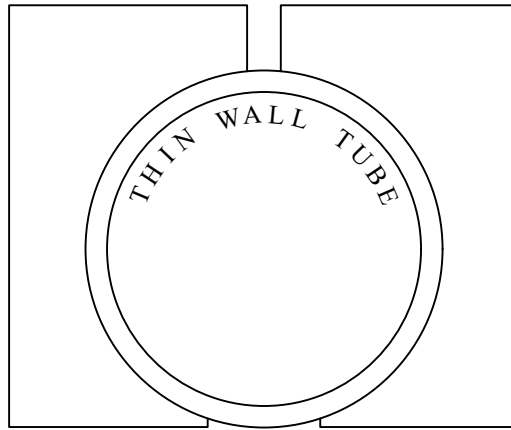


Special vise jaws for holding thin wall round tubes and profiles are available on a "made-to-order" basis. For prices and delivery on special jaws, contact your local dealer or the factory at 1-800-843-8844 for prices and delivery.

On the next page there are some examples of special jaws that can be made.

**BELOW ARE SOME EXAMPLES OF
SPECIAL JAWS THAT CAN BE MADE:**

These jaws allow solid clamping of thin-wall tube.



**These jaws allow a square profile to be
cut through its wall thickness.**

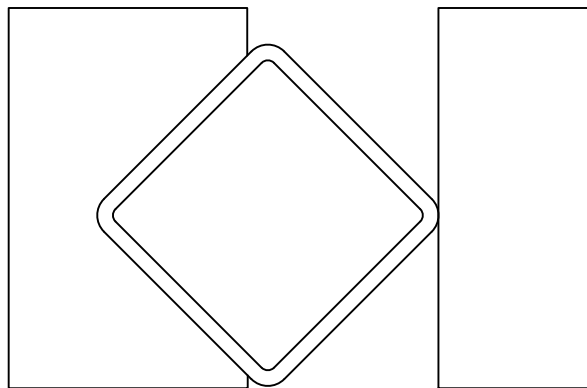
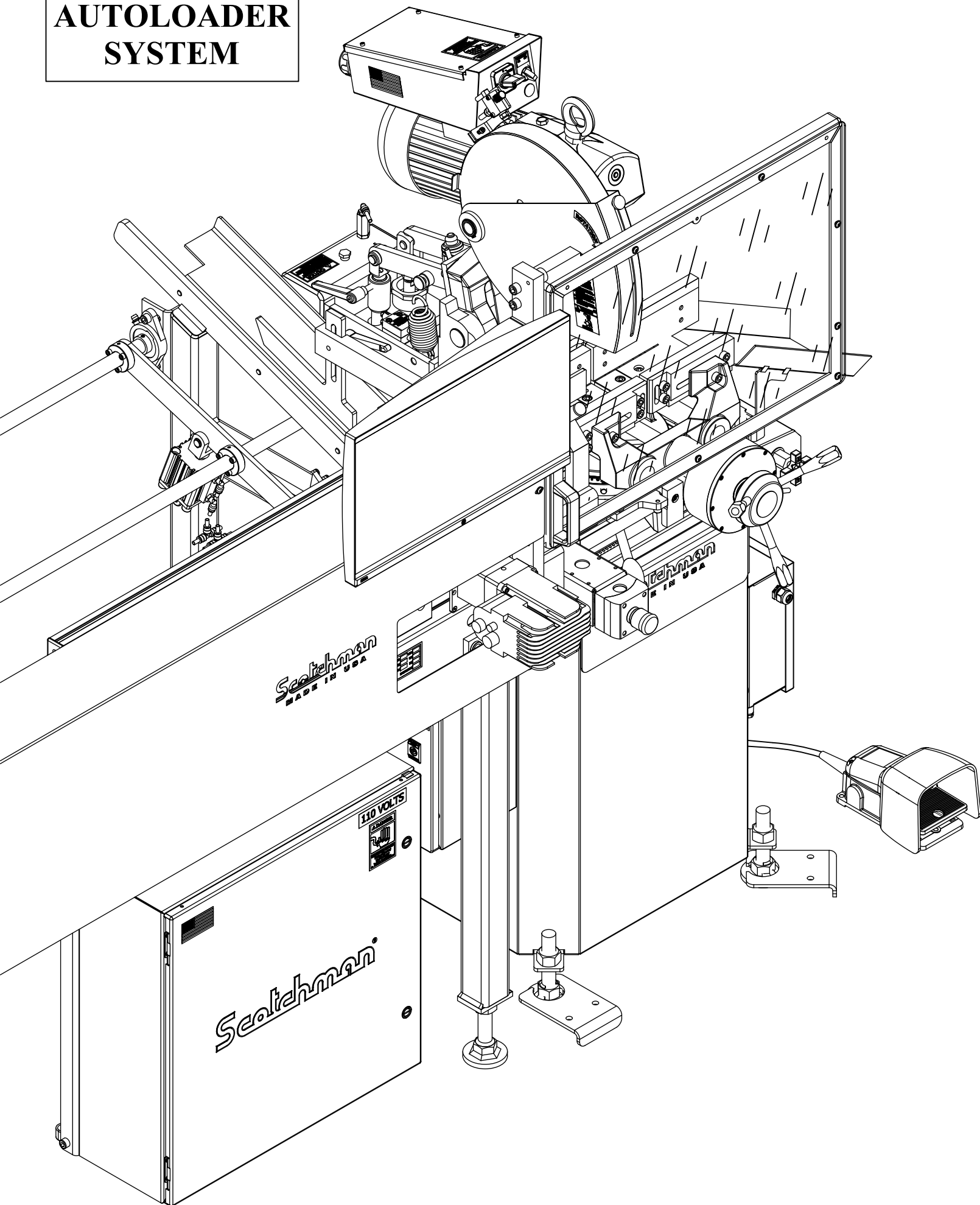


FIGURE 41

AUTOLOADER SYSTEM



11.0 SAW PARTS LIST

11.1 SAW HEAD

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	4	060250	M10 X 20 DIN 6912 SHCS
2	8	073110	M10 DIN7980 BLK FINISH LOCK WA
3	3	073641	M10 X 65 DIN 6912 SHCS
4	1	073692	M20 DIN 580 I BOLT
5	2	077150	HEAD BEARING BK3026
6	1	077152	SIGHT GAUGE TLT 3/8
7	1	077153	PLUG 3/8-19 DIN906
8	1	077617	350 SPINDLE ASSEMBLY
9	1	075075	OIL SEAL
10	1	075076	3207J BEARING-KOYO
11	1	075081	M32 DIN471 EXT RET RING
12	1	077333	350 WORM WHEEL
13	1	077334	350 DISTANCE BOX
14	1	077335	M72 DIN472 RET. RING
15	1	077337	O-RING 74-2
16	1	077340	KEY 10-8-32 DIN6885
17	1	077624	350 SPINDLE
18	1	077628	350 BEARING HOUSING
19	1	077618	350 WORM SHAFT ASSEMBLY
20	1	075080	KEY 8-7-32 DIN6885
21	1	077321	M25 X 1.5 KM5 SHAFT NUT
22	1	077322	350 WORM SHAFT
23	1	077323	350 HEAD PIVOT BEARING-KOYO
24	1	077324	350 DISTANCE RING
25	1	077325	6206 C3 BRG.-NACHI/SKF/TIMKEN
26	1	077326	FILLING RING
27	1	077328	350 GEAR WHEEL

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

28	1	077330	350 LOCK RING
29	1	077622	350 SAW HEAD
30	1	077626	350 SAW FLANGE ASSY
31	4	073920	M10 X 20 6325 DOWEL PIN
32	1	660360	350 SAW FLANGE-RAW
33	1	660365	FLANGE ATTENTION DECAL
34	1	077630	3/8" BSPT BREATHER
35	1	077860	350 HEAD GASKET
36	1	221212	M10 X 30MM DIN912 SHCS

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

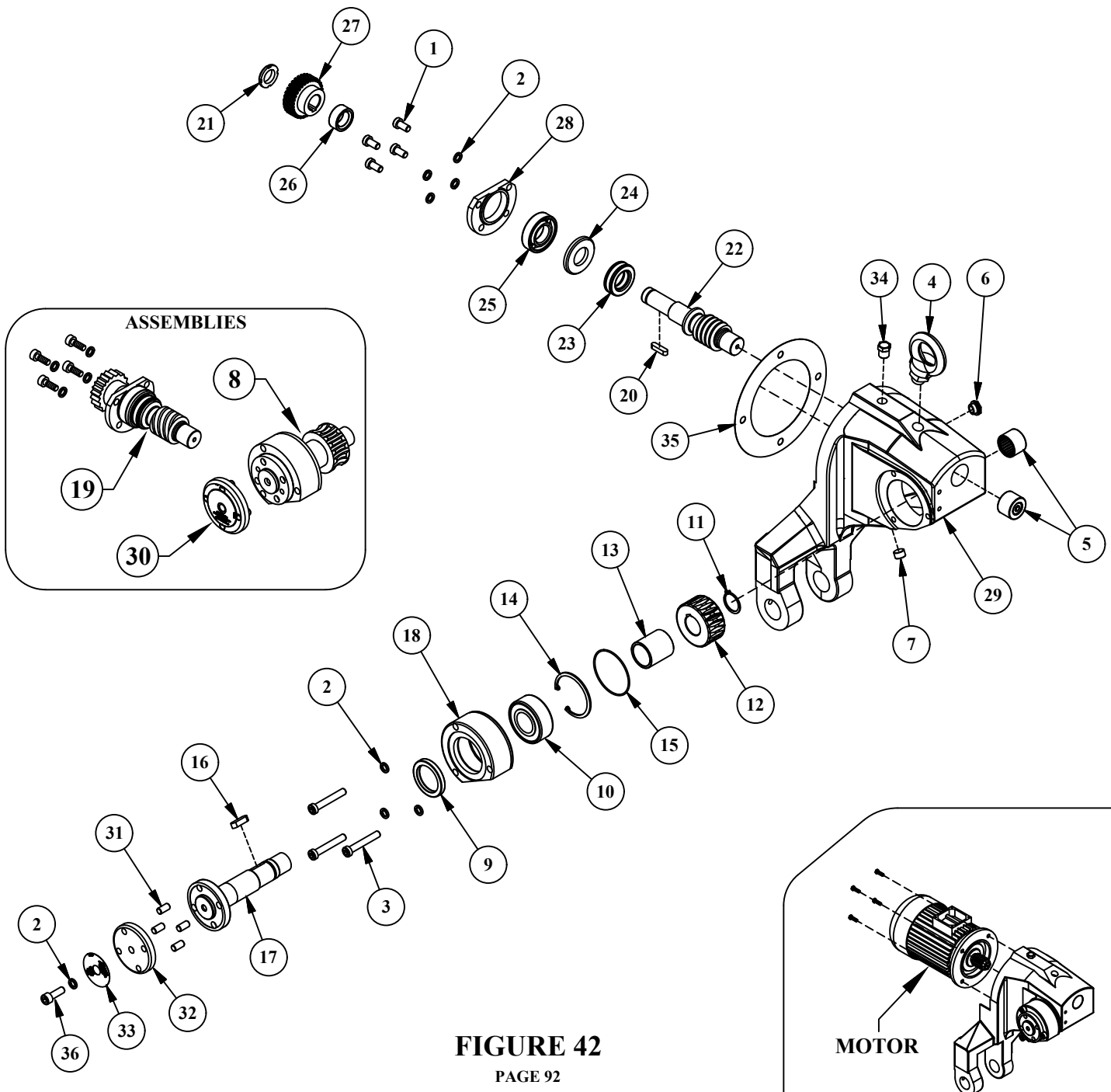


FIGURE 42

11.2 MOTOR ASSEMBLY

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	076902	FAN COVER-PAINTED
2	4	073407	M5 X 6 SLOT HEAD
3	1	076900	FAN BLADE (24mm DIA HOLE)
4	1	077370	KEY 6-4-30
5	1	077375	350 MOTOR GEAR
6	1	077189	M20 X 1.0 KM4 SHAFT NUT
7	1	077860	350 HEAD GASKET
8	1	077855	SWITCHBOX GASKET
9	4	203210	M10 X 25MM HHCS
10	1	076993	230/460 5HR/LT PAINTED MOTOR INCLUDES 7 & 8

**NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.
Contact factory for information regarding replacement of internal components.**

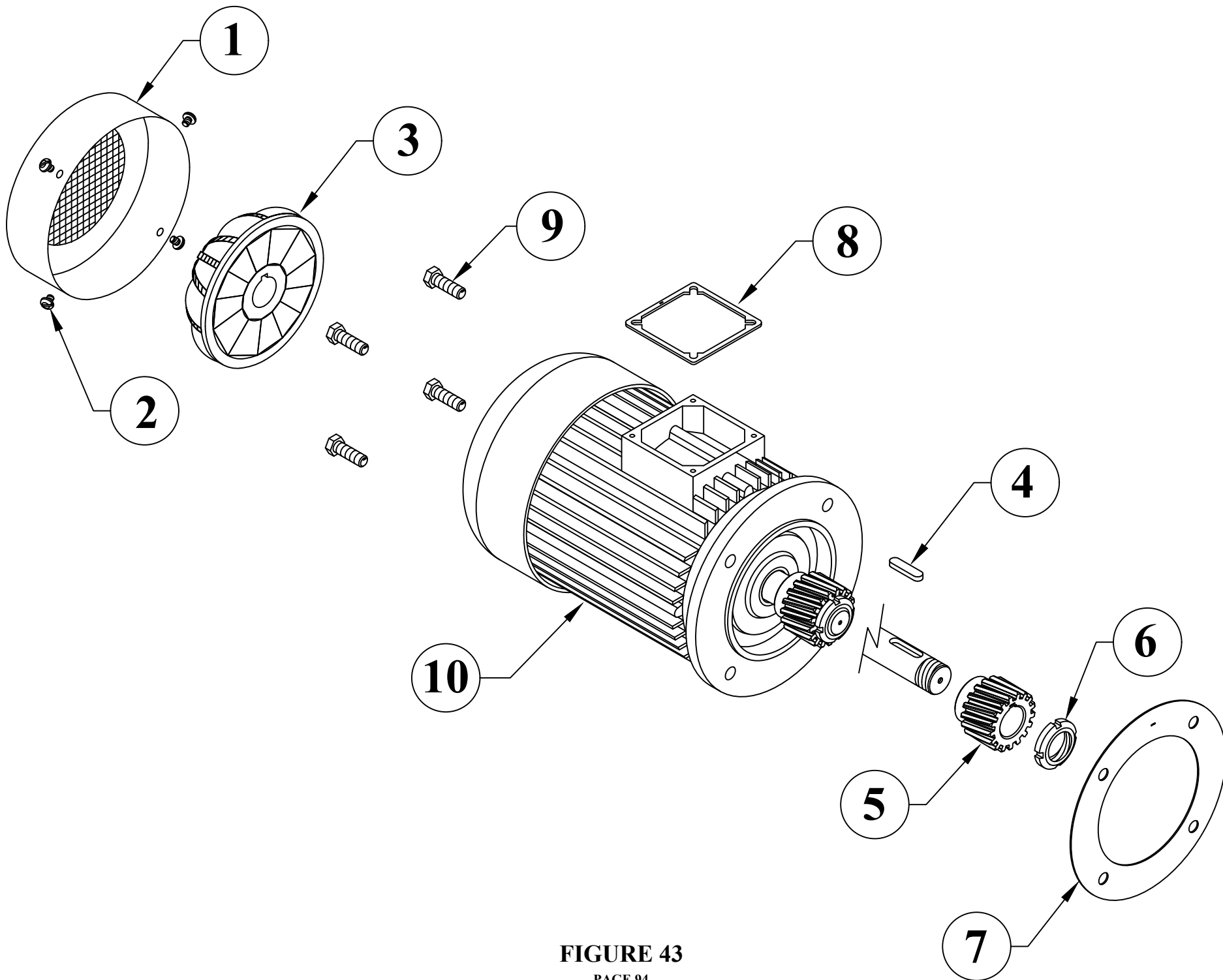


FIGURE 43
PAGE 94

11.3 UPPER SWITCH BOX

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	0191XX-STICKER	VOLTAGE STICKER
2	1	000395	SNUBBER
3	1	003122	DANGER VOLTAGE STICKER (12-13)
4	1	004519	FEED/CLAMP LEGEND
5	1	004521	LEGEND PLATE HOLDER
6	1	011877	SELECTOR SWITCH
7	1	019127	US FLAG DECAL
8	1	044125	MOUNTING PLATE
9	1	045557	POTENTIOMETER
10	1	045558	KNOB
11	3	060049	SINGLE WIRE GROUND LUG
12	1	060050	TRANSFORMER 24V 208/230/460
13*	1	060094	SWITCH BOX & LID-PAINTED
14	1	060071	DILM 12-10 24VAC CONTACT
15	9	073440	M4 x 6 DIN912 SHCS
16	1	075210	ELEC. PD MOUNT STRIP
17	1	077564	FUSE FLM 1 TIME-DELAY
18	2	078104	END BRACKET
19	4	221002	M4 X 12MM DIN912 SHCS
20	1	060104	3210 CORD GRIP
21	1	060115	CAM SWITCH T0-1-15511/E
22	1	011844	KM KNOB SEL SW KNB-T0
23	1	077855	SWITCHBOX GASKET
24	4	077864	M5 X 12 DIN912 SHCS
25	1	078115	V.S. CONDUIT ASS'Y
26	4	078456	M4/6 TERMINAL BLOCK
27	1	049331	.875 PLASTIC PLUG
28	1	562501	M16 LIQUID CORD CONN

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

***Std. on S/N B116450120 and after - Replacement part - will fit older saws.**

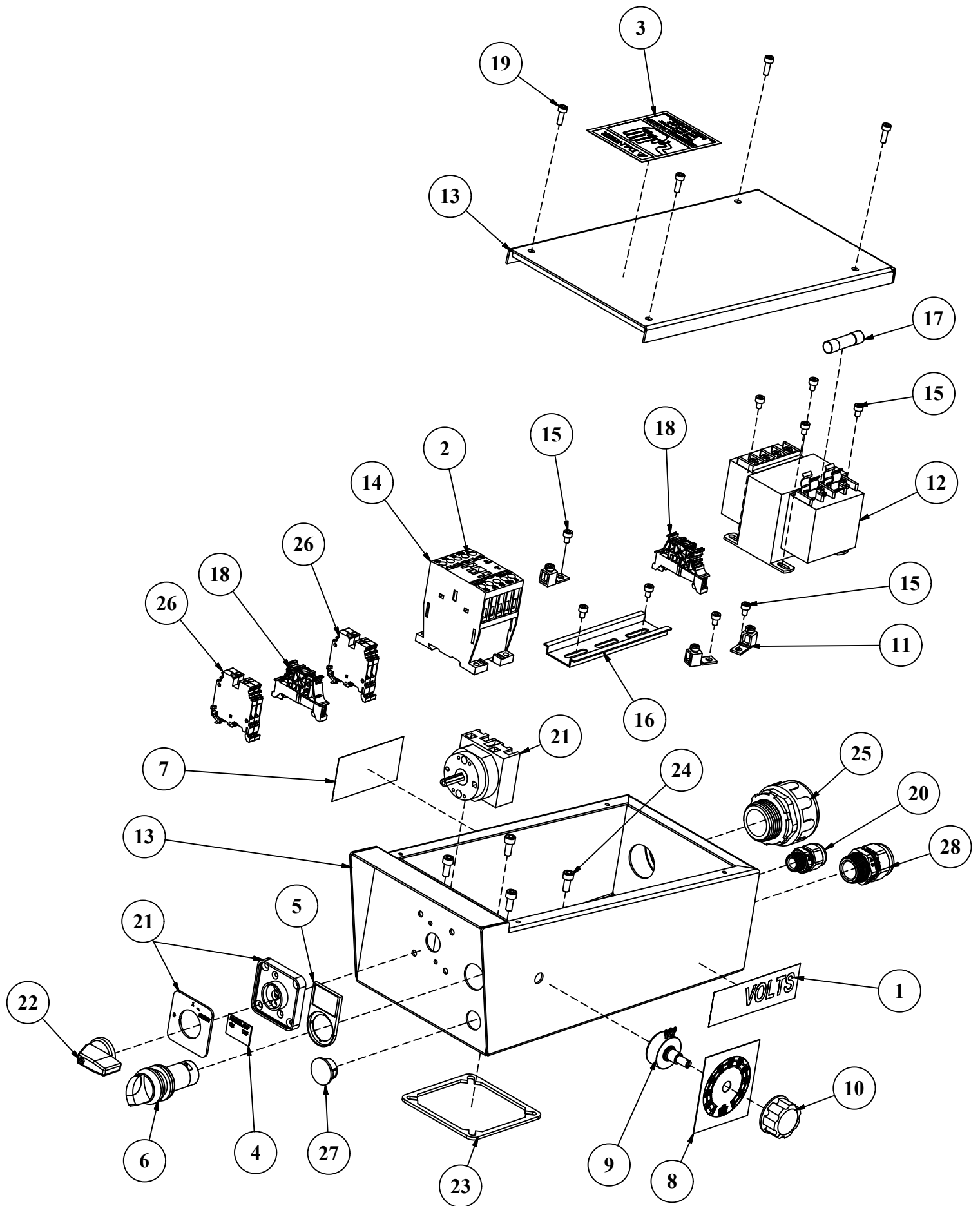


FIGURE 44

11.4 GUARD ASSEMBLY

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	2	060345	DANGER DECAL
2	*	060501	5/16" BLACK AIR TUBE
3	2	073090	M4 SPACER NF GUARD
4	2	073415	M4 X 25 DIN912 SHCS
5	1	073691	M6 X 12MM DIN464 KNOB
6	1	076838	MISTER BRACKET
7	1	076839	NF MISTER UNIT
8	1	077650	350PD GUARD-RAW
9	1	077165	RING THK 2 50.0846
10	1	077167	M30 DIN471 EXT RET RING
11	1	077202	SPACER-NYLON
12	1	077864	M5 X 12 DIN912 SHCS
13	*	077926	NF US 3/16X5/16X1/16 TB
14	1	078516	PD GUARD STOP
15	1	214005	M5 DIN433 SMALL WASHER
16	1	215010	M5 DIN985 GREER NUT
17	1	660350	BLADE ROTATION DECAL
18	1	676842	MALE ELBOW X 90DEG BARB
19	1	676844	NF-1168X5 1/8 NPT STR

*** SOLD IN INCHES**

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

11.5 CAST BASE AND PEDESTAL

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	019100	U.S. DATA PLATE
2	2	019105	DECAL "GREASE POINT"
3	1	046669	1/2 NYLON CLAMP-HEYCO
4	1	048550	AL MATERIAL CHUTE WELDMENT
5	1	060102	E. S. BOX (SALES#60110)
6	1	060240	TENSION BAR ASS'Y
7	1	073326	M8 X 30 933 HHCS
8	2	073350	M10 X 100 DIN931 HHCS
9	4	073660	M8 x 12MM DIN912 SHCS
10	2	077011	M22-KC01 CONTACTOR
11	1	077113	BASE PLATE
12	1	077114	MITER LOCK ASSEMBLY
13	1	077225	MITER LOCK SUPPORT
14	1	077226	MITER LOCK HANDLE
15	1	077227	MITER LOCK SPRING
16	1	077228	MITER LOCK PIN
17	1	077136	PRESSURE PLATE
18	2	077142	M10 H2121Z3 GREASE ZERK
19	1	077183	M13.5 LIQUID CORD CONN
20	1	077300	350 BEAR. PEDESTAL ASSY
21	3	077100	M10 X 30 6325 DOWEL PIN
22	1	077101	PIVOT SCALE
23	2	660255	#6 X 3/8" DRIVE SCREW
24	5	077864	M5 X 12 DIN912 SHCS
25	1	078546	LEFT PALM BUTTON BOX
26	1	078600	350 PIVOT SHAFT
27	2	203210	M10 X 25MM DIN933 HHCS
28	2	214012	M10 DIN125 REGULAR WASHER
29	1	677879	TENSION NUT ASSEMBLY
30	3	073329	M8 X 45 DIN933 HHCS
31	1	077135	TENSION NUT
32	3	208010	M8 HEX NUT DIN934

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

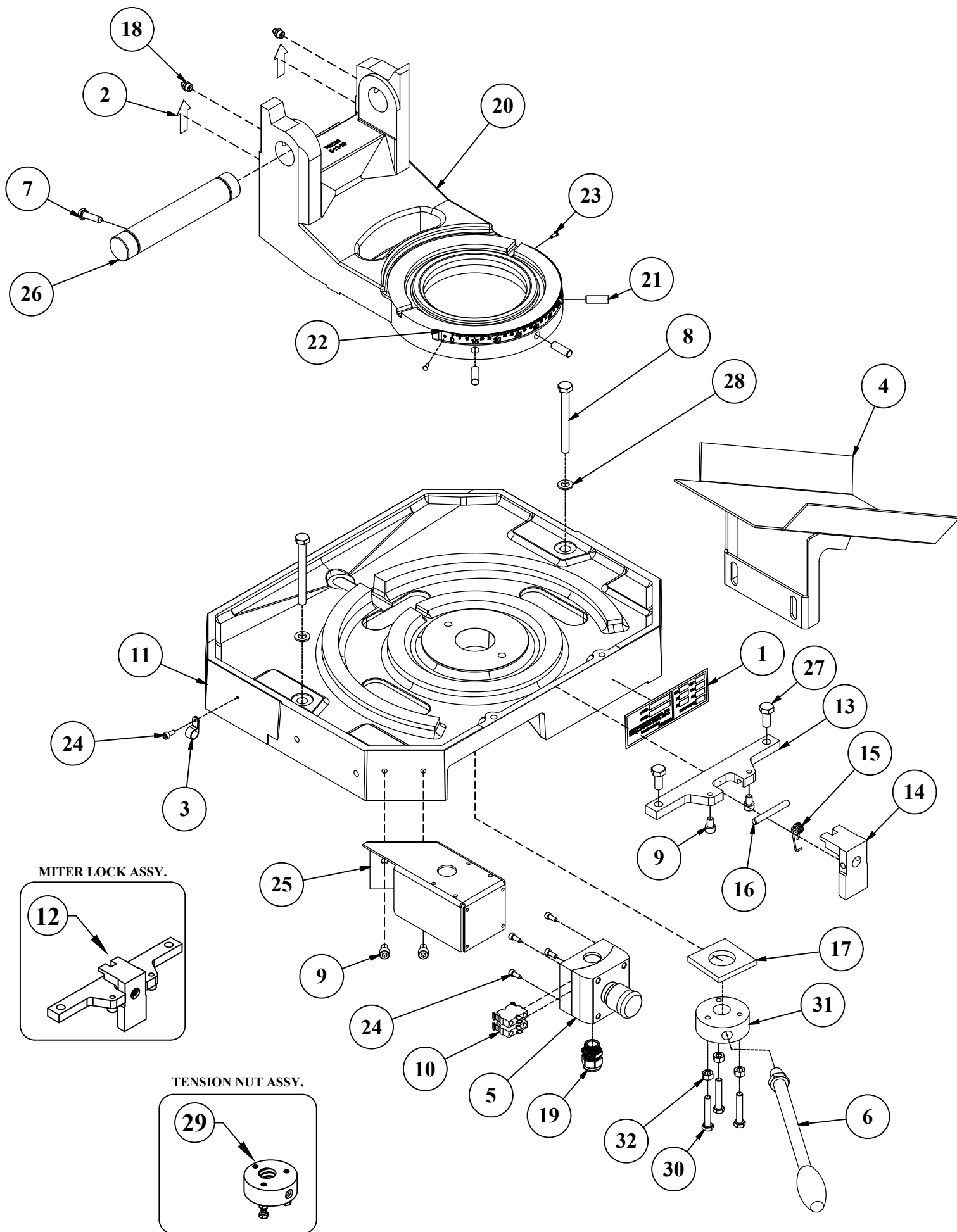


FIGURE 46

11.6 POWER DOWN FEED ASSEMBLY

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	077661	1/4" ELBOW 90°
2	1	045039	3600X4 TEE MALE BRANCH
3	3	046093	STROKE LIMIT SWITCH
4	2	073335	M5 X 70MM DIN912 SHCS
5	*	073757	1/4" RED POLY TUBE
6	*	073758	1/4" GREEN POLY TUBE
7	1	077211	RETURN SPRING
8	1	077505	BELLOW CLAMP
9**	1	077670	SALES CYL FESTO 275/350/NF METRIC
10	1	077512	TPC CYL. NUT-MACHINED
11	1	077531	CHECK VALVE
12	1	077700	BELLOW
13	1	077701	BAFFLE ARROW 9072 1/4"
14	1	077715	CYLINDER PIVOT BOLT(2)
15	1	077578	M16x1.5 CLEVIS
16	3	077738	90 DEG. SWIVEL
17	1	077662	3/8" ELBOW 90°
18	1	077746	1/4 NPT 90 169PL-4-4
19	1	077777	3/8 NPT PLUG 106-0099
20	1	078455	RO1-A SIGHT GLASS
21	1	078510	350PD UPPER BRKT ASSY
22	2	078518	PD STROKE ADJ STOP
23	1	078520	PD STOP ROD ASSY.
24	1	078524	PD CYLINDER PIVOT
25	1	078525	350PD LOWER BRKT ASSY
26	2	080063	RS/JIG HANDLE
27	1	123120	1/8" X 1-1/4" COTTER PIN
28	1	140415	1/2 X 1-1/2 CLEVIS PIN
29	4	203210	M10 X 25MM DIN933 HHCS
30	2	215010	M5 DIN985 GREER NUT
31	4	221210	M10 X 25MM DIN912 SHCS
32	*	660502	3/8 BLACK POLY TUBE
33	1	677779	1164 X 4 UNION-TEE
34	1	678550	RESERVOIR DECAL
35	1	660505	BLACK ZIP TIE
36	1	210017	M16 X 1.5 JAM NUT

* Sold in inches - Order as needed

9** Includes Items: 1, 8, 9, 10, 12, 15, 17, 35 & 36

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

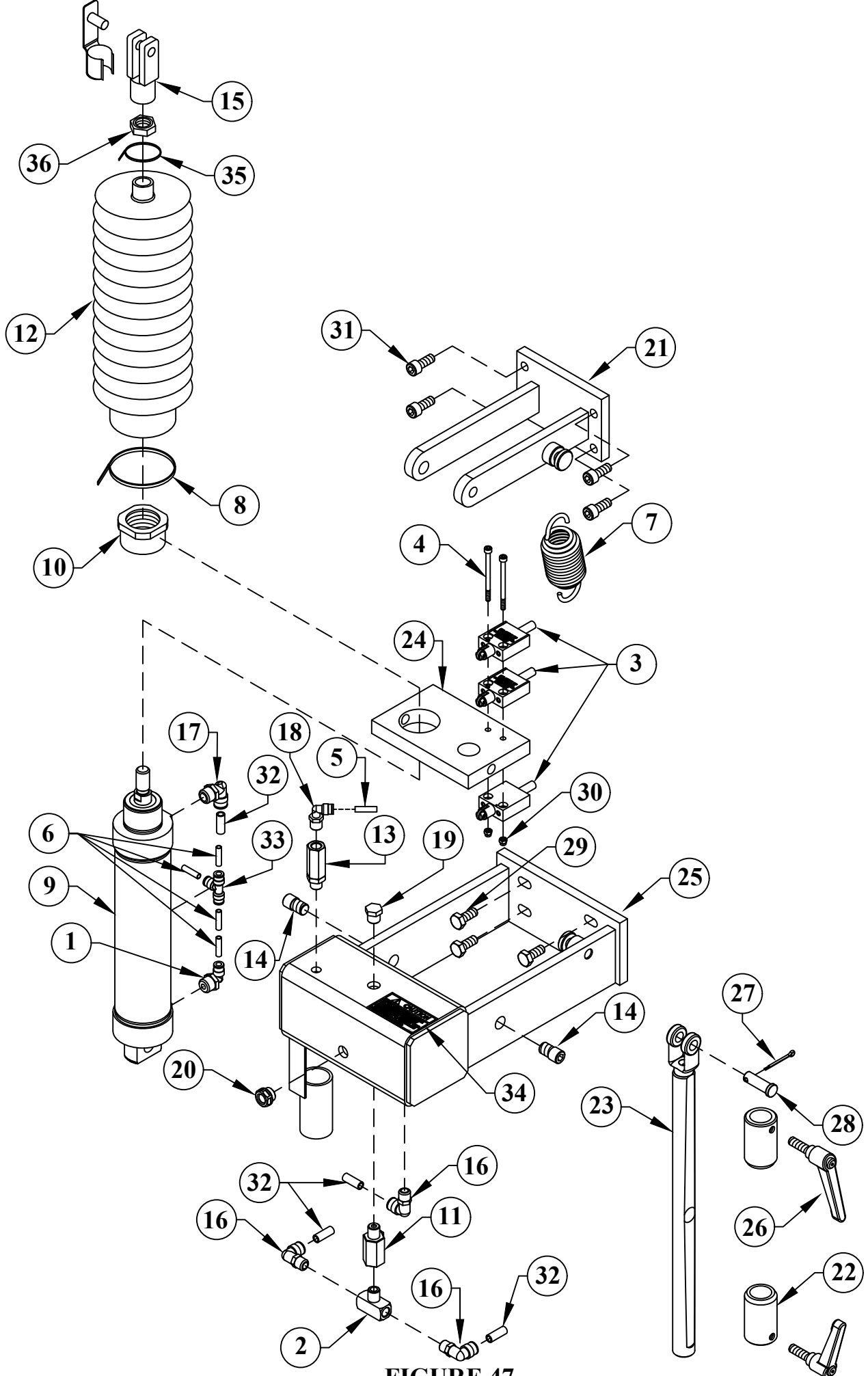


FIGURE 47

11.7 POWER DOWN FEED CONTROLS

PARTS LIST							
ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	2	045045	ASP-3BV BREATHER	13	1	077653	CAMOZZI FRL
2	1	047535	3/8" FLOW CONTROL VALVE	14	1	077719	SLIDE VALVE
3	1	047547	FEED RATE DECAL	15	1	077736	PD VALVE MOUNT-PAINTED
4	1	060030	3 STATION VALVE BANK	16	1	077737	1/4NPT-1/4 90DEG ST EL
5	5	060104	3210 CORD GRIP	17	1	077738	90 DEG. SWIVEL
6	*	060501	5/16" BLACK AIR TUBE	18	3	077740	3/8" 90 DEG MALE SWIVEL
7	4	073331	M5 X 45MM DIN912 SHCS	19	2	077742	1/4" MALE SW X169PL
8	2	073660	M8 x 12MM DIN912 SHCS	20	4	077746	1/4 NPT 90 169PL-4-4
9	*	073755	1/4" YELLOW POLY TUBE	21	3	077777	3/8 NPT PLUG 106-0099
10	*	073757	1/4" RED POLY TUBE	22	*	077874	1/4" BLUE POLY TUBE
11	*	073758	1/4" GREEN POLY TUBE	23	2	221006	M4 X 50MM DIN912 SHCS
12	5	077183	M13.5 LIQUID CORD CONN	24	*	660502	3/8 BLACK POLY TUBE

*** Sold in inches - Order as needed**

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

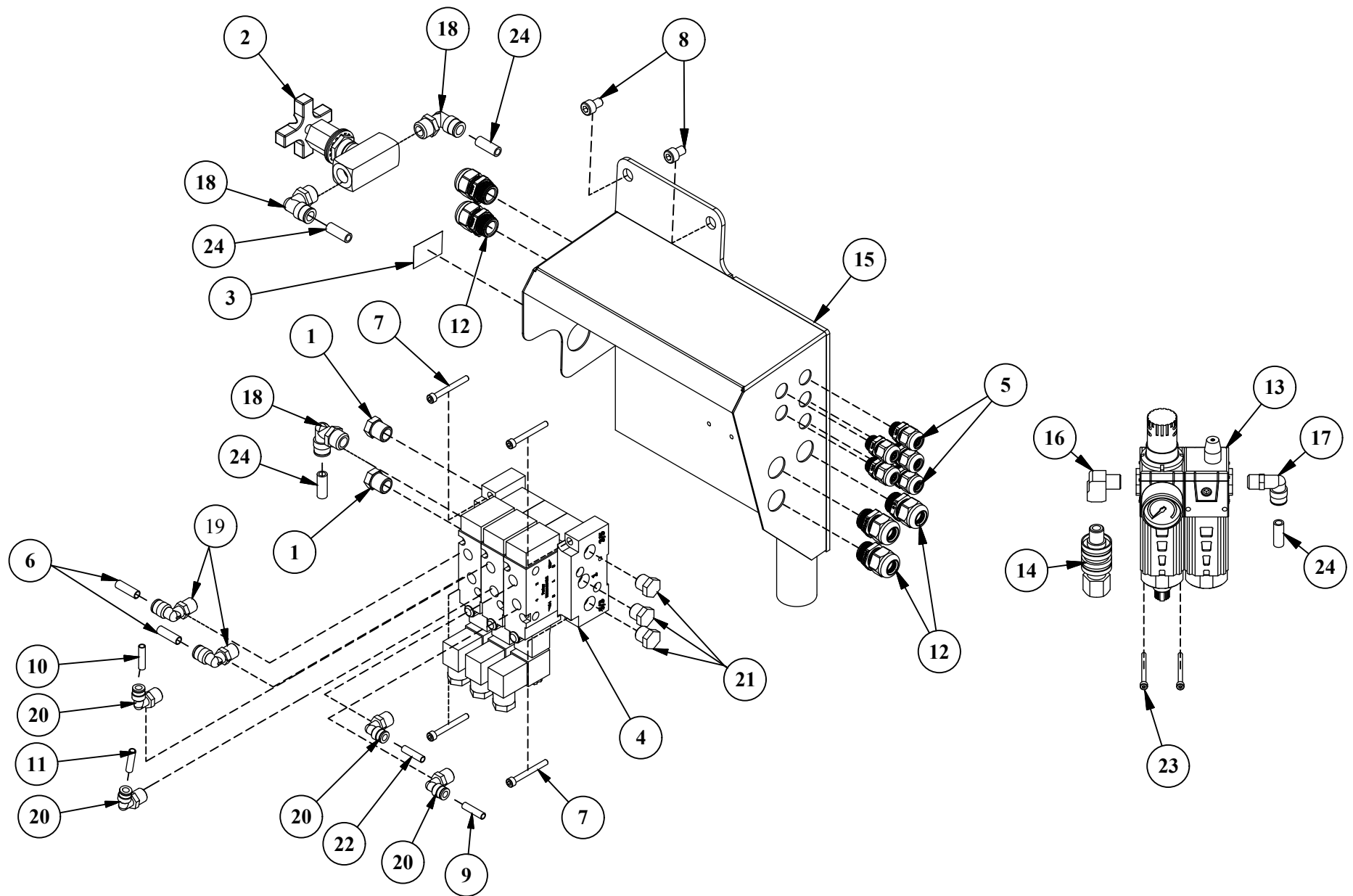


FIGURE 48

11.8 POWER DOWN FEED ELECTRIC

P A R T S L I S T							
ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	1	000395	SNUBBER	13	5	077183	M13.5 LIQUID CORD CONN
2	1	049706	4 PIN CABLE MALE	14	2	078104	END BRACKET
3	2	073660	M8 x 12MM DIN912 SHCS	15	9	078456	M4/6 TERMINAL BLOCK
4	1	075203	AUTO-LOADER BOX ASSY.	16	1	078457	JUMPER SCREW
5	1	003122	DANGER VOLTAGE STICKER (12-13)	17	2	115011	5/16-18 NYLOC NUT
6	1	060044	DILA-31(24V 50/60HZ AC)	18	2	158202	5/16 SINGLE STUD BUMPER
7	3	060104	3210 CORD GRIP	19	1	562501	M16 LIQUID CORD CONN
8	2	073440	M4 x 6 DIN912 SHCS	20	1	077014	TURCK RECEPTACLE - FK 4.4-0.5
9	1	075205	SUBPLATE-DRILLED	21	2	214012	M10 DIN125 REGULAR WASHER
10	1	075211	AUTOLOADER PD MOUNT STRIP	22	1	562453	FOOT SWITCH ASSEMBLY
11	1	075250	ENCLOSURE BOX-PAINTED	23*	1	562451	MICRO SWITCH (SSC FOOT PEDAL)
12	1	077090	TURCK RECEPTACLE-MFS 4F-0.2		1	562452	MICRO SWITCH (LINEMASTER FOOT PEDAL)

***BEFORE ORDERING A MICROSWITCH:** Inspect foot pedal to determine if it's a LINEMASTER or SSC.

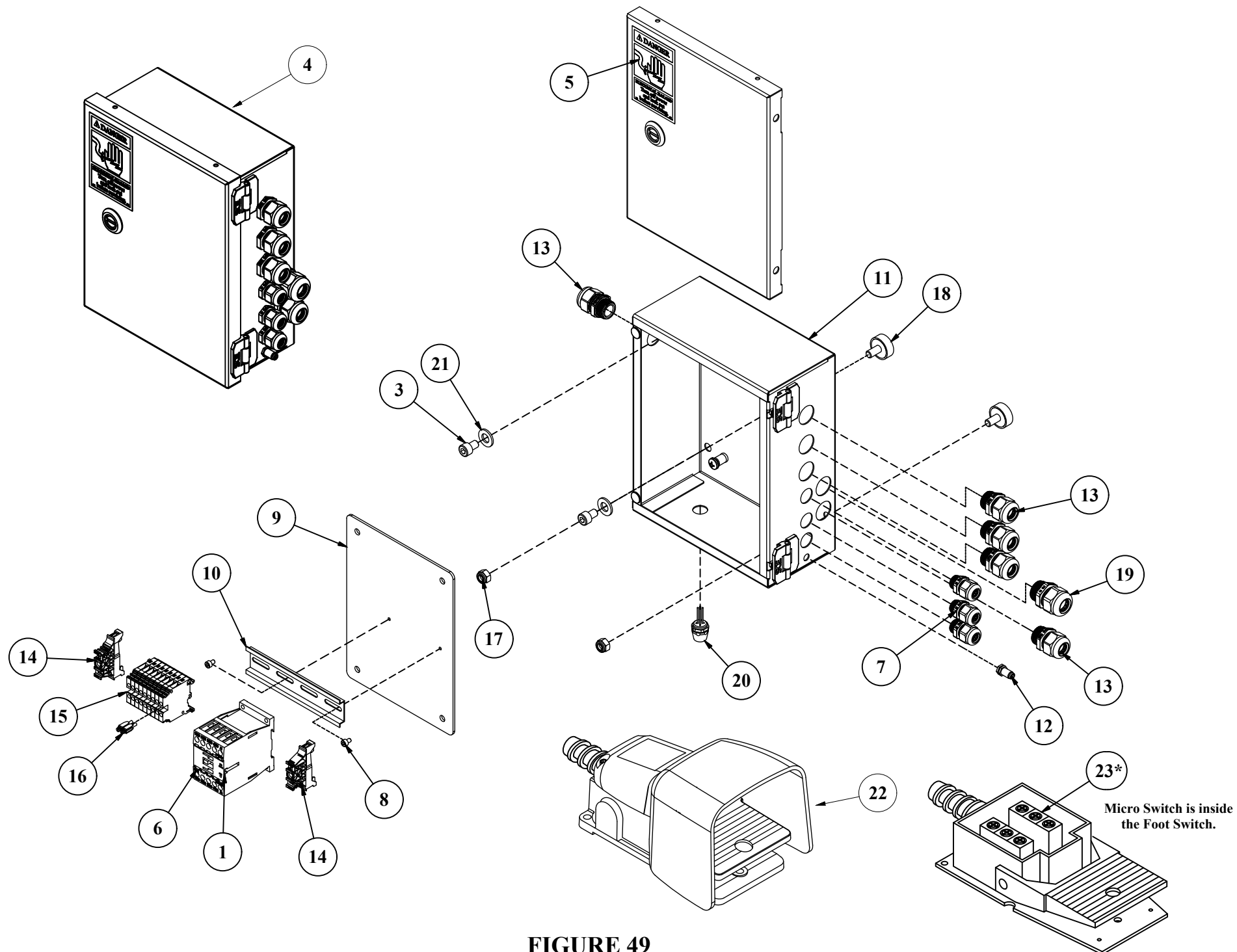


FIGURE 49

11.9 POWER VISE ASSEMBLY

PARTS LIST

ITEM	QTY	PART #	DESCRIPTION	17	1	077575	350 AUTO LOADER VISE BASE
1	2	048716	AUTO LOADER FRONT JAW PLATE	18	2	077100	M10 X 30 6325 DOWEL PIN
2	2	048717	AUTO LOADER BACK JAW PLATE	19	1	077579	LONG VISE JAW RIGHT AUTO LOADER
3	1	060270	1-3/4" HOLE PLUG 2773-01	20	4	077580	WISE BACK JAW RING
4	2	073457	M6 X 80MM DIN912 SHCS	21	1	077581	350 AUTO LOAD SCREW SPINDLE
5	1	076908	GRIP CHEEK LEFT	22	1	077582	350 AUTO LOADER SAW JAW REAR
6	1	076909	GRIP CHEEK RIGHT	23	1	077583	LONG VISE JAW LEFT AUTO LOADER
7	1	077035	AFS 350 ALUMINUM BLOCK	24	2	077588	AL GUIDE SHAFT
8	1	077121	M20 X 1.5 DIN936 JAM NUT	25	1	077742	1/4" MALE SW X169PL
9	1	077133	SCREW END	26	1	077744	1/4-5/16 NPT STR FITTING
10	1	077314	350 FILLING BLOCK REV. 2	27	4	208012	M10 DIN 934 HEX NUT
11	3	077400	WISE HANDLE	28	4	219040	M10 X 10MM DIN914 SET S.
12	1	077409	PK LOCK NUT	29	6	221210	M10 X 25MM DIN912 SHCS
13	1	077408	M8 X 24 DIN1481 ROLL PIN	30	2	221212	M10 X 30MM DIN912 SHCS
14	1	077412	PK CYLINDER ASSY	31	12	221215	M10 X 35MM DIN912 SHCS
15	1	077462	350PK SAW JAW W/SEAL	32	4	221220	M10 X 40MM DIN912 SHCS
16	2	077310	SEAL 28 X 35 X 5 IN BULK	33	1	660265	BOSS 275, 350

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

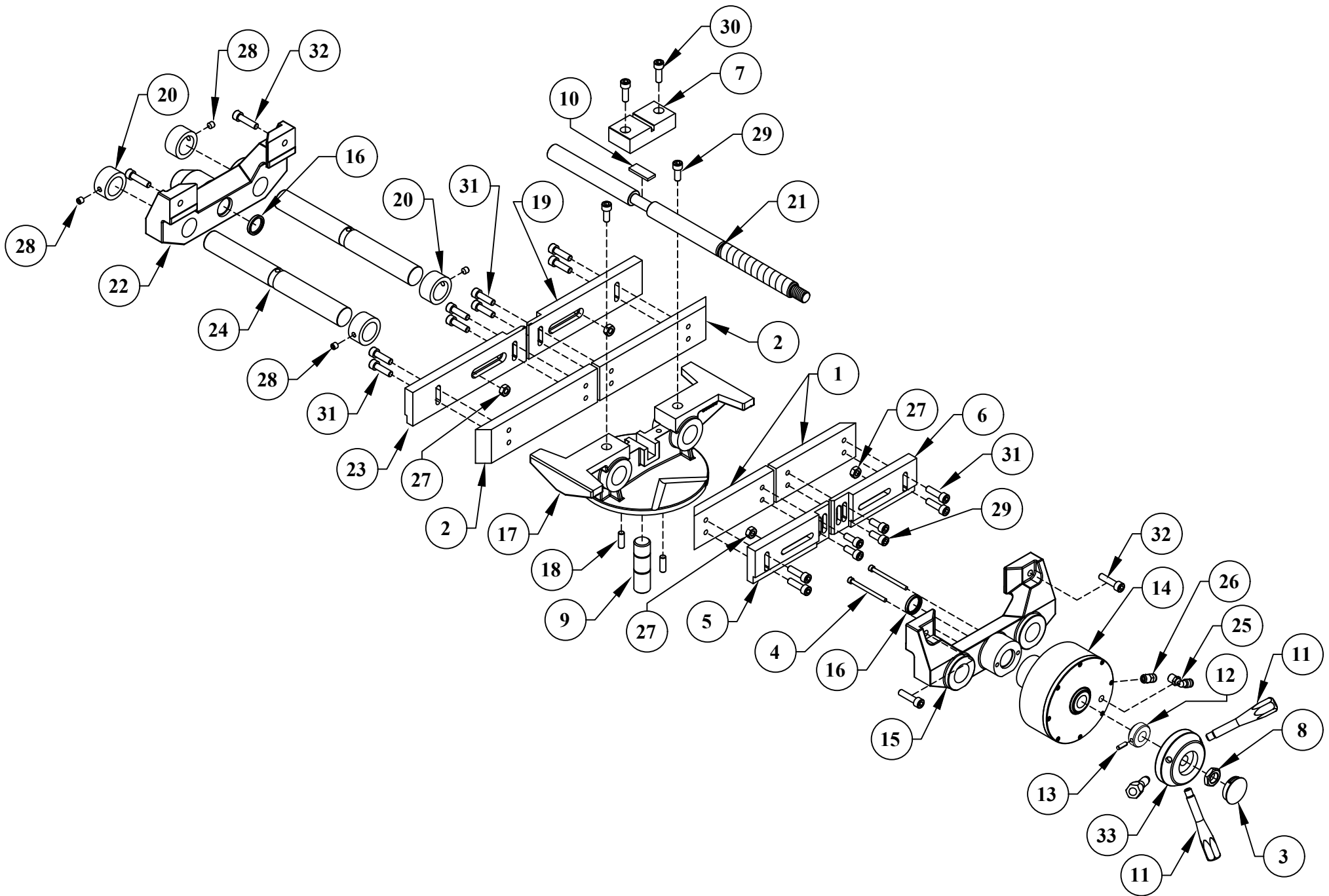


FIGURE 50

11.10 POWER VISE CYLINDER ASSEMBLY

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	060204	PK CYLINDER BODY
2	1	060450	PK CYLINDER LID
3	1	077411	PK CYL PISTON
4	1	077418	M6 X 30 DIN1481 ROLL PIN
5	2	077416	O-RING 34MM X 3.0MM
6	2	077417	O-RING 129.2MM X 5.7MM
7	1	077419	OIL SEAL 40 X 50 X 5/8
8	8	221002	M4 X 12MM DIN912 SHCS

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

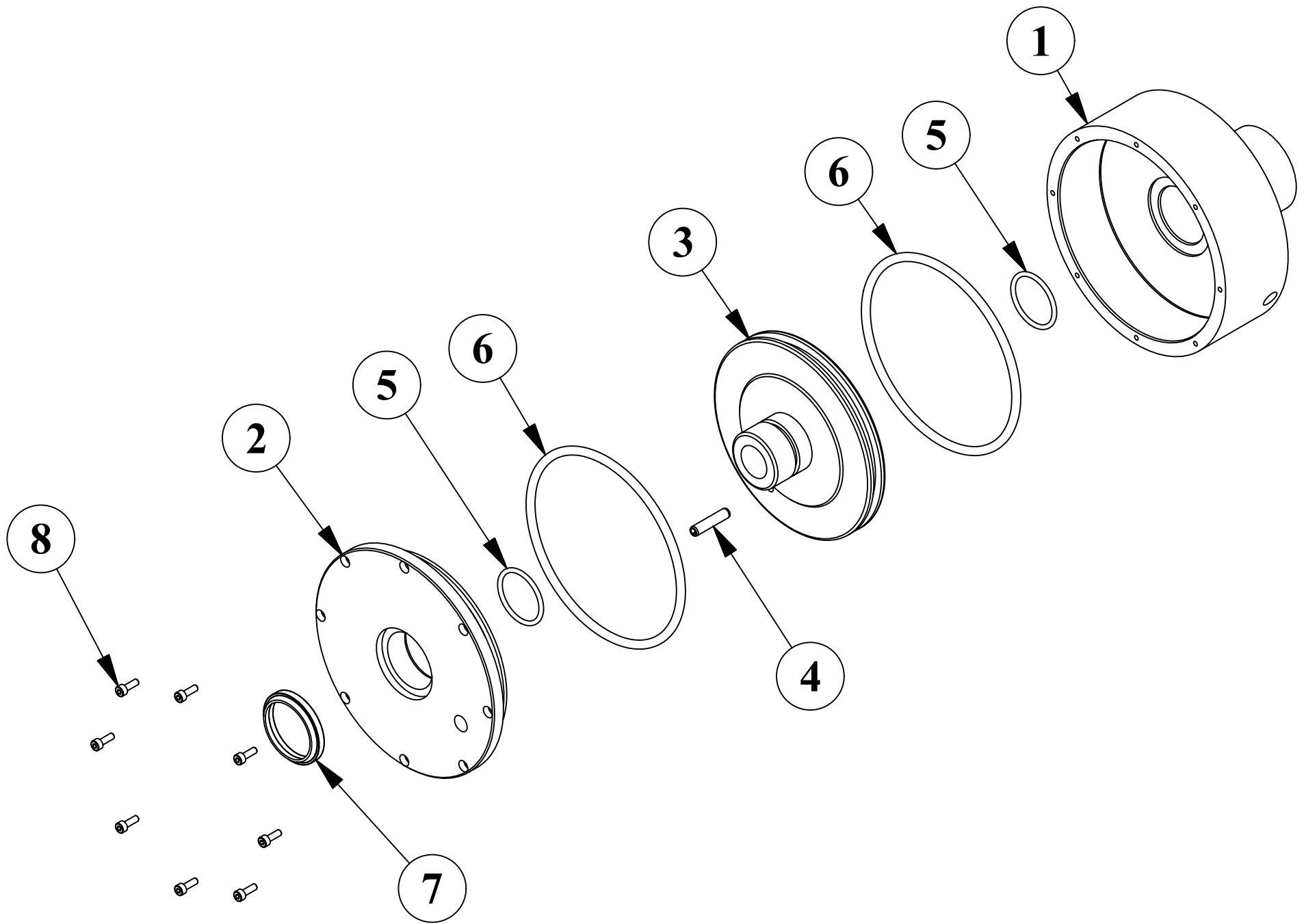


FIGURE 51
PAGE 110

11.11 BASE CABINET

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	014400	STAINLESS BACK PLATE
2	4	049217	FOOT ASS'Y
3	1	077595	SAW BASE PAINTED AUTO LOADER
4	4	208024	M24 DIN934 HEX NUT
5	1	350014	1/2" MAGNETIC PLUG
6	1	760113	PAINTED DRAWER SALES

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

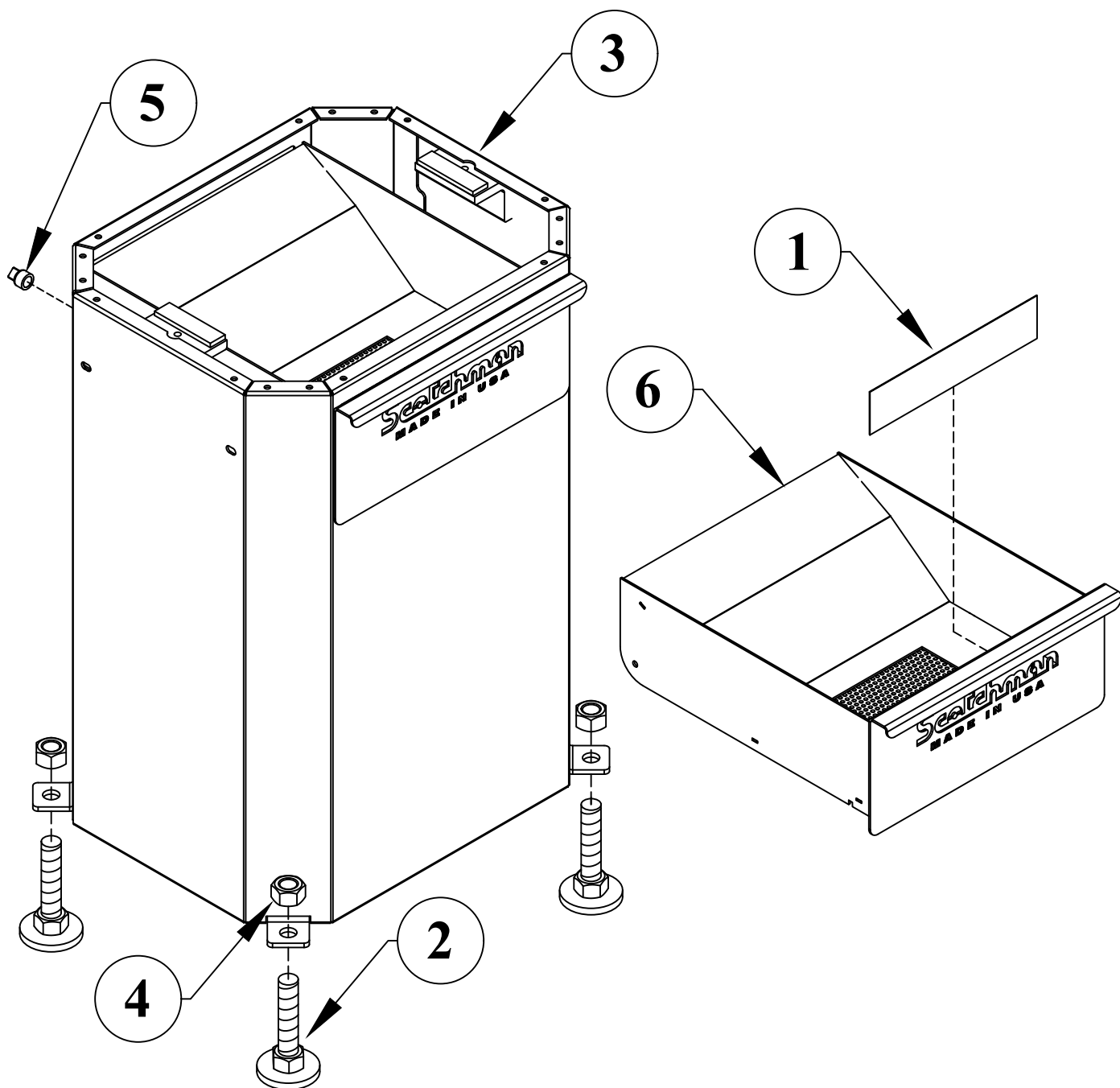


FIGURE 52

11.12 VARIABLE SPEED DRIVE

VARIABLE SPEED MOTOR CONTROLS			
ITEM	QTY	PART #	DESCRIPTION
1	1	019121	230V STICKER
		019122	460V STICKER
2	1	078205	240V 5HP VFD ASSY-PAINTED
		078220	1PH 10HP VFD ASSY-PAINTED
		078210	480V 5HP VFD ASSY-PAINTED
3	1	077867	GROUND LUG 87-003
4	1	078285	5HP 230V VFD-PROGRAMMED
		078270	10HP 1PH VFD-PROGRAMMED
		078286	5HP 460V VFD-PROGRAMMED
5	1	078203	MANUAL STARTER 13-18A
		SEE BELOW	* MANUAL STARTER 37-50A
		078208	MANUAL STARTER 6-10A
6	1	003122	DANGER VOLTAGE STICKER
7	1	078115	V.S. CONDUIT ASS'Y
8	4	115011	5/16-18 NYLOC NUT
9	2	158202	5/16 SINGLE STUD BUMPER
10	2	158205	5/16-18 X 1" G5 HHCS
11	2	158206	5/16-18 FLANGE NUT
12	1	563441	3/4 LIQ. TYPE CORD CONN.

*** Please call the factory at 1-800-843-8844**

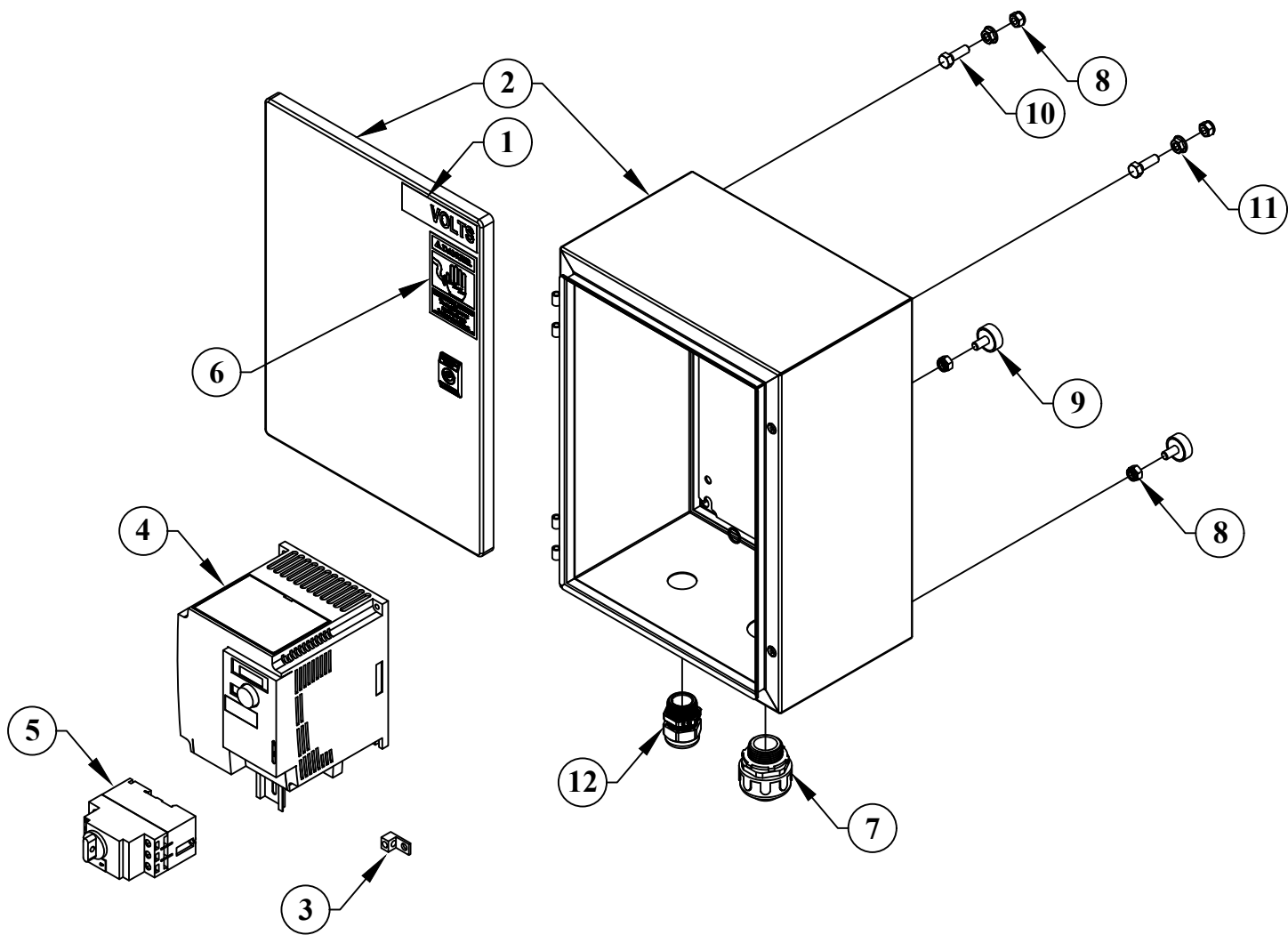


FIGURE 53

11.13 MIST COOLANT SYSTEM

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	045740	LIQUID CHECK VALVE
2	*	060501	5/16" BLACK AIR TUBE
3	*	073758	1/4" GREEN POLY TUBE
4	1	076839	NF MISTER UNIT
5	1	077427	FRL BRACKET BR1611
6	1	077741	1/8" MALE SW X169PL
7	1	077743	1/8 NPT 1/4 90DEG FITTING
8	2	077864	M5 X 12 DIN912 SHCS
9	*	077926	NF US 3/16X5/16X1/16 TB
10	1	077930	IN-LINE REG 1611X30 PSI
11	4	154004	#66 ALUM LARGE POP RIVET
12	1	676842	MALE ELBOW X 90DEG BARB
13	1	676844	NF-1168X5 1/8 NPT STR
14	1	677933	NF COOLANT RES 5 QUART

*** Sold in inches - Order as needed**

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

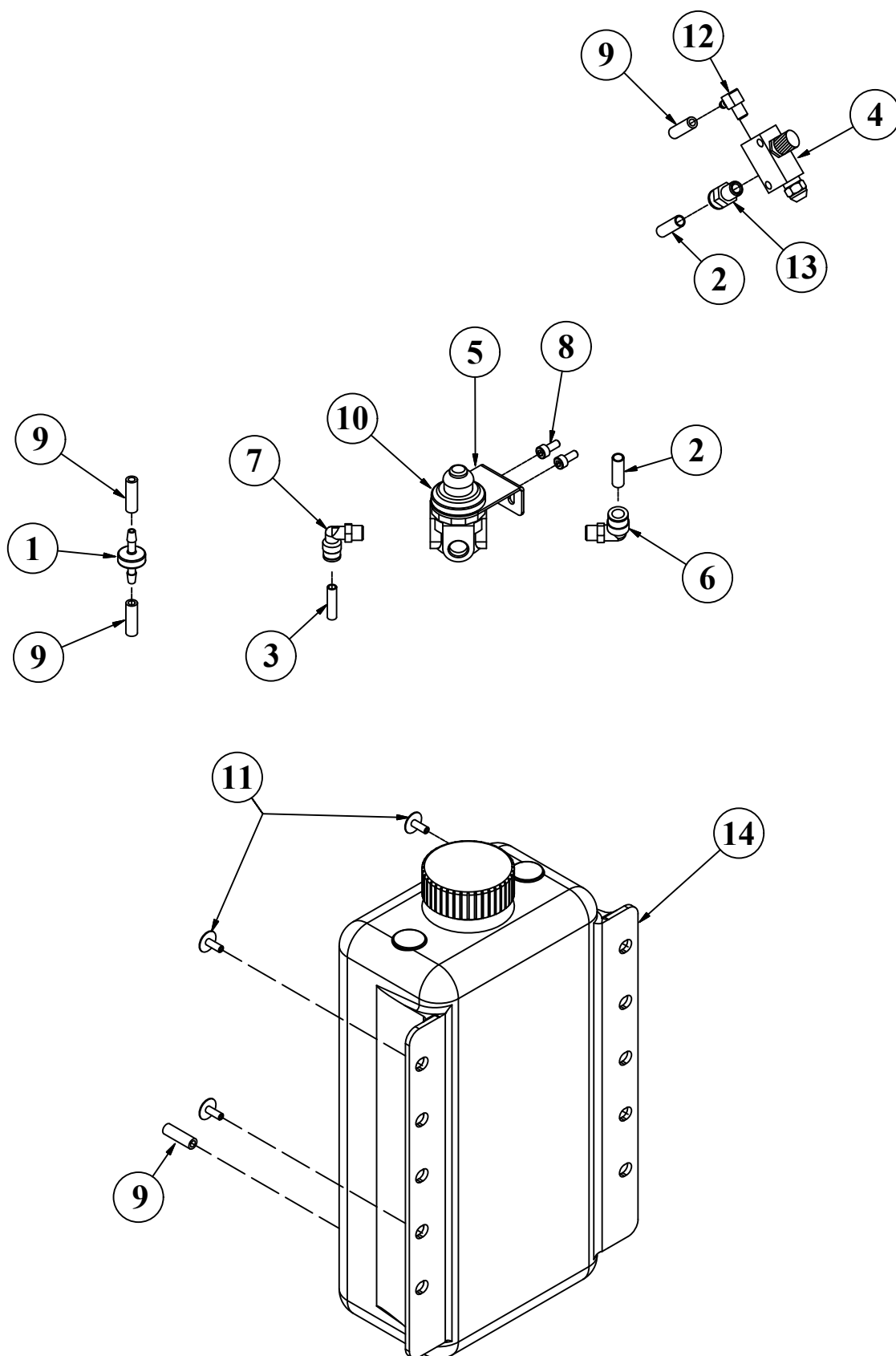
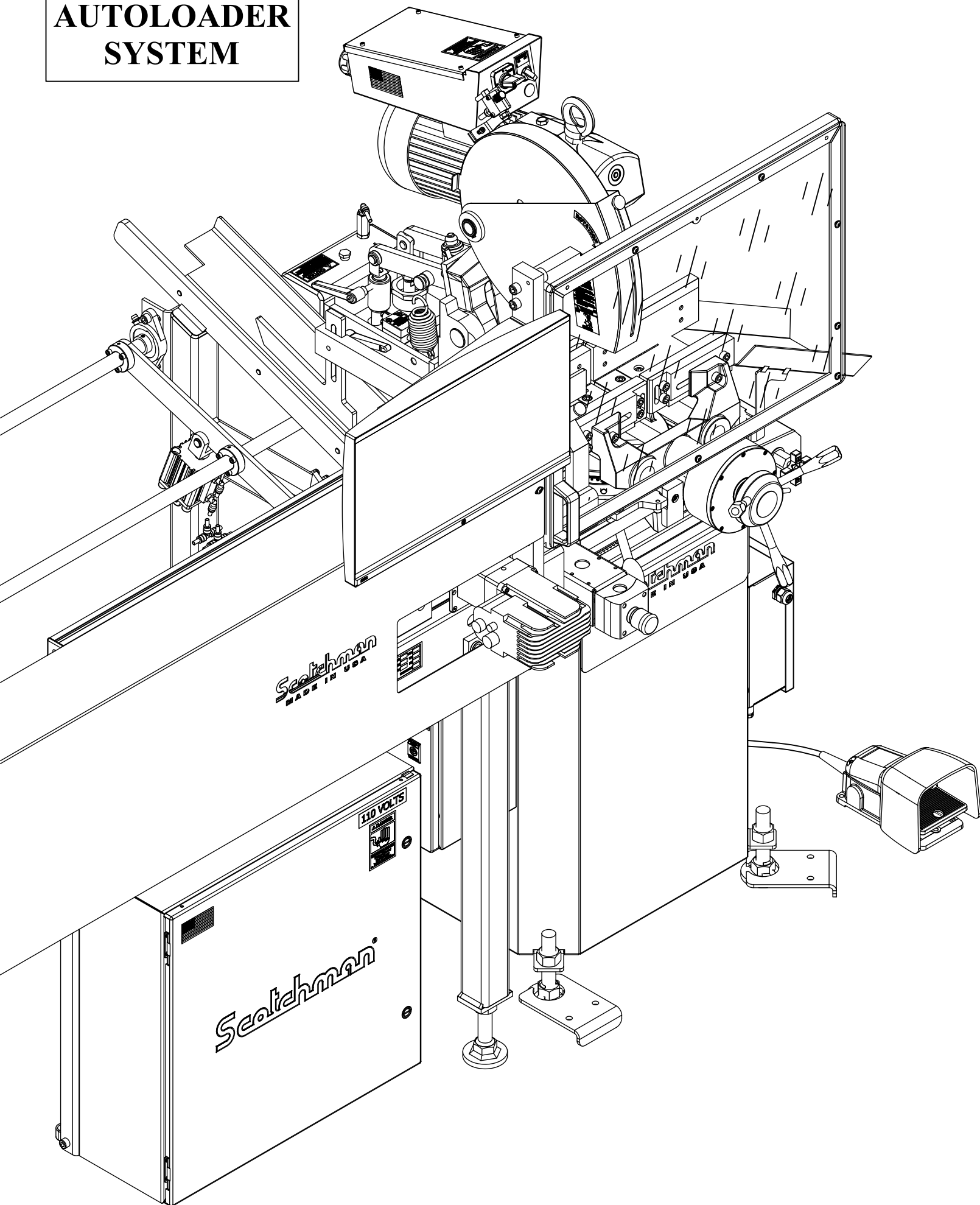


FIGURE 54

AUTOLOADER SYSTEM



11.14 CUTTING OILS AND LUBRICANTS

The list below shows Scotchman's available cutting oils and lubricants.

Using high quality lubricants and oils will greatly increase the life of this equipment.

We recommend using only pure, synthetic, water soluble cutting lubricant for coolant.

For the saw head, use a non-EP additive ISO-460 gear oil specified for worm gears. Oils containing EP additives may degrade or damage bronze gears and must be avoided. Mobil 600W Super Cylinder Oil is highly recommended and available from the factory under P/N 075758.

Use a SAE 10W (ISO 32) non-foaming hydraulic oil such as Mobil DTE 10 or equivalent in the power down-feed.

NOTE: Disconnect Air Supply Before Checking Hydraulic Oil!!

For the air lubricator, use a high quality air line lubricant (ISO 22) designed for automatic oilers. We recommend Scotchman's Air Line Lubricant.

<u>ITEM</u>	<u>PART #</u>	<u>DESCRIPTION</u>
1	075751	1 Gallon Synthetic Coolant
2	075752	5 Gallon Synthetic Coolant
3	075754	55 Gallon Synthetic Coolant
4	075756	1 Gallon Stainless Coolant
5	075757	5 Gallon Stainless Coolant
6	075753	1 Quart Air Line Lubricant
7	075759	1 Gallon Air Line Lubricant
8	075758	1 Gallon Gear Oil - Head

12.0 AUTO TRACK PARTS LIST

12.1 BEAMS & LEGS

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	4	045440	CARRIER BEAM SPLICE
2	1	048534	CARRIER BEAM 1
3	2	048535	CARRIER BEAM 2
4	5	048706	STAND WELDMENT
5	1	048708	AUTO LOADER STAND
6	1	048718	AL POST LEG
7	2	048722	AUTO LOADER TABLE SUPPORT
8	1	048743	AL POST LEG CLAMP
9	6	049255	1" CLAMP
10	16	114020	3/8" HARD WASHER
11	16	208012	M10 DIN 934 HEX NUT
12	16	221210	M10 X 25MM DIN912 SHCS
13	18	221215	M10 X 35MM DIN912 SHCS

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

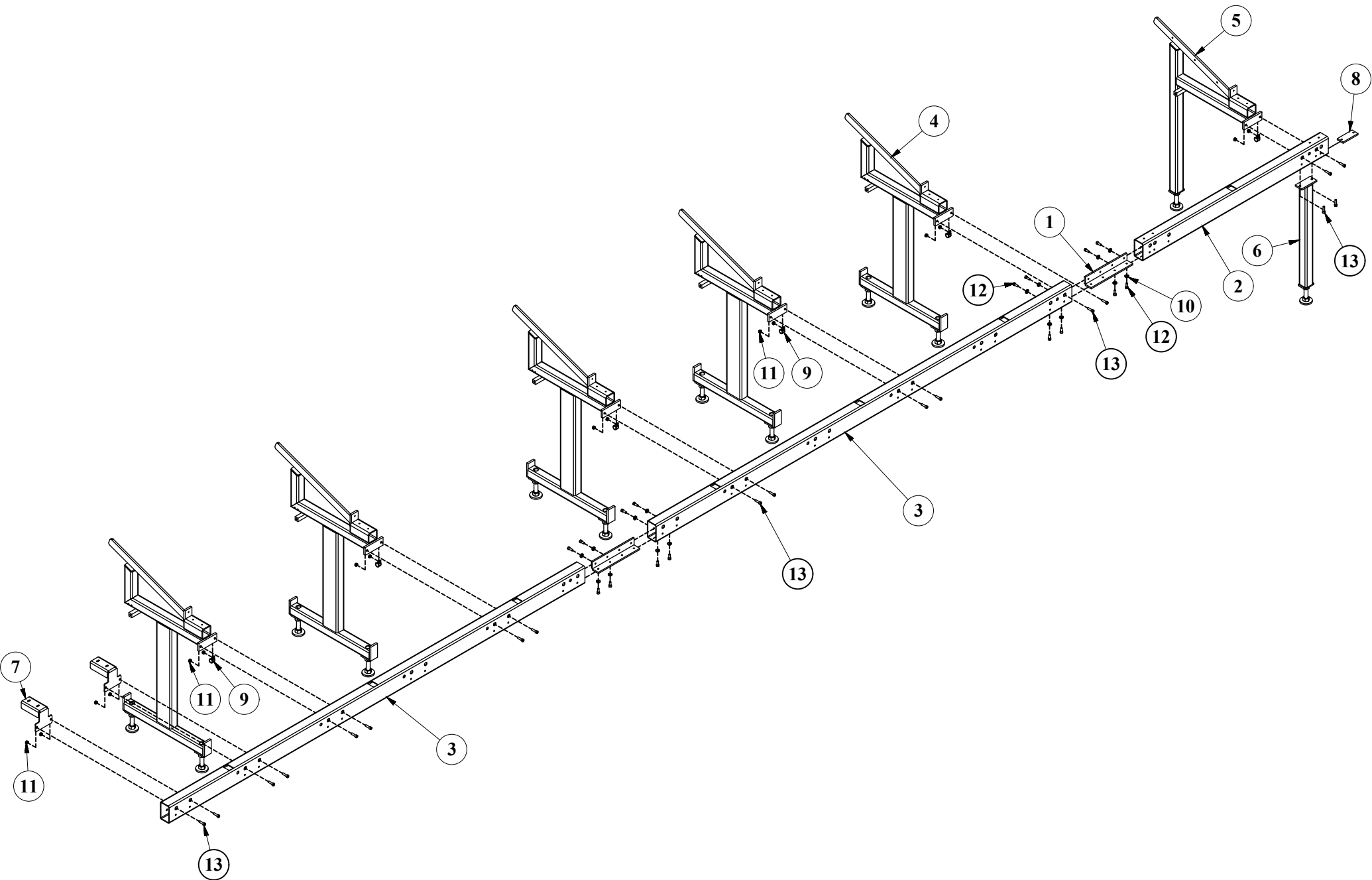


FIGURE 55
PAGE 119

12.2 NORMAL LEG

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	045407	CYLINDER
2	1	045374	CLEVIS ASSEMBLY
3	2	045384	LIFT ARM LOCK
4	1	045385	BEARING MOUNT
5	1	045402	P1M CLEVIS
6	1	048706	STAND WELDMENT
7	1	048707	AUTOLOADER LIFTING ARM
8	1	048710	NYLON BACKING PLATE
9	1	048712	AUTO LOAD ADJUSTABLE GUIDE ARM
10	1	049321	BEARING SCJT 1"
11	4	073331	M5 X 45MM DIN912 SHCS
12	6	073621	M6 X 30MM DIN 912 SHCS
13	3	073626	M10 X 20MM DIN912 SHCS
14	5	073755	1/4" YELLOW POLY TUBE
15	8	077746	1/4 NPT 90 169PL-4-4
16	2	077771	3/8-1/4 NPT RED.BUSHING
17	2	077777	3/8 NPT PLUG 106-0099
18	*	077874	1/4" BLUE POLY TUBE
19	2	078299	3 STATION MANIFOLD
20	2	079217	FOOT ASS'Y
21	1	114020	3/8" HARD WASHER
22	1	201215	M10 X 40MM DIN931 HHCS
23	2	208012	M10 DIN 934 HEX NUT
24	2	208024	M24 DIN934 HEX NUT
25	5	214012	M10 DIN125 REGULARWASHER
26	2	218023	M6 X 12MM DIN 916 SET SC
27	4	221210	M10 X 25MM DIN912 SHCS
28	3	221212	M10 X 30MM DIN912 SHCS
29	1	229500	M12 X 16 X 25 ISO7379 12.9 SB
30	1	230107	M8 X 16 DIN 7991-10.9 FSHCS
31	1	520090	SHIPPING CLIP
32	2	677728	1/4 NPT TO 1/4 HOSE FIT.

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

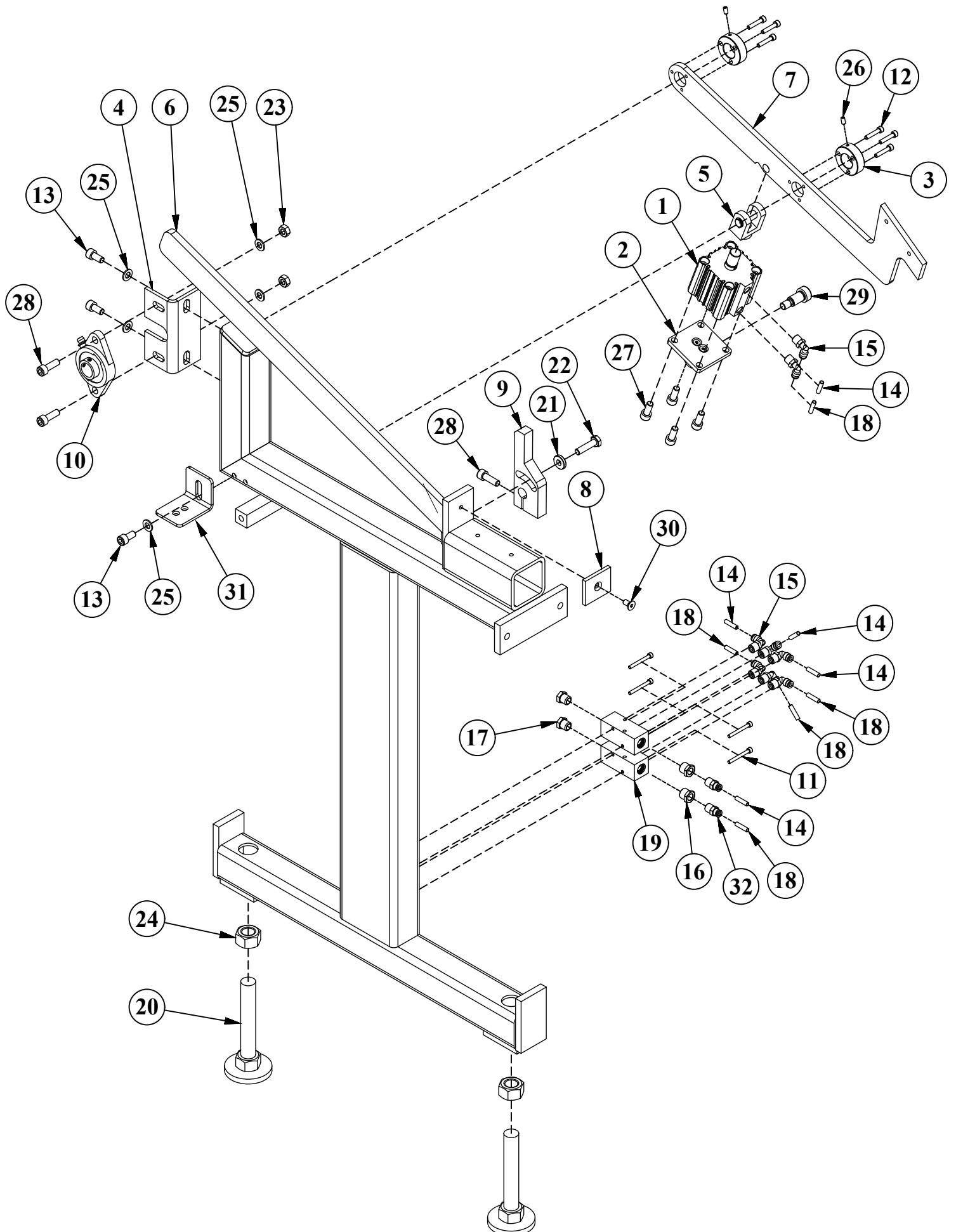


FIGURE 56

12.3 FLOAT LEG & POST

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	2	045038	UNION x 1/4"
2	1	045407	CYLINDER
3	1	045374	CLEVIS ASSEMBLY
4	2	045384	LIFT ARM LOCK
5	1	045385	BEARING MOUNT
6	1	045402	P1M CLEVIS
7	1	048555	CONNECTION BRACKET AL
8	1	048702	MATERIAL STOP AUTO TRACK
9	1	048707	AUTOLOADER LIFTING ARM
10	1	048708	AUTO LOADER STAND
11	1	048710	NYLON BACKING PLATE
12	1	048712	AUTO LOAD ADJUSTABLE GUIDE ARM
13	1	048718	AL POST LEG
14	1	048743	AL POST LEG CLAMP
15	1	049321	BEARING SCJT 1"
16	6	073621	M6 X 30MM DIN 912 SHCS
17	5	073626	M10 X 20MM DIN912 SHCS
18	*	073755	1/4" YELLOW POLY TUBE
19	2	077746	1/4 NPT 90 169PL-4-4
20	*	077874	1/4" BLUE POLY TUBE
21	2	079217	FOOT ASS'Y
22	3	114020	3/8" HARD WASHER
23	1	201215	M10 X 40MM DIN931 HHCS
24	2	208012	M10 DIN 934 HEX NUT
25	2	208024	M24 DIN934 HEX NUT
26	6	214012	M10 DIN125 REGULARWASHER
27	2	218023	M6 X 12MM DIN 916 SET SC
28	8	221210	M10 X 25MM DIN912 SHCS
29	3	221212	M10 X 30MM DIN912 SHCS
30	2	221215	M10 X 35MM DIN912 SHCS
31	1	229500	M12 X 16 X 25 ISO7379 12.9 SB
32	1	230107	M8 X 16 DIN 7991-10.9 FSHCS

* SOLD IN INCHES

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

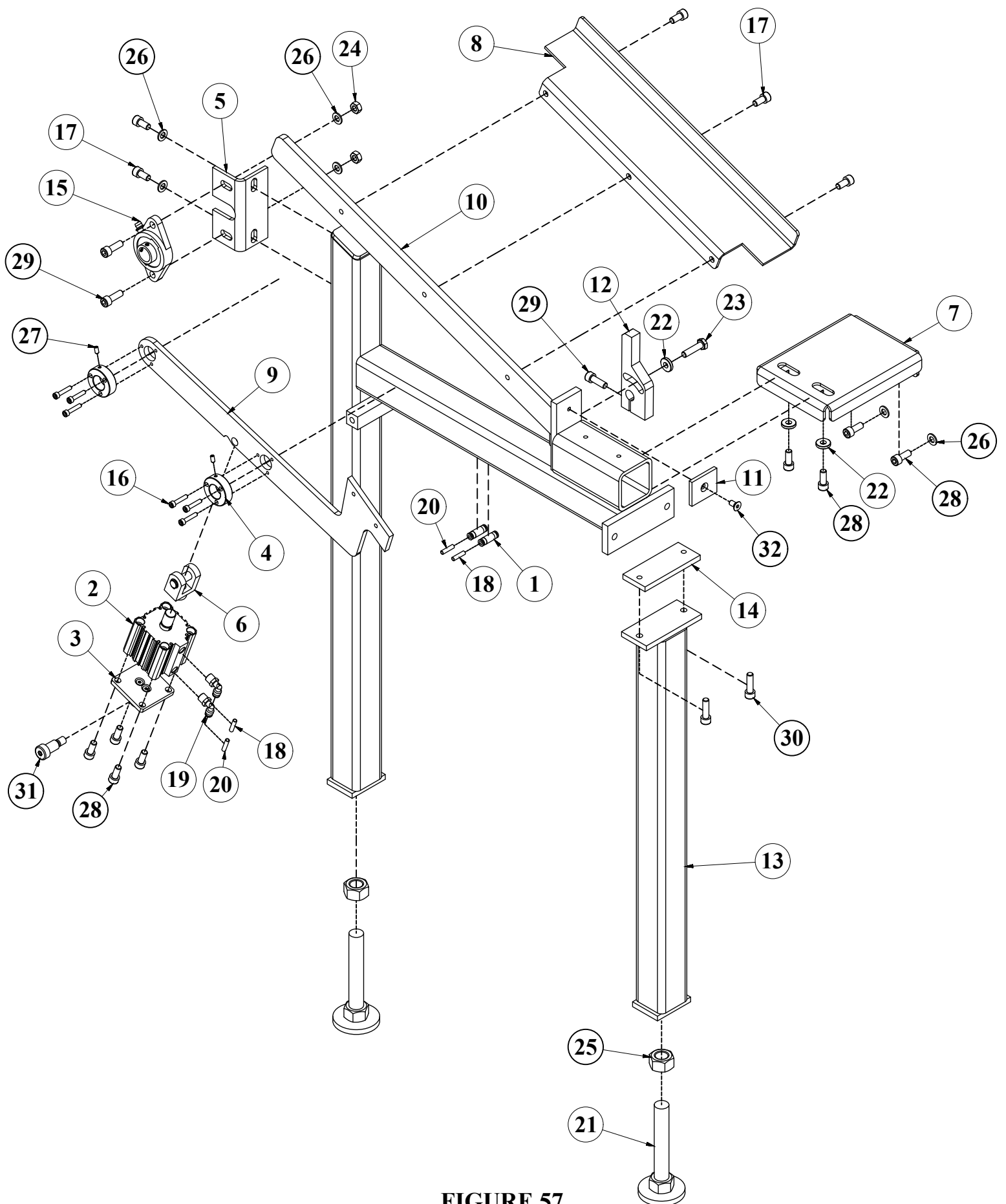


FIGURE 57

12.4 RODS & BEDS

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	2	045540	3/4 RD COUPLER
2	3	048533	GAUGE ROD AUTO BUNDLE LOADER
3	6	048701	LIFT CONNECTING ROD 12' AUTO LOADER
4	1	048726	AL STEEL BED 1
5	3	048727	AL STEEL BED 2
6	1	048728	AL STEEL BED 4
7	1	048730	AL STEEL BED 3
8	4	049300	1" COUPLER
9	12	220025	M8 X 16MM 7380-10.9 BHCS
10	4	220026	M8 X 12MM ISO 7380 BHCS

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

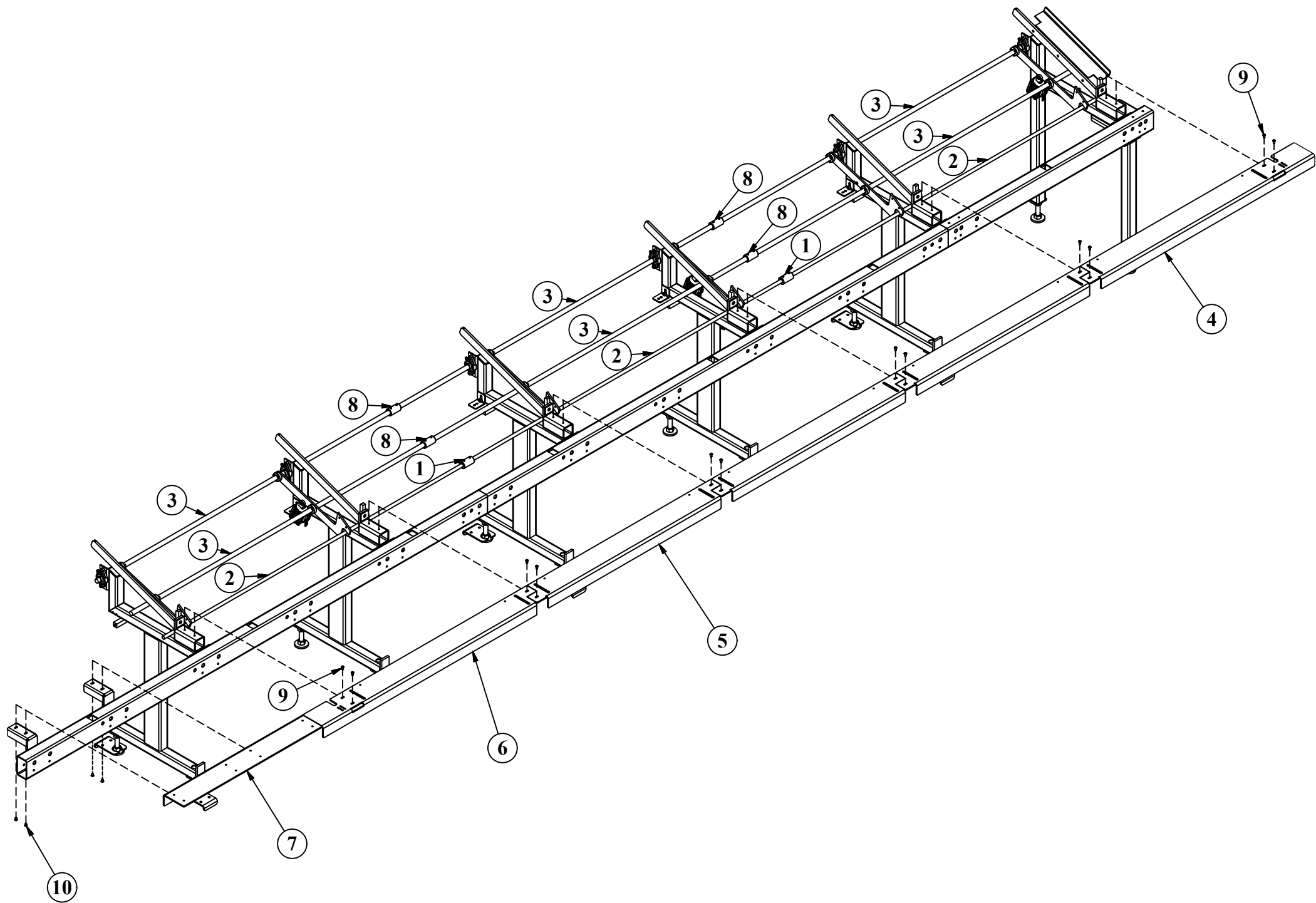


FIGURE 58

12.5 TABLES & GUIDES

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	6	026619	SMALL TEE NUT (M10)
2	6	048500	NYLON RAMP
3	*	048600	1" ACRYLIC FOAM
4	1	048731	AL NYLON TABLE
5	6	048732	AL NYLON TABLE 1
6	6	221222	M10 X 45MM DIN912 SHCS

*** SOLD IN INCHES**

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

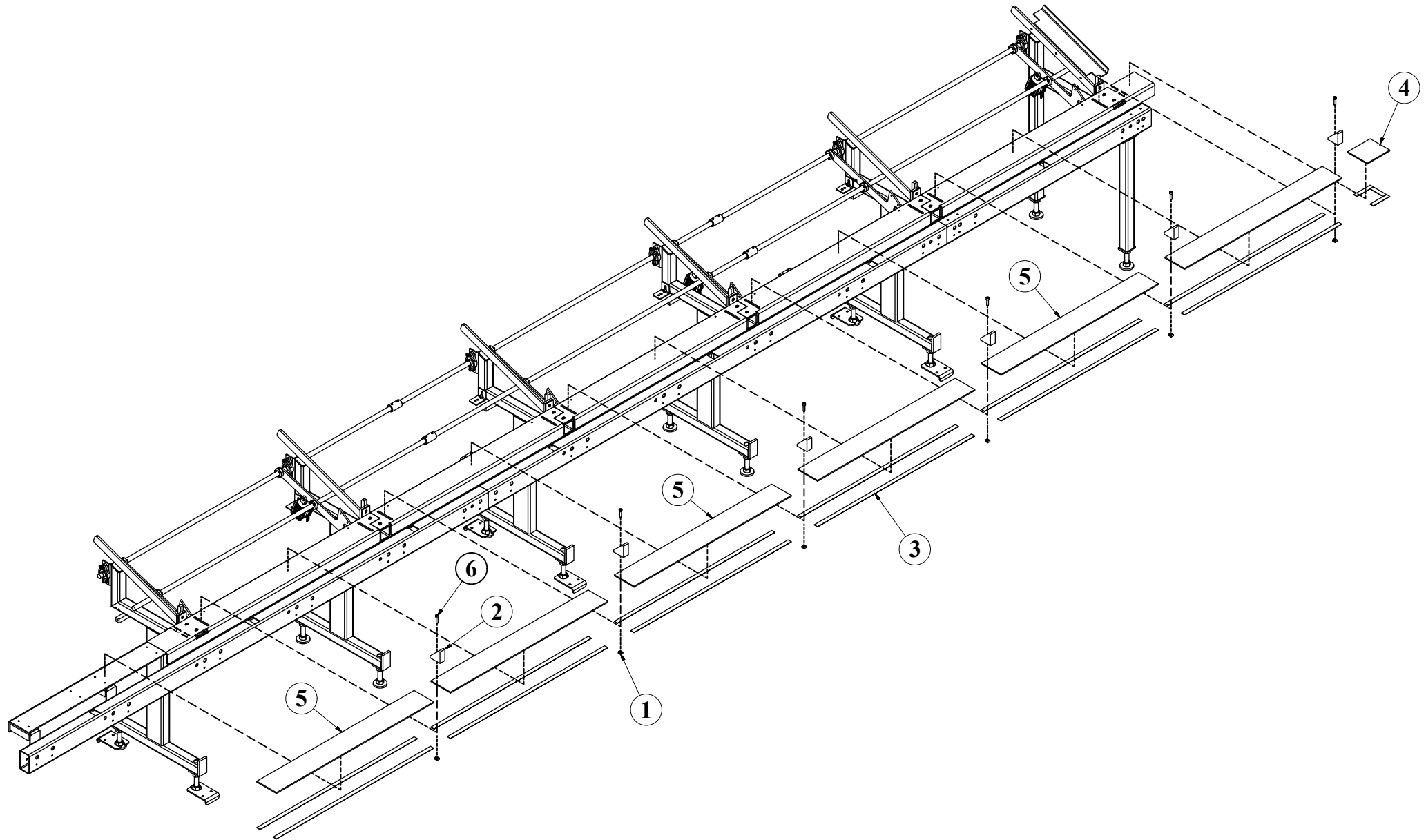


FIGURE 59

12.6 RAZORGAGE PANEL

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	4	048557	RG BOX CABLE CLAMP
2	*	048601	1" X 1" X 25' ADHESIVE FOAM TAPE
3	2	048736	RG ELECTRICAL BOX BRACKET
4	3	049255	1" CLAMP
5	1	049426	AUTO LOADER ENCLOSURE PAINTED
6	8	073095	M4 WASHER DIN 125
7	7	073626	M10 X 20MM DIN912 SHCS
8	7	208012	M10 DIN 934 HEX NUT
9	8	214012	M10 DIN125 REGULAR WASHER
10	8	215000	M4 DIN985 GREER NUT
11	8	221002	M4 X 12MM DIN912 SHCS
12	4	221210	M10 X 25MM DIN912 SHCS

*** SOLD IN INCHES**

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

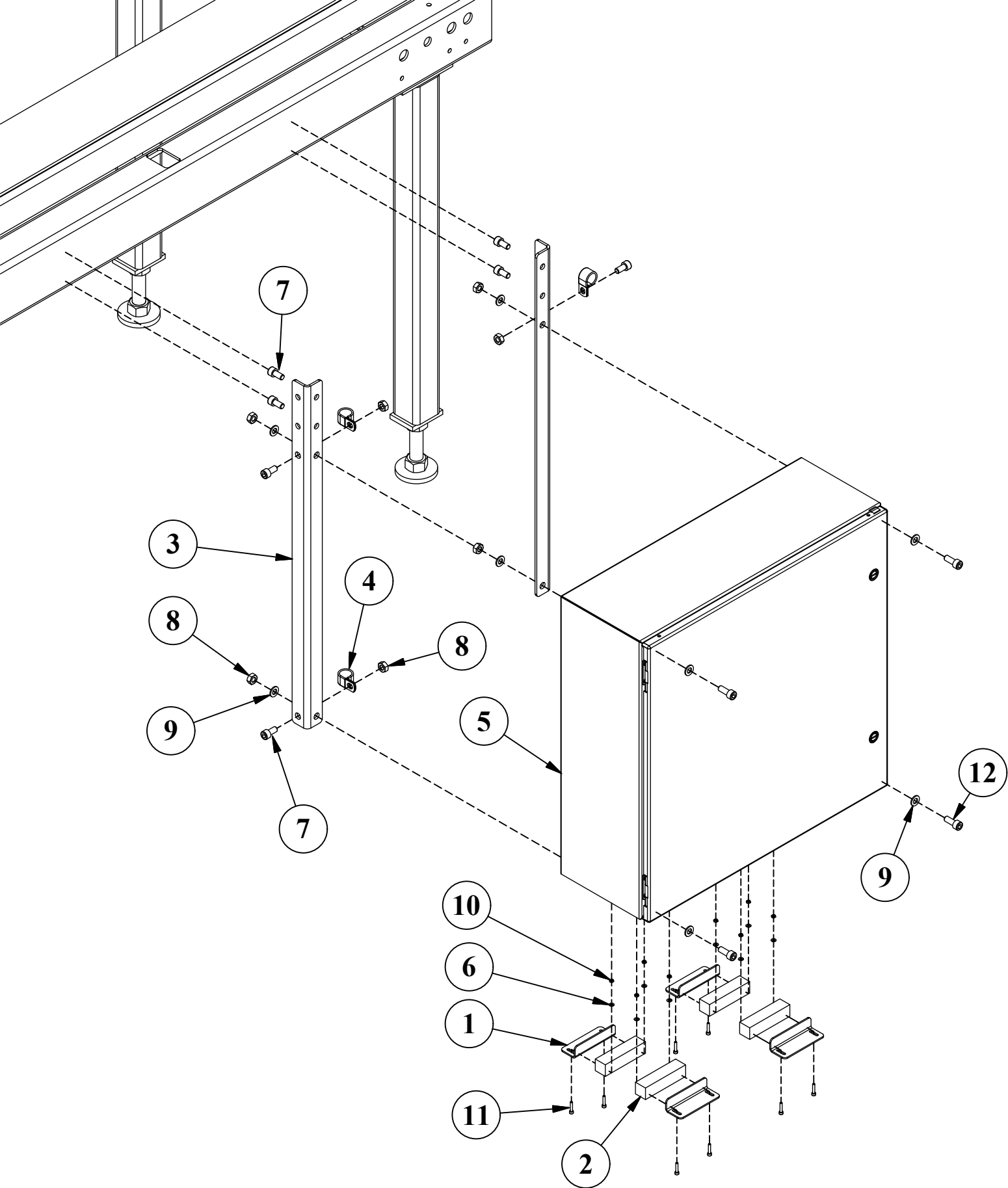


FIGURE 60

12.7 RAZORGAGE

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	4	028422	M8 DOUBLE TAB WELD NUT
2	1	048543	RG PUSHER PLATE
3	2	048556	RG HOLD-DOWN PAD
4	1	048721	AUTO LOADER PUSHER FOOT
5.1	1		RAZORGAGE TOUCHSCREEN MONITOR
5.2	4		5/16" X 2" CARRIAGE BOLT
5.3	4		5/16" FLANGE NUT
5.4	1		M DRIVE
5.5	2		VINYL COVER
5.6	1		STOP EXTRUSION
5.7	1		STOP PLASTIC CAP
6	3	120025	1/4" 20 X 3/4" BHSCS
7	4	214011	M8 DIN125 REGULAR WASHER
8	1	218008	M4 X 12MM SET SCREW DIN 916
9	4	221115	M8 X 20MM DIN912 SHCS

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

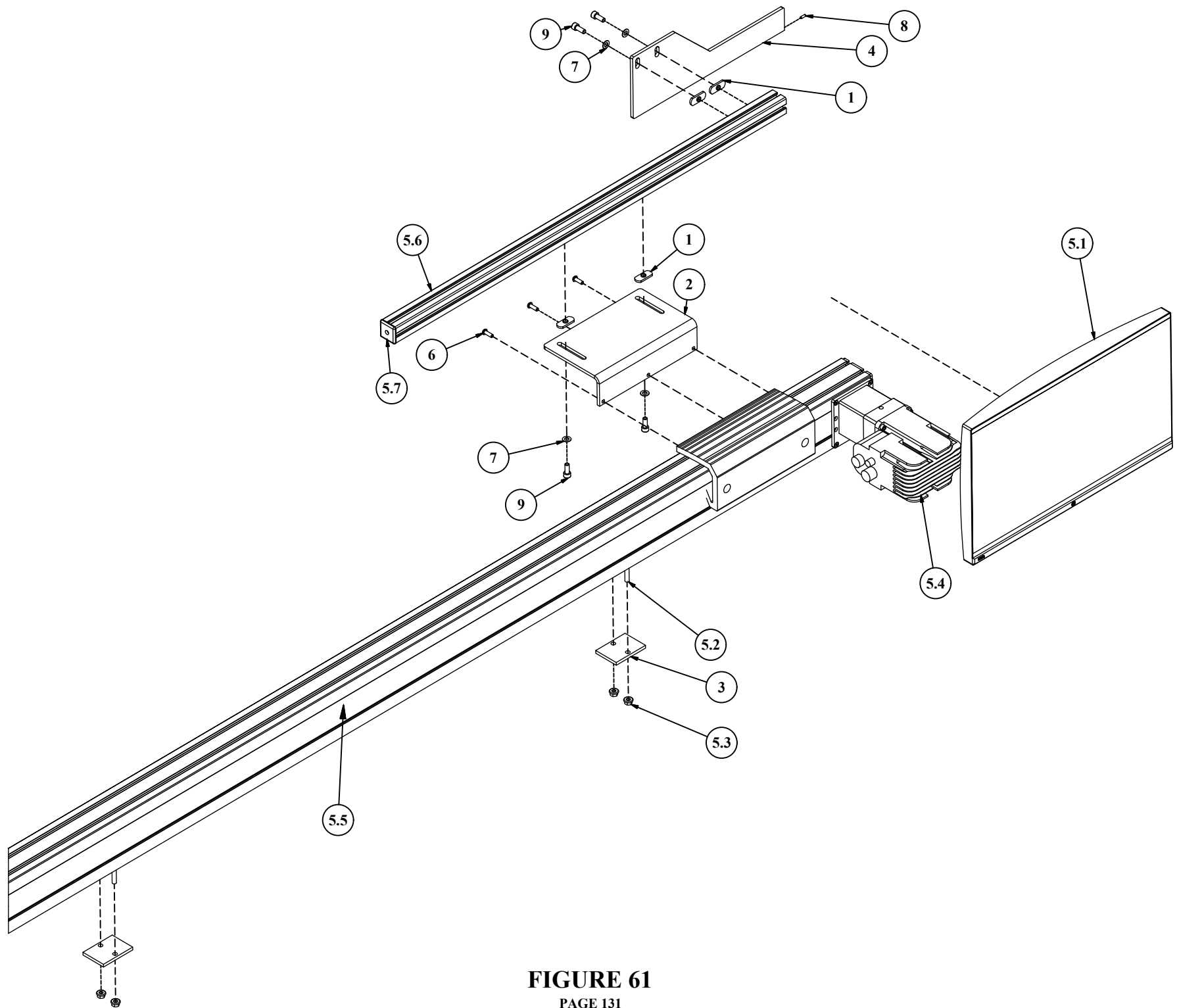


FIGURE 61

12.8 HOLD-DOWN & SENSOR

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	048502	HOLD-DOWN ROLLER MOUNT
2	1	048729	AUTO ST SENSOR BRACKET
3	1	048739	HOLD-DOWN ROLLER
4	1	048740	HOLD-DOWN ROLLER ROD
5	1	048741	BRACKET WELDMENT
6	1	049705	CAPACITIVE SENSOR AUTO LOADER
7	2	073420	M8 X 16 DIN912 SHCS
8	2	073626	M10 X 20MM DIN912 SHCS
9	1	203415	M12 X 35MM DIN933 HHCS
10	2	220020	M6 X 16MM ISO 7380 BHCS
11	1	221210	M10 X 25MM DIN912 SHCS

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

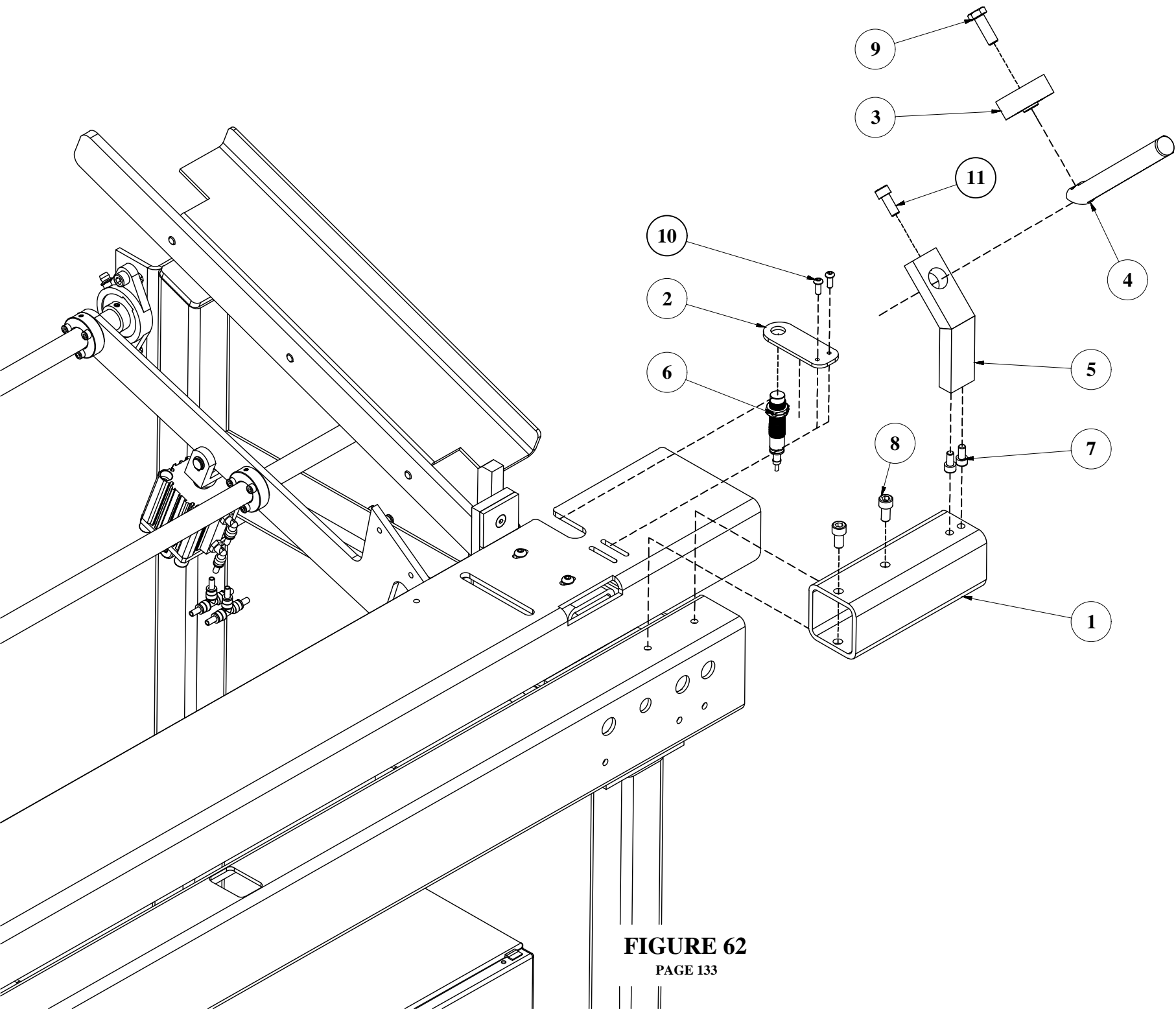


FIGURE 62

12.9 ARMS

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	045085	BEAM SUPPORT
2	1	045126	MATERIAL GUIDE
3	1	048704	AUTO TRACK MATERIAL GUIDE ARM
4	1	048713	AUTO TRACK GUIDE ARM
5	1	080061	STROKE ADJUSTMENT HANDLE
6	2	114020	3/8" HARD WASHER
7	1	214012	M10 DIN125 REGULAR WASHER
8	2	221210	M10 X 25MM DIN912 SHCS
9	2	221222	M10 x 45MM DIN912 SHCS
10	2	230415	M12 X 35 DIN 7991-10 FSHCS

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

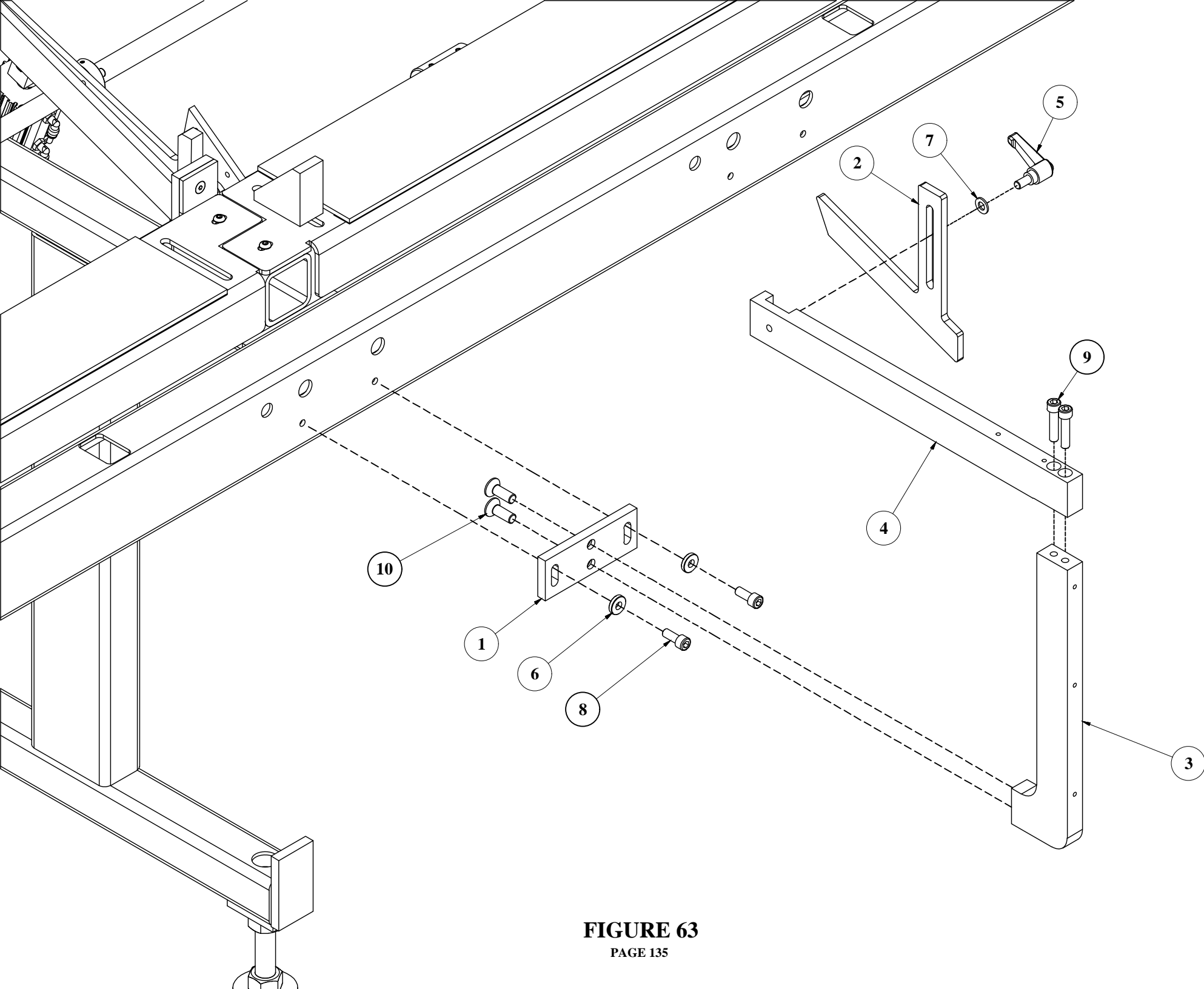


FIGURE 63
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12.10 FIRST ARM & MONITOR

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	045085	BEAM SUPPORT
2	1	045126	MATERIAL GUIDE
3	1	048602	SB VERTICAL ARM
4	1	048603	SB HORIZONTAL ARM
5	1	048605	AL MONITOR BRACKET WELD
6	2	073420	M8 X 16 DIN912 SHCS
7	1	080061	STROKE ADJUSTMENT HANDLE
8	2	114020	3/8" HARD WASHER
9	4	208010	M8 HEX NUT DIN934
10	1	214012	M10 DIN125 REGULAR WASHER
11	4	221115	M8 X 20MM DIN912 SHCS
12	2	221210	M10 X 25MM DIN912 SHCS
13	2	221222	M10 x 45MM DIN912 SHCS
14	2	230415	M12 X 35 DIN 7991-10 FSHCS

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

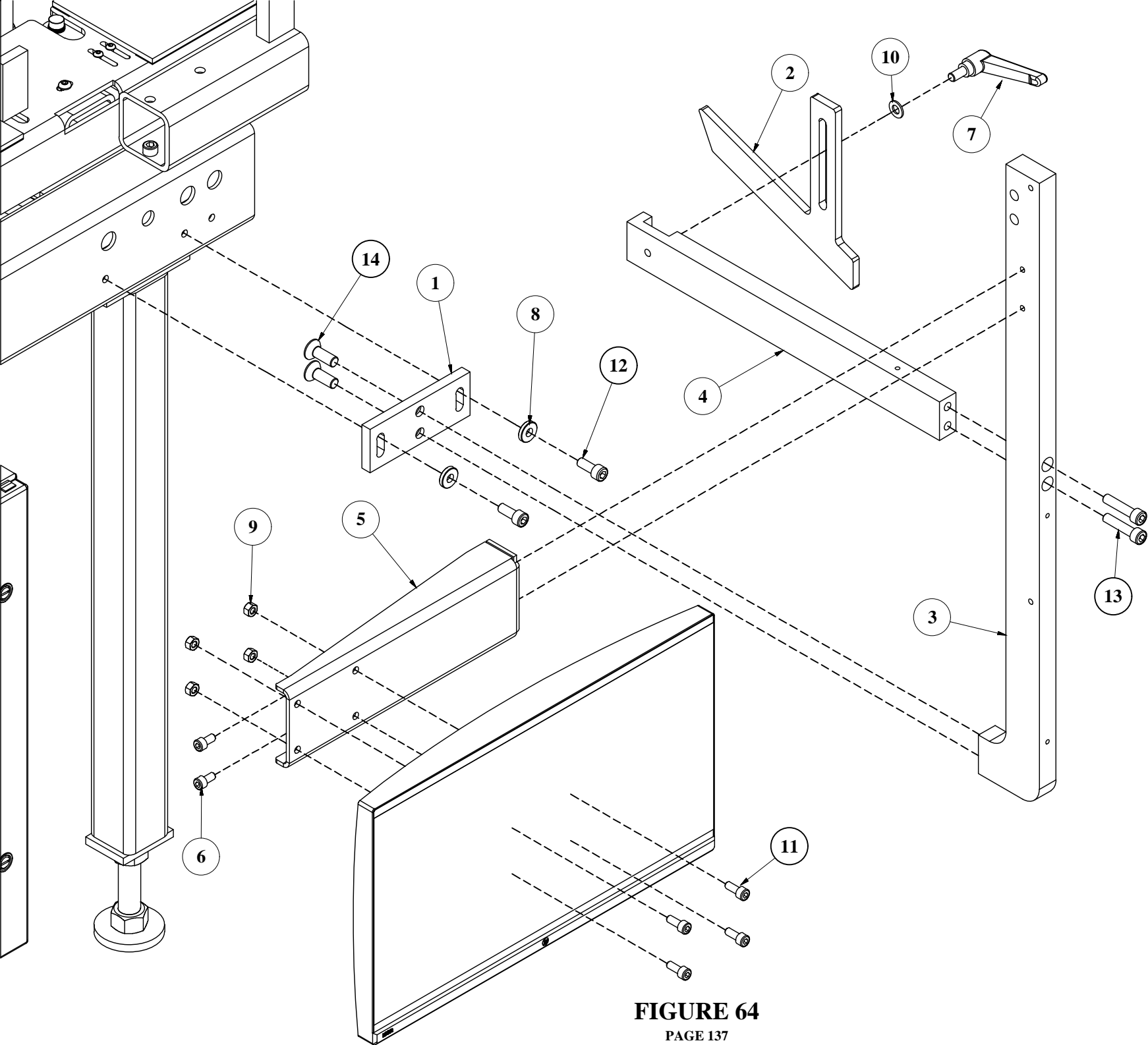


FIGURE 64

12.11 SAFETY BARRIER

P A R T S L I S T							
ITEM	QTY	PART #	DESCRIPTION	ITEM	QTY	PART #	DESCRIPTION
1	1	016401	.61 ID SNAP RING	11	2	158202	5/16 SINGLE STUD BUMPER
2	1	046018	HANDLE MT/105	12	1	204000R452	SWIVEL JOINT--REF# 4505
3	1	048604	SAFETY BARRIER PIVOT	13	1	20400TB452	BALL STUD REF# 4506
4	1	048606	SAFETY BARRIER FRAME ASSY. LH	14	1	20500M6452	M6 EYE REF #8931
4A	1	048607	SAFETY BARRIER FRAME ASSY. RH	15	1	2160000300	M8X20 ØEXT 25 CYL REF# 684
5	1	048610	AUTO LOADER SAFETY BARRIER WINDOW	16	4	220014	M6 X 10MM DIN BN19 BHCS
6	1	048611	SAFETY BARRIER INTERLOCK BRACKET	17	7	220016	M6 X 10MM DIN WN11252 BF
7	1	048612	SAFETY BARRIER INTERLOCK ACTUATOR	18	2	220020	M6 X 16MM ISO 7380 BHCS
8	1	048613	5/8" X 3/4" X 1" BUSHING	19	2	221317	M12 X 45MM DIN912 SHCS
9	2	073450	M4 X 16MM DIN912 SHCS	20	1	229505	1/4 X 5/16 X 3/4 SB SHORT THREAD
10	1	077004	TURCK CONNECTOR	21	1	562110	LIMIT SWITCH

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

→ LH VERSION & RH VERSION ←
Parts for Safety Barrier are all the same
except for 4 & 4A - Safety Barrier Frame Assys.

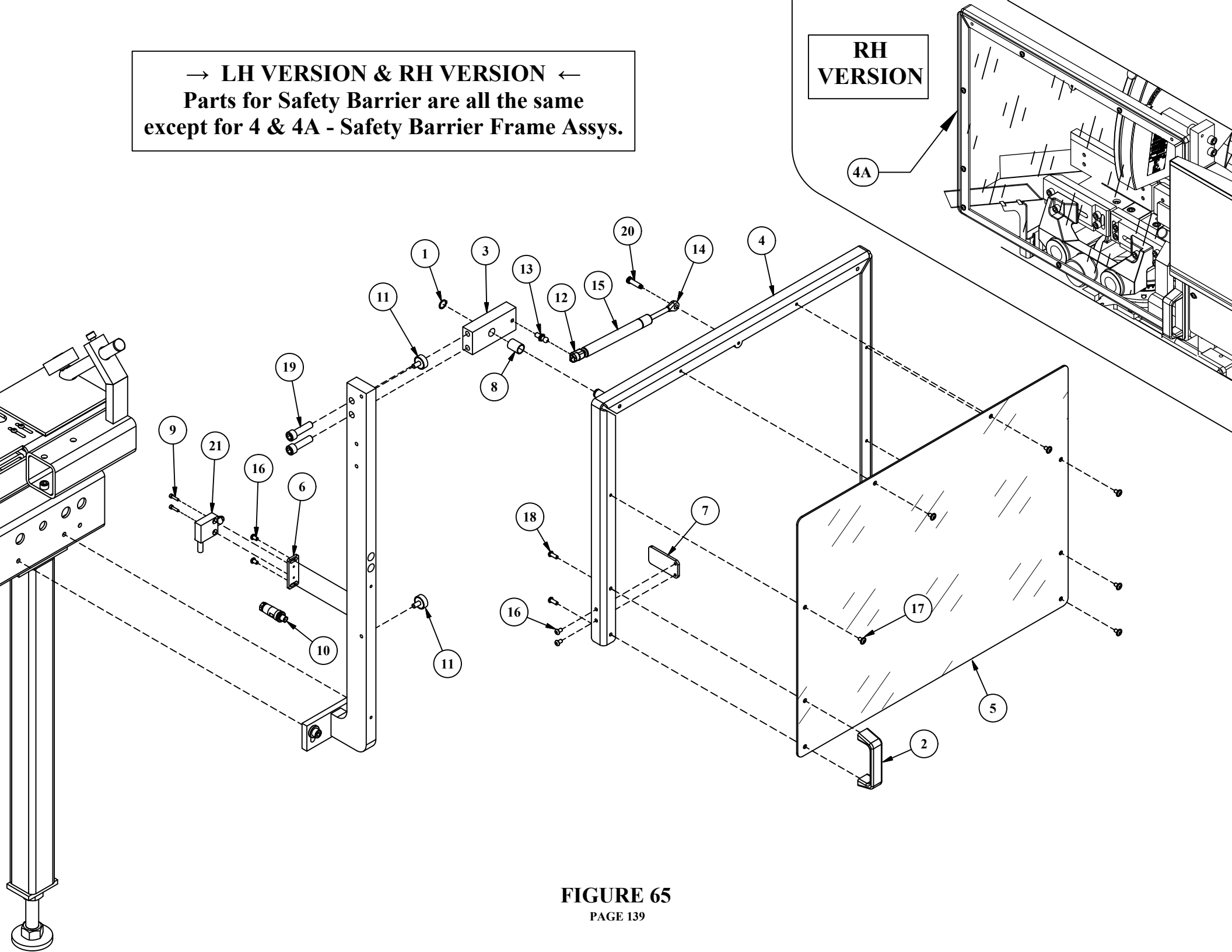


FIGURE 65

12.12 COVERS & DECALS

PARTS LIST			
ITEM	QTY	PART #	DESCRIPTION
1	1	003122	DANGER VOLTAGE STICKER (12-13)
2	1	010115	15" SCOTCHMAN DECAL
3	1	019100	U.S. DATA PLATE
4	1	019127	US FLAG DECAL
5	1	048529	LEFT HAND MOTOR COVER
5A	1	048554	RIGHT HAND MOTOR COVER
6	5	048530	COVER 2
7	1	093001	110V STICKER
8	31	220016	M6 X 10MM DIN WN11252 BF

NOTE: PARTS LIST QUANTITIES ARE REPRESENTATIVE OF THIS SHEET ONLY.

NOTE: The LH & RH Motor Covers (5 & 5A) are different. The Electrical Enclosure is the same for both and is mounted on opposite sides of the Auto Track.

RH Version

Motor Cover (5A) is different than LH version. Electrical Enclosure is mounted on the opposite side.

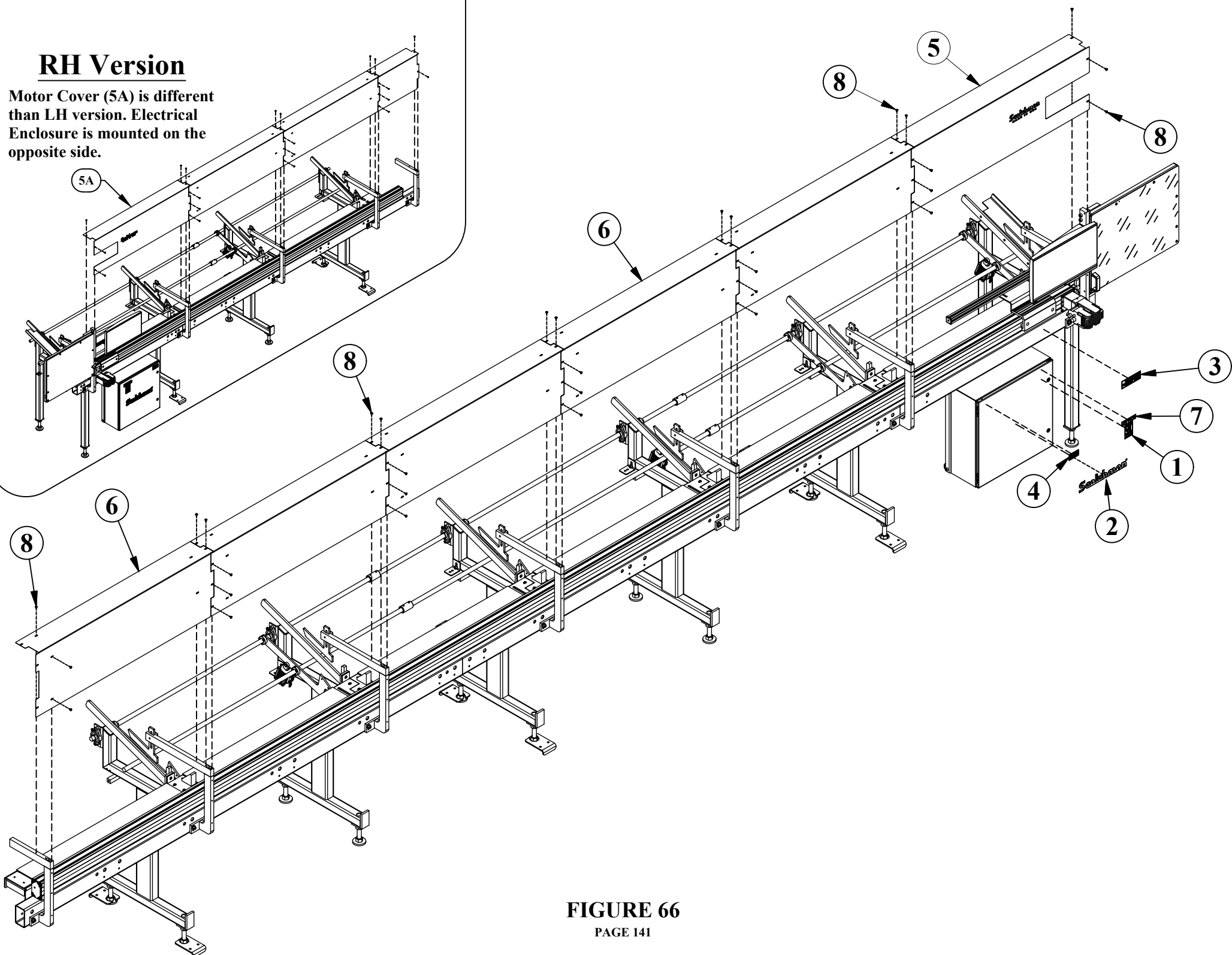


FIGURE 66

S/N B116450120 & AFTER

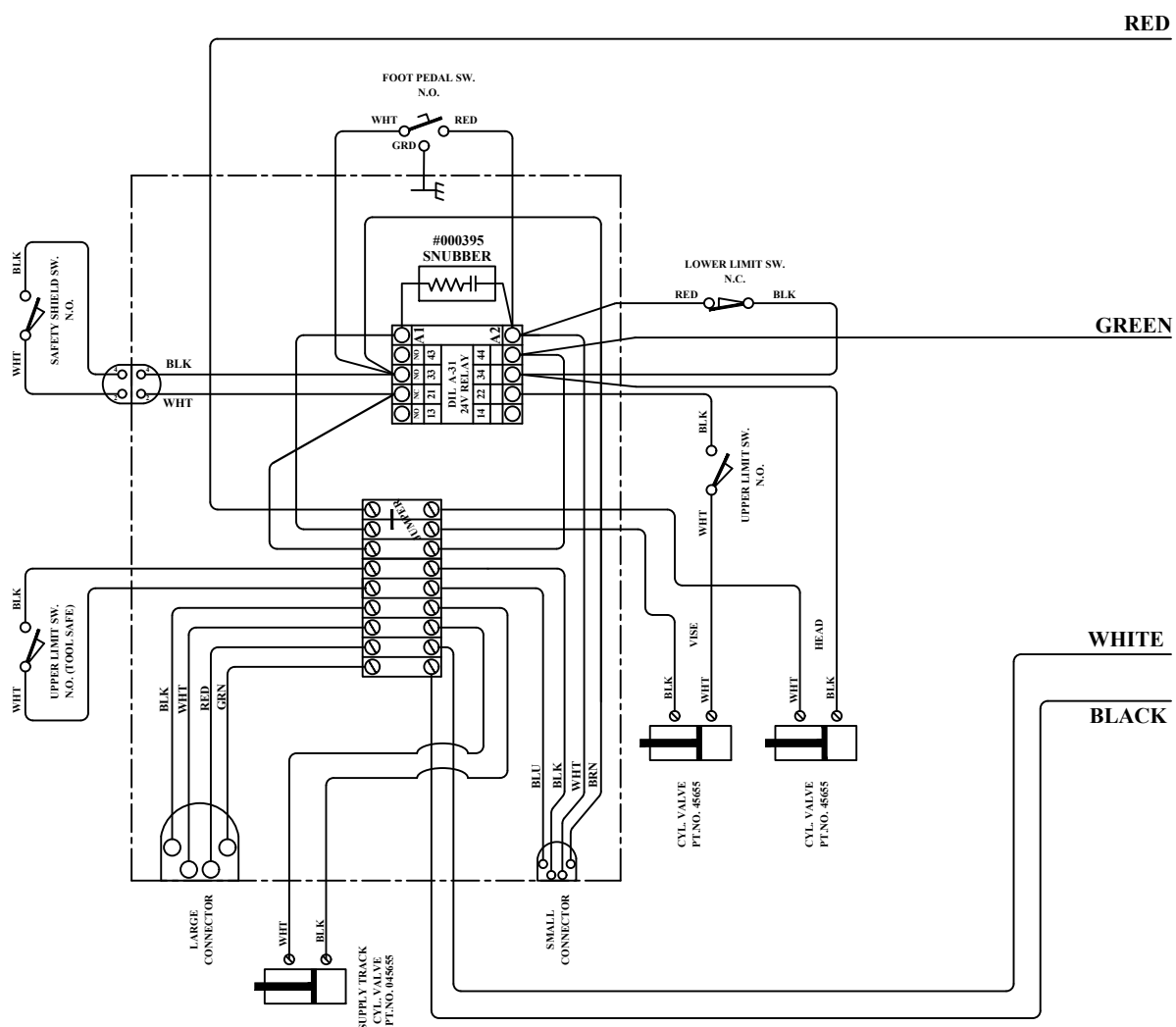
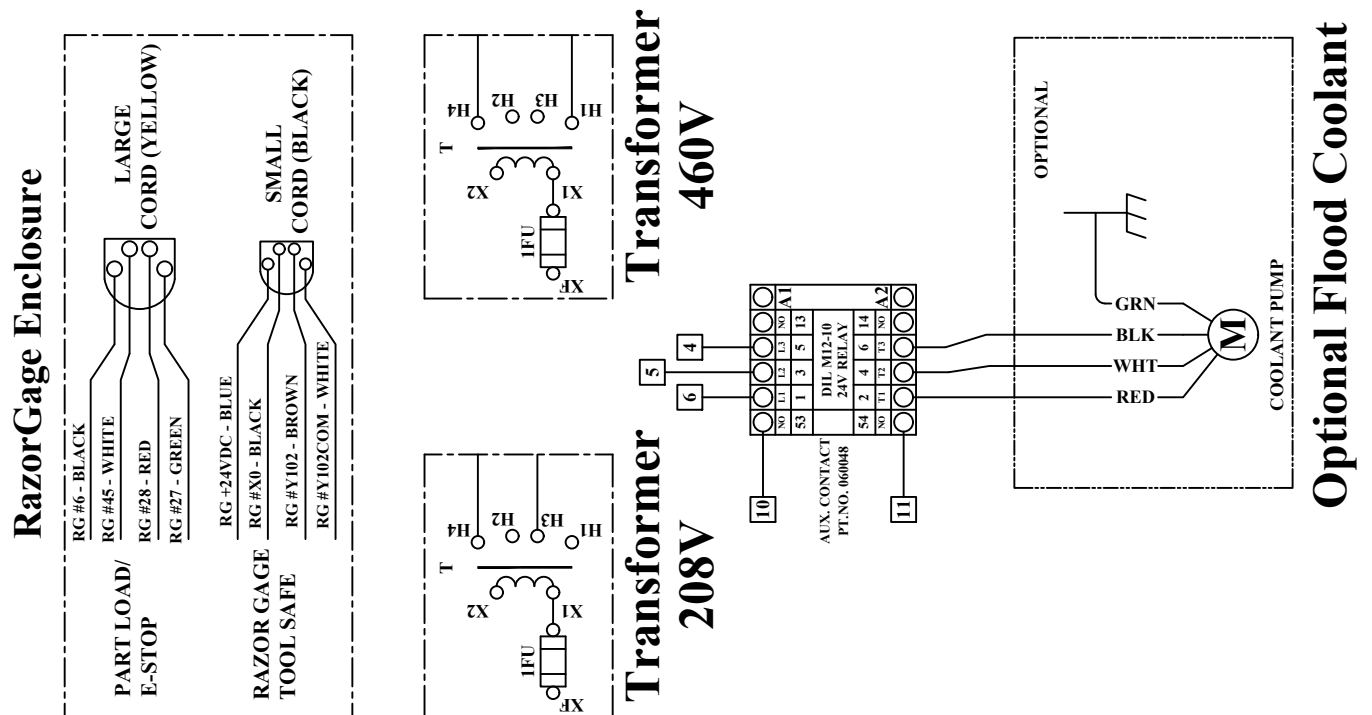
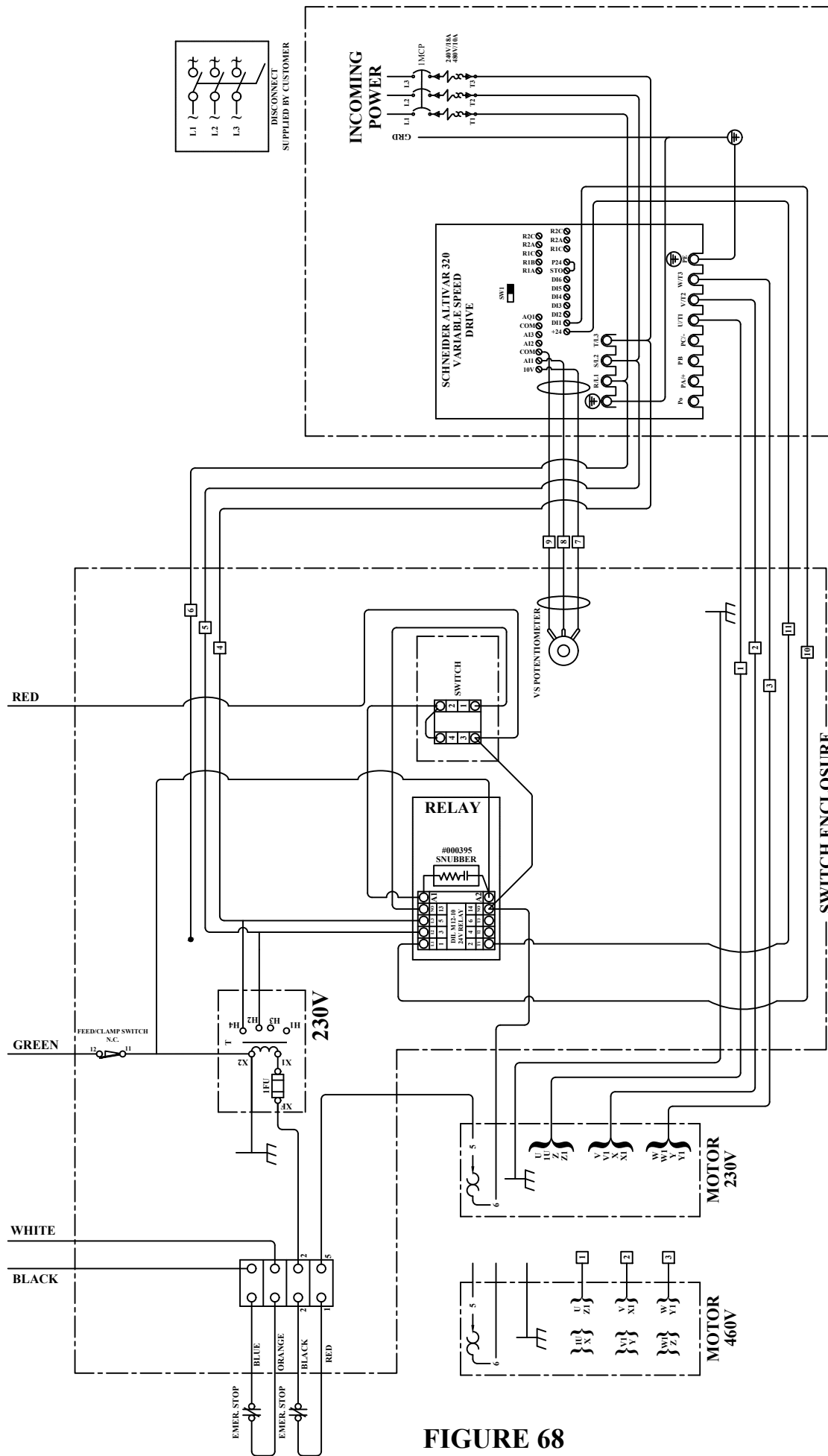


FIGURE 67

SEE NEXT PAGE

SEE PREVIOUS PAGE



CPO 350 AUTO LOADER VS-PK-PD 5HP 208V/230V/460V 3 Phase

FIGURE 68
PAGE 143

14.0 RAZORGAGE WIRING DIAGRAMS (1/9)

S/N B119080421 & AFTER

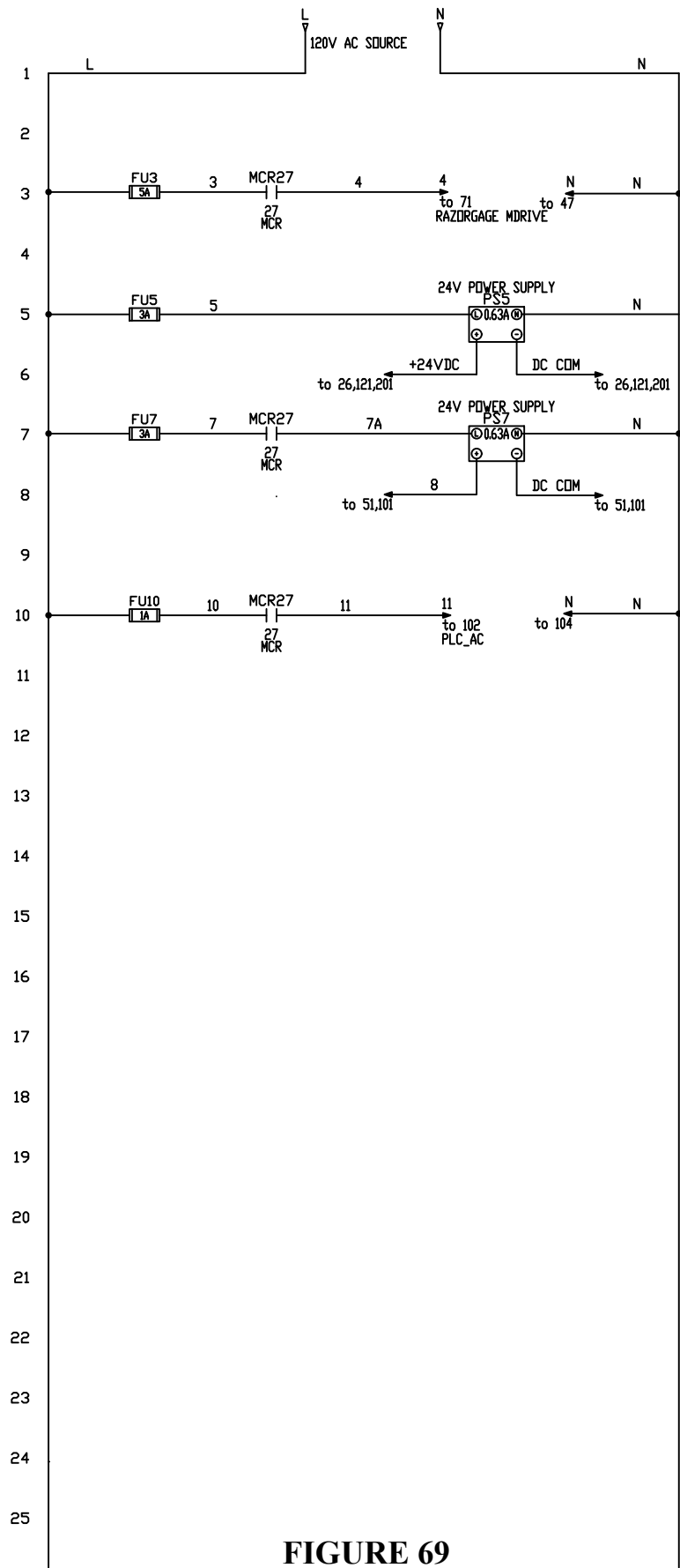


FIGURE 69

RAZORGAGE WIRING DIAGRAMS

(2/9)

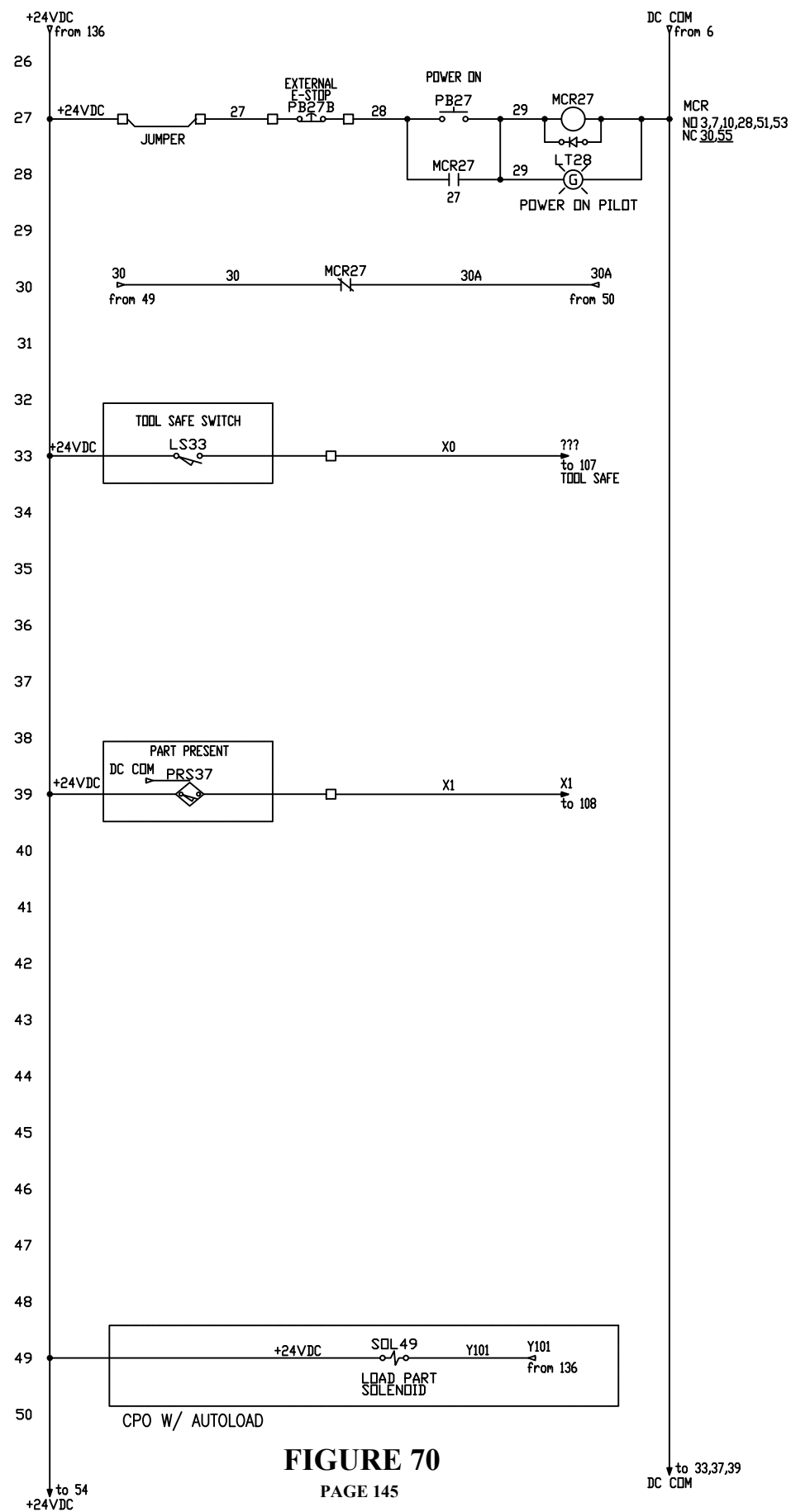


FIGURE 70

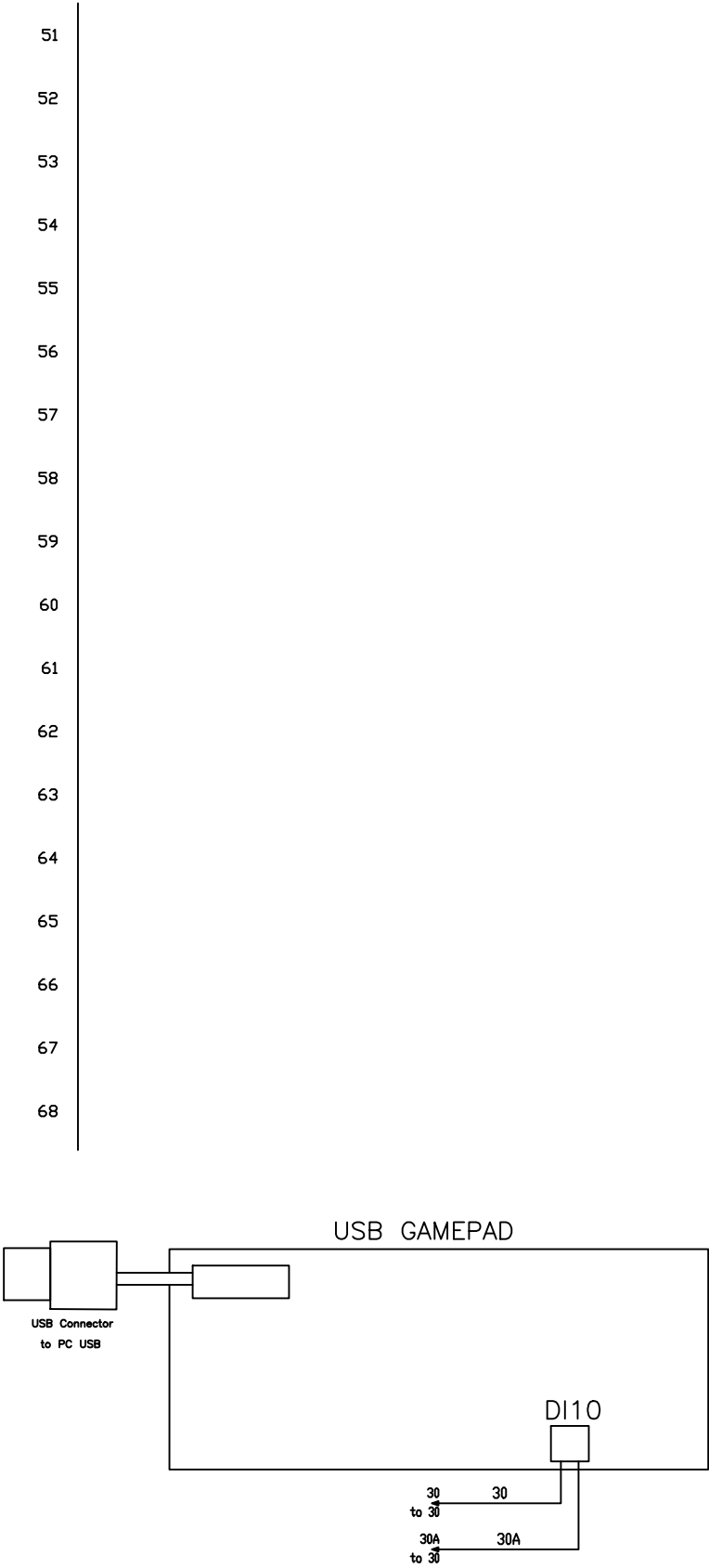


FIGURE 71
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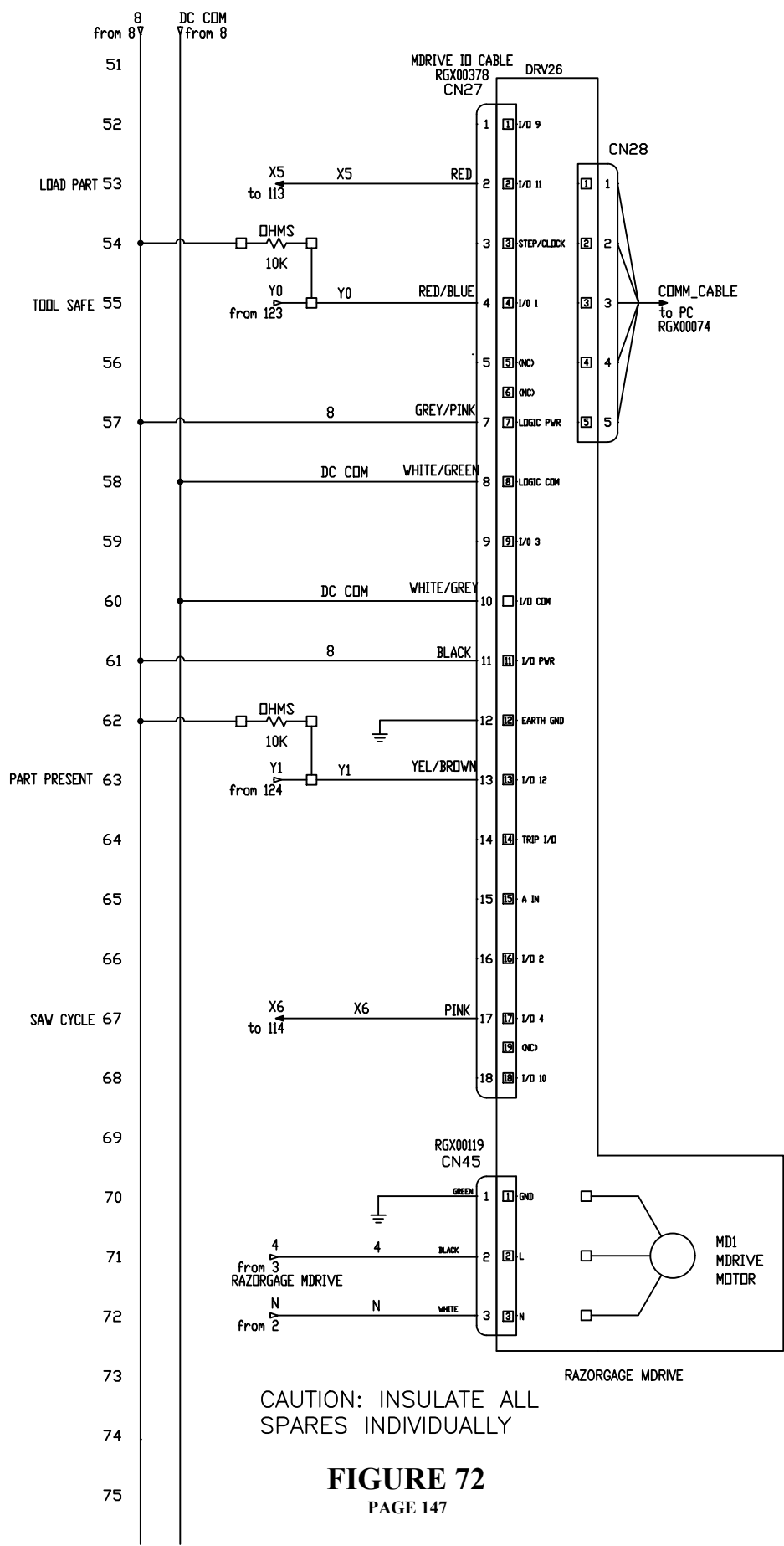


FIGURE 72
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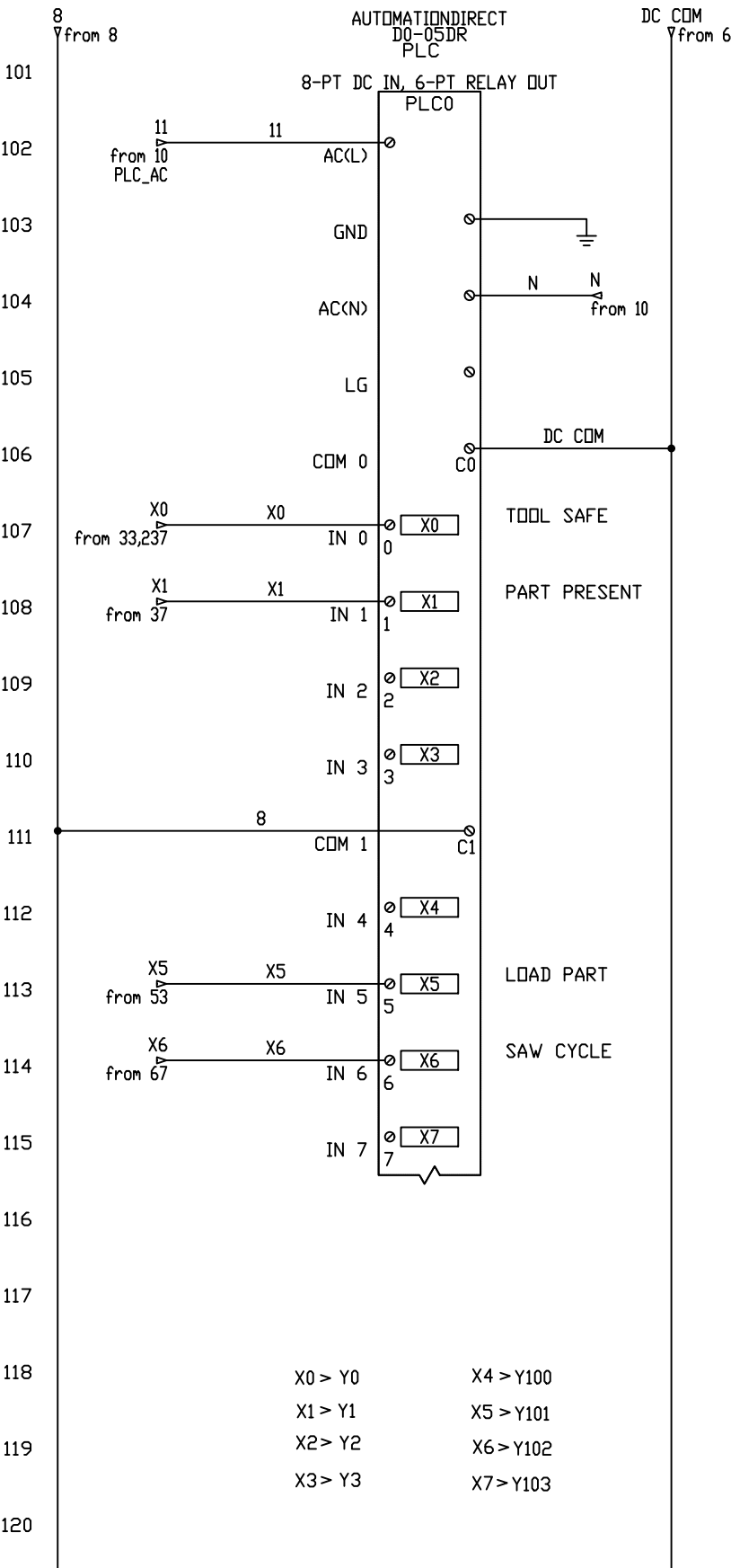


FIGURE 73

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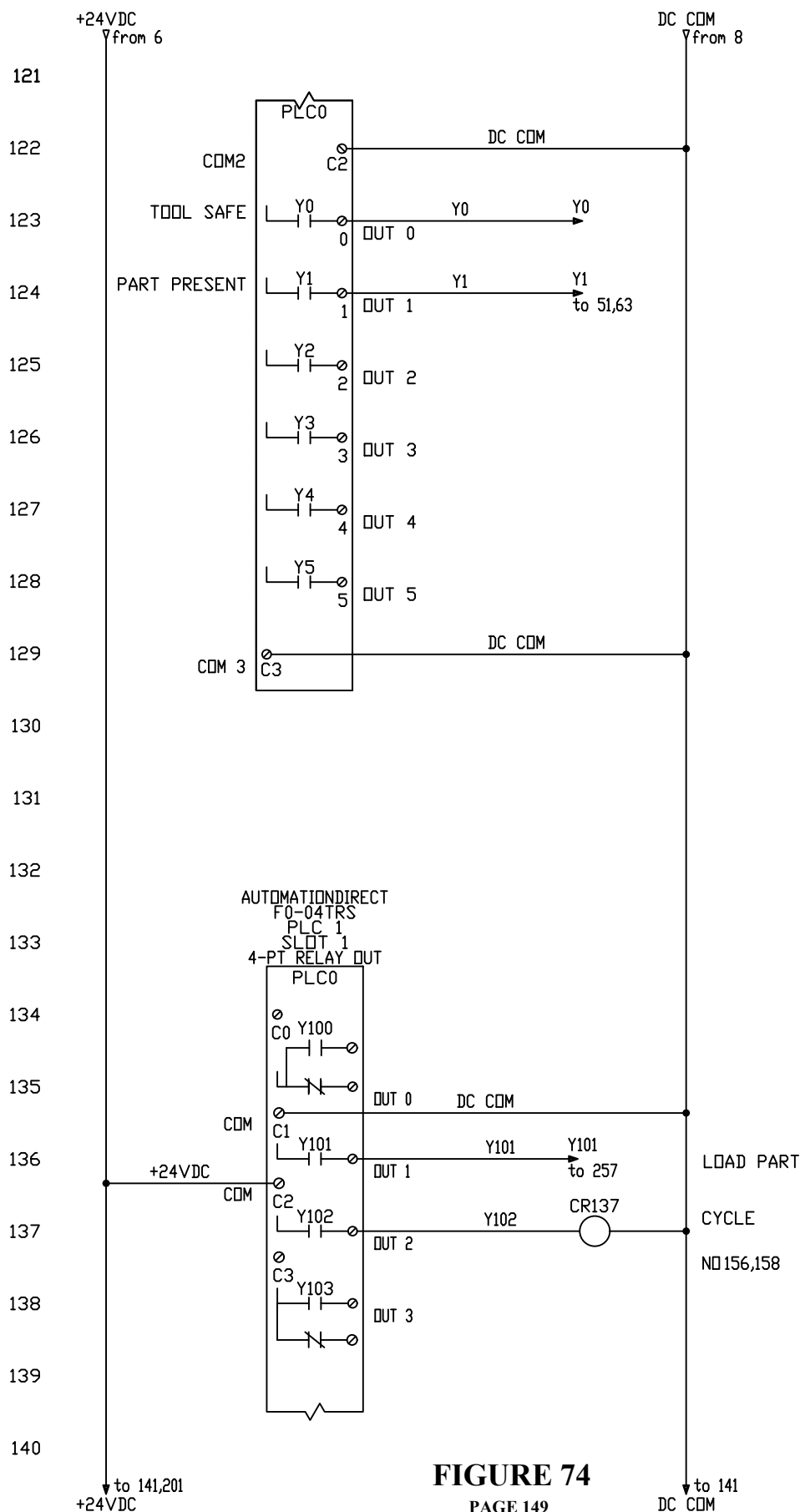


FIGURE 74
 PAGE 149

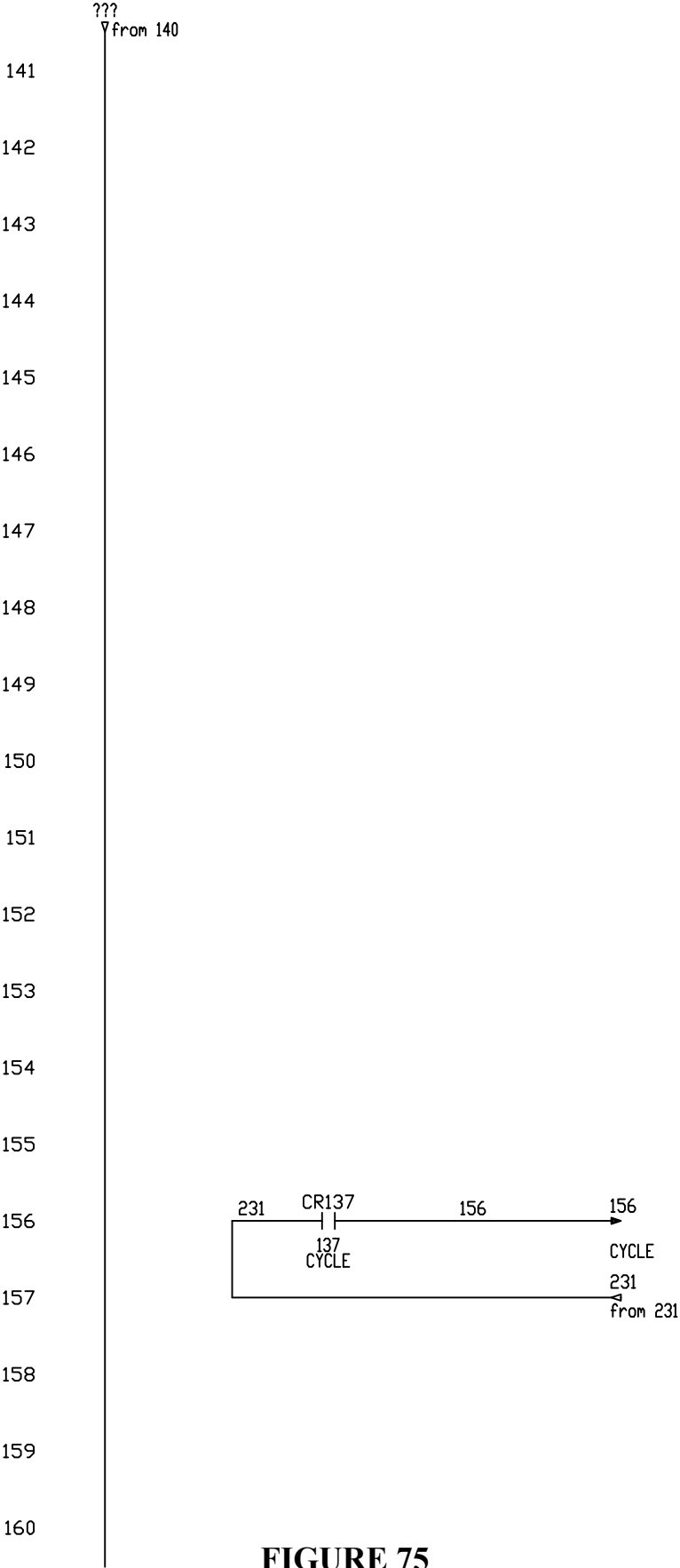


FIGURE 75
PAGE 150

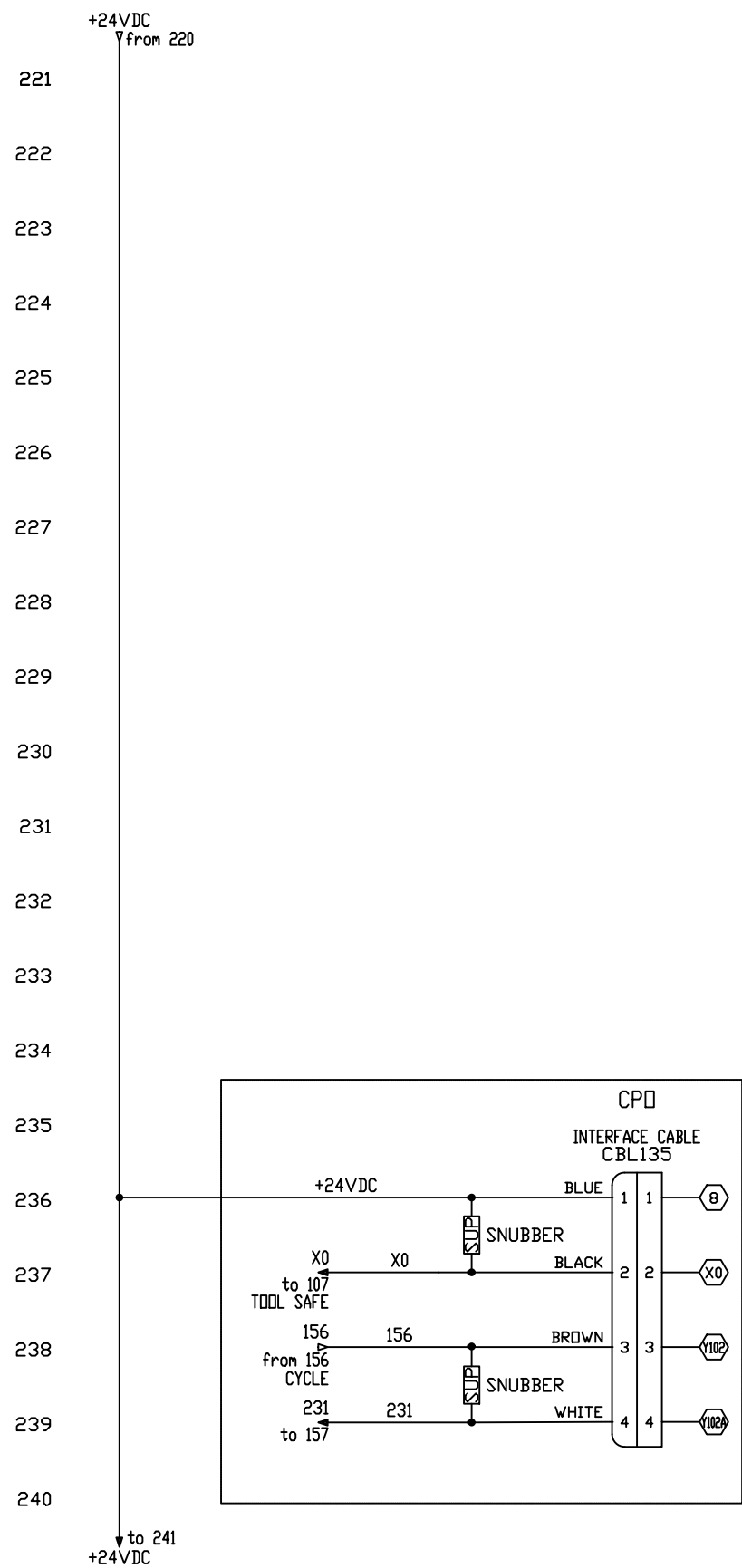


FIGURE 76
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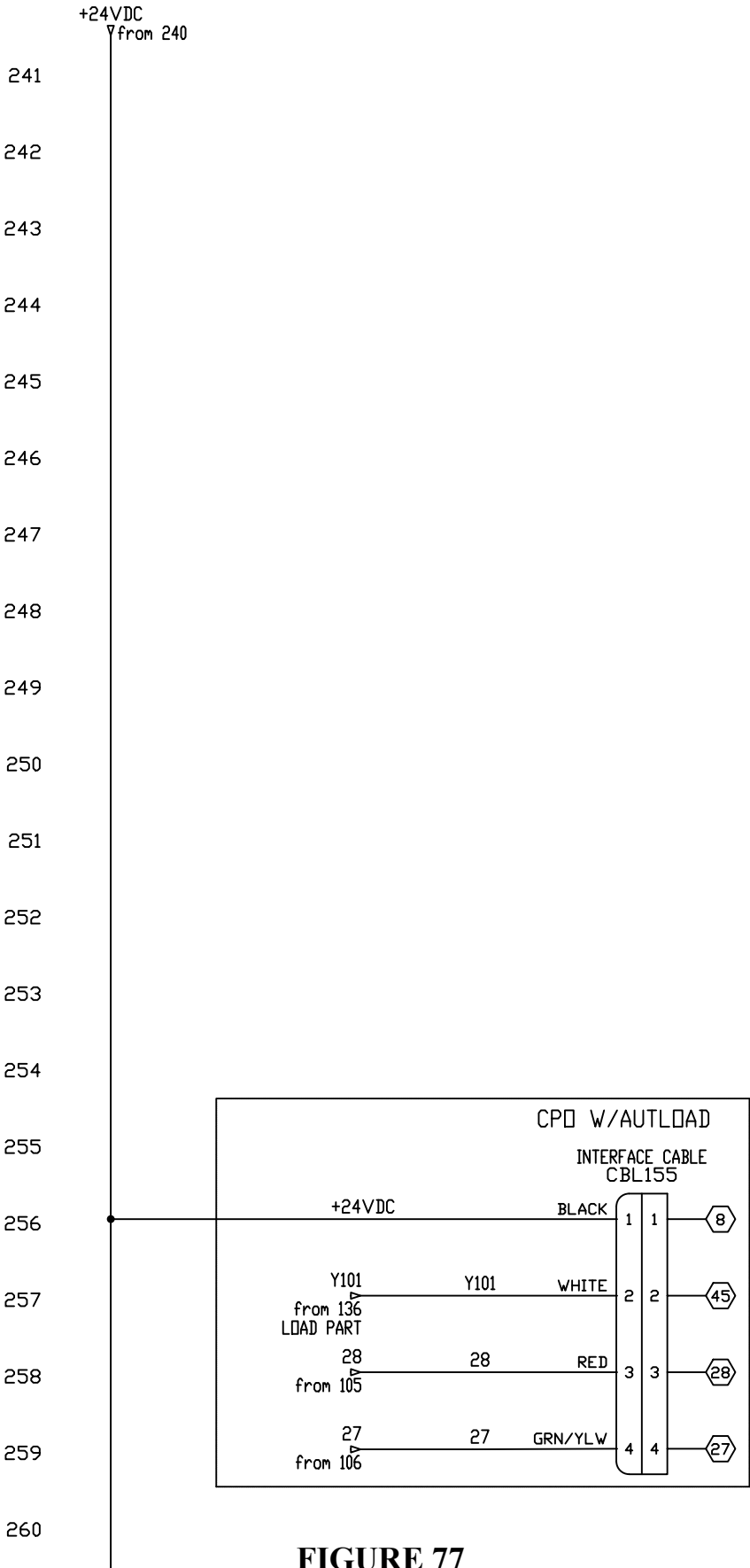


FIGURE 77

15.0 PNEUMATIC DIAGRAMS

CPO-350 AUTOLOADER

LEGEND

LINE, WORKING MAIN

LINE, PILOT

COMPONENT ENCLOSURE

- 1) SLIDE VALVE
- 2) FILTER REGULATOR LUBRICATOR (FRL)
- 3) EXHAUST MUFFLER
- 4) BASE MANIFOLD
- 5) 4-WAY, 2-POS, 24VAC SOLENOID VALVE
- 6) 4-WAY, 2-POS, 24VDC SOLENOID VALVE
- 7) PLUG
- 8) PK CYLINDER
- 9) MISTER IN-LINE REGULATOR
- 10) MISTER UNIT
- 11) MIST CHECK VALVE
- 12) MIST LUBRICANT RESERVOIR
- 13) INLINE PARTICULATE FILTER
- 14) AIR/HYD RESERVOIR
- 15) CHECK VALVE
- 16) FEED RATE FLOW CONTROL VALVE
- 17) PD AIR/HYD CYLINDER
- 18) UNION
- 19) MATERIAL LIFT CYLINDER

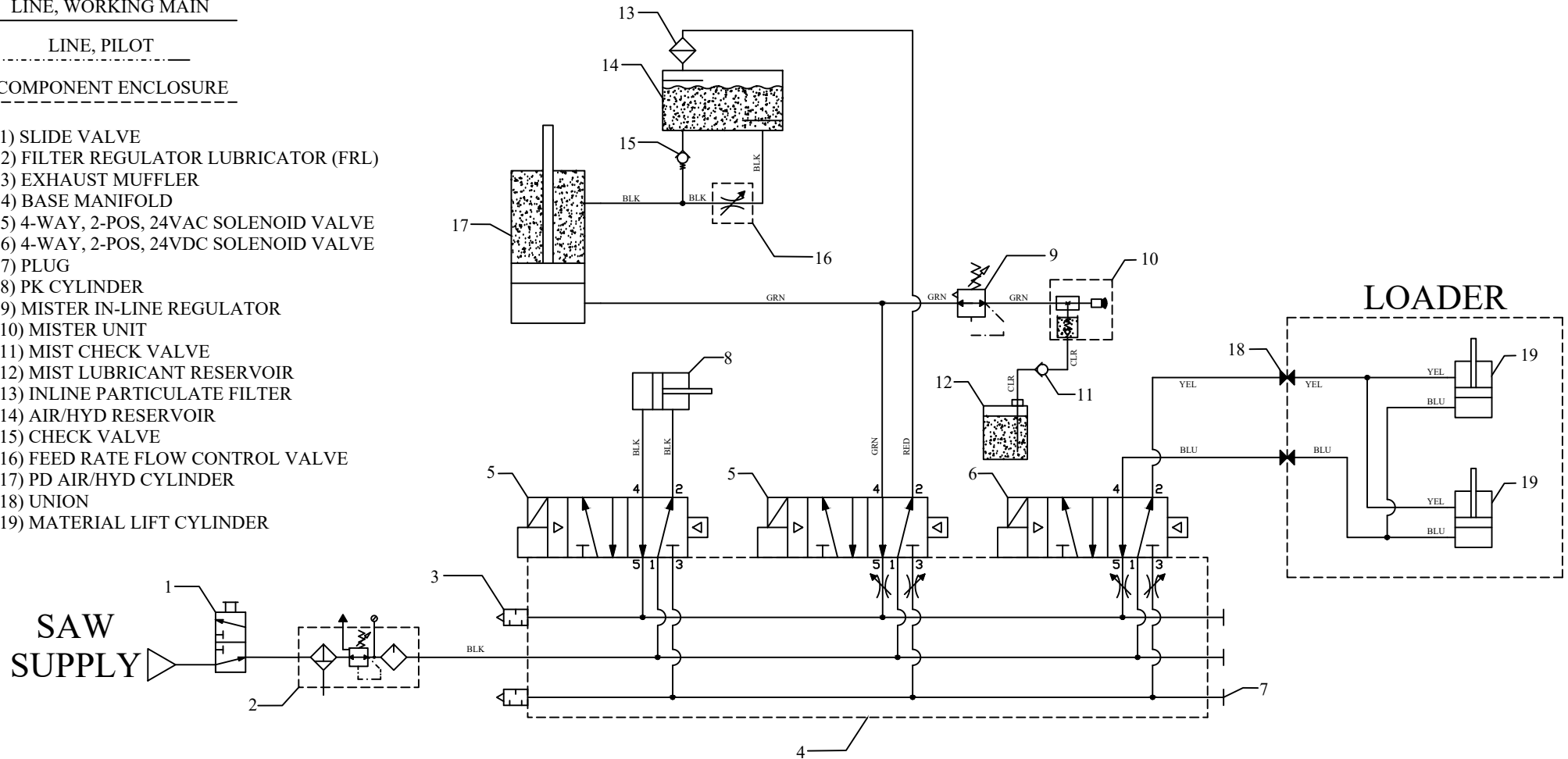


FIGURE 78