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MODEL GAA-500-90 DT20  
AUTO UP-CUT  
NON-FERROUS SAW**





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**MODEL  
GAA-500-90 DT20  
AUTO UPCUT  
COLD SAW**

PRINTED NOVEMBER 2024

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## GAA-500-90 DT20





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## **1.0 INTRODUCTION**

This instruction manual has been made in compliance with the requirements of the legislation according to the Machine directive 2006/42/CEE and its subsequent amendments.

This instruction manual represents an integral part of the machine. It must be consulted before, during, and after the machine is put into service, as well as whenever it is considered necessary. Operators will only have the knowledge they need to safely and effectively operate this machine by reading this manual. Safety information that is necessary to prevent property damage and injury is covered in the following pages.

- **ATTENTION:** Carefully read this manual before installing the machine. The manual must be kept throughout the machine's lifetime in a place that is easy to find in the event that it is needed. In the event that a used machine is sold, the machine shall be sold together with this manual. In the event that the machine is scrapped, the identification plate and any other document supplied with the same shall be destroyed.

## **1.1 Legislation**

EN-12100-1 Machine Safety. Basic concepts, general design principles.

EN-12100-2 Machine Safety. Basic concepts, general design principles.

EN-13857 Safety distances to prevent dangerous zones from being reached by the upper extremities.

EN-60204/1 Electrical equipment of industrial machines.

EN-13850 Machine Safety: Emergency stop equipment.

98/37/CEE On "Machine Safety".

93/68/CEE On the CE Marking (amendment).

73/23/CEE On "Safety of Electrical Material".

2004/108/CEE On "Electromagnetic Compatibility".

## **1.2 Warranty**

Scotchman Industries, Inc. will, within two years 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, 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 and electrical 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 or 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 the 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 the 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.

## 2.0 GENERAL MACHINE INFORMATION

### 2.1 Machine Identification Data

<b><u>MODEL - GAA-500-90 DT20</u></b>
<b><u>SERIAL NUMBER</u></b> _____
<b><u>YEAR OF MANUFACTURE</u></b> _____

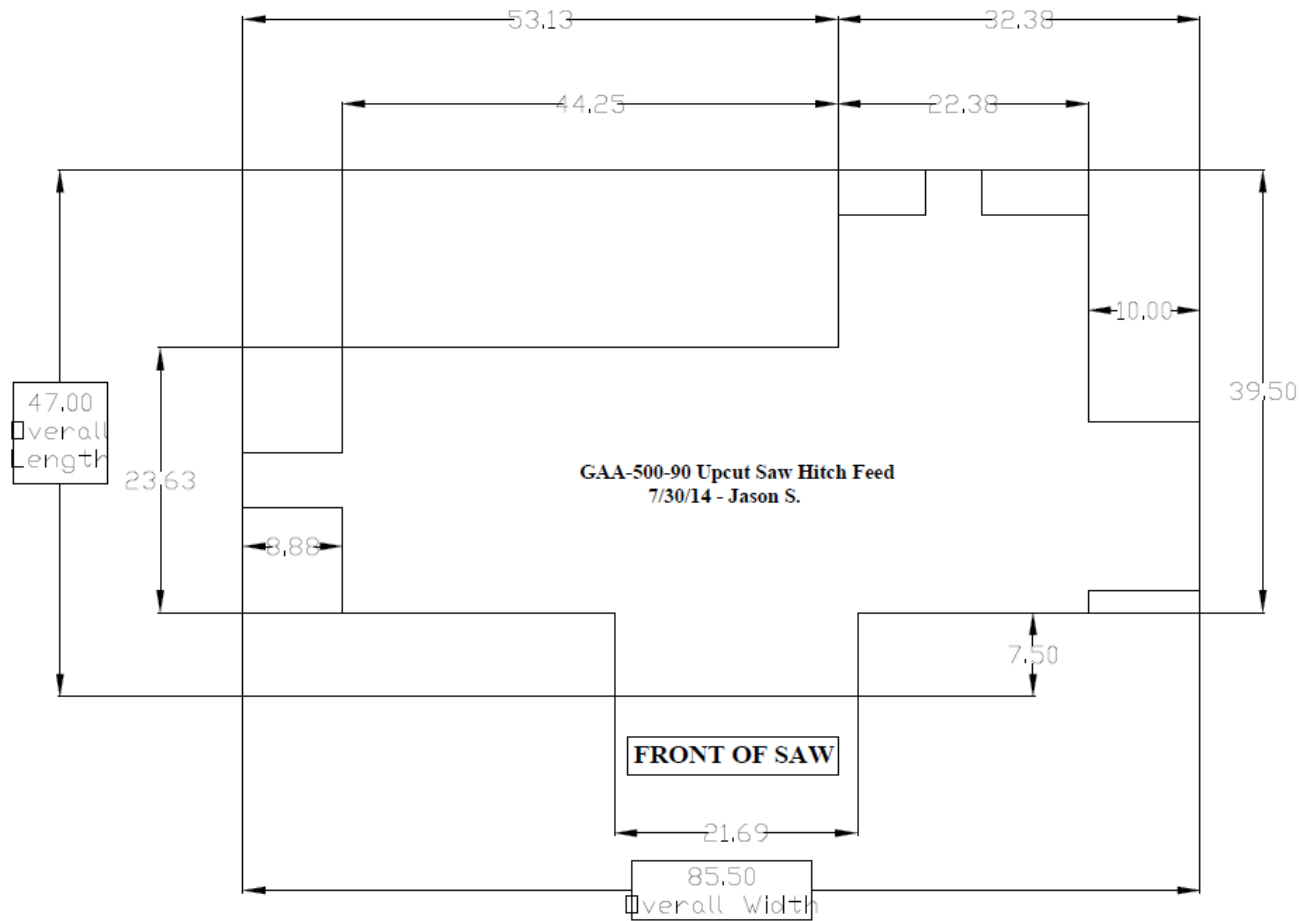
- NOTE: IN ORDER TO REQUEST SPARE PARTS, WHETHER COVERED BY THE WARRANTY OR NOT, ALWAYS INDICATE THE MODEL AND SERIAL NUMBER OF THE MACHINE, AS WELL AS THE NAME OF THE PART AND THE PART NUMBER THAT APPEARS IN THE FOLLOWING PARTS DIAGRAMS WITHIN THIS MANUAL.

### 2.2 Technical Data

<b>ITEM</b>	<b>SPECIFICATION</b>
Three Phase Motor	230/460V 9.0 HP @ 60 Hz, 7.5 HP @ 50 Hz
Motor Speed	3,440 @ 60 Hz, 2,870 @ 50 Hz
Blade Arbor	50 mm
Maximum Blade Dimensions	500 x 4.5 x 50 mm
Feed Shuttle Travel	20" (Hitch I) or 40" (Hitch II)
Working Pressure	90 – 105 psi, 6.5 – 7.2 bar
Air Demand	5 CFM
Pneumatic Material Vise Cylinders	3 Vertical and 3 Horizontal
Blade Lubrication System	Pneumatic Mist
Dimensions	78" x 41" x 72" (hood open)
Weight	1,300 lbs

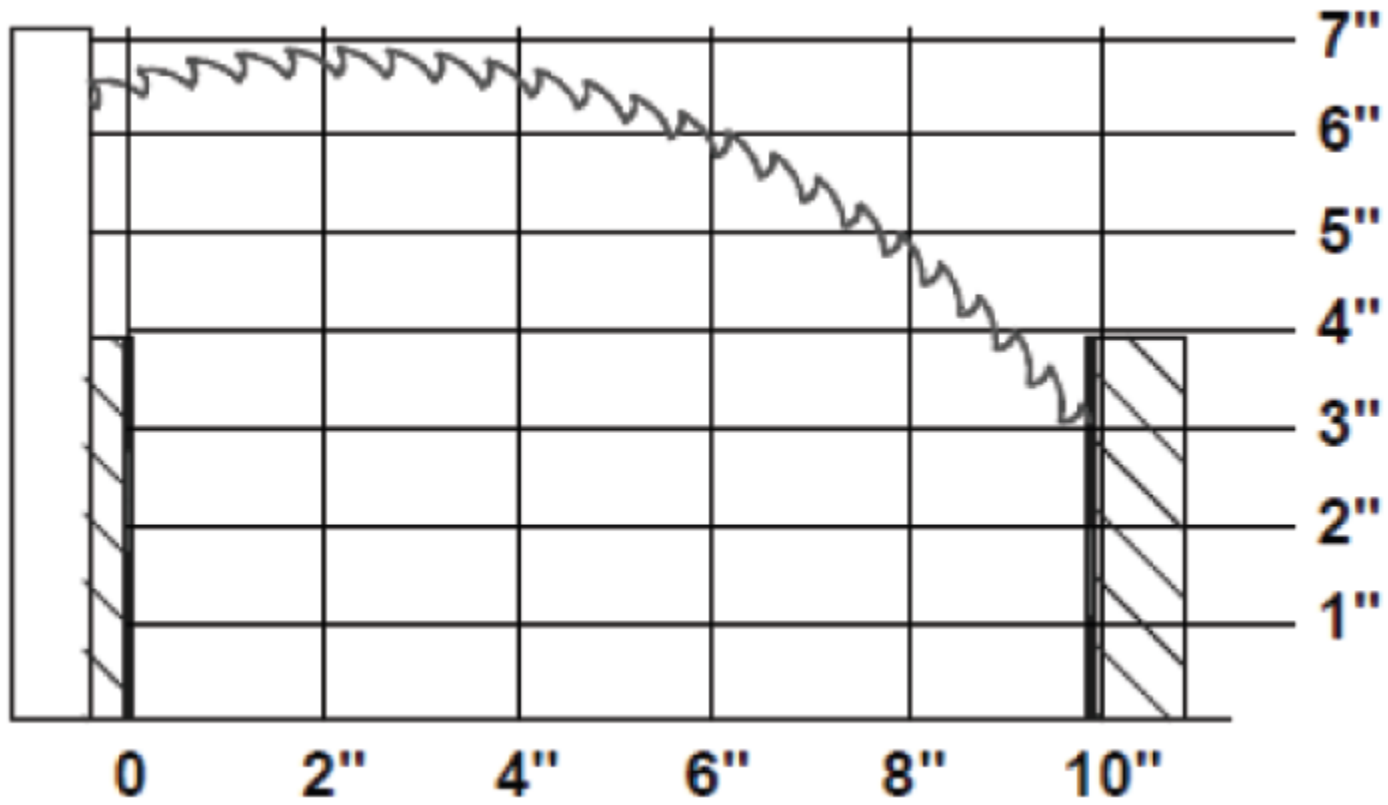


## 2.3 Machine Dimensions



Height with hood open is 6ft. Height to saw table is 38.4”.

## 2.4 Cutting Capacity



## **2.5 Electrical Data**

<b>POWER SUPPLY</b>	<b>MOTOR POWER</b>	<b>TOTAL CONSUMPTION</b>
230 V Three Phase	9.0 HP	24 amps at 60 Hz
460 V Three Phase	9.0 HP	12 amps at 60 Hz

## **2.6 Noise Level**

At a distance of 2 ft	RUNNING OFF-LOAD	68 dB (A)
	CUTTING A 2.75" x 2" PROFILE	108 dB (A)

- **ATTENTION:** When working with the machine, use individual hearing protection equipment.

## **3.0 INSTRUCTIONS ON TRANSPORT AND STORAGE**

1. The saw can be transported via forklift. Take great care not to damage the machine when sliding forks beneath it.
2. Store the saw in a vertical position. Do not stack any items on top of it.
3. If the saw is to be stored for a long time period, inspect it monthly. During each inspection, cycle the vise cylinders, cycle the saw blade, and move the shuttle lock to lock to prevent seizure of any moving components.
4. Store this machine in a covered area. It must not be exposed to outdoor weather conditions.
5. Place the machine on a properly sized, structurally sound pallet and wrap in plastic to prevent moisture and dust intrusion.

- **CAUTION:** Do not improperly dispose of the packaging. Send this material to be recycled or disposed of in accordance with local regulations.

## **4.0 INSTRUCTIONS FOR ANCHORING / SERVICE START-UP**

### **4.1 Anchoring Instructions**

When receiving a new machine, ensure the machine has not been damaged during transport by making a visual inspection BEFORE signing the delivery paperwork. If damage is seen, refuse the shipment and notify Scotchman. DO NOT ACCEPT DAMAGED EQUIPMENT. This makes filing damage claims with the shipping company impossible and will make the customer responsible for the damage repair costs.

The machine must be installed on a firm surface that is as level as possible to reduce vibration during saw operation. A machine that is not levelled on a firm surface will not meet the specified cutting accuracy.

### **4.2 Power Supply Connection**

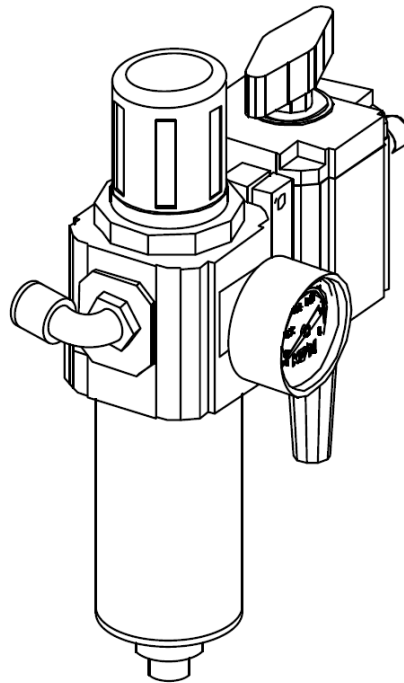
Verify that the power supply voltage corresponds to the voltage indicated on the specifications plate of the machine. Connect the cable to the power supply using a plug that is appropriate for the amp draw of both the machine and power loss through the customer supplied power cable as determined by the customer's certified electrician. Ensure all connections made to power comply with local and national electric codes.

Once the machine is connected, verify that the saw blade rotation is away from the operator when the operator is standing in front of the machine. If the saw blade rotation is wrong, swap two phases of incoming power to the machine. Then check for proper rotation again.

- Some machines are equipped with soft starters that can detect improper phasing of the blade. If this is the case, the soft starter may prevent the motor from energizing and will flash an error code for “Phase Reversal”. If this is the case, swap two phases of incoming power to the machine.

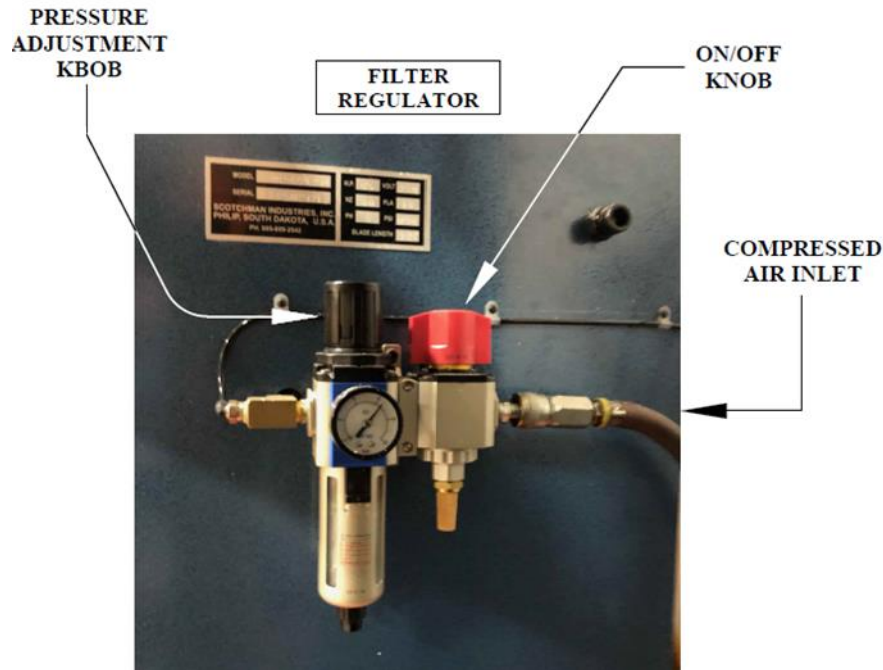
The saw must be connected to a steady supply of compressed air. The incoming supply is connected to the filter regulator. It is located on the right side of the machine.

- **ATTENTION:** The pneumatic working pressure must be between 6.5 to 7.2 bar (90 – 105 psi).



### 4.3 Pressure Regulator

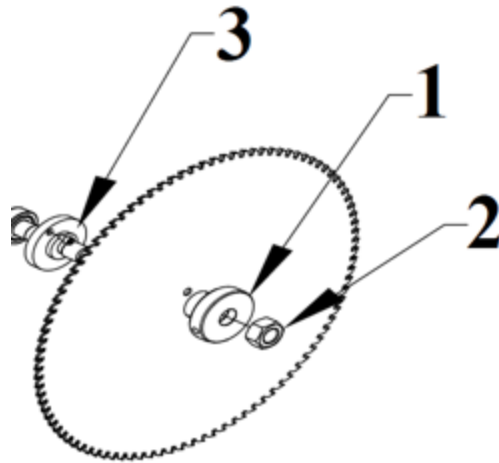
The air inlet location is shown below. The air regulator must be set at 6.5 to 7.2 bar (90 to 105 psi). The red knob on top is used to turn the air supply on or off. Do not add oil to the regulator. The pneumatic components of this machine are internally lubricated with grease.



### 4.4 Installing the Blade

This machine uses a 500mm diameter blade with a 50mm diameter arbor.

1. Set the saw to 90° and disconnect the power. Open the cabinet door and remove the existing blade.
  - NOTE: The blade nut has a standard (right hand) thread direction.
2. Insert the rod provided with the machine into the blade flange (1) and loosen the blade nut (2) with the wrench provided. Remove the blade. The teeth on carbide blades are very sharp and we recommend wearing gloves while changing blades.
3. Check the blade flange and the blade for any chips or nicks before installing the new blade.
4. Install the new blade, blade flange, and blade nut. The saw blade rotates counterclockwise when facing the blade from the left side of the machine.
  - CAUTION: Make sure that the blade is installed with the teeth in the right direction for the rotation and the saw is wired for the correct rotation. If the saw is not wired for the correct rotation, the blade will come loose when the saw is powered. If the blade is not installed in the correct orientation, the teeth will be dulled almost immediately.
5. Close the access panel and reset the safety switch.



### **4.5 Belt Removal and Installation**

To remove the belt, simply roll it off the pulleys. Do not loosen the motor. Do not pry on the aluminum pulleys or they will get damaged. If the motor has been loosened or removed, it must be realigned. Use a straight edge across the end of the motor pulley and spindle shaft pulley to align the pulleys back again. The straight edge should sit perfectly flat across both pulleys.

### **4.6 Cutting Coolant**

In order to fill the machine with cutting coolant, open the reservoir and fill with our SYNLUBE 2 or equivalent. The coolant reservoir is located on the back of the machine between the rear doors.



## **4.7 Priming/Adjusting the Coolant Mister**

The following procedure explains how to adjust the coolant mister or prime the system if it has run out of coolant. This job requires 2 people in order to safely perform. Make sure to adhere to the following instructions. Failure to do so may result in serious injury.

1. Make sure the saw is clear of material over the cutting area and the blade has been turned off. Material will need to be in the shuttle vise just enough to prevent the shuttle vise from tripping the machine out due to an out of material condition.
2. Fill the coolant reservoir located on the back of the machine.
3. Adjust the shuttle vise horizontal clamp so that it does not trip the saw on a material out lock (ensure the proximity sensor on the side of this clamp is not lit). Be careful not to crash the vertical clamp into the horizontal clamp.
4. Press both the horizontal and vertical clamp buttons so the clamps are all shut.
5. Turn the 2-position switch for the hood to the down position.
6. Turn the blade advance rate knob clockwise until it is turned off. This will prevent the blade from raising.
7. Turn the auto/1, manual, auto/2 3-position switch to the center (manual) position.
8. Disengage the safety switch on the front blade door by turning the knob clockwise. Once fully disengaged, the door will be able to be opened.
9. Before proceeding, have a second person press and hold both blade up buttons on the control panel briefly to engage the saw. This should cause the solenoid to activate as if the blade is trying to raise and make a cut. With the blade door open, **THE BLADE WILL NOT SPIN**. With the rate off, the blade will also not be able to raise out of the base cabinet. If the solenoid does not activate, check to make sure the clamps are clamped, material out sensor is not tripped, hood is down, and the hood safety sensor is functioning.
10. If the saw solenoid activates and the blade remains down, the coolant mister can now be adjusted/primed. The knob is located on the outside of the machine just above the front blade compartment door.
  - a. Prime: Fully open the mister knob. Have the second person now press and hold the blade up buttons to activate the saw solenoid. As the buttons are held, the machine should begin to purge the air out of the coolant system and then slow turn to a heavy mist of coolant. Adjust the spray to a satisfactory setting.
  - b. Adjust: Have the second person now press and hold the blade up buttons to activate the saw solenoid. As the buttons are held, the machine will begin to spray coolant onto the blade. Adjust the spray to a satisfactory setting.
11. Close the front blade door and reset the safety switch by turning the knob counter clockwise until finger tight. Do not overtighten the knob.

## 4.8 Cleaning the Coolant Mister

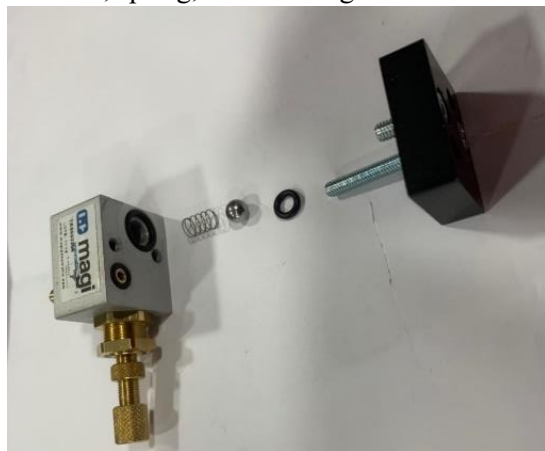
The coolant mister can be removed and disassembled for cleaning. It works on a venturi principle. Some of the blade cylinder supply air is diverted to the mister when the blade is advancing up. The air flow through the venturi creates suction that draws the oil from the bottle on the exterior of the machine. Due to the small size of the venturi any debris in the oil bottle can block the venturi and prevent oil flow. When this happens, the mister needs to be removed and disassembled for cleaning.

1. Open the venturi case:



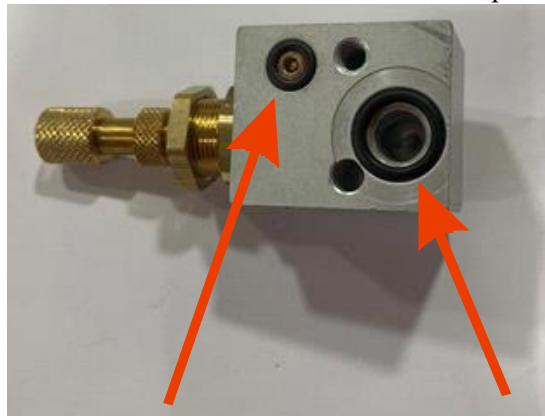
a.

2. Remove the ball, spring, and rubber gasket:



a.

3. Clean the two holes indicated which are the air input and the oil mist output.

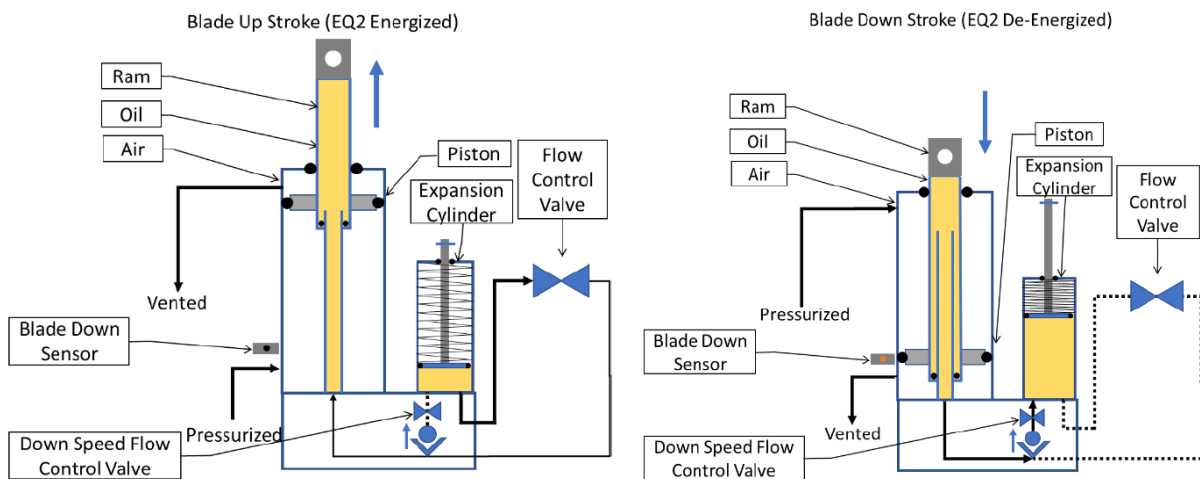


a.

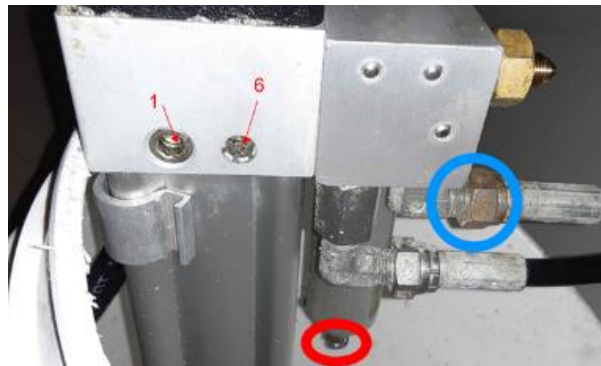


## 4.9 Blade Advance Oleo-Pneumatic System

The oleo-pneumatic system for the blade advance on a GAA machine is a sealed system. It must be filled with AW32 or 10w non-foaming hydraulic oil. This system can be customer serviced, but it requires advanced hydraulic tools and is therefore usually replaced as a complete assembly pre-filled. This system is air powered and hydraulically regulated. The expansion cylinder has an external rod that can be used to check fill. When the blade is down, this rod should be extended 4.5 cm (1-3/4").

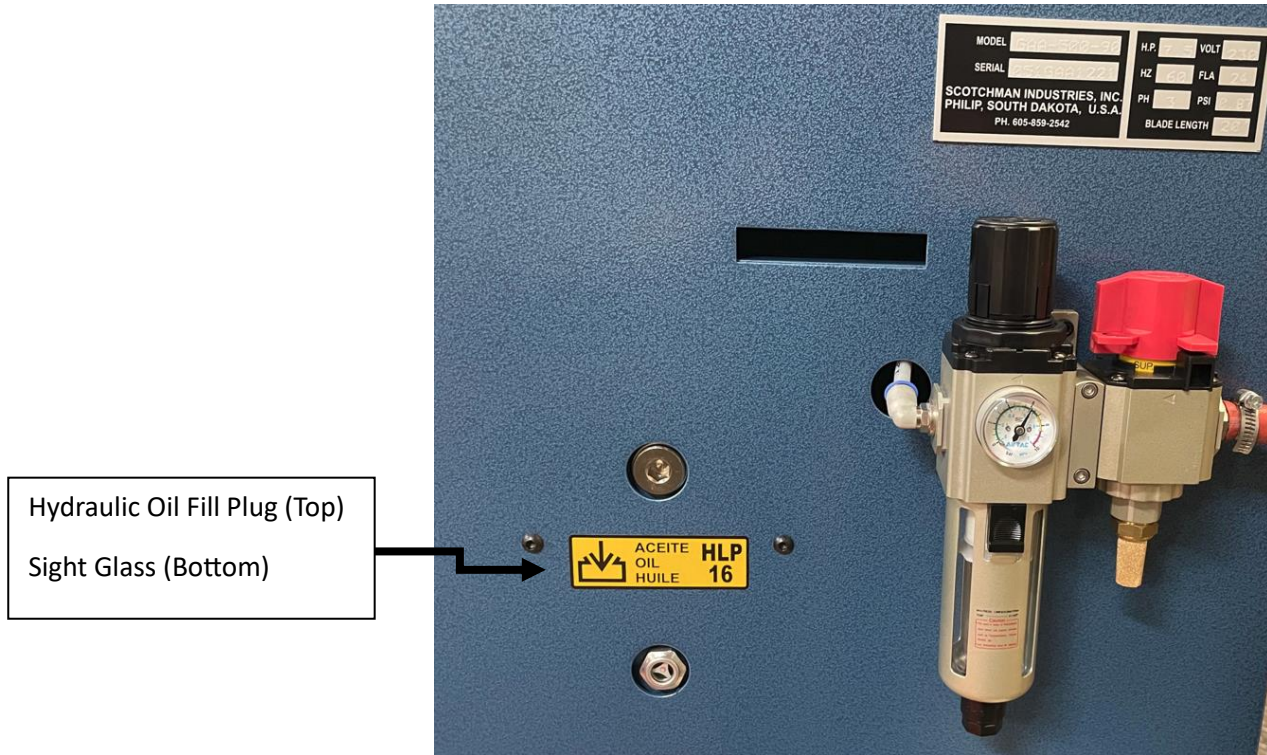


To refill this cylinder, it is easiest to do on the machine to force the retract, but can be done on a bench. Fill the cylinder through the fill port 2 (red circle, left). Cycle the cylinder up, then down and slightly loosen the hydraulic line fitting to the regulator valve (blue circle, right). Re-tighten this fitting after bleeding. Adjustment screws 6 and 7 adjust the cushion on the retract so the blade does not slam down.

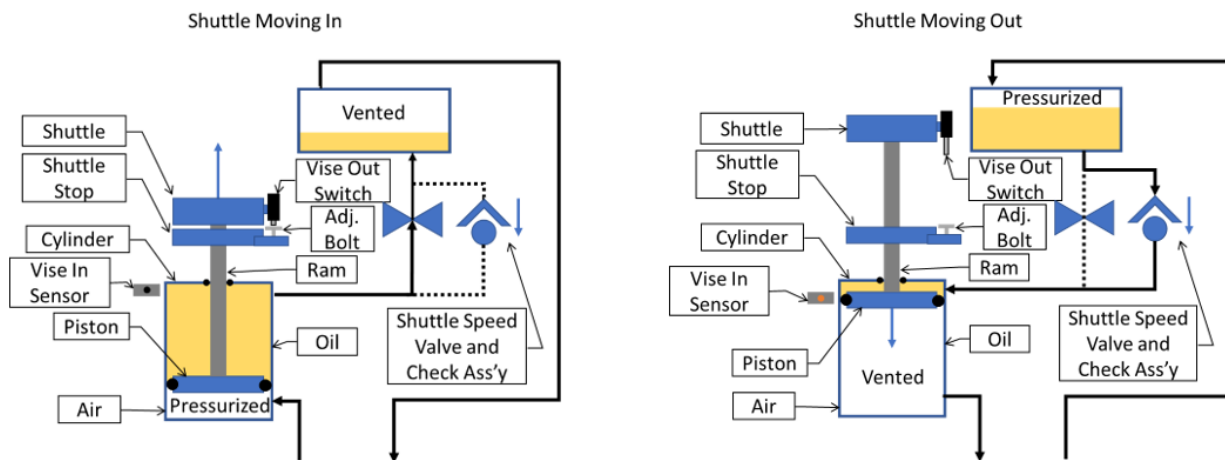


## 4.10 Feed Shuttle Oleo-Pneumatic System

The oleo-pneumatic converter must be filled with AW32 or 10w nonfoaming hydraulic oil through the threaded plug above the sight glass on the rear of the machine until the level reaches the center of the sight glass. Be sure to turn off the air supply and dump pressure before removing this plug. It is normally under pressure. This machine holds approximately 1 quart of hydraulic oil.



The operational diagrams below demonstrate how the oleo-pneumatic system operates for the feed shuttle only. Understanding this system is beneficial to operations and essential for troubleshooting. Air is used to power the shuttle cylinder and the hydraulic oil is used to regulate the advance speed.



## 5.0 INSTRUCTIONS FOR USE

### 5.1 Proper and Improper Use

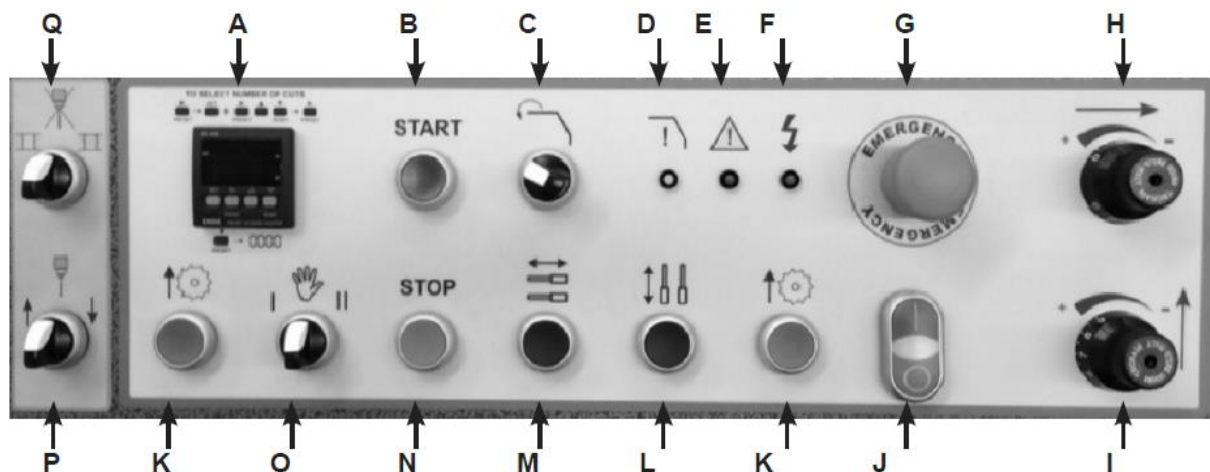
This is an automatic cold saw especially designed for cutting non-ferrous material. The use of this machine for cutting ferrous materials is strictly forbidden and may lead to machine damage as well as serious injury.



**DANGER: We are not responsible for any possible accident caused by the failure to comply with the aforementioned provision.**

### 5.2 Operating Controls

- A. Parts Counter
- B. Auto Mode Start Button
- C. Hood Switch
- D. Hood Open Indicator Lamp
- E. E-Stop Indicator Lamp
- F. Power Indicator Lamp
- G. E-Stop
- H. Shuttle Feed Speed Regulator Knob
- I. Blade Advance Speed Regulator Knob
- J. Blade Motor On/Off Switch
- K. Blade Up Buttons (2)
- L. Stationary Material Vise Push Button
- M. Moving Shuttle Vise Push Button
- N. Auto Mode Stop Button
- O. Auto/Manual Selector (One Hitch Auto/Manual/Two Hitch Auto)
- P. Drill Position Selector (Up/Auto/Down)
- Q. Drill Mode Selector (Drill/Off/Drill & Tap)



## 5.3 Operation of the Machine



**DANGER: Always work with the protective shield lowered.  
DO NOT DISCONNECT ANY SAFETY DEVICES!**

MANUAL MODE: One cut at a time.




1. Turn on power at the disconnect switch. The green power lamp (F) should illuminate.
2. Turn the auto/manual switch (O) to the center “hand” position for manual mode.
3. Open the hood with switch (C).
4. Insert the material to be cut into the machine. Adjust the vises so that they have the minimum required travel (no more than ¼”). A 17mm wrench is needed for this task.
5. Close both material and shuttle vises with the push buttons (L) and (M).
6. Close the hood with switch (C).
7. Turn on the blade motor with (J).
8. To make a cut, press both blade up buttons (K) simultaneously and hold until the cut is complete.
9. Turn off the blade motor with (J).
10. Open the vises by pressing (L) and (M).

AUTOMATIC MODE: Cuts continuously until material runs out or parts count is met. Be sure to test your actual cut part length after 1 or 2 cycles before letting the machine continue through the entire job.

1. Turn on power at the disconnect switch. The green power lamp (F) should illuminate.
2. Rotate the stop adjustment knob to the desired position. The scale will indicate the cut length.
3. Program the desired parts count into the counter. Reset the current count if desired (counter instructions below).
4. Turn the auto/manual switch (O) to the left “I” or right “II” for auto mode.
  - a. I is single hitch. The saw will cut what the stop scale says it will cut.
  - b. II is double hitch. The saw will cut double what the stop scale says it will cut.
5. Set the blade height to the desired maximum with the knob on the right side of the machine.
6. Open the hood with switch (C).
7. Insert the material to be cut into the machine with 3/8” to ½” extending beyond the blade slot.
8. Adjust the vises so that they have the minimum required travel (no more than ¼”). A 17mm wrench is needed for this task.
9. Close both material and shuttle vises with the push buttons (L) and (M).
10. Close the hood with switch (C).
11. Turn on the blade motor with (J).
12. Start the auto sequence with (B). The saw will make a trim cut and proceed to continue cutting until material runs out, the parts count is met, stop (N) is pressed, or the E-stop (G) is pressed.
13. If the saw stops in auto mode for any reason other than meeting the preset parts count, to resume, simply turn the motor back on with (J) and press (B) to restart. The parts counter (A) must be reset to 0 to restart if the parts count has been met before operations can resume if the counter initiated the shut down.

## 5.4 Programming the Parts Counter

There have been three different counters installed in the GAA-500-90-NF over its service history. Programming is slightly different for each one. However, the top value is always the number of parts the saw has actually cut and the bottom is the desired setpoint for total number of parts required.

<b>Counter Programming</b>			
	Enda EC442	Enda ECH4400	Autonics CT6S-1P
Status	Obsolete	Obsolete	Current Model
Part No.	285	E000000D54	3390
Image			
To set a parts count.	<ol style="list-style-type: none"> <li>1. Press PRESET</li> <li>2. Hold SET</li> <li>3. Use PRESET to scroll digits.</li> <li>4. Use UP and DOWN to modify digits.</li> <li>5. Release SET.</li> <li>6. Press PRESET</li> </ol>	<ol style="list-style-type: none"> <li>1. Press the SET (left most) button.</li> <li>2. Use RIGHT to scroll digits.</li> <li>3. Use UP and DOWN to modify digits.</li> <li>4. Wait 10 secs.</li> </ol>	<ol style="list-style-type: none"> <li>1. Press LEFT.</li> <li>2. Press LEFT to scroll digits.</li> <li>3. Use UP and DOWN to modify digits.</li> <li>4. Press MD.</li> </ol>
To Reset the Cut Counter	Hold RESET until the count zeros.	Hold DOWN until the count zeros.	Hold RST until the count zeros.
<p>*Note: These counters are programmed devices specifically for the GAA-500-90. If the advanced programming is inadvertently modified from the factory default, contact Scotchman for programming instructions to return the counter to the Scotchman factory settings.</p>			

## 5.5 General Rules and Safety Checks

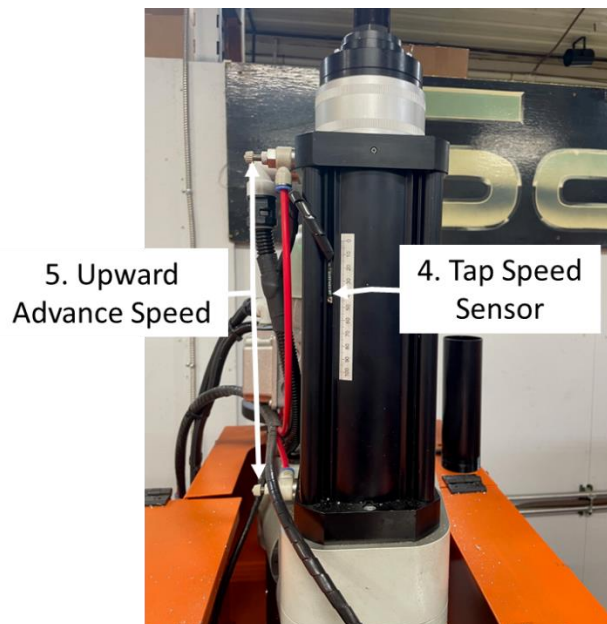
- Before using the machine, check the efficacy and operation of all safety devices, check that the moving parts of the machine are not blocked, ensure there are no damaged parts and all machine components are in place and working correctly.
- NEVER operate the machine with any of the safety devices disabled or removed from the machine.
- It is entirely prohibited to work without the shield down.
- It is mandatory to use appropriate personal protective equipment (reinforced footwear, eyewear, hearing protection, gloves, and head protection).
- Do not wear any loose clothing that can become caught in the machine. Do not keep long hair down or wear loose jewelry which may also become caught in the machine.
- Before starting work, the operator must ensure that all tools used for maintenance or adjustment have been cleared from the machine.
- In the event of a fire, use a class ABC fire extinguisher and disconnect the machine from power as soon as possible. Use of an inappropriate fire extinguisher or water on an oil/electric fire may result in serious injury.

## 5.6 Drill Setup

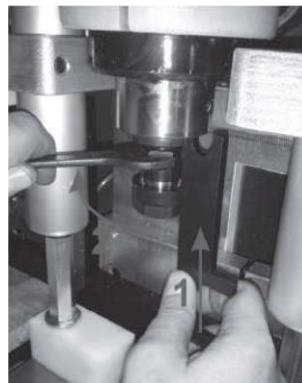
The Drill on a GAA 500 90 DT20 is a complex piece of equipment. It has a two stage advance speed control to handle fast approach and working speed, two stage tool speed to handle drilling and tapping speed, total stroke control, and up/down sensors. It also has some up and down spring loaded play so tapping operations don't pull out the threads. Adjusting the tap speed sensor properly to reduce speed at the right moment keeps the tap in the center of this spring travel.

Setup is as follows:

1. Adjust total depth of advance (drill and tap)
2. Adjust the transition point from fast approach to working advance speed.
3. Adjust the working advance speed.
4. Adjust the height sensor which transitions the drill VFD from drilling to tapping tool speed.
5. Adjust the upward movement speed.
6. The password in the GAA setup menu is 7890.



The machine is provided with a drill collet equipped with a spring loaded axial compensation for drill and tapping operations. To change the collet, lock it in place as shown with a flat tool and unscrew it from the drill.



## **6.0 RECOMMENDATIONS AND MAINTENANCE**

### **6.1 Type and Frequency of Inspections**

The operator's thorough knowledge of the machine and proper maintenance schedules is the best way to prevent issues and ensure reliable operation. If any failures are detected, stop using the saw immediately and inform qualified personnel to have the saw repaired.

- NOTE: Always clean the machine and the surrounding work area at the end of each shift or work day.

<b>Saw Lubrication and Inspection Guide</b>				
<b>Saw</b>	<b>Lubricant</b>	<b>Location</b>	<b>Capacity</b>	<b>Frequency</b>
GAA Series	Oil, AW32	Hydraulic Tank	Center of Sight Glass	Annually
	Grease	Saw Bearings	1 – 2 Pumps (Top Off) 1/2 Tube (Refill)	Monthly
	Blade Coolant	Coolant Reservoir	As needed	Top Off Daily
Recommended air line pressure is 6.5 to 7.2 bar (90 – 105 psi)				
Clean the machine and surrounding work areas daily or at the end of each shift for 24hr operations.				
Check the condition of the drive belt weekly. Replace when belt cracks or fraying are observed.				
Check condition of the shuttle guide rails weekly.				
Check condition of the blade stroke limit rail weekly.				

<b>Lubricant Ordering Table</b>			
<b>Lubricant</b>	<b>Size</b>	<b>Sales Part #</b>	<b>Recommended Lubricant</b>
Blade Coolant	1 Gallon	075760	SynLube 2
Hydraulic Oil	1 Quart	060520*	Western M Series AW32
Grease	1 Tube	001139	Mobil XHP 222 Special
*Same part number as our 10W non foaming hydraulic oil. Specify AW32 when ordering.			

### **6.2 Qualified Personnel for Maintenance and Repair Work**

All repairs shall be made exclusively by qualified personnel. Always use original replacement parts. Third party components may cause damage to the machine and injuries.

### **6.3 Manufacturer's Recommendations**

- In the event that the machine is broken down or the saw blade must be replaced, place a padlock on the disconnect switch and place keys under the care of qualified personnel.
- Before working on any electrical devices, disconnect power from the power supply.
- If extension cords are used, ensure that the cable has the appropriate rating for the power of the machine. Aside from the fire risk posed from insufficient cabling, an undersized cable will cause the saw to draw too many amps and either operate improperly or trip breakers.
- Whenever any part has to be replaced, use an original replacement part and use lubricants as recommended by Scotchman in the table above.
- Follow the maintenance schedule as listed above.
- Note: In case of any doubt or problem, do not hesitate to contact Scotchman: (605-859-2542).

## 6.4 Voltage Conversions




SERIOUS DAMAGE TO THE MACHINE AND INJURY CAN OCCUR IF IMPROPER MODIFICATIONS ARE MADE TO THE ELECTRICAL SYSTEM. ELECTRICAL REPAIRS SHOULD BE DONE BY ELECTRICIANS ONLY.

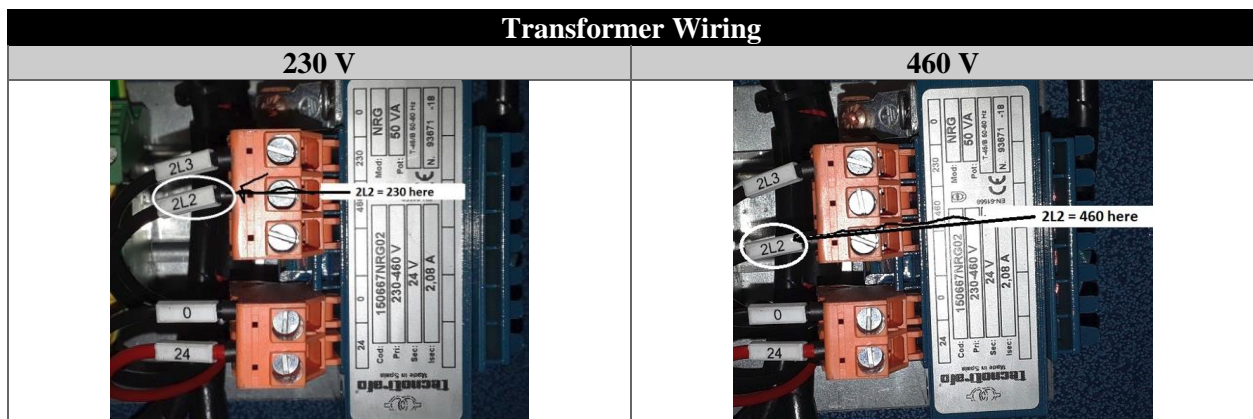
GAA saws can be converted between 230V and 460V three phase. The following components need modification or replacement to accomplish this task.

- Motor Overload/Disconnect Switch (Replace)
- 24 VAC Transformer (Modify)
- 120 VAC Transformer (Modify)
- Reduced Voltage Soft Starter (Replace)
- Motor (The brakeless motor is dual voltage. Motors with brakes require replacement.)
  - **If unsure about which motor is on hand, Scotchman can identify your motor off of a photo of the motor data plate.**

1. Replace the overload. This is the same as the disconnect switch for SUP saws. It comes out from the front of the panel. New overloads will come with a plastic knob. Pull the stock knob off before installing on the saw.

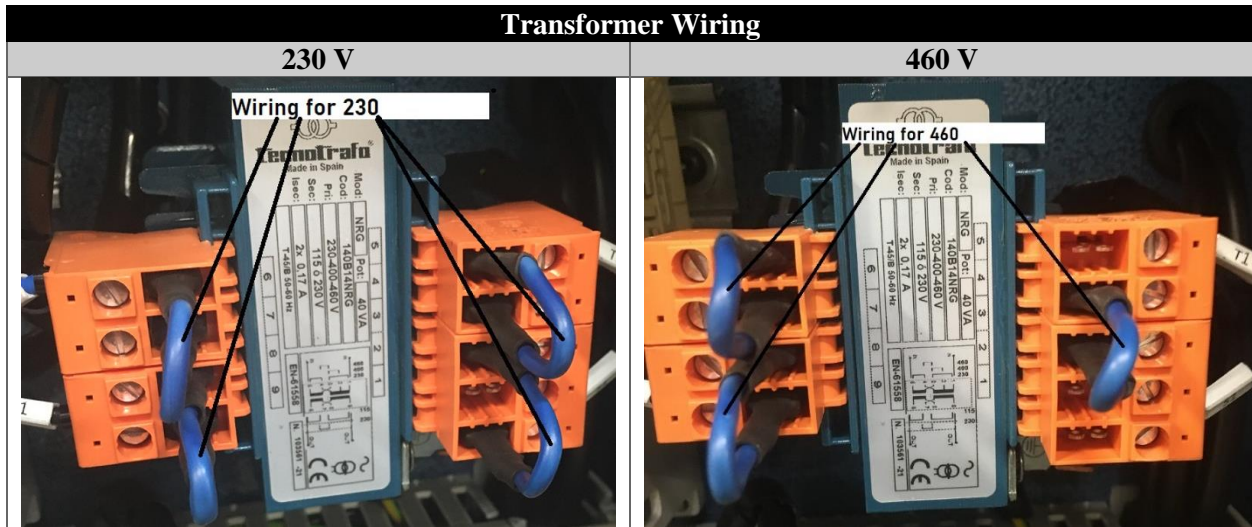
SUP Overload/Disconnect Switch Information				
	Saw	Voltage	Overload #	Setting
	GAA 500 (9/7.5 HP Motor)	230	000943	16
GAA 500 (9/7.5 HP Motor)	460	000940	10	

2. Change over 24 VAC transformer wiring

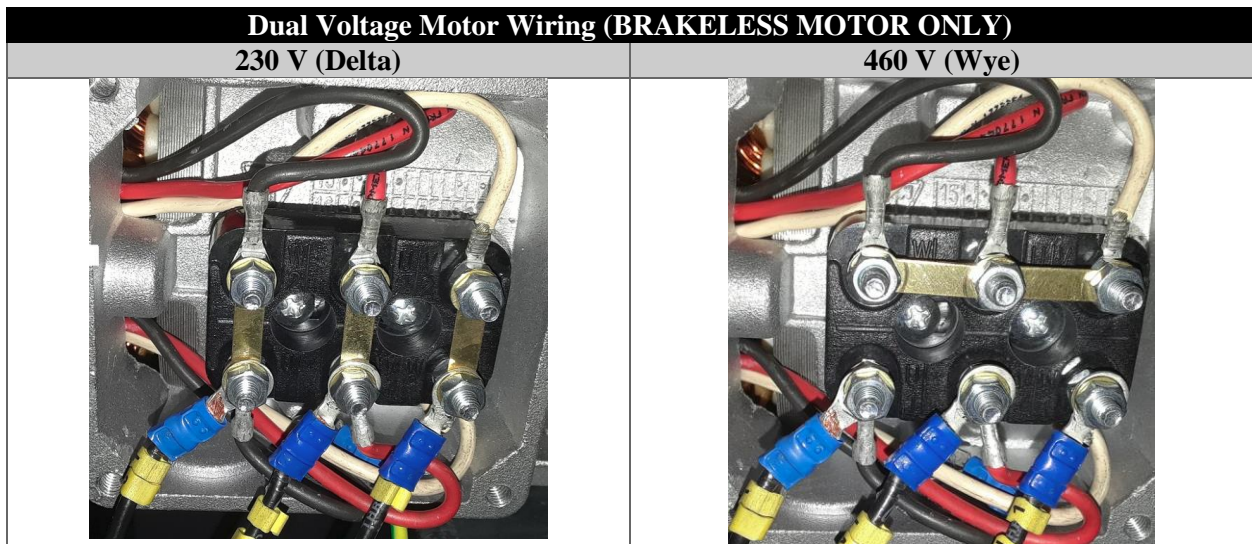




3. Change over 120 VAC transformer wiring



4. Change over dual voltage motor bus bars. If the motor has a solenoid friction brake (in the fan shroud), it is a single voltage motor and must be replaced.



5. Replace voltage stickers (19121, 230V or 19122, 460V) and saw data 19100 plate. The model number, serial number, and desired voltage are required when ordering a new data plate.







## 6.5 PLC and Sensor Troubleshooting and Adjustment

Note the PLC on the GAA-500-90-NF is equipped with indicator lamps for the operator to determine which inputs and outputs are active. Inputs are on the top row. Outputs are on the bottom row. Viewing these lamps are very helpful in determining issues. The input numbers on the PLC correspond to the control wiring diagram (below). The PLC is almost never the culprit when it comes to electronic issues. The sensors or faulty solenoid valves are nearly always the cause of saw issues.



Below is a table of GAA-500-90 sensors and part numbers.

Sensor List Table			
Sensor	Saw Model(s)	Make	Part No
Blade Down Sensor	All	Kita KT-50R (Some are KT-50P)	1724
Blade Up Switch	All	EMAS L5K13MUM331	12112
Material Out Switch	All	Kita KT-50R	1724
Hood Down Sensor	All	Kita KT-50R	1724
Shuttle Cylinder In	500 90 (non-CNC)	Kita KT-50R	1724
Shuttle Cylinder Out	500 90 (non-CNC)	Pizzato V11D04	9973 / E000000032

<b>Sensor Troubleshooting Table</b>		
<b>Sensor</b>	<b>Symptom</b>	<b>Cause</b>
Blade Down Sensor 	Blade will not energize, clamps will not release. Machine will not make a cut.	Sensor out of adjustment. Sensor fell off cylinder. Sensor damaged by debris. Faulty sensor.
Blade Up Switch 	Blade goes past the stop and gets stuck in the full upwards position.	Chip packed in the actuator preventing the switch from actuating. Faulty switch.
Material Out Switch 	Machine stops abruptly (sensor stuck on) or machine will not stop when material runs out (sensor stuck off).	Sensor out of adjustment. Faulty sensor.
Hood Down Sensor 	Motor will not start. Machine will not make a cut.	Sensor out of adjustment. Faulty sensor.
Shuttle Cylinder In 	Machine gets stuck with the shuttle in and will not continue in the automatic cycle. Clamps may not release.	Sensor out of adjustment. Faulty sensor.
Shuttle Cylinder Out 	Machine gets stuck with the shuttle out and will not continue in the automatic cycle. Clamps may not release.	Switch actuator bolt out of adjustment. Mechanical damage to switch or wiring. Faulty switch.

Several sensors on the GAA line have an adjustment:

1. Blade Down Sensor (all models)
2. Hood Down Sensor (all models)
3. Material Out Sensor (all models)
4. Shuttle Cylinder In Sensor (only GAA 500 90 Non-CNC has adjustment)
5. Shuttle Cylinder Out Switch (only GAA 500 90 Non-CNC has adjustment)
6. Tap Speed Sensor (only DT20)

The blade down sensor is best accessed through the rear blade compartment hatch. It is mounted on the rear of the pneumatic blade up cylinder. Remove the bolts in the hatch cover. E-stop the machine so the blade cannot be energized, but have the disconnect on. With the blade down, the sensor has an LED on it that should be lit. If the sensor has slid down the rail track, it may not actuate, causing the saw to lockout and prevent most functions. Loosen the set screw and raise the sensor until the LED illuminates. Raise it no more than 1/16" to ensure reliable actuation every time and lock the set screw back down. Re-install the rear blade compartment hatch cover.

The hood down sensor is mounted to the side of the hood pneumatic cylinder located on the back of the machine. With the hood down, loosen the set screw and raise the sensor all the way to the top of the track. The LED should go out. Slowly lower the sensor until the LED illuminates and then go no further than 1/16" farther down to ensure reliable actuation.

The material out sensor is mounted to the side of the shuttle vise horizontal clamp cylinder located on the material feed table. Adjust the shuttle vise horizontal cylinder so that when it is clamped, the cylinder bottoms out before the vise plate makes contact with the back fence. This will put the cylinder in a fully extended orientation. Slide the sensor towards the back fence (rear) until the LED turns off. Then slide the sensor back towards the control panel (front) until the LED lights. Continue moving the sensor to the front another 1/16" of an inch at least to ensure reliable actuation. This can be slide farther to the front to make the material out sensor more sensitive (reduce the vise travel distance before the material out sensor trips).

The shuttle cylinder in sensor detects if the shuttle has returned to the position closest to the saw blade. Remove the shuttle cylinder top cover. The sensor is mounted to the side of the shuttle cylinder. To adjust, ensure the shuttle is closest to the saw blade and the saw disconnect switch is on. Loosen a lock screw and slide the sensor to the end of the cylinder closest to the blade. Begin sliding it away from the blade until the LED on the sensor lights, then slide it no more than 1/16" farther to ensure reliable actuation. Tighten the lock screw and re-install the shuttle cylinder top cover.

The shuttle cylinder out switch detects if the shuttle has returned to the position farthest from the saw blade. The switch is mounted to the moving shuttle, however, it actuates against a bolt head on the stop. To adjust the position of the bolt head, loosen the lock nut and back out the bolt until the microswitch activates. If it does not activate reliably, the bolt head may need to be backed out slightly more. Tighten the lock nut once adjusted to satisfaction.

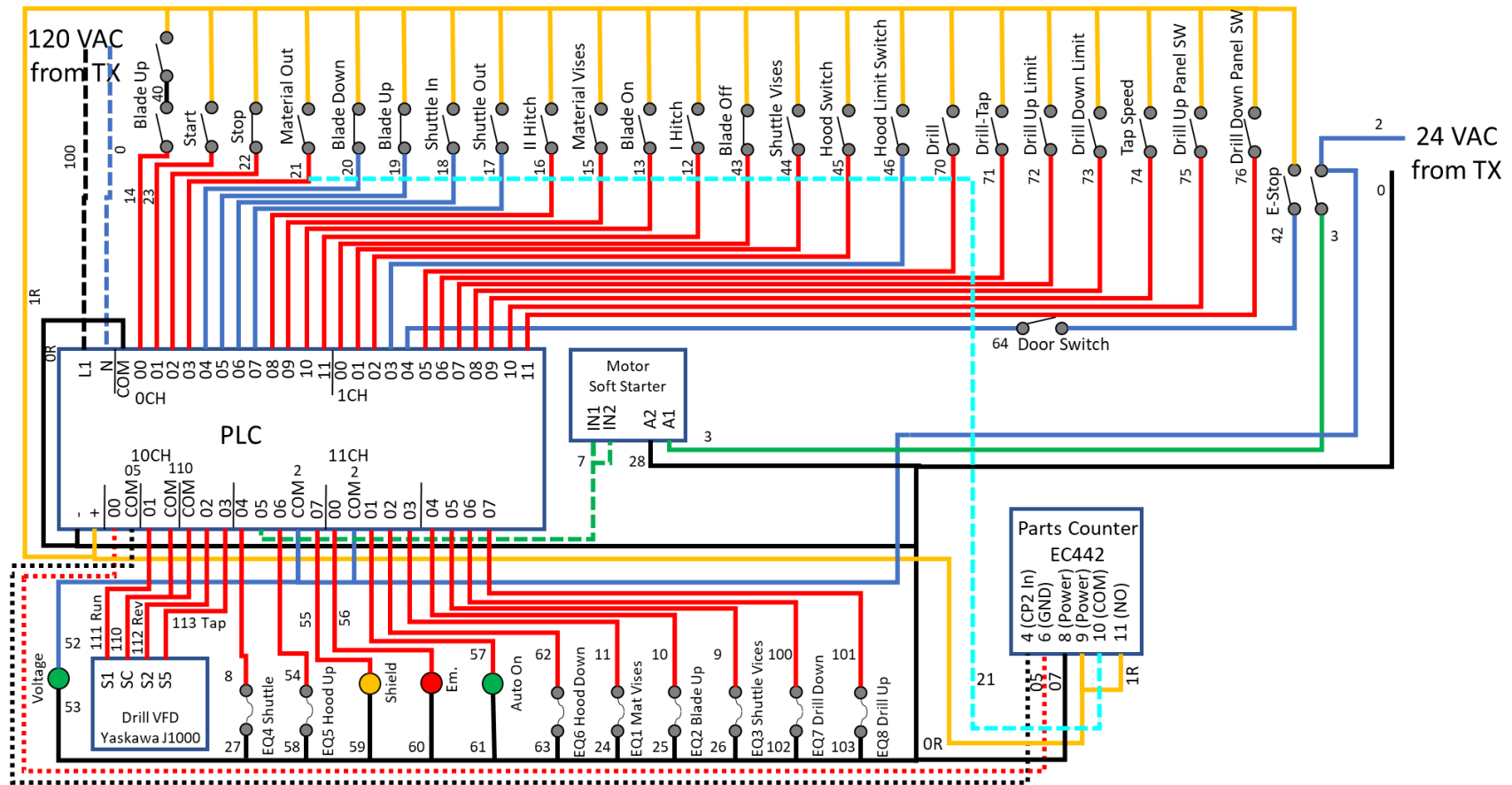


THE SHUTTLE OUT ADJUSTMENT BOLT CAN BE BACKED OUT FAR ENOUGH TO CRUSH THE SWITCH. USE CAUTION WHEN BACKING THIS BOLT OUT. MAKE ONLY SMALL INCREMENTAL CHANGES SO THE STOP BLOCK TAKES THE FORCE OF THE SHUTTLE AND NOT THE SWITCH ACTUATOR.

## 7.0 PARTS DIAGRAMS AND SCHEMATICS

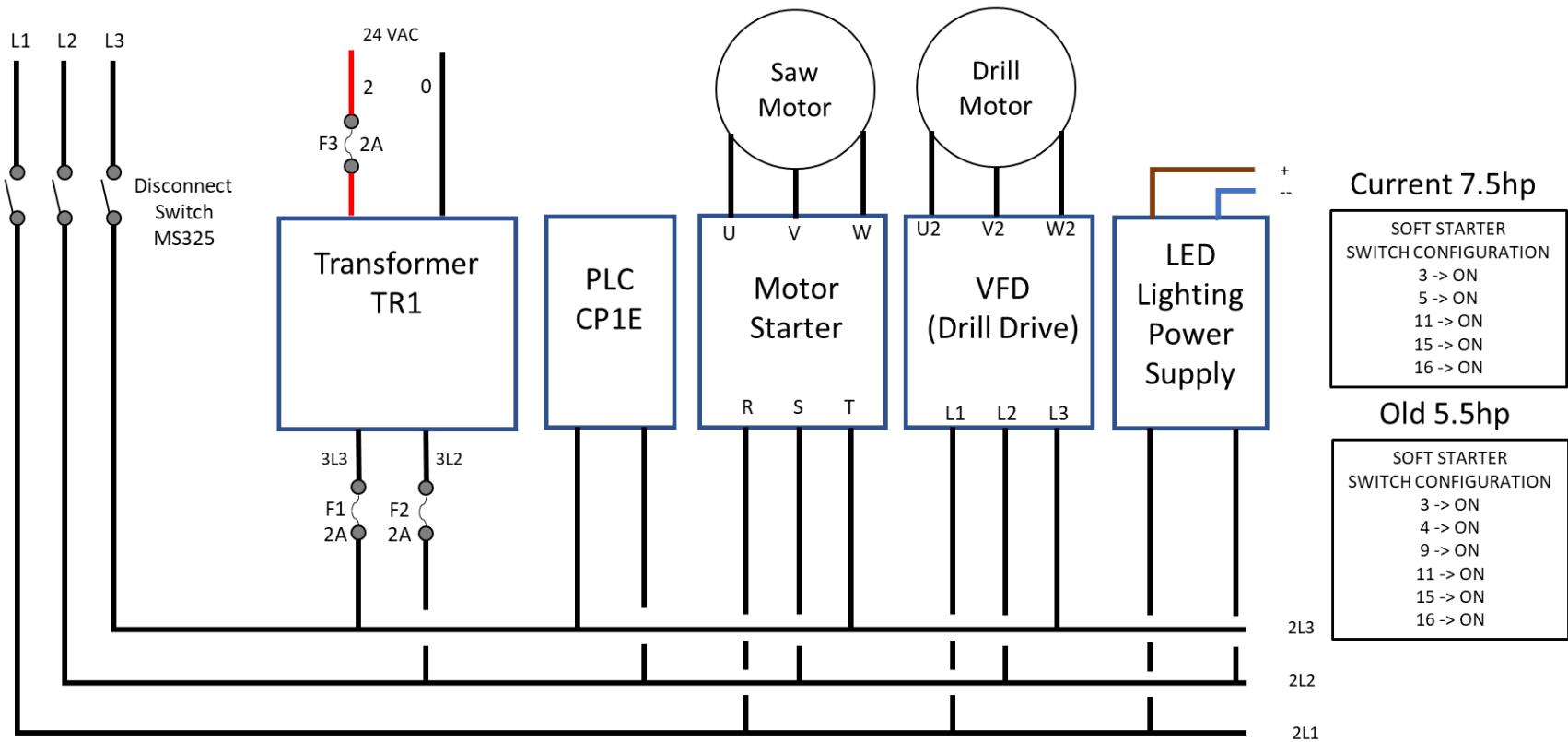
### 7.1 Control Schematic

GAA 500 90 DT



## 7.2 Power Schematic

GAA 500 90 DT Power Diagram



Control Wiring Shown on the Control Diagram

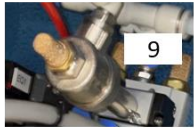
# 7.3 Pneumatic Schematic

Uni-Directional Valve  
(Check Valve with Air Release)



10B

Quick Exhaust Valve



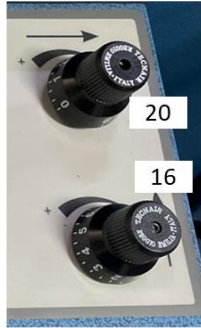
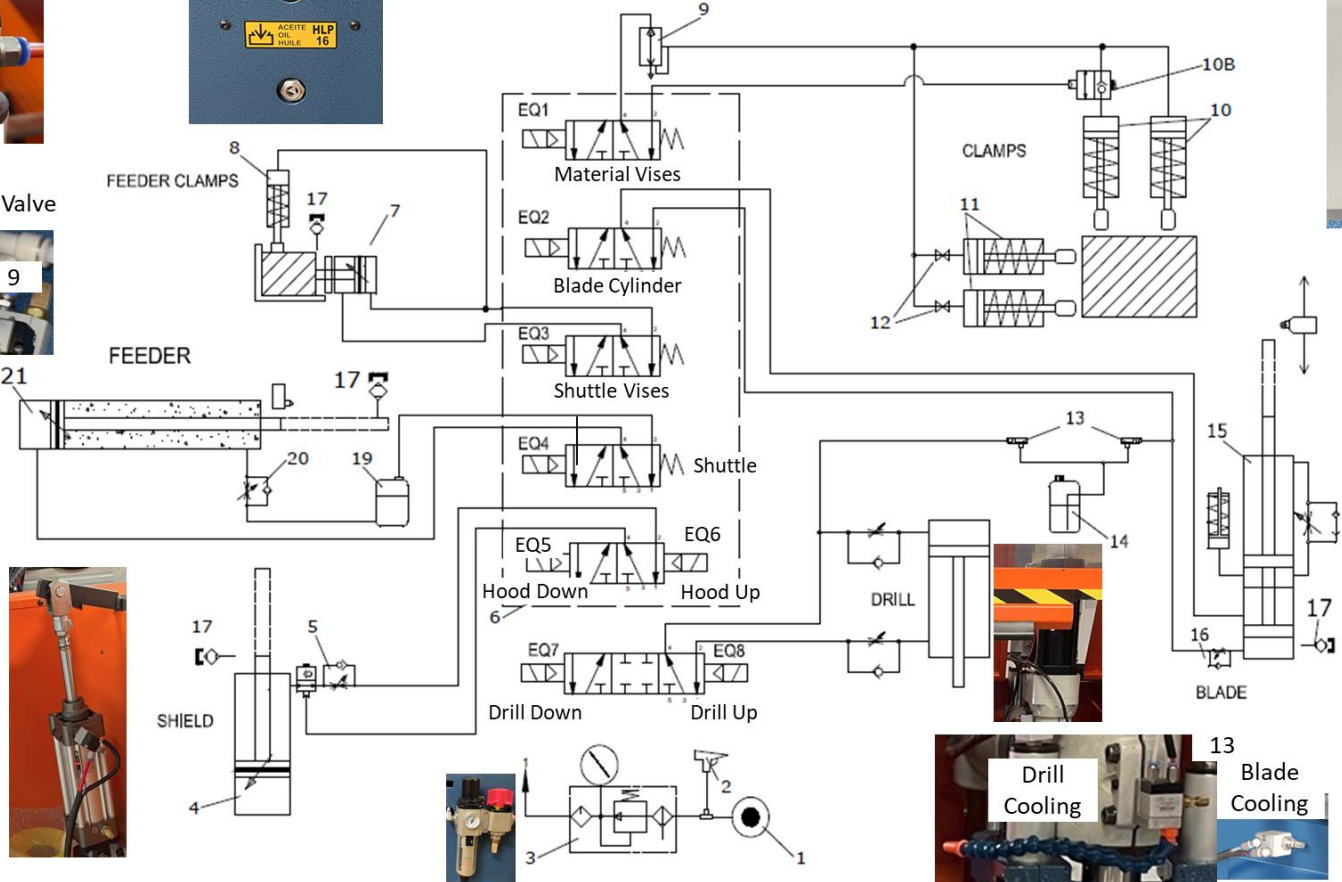
9

Shuttle Reservoir



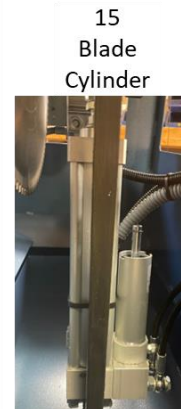
19

GAA 500 90 DT20

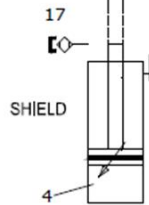


10

10B



15  
Blade  
Cylinder



4



Drill  
Cooling



Blade  
Cooling



14

## **7.4 Power Electrical Components**

<b>REFERENCE</b>	<b>PART #</b>	<b>DESCRIPTION</b>
MS325	000943	Overload Switch, 230V
MS325	000940	Overload Switch, 460V
KM1	E000002484	Soft Starter, 230V
KM1	E000002384	Soft Starter, 460V
M1	1020	7.5 / 9.0 HP Motor
M2		Drill Motor
C1	E000T21584	Drill Variable Speed Drive (Yaskawa J1000 or Control Techniques S100)
CP1E	E000000067	OMRON PLC 18E-12SR
TR1	E000000014	50VA 24VAC Transformer
F1	071085	2A Fuse
F2	071085	2A Fuse
F3	071085	2A Fuse

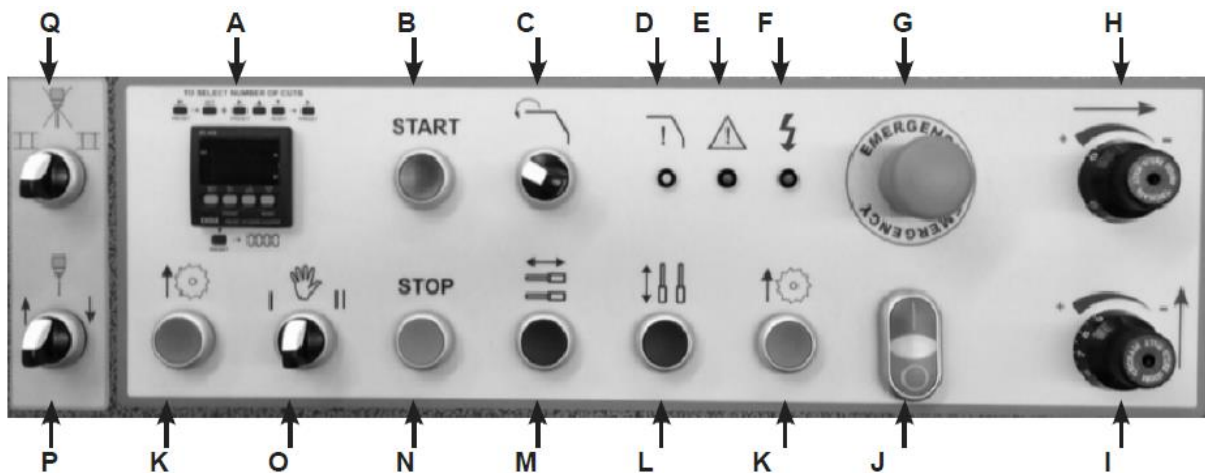


## 7.5 Control Electrical Components

ITEM	PART #	DESCRIPTION
A*	3390	Digital Parts Counter, Autonics
B	011879	Start Button
C	562023	Hood Switch
D	E000NVAC30	Yellow Pilot Lamp, Shield
E	E000RVAC30	Red Pilot Lamp, Emergency Stop
F	E000VVAC30	Green Pilot Lamp, Power
G	011837	Emergency Stop Switch
H	N000000018	Shuttle Speed Regulator, 3/8"
H-A	18722	Knob, Regulator
I*	N000050061	Blade Cylinder w/ Regulator, Pre-Filled
J	E000000011-011867-011874	Saw On/Off Switch
K	N000000008-011874	Green Button (Blade Up, Modular Style)
L	048101-011874	Stationary Material Vise Button
M	048101-011874	Moving Shuttle Vise Button
N	E000000M51	Stop Button
O	E000000S70	Auto/Manual Switch, 3 Position
P		Drill Position Switch, 3 Position
Q		Drill Mode Switch, 3 Position

\*Item A: The older Enda 442 and 4400 models are obsolete. This counter can be replaced and will work in the same way. Contact Scotchman for instructions.

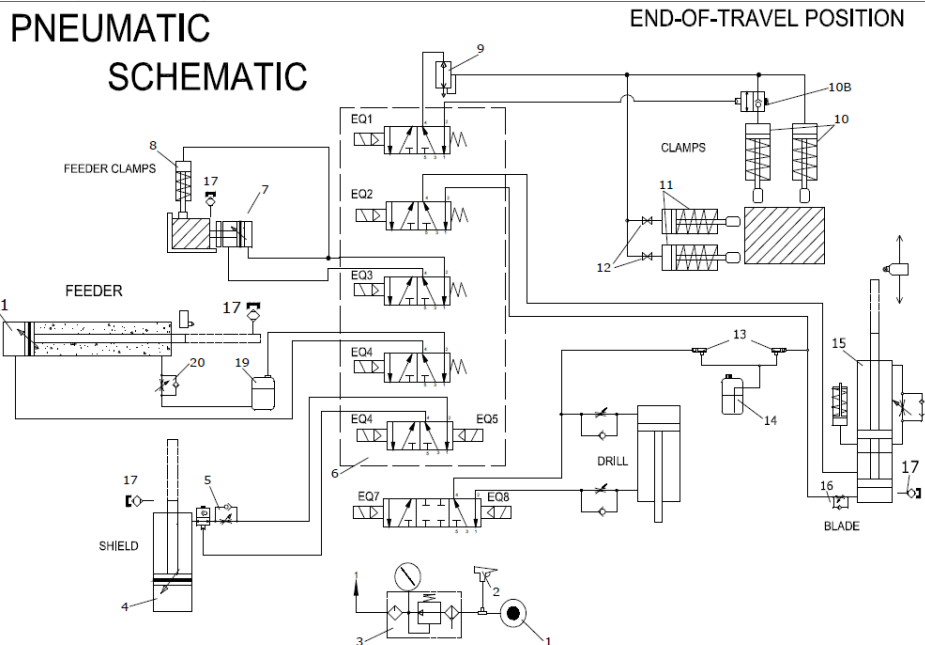
\*Item I: The blade hydraulic speed regulator is part of the sealed blade system. This part number includes the regulator, hoses, and blade cylinder as a complete, pre-filled assembly.



## 7.6 Pneumatic Components

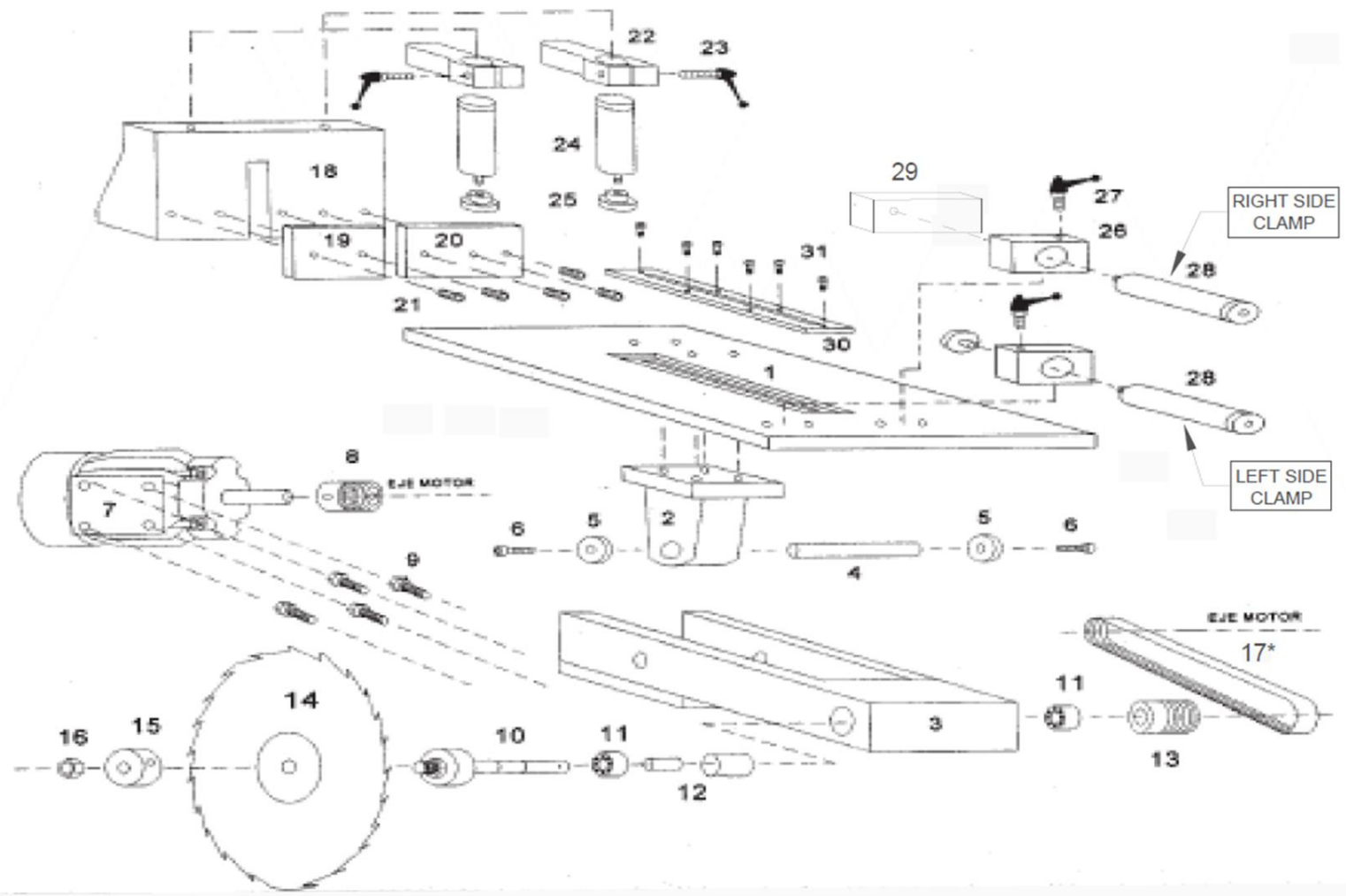
ITEM	PART #	DESCRIPTION
1		Supply Air Line (by Customer)
2	N000000021	Cleaning Gun with Hose
3	N000000017	Filter Regulator, 1/4" BSPT Ports
4	2639	Shield Cylinder
5	N0CCRC1806	1/8 x 6mm Push Regulator
6	N000A13434	Solenoid Valve Manifold Block
7	N0000C4010	Horizontal Moving Vise Cylinder
8	N00P36X160	Vertical Moving Vise Cylinder
9	N000000038	Quick Exhaust Valve
10	1677	Ø 45 Vertical Stationary Vise Cylinder
10B	N000000015	Uni Directional (Check) Valve
11	C2070000295	Ø 36 X 225 Horiz. Stationary Vise Cylinder
12	2K20000281	Mini Ball Valve 1/8" M-H
13	2612	Venturi Sprayer Assembly With Tube
13A	N000000036	Venturi Sprayer (for Drill)
14	077927	NF Coolant Reservoir
15	N000050061	Blade Cylinder w/ Regulator, Pre-Filled
16	N0CCRC140	1/4 x 6mm Push Regulator
17	1724	Magnetic Sensor, KT-50R
17A	028459	Magnetic Sensor KT-50R With Wire Harness
17B	2154	KT-50R Sensor Mounting Bracket
18	12112	Blade Up Switch
19	2040000092	Oleo Pneumatic Hydraulic Tank
20	N000000018	Advance Regulator 3/8"
21	N004052500	40x525 Shuttle Cylinder

\*Item 17 or 17A: Ensure this sensor says KT-50R. Some said KT-50P. These are not interchangeable. They are opposite (NO vs NC).



## 7.7 Rocker and Stationary Vise Assembly

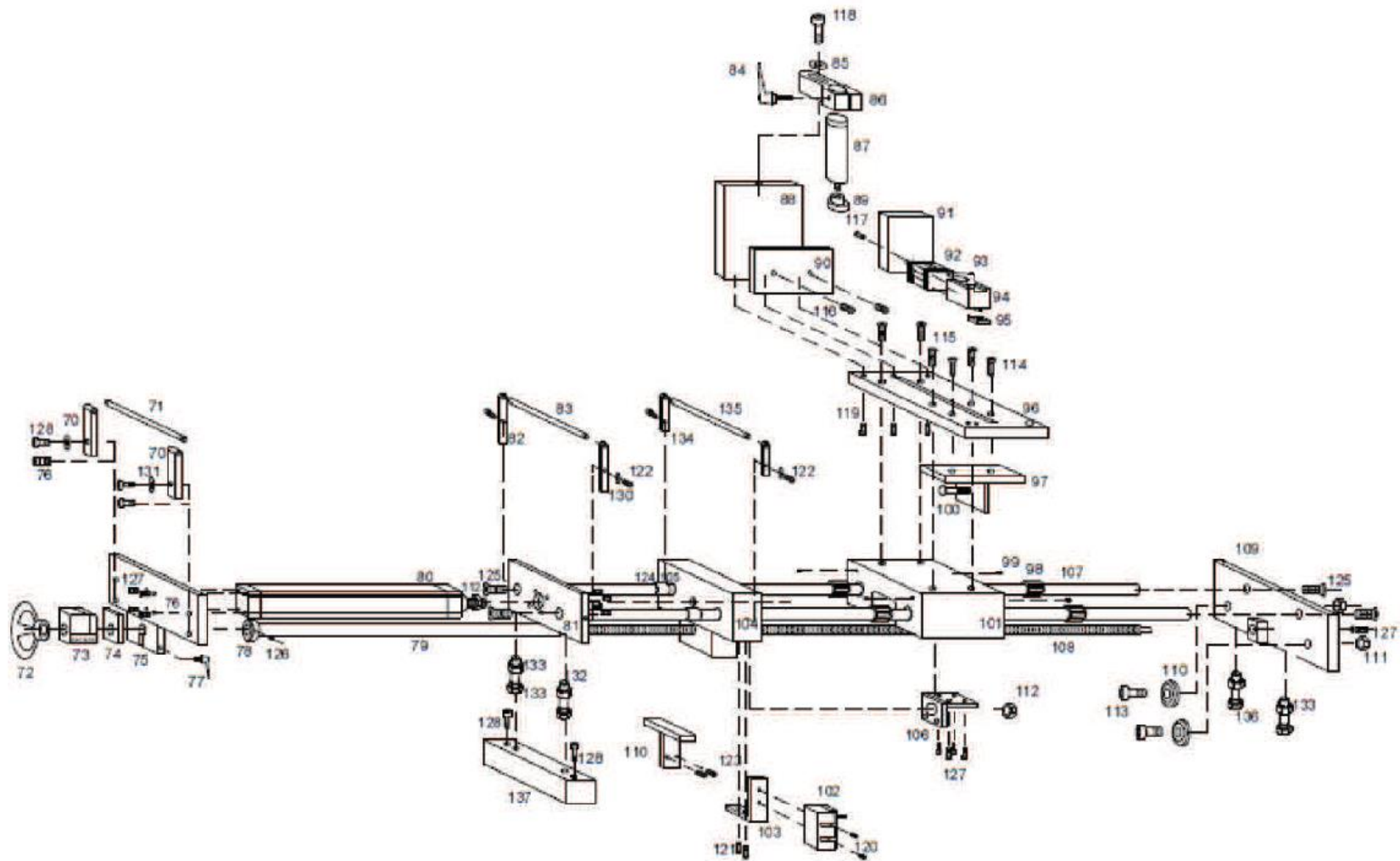
ITEM	PART #	DESCRIPTION
1	2059000064	Working Plate
2	2050000322	Rocker Support
3	2050000332	Rocker
4	2040000072	Rocker Pivot Shaft
5	TD12500012	M12 Washer
6	TD91212025	DIN 912 M-12 X 25
7	1020	7.5 / 9.0 HP Motor
8	2169000142	Motor Pulley
9	TD93110050	DIN 931 M-10 X 50
10	2050000092	Ø 100 Spindle Shaft
11	2050000162	4206 Bearing
12		Separators
13	2169000132	Rocker Pulley
14	074490	Blade Ø 500 x 4.1 x 50 - 80 Tooth
14A	074495	Blade Ø 500 x 4.6 x 50 - 96 Tooth
14B	074500	Blade Ø 500 x 4.6 x 50 - 120 Tooth
15	2050000032	Blade Washer
16	2040000232	Blade Nut
17	1283	7.5 HP Belt, 1016 PJ16
17A	C2050000012	5.5 HP Belt, 960 J12
17B	C2059001059	10 HP Belt, 1059 PJ20
18	2059000024	Turret
19 & 20	5434	Nylon Plate Set, Blade
19 & 20	5433	Aluminum Plate Set, Blade
21	TD69120616	DIN 6912 M-6 X 16
22	2040000062	Ø 45 Aluminum Rod
23	B000001070	M-10 X 70 Adjustment Handle
24	1677	Ø 45 Vertical Stationary Vise Cylinder
25	2350000131	M10 Nylon Cleat
26	2090000191	Ø 36 Horizontal Rod
27	B0000P1040	M-10 X 40 Adjustment Handle
28	C2070000295	Ø 36 X 225 Horiz. Stationary Vise Cylinder
29	2050000172	GAA Clamp Block
30	5167	Blade Groove GAA-500
31		DIN 7991 M-6



## 7.8 Moving Shuttle Vise Assembly

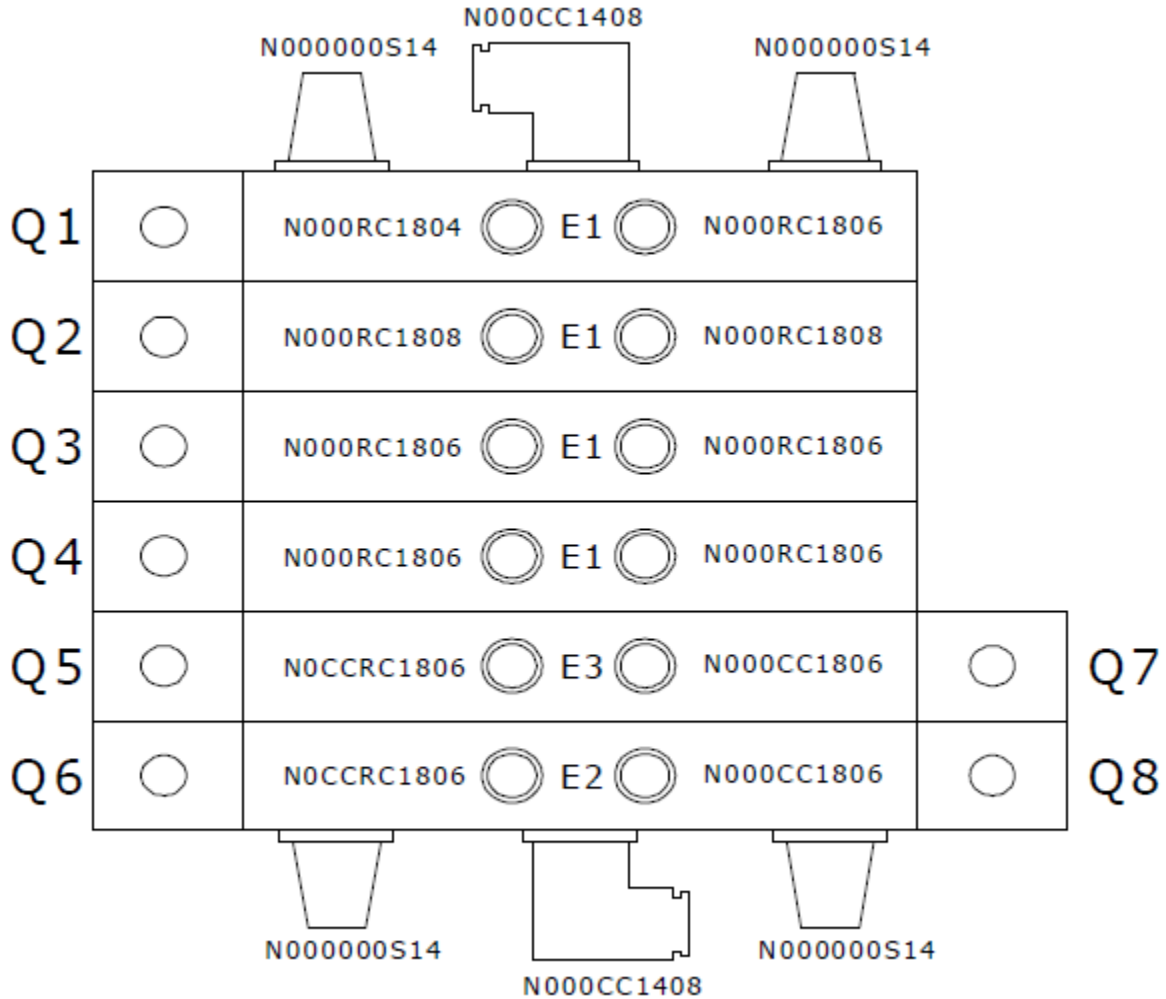
ITEM	PART #	DESCRIPTION
70		Back Roller Support
71		Ø20x300 Back Roller
72	B000000020	Ø160 Guide Wheel With Handle
73	1359000724	Counter Step 5
74		Counter Separator
75		Feeder Back Support
76	TD91206025	DIN 912 M8x25 Screw
77	B0000P0840	M8x40 Adjustment Handle
78		Tip Screw Washer
79		Feeder Screw 500mm
80	N004052500	40x525 Shuttle Cylinder
81		Intermediate Guide Tie
82		Intermediate Roller Support
83		Ø20x249 Intermediate Roller
84	B0000P1060	M10x60 Adjustment Handle
85	TD12500010	Ø10 Washer
86	2350000231	Ø36 Aluminum Rod
87	N00P36X160	Vertical Shuttle Vise Clamp Cylinder Ø36x160
88		Plate Support
89		Nylon Cleat
90	2359001724	Material Plate
91	2359001734	Horizontal Nylon Cleat
92	N0000C4010	Horiz Shuttle Vise Clamp Cylinder Ø40/10 DE
93	B0000P1070	M10x70 Adjustment Handle
94	2359000084	Cylinder Carriage
95		17mm Plane Nut
96	2059000084	Carriage Plate
97		End of Travel Stop
98	2082000171	Ø25 Lineal Bearing
99		Ø6 Nylon Block
100		Feeder Tip Screw
101	2359000254	Feeder Carriage
102	E000000032	Long Button Microswitch (Shuttle Out)
103		Microswitch Feeder Bracket
104	2359001044	Feeder Measure Buffer

ITEM	PART #	DESCRIPTION
105	2359001054	Ø25- Ø28 -30 Bushing
106		Rod Fixation Support
107	2059001074	Ø25x675 Rectified Bar
108		Threaded Screw
109		Feeder Machine Support
110		Washer
111	TD93400014	DIN934 M14 Nut
112	TD93400012	M12x1.5 Cylinder Nut
113	TD91214040	DIN912 M14x40 Screw
114	TD79910830	DIN7991 M8x30 Screw
115	TD79910830	DIN7991 M8x30 Screw
116	TD91208020	DIN912 M8x20 Screw
117	TD91206025	DIN912 M6x25 Screw
118	TD91210060	DIN912 M10x60 Screw
119	TD91208035	DIN912 M8x35 Screw
120	TD91204030	DIN912 M4x30 Screw
121	TD91205015	DIN912 M5x15 Screw
122	TD91206025	DIN933 M6x25 Screw
123	TD91206020	DIN912 M6x20 Screw
124	TD91206025	DIN912 M6x25 Screw
125	TD79911035	DIN7991 M10x35 Screw
126	TD91300006	M6 Stud Bolt
127	TD79910616	DIN7991 M6x16 Screw
128	TD91208040	DIN912 M8x40 Screw
129	TD91208040	DIN912 M10x25 Screw
130	TD12500006	Ø6 Washer
131	TD12500008	Ø8 Washer
132	TD91301040	M10 Stud Bolt
133	TD93400010	M10 Nut
134	P2359000444	Final Roller Support
135		Ø20x210 Roller
136	TD93312040	DIN933 M12x40 Screw
137		Guide Tie Support



## 7.9 Valve Bank

ITEM	PART #	DESCRIPTION
EQ1	1618	Stationary Material Vise Air Solenoid
EQ2	1618	Blade Up Air Solenoid
EQ3	1618	Moving Shuttle Vise Air Solenoid
EQ4	1618	Shuttle Cylinder Air Solenoid
EQ5 & EQ6	1619-1620-1620	Hood Up (EQ6) and Down (EQ5) Air Solenoid
EQ7 & EQ8	1619-1620-1620	Drill Up (EQ8) and Down (EQ7) Air Solenoid





## 7.10 Drill Assembly

ITEM	PART #	DESCRIPTION
C	C2DT20M20N2	Axial Compensator Collet
C-1	18740	Spring for Axial Compensator Collet
All other components are special order. Call Scotchman for availability 605-859-2542.		

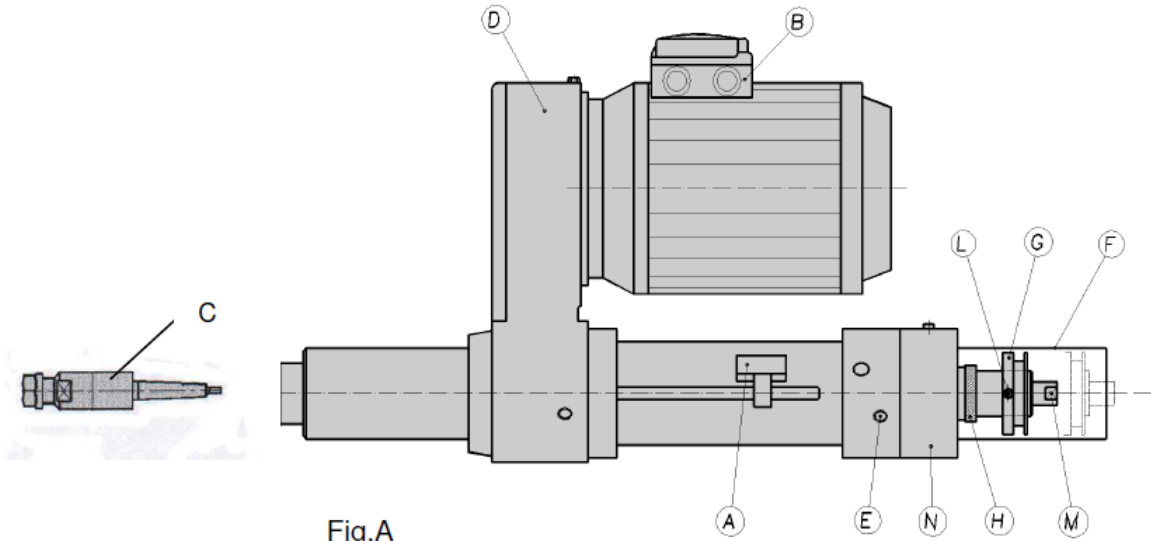


Fig.A

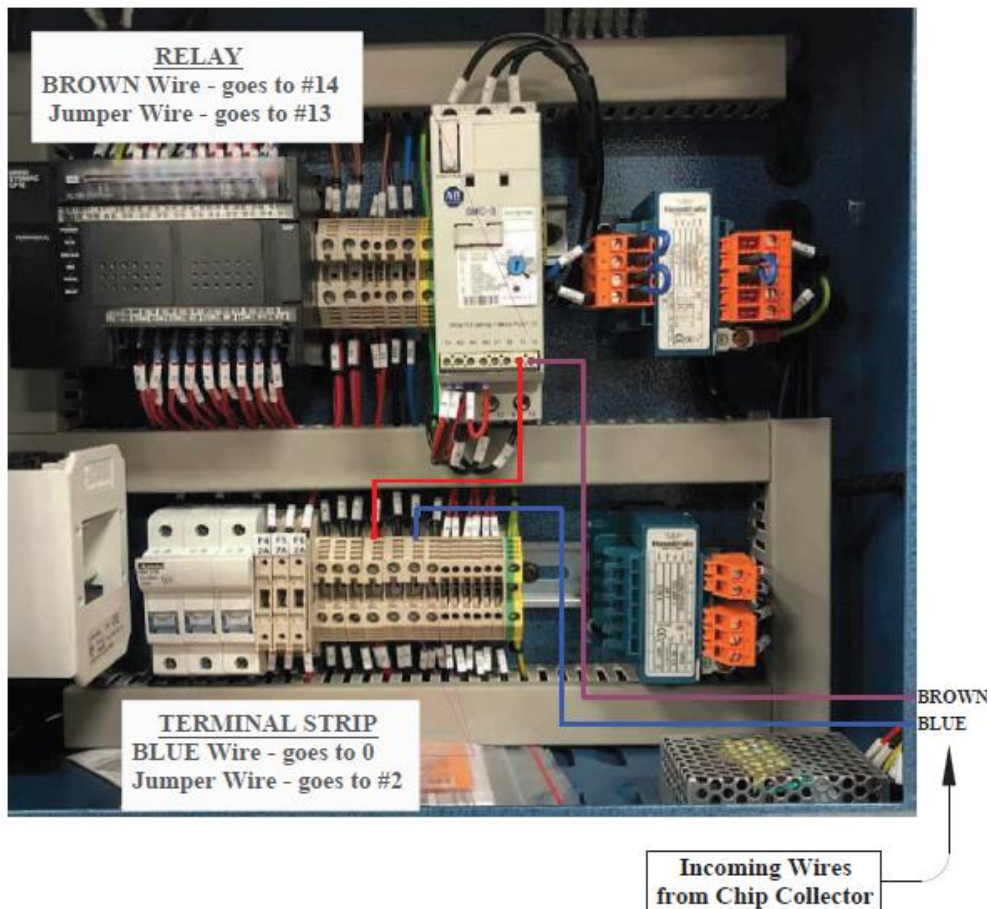
## 8.0 OPTIONAL CHIP COLLECTOR REMOTE START WIRING



NOTE: THE CHIP COLLECTOR VACUUM MUST HAVE ITS OWN POWER DROP. DO NOT ATTEMPT TO POWER THE VACUUM FROM THE SAW. THE REMOTE START WIRING TO THE SAW IS ONLY A 24VAC CONTROL SIGNAL.

TO MAKE THE CHIP COLLECTOR START WITH THE GAA SAW, READ THE INSTRUCTIONS BELOW AND USE THE WIRE LOCATIONS ON THE FOLLOWING PAGE.

1. Locate the motor soft starter. It has contacts 13 and 14 on the front that are already available for switching the vacuum on.
2. The chip collector remote start harness has two wires that may be any color such as black, brown, or blue. Polarity does not matter.
3. Attach one wire from the chip collector to #14 NO on the motor soft starter.
4. Attach the other wire from the chip collector to “0” on the main terminal strip.
5. Attach a jumper wire from the #13 on the motor soft starter to “2” on the terminal strip.
6. The vacuum should now be able to operate with the saw.



### Chip Vacuum Wiring Diagram (Auto Start)

