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





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

PRINTED SEPTEMBER 2024

SCOTCHMAN IND. - 180 E US HWY 14 - PO BOX 850 - PHILIP, SD 57567  
Call: 1 -605-859-2542 Email: [info@scotchman.com](mailto:info@scotchman.com)

# GAA-500-90 CNC DT20





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# **TABLE OF CONTENTS**

## Contents

<b>TABLE OF CONTENTS</b> .....	3
<b>1.0 INTRODUCTION</b> .....	6
<b>1.1 Legislation</b> .....	6
<b>1.2 Warranty</b> .....	6
<b>2.0 GENERAL MACHINE INFORMATION</b> .....	7
<b>2.1 Machine Identification Data</b> .....	7
<b>2.2 Technical Data</b> .....	7
<b>2.3 Machine Dimensions</b> .....	8
<b>2.4 Cutting Capacity</b> .....	9
<b>2.5 Electrical Data</b> .....	10
<b>2.6 Noise Level</b> .....	10
<b>3.0 INSTRUCTIONS ON TRANSPORT AND STORAGE</b> .....	10
<b>4.0 INSTRUCTIONS FOR ANCHORING / SERVICE START-UP</b> .....	10
<b>4.1 Anchoring Instructions</b> .....	10
<b>4.2 Power Supply Connection</b> .....	10
<b>4.3 Pressure Regulator</b> .....	12
<b>4.4 Installing the Blade</b> .....	12
<b>4.5 Belt Removal and Installation</b> .....	13
<b>4.6 Cutting Coolant</b> .....	13
<b>4.7 Priming/Adjusting the Coolant Mister</b> .....	14
<b>4.8 Cleaning the Coolant Mister</b> .....	15
<b>4.9 Blade Advance Oleo-Pneumatic System</b> .....	16
<b>4.10 Feed Shuttle Servo System</b> .....	17
<b>5.0 INSTRUCTIONS FOR USE</b> .....	18
<b>5.1 Proper and Improper Use</b> .....	18
<b>5.2 Operating Controls</b> .....	18
<b>5.3 Operation of the Machine</b> .....	19
<b>5.4 Programming Jobs on the Touch Screen</b> .....	21
<b>5.5 General Rules and Safety Checks</b> .....	23
<b>5.6 Drill Setup</b> .....	24

<b>6.0 RECOMMENDATIONS AND MAINTENANCE .....</b>	<b>25</b>
<b>6.1 Type and Frequency of Inspections .....</b>	<b>25</b>
<b>6.2 Qualified Personnel for Maintenance and Repair Work.....</b>	<b>25</b>
<b>6.3 Manufacturer’s Recommendations .....</b>	<b>25</b>
<b>6.4 Voltage Conversions.....</b>	<b>26</b>
<b>6.5 PLC and Sensor Troubleshooting and Adjustment.....</b>	<b>27</b>
<b>7.0 PARTS DIAGRAMS AND SCHEMATICS.....</b>	<b>30</b>
<b>7.1 Front Electrical Panel Layout.....</b>	<b>30</b>
<b>7.2 Control Schematic.....</b>	<b>31</b>
<b>7.3 Power Schematic .....</b>	<b>33</b>
<b>7.4 Pneumatic Schematic.....</b>	<b>35</b>
<b>7.5 Rocker and Stationary Material Vise Assemblies .....</b>	<b>36</b>
<b>7.6 Shuttle Clamp Assembly.....</b>	<b>38</b>
<b>7.6 Electrical Components.....</b>	<b>40</b>
<b>7.7 Pneumatic Components.....</b>	<b>41</b>
<b>7.7 Drill Assembly .....</b>	<b>42</b>
<b>8.0 OPTIONAL CHIP COLLECTOR REMOTE START WIRING .....</b>	<b>43</b>

## **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**

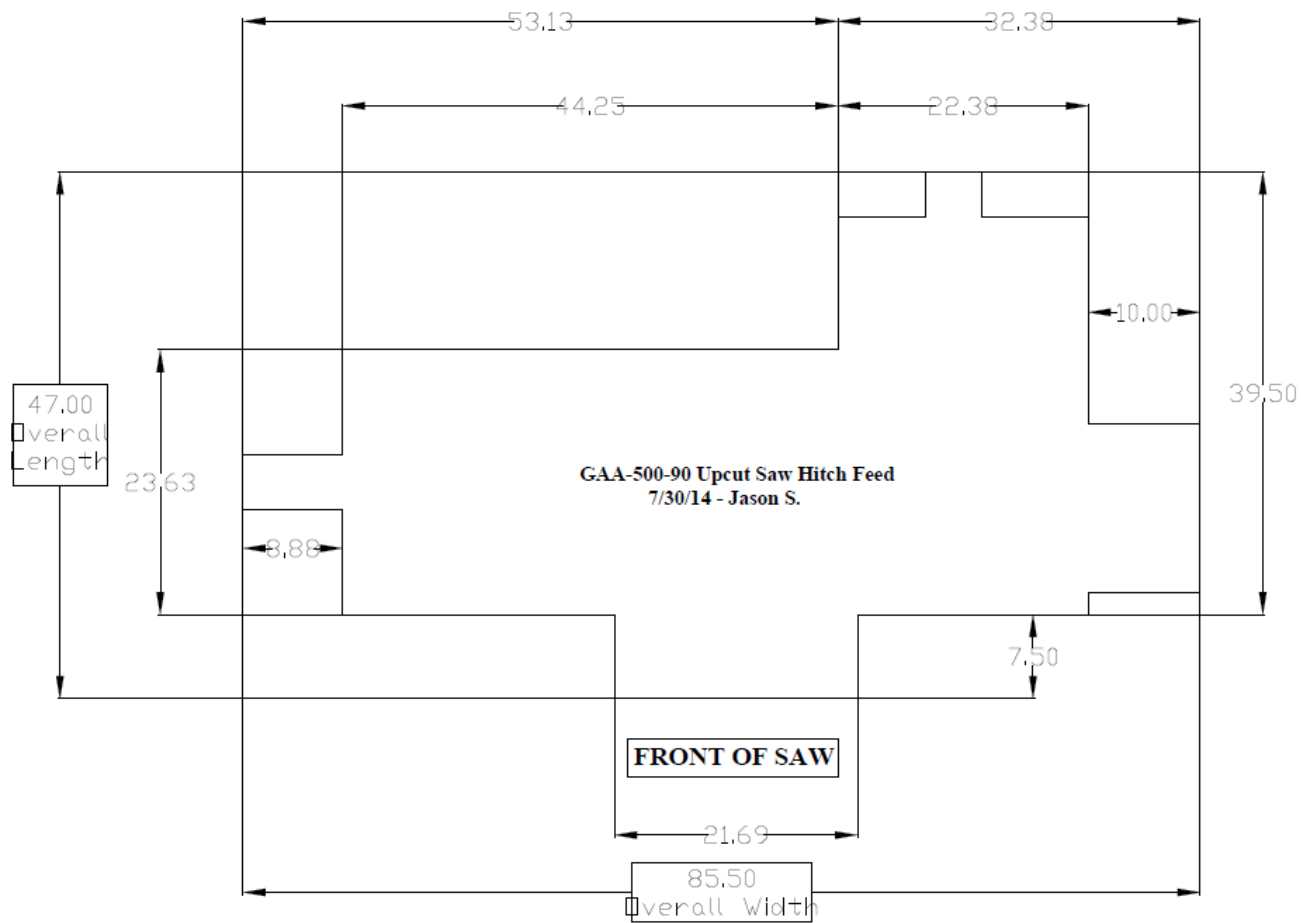
<b><u>MODEL - GAA-500-90-CNC-DT20</u></b>
<b><u>SERIAL NUMBER</u></b> _____
<b><u>YEAR OF MANUFACTURE</u></b> _____

- 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**

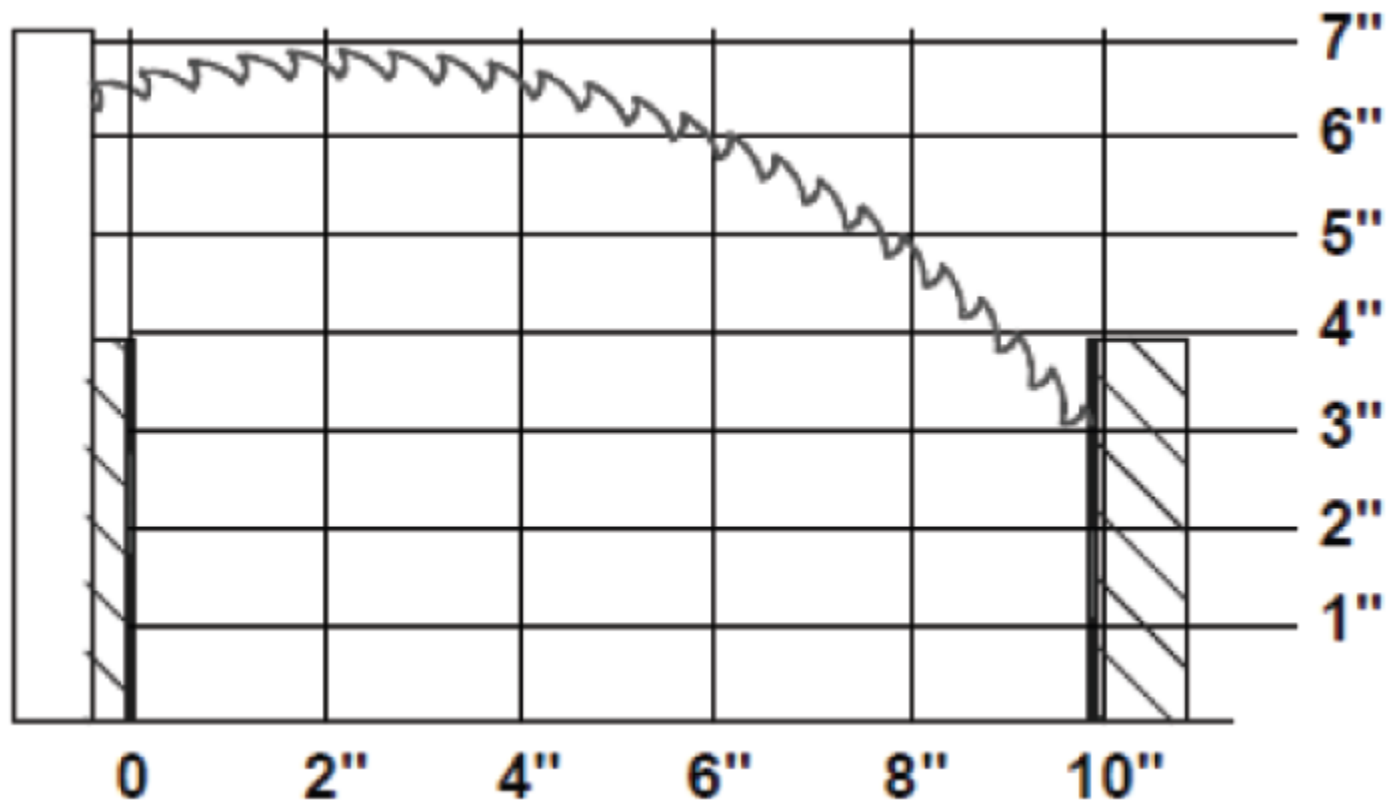
ITEM	SPECIFICATION
Three Phase Motor	230/460V 9.0 HP @ 60 Hz, 7.5 HP @ 50 Hz
Motor Speed	3,440 @ 60 Hz, 2,870 @ 50 Hz
Blade Arbor	50 mm
Maximum Blade Dimensions	500 x 4.5 x 50 mm
Feed Shuttle Travel	28" Per Hitch (Multiple Hitches Possible)
Working Pressure	90 – 105 psi, 6.5 – 7.2 bar
Air Demand	5 CFM
Pneumatic Material Vise Cylinders	3 Vertical and 3 Horizontal
Blade Lubrication System	Pneumatic Mist
Dimensions	77" x 47" x 72" (hood open)
Weight	1,430 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**

POWER SUPPLY	MOTOR POWER	TOTAL CONSUMPTION
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**

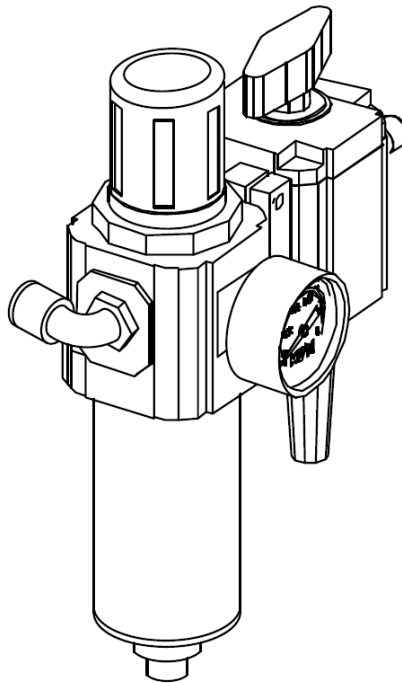
Verify that the power supply voltage corresponds to the voltage indicated on the specifications plate of the machine. Connect the cable to the power supply using a plug that is appropriate for the amp draw of both the machine and power loss through the customer supplied power cable as determined by the 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.

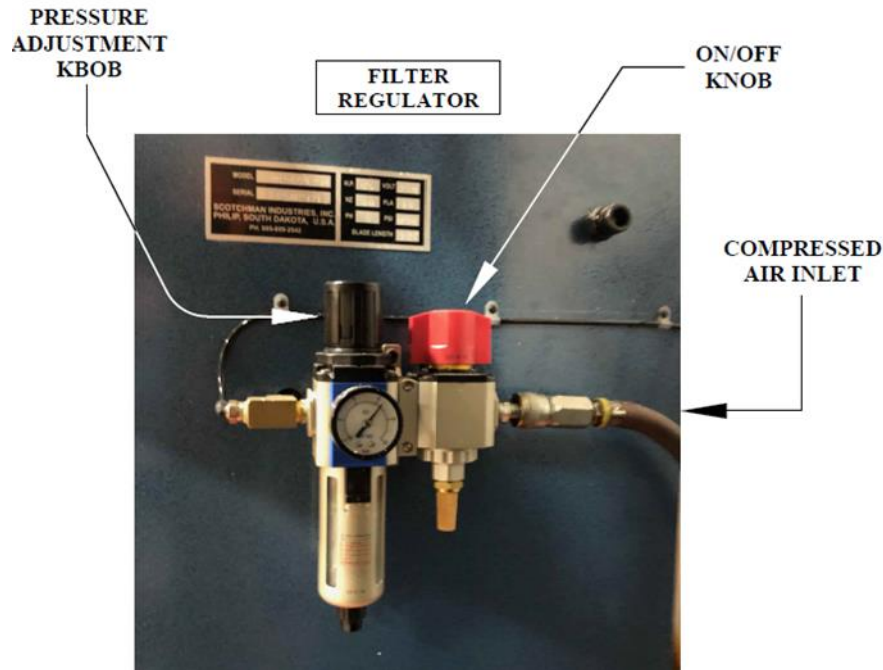
The saw must be connected to a steady supply of compressed air. The incoming supply is connected to the filter regulator. It is located on the right side of the machine.

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



### **4.3 Pressure Regulator**

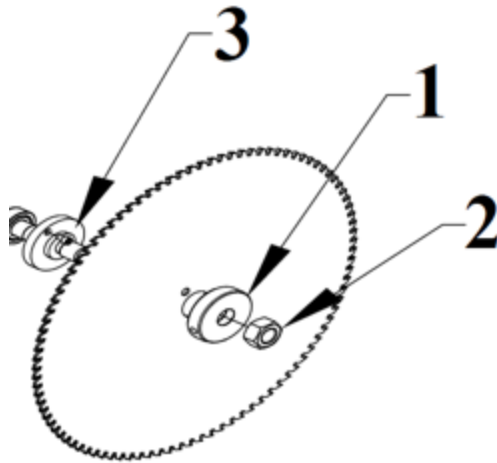
The air inlet location is shown below. The air regulator must be set at 6.5 to 7.2 bar (90 to 105 psi). The red knob on top is used to turn the air supply on or off. Do not add oil to the regulator. The pneumatic components of this machine are internally lubricated with grease.



### **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. Press the stationary vise button to close the clamps around the saw blade. The moving shuttle vise clamps can be in either position.
4. Turn the 2-position switch for the hood to the down position.
5. Turn the blade advance rate knob clockwise until it is turned off. This will prevent the blade from raising.
6. Turn the auto/manual 2-position switch to the manual position.
7. 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.
8. 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 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.
9. 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.
10. 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:



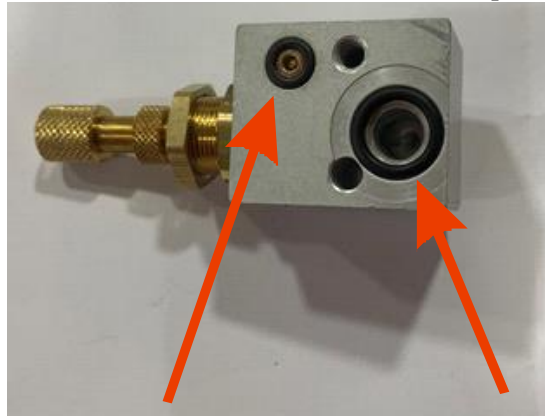
a.

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



a.

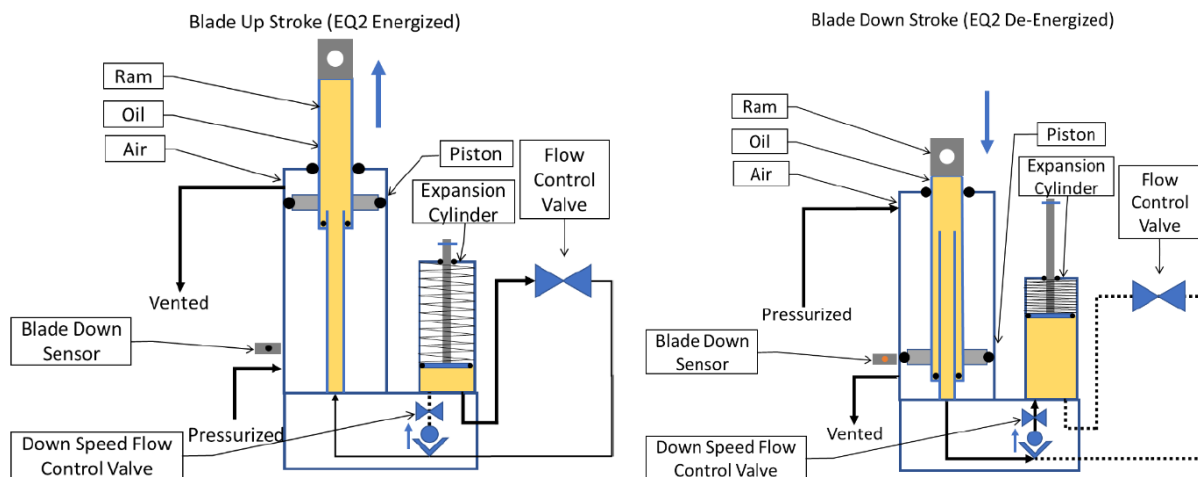
3. Clean the two holes indicated which are the air input and the oil mist output.



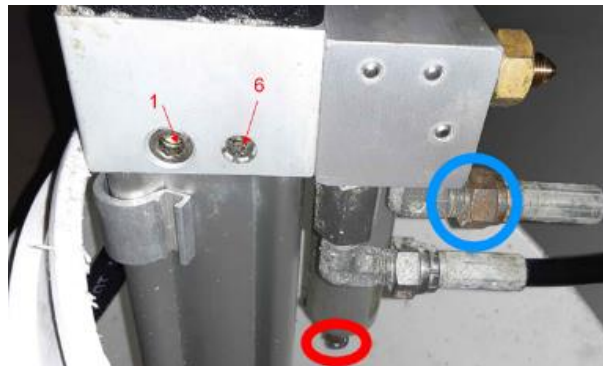
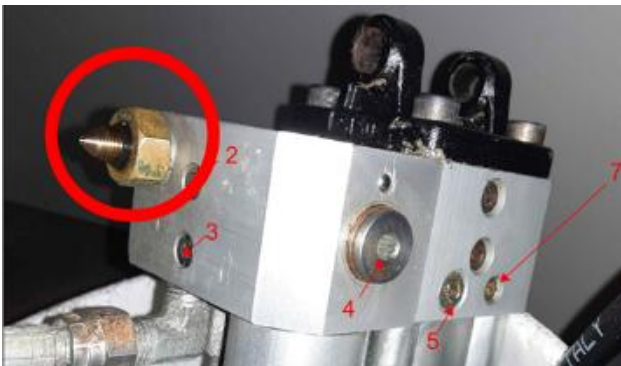
a.

## 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 Servo System**

The CNC series of the GAA line uses a screw drive servo to advance the shuttle. This consists of a motor/encoder unit on the left side of the saw and a servo variable frequency drive within the cabinet.

Should the shuttle fail to advance, check the screen on the servo drive for error messages.

Note this screw is grease lubricated via a zerk on the back side of the moving shuttle vise

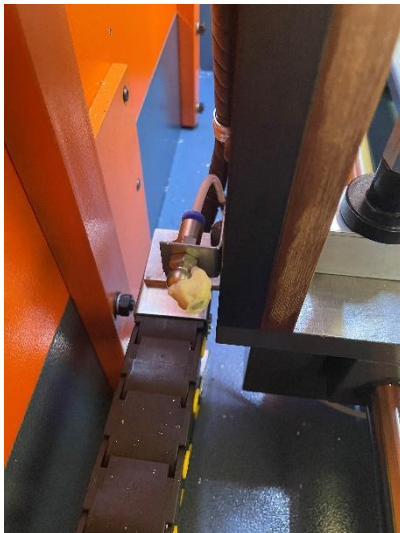
Servo Variable Frequency Driver



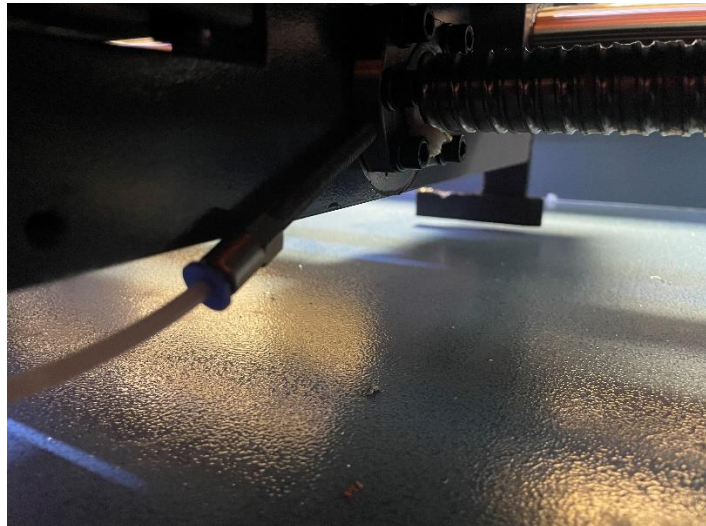
Servo Motor



Servo Screw Lubricator Zerk



Servo Screw



## **5.0 INSTRUCTIONS FOR USE**

### **5.1 Proper and Improper Use**

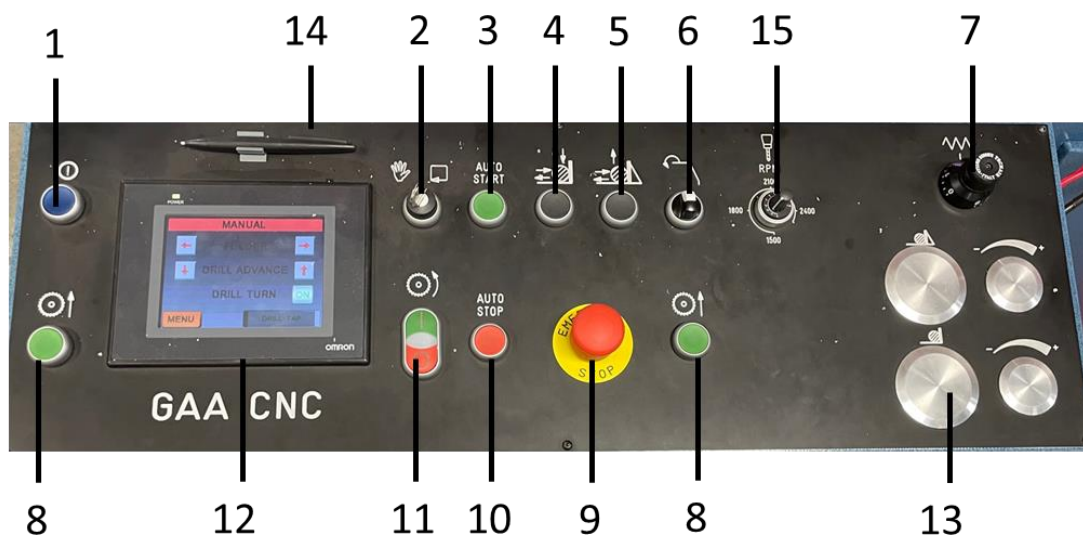
This is an automatic cold saw especially designed for cutting non-ferrous material. The use of this machine for cutting ferrous materials is strictly forbidden and may lead to machine damage as well as serious injury.



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

### **5.2 Operating Controls**

1. Reset Button: Press when powering up or after an emergency stop.
2. Auto/Manual Selector (Manual “Hand”/Auto “Box Arrow”)
3. Auto Mode Start Button
4. Moving Shuttle Vise Push Button
5. Stationary Material Vise Push Button
6. Hood Switch
7. Blade Advance Speed Regulator Knob
8. Blade Up Buttons (2)
9. Emergency Stop Button
10. Auto Mode Stop Button
11. Blade Motor On/Off Buttons
12. Touch Screen
13. Optional Vise Pressure Regulators
14. Legend Plate
15. Drill Speed Adjustment





#### Signal Lamps:

Red: Emergency Stop

Orange/Yellow: Machine Running in Auto

Green: Machine is Powered On

## 5.3 Operation of the Machine



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

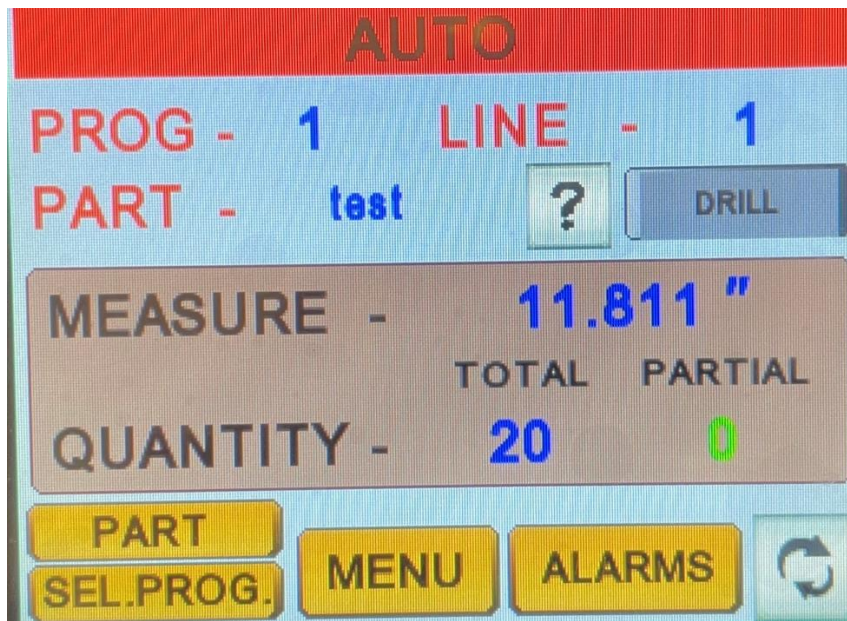
MANUAL MODE: One cut at a time.

1. Turn on power at the disconnect switch. Ensure the E-Stop switch (9) is pulled out. Press the blue reset button (1). The green power lamp on the vertical pole should illuminate.
2. Turn the auto/manual switch (2) to the “hand” position for manual mode.
3. Open the hood with switch (6).
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. Note the shuttle can be jogged left or right in manual mode by the touch screen (12). Blade cut height can also be adjusted.
5. Close both material and shuttle vises with the push buttons (4) and (5).
6. Close the hood with switch (6).
7. Turn on the blade motor with (11).
8. To make a cut, press both blade up buttons (8) simultaneously and hold until the cut is complete.
9. Turn off the blade motor with (11).
10. Open the vises by pressing (4) and (5).



**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. Ensure the E-Stop switch (9) is pulled out. Press the blue reset button (1). The green power lamp on the vertical pole should illuminate.
2. Turn the auto/manual switch (2) to the auto position ("box arrow").
3. Open the hood with switch (6).
4. Insert the material to be cut into the machine with 3/8" to 1/2" extending beyond the blade slot.
5. Adjust the vises so that they have the minimum required travel (no more than 1/4"). A 17mm wrench is needed for this task.
6. Close both material and shuttle vises with the push buttons (4) and (5).
7. Close the hood with switch (6).
8. On the touchscreen (12), program in the job details including parts count, cut length, and desired blade height. See next section below for auto screen programming.
9. Turn on the blade motor with (11).
10. Start the auto sequence with (3). The saw will make a trim cut and proceed to continue cutting until material runs out, the parts count is met, stop (10) is pressed, or the E-stop (9) is pressed.
11. 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 (11) and press (3) to restart. The job must be restarted on the touchscreen (12) to restart if the parts count has been met before operations can resume if the job completion initiated the shutdown.



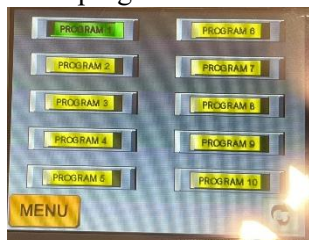
## **5.4 Programming Jobs on the Touch Screen**

The touch screen menu map can be seen below. However, note the screen will automatically snap to the manual or automatic screen when the auto/manual selector switch is actuated.

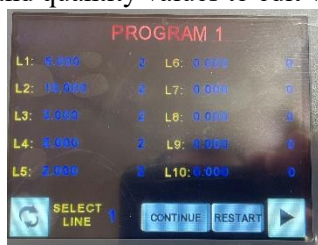
For automatic mode job program entry, note that there are 10 program slots and 30 part length slots. The 30 part lengths are shared among all 10 programs. Altering “L1” length, for example, will alter “L1” in all 10 programs. However, the individual quantities can differ between the 30 parts for each of the 10 programs anywhere from 0 to the desired number of pieces.



1. Set the desired maximum blade height on the main auto screen by tapping the “CUT HEIGHT” value. A calculator screen will pop up to edit the value.
2. From the main auto screen, press “SEL.PROG.”. A 10 program list will pop up. Press the number of the desired program.



- a.
3. A list of 10 parts will show up with side arrows to scroll between 1-10, 11-20, and 21-30. Tap the length and quantity values to edit via a pop up keypad screen.



- a.
4. When satisfied with the entries, back out of the parts screen, then back out of the program screen to return to the auto screen. When the START button is pressed on the control panel, the saw will begin running the selected program. Note the main auto screen also displays the program number selected (1-10) on the top left for confirmation.
5. The drill operation can be changed from off, drill, or drill-tap by sequentially pressing the mode button on the top right of the auto screen.

Boot Complete  
(Press Blue Button to Proceed)



## **5.5 General Rules and Safety Checks**

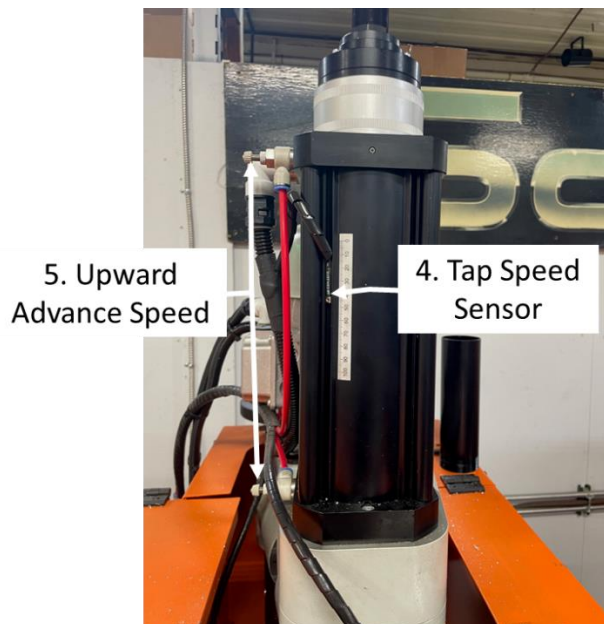
- Before using the machine, check the efficacy and operation of all safety devices, check that the moving parts of the machine are not blocked, ensure there are no damaged parts and all machine components are in place and working correctly.
- NEVER operate the machine with any of the safety devices disabled 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**

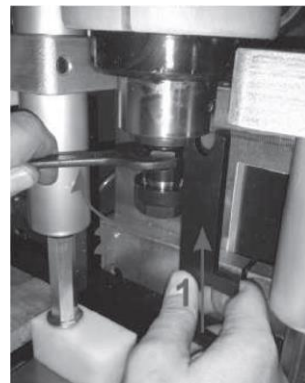
The Drill on a GAA 500 90 DT20 is a complex piece of equipment. It has a two stage advance speed control to handle fast approach and working speed, two stage tool speed to handle drilling and tapping speed, total stroke control, and up/down sensors. It also has some up and down spring loaded play so 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
	Bearing Grease	Saw Bearings	1 – 2 Pumps (Top Off) 1/2 Tube (Refill)	Monthly
	Kluber Isoflex NBU 15	Servo Screw	1 – 2 Pumps	Every 8 Hrs
	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.				

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

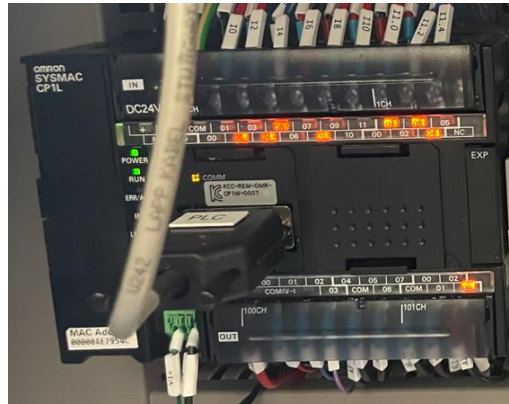
- Main power transformer (Install, 460V or remove, 230V)
- 1. GAA CNC models use a shuttle servo which can only be configured for 230V. Therefore, CNC models simply convert between 230 VAC and 460 VAC by removing or adding an in-line power transformer upstream of the main disconnect switch. Therefore, everything else in these saws stays wired for 230 V regardless of whether the saw is 230 or 460.
- 2. Add (converting to 460V) or remove (converting to 230V) in-line power transformer.



- 3. 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.






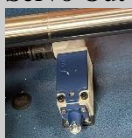
## **6.5 PLC and Sensor Troubleshooting and Adjustment**

Note the PLC on the GAA-600-90-CNC 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-600-90 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 Servo In Sensor	CNC Models	Autonics PSN17-5DP	1029
Shuttle Servo Out Switch	CNC Models	EMAS L5K13MUM331	12112

Sensor Troubleshooting Table		
Sensor	Symptom	Cause
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 Servo In Sensor 	Machine fails to home and will not make an automatic cut.	Mechanical damage to sensor or wiring. Faulty sensor.
Shuttle Servo Out Switch 	Machine gets stuck with the shuttle out and will not continue in the automatic cycle. Clamps may not release.	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)

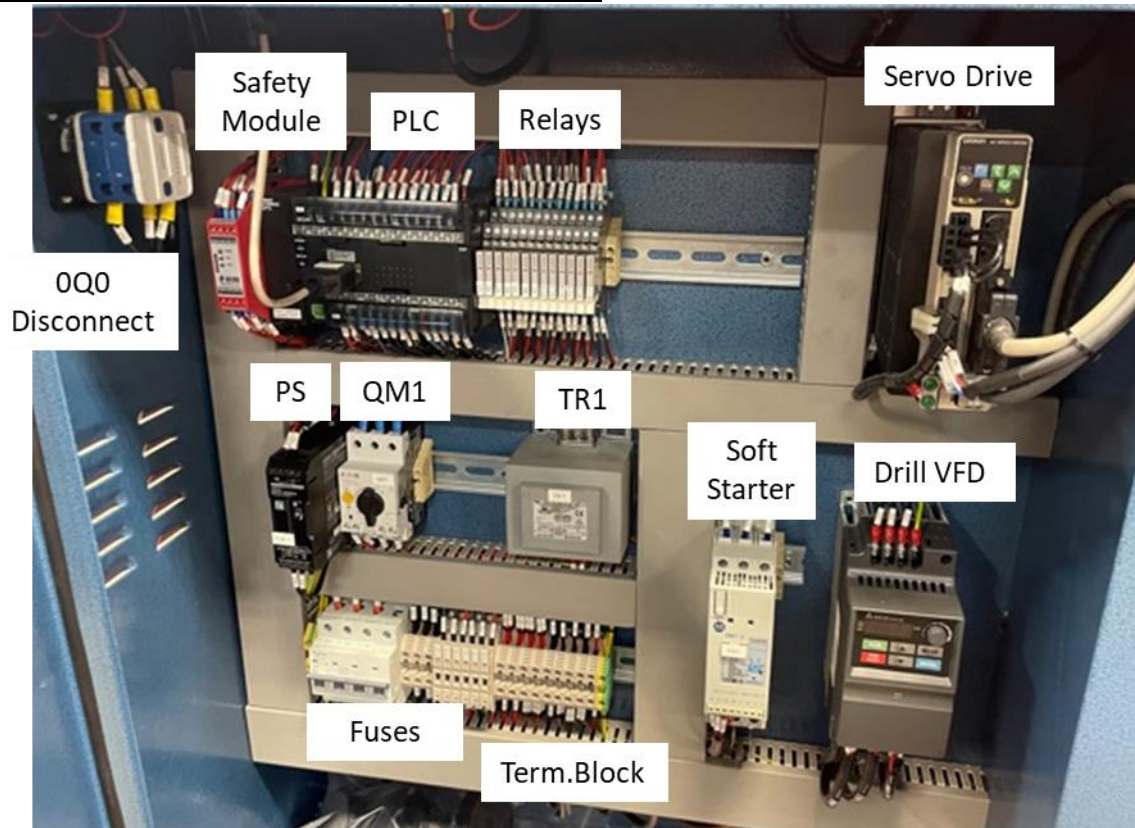
The blade down sensor is best accessed through the rear blade compartment hatch. It is mounted on the rear of the pneumatic blade up cylinder. Remove the bolts in the hatch cover. E-stop the machine so the blade cannot be energized, but have the disconnect on. With the blade down, the sensor has an LED 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).

## 7.0 PARTS DIAGRAMS AND SCHEMATICS

### 7.1 Front Electrical Panel Layout



#### Abbreviations:

PLC: Programmable Logic Controller

PS: 24VDC Power Supply

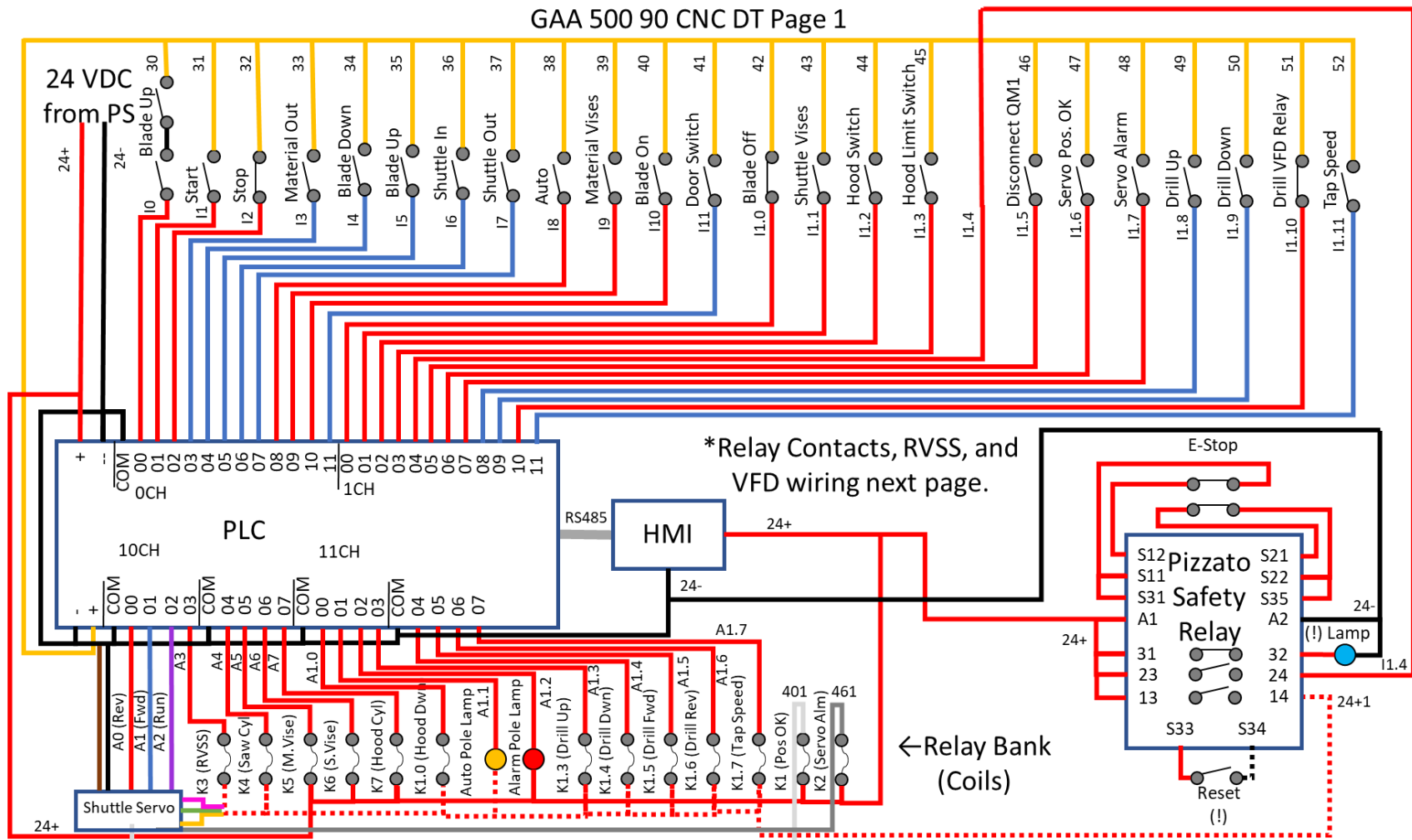
QM1: Overload Switch

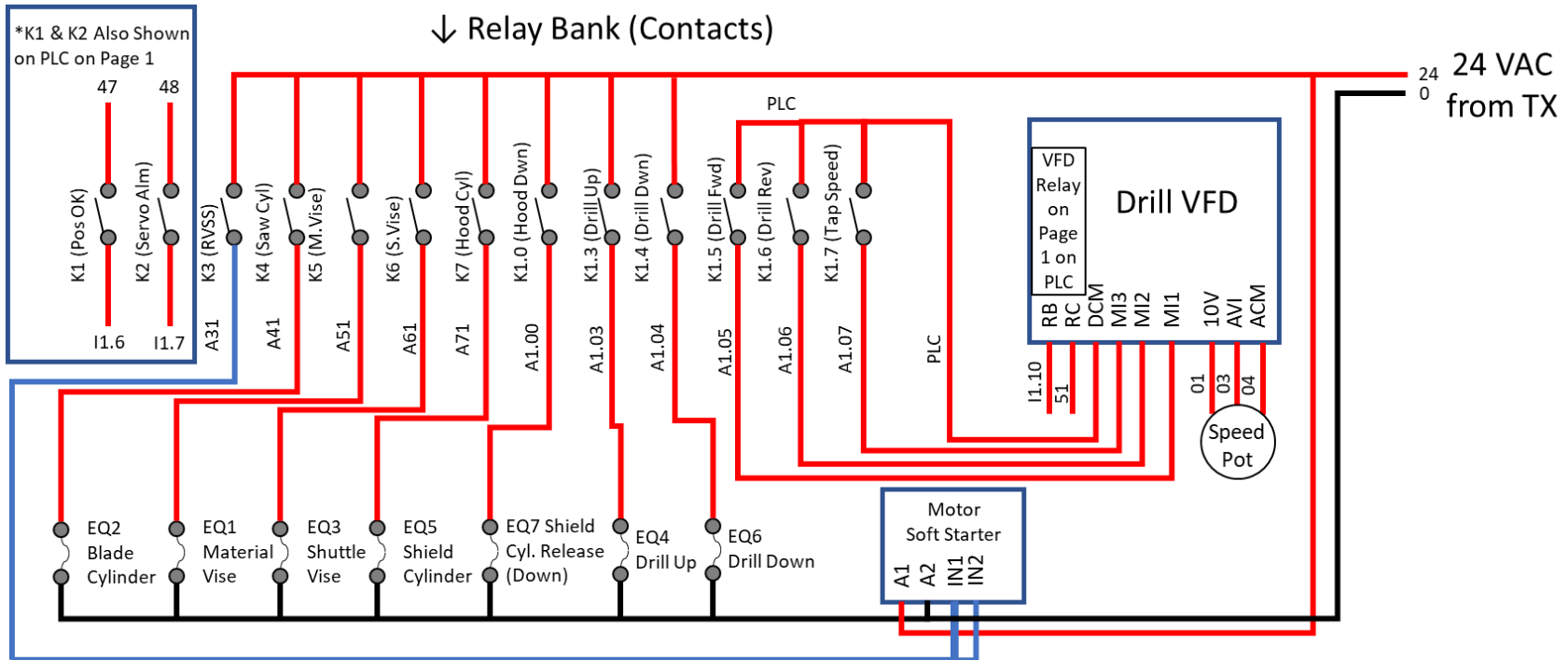
TR1: 24VAC Transformer

Term Block: Terminal Block

## 7.2 Control Schematic

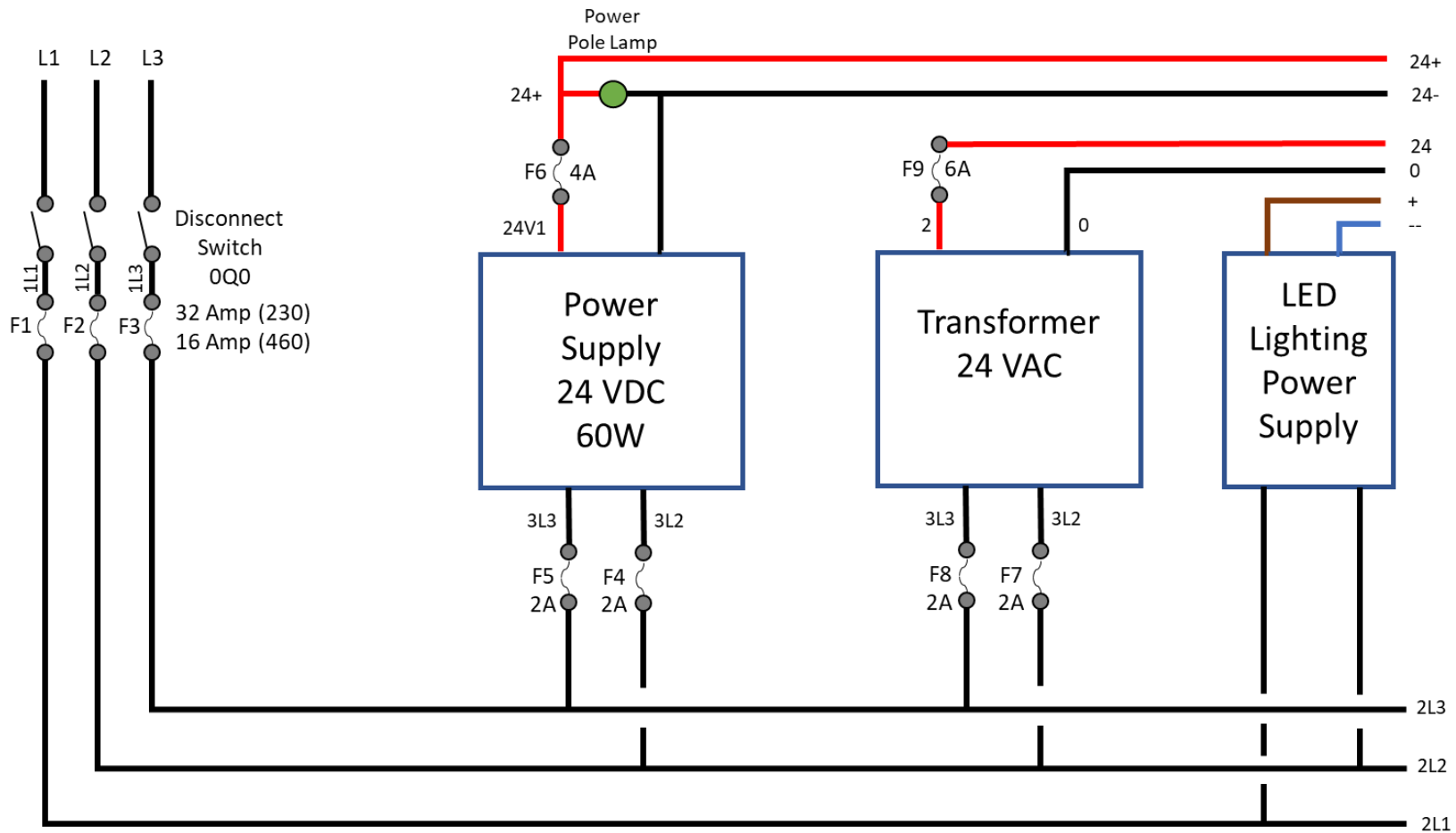
GAA 500 90 CNC DT Page 1



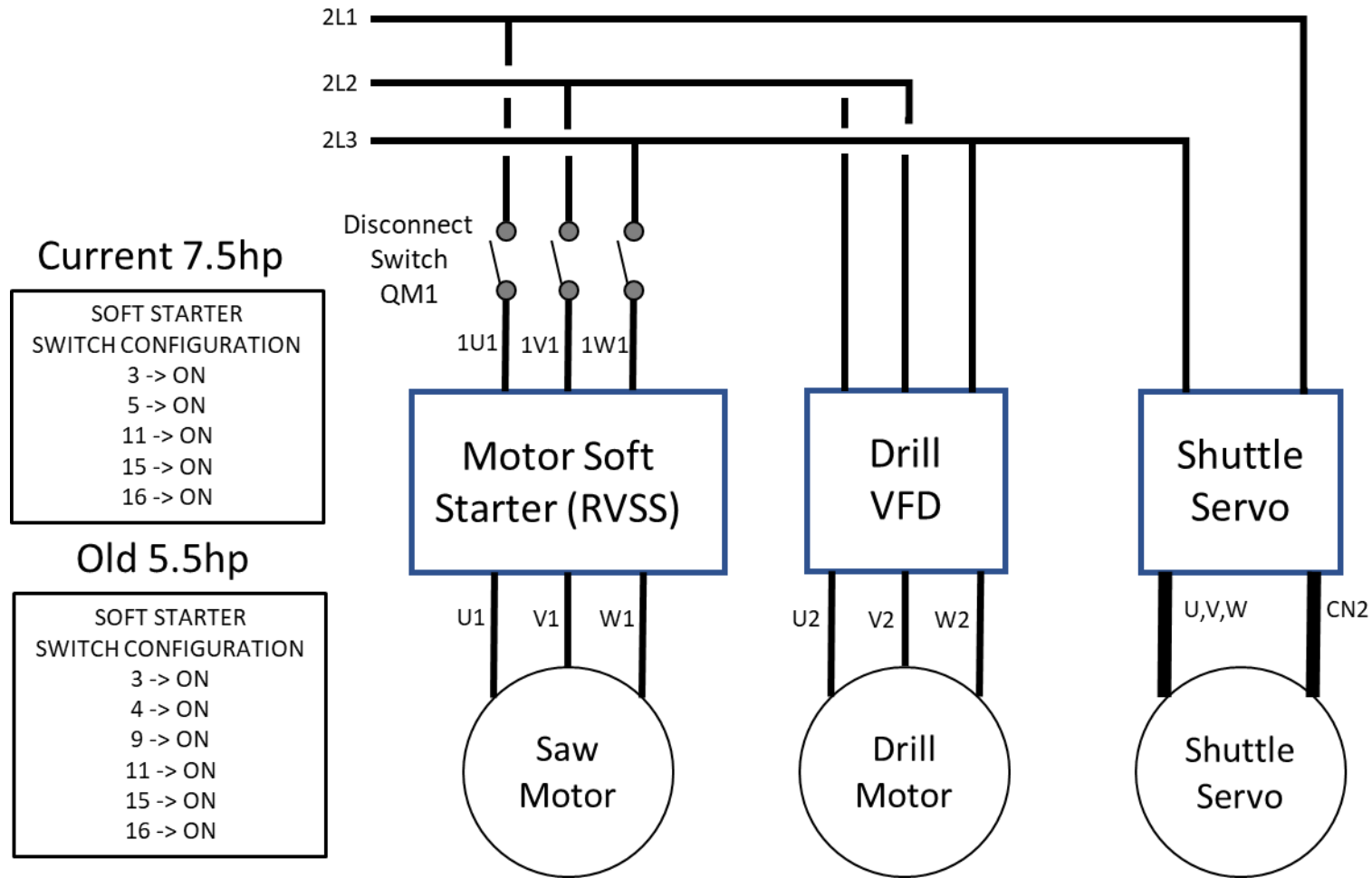


## 7.3 Power Schematic

GAA 500 90 CNC DT Power Diagram

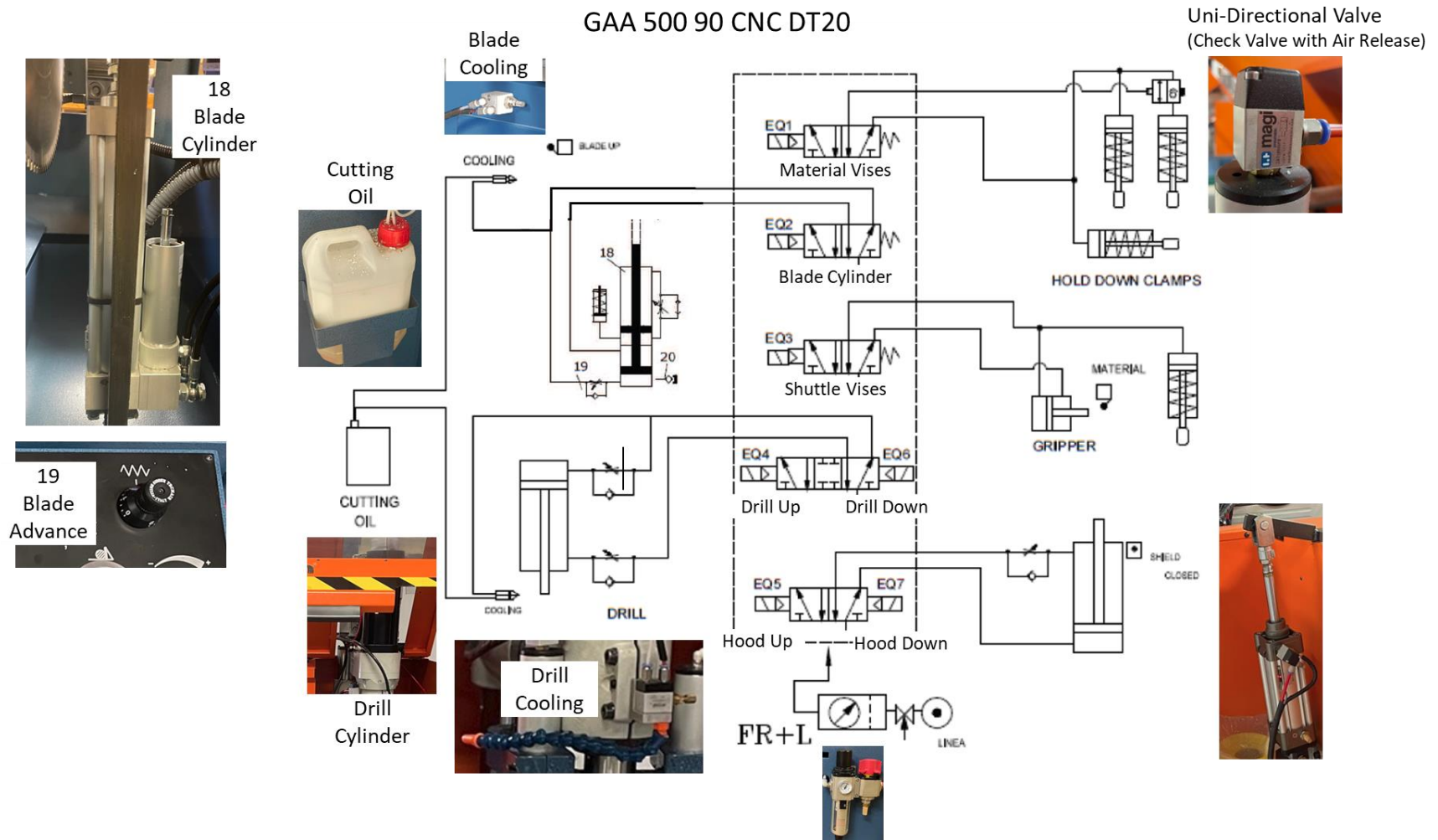


## GAA 500 90 CNC DT Motor Diagram



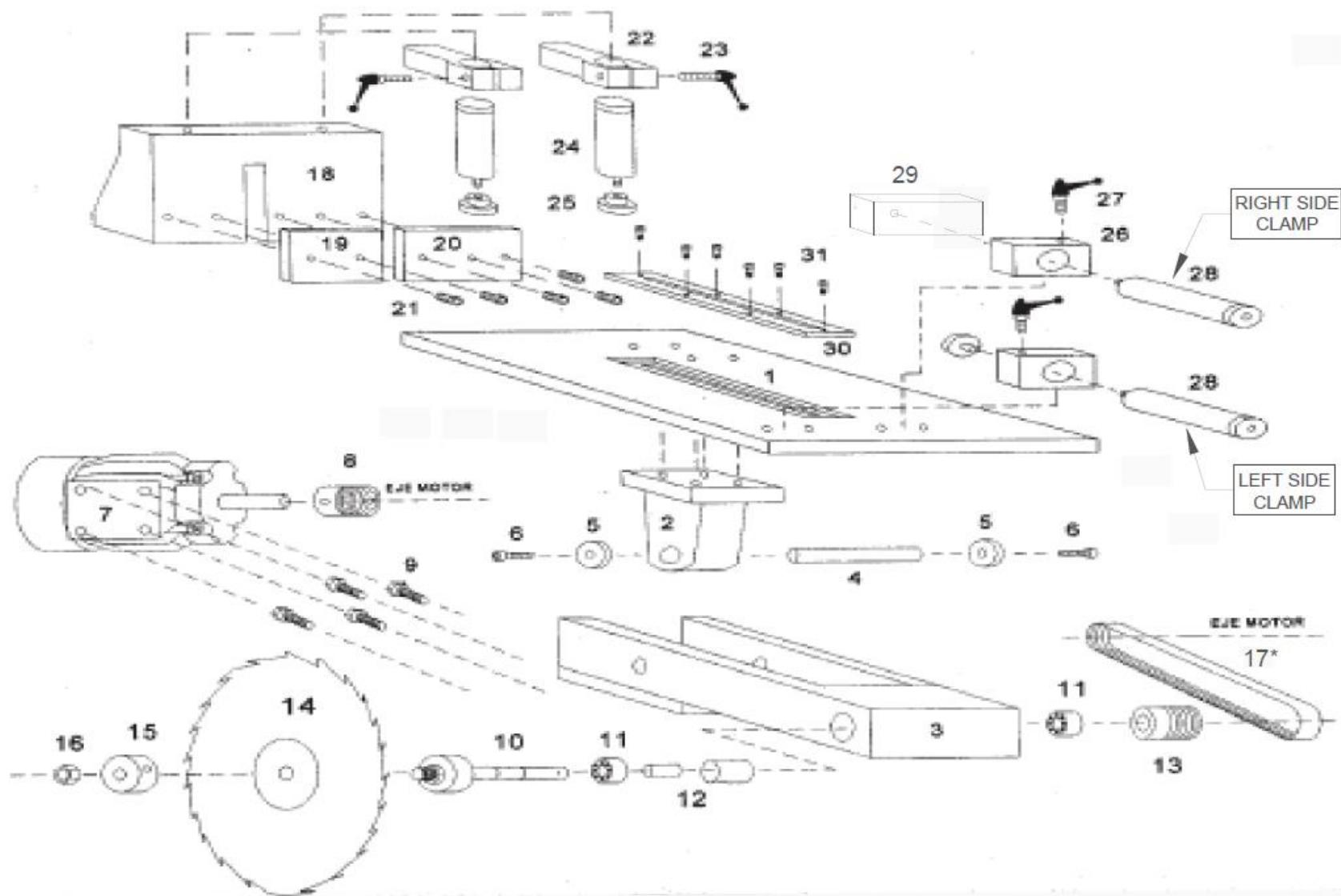
Control Wiring Not Shown

## 7.4 Pneumatic Schematic



## 7.5 Rocker and Stationary Material Vise Assemblies

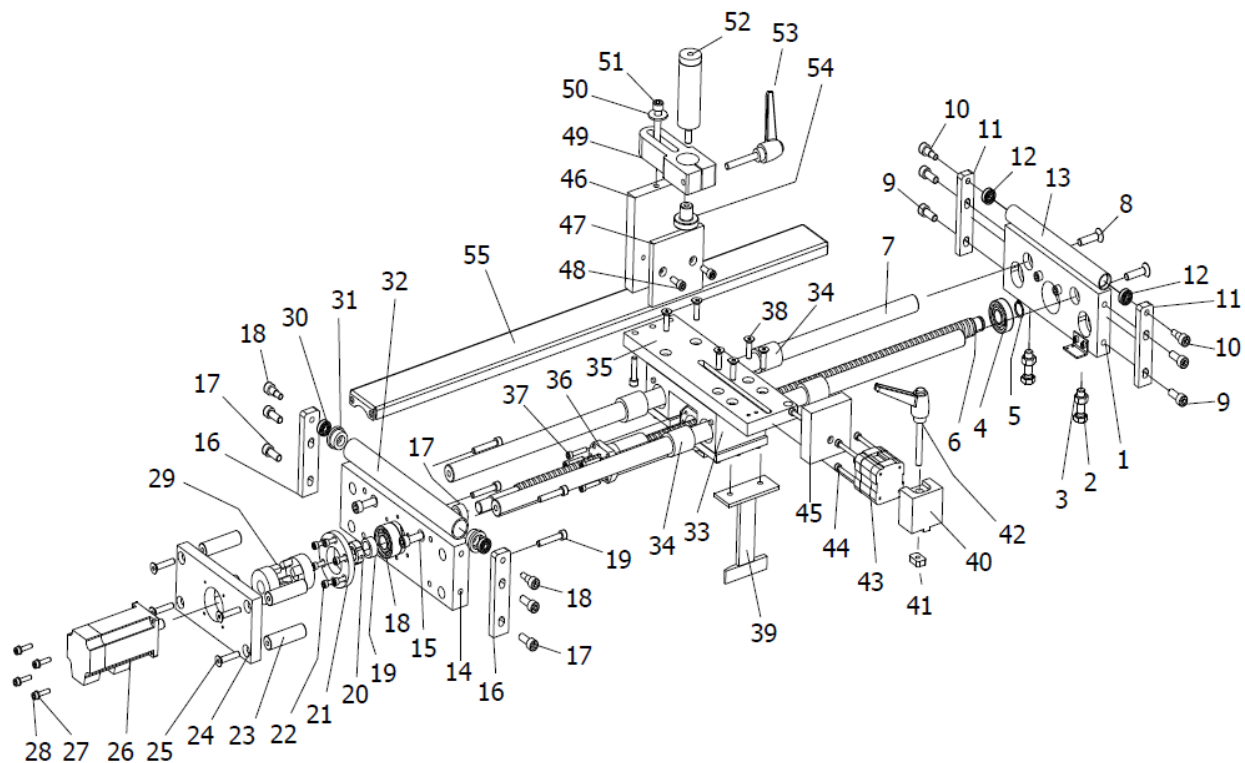
ITEM	PART #	DESCRIPTION
1	2059000064	Working plate
2	2050000322	Rocker support
3	2050000322	Rocker
4	2040000072	Rocker rotation shaft
5	TD12500012	M-12 washer
6	TD91212025	DIN 912 M-12 x 25 PIN
7	1020	7.5 / 9.0 HP Motor
8	2169000142	Motor pulley J16
9	TD93110050	DIN 931 M-10 x 50 PIN
10	2050000092	Rectified Ø100 shaft
11	2040000172	4206 bearing
12		Separators
13	2169000132	Rocker pulley J16
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		Left turret plate
20		Right turret plate
21	TD69120616	DIN 6912 M-6 x 16 PIN
22	2040000062	Ø45 Aluminum rod
23	B000001070	M-10 x 70 Pull
24	1677	Ø45 Pneumatic hold-down clamp
25	2350000131	Nylon cleat
26	2090000191	Ø36 Horizontal rod
27	B000006x40	M-10 x 40 Pull
28	C2070000295	Ø36 x 225 Pneumatic clamp
29	2050000172	GAA Clamp Block
30	5167	Blade groove GAA-500
31		DIN 7991 M-6



## 7.6 Shuttle Clamp Assembly

ITEM	PART #	DESCRIPTION
1		Feeder Machine Support
2	CTD93312040	DIN 933 M-12 x 40 Screw
3	CTD93400010	M-10 Nut
4	C2070000142	6204 2RS Bearing
5	CTD47100120	DIN 471 Ø 20 Ring
6	M200HBA2510	Ball Screw Ø 25 x 10
7	C2169011074	Ø 25H6 x 925 Bar
8	CTD79911040	DIN 7991 M-10 x 40 Screw
9	CTD91210025	DIN 912 M-10 x 25 Screw
10		Roller Shaft
11		Front Roller Support
12	C2350000461	608 Bearing
13		Ø 25 x 2250 PVC Roller
14		Back Feeder Support
15		Ø 32 x 300 PVC Roller
16		Back Roller Support
17		Screw Separating Tip
18	CR0003204RS	3204 2RS Bearing
19		Screw Separating Tip
20	CTP00FR2010	M-20 x 1 Precision Nut
21		Cover Bearing
22	CTD91206020	DIN 912 M-6 x 20 Screw
23		Ø 20 Support
24		Servo Plate 400w
25	CTD79910840	DIN 7991 M-8 x 40
26	CE000R88400	400W Servomotor G
27	CTD12700006	DIN 127 Ø 6
28	CTD91206025	DIN 912 M-6 x 25 Screw
29	C2000401417	Elastic Coupling Ø 17-Æ 14
30	C2350000461	608 Bearing
31		Roller Head Ø 32
32		Ø 32 x 300 PVC Roller
33		Feeder Carriage
34	C2060000171	Ø 25 Lineal Bearing
35		Carriage Plate

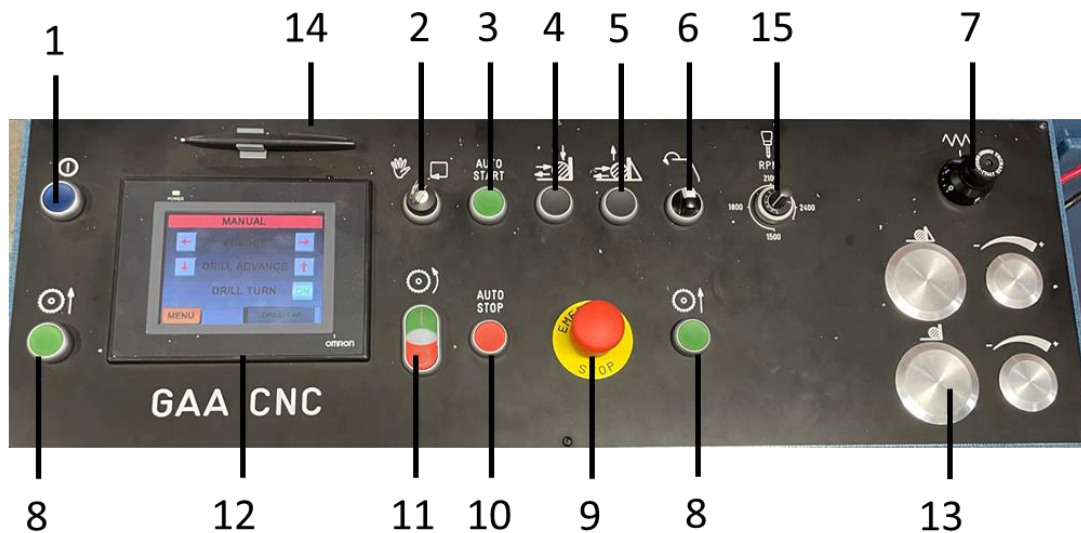
ITEM	PART #	DESCRIPTION
36	C20000A2510	25 x 10 Ball Screw Nut
37	CTD91206020	DIN 912 M-6 x 20 Screw
38	CTD79910835	DIN 7991 M-8 x 35 Screw
39		End Of Travel Stop
40		Cylinder Carriage
41		Plane Nut M-10
42	CB0000P1070	M-10 x 70 Lever
43	CN0000C4010	Æ 40 x 10 D.E. Compact Cylinder
44	CTD91206060	DIN 912 M-6 45 x 60 Screw
45	P2359001734	Horizontal Nylon Cleat
46		Plate Support
47		Material Plate
48	CTD91208020	DIN 912 M-8 x 20 Screw
49	P2350000231	Æ 36 Aluminum Rod
50	TD90210010	DIN 9021 Æ 10
51	TD91210060	DIN 912 M-10 x 60 Screw
52	CN00P36X120	Hold-Down Clamp Æ EXT = 36 x 120
53	CB0000P1060	M-10 x 60 Lever
54		Nylon Cleat
55		Ball Screw Protector



## 7.6 Electrical Components

ITEM	PART #	DESCRIPTION
1		Reset Button
2		Auto/Manual Switch, 2 Position
3	011879	Start Button
4	048101-011874	Moving Shuttle Vise Button
5	048101-011874	Stationary Material Vise Button
6	562023	Hood Switch
7*	N000050061	Blade Cylinder w/ Regulator, Pre-Filled
7A	18722	Knob, Regulator
8	N000000008-011874	Green Button (Blade Up, Modular Style)
9	011837	Emergency Stop Switch
10	E000000M51	Stop Button
11	E000000011-011867-011874	Saw On/Off Switch
12		Omron HMI, Programmed
13	CN000000P20	Optional Vise Pressure Gauges
14		Legend Plate
15		Drill Speed Potentiometer
	E000000067	Omron PLC, Programmed

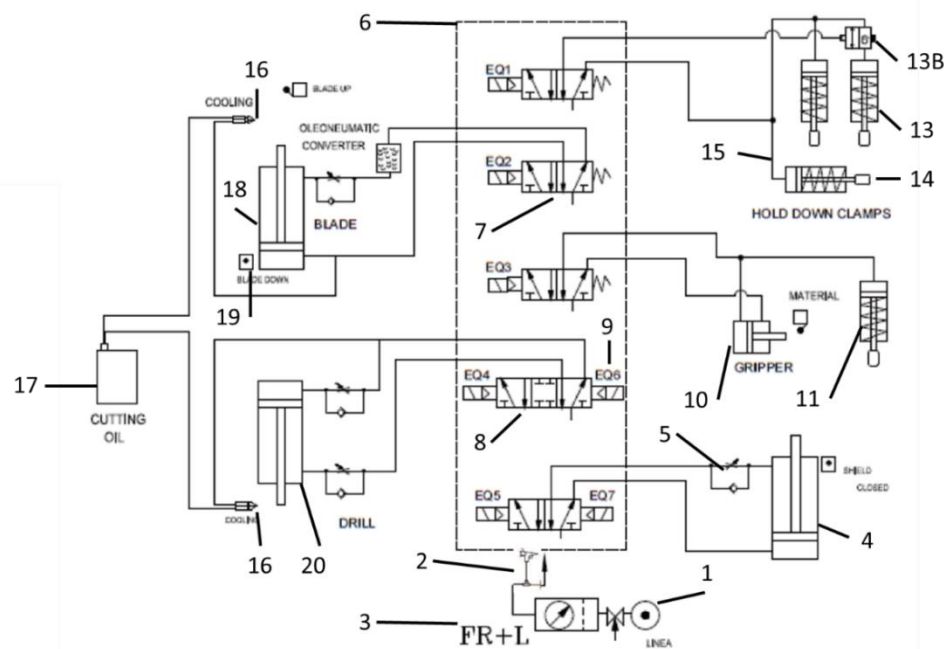
\*Item 7: The blade hydraulic speed regulator is part of the sealed blade system. This part number includes the regulator, hoses, and blade cylinder as a complete, pre-filled assembly.



## 7.7 Pneumatic Components

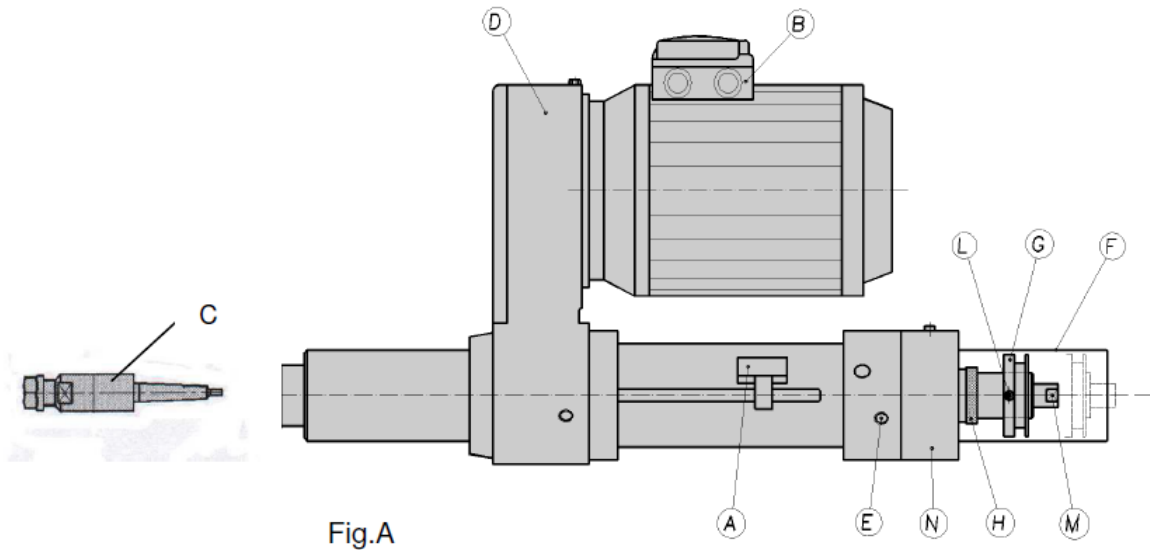
ITEM	PART #	DESCRIPTION
1		Supply Air Line (by Customer)
2	N000000021	Cleaning Gun with Hose
3	N000000017	Filter Regulator, 1/4" BSPT Ports
4	2639	Shield Cylinder
5	N0CCRC1806	1/8 x 6mm Push Regulator
6	N000A13434	Solenoid Valve Manifold Block
7	1618	KPM Single Valve with Coil
8	1619	KPM Dual Valve WITHOUT Coils
9	1620	KPM Solenoid Coil
10	CN0000C4010	Horizontal Moving Vise Cylinder
11	CN00P36X120	Vertical Moving Vise Cylinder
12		
13	1677	Vertical Stationary Vise Cylinder
13B	N000000015	Uni Directional (Check) Valve
14	C2070000295	Horizontal Stationary Vise Cylinder
15	2K20000281	Mini Ball Valve 1/8" M-H
16	2612	Venturi Sprayer Assembly With Tube
16A	N000000036	Venturi Sprayer (for Drill)
17	077927	NF Coolant Reservoir
18	N000050061	Blade Cylinder w/ Regulator, Pre-Filled
19*	1724	Blade Down Magnetic Sensor, KT-50R
19A	028459	Magnetic Sensor KT-50R With Wire Harness
19B	2154	KT-50R Sensor Mounting Bracket
20		Drill

\*Item 19 or 19A: Ensure this sensor says KT-50R. Some said KT-50P. These are not interchangeable. They are opposite (NO vs NC).



## 7.7 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.		



## **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 600 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 transformer.
5. Attach a jumper wire from the #13 on the motor soft starter to “2” on the transformer.
6. The vacuum should now be able to operate with the saw.

