



OPERATOR'S MANUAL

Metal Working



AUTOMATIC HORIZONTAL BANDSAW MODEL: BS-20A

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THANK YOU & WARRANTY

Thank you for your purchase of a machine from Baileigh Industrial Holdings LLC. We hope that you find it productive and useful to you for a long time to come.

Inspection & Acceptance. Buyer shall inspect all Goods within ten (10) days after receipt thereof. Buyer's payment shall constitute final acceptance of the Goods and shall act as a waiver of the Buyer's rights to inspect or reject the goods unless otherwise agreed. If Buyer rejects any merchandise, Buyer must first obtain a Returned Goods Authorization ("RGA") number before returning any goods to Seller. Goods returned without an RGA will be refused. Seller will not be responsible for any freight costs, damages to goods, or any other costs or liabilities pertaining to goods returned without a RGA. Seller shall have the right to substitute a conforming tender. Buyer will be responsible for all freight costs to and from Buyer and repackaging costs, if any, if Buyer refuses to accept shipment. If Goods are returned in unsalable condition, Buyer shall be responsible for full value of the Goods. Buyer may not return any special-order Goods. Any Goods returned hereunder shall be subject to a restocking fee equal to 30% of the invoice price.

Specifications. Seller may, at its option, make changes in the designs, specifications or components of the Goods to improve the safety of such Goods, or if in Seller's judgment, such changes will be beneficial to their operation or use. Buyer may not make any changes in the specifications for the Goods unless Seller approves of such changes in writing, in which event Seller may impose additional charges to implement such changes.

Limited Warranty. Seller warrants to the original end-user that the Goods manufactured or provided by Seller under this Agreement shall be free of defects in material or workmanship for a period of twelve (12) months from the date of purchase, provided that the Goods are installed, used, and maintained in accordance with any instruction manual or technical guidelines provided by the Seller or supplied with the Goods, if applicable. The original end-user must give written notice to Seller of any suspected defect in the Goods prior to the expiration of the warranty period. The original end-user must also obtain a RGA from Seller prior to returning any Goods to Seller for warranty service under this paragraph. Seller will not accept any responsibility for Goods returned without a RGA. The original end-user shall be responsible for all costs and expenses associated with returning the Goods to Seller for warranty service. In the event of a defect, Seller, at its sole option, shall repair or replace the defective Goods or refund to the original end-user the purchase price for such defective Goods. Goods are not eligible for replacement or return after a period of 10 days from date of receipt. The foregoing warranty is Seller's sole obligation, and the original end-user's exclusive remedy, with regard to any defective Goods. This limited warranty does not apply to: (a) die sets, tooling, and saw blades; (b) periodic or routine maintenance and setup, (c) repair or replacement of the Goods due to normal wear and tear, (d) defects or damage to the Goods resulting from misuse, abuse, neglect, or accidents, (e) defects or damage to the Goods resulting from improper or unauthorized alterations, modifications, or changes; and (f) any Goods that has not been installed and/or maintained in accordance with the instruction manual or technical guidelines provided by Seller.

EXCLUSION OF OTHER WARRANTIES. THE FOREGOING LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. ANY AND ALL OTHER EXPRESS, STATUTORY OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. NO WARRANTY IS MADE WHICH EXTENDS BEYOND THAT WHICH IS EXPRESSLY CONTAINED HEREIN.

Limitation of Liability. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER OR ANY OTHER PARTY FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR DOWN TIME) ARISING FROM OR IN MANNER CONNECTED WITH THE GOODS, ANY BREACH BY SELLER OR ITS AGENTS OF THIS AGREEMENT, OR ANY OTHER CAUSE WHATSOEVER, WHETHER BASED ON CONTRACT, TORT OR ANY OTHER THEORY OF LIABILITY. BUYER'S REMEDY WITH RESPECT TO ANY CLAIM ARISING UNDER THIS AGREEMENT IS STRICTLY LIMITED TO NO MORE THAN THE AMOUNT PAID BY THE BUYER FOR THE GOODS.



Force Majeure. Seller shall not be responsible for any delay in the delivery of, or failure to deliver, Goods due to causes beyond Seller's reasonable control including, without limitation, acts of God, acts of war or terrorism, enemy actions, hostilities, strikes, labor difficulties, embargoes, non-delivery or late delivery of materials, parts and equipment or transportation delays not caused by the fault of Seller, delays caused by civil authorities, governmental regulations or orders, fire, lightening, natural disasters or any other cause beyond Seller's reasonable control. In the event of any such delay, performance will be postponed by such length of time as may be reasonably necessary to compensate for the delay.

Installation. If Buyer purchases any Goods that require installation, Buyer shall, at its expense, make all arrangements and connections necessary to install and operate the Goods. Buyer shall install the Goods in accordance with any Seller instructions and shall indemnify Seller against any and all damages, demands, suits, causes of action, claims and expenses (including actual attorneys' fees and costs) arising directly or indirectly out of Buyer's failure to properly install the Goods.

Work By Others; Safety Devices. Unless agreed to in writing by Seller, Seller has no responsibility for labor or work performed by Buyer or others, of any nature, relating to design, manufacture, fabrication, use, installation or provision of Goods. Buyer is solely responsible for furnishing and requiring its employees and customers to use all safety devices, guards and safe operating procedures required by law and/or as set forth in manuals and instruction sheets furnished by Seller. Buyer is responsible for consulting all operator manuals, ANSI or comparable safety standards, OSHA regulations and other sources of safety standards and regulations applicable to the use and operation of the Goods.

Remedies. Each of the rights and remedies of Seller under this Agreement is cumulative and in addition to any other or further remedies provided under this Agreement or at law or equity.

Attorney's Fees. In the event legal action is necessary to recover monies due from Buyer or to enforce any provision of this Agreement, Buyer shall be liable to Seller for all costs and expenses associated therewith, including Seller's actual attorney fees and costs.

Governing Law/Venue. This Agreement shall be construed and governed under the laws of the State of Wisconsin, without application of conflict of law principles. Each party agrees that all actions or proceedings arising out of or in connection with this Agreement shall be commenced, tried, and litigated only in the state courts sitting in Manitowoc County, Wisconsin or the U.S. Federal Court for the Eastern District of Wisconsin. Each party waives any right it may have to assert the doctrine of "forum non conveniens" or to object to venue to the extent that any proceeding is brought in accordance with this section. Each party consents to and waives any objection to the exercise of personal jurisdiction over it by courts described in this section. Each party waives to the fullest extent permitted by applicable law the right to a trial by jury.

Summary of Return Policy.

- 10 Day acceptance period from date of delivery. Damage claims and order discrepancies will not be accepted after this time.
- You must obtain a Baileigh issued RGA number PRIOR to returning any materials.
- Returned materials must be received at Baileigh in new condition and in original packaging.
- Altered items are not eligible for return.
- Buyer is responsible for all shipping charges.
- A 30% re-stocking fee applies to all returns.

Baileigh Industrial Holdings LLC makes every effort to ensure that our posted specifications, images, pricing and product availability are as correct and timely as possible. We apologize for any discrepancies that may occur. Baileigh Industrial Holdings LLC reserves the right to make any and all changes deemed necessary in the course of business including but not limited to pricing, product specifications, quantities, and product availability.

For Customer Service & Technical Support:

Please contact one of our knowledgeable Sales and Service team members at:
(920) 684-4990 or e-mail us at sales@baileigh.com



INTRODUCTION

The quality and reliability of the components assembled on a Baileigh Industrial Holdings LLC machine guarantee near perfect functioning, free from problems, even under the most demanding working conditions. However, if a situation arises, refer to the manual first. If a solution cannot be found, contact the distributor where you purchased our product. Make sure you have the serial number and production year of the machine (stamped on the nameplate). For replacement parts refer to the assembly numbers on the parts list drawings.

Our technical staff will do their best to help you get your machine back in working order.

In this manual you will find: (when applicable)

- Safety procedures
- Correct installation guidelines
- Description of the functional parts of the machine
- Capacity charts
- Setup and start-up instructions
- Machine operation
- Scheduled maintenance
- Parts lists

GENERAL NOTES

After receiving your equipment remove the protective container. Do a complete visual inspection, and if damage is noted, **photograph it for insurance claims** and contact your carrier at once, requesting inspection. Also contact Baileigh Industrial Holdings LLC and inform them of the unexpected occurrence. Temporarily suspend installation.

Take necessary precautions while loading / unloading or moving the machine to avoid any injuries.

Your machine is designed and manufactured to work smoothly and efficiently. Following proper maintenance instructions will help ensure this. Try and use original spare parts, whenever possible, and most importantly; **DO NOT** overload the machine or make any modifications.



Note: This symbol refers to useful information throughout the manual.



IMPORTANT

PLEASE READ THIS OPERATORS MANUAL CAREFULLY

It contains important safety information, instructions, and necessary operating procedures. The continual observance of these procedures will help increase your production and extend the life of the equipment.



SAFETY INSTRUCTIONS

LEARN TO RECOGNIZE SAFETY INFORMATION

This is the safety alert symbol. When you see this symbol on your machine or in this manual, **BE ALERT TO THE POTENTIAL FOR PERSONAL INJURY!**



Follow recommended precautions and safe operating practices.

UNDERSTAND SIGNAL WORDS

A signal word – **DANGER**, **WARNING**, or **CAUTION** – is used with the safety alert symbol. **NOTICE**, which is not related to personal injury, is used without a symbol.

DANGER: Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE: Indicates a situation which, if not avoided, could result in property damage.

DANGER

WARNING

CAUTION

NOTICE

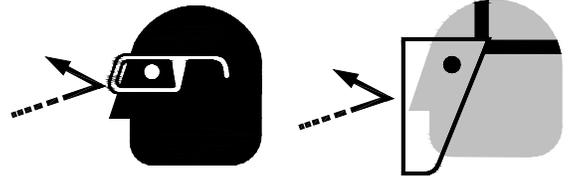


SAVE THESE INSTRUCTIONS.
Refer to them often and use them to instruct others.



PROTECT EYES

Wear safety glasses or suitable eye protection when working on or around machinery.



PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protective devices such as ear muffs or earplugs to protect against objectionable or uncomfortable loud noises.



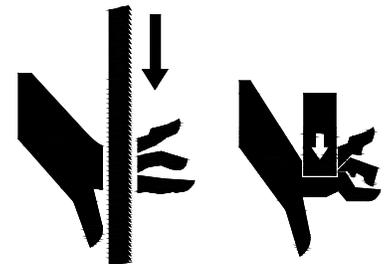
HIGH VOLTAGE

USE CAUTION IN HIGH VOLTAGE AREAS. DO NOT assume the power to be off.
FOLLOW PROPER LOCKOUT PROCEDURES.



BEWARE OF CUT AND PINCH POINTS

Moving saw blade may result in loss of fingers or limb. **DO NOT** operate with guard removed. **Follow lockout/tagout procedures before servicing.**



EMERGENCY STOP BUTTON

In the event of incorrect operation or dangerous conditions, the machine can be stopped immediately by pressing the **E-STOP** button. Twist the emergency stop button clockwise (cw) to reset. Note: Resetting the E-Stop will not start the machine.



CALIFORNIA PROPOSITION 65

WARNING: Cancer and Reproductive Harm.
www.P65Warnings.ca.gov





SAFETY PRECAUTIONS



Metal working can be dangerous if safe and proper operating procedures are not followed. As with all machinery, there are certain hazards involved with the operation of the product. Using the machine with respect and caution will considerably lessen the possibility of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator may result.

Safety equipment such as guards, hold-downs, safety glasses, dust masks and hearing protection can reduce your potential for injury. But even the best guard will not make up for poor judgment, carelessness or inattention. **Always use common sense** and exercise **caution** in the workshop. If a procedure feels dangerous, don't try it.

REMEMBER: Your personal safety is your responsibility.



WARNING: FAILURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS PERSONAL INJURY

Dear Valued Customer:

- All Baileigh machines should be used only for their intended use.
- Baileigh does not recommend or endorse making any modifications or alterations to a Baileigh machine. Modifications or alterations to a machine may pose a substantial risk of injury to the operator or others and may do substantial damage to the machine.
- Any modifications or alterations to a Baileigh machine will invalidate the machine's warranty.

PLEASE ENJOY YOUR BAILEIGH MACHINE!PLEASE ENJOY IT SAFELY!

1. **FOR YOUR OWN SAFETY, READ INSTRUCTION MANUAL BEFORE OPERATING THE MACHINE.** Learn the machine's application and limitations as well as the specific hazards.
2. **Only trained and qualified personnel can operate this machine.**
3. **Make sure guards are in place and in proper working order before operating machinery.**
4. **Remove any adjusting tools.** Before operating the machine, make sure any adjusting tools have been removed.
5. **Keep work area clean.** Cluttered areas invite injuries.
6. **Overloading machine.** By overloading the machine you may cause injury from flying parts. **DO NOT** exceed the specified machine capacities.
7. **Dressing material edges.** Always chamfer and deburr all sharp edges.



8. **Do not force tool.** Your machine will do a better and safer job if used as intended. **DO NOT** use inappropriate attachments in an attempt to exceed the machines rated capacity.
9. **Use the right tool for the job. DO NOT** attempt to force a small tool or attachment to do the work of a large industrial tool. **DO NOT** use a tool for a purpose for which it was not intended.
10. **Dress appropriate. DO NOT** wear loose fitting clothing or jewelry as they can be caught in moving machine parts. Protective clothing and steel toe shoes are recommended when using machinery. Wear a restrictive hair covering to contain long hair.
11. **Use eye protection.** Always wear ISO approved protective eye wear when operating machinery. Wear a full-face shield if you are producing metal filings. Eye wear shall be impact resistant, protective safety glasses with side shields which comply with ANSI Z87.1 specification. Use of eye wear which does not comply with ANSI Z87.1 specification could result in severe injury from breakage of eye protection.
12. **Do not overreach.** Maintain proper footing and balance at all times. **DO NOT** reach over or across a running machine.
13. **Stay alert.** Watch what you are doing and use common sense. **DO NOT** operate any tool or machine when you are tired.
14. **Check for damaged parts.** Before using any tool or machine, carefully check any part that appears damaged. Check for alignment and binding of moving parts that may affect proper machine operation.
15. **Observe work area conditions. DO NOT** use machines or power tools in damp or wet locations. Do not expose to rain. Keep work area well lighted. **DO NOT** use electrically powered tools in the presence of flammable gases or liquids.
16. **Blade adjustments and maintenance.** Always keep blades sharp and properly adjusted for optimum performance.
17. **Keep children away.** Children must never be allowed in the work area. **DO NOT** let them handle machines, tools, or extension cords.
18. **Store idle equipment.** When not in use, tools must be stored in a dry location to inhibit rust. Always lock up tools and keep them out of reach of children.
19. **DO NOT** operate machine if under the influence of alcohol or drugs. Read warning labels on prescriptions. If there is any doubt, **DO NOT** operate the machine.
20. **DO NOT** touch live electrical components or parts.
21. **Turn off power** before checking, cleaning, or replacing any parts.
22. **Be sure all equipment** is properly installed and grounded according to national, state, and local codes.
23. **Keep all cords** dry, free from grease and oil, and protected from sparks and hot metal.
24. Inspect power and control cables periodically. Replace if damaged or bare wires are exposed. **Bare wiring can kill!**



25. **DO NOT** bypass or defeat any safety interlock systems.
26. Keep visitors a safe distance from the work area.

GENERAL NOTES

- Take necessary precautions while loading / unloading or moving the machine to avoid any injuries. Refer to the related chapter of this Manual for the best way of handling the machine.
- Always disconnect the machine from the power source before a blade change, carrying out any maintenance job, or any abnormal machine operation.
- Always check that the work piece is securely clamped and that long pieces are properly supported.
- If the blade gets stuck in the cut, press the emergency stop button immediately. Reset the E-stop button. In manual mode you can now raise the saw bow, open the vise, and remove the piece part. Check the blade for any broken teeth and replace blade if necessary.
- The operator should stand in front of the machine while the saw is cutting.
- Your machine is designed and manufactured to work smoothly and efficiently. Following proper maintenance instructions will help ensure this. Try and use original spare parts, whenever possible, and most importantly; **DO NOT** overload the machine or make any unauthorized modifications.





TECHNICAL SPECIFICATIONS

Capacity Rectangular 90° / 45°	13" x 18" / 13" x 11" (330 x 460mm / 330 x 280mm)
Capacity Round 90° / 45°	13" / 11" (330mm / 280mm)
Capacity Square 90° / 45°	13" x 13" / 11 x 11" (330 x 330mm / 280 x 280mm)
Miter Adjustment	Swivel Head
Miter Angle	0 - 45°
Blade Size (H x T x L)	1.06" x .035" x 162.6" (27 x .90 x 4130mm)
Blade Speed	98 – 279fpm (30 – 85mpm) Variable
Chip Removal	Hydraulic Auger
Table Height	32.3" (820mm)
Blade Guide	Carbide x Roller
Material Clamping Bundling	Hydraulic
Material Feed	Hydraulic
Saw Bow Descent Control	Pressure Assist Hydraulic
Saw Bow Return	Hydraulic
Power	220V, 3ph, 60hz
Motor	5hp (3.75kw) 220V, 3ph, 60hz, 15A
Shipping Weight	3677lbs (1668kg)
Shipping Dimensions	90" x 86" x 69" (2280 x 2190 x 1730mm)

TECHNICAL SUPPORT

Our technical support department can be reached at 920.684.4990 and asking for the support desk for purchased machines. Tech Support handles questions on machine setup, schematics, warranty issues, and individual parts needs: (other than die sets and blades).

For specific application needs or future machine purchases contact the Sales Department at: sales@baileigh.com, Phone: 920.684.4990, or Fax: 920.684.3944.



Note: *The photos and illustrations used in this manual are representative only and may not depict the actual color, labeling or accessories and may be intended to illustrate technique only.*



Note: *The specifications and dimensions presented here are subject to change without prior notice due to improvements of our products.*



UNPACKING AND CHECKING CONTENTS

Your Baileigh machine is shipped complete. Separate all parts from the packing material and check each item carefully. Make certain all items are accounted for before discarding any packing material.

⚠ WARNING: SUFFOCATION HAZARD! Immediately discard any plastic bags and packing materials to eliminate choking and suffocation hazards to children and animals.
If any parts are missing, **DO NOT** place the machine into service until the missing parts are obtained and installed correctly.

Cleaning

⚠ WARNING: DO NOT USE gasoline or other petroleum products to clean the machine. They have low flash points and can explode or cause fire.

⚠ CAUTION: When using cleaning solvents work in a well-ventilated area. Many cleaning solvents are toxic if inhaled.

Your machine may be shipped with a rustproof waxy coating and/or grease on the exposed unpainted metal surfaces. Fully and completely remove this protective coating using a degreaser or solvent cleaner. Moving items will need to be moved along their travel path to allow for cleaning the entire surface. For a more thorough cleaning, some parts will occasionally have to be removed. **DO NOT USE** acetone or brake cleaner as they may damage painted surfaces.

Follow manufacturer's label instructions when using any type of cleaning product. After cleaning, wipe unpainted metal surfaces with a light coating of quality oil or grease for protection.



Important: This waxy coating is **NOT** a lubricant and will cause the machine to stick and lose performance as the coating continues to dry.



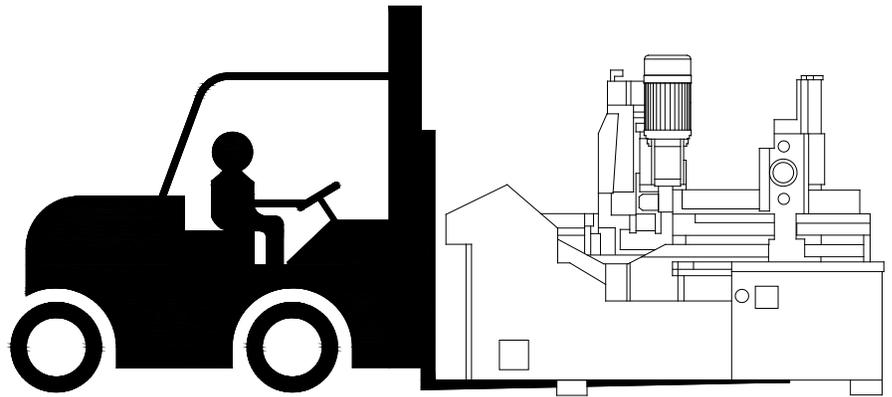


TRANSPORTING AND LIFTING

NOTICE: *Lifting and carrying operations should be carried out by skilled workers, such as a truck operator, crane operator, etc. If a crane is used to lift the machine, attach the lifting chain carefully, making sure the machine is well balanced.*

Follow these guidelines when lifting:

- Use proper lifting techniques when moving the saw from location to location.
- Make sure the machine is balanced, level, and securely tied or strapped to the transport vehicle or device so that all the supporting feet are taking the weight of the machine and no rocking is taking place.
- While transporting, avoid rough or jerky motion, and maintain a safe clearance zone around the transport area.



INSTALLATION

IMPORTANT:

Consider the following when looking for a suitable location to place the machine:

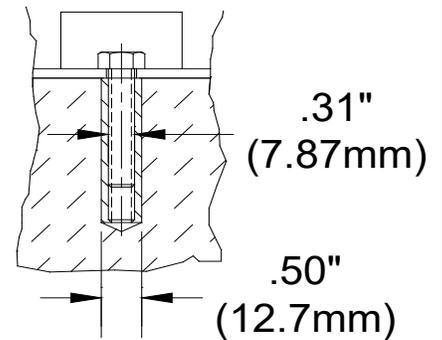
- Overall weight of the machine.
- Weight of material being processed.
- Sizes of material to be processed through the machine.
- Space needed for auxiliary stands, work tables, or other machinery.
- Clearance from walls and other obstacles. Maintain an adequate working area around the machine for safety.
- Have the work area well illuminated with proper lighting.
- Keep the floor free of oil and make sure it is not slippery.
- Remove scrap and waste materials regularly, and make sure the work area is free from obstructing objects.
- If long lengths of material are to be fed into the machine, make sure that they will not extend into any aisles.
- **LEVELING:** The machine should be sited on a level surface. The accuracy of any machine depends on the precise placement of it to the mounting surface. If the unit wobbles or rocks once in place, be sure to eliminate by using shims.



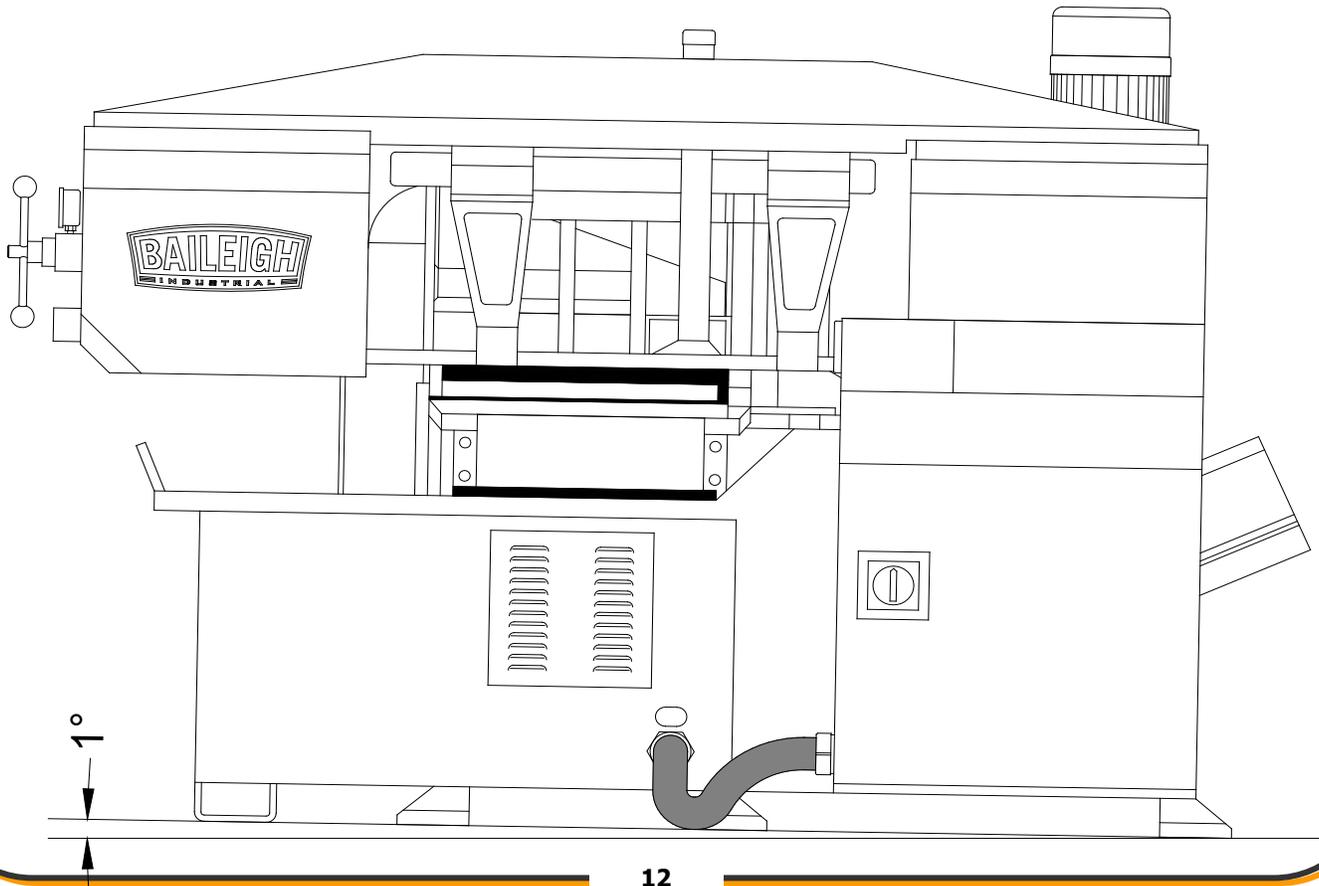
- **POWER SUPPLY PLACEMENT:** The power supply should be located close enough to the machine so that the power cord is not in an area where it would cause a tripping hazard. Be sure to observe all electrical codes if installing new circuits and/or outlets.

Anchoring the Machine

- Set the saw on a flat and level foundation of reinforced concrete. Maintain a minimum distance of 32" from the rear of the machine to the wall.
- Machinist's levels should be used alternately on the vise slide plates and work feed table. Adjust the left to right and front to back level of the machine with leveling bolts. When leveling front to back, adjust the back to be 1° higher than the front. This will provide for proper return of the blade coolant to the reservoir.
- When leveling left to right, adjust the left side to be approximately 1° higher than the right side. This will allow proper return of the coolant to the reservoir.
- Now secure the saw to the foundation with anchor bolts, screws and expansion plugs, or tie rods sunk in the concrete.

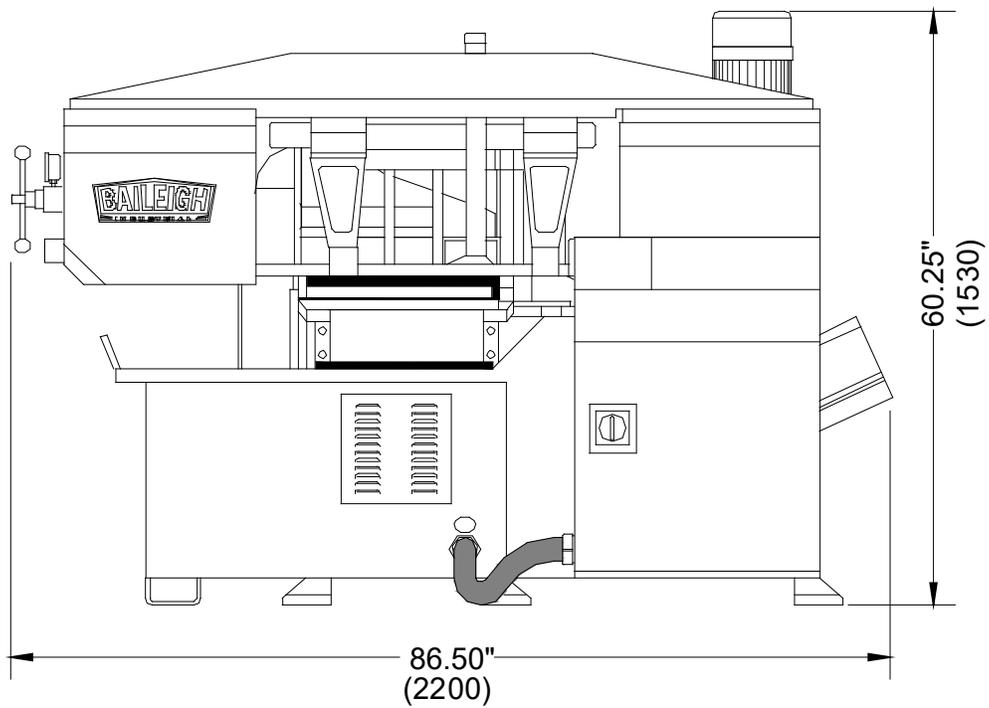
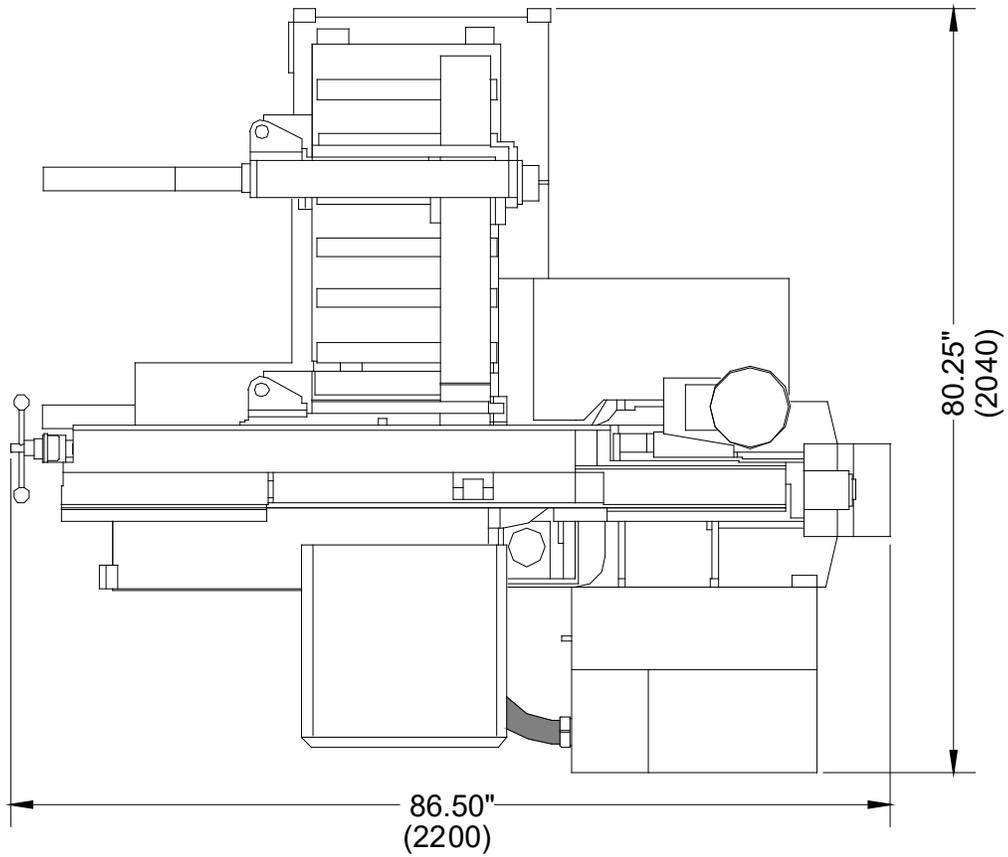


Important: All leveling bolts should support the weight of the machine evenly. The operating accuracy of precision machinery depends on the accuracy of the installation.



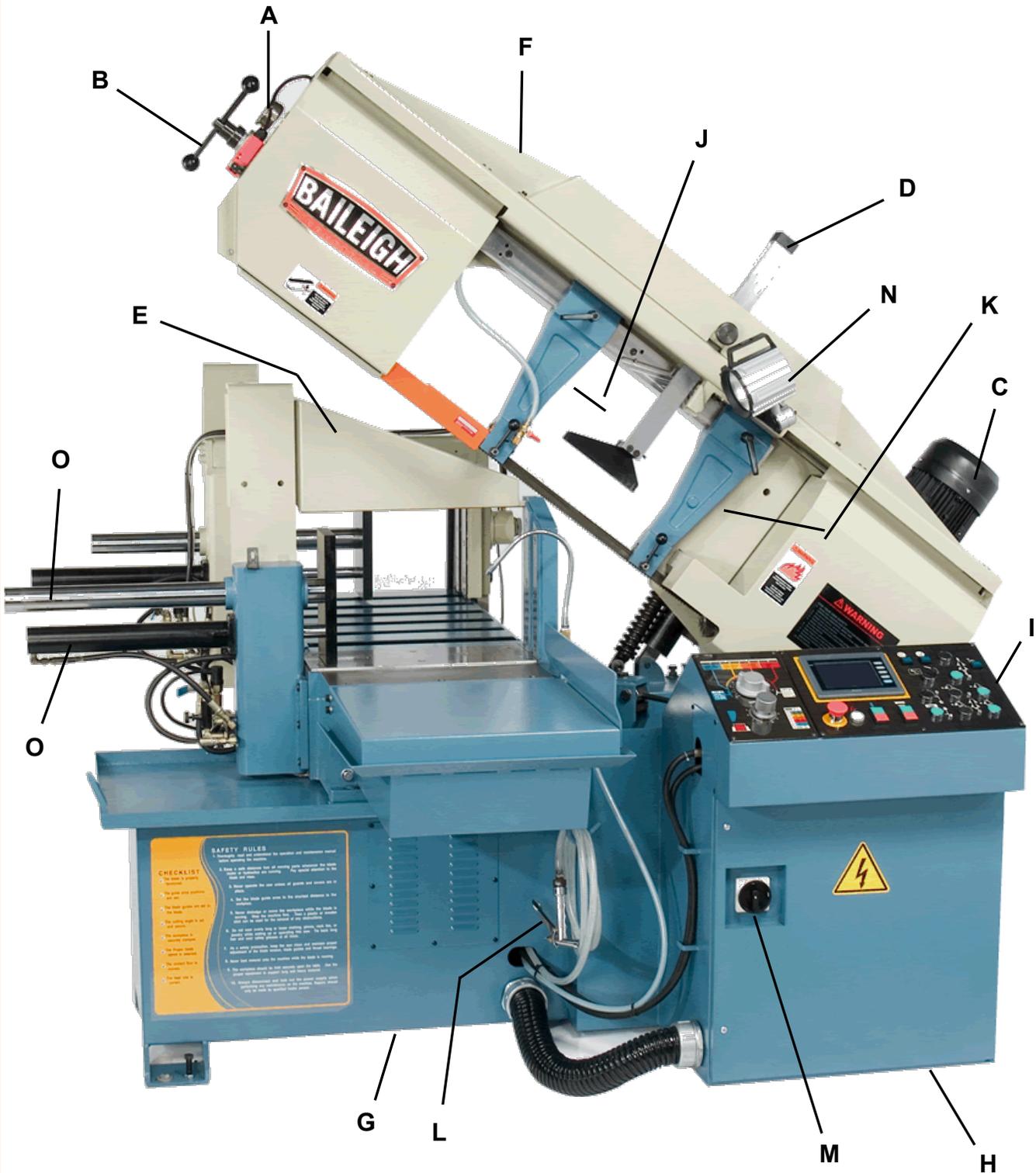


OVERALL DIMENSIONS





GETTING TO KNOW YOUR MACHINE

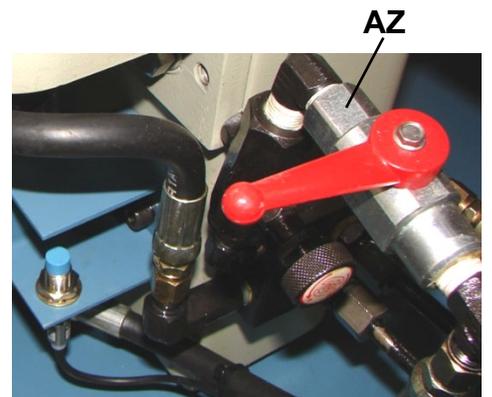




A	Blade tension gauge	Reads tension in Kgs / cm2
B	Blade tension handle	For applying and releasing blade tension
C	Drive motor	Supplies power to reducer to drive blade
D	Material probe arm	Device that reduces operation cycle time
E	Nesting clamps	Used for bundle cutting operations
F	Saw bow	Pivoting saw head including drive components
G	Saw base	Supports the saw assembly
H	Electrical enclosure	Houses disconnect and electrical components
I	Control console	Houses the operator controls
J	Left blade guide post	Adjusts front end of blade
K	Right blade guide post	Adjusts rear end of blade
L	Spray gun	Uses coolant for machine chip cleaning
M	Disconnect switch	Controls main power to the saw
N	Halogen work light	Provides lighting to work area
O	Hydraulic Vise cylinders	Provide work stroke to vise clamps
P	Chip auger	Hydraulic motor driven chip removal
Q	Coolant pump	Recirculates blade coolant

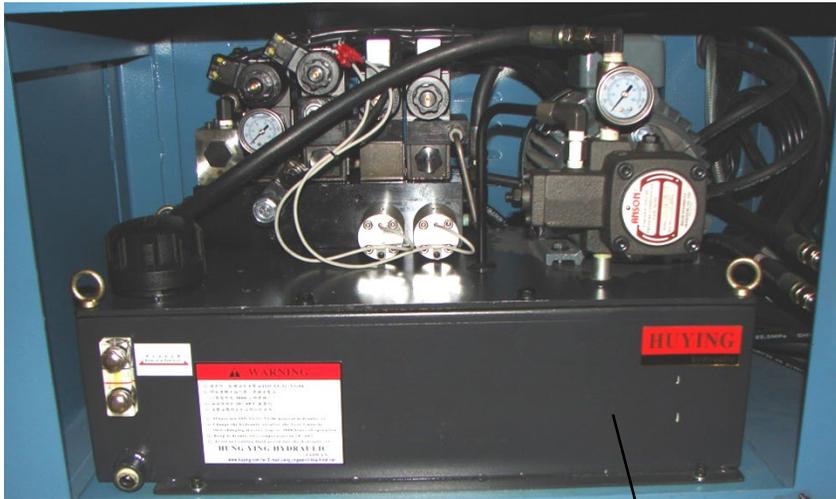
Nesting Clamps

Nesting clamps are used for bundle cutting operations. They vertically press down upon a stack of equally sized piece parts. Using these hydraulically operated clamps you can cut multiple pieces at once. To regulate the speed of the cylinder turn the flow control knob located below the hydraulic shut-off valve. If you want to stop using the nesting clamps, allow them to return to the up position, and turn off the hydraulic valves (AZ).





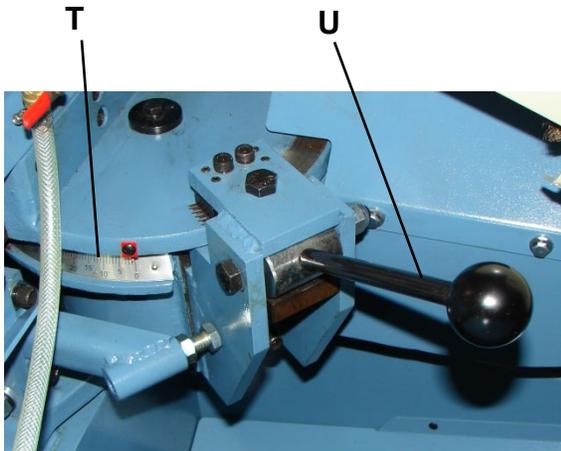
R	Hydraulic system	Supplies power to hydraulic components
S	System pressure gauge	Monitors vise clamp pressure
T	Angle indicator	Shows angular cutting degrees
U	Miter angle lock lever	Tightens and loosens table to set angles
V	Wheel driven wire brush	Cleans debris from blade



R

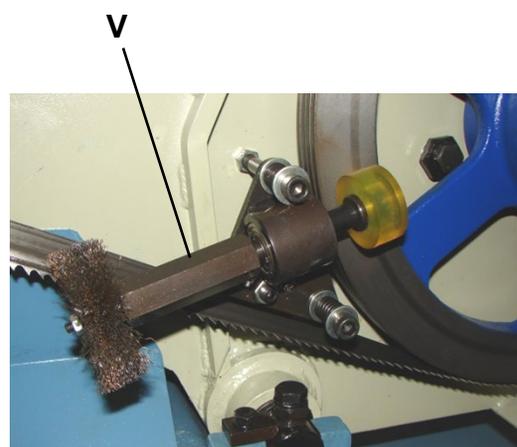


S



T

U



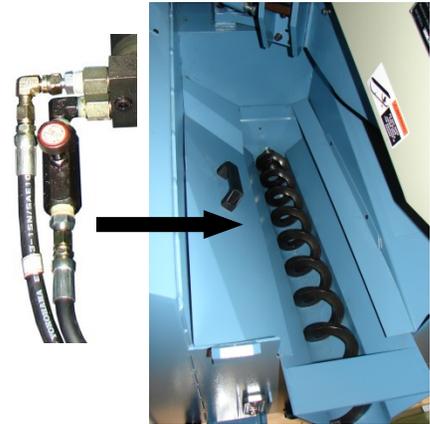
V



Chip Auger

The chip auger (P) is driven by a hydraulic motor. It is set to run automatically when the cutting cycle starts. To access a flow control valve for the hydraulic motor, lift off the cover.

⚠ WARNING: Keep hands and clothing clear of auger. It will run automatically.



Coolant Pump

The coolant pump (Q) recirculates coolant to the blade at two locations. The amount of coolant to each is regulated with a flow control valve. The spray hose located to the left of the control console is used to flush chips and debris from the rest of the saw.



(Cover removed)

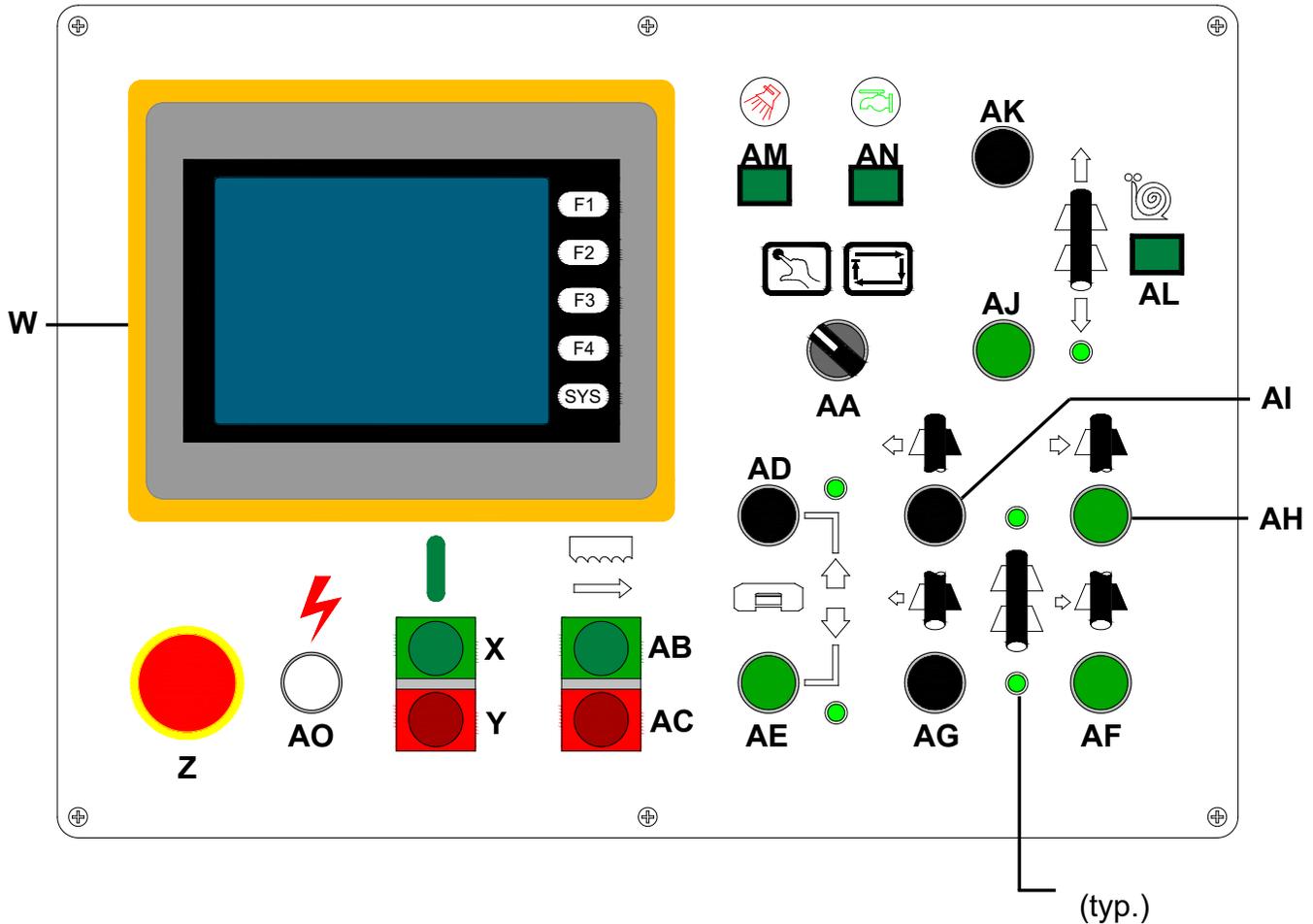
Blade Safety Interlock Switch

When either hinged access cover for the blade is opened, the switch tongue disengages the switch and the saw will not run.





Control Panel



(typ.)

* There are (5) small green indicator lights on the control panel. They correspond to the vise and bow UP or Down operation. One is for shuttle vise movement and the others indicate clamping of the vises. They will be lit when the piece part(s) are properly clamped in their respective vises or the shuttle vise has reached the forward limit position. The saw bow will not start the down stroke until the green clamping indicator lights are lit.



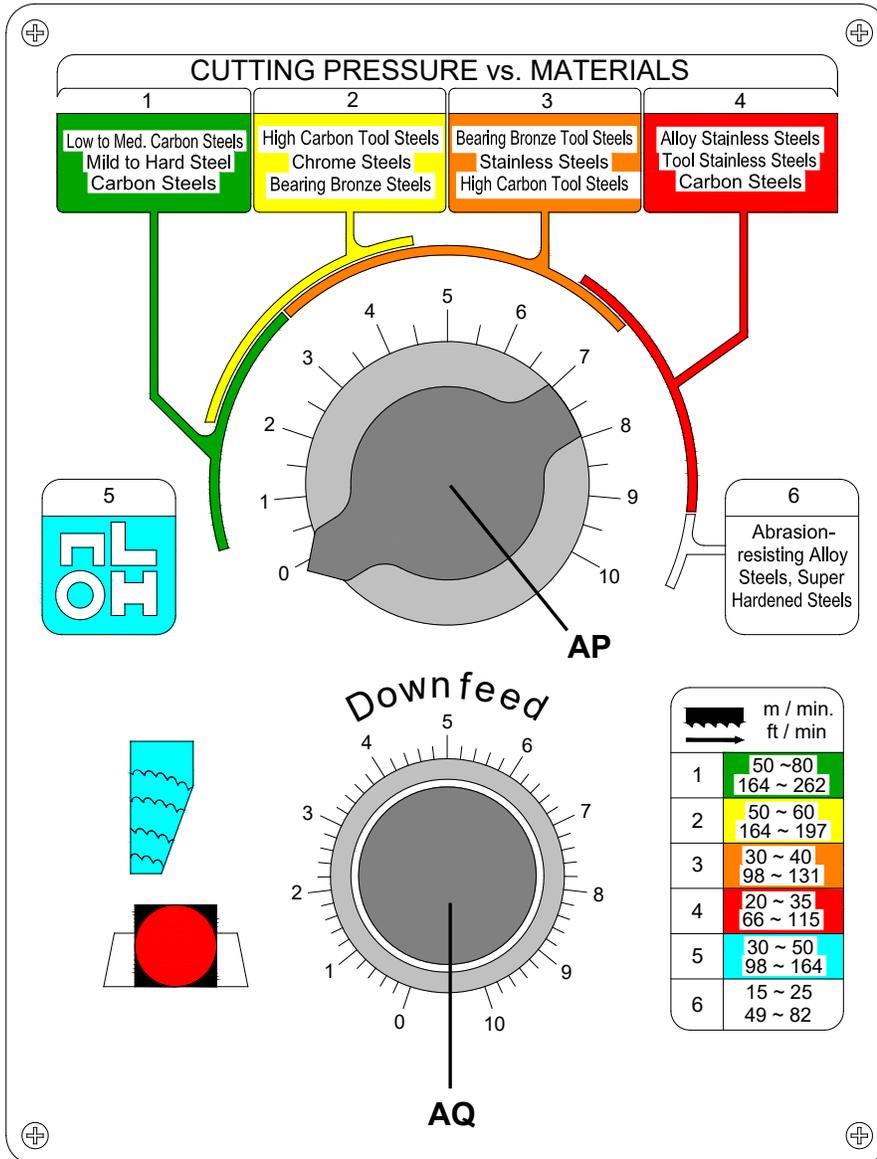
W	Human-Machine Interface (Touch screen)	Press the hydraulic start button X to start
X	Hydraulic Pump Start Switch	Press to start the pump, Indicator light will be lit.
Y	Hydraulic Pump Off Switch	Press to stop the pump, Indicator light will not be lit.
Z	Emergency Stop Button	Stops and resets the machine parameters, rotate the button (cw) to release.
AA	Auto / Manual Switch	This is an operation mode selector. Manual mode for single cut operations and Auto mode for multiple cutting cycles.
AB	Operation Start Button	Starts the cutting operation cycle.
AC	Operation Stop Button	Stops the cutting operation cycle.
AD	Bow Up Button and Stop Cycle Cutting	Press to raise the saw bow and stop the machine's operation without resetting.
AE	Bow Down Button	Press to lower the saw bow.
AF	Bench Vise Close Button	Press to approach or clamp the piece part.
AG	Bench Vise Open Button	Press and hold to adjust the widths to desired lengths. When saw bow is not at the safe height limit, the vise will open 0.20" (5mm) for every push of the button.
AH	Shuttle Vise Close Button	Press to approach or clamp the shuttle vise on the piece part.
AI	Shuttle Vise Open Button	Press and hold to adjust the widths to desired lengths. Opens one full length when saw bow is at the safe height. When saw bow is not at the safe height, the vise will open 0.20" (5mm) for every push of the button.
AJ	Shuttle Vise Forward Button	Press to advance the vise or piece part.
AK	Shuttle Vise Backward Button	Press to back-off the vise or piece part.
AL	Shuttle Vise Slow Motion in Manual Operation	Press button AJ to move feeding vise forward or button AK to move backward. Pressing the slow motion button AL will cause the feeding vise to move at slow speed and the light will be lit.
AM	Work Light Switch	Press to turn on the work lamp. The button light will be lit. Press again to turn off the lamp. The button light will not be lit.
AN	Coolant Switch	Press to start the coolant pump and begin coolant flow. The button light will be lit. Press again to stop the coolant pump.
AO	Power Indicator Light.	The power indicator light will be lit when the main power disconnect on the machines electrical enclosure is turned on.
AP	Cutting Pressure Knob	This control knob sets the rate of the cutting pressure for different materials



AQ

Bow Down Feed Knob

This control knob sets the down bow cutting feed rate.





Saw Bow

The saw bow consists of a variable speed drive motor, reducer, pulleys, saw blade, blade tensioning system, guide arms, blade guide blocks, material probe arm, and a halogen work light.

Machine Base

The machine base is the structure that supports the saw bow, the vise, the coolant pump, the hydraulic system, the rollers, and the feeding system.

The Vise System

The hydraulically driven vise system consists of a fixed vise and a shuttle vise. The shuttle vise is movable for extension of stock material and can be positioned to provide more support while clamping. Both jaws on the shuttle vise are driven with heavy duty hydraulic cylinders providing flexibility and security when clamping irregular stock. The vises also move vertically to secure stock for bundle cutting.

Shuttle Vise Encoder

An electrical rotary encoder (AS), via a gear rack attached to the shuttle vise, sends shuttle position information back to the PLC. This information is used to measure the material length as set on the touch screen interface. Any problem with the encoder will show up as a fault on the touch screen.

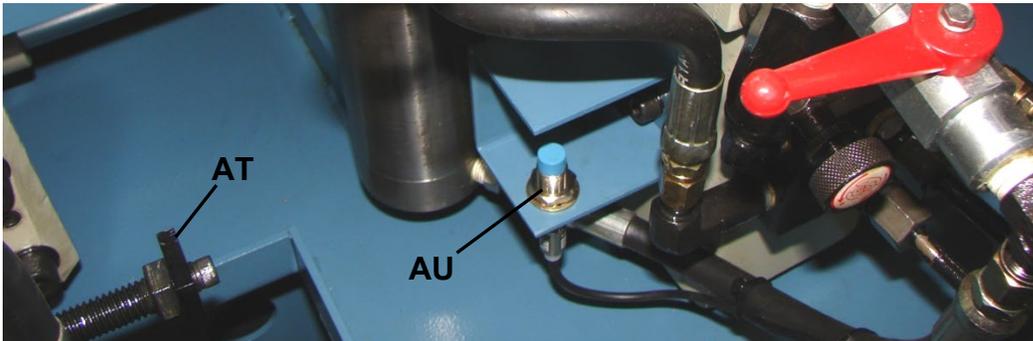


AS



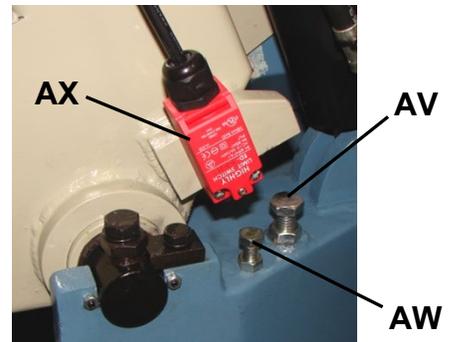
Shuttle Vise Forward Sensor

When the shuttle cylinder is retracted, the actuator (AT) on the shuttle vise will pass over the proximity sensor (AU). This is the zero position and the sensor will send a signal to the PLC for the next motion.



Down Bow Hard Stop and Limit Switch

With the saw bow down on the hard stop, the micro-switch will actuate, stopping the saw blade motor. To change the saw bow travel limit, loosen the jam nut, and screw the hex bolt (AV) in or out as needed. Adjust hex bolt (AV) so that micro-switch (AX) actuates and stops the blade.



Vertical Guide Roller

The vertical roller is located at the end of the inlet roller conveyor. It is used to guide material entering the shuttle vise.



Nesting Cylinder Stop Clamp

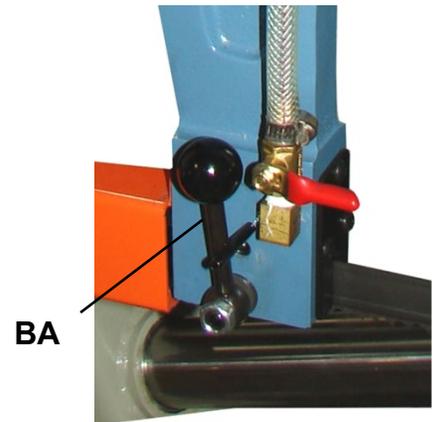
The stop clamp when in position as shown, keeps the nesting arm 1" (25.4mm) above the inlet roller table. Removing the clamp allows the nesting arm to rest on the roller table.





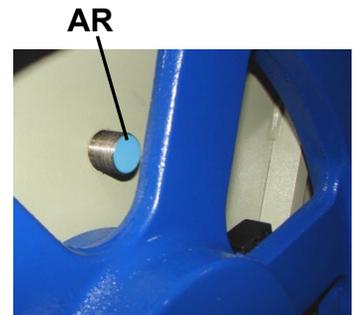
Blade Tension Handle

Turning the handle (BA) counterclockwise (ccw) releases tension of the carbide guides on the blade. The stop pin prevents the guides from being overtightened and pinching the blade.



Blade Broken Proximity Switch

The saw comes equipped with an automatic power shut-off safety device to prevent damage when a blade has broken. The actuators on the idler pulley are detected by the proximity switch (AR) as the idler rotates. When the blade breaks or the tension is set too low, the idler does not turn and no signal is sent to the switch. This shows up as a fault on the touch screen interface.



Swivel Saw Head

Angles can be cut up to 45° (Right).

1. Unlock the rotating saw head by pulling up on the miter lock lever (U).
2. Rotate the saw head to the desired angle as shown on the angle indicator (T).
3. Lock the saw head by pushing the lock lever (U) down.



IMPORTANT: Check that the saw blade clears the vise table guide before cutting. The guide has slots to allow for adjustments.



ELECTRICAL

⚠ WARNING: Baileigh Industrial Holdings LLC is not responsible for any damage caused by wiring up to an alternative 3-phase power source other than direct 3-phase. If you are using an alternate power source, consult a certified electrician or contact Baileigh Industrial Holdings LLC prior to energizing the machine.

⚠ CAUTION: HAVE ELECTRICAL UTILITIES CONNECTED TO MACHINE BY A CERTIFIED ELECTRICIAN!
Check if the available power supply is the same as listed on the machine nameplate.

⚠ WARNING: Make sure the grounding wire (green) is properly connected to avoid electric shock. DO NOT switch the position of the green grounding wire if any electrical plug wires are switched during hookup.

Power Specifications

Your machine is wired for 220 volts, 60hz alternating current. Before connecting the machine to the power source, make sure the power source is OFF.

Before switching on the power, you must check the voltage and frequency of the power to see if they meet with the requirement, the allowed range for the voltage is $\pm 5\%$, and for the frequency is $\pm 1\%$.

Considerations

- Observe local electrical codes when connecting the machine.
- The circuit should be protected with a time delay fuse or circuit breaker with an amperage rating slightly higher than the full load current of machine.
- A separate electrical circuit should be used for your machines. Before connecting the motor to the power line, make sure the switch is in the "OFF" position and be sure that the electric current is of the same characteristics as indicated on the machine.
- All line connections should make good contact. Running on low voltage will damage the motor.
- In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This machine is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.



⚠ WARNING: In all cases, make certain the receptacle in question is properly grounded. If you are not sure, have a qualified electrician check the receptacle.

- Improper connection of the equipment-grounding conductor can result in risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.
- Check with qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the machine is properly grounded.
- Repair or replace damaged or worn cord immediately.

Power cord connection:

1. Turn the main disconnect switch on the control panel to the OFF position.
2. Unwrap the power cord and route the cord away from the saw toward the power supply.
 - a. Route the power cord so that it will NOT become entangled in the saw bow, saw blade, or feed assembly in any way.
 - b. Route the cord to the power supply in a way that Does NOT create a trip hazard.
3. Connect the power cord to the power supply and check that the power cord has not been damaged during installation.
4. When the saw blade is clear of any obstruction and raised up off of the limit switch. The main disconnect may be turned ON to test the saw operation. Turn the main disconnect to OFF when the saw is not in operation.

Check for correct rotation of the motor

5. Close the electrical enclosure door.
6. With power connected and the main disconnect turned ON, the power light on the control panel will be lit.
7. Remove the cover to the coolant pump to be able to see the rotation of the coolant pump motor.
8. Start the coolant pump and verify that the motor rotates as indicated by the red arrow.
9. If not, disconnect power to the machine, and switch the L1 and L3 wires. DO NOT move the ground wire.





BEFORE EACH USE

- For dusty operations, wear a face shield along with safety goggles.
- It is important to choose the right blade for the material and the type of cutting you plan to do. This saw is equipped with a bi-metallic blade which can be used to cut stainless steel, steel, iron, brass, aluminum, wood, plastic.
- Make sure the direction of rotation arrow on the blade matches the direction arrow on the saw. The blade teeth should always point downward at the front of the saw.
- Make sure the blade is sharp, undamaged and properly aligned. With the saw unplugged, push the power-head all the way down. Rotate the blade by hand checking for clearance. If the blade hits anything, make the adjustments shown in the Maintaining Maximum Cutting Capacity section.
- Never cut freehand.
- Make sure the cut-off piece can move sideways after it is cut off. Otherwise, it could get wedged against the blade and thrown violently.
- Never turn the saw "ON" before clearing everything except the work piece beneath the blade.
- Never put lubricants on the blade while it is spinning.

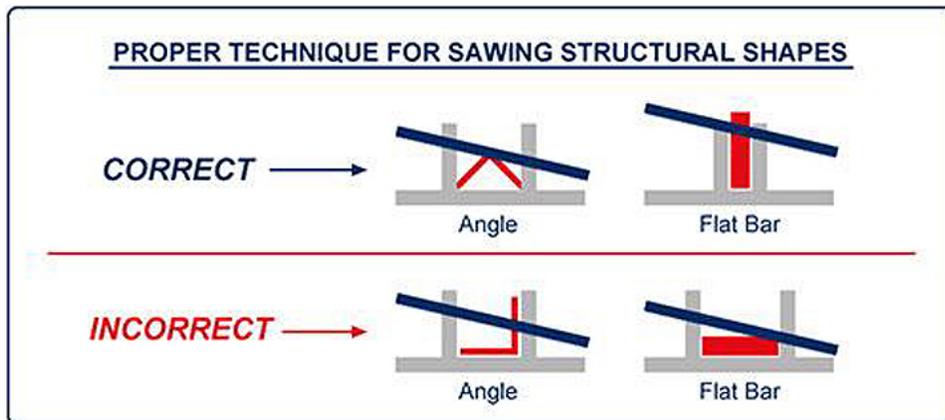
Whenever Saw is Running

- Never confine the piece being cut out.
- Never hold it, clamp it, touch it, or use length stops against it. It must be free to move sideways. If confined, it could get wedged against the blade and thrown violently.
- Avoid awkward hand positions where a sudden slip could cause a hand to move into the blade.
- Let the blade reach full speed before cutting.
- Feed the saw into the work piece only fast enough to let the blade cut without bogging down or binding.
- Before freeing jammed material, turn the switch off and unplug the saw. Wait for all moving parts to stop.
- After finishing a cut, keep holding the saw bow down, release the switch, and wait for all moving parts to stop before moving your hands.



Breaking in a Band Saw Blade

Sharp cutting edges with extremely small edge radii are required for high cutting capacity. To achieve the optimal tool life we recommend breaking-in the blade accordingly. The correct cutting speed is determined by the material being cut and its dimensions. It is very important that the new blade is first used with only 50% of the determined feed rate. This will avoid micro-breakages of the blade because of too large chip thicknesses. New band saw blades may tend toward vibrations and vibration sounds. In this case a slight reduction of the cutting speed is helpful. With small workpiece dimensions approximately 300cm² of the material should be cut for breaking-in. If large work piece dimensions are to be cut we recommend a breaking-in period of about 15 minutes. After breaking-in you may slowly increase the feed rate up to the determined value.



Metal Chip Indicators

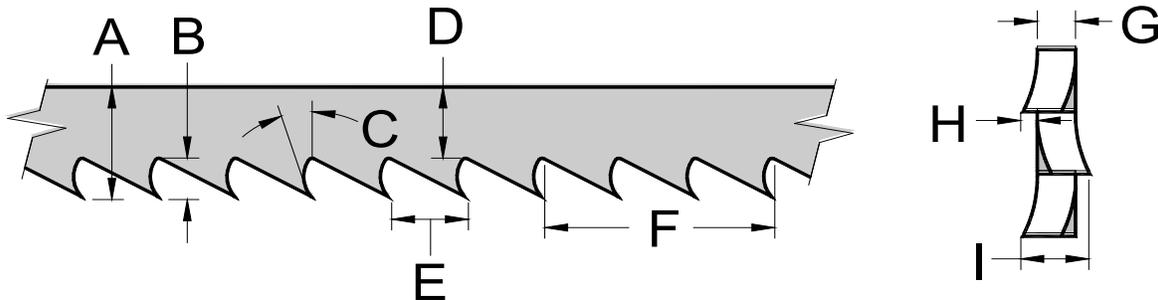
Chips are the best indicator of correct material feed force. Monitor chip information and adjust feed accordingly.

- Thin or Powdered Chips – increase feed rate or reduce saw speed
- Burned Chips – reduce feed rate and / or saw speed
- Curly Silvery and Warm Chips – optimum feed rate and saw speed

Baileigh Industrial offers a wide selection of tooth styles for various cutting applications. Please phone Baileigh Industrial at (920.684.4990) or fax to (920.684.3944) to have one of our technicians assist you in selecting the proper band saw blade for your cutting applications.



Blade Terminology



A	BLADE WIDTH	The widest part of the blade measured from the back edge of the blade to the tip of the tooth.
B	GULLET DEPTH	The distance from the tooth tip to the bottom of the curved area.
C	TOOTH RAKE	The angle of the tooth face from a line perpendicular to the length of the blade.
D	BLADE BACK	The distance between the back edge of the blade and the bottom of the gullet.
E	TOOTH PITCH	The distance between tooth tips.
F	TPI	The number of teeth per inch when measured from gullet to gullet.
G	GAUGE	The thickness of the blade.
H	TOOTH SET	The distance a tooth is bent from the blade.
I	KERF	The width of material that is removed by the blade when cutting.

Width of Blade

The blade width determines the largest and the smallest curve that can be cut. Usually the wider a blade is, the more accurate and straighter it will cut.

Length of Blade

The length of the band saw blade can be measured with a tape measure at it's circumference or by the formula below:

$$\text{Blade Length} = (2 \times A) + (3.14 \times B)$$

A = the distance in inches between the band saw pulley centers (when the upper pulley is midway in its adjustment range).

B = the band saw pulley diameter.



Blade structure

Bi-metal blades are the most commonly used. They consist of a silicon-steel blade backing by a laser welded high speed steel (HSS) cutting edge. The type of stocks are classified in M2, M42, M51 and differ from each other because of their major hardness due to the increasing percentage of Cobalt (Cc) and molybdenum (Mo) contained in the metal alloy.

Blade type

They differ essentially in their constructive characteristics, such as:

- Shape and cutting angle of tooth
- Pitch
- Set

Shape and angle of tooth

REGULAR TOOTH: 0° rake and constant pitch.



Most common form for transversal or inclined cutting of solid small and average cross-sections or pipes, in laminated mild steel and gray iron or general metal.

POSITIVE RAKE TOOTH: $9^\circ - 10^\circ$ positive rake and constant pitch.



Particular use for crosswise or inclined cuts in solid sections or large pipes, but above all harder materials (highly alloyed and stainless steels, special bronze and forge pig iron).

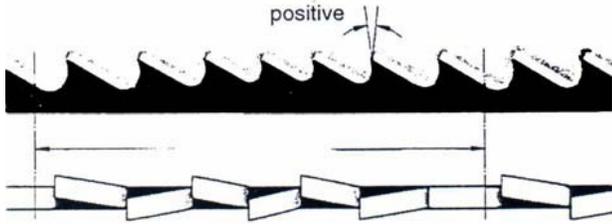
COMBO TOOTH: pitch varies between teeth and consequently varying teeth size and varying gullet depths. Pitch varies between teeth, which ensures a smoother, quieter cut and longer blade life owing to the lack of vibration.



Another advantage offered in the use of this type of blade is the fact that with an only blade it is possible to cut a wide range of different materials in size and type.



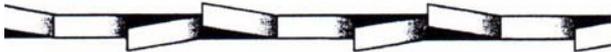
COMBO TOOTH: 9° - 10° positive rake.



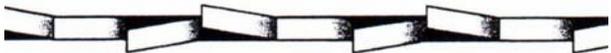
This type of blade is the most suitable for the cutting of section bars and large and thick pipes as well as for the cutting of solid bars at maximum machine capacity. Available pitches: 3-4/4-6.

SETS

Saw teeth bent out of the plane of the saw body, resulting in a wide cut in the workpiece.



REGULAR OR RAKER SET: Cutting teeth right and left, alternated by a straight tooth.



Of general use for materials with dimensions superior to 5 mm. Used for the cutting of steel, castings and hard nonferrous materials.

WAVY SET: Set in smooth waves.



This set is associated with very fine teeth and it is mainly used for the cutting of pipes and thin section bars (from 1 to 3 mm).

ALTERNATE SET (IN GROUPS): Groups of cutting teeth right and left, alternated by a straight tooth.



This set is associated with very fine teeth and it is used for extremely thin materials (less than 1mm).

ALTERNATE SET (INDIVIDUAL TEETH): Cutting teeth right and left.



This set is used for the cutting of nonferrous soft materials, plastics and wood.



BLADE CARE

The bandsaw blade is subjected to a tremendous amount of strain. Make sure to always use the appropriate feed rate for the type material you are cutting.

Be sure to select a blade of the proper width, style, and pitch that will produce the best cut in your material. Choosing the wrong blade can produce excess heat that can adversely affect the life of the blade.

A clean blade performs much better than one that is dirty. Blades that are gummed up and dirty offer more resistance when cutting through the material. This in turn creates unnecessary heat in the blade.

CHOOSING A SAW BLADE

A general purpose blade is furnished with this band saw.

To achieve a quality, economical, and efficient saw cut, the following points must be taken into consideration:

- Type of material being cut (ferrous or non ferrous)
- Material hardness and physical dimensions
- Blade descent rate
- Longitudinal speed of blade
- Blade tooth profile

Choose a tooth pitch that is suitable for the workpiece. Thin walled profiles, including tubes and pipes require close tothing. At least 3-6 teeth should be in contact with the material while cutting. Large solid or transverse sections require widely spaced tothing to allow for greater volume of chips and better tooth penetration. Soft materials such as plastics, light alloys, mild bronze, Teflon, etc. require widely spaced tothing to avoid clogging.



S	Outer Diameter of the Tube (inch) / Tooth pitch																
	0.787	1.574	2.362	3.15	4	4.724	6	7.873	11.811	15.75	19.685	23.621	27.5	31.5	35.5	39.5	59
0.079	14	14	14	14	14	14	10-14tpi	10-14tpi	8-12tpi	8-12tpi	8-12tpi	6-10tpi	5-8tpi	5-8tpi	5-8tpi	5-8tpi	5-8tpi
0.118	14	14	10-14tpi	10-14tpi	10-14tpi	10-14tpi	8-12tpi	8-12tpi	6-10tpi	6-10tpi	5-8tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi
0.157	14	14	10-14tpi	10-14tpi	8-12tpi	8-12tpi	8-12tpi	8-12tpi	5-8tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi
0.197	14	10-14tpi	10-14tpi	10-14tpi	8-12tpi	8-12tpi	8-12tpi	6-10tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi
0.236	14	10-14tpi	10-14tpi	8-12tpi	8-12tpi	8-12tpi	8-12tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	3-4tpi
0.315	14	10-14tpi	8-12tpi	8-12tpi	8-12tpi	8-12tpi	6-10tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	3-4tpi	2-3tpi
0.394		8-12tpi	6-10tpi	6-10tpi	6-10tpi	6-10tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	2-3tpi	2-3tpi	2-3tpi
0.472		8-12tpi	6-10tpi	6-10tpi	6-10tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi
0.591		8-12tpi	6-10tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi
0.787			6-10tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	2-3tpi						
1.181				4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	1.4-2tpi
2						3-4tpi	3-4tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi
3								2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi
4									2-3tpi	2-3tpi	1.4-2tpi						
6											1.4-2tpi						
7.873													1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi
9.842													1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi
11.81													1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi
13.778													1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi
15.747													1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi
17.716													1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi
19.685													1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi

S= Wall Thickness
 If you have to cut two or more tubes lying side by side please use this table in consideration of the double wall thickness (s).



BLADE BREAKAGE

In some cases blade breakage is unavoidable due to the stresses that are imparted on the blade. Avoidable breakage is often the result of poor care, or poor operator judgment when it comes to adjusting or mounting the blade or blade guides.

Listed below are some of the more common reasons for blade breakage.

- Top blade guide assembly is set too high above the piece part.
- The blade is tensioned incorrectly.
- Piece part is fed into the blade too quickly.
- Blade teeth are dull or broken.
- Blade is not properly aligned with the guides.
- Forcing a large width blade to cut a small radius.
- Using a blade with an improperly finished weld joint.
- Allowing the blade to run when not in use. (**NEVER** leave an unattended blade running.)

MATERIAL SELECTION

 **CAUTION:** It must be determined by the customer that materials being processed through the machine are **NOT** potentially hazardous to operator or personnel working nearby.

When selecting materials keep these instructions in mind:

- Material must be clean and dry. (without oil)
- Material should have a smooth surface so it processes easily.
- Dimensional properties of material must be consistent and not exceed the machine capacity values.
- Chemical structure of material must be consistent.
- Buy certificated steel from the same vendor when possible.

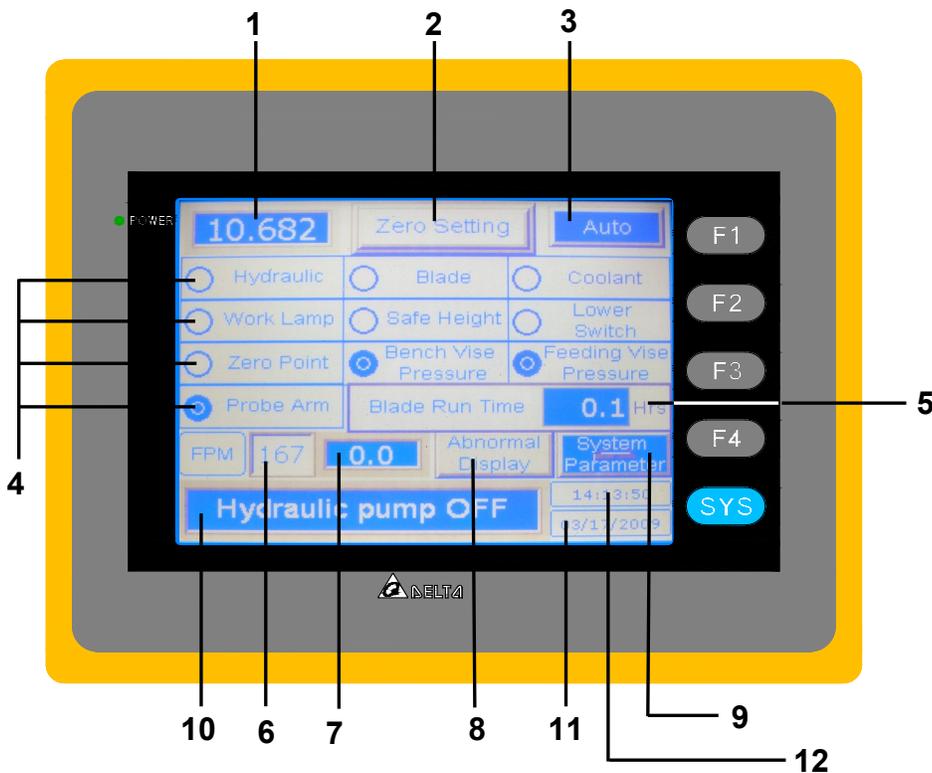


MACHINE INTERFACE and PROGRAMMING

The Baileigh BS-20A Band Saw comes standard with a touch screen input window for the programming of operation variables. It also displays current operation parameters and machine faults. They are presented to the machine operator in an easy to follow menu form. After turning on the disconnect switch, the white power light will be lit, and the interface will power up, displaying the company logo and machine model as shown below.



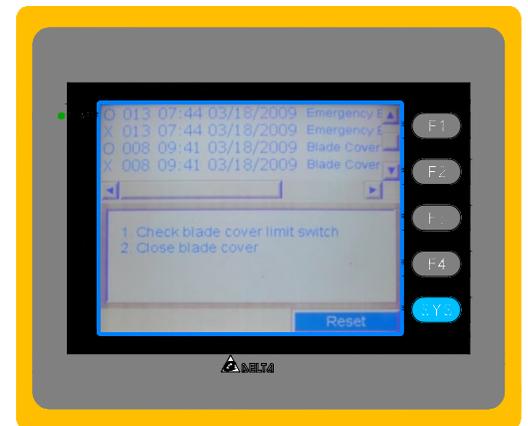
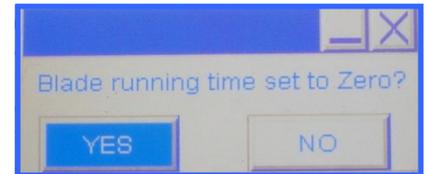
(F1) Main Menu (Touching the F1 button will display the following screen):



1. Shuttle Vise Move Position – This box shows the distance the shuttle has traveled from the zero position.
2. Zero (Home) Setting – Touch to set the shuttle vise zero position before automatic cutting or to set when machine has been shut Off and turned On again.  **Note:** Close front vise and open the rear vise in manual mode before setting the zero position.
3. Operating Mode – Indicates whether machine is in Manual mode or Auto mode.



4. Working Indicator Lights – The indicator lights show the machines current operating status. (Hydraulic, Blade, Coolant, Work Lamp, Safe Height, Lower Switch, Zero Point, Bench Vise Pressure, Feeding Vise Pressure, & Probe Arm.)
5. Blade Run Time – Displays time that the blade has been in service. Touch to bring up the “Blade running time set to Zero?” message after changing a blade. After selecting “Yes or No” touch the “X” to return to the main screen.
6. Set the Blade Speed – Touch to enter a value for the blade speed.
7. Blade Speed – Shows actual blade running speed.
8. Abnormal Display – Touch to show fault screen (at right). The fault screen shows the malfunction and how to solve it. It also shows prior faults with the date and time when they occurred.
9. System Parameter – A password is required to enter into this section. ONLY QUALIFIED PERSONNEL should have access to the parameter settings. Key in the password and Touch enter. Caution should be taken when making any parameter changes as they could cause a machine malfunction.
10. Main Message Display
11. Current Date
12. Current Time





(F2) Current Operation (Touching the F2 button will display the following screen):



- 13. Executing No. – Refers to the instruction task order. Touch to go to menu F3, Material Cutting Jobs
- 14. Operating Mode – Shows whether machine is in Manual or Auto mode.
- 15. Length Setting – Refers to the length setting of the current task.
- 16. Quantity Setting – Refers to the quantity setting of the current task.
- 17. Feeding Length – Refers to the current total length of material that has fed forward. This includes distances beyond a single shuttle stroke.
- 18. Finished Quantity – Refers to the number of cut pieces completed.
- 19. Count Trim Cut In – Touch to count trim cut out after starting automatic cutting cycle.
- 20. Upper Position – Set the saw upper or lower head stop position after finished cutting in Manual mode.
- 21. Single Cutting or Bundle Cutting – Touch to select Single cutting or Bundle cutting. For single cutting operation, the shuttle vise will clamp at a position in the back to prepare for the next feed. Bundle cutting means the shuttle vise will stay at the front position after feeding material forward.



22. Blade Speed (FPM) – Touch to set blade speed directly, the blade speed is read in feet per minute. After entering blade speed Touch “Enter” and then “X” to return to screen F2.

23. Shows Actual Blade Running Speed.

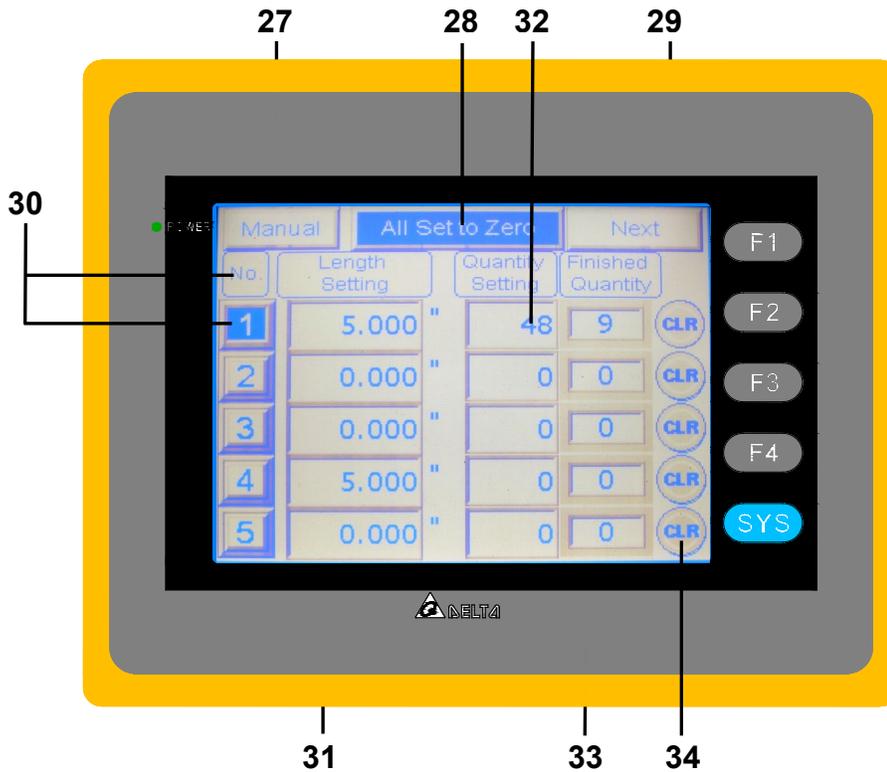
24.(+) Touch to increase blade speed.

25.(-) Touch to decrease blade speed.

26. Main Message Display – Shows a machine or fault message and a possible remedy.



(F3) Sets Material Cutting Jobs (Touching the F3 button will display the following screen):





- 27. Shows Manual or Auto Mode.
- 28. All Set To Zero – Touch to bring up screen “All Data Zero Setting” Yes or No. Touch “X” to return to F3 menu.
- 29. Next – Touch to advance to additional entry lines.
- 30. Job Number – Refers to the cutting task orders (1 – 10). For cutting piece parts, the saw will follow the selected jobs in sequence. Touch the task number(s) required and the box will turn blue.



Note: The Length Setting and Quantity settings must be filled in first.

Chosen task number

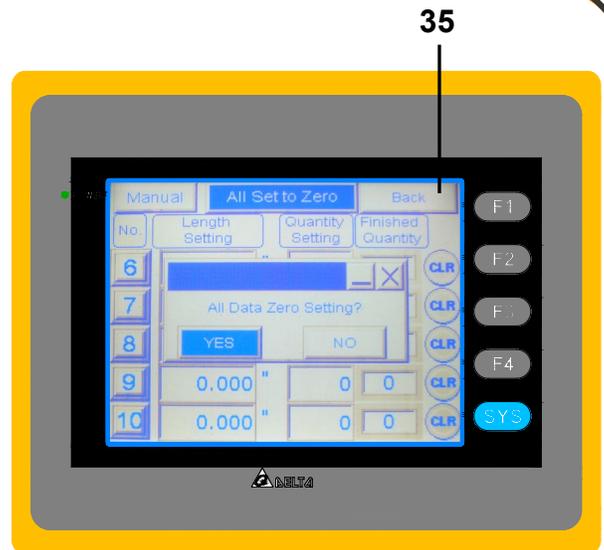


- 31. Length Setting – Refers to the length of cut pieces. This menu allows the user to set the variables for cutting piece parts. There are 10 total task lines available for altering the production lengths. To modify the cut length (in manual mode) Touch the Length Setting box and the screen to the right will display. Key in the cutting length and Touch the enter key.
- 32. Quantity Setting – Touch the Quantity Setting box. Key in the quantity and Touch the enter key.
- 33. Finished Quantity – Refers to the number of cut pieces completed.





- 34. Clear Setting (CLR) – Touch any CLR button within 2 sec. to set the length and quantity back to zero.
- 35. Back – Touch the back button and you will return to task lines (1 – 5).



(F4) Language Option (Touching the F4 button will display the following screen.)

This menu allows the operator to change the user language. Touch the button of the language you desire, and then the button to return to the main menu in the language you selected.



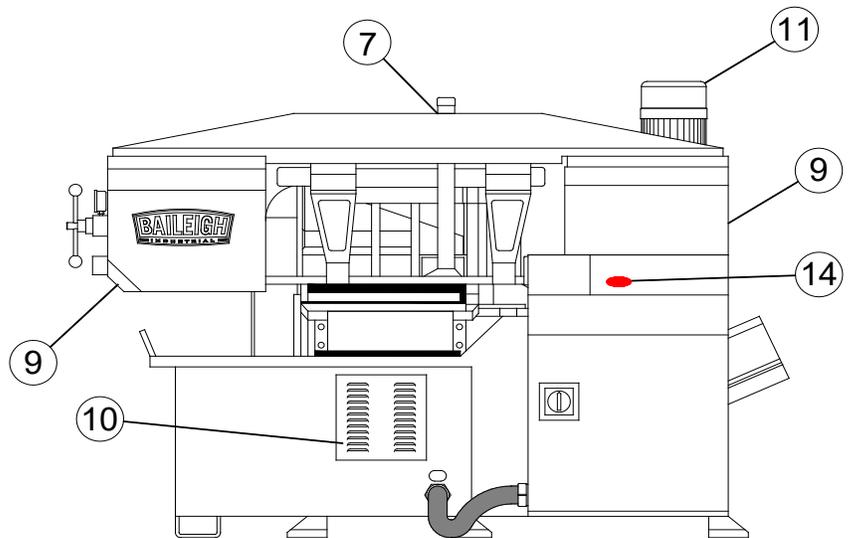
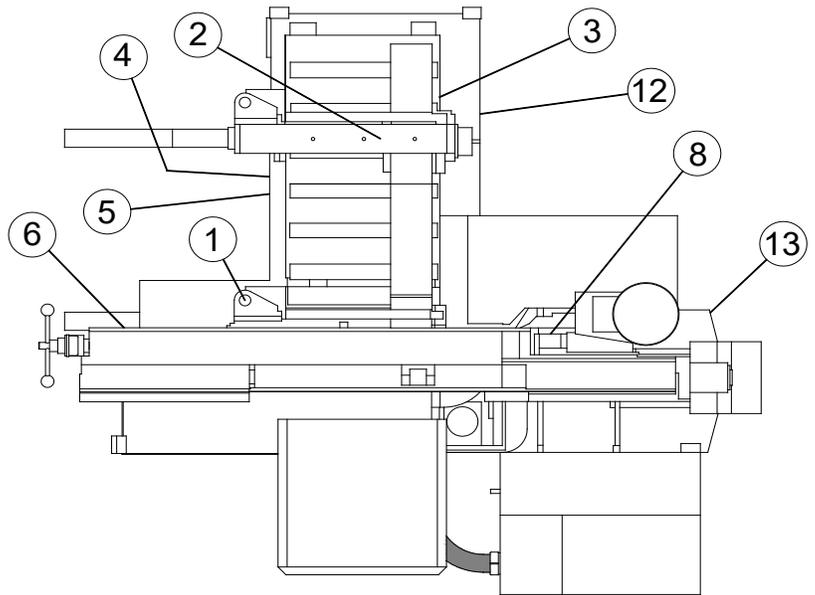


Machine Faults

The touch screen interface will show machine faults when they occur. You will be able to see the probable causes and possible remedies. After the fault is corrected, touch the reset button to remove the error notice.

Use the diagram showing the number and location of the various machine faults:

1. Faulty forward proximity switch
2. No material in the shuttle vise
3. Incorrect encoder reading
4. Shuttle vise pressure sensor fault
5. Bench vise pressure sensor fault
6. Blade tension fault
7. Probe arm limit switch fault
8. Bow down limit switch fault
9. Blade cover limit switch fault
10. Motor inverter malfunction
11. Blade motor fault
12. Hydraulic pump motor fault
13. Coolant motor fault
14. Emergency button pressed





SAW BLADE CARE



WARNING: Make sure the electrical disconnect is OFF before working on the machine.

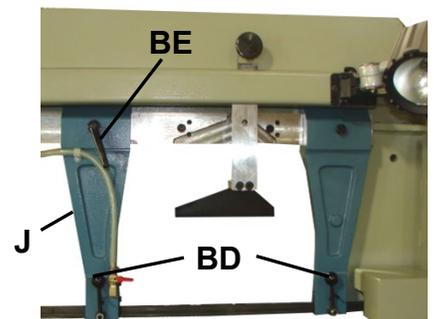
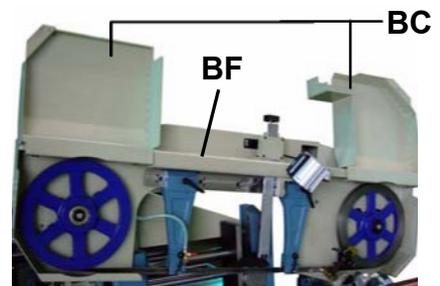
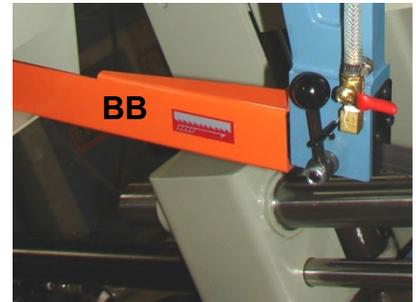
Maintenance should be performed on a regular basis by qualified personnel.

Always follow proper safety precautions when working on or around any machinery.

Blade changes are periodically required when they become worn. Choose a saw blade that is best suited for the size, type, and shape of material you will be cutting.

Removing and Installing the Blade

1. Raise the saw bow approximately 6" in height.
2. Disconnect the saw from the power source.
3. Remove blade guard (BB) from the guide post.
4. Rotate the saw bow to 10° and lock in place.
5. Remove a single bolt on each cover (BC) and open each cover.
6. Release the tension on the carbide guides by turning the handles (BD) counterclockwise (ccw) 1/4 turn.
7. Loosen handle (BE) and slide left blade guide post (J) as far to the right as possible.
8. Release the blade tension. Turn the blade tension handle (B) counterclockwise (ccw) until the blade is free.
9. At the top of the saw bow, the saw blade passes through a protective channel (BF).



CAUTION: Wear leather gloves to protect your hands from the sharp blade!

10. Grip the blade at each end of this channel and guide out carefully.
11. Remove the old blade from both the idler and drive pulleys and out of each carbide blade guide.
12. Place the new blade in the carbide guides and then slide the blade over the pulleys. The teeth should be pointing towards the drive side as they pass through the carbide guides.



Blade Tracking

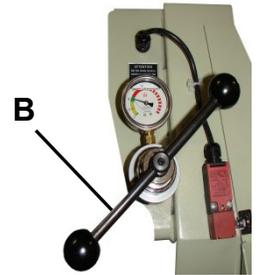
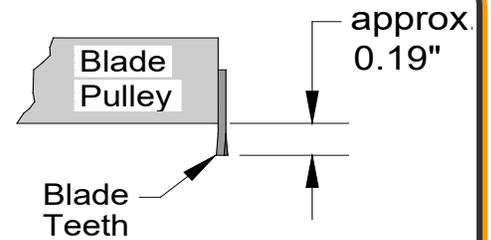
The blade teeth should protrude from the face of the blade pulleys approximately 0.19" (5mm).

1. With the blade in place, turn the tension handle (B) clockwise (cw) until the needle of the tension gauge is centered in the green area.
2. Set the carbide guides by turning the locking handles (BD) clockwise (cw) to the locked position.
3. Jog the blade a few revolutions.



Note: Blade covers must be closed or the saw will not run.

4. Check that the blade is not moving in or out on the pulleys.
5. Close and secure the blade covers.



Blade Tracking Adjustment

Blade tracking has been set at the factory and requires no adjustment. Generally the blade tracking will stay fairly constant. The blade teeth should protrude from the face of the pulley approximately 0.19" (5mm).

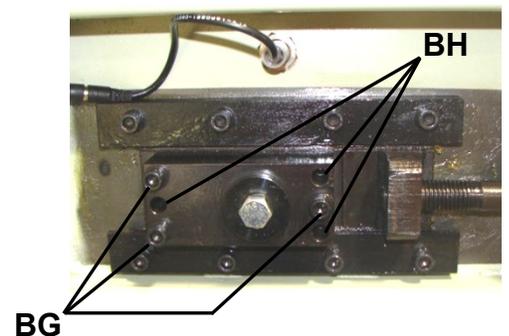
If a tracking problem occurs, adjust the saw as follows:



Note: Normally only the idler pulley will need adjustment.

Idler Pulley

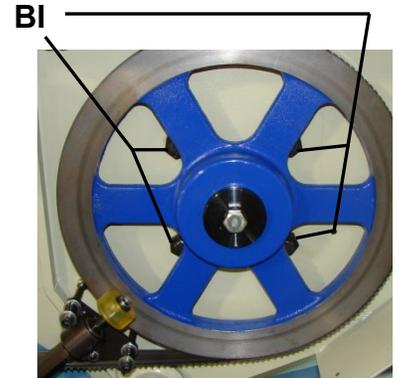
1. Locate the axle mount for the idler pulley on the backside of the saw bow. It has (3) socket head bolts (BG) and (3) setscrews (BH).
2. Unlock the axle mount by loosening the (2) socket head bolts (BG) on the left side 1/4 turn, and (1) bolt on the right side 1/2 turn.
3. Set the tracking by adjusting the setscrews (BH). Turning the (2) right side setscrews clockwise (cw) will pull the blade towards the saw bow frame. Turning the left setscrew clockwise (cw) will push the blade away from the saw bow. Using a 1/4 turn make the adjustment.
4. Lock the change by tightening the (3) hex socket bolts (BG).





Drive Pulley

1. Tracking is held in place with (4) small hex bolts (BI) located behind the drive pulley.
2. Loosen all (4) of the small hex bolts.
3. Turning the (2) large hollow hex head bolts on the right side, 1/4 turn clockwise (cw), will pull the blade toward the saw bow frame. Turning them counterclockwise (ccw) will push the blade away from the saw bow frame.



Note: The (2) hollow hex head bolts on the left side adjust opposite.

4. After adjustment, tighten all (4) small hex bolts.

Breaking in the Saw Blade

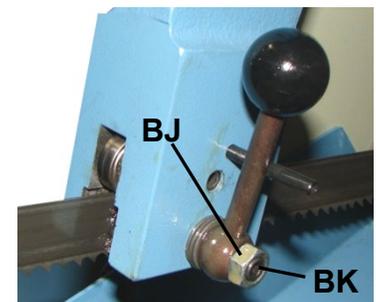
When a new blade is used, break it in before using it for extended operation. Failure to break in the blade will shorten the service life of the blade, and result in less than optimum efficiency. To break in the blade, proceed as follows:

- Lengthen the time required for cutting to 2-3 times that of normal.
- The break-in period can be considered sufficient if all unusual noises or metallic sounds have been eliminated. To completely break in the blade, a minimum of five complete cuts of an 8" (203mm) diameter piece part will be required.
- After the break-in period has been completed, return the feed rate to a normal setting.

Adjusting the Tungsten Carbide Guides

The carbide blade guides are at the base of the guide posts. Adjustments are needed when the carbide pads become worn. Adjust the carbide pads as follows:

1. Loosen the nut (BJ) on the locking handle.
2. Adjust the setscrew (BK) by turning it clockwise (cw) until tight and then loosen it 1/8 of a turn.
3. Tighten hex nut (BJ). This should put just enough pressure on the blade to permit you to push the blade down approximately 1/8".





OPERATION

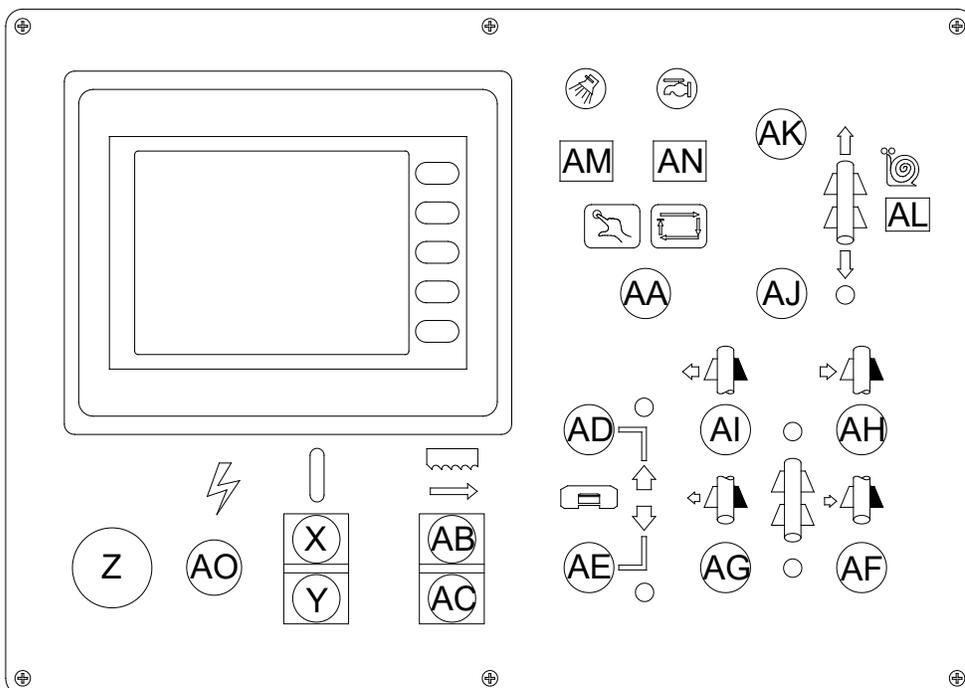
⚠ CAUTION: Always wear proper eye protection with side shields, safety footwear, and leather gloves to protect from burrs and sharp edges. **NEVER** operate saw without blade guards in place.

Before you start to cut the piece part check the following:

- The saw blade is suitable for the material being cut.
- The blade guide post is properly positioned and secure.
- There is sufficient saw blade tension.
- The wire brush is properly positioned.
- Adequate amount of coolant in reservoir.
- The piece part is securely clamped.
- The feed length is set to the correct distance.

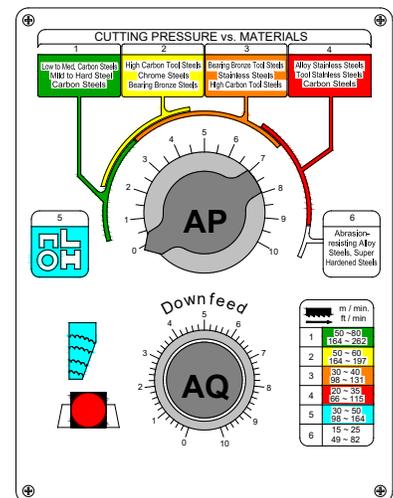
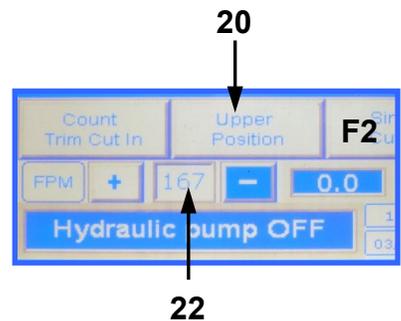
Manual Operation

1. Connect power to the saw and turn the main disconnect switch (M) to On.
2. Press the hydraulic start button (X).
3. Use the Auto/Manual selector switch (AA) to select Manual mode.





4. Secure the piece part into the vise.
 - a. Raise the saw bow to adequately clear the piece part.
 - b. In Manual mode open both vises wide enough for the material.
 - c. Place the piece part onto the roller table.
 - d. Gently push the piece towards the blade.
5. Press button (AH) to close the shuttle vise.
6. Move the piece part to the desired location with buttons (AJ) and (AK).
7. Clamp the piece part with the bench vise by pressing button (AF).
8. Adjust the spacing of the blade guidepost.
 - a. Unlock the left guide post by loosening the adjustable handle.
 - b. Grip the post and move horizontally.
 - c. Using the handle, lock into position.
9. Set the blade speed in Manual mode. Touchscreen Menu F1, button 6 or Menu F2, button 22. In Auto mode touchscreen menu F2 the + / - can be used to set the blade speed.
10. Set the rate for the cutting pressure by turning knob (AP) to the corresponding setting. Set the bow down speed by turning knob (AQ) clockwise (cw) for faster speed and counterclockwise (ccw) for slower bow drop speed.
11. Press operation start button (AB) to start the cutting operation cycle.
12. Press coolant switch (AN) to start the coolant pump. Indicator light will be lit. The chip auger will also start turning. The saw bow will begin to descend quickly until the probe arm touches the piece part. Then the blade descent speed will slow to the cutting pressure (AP) and down feed (AQ) settings.
13. After completion of the cut, the saw blade will stop at the lower limit position and stop moving. The bow stop location can be set at upper position or lower position while in manual cutting mode F2, button 20. After a short pause the bow will ascend to the start cut position.





Stopping the Machine

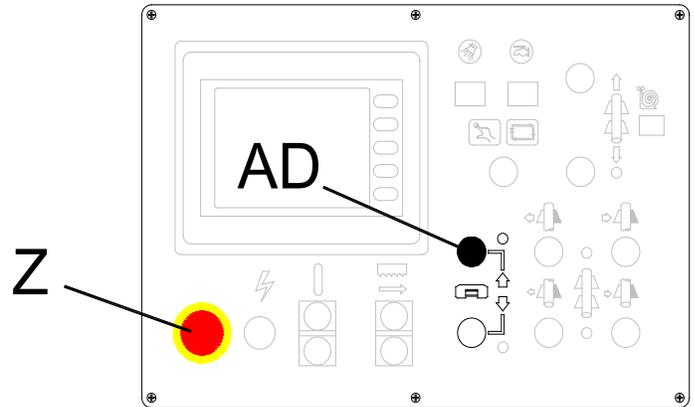
In the event of an emergency, press either the Emergency Stop button (Z) or the Bow Up switch (AD) to stop all machine functions. To release the E-STOP button, rotate the mushroom head clockwise (cw) to reset.



Note: Resetting the E-STOP button will not start the machine.

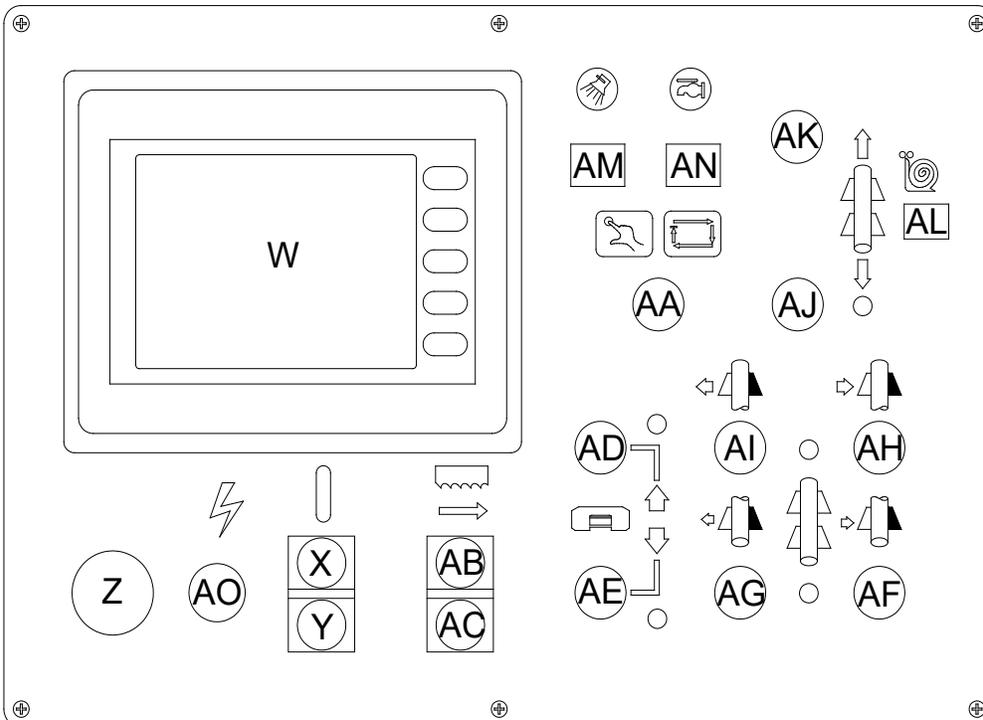
Using the Bow Up switch in an emergency situation will not cancel the machine settings entered into the touch screen interface,

whereas the Emergency Stop button will. When using the Bow Up switch the piece part will stay clamped. Also the saw can be stopped between task cycles by switching to manual mode. When in manual mode the saw will stop at the end of the current task.



Automatic Operation

1. Connect power to the saw and turn the main disconnect switch (M) to On.
2. Press the hydraulic start button (X).
3. Use the Auto/Manual selector switch (AA) to select Manual mode.

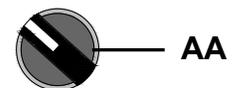
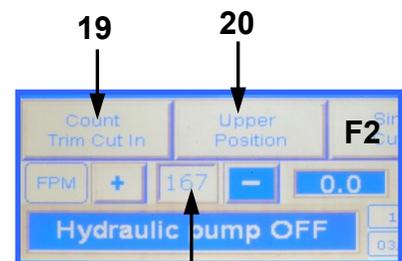




4. Secure the piece part into the vise.
 - a. Raise the saw bow to adequately clear the piece part.
 - b. In Manual mode open both vises wide enough for the material.
 - c. Place the piece part onto the roller table.
 - d. Gently push the piece towards the blade.
5. Use the Auto / Manual switch (AA) to select the Automatic mode.
6. Set the cut-piece variables on the Human-Machine (touch screen) Interface (W). See the F3 Sets Material Cutting Jobs descriptions in the MACHINE INTERFACE and PROGRAMMING section.
7. Adjust the spacing of the blade guidepost.
 - a. Unlock the left guide post by loosening the adjustable handle.
 - b. Grip the post and move horizontally.
 - c. Using the handle, lock into position.
8. Set the blade speed in Manual mode. Touchscreen Menu F1, button 6 or Menu F2, button 22. In Auto mode touchscreen menu F2 the + / - can be used to set the blade speed.
9. Set the rate for the cutting pressure by turning knob (AP) to the corresponding setting. Set the bow down speed by turning knob (AQ) clockwise (cw) for faster speed and counterclockwise (ccw) for slower bow drop speed.

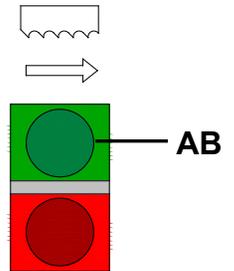
If starting with a new piece part, refer to the Initial Trim Cut Procedure that follows:

- When inserting a new piece part in Automatic mode, the first cut piece will not be the proper length unless an end-cut is performed. This initial cut will zero the material length so that additional cuts will be to the specified size.
- Begin by inserting the material. Have the material slightly past the blade cut-off line.
- Switch the operation to Manual mode by turning the Auto / Manual switch (AA).
- Start the initial trim cut in Automatic mode. The initial trim cut can count: Trim Cut In or Trim Cut Out by touching the F2, button 19.

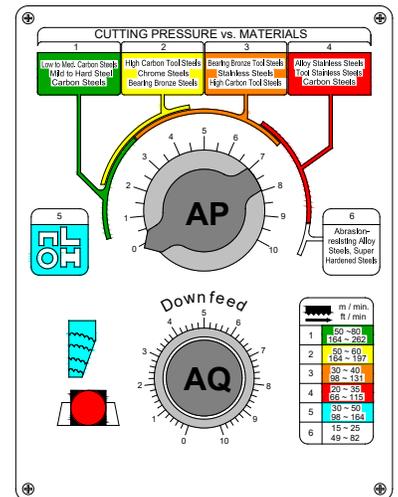




10. Press the start button (AB) to start the operation cycle.
11. Press (AN) to start the coolant pump. The chip auger will also start turning. The saw bow will begin to descend at the speed settings made by the operator for the cutting pressure (AP) and the down feed (AQ).
12. After completion of the cut, the saw bow will stop at the lower limit position.
13. The saw bow will rise and the piece part will feed ahead for the next cut.
14. The cycle will continue until all commands have been completed. The machine will stop and the motors will turn off.



Note: When switching from Manual mode to Auto mode Execute "Zero" setting after clamping the bench vise and opening the shuttle vise.



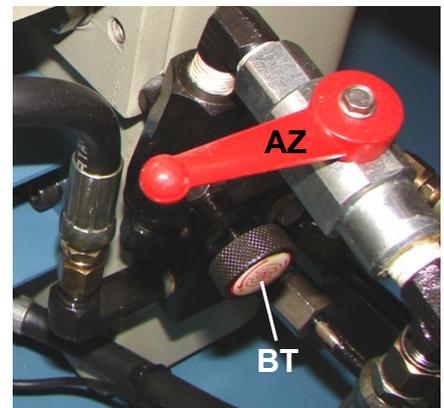


Bundle Cutting

Nesting clamps are used for bundle cutting operations. They vertically press down upon a stack of equally sized piece parts. Using these hydraulically operated clamps you can cut multiple pieces at once. To regulate the speed of the cylinder turn the flow control knob (BT) located below the hydraulic shut-off valve. If you want to stop using the nesting clamps, allow them to return to the up position, and turn off the hydraulic valves (AZ) closed as shown in photo.



1. Follow either the Manual operation or the Automatic operation.
 2. Open the hydraulic valves on the bench vise cylinder and the shuttle vise cylinder. (Note: photo at right shows closed position.)
- All clamping operations are the same.
 - The pushbuttons (AF), (AG), (AH), & (AI) that operate the vises also operate the vertical motion of the nesting clamps.
 - If you open the shuttle vise clamps, the nesting clamp will rise. When the shuttle vise clamps are closed the nesting clamp will lower onto the piece part.

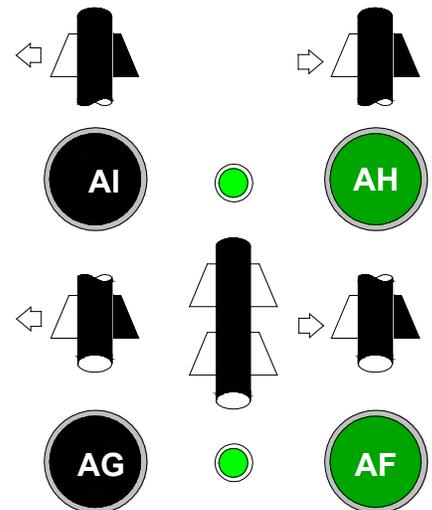


Special Operation for a Jammed Blade

While cutting a piece part, if the saw blade suddenly jams, press the bow up button (AD) on the control panel.

The following situations could cause jamming:

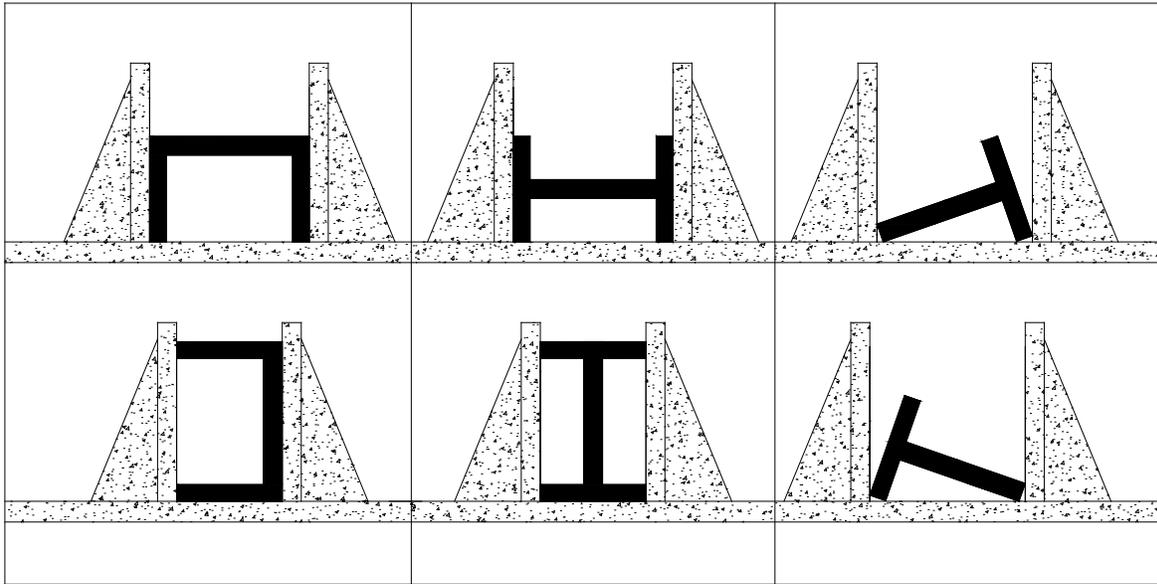
- Slippage between drive wheel and blade caused by insufficient blade tension.
- Broken teeth on the saw blade.
- The saw blade teeth are dull.
- The tooth spacing on the saw blade is too fine for material being cut.
- Feed rate is too fast for material being cut and type of blade being used.





Material Clamping Examples

These examples below show ways to clamp a variety of cross sections. Always keep in mind the cutting capacity of the saw to achieve efficient saw cuts and long blade life. Do not use blades of a size different from that shown in the technical specification chart.



Vise Operation

1. In manual mode the bench vise and the shuttle vise can open and close full stroke.
2. The shuttle vise will not advance the piece part when the bench vise is clamped.
3. With the bench vise clamped on a piece part, the shuttle vise can be repositioned ONLY if the vise is unclamped.
4. In AUTO mode the bench vise Open and Close and the Shuttle vise Open and Close buttons will not respond.

Securing the Piece Part

1. Raise the saw bow to adequately clear the piece part.
2. In Manual mode open both vises wide enough for the material.
3. Place the piece part onto the roller table.
4. Gently push the piece towards the blade.
5. The part can now be clamped with the vise close buttons. (Manual mode)



MACHINE ADJUSTMENTS



WARNING: Make sure the electrical disconnect is OFF before working on the machine.

Maintenance should be performed on a regular basis by qualified personnel.

Always follow proper safety precautions when working on or around any machinery.

Blade Brush Adjustment

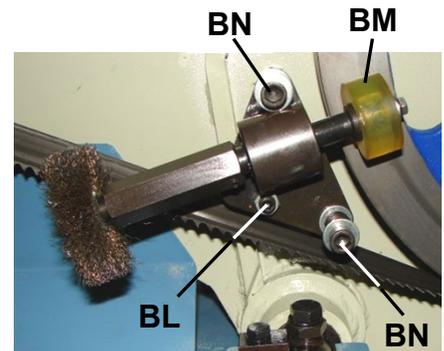
Due to wear of the blade brush, it is necessary to adjust its position. The brush should be held against the blade gullets with minimum force. The brush must periodically be moved closer to the blade as it wears.

Adjust the brush as follows:

1. Disconnect power from the saw.
2. Open the drive idler cover.
3. Loosen the hex nut on setscrew (BL).
4. Turning setscrew (BL) counterclockwise (ccw) will move the blade brush closer to the blade. Turning the setscrew clockwise (cw) will move the brush further away from the blade.
5. After adjustment re-tighten the hex nut.

Adjust the urethane drive wheel (BM) as follows:

6. Turn the (2) spring loaded setscrews (BN) clockwise (cw) to bring the urethane wheel closer to the drive idler face.
7. After adjustment, close and secure the cover.
8. Reconnect power to the saw.





Hydraulic Vise Pressure

The hydraulic vise pressure can be monitored by gauge (S) and adjusted by a pressure adjuster knob (BN) located to the right of the hydraulic tank. It allows for the reduction of hydraulic pressure clamping force. The normal pressure is set at 28kgs/cm² (400psi). This is good for most solid materials. For softer or hollow materials, including pipe, 15kgs/cm² (215psi) is good. Other materials may require different pressure settings.

1. In AUTO mode, the vise pressure can be changed by turning the pressure knob (BN) after clamping a piece part.
2. Unlock the fluted knob nut (BO).
3. Turn the pressure knob (BN) counterclockwise (ccw) to decrease the pressure and clockwise (cw) to increase the vise pressure.
4. Lock the fluted nut (BO) after adjusting.



Guide Post Adjustment

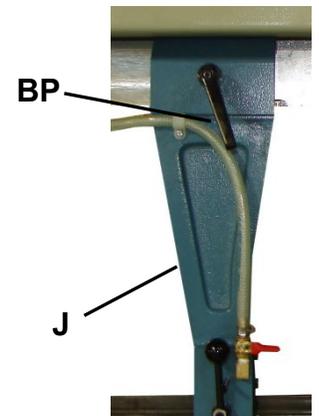
The blade guide post adjusts horizontally on a slide to control the spacing of the blade guide. Having the guide post close to the piece part reduces blade flexing offering a more precise cut. It also offers more safety protection of the blade guard.

1. Unlock the left guide post (J) by loosening the adjustable handle (BP).
2. Grip the post and move horizontally.



Note: Do not try and move further than the coolant hose will allow.

3. Using the handle (BP), lock into position.

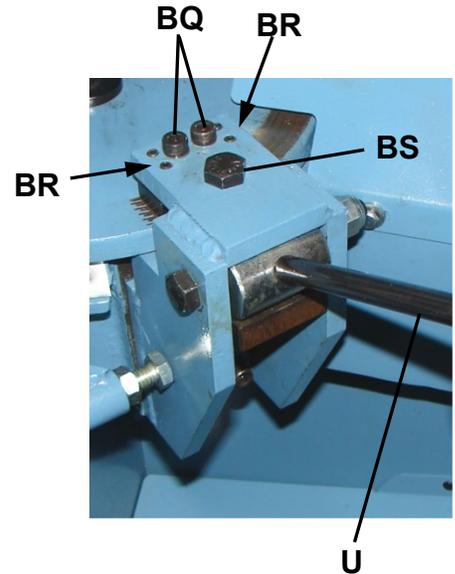




Miter Angle Lock Adjustment

The clamping force on the miter angle lock can be adjusted to ensure that the head is held securely during cutting. If the lock lever fails to clamp while locked, the clamp force should be adjusted as follows:

1. Raise the lock lever (U).
2. Loosen the two locking hex socket screws (BQ).
3. Tighten all four setscrews (BR) until tight.
4. Back out the setscrews (BR) 1/4 of a turn.
5. Tighten the two locking hex socket screws (BQ).
6. Swing the saw bow forward and back to about 45° to ensure that the head moves freely and does not bind on the surface of the pivot link.
7. If necessary, adjust bolt (BS). If it is not tight enough, lock lever (U) will bottom out and not hold the miter angle.



Cutting Pressure

Select a suitable cutting pressure for the piece being cut. This varies according to the size and shape of the piece part, type of material, and type of saw blade being used.

Refer to the chart which is also located on the control panel.

CUTTING PRESSURE vs. MATERIALS			
1	2	3	4
Low to Med. Carbon Steels Mild to Hard Steel Carbon Steels	High Carbon Tool Steels Chrome Steels Bearing Bronze Steels	Bearing Bronze Tool Steels Stainless Steels High Carbon Tool Steels	Alloy Stainless Steels Tool Stainless Steels Carbon Steels



LUBRICATION AND MAINTENANCE



WARNING: Make sure the electrical disconnect is OFF before working on the machine.

Maintenance should be performed on a regular basis by qualified personnel.

Always follow proper safety precautions when working on or around any machinery.

Daily Maintenance

- Check daily for any unsafe conditions and fix immediately.
- Check that all nuts and bolts are properly tightened.
- Do a general cleaning by removing dust and metal chips from the machine.
- Inspect the saw blade for wear.
- Top off the coolant tank.
- Check that the blade guards and emergency stop button are in good working order.
- When through using saw for the day, raise the bow to its up position and release some of the blade tension.

Weekly Maintenance

- On a weekly basis clean the machine and the area around it.
- Lubricate threaded components and sliding devices.
- Apply rust inhibitive lubricant to all non-painted surfaces.
- Wipe down the cylinder shafts and lightly oil the vise sliding shafts and other sliding surfaces.
- Inspect blade brush and clean if needed.
- Clean coolant pump inlet.
- Remove chips from inside the guard housings for the saw blade.
- Use compressed air to clean the blade guides and guide bearings.
- Make sure coolant is circulating through system adequately.

Monthly Maintenance

- Check the tightening of the motor flywheel screws.
- Check the blade guide bearings for wear. (replace if necessary)
- Tighten any loose bolts or screws on the gear motor, pump, and safety switches.
- Clean coolant tank.



- Regrease blade tension slide and slide of blade guide post.

Six month maintenance

- Do an operational check of the safety circuit.

Annually

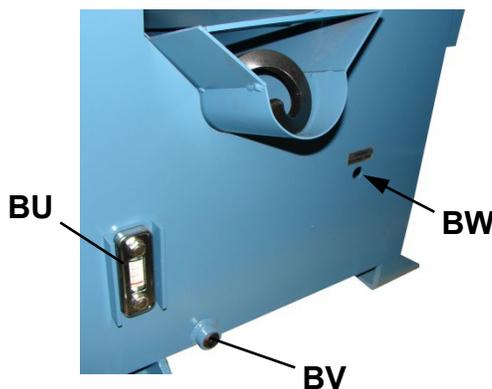
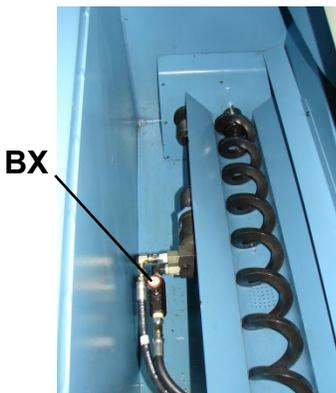
- Change hydraulic oil and clean oil tank



Note: Proper maintenance can increase the life expectancy of your machine.

Coolant System Maintenance

1. Disconnect power from the saw.
2. Remove the coolant cover by taking out the two screws.
3. Lift off the chip auger pump cover. Notice the flow control (BX) that is used to change the speed of the augers hydraulic motor.
4. Remove the drain plug (BV) and completely empty the tank. Use a vacuum cleaner to remove any chips and debris.
5. Thoroughly clean the pump and pump inlet.
6. Replace the drain plug and fill the tank with coolant to the full mark on the sight gauge (BU).
7. (Coolant tank capacity is approx. 22.0 US gal.)
8. The overflow (BW) will prevent over filling.
9. Replace the pump cover and the auger cover.
10. Connect power to the saw.
11. Test coolant flow at the blade nozzles and the coolant hose nozzle.





Oils for Lubricating Coolant

Any 20:1 (water to coolant) solution will work, however we recommend Baileigh B-Cool biodegradable metal cutting fluid. It has excellent cooling and heat transfer characteristics, is non-flammable, and extends blade and machine life. Each gallon of concentrate makes 21 gallons of coolant.

Oil Disposal

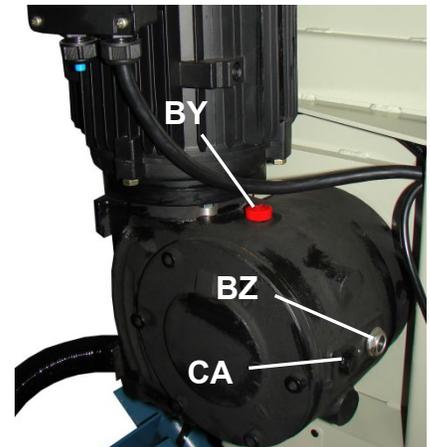
Used oil products must be disposed of in a proper manner following your local regulations.

Gearbox Maintenance

The gearbox requires periodic changing of the oil. Change the gear oil after the first 3-6 months of operation. Then change the gear oil annually thereafter.

Follow the procedure below:

1. Lower the saw bow to a horizontal position.
2. Disconnect machine from the power source.
3. Remove the oil drain plug (CA) and drain the oil into a catch basin. Loosening oil fill cap (BY) will help oil to drain.
4. After draining, replace drain plug (CA).
5. Remove the fill cap (BY) and add gear oil. (For reference use SHELL type gear oil or Mobil gear oil #90). (Fill until the sight gauge (BZ) shows full)
6. Replace oil fill cap (BY).
7. Reconnect power to the saw.



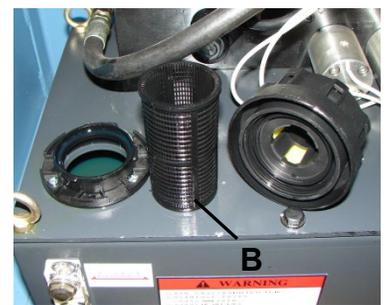
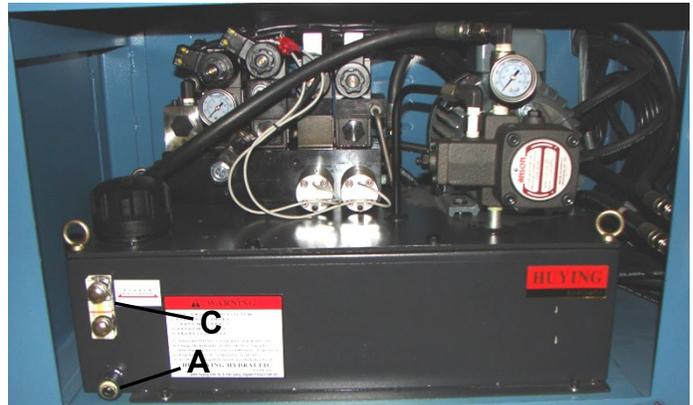


Hydraulic System

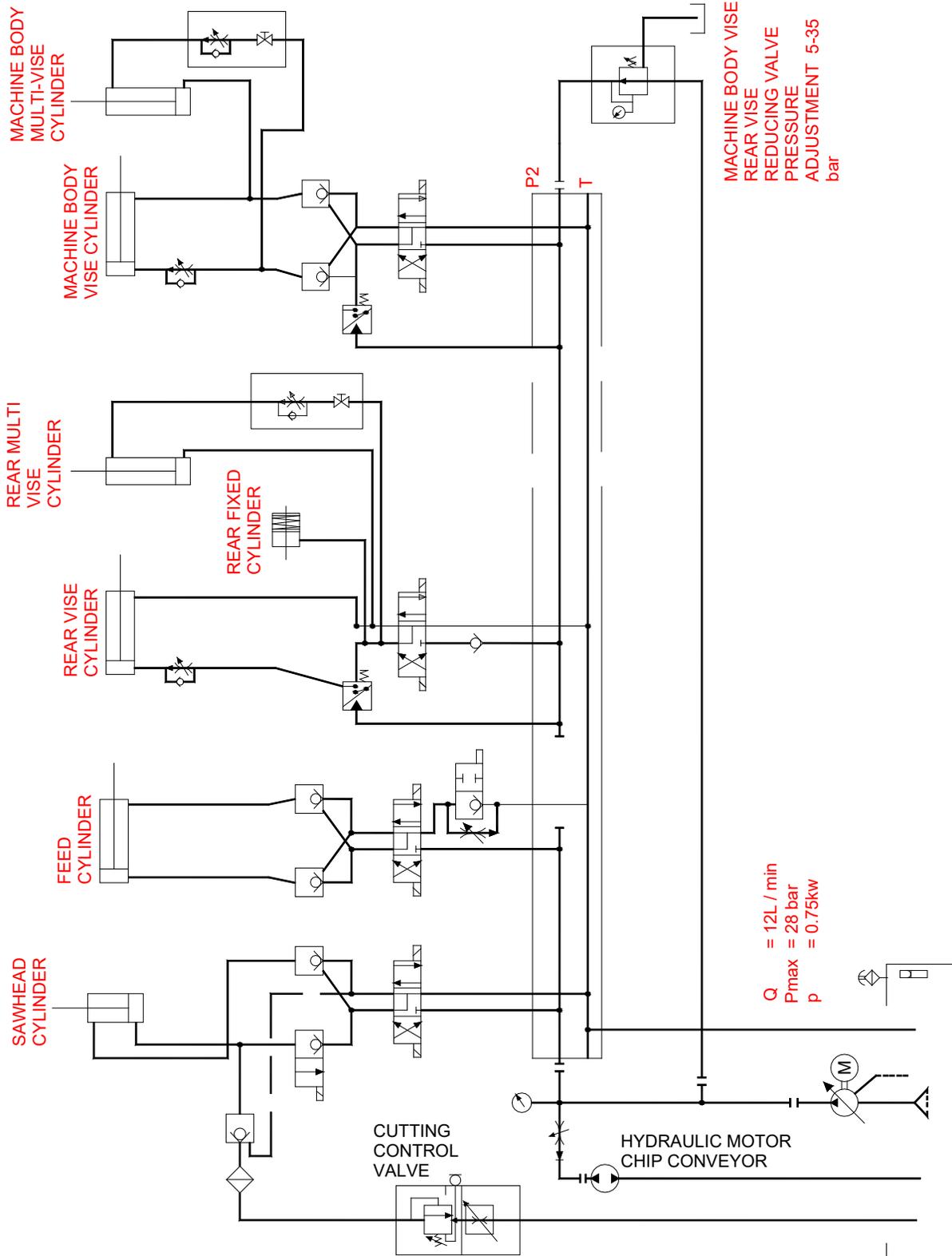
The hydraulic oil is the primary medium for transmitting pressure and also must lubricate the running parts of the pump.

Change the hydraulic oil after the first 3 months of operation. Then change the oil annually or after every 3,000 hours of operation, whichever comes first.

- Keep hydraulic oil temperature between 50°F - 140° F.
 - Avoid mixing cutting fluid with the hydraulic oil.
 - Check hydraulic oil level periodically by monitoring the sight gauge on the tank.
 - Tank capacity is approx. 6.0 US gal. (22.5L).
1. Disconnect power to the saw.
 2. Use hydraulic oil #68 SHELL BRAND or an equivalent with similar specifications.
 3. Keep hydraulic reservoir filled to 90% of capacity.
 4. DO NOT rely totally on the oil gauge as they can sometimes indicate an incorrect level reading. Do a visual inspection with the oil fill cap removed as well.
 5. A shortage of hydraulic oil will cause hydraulic system breakdown to major mechanical components due to overheating.
 6. Change the hydraulic oil every 12 months along with the oil filter.
 7. Remove the cover panel to access the hydraulic tank.
 8. Place a suitable container under the drain plug (A) to drain the oil into. Remove plug and drain oil.
 9. If cleaning the inside of the tank, remove the bolts securing the cover to the tank and slide the cover over enough to access the inside. Replace the cover when complete.
 10. Clean filter basket (B) when filling or changing hydraulic oil.
 11. Fill to the full mark on the sight gauge (C).
 12. Operate the hydraulics to cycle each cylinder to full extension and retraction several times to purge any air from the system.
 13. Install the access cover.

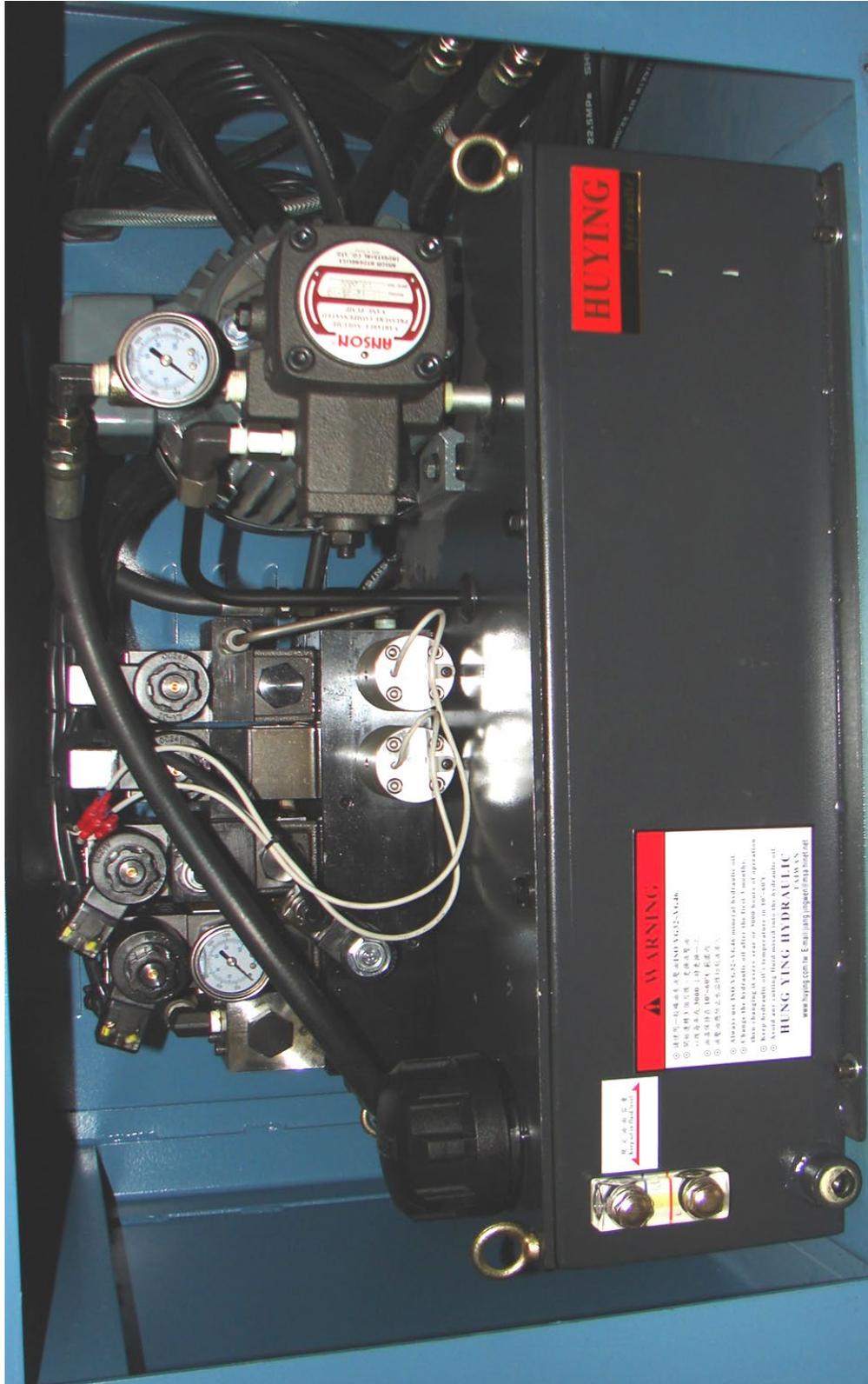


HYDRAULIC SCHEMATIC

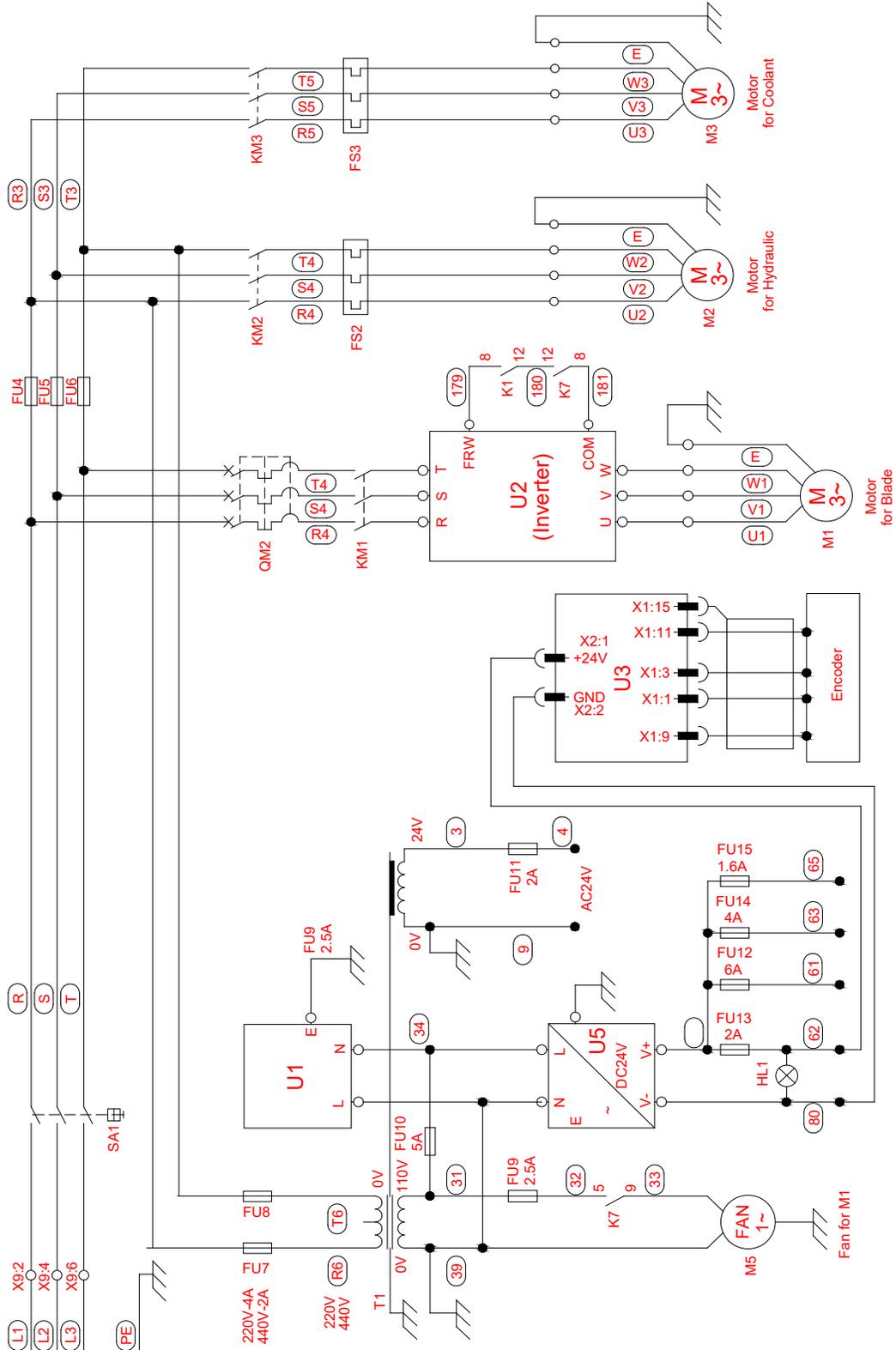




HYDRAULIC TANK

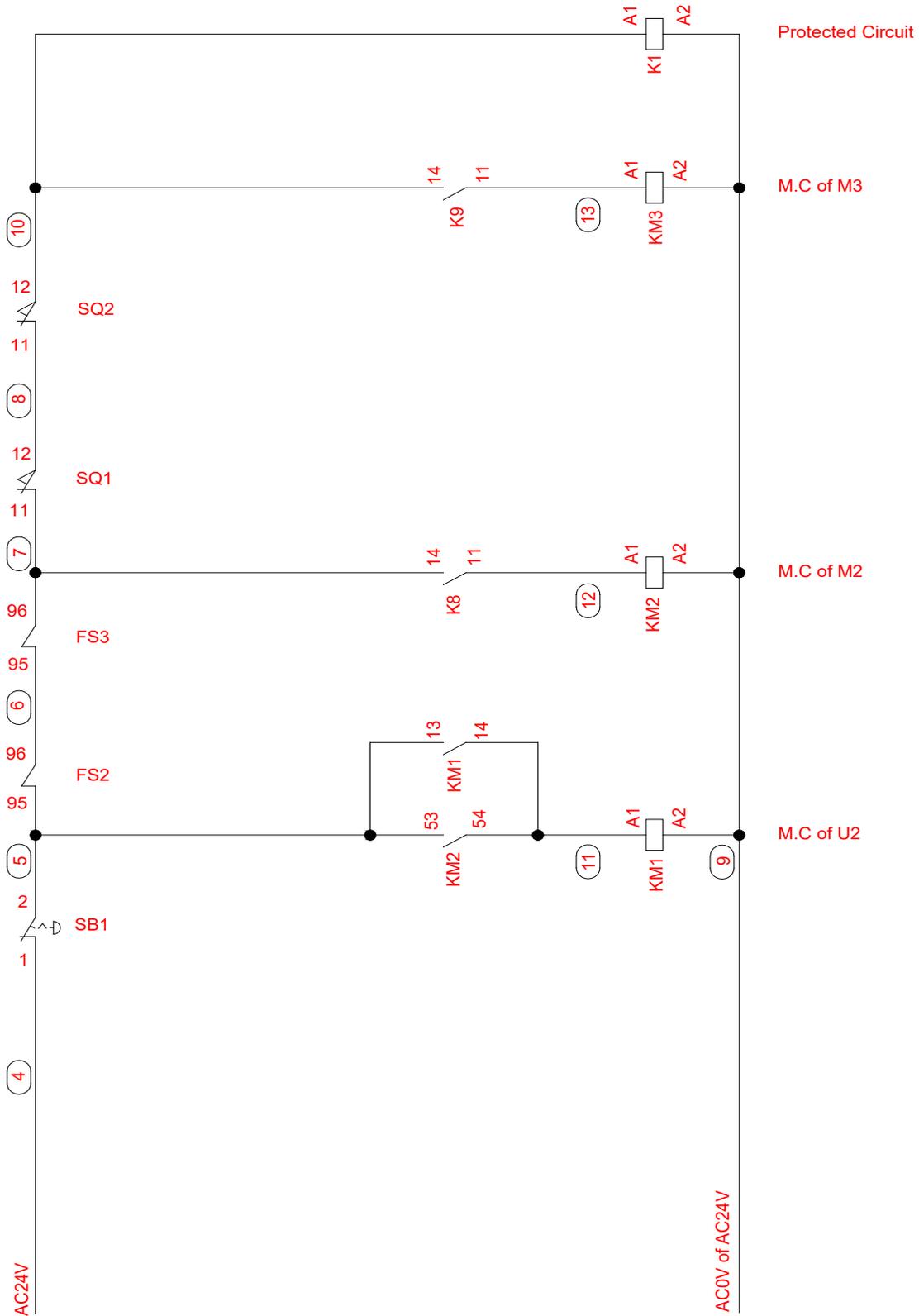


ELECTRICAL CIRCUIT DIAGRAM - (1 of 5)



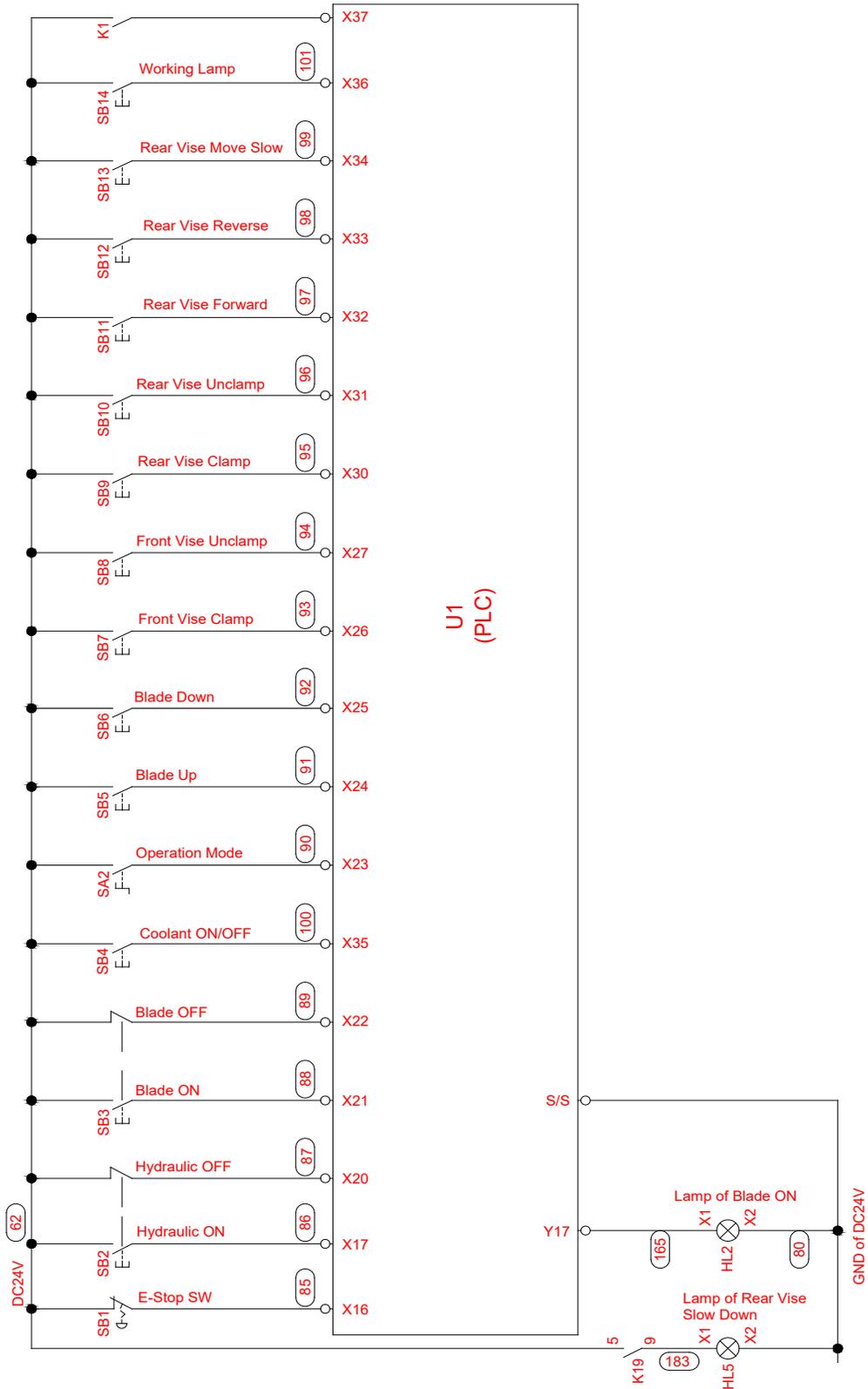


ELECTRICAL CIRCUIT DIAGRAM - (2 of 5)



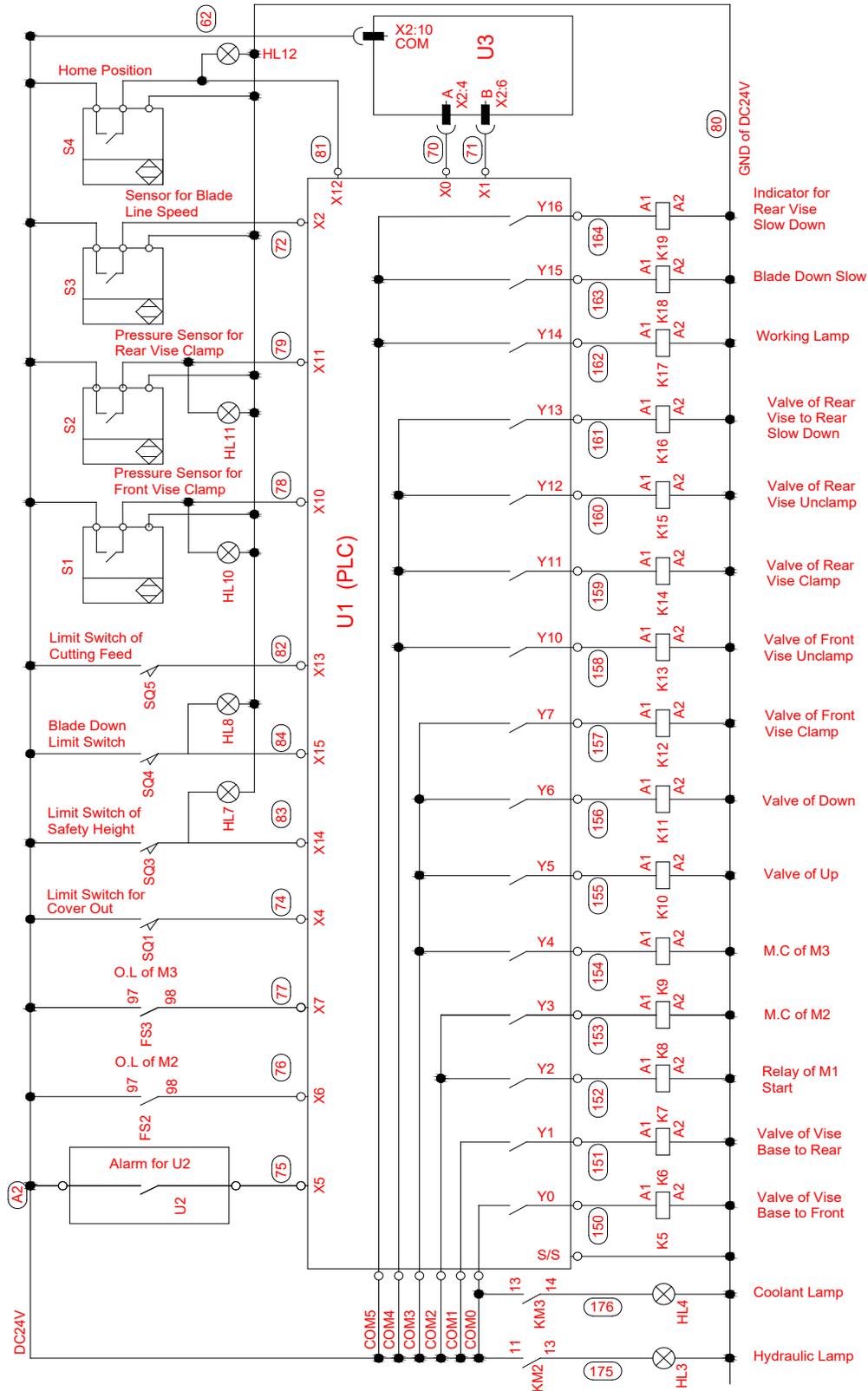


ELECTRICAL CIRCUIT DIAGRAM Panel I/O's - (3 of 5)



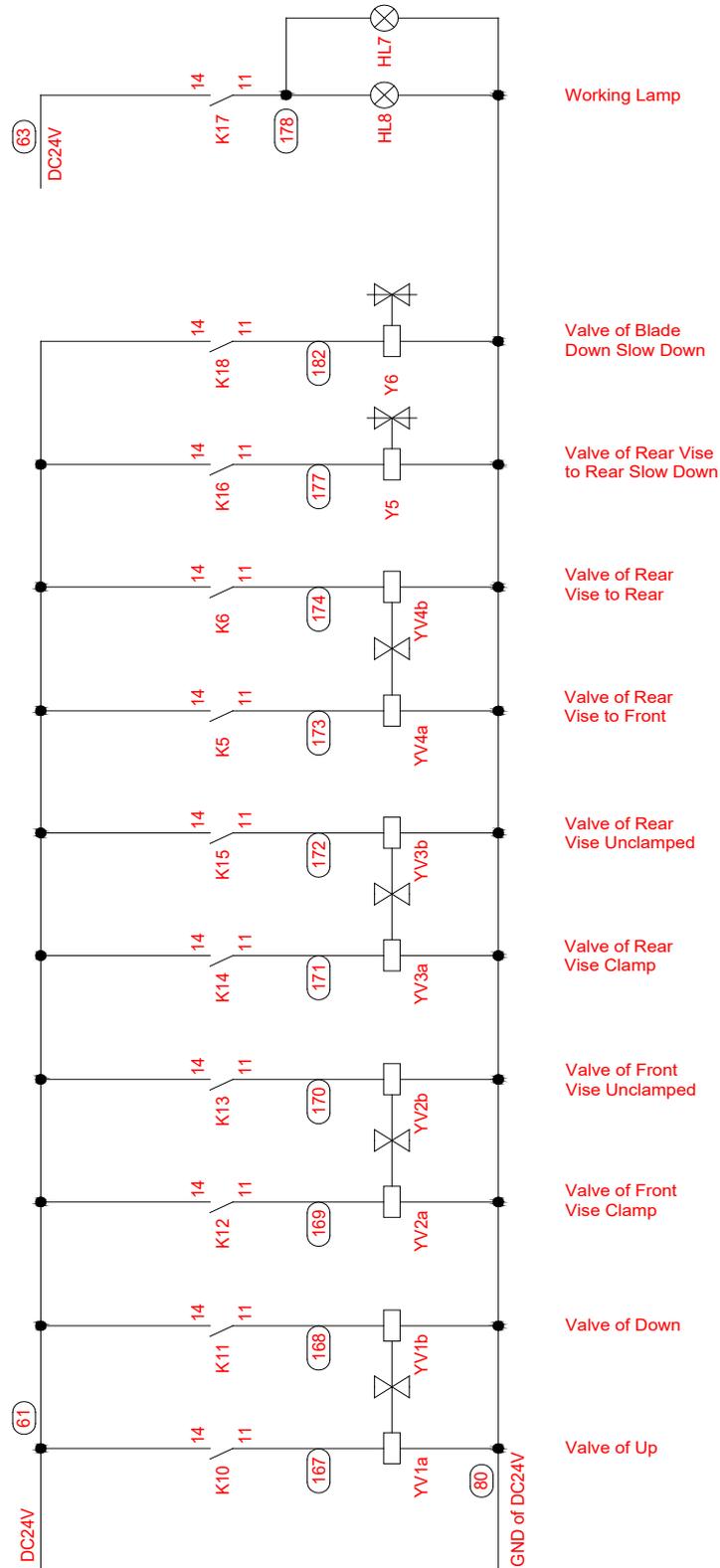


ELECTRICAL CIRCUIT DIAGRAM - (4 of 5)



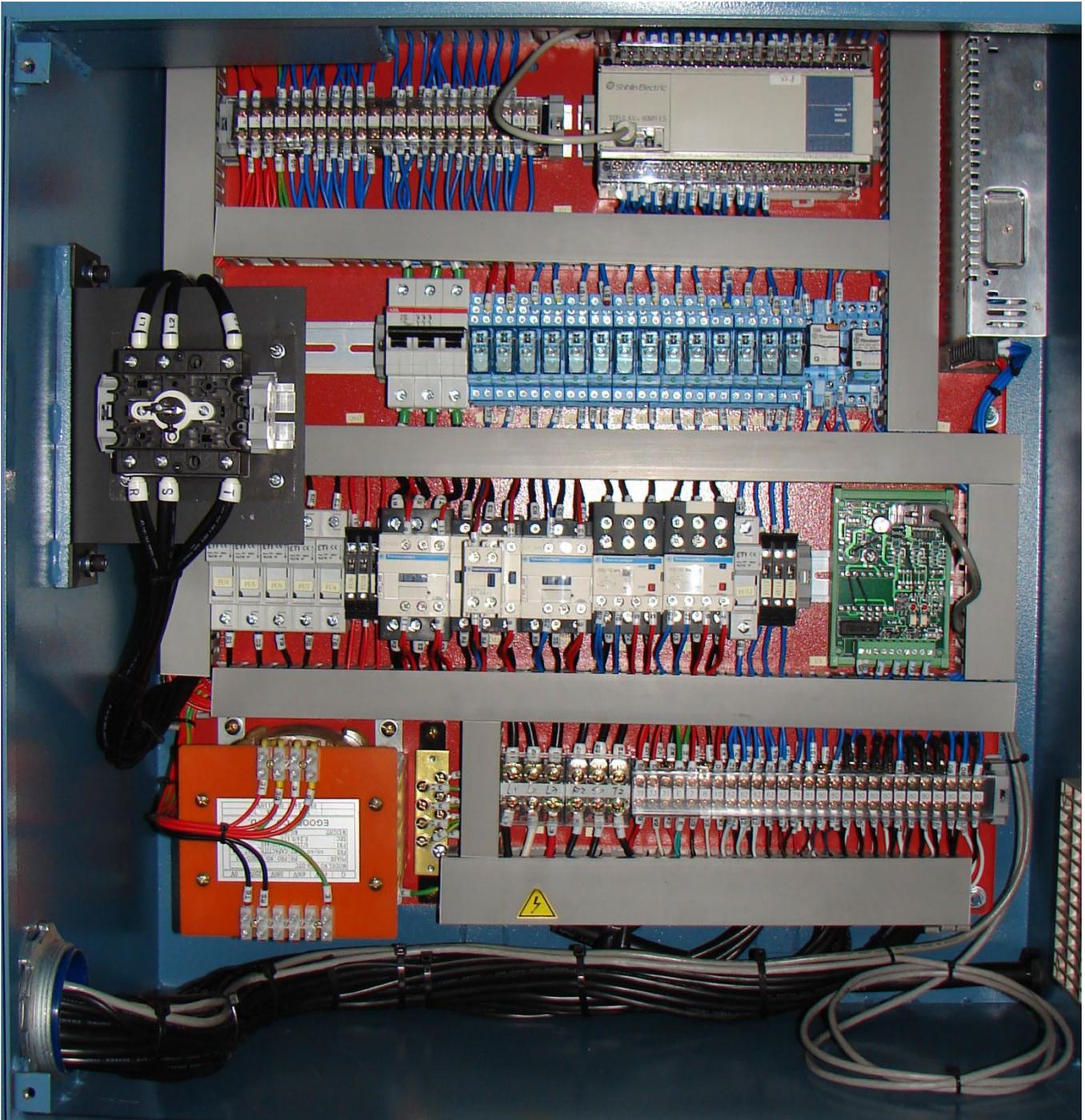


ELECTRICAL CIRCUIT DIAGRAM - (5 of 5)



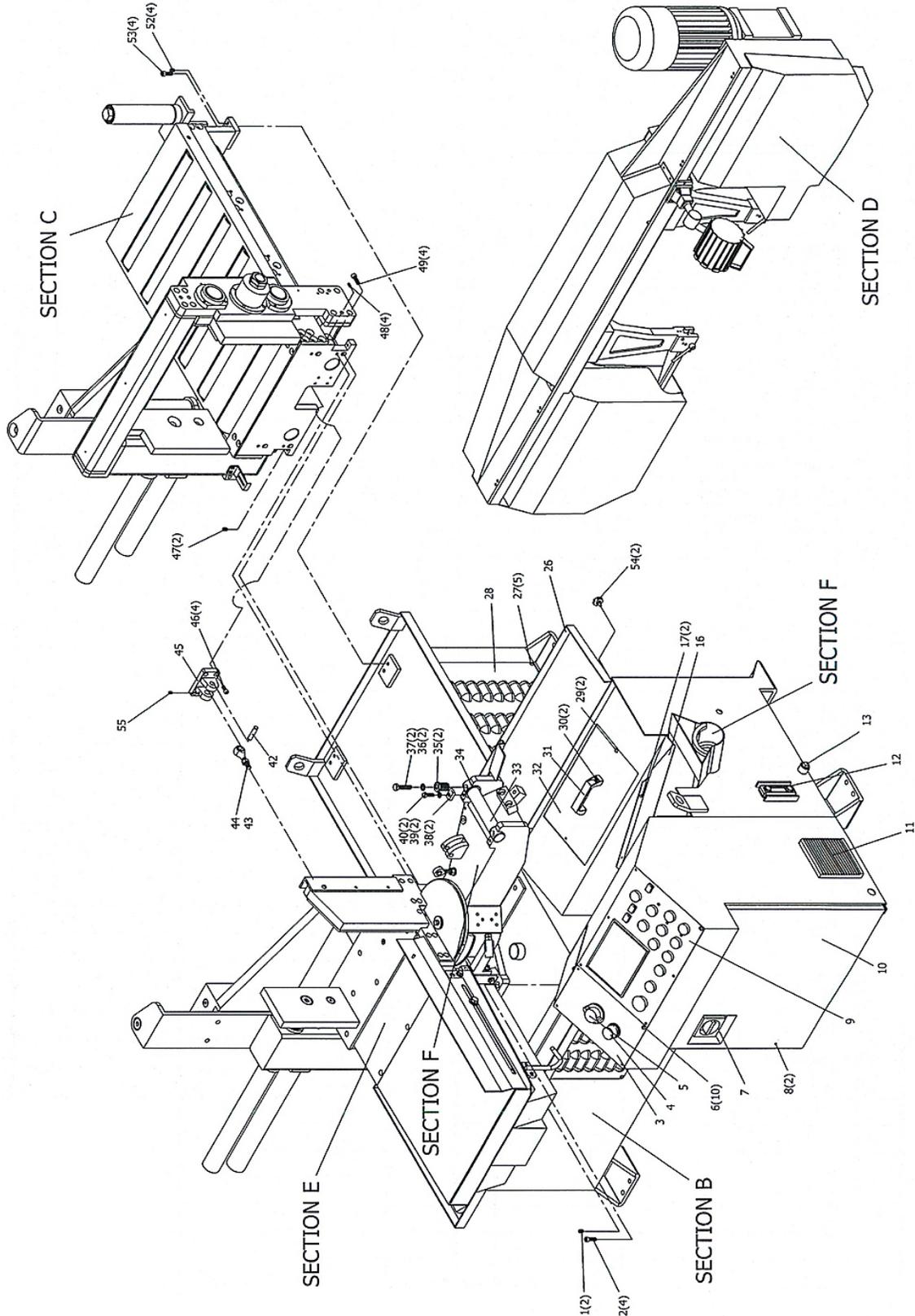


ELECTRICAL ENCLOSURE COMPONENTS





SECTION A PARTS DIAGRAM





Section A Parts List

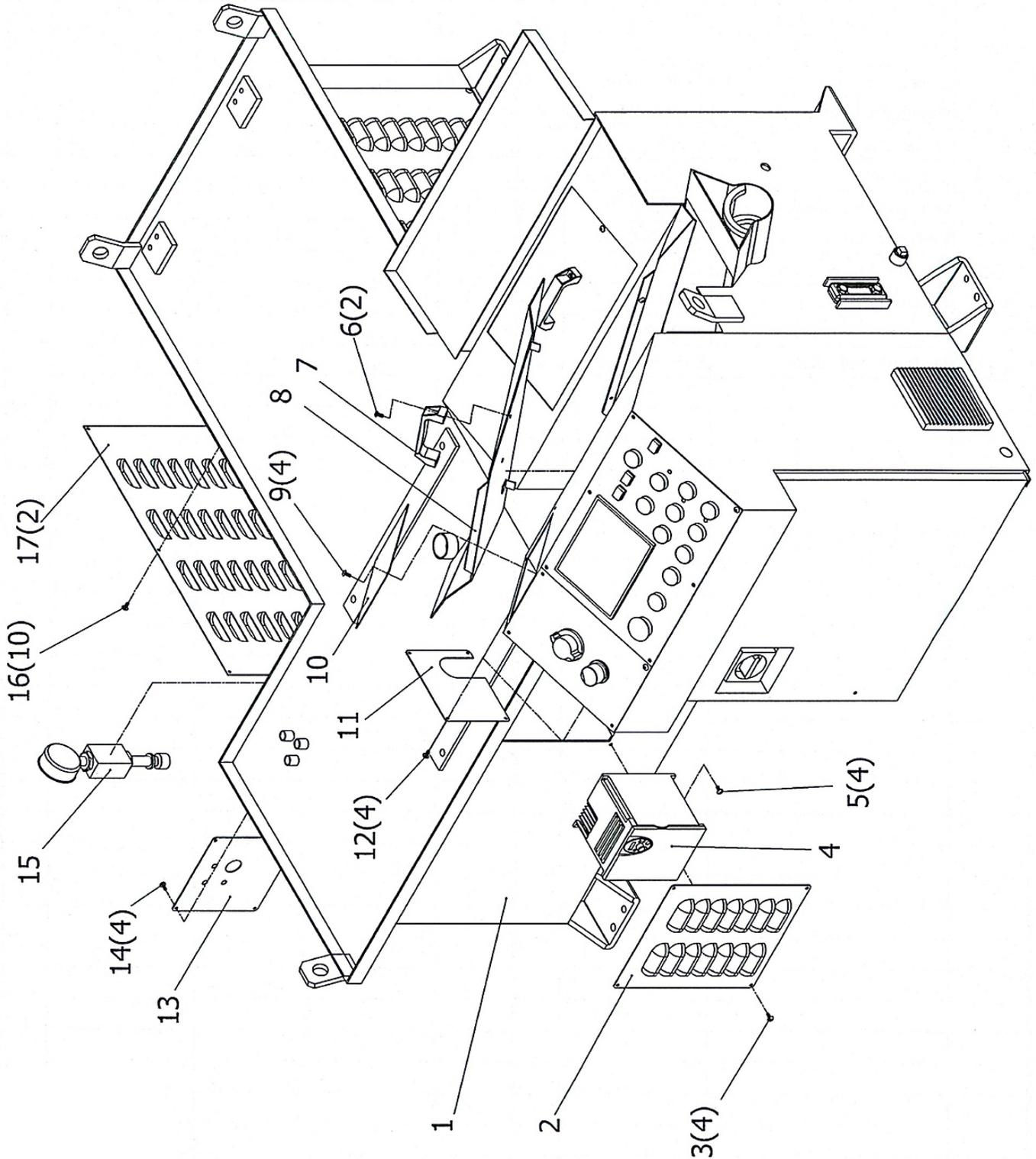
Index No	Part no	Description	Size	Qty.
1	TS-0273042	Socket Set Screw	1/2"x3/4"L	2
2	TS-0211061	Socket Head Cap Screw	1/2"x1-1/4"L	4
3	BS20A-A3	Hydraulic Control Panel	NP2E300	1
4	BS20A-A4	Cutting Rate Knob	L25A2-01	1
5	BS20A-A5	Pressure Regulator Knob	L25A1-42	1
6	TS-0813032	Phillips Round Head Screw	1/4"x1/2"L	10
7	BS20A-A7	Main Power Switch		1
8	BS20A-A8	Big Round Head Screw	1/4"x1/2"L	2
9	BS20A-A9	Control Panel	NP2E305	1
10	BS20A-A10	Control Cabinet Door	S138F3-01-H	1
11	BS20A-A11	Radiation Device		2
12	BS20A-A12	Oil Level Gauge	9160418	1
13	BS20A-A13	Drain Screw	PT 3/4"	1
16	BS20A-A16	Side Plate	S138F3-03-A	1
17	TS-081C032	Phillips Round Head Screw	3/16"x1/2"L	2
26	BS20A-A26	Coolant Tray (Rear)	S138F3-24	1
27	TS-081C032	Phillips Round Head Screw	3/16"x1/2"L	10
28	BS20A-A28	Hydraulic Unit Cover	S138F3-01-B	1
29	TS-081C032	Phillips Round Head Screw	3/16"x1/2"L	2
30	TS-0813032	Phillips Round Head Screw	1/4"x1/2"L	2
31	BS20A-A31	Plastic Handle	9160502	1
32	BS20A-A32	Coolant Cover	S138F3-01-E	1
35	BS20A-A35	Adjusting Screw	S13802-23	2
36	TS-0720111	Spring Washer	1/2"	2
37	TS-0070071	Hex Cap Screw	1/2"x2-1/2"L	2
38	BS20A-A38	Press Plate	S13802-27	2
39	TS-0720091	Spring Washer	3/8"	2
40	TS-0060031	Hex Cap Screw	3/8"x3/4"L	2
42	BS20A-A42	Support Shaft	S138F2-18	1
43	TS-154010	Nut	M16	1
44	BS20A-A44	Fish Eye Bearing	POS16	1
45	BS20A-A45	Cylinder Support Device	S138F1-03	1
46	TS-0209051	Socket Head Cap Screw	3/8"x1"L	4



Index No	Part no	Description	Size	Qty.
47	TS-0271121	Socket Set Screw	3/8"x3/4"L	2
48	TS-0271121	Socket Set Screw	3/8"x3/4"L	4
49	TS-0211061	Socket Head Cap Screw	1/2"x1-1/4"L	4
52	TS-0271121	Socket Set Screw	3/8"x3/4"L	4
53	TS-0211061	Socket Head Cap Screw	1/2"x1-1/4"L	4
54	BS20A-A54	Thumb Screw	1/4"x1/2"L	2
55	TS-0267022	Socket Set Screw	1/4"x1/4"L	1



SECTION B PARTS DIAGRAM

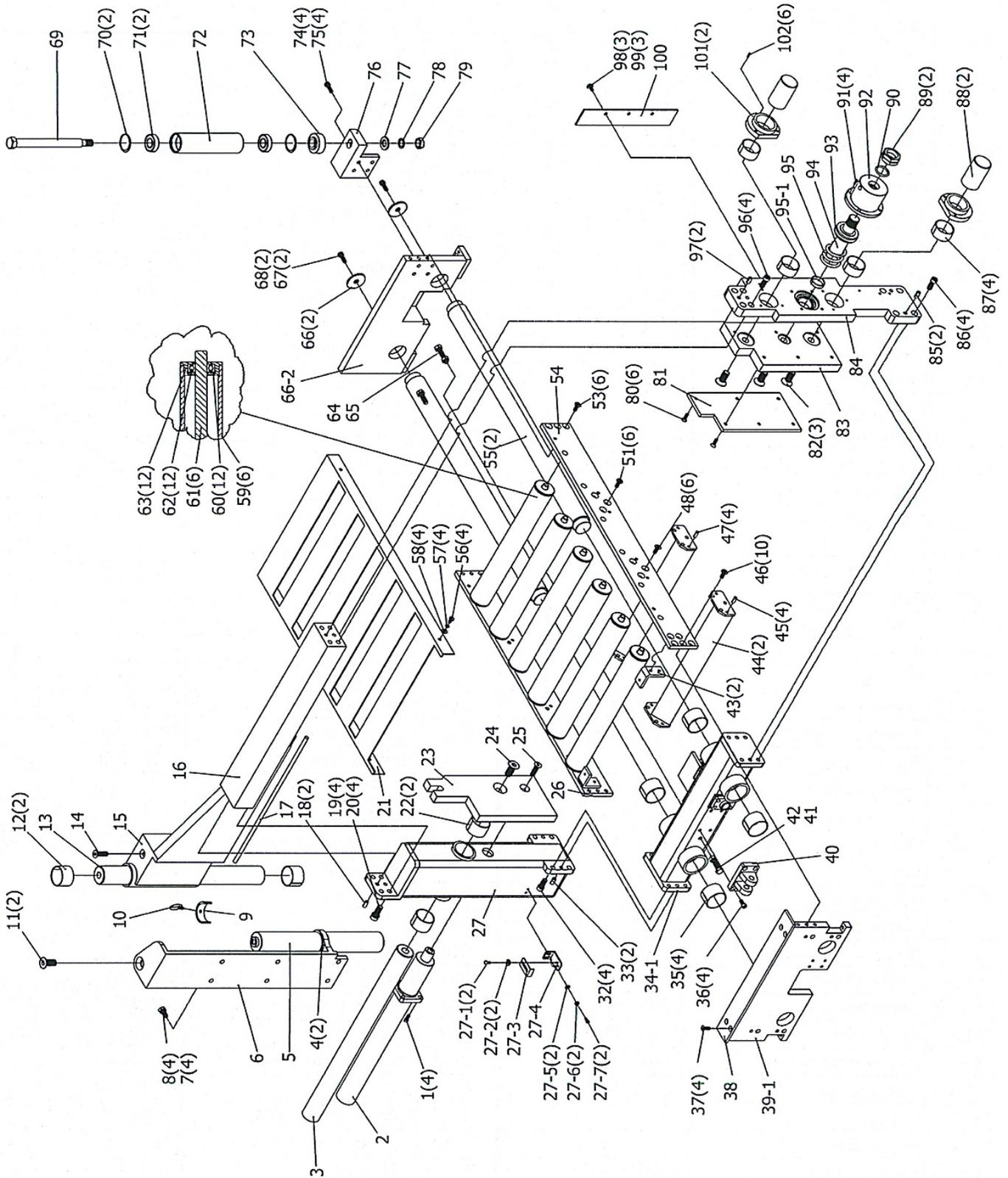




Section B Parts List

Index No	Part No	Description	Size	Qty.
1	BS20A-B1	Machine Base	S138F3-01	1
1-1	BS20A-B1-1	Inverter	5HP/ 230V / 3Ph	1
1-2	TS-081B032	Phillips Round Head Screw	5/32"x1/2"L	4
2	BS20A-B2	Inverter Cover	S138F3-01-C	1
3	TS-081C032	Phillips Round Head Screw	3/16"x1/2"L	4
6	BS20A-B6	Big Round Head Screw	1/4"x1/2"L	2
7	BS20A-B7	Plastic Handle	9160502	1
8	BS20A-B8	Side Plate	S138F3-03-B	1
9	BS20A-B9	Big Round Head Screw	3/16"x1/2"L	4
10	BS20A-B10	Upper Cover	S138F3-01-G	1
11	BS20A-B11	Left Cover	S138F3-01-F	1
12	BS20A-B12	Big Round Head Screw	3/16"x1/2"L	4
13	BS20A-B13	Line Fixed Plate	S138F3-01-D	1
14	BS20A-B14	Big Round Head Screw	3/16"x1/2"L	4
14-1	BS20A-B14-1	Cover	S138F3-42B	1
14-2	BS20A-B14-2	Socket Head Button Screw	3/16"x3/8"L	4
14-3	TS-1502071	Socket Head Cap Screw	M5x30L	4
15	BS20A-B15	Pressure Regulator		1
15-1	TS-1502071	Socket Head Cap Screw	M5x30L	2
15-2	BS20A-B15-2	Manifold Block		1
15-3	TS-2246082	Socket Head Button Screw	M6x8L	4
15-4	BS20A-B15-4	Pressure Regulator Fixation	460D3-22	1
16	BS20A-B16	Big Round Head Screw	3/16"x1/2"L	10
17	BS20A-B17	Hydraulic Unit Cover	S138F3-01-B	2

SECTION C PARTS DIAGRAM





Section C Parts List

Index No	Part No.	Description	Size	Qty.
1	TS-0209062	Socket Head Cap Screw	3/8"x1-1/4"L	4
2	BS20A-C2	Front Cylinder		1
3	BS20A-C3	Upper Shaft	S138F2-03	1
4	BS20A-C4	C Ring	S60	2
5	BS20A-C5	Vertical Cylinder		1
6	BS20A-C6	Fixed Bracket	S138F3-08	1
7	TS-0720111	Lock Washer	1/2"	4
8	TS-0070011	Hex Cap Screw	1/2"x1"L	4
9	BS20A-C9	Safety Collar	S1318F2-16	1
10	BS20A-C10	Ring Screw	M8	1
11	BS20A-C11	Socket Head Flat Screw	3/4"x1-1/4"L	2
12	BS20A-C12	Oilless Bush 5540	BB2067	2
13	BS20A-C13	Guide Shaft	S138F2-02	1
14	BS20A-C14	Socket Head Flat Screw	1/2"x3/4"L	1
15	BS20A-C15	Down Bracket	S138F3-09	1
16	BS20A-C16	Upper Bracket	S138F3-11	1
17	BS20A-C17	Plastic Wire	D10	1
18	BS20A-C18	Spring Pin	10x30L	2
19	TS-0211062	Socket Head Cap Screw	1/2"x1-1/4"L	4
20	TS-0720111	Lock Washer	1/2"	4
21	BS20A-C21	Roller Cover	S138F3-04	1
22	BS20A-C22	Oilless Bush 5540	BB2067	2
23	BS20A-C23	Front Vise	S138F2-07	1
24	BS20A-C24	Socket Head Flat Screw	3/4"x1"L	1
25	BS20A-C25	Socket Head Flat Screw	1/2"x1-1/4"L	1
26	BS20A-C26	Roller Holder (L)	S138F2-04-C	1
27	BS20A-C27	Cylinder Bracket	S138F3-10	1
27-1	TS-0254021	Socket Head Button Screw	1/4"x1/2"L	2
27-2	BS20A-C27-2	Flat Washer	1/4"	2
27-3	BS20A-C27-3	Adjusting Plate	S138F3-21-C	1
27-4	BS20A-C27-4	Adjusting Bracket	S138F3-21-B	1
27-5	BS20A-C27-5	Flat Washer	1/4"	2
27-6	TS-0720071	Lock Washer	1/4"	2
27-7	TS-0207021	Socket Head Cap Screw	1/4"x1/2"L	2



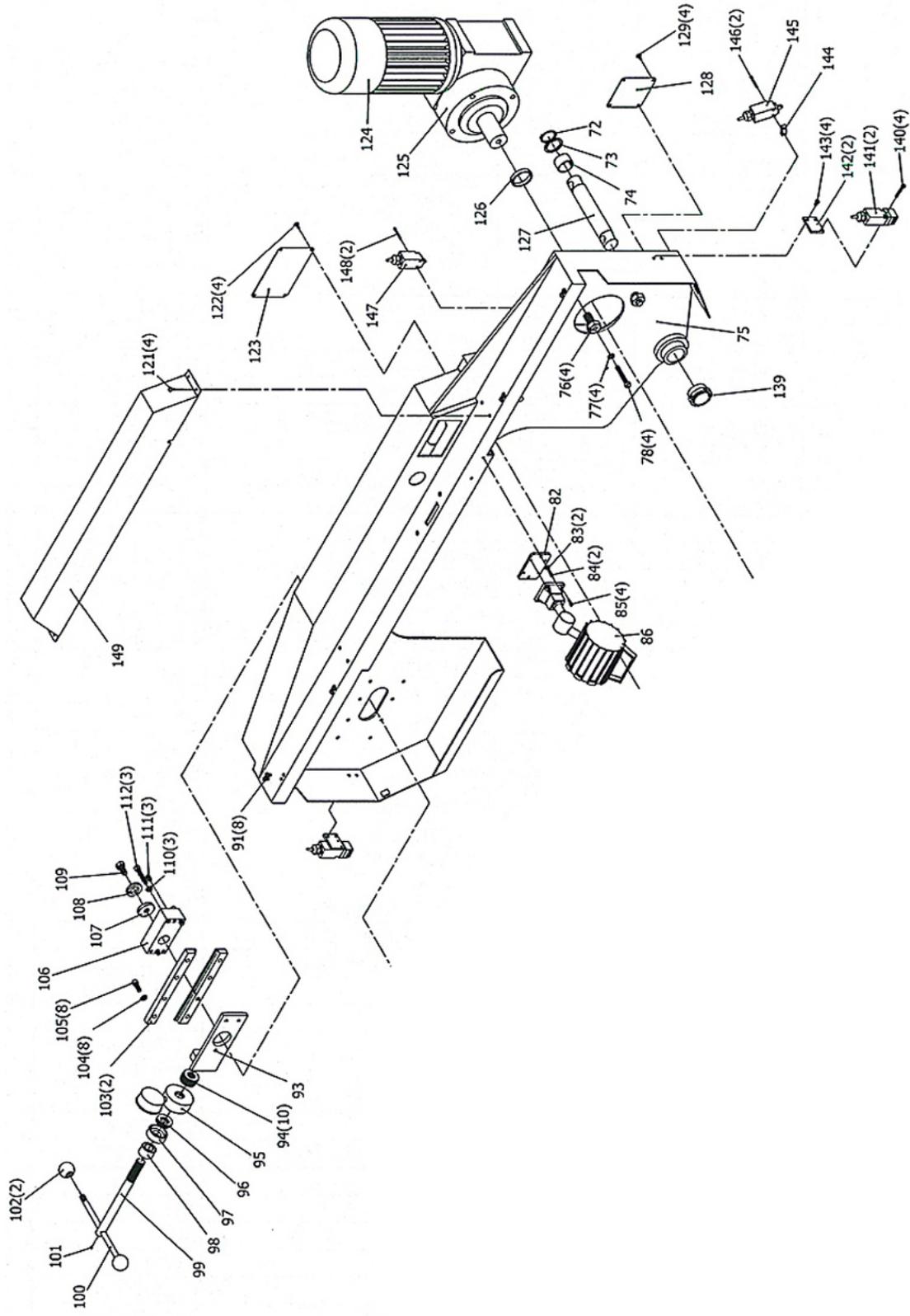
Index No	Part No.	Description	Size	Qty.
32	TS-0211062	Socket Head Cap Screw	1/2"x1-1/4"L	4
33	BS20A-C33	Spring Pin	10x30L	2
34-1	BS20A-C34-1	Rod Supporter	S138F3-12-A	1
35	BS20A-C35	Oiless Bush 6040	BB2068	4
36	TS-0209022	Socket Head Cap Screw	3/8"x5/8"L	4
37	TS-0246031	Socket Head Flat Screw	5/16"x3/4"L	4
38	BS20A-C38	Upper Bracket	S138F2-04-D	1
39-1	BS20A-C39-1	Front Bracket	S138F2-04-E	1
40	BS20A-C40	Cylinder Connecting	S138F1-03	1
41	TS-0070071	Hex Cap Screw	1/2"x2-1/2"L	1
42	TS-0561052	Nut	1/2"	1
43	BS20A-C43	Angle Plate	S138F3-04-B	2
44	BS20A-C44	Enhance Plate	S138F3-04-A	2
45	BS20A-C45	Spring Pin	8x20L	4
46	BS20A-C46	Socket Head Flat Screw	3/8"x1"L	10
47	BS20A-C47	Spring Pin	8x20L	4
48	BS20A-C48	Socket Head Flat Screw	3/8"x1"L	6
51	BS20A-C49	Socket Head Flat Screw	3/8"x1"L	6
53	BS20A-C50	Socket Head Flat Screw	3/8"x1"L	6
54	BS20A-C51	Roller Holder (R)	S138F2-04-B	1
55	BS20A-C52	Feeding Rod	S138F2-01	2
56	TS-0051011	Hex Cap Screw	5/16"x1/2"	4
57	TS-0720081	Lock Washer	5/16"	4
58	BS20A-C55	Flat Washer	5/16"	4
59	BS20A-C56	Roller	S138 02-07-A	6
60-1	BS20A-C60-1	C Ring		12
61	BS20A-C61	Roller Shaft	S138F2-14	6
62-1	BS20A-C62-1	Bearing		12
63-1	BS20A-C63-1	Sleeve		12
64	BS20A-C64	Steel Hex. Cap Bolt	1/2"x1-3/4"L	1
65	TS-0561052	Nut	1/2"	1
66	BS20A-C66	Washer	S138F2-01-A	2
66-1	BS20A-C66-1	Roller Bracket (Rear)	S138F2-04-F	1
67	BS20A-C67	Steel Hex. Cap Bolt	1/2"x1-1/4"L	2
68	TS-0720111	Lock Washer	1/2"	2



Index No	Part No.	Description	Size	Qty.
69	BS20A-C69	Roller Shaft	S138 02-18-A	1
70	BS20A-C70	C Ring	R52	2
71	BB6205	Ball Bearing	6205	2
72	BS20A-C72	Vertical Roller	S138 02-18	1
73	BS20A-C73	Roller Sleeve	S138 02-18-B	1
74	BS20A-C74	Steel Hex. Cap Bolt	3/8"x1"L	4
75	TS-0720091	Lock Washer	3/8"	4
76	BS20A-C76	Vertical Roller Bracket	S138F3-23	1
77	BS20A-C77	Flat Washer	3/4"	1
78	TS-0720141	Lock Washer	3/4"	1
79	TS-0561081	Nut	3/4"	1
80	TS-0246031	Socket Head Flat Screw	5/16"x3/4"	6
81	BS20A-C81	Vise Steel Plate	S138F2-08-A	1
82	BS20A-C82	Socket Head Flat Screw	3/4"x1-1/4"L	3
83	BS20A-C83	Feeding Fixed Vise	S138F2-08	1
84	BS20A-C84	Vise Locking Bracket	S138F2-09	1
85	BS20A-C85	Spring Pin	10x30L	2
86	TS-0211062	Socket Head Cap Screw	1/2"x1-1/4"L	4
87	BS20A-C87	Oilless Bush 5530	BB2066	4
88	BS20A-C88	Upper Shaft	S138F2-15-B	2
89	BS20A-C89	Nut	S138F2-20	2
90	BS20A-C90	O Ring P35	S1380510	1
91	TS-0208062	Socket Head Cap Screw	5/16"x1"L	4
92	BS20A-C92	Cylinder Sleeve	S138F2-15-A	1
93	BS20A-C93	O Ring P60	L25A5-47	1
94	BS20A-C94	Short Cylinder Piston	S138F2-15	1
95	BS20A-C95	Spring	S138F4-05	1
95-1	BS20A-C95-1	Oilless Bushing 4015	BB2098	1
96	TS-0211062	Socket Head Cap Screw	1/2"x1-1/4"	4
97	BS20A-C97	Spring Pin	10x30L	2
98	TS-0720081	Lock Washer	5/16"	3
99	TS-0255061	Socket Head Button Screw	5/16"x1"L	3
100	BS20A-C100	Guide Plate	S138F3-19	1
101	BS20A-C101	Shaft Collar	S138F2-15-C	2
102	TS-0207061	Socket Head Cap Screw	1/4"x1"L	6

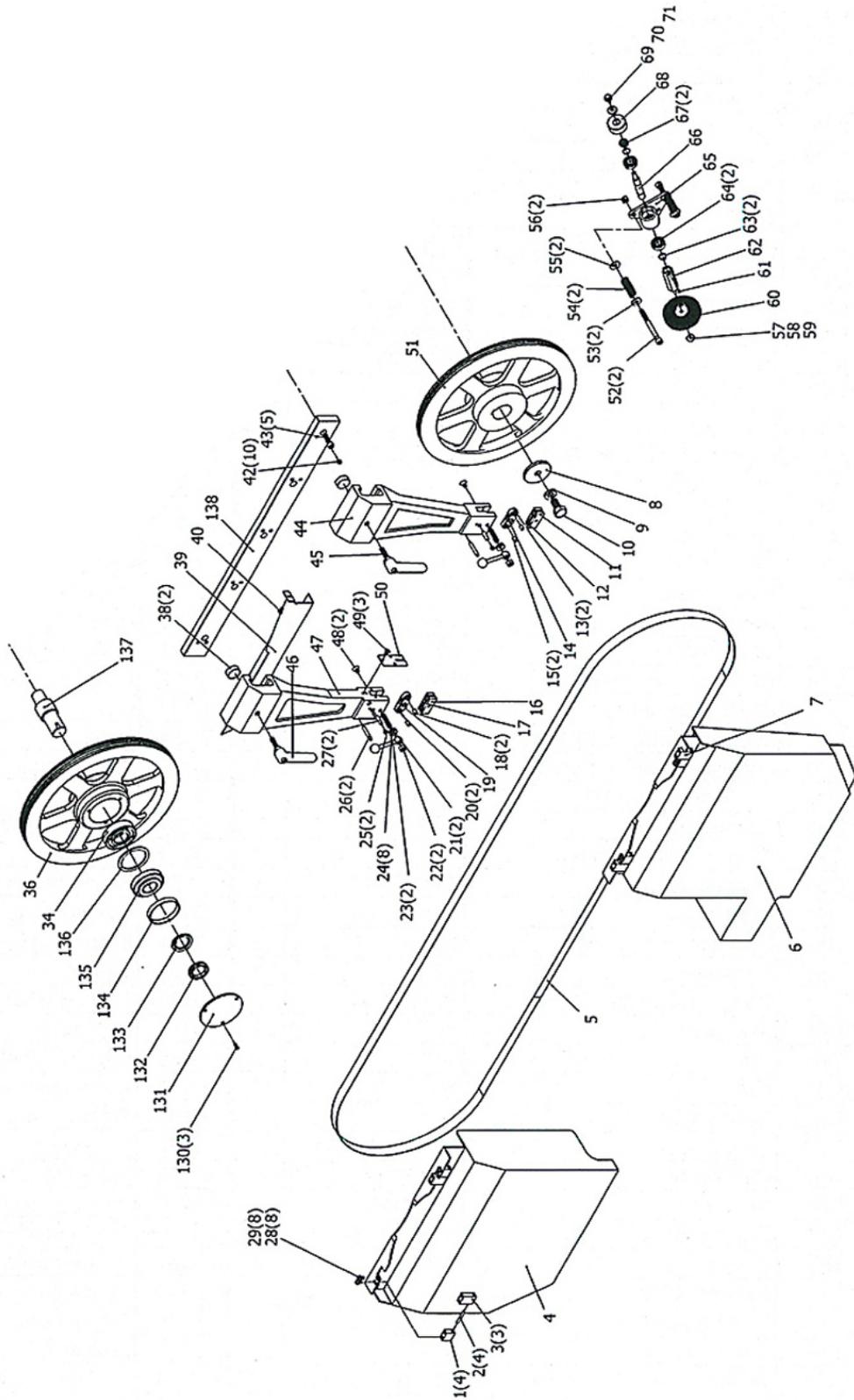


SECTION D PARTS DIAGRAM - 1





SECTION D PARTS DIAGRAM - 2





Section D Parts List

Index No.	Part No	Description	Size	Qty.
1	BS20A-D1	Cover Latch (F)	S138 02-19-1	4
2	BS20A-D2	Pin	5x50L	4
3	BS20A-D3	Cover Latch (R)	S138 02-19	3
4	BS20A-D4	Front Wheel Cover	S138 03-04-1	1
5	BS20A-D5	Blade	27x4130x0.9	1
6	BS20A-D6	Rear Wheel Cover	S138 03-04-2	1
7	BS20A-D7	Rear Latch	S138 02-19-2	1
8	BS20A-D8	Wheel Washer	S138 02-14-2	1
9	TS-0720141	Lock Washer	3/4"	1
10	BS20A-D10	Hex Cap Screw	5/8"x1-1/4"L	1
11	BS20A-D11	Adjustable Guide	S138 02-12-3	1
12	BS20A-D12	Fixed Guide	S138 02-12-2	1
13	BB608	Ball Bearing	608	2
14	BS20A-D14	Bearing Bracket	S138 03-14	1
15	BS20A-D15	Pin	8x12L	2
16	BS20A-D16	Adjustable Guide	S138 02-12-3	1
17	BS20A-D17	Fixed Guide	S138 02-12-2	1
18	BS20A-D18	Pin	8x12L	2
19	BS20A-D19	Bearing Bracket	S138 03-14	1
20	BB608	Ball Bearing	608	2
21	BS20A-D21	Adjusting Screw	S138 02-12-1	2
22	TS-0561031	Nut	3/8"	2
23	BS20A-D23	Locking Handle	S138 02-12	2
24	BS20A-D24	Disc Washer	S1380414- 201010	8
25	BS20A-D25	Socket Set Screw	3/8"x3/8"L	2
26	BS20A-D26	Spring Pin	6x45L	2
27	BS20A-D27	Pin	8x25L	2
28	BS20A-D28	Socket Head Button Screw	1/4"x1/2"L	8
29	TS-0720071	Lock Washer	1/4"	8
34	BB6307	Ball Bearing	6307	1
36	BS20A-D36	Front Wheel	S138 01-04	1
38	BS20A-D38	Lock Brass	S138 02-16	2
39	BS20A-D39	Blade Guard	S138 03-17	1



Index No.	Part No	Description	Size	Qty.
40	BS20A-D40	Socket Head Button Screw	1/4"x1/2"L	1
42	BS20A-D42	Socket Set Screw	3/8"x3/4"L	10
43	TS-0209051	Socket Head Cap Screw	3/8"x1"L	5
44	BS20A-D44	Blade Guide Arm (R)	S138 01-07	1
45	BS20A-D45	Locking Handle	1/2"x40L	1
46	BS20A-D45	Locking Handle	1/2"x40L	1
47	BS20A-D47	Blade Guide Arm (F)	S138 01-06	1
48	TS-0246031	Socket Head Flat Screw	5/16"x3/4"L	2
49	BS20A-D49	Socket Head Button Screw	1/4"x1/2"L	3
50	BS20A-D50	Coolant Cover	S138 03-13	1
51	BS20A-D51	Rear Wheel	S138 01-05	1
52	TS-0209161	Socket Head Cap Screw	3/8"x4"	2
53	TS-0680041	Flat Washer	3/8"	2
54	BS20A-D54	Compress Spring	S138 04-09	2
55	TS-0680041	Flat Washer	3/8"	2
56	TS-0561031	Nut	3/8"	2
57	TS-0570011	Nut	1/4"	1
58	TS-0680021	Flat Washer	1/4"	1
59	TS-0720071	Lock Washer	1/4"	1
60	BS20A-D60	Chip Brush	331D4-08	1
61	TS-0267021	Socket Set Screw	1/4"x1/4"L	1
62	BS20A-D62	Brush Shaft	S138 02-15-1	1
63	BS20A-D63	C Ring	S15	2
64	BB6002	Ball Bearing	6002	2
65	BS20A-D65	Brush Bracket	S138 03-16	1
66	BS20A-D66	Shaft	S138 02-15	1
67	BS20A-D67	Rubber Cover	331D2-42-1	2
68	BS20A-D68	Brush Wheel	S138 02-15-2	1
69	TS-0680021	Flat Washer	1/4"	1
70	TS-0720071	Lock Washer	1/4"	1
71	TS-0050011	Hex Cap Screw	1/4"x1/2"L	1
72	BS20A-D72	C Ring	S38	1
73	BS20A-D73	Washer	S138 02-01-1	1



Section E Parts List

Index No	Part No	Description	Size	Qty.
1	BS20A-E1	Retrieval Table	S138F3-06	1
5	BS20A-E5	Coolant Gun Holder	S138F3-20	1
6	TS-0207061	Socket Head Cap Screw	1/4"x1"L	2
7	TS-0720071	Lock Washer	1/4"	2
8	BS20A-E8	Hex Cap Screw	1/2"x5/8"L	4
9	TS-0720111	Lock Washer	1/2"	4
10	TS-0680061	Flat Washer	1/2"	4
11	BS20A-E11	Side Plate	S138F3-06-A	1
12	BS20A-E8	Hex Cap Screw	1/2"x5/8"L	2
13	TS-0720111	Lock Washer	1/2"	2
14	TS-0680061	Flat Washer	1/2"	2
15	BS20A-E15	Feeding Cylinder		1
16	TS-0209061	Socket Head Cap Screw	3/8"x1-1/4"L	4
17	TS-0100041	Hex Cap Screw	1/2"x1-1/4"L	1
18	TS-0561051	Nut	1/2"	1
19	TS-0209061	Socket Head Cap Screw	3/8"x1-1/4"L	2
20	TS-0720091	Lock Washer	3/8"	2
21	TS-0680041	Flat Washer	3/8"	2
22	BS20A-E22	0° Position Device	S138F3-14	1
23	BS20A-E23	Cutting Table	S138F1-01	1
24	BS20A-E24	Spring Pin	8x20L	2
33	BS20A-E33	Front Cylinder Supporter	S138F3-09	1
34	TS-0070031	Hex Cap Screw	1/2"x1-1/2"L	6
35	TS-0720111	Lock Washer	1/2"	6
36	BS20A-E36	Spring Pin	8x20L	2
37	BS20A-E37	Vise Cylinder		1
38	TS-0209061	Socket Head Cap Screw	3/8"x1-1/4"L	4
39	BS20A-E39	Upper Shaft	S138F2-03	1
40	BS20A-E40	Oilless Bush	5540	2
41	BS20A-E41	Front Vise	S138F2-05	1
42	BS20A-E42	Socket Head Flat Screw	3/4"x1-1/4"L	1
43	BS20A-E43	Socket Head Flat Screw	1/2"x1-1/4"L	1
44	TS-0209111	Socket Head Cap Screw	3/8"x2-1/2"L	6



Index No	Part No	Description	Size	Qty.
45	BS20A-E45	Socket Head Flat Screw	5/16"x3/4"L	8
46	BS20A-E46	Cutting Plate	S13802-09	1
47	BS20A-E47	Cutting Table	S13801-02	1
48	BS20A-E45	Socket Head Flat Screw	5/16"x3/4"L	6
49	BS20A-E49	Vise Steel Plate	S138F2-06-A	1
50	BS20A-E50	Attached Plate	S138F2-06-B	1
51	BS20A-E51	Spring Pin	8x20L	2
52	BS20A-E52	Rear Vise	S138F2-06	1
53	TS-0209091	Socket Head Cap Screw	3/8"x2"L	5
54	BS20A-E54	Guide Plate	S138F3-18	1
55	TS-0208041	Socket Head Cap Screw	5/16"x3/4"L	3
56	BS20A-E56	Nylon Nut	1/2"	1
57	TS-0720111	Lock Washer	1/2"	1
58	TS-0680061	Flat Washer	1/2"	1
59	BS20A-E59	Clamping Block	S13802-11-1	1
60	BS20A-E60	Bakelite Ball	1-1/2"x1/2"	1
61	BS20A-E61	Cam Handle	S13802-11-3	1
62	BS20A-E62	Locking Cam	S13802-11-2	1
63	TS-0209061	Socket Head Cap Screw	3/8"x1-1/4"L	4
64	TS-0720091	Lock Washer	3/8"	4
65	BS20A-E65	Nylon Nut	1/2"	1
66	TS-0720111	Lock Washer	1/2"	1
67	TS-0680061	Flat Washer	1/2"	1
68	TS-0267071	Socket Set Screw	1/4"x3/4"L	4
69	TS-0680061	Flat Washer	1/2"	2
70	BS20A-E70	Fixed Block	S13803-11	1
71	TS-0070131	Hex Cap Screw	1/2"x4"L	1
72	TS-0208061	Socket Head Cap Screw	5/16"x1"L	2
73	BS20A-E73	Upper Clamp Block	S13802-11	1
74	TS-0070131	Hex Cap Screw	1/2"x4"L	1
75	BS20A-E75	Spring Pin	8x20L	2
76	TS-0209071	Socket Head Cap Screw	3/8"x1-1/2"L	2
77	BS20A-E77	Locking Block	S13802-02-2	1
78	TS-0561051	Nut	1/2"	1
79	TS-0070031	Hex Cap Screw	1/2"x1-1/2"L	1

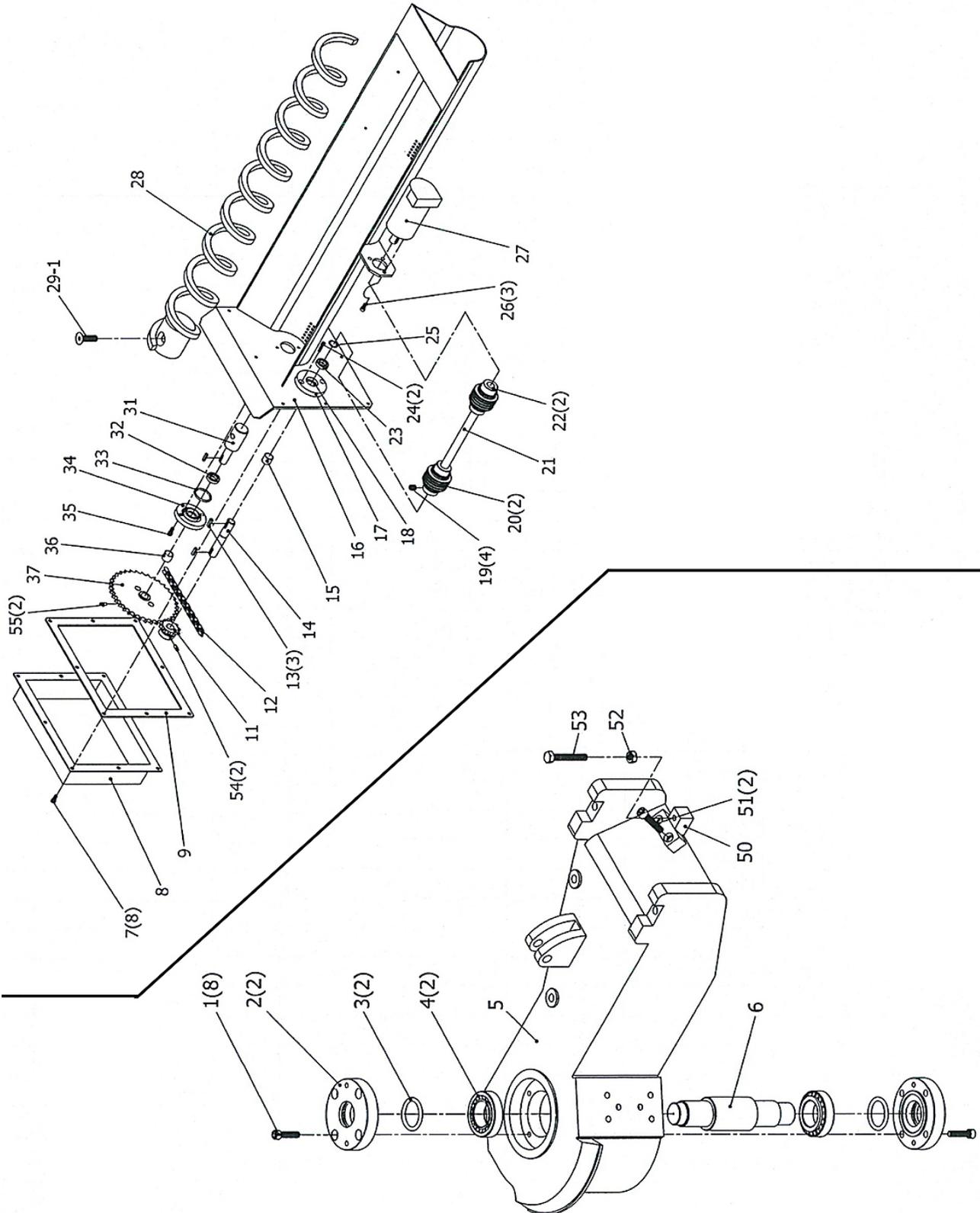


Index No	Part No	Description	Size	Qty.
80	TS-0561032	Nut	3/8"	1
81	TS-0060051	Hex Cap Screw	3/8"x1"L	1
82	BS20A-E82	Lift Cylinder		1
83-1	BS20A-E83-1	Upper Shaft	S13802-29	1
84	TS-0081051	Hex Cap Screw	5/16"x1"L	1
85	BS20A-E85	Flat Washer	S13802-22	1
86	BS20A-E86	Spring Shaft	S13802-08	1
87	BS20A-E87	Compress Spring	S13804-07	1
88-1	BS20A-E88-1	Nut	S1380208B	1
89	BS20A-E89	C Ring	S14	2
90	BS20A-E90	Lower Shaft	S13802-17	1
91	BS20A-E91	Fish Eye Bearing	1/2"x20UNF	1
92	BS20A-E92	Spring Pin	6x30L	1
93	TS-0211062	Socket Head Cap Screw	1/2"x1-1/4"L	1
94	BS20A-E94	Upper Cover	S138F1-02	1
95	TS-0209061	Socket Head Cap Screw	3/8"x1-1/4"L	5
96	BS20A-E96	Lock Washer	S13802-28	1
97	TS-0720091	Lock Washer	3/8"	1
98	TS-0060051	Hex Cap Screw	3/8"x1"L	1
99-1	BS20A-E99-1	Sensor Bracket	S138F3-42	1
99-2	BS20A-E99-2	Zero Point Sensor		1
100	TS-0720081	Lock Washer	5/16"	2
101	TS-0208021	Socket Head Cap Screw	5/16"x1/2"L	2
101-1	TS-0206022	Socket Head Button Screw	3/16"x1/2"L	2
101-2	BS20A-E101-2	Sensor Cover	S138F3-42A	1
102	BS20A-E102	Safety Collar	S138F2-16	1
103	BS20A-E103	Plastic Wire	Ø10	1
104	BS20A-E104	Guide Shaft	S138F2-02	1
105	BS20A-E105	Press Cylinder		1
106	BS20A-E106	C Ring	S60	2
107	BS20A-E107	Press Bracket	S138F3-07	1
108	BS20A-E108	Socket Head Flat Screw	1/2"x3/4"L	1
109	BS20A-E40	Oilless Bush	5540	2
110	BS20A-E42	Socket Head Flat Screw	3/4"x1-1/4"L	2
111	BS20A-E111	Press Fixed Bracket	S138F3-08	1



Index No	Part No	Description	Size	Qty.
112	TS-0720111	Lock Washer	1/2"	4
113	TS-0070011	Hex Cap Screw	1/2"x1"L	4
114	BS20A-E114	Nylon Nut	3/8"	1
115	BS20A-E115	Position Washer	S138F2-26-A	1
116	BS20A-E116	Position Plastic Washer	S138F2-26-B	1
117	BS20A-E117	Adjusting Plate	S138F3-29	1
118	BS20A-E118	Adjusting Screw	S138F2-26	1
119	BS20A-E119	Handle	3/8"x30L	1
120	BS20A-E120	Bakelite Ball	2"x1/2"	1
123	BS20A-E123	Rod	S138F2-24	1
124-1	BS20A-E124-1	Left Plate	S138F3-40	1
124-2	BS20A-E124-2	Left Bracket	S138F2-31-A	1
125	TS-0270031	Socket Set Screw	5/16"x3/8"L	1
126	TS-0208041	Socket Head Cap Screw	5/16"x3/4"L	2
127	TS-0720081	Lock Washer	5/16"	2
128	TS-0208081	Socket Head Cap Screw	5/16"x1-1/2"L	4
129	BS20A-E129	Position Block	S138F2-31	1
130	BS20A-E130	Cover	S138F2-31-B	1
131	BS20A-E131	Handle	M10x30L	1

SECTIN F PARTS DIAGRAM





Section F Parts List

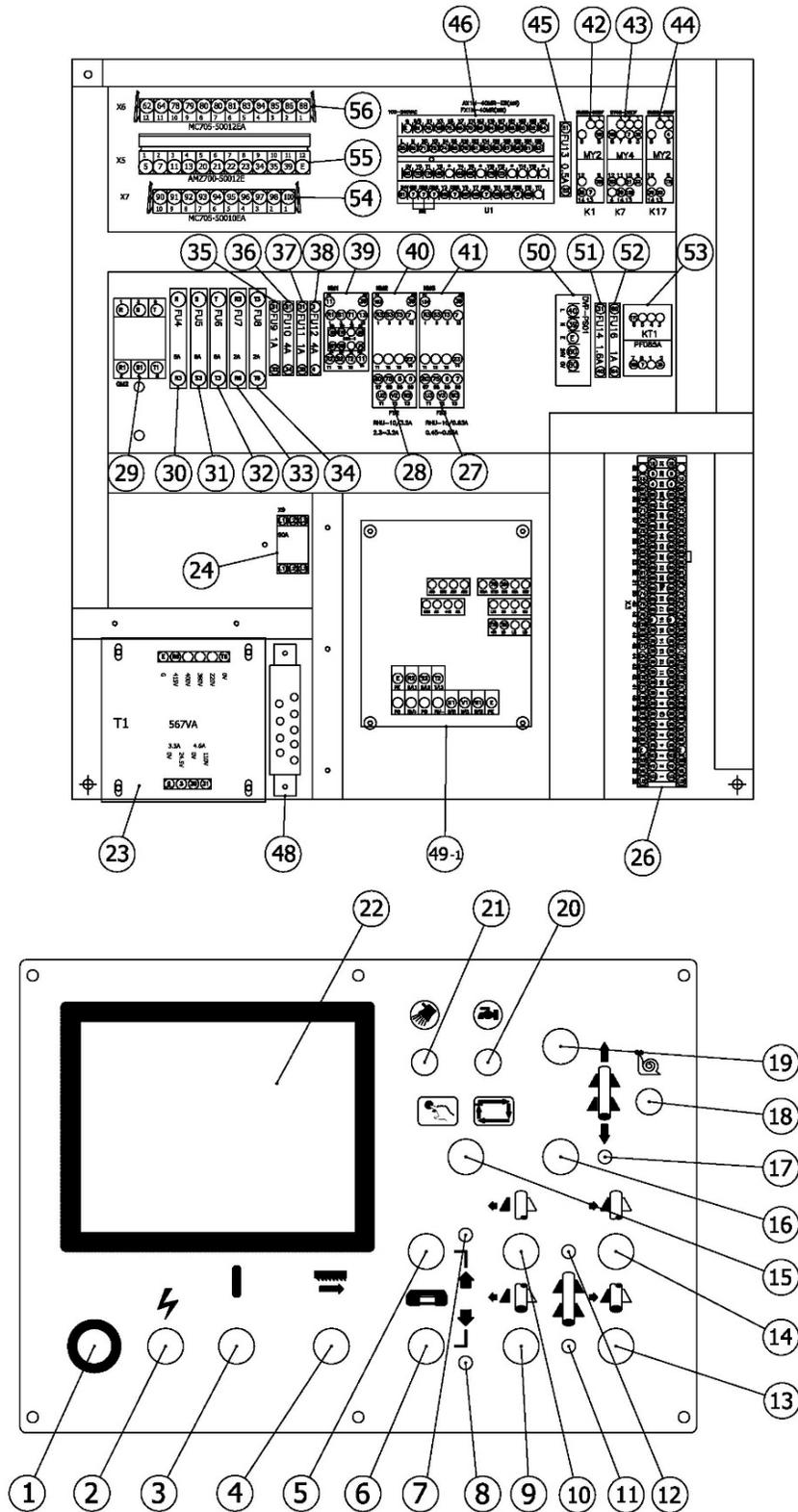
Index No	Part No	Description	Size	Qty.
1	TS-0208081	Socket Head Cap Screw	5/16"x1-1/2"L	8
2	BS20A-F2	Swing Cover	S13802-02-1	2
3	BS20A-F3	O Ring	P35	2
4	BB32007	Ball Bearing	32007	2
5	BS20A-F5	Swing Base	S13801-03	1
6	BS20A-F6	Swing Shaft	S13802-02	1
7	TS-0207022	Socket Head Cap Screw	1/4"x1/2"L	8
8	BS20A-F8	Chain Wheel Cover	L25A3-09-A	1
9	BS20A-F9	Rubber Seal	L25A5-38	1
11	BS20A-F11	Small Chain Wheel	L25A2-62	1
12	BS20A-F12	Chain	L25A5-28	1
13	BS20A-F13	Key	M5x20L	3
14	BS20A-F14	Small Shaft	L25A2-63	1
15	BS20A-F15	Oilless Bush	1625	1
16	BS20A-F16	Conveyer Base	L25A3-06-A	1
17	BS20A-F17	Small Shaft Bush	L25A2-63A	1
18	BS20A-F18	O Ring	P-32	1
19	TS-1523011	Socket Set Screw	M6x6L	4
20	BS20A-F20	Rubber Cover	L25A4-03-1	2
21	BS20A-F21	Drive Shaft	L25A2-64	1
22	BS20A-F22	Universal Joint	L25A4-03	2
23	TC16726	Oil Seal	TC16.7.26	1
24	TS-0207012	Socket Head Cap Screw	1/4"x3/8"L	2
25	BS20A-F25	C Ring	S-16	1
26	TS-1503041	Socket Head Cap Screw	M6x16	3
27	BS20A-F27	Hydraulic Motor		1
28	BS20A-F28	Conveyer Screw	L25A2-53-A	1
29-1	BS20A-F29-1	Socket Head Flat Screw	M8x60L	1
31	BS20A-F31	Large Chain Wheel Shaft	L25A2-63B	1
32	TC16726	Oil Seal	TC16.7.26	1
33	BS20A-F18	O Ring	P-32	1
34	BS20A-F34	Shaft Bush	L25A2-63-C	1
35	TS-0207012	Socket Head Cap Screw	1/4"x3/8"L	2



Index No	Part No	Description	Size	Qty.
36	BS20A-F15	Oilless Bush	1625	1
37	BS20A-F37	Big Chain Wheel	L25A2-61	1
50	BS20A-F50	Limited Set	S138F2-27	1
51	TS-0211061	Socket Head Cap Screw	1/2"x1-1/4"L	2
52	TS-0561051	Nut	1/2"	1
53	TS-0050081	Hex Cap Screw	1/2"x1-3/4"L	1
54	TS-1522011	Socket Set Screw	M5x5L	2
55	TS-1522011	Socket Set Screw	M5x5L	2



SECTION G PARTS DIAGRAM





Section G Parts List

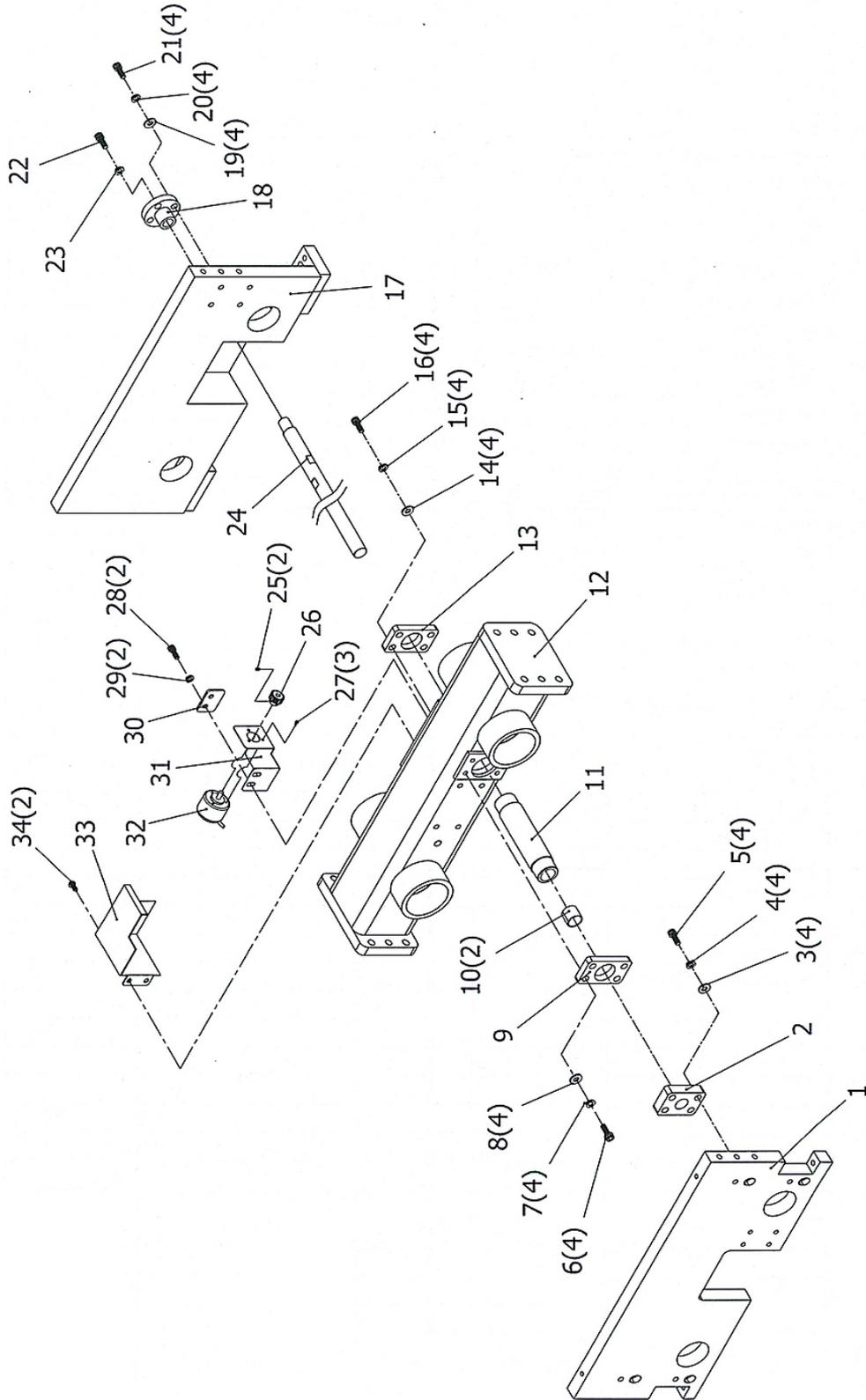
Index No	Part No	Description	Size	Qty.
1	BS20A-G1	Emergency Stop Button	SB1	1
2	BS20A-G2	Power Indicator Light	HL1	1
3	BS20A-G3	Hydraulic Start Button	SB2/HL3	1
4	BS20A-G4	Operation Start Button	SB3/HL2	1
5	BS20A-G5	Bow Up Button	SB5	1
6	BS20A-G6	Bow Down Button	SB6	1
7	BS20A-G7	LED Light	HL7	1
8	BS20A-G8	LED Light	HL8	1
9	BS20A-G9	Bench Vise Open Button	SB8	1
10	BS20A-G10	Shuttle Vise Open Button	SB10	1
11	BS20A-G11	LED Light	HL10	1
12	BS20A-G12	LED Light	HL11	1
13	BS20A-G13	Bench Vise Close Button	SB7	1
14	BS20A-G14	Shuttle Vise Close Button	SB9	1
15	BS20A-G15	Select Switch	SA2	1
16	BS20A-G16	Shuttle Vise Forward Button	SB11	1
17	BS20A-G17	Led Light	HL12	1
18	BS20A-G18	Cover		1
19	BS20A-G19	Shuttle Vise Backward Button	SB12	1
20	BS20A-G20	Coolant Pump Button	SB4/HL4	1
21	BS20A-G21	Light Button	SB14/HL14	1
22	BS20A-G22	Touch Screen	HMI (5.7")	1
23	BS20A-G23	Transformer	T1	1
24	BS20A-G24	Power in Connecting Board	X9	1
26	BS20A-G26	Terminal Board	X3	1
27	BS20A-G27	Coolant Motor Overload Relay	FS3	1
28	BS20A-G28	Hydraulic Motor Overload Relay	FS2	1
29	BS20A-G29	Motor Circular Protector	QM2	1
30	BS20A-G30	Power in Fuse	FU4 (12A:230V)	1
31	BS20A-G31	Power in Fuse	FU5 (12A:230V)	1
32	BS20A-G32	Power in Fuse	FU6 (12A:230V)	1
33	BS20A-G33	Transformer Power in Fuse	FU7 (4A:230V)	1
34	BS20A-G34	Transformer Power in Fuse	FU8 (4A:230V)	1



Index No	Part No	Description	Size	Qty.
35	BS20A-G35	Inverter Fan Output Fuse	FU9 ,1A	1
36	BS20A-G36	Transformer Output Fuse	FU10 ,4A	1
37	BS20A-G37	Transformer Output Fuse	FU11, 1A	1
38	BS20A-G38	Transformer Output Fuse	FU12 ,4A	1
39	BS20A-G39	Blade Motor Contactor	KM1	1
40	BS20A-G40	Hydraulic Motor Contactor	KM2	1
41	BS20A-G41	Coolant Motor Contactor	KM3	1
42	BS20A-G42	Relay	K1	1
43	BS20A-G43	Relay	K7	1
44	BS20A-G44	Relay	K17	1
45	BS20A-G45	Power Supply Fuse (DC24V)	FU13	1
46	BS20A-G46	PLC	U1	1
48	BS20A-G48	Terminal Blocker (Earth Wire)		1
49-1	BS20A-G49-1	Inverter	L33N4-04	1
50	BS20A-G50	Power Supplier	U5	1
51	BS20A-G51	Power Supplier Input Fuse	FU14, 1.6A	1
52	BS20A-G52	Power Supplier Output Fuse	FU16,1A	1
53	BS20A-G53	Time Meter	KT1	1
54	BS20A-G54	Connector	X6	1
55	BS20A-G55	Connector	X5	1
56	BS20A-G56	Connector	X7	1



SECTION H PARTS DIAGRAM





Section H Parts List

Index No	Part No	Description	Size	Qty.
1	BS20A-H1	Roller Bracket (Front)	S138F2-04-E	1
2	BS20A-H2	S Aft Fixing Plate	S138F2-29-D	1
3	TS-0680031	Flat Washer	5/16"	4
4	TS-0720081	Lock Washer	5/16"	4
5	TS-0208062	Socket Head Cap Screw	5/16"x1"L	4
6	TS-0208062	Socket Head Cap Screw	5/16"x1"L	4
7	TS-0720081	Lock Washer	5/16"	4
8	TS-0680031	Flat Washer	5/16"	4
10	BS20A-H10	Oilless Bushing	BB2103 2020	2
10-1	BS20A-H10-1	Support Block	S138F2-29-E	1
12	BS20A-H12	Guide Rod Bracket	S138F3-12-A	1
13-1	BS20A-H13-1	Support Block	S138F2-29-E	1
14	TS-0680031	Flat Washer	5/16"	4
15	TS-0720081	Lock Washer	5/16"	4
16	TS-0208062	Socket Head Cap Screw	5/16"x1"L	4
17	BS20A-H17	Roller Bracket (Rear)	S138F2-04-F	1
18	BS20A-H18	Shaft Bracket	S138F2-29-A	1
19	TS-0680031	Flat Washer	5/16"	4
20	TS-0720081	Lock Washer	5/16"	4
21	TS-0208062	Socket Head Cap Screw	5/16"x1"L	4
22	TS-0208062	Socket Head Cap Screw	5/16"x1"L	1
23	TS-0720081	Lock Washer	5/16"	1
24	BS20A-H24	Gear Shaft	S138F2-29	1
25	TS-1521011	Set Screw	M4x4L	2
26	BS20A-H26	Length Gear	S138F2-11	1
27	BS20A-H27	Socket Head Button Screw	M4x6L	3
28	TS-0207021	Socket Head Cap Screw	1/4"x1/2"L	2
29	TS-0720071	Lock Washer	1/4"	2
30	BS20A-H30	Press Plate	L25A3-90	1
31	BS20A-H31	Fixing Bracket	S138F3-38	1
32	BS20A-H32	Encoder		1
33	BS20A-H33	Encoder Cover	S138F3-38-A	1
34	TS-0254041	Socket Head Button Screw	1/4"x3/4"L	2



TROUBLESHOOTING

⚠ WARNING: Make sure the electrical disconnect is **OFF** before working on the machine.

SYMPTOM	POSSIBLE CAUSE (S)	CORRECTIVE ACTION
The Blade Drive Motor Does Not Work	<p>Overload relay switch K1 bad</p> <p>Wires 11 & 13 of K1 have 24VAC but no response.</p> <p>There are no voltage outputs at (54 and 55) to the PCB1 when K1 is actuated.</p> <p>No. 61 and 62 (wire code) do not close after K1 actuated.</p> <p>Check 24VAC on wires 1 & 10 (either below 22 volts or above 27 volts)</p>	<p>Replace overload relay switch K1.</p> <p>Contact Baileigh Service</p>
Saw Motor Does Not Stop When Cut is Finished	<p>Actuator on cylinder does not contact switch properly.</p> <p>Bow down limit switch SQ3 damaged</p>	<p>Re-adjust actuator or switch.</p> <p>Replace SQ3</p>
Coolant Motor Does Not Run With Band Saw Motor	Coolant motor M2 damaged.	Replace M2 motor.
No Power Indicator Light When Main Power Turned On	<p>Fuses FU1, FU2, FU3, or FU4 may have burned out.</p> <p>Transformer T1 damaged</p> <p>Power LED HL1 damaged</p> <p>PCB1 damaged</p>	<p>Switch off main power. Replace defective fuse(s)</p> <p>Replace Transformer</p> <p>Replace (white) power LED</p> <p>Replace PCB1</p>
Operating Indicator Light Does Not Work When Saw Motor is Running	<p>Run LED HL2 damaged</p> <p>PCB1 damaged</p>	<p>Replace (green) run LED</p> <p>Replace PCB1</p>



SYMPTOM	POSSIBLE CAUSE (S)	CORRECTIVE ACTION
<p>The Blade Drive Motor Does Not Work</p>	<p>Fuses FU1, FU2, FU3, or FU4 may have burned out.</p>	<p>Switch off main power. Replace defective fuse(s).</p>
	<p>2. Defective transformer (Power at input – no power at output).</p>	<p>Replace T1 (transformer).</p>
	<p>3. If there is no voltage between wires 11 & 13 of K1 and fuses FU3, FU4 & transformer T1 are ok:</p>	<p>Turn speed switch (ccw) to “OFF” position.</p>
	<p>Speed switch is not in “OFF” position.</p>	<p>Replace speed switch.</p>
	<p>Speed switch is not at the “OFF” position and contact is not closed.</p>	<p>Twist the button (cw) to reset or replace the switch.</p>
	<p>E-stop pushed.</p>	<p>Replace blade guard or replace switch SQ1.</p>
	<p>Blade guard limit switch SQ1 open.</p>	<p>Replace broken blade or replace switch SQ2.</p>
	<p>Broken blade limit switch SQ2 open.</p>	<p>Raise saw bow or replace switch SQ3.</p>
	<p>Bow down limit switch SQ3 opened.</p>	<p>Replace move select switch SA2.</p>
	<p>Move select switch SA2 has been turned to right position, but contact is not closed.</p>	<p>Check that cycle start button SB2 has been pressed in correct position or replace button SB2.</p>
<p>Cycle start switch SB2 opened.</p>	<p>Too fast of advance causes overload.</p>	
<p>Overload on the DC driver PCB1.</p>	<p>Switch “OFF” main disconnect switch SA1, Then switch “ON” SA1.</p>	
		<p>Replace PCB1.</p> <p>Replace motor.</p>



SYMPTOM	POSSIBLE CAUSE (S)	CORRECTIVE ACTION
Excessive Blade Breakage	Material loose in vise	Clamp work securely
	Incorrect speed or feed	Adjust speed or feed
	Blade tooth spacing too large	Replace with a small tooth spacing blade
	Material too coarse	Use a slow speed blade an small tooth spacing
	Incorrect blade tension	Adjust to where blade does not slip on wheel
	Teeth in contact with material before saw is started	Start saw and lower into work piece
	Blade rubs on wheel flange	Adjust wheel alignment
	Misaligned guide bearings	Adjust guide bearings
Premature Blade Dulling	Cracking at weld	Weld again, note quality of weld
	Teeth too coarse	Use finer teeth
	Too much speed	Decrease speed
	Inadequate feed pressure	Decrease spring tension on side of saw
	Hard spots or scale on material	Reduce speed, increase feed pressure
	Work hardening of material	Increase feed pressure by reducing spring tension
	Blade twist	Replace with a new blade, and adjust blade tension
	Insufficient blade	Tighten blade tension adjustable knob



SYMPTOM	POSSIBLE CAUSE (S)	CORRECTIVE ACTION
Unusual Wear on Side/Back of Blade	Blade guides worn	Replace
	Blade guide bearings not adjusted properly	Adjust as per operators manual
	Blade guide bearing bracket is loose	Tighten
Teeth Ripping From Blade	Teeth too coarse for work	Use finer tooth blade
	Too heavy pressure, too slow speed	Decrease pressure, increase speed
	Vibrating work piece	Clamp work piece securely
	Gullets loading	Use coarse tooth blade or brush to remove chips
Motor Running Too Hot	Blade tension too high	Reduce tension on blade
	Drive belt tension too high	Reduce tension on drive belt
	Gears need lubrication	Check oil bath
	Cut is binding blade	Decrease feed and speed
	Gears aligned improperly	Adjust gears so that worm is in center
Poor Cuts (Rough)	Too much speed or feed	Decrease speed or feed
	Blade is too coarse	Replace with finer blade
	Blade tension loose	Adjust blade tension
Blade is Twisting	Cut is binding blade	Decrease feed pressure
	Too much blade tension	Decrease blade tension



SYMPTOM	POSSIBLE CAUSE (S)	CORRECTIVE ACTION
Poor Cuts	Feed pressure too great	Reduce pressure by increasing spring tension on side of saw
	Guide bearing not adjusted properly	Adjust guide bearing, the clearance cannot be greater than .001mm
	Inadequate blade tension	Increase blade tension with tension knob
	Dull blade	Replace blade
	Speed incorrect	Adjust speed
	Blade guide spaced out too much	Adjust guide space
	Blade guide assembly loose	Tighten blade guide assembly
	Blade truck too far away from wheel flanges	Re-track blade according to operating instructions



NOTES

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