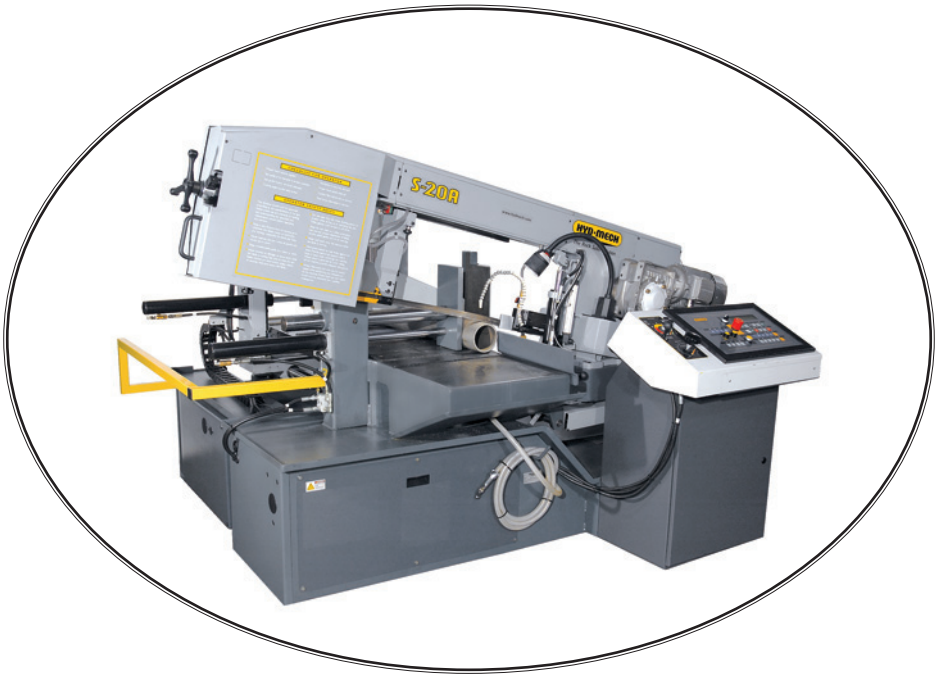

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THANK YOU,

On behalf of everyone at **HYD·MECH**, we would like to thank and congratulate you on your decision to purchase a **HYD·MECH** band saw.

Your new machine is now ready to play a key role in increasing the efficiency of your operation, helping you to reduce cutting costs while boosting quality and productivity.

To ensure you are maximizing the power and versatility of your new **HYD·MECH** band saw, please take the time to familiarize yourself and your employees with the correct operation and maintenance procedures as outlined in this manual.

We sincerely appreciate the confidence you have demonstrated in purchasing our product and look forward to building a long and mutually beneficial relationship.

Thank-you.

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SECTION 0 - SAFETY INSTRUCTIONS

SUMMARY

All persons operating this machine must have read and understood all of the following sections of this Manual:

Section 0 SAFETY
Section 2 OPERATING INSTRUCTIONS

However, as a memory aid, the following is a summary of the Safety Section.

Put Safety First

Mandatory Information – What operators and maintenance people must have read and understood.

Signatures – Everyone involved with this machine must sign to confirm they have read and understood mandatory information.

Basic Rules – only use this machine when

- it is in good working order
- all safety equipment is in place and functional
- operations are in compliance with this manual
- materials are within designed specifications and are non-hazardous

Owner is responsible to

- keep Manual accessible at the machine
- ensure only reliable, fully trained personnel work with the machine
- clearly define responsibilities of all personnel working with the machine
- keep the machine in good working order

Operator and Maintenance Personnel are responsible to:

- keep all safety equipment in order, check its function at the beginning of each shift, and report any shortcomings
- shut-down machine and report any faults or malfunctions which could impair safety
- understand and obey safety hazard labels
- not to wear un-restrained long hair, loose clothing or jewelry
- wear all required personal protective equipment
- not to wear gloves within 24 inches of moving blade
- maintain a clean working area and machine
- always use Lock-out when performing maintenance or repairs.

FOREWORD

Put Safety First!

This Safety Section contains important information to help you work safely with your machine and describes the dangers inherent in our machines. Some of these dangers are obvious, while others are less evident.

It really is important to PUT SAFETY FIRST. Make it a habit to consider the hazards associated with any action BEFORE you do it. If you feel any uncertainty, stop and find a safer approach to the action. If you're still uncertain, ask for advice from your supervisor.

The SAFETY FIRST approach is particularly necessary when you do something new, or different, and most people instinctively recognize this, although impatience may still cause them to take unnecessary risks.

Danger also lurks in the routine task that we have done over and over. Here, familiarity, boredom, or tiredness may lull us into unthinking, automatic repetition. Be alert for this, and when you feel it happening, stop and take stock of your situation. Review the safety hazards associated with what you are doing. That should get your brain working again.

Certainly production is important, but if you think you're too busy to put safety first, think how much production you'll lose if you get hurt.

You owe it to yourself, your family, and your co-workers to PUT SAFETY FIRST.

Mandatory Information

All persons operating this machine must have read and understood all of the following sections of this Manual:

Section 0 SAFETY

Section 2 OPERATING INSTRUCTIONS

Personnel involved in installation and maintenance of the machine must have read and understood all sections of the manual

Persons who have difficulty reading, or for whom English is not their first language, must receive particularly thorough instruction.

Signatures

Everyone involved in operation of this machine must sign below to confirm that:

I have read and understood all parts of Section 0 – Safety, and Section 2 – Operating Instructions.

Name	Date	Signature

Everyone involved in the installation, inspection, maintenance, and repair of this machine must sign below to confirm that:

I have read and understood all parts of this Operation and Maintenance Manual.

Name	Date	Signature

BASIC RULES

Intended Use

Our machines are designed and built in line with the state of the art, and specifically in accordance with American National Standards Institute Standard B11.10 *Safety Requirements for Metal Sawing Machines.* However, all machines may endanger the safety of their users and/or third parties, and be damaged, or damage other property, if they are operated incorrectly, used beyond their specified capacity, or for purposes other than those specified in this Manual.

Exclusion of Misuse

Misuse includes, for example:

Sawing hazardous materials such as magnesium or lead

Sawing work pieces which exceed the maximum workload appearing in the Specifications

Operating the machine without all original safety equipment and guards

Liability

The machine may only be operated:

When it is in good working order, and

When the operator has read and understood the Safety and Operating Instructions Sections of the Manual, and

When all operations and procedures are in compliance with this Manual.

Hyd-Mech Group cannot accept any liability for personal injury or property damage due to operator errors or non-compliance with the Safety and Operating Instructions contained in this Manual.

RESPONSIBILITIES OF THE OWNER

Organization of work

This Operation and Maintenance Manual must always be kept near the machine so that it is accessible to all concerned.

The general, statutory and other legal regulations on accident prevention and environmental protection must also be observed, in addition to the Manual material. The operators and maintenance personnel must be instructed accordingly. This obligation also includes the handling of dangerous substances and the provision and use of personal protective equipment.

Choice and qualification of personnel

Ensure that work on the machine is only carried out by reliable persons who have been appropriately trained for such work.

Training

Everyone working on or with the machine must be duly trained with regard to the correct use of the machine, the correct use of safety equipment, the foreseeable dangers that may arise during operation of the machine, and the safety precautions to be taken.

In addition, the personnel must be instructed to check all safety devices at regular intervals.

Define responsibilities

Clearly define exactly who is responsible for operating, setting-up, servicing and repairing the machine.

Define the responsibilities of the machine operator and authorize him to refuse any instructions by third parties if they run contrary to the machine's safety.

Persons being trained on the machine may only work on or with the machine under the constant supervision of an experienced operator. Observe the minimum age limits required by law.

Condition of Machine and Workplace

Ensure that the machine and its safety equipment is kept in good working order.

Ensure that the work area is well lit, and protected from the elements, such as rain, snow, abrasive dust, and extremes of temperature.

Ensure that the machine is installed with sufficient clearance around it for the safe loading and unloading of work pieces.

RESPONSIBILITIES OF THE OPERATOR AND MAINTENANCE PERSONNEL

Safety equipment

All machines are delivered with safety equipment that must not be removed or bypassed during operation.

The correct functioning of safety equipment on the machine must be checked:

- at the start of every shift.
- after maintenance and repair work
- when starting for the first time, and after prolonged shutdowns

Emergency Stop Button (E-Stops)

Always be aware of the location of the Emergency Stop Buttons). Do not allow material or objects to block your access to an Emergency Stop.

Damage

If any changes capable of impairing safety are observed in the machine or its operation, such as damage, malfunctions, or irregularities, then appropriate steps must be taken immediately, the machine switched off, locked-out, and the fault reported to the responsible person.

Safe operation

The machine may only be operated when in good working order and when all protective equipment is in place and operational.

Keep a safe distance from all moving parts – especially the blade and vises

Stock should not be loaded onto the saw if the blade is running

Long and heavy stock should always be properly supported in front of and behind the saw.

Faults

The machine must be switched off and locked-out before starting to remedy any faults.

Safety hazard labels

Safety hazard labels, and other instructional labels on the machine must be observed. They must be clearly visible and legible at all times. If they become damaged they must be replaced.

Clothing, jewelry, protective equipment

Personnel operating or working on the machine must not wear un-restrained long hair, loose-fitting clothes and dangling jewelry.

When operating or working on the machine, always wear suitable, officially tested personal protective equipment such as safety glasses and safety boots and any other equipment required by plant regulations.

Gloves

Experience has shown that careless use of gloves around machinery is a major factor in serious hand injuries.

Gloves should not be worn when operating or adjusting the machine, except:

Wear protective gloves when handling bandsaw blades at blade changes.

Gloves may be worn when handling work pieces, only if the machine is in Manual Mode and the bandsaw blade is not running.

If the machine is running in Auto Mode, and only if the cut parts are greater than 24 inches long, it may be possible to safely wear gloves for handling the cut parts, but the wearer of the gloves must never put his hands near the blade for any reason. If the cut parts are less than 24 inches long, it is required to arrange their automatic flow into a parts bucket or other suitable arrangement to avoid the necessity to pick them off the machine by hand.

Hearing protection

Ear protection must be worn whenever necessary.

The level and duration of noise emission requiring hearing protection depends upon the national regulations in the country in which the machine is being used.

The actual level of noise emission by band sawing machines depends upon work piece size, shape and material, blade type, blade speed and feed rate.

The only practical course of action is to measure the actual noise emission levels for the type of work that is typically done. With reference to national standards, decide upon the necessary hearing protection required.

In the absence of such measurements, it is advisable for anyone exposed to long periods of moderate to loud noise to wear hearing protection. It is important to understand that hearing loss is gradual and easily goes unnoticed until it is serious and irreversible.

Workplace

A clear working area without any obstructions is essential for safe operation of the machine. The floor must be level and clean, without any build-up of chips, off-cuts, coolant, or hydraulic oil.

The workplace must be well lit, and protected from the elements, such as rain, snow, abrasive dust, and extremes of temperature

Nothing may ever be placed on, or leaned against the machine, with the obvious exception of the work piece on the table and conveyor of the machine.

Master Disconnect

Lock-out the machine before undertaking any maintenance or repair work on it. ‘Lock-out’ refers switching off the master electrical disconnect switch, and locking it out so that it cannot be switched on again without authorization.

On Hyd-Mech machines the Master Disconnect Switch will be of one of four types:

- Rotary switch mounted in electrical control cabinet door and inter-locked with door
- Rotary switch mounted on the side of electrical control cabinet.
- Lever switch mounted in separate box mounted on the machine
- Supply disconnect switch supplied by user at installation and usually wall-mounted within sight of the machine, depending upon local regulations.

In almost all jurisdictions, it is required that owners of industrial equipment establish and post lock-out procedures. Know and use the lock-out procedures of your company or organization.

Residual Risks

The machine is still not completely de-energized if an electrical cabinet door type switch is locked-out.

The line side of the disconnect switch itself remains energized.

Variable speed blade drives store dangerous voltage in their capacitors, and this requires time to dissipate. After locking out power, wait 3 minutes before beginning to work on machine electrical circuits.

If compressed air is supplied to the machine to power a mist lubrication system or other devices, it should be disconnected, and any stored air pressure released before working on the machine.

The weight of individual machine components represents stored potential energy that can be released if they fall when disconnected. Secure these components with adequate hoisting gear before disassembly.

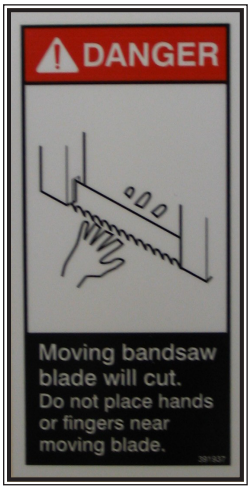
SAFETY HAZARD LABELS

The safety hazard labels attached to your machine represent important safety information to help you avoid personal injury or death.
All supervisors, operators, and maintenance personnel must locate and understand the safety information associated with each hazard label prior to operating or servicing the machine.
The safety hazard labels shown below are located at various positions on the machine to indicate possible safety hazards. The location, and re-order part number of all the safety labels associated with this particular model of bandsaw are indicated at the end of this section of the manual. It is important to replace any safety hazard label that becomes damaged or illegible.

HAZARDOUS VOLTAGE INSIDE

Contact with high voltage may cause death or serious injury. Never perform maintenance on, or near, electrical components until the machine's electrical power source has been disconnected. Lock-out power in accordance with your company's lock-out procedures before any such maintenance. The "Stop" or "Emergency Stop" push button does not disconnect the machine's power supply. Hazardous voltage is still present in the machines electrical circuits.
The machine's Electrical Disconnect Switch does disconnect voltage from the machine's circuits, however hazardous voltage is still present inside the main electrical cabinet, on the infeed (line) side of the main fuses. Therefore keep hands and tools away from the infeed side of the control panel main fuses. If these fuses need to be replaced, use a fuse puller.
Allow three minutes after locking-out power before opening any electrical enclosures. Your machine may be equipped with a variable frequency drive that stores high voltage within its capacitors. Three minutes will allow sufficient time for this voltage to safely discharge.
Never spray coolant directly at electrical components or cabinets.

MOVING BANDSAW BLADE WILL CUT



Do NOT operate with guard removed.
Do NOT place hands or fingers near moving bandsaw blade.
For blade changing, always follow the proper Blade Changing Procedure, as given in Section 3 of this manual.

PINCH POINT

Machine parts may move without warning because of another person initiating the motion. Keep hands clear of all labeled pinch points, whenever the machine is running. Machine vises and bundling can exert great force and cause severe injury. Keep hands clear of vises and work piece when the vises and bundling are opened or closed. Be aware that vise and bundling closing or opening may result in potentially dangerous work piece movement. Be aware also that the head swing either left or right, and the advancement or retraction of the head may create potential pinch points.

LOCATION AND PART NUMBERS OF SAFETY HAZARD LABELS

Warning
Pinch Point
Item N0. 392801

Danger
Hazardous voltage inside
Item N0. 391938

Danger
Moving bandsaw blade will cut
Item N0. 391937

SECTION 1 - INSTALLATION

Upon delivery of your new bandsaw, it is imperative that a thorough inspection be undertaken to check for any damage that could have been sustained during shipping. Special attention should be paid to the electrical and hydraulic systems to check for damaged cords, hoses and fluid leaks. In the event of damage caused during shipping, contact your carrier to file a damage claim.

SAFETY PRECAUTIONS

The bandsaw has been designed to give years of reliable service. It is essential that operators be alerted to the safe operation of this saw, and the practices to avoid that could lead to injury. The following safety rules are at the minimum necessary for the safe installation, operation, and maintenance of the saw. Take every precaution for the protection of operators and maintenance personnel.

- POWER HOOK-UPS AND REPAIRS SHOULD BE ATTEMPTED ONLY BY QUALIFIED TRADESMEN.
- THE SAW SHOULD BE LOCATED IN AN AREA WITH SUFFICIENT ROOM TO SAFELY LOAD STOCK INTO THE SAW. SECURE THE SAW TO THE FLOOR.
- THE AREA AROUND THE SAW SHOULD BE MAINTAINED IN A CLEAN AND TIDY CONDITION TO AVOID OBSTACLES OPERATORS COULD TRIP OVER.
- THE BANSAW SHOULD ONLY BE OPERATED ACCORDING TO THE SPECIFICATIONS OF THE SAW. AVOID UNSAFE USAGE PRACTICES.
- IF AT ANY TIME THE SAW DOES NOT APPEAR TO BE OPERATING PROPERLY IT SHOULD BE STOPPED IMMEDIATELY AND REPAIRED.

OPERATOR:

- THE SAW SHOULD NEVER BE OPERATED UNLESS ALL GUARDS AND DOORS ARE IN PLACE AND CLOSED.
- KEEP A SAFE DISTANCE FROM ALL MOVING PARTS - ESPECIALLY THE BLADE AND VISES.
- LOOSE CLOTHING AND GLOVES SHOULD NEVER BE WORN WHILE OPERATING THE SAW. COVER LONG HAIR.
- STOCK SHOULD NOT BE LOADED ONTO THE SAW IF THE BLADE IS RUNNING.
- LONG AND HEAVY STOCK SHOULD ALWAYS BE PROPERLY SUPPORTED IN FRONT OF AND BEHIND THE SAW.
- NEVER ATTEMPT TO DISLODGE OR MOVE STOCK WHILE THE BLADE IS MOVING. TAKE THE TIME TO STOP THE SAW BLADE, REMOVE OBSTRUCTIONS, AND RESTART BLADE.
- MUST WEAR EYE PROTECTION
- MAINTAIN PROPER ADJUSTMENT OF BLADE TENSION, AND BLADE GUIDES
- HOLD WORK PIECE FIRMLY AGAINST TABLE
- DO NOT REMOVE JAMMED CUTOFF PIECES UNTIL BLADE HAS STOPPED

NO MODIFICATIONS TO THE MACHINE ARE PERMITTED WITHOUT PRIOR APPROVAL FROM HYD-MECH. ANY APPROVED MODIFICATIONS SHOULD ONLY BE UNDERTAKEN BY TRAINED PERSONNEL.

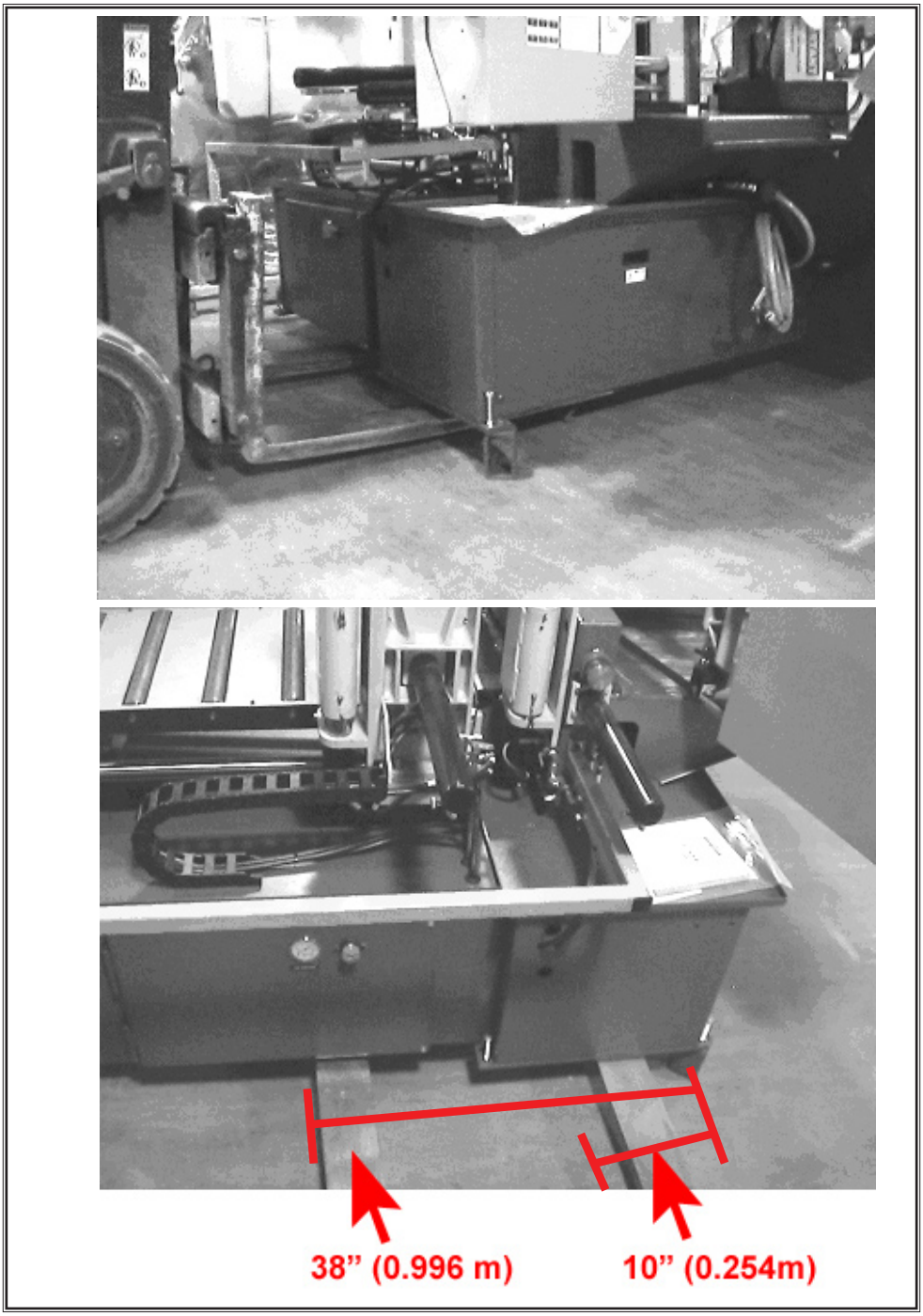
LIFTING THE S20A WITH A FORK LIFT

The S20A is shrink-wrapped and shipped on a pallet. When lifting the pallet with a forklift truck make sure that the load is firmly balanced. The pallet length dimension is 94" (2388 mm). Minimum fork length of 48" (1219 mm) is recommended to safely lift the pallet.

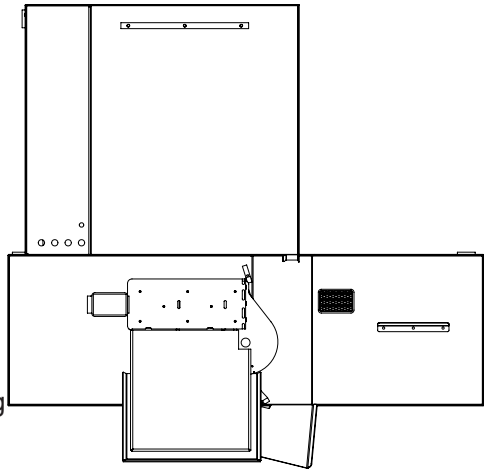
Remove the wrapping from around the saw. Complete the inspection for signs of damage. Remove the lag bolts that hold the saw to the pallet. The larger diameter hole is used for retaining during shipping and for use with concrete floor anchors. The smaller diameter, threaded holes at each corner are used for leveling the saw properly.

The machine should be lifted from the SIDE as shown below. Locate one fork 10” and the other 38” from the front edge of the machine.

NOTE: DO NOT position the forks to allow contact with the hydraulic cabinet. DAMAGE WILL RESULT!



FOUNDATION, LEVELLING AND ANCHORING



Machine location should be carefully selected. A flat concrete floor area should be chosen. It should have enough free space surrounding the machine to enable free access for safe operation and maintenance. The machine should be leveled in both directions (from side to side & from front to back). Six leveling screws used for securing machine to the pallet during transport, should be installed, one in each corner of the machine base, as shown below. It might be required to place steel plates under leveling bolts to prevent their sinking into the concrete floor. In cases when the machine is to be anchored permanently, anchoring holes are provided. They are located next to the leveling screw holes. The larger diameter hole is used for retaining during shipping and for use with concrete floor anchors. The smaller diameter threaded hole at each corner, are used for leveling the saw.
Using a level on the machine out-feed table, level machine front to back and side to side.
NOTE: In some cases leveling the saw infeed with a slight slope towards the blade is recommended. This will prevent coolant from running down the raw stock. (This is especially true when cutting tubing or bundles).

EARTH GROUNDING PROCEDURE

1. The customer is to provide and install a ground rod approximately .60 (15mm) diameter, copper clad steel, to be driven no less than 8’ (2.5m) into the ground, no more than 10’ (3m) away from control enclosure.
2. The ground rod is to be connected to customer’s in plant ground system. This connection shall be made directly at the ground rod. (If applicable).
3. It is desirable that the overall resistance to ground measured at the ground rod does not exceed 3 ohms. Customer is advised to consult local power company for further information on grounding.
4. The ground rod is to be connected to the ground terminal in the control enclosure using insulated, stranded copper wire. The wire gauge size is to be determined according to the electrical code of the customers local electrical authority.
5. An additional point to check is to ensure continuity of all ground within the control enclosure. Start with the main power entrance ground terminal where the internal ground conductors should originate and then connect to, the DIN terminal strip, control transformer, and the lid of control enclosure. Also, the PLC and Interface units should have their own ground conductors connected to one of the main ground terminals.
6. A properly functioning ground system will:
   - provide safety for personnel.
   - ensure correct operation of electrical/electronic apparatus.
   - prevent damage to electrical/electronic apparatus.
   - help dissipate lightning strikes.
   - divert stray radio frequency (RF) energy from electronic/control equipment.

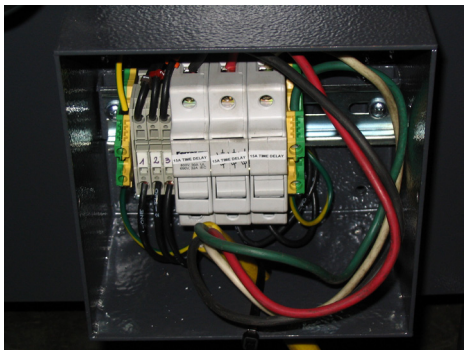
POWER WIRING CONNECTIONS

After the machine is levelled and anchored the necessary power hook-up needs to be performed.
Check that there is no sign of shipping damage to the electrical conduits, cords or hydraulic hoses.

As supplied, the machine is set to run on three phase voltage as indicated on the serial plate and voltage label. Machine voltage is customer specific and should be indicated while ordering the machine. If machine voltage does not match available power source, contact the factory.

Power connection to the machine is made in the junction box, located on the side of the electrical panel. The power cable can be routed through the supplied hole in the junction box (ensure correct strain relief is used) and connections made to terminals L1, L2, L3 and ground terminals. If the machine is equipped with an auto-transformer then the power cable is to be connected to the fuses located in the junction box.

Power junction box without auto-transformer installed in the bandsaw.



Power junction box with auto-transformer installed in the bandsaw.

Power junction box

HYDRAULIC OIL

The S20A is supplied with Texaco Rando HD46 hydraulic oil. Substitutes should be of the same viscosity hydraulic oil.

CUTTING FLUID

The S20A uses a pump and reservoir to circulate the necessary cutting fluid to the blade for maximum blade life. Your saw blade supplier will be able to provide information to the cutting fluid products that are available for your needs.

No cutting fluid (coolant) is supplied with the machine. There are two types of coolant available:

- Oil based; dilute 1:10 ratio (one part concentrated coolant to 10 parts water)
- Synthetic; dilute as recommended by manufacturer.

SECTION 2 - OPERATING INSTRUCTIONS

OPERATOR CONTROL PANEL

The operator control panel provides the operator with all the controls necessary to operate the saw after the cutting angle has been set and the stock has been loaded and secured. All of the electrical functions are operated from the control panel. **For all the functions to work the machine has to be powered up**. The Main Disconnect switch, which is located on the side of control box, has to be in ON (1) position. Emergency Switch has to be released (Rotate Emergency button 45º to release). For the blade to operate the blade guard door has to be completely shut and blade tensioned to the correct setting:
S20A: Minimum tension 2200 lbs. (1000kg) Maximum tension 2650 lbs. (1200kg)

S20A Machine Disconnect Switch

The Machine Disconnect Switch is located on the side on the machine control box. It is a **Thermal-magnetic circuit breaker with under voltage coil and door locking device.** The switch consists of three power failure protection systems. In the event of a power failure, this switch disconnects all the electrical devices, causing the machine to immediately shut down and prevents it from automatically starting when power is restored. This device also resets the thermal relay fitted to protect against current overloads.

START-UP

We can not overstress the importance of familiarizing yourself with the controls of the bandsaw prior to starting the machine for the first time.

NOTE: WHEN STARTING THE BANDSAW FOR THE FIRST TIME MAKE SURE THAT THE PRESSURE IS 440 PSI (30 BAR) AND THAT THE BLADE IS RUNNING IN A COUNTER CLOCKWISE DIRECTION AS VIEWED FROM THE OPERATOR CONSOLE.

CONTROL CONSOLE

The control console is arrayed with a complete set of controls to operate the electrical and hydraulic functions of the saw. The HMI (**H**uman **M**achine **I**nterface) consists of all, the electrical controls required to function the saw.

OPERATION CONTROLS

The electrical push buttons on the HMI allow for full manual and semi-automatic operation of the bandsaw. The operation of each push button is detailed on the following pages.

HYDRAULIC FEED CONTROL

The hydraulic feed controls are located on the left side of the control console and consist of the Feed Force Setting knob, the Feed Rate knob and the Head Fast Approach lever. These controls allow the operator to control both the Feed Force Limit and the Feed Rate. See Cutting Parameters Chart information on the following pages.

BCM:

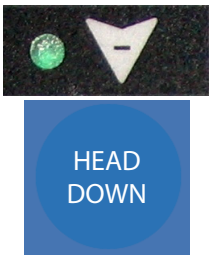
• **B**LADE **C**HANGE **M**ODE. (See page 2.23)
• With the selector switch in the left position, all functions are operative.
• With the selector switch in the right position, only HEAD UP and HEAD DOWN are operative.

EMERGENCY STOP:

• This button will stop both the hydraulic and blade motors. The head motion will cease. The vises remain as they are, but if closed, they will lose gripping force. For this reason all long stock should be supported so that it will not fall.
• To reset the button, simply rotate through 45º

RESET:

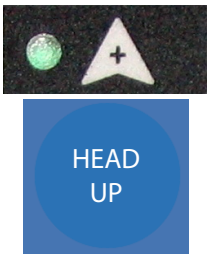
• This is used at the initialization phase after MACHINE START is depressed and to RESET any alarm conditions that may occur.



HEAD DOWN:

• When depressed in MANUAL MODE the head will move down until any of the following occur:
  i) The push button is released.
  ii) The hydraulic cylinder is at it's maximum capacity.

• A lit LED will be visible whilst HEAD DOWN is depressed.
• Head feed and head force are controlled by the FEED RATE and FEED FORCE controls.



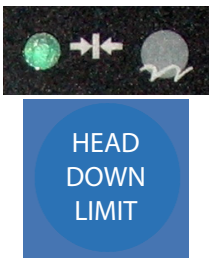
HEAD UP:

• When depressed in MANUAL MODE the head will move up until any of the following occur:
  i) The push button is released.
  ii) The hydraulic cylinder is extended to it's maximum capacity.

• A lit LED will be visible whilst HEAD UP is depressed.

HEAD UP LIMIT:

• Depressed when the desired HEAD UP LIMIT SETTING is to be set.
• A lit LED will be visible when the HEAD UP LIMIT has been reached.



HEAD DOWN LIMIT:

• Depressed when the desired HEAD DOWN LIMIT SETTING is to be set.
• A lit LED will be visible when the HEAD DOWN LIMIT has been reached.

BLADE SPEED DIAL:

• This dial controls the blade speed which can be adjusted to the desired speed in SFM or SMM . The blade speed is displayed on the LCD display next to the BS abbreviation.

NUMERICAL DIAL:

• This dial allows numerical values to be decreased or increased on the LCD over the flashing cursor. Length control and parameters are an example.

FIXED VISE OPEN:
- The push button operates the fixed (front) vise.
- When depressed and held, the fixed vise will open all the way, or until the push button is released.
- A lit LED will be visible when FIXED VISE OPEN is selected.
- Push button is also used to enter set up mode (machine parameters)

FIXED VISE CLOSE:
- The push button operates the fixed (front) vise.
- When depressed the fixed vise will close all the way to the fixed jaw or until it encounters enough resistance to stop it.
- A lit LED will be visible when FIXED VISE CLOSE is selected.

SHUTTLE VISE OPEN:
- The push button operates the shuttle (rear) vise.
- When depressed and held, the shuttle vise will open all the way, or until the push button is released.
- A lit LED will be visible when SHUTTLE VISE OPEN is selected.

SHUTTLE VISE CLOSE:
- The push button operates the shuttle (rear) vise.
- When depressed the shuttle vise will close all the way to the fixed jaw or until it encounters enough resistance to stop it.
- A lit LED will be visible when SHUTTLE VISE CLOSE is selected.

LCD:
- All visual communication from machine controller to operator is displayed on the LCD.

ENTER:
- Depressed when prompted on the LCD for e.g. at initialization phase when the shuttle is to move to the home position. (Shuttle Home)
- Used to enter data in the controller, such as quantity & length required, machine parameters etc.
- Used to enter programs in the controller.
- Used to select programs from the controller.
- Used to scroll the cursor on the LCD.

CLEAR:
When depressed in the following:
• AUTOMATIC MODE: Allows you to delete last program executed and replace with new program.
• PROGRAMMING MODE: Allows you to delete existing or incorrect data.
• MACHINE PARAMETERS: Allows you to delete existing or incorrect data.
• Resets the number of pieces cut to 0 (Zero) on the LCD display.

RUN / PROG:
•In AUTOMATIC MODE: Allows access to programming screens.

• Used to scroll through lines and pages on the LCD display.
• MACHINE PARAMETERS: When depressed previous parameter page is shown.

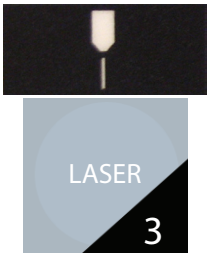
MACHINE START:
• To start the hydraulic pump the following actions are required:
i) Press & hold COMMAND ENABLE then press MACHINE START.
• The EMERGENCY STOP button must be pulled out.
• On initial start up, press & hold COMMAND ENABLE (see symbol below) then press MACHINE START.

COMMAND ENABLE:
• For initial start up after the disconnect switch has been set to '1' (ON) press & hold COMMAND ENABLE then press MACHINE START.
• Push button is also used in conjunction with other function buttons such as BLADE START, CYCLE START and are explained in detail in this section.

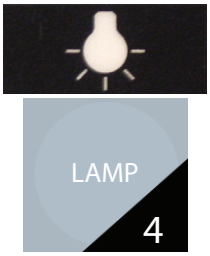
BLADE START:
• To start the blade, the following actions are required:
i) Press & hold COMMAND ENABLE then press BLADE START.

• The blade will not start if the head is completely in the down position or if the HEAD DOWN LIMIT setting has been reached.
• Push button is also used to enter the value of 1 when numerical data input is required.

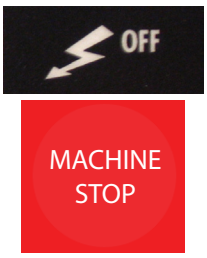
BLADE STOP:
• When depressed the blade will stop.
• A lit LED will be visible when the blade is OFF.
• Push button is also used to enter the value of 2 when numerical data input is required.



LASER: (OPTION, IF AVAILABLE)
• When depressed the laser will switch ON or OFF.
• Push button is also used to enter the value of 3 when numerical data input is required.

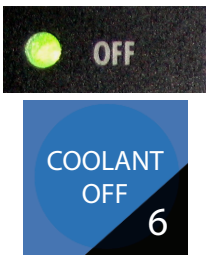


LAMP:
• When depressed the lamp will switch ON or OFF.
• Push button is also used to enter the value of 4 when numerical data input is required.



MACHINE STOP:
• When depressed all machine functions and hydraulic pump will shut down. To continue using the saw follow the prompts displayed on the LCD.
• All jobs will remain in memory as will the QUEUE.

COOLANT MAN:
•When depressed COOLANT will flow continuously.
• A lit LED will be visible when the COOLANT MAN is selected.
• Push button is also used to enter the value of 5 when numerical data input is required.



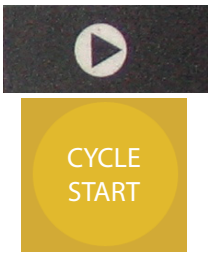
COOLANT OFF:
• When depressed COOLANT will stop flowing.
• A lit LED will be visible when the COOLANT OFF is selected.
• Push button is also used to enter the value of 6 when numerical data input is required.

COOLANT AUTO:

- When depressed the coolant or mist will flow only when the blade is running OR when the blade is running and the head is descending. This is selectable via the MACHINE PARAMETERS.
- A lit LED will be visible when COOLANT AUTO is selected.
- Push button is also used to enter the value of 7 when numerical data input is required.

FLOOD / MIST: (MIST OPTION)

- If the MIST option is installed then this push button is used to select the MIST.
- A lit LED will be visible when MIST COOL is selected.
- With MIST COOL selected, BLADE START must be selected for the MIST to operate.
- Push button is also used to enter the value of 8 when numerical data input is required.



CYCLE START:

- To initiate CYCLE START in manual and automatic mode, the following actions are required:
  i) Press & hold COMMAND ENABLE then press CYCLE START.

SHUTTLE FWD:

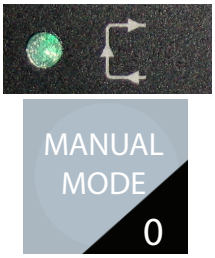
- When depressed and held in MANUAL MODE the shuttle will travel towards the saw blade and will stop and hold its position when the button is released.
- If ZEROING sequence is not executed each time the machine is started then SHUTTLE FWD will not function

SHUTTLE REV:

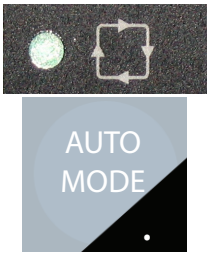
- When depressed and held in MANUAL MODE the shuttle will travel away from the saw blade and will stop and hold its position when the key is released.
- Push button is also used to enter the value of 9 when numerical data input is required.
- If ZEROING sequence is not executed each time the machine is started then SHUTTLE REV will not function

SHUTTLE SLOW:

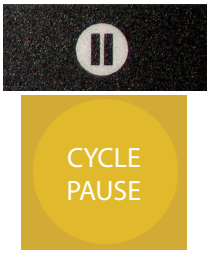
- When depressed and held the shuttle will move at a slow speed provided SHUTTLE FWD or SHUTTLE REV are also depressed.



MANUAL MODE:
- When depressed the bandsaw can be controlled by using all the MANUAL MODE functions.
- A lit LED will be visible when MANUAL MODE is selected.
- Push button is also used to enter the value of 0 when numerical data input is required.



AUTO MODE:
- Depress to enter AUTO MODE.
- A lit LED will be visible when AUTO MODE is selected.
- Fixed Vise Close must be depressed for AUTO MODE to cycle to start.
- Push button is also used to enter a decimal point when numerical data input is required.



CYCLE PAUSE:
- When depressed the controller will pause the cycle in progress.
- To continue the cycle follow the action items for CYCLE START (page 2.8)

STARTING THE MACHINE

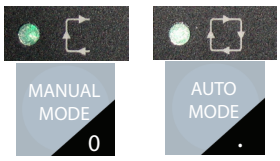
Turn the machine disconnect switch to ‘1’ (ON position) to apply power to the machine and release the EMERGENCY STOP if depressed. (To reset the button, simply rotate through 45º)

Follow instructions on the LCD:
Depress and hold COMMAND ENABLE then depress MACHINE START

Depress RESET

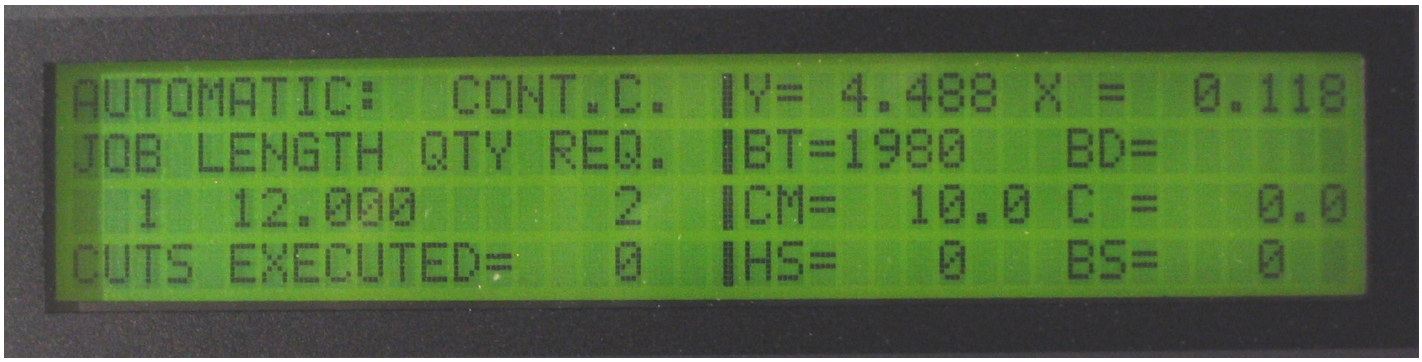
Depress ENTER. (shuttle home sequence starts). All other function buttons will be in-active with the exception of Head Up, Head Down, Fixed Vise Open, Fixed Vise Close, Shuttle Vise Open & Shuttle Vise Close. Do not depress ENTER if you wish not to initiate the shuttle home sequence.

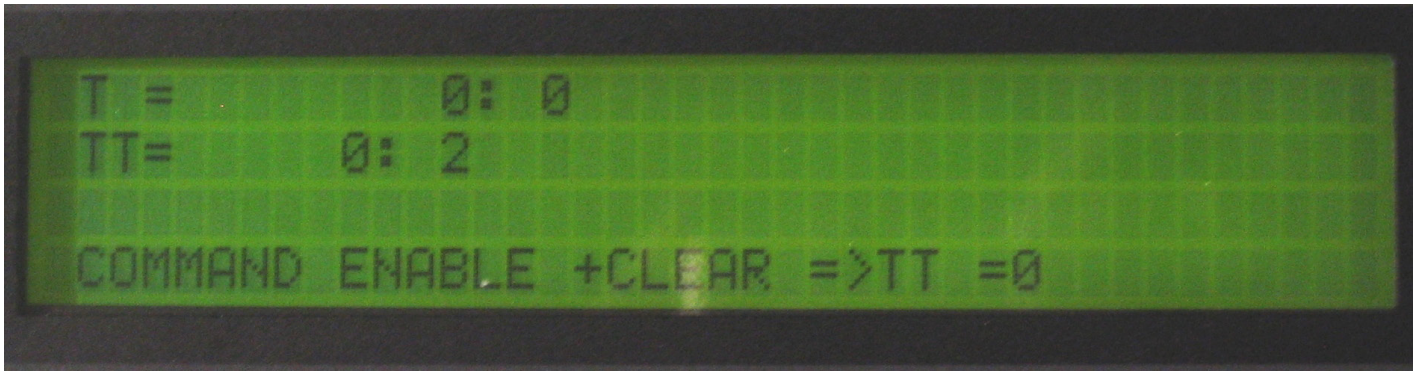
Depress PAGE UP. (Main Menu page appears on LCD)



To select mode operation:
Depress MANUAL MODE or Depress AUTO MODE
A lit LED adjacent to the Manual Mode or Automatic Mode button indicates machine mode.

In manual and automatic mode it is possible too view the basic cutting parameters by using  to scroll through the page. See the table below for details.





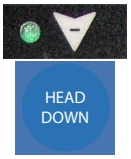
Cutting Parameters	Y = Position of the head height on the Y axis.
	X = Position of the shuttle on the X axis.
	BT = Indicates the current value of blade tension.
	BD = Blade Deviation (Option – If available)
	CM = Maximum current absorption of the blade motor.
	C = Blade motor current during cut
	CUTS EXECUTED = The number displayed relates to those CUTS effectively completed before the machine was last switched off. These will remain in the memory until they are replaced by further cuts carried out using the same program, or until set to zero or modified by a new program.
	HS = Head down speed (Feed Rate)
	BS = Blade speed.
	T = Working cycle partial cut time.
	TT = Total working time of the bandsaw.

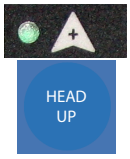
MANUAL MODE Machine Operation

Manual mode allows for a manual operation of the saw. In this mode all functions are activated by selection of the respective function buttons on the HMI.

Cut in Manual Mode

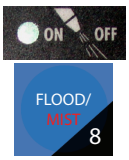
• Open fixed vise and shuttle vise.

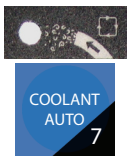




• Load the material.
• Position the head using the HEAD DOWN or HEAD UP so that it is above the material to be cut.
• Move material to the required length to be cut.

• Close fixed vise and shuttle vise.

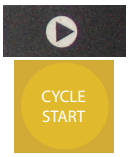




• Select coolant type: FLOOD/MIST
• Select coolant flow: Continuous or Automatic.

• Press & hold COMMAND ENABLE then press BLADE START.
N.B. **The bandsaw is equipped with DOOR INTERLOCK SAFETY SWITCH. If either the drive door or idler door is open then the blade cannot be started.**

• Use the potentiometer to set the desired blade speed.



• Press & hold COMMAND ENABLE then press CYCLE START.

• Use the hydraulic feed controls to adjust the Feed Force Limit and the Feed Rate.

Once the cut is complete the blade will shut OFF and the head will remain in the down position.

SETTING HEAD UP AND HEAD DOWN LIMITS

The machine can be setup to restrict the head movement in Automatic mode between up and down limit settings. During normal operating conditions where a complete through cut is required, the head down limit should be set beyond the material which is to be cut. Setting the head down limit at any other position will result in a partially cut piece.
The head up limit should be set so that the blade clears the material. In automatic mode these two preset limits will be executed until the limits are changed.

To Set Head Up Limit in MANUAL MODE

- Position the head at the desired head up position by pressing the HEAD UP or HEAD DOWN buttons
- Press the HEAD UP LIMIT button.

To Set Head DOWN Limit MANUAL MODE

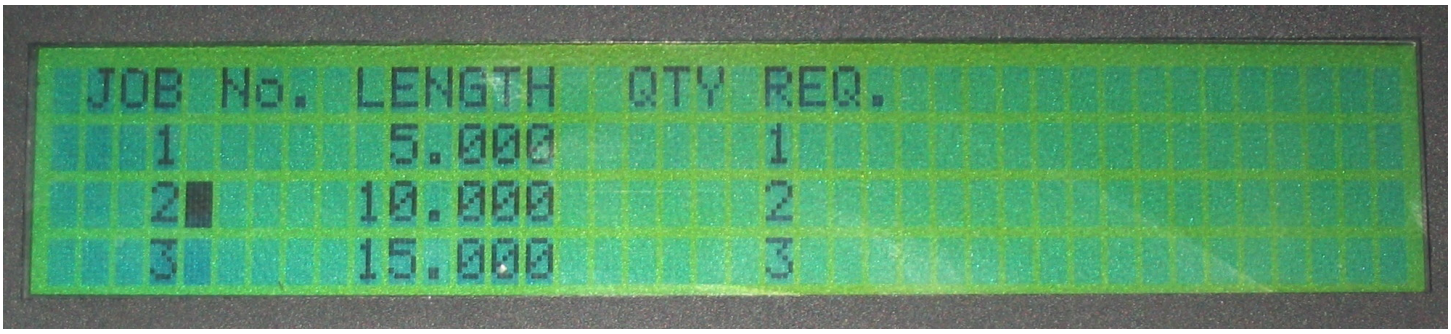
- Position the head at the desired head down position by pressing the HEAD UP or HEAD DOWN buttons.
- Press the HEAD DOWN LIMIT button.
- HEAD DOWN LIMIT will be set and the head will move to the UP LIMIT.

PROGRAMMING JOBS

Prior to using the AUTOMATIC MODE, JOBS need to be entered in the PLC. Follow the steps outlined below:

1. Depress AUTO MODE. (Screen will change on the LCD)
2. Depress RUN/PROG.

3. Depress #1 to select JOB



The above screen will be displayed and the cursor will flash beside JOB No.

4. Depress ENTER and the cursor will flash beside the LENGTH value.
   - Using the numerical keys enter the new LENGTH required and depress ENTER.
   - Alternatively when the cursor flashes beside the LENGTH value, depress CLEAR, 0 (Zero) will be displayed. using the numerical keys enter the new LENGTH required and depress ENTER.
   - The cursor will now flash beside QTY REQ. value.
   - Using the numerical keys enter the new QTY REQ. value and depress ENTER.
   - The cursor will now flash beside JOB No. 2. Repeat above steps to enter JOBS 1 to 999.

An alternative way to enter JOBS between 1 to 999 is to do the following, when the cursor is flashing beside the JOB No.

5. Using the numerical keys enter the new JOB No. required and depress ENTER. (I.e. 345)
   - The cursor will flash beside LENGTH value at JOB No. 345
   - Enter the LENGTH & QTY REQ. as described on page 2.13
   - Depress RUN/PROG button twice to exit.

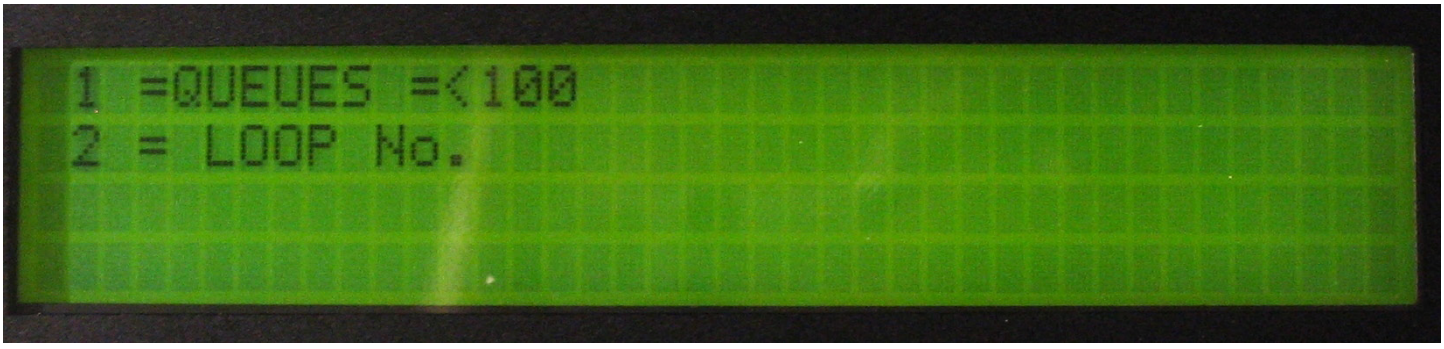
6. To clear ALL or PARTIAL JOBS, move the cursor to the required JOB No. and depress & hold COMMAND ENABLE and then depress & hold CLEAR button for 5 seconds. All JOBS below and including the JOB No. highlighted with the cursor will have length and quantity values set to Zero.

PROGRAMMING THE QUEUE

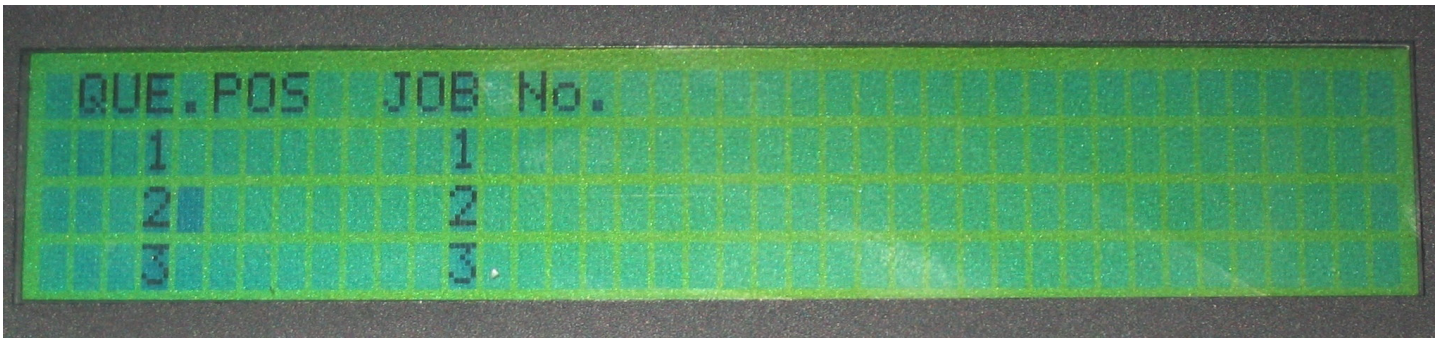
Another aspect required for the AUTO MODE to run is to populate the QUEUE with the JOB No. required. Follow the steps outlined below to accomplish this:

1. Depress AUTO MODE. (Screen will change on the LCD)
2. Depress RUN/PROG.

3. Depress #2 to select QUEUE



4. Depress #1 to select QUEUE =<100



The screen shown on the previous page will be displayed and the cursor will flash beside QUE. POS 1.
5. Depress ENTER and the cursor will flash beside the JOB No. value.
    - Using the numerical keys enter the new JOB No. required and depress ENTER.
    - The cursor will now flash beside QUE. POS. 2. Repeat above steps to enter QUE. POS 1 TO 100

If there are other JOBS programmed in the QUEUE which are not required, then they must be deleted by executing the following steps.
6. Enter the value 0 (Zero) in 2 consecutive QUE POS. and all remaining JOB No. will be set to 0 (Zero)
7. Depress RUN/PROG button twice to exit.

An alternative way to enter QUE. POS between 1 to 100 is to do the following, when the cursor is flashing beside the QUE. POS.

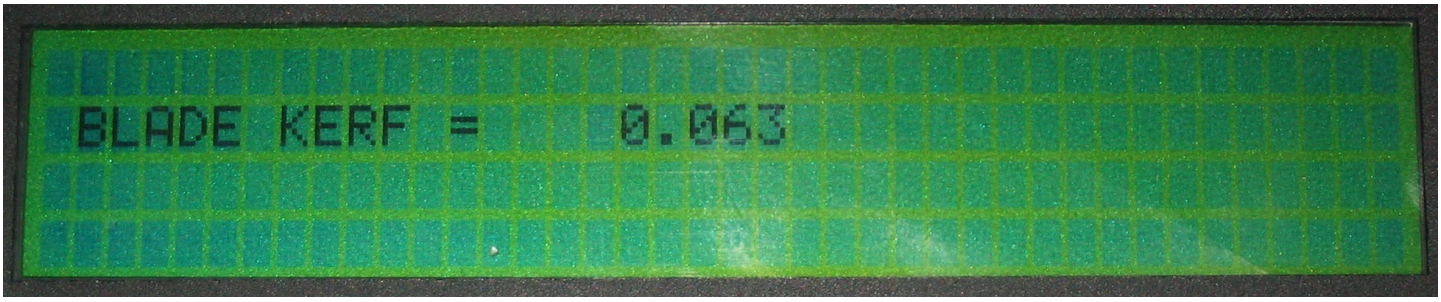
1. Using the numerical keys enter the new QUE. POS. required and depress ENTER. (I.e. 60)
    - The cursor will flash beside JOB No. value at QUE. POS 60
    - Enter the JOB No. as described on page 2.13
    - Depress RUN/PROG button twice to exit.

BLADE KERF

This applies to the width of material removed by the blade.
To change the BLADE KERF value, follow the steps outlined below:

1. Depress AUTO MODE. (Screen will change on the LCD)
2. Depress RUN/PROG.

3. Depress #3 to select BLADE KERF

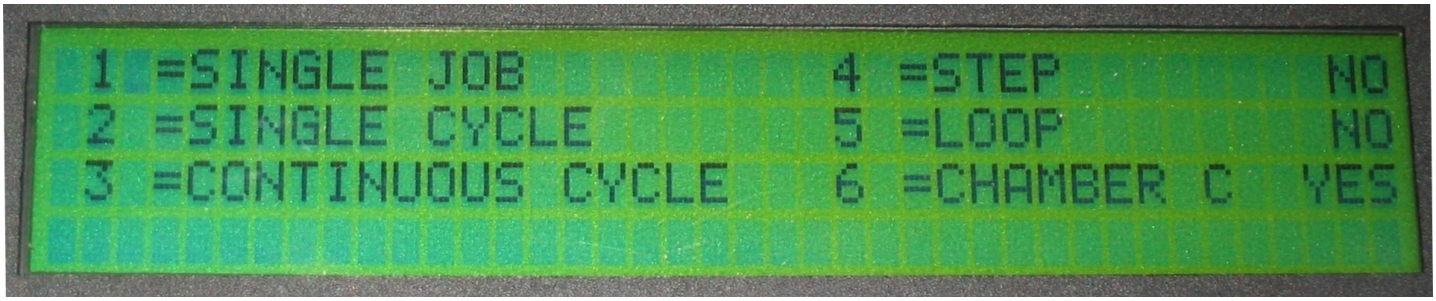


4. Using the numerical keys enter the new BLADE KERF value and depress ENTER. (The BLADE KERF value will be rounded up or rounded down to equivalent of 0.1mm)
5. Depress RUN/PROG button twice to exit.

AUTOMATIC MODE Machine Operation

Automatic mode can be programmed to run 3 different types of cutting cycles:

1. SINGLE JOB.
2. SINGLE CYCLE.
3. CONTINUOUS CYCLE.



Other features are:

4. STEP: If set to YES the machine will stop at the end of each cut of any JOB in any of the above cutting cycles and wait for the a start command from the operator to continue.

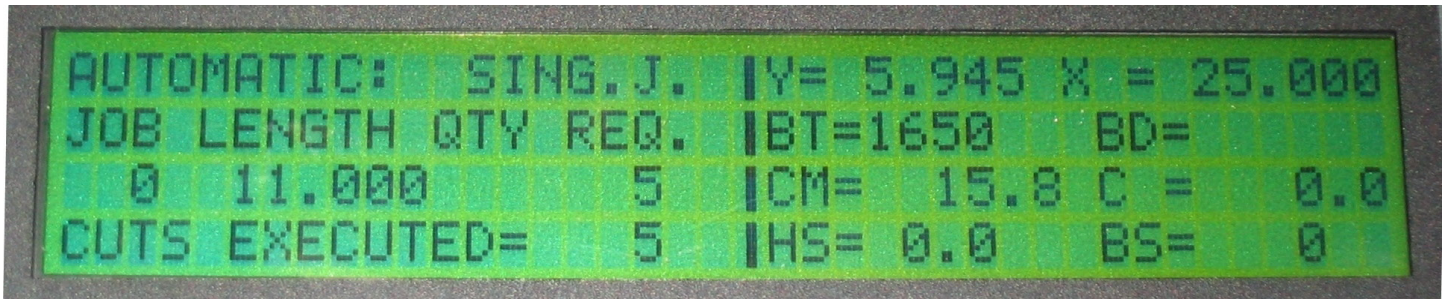
5. LOOP. If set to YES the QUEUE will be continuously repeated until the preset limit has been reached. (OPTION- IF AVAILABLE)

6. CHAMBER C: If set to YES, once a cut is made and with the head in the down position, the shuttle will move back approximately 2mm, head will move up and the cycle will continue.

SINGLE JOB

This mode allows a single job to be executed at the required length and with the required quantity. Once the cycle is complete the blade will switch off. The following steps will outline how to execute the SINGLE JOB mode.

- Load material and close FIXED VISE.
- Set the HEAD UP LIMIT and HEAD DOWN LIMIT. If the limits have been previously set then it is not necessary to re-enter the limits.
- Select AUTO MODE. (The following screen shown on the next page will appear)

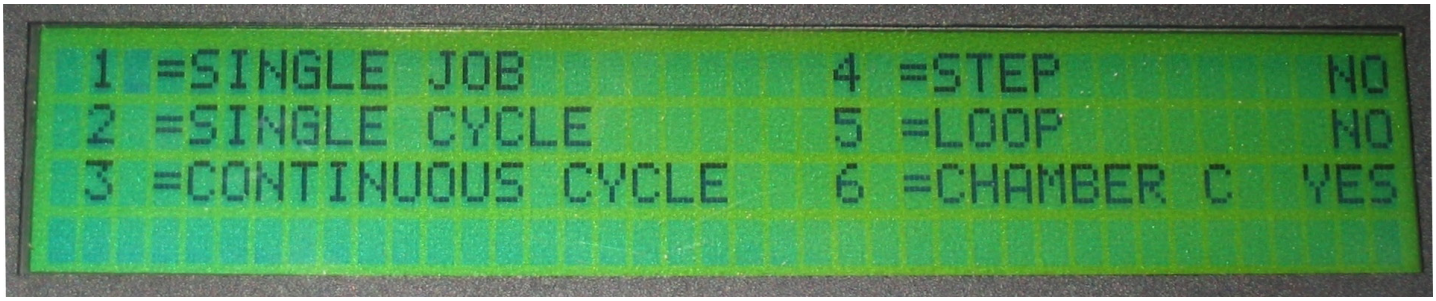


• Make sure that the first line of the Automatic Mode screen displays AUTOMATIC: SING. J. (SINGLE JOB)

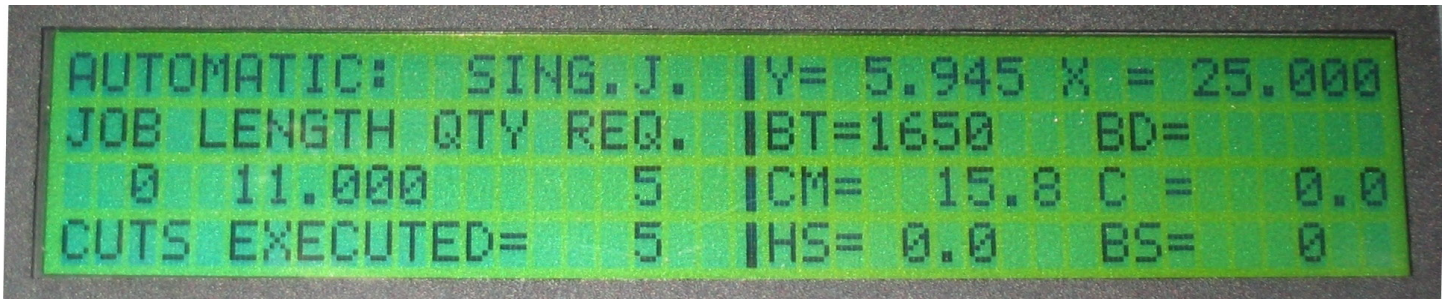
If not, then follow these steps:

1. Depress RUN/PROG button

2. Depress #4 to select CUTTING MODE



3. Depress #1 to select SINGLE JOB
4. Depress RUN/PROG button twice to exit and the correct page will be displayed.



5. JOB 0 (Zero) will always apply to SINGLE JOB mode and cannot be programmed for any other cut modes.
6. Depress ENTER button until cursor flashes beside the LENGTH value.

7. Using the numerical keys enter the new length required. Alternatively when the cursor flashes beside the LENGTH value depress the CLEAR button. 0 (Zero) will be displayed. Using the numerical keys enter the new length required.

8. Depress ENTER: The cursor will move to the QTY REQ value.

9. Using the numerical keys enter the quantity required. Alternatively when the cursor flashes beside the QTY REQ value. Depress the CLEAR button. 0 (Zero) will be displayed. Using the numerical keys enter the new quantity required.

10. Depress ENTER and then depress CLEAR. CUTS EXECUTED will be reset to 0 (Zero)

11. Select coolant type, FLOOD/MIST and then select coolant flow, COOLANT MAN or COOLANT AUTO.

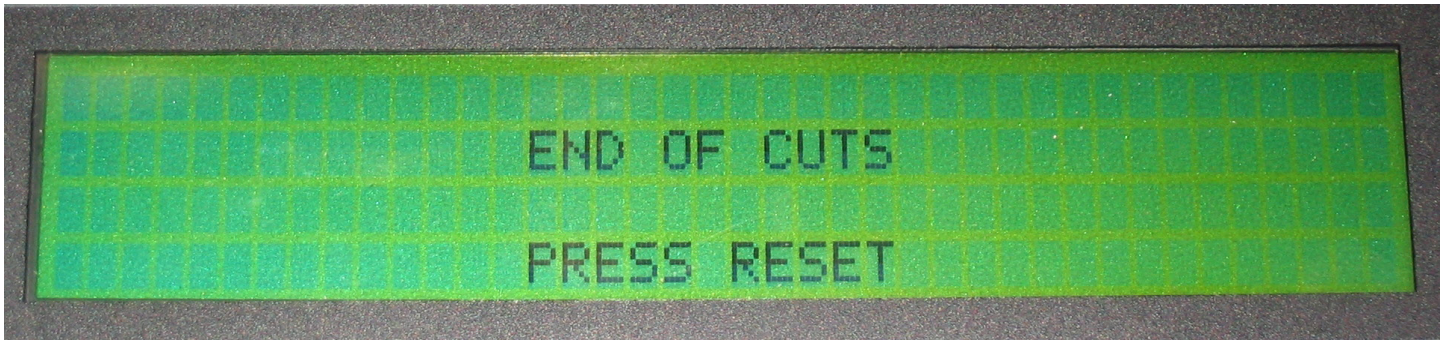
12. Depress and hold COMMAND ENABLE then depress BLADE START. Adjust the potentiometer to set the desired blade speed.

13. Depress and hold COMMAND ENABLE then depress CYCLE START.

14. Use the hydraulic feed controls to adjust the feed force limit and feed rate.

• The SINGLE JOB cycle will commence and the cycle can be paused by depressing CYCLE PAUSE. To restart the cycle:
  (i) Depress and hold COMMAND ENABLE then depress BLADE START.
  (ii) Depress and hold COMMAND ENABLE then depress CYCLE START. (The cycle will continue)

15. Once the SINGLE JOB cycle is complete a high pitched tone is continuously heard and the following is displayed.



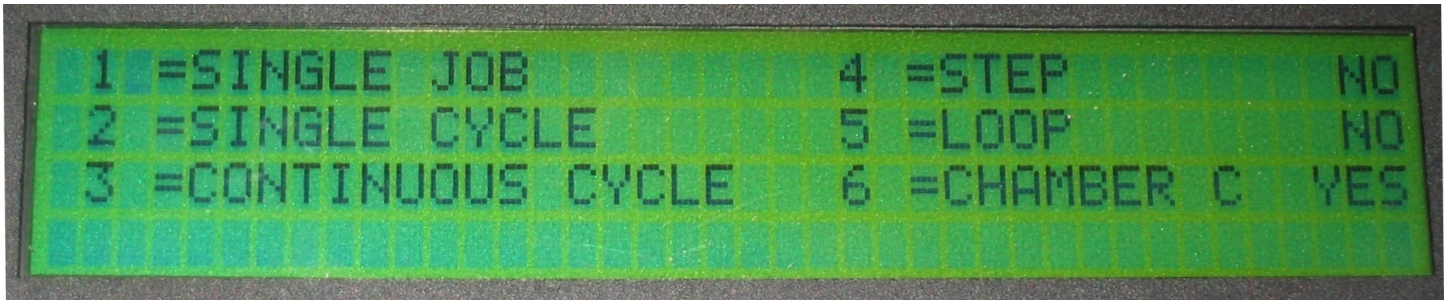
SINGLE CYCLE

This mode allows Individual JOBS or a group of JOBS to be executed in the QUEUE. When the latter is selected the bandsaw will execute all the JOBS in the QUEUE one by one, stopping after each finished JOB and then wait for the operator to manually start the next JOB in QUEUE. This feature prevents material from different JOBS being mixed together in one output bin.

Once the cycle is complete the blade will switch off. The following steps will outline how to execute the SINGLE CYCLE mode.

- Load material and close FIXED VISE
- Set the HEAD UP LIMIT and HEAD DOWN LIMIT. If the limits have been previously set then it is not necessary to re-enter the limits.
- Select AUTO MODE. If the LCD does not display on the 1st line AUTOMATIC: SING.C. then follow the steps below:

1. Depress RUN/PROG button
2. Depress #4 to select CUTTING MODE



3. Depress #2 to select SINGLE CYCLE ensure #4 STEP = NO and #5 LOOP =NO
4. Depress RUN/PROG button

5. Depress #2 (QUEUE) and then Depress #1 to select QUEUE =<100 to go into QUEUE screen.
6. Program the QUEUE with the required JOB No. (See page 2.14 for detailed explanation on programming the QUEUE)
7. Depress RUN/PROG button twice.
8. Depress CLEAR. The LCD will update the screen with the new JOB No. LENGTH, QTY REQ and CUTS EXECUTED will be reset to 0 (Zero)

9. Ensure FIXED VISE is closed.

10. Select coolant type, FLOOD/MIST and then select coolant flow, COOLANT MAN or COOLANT AUTO.

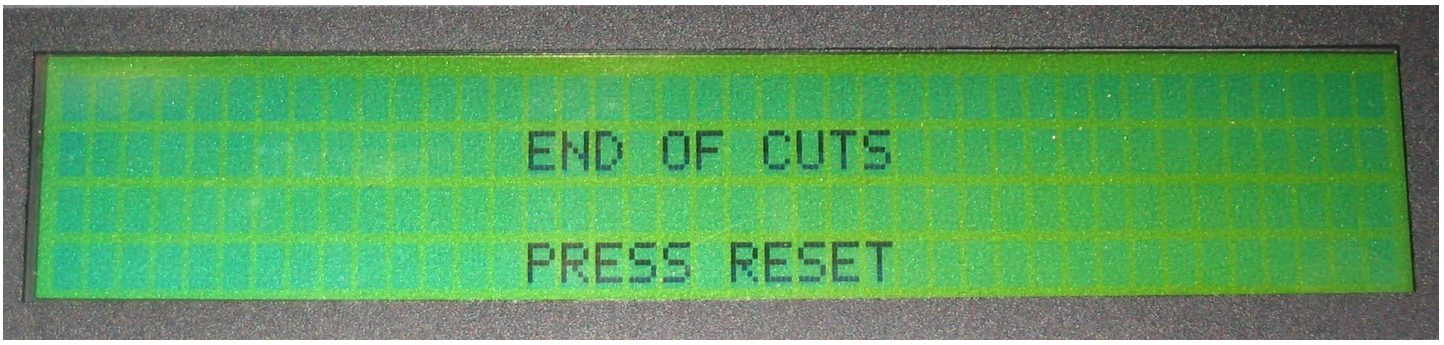
11. Depress and hold COMMAND ENABLE then depress BLADE START. Adjust the potentiometer to set the desired blade speed.

12. Depress and hold COMMAND ENABLE then depress CYCLE START.

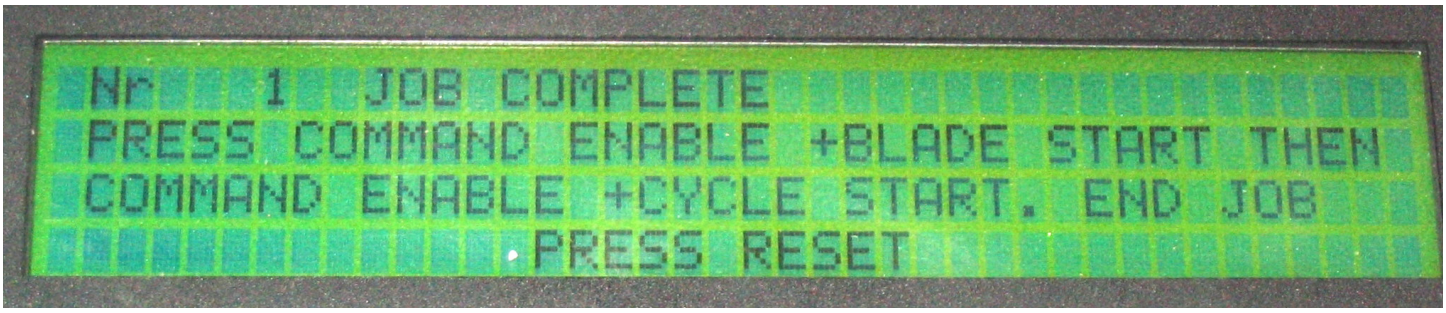
13. Use the hydraulic feed controls to adjust the feed force limit and feed rate.

• SINGLE CYCLE will commence and the cycle can be paused by depressing CYCLE PAUSE. To restart the cycle depress and hold COMMAND ENABLE then depress CYCLE START. The cycle will continue.

14. If the QUEUE is programmed with only one job then once the SINGLE CYCLE is complete a high pitched tone is continuously heard and the following is displayed.



If the QUEUE is programmed with multiple JOBS then once the SINGLE CYCLE is complete with first JOB in the QUEUE, the FIXED VISE will open and the following screen will be displayed.

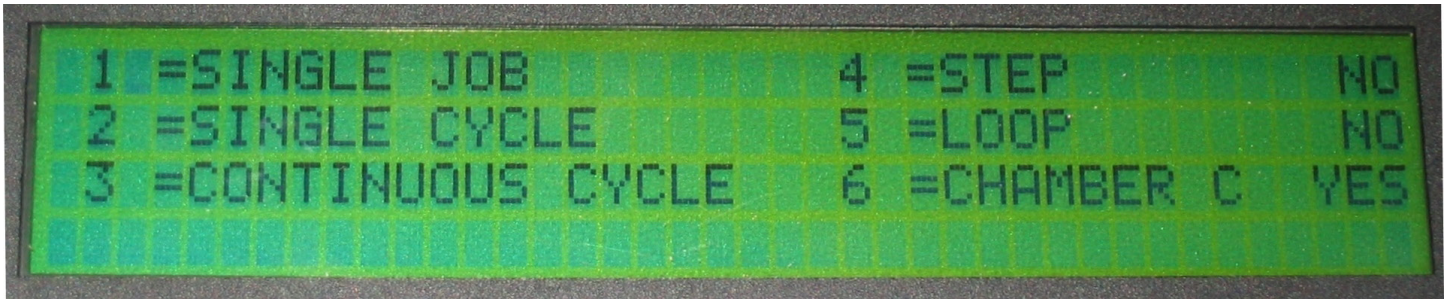


Nr 1 refers to the JOB number 1 (one). This will vary depending on how the QUEUE was programmed with JOBS.
1. Depress FIXED VISE CLOSE.
2. Follow the instructions as indicated on the LCD.
The next JOB in QUEUE will be executed and when the JOB is complete the above screen will be displayed. Once all the JOBS in the QUEUE are complete the screen will indicate END OF CUTS. PRESS RESET

CONTINUOUS CYCLE. This mode allows Individual JOBS or a group of JOBS to be executed in the QUEUE without waiting for further commands from the operator. Once the cycle is complete the blade will switch off. The following steps will outline how to execute the CONTINUOUS CYCLE mode.

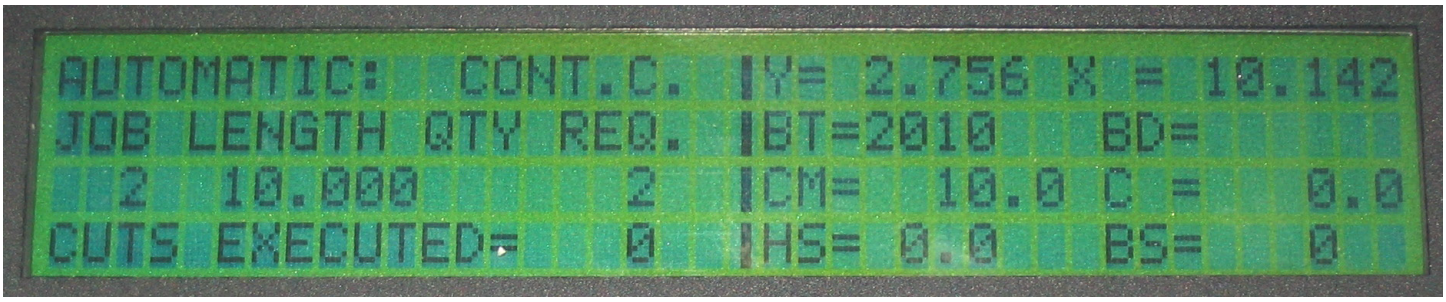
- Load material and close FIXED VISE
- Set the HEAD UP LIMIT and HEAD DOWN LIMIT. If the limits have been previously set then it is not necessary to re-enter the limits.
- Select AUTO MODE. If the LCD does not display on the 1st line AUTOMATIC: CONT.C. then follow the steps below:

1. Depress RUN/PROG button
2. Depress #4 to select CUTTING MODE



3. Depress #3 to select CONTINUOUS CYCLE ensure #4 STEP = NO and #5 LOOP =NO
4. Depress RUN/PROG button

5. Depress #2 (QUEUE) and then Depress #1 to select QUEUE =<100 to go into QUEUE screen.
6. Program the QUEUE with the required JOB No. (See page 2.14 for detailed explanation on programming the QUEUE)
7. Depress RUN/PROG button twice.
8. Depress CLEAR. The LCD will update the screen with the new JOB No. LENGTH, QTY REQ and CUTS EXECUTED will be reset to 0 (Zero)



10. Select coolant type, FLOOD/MIST and then select coolant flow, COOLANT MAN or COOLANT AUTO.

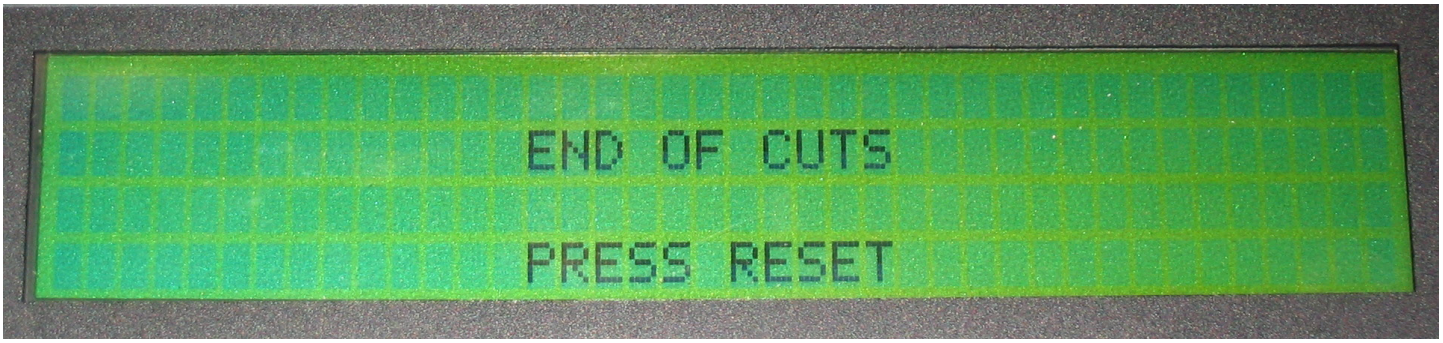
11. Depress and hold COMMAND ENABLE then depress BLADE START. Adjust the potentiometer to set the desired blade speed.

12. Depress and hold COMMAND ENABLE then depress CYCLE START.

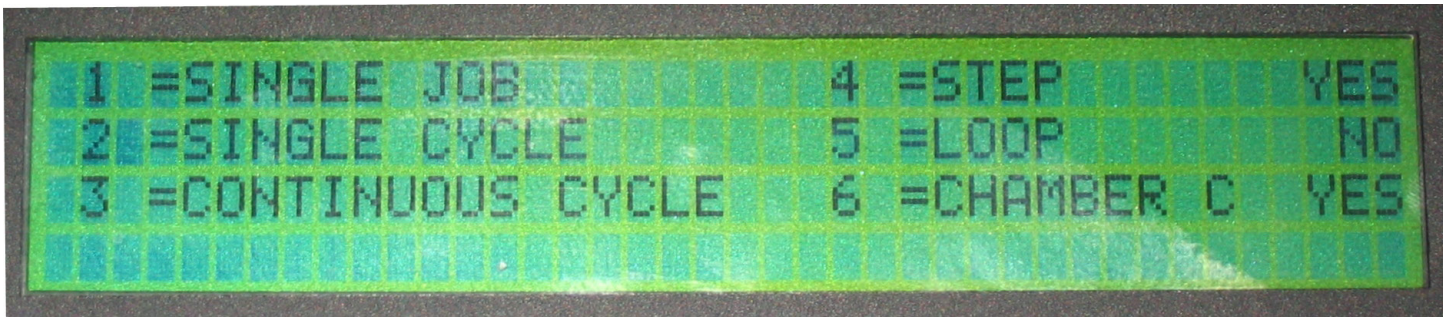
13. Use the hydraulic feed controls to adjust the feed force limit and feed rate.

• CONTINUOUS CYCLE will commence and the cycle can be paused by depressing CYCLE PAUSE. To restart the cycle depress and hold COMMAND ENABLE then depress CYCLE START. The cycle will continue.

14. Once the CONTINUOUS CYCLE is complete a high pitched tone is continuously heard and the following is displayed.



STEP



If the STEP is set to YES (see page 2.16) the 1st line on the LCD will display: AUTOMATIC: STEP and for each JOB once a cut is made the following will occur:
1. Fixed vise will open.
2. Head will move up.
3. Blade will stop and the LCD will display:

4. Depress FIXED VISE CLOSE and then follow the instructions on the LCD to continue cutting.
5. This sequence will continue until the QTY REQ for the JOB is reached and the LCD will show: END OF CUTS, PRESS RESET.
7. If the QUEUE is programmed with a number of JOBS then once the QTY REQ for the JOB is reached, the LCD will display: (See next page)

Nr 1 refers to the JOB number 1 (one). This will vary depending on how the QUEUE was programmed with JOBS.
1. Depress FIXED VISE CLOSE.
2. Follow the instructions as indicated on the LCD.

The next JOB in QUEUE will be executed and when the JOB is complete the above screen will be displayed. Once all the JOBS in the QUEUE are complete the screen will indicate END OF CUTS. PRESS RESET

BLADE CHANGE MODE (BCM)

When the BCM switch is turned to the RIGHT position the machine will enter BLADE CHANGE MODE.

1. The Machine will shut down.
2. The LCD will display:

3. Depress RESET.
4. All functions with the exception of HEAD UP & HEAD DOWN will be INACTIVE.
5. Open the BLADE GUARD DOOR. (HEAD position may require movement using HEAD UP or HEAD DOWN for this to occur)
6. Release Blade Tension until blade can be removed from the wheels.
7. Install new blade .
8. Tension the blade to the correct setting (See page 2.1)
9. Close BLADE GUARD DOOR.
10. Turn BCM switch to the LEFT position.
11. Follow instructions on LCD.

SECTION 3 – MAINTENANCE & TROUBLESHOOTING

SAFETY DURING MAINTENANCE AND TROUBLESHOOTING

“Lock-out”, or “Lock-out Tag-out” are terms that refer to procedures taken to prevent the unexpected start-up, or other release of energy, by a machine, whenever anyone is required to remove or bypass safety guards or devices, or whenever anyone is required to place part of his body in a hazard area.
In almost all jurisdictions, it is required that owners of industrial equipment establish and post lock-out procedures. Know and use the lock-out procedures of your company or organization. In the absence, of such posted procedures, use the following procedure.

LOCK OUT PROCEDURE

Whenever work is to be performed on a machine, which requires removal or bypassing of safety guards or devices, or the placement of part of anyone’s body in a hazard area, the following steps shall be taken:

1. Operator shuts down the machine.
2. The supervisor in charge of the machine must be informed of the intention to Lock-out the machine.
3. The FEEDER power which supplies power to the machine and which is connected to the machine via the Power Junction Box (see picture below) must be turned OFF and locked in the OFF (0) position by means of a padlock. The key for this padlock must be kept by the person performing the work on the machine. If more than one person is performing work on the machine, then a multiple lock hasp shall be used, and each person shall apply his or her own lock to the hasp.
4. The Machine Power Disconnect Switch must be turned OFF, and locked in the OFF (0) position by means of a padlock. The key for this padlock must be kept by the person performing the work on the machine. If more than one person is performing work on the machine, then a multiple lock hasp shall be used, and each person shall apply his or her own lock to the hasp.
5. Prior to starting any work on the locked-out machine, the supervisor shall attempt to start the machine to ensure that the lock-out device provides adequate protection. Operating controls must be reset to the “OFF” position after this test.
6. Work on the locked-out machine may now proceed.

S20A Machine disconnect switch used for safety lockout purposes.

Special door lock.

Power Junction Box.

Machine Power Disconnect located on the side of the machine control box.

1. Ensure switch is in the OFF position.
2. Close the the disconnect switch cover.
3. Install padlock and lock it.

RESTORING MACHINE TO USE

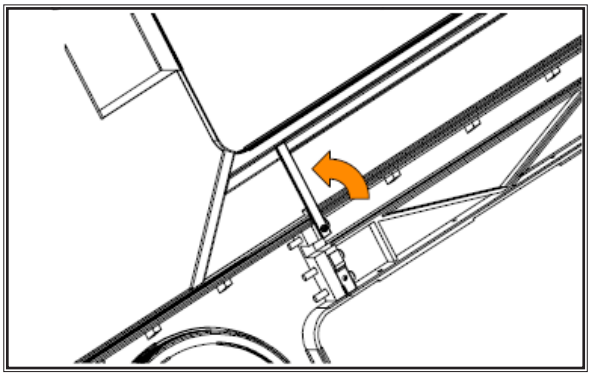
After completion of all repairs or maintenance to the locked-out machine, it shall be restored to use as follows:

The person(s) who performed the work shall verify that all areas around the machine are safe, before the machine is re-energized. No-one shall be permitted in un-safe areas around the machine. All guards and covers shall be properly installed.
Each lock-out padlock shall be removed by the person who applied it.
After the lock-out padlocks are removed, and before the machine is started, the supervisor and all other employees who use the machine, shall be informed that the lock-out has been removed. After notification is made, the machine may be re-started.

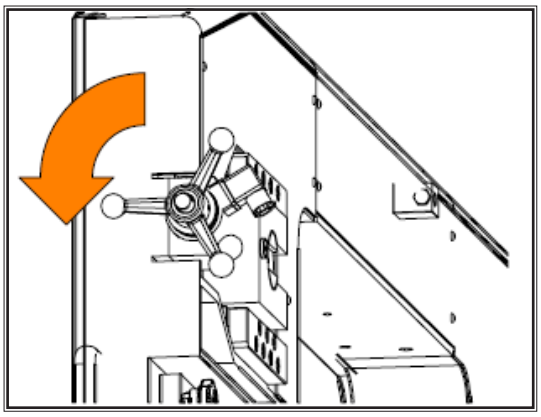
BLADE CHANGING PROCEDURE

NOTE: Wear gloves for protection from the sharp blade.

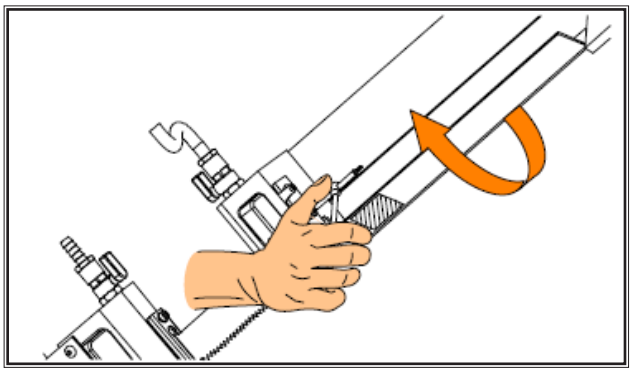
1. Open the Wheels door by unscrewing the two knobs.



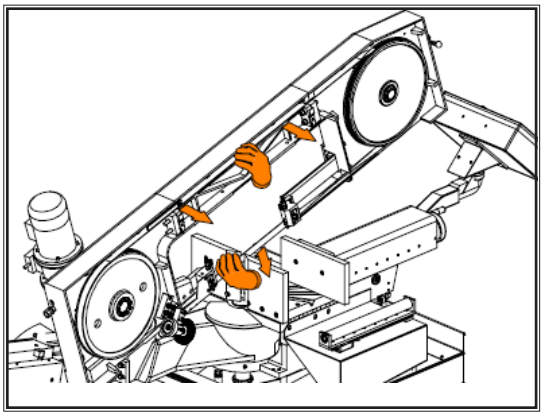
2. Loosen the Blade Tensioner by turning counter clockwise.



3. Open the blade guard at idler guide arm by undoing the mounting screws and removing it as illustrated below.



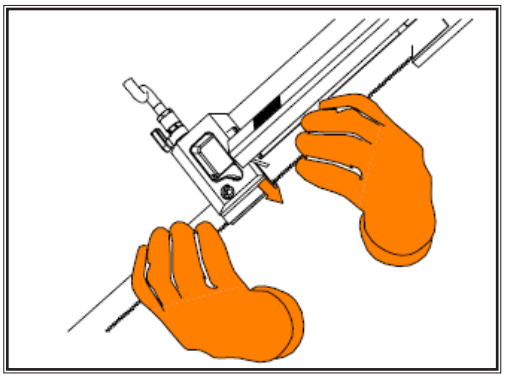
4. Remove the worn blade by sliding it off the wheels and out off both guide blocks



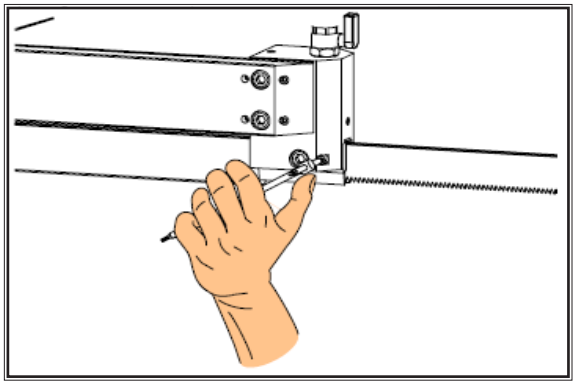
5. Your new blade will be in a coil. While wearing gloves, hold the blade away from yourself; twist the blade to uncoil it. Do not let the blade teeth bounce on the concrete floor as some damage may be caused.

6. Place the new blade in the carbide guides and then slide the blade over the wheels. The teeth should be pointing towards the drive side as they pass through the carbide guides.

7. Make sure there is a small amount of play between the blade and guide carbides. The blade band should be snug but able to move freely up and down.



8. If the amount of play is not sufficient for the blade to run smoothly, adjust the locking torque of the screws with an Allen key.



9. With the blade in place, turn the tensioner handle clockwise until Bade Tension Display shows required value. Recommended blade tension is between 1000 - 1200 kg. (2200 - 2650 lbs) If blade is under tensioned the blade motor will not start.

10. Replace the blade cover and close wheels door.

11. Jog the blade a few rotations to check that the blade is not moving in or out on the blade wheels. As the blade tracking will stay fairly constant, it should be checked occasionally by measuring the gap between the back of the blade and wheel flange. The gap should measure .040-.080”. If the tracking requires adjustment, follow the instructions below.

BLADE TRACKING ADJUSTMENT

First, inspect the blade wheels for wear or damage and repair as required, Blade tracking adjustment should always begin at the wheel where the tracking is farthest out of specification. Using the instructions below, adjust the worst wheel, jog the blade and recheck both wheels. Repeat this process until both wheels are within specification.

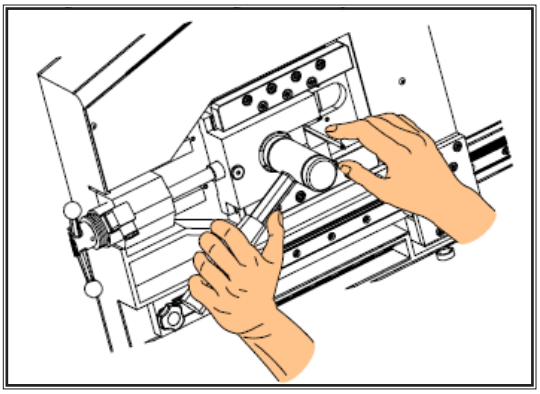
Idler Wheel Adjustment

The Idler Wheel must be adjusted so that it is aligned with the drive wheel. The purpose of the adjustment is to ensure that the back of the blade remains about .040-.080” away from the wheel flange during rotation.

1. Release blade tension.

2. Open wheel cover.

3. Loosen the screw and using a mallet tap the shaft in or out.



4. Restore the machine and run blade for few wheel rotations.

5. Check the distance between the blade and wheels flange.

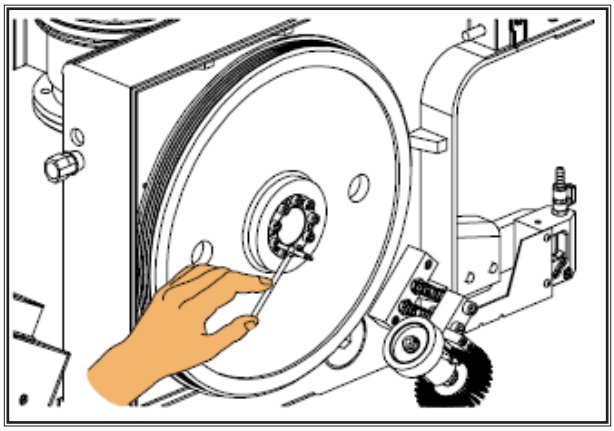
6. If necessary repeat above steps until proper gap is achieved.

DRIVE WHEEL ADJUSTMENT

The Drive Wheel adjustment is closely linked to adjustment of the Idler Wheel. The purpose of the adjustment is to ensure that the back of the blade remains about .040-.080” away from the wheel flange during rotation.

1. Open wheel cover.

2. Loosen all the screws on the wheel and manually move it in or out until the blade is correctly distanced from the wheel flange.



3. Restore the machine and run blade for few wheel rotations.

4. Check the distance between the blade and wheels flange.

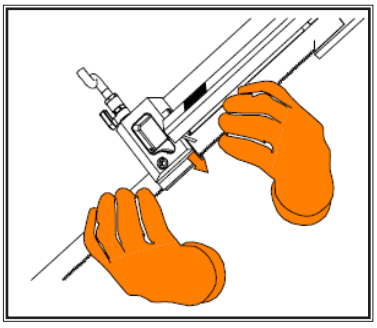
5. If necessary repeat steps until proper gap is achieved.

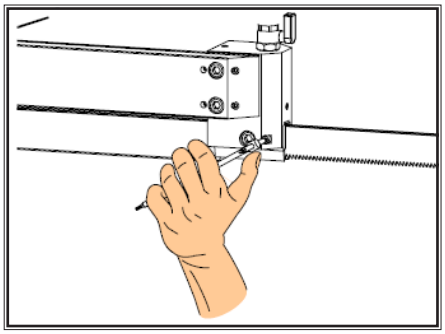
BLADE GUIDE ADJUSTMENT

At the bottom of the guide arms are the blade guide block assemblies with carbide pads. These assemblies will need to be adjusted occasionally as the carbide pads become worn, or if a blade with different thickness is used. To adjust properly, follow this simple procedure.

1. Make sure there is a small amount of play between the blade and guide carbides. The blade band should be snug but able to move freely up and down.

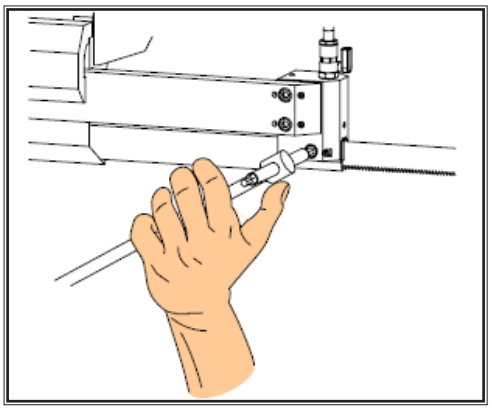
2. If the amount of play is not sufficient for the blade to run smoothly, adjust the locking torque of the screws with an Allen key.

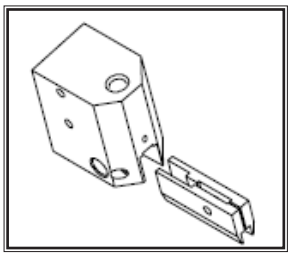


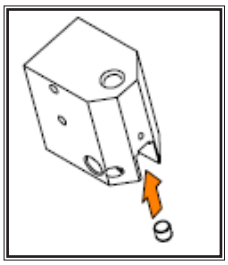


CARBIDE REPLACEMENT

The blade guide blocks are equipped with one top carbide and two side carbide inserts each. The working life of carbide guides is practically the same as that of the machine itself. However, if required they can be replaced by removing the plate fixing screw as shown.



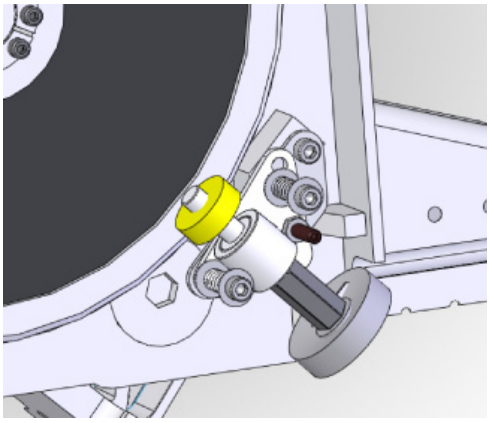




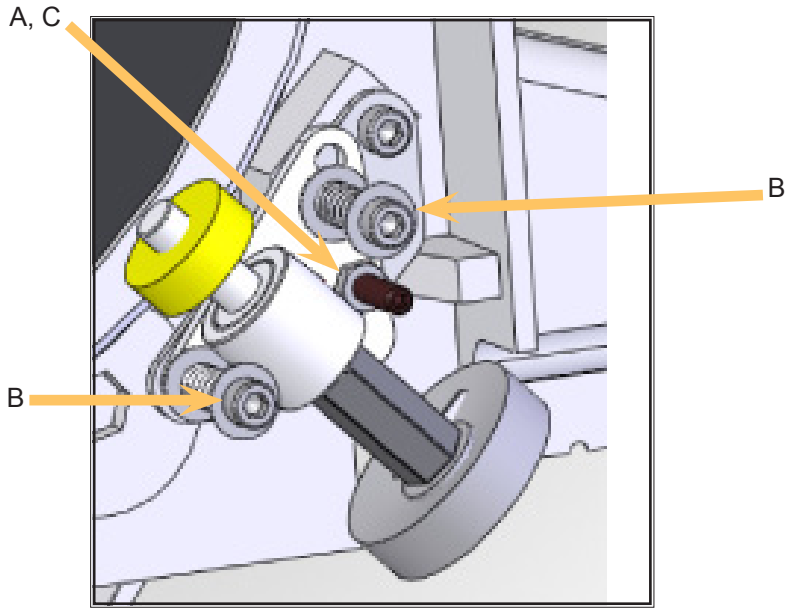
The top carbide is press fit into the guide block. If the top carbide needs replacement the whole guide block has to be changed.

BLADE BRUSH ADJUSTMENT

The machine leaves the factory with the blade brush adjusted for maximum life of the brush. This setting places the ends of the blade brush wires so as to contact the blade at the bottom of the blade gullets. The plastic drive wheel that is driven by the drive wheel face should be held against the wheel face with the minimum force that is necessary to ensure brush rotation. As the blade brush wears it is necessary to periodically adjust it closer to the blade or if a new brush is installed, further away from the blade.



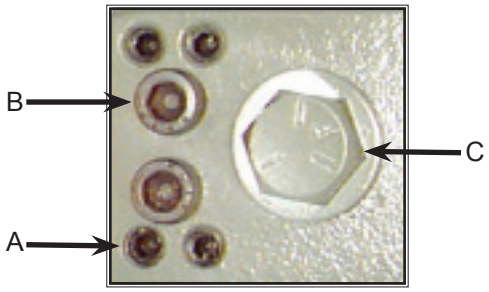
As shown, there are two springs on socket head screws holding the brush assembly against the blade. There is also an adjusting stop socket set screw **A** with a hex nut **C** on it. This adjusting set screw works as a stop determining the brush position in respect to the blade. To move the brush closer to the blade loosen the hex nut and turn the setscrew **A** counter clockwise with an Allen key. Then rotate the brush stem towards the blade and turn the spring loaded socket head bolts **B** in to maintain proper spring preload. To move the brush away from the blade loosen the spring loaded socket bolts **B** respectively. Then rotate the brush stem away from the blade and turn setscrew **A** clockwise to lock the brush in position. Lock the hex nut to prevent the set screw from loosening.



ANGLE BRAKE ADJUSTMENT

The clamping force on the swivel brake can be adjusted to ensure that the Head is held securely and does not move during cutting. The brake handle should be adjusted so that it does not “bottom out” or hit its movement limit, yet holds the head securely.

ANGLE BRAKE ADJUSTMENT PROCEDURE



STEP 1 Loosen locking cap screws “B” with a 6mm Allen key.

STEP 2 Tighten all 4 set screws “A” until snug with a 4mm Allen key

STEP 3 Back out the “A” screws ¼ of a turn

STEP 4 Tighten the locking cap screws “B”

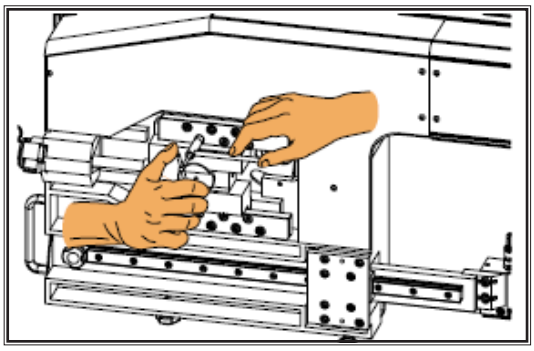
STEP 5 Swing the head to 45° and back to ensure that the head moves freely and does not bind on the pivot surfaces. Continue to step 6 if necessary.

STEP 6 Adjust the clamping force bolt “C” with a 19mm wrench. If not tightened enough, the locking handle will “bottom out” and not hold the head firmly

BLADE TENSION SLIDE ADJUSTMENT

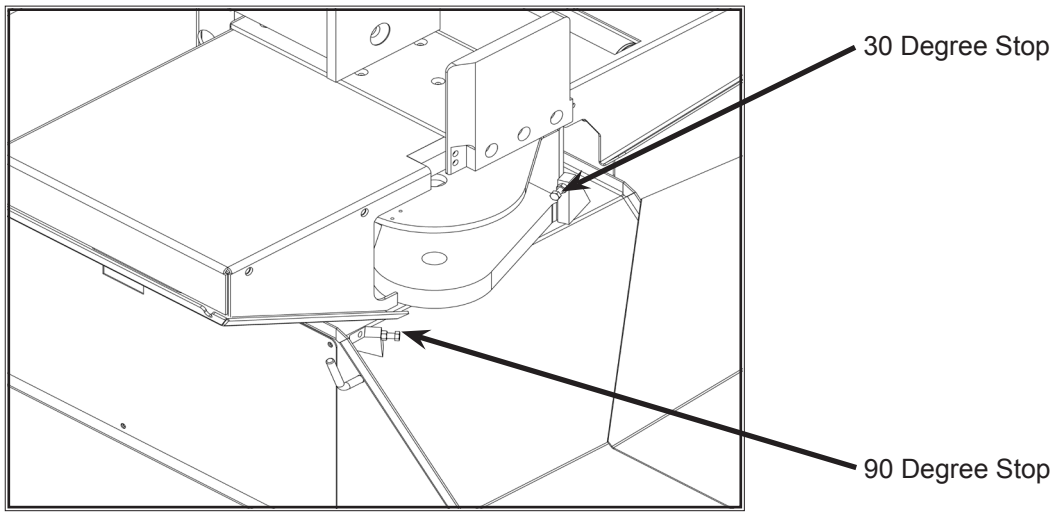
To reduce the play, which may develop over time between the blade tensioner slide and slide gibs, adjust the screws between the gibs and slide as follows:

1. Remove the head front cover.
2. Undo blade tension.
3. Remove blade from wheels.
4. Remove the pin connecting tensioner actuator with slider.
5. Move the slider by hand back and forth to locate any friction or excessive play.
6. Loosen the nuts, using tubular nut driver while holding the set screws firm with Allen key.
7. Tighten the set screws to take up any play or loosen them up in case of excessive friction.
8. Retighten the nuts with tubular nut drive.



90 AND 30 DEGREE STOP ADJUSTMENT

There are two adjustable mechanical stops for 90 degree and 30 degree head swing position that can be recalibrated if required.



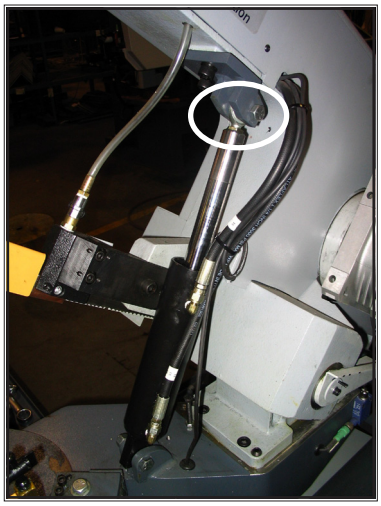
LUBRICATION

The S20A was designed to minimize the maintenance requirements. Moving assemblies and contact faces need lubrication on a regular schedule whether they are in heavy use or not. The lubrication requirements of the S20A are primarily the saw pivot points and shuttle assembly which are equipped with grease fittings, and metal to metal surfaces that require lubrication to prevent wear and seizure.

It is recommended to use LPS ThermaPex Hi-Load bearing Grease manufactured by LPS Labratories or equivalent, for lubrication of the shuttle assembly. For other points of lubrication general purpose grease is sufficient.

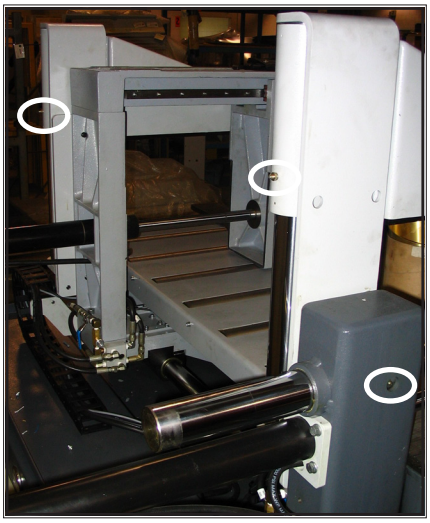
The lubricant should be applied as frequently as required. Main lubrication points are indicated on the following pictures.

Swivel Pivot

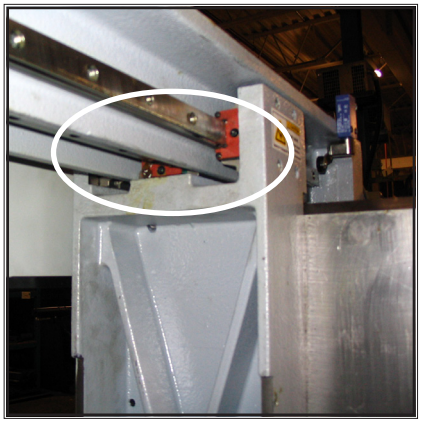


Head Cylinder Rod End

Runner Block
Movable Guide Arm



Vise/Bundling



Runner Block
Shuttle Jaw (3)

GEARBOX LUBRICATION

The Bonfignoli W86 gearbox used on the S20A is supplied with 0.64 litres (0.17 US gallons) of Shell Tivella S320 synthetic oil. This oil has an ISO Viscosity Grade of 320 that is optimum for ambient temperatures from 20-70 Deg C (70-140 Deg F). The W86 was designed to be a sealed unit, so no oil change should be necessary. However, if the oil needs to be changed, Bonfiglioli recommends that, should a lubricant other than the approved Shell type be used, this be equivalent viscosity wise and of the synthetic type. The lubricant must also have the necessary EP and anti-foaming additives.

1. HYDRAULIC OIL- Machine hydraulic reservoir is filled with mineral oil Texaco Rando HD46. In case of changing the brand, hydraulic system should be drained and thoroughly flashed. Following is a list of recommended replacement oils:

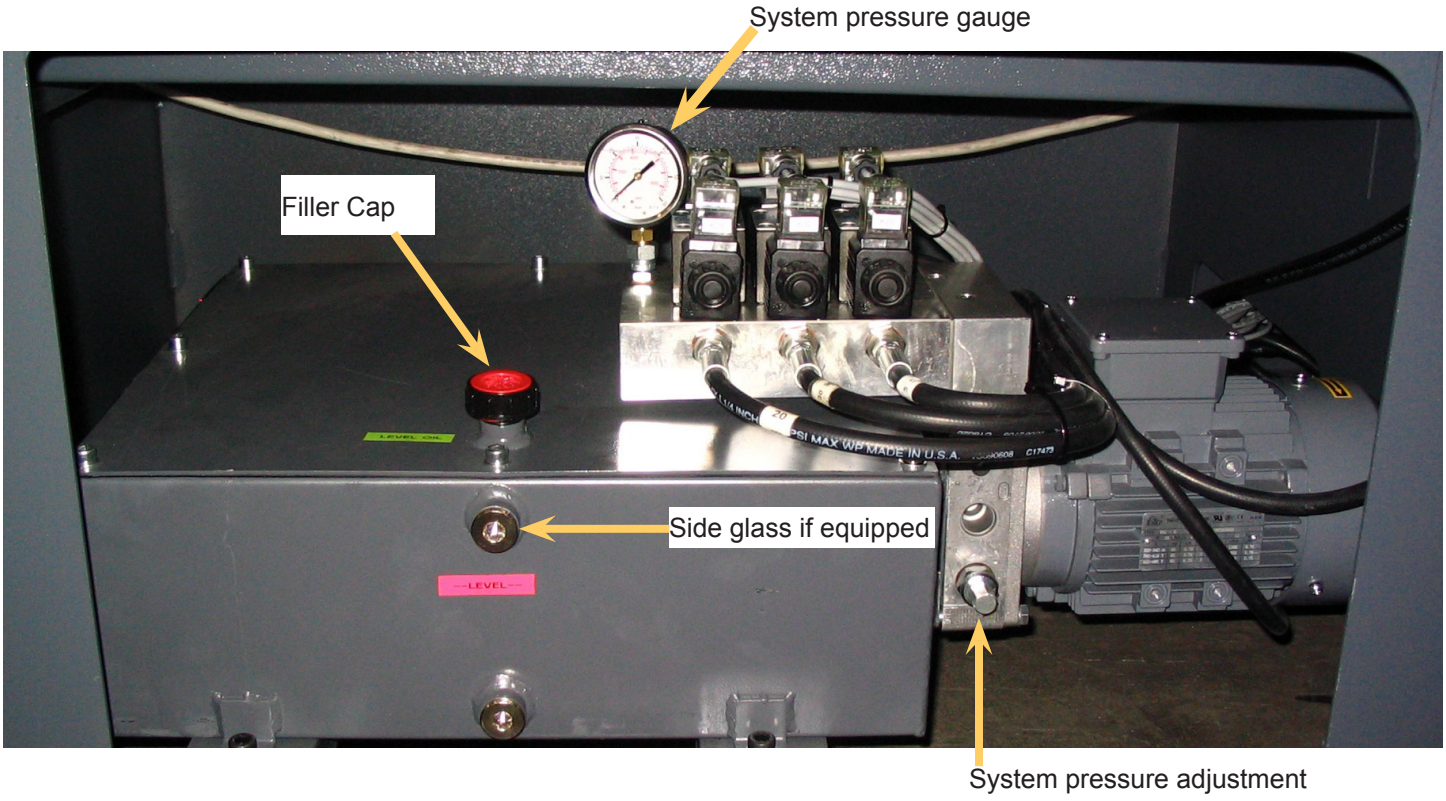
- Texaco Rando HD 46
- CHEVRON ECO Hydraulic oil AW ISO 46
- MOBIL DTE 25
- ESSO NUTO H46
- SHELL TELLUS OIL 46

2. HYDRAULIC OIL LEVEL –

- Units equipped with side Glass: Oil level should be maintained in the middle of the side glass window.
- Units without side glass: Filler cap is equipped with dip stick for checking oil level. Oil level should be maintained so the oil leaves a wet trace approximately half way on the dip stick.

3. HYDAULIC OIL CHANGE - It is recommended to change oil after every 2000 hours of operation but at least once a year.

4. HYDRAULIC PRESSURE - Hydraulic pressure is factory set to 30 bar (435PSI) and should not require any further attention. System pressure adjustment is located directly on the hydraulic pump.



CLEANLINESS

The heavy-duty design should endure heavy operating conditions and provide the customer with flawless machine performance. To extend good performance some care is required especially where cleanliness is concerned.
The following areas should be kept clean:

- Control console free of dirt and grease
- Door charts free of dirt and grease
- Wheel boxes free of chips
- Blade guides free of chips
- Out-feed tables free of chips
- A large chip build-up should be avoided in the base of the saw

NOTE: All parts must be cleaned before any repair service may be performed on them.

S20A PARAMETER DEFINITIONS		
LCD Page #	**Description**	**Definition**
1	LANGUAGE	Allows language selection which is to be viewed on the LCD.
2	MACHINE TYPE	Allows machine model selection.
3	UNIT OF MEASURE	Allows selection between imperial and metric units.
5	MIST COOLANT	Allows MIST selection. Change NO to YES on the LCD for MIST.
	CHIP CONVEYOR	Allows chip conveyor (CC) selection. Change No to YES on the LCD for CC.
6	RHL/FHL OUTPUT	Head backward / Head forward outputs enabled. Allows for control board to supply output signal for respective head position.
	BLADE SPEED PROXIMITY	Allows selection of functioning proximity switch.
7	INVERTER	Inverter blade motor drive.
8	BLADE TENSIONER	Set to YES if electric blade tension is installed.
	BLADE CHAMBER	To activate blade chamber, change No to YES on the LCD.
10	BLADE DEVIATION	To activate blade deviation, change No to YES on the LCD (OPTION)
	HEAD FAST APPROACH SENSOR	Set to YES if head fast approach sensor is installed.
16	SHUTTLE HOME (FRW/REV 1/0)	Controls position of shuttle during the cut. Values are: a. FRW (At the shuttle home position) = 1 b. REV (At the rear of the shuttle) = 0
	FIXED VISE OPENING (NEV./FTI 1/0)	
	BLADE MOTOR OFF (NEV./RHL/FHL 2/1/0)	Controls when the blade motor is to stop. Values are: a. NEV (Never) = 2 b. RHL (Blade to stop when head is at the BACK limit) = 1 c. FHL (Blade to stop when the head is at the FWD limit) = 0.
17	MINIMUM BLADE TENSION [lbs]	Allows minimum blade tension to be set.
	MAXIMUM BLADE TENSION [lbs]	Allows maximum blade tension to be set.
20	LASER/LAMP OFF TIME	If option is installed, Laser will switch off once preset time is reached.
	LCD BACKLIGHT OFF TIME	LCD backlight will dim, once preset time is reached.
24	SCREW PITCH	Size of ball screw.
	STEP/REV.(800/400/200)	Steps per revolution of the stepper motor.
25	MAX. LENGTH	Maximum shuttle length.
	BEYOND ZERO	Distance shuttle is required to go past the HOME POSITION.
26	LENGTH	Allows data to be entered to compensate for ball screw error.
	OFFSET	Allows data to be entered to compensate for ball screw error.
27	RAMP TIME	Acceleration and de-acceleration time of the shuttle.
	MAX. CURRENT	Maximum stepper motor current.
28	DRIFT FREQUENCY	
	ZEROING FREQUENCY	Shuttle Home speed.
29	MANUAL FREQUENCY	Shuttle speed in manual mode.
30	MAXIMUM REVERSE FREQUENCY	Maximum shuttle reverse speed.
	MAXIMUM FORWARD FREQUENCY	Maximum shuttle forward speed.
32	MAX. CURRENT (Blade motor driver)	F.L.A. value depicted on the nameplate of the motor.

S20A PARAMETER DEFINITIONS		
LCD Page #	**Description**	**Definition**
45	REVERSE HEAD LIMIT	Maximum limit of head up position.
	HEAD POSITION	Value of current head position.
	FORWARD HEAD LIMIT	Maximum limit of head down position.
46	SOFTWARE REVISION	Version of software.
	Tt (blade total run time)	Total time the blade motor has accumulated.

MEP31 AND MEP32 CONTROLLER: TROUBLESHOOTING

PROBLEM #1 – (For automatic models with a shuttle)

MEP32 CONTROLLER is not measuring lengths / length inaccuracies.

POSSIBLE CAUSES:

1. Coupling loose between screw and stepper motor.
2. Bad stepper motor drive
3. Faulty unit (not repairable in the field) Contact Hyd-Mech service department.
4. Improper Programmed Information:
   - existing parameter(s) incorrect
   - incorrect blade kerf

GENERAL RULES – Normally, three types of length inaccuracies may occur

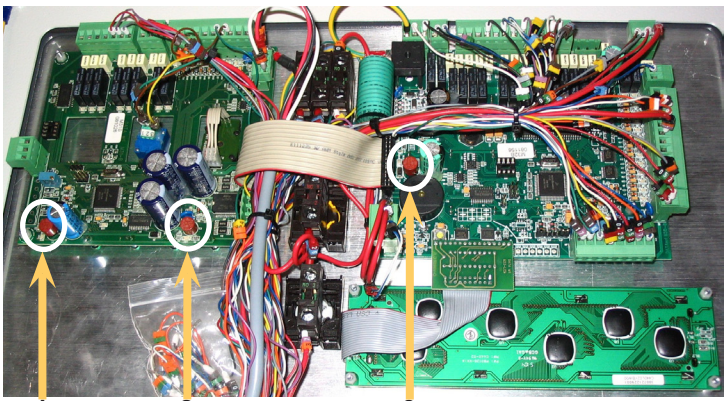
1. Inconsistent – lengths cut are not consistent, error changes. It doesn't matter how long the part required is the error is never the same. Cause – most likely a defective electrical, hydraulic or mechanical component.
2. Consistent – lengths cut are consistent and the error is also consistent. The error always stays the same regardless of part length. Cause – kerf value.
3. Linear – lengths cut are consistent but the error increases as the part length increases. The longer the part the greater the error. Cause –incorrect LENGTH and OFFSET values entered in paremeter 26.

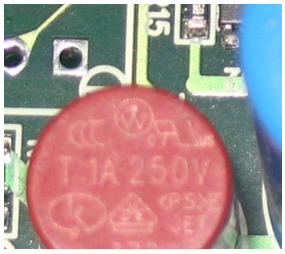
DIAGNOSIS:
Check and record existing parameter. Also check for proper blade kerf. By making a cut partway into a piece of material and measuring the width of the cut, the operator can verify blade kerf.

FUSES

MEP31 controller has 2 fuses installed: F1 = 1A 250V and F2 = 2.5A 250V. When the fuse is blown, a lit LED beside the corresponding fuse will be visible.

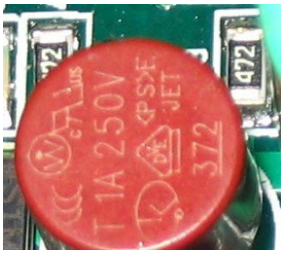
MEP32 controller has 1 fuse installed: F1 = 1A 250V. When the fuse is blown, a lit LED beside F1 fuse will be visible.





1

2



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PROBLEM #2 – NO DISPLAY

POSSIBLE CAUSES:

1. No power to the MEP 31 and MEP 32 CONTROLLER.
2. MEP CONTROLLER failure.
3. 24VDC power supply faulty or short present on the output.

DIAGNOSIS:

1. Check fuses on the MEP31 & MEP32 CONTROLLER.
2. Check power supply input voltage and output voltage.

PROBLEM #5 – NO BLADE SPEED DISPLAY

POSSIBLE CAUSES:

1. Fault at proximity sensor
    - Bad sensor, misadjusted sensor (gap should be approx. 0.015”)
    - Contamination on the end of the sensor
    - Check BLADE SPEED PROXIMITY is set to YES in the parameters.

2. Fault at the MEP32 CONTROLLER
    - Bad connection of sensor wiring
    - Faulty MEP32 CONTROLLER.

DIAGNOSIS:

Check for LED light on the sensor – light ON indicates proximity sensor power connections are correct and sensor is activated. Problem could be with sensor, signal wire to the MEP CONTROLLER. With blade running, proximity LED should pulse. Likewise, the MEP CONTROLLER LED for proxy input should be pulsing. If both LEDs are pulsing with the blade running, the CONTROLLER is the problem. If the sensor LED is pulsing but the input at the MEP CONTROLLER is not; there is a problem between the sensor and the MEP CONTROLLER INPUT. If the LED on the sensor is not on, the problem is with the sensor wiring or the sensor is at fault or sensor adjustment is required.

MACHINE ALARMS AND TROUBLESHOOTING		
LCD DISPLAY	**DESCRIPTION**	**DIAGNOSIS**
EMERGENCY EMERGENCY BUTTON PRESSED PRESS RESET	Displayed when the EMERGENCY STOP push button is depressed.	1.Release EMERGENCY STOP 2. PRESS RESET
PRESS RESET	Displayed at the initialization phase after MACHINE START is depressed.	PRESS RESET
END OF CUTS PRESS RESET	Displayed when the machine has completed the number of programmed cuts.	PRESS RESET
ALARM OUT OF STOCK PRESS RESET	Displayed when the machine is out of stock or the material cannot be fed anymore.	Load new material to continue the interrupted machine cycle.
TWO OR MORE COMMANDS PRESS RESET	Displayed when two keys are simultaneously depressed on the HMI.	NONE
COMMAND DISABLED CLOSE FIXED VICE PRESS RESET	Displayed when starting the blade or cycle with the FIXED VISE OPEN	Close FIXED VISE
COMMAND DISABLED HEAD NOT AT UP LIMIT PRESS RESET	Displayed if the head is not positioned at the Head Up Limit position when the cycle is STARTED.	Move the head to the HEAD UP LIMIT position before resuming the cycle.
COMMAND DISABLED AXIS X NOT ZEROED PRESS RESET	Displayed when a shuttle movement FWD or REV is activated or a job cycle is started automatically without having initialized the shuttle home sequence.	Re-start the machine & follow LCD instructions.
COMMAND DISABLED OPEN AT LEAST ONE VICE PRESS RESET	Displayed when trying to move the shuttle with BOTH VISES in the CLOSED position.	Open one or both VISES
BLADE GUARD OPEN PRESS RESET	Displayed when the door interlock safety switch is activated by: 1. Changing the blade. 2. The idler/drive door is open. 3. Defective switch	Close idler/drive door. Check safety switch.
COMMAND DISABLED START BLADE FOR TRIM CUT PRESS RESET	Displayed when CYCLE START is depressed before the BLADE is started.	Start the blade before depressing CYCLE START

MACHINE ALARMS AND TROUBLESHOOTING		
LCD DISPLAY	**DESCRIPTION**	**DIAGNOSIS**
EMERGENCY FROM BLADE TENSION PRESS RESET	Displayed when a mechanical or electrical/electronic fault is affecting the blade tension unit.	Check: 1. Blade Tension 2. Operation of the tensioning slider. 3. The blade is correctly positioned on both wheels. 4. The STRAIN GAUGE input on the IUV card. 5. Blade condition 6. Wiring connections.
EMERGENCY HEAD JAMMED PRESS RESET	Displayed when the head cannot move upwards or downwards due to a mechanical or hydraulic obstruction.	1. Check & remove any mechanical obstacles. 2. Check hydraulic powerpack, hoses & solenoid valves. 3. Turn OFF main power, wait 30 seconds and restart.
EMERGENCY BLADE TENSION OUT OF RANGE PRESS RESET	Blade Tension outside of the specified range	1. Adjust blade tension in the range of: 1000 - 1200 kg 2200 - 2650 lbs

SECTION 4 - ELECTRICAL

ELECTRICAL SCHEMATICS: SEE PDF ON ATTACHED CD

SECTION 5 - HYDRAULIC

HYDRAULIC SCHEMATICS & PLUMBING DIAGRAMS: SEE PDF ON ATTACHED CD

SECTION 6 - MECHANICAL ASSEMBLIES

MECHANICAL ASSEMBLY DRAWINGS & PARTS LIST: SEE PDF ON ATTACHED CD

SECTION 7 - OPTIONS

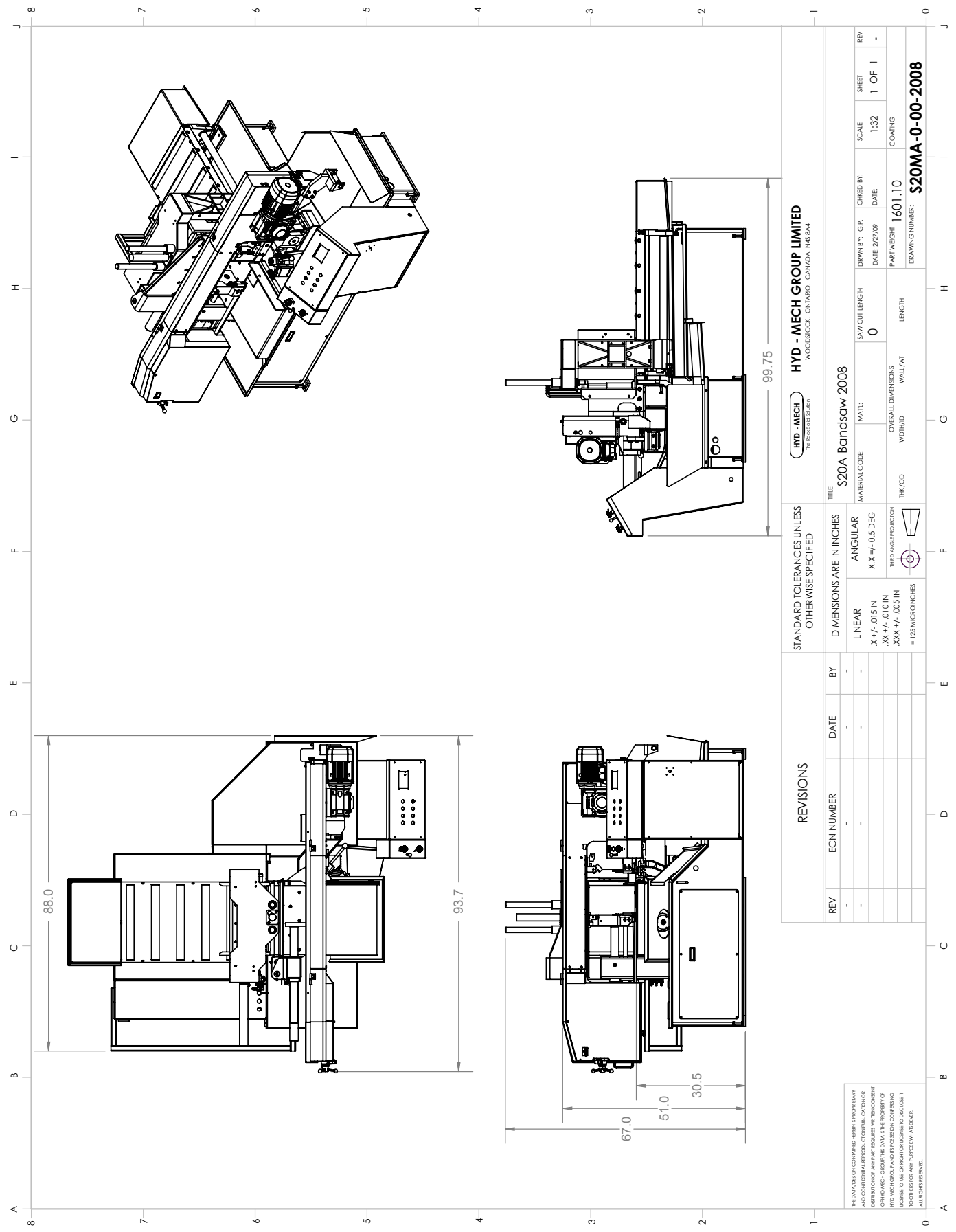
OPTIONAL ASSEMBLY DRAWINGS: SEE PDF ON ATTACHED CD

SECTION 8 - SPECIFICATIONS

S20A BANDSAW SPECIFICATION LIST

Capacity - 90º	Rectangular	13” high x 18” wide
	Round	13” dia
Capacity - 45º	Rectangular	13” high x 10.9” wide
	Round	12” dia
Capacity - 60º	Rectangular	13” high x 7.3” wide
	Round	8” dia
Blade	Length	14’10”
	Width	1”
	Thickness	.035”
Blade Speed	75-350 SFM (VFD)	
Blade Guides	Pre Set carbide inserts	
Blade Wheel Diameter	17 3/4”	
Drive	Blade drive: 5 hp	
	Hydraulic drive: 1 hp	
Hydraulic System	440 psi	
Hydraulic Tank Capacity	4.75 U.S. Gallons	
Coolant Tank	6 U.S. Gallons	
Shuttle Stroke	0-29” single stroke (Multi-indexing standard)	
Vise Control	Hydraulic	
Table Height	31”	
Machine Work Load	5000 lbs	
Machine Weight	3600 lbs	
Dimensions	89.5” Wide x 86.75” Long x 55” High	
Options	Full capacity bundling	
	Worklight	
	Variable vise pressure	
	Material stop	

S20A LAYOUT DRAWING



SECTION 9 - WARRANTY

WARRANTY

Hyd-Mech Group Limited warrants parts/components on each new S20A bandsaw to be free from failure resulting from defective material and workmanship under proper use and service for a period of two years on following the date of shipment from the factory. Hyd·Mech's sole obligation under this warranty is limited to the repair or replacement without charge, at Hyd·Mech's factory, warehouse, or approved repair shop any part or parts which Hyd·Mech's inspection shall disclose to be defective. Return freight must be prepaid by the user.

This warranty, in its entirety, does not cover maintenance items, including but not limited to lubricating grease and oils, filters, V-belts, saw blades, etc., nor any items therein which show signs of neglect, overloading, abuse, accident, inadequate maintenance, or unauthorized altering.

MOTOR, GEARBOX, PUMP, ELECTRIC COMPONENTS, VALVES, HOSES, FITTINGS, and any other items used in the manufacture of the S20A, but not originally manufactured by Hyd·Mech are subject to the original manufacturer's warranty. Hyd·Mech will provide such assistance and information as is necessary and available to facilitate the user's claim to such other manufacturer.

Liability or obligation on the part of Hyd·Mech for damages, whether general, special or for negligence and expressly including any incidental and consequential damages is hereby disclaimed. Hyd·Mech's obligation to repair or replace shall be the limit of its liability under this warranty and the sole and exclusive right and remedy of the user.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, WRITTEN OR ORAL, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

This warranty may not be changed, altered, or modified in any way except in writing by Hyd-Mech Group Limited

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