



V18APC

393401

THANK YOU,

On behalf of everyone at HYD·MECH Group Limited, we would like to thank and congratulate you on your decision to purchase a HYD·MECH bandsaw.

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

To ensure you are maximizing the power and versatility of your new HYD·MECH bandsaw, please take the time to familiarize yourself and your employees with the correct operation and maintenance procedures as outlined in this manual. Please keep this instruction manual for future reference in a known location and easily accessible to all users of the device.

HYD·MECH offers a great variety of options, components, and features for its various models. Therefore, some of the equipment described in this manual (various illustrations and drawings) may not be applicable to your particular machine.

The information and specifications provided in this manual were accurate at the time of printing. HYD·MECH reserves the right to discontinue or change specifications or design at any time without notice and without incurring any obligation.

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 that could impair safety.
- Understand and obey safety hazard labels.
- Not to wear un-restrained long hair, loose clothing or jewellery.
- 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 to bandsaws. 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 assess 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 |
|------|------|-----------|
| | | |
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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 properly 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 are 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 Button(s). 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, jewellery, protective equipment

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

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 workplace 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 un-noticed 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 the operator interface console.
- Lever switch mounted in separate box 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 machine's 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, either because the machine is operating automatically, or because another person initiates the motion. Keep hands clear of all labelled pinch points, whenever the machine is running. Machine vises can exert great force and cause severe injury. Keep hands clear of vises and work piece when vises are opened or closed. Be aware that vise closing or opening may result in potentially dangerous work piece movement. Be aware also that the opening motion of a vise may create potential pinch points.



MOVING PARTS CAN CRUSH AND CUT

Keep hands clear of chip auger. Lock-out power in accordance with your company's lock-out procedures before attempting to clear a jam in the chip auger. Be aware that the chip auger may start unexpectedly, either because the machine is operating automatically, or because another person initiates the motion.
If the chip auger is stalled because of a jam, it may start without warning when the jam is cleared, unless the machine power is locked out.



SECTION 1 - INSTALLATION



SAFETY PRECAUTIONS

All safety precautions must be observed during installation, operation, or repair work on the V18 APC bandsaw machine.

Inspect the machine thoroughly before power hook-up. Pay special attention to the electrical and hydraulic systems to ensure no damage was caused in shipping.

Power hook-up should be performed by qualified personnel.

If not performing properly, the machine should be stopped immediately and set-up, or repaired by a qualified person.

Stock must not be loaded while the blade is running and the V18 APC should not be operated unless all guards, covers, and doors are in place and closed.

Long and heavy stock should be supported where it extends off the saw table.

The operator should keep a safe distance from all moving parts especially the blade and operating vises.

Long hair, loose clothing, or gloves, should not be worn while operating the V18 APC.

The area around the machine should be kept clean and tidy.

The V18 APC machine should be used according to its specifications.

The operator must wear eye protection.

No modifications to the machine are allowed without Hyd-Mech Group Limited's prior approval. Any approved modifications shall be performed by trained personnel.

V18 APC LIFTING AND SHIPPING

The shipping weight of the V18 APC main machine is 6000 lb. The machine can be lifted from the infeed side of the machine by forklift as shown below.

NOTE: The head restraint plate attached to the head and table must be removed before machine start up.

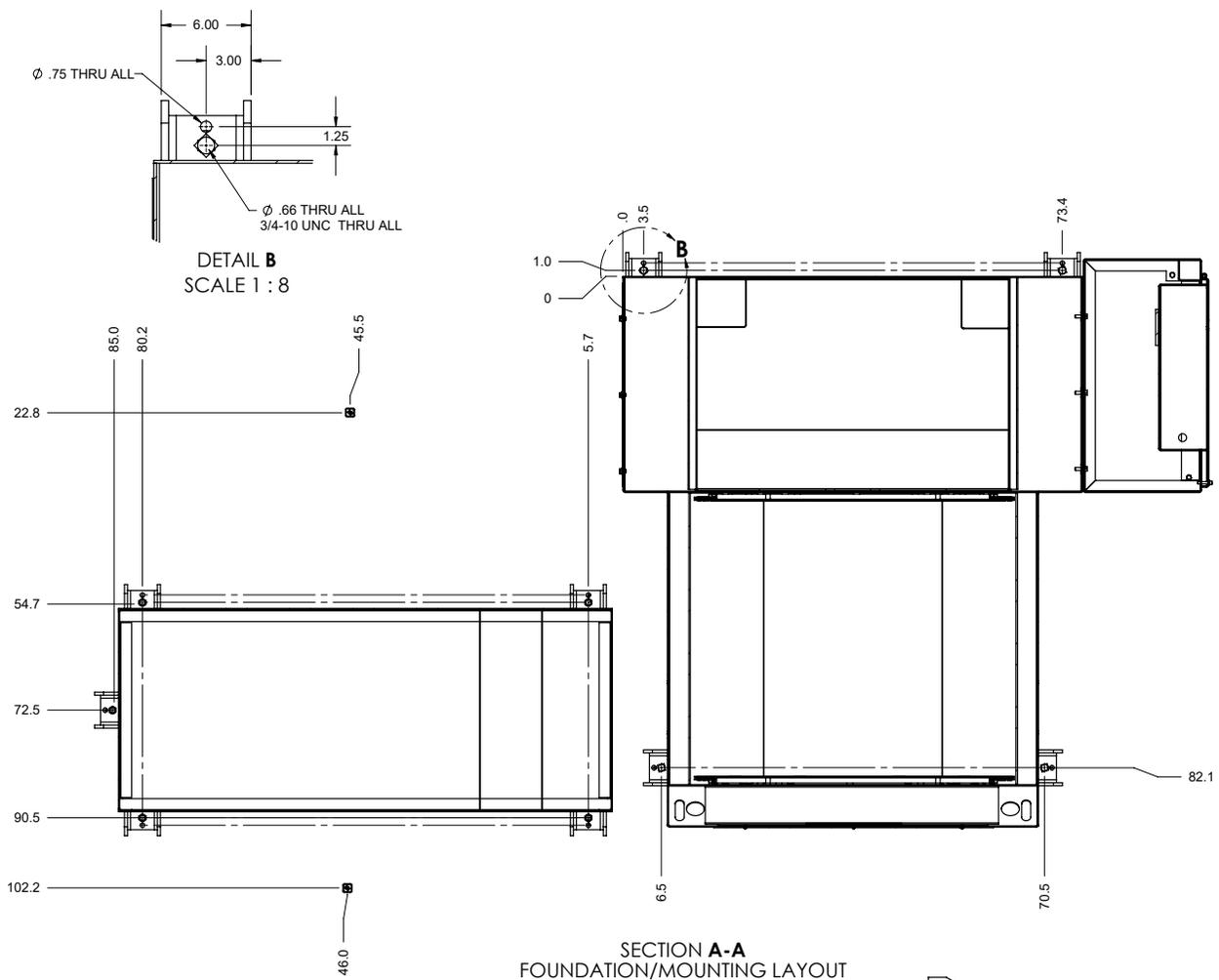


LEVELLING THE V18 APC

It is important that the V18 APC be leveled and provision is made to secure the saw with concrete anchors to the floor. See foundation plan below - Note: There are 2 levelling bolts inside of the power pack compartment. Using a machinist's level, level the saw from side to side and from front to back.



A machinists level being used in both directions



REMOVE HEAD RESTRAINTS

Before start-up, remove the head support strut installed for shipping purposes to secure the head to the base. Replace the two 5/16 NC countersunk screws which fasten the wear-strip down.



INSTALLATION OF THE INFEEED BASE

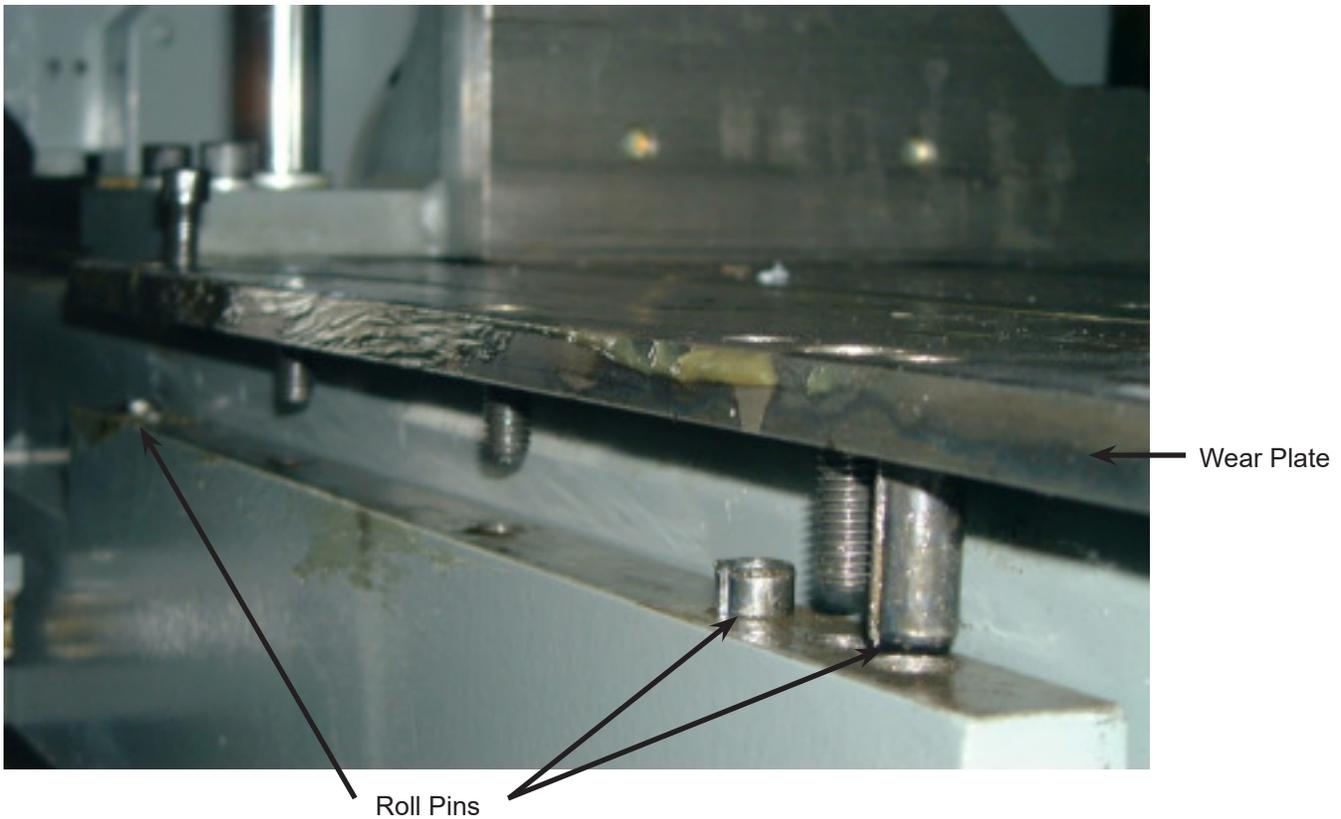
The shipping weight of the infeed is 3000 lb. The infeed can be lifted from the datum side by forklift as shown below.



-
- Install the coolant side shields to both the infeed and outfeed side of the base.



- Move the infeed base into position under the wear plate and line up the holes for the roll pins.

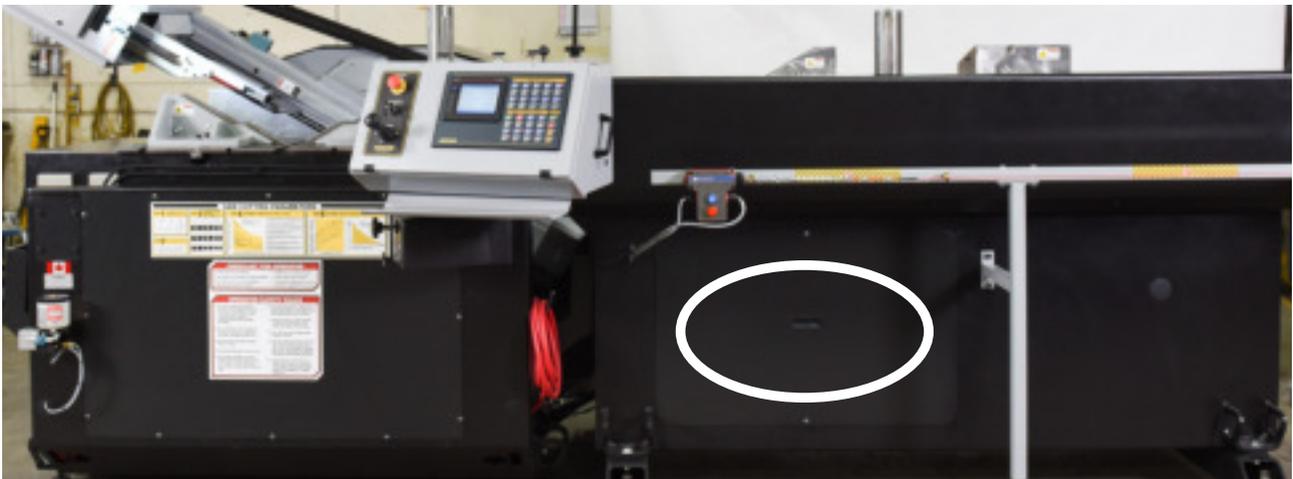


- Use the leveling foot bolts to raise the infeed base towards the wear plate. Tighten the four socket head cap screws (390715) to mate the two pieces together. Level the infeed base with the machine by elevating the rear adjusting bolt. Once level has been achieved make sure that all levelling bolts are touching the floor.

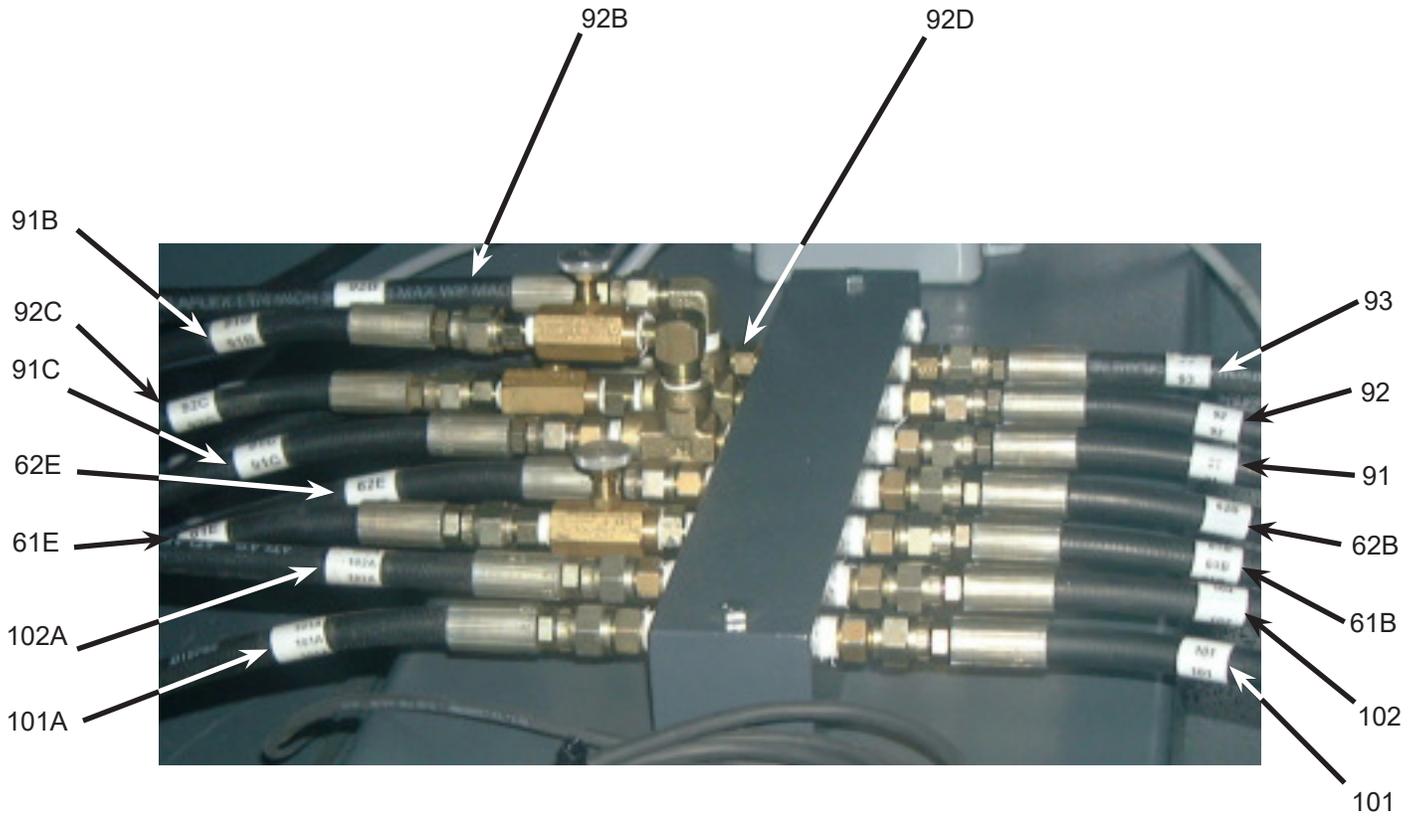
Tighten SHCS



- Remove the infeed base cover. Feed the bundle of hydraulic hoses and electrical cables from inside the machine to the infeed base



- Plumb the hydraulic hoses as per the photo below. Refer to the "Hydraulic Plumbing Diagram" found in the DWG package CD
NOTE: LH Infeed configuration shown



- Fasten the conduit to the bracket with the provided nut.
Connect the M12 connectors:
C 19 : C 19-1
C2 23 : C 23
C E1 : C E2



SHUTTLE GUARD INSTALLATION

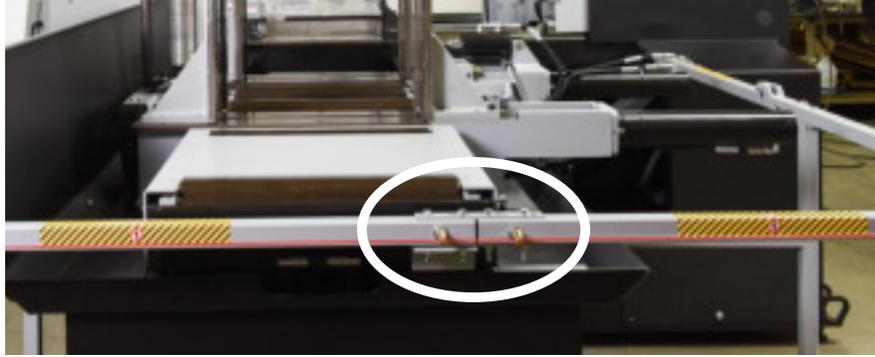
- Refer to the “Perimeter Guard Assembly” drawings in the DWG package CD
- Assemble the moveable side leg to the infeed assembly



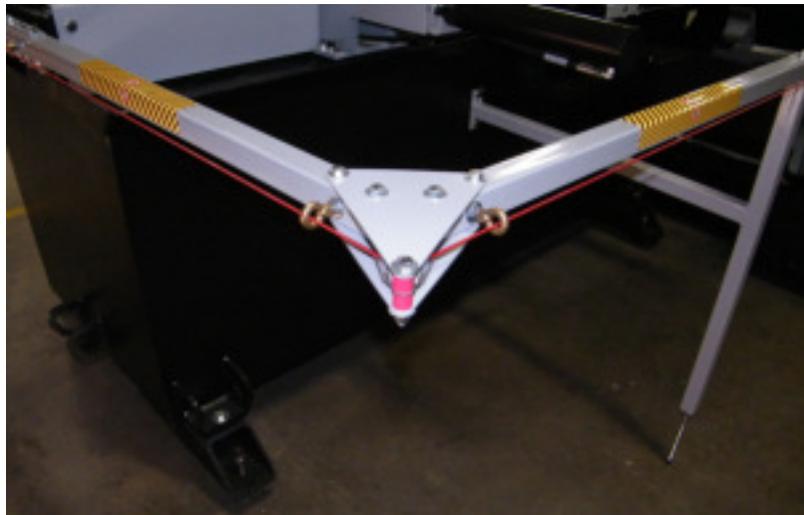
- Assemble the datum side leg to the infeed assembly



- Assemble the rear guard tubes to the back of the infeed assembly



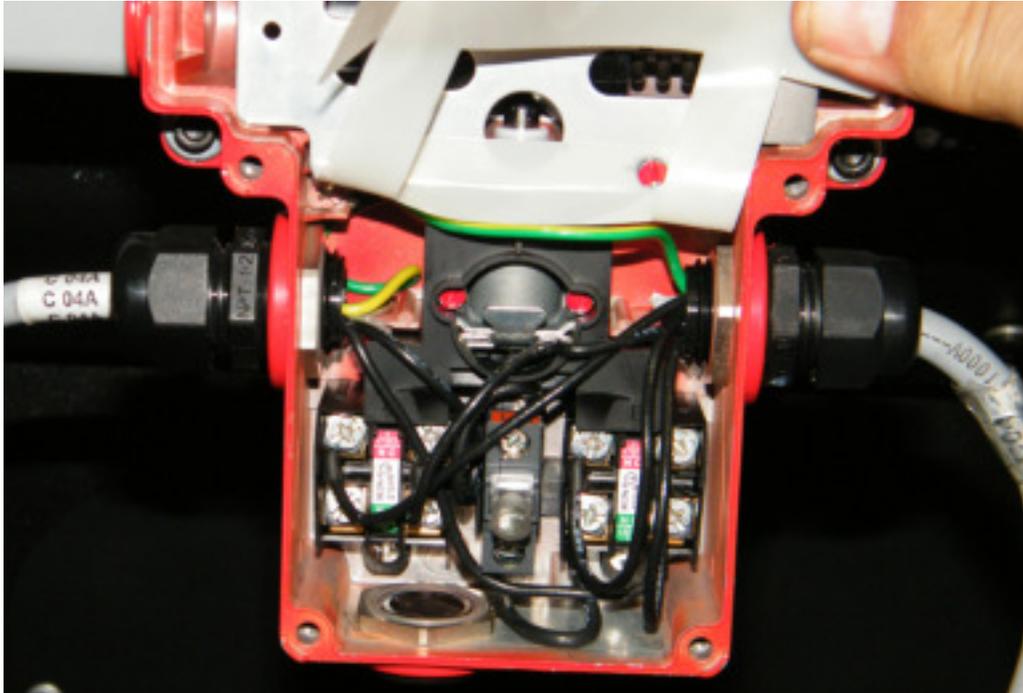
- Assemble both the front guard and the hinged guard to the legs. A pulley is mounted on a bracket and attached to each rear corner of the safety guard. Fasten the three sides of the guard together at these brackets. Adjust the levelling bolts on each leg to ensure the guard is level.



- Remove the cover of the trip wire control box.



-
- Pull cables C04 AND C 04A from the base and our through the 2 access holes in the infeed. Wire the switch. Refer to the wiring diagram provided (also located in the DWG package CD).



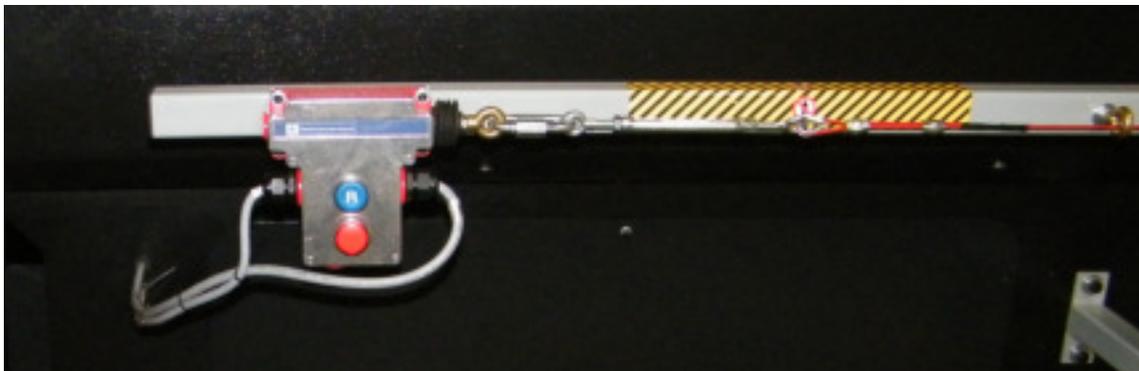
- Attach the spring/wire rope to the hinged guard's eyebolt.



- Feed the wire rope through the eyebolts and pulleys along the guide rail. Attach the other end of the wire rope to the eyebolt of the trip wire control box. Adjust the turnbuckle to place enough tension on the wire rope to have the switch in the neutral position.

NOTE: The switch can not be activated if there is not enough tension on the wire rope.

To reset the switch: Tension the wire rope to pull the switch out of neutral, and then press the reset button.



HYDRAULIC OIL

The V18 APC bandsaw is supplied with Texaco Rando HD46 oil. If it is necessary to change the oil to a different brand it is good practice to empty the hydraulic tank using a pump. Fill the hydraulic tank approximately 1/3 full with the new brand of oil and operate the saw through several cycles with maximum cylinder extension. Drain the hydraulic tank again and then refill to capacity with the new brand.

CUTTING FLUID

As the V18 APC operates with an open reservoir to contain the cutting fluid, no cutting fluid can be shipped with the saw. There are two main types of cutting fluids available, oil based and synthetic. For oil based fluids, the dilution ratio is 1:10, one part concentrate to ten parts water. For synthetic cutting fluids dilution, if required, should be done to the specifications as recommended by the manufacturer.

WIRING CONNECTIONS

After the machine is leveled and anchored the necessary power hook-up needs to be performed. In order to provide safe operation as well as to prevent potential damage to the machine, only qualified personnel should make the connections.

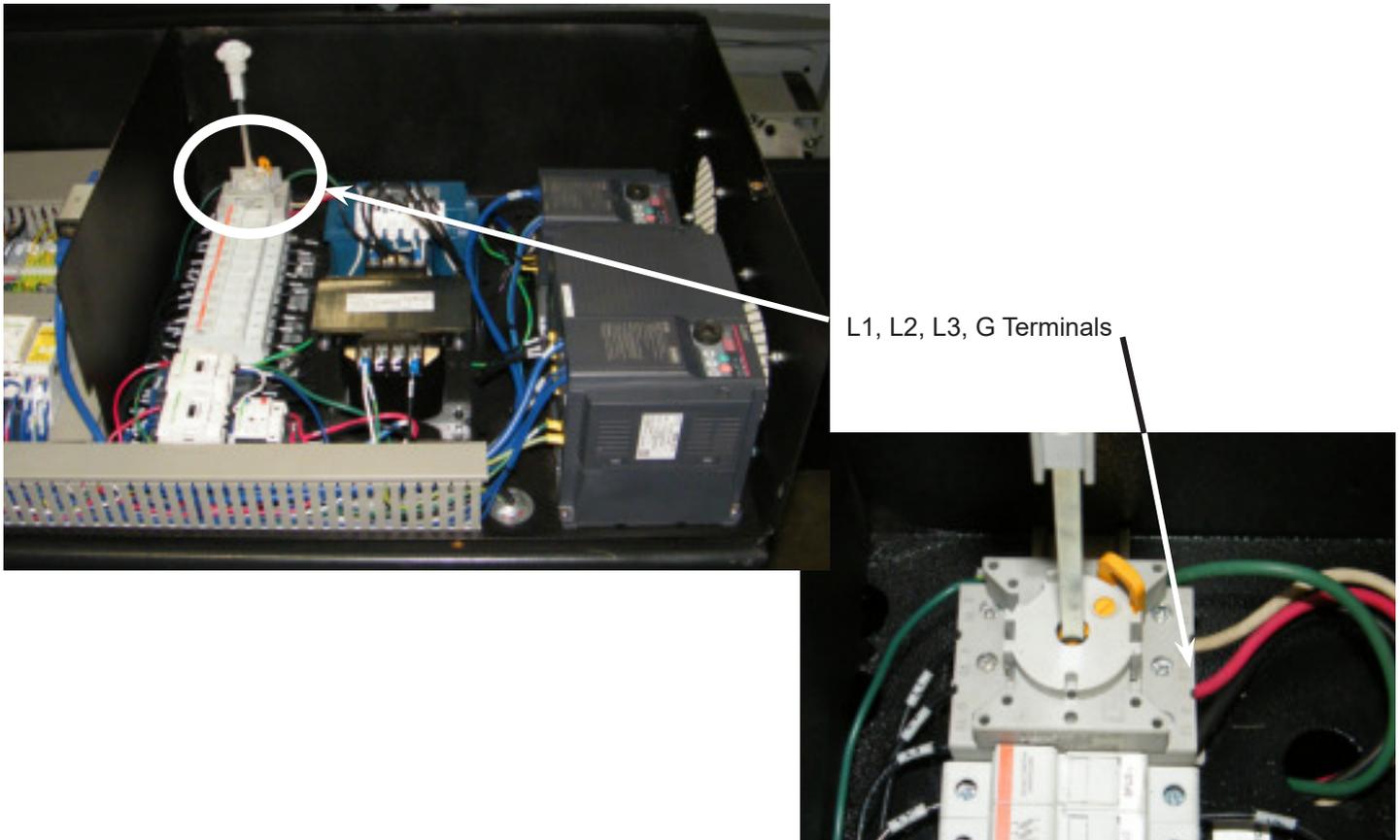
BEFORE START-UP THE FOLLOWING TWO POINTS SHOULD BE CHECKED

1. Signs of damage that may have occurred during shipping to the electrical cables and the hydraulic hoses.
2. The hydraulic oil level is between the upper and lower levels on the gauge.

As supplied, the machine is set to run on three phase voltage as indicated on the serial plate and voltage label. During the initial hook-up, it is very important to check that the phase order is correct. This is indicated by the hydraulic system pressure gauge registering a pressure rise and the blade running in a counter clockwise direction. If the hydraulics do not register an immediate pressure rise, SHUT THE HYDRAULICS OFF and change the phase order.

ATTENTION: *Running the hydraulics “backwards” can damage the hydraulic pump!*

Power connection to the machine is made to the L1, L2, L3 and ground terminals located inside the control panel as shown in the photo.



BLADE TENSION CHECK

When the machine is first started, the head must be swung to the vertical position so the blade position can be checked. Open the door at the top of the head and see that the blade has not moved off of the wheel. It should not be overhanging from the wheel more than 1/4", if it is, then consult Blade Tracking information. If it has stayed in its correct position, then turn the blade tension switch to the "+" and close the door.



EARTH GROUNDING PROCEDURE

1. Customer to provide and install a ground rod approx. 0.60 (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. Ground rod 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. Ground rod to be connected to ground terminal in control enclosure using insulated, 8 AWG stranded copper wire. The correct wire size is shown.

An additional point to check is ensuring continuity of ground within control enclosure. Start with main power entrance ground terminal where internal ground conductors should originate and connect to, DIN terminal strip, control transformer and the lid of control enclosure. Also PLC and Interface units should have their own ground conductors connected to one of the main ground terminals.

Properly functioning ground system will;

- Provide safety for personnel.
- Ensure correct operation of electrical/electronic devices.
- Prevent damage to electrical/electronic apparatus.
- Help dissipate lightning strokes.
- Divert stray radio frequency (RF) energy from electronic/control equipment.

PUSH BUTTON DESCRIPTIONS

| MANUAL MODE ONLY CONTROLS | |
|--|--|
| HEAD CONTROLS | |
| HEAD RETRACT | Pressing this key will retract the head backward and it will stop and hold its position if the key is released. |
| HEAD ADVANCE | Pressing this key will advance the head forward and it will stop and hold its position if the key is released. |
| HEAD SWING RIGHT | Pressing this key will swing the head clockwise and will stop and hold its position if the key is released. Will not swing unless the Guide Arm is in the full upward position and the Head is retracted fully. |
| HEAD SWING LEFT | Pressing this key will swing the head counter-clockwise and it will stop and hold its position if the key is released. Will not swing unless the Guide Arm is in the full upward position and the Head is retracted fully. |
| HEAD SWING SLOW / FAST | Pressing this key will cause the head to swing either fast or slow. The red LED indicates that the head will move FAST. Pressing the key will switch this function back to SLOW. |
| SHUTTLE VISE CONTROLS | |
| SHUTTLE VISE OPEN | Pressing this key will open the shuttle vise and will stop and hold its position if the key is released. |
| SHUTTLE VISE CLOSE | Pressing this key will close the shuttle vise. To stop and hold its position, press again or press the SHUTTLE VISE OPEN key. |
| SHUTTLE CONTROLS | |
| SHUTTLE FORWARD | Pressing this key will move the shuttle to the front (towards the blade) and will stop and hold its position if the key is released. |
| SHUTTLE REVERSE | Pressing this key will move the shuttle to the back (away from the blade) and will stop and hold its position if the key is released. |
| SHUTTLE SLOW / FAST | Pressing this key will cause the shuttle to move either fast or slow. The red LED indicates that the shuttle will move FAST. Pressing the key will switch this function back to SLOW. |
| INFEED VISE CONTROLS | |
| INFEED VISE OPEN | Pressing this key will open the infeed vise and will stop and hold its position if the key is released. |
| INFEED VISE CLOSE | Pressing this key will close the infeed vise. To stop and hold its position, press again or press the FIXED VISE OPEN key. |
| OUTFEED VISE CONTROLS | |
| OUTFEED VISE OPEN | Pressing this key will open the outfeed vise and will stop and hold its position if the key is released. |
| OUTFEED VISE CLOSE | Pressing this key will close the outfeed vise. To stop and hold its position, press again or press the OUTBOARD VISE OPEN key. |
| MANUAL & AUTO MODE CONTROLS | |
| BLADE CONTROLS | |
| BLADE START | Pressing this key will start the blade. The blade will not start if the head is fully forward. |
| BLADE STOP | Pressing this key will stop the blade. |
| BLADE SPEED (+) | Pressing this key will cause the blade speed to increase until the key is released or the speed is at the maximum (385 SFM). The blade must be running to use this key and the blade speed is shown on the display screen. |
| BLADE SPEED (-) | Pressing this key will cause the blade speed to decrease until the key is released or the speed is at the minimum (65 SFM). The blade must be running to use this key and the blade speed is shown on the display screen. |

| GUIDE ARM CONTROLS | |
|-------------------------------------|--|
| GUIDE ARM DOWN | Pressing this key will move guide arm down. |
| GUIDE ARM UP | Pressing this key will move guide arm up. |
| CHIP CONVEYOR CONTROLS | |
| CHIP CONV LEFT | Pressing this button will activate the chip conveyor and discharge the chips to the left side. For the Right Infeed, after releasing the button, it will stay running for a predefined time. |
| CHIP CONV RIGHT | Pressing this button will activate the chip conveyor and discharge the chips to the right side. For the Left Infeed, after releasing the button, it will stay running for a predefined time. |
| COOLANT CONTROLS | |
| COOLANT ON | Pressing this key will start the coolant flow. |
| COOLANT OFF | Pressing this key will stop the coolant flow. |
| COOLANT AUTO | Pressing this key will cause the coolant to flow only when the blade is running OR when the blade is running and the head is descending. This is selectable via the PLC parameters in the SERVICE MODE. |
| FLOOD / MIST | Pressing this key will toggle between flood and mist cooling system |
| MODE CONTROLS | |
| MANUAL MODE | Pressing this key will enable all of the "MANUAL MODE ONLY CONTROLS." |
| AUTO MODE | Pressing this key will disable all of the "MANUAL MODE ONLY CONTROLS." To enter AUTO MODE, the FIXED VISE must be activated. |
| SERVICE MODE | The SERVICE MODE allows the user to adjust the various PLC parameters. The user will be prompted for a password. Contact Hyd-Mech Group Limited to access this mode. |
| LASER ON / OFF | Pressing this key will cause the LASER to turn on or off. The red LED indicates that the LASER will be on. |
| MACHINE & CYCLE CONTROLS | |
| MACHINE START | Pressing this key will activate the control panel, display, and start the hydraulic system. The EMERGENCY STOP button must be pulled out. This key must be activated to use the machine functions. |
| MACHINE STOP | Pressing this key will shut down all machine functions including the control display and hydraulic system. The display will not have a backlight on. All jobs will remain in memory as will the QUEUE. |
| CYCLE START | The user will be prompted by the display to press this key as it is used to initiate an AUTO or SINGLE CUT MODE cycle. Pressing this button will also initiate the QUEUE if pressed when in the QUEUE screen. |
| CYCLE PAUSE | Pressing this key will pause the CYCLE in progress. If SHUTTLE is in motion and CYCLE PAUSE is activated, the SHUTTLE will complete it's movement and then the CYCLE will PAUSE. To resume the CYCLE, press the CYCLE START key. |

The following must be done to activate the cutting modes:

1. The head must be fully retracted.
2. Then the head must pass 90 degrees. The approach can be done in fast speed, but the passing of 90 must be done in slow.

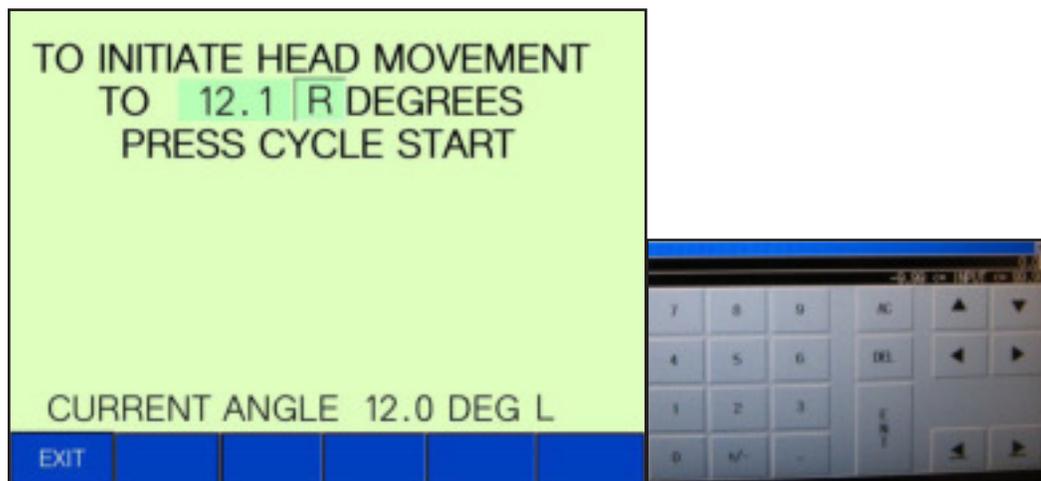
After the above points are achieved the screen will change to manual mode.

MANUAL MODE

MANUAL MODE is the default mode. All functions are enabled when in MANUAL MODE. The screen should look as follows:

| MANUAL MODE PAUSED | |
|--------------------|------------------------|
| FEED RATE | 12.00 ^{"/min} |
| BLADE SPEED | 123 ^{SFM} |
| BLADE MOTOR LOAD | 123 % |
| CURRENT ANGLE | 12.0 ^{Deg L} |
| CURRENT LENGTH | 12.000 ["] |
| | ANGLE GO TO KERF |

To program the required angle, press Angle Go To. The screen will change to the picture below.



To enter the required angle touch the screen at the angle numerical values. The number pad display window will open. Enter a numerical angle then press the ent button. Left or Right is changed by toggling L or R on the display. Press the CYCLE START button once the desired angle is chosen.

The screen will change back to manual mode after "ANGLE GO" cycle was completed. The saw head will move to the new angle.

KERF CORRECTION FOR ANGLE CUTTING (Manual Mode)

When making mitered cuts, the part length must be set longer than the desired length by an amount called the KERF CORRECTION or the kerf value must be adjusted. This is due to the fact that the PLC will not account for a difference in the kerf value at various angles. If the kerf value is to be adjusted, its value can be accessed by pushing the next button.

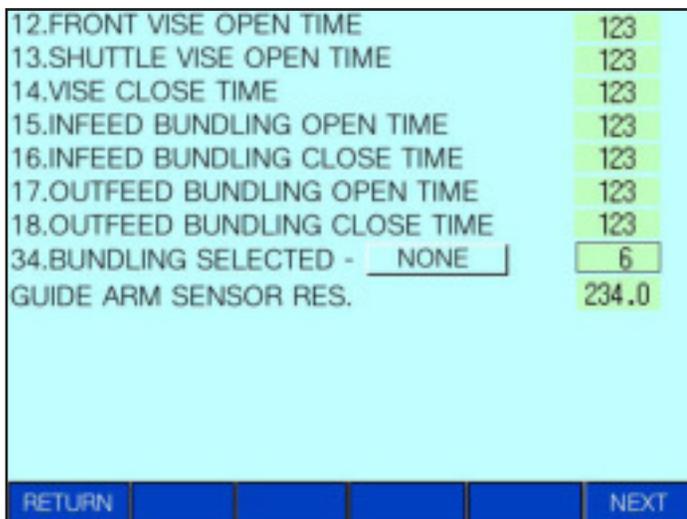
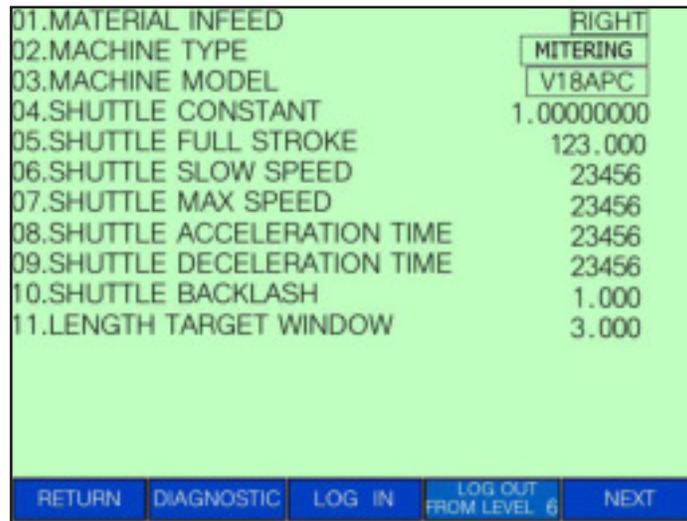
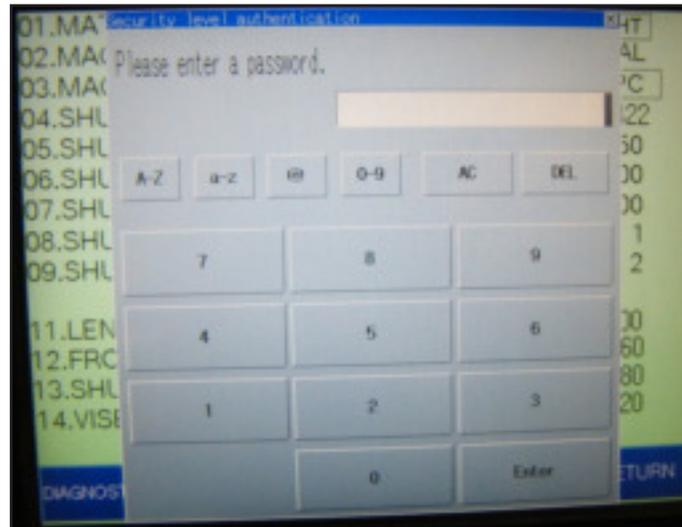


To return to previous screen press exit key.

The Standard kerf and corrected values are as follows:

| STD KERF @ | 90° | 75° | 60° | 55° | 50° | 45° | 40° | 35° | 30° |
|------------|------|------|------|------|------|------|------|------|------|
| 1 ¼" BLADE | .066 | .068 | .076 | .081 | .086 | .093 | .103 | .115 | .132 |
| 1 ½" BLADE | .074 | .077 | .085 | .090 | .097 | .105 | .115 | .139 | .148 |

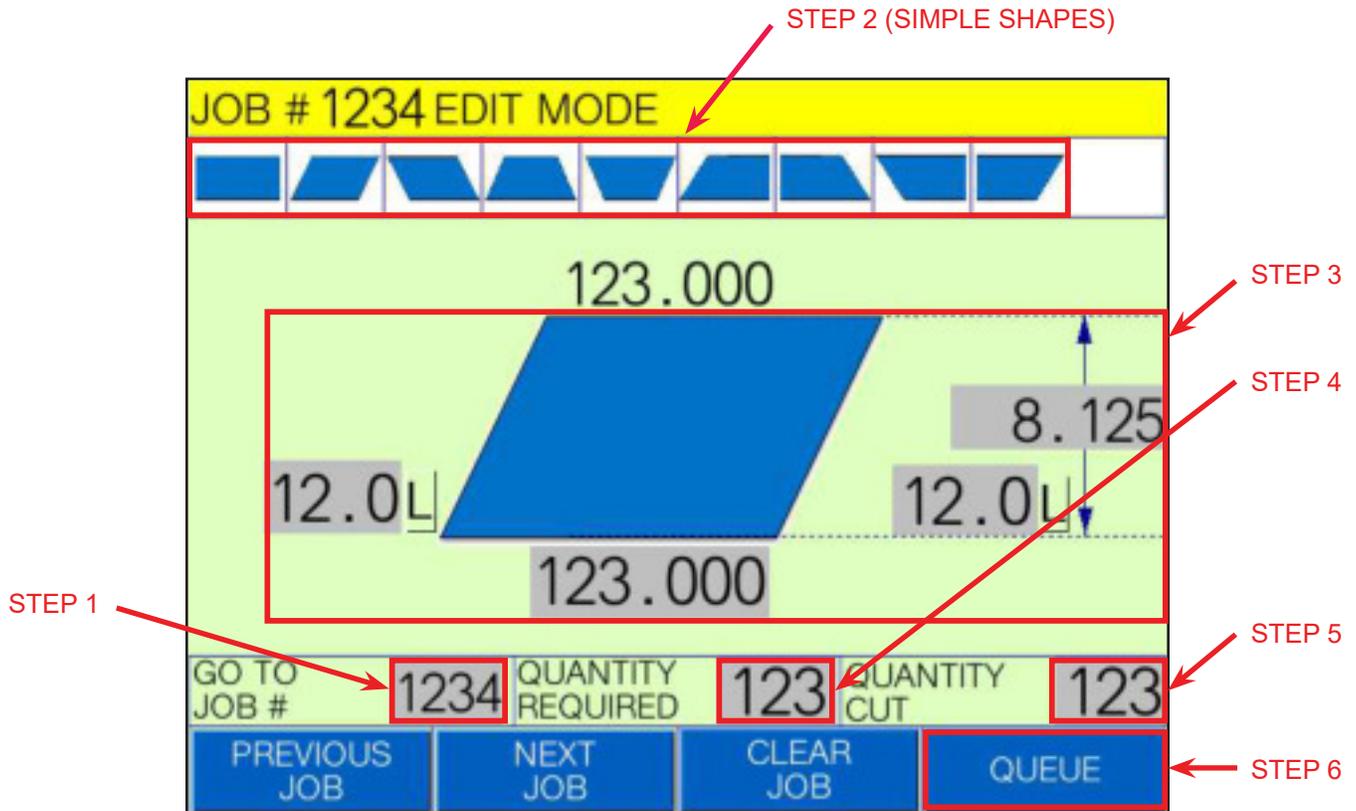
From this screen all the other parameters can be viewed, but a password will be needed to change any settings. See "PLC Parameters" at the end of this section to view the list. HYD MECH service department should be contacted before attempting to change any of these settings.



| PARAMETER | DEFINITION |
|--------------------------------|--|
| MATERIAL INFEED | Defines the infeed side of the machine. |
| MACHINE TYPE | Defines the style of machine. |
| MACHINE MODEL | Defines model. |
| SHUTTLE CONSTANT | Specifies linear distance of shuttle movement in inches per one pulse. |
| SHUTTLE FULL STROKE | Maximum usable shuttle travel. |
| SHUTTLE SLOW SPEED | Minimum shuttle speed constant. |
| SHUTTLE MAX SPEED | Maximum shuttle speed constant. |
| SHUTTLE ACCELERATION TIME | Shuttle acceleration time. Time, in milliseconds that the shuttle will accelerate from 0"/s to full speed. |
| SHUTTLE DECELERATION TIME | Shuttle deceleration time. Time, in milliseconds that the shuttle will decelerate from full speed to 0"/s. |
| SHUTTLE BACKLASH | Backlash value of the shuttle drive system. |
| LENGTH TARGET WINDOW | Allowable +/- tolerance from programmed angle. |
| FRONT VISE OPEN | Delay time for the opening of the FRONT VISE in milliseconds. |
| SHUTTLE VISE OPEN DWELL | Delay time for the opening of the SHUTTLE VISE in milliseconds. |
| VISE CLOSE TIME | Delay time for the closing of the SHUTTLE or FRONT VISE in milliseconds. |
| LEFT ANGLE CONSTANT | This constant represents LEFT Angle Encoder Resolution. |
| RIGHT ANGLE CONSTANT | This constant represents RIGHT Angle Encoder Resolution. |
| ANGLE TARGET WINDOW | Allowable +/- tolerance from programmed angle. |
| HEAD SWING ACEL/DECEL DISTANCE | Acceleration / Deceleration distance. |
| HEAD SWING MAX. SPEED | Head swing maximum speed. |
| HEAD SWING SOFT (30 DEG L) | Head swing soft over travel. |
| HEAD SWING SOFT (30 DEG R) | Head swing soft over travel. |
| HEAD 90DEG SET | Set new 90 deg position. |
| BP RADIUS | The distance in inches from the front side of the blade to the pivot point of the head. |
| DP RADIUS | The distance in inches from the inside face of the fixed jaw on the front vise (usually referred to as the datum line) to the pivot point of the head. |
| FEED RATE CONSTANT | Feed rate display constant value. If the actual feed rate differs from displayed value, enter new Height Constant=(old Height Constant x actual feed rate)/ displayed feed rate. |
| BLADE SPEED CONSTANT | Blade Speed Display adjustment number. If actual blade speed is different than displayed blade speed, a new Speed Constant will need to be calculated. Speed Constant = old Speed Constant x actual speed / displayed speed. |
| BLADE MOTOR FLA | Blade motor full load current. |
| BROKEN PROX | Allows user to override signal from blade drive. Allow to run "dry cycle" in automatic mode without running the blade. Set to YES allows machine to run auto cycle without blade running. |
| MULTI QUEUE | Allows the operator to run several jobs (max 10) in series |
| CONVEYOR SPEED RATIO | Allows the conveyor speed to be calibrated to match the shuttle speed. |

AUTOMATIC OPERATION

To enter AUTO MODE, the Infeed Vise must be in the closed position. When the AUTO MODE push button is pressed, the red indicator will come on. The screen will change to the JOB display window as shown below and will be ready for editing or starting a new job. All manual functions will be disabled.



PROCEDURE FOR EDITING OR STARTING A NEW JOB IN AUTO MODE (SIMPLE SHAPES)

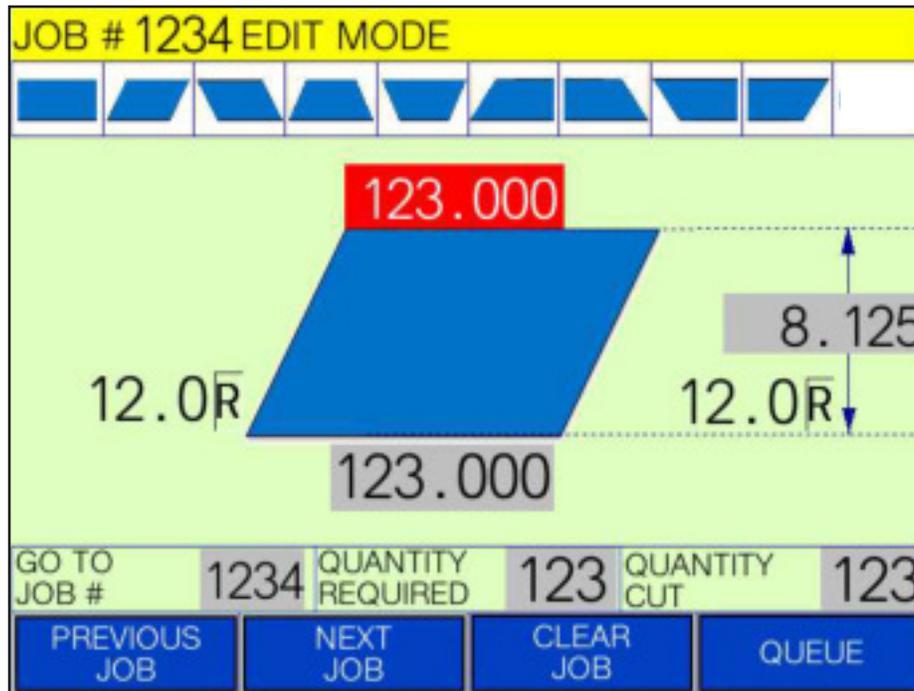
Step 1. In AUTO mode and under the job display window, select the grey input box under “GO TO JOB #” on the touch screen. A number pad display window will appear over the job display window.



Key in the desired job number from 1 to 1000 on the touch screen and press ent. The number pad display window will disappear and the Job # will be changed to the inputted value in the top field highlighted in yellow. Select the “CLEAR JOB” option on the touch screen to clear all the previous job properties. It is important to note that the current job # being edited is always the job # indicated in the yellow highlighted field.

Step 2. After the job # has been assigned, select the desired cut profile from the 9 different cut profiles provided on the selection bar illustrated on the touch screen. Once the desired profile has been selected, the geometry and required dimensional inputs of the cut profile will change on the job display window to that of the selected profile.

Step 3. Input the desired dimensional properties by selecting the appropriate grey box used to define specific dimensional features of the selected profile. Each time a number pad display window will appear over the job display window. Key in the desired linear and/or angular value on the touch screen and press enter. It is important to note that any values that are beyond the capabilities of the machine will be highlighted in a **red box** to indicate that a correction to the dimensional properties is required.



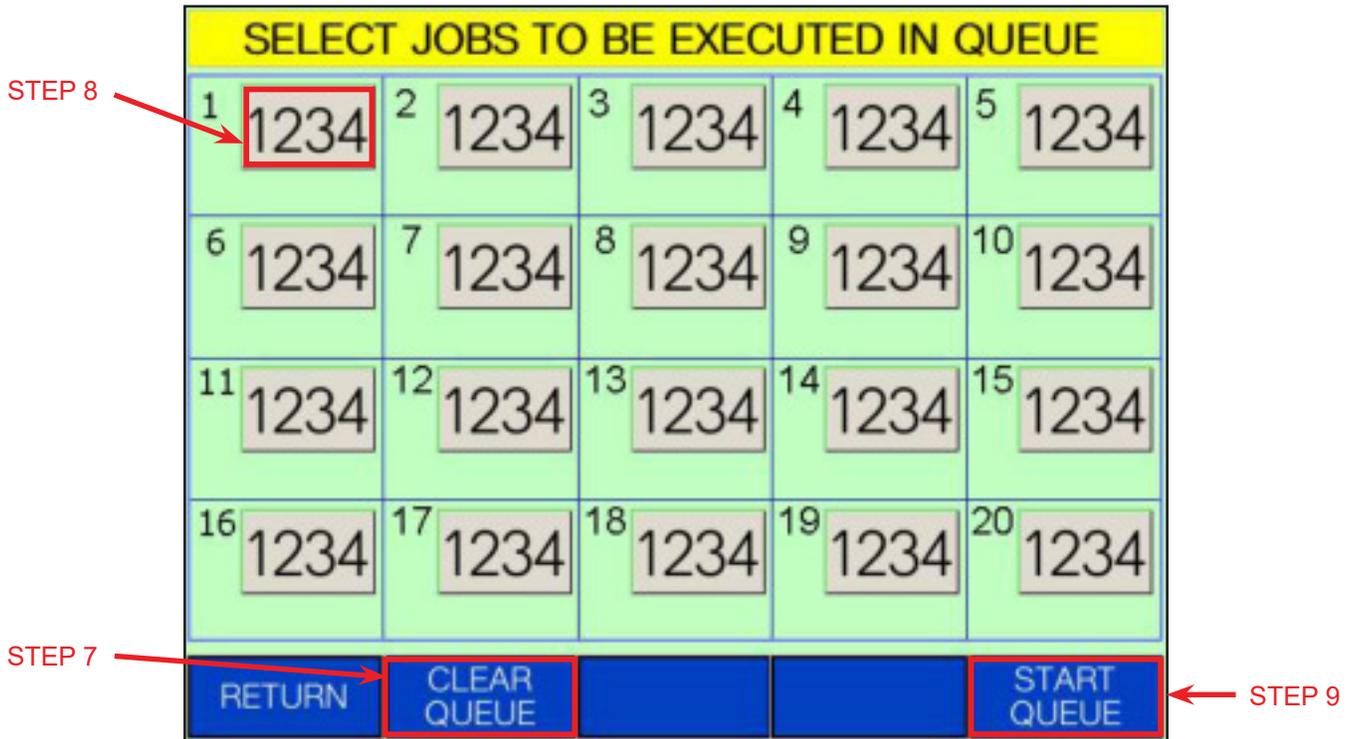
Note: All Length & angular inputs are always with respect to the machine datum (table). Overall height is the actual material height (not the nominal height).

Step 4. After the dimensional properties have been assigned. The number of pieces required must be assigned. This is done by selecting the grey input box under “QUANTITY REQUIRED” on the touch screen. A number pad display window will appear over the job display window. Key in the desired quantity from 1 to 999 on the touch screen and press enter. The number pad display window will disappear and the quantity required on the job display window will be adjusted to the desired value.

Step 5. After the quantity has been assigned. The number of pieces cut must be assigned. This is done by selecting the grey input box under “QUANTITY CUT” on the touch screen. A number pad display window will appear over the job display window. Key in the desired quantity already cut from 0 to 999 on the touch screen and press enter. The number pad display window will disappear and the quantity already cut on the job display window will be adjusted to the desired value.

Note: Quantity cut represents the number of pieces already cut under that job. Ensure that the value for Quantity Cut under any New Job is always “0” so the desired number of pieces cut is always the same as the Quantity required.

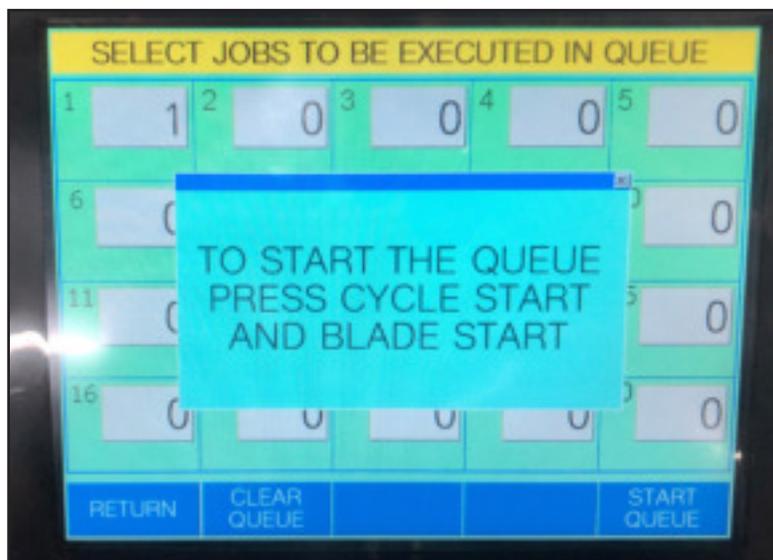
Step 6. The job is now ready to start its run or other jobs can now be programmed at this time. To program another job either repeat steps 1 to 5 detailed above or select “NEXT JOB” on the touch screen and repeat steps 2 to 5. Once all desired jobs have been programmed press the QUEUE key on the touch screen. The job display window will disappear and the job queue window will appear as shown below. To return to the job display window, select the “RETURN” key on the touch screen.



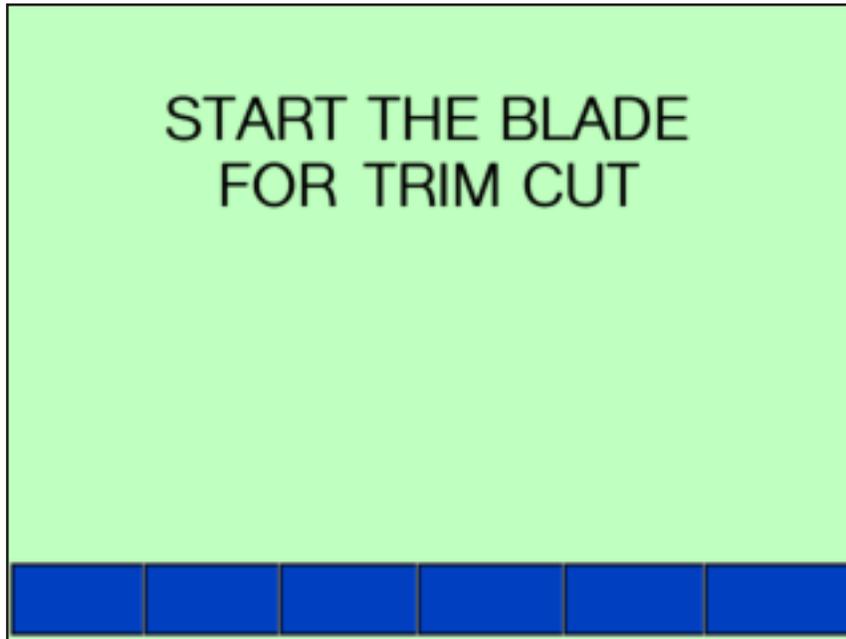
Step 7. To ensure that no jobs from the previous queue have been programmed into this queue. It is recommended that the previous job queue be cleared before programming the new job queue. This is done by selecting the “CLEAR QUEUE” key on the touch screen. All job numbers currently inputted in the queue will disappear and the 20 grey input fields in the job queue should be set to their default setting of “0” meaning no job has been inputted.

Step 8. Select grey input box on the 1st queue block on the interface, a number pad display window will appear over the job queue window. Key in the desired Job # from 1 to 1000 on the touch screen and press enter. The number pad display window will disappear and the desired job # will be displayed in the selected queue block on the job queue window. The purpose of a QUEUE is to allow the operator to run several jobs (maximum of 20) in series if they are of the same material and shape. Order of the queue is determined by the number in each queue block. With the job programmed in queue block 1 being run first and the job programmed in queue block 20 being run last.

Step 9. After all jobs have been entered, select the “START QUEUE” key on the interface. The job queue window will disappear and a display window will prompt to initiate the job queue by pressing cycle start on the keypad. Press the “Cycle Start” button on the keypad to initiate the job queue.



Step 10. Once the queue has been initiated the Auto Mode Status display window will appear and the machine will begin positioning itself for its first cut. If the blade is not running, the display will prompt you to start the blade. Press the “Blade Start” button on the keypad to run the blade. The prompt will disappear and the Auto Mode Status display window will return and the machine will begin to start feeding for the first cut.



Note: It is recommended that the feed rate be lowered or stopped to allow for adjustments in the blade speed before increasing the feed rate for the first cut.

Step 11. To increase the blade speed press and hold the “Blade Speed +” button until the desired speed is displayed on the touchscreen. To decrease the blade speed press and hold the “Blade Speed -” button until the desired speed is displayed on the touchscreen. These buttons are located on the keyboard beside the “Blade Start” and “Blade Stop” buttons.

| AUTO MODE | | | |
|---------------------|-------------|------------|-----------|
| JOB # 123 IS PAUSED | | | |
| PIECES REQ. | 123 123 | PIECES CUT | 123 123 |
| ANGLE 2 | 00.0 R | NEXT ANG1 | 12.0 R |
| LENGTH2 | 123.000 " | NEXT LTH 1 | 123.000 " |
| BLADE SPEED | 123 SMF | | |
| BLADE MOTOR LOAD | 123 % | | |
| FEED RATE | 12.00 "/min | | |
| | | | |
| LAMP OFF | | | |

When the Queue has been completed the machine head will retract, the machine will stop and the hydraulics will power off. To turn the machine and hydraulics back on press the “Machine Start” button on the keypad.

HYDRAULIC FEED CONTROL

The Hydraulic Feed Control is located next to the control panel. These controls allow independent control of Feed Force and Feed Rate.



Fast Approach Lever
Depress for fast head approach.

Feed Force Knob
Used to set Feed Force Limit (counterclockwise rotation to increase and clockwise rotation to decrease).

Feed Rate Knob
Used to control the speed of head advancement

CUTTING PARAMETERS CHART

A full size PARAMETERS CHART is mounted on the saw. The chart contains five steps for the operator to follow in order to achieve optimum performance of the saw. Details of these steps are explained in detail on the following pages.

SAW CUTTING PARAMETERS

STEP 1 DETERMINE EFFECTIVE MATERIAL WIDTH, W (in.)

STEP 2 SET FEED FORCE LIMIT

SET FEED FORCE TO MATERIAL SECTION TYPE AS SHOWN ON FEED FORCE ADJUSTING LABEL.

STEP 3 DETERMINE OPTIMUM BLADE PITCH, TEETH PER INCH (T.P.I.)

EFFECTIVE MATERIAL WIDTH (INCHES)

| | | |
|--------------|----------------|----------------|
| 0" - 4" | 4" - 6" | 6" - 8" |
| T.P.I. 10/14 | T.P.I. 8/12 | T.P.I. 6/10 |
| 8" - 10" | 10" - 12" | 12" - 18" |
| T.P.I. 5/8 | T.P.I. 4/6 | T.P.I. 3/4 |
| 6" - 8" | 8" - 10" | 10" - 18" |
| T.P.I. 2/3 | T.P.I. 1.4/2.0 | T.P.I. 1.0/1.3 |

STEP 4 DETERMINE OPTIMUM BLADE SPEED, V (ft/min)

DETERMINE OPTIMUM BLADE SPEED, V (ft/min)

CHARTED FROM TOP TO BOTTOM

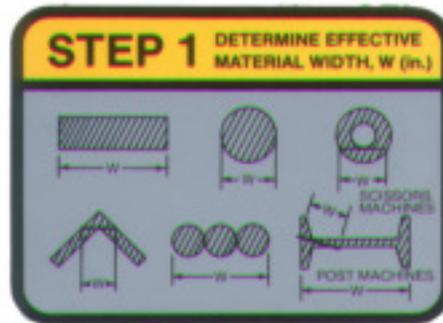
LOW CARBON STEELS 1005 - 1010, 1015 - 1018, ALLOY STEELS 4130 - 4037, 4140, 4142, 4145, 4150, 4152, 4155, 4160, 4162, 4165, 4170, 4175, 4180, 4185, 4190, 4195, 4200, 4205, 4210, 4215, 4220, 4225, 4230, 4235, 4240, 4245, 4250, 4255, 4260, 4265, 4270, 4275, 4280, 4285, 4290, 4295, 4300, 4305, 4310, 4315, 4320, 4325, 4330, 4335, 4340, 4345, 4350, 4355, 4360, 4365, 4370, 4375, 4380, 4385, 4390, 4395, 4400, 4405, 4410, 4415, 4420, 4425, 4430, 4435, 4440, 4445, 4450, 4455, 4460, 4465, 4470, 4475, 4480, 4485, 4490, 4495, 4500, 4505, 4510, 4515, 4520, 4525, 4530, 4535, 4540, 4545, 4550, 4555, 4560, 4565, 4570, 4575, 4580, 4585, 4590, 4595, 4600, 4605, 4610, 4615, 4620, 4625, 4630, 4635, 4640, 4645, 4650, 4655, 4660, 4665, 4670, 4675, 4680, 4685, 4690, 4695, 4700, 4705, 4710, 4715, 4720, 4725, 4730, 4735, 4740, 4745, 4750, 4755, 4760, 4765, 4770, 4775, 4780, 4785, 4790, 4795, 4800, 4805, 4810, 4815, 4820, 4825, 4830, 4835, 4840, 4845, 4850, 4855, 4860, 4865, 4870, 4875, 4880, 4885, 4890, 4895, 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CHART EXAMPLE #1

We will use the parameters chart to set up the saw for cutting 8" (200mm) Diameter #1045 Carbon Steel.

STEP 1 - DETERMINE EFFECTIVE MATERIAL WIDTH - W (inches) or (mm)

Effective material width, W (in.) for most common shapes of materials, is the widest solid part of the material to be in contact with blade during cutting. For simple shapes, as illustrated on the chart, this can be directly measured. For bundles of tubes and structurals, measuring the effective width is difficult. Effective width is 60% to 75% of the actual material width.



NOTES:

1. Both effective material width and guide arm width are used in setting the saw.
2. Guide arm width is the distance between the guide arms and is used in STEP 2.
3. Effective material width, as determined here in STEP 1, can be thought of as the average width of material "seen" by each tooth, and it is used in STEPS 3 and 4.
In Example #1, for an 8" (200 mm) diameter solid, Effective Material Width is 8" (200mm).

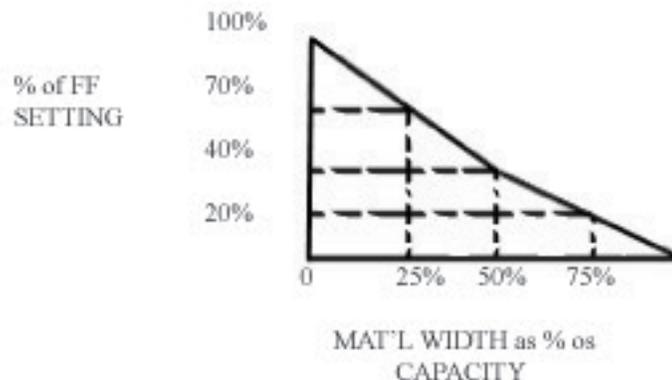
STEP 2 - SET FEED FORCE LIMIT

The Feed Force Limit is the maximum amount of force with which the head is allowed to push the blade into the work-piece. FEED FORCE LIMIT should be set with the head in the down mode, according to the label.

CUTTING SOLIDS

For cutting solids, the wider the section, the less FF should be set, to avoid blade overloading. See the graph.

EXAMPLE: When cutting a solid which is 1/2 of machine capacity using the graph, locate 50% on the horizontal line and travel upwards to the plotted line and then travel directly across to the vertical FF Setting line. The point that you have arrived at shows a setting of 40% for a piece 50% of capacity.



CUTTING STRUCTURALS

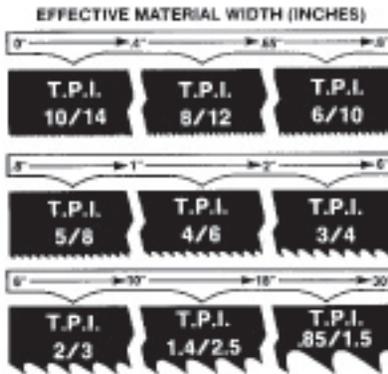
A reduced Feed Force Setting is used when cutting structurals:

For structurals, a blade finer than Optimum can be used for more efficient cutting.

If a finer than optimum blade is going to be used, Feed Force Setting should be reduced even further.

STEP 3 - DETERMINE OPTIMUM BLADE PITCH - TEETH PER INCH (T.P.I.)

Selecting a blade with proper tooth pitch is important in order to achieve optimal cutting rates and good blade life. For cutting narrow or thin wall structural materials a fine blade with many teeth per inch (T.P.I.) is recommended. For wide materials a blade with a coarse pitch should be used. The sketch can be referenced for the blade pitch changes for differing effective material widths.

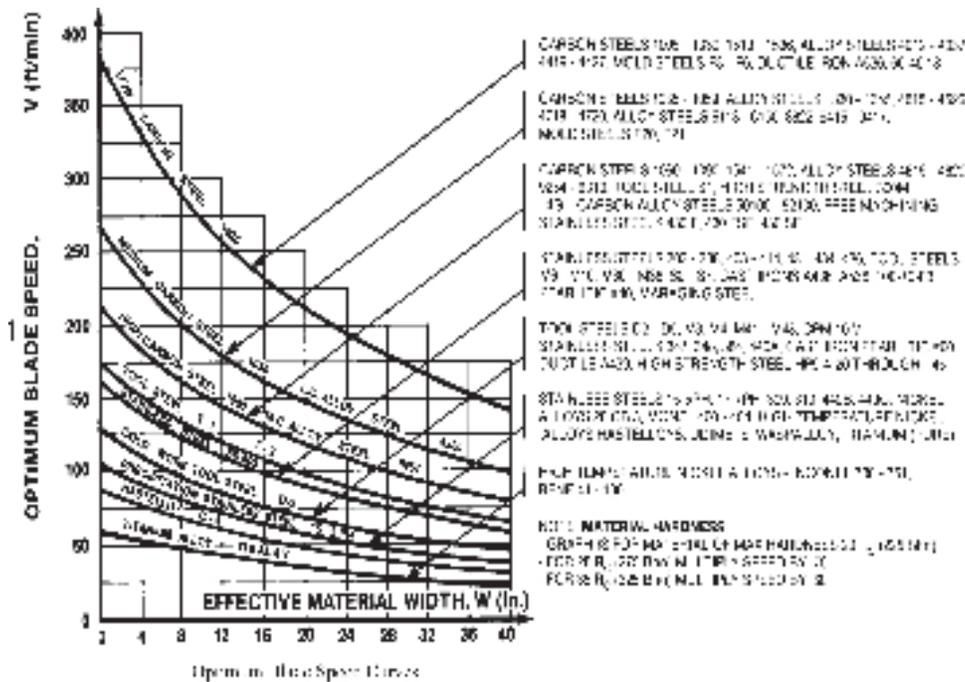


It is impractical to change the blade to the proper pitch every time a different width of material is cut and it is not necessary, but remember that the optimum blade will cut most efficiently. Too fine a blade must be fed slower on wide material because the small gullets between the teeth will get packed with chips before they get across and out of the cut. Too coarse a blade must be fed slower because it has fewer teeth cutting and there is a limit to the depth of a cut taken by each tooth. Allowance for the use of a non-optimum blade is made in STEP 5.

In our Example #1: Effective material width of 8" (200 mm) & Optimum blade has 2/3 teeth per inch.

STEP 4 - DETERMINE OPTIMUM BLADE SPEED, V (ft/min) (m/min)

The relationship between optimum blade speed and effective material width for various materials is represented on the graph shown.



In Example #1

- 8" (200mm) diameter #1045 Medium Carbon Steel solid bar is to be cut.
- On the graph above find the Medium Carbon Steel Curve which represents the optimum blade speeds for 1045 Carbon Steel.
- On the horizontal axis (effective material width axis) find number 8 which represents effective material width of an 8" (200mm) diameter solid.
- Find the point where a vertical line from 8" (200mm) intersects the Medium Carbon Steel Curve.
- From this intersection point run horizontally left to the vertical axis (optimum blade speed axis) and find the point marked "200".
- For 8" (200mm) diameter, 1045 Carbon Steel solid bar 200 ft/min (60m/min) is the optimum blade speed.

NOTE:

Higher than optimum blade speed will cause rapid blade dulling. Lower than optimum blade speeds reduce cutting rates proportionately and do not result in significantly longer blade life except where there is a vibration problem. If the blade vibrates appreciably at optimum speed as most often occurs with structurals and bundles, a lower blade speed may reduce vibration and prevent premature blade failure.

Material Hardness - The graph on the previous page illustrates blade speed curves for materials of hardness 20 RC (225 Bhn) or lower. If the material is hardened then the multipliers need to be used. These multipliers are given in the NOTE at the bottom right of the graph. As the hardness increases the optimum blade speed decreases.

The following table gives examples of the optimum blade speeds for different materials.

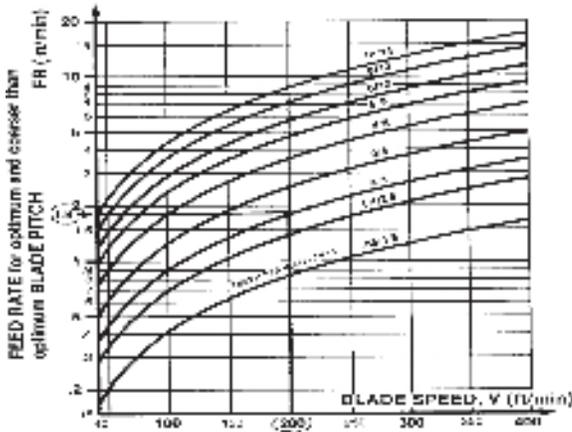
| NO. | Materials | Optimum Blade Speed ft/min | Optimum Blade Speed m/min |
|-----|---|----------------------------|---------------------------|
| 1 | 5" (125mm) diameter solid medium carbon steel | 225 | 70 |
| 2 | 10" (250mm) I-Beam | 270 | 90 |
| 3 | 4" x 4" (100mm x 100mm) Rect tube 1/4" (6mm) wall | 325 | 110 |
| 4 | 4" 9100mm) 400 stainless steel | 140 | 45 |
| 5 | 2" x 2" (50mm x 50mm) Rect tube 1/4" (6mm) wall bundle 5 x 5 pcs 10" x 10" (500mm x 500mm) | 300 | 100 |
| 6 | 3" x 3" (75mm x 75mm) Inconel | 60 | 20 |

STEP 5 - DETERMINE FEED RATE SETTING, FR (in/min) (mm/min).



FEED RATE is the speed at which the blade travels through the work-piece.

The FEED RATE Knob controls FEED RATE of the blade travel in the range 0 to 15 in/min (380mm/min). The FEED RATE should be adjusted only in one direction (from "O" to required value). If you go too far, go back to "O" and come back up. To set FEED RATE for particular cutting situations use the Graph below, which represents the relationship between FEED RATE, blade speed and blade pitch.



For Example #1, it is known from Step 3 that optimum blade pitch is 2/3, and from Step 4 that blade speed, is 200 ft/min (60mm/min). From the Graph on the left, the FEED RATE is determined in the following way:

On the horizontal axis (blade speed axis), find 200 ft/min(60mm/min).

Find the point where a vertical line from 200 ft/min (60mm/min) would intersect the 2/3 blade pitch curve.

From this intersection point run horizontally left to the vertical (FEED RATE) axis, to arrive at 1.8 in/min (45mm/min) FEED RATE. Thus 1.8 in/min (45mm/min) is the FEED RATE for cutting 8" (200mm) diameter 1045 Carbon Steel when the optimum 2/3 pitch blade is used.

If the saw is fitted with a blade coarser than optimum (e.g.. 1.4/2.5 TPI) we can still use the graph, but we go to the 1.4/2.5 curve. As a result we find that the FEED RATE is decreased to 1.3 in/min (133mm/min) for this blade. If however, the machine is fitted with a finer than optimum blade (e.g. 3/4 TPI) we use the graph for the optimum blade as before, and then use a multiplier given by the table below.

| OPTIMUM PITCH | | | | | | | | | | ACTUAL PITCH | |
|---------------|-------|------|------|-----|-----|-----|-----|---------|---------|--------------|--|
| 10/14 | 1.0 | | | | | | | | | | |
| 8/12 | .83 | | | | | | | | | | |
| 6/10 | .67 | .80 | | | | | | | | | |
| 5/8 | .54 | .65 | .81 | | | | | | | | |
| 4/6 | .42 | .50 | .63 | .77 | | | | | | | |
| 3/4 | .29 | .35 | .44 | .54 | .70 | | | | | | |
| 2/3 | .21 | .25 | .31 | .38 | .50 | .71 | | | | | |
| 1.4/2.5 | .17 | .20 | .25 | .31 | .40 | .57 | .80 | | | | |
| .85/1.5 | .10 | .12 | .15 | .18 | .24 | .34 | .48 | .60 | 1.0 | | |
| | 10/14 | 8/12 | 6/10 | 5/8 | 4/6 | 3/4 | 2/3 | 1.4/2.5 | .85/1.5 | | |

**IF YOUR BLADE IS FINER THAN OPTIMUM BLADE PITCH
MULTIPLY FEED RATE, FR, BY ABOVE FACTORS**

ADDITIONAL CUTTING SETUP EXAMPLES

EXAMPLE # 2

| | |
|----------|--|
| Material | Round Steel Tube SAE 4320 - Hardened to 35 RC (325 Bhn) Dimensions - 6" O.D. x 4" I.D. (150mm O.D. x 100mm I.D.) |
| STEP 1 | Effective Material Width: 4 1/2" (.75 X 6) 114mm (19 x 6) |
| STEP 2 | Feed Force limit setting for 6" Diameter material Refer to Feed Force Limit, Setting in Step 2 |
| STEP 3 | Optimum blade pitch (TPI): 3/4 T. P. I. Actual blade pitch on the saw: 4/6 T. P. I. |
| STEP 4 | Optimum blade speed for 4 1/2" effective 225 ft/min (70 m/min) material width Blade speed reduced by hardness factor: 225 ft/min X .60 = 135 ft/min 70 m/min x .60 = 42 m/min) |
| STEP 5 | Feed Rate for 3/4 TPI blade: 1.8 in/min (45 mm/min) Feed Rate for 4/6 TPI blade: 1.8 in/min X .70 = 1.3 in/min (reduced by finer than optimum blade pitch factor) (45 mm/min x .70= 31.5 mm/min) |

EXAMPLE # 3

| | |
|----------------|--|
| MaterialBundle | -Low carbon steel 2" x 2" Tube with 1/4" wall, 12 piece bundle (50 mm x 50 mm with 6 mm wall) Dimensions 6" x 8" (150 mm x 200 mm) |
| STEP 1 | Effective Material Width: 5" (.6 X 8") 120 mm (.6 x 200) |
| STEP 2 | Feed Force limit setting for 8" Diameter material. Refer to Feed Force Limit Setting in Step 2 |
| STEP 3 | Optimum blade pitch (TPI): 3/4 T. P. I. |
| STEP 4 | Optimum blade speed for 5 "effective material width - 320 ft/min (100 m/min) |
| STEP 5 | Feed Rate for 3/4 TPI blade: 4.0 in/min (100 mm/min) |

COOLANT FLOW

A generous flow of coolant should be applied in order to increase production and blade life. The machine is provided with an independently controlled coolant spout. This spout should always flood the blade with coolant. Slight adjustment may be required when changing the blade speed. A properly adjusted flow of coolant should cover the blade which in turn will carry it into the cutting area. Flow adjusting tap is shown at Console side in the photo.

NOTE: When cutting materials that do not need coolant (cast iron) some coolant flow is required to provide blade lubrication in order to prevent blade scoring by the carbides.



Coolant valve and wash hose

HEAD BACK LIMIT ADJUSTMENT

For machines with the canted head option, the blade is further from the material at the table than it is at the top of the guide arm height. The higher the material height, the farther back the head must travel to allow the material to clear the blade when it is being shuttled forward. When cutting lower materials, the head back travel distance can be limited and thereby reduce the cycle time for each cut. The head back limit handle is located on the control mounting arm. It can be pulled out (full back position) or pushed in.

With the handle pulled fully out, fully retract the head. Load and close the vise on the material, advance the head so the blade is approximately 1/4" from the material at its widest point. Push the handle fully in, retract the head, and pull the handle out slowly until the head begins to retract. At this point the handle should be turned (either way) to lock its position. This procedure should be repeated whenever different material is to be cut.



CHIP CONVEYOR

The chips generated while sawing can be removed from the bottom of the machine with the help of the optional chip conveyor. Rotation of the chip conveyor crank will operate the conveyor in the direction of rotation of the crank. A chip bucket is available as an option with the chip conveyor option. The crank handle and chip bucket are shown here.

HYDRAULIC CHIP CONVEYOR

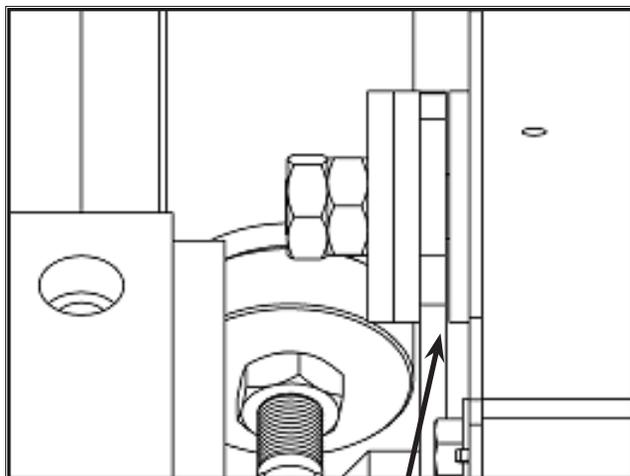
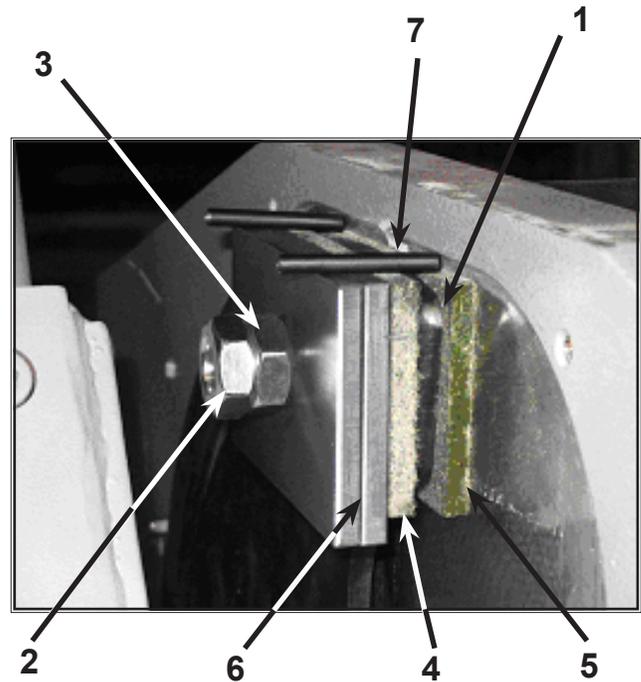
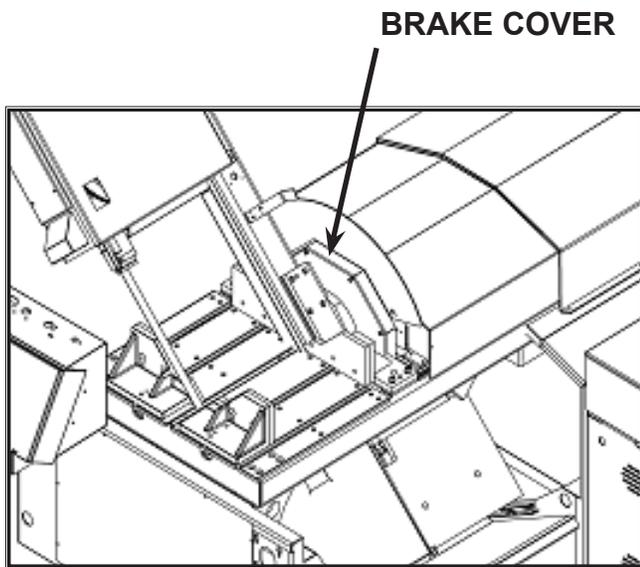
An option available with the V18 APC is the hydraulic chip conveyor drive which provides an easier means of cleaning out the chips that accumulate while cutting. A Chip Conveyor control switch for the hydraulically driven chip conveyor is located on the operator control panel.



Manual chip conveyor handle and chip bucket.

HEAD SWING BRAKE

The brake assembly can be accessed by removing the brake cover. The brake should be adjusted with the head swing either to the extreme left or right. (Make sure system pressure is set properly). Maintain the machine in swing mode (either left or right). **THE BRAKE MUST BE FULLY RELEASED.** Adjust the brake nut #3 so that the total clearance between the brake plate #1 and the rear brake pad #5 is .005" - .010". Lock the jam nut #2. Make sure the two roll pins #7 secure the brake pads from rotation. Swing the head in both directions through the entire range to make sure the brake is working properly. Re-install the brake cover.



CLEARANCE .010" MAX

- 1- Brake plate (V18-272-01)
- 2- Lock Nut
- 3- Brake Nut
- 4- Front Brake Pad (V18-271-01B)
- 5- Rear Brake Pad (V18-271-01B)
- 6- Brake Pad Support (V18-271-02A)
- 7- Roll Pin

Note: Canted head machine takes only 1 Front brake pad support item #6

SECTION 3 - MAINTENANCE AND TROUBLE SHOOTING

LOCK-OUT

Purpose: To prevent injury to workers caused by unexpected start-up of machines being worked on,
OR
Where the starting of a machine or device may endanger the safety of a worker.

- a) Control switches or other control mechanisms shall be locked out,
AND
- b) Other effective precautions necessary to prevent such starting shall be taken.

LOCK OUT PROCEDURE

Whenever work is to be performed on a machine, the following steps shall be taken:

1. Operator shuts down the machine. (The head should be swung to 30° left or right before any hydraulic service is performed to prevent the head from moving unexpectedly).
2. The person in charge should follow Lockout procedures as is required by his organization. The main power disconnect box is supplied with a suitable mechanism for this purpose as shown below.



The main power disconnect switch used for safety lockout purposes.

BLADE CHANGE PROCEDURE

Wear safety glasses, gloves, and a long sleeve shirt for protection when handling bandsaw blades during blade change. NOTE THAT GLOVES SHOULD NEVER BE WORN NEAR A RUNNING BANDSAW BLADE.

When handling new blades, or ones that will be re-used, it is important to keep the teeth out of contact with concrete floors.

All machines with hydraulic blade tension are equipped with a 'Blade Change Mode' key switch, located on the operator control panel.

This key switch has 2 positions:

OFF = All normal operations of the band saw are operative.

ON = Hydraulic motor can be started.

Blade Tension is operative.

All other hydraulic functions and blade start are inoperative.



BLADE REMOVAL

1. With the Blade Change Mode key switch in 'OFF', the blade stopped and the hydraulics ON, retract the saw head in the full retract position. Pull the head back adjustment lever out and then press the head retract push button. This will drive the head past the Head Limit Switch creating a wider gap between the blade and the cutting table allowing easier removal of the blade.

2. Turn the blade change key switch to the 'ON' position.

- Hydraulics will continue to run, but only the Blade Tension Switch is functional. The blade wheel doors can be opened without the hydraulics shutting down.

3. The V18 APC blade is only exposed to the operator at the cutting area. A hinged cover protects the operator from the blade between the Idler wheel assembly and the actual cutting area. A black knob on the cover allows it to be easily pulled open.

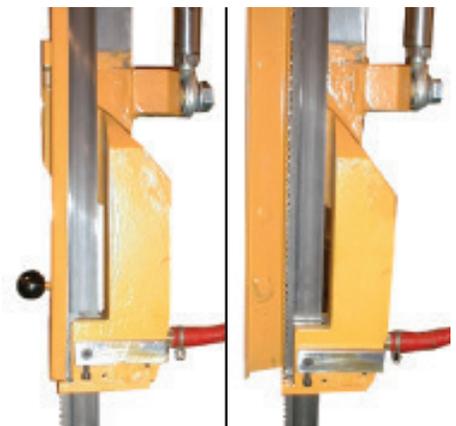
4. It is necessary to release the carbides from the locked position so that the blade can be easily removed. As shown in the photo the carbides are released by turning the lock bars 270 degrees counter clockwise. The top carbide lever is shown in the photo. The bottom lock lever is on the lower guide arm.

5. Turn the Blade Tension Switch from the TIGHTEN position "+/RUN", through central HOLD position, and briefly to the LOOSEN position "-".

- By joggling the switch between hold and loosen, it is possible to regulate the degree of looseness of the blade. It is helpful to have the blade just loose enough that it stays on the wheels and in the blade guides, but can be manually pulled off the wheels and out of the guides.

6. Pull the blade forward out of the slot on the inside walls of the blade wheel housings and out of blade guides.

7. Store or dispose of the used blade.



The blade guard closed and open with the carbide locking lever in the locked position.

BLADE INSTALLATION

NOTES ABOUT NEW BLADES:

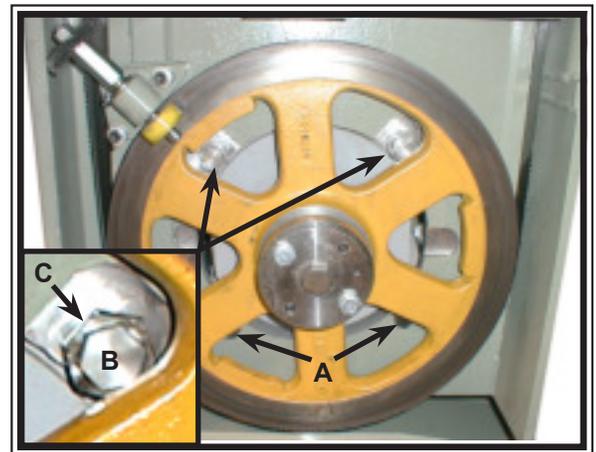
- It is helpful to have two people to install a new blade.
 - A new blade will come folded into a compact coil. Follow the blade manufacturer's instructions for safely unfolding blade.
 - The blade must be installed with the teeth facing out towards the front of the saw where it passes around the wheels, and with the teeth in the cutting area pointing towards the drive wheel. This may require that the blade be turned inside out before installation.
1. With the Blade Change Mode key switch remaining in the 'ON' position, turn the Blade Tension Switch to the LOOSEN position for several seconds until the idler wheel has fully retracted.
 2. Insert new blade into the blade guides and briefly onto the wheel.
 3. Turn the Blade Tension Switch briefly to TIGHTEN "+/RUN" and then leave it in HOLD, to retain the blade lightly on the wheels.
 4. Adjust blade position on the wheels so that the blade is not crooked on them and the teeth overhang the front edge of the wheels.
 5. Turn the Blade Tension Switch to TIGHTEN "+/RUN".
 6. Close both blade wheel doors.
 7. Turn the Blade Change Mode key switch to the 'OFF' position. Hydraulics will shut down.
 8. Switch the hydraulics ON, start the blade and run for 20 seconds.
 9. STOP the blade.
 10. Turn the blade change key switch to the 'ON' position.
 11. Open the blade wheel doors and inspect the blade tracking, plus the position of the blade brush. Refer to following pages for tracking adjustments, if necessary.
 12. Close the carbide locks, blade guard, and the blade wheel doors. Turn the Blade Change Mode key switch to the 'OFF' position.
 13. Blade change procedure is complete.

BLADE TRACKING

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 check both wheels. Repeat this process until both wheels are within specification (.200-.220" of tooth overhang from the front of the wheel). Both the drive and idler wheels are factory set a certain distance from the wall behind the wheel. Adjustment should not be required unless the wheel is being replaced. On the drive wheel there is a large hex head bolt and four set screws in a "push/pull" arrangement. For the idler wheel there is single adjuster assembly in the centre of the idler shaft under the cover on the front of the head. Hyd-Mech Service should be contacted before making any adjustment to the wheel position.

DRIVE WHEEL ADJUSTMENT

Adjustments should be made with the blade tension released slightly. The drive wheel has two mounting bolts and two adjusting bolt assemblies. The mounting bolts (A) should be loosened but remain snug before making any adjustment to the bolt assemblies (B & C). Both of the bolt assemblies should be adjusted by equal amounts. To adjust the bolt assemblies, release blade tension slightly, loosen bolts "B" and turn bolts "C" in or out by equal amounts and tighten bolts "B". Turning bolts "C" out will pull the blade onto the wheel and turning them in will push the blade off the wheel. Check the tracking movement after each one quarter turn of bolts "C" by running the blade at minimum speed. When the tracking is within specification, tighten bolts "A".

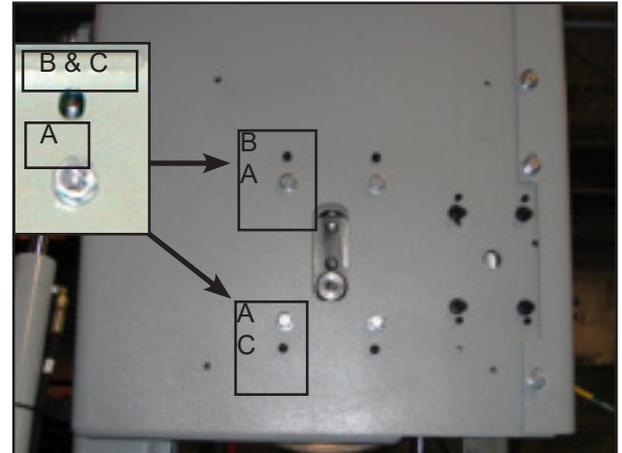


Drive wheel mounting bolts and tracking bolt assemblies.

IDLER WHEEL ADJUSTMENT

Adjustments should be made with the blade tension released slightly. Remove the cover on the back side of the head. There are four hex bolts "A" and four set screws "B & C". Bolts "A" are loosened and then set screws "B & C" are adjusted by turning one out, the other in 1/4 turn and tightening the first again. Adjust by 1/4 turn at a time and check the blade movement with each adjustment by running the blade at minimum speed.

Loosening "B" and tightening "C" will pull the blade onto the wheel.
Loosening "C" and tightening "B" will push the blade off the wheel.



Idler wheel tracking bolts "A" and set screws "B & C" with the cover removed.

BLADE BRUSH ADJUSTMENT

The blade brush is properly set when the machine leaves the factory but it will wear during operation and needs to be adjusted periodically. The blade brush assembly is shown below. In order to adjust it, the nut on the adjusting screw needs to be loosened and the screw turned counter clockwise to move the brush closer to the blade until the wires on the brush touch the bottom of the blade gullets. If a new brush is being installed, then the adjusting screw must be turned clockwise in order to move the new brush away from the blade so that the wires are touching the bottom of the gullets. If the brush gets worn to approximately 70% of its original 3" diameter it should be replaced. A brush may be purchased from your HYD-MECH dealer.



Blade brush & adjusting screw (circled).

BLADE GUIDES

Both guide arms are provided with blade guide assemblies consisting of carbide pads that are integral to the correct guidance of the saw blade. These guide assemblies will require an adjustment periodically; refer to Troubleshooting in this section for indications that adjustment is needed. To adjust the pads properly, follow this simple procedure. With the lever in the locked position, loosen the small set screw (A) in the edge of the lever. Turn the adjusting set screw (B) clockwise until tight and then loosen it 1/8th of a turn. With the lever still in the locked position, tighten the small set screw in the side of the lever. This should put just enough pressure on the blade to permit you to push the blade out approximately 1/8". In the event that the pads must be replaced, refer to the exploded parts drawing in Section 6.



Blade guide adjusting screws.

HEAD FORWARD LIMIT SETTING

The Head Forward Limit is factory set and under normal operating conditions should not need to be reset.

TO SET LIMIT:

If adjustment of the Shaft Collar is necessary, the Head Forward Limit is an assembly on the vise cylinder rod. Loosen the set screw that allows setting of the limit switch actuator, and adjust according to your needs. The photo shows the Head Forward limit switch assembly. This assembly will be on the same side of the head as the in-feed conveyor.



Head forward limit switch

GEARBOX LUBRICATION (V18 WITH A412 GEARBOX)

The Bonfiglioli A412 gearbox used on the V18 is supplied with 5.0 litres (1.32 US gallon) of Mobil SHC 630 synthetic oil. This oil has an ISO Viscosity Grade of 220 that is optimum for ambient temperatures from 10 – 40 Deg C [70 – 104 Deg F]. If the machine will be operated for prolonged periods at ambient temperatures below 20 Deg C [70 Deg F] an oil of ISO Viscosity Grade 150 should be substituted.

The suggested oil change interval is given below:

| Oil Temperature Deg C [Deg F] | Mineral Oil Interval [hours] | Synthetic Oil Interval [hours] |
|----------------------------------|---------------------------------|-----------------------------------|
| < 65 [< 150] | 8000 | 25000 |
| 65 – 80 [150 – 175] | 4000 | 15000 |
| 80 – 95 [175 – 200] | 2000 | 12500 |

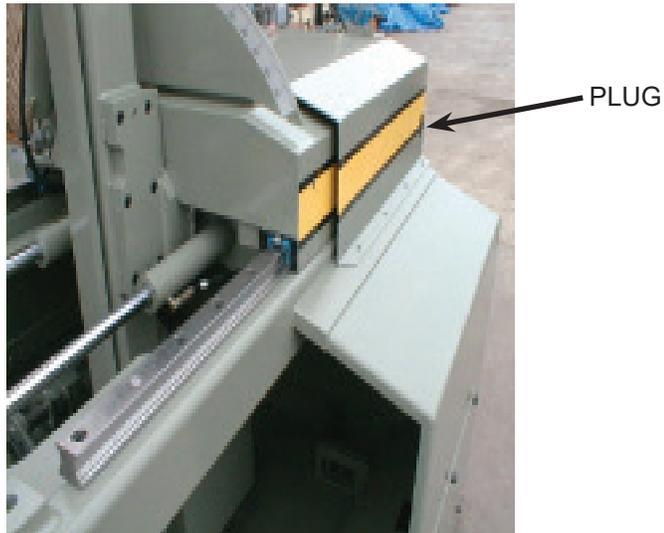
LUBRICATION

The V18 APC was designed with a goal to minimize the maintenance required so as to reduce downtime. Moving parts of the V18 APC will require periodic lubrication nonetheless, primarily application of a general purpose grease to the guide arms, vise ways, and the linear bearings. The following photos show the location of grease fittings that should be lubricated monthly.

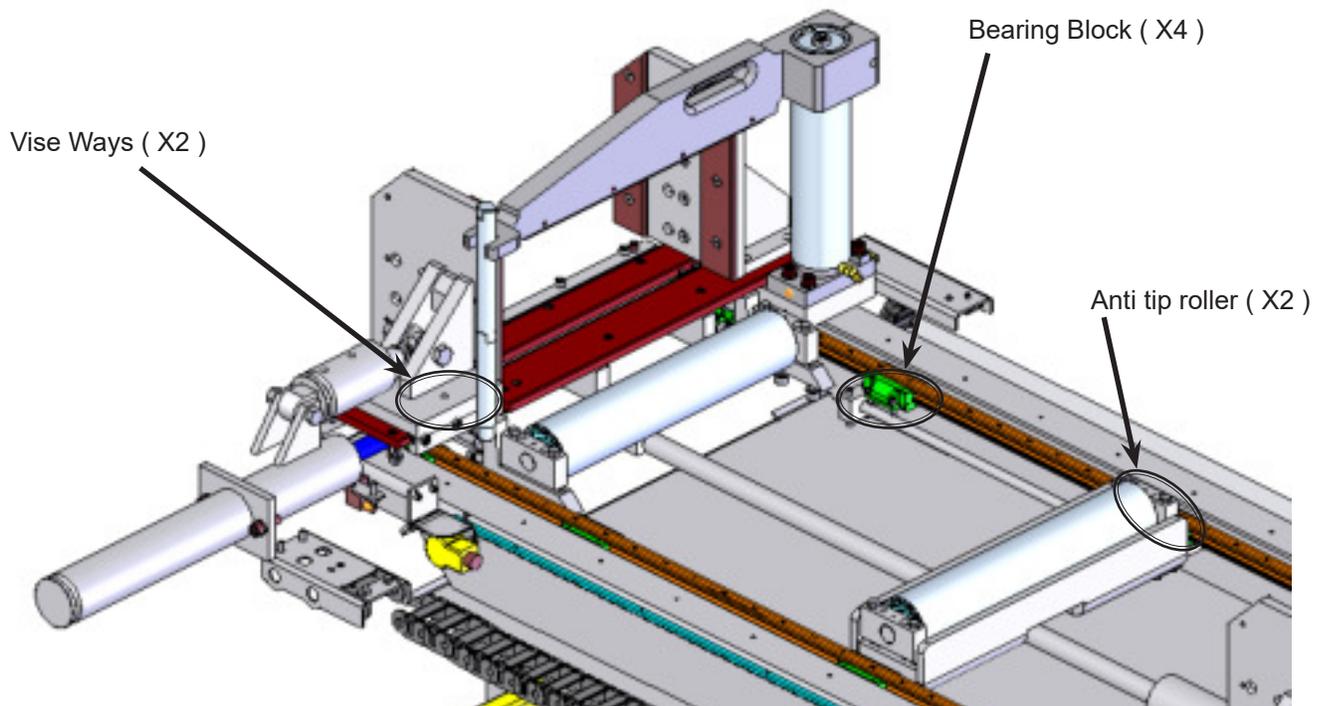
In addition to the grease fittings shown, it is good practice to maintain a constant greased surface on the vise ways. As the vises are precision fit to the vise table, the constant friction of metal to metal can be effectively alleviated with the application of general purpose grease. If the saw is left for long periods without use, an effective coating of grease will prevent metal to metal adhesion and rust.



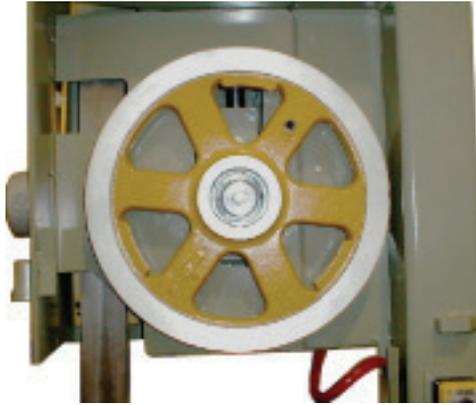
There is one grease nipple for the idler guide arm slide under the black plug.



One of 4 linear bearing block grease nipples. There is one at each corner of the head carrier cover. Remove round plastic plugs to gain access to the two back grease nipples



INFEED ASSEMBLY -
Linear bearing block
grease nipples.



To access the two idler wheel slide assembly grease nipples the wheel must be removed. A flexible grease gun hose with a 45° fitting is required to apply the grease.

HYDRAULIC MAINTENANCE

There are four items of routine maintenance associated with the hydraulic system of the V18 APC. With proper maintenance the hydraulic system of the V18 APC should provide years of reliable service.

1. **OIL FILTER** - Ten micron filtration of the hydraulic oil is provided by a spin on type filter mounted on the tank return line as shown below. The element should be changed every 500 working hours or a minimum of at least once per year. Suitable replacement elements are:

CANFLO - RSE-30-10
GRESEN - K-23018
LHA - SPE-15-10
ZINGA - AE-10

2. **OIL LEVEL** - Oil level should be maintained in the upper half of the level gauge. Normally the rate of oil consumption will be very low and it should be unnecessary to add oil more often than at filter changes. Add oil only to the top line on level gauge. The hydraulic tank capacity is 8 US gallons.

NOTE:

The V18 APC is shipped from the factory with Texaco Rando HD 46 oil. Generally any brand of recognized mineral hydraulic oil with the same properties should be compatible with Texaco Rando HD 46 oil, but to avoid any risk we suggest staying with Texaco Rando HD 46. If it is desirable to change brands, it is necessary to drain the tank and to fill to 1/3 with the new oil. Operate through several full strokes of each cylinder, drain the tank again, and finally fill the tank with the new brand.

Recommended replacement oils:

Chevron - AW Hydraulic Oil 46
Texaco - Rando HD 46
Mobil - Mobil DTE 25
Esso - NUTO H46
Shell - Tellus 46

3. **OIL TEMPERATURE** - Oil temperature is indicated by a thermometer contained in the level gauge. Oil temperature during steady operation should stabilize at about 50 - 55°F above room temperature. Thus in a 70°F shop one might expect an oil temperature of about 120°F. Oil temperature should never exceed 160 F°.

OIL PRESSURE - Oil pressure is factory set to 900 psi and should not require further attention.



Hydraulic tank and manifold assembly are mounted on a door located on the infeed side of the base. The level and temperature gauge is found on the front of the door.

TROUBLE SHOOTING GUIDE

Most problems which may occur have one of the relatively simple solutions which appear in this section. If the solution is not found here, contact the Hyd·Mech Distributor from whom you purchased your bandsaw. They have trained field service personnel who will be able to rectify the problem.

NOTES:

1. IF THE BLADE IS RUNNING COUNTER CLOCKWISE OR THE HYDRAULIC PUMP IS NOISY SHUT THE SAW DOWN IMMEDIATELY!
2. If the drive motor is to be replaced, it must be replaced with a non-vented motor to prevent coolant leaking into the motor.

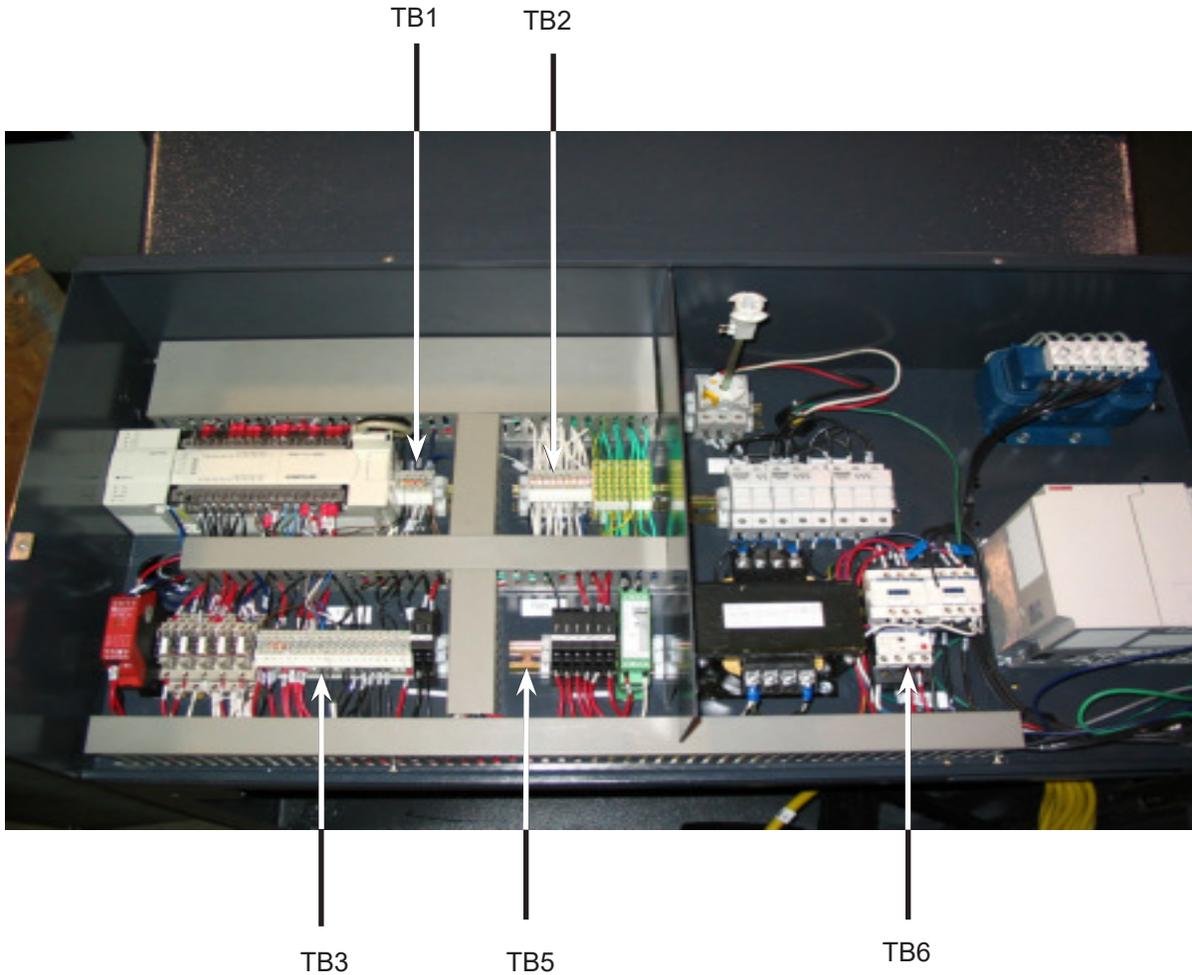
| ELECTRICAL TROUBLESHOOTING | | | | | |
|--|--|-----|--|-------|--|
| | PROBLEMS | | CAUSE | | SOLUTION |
| 1 | Saw will not start at all. | 1a. | Motor overload has tripped. | 1a. | Depress Blade Motor Overload Reset Button. |
| | | 1b. | Control circuit has blown. | 1b. | Replace Fuse with 8 AMP 250V AG type. Repeated Fuse Blow-outs indicate an internal wiring fault. |
| | | 1d. | Safety interlock switch not closed. | 1d. | Check that all switches are closed and operating properly. |
| 2 | Saw will start, but no hydraulic functions respond | 2a. | Check system pressure gauge. Wrong phase order if no pressure. | 2a. | Stop immediately. Reverse any two of three phase connections. |
| | | 2b. | If pumps runs noisily then check the hydraulic oil level at gauge. | 2b. | Stop immediately and add hydraulic oil until the correct level is present. |
| | | 2c. | Check the pump/motor coupling for separation. | 2c. | Stop immediately and check for the adjustment required. |
| 3 | Functions will not respond to manual controls. | 3a. | Check pilots of valves. If pilot fails to light, then check electrical system. | 3a-b. | The solution to this problem is handled best by a qualified technician. |
| | | 3b. | If pilot lights but output fails the coil may be bad. Check dirt in valve spool. | | |
| 4 | An operator control will not respond. | 4 | The switch or pushbutton contact assembly is defective. | 4 | Replace the component that is inoperative. Test voltage levels at switch. |
| 5 | Hydraulics run but blade will not start. | 5a. | Check for red fault light at VFD. | 5a. | Interrupt main supply to machine for two to three minutes. |
| | | 5b. | Red fault light on VFD is not on. | 5b. | Check blade motor line fuses. |
| CUTTING AND BLADE TROUBLESHOOTING | | | | | |
| 1 | Saw is cutting out of square. | 1a. | Blade is worn. | 1a. | Change the blade and check alignment with new blade. |
| | | 1b. | Blade guide is worn or not adjusted. | 1b. | Replace the worn guide or adjust the guide until the blade is cutting square. |

| | | | | | |
|---|---------------------------------|-----|---------------------------------------|-----|---|
| 2 | Blade comes off wheels. | 2a. | Blade tension is insufficient. | 2a. | Blade tension is determined by system pressure. Check. (Extended head, check if blade tension gauge reads 650 psi). |
| | | 2b. | Blade tracking out of adjustment. | 2b. | Have tracking set to blade specification. |
| 3 | Blade stalls while cutting. | 3a. | Blade tension is insufficient. | 3a. | Blade tension is determined by system pressure. Check. (Extended head, check if blade tension gauge reads 650 psi). |
| | | 3b. | Excessive feed force. | 3b. | Reduce the Feed Force pressure and attempt cut. |
| 4 | Blade vibrates excessively. | 4a. | Blade tension is insufficient. | 4a. | Blade tension is determined by system pressure. Check. (Extended head, check if blade tension gauge reads 650 psi). |
| | | 4b. | Blade speed excessive. | 4b. | Reduce the blade speed to eliminate vibration. |
| | | 4c. | Guide arms too far apart. | 4c. | Adjust the distance between the guide arms (Min.) |
| 5 | Excessive blade breakage. | 5a. | Excessive feed rate. | 5a. | Reduce the feed rate and check system pressure. |
| | | 5b. | Excessive blade tension. | 5b. | Blade tension is determined by system pressure. Check. |
| 6 | Tooth strippage. | 6a. | Blade pitch is too fine. | 6a. | Select a blade with a coarser pitch for cutting. |
| | | 6b. | Blade brush is not cleaning. | 6b. | Replace or adjust the blade brush. |
| | | 6c. | Excessive feed rate. | 6c. | Reduce the feed rate. Check calculations for rate. |
| | | 6d. | Excessive feed force. | 6d. | Reduce the feed force pressure maximum setting. |
| 7 | No coolant flow. | 7a. | Coolant reservoir low or empty. | 7a. | Add coolant to the reservoir. Check for leaks. |
| | | 7b. | Coolant line is blocked. | 7b. | Use compressed air to blow obstruction out of the line. |
| | | 7c. | Coolant pump not operating. | 7c. | Check the pump output and replace if necessary. |
| 8 | Head will not advance. | 8a. | The feed rate valve is closed. | 8a. | Pointer is at "0". Turn the Feed Rate Knob counter clockwise to open. |
| | | 8b. | The Feed Force limit is too low. | 8b. | Increase the Feed Force limit - to at least 100 PSI. |
| | | 8c. | Pointer out of adjustment. | 8c. | Loosen pointer lock nut. Turn the knob clockwise to "0". Tighten lock nut. |
| 9 | Head advances with feed at "0". | 9a. | Pointer stopped but valve open. | 9a. | Loosen pointer lock nut. Turn the knob clockwise to "9". Tighten lock nut. |
| | | 9b. | Fast Approach is open. Blocked lever. | 9b. | Adjust Fast Approach lever. Phone factory for details. |

SECTION 4 - ELECTRICAL

V18 APC ELECTRICAL

The electrical schematics on CD show some components labeled as TB1 to TB6 and these components are physically mounted on din rails. The illustration below shows the location of the Din rails with the installed components and the designated TB number.



The following pages will show and explain in brief how to understand the correlation between the electrical schematic and the control panel with regards to TB1 to TB6.

TB1

From page 1, it can be seen that TB1 has the High Speed Counter, PLC and terminals mounted to it.

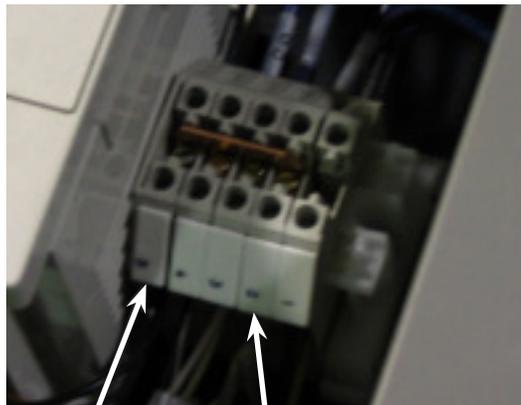


For example, if the electrical schematic shows a terminal, described as TB1
2

This indicates that the terminal is located on din rail TB1 and is terminal #2.

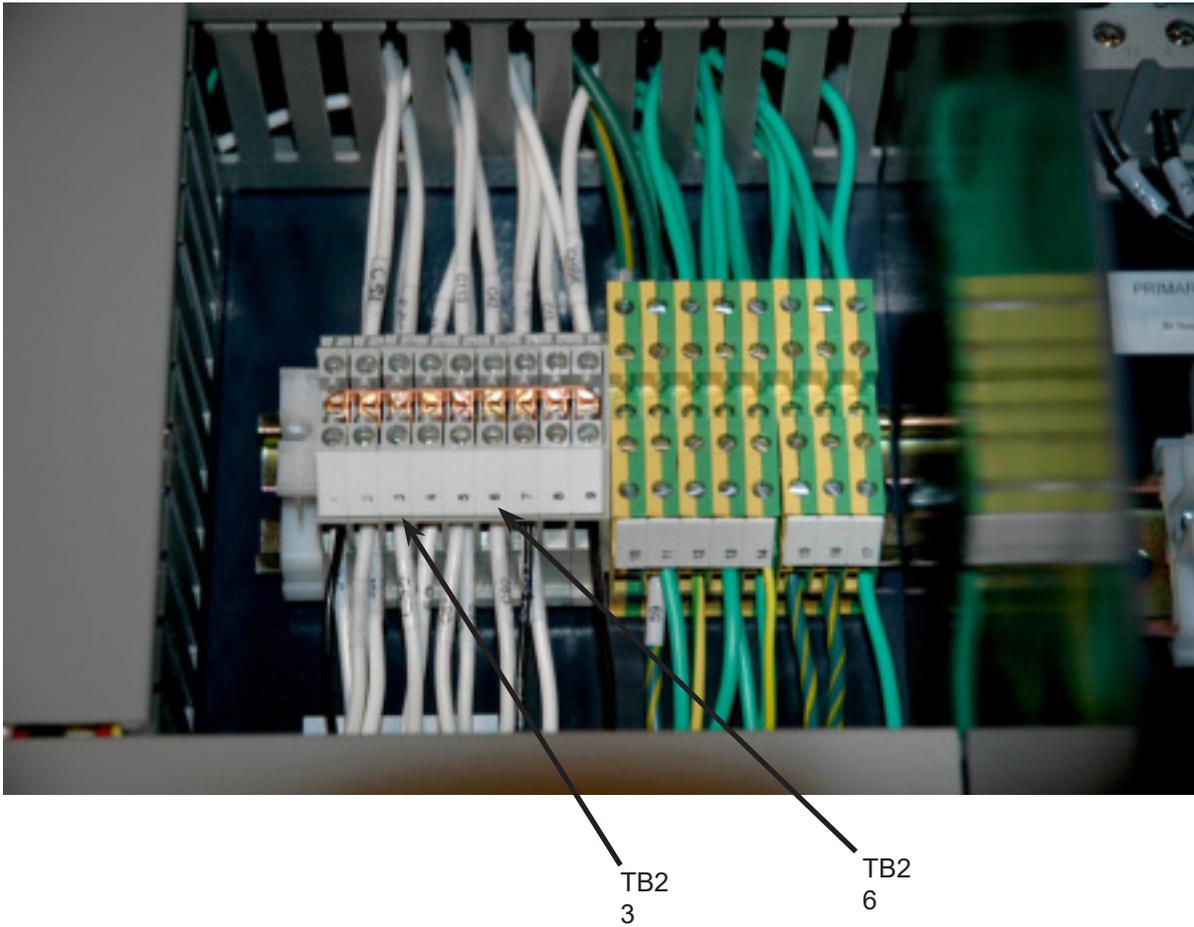
TB1

5 This would indicate that the terminal is mounted on TB1 and is terminal #5.



TB1
5

TB1
2



A close up view of TB2 is shown.

Page 1 shows the position of TB2 in the control panel.

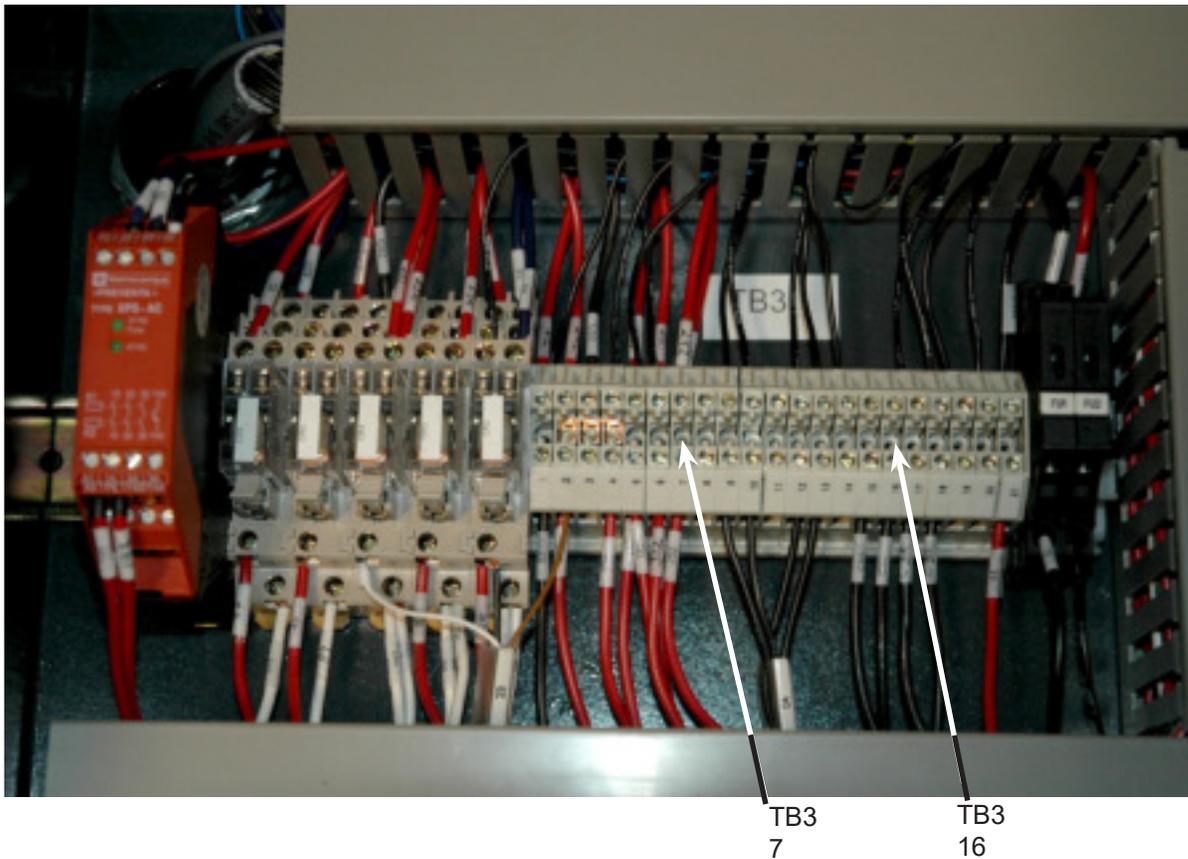
For example, if the electrical schematic shows a terminal, described as TB2
3

This indicates that the terminal is located on din rail TB2 and is terminal #3.

TB2

6 This would indicate that the terminal is mounted on TB2 and is terminal #6.

TB3



A close up view of TB3 is shown.

Page 1 shows the position of TB3 in the control panel.

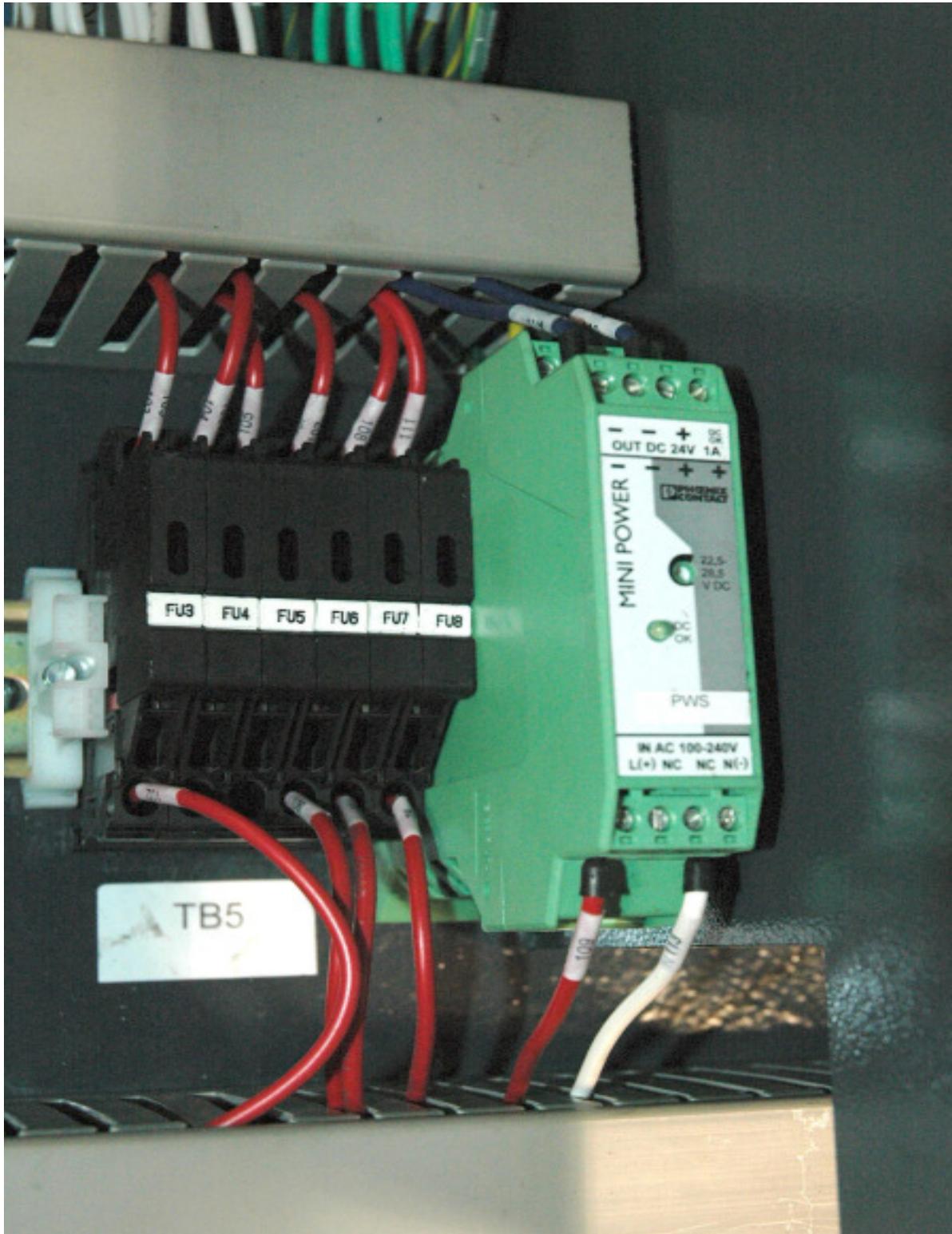
For example, if the electrical schematic shows a terminal, described as $\begin{matrix} \text{TB3} \\ 7 \end{matrix}$

This indicates that the terminal is located on din rail TB3 and is terminal #7.

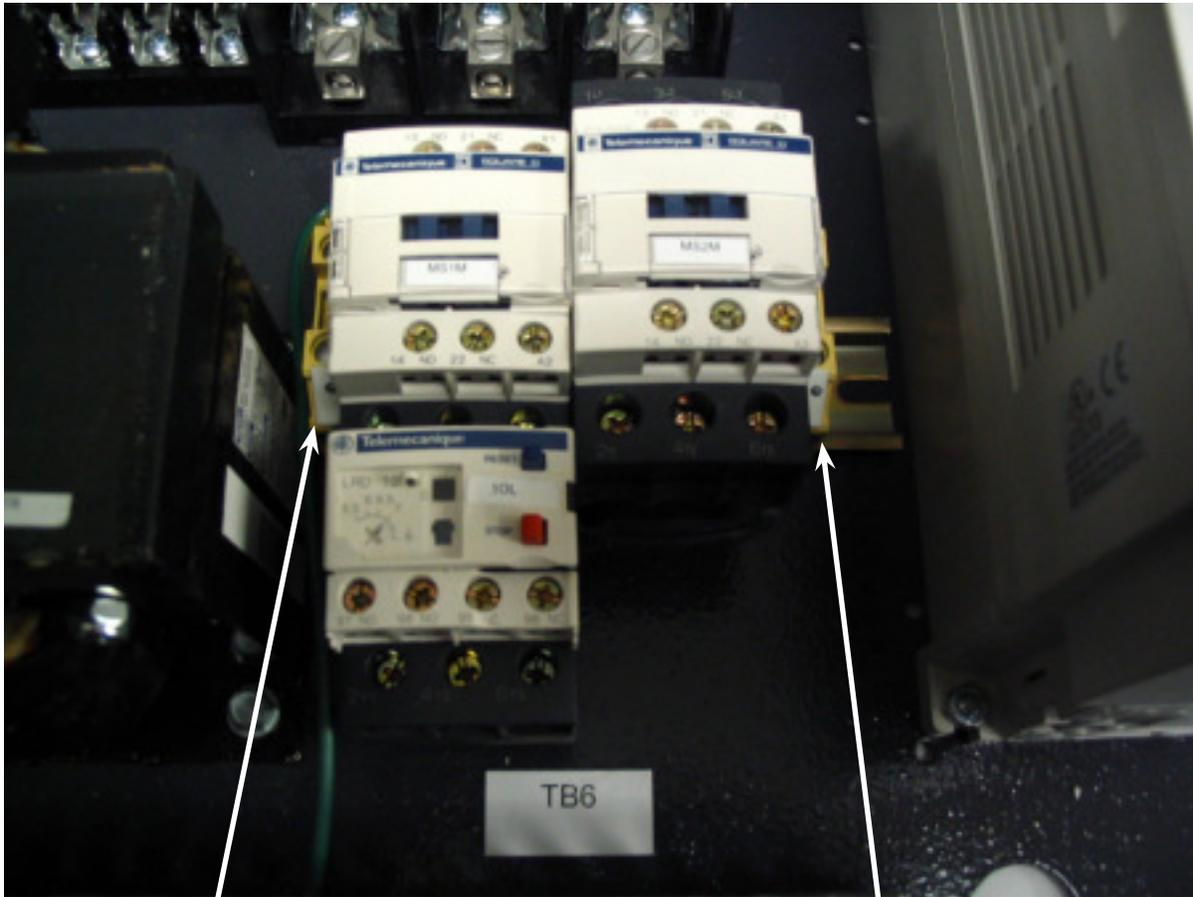
TB3
16 This would indicate that the terminal is mounted on TB3 and is terminal #16.

TB4

TB4 is located in another control panel and will be included on page 7.



TB5 contains fusible terminals and a power supply. These are identified on the schematic as FU3 to FU8 and PWS for the power supply.



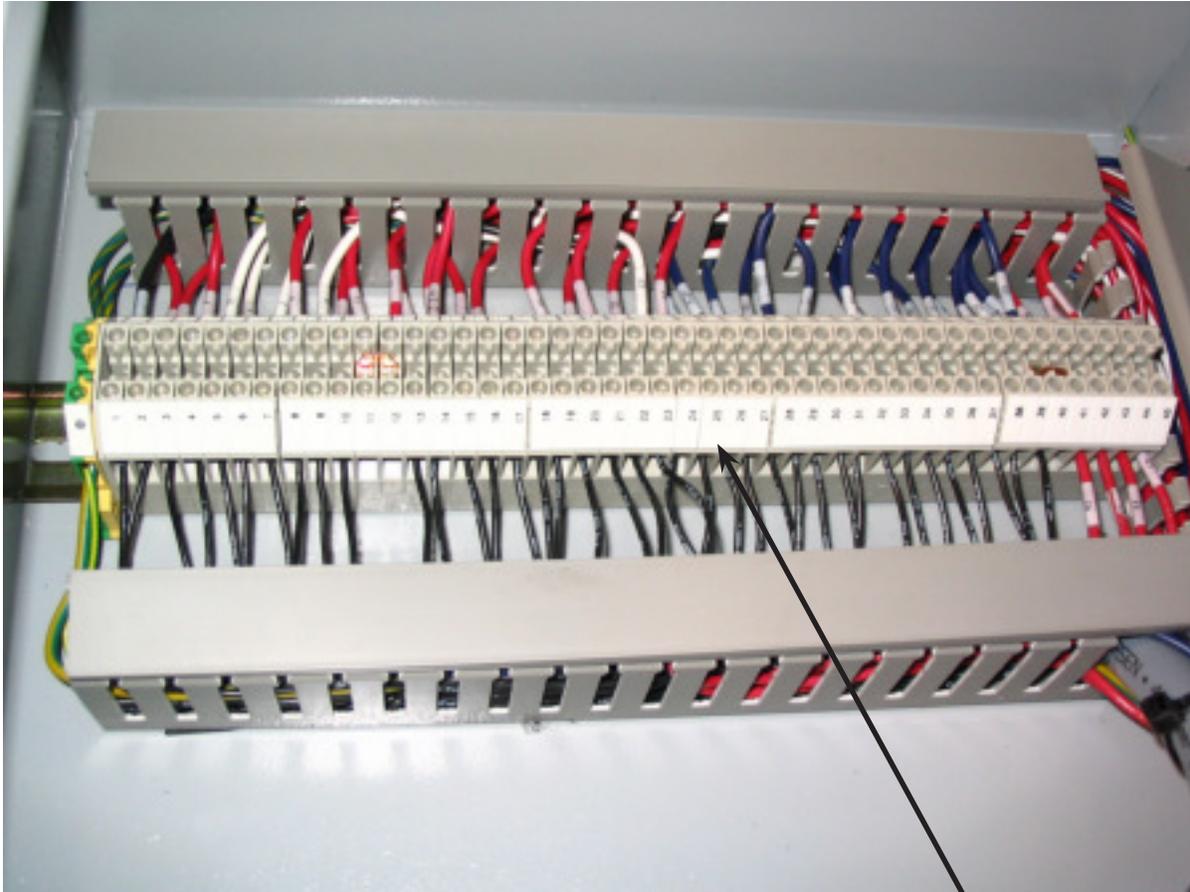
TB6
1

TB6
2

TB6 Contains ground terminals (partially visible) mounted either side of the contactors MS1M & MS2M and are indicated on the schematic as TB6 & TB6
1 2

The mounting location in the control panel is shown on page 1

TB4



TB4
25

TB4 is located in the HMI panel (Human Machine Interface). This houses the selector switches and push buttons.

As in the main panel the same concept applies, for example: TB4
25

This indicates that the terminal is located on din rail TB4 and is terminal #25.

DT (Device Tag)

The remainder of the components in the control panel are labeled and are referred to in the documentation under the DT heading. For example:

DT, CR4 is the control relay labeled CR4.

DT, LS2 is the limit switch for Head Advance function.

DT, MS 1M is the contactor labeled MS 1M.

DT, SS4 is the selector switch for Head Control.

Page and Row Numbers

In each title block of the project (electrical documentation) there are 2 headers, which are:

1. Page. This refers to the current page number
2. Pg. This refers to the total number of pages in the entire project and is for internal HYD·MECH use only.

On each Page there are a row of 4 digit numbers on the left of the page.

For example, Page 14 shows the numbers from 1400 to 1439.

The first 2 digits refer to the page number, which in this case is page 14.

The latter 2 digits refer to the row number, which in this case are from 00 to 39.

Whenever the electrical schematic shows a target to another page then the method described above should be used to locate the component, device, wire etc.

The same format applies when reading the wire list or cable list as the page and row number are included on the list.

**For Electrical Schematics and Components Parts List
See PDF on Attached CD**

SECTION 5 - HYDRAULIC SYSTEM

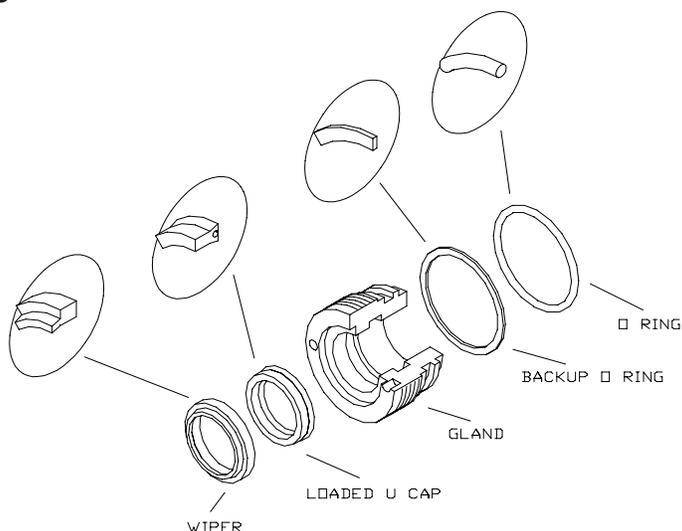
The V18 APC hydraulic system does not require any special work on a new machine before its start-up. The hydraulic tank is filled with Texaco Rando HD 46 oil and all machine functions have been tested at the factory to ensure the proper operation upon initial start-up.

HYDRAULIC PARTS LIST

| ITEM | PART # | DESCRIPTION |
|-------------|---------------|---|
| 1 | VW18-C3A-00B | Front Vise Cylinder |
| 2 | V18A-C3A-00B | Shuttle Vise Cylinder |
| 3 | S25-C5-00 | Assembly, Cylinder, Blade Tension |
| 4 | 50002992 | Guide Arm Cylinder |
| 5 | V18L-C8-00 | Head Swing Brake Cylinder |
| 6 | 50002219 | Swing Cylinder |
| 7 | 50001504 | Bundling Cylinder |
| 8 | V18A-C1-00A | Shuttle Cylinder |
| 9 | V18A-C22-00A | Assembly, Cylinder, Datum V18A |
| 10 | 801174 | Assembly, Ddf Valve, V18, DDF5-0-00 |
| 11 | 808424 | Block, Manifold 6-Position, MB6PA |
| 12 | 808422 | Block, Manifold, 2-Position, MB2P_B |
| 13 | 363160 | Valve, Cartridge PV2P-A-C |
| 14 | 363155 | Valve, Cartridge, PRV2-10-S-0/20 |
| 15 | 363160 | Valve, Cartridge PV2P-A-C |
| 16 | 363145 | Valve, Cartridge Prv1 With Body, PRV1-10-K-6T-6 |
| 17 | 363185 | Valve, Directional, DG4V-3S-2A-MUB5-60 |
| 18 | 363295 | Valve, Sandwich, DCV3P-AB-T |
| 19 | 363290 | Valve, Sandwich, DCV3P-AB-C |
| 20 | 363300 | Valve, Sandwich, DPCH-1 |
| 21 | 811070 | Check Valve, Single Pilot, SPCH-1 |
| 22 | 363313 | Holding Valve, CBCA-LIN |
| 23 | 363314 | Inline Valve Block, YEI |
| 24 | 811571 | Block, Cushion , Swing, V18-CHB-15 |
| 25 | 800514 | Block, Cushion .025 in., CHB-25C |
| 26 | 362722 | Tapping Plate |
| 27 | 801229 | Extension Block, EB-02 |
| 28 | 801230 | Extension Block, EB-03 |
| 29 | 360745 | Gauge, Pressure 1000 Psi |
| 30 | 360747 | Gauge, Pressure 1500 Psi |
| 31 | 395410 | Motor, Hydraulic, MG06 |
| 32 | 363110 | Tank Component, Suction Strainer |
| 33 | 363105 | Tank Component, Return Filter Element, 10 Micron Rating |

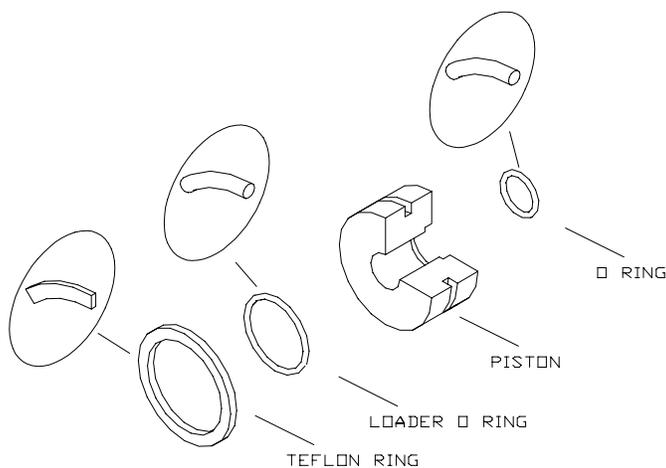
CYLINDER ASSEMBLIES

GLAND ASSEMBLIES



| CYLINDER DIAMETER | E O RING | F BACKUP O RING | G GLAND | H LOADED U CAP | I WIPER |
|-------------------|----------|-----------------|-------------|----------------|---------|
| 2.0" | 362960 | 362785 | CS20-GL-01A | 362830 | 363330 |
| 2.5" | 362970 | 362790 | CS25-GL-01B | 362815 | 363335 |
| 3.0" | 362985 | 362795 | CS30-GL-01A | 362815 | 363335 |
| 3.5" | 362995 | 362800 | CS35-GL-01A | 362835 | 363340 |
| 4.0" | 363005 | 362805 | CS40-GL-01A | 362840 | 363345 |
| 5.0" | 363015 | 362810 | CS50-GL-01A | 362840 | 363345 |

PISTON ASSEMBLIES



| CYLINDER DIAMETER | A TEFLON RING | B LOADER RING | C PISTON | D O-RING |
|-------------------|---------------|---------------|-------------|----------|
| 2.0" | 363035 | 362950 | CS20-PS-01B | 362905 |
| 2.5" | 363040 | 362965 | CS25-PS-01 | 362910 |
| 3.0" | 363045 | 362980 | CS30-PS-01 | 362910 |
| 3.5" | 363050 | 362990 | CS35-PS-01 | 362925 |
| 4.0" | 363055 | 363000 | CS40-PS-01 | 362940 |
| 5.0" | 363060 | 363010 | CS50-PS-01 | 362940 |

**HYDRAULIC SCHEMATIC AND PLUMBING DIAGRAM:
SEE PDF ON ATTACHED CD**

SECTION 6 - MECHANICAL ASSEMBLIES

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

SECTION 7 - OPTIONS

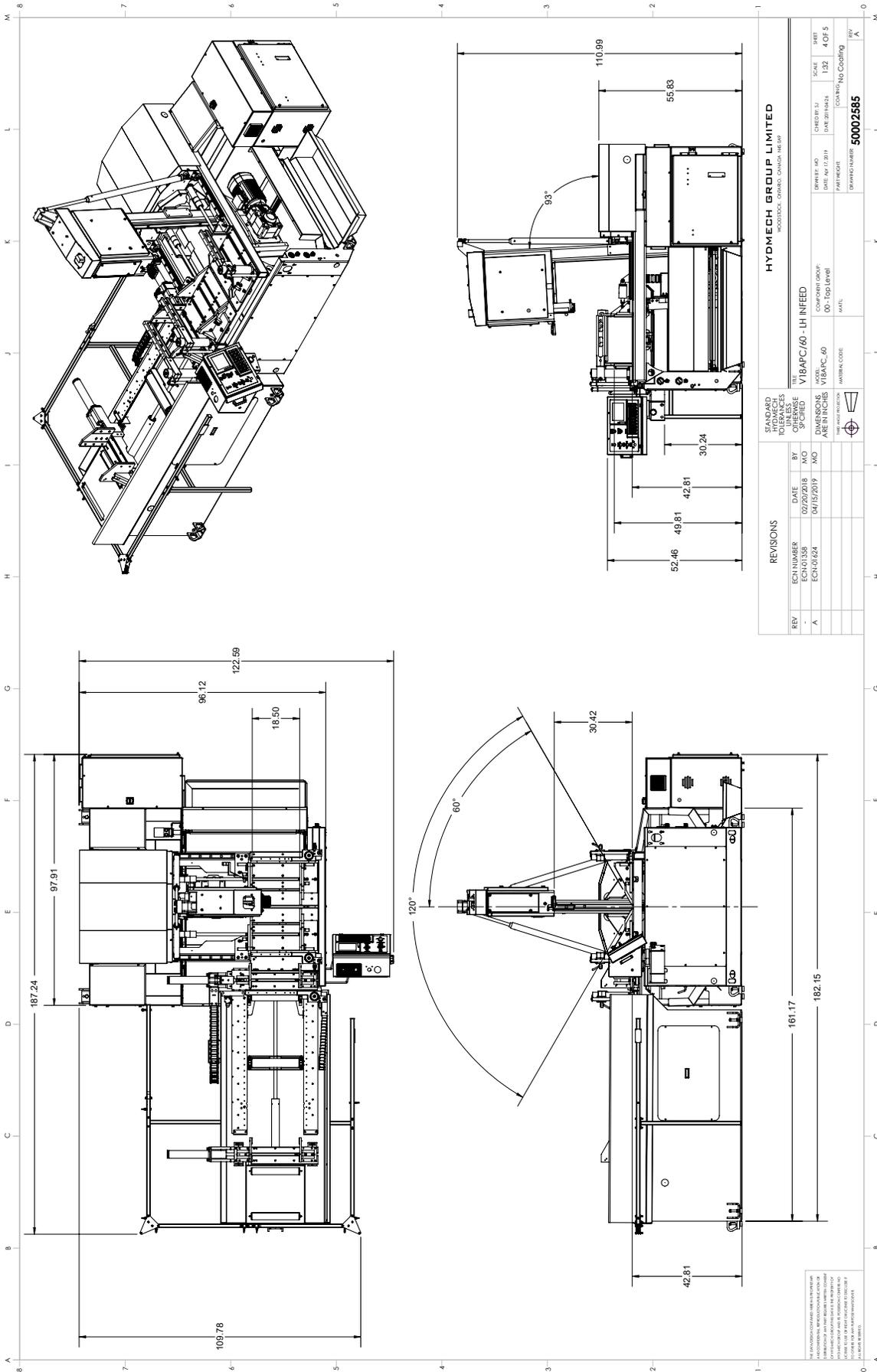
OPTIONAL ASSEMBLY DRAWINGS: SEE PDF ON ATTACHED CD

SECTION 8 - SPECIFICATIONS

V18APC SPECIFICATIONS

| V18APC-60 BANDSAW SPECIFICATIONS | | | |
|---|--|--|------------------------------|
| Capacity | HEAD CANT | STRAIGHT HEAD | 3 DEGREE |
| | at 90° rectangular | 18" x 23" (457mm x 584mm) | 18" x 22" (457mm x 558mm) |
| | at 90° round | 18" (457mm) with tall vise insert option | |
| | at 45° rectangular | 18" x 16" (457mm x 406mm) | 18" x 14.75" (457mm x 374mm) |
| | at 30° rectangular | 18" x 10.25" (457mm x 260mm) | 18" x 9" (457mm x 228mm) |
| | | WITH BUNDLING OPTION | |
| | at 90° rectangular | 18" x 12" (457mm x 305mm) | |
| | at 45° rectangular | | |
| | at 30° rectangular | | |
| Blade | Length | 16'11" (5157mm) | |
| | Width | 1 1/4" (31.75mm) | |
| Blade Tension | Hydraulic | | |
| Blade Speed | variable | 65 - 385 sf/min (20 - 118 m/min) | |
| Blade Guides | carbide inserts | | |
| Blade Wheel Dia. | 19" (483mm) | | |
| Motors | blade drive | 7 1/2 HP (5.6 KW) | |
| | hydraulic pump drive | 2 HP (1.5 KW) | |
| Pumps | Hydraulic | 6 1/2 U.S. Gal. / min (25 Liters / min) | |
| | Coolant | 3 1/2 U.S. Gal. / min (13 Liters / min) | |
| Vises | hydraulic full stroke | | |
| Head Swing | hydraulically positioned and locked, full 60° left or right | | |
| Table Height | 44" (1117mm) | | |
| Feed System | variable pressure 0-300 PSI (0-2068 kPa), variable rate 0-15 in/min (0-380 mm/min) | | |
| V18APC-60 only | Hydraulic 40" multi index bar feed | | |
| System Pressure | 900 PSI (6200 kPa) | | |
| Tank Capacity | Hydraulic | 8 US Gallons (30 Liters) | |
| | Coolant | 30 US Gallons (114 Liters) | |
| Guide Arm | hydraulically positioned and locked | | |
| Machine Weight | 9000 lbs (4082 kg) Main Machine: 6000 lbs (2721 kg) Infeed: 3000 lbs (1361 kg) | | |
| Overall Dimensions | 112" (2845mm) high @ 90° x 123" (3124mm) wide x 188" (4775mm) long | | |

V18APC LAYOUT LH (CANTED HEAD)

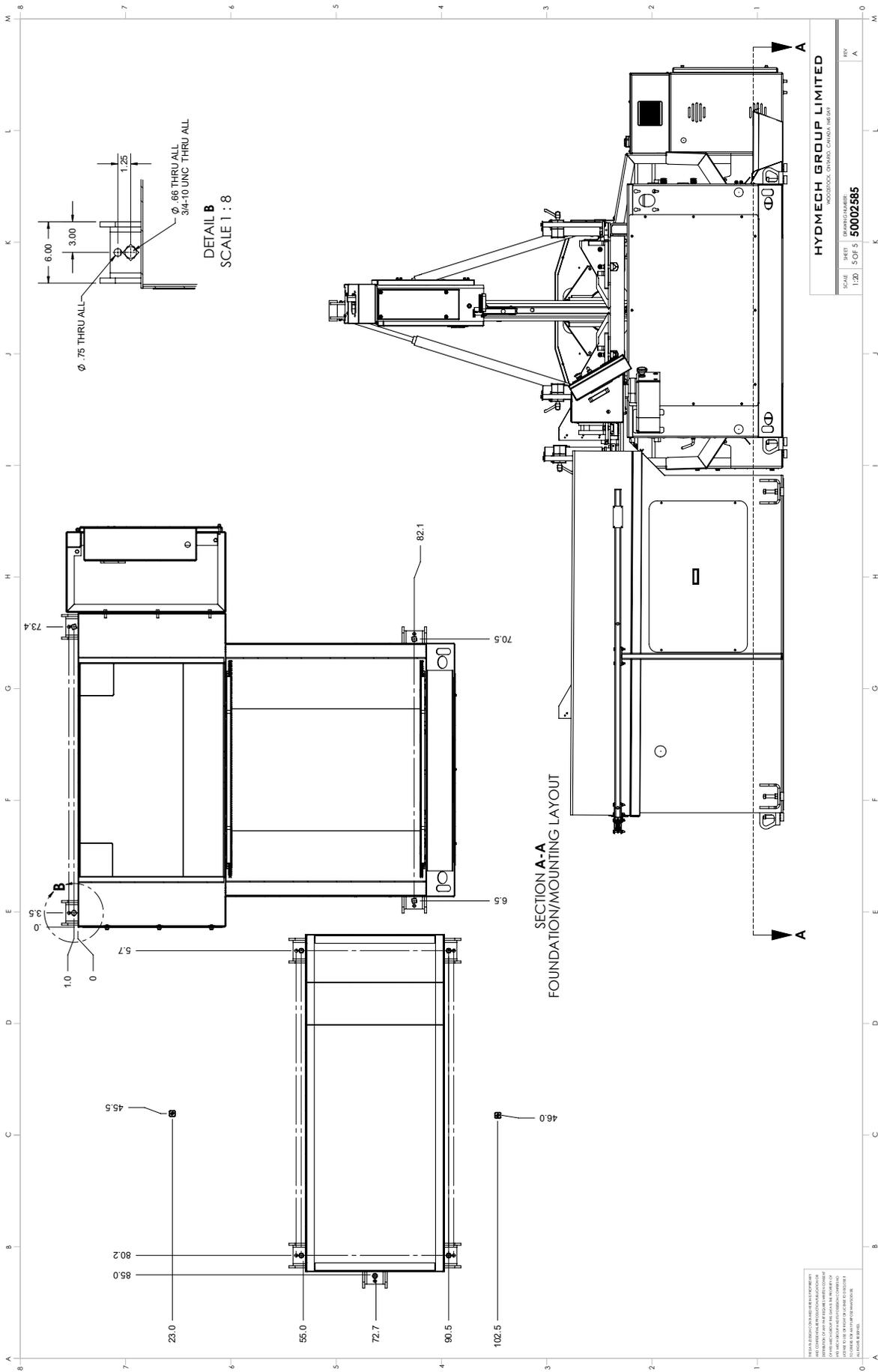


| REVISIONS | | DATE | | BY | |
|-----------|------------|------------|-----|----|--|
| REV | ECH NUMBER | 02/20/2018 | N/O | | |
| A | ECH-01624 | 04/15/2019 | MO | | |

| HYDMECH GROUP LIMITED | | | | | |
|-----------------------------------|------------------------|------|-----------------|--------------------|------|
| WOODBROOK, ONTARIO, CANADA, M2W3W | | | | | |
| TITLE | V18APC/60 - LH INFEEED | | | | |
| DESIGNED BY | MO | DATE | 04/17/2019 | CHECKED BY | LI |
| DRAWN BY | MO | DATE | 04/30/2018 | SCALE | 1:32 |
| PART NUMBER | V18APC_60 | | COMPONENT GROUP | 00 - Top Level | |
| MATERIAL CODE | | | MATERIAL | CONTROL NO COATING | |
| EXPANDED NUMBER | 50002585 | | | | |

| STANDARD DIMENSIONS TO BE MAINTAINED UNLESS OTHERWISE SPECIFIED | |
|---|--|
| ARE IN MILLIMETERS | |
| DIMENSIONS ARE TO UNLESS OTHERWISE SPECIFIED | |
| FINISHES ARE TO UNLESS OTHERWISE SPECIFIED | |
| ALL DIMENSIONS ARE TO UNLESS OTHERWISE SPECIFIED | |
| ALL DIMENSIONS ARE TO UNLESS OTHERWISE SPECIFIED | |





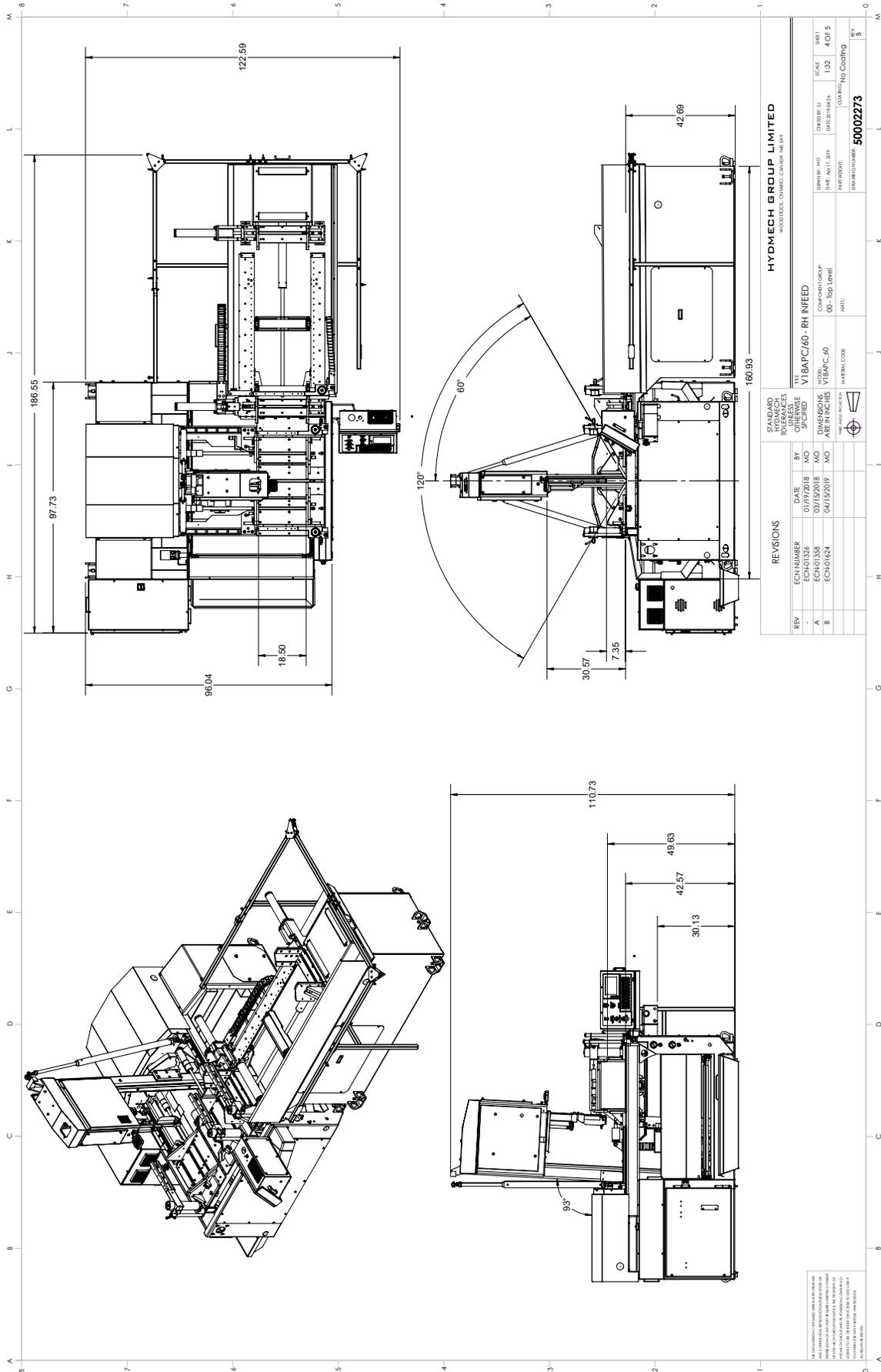
SECTION A-A
FOUNDATION/MOUNTING LAYOUT

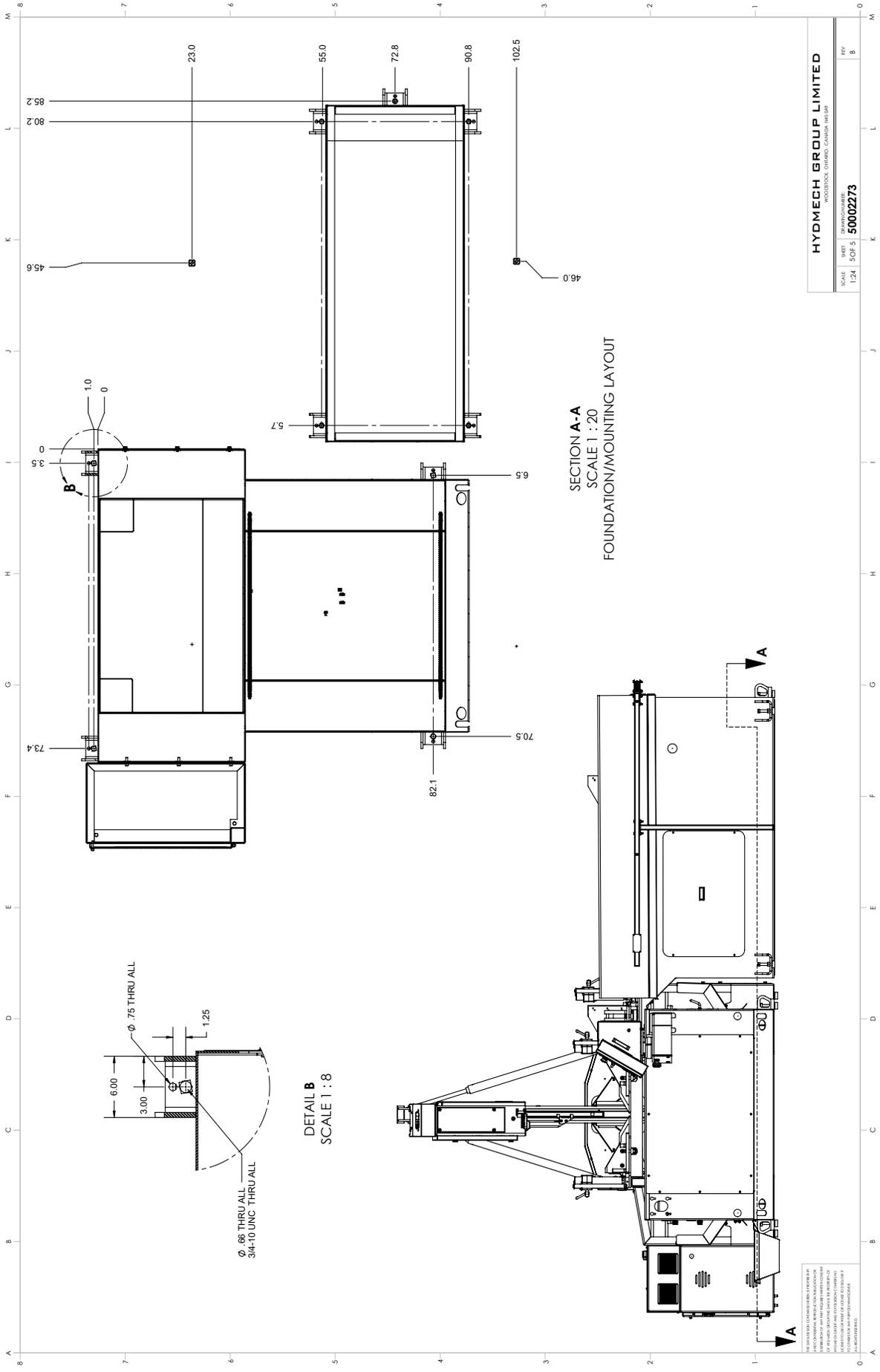
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| | |
|-------------------------------------|-----|
| HYDMECH GROUP LIMITED | |
| INDUSTRIAL, ONTARIO, CANADA M9B 6P9 | |
| SCALE | REV |
| 1:20 | A |
| SHEET 5 OF 5 50002585 | |



V18APC LAYOUT RH (CANTED HEAD)





SECTION A-A
SCALE 1 : 20
FOUNDATION/MOUNTING LAYOUT

DETAIL B
SCALE 1 : 8

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| | |
|------------------------------------|-------------|
| HYDMECH GROUP LIMITED | |
| WOODBOCK, ONTARIO, CANADA, M1E 5B4 | |
| PROJECT | 50002273 |
| SCALE | 1:24 |
| DATE | SEP 15 2011 |
| DRAWN BY | B |
| CHECKED BY | B |

SECTION 9 - WARRANTY

WARRANTY

Hyd-Mech Group Limited warrants parts/components on each new V18APC bandsaw to be free from failure resulting from defective material and workmanship under proper use and service for a period of two years following the date of shipment to the user. 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 V18APC, 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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