

V-25APC 393209

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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HYDMECH

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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 unrestrained long hair, loose clothing or jewelry.
- · Wear all required personal protective equipment.
- Not to wear gloves within 24 inches of moving blade.
- Maintain a clean working area and machine.
- Always use Lock-out when performing maintenance or repairs.



FOREWORD

Put Safety First!

This Safety Section contains important information to help you work safely with your machine and describes the dangers inherent 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 take stock of your situation. Review the safety hazards associated with what you are doing. That should get your brain working again.

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

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

Mandatory Information

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

Section 0 SAFETY

Section 2 OPERATING INSTRUCTIONS

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

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

Signatures

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

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

Name	Date	Signature

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

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

Name	Date	Signature



BASIC RULES

Intended Use

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

Exclusion of Misuse

Misuse includes, for example:

Sawing hazardous materials such as magnesium or lead.

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

Operating the machine without all original safety equipment and guards.

Liability

The machine may only be operated:

When it is in good working order, and

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

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

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

RESPONSIBILITIES OF THE OWNER

Organization of work

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

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

Choice and qualification of personnel

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

Training

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

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



Define responsibilities

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

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

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

Condition of Machine and Workplace

Ensure that the machine and its safety equipment 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, jewelry, protective equipment

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

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

Gloves

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

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

Wear protective gloves when handling bandsaw blades at blade changes.

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

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

Hearing protection

Ear protection must be worn whenever necessary.

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

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

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

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

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

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

Residual Risks

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

The line side of the disconnect switch itself remains energized.

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

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

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

SAFETY HAZARD LABELS

The safety hazard labels attached to your machine represent important safety information to help you avoid personal injury or death.

All supervisors, operators, and maintenance personnel must locate and understand the safety information associated with each hazard label prior to operating or servicing the machine.

The safety hazard labels shown below are located at various positions on the machine to indicate possible safety hazards. The location and re-order part number of all the safety labels associated with this particular model of bandsaw are indicated at the end of this section of the manual. It is important to replace any safety hazard label that becomes damaged or illegible.

HAZARDOUS VOLTAGE INSIDE



Contact with high voltage may cause death or serious injury. Never perform maintenance on, or near, electrical components until the machine's electrical power source has been disconnected. Lock-out power in accordance with your company's lock-out procedures before any such maintenance. The "Stop" or "Emergency Stop" push button does not disconnect the machine's power supply. Hazardous voltage is still present in the machines electrical circuits.

The machine's Electrical Disconnect Switch does disconnect voltage from the machine's circuits; however hazardous voltage is still present inside the main electrical cabinet, on the infeed (line) side of the main fuses. Therefore keep hands

and tools away from the infeed side of the control panel main fuses. If these fuses need to be replaced, use a fuse puller. Allow three minutes after locking-out power before opening any electrical enclosures. Your machine may be equipped with a variable frequency drive that stores high voltage within its capacitors. Three minutes will allow sufficient time for this voltage to safely discharge.

Never spray coolant directly at electrical components or cabinets.



MOVING BANDSAW BLADE WILL CUT



Do NOT operate with guard removed.

Do NOT place hands or fingers near moving bandsaw blade.

For blade changing, always follow the proper Blade Changing Procedure, as given in Section 3 of this manual.

PINCH POINT

Machine parts may move without warning, 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.





LOCATION AND PART NUMBERS OF SAFETY HAZARD LABELS ON V-25APC





DANGER Hazardous voltage inside Item N0. 391938







DANGER Moving bandsaw blade will cut Item N0. 391937

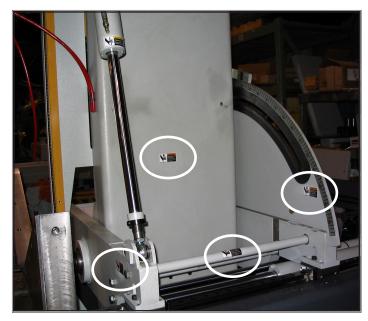
The following pictures on the next page show the locaton of label: WARNING Pinch Point





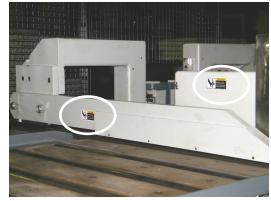
WARNING Pinch Point Item No. 392801





















The following pictures show the locaton of label: DANGER. Moving parts can crush and cut. Keep hands clear.



DANGER
Moving parts can crush and cut. Keep hands clear.
Item N0. 391335









The following pictures show the locaton of labels :

1. DANGER. Moving parts can crush and cut. Keep hands clear.

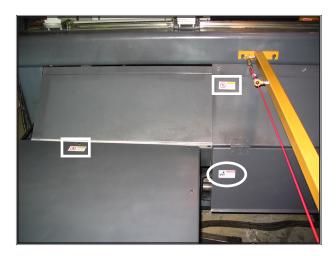


2. CAUTION. Do NOT step or stand on this surface.















CAUTION
Do NOT step or stand on this surface.
Item N0. 391632





SECTION 1 - INSTALLATION



SAFETY CONSIDERATIONS

All safety precautions must be observed during installation, operation, or repair work on the V-25 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 must 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 V-25 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 V-25 APC.

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

The V-25 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's prior approval. Any approved modifications shall be performed by trained personnel.



V-25 APC LIFTING AND SHIPPING

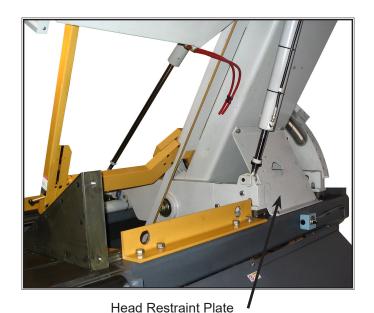
The shipping weight of the V-25 APC is 10000 lb. The front-to-rear location of the centre of gravity is midway between the chain holes on the lifting angles. Side-to side the centre of gravity is about 7" to the right of the centre line of the saw table. With the left hand barfeed, the centre of gravity will be about 5" forward and 5" to the left of the normal position.

CRANE

Before lifting with a crane, the head must be retracted, swung to 64° right, and locked in position using the supplied head restraint plate and four ½ NC bolts. The upper guide arm must be fully lowered.

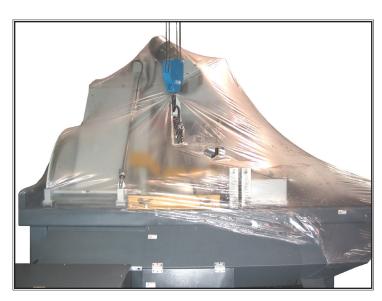
Four chains should be connected to the four holes in the lifting angles which bolt to the table rails as shown in the illustrations. Chain lengths must be carefully adjusted so that the crane is above the centre of gravity, and the chains, when tightened, do not contact any part of the head or guide arm.

NOTE: The head restraint plate and two lifting angles must be removed before machine start up.





Lifting Angles (x2)

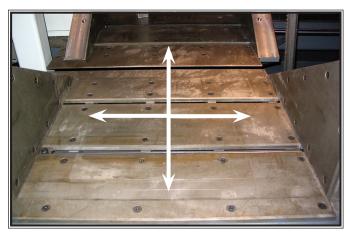




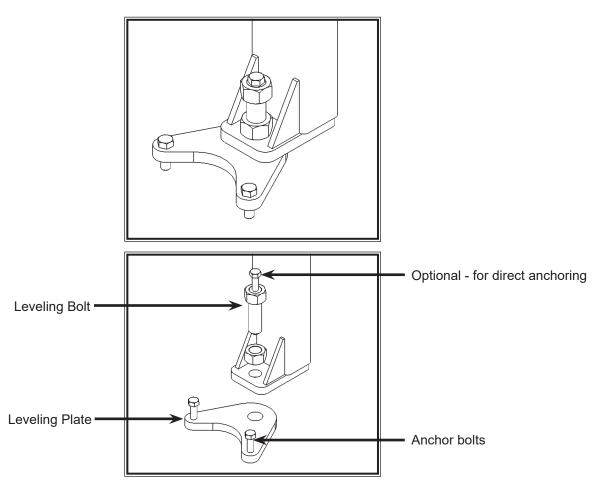


LEVELING THE V-25 APC

It is important that the V-25 APC sit solidly on all four leveling bolts, and that the saw table be level. The V-25 APC is stable in all head positions, and it is not necessary to bolt the saw directly to the floor. The leveling plates provided have a dimple for the leveling bolt to sit in, and two holes for lagging the plate to the floor. As long as at least two plates are lagged with two bolts each, the saw will be positively located. The advantage of this approach is that an accidental collision with the saw may pop the saw out of the dimples, but damage to the saw and the lagging is minimized. Leveling is checked by applying an accurate bubble level to the saw table, checking level both front-to-rear and side-to-side. Lock the level using the jam nuts on the leveling bolts.



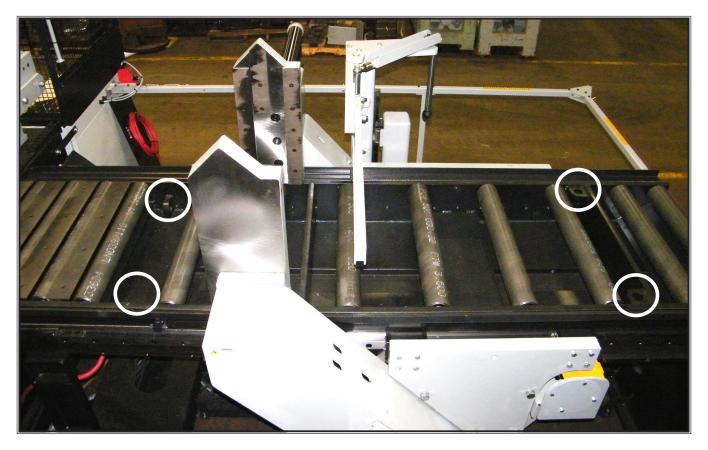
At least two of the leveling feet should be anchored to the floor.



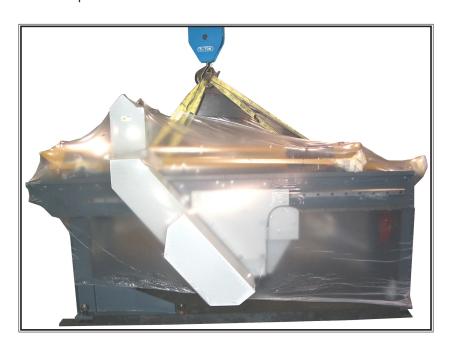


BARFEED INSTALLATION

- 1. The shipping weight of the 5' barfeed is 5000 lb, and the 10' barfeed is 6500 lb.
- a) There are four lifting eyes welded to the barfeed for lifting.



- b) Before lifting with a crane, the lifting straps or chains should connected to the lifting eyes. The strap/chain lengths must be carefully adjusted so that the shuttle is balanced when lifted.
- c) Lift the barfeed and slide it into position towards the machine.





2. Place the 6 levelling plates for the barfeed under each of the levelling bolts, then lower the barfeed to the ground in line with the machine. Remove the cable trough, cable track, and the associated hoses and cords from the machine coolant tray. Place the cable trough into position under the barfeed. Slide the cable track and bundle of hoses/cords under the front end of the barfeed and into the cable track.



3. Connect the three lower struts that assemble the front leg of the barfeed to the saw. The finished gap between the front plate of the conveyor and the rear plate of the machine is to be 5/8" +/- 1/8". The alignment between the barfeed and machine should be checked quickly with a 10' piece of cold rolled flat bar or a laser. Adjust the struts if necessary.







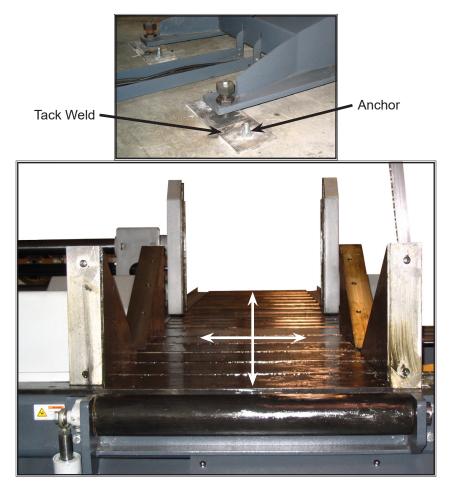


4. The six levelling plates should be lagged to the concrete floor with $\frac{3}{4}$ " x $4\frac{3}{4}$ " heavy duty concrete wedge anchors and strong tack welds should be placed at all six areas.

As mentioned earlier, the conveyor should be leveled in both directions; across and along the infeed conveyor. Six leveling screws are provided, three down each length of the conveyor.

Leveling is checked by applying an accurate bubble level to the saw table, checking level both front-to-rear and side-to-side. Lock the level using the jam nuts on the leveling bolts.

NOTE: Leveling the infeed conveyor with a slight slope towards the blade will prevent coolant from running down the raw stock.



5. At the barfeed front leg, connect hose 151 to the cap port of the shuttle lift cylinder and hose 152 to the gland port.





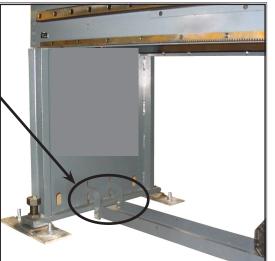
6. The cable trough is located by four L-shaped brackets; two hooked into each front and rear conveyor legs. Fasten two of the brackets to the front end of the cable trough and then place them into the slots at the front conveyor leg. Slide the other two brackets through the slots of the rear leg and fasten them to the cable trough. Install the two capture bolts to the brackets on the outside of the rear leg.





Capture bolts for the bracket are on the back side of the rear leg.







7. The barfeed coolant drain line is tied to the front leg. Cut and route through the cable trough into the chip tray of the saw. Be careful to not interfere with the travel of the chip paddle.



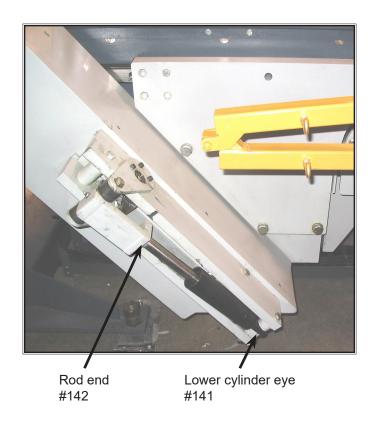


8. Fasten the cable track upper bracket to the back of the carriage box centre.



9. Remove the datum vise toggle cover - three 3/8 NC bolts on top, and two 3/8 NC bolts on the underside. Install the rod end of the cylinder with the 1/2 NF x 1.50 socket bolt. Fasten the lower cylinder eye with the 1/2 NC x 4.50 hex bolt. Zip tie the cylinder hoses (141 and 142) to the bottom of the carriage box centre. Re-install the datum vise toggle cover.





10. Feed the hoses for the movable vise cylinder (#61 and #62) along with the out-of-stock limit switch cord (C23) up along the movable vise post. Connect hose #62 at the needle valve and hose #61 at the cylinder gland. Connect cord C23 to the out-of-stock limit switch.

Hose #62 - Needle Valve

Hose #61

C23 - Out-of-stock limit switch



11. Remove the shuttle servo motor cover - three 3/8 NC bolts on top, and two 3/8 NC bolts on the underside. Connect the three carriage position limit switch cords: #18, #17, and #19 from top to bottom. Install the proxy cable (P1) to the M12 proxy extension. Connect both the large servo power cord and the smaller servo encoder cord. Hydraulic hose 131 and 132 will need to be installed if the machine is equipped with the barfeed bundling option (See Below). Bundle and zip tie cords and cables to the to the carriage box. Re-install the shuttle servo motor cover.

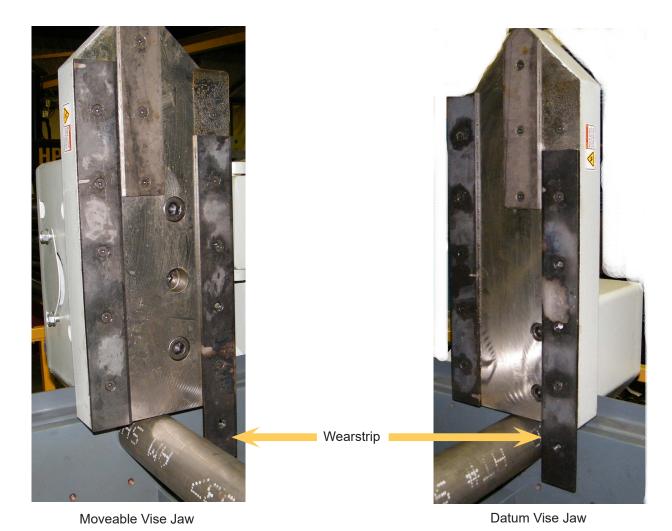




V25APC SHUTTLE FIXTURE

For shipping and installation purposes the shuttle has been fixed to prevent it from moving. After step 11 implement the outlined steps.

12. Wearstrips mounted on both the shuttle vise jaws have been re-positioned to hold the shuttle.

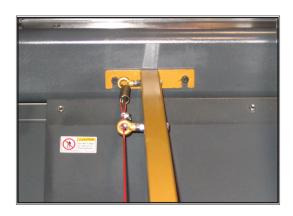


- 13. Using 3/16 hex key, remove the 5/16 bolt socket cap screws from the wearstrip on the movable vise jaw, re-position the wearstrip and re-insert the 5/16 bolt socket cap screws and tighten. (Extra screws are attached to the product manual)
- 14. Repeat step #2 for the datum vise jaw.
- 15. Removal of the shuttle fixture is complete.

16. Fasten the rear guard rail to the barfeed rear leg with the provided fasteners.



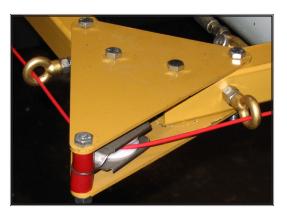
17. Fasten the shuttle datum side guard to the machine with the bolts provided.



18. Fasten the shuttle movable side guard to the control console with the provided hex bolts. Fasten the trip wire control box to the safety guard with the four socket head cap screws.



19. 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.





20. Attach the eyebolt to the shuttle datum side guard. Fasten the wire rope to the spring and then proceed to feed it through the eyebolts and pulleys along the guide rail. Loop the other end of the wire rope around 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.

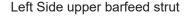


The machine can now be powered up (See the following page for wiring connections) **NOTE:** The head restraint plate and two lifting angles must be removed before machine start up.

21. The upper barfeed struts need to be assembled once the machine is powered up. The conveyor will need to be moved back out of the way in order to screw in the mounting bar. The desired gap between the front plate of the conveyor and the rear plate of the machine is to be 5/8" +/- 1/8".









Right Side upper barfeed strut

22. The barfeed should now be fully aligned to the machine with the use of a dial gauge and a piece of cold rolled flat bar +/- 1/16" over a 10' length. Refer to the Performance Testing Procedure supplied by your dealer.

Once alignment is complete:

- 1. Tighten the lock nuts of both the lower turnbuckles and upper struts.
- 2. Check that the levelling bolt nuts are tight.
- 3. Weld the levelling feet to the adjustment plates.



BARFEED BUNDLING OPTION

Two hydraulic hoses will need to be connected to the shuttle bundling cylinder:

Hose 132 to the Cap Port.

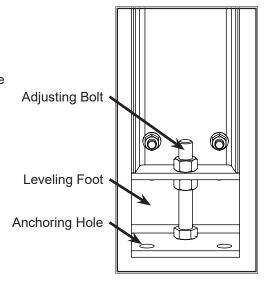
Hose 131 connected to 131A at a union coupling (Gland Port). The coupling is located towards the bottom (cap port) of the cylinder.



132 - Cap Port

CONVEYOR INSTALLATION (OPTIONAL)

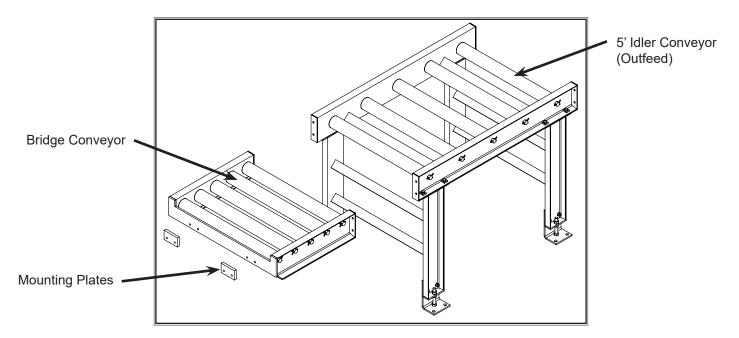
Optional conveyors can be added once the machine and barfeed are installed and set up. The conveyors are offered in 5' or 10' sections that are either idler or powered. The height of all conveyors can be aligned with the machines table height by adjusting the leveling feet.





OUTFEED CONVEYOR

A bridge conveyor is supplied and needs to be installed anytime an outfeed conveyor is to be used. It is used to close the gap between the saw and the conveyor. One end fastens to the outfeed conveyor, and the other end is attached with mounting plates that are welded to the saw base.



INFEED CONVEYOR

The infeed conveyor is free standing. It needs to be aligned and levelled to the machines barfeed.

POWERED CONVEYORS (Refer to electrical schematics)

Each powered conveyor will have an electrical conduit coming from the control console that needs to be connected in to the conveyors drive motor. (Refer to the provided electrical schematics) The user will have push buttons on the control console to move the conveyor either forward or reverse. Each movement can be performed in either Fast or Slow speed.

CUTTING FLUID

As the V-25 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.

HYDRAULIC OIL

The V-25 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.



WIRING CONNECTIONS

After the machine is levelled 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. Route the power conduit/cable through the hole and up to the disconnect.

BEFORE START-UP THE FOLLOWING TWO POINTS SHOULD BE CHECKED

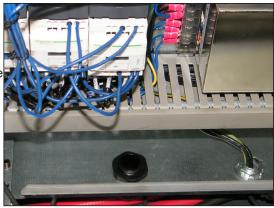
- **1.** Signs of damage that may have occurred during shipping to the electrical cables and the hydraulic hoses.
- **2.** The hydraulic oil level is between the upper and lower levels on the gauge.

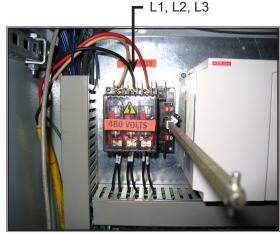
As supplied, the machine is set to run on three phase voltage as indicated on the serial plate and voltage label.

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 above the fuse holders as shown in the photo.





BLADE TENSION CHECK

When the machine is first started, the blade position must be checked. Check that the blade teeth do not project more than 1/4" beyond the front face of both the drive and idler wheel. If it is consult "Blade Tracking" in Section 3. If it has stayed in it's correct position, then check that the blade tension switch is in the "+" position and close the door.



Blade tension switch

EARTH GROUNDING PROCEDURE

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



SECTION 2 - OPERATING INSTRUCTIONS

E1060 Interface Operation Instructions

PLC 500 CONTROL SYSTEM

OPERATION OVERVIEW

The PLC is a programmable logic controller that allows the operator to run the machine in both manual and automatic modes.

The control panel is divided into four parts: MANUAL ONLY on the left; MANUAL & AUTO in the centre; MACHINE on the right; and NUMERIC and CURSOR keys at the top right. All of these as well as the EMERGENCY STOP button detailed descriptions follow.

To power up the control panel, the EMERGENCY STOP button must be pulled out. The display screen will scroll through several screens and finally display in the MANUAL MODE with the display dimmed. Pressing any key will bring the control panel to full ON and the display back light will come ON.

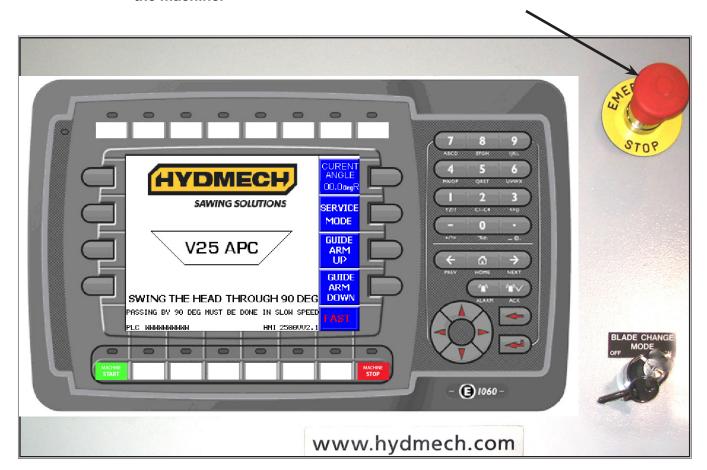
Once the control panel has power, the MACHINE START key must be pressed to activate the interface, which will also start the hydraulic system. Now all of the control keys have been activated and each key has an LED to indicate which functions are active.

In MANUAL MODE, the operator has the ability to execute a single cut utilizing a pre-programmed SINGLE CUT MODE.

In AUTOMATIC MODE, the PLC has the capacity to program and store 1000 jobs. Designated job numbers can be programmed for the quantity required (maximum 999 pieces). Piece lengths range from 0" to 999". Jobs can be run individually or in a QUEUE, which allows a maximum of 20 jobs to run consecutively.

NOTE:

If an emergency situation arises during any operation, use the large red mushroom EMERGENCY STOP button located on the control panel to shut down the machine.





		MANUAL MODE ONLY CONTROLS	
	HEAD CONTROLS		
HEAD SWING RIGHT	HEAD SWING RIGHT	Moving the joystick in this direction will swing the head clockwise and will stop and hold its position if the joystick is returned to the center position. Will not swing unless the Guide Arm is in the full upward position and the Head is retracted fully.	
HEAD SWING LEFT	HEAD SWING LEFT	Moving the joystick in this direction will swing the head counter-clockwise and will stop and hold its position if the joystick is returned to the center position. Will not swing unless the Guide Arm is in the full upward position and the Head is retracted fully.	
MW HEAD RETRACT	HEAD RETRACT	Moving the joystick in this direction will retract the head backward and it will stop and hold its position if the joystick is returned to the center position.	
MV 334 HEAD ADVANCE	HEAD ADVANCE	Moving the joystick in this direction will advance the head forward and it will stop and hold its position if the joystick is returned to the center position.	
FAST	HEAD SWING SLOW / FAST	Pressing this key will cause the head to swing either fast or slow. The red TEXT indicates that the head will move FAST. Pressing the key will switch this function back to SLOW.	
	INFEED VISE CONTI	ROLS	
INFEED VISE OPEN	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	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.	
	SHUTTLE VISE CONTROLS		
SHUTTLE VISE OPEN	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	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 CONTROL	S	
SHUTTLE SHUTTLE REVERSE	SHUTTLE FORWARD	Moving the joystick in this direction will move the shuttle to the front (towards the blade) and will stop and hold its position if the joystick is returned to the center position.	
FAST	SHUTTLE REVERSE	Moving the joystick in this direction will move the shuttle to the back (away from the blade) and will stop and hold its position if the joystick is returned to the center position.	
SHUTTLE FORWARD	SHUTTLE SLOW / FAST	Pressing this key will cause the shuttle to move either fast or slow. The red TEXT indicates that the shuttle will move FAST. Pressing the key will switch this function back to SLOW.	
	OUTFEED VISE CONTROLS		
VISE OPEN	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	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	MANUAL & AUTO MODE CONTROLS	
BLADE START BLADE	BLADE START	Pressing this key will start the blade. The blade will not start if the head is fully forward.	
STOP	BLADE STOP	Pressing this key will stop the blade.	
A P	BLADE SPEED (+)	Pressing the red right arrow navigation key when the blade is running will cause the blade speed to increase until the key is released or the speed is at the maximum (350 SFM). The blade must be running to use this key and the blade speed is shown on the display screen.	
	BLADE SPEED (-)	Pressing the red left arrow navigation key when the blade is running will cause the blade speed to decrease until the key is released or the speed is at the minimum (70 SFM). The blade must be running to use this key and the blade speed is shown on the display screen.	
	GUIDE ARM CONTR		
GUIDE ARM UP	GUIDE ARM UP	Pressing this key will move guide arm up.	
GUIDE ARM DOWN	GUIDE ARM DOWN	Pressing this key will move guide arm down.	
	COOLANT CONTRO	DLS	
COOLANT ON	COOLANT ON	Pressing this key will start the coolant flow. Pressing this key again will stop the coolant flow.	
COOLANT MANUAL AUTO	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	FLOOD / MIST	Pressing this key will toggle between flood and mist cooling system	
	MODE CONTROLS		
SERVICE MODE	SERVICE MODE	The SERVICE MODE allows the user to adjust the various PLC parameters.	
MANUAL	MANUAL MODE	Pressing this key will enable all of the "MANUAL MODE ONLY CONTROLS."	
AUTO MODE	AUTO MODE	Pressing this key will disable all of the "MANUAL MODE ONLY CONTROLS." To enter AUTO MODE, the INFEED VISE must be activated.	



	MACHINE & CYCLE CONTROLS		
MACHINE START	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	MACHINE STOP	Pressing this key will shut down all machine functions.	
CYCLE START CYCLE	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.	
PAUSE	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.	
	MISC CONTROLS		
CHIP CONVEYOR LEFT	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 CONVEYOR RIGHT	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.	
		OPTIONAL EQUIPMENT CONTROLS	
LASER ON	LASER ON / OFF	Pressing this key will cause the LASER to turn on or off. The message on the screen indicates the status of the laser.	
	*** SHUTTLE BUNDLING CONTROLS ***		
SHUTTLE BUNDLING OPEN	SHUTTLE BUNDLING OPEN	Pressing this key will open the shuttle bundling clamp. It will stop and hold its position if the key is released.	
SHUTTLE BUNDLING CLOSE	SHUTTLE BUNDLING CLOSE	Activating this push button (the blue button background will change to black) before entering AUTO MODE will allow the shuttle bundling clamp to work in conjunction with the shuttle vise. The clamp will remain stationary in AUTO MODE if the push button is not activated.	
	*** INFEED BUNDLIN	IG CONTROLS ***	
INFEED BUNDLING OPEN	INFEED BUNDLING OPEN	Pressing this key will open the infeed bundling clamp. It will stop and hold its position if the key is released.	
INFEED BUNDLING CLOSE	INFEED BUNDLING CLOSE	Activating this push button (the blue button background will change to black) before entering AUTO MODE will allow the infeed bundling clamp to work in conjunction with the infeed vise. The clamp will remain stationary in AUTO MODE if the push button is not activated.	
	*** OUTFEED BUNDLING CONTROLS ***		
OUTFEED BUNDLING OPEN	OUTFEED BUNDLING OPEN	Pressing this key will open the outfeed bundling clamp. It will stop and hold its position if the key is released.	
OUTFEED BUNDLING CLOSE	OUTFEED BUNDLING CLOSE	Activating this push button (the blue button background will change to black) before entering AUTO MODE will allow the outfeed bundling clamp to work in conjunction with the outfeed vise. The clamp will remain stationary in AUTO MODE if the push button is not activated. If the bundling is activated during AUTO CYCLE then it will start clamping when the AUTO CYCLE calls for material clamp.	



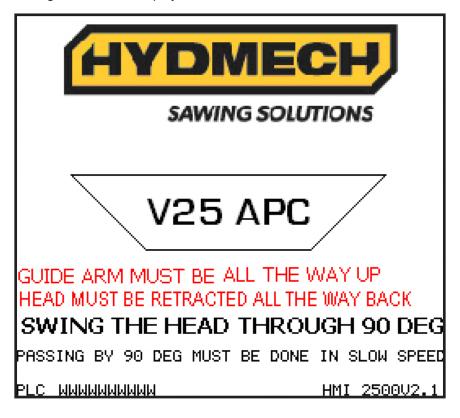
*** NOTE ***

- 1. Make sure that the height of the bundling arm will not create a collision with the head.
- 2. The bundling clamps need to be moved out of the way when material is to be top loaded.

Refer to Section 7 for full details of Bundling Options.

MACHINE START UP

Reset the E-Stop by pulling out the red mushroom button. There is a short delay to allow the machine software to load. Press the machine start button two times: First to wake up the screen saver, and then a second time to start the hydraulics. If the head is not at 90 degrees then the display screen will look as follows.



The following must be done to activate the cutting modes:

- 1. The guide arm must be in full upward position.
- 2. The head must be fully retracted.
- 3. 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 three 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:



INFEED VISE OPEN	MANUAL MODE - Page 1 ANGLE REQUIRED 00.0DecL	OUTFEED VISE OPEN
INFEED VISE CLOSE	CURRENT ANGLE0.000" CURRENT ANGLE 00.0DegR CURRENT LENGTH0.000" BLADE SPEED0.5fm	OUTFEED VISE CLOSE
SHUTTLE VISE OPEN	FEED RATE -0.00 "min BLADE MOTOR LOAD0 %	GUIDE ARM UP
SHUTTLE VISE CLOSE	. COOLANT (FLOOD) IS FLOOD IS SELECTED LASER ON GUIDE ARM MUST BE ALL THE WAY UP HEAD MUST BE RETRACTED ALL THE WAY BACK	GUIDE ARM DOWN
BLADE START	AUTO CYCLE MANUAL PAGE 3 START COOLANT) BUNDLING	FAST

CHIP CONVEYOR	MANUAL MODE - Page 2	COOLANT
LEFT	ANGLE REQUIRED 00.0 DegL LENGTH REQUIRED0.000"	ON
CHIP CONVEYOR RIGHT	CURRENT ANGLE 00.0DegR CURRENT LENGTH0.000" BLADE SPEED0sfm	COOLANT MANUAL AUTO
LASER ON	FEED RATE -0.00 "min BLADE MOTOR LOAD0 %	FLOOD MIST
SHUTTLE HOME	COOLANT (FLOOD) IS FLOOD IS SELECTED LASER IS ON GUIDE ARM MUST BE ALL THE WAY UP HEAD MUST BE RETRACTED ALL THE WAY BACK	KERF
BLADE START	AUTO CYCLE RETURN MANUAL PAGE 3 START (VISES) BUNDLING	FAST

INFEED BUNDLING	MANUAL MODE - Page 3	OUTFEED
OPEN	ANGLE REQUIRED 00.0 Der 1.0000.000	PL OPEN
INFEED BUNDLING CLOSE	CURRENT ANGLE OO Oper	R BUNDLING
SHUTTLE BUNDLING OPEN	FEED RATE -0.00 "/r BLADE MOTOR LOAD0 %	1000 00 00 00 00 00
	COOLANT (FLOOD) IS FLOOD IS SELECTED LASER ON GUIDE ARM MUST BE ALL THE WAY UP HEAD MUST BE RETRACTED ALL THE WAY BACK	SHUTTLE LIFT
BLADE START	AUTO CYCLE MANUAL RETURN PAGE 1 PAGE 1 (COOLAN	FAST

The cursor on the display is flashing on ANGLE REQUIRED. Enter a numerical angle then press the enter button. Left or Right is changed by moving the cursor over to the "L" or "R" and pressing enter. Press the CYCLE START button once the desired angle is chosen. The screen will change and the cycle start push button must be pressed in order to achieve the desired angle.



The screen will change back to manual mode after "ANGLE GO" cycle was completed.

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 pres 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



COLLISION DETECTION FEATURE

Your machine is equipped with a collision detection feature. This feature protects the machine from a collision that happens when the required angle is less than 45 degrees towards the infeed side of the machine, and the shuttle vise is in front position. Your machine is equipped with sensors which will prevent this possible collision and cause the head or the shuttle to stop.



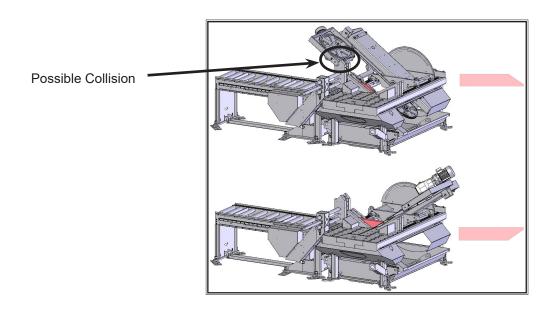
In such cases you will need to retract the shuttle to the back in order to clear the head to go to the required angle. In Manual Mode: It is a good idea to alter the cut if the required pieces involve this scenario. Flip the piece upside down and perform the cut when the head is turned 30 degrees towards the outfeed side of the machine where there is no possible collision as shown in the following example:

Example -1

A rectangular section bar, 30" long, the required cutting angle is 35 degrees.

When the cut is facing upward, a possibility of collision exist, therefore if the shuttle is moved close to the infeed vise, the head will not swing to the required 35-degree angle. This is to prevent a collision as shown below.

To avoid this scenario, turn the piece upside down, and swing the head 35 degrees in the opposite direction.



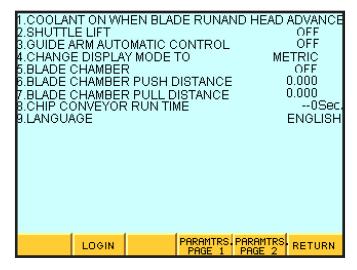


PARAMETERS

The parameters can be accessed by pressing the service mode button on the panel. These parameters can be changed without a password.

1. COOLANT ON WHEN BLADE RUN: / AND HD. AD

In Automatic Mode - Allows the coolant to flow whenever the blade is running or when the blade is running and the head advances.



2. SHUTTLE LIFT: ON / OFF

ON allows the material to be lifted up and away to ensure it will not get caught when it is shuttled forward.

3. GUIDE ARM AUTOMATIC CONTROL: ON / OFF

ON (In Automatic Mode) – The user will be prompted to enter the material height before the cycle will start. This will automatically position the guide arm a couple of inches above the material before every cut.

4. CHANGE DISPLAY MODE TO: METRIC / IMPERIAL

Toggle the display units between metric and imperial.

5. BLADE CHAMBER: ON / OFF

If Blade Chamber is on:

- In the auto cycle, the head will make the cut and continue moving forward until it exits the material.
- Shuttle will move the stock forward (by the distance set in the BLAD CHAM PUSH DIST parameter) and will push away the cut pieces.
- Shuttle will move back allowing the head to retract.
- Head will retract.
- Shuttle will feed the next length to cut.
- The cycle will repeat.

BLADE CHAMBER PUSH DISTANCE

This parameter defines the distance that the shuttle will move forward (behind the table) during the blade chamber cycle.

7. BLADE CHAMBER PULL DISTANCE: # ----

This parameter defines the retract distance that the shuttle will move during blade chamber cycle.

8. CHIP CONVEYOR RUN TIME: # ----

This parameter defines the time that the chip conveyor will run after releasing the chip conveyor button. Chip conveyor will run (extracting the chips) for that preset time (to the right on the left side infeed and to the left on the right side infeed machines). This parameter is not functioning for the reverse mode. The conveyor will move in the reverse direction only when the button is activated, and it will stop after the button is released.



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.

12.SHUTT 13.VISE C 14.INFEEI	NE MODE ARM SEN IT ENCOI LE FULL LE SLOV LE ACCE LE DECE LE BACK VISE OP LE VISE I LOSE TIM D BUNDL	EL NSOR RE DER RES STROKE V SPEED PEED ELERATIO ELERATIO LASH EN DWEI OPEN DV IE ING OPEI	OLUTION IN TIME IN TIME LL VELL N TIME		LEFT 0.000 0.00000 0.000 0 0 0 0.0000 0 	
	BUNDL	ING OPEI			0 0	
16.OUTFEED BUNDLING OPEN TIME0 17.OUTFEED BUNDLING CLOSE TIME0						
	LOGIN	LOGOUT		PARAMTRS. PAGE 2	RETURN	

19.LEFT A	NGLE CO	NSTANT			0.000		
20.RIGHT	ANGLE 0	ONSTAN	Τ		0.000		
21.ANGLE	TARGET	WINDOV	٧		0.000		
22.HEAD :	SWING AG	CELIDEC	EL DISTAI	NCE	0		
23.HEAD :	SWING M	AX SPEEI)		0		
24.HEAD :	SWING S	OFT 90DE	EG O/T		0		
25.HEAD :					0		
26.HEAD :	90DEG SI	ET C252:	=0		NO		
27.BP RAI	DIUS				0.0000		
28.DP RAI	DIUS				0.0000		
29.FEED I	0.0000						
30.BLADE	0.000						
31.BLADE	-Q.OD						
32.BROKE	32.BROKEN PROX •NO						
33.BUNDI	LING				NOME !		
	LOGIN	LOGOUT	PARAMTRS. PAGE 1		RETURN		



PARAMETER	DEFINITION
MATERIAL INFEED	Defines the infeed side of the machine
MACHINE MODEL	Defines vertical (V25APC) or metering (M20APC) models
GUIDE ARM SENSOR RES.	Specifies linear distance of guide arm movement in pulses per inch
LENGTH ENCODER	Specifies linear distance of shuttle movement in inches per one pulse generated
RESOLUTION	by motion controller.
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	Shuttle deceleration time. Time, in milliseconds that the shuttle will decelerate
DECELERATION TIME	from full speed to 0"/s.
SHUTTLE BACKLASH	Backlash value of the shuttle drive system.
FRONT VISE OPEN DWELL	Delay time for the opening of the FIXED 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 FIXED VISE in milliseconds.
INFEED BUNDLING OPEN TIME	Delay time for the opening of the infeed bundling.
OUTFEED BUNDLING OPEN TIME	Delay time for the opening of the outfeed bundling.
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 (ACCEL/DECEL TIME)	Acceleration / Deceleration time.
HEAD SWING MAX. SPEED	Head swing maximum speed.
HEAD SWING SOFT (90 DEG O/T)	Head swing soft over travel
HEAD SWING SOFT (30 DEG O/T)	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 fed 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.
BUNDLINGS	This parameter activates bundling: INFEED = shuttle and infeed bundling OUTFEED =shuttle and outfeed bundling BOTH =shuttle, infeed and outfeed bundlings



OPENING THE FRONT GATE IN MANUAL AND AUTOMATIC MODE

To open the front gate during MANUAL MODE, the following steps need to be done in the following sequence:

NOTE: Before opening the front gate in MANUAL MODE, make sure that the head swing and shuttle movements are not activated. If required, open the vise or bundling before opening the gate.

1. Open the gate.

The following will occur:

- The blade motor will stop if it is running.
- The hydraulic pump motor will stop if it is running.
- Shuttle movement will be disabled.
- 2. Close the gate.
- 3. Press the MACHINE START button.

To open the front gate during AUTOMATIC MODE, the following steps need to be done in the following sequence:

- 1. Press the CYCLE PAUSE button.
- 2. The gate can be opened when the "GATE OPEN ENABLED" message is displayed in the upper right corner of the operator interface panel.

The following will occur:

- The blade motor will stop if it is running.
- The hydraulic pump motor will stop if it is running.
- Shuttle movement will be disabled.
- 3. Close the gate to restart the cycle.

*** If the gate is closed within 25 seconds from opening, then the following message will appear "BLADE+SERVO READY IN xx S". Wait until it counts down to 0 and the message disappears. ***

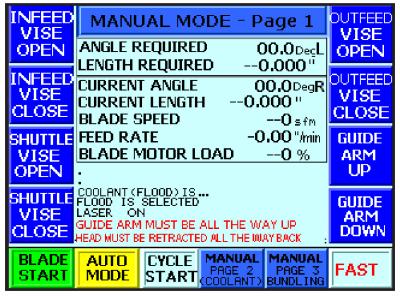
- 4. Press the MACHINE START button. The hydraulic pump will start.
- 5. Press the CYCLE START button.
- 6. Press the BLADE START button. The cycle should continue from the point where it stopped.



ONE CUT MODE OPERATION

In MANUAL mode, the PLC allows the operator to initiate a ONE CUT MODE to cut one piece at a desired length. To accomplish this, follow the procedure below.

- 1. A trim cut should be made before initiating the ONE CUT MODE operation. Key in the required angle using the keypad and cursors, press "AngleGo" button at the bottom of the screen, then CYCLE START button. The head will turn to the required area and stop.
- 2. Press the Infeed Vise Closed push button to activate ONE CUT MODE.



- 3. In the "Length Required" field key in the desired length up to 999" using the numeric keypad and press enter.
- 4. Push the Blade Start button.
- 5. When the blade is started, the word BLADE will change to the words CYCLE START and will be flashing on the display window. Press CYCLE START and the cycle will begin.
- 6. When the cut is completed, the blade will stop, the head will retract back to the limit switch, and the display window will reset for the next cut.
- 7. To cut another piece, repeat steps 2 through 6.

AUTOMATIC OPERATION

To enter AUTO MODE, the Infeed Vise must be in the closed position. When the AUTO MODE key 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.

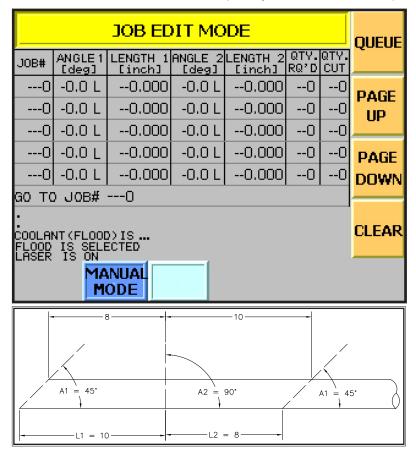
PROCEDURE FOR EDITING OR STARTING A NEW JOB IN AUTO MODE

- 1. In AUTO mode, key in a job number from 0 to 999, the number of pieces to be cut, the number of pieces already cut, and the length, pressing enter after each value. If the number of pieces cut equals or exceeds the number required, the cycle will not start. If the job number has previously been programmed, the number of pieces, length, and number cut will be displayed. To navigate through the values, use the cursor keys. The values displayed may be edited by using the numeric keypad and pressing enter. The job will then be stored in memory with the new values.
- 2. Two angles, and two lengths define each job. Angle 1 (A1) is the first angle to be cut (this will be the trim cut). Length 1 (L1) is the length of the material to be cut as measured between the two intersection points of the blade axis and the saw table datum line. Angle 2 (A2) is the second angle to be cut and Length 2 (L2) again is the length of material as measured between the two intersection points of the blade axis and the table datum line.



- 3. Immediately after entering the AUTO mode, the JOB screen will be displayed with the cursor located at "A1 of JOB #1" (See Below). Both the ENTER button or the cursor key can be used to move through this screen. There are three ways to navigate between pages:
 - PG UP (Page Up) Pressing this key will cause the display to scroll up.
 - PG DOWN (Page Down) Pressing this key will cause the display to scroll down.
 - Go to JOB#. Enter the job number that you want to display/edit and then press enter. The required Job number will be displayed on the screen.

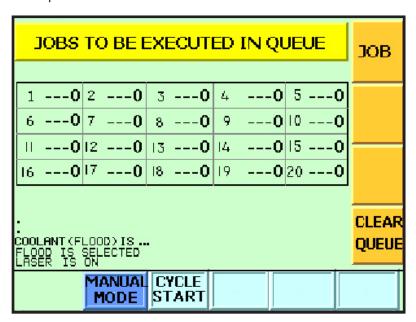
To CLEAR JOB parameters – Move the cursor to the required job number, and then press the CLEAR button.



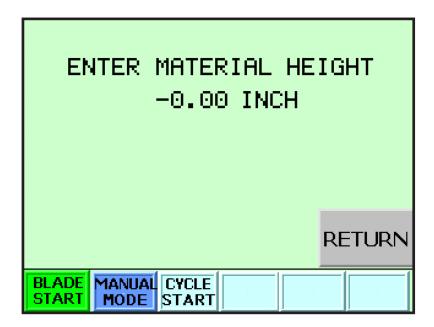
- 4. Enter proper "A1" value, press ENTER and the cursor will move to angle direction letter.
- 5. Press ENTER to toggle between R (right) and L (left). To move to "L1", use the cursor key.
- 6. Enter proper "L1" value, press ENTER and the cursor will move to "A2".
- 7. Enter proper "A2" value, press ENTER and the cursor will move to angle direction letter.
- 8. Press ENTER to toggle between R (right) and L (left). To move to "L2", use the cursor key.
- Enter proper value for "L2", press ENTER and the cursor will move to "REQ".
- 10. Enter required quantity, press ENTER and the cursor will move to "CUT".
- 11. When starting a new job, zero out "CUT" quantity by entering "0".
- 12. The job is now ready to start to run or other jobs can be programmed at this time. To run a certain job, press the QUEUE key and then CIrQUE to clear the QUEUE. Move the cursor to the 1st job and key in the desired JOB #. 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.



To run a QUEUE, it is necessary to program in all job values as is done with programming a single job. After the jobs are programmed in, press QUEUE, press CLR QUE to clear the previous QUEUE, and enter the desired JOB #'s in the desired sequence.

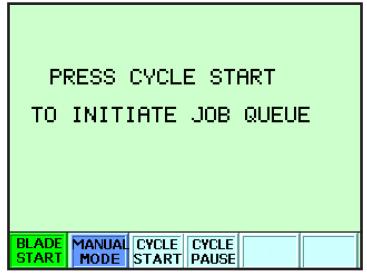


13. After the values are entered, press the START button. The display window will prompt you to Input Material Height. This will control the guide arm position (if the guide arm automatic control parameter is activated).

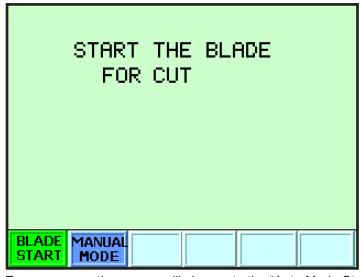




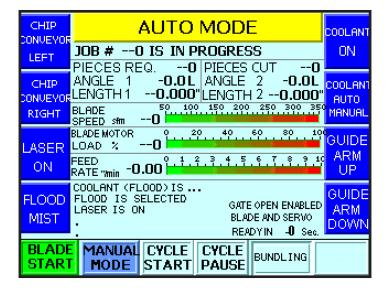
14. The display will prompt you to press Cycle Start to initiate Job Queue.



15. If the blade is not running, the display will prompt you to start the blade. To change the blade speed use the left or right red navigation keys. To increase the blade speed use the right arrow key. To decrease the blade speed use the left arrow key.

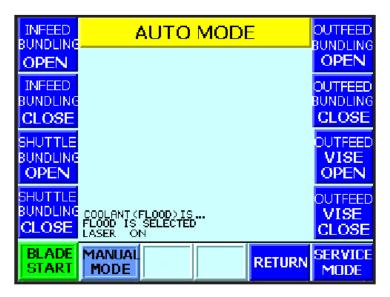


16. When the AUTO CYCLE commences, the screen will change to the "Auto Mode Status" screen.





To activate the outfeed vise or bundlings during AUTO CYCLE press the "BUNDLING" button to display the bundling control screen. After a short delay (approximately 1 minute) the screen will change back to the JOB IN PROGRESS screen.



SEQUENCE OF OPERATION

- 1. The shuttle and head will go to home position.
- 2. If the A1- first angle is not a collision angle, then the head will move to that angle.
- 3. A trim cut will be performed.
- 4. The shuttle will move to target length L-1.
- 5. After a trim cut, the shuttle will advance the material by the L1 value.
- 6. If the next angle is a collision angle then shuttle will retract to a safe position.
- 7. Head will swing to the A2 value to make the second cut and complete the first part.

If the previous angle was a collision angle, than the shuttle and the head will move to home position and the cycle will repeat.

NOTES:

- 1. The CYCLE PAUSE key is used to pause a job in progress. To resume the job, press the CYCLE START key and the AUTO CYCLE will resume.
- 2. If PIECES CUT equals or exceeds NUMBER OF PIECES, AUTO CYCLE will not start.



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.



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.

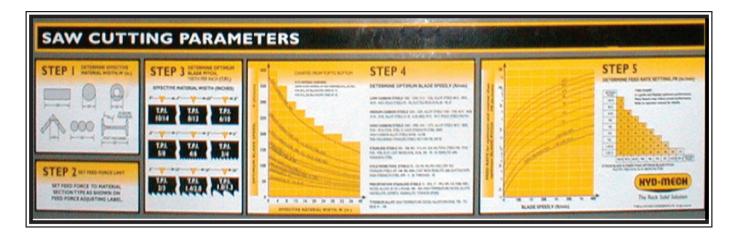


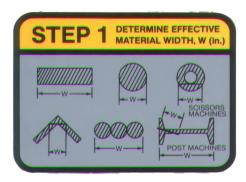


CHART EXAMPLE #1

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:

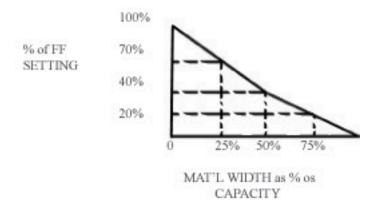
- 1. Both effective material width and guide arm width are used in setting the saw.
- 2. Guide arm width is the distance between the guide arms and is used in STEP 2.
- 3. Effective material width, as determined here in STEP 1, can be thought of as the average width of material "seen" by each tooth,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

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:

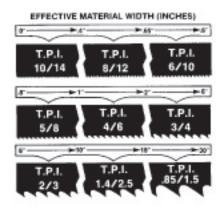
For structurals, a blade finer than Optimum can be used for more efficient cutting.

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.

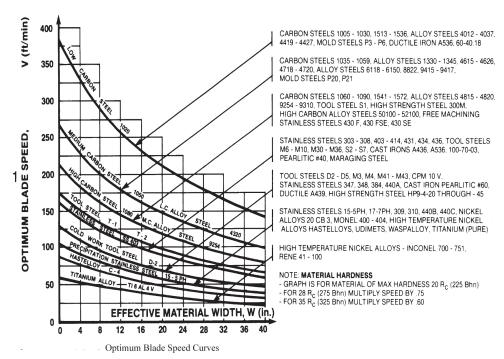


It is impractical to change the blade to the proper pitch every time a different width of material is cut and it is not necessary, but remember that the optimum blade will cut most efficiently. Too fine a blade must be fed slower on wide material because the small gullets between the teeth will get packed 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.



The graph shows that as effective material width gets wider or as material gets harder, lower blade speeds are recommended. If material is narrow or soft, higher blades speeds should be selected.



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

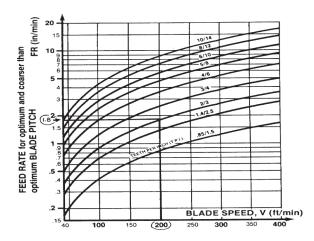
STEP 5 - DETERMINE FEED RATE SETTING, FR (in/min) (mm/min).





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	1									
10/14	1.0	e.								
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}	ACTUAL PITCH
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 I	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
	$70 \text{ m/min } \times .60 = 42 \text{ m/min}$
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 I	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)



MECHANICAL CONTROLS

HEAD FORWARD LIMIT SETTING

The Head Forward Limit is factory set and under normal operating conditions should not need to be reset. It functions by stopping head advance and shutting off the blade when it has advanced to meet the left hand movable vise jaw.

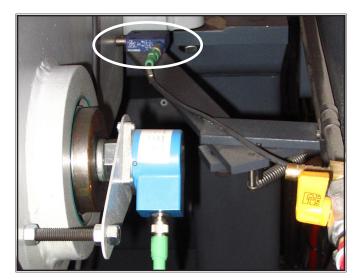
TO SET LIMIT:

If adjustment of the head stopping position with respect to the vise jaw is necessary, the split shaft collar on the vise cylinder shaft may be loosened and the collar re-positioned as necessary.

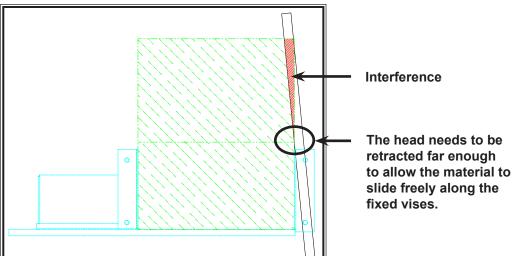


HEAD BACK LIMIT SETTING

The machine has a 5.6° canted head which requires the head back limit setting to be adjusted according to the height of material to avoid interference between the blade and the work piece (The head needs to be retracted further for higher material). The head needs to be adjusted to allow the material to slide freely along the fixed vises. This is achieved by setting the Head Back Adjustment Pull Cable located on the front of the control console. Pulling the handle out will pull the limit switch further back, which in turn will allow the head to be retracted further.









OUT OF STOCK COLLAR

The collar is located on the lower guide shaft of the barfeed's movable vise, and is locked in position by a brass thumbscrew. The action of the collar is to trip a limit switch and shut down the saw when the vise closes without encountering a work piece.

Proceed as follows:

- 1. Loosen the thumbscrew, move the collar to the outer end of the shaft, and re-tighten.
- 2. Start the saw and clamp the barfeed vise on the work piece.
- 3. Loosen the thumbscrew, move the collar in until it just touches the limit switch, and re-tighten.

If the Out Of Stock limit switch is tripped during any automatic cycle, the cycle is halted when the saw is shut down. However, the PLC retains all job and que information, including quantities cut, so that when the cycle is manually restarted, it will continue from the same point.



COOLANT FLOW

A generous flow of coolant should be applied in order to increase production and blade life. The machine is provided with a control switch on the operator panel and 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. The flow adjusting tap is shown on the Console 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.



PRIMING THE COOLANT PUMP

The coolant pump needs to be primed after the initial installation of the machine. This is done by opening the priming valve (Located at the back side of the machine) and changing the coolant control to the "ON" mode on the control interface. The valve can be closed after some coolant sprays out of the primer hose (Wait a couple of minutes).



RESTRICTIONS - HEAD SWING LEFT

With the head swung to the left and below 38°, the upper guide arm can be positioned over its full range only for a work piece less than 18" wide. For work pieces wider than 18" and left mitre angles less than 38°, the guide arm position must be kept high enough to avoid interference between the rear of the guide arm and the left fixed vise jaw. The following table may be used as a guide:

Left Mitre Angle	Minimum Distance. Upper Guide to Table Top. Measure with Head at 90°
Less Than 38°	9
Less Than 36°	17
Less Than 34°	21



SECTION 3 - MAINTENANCE & TROUBLE SHOOTING

SAFETY DURING MAINTENANCE AND TROUBLESHOOTING

"Lock-Out", or "Lock-out Tag-out" are terms that refer to procedures taken to prevent the unexpected start-up, or other release of energy, by a machine, whenever anyone is required to remove or bypass safety devices, or whenever anyone is required to place part of his body in a hazard area.

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

LOCK-OUT PROCEDURE

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

- Position the head in a suitable angular position for the work to be done.
 NOTE: The head is quite top heavy. When any hydraulic work is to be performed, the head must be swung fully left or right so that it can swing no further. If it is necessary to keep the head vertical, the head must be restrained by a crane.
- 2. Operator shuts down the machine.
- 3. The supervisor in charge of the machine must be informed of the intention to lock-out the machine.
- 4. The main power disconnect switch must be turned off, and locked in the off position by means of a padlock. The person performing the work on the machine must keep the key for this padlock. If more than one person is performing the work on the machine, then a multiple lock hasp shall be used, and each person shall apply his or her own lock to the hasp.
- Prior to starting any work on the locked-out machine, the supervisor shall attempt to start the machine to ensure that the lock-out device provides adequate protection. Operating control must be reset to the "OFF" position after this test.
- 6. Work on the locked-out machine may now proceed.





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 at the operator control panel.

This key switch has 2 positions:

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

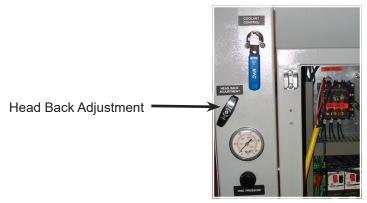
ON = Hydraulic motor can be started.

Blade Tension is operative.

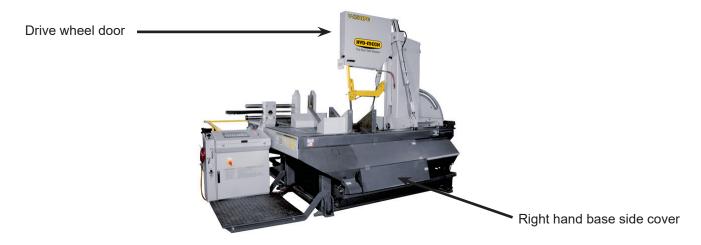
All other hydraulic functions and blade start are inoperative.

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 and then press the head retract button on the panel. This will drive the Head past the Head Back Limit Switch creating a wider gap between the blade and the cutting table allowing easier removal of the blade.



- 2. Lower the upper guide arm for easier access.
- 3. Turn the blade change key switch to the "ON" position. Hydraulics will continue to run, but only the Blade Tension Switch is functional.
- 4. Lift and slide open the right hand base side cover to expose the idler wheel. Unlatch and open the drive wheel door.





3.2



5. The V-25APC blade is only exposed to the operator at the cutting area. A blade guard protects the operator from the blade between the drive wheel assembly and the actual cutting area. A black knob on the cover allows it to be swung open.



6. It is necessary to release the carbides on both guide arms from the locked position so that the blade can be easily removed. As shown in the photo the carbides are released by loosening the socket head cap screw with a 5mm allen key (2 turns CCW).



- 7. Turn the Blade Tension Switch from the TIGHTEN position "+ RUN", through the unmarked, central HOLD position, and briefly to the LOOSEN position "-".
 - By jogging 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.



- 8. Pull the blade forward off of the blade wheels and out of blade guides.
- 9. The door drain tube must be released from its retainer in order to remove the blade.



10. Store or dispose of the used blade.



BLADE INSTALLATION

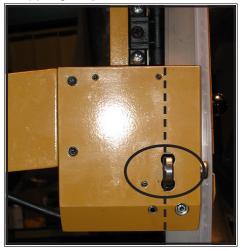
NOTES ABOUT NEW BLADES:

- 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 right hand side of the saw where it passes around the wheels, and with the teeth in the cutting area pointing down towards the idler wheel. This usually requires 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 the new blade into the blade guides and onto the wheels. Take care to fully insert the blade into both the upper and lower guides so that the back edge of the blade is fully past the rear side rollers of both guides (see illustration of upper guide). Make sure the blade is sitting behind and clear of the blade guard.





- 3. Turn the Blade Tension Switch briefly to TIGHTEN "+ RUN" and 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 "+ RUN".
- 6. Close both the upper and lower blade guides by tightening the adjusting screw with a 5mm hex key until firm resistance is encountered.





- 7. Swing the blade guard into the closed position. NOTE: The drive wheel door can not be closed unless the blade guard is closed.
- 8. Snap the door drain tube back into its retainer.



- 9. Close the drive wheel door and the right hand base side cover.
- 10. Turn the Blade Change Mode key switch to the 'OFF' position.
- 11. Switch the hydraulics ON. Set the blade to minimum speed, and then start and run the blade for 20 seconds.
- 12. STOP the blade.
- 13. Turn the blade change key switch to the 'ON' position.
- 14. Open the drive wheel door to inspect the blade tracking. Open the right hand base side cover to check the position of the blade brush. Refer to following pages for tracking adjustments, if necessary.
- 15. Advance the head and push in the head back adjustment lever. This will return the head to the proper position.
- 16. Break in the new blade.

BLADE TRACKING

Blade tracking refers to the lateral position in which the blade runs on the blade wheels. On metal-cutting saws the tracking is set so that the teeth project (or overhang) beyond one edge of the wheels so that interference between the wheel and the "set" of the teeth does not flatten the set, or chew up the wheel. For the 1.50" wide blades used on the V-25, the designed overhang is .200 - .220".

The actual position in which a blade tracks depends upon three things:

The lateral position of the wheels: This is factory set, and should not normally need to be re-adjusted. On the V-25, the drive wheel lateral position is adjusted by two push and two pull bolts in the drive wheel retaining cap. The idler wheel lateral position is adjusted by a large (1.5" across flats) hex bolt, and locked by a concentric round head socket screw. Hyd-Mech Service should be contacted before making any adjustment to lateral wheel position.

The angular position of the blade wheels: Although apparently parallel to each other, the blade wheels are tilted slightly and adjustment of the tilt of each wheel is the primary method of adjusting blade tracking. In general, tilting the wheels away from each other, as viewed from the "tooth edge" of the wheels, causes the blade to run farther onto the wheel (overhang decreases).

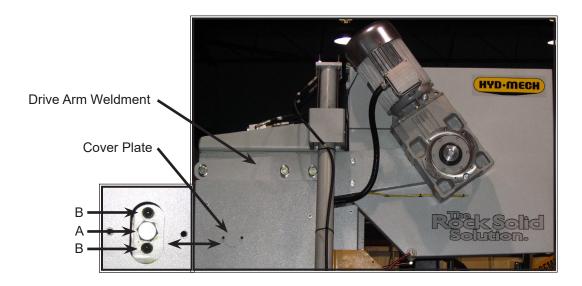
The condition of the wheel surfaces: With prolonged use the wheels may wear unevenly so that the front edge has a slightly smaller diameter than the rear edge. This will result in the blade tracking farther off the wheels. Moderate wheel wear can be offset by adjusting wheel tilt, but excessive correction by wheel tilt will cause premature blade cracking, and the only solution is to replace the worn wheel(s).

Adjustment of the tilt of either wheel affects the tracking on it, as well as the tracking on the other wheel. Thus 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, run the blade slowly for about 5 – 10 seconds, stop the machine and re-check tracking at both wheels. Repeat the process until tracking at both wheels is within tolerance, test running the blade for longer periods each time, as the desired tracking is approached.



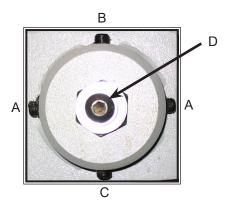
DRIVE WHEEL ADJUSTMENT

Adjustments should be made with the blade tension released slightly. The drive wheel assembly is mounted on the drive arm weldment which has two set screws and a hex bolt in a "push/pull" arrangement. Gain access to these adjusters by removing the cover plate on the head upper side cover. To make adjustments, loosen bolt "A" and back one of the set screws "B" out several turns, so that adjustment is made with just the other set screw and the hex bolt. Use the hex bolt to pull the adjustment arm in and cause the blade to track with less overhang. Use the set screw to push the adjustment arm out and cause the blade to track with more overhang. Check the blade movement after each 1/4 turn of set screw "B" by running the blade at minimum speed for a couple of rotations. When the tracking is within specification, tighten the other set screw "B" to contact the surface of the head post weldment, then tighten bolt "A".



IDLER WHEEL ADJUSTMENT

Before adjusting the idler wheel, reduce blade tension and slightly loosen the button head cap screw "D". There are four set screws; "A" set screws should not be adjusted as they are pivot points. Set screws "B & C" are adjusted by turning one out and the other in a 1/4 turn, and then tightening the first again. Check the blade movement after each 1/4 turn adjustment by running the blade at minimum speed for a couple of rotations. Loosening "C" and tightening "B" will push the blade off the wheel. Loosening "B" and tightening "C" will pull the blade onto the wheel. When correct tracking is achieved, re-tighten "D".

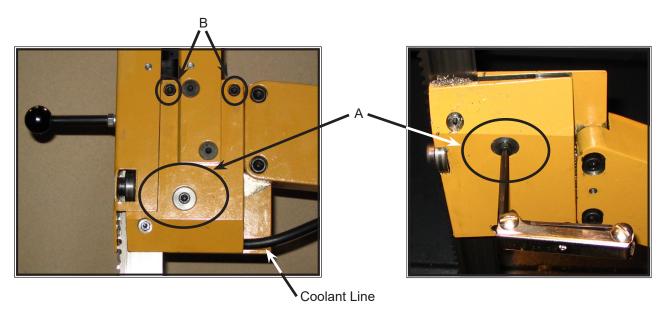




BLADE GUIDES

The blade is twisted and guided by upper and lower guide block assemblies. These are almost identical except that the upper assembly contains a coolant gallery, and the lower guide is externally tapered on an angle to allow it to sit closer to the underside of the table.

Each assembly consists of a fixed rear plate bolted to the guide arm, and a movable front plate hinged to the rear plate. An adjusting screw "A", circled in the pictures allows the front plate to be swung into or away from the rear plate. Mounted in each plate is a carbide pad and a roller. The two rollers twist the blade through 90°, and the two pads support the blade laterally. The rear plate also carries a pivoting carbide insert that applies the feed force to the back (or smooth) edge of the blade.



Drive Guide Arm Idler Guide Arm

The adjusting screw assembly includes a pre-loaded stack of spring washers so that when the screw is turned in (clockwise) to a firm stop, the carbides clamp the blade with a controlled force. To open the guide for blade changing the adjusting screw is backed out (counterclockwise) 2-3 turns, using the supplied 5mm hex key. The first half turn takes the spring loading off the carbide, and the subsequent turns open the front plate and its carbide away from the rear plate and its carbide, to assist blade removal and insertion.

No adjustment is normally required, except to open and close the adjusting screw, as described above for blade change.

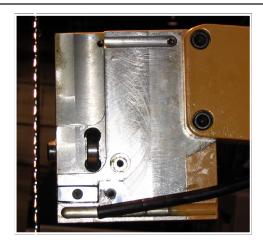
Maintenance of the guide assemblies will consist of periodically inspecting, and replacing, as necessary, the side and back carbides, and the blade rollers.

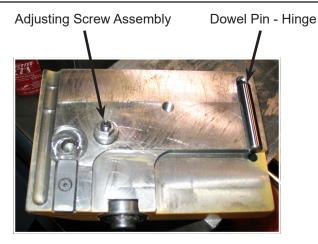
Roller stoppage may occur at any time due to the wedging of cuttings between the blade and the roller. This will quickly cause a flat on the roller, which requires that it be replaced. For this reason the operator should make it a regular habit to visually check that all four rollers are turning.

Roller replacement does not require removing the front plate of the guide - simply remove the associated shoulder bolt. On the bearing in the front plate, there is a small shim between the bearing inner race and the front plate. The shim must be replaced in the same spot to keep the outer race of the bearing from rubbing on the front plate. The rollers are standard double sealed 6200 ball bearing units that are readily available at any bearing supply.

The side carbides and the pivoting back carbide wear very slowly but should be inspected every 6 months, and whenever crooked cutting does not arise from another obvious cause. Access to the carbides is gained by removing the movable front guide plate from the fixed rear plate. To do this, open the adjusting screw "A" 2-3 turns as for normal blade change. Then, using a 5mm hex key remove the two hinge bolts, labeled B in the pictures. At this point the front plate will be held only by the loosened adjusting bolt. Support the front plate with one hand while unscrewing the adjusting screw completely (about 6-7 turns).







Removal of the front plate completely exposes the internals of the guide block assembly as shown in the photos above. The side carbides are mounted by #6-32 flat head socket screws which engage lock nuts on the outside of the plates. The back plate holds the square pivoting carbide insert that correspond to the "top" carbide in horizontal machines. A dowel pin pressed into the rear plate locates the pivoting carbide. This carbide can be rotated four times to offer four new surfaces before it is replaced.

The adjusting screw assembly should not normally need to come apart. If dis-assembly is required, be aware that the nut, and circular nut above it are both locked with red Loctite™ 271, and similar material must be used at re-assembly.

The hinge between the front and rear plates of the guide assembly is formed by a dowel pin resting in two semi circular grooves. For convenience during disassembly, the pin is "glued" into the groove of the front plate using Loctite™ 515 Gasket Eliminator.

When re-installing the front plate, support the plate with one hand while locating the adjusting screw in its tapped hole, and then turning it in 6-7 turns before installing the hinge screws. This avoids the possibility of cross-threading or bending the adjusting screw.

BLADE BRUSH ADJUSTMENT

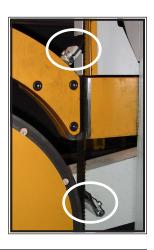
The blade brush is properly set when the machine leaves the factory, but wears during operation and needs to be re-adjusted periodically. The plastic wheel that is driven by the idler wheel face should be held against the idler wheel with the minimum force that is necessary. As the blade brush wears it is necessary to adjust it closer to the blade, or further away from the blade if a new brush is installed.

As shown, there are two springs on socket head screws holding the brush against the blade. There is also an adjusting socket set screw with a hex nut on it. Adjustment is made from the back side by loosening the hex nut and turning the set screw. Tightening the set screw will move the brush away from the blade, and loosening the set screw will move the brush closer to the blade. Adjust the set screw so that the brush cleans to the bottom of the blade gullets and then tighten the hex nut.



BLADE WIPERS

Two blade wiper assemblies are mounted close to the idler wheel to remove coolant from the blade. As the urethane wipers wear, the angular position of the assemblies may be adjusted to maintain contact with the blade. The wipers may be flipped over and rotated end for end to provide four successive wiping edges before they must be replaced. Rubber has a very short life in this application and it is recommended that genuine urethane wipers be obtained from your dealer.





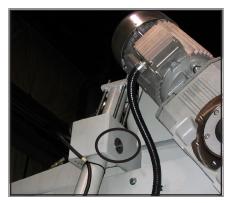
LUBRICATION

The V-25APC was designed with a goal to minimize the maintenance required so as to reduce downtime. We recommend that periodic lubrication be done once a month using any general purpose grease. 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 and moving parts. 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 a 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.



Carriage Runner Blocks (x4)



Swing Cylinder Trunnion (x4)



Moveable Jaw Post (x2)



Head Pivot Bearing (x2) &
Idler Tension Arm Bushing



Barfeed Runner Blocks (x4)



OUTPUT SHAFT LUBRICATION

Band tension load is carried by a grease lubricated spherical bearing. A grease fitting is accessible on the back side of the drive box as shown in the accompanying illustration. Lubricate once per year with 30 ml [1 fluid once] of NLGI Class 2 Lithium base mineral oil grease. This quantity represents about 20 to 30 strokes of a typical hand grease gun.



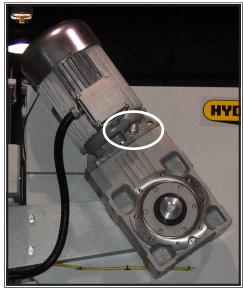
GEARBOX LUBRICATION (V-25APC WITH A503 GEARBOX)

The Bonfiglioli A503 gearbox used on the V-25APC is supplied with 11 liters (2.90 US gallons) of Mobil SHC 634 synthetic oil. This oil has an ISO Viscosity Grade of 220 that is optimum for ambient temperatures from 20 – 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. If the type of oil is being changed, it is advisable to flush the old oil by filling the box with the normal quantity of the new oil, running it briefly at moderate speed, and then draining the box again, before re-filling it with a fresh quantity of the new oil.

Because of the tilted orientation of the gearbox on the V-25APC, the correct oil level is to the bottom of the fill plug "A" shown in the photo. The gearbox can also be filled at the breather shown in the photo.

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



Fill plug "A"



Breather



HYDRAULIC MAINTENANCE

There are four items of routine maintenance associated with the hydraulic system of the V-25APC. With proper maintenance the hydraulic system of the V-25APC 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 - The 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 V-25APC 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 Conoco - Super Hydraulic 46 Mobil - Mobil DTE 25 Esso - NUTO H46 Shell - Tellus 46

3 HYDRAULIC OIL CHANGE - Oil visual inspection should be conducted with every filter change for the following signs of degradation: Milky or hazy oil colour.

signs of degradation: Milky or hazy oil colour

Burnt smell

Varnish or sludge formation

Increased viscosity

If one of the above is observed, oil should be changed. It is recommended to change the oil after 6000 hours of operation or every 2 years.

- **4. 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 (10° 13°C) above room temperature. Thus in a 70°F (21C) shop one might expect an oil temperature of about 120°F (49°C). Oil temperature should never exceed 160 F° (71°C).
- 5. OIL PRESSURE Oil pressure is factory set to 1000 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 CLOCKWISE OR THE HYDRAULIC PUMP IS NOISY SHUT THE SAW DOWN IMMEDIATELY!
- THE HEAD SHOULD BE SWUNG FULLY TO THE LEFT OR RIGHT BEFORE ANY HYDRAULIC SERVICE IS PERFORMED TO PREVENT THE HEAD FROM MOVING UNEXPECTEDLY.

NOTE: All solutions referring to a qualified technician require that your organizations safety lock-out provision be followed. Other solutions may require lock-out depending upon circumstances.

CONTROL PROBLEMS

	PROBLEMS		CAUSE		SOLUTION
1	Saw hydraulics will not start	1 1	Head and vise selector switches not in centre positions.	1.1	Place switches in centre position.
		1.2	Side covers or drive wheel door are not closed.	1.2	Close covers and door.
		1.3	Broken or dismounted blade.	1.3	Replace or remount blade using blade change mode.
			Hydraulic motor overload has tripped.	1.4	Qualified technician - reset overload relay.
		1.5	Control circuit fuse has blown.	1.5	Qualified technician- replace fuse.
	Hydraulic pump runs but no hydraulic functions available.	2.1	Check system pressure gauge. No pressure indicates wrong phase order.	2.1	Shut down immediately. Qualified technician reverse any two phase connections.
		2.2	Blade change mode selected.	2.2	Switch off blade change mode.
2		2.3	Pump runs noisily - check hydraulic oil level at tank gauge.	2.3	Stop immediately. Add correct grade of hydraulic oil to level mark on tank.
		2.4	Pump/motor coupling backed off.	2.4	Qualified technician - re-adjust coupling spacing.
3	An individual function does not respond to manual control.	3.1	If pilot light on corresponding valve does not light, then electrical fault is indicated.	3.1	Qualified technician - use schematic to find fault.
			If pilot light responds, then valve coil may be bad.	3.2	Test by interchanging coil from another valve.
		3.3	If pilot light responds and coil is good, then valve may contain dirt.	3.3	Qualified technician - remove, disassemble and clean valve spool.
4	Hydraulics function but blade will not start.	4.1	Vise switches not set correctly.	4.1	At least one vise must be closed. The other must be closed or open, but not in neutral.
5	Head will not advance.	5.1	Blade motor not started.	5.1	Start blade motor, or use Head Back Limit Override button to permit advance with blade stopped.
6	Head will not swing.	n	Head not back, or guide arm not fully up.	6.1	Retract head to limit switch and fully raise guide arm.



CUTTING AND BLADE TROUBLESHOOTING

	PROBLEMS		CAUSE		SOLUTION
1	Saw is cutting out of square from top to bottom.	1.1	Head is not set at 90 degrees.	1.1	Re-position head.
		1.2	Blade guide(s) not closed.	1.2	Close guide adjusters fully.
2	Saw is cutting out of square front to back, or cut is not flat.	フコ	Excessive feed rate or feed force settings.		Review settings using Blade Basics and Cutting Parameters Chart in Section 2 of this manual.
		2.2	Upper guide arm too far above workpiece.		Lower guide arm close to workpiece.
		/ 3	Blade type or pitch is incorrect for workpiece.	2.3	Get advice of blade supplier.
		2.4	Blade is worn.	2.4	Replace blade.
		2.5	Blade guides are worn.	2.5	Replace blade guide carbides.
		2.6	Low band tension.		Check blade tension pressure gauge against specification. Adjust pressure reducing valve as indicated.
3	Excessive blade breakage.	3.1	Excessive feed rate or feed force settings.	3.1	As 2.1, above.
		3.2	Upper guide arm too far above workpiece.	3.2	As 2.4, above.
		3.3	Excessive band tension.	3.3	As 2.6, above.
		3.4	Worn blade guide carbides.	< /	Refer to Blade Guides in Section 3 of this manual.
	Blade tooth strippage.	4.1	Blade pitch is too fine for workpiece.		Use coarser blade; refer to Cutting Parameters Chart.
		4.2	Blade brush is not cleaning.	4.2	Replace or adjust blade brush.
4		4.3	Workpiece movement.	4.3	Special care is required in clamping thin workpieces and bundles.
		4.4	Excessive feed rate or feed force settings.	4.4	As 2.1, above.
5	Excessive blade vibration.	5.1	Blade not properly broken in.	5.1	See Blade Basics in Section 2 of this manual.
		5.2	Blade speed resonance.		Adjust blade speed up or down while cutting.
	Blade stalls while cutting.		Blade tension switch not in "+ RUN"	6.1	Correct switch position.
6		6.2	Blade tension insufficient.	6.2	As 2.6, above.
		6.3	Excessive feed rate or feed force settings.	6.3	As 2.1, above.
7	Blade comes off wheels.	7.1	Blade tension switch not in "+ RUN"	7.1	Correct switch position.
		7.2	Blade tracking out of adjustment.	7.2	Refer to Blade Tracking in Section 3 of this manual.
8	Head will not advance.	8.1	Feed Rate Valve is closed.	8.1	Turn feed rate knob counter clockwise to open.
		8.2	Feed Force Limit is set too low.	8.2	Turn feed force knob counter clockwise to increase.



9	9. No coolant flow.	9.1	In "Auto" coolant only flows when head advances.	u 1	Place coolant switch in "ON" to check operation of system.
		9.2	Coolant flow regulating valve turned off.	9/	Open valve (located below operator console).
		9.3	Coolant level low or empty.	9.3	Add coolant. Level must cover suction inlet located at extreme rear of reservoir.
		9.4	Pump had lost prime.		Open priming valve until coolant flows from it, and then shut valve.
		9.5	If wash gun flows, then line to blade guide or guide coolant gallery may be plugged.	9.5	Open upper blade guide, remove hose, use air gun <u>with safety nozzle</u> to blow out hose and gallery.
10	Head advances with set to "0".	10.1	Feed Rate pointer misaligned.	10.1	Loosen pointer lock nut. Turn the knob clockwise until it is closed. Position the pointer to "0" and tighten lock nut.
		10.2	Fast approach valve is open. Blocked lever.	10.2	Adjust fast approach lever. Phone Hyd-Mech Service for details.



SECTION 4 - ELECTRICAL

ELECTRICAL SCHEMATICS: SEE PDF ON ATTACHED CD



SECTION 5 - HYDRAULICS

FOR HYDRAULIC SCHEMATICS AND PLUMBING DIAGRAMS SEE PDF ON ATTACHED CD

The V-25APC 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 start-up.

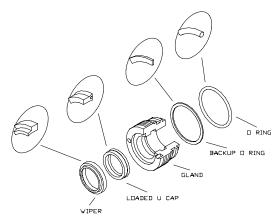
V-25APC HYDRAULIC PARTS LIST

ITEM	V-25APC PART NUMBER	DESCRIPTION	PLUMBING DIAGRAM REF #
1	V25-C3-00	VISE CYLINDER	
2	V25-C4-00	HEAD CYLINDER	
3	H22-C5-00A	BLADE TENSION CYLINDER	
4	M20-C6-00	GUIDE ARM CYLINDER	
5	V25-C7-00	HEAD SWING CYLINDER	
6	V25-C8-00	BRAKE CYLINDER	
7	V25BF-C2-00	VISE CYLINDER	
8	H14-C22-00	DATUM CYLINDER	
9	800047	DATUM TOGGLE CYLINDER (S22A-C4-00)	
10	V25-C10-00	LIFT CYLINDER (OPTION)	
11	V25-C23-00	BUNDLING CYLINDER (OPTION)	
12	363225	NEEDLE VALVE, N10BK	
13	363105	TANK COMPONENT, RETURN FILTER ELEMENT, 10 MICRON, SF6520	
14	363110	TANK COMPONENT, SUCTION STRAINER, TFS100-0-P	
15	363235	VALVE, PRESSURE REDUCING, FREE BACK FLOW, PBDB OBN E21	
16	363305	VALVE, SANDWICH, DGMX2-3-PP-BW-S-40	PRV2
17	363187	VALVE, SINGLE SOLENOID AB-PT DIRECTIONAL VALVE, 24VDC, M12	DCV2P-ABT 24VDC
18	362748	VALVE, DIRECTIONAL, 24VDC, M12, 4WE6J6X/EG24N9DK35L	DC3VP-AB-T 24VDC
19	362749	VALVE, DIRECTIONAL, 24VDC, M12, 4WE6E6X/EG24N9DK35	DC3VP-AB-C 24VDC
20	363300	VALVE, SANDWICH	DPCH-1
21	363302	VALVE, CARTRIDGE	FPCC-MBN
22	363313	VALVE, LOAD HOLDING	CBCA-LIN-EBY
23	360747	GAUGE, PRESSURE, 1500 PSI	PG15
24	362690	MOTOR, HYDRAULIC, MG12	HM-01
25	362745	PUMP, HYDRAULIC, PVQ-13	HYP-1
26	DDF5-0-00	ASSEMBLY, DDF VALVE	DDF5-0-00
27	EB-02	EXTENSION BLOCK, LEFT	EB-02
28	EB-03	BLOCK, EXTENSION	EB-03
29	JB-02A	BLOCK, JUNCTION, DOUBLE	JB-02A



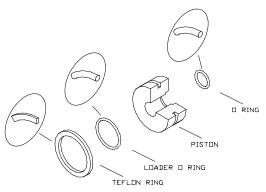
CYLINDER ASSEMBLIES

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



SECTION 6 - MECHANICAL ASSEMBLIES

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



SECTION 7 - OPTIONS

FOR OPTIONAL DRAWINGS AND PARTS LIST SEE PDF ON ATTACHED CD

MIST COOLANT OPTION

Mist Coolant – the air powered pump delivers a regulated number of pulses of lubricant to a single applicator nozzle. The unit has two control screws.

Pulse / Minute – adjusts rate of lubricant use. About 8 to 12 pulses per minute is optimum – more is not better. Air Screw – regulates the jet of air that projects the lubricant from the nozzle onto the blade. Adjustment should be such that lubricant covers the blade without blowing the mist beyond the back edge of the blade.

Note: A new blade may require initial lubrication with a small quantity of mist coolant applied to the blade to prevent squealing.



PULSE / MINUTE

AIR SCREW

VARIABLE VISE PRESSURE OPTION

Vise clamping pressure adjustment is located on the top of the control console. Clamping pressure is indicated by the pressure gauge adjacent to pressure control knob. Turning knob clockwise increases clamping pressure. The clamping pressure can be changed infinitely from 50PSI to 1000PSI (full pump pressure). It has to be taken under consideration that clamp pressure setting will affect the clamp speed. The actual usable low clamp pressure setting maybe higher than achievable by controls and is limited by mechanical friction of the vise assemblies.





BUNDLING OPTION

The bundling clamps can be used to supplement the infeed, outfeed, and barfeed vises by clamping down on the work piece from above. They work in conjunction with their associated vise when the "Bundling Close" push button is activated before entering AUTO MODE (The light on the push button will be on).

As the name implies, they are primarily used to clamp work pieces made of bundles of smaller material. For simple, non-bundled work pieces, the bundling clamps are not usually needed. They need to moved out of the way when the bundled material is to be top loaded.

SETTING THE HEIGHT OF THE INFEED AND OUTFEED VISE BUNDLING IN AUTO MODE

The bundling opening in "Automatic Mode" can be adjusted by the "INFEED or OUTFEED BUNDLING OPEN TIME" parameter. Increasing this value will allow for a larger opening.

NOTE: Make sure that the height of the bundling arm will not create a collision with the head.

BUNDLING HEIGHT RESTRICTIONS

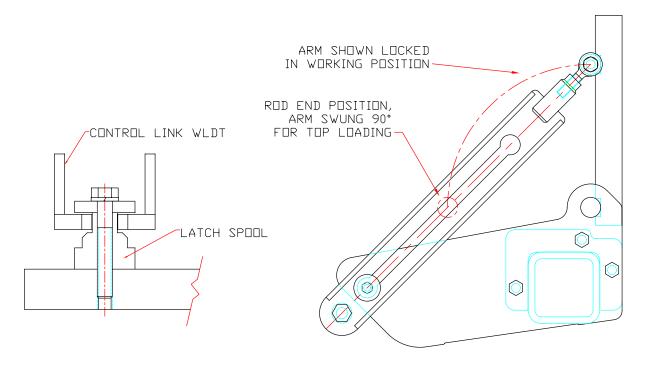
The allowable height of a bundle will decrease with the head swung towards the infeed side of the machine. The bundling arm must be kept low enough to avoid interference with the head assembly. The following table can be used as a guide:

HEAD SWING	BUNDLE HEIGHT
90°	20"
45°	18.5"
30°	8.5"

SHUTTLE BUNDLING

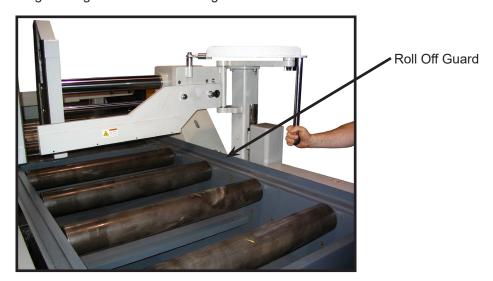
The procedure below details how to remove the shuttle bundling clamp out of the loading area of the barfeed:

NOTE: The shuttle bundling clamp will remain stationary in AUTO MODE if the "Shuttle Bundling Close" push button is **not** activated (No light on the push button).





1. Raise the shuttle bundling arm high enough to clear the roll off guard of the barfeed.



2. Lift the swing arm upwards to lift the control link weldment off of the latch spool. This will allow the handle to be pulled away from the barfeed which will begin to rotate the arm away from the shuttle vise.



3. Rotate the bundling arm completely out of the loading area until the control link weldment seats on to the spool.

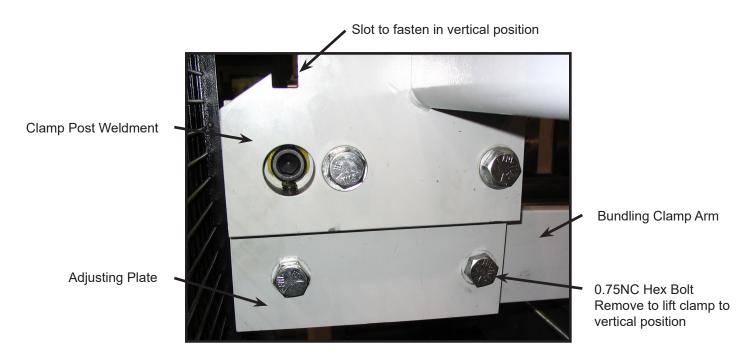




SAW BUNDLING (INFEED VISE AND OUTFEED VISE)

The procedure below details how to remove the infeed or outfeed bundling clamps out of the loading area of the machine:

NOTE: The bundling clamps will remain stationary in AUTO MODE if the "Bundling Close" push button is **not** activated (No light on the push button).

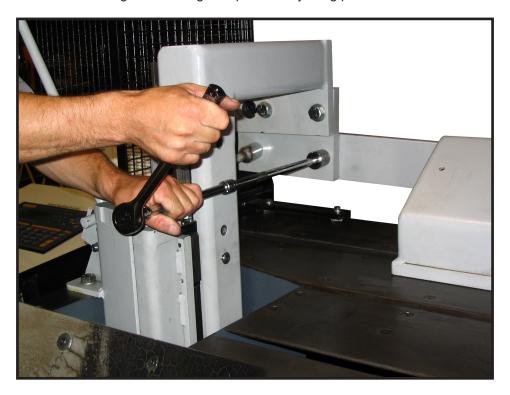


- 1. Raise the bundling clamp a couple inches off the table, and close the movable vise.
- 2. Unlatch and open the operator screen. All machine functions are inoperable.

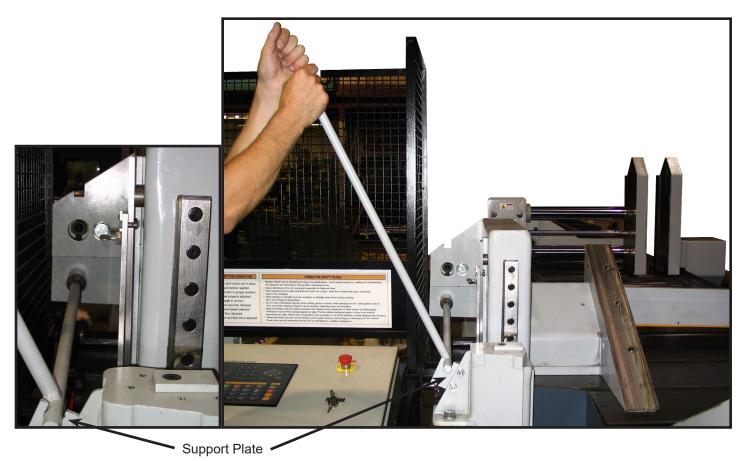




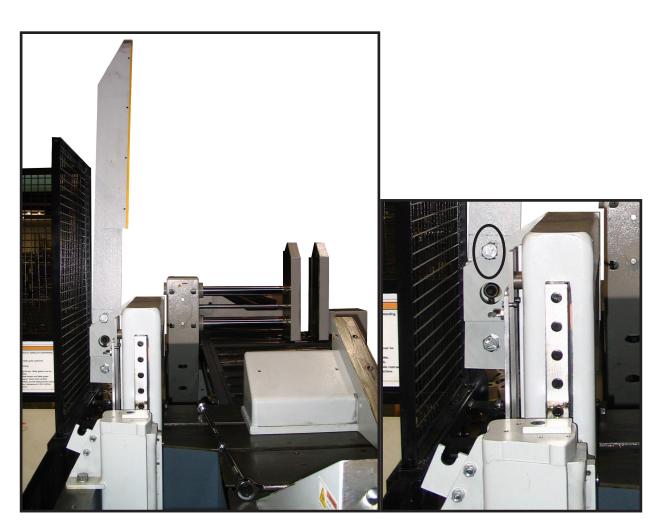
3. Remove the 0.75NC hex bolt holding the bundling clamp to the adjusting plate.



4. Insert the bundling arm lift tool into the slot of the support plate and fit the socket onto the 0.75NC hex bolt.



5. Lift the bundling clamp to its vertical position and fasten it through the slot of the clamp post weldment using the 0.75NC hex bolt.



OVERVIEW OF THE BLADE DEVIATION MONITORING SYSTEM. (BDMS)

This system monitors lateral blade deviation during cutting. If the blade deflection increases beyond the pre-set warning limit, then the monitoring device sends a warning signal by means of a flashing beacon mounted on top of the machine head. If no steps are taken to correct this condition, the machine will continue to cut until the pre-set shut-down limit is reached. At this point the machine will behave in one of two ways selectable by a parameter setting:

1. Stop cutting, raise the head, and shut down.

or

2. Finish the cut with the present degree of deviation and then shut down.

FACTORY DEFAULT SETTING IS: #1. Stop cutting, raise the head, and shut down.

OPERATION OF THE SYSTEM

The proximity transducer is enclosed in a housing mounted on the idler side guide arm. The sensor converts the blade lateral deflection to an analog signal, which is sent to the PLC. After a series of calculations the lateral deflection is displayed on the operator interface in the form of a bar graph.

The bar graph appears in both the Manual Mode and Automatic Mode Screens. It is only active when the blade is running and head is descending. The length of the bar graph is proportional to the blade deflection. The bar graph extends from the screen centre towards the right if the blade is deviating towards the front of the saw (cutting into the part), and extends from the screen centre towards the left if the blade is deviating towards the rear of the saw (cutting into the stock).

If a warning limit is reached and maintained longer than the preset response time, then the beacon light mounted on top of the head will start flashing.

If a shutdown limit is reached and maintained longer than the preset response time, then the machine will behave in one of two ways:

. Stop cutting, raise the head, and shut down.

or

2. Finish the cut with the present degree of deviation and then shut down.

E1060







SETUP PROCEDURE

The BDMS is factory installed but at times it may be necessary to enter the setup mode:

To enable the blade monitor system, follow the steps outlined below:

- 1. Enter the MONITOR LIMIT SETTING screen by pressing function key F8 labeled BLADE DEV/KERF. The MONITOR LIMIT SETTING screen will be displayed (Fig. 2)
- The Parameters are listed on the MONITOR LIMIT SETTING screen.
- 3. Change the BLADE DEVIATION MONITOR parameter to ON by moving the cursor using the navigation keys to ON/OFF and pressing ENTER. The Blade Monitor parameter will change to ON.

To disable the blade monitor option, repeat the above steps 1 to 3 but ensure in step #3 that OFF is selected.

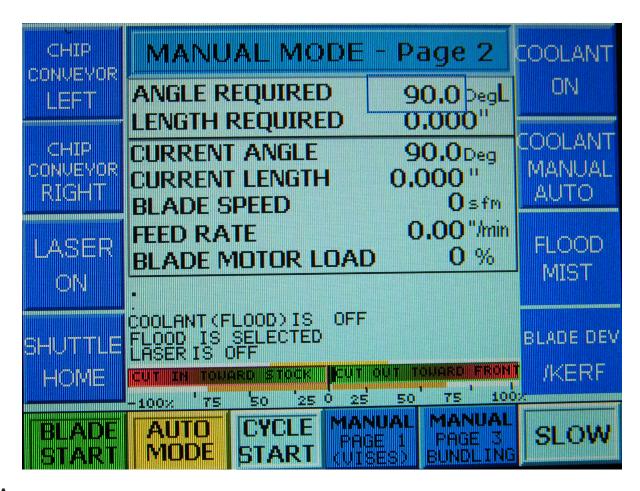
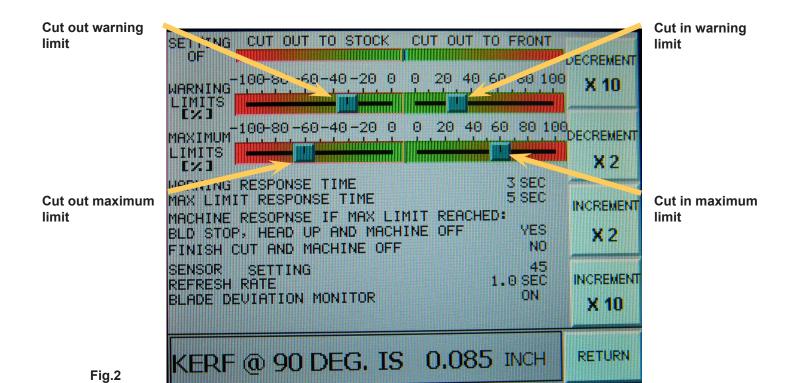


Fig.1A



WARNING AND SHUTDOWN LIMITS ADJUSTMENTS

To adjust the warning and shutdown limits, enter the MONITOR LIMIT SETTING screen by pressing function key F8 labeled BLADE DEV/KERF (Screen will change as shown in Fig.2)

There are two scales, the upper one showing the preset right and left warning limits, and the lower scale showing the preset right and left maximum limits. All four limits (right and left warning, and right and left maximum) are set independently.

To adjust the limits, move the cursor to the desired limit and then use the DECREMENT or INCREMENT keys.

Cut out warning limit – (out - cutting towards outfeed, range 0 ~100) This parameter will adjust the warning limit if the blade is cutting towards the part. Increasing this value decreases sensitivity, which will result in a warning further away from nominal straight.

Cut in warning limit – (in - cutting towards infeed, range -100 ~ 0) This parameter will adjust the warning limit if the blade is cutting towards the stock. Decreasing this value decreases sensitivity, which will result in a warning further from away nominal straight.

Cut out maximum limit – (out - cutting towards outfeed, range 0 ~100). This parameter will adjust the shutdown limit if blade is cutting towards the part. Increasing this value decreases sensitivity, which will result in a larger deviation from nominal straight, before the shutdown sequence is initialized.

Cut in maximum limit – (in - cutting towards infeed, range -100 \sim 0) This parameter will adjust the shutdown limit if the blade is cutting towards the stock. Decreasing this value decreases sensitivity, which will result in a larger deviation from nominal straight, before the shutdown sequence is initialized.



MONITOR LIMIT SETTING FUNCTION KEY DESCRIPTION CHART

DECREMENT X 10	When this function key is depressed once, the value of the selected slider will decrement by 10%
DECREMENT X 2	When this function key is depressed once, the value of the selected slider will decrement by 2%
INCREMENT X 2	When this function key is depressed once, the value of the selected slider will increment by 2%
INCREMENT X 10	When this function key is depressed once, the value of the selected slider will increment by 10%
RETURN	This function key will return to previous screen.

Fig.3

To return from the MONITOR LIMIT SETTING screen to the AUTO or MANUAL screens, press the RETURN key.

To set any of the numerical parameters, use the NAVIGATION keys (Fig. 1) to place the cursor over the number. Key in the desired value, and then press ENTER.

To change the ON/OFF parameters, place the cursor over the parameter, and press ENTER to toggle between ON and OFF.

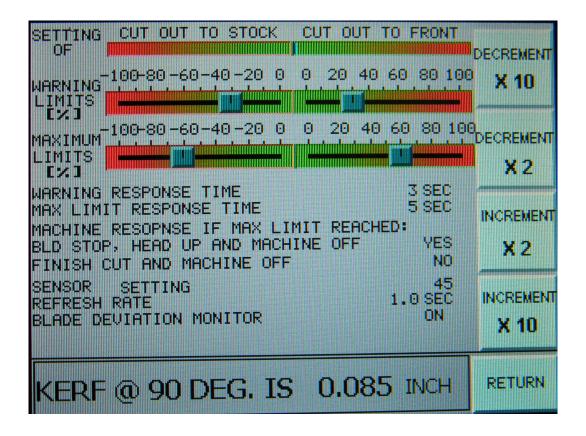


Fig.4



PARAMETER DESCRIPTION CHART

	Warning response time (range 2 – 99 seconds)			
WARNING RESPONSE TIME	If the blade deviation exceeds the preset warning limit for longer than the warning response time, then the beacon light mounted on top of the head will start flashing.			
	Warning response time (range 2 – 99 seconds)			
MAX LIMIT RESPONSE TIME	If the blade deviation exceeds the preset shutdown limit for longer than the shutdown response time, then the machine will execute the shutdown sequence.			
MACHINE RESPONSE IF MAX LIMIT REACHED	If the shutdown sequence has been executed then, the machine will behave in one of two ways.			
	NO/YES			
BLADE STOP, HEAD UP AND MACHINE STOP	Stop cutting, raise the head, and shut down			
FINION OUT MACHINE OFF	NO/YES			
FINISH CUT, MACHINE OFF	Finish the cut with present degree of deviation and then shut down			
	Range: -2000 to +2000			
SENSOR SETTING	The number displayed here represents the position of the blade within the measuring range of the proximity transducer. At 0, the blade is exactly centered within the sensing range. The display assists adjustment with the prompts 'SETTING, or 'SET'. The prompt 'SET' appears when the adjustment is within the acceptable range of – 100 +100. [See sensor adjustment procedure section]			
	Range 0.1 sec to 10 sec)			
REFRESH RATE	The refresh time is time between bar graph updates.			
	ON/OFF			
BLADE DEVIATION MONITOR	This parameter will activate or deactivate response of the blade deviation monitoring system.			

Fig.5

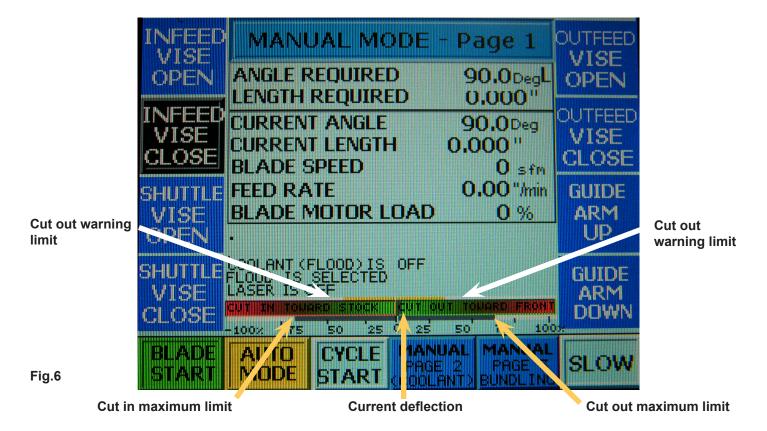
RELATIONSHIP BETWEEN BLADE DEFLECTION DISPLAY AND ACTUAL CUT DEVIATION

The digital display indicates the blade lateral deflection at the point where it passes the blade deflection sensor, which is 1" past the idler side guide arm. The maximum deviation of the cut surface will actually occur at or near the center of the cut, and will be several times larger than that measured at the sensor. The display range of 0 +/-100 is proportional to the amount of blade deviation. This depends on the type of material, shape of the work-piece and amount of blade tension.

The actual amount is difficult to predict, experience with different work-pieces will provide the best guide.



MANUAL MODE SCREEN



AUTOMATIC MODE SCREEN

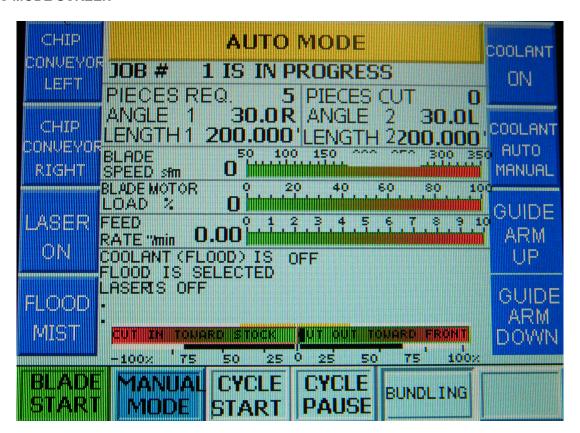
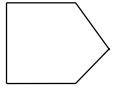


Fig.7



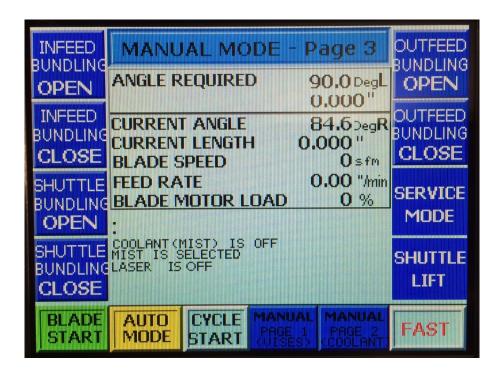
V25APC SPECIAL PROGRAMMING OPTION

V25APC saw has been equipped with special programming software in addition to the standard programming software. This special software is designed to produce a specific style of part. The part style is that similar to the part shown on ICON INDUSTRIES DWG # R-4. This part consists of 2 angles meeting at a point on one end and an angle on the other end. Refer to diagram below.



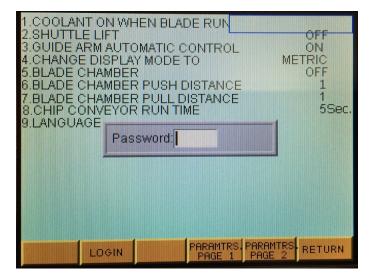
The special software may be activated by parameter input. To activate special software you must do the following:

1) In manual mode, press SERVICE MODE soft-key.

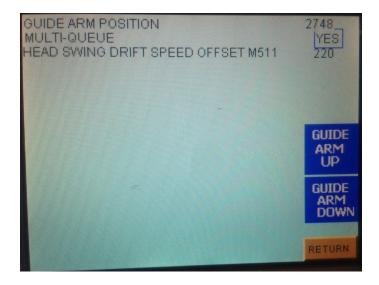




2) In Service Mode press the Login button (password 308)



3) Press the unlabeled button between Login and Parameters Page 1.



- 4) Change Multi-Queue to Yes and press Enter.
- 5) Exit from parameter screen.

This will activate the special software.

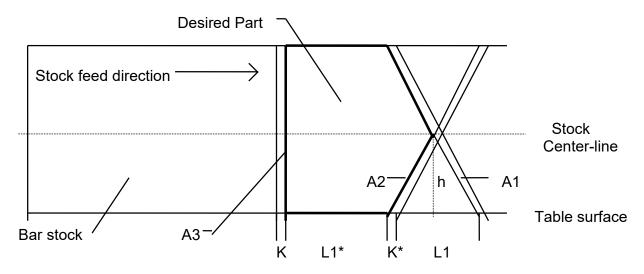
The software has been developed to allow this part to be produced complete in one operation as opposed to having two operations. Use of this software requires the user to have sufficient knowledge of mathematics to calculate the proper values for the programming of this style of

In order to produce this style of part the user will need to determine some basic features. The features consist of (3) angle features and (2) length features. The angle features will determine the shape of this style of part while the length features determine the overall length of the part as well as the placement of the pointed end of the part.



For the programming of Hyd-Mech software all angles are measured from the table surface. Angles can be between 30 degrees and 90 degrees from the table. The saw has the capability to index to either side of 90 degrees.

In the diagram below, the bar stock is represented as the saw infeed being from the left and the pointed end of the part facing toward the outfeed side of the saw table. A1 represents the blade position for the first cut. A2 represents the blade position for the second cut. A3 represents the blade position for the third cut. L1 represents the distance between cuts A1 and A2. L1* represents the distance between A2 and A3. K* represents the width of the saw cut relative to the table surface at the angle programmed for A2. Note: as the angle from 90 degrees increases, the width of K* also increases. K is the actual width of the saw cut.



The value for A1, A2, A3, and L1* should be given as print dimensions but may have to be calculated. The value for L1 must be calculated for the particular angles of A1 and A2. Use of trigonometric functions is required. The calculations are as follows:

h h

Detail from above diagram.

h = Intersection of angles relative to table surface.

r = h/tan A2

 $K^* = K / \sin A2$

L1= (r x 2) - K* For parts where A1 and A2 are symmetrical.

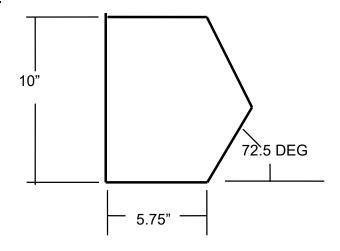
Note: For parts where A1 and A2 are not symmetrical, calculations must be made for the triangle made by A1.

This condition will affect L1.

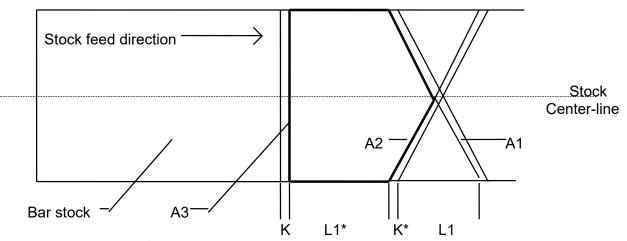


EXAMPLE PROGRAM:

SAMPLE PART:



ABOVE PART REPRESENTED WITHIN THE STOCK:



Measured width of cut K=.072"
A1=72.5 degrees left h = 5.0"
A2=72.5 degrees right
A3=90 degrees

r = h/tan A2 = 5"/tan 72.5 = 5" / 3.1716 = $\underline{1.5765}$ " K*=K/ sin A2 = .072/sin 72.5 = .072/.9537 = $\underline{.0755}$ " L1= (r x 2)-K* = (1.5765 x 2) - .0755 = $\underline{3.0775}$ Due to symmetrical A1 and A2. The special software required the use of (2) jobs programmed to run sequentially in the job queue in order to produce this part in one operation.

The previous data would be programmed into the PLC as follows:

Close infeed vise and press AUTO.

Job 1: A1 = 72.5 left	L1 = 3.078"	A2 = 72.5 right	L2 = 0	RQD = 1
Job 2: A1 = 72.5 right	L1 = 5.750"	A2 = 90	L2 = 0	RQD = 1

Note that L2 values are zero. These values will be disregarded by the PLC so they could be any value. Also note that L1 of job 2 is L1*.

To produce a run of 25 parts the user must do the following:

Close infeed vise and press AUTO.

Enter job 1 and 2 into the queue in that order.

Press QUEUE button

Select job 1as first and job 2 as second in queue.

Press M-QUE button

Select to run the gueue 25 times. QUEUE REQUIRED = 25, QUEUE CUT = 0

Press START button.

Enter stock height.

Press CYCLE START.

Start blade at appropriate speed.

The machine should then do the following, 25 times:

Head swings to 72.5 degrees left and makes 1st cut. (A1 job 1)

Shuttle Feeds L1. (L1 job1)

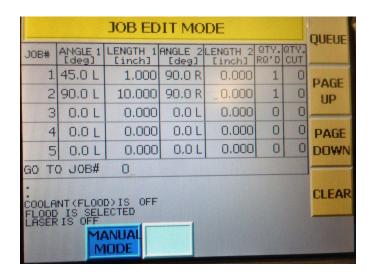
Head swings to 72.5 degrees right and makes 2nd cut. (A2 job 1 and A1 job 2)

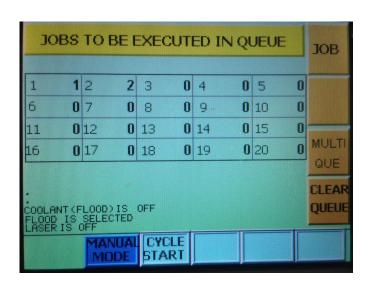
Head and Shuttle will move to the home position - it is always performed between jobs.

Shuttle Feeds L1*. (L1job 2)

Head swings to 90 degrees and makes 3rd cut. (A2 job 2)

(this completes one part)





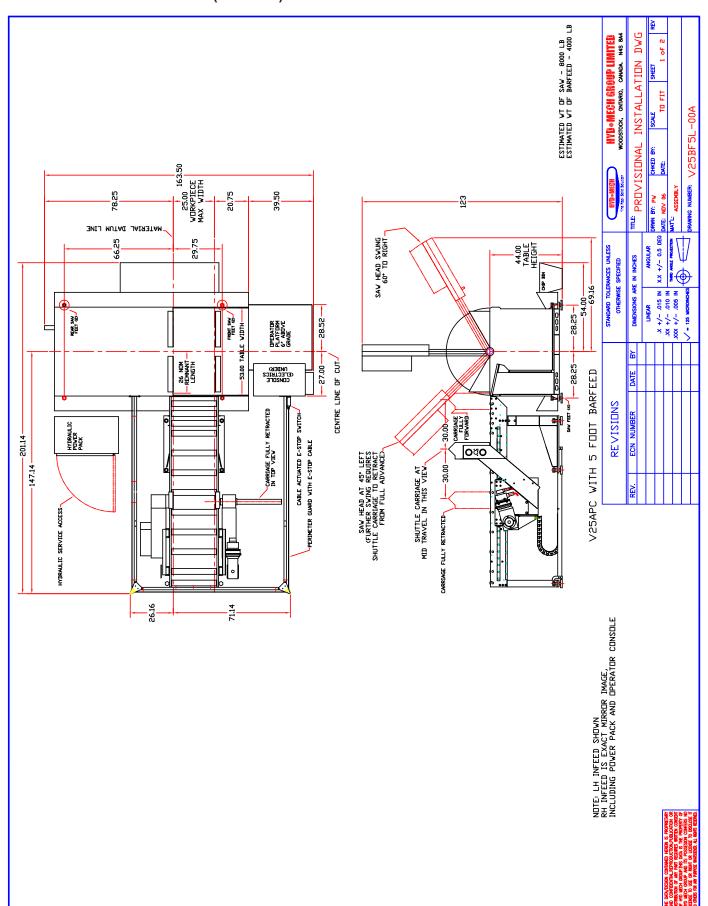


SECTION 8 - SPECIFICATIONS

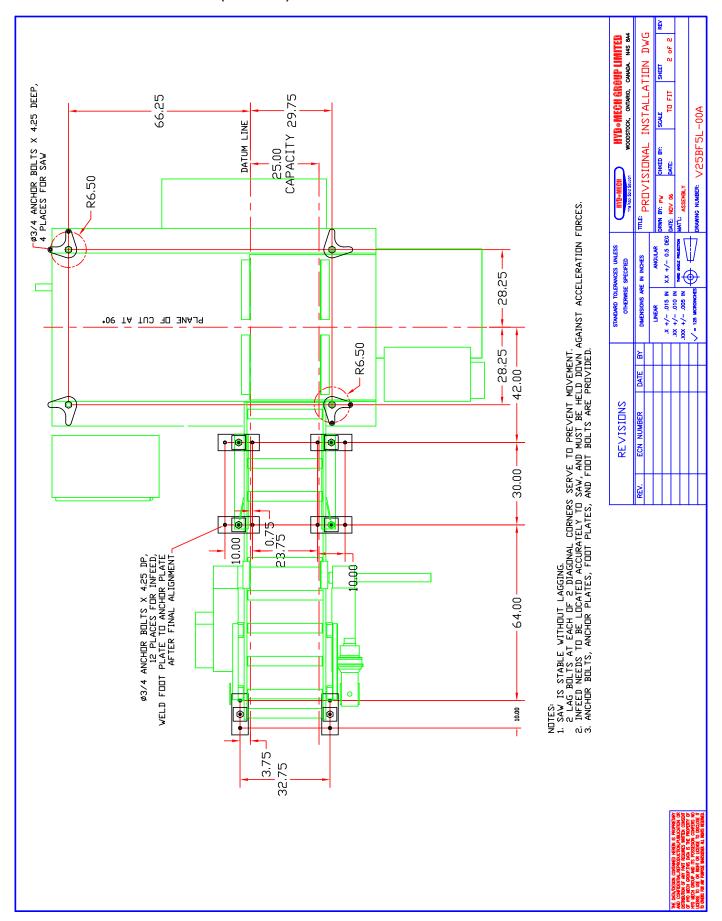
V-25APC BANDSA	W SPECIFICATION	IS				
	at 90°	25"x 30.5"(635mm x 775mm)				
	at 45°	21"x 25"(534mm x 635mm)				
Capacity	at 30° RH	14.5"x 25"(368mm x 635mm)				
	at 30° LH 13.5"x 25"(343mm x 635mm)					
	Bundling clamp is fu	Il capacity at 90°				
Cant Angle	5.6°					
	Length	21' 1/2" (6414mm)				
Blade	Width	1 1/2" (38mm) Wide x .050 (1.3mm) Thk.				
Blade Speed	variable	75 - 350 sf/min (23 - 106 m/min)				
Diada Cuidas	Carbide pads, spring loaded, zero clearance, with positively maintained parallelism					
Blade Guides	Integrally mounted entry rollers					
Blade Wheel Dia.	Drive Wheel	32" (813mm)				
Blade Wileel Dia.	Idler Wheel	24" (610mm)				
Blade Drive	10 HP (7.5 kW)					
	Power	3 HP (2.2 kW)				
Hydraulic System	Pressure	1000 psi (6895 kPa)				
	Tank	7 U.S. Gal.(26.5 liters)				
	Tank Capacity	38 US Gal (144 liters)				
Coolant System	Usable Capacity	28 US Gal (106 liters)				
	Hydraulic	Full stroke				
Vises	Adjustable Force	1000 - 3300 lbs (454 - 1497 Kg)				
Table Height	44" (1118mm)					
Manimum Minds	10,000 lbs (4536 Kg) applied to table.					
Maximum Workload	Based on .030" (0.76 mm) allowable table deflection , safety factor of 4 on structure yield.					
Machine Weight	9500 lbs (4309 Kg)					
Barfeed Weight	4500 lbs (2041 Kg)					



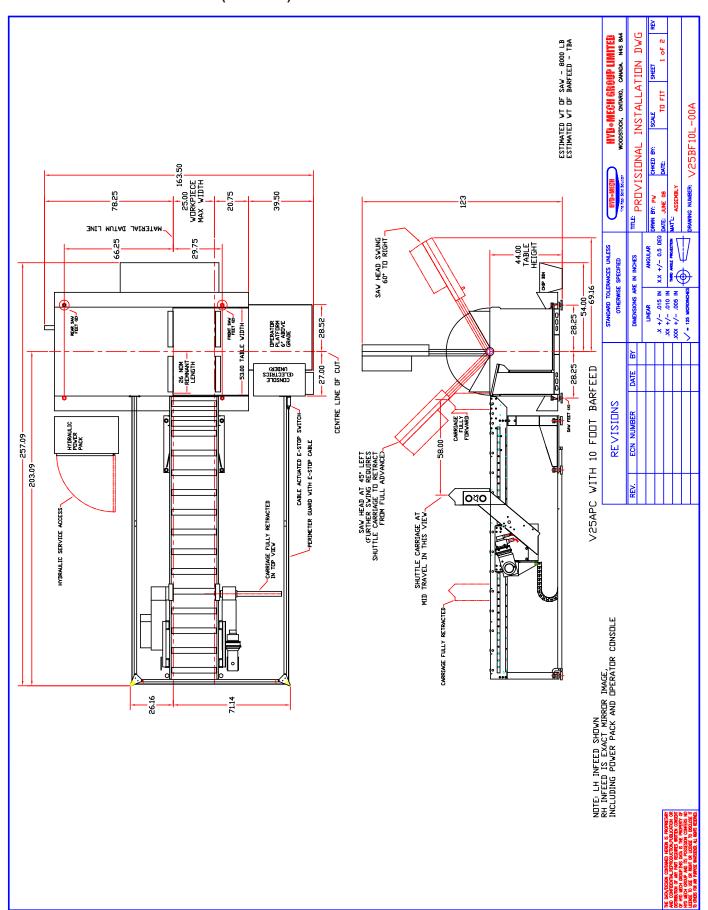
V-25APC 5' BARFEED LAYOUT (SHEET 1)



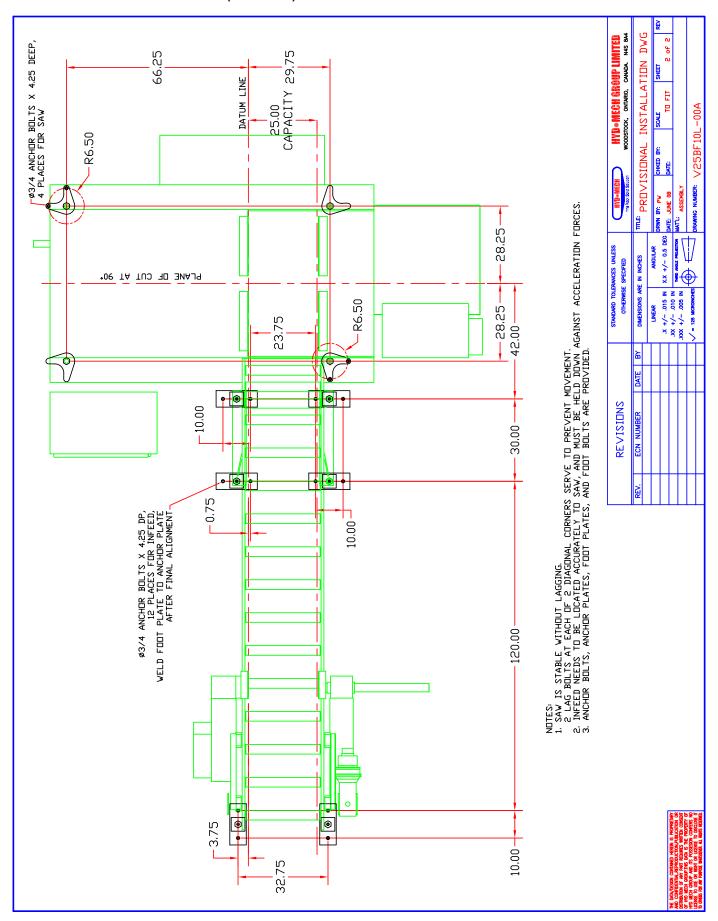
V-25APC 5' BARFEED LAYOUT (SHEET 2)



V-25APC 10' BARFEED LAYOUT (SHEET 1)



V-25APC 10' BARFEED LAYOUT (SHEET 2)





SECTION 9 - WARRANTY

WARRANTY

Hyd·Mech Group Limited warrants parts/components on each new V-25 APC 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 V-25 APC, 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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