H4040, H4060, H4080

393139

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.

Hyd·Mech Group Limited
P.O. Box 1659, 1079 Parkinson Road
Woodstock, Ontario, N4S 0A9
Phone : (519) 539-6341
Service : 1-877-237-0914
Sales : 1-877-276-SAWS (7297)
Fax : (519) 539-5126
e-mail : info@hydmech.com

PRINTED APRIL 2017

TABLE OF CONTENTS

SECTION 0 - SAFETY INSTRUCTIONS

SECTION 1 - INSTALLATION

SECTION 2 - OPERATING INSTRUCTIONS

SECTION 3 – MAINTENANCE

SECTION 4 - ELECTRICAL

SECTION 5 - HYDRAULIC SYSTEM

SECTION 6 - MECHANICAL ASSEMBLIES

SECTION 7 - OPTIONS

SECTION 8 - SPECIFICATIONS

SECTION 9 - WARRANTY

SECTION 0 - SAFETY INSTRUCTIONS

SUMMARY

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

Section 0 SAFETY
Section 2 OPERATING INSTRUCTIONS

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

Put Safety First

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

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

Basic Rules – only use this machine when

- It is in good working order.
- All safety equipment is in place and functional.
- Operations are in compliance with this manual.
- Materials are within designed specifications and are non-hazardous.

Owner is responsible to

- Keep Manual accessible at the machine.
- Ensure only reliable, fully trained personnel work with the machine.
- Clearly define responsibilities of all personnel working with the machine.
- Keep the machine in good working order.

Operator and Maintenance Personnel are responsible to:

- Keep all safety equipment in order, check its function at the beginning of each shift, and report any shortcomings.
- Shut down machine and report any faults or malfunctions that could impair safety.
- Understand and obey safety hazard labels.
- Not to wear un-restrained long hair, loose clothing or jewellery.
- Wear all required personal protective equipment.
- Not to wear gloves within 24 inches of moving blade.
- Maintain a clean working area and machine.
- Always use Lock-out when performing maintenance or repairs.

FOREWORD

Put Safety First!

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

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

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

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

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

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

Mandatory Information

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

Section 0 SAFETY

Section 2 OPERATING INSTRUCTIONS

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

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

Signatures

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

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

Name	Date	Signature

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

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

Name	Date	Signature

BASIC RULES

Intended Use

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

Exclusion of Misuse

Misuse includes, for example:

Sawing hazardous materials such as magnesium or lead.

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

Operating the machine without all original safety equipment and guards.

Liability

The machine may only be operated:

When it is in good working order, and

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

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

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

RESPONSIBILITIES OF THE OWNER

Organization of work

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

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

Choice and qualification of personnel

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

Training

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

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

Define responsibilities

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

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

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

Condition of Machine and Workplace

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

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

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

RESPONSIBILITIES OF THE OPERATOR AND MAINTENANCE PERSONNEL

Safety equipment

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

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

- At the start of every shift.
- After maintenance and repair work
- When starting for the first time, and after prolonged shutdowns

Emergency Stop Button (E-Stops)

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

Damage

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

Safe operation

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

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

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

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

Faults

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

Safety hazard labels

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

Clothing, jewellery, protective equipment

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

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

Gloves

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

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

Wear protective gloves when handling bandsaw blades at blade changes.

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

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

Hearing protection

Ear protection must be worn whenever necessary.

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

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

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

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

Workplace

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

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

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

Master Disconnect

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

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

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

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

Residual Risks

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

The line side of the disconnect switch itself remains energized.

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

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

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

SAFETY HAZARD LABELS

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

HAZARDOUS VOLTAGE INSIDE

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

SECTION 1 - INSTALLATION

Upon delivery of your new H-40 saw, it is imperative that a thorough inspection be undertaken to check for any damage that could have been sustained during shipping. Special attention should be paid to the electrical and hydraulic systems to check for damaged cords, hoses and fluid leaks. In the event of damage caused during shipping, contact your carrier to file a damage claim.

SAFETY PRECAUTIONS

The H-40 has been designed to give years of reliable service. It is essential that operators be alerted to the safe operation of this saw, and the practices to avoid that could lead to injury. The following safety rules are at the minimum necessary for the safe installation, operation, and maintenance of the saw. Take every precaution for the protection of operators and maintenance personnel. At the beginning and through out this manual there are precautionary indicators, these will inform you of areas which require special attention.

- POWER HOOK-UPS AND REPAIRS SHOULD BE ATTEMPTED ONLY BY QUALIFIED TRADESMEN.
- THE SAW SHOULD BE LOCATED IN AN AREA WITH SUFFICIENT ROOM TO SAFELY LOAD STOCK INTO THE SAW. SECURE THE SAW TO THE FLOOR.
- THE AREA AROUND THE SAW SHOULD BE MAINTAINED IN A CLEAN AND TIDY CONDITION TO AVOID OBSTACLES OPERATORS COULD TRIP OVER.
- THE H-40 SAW SHOULD ONLY BE OPERATED ACCORDING TO THE SPECIFICATIONS OF THE SAW AVOID UNSAFE USAGE PRACTICES.
- IF AT ANY TIME THE SAW DOES NOT APPEAR TO BE OPERATING PROPERLY IT SHOULD BE STOPPED IMMEDIATELY AND REPAIRED.

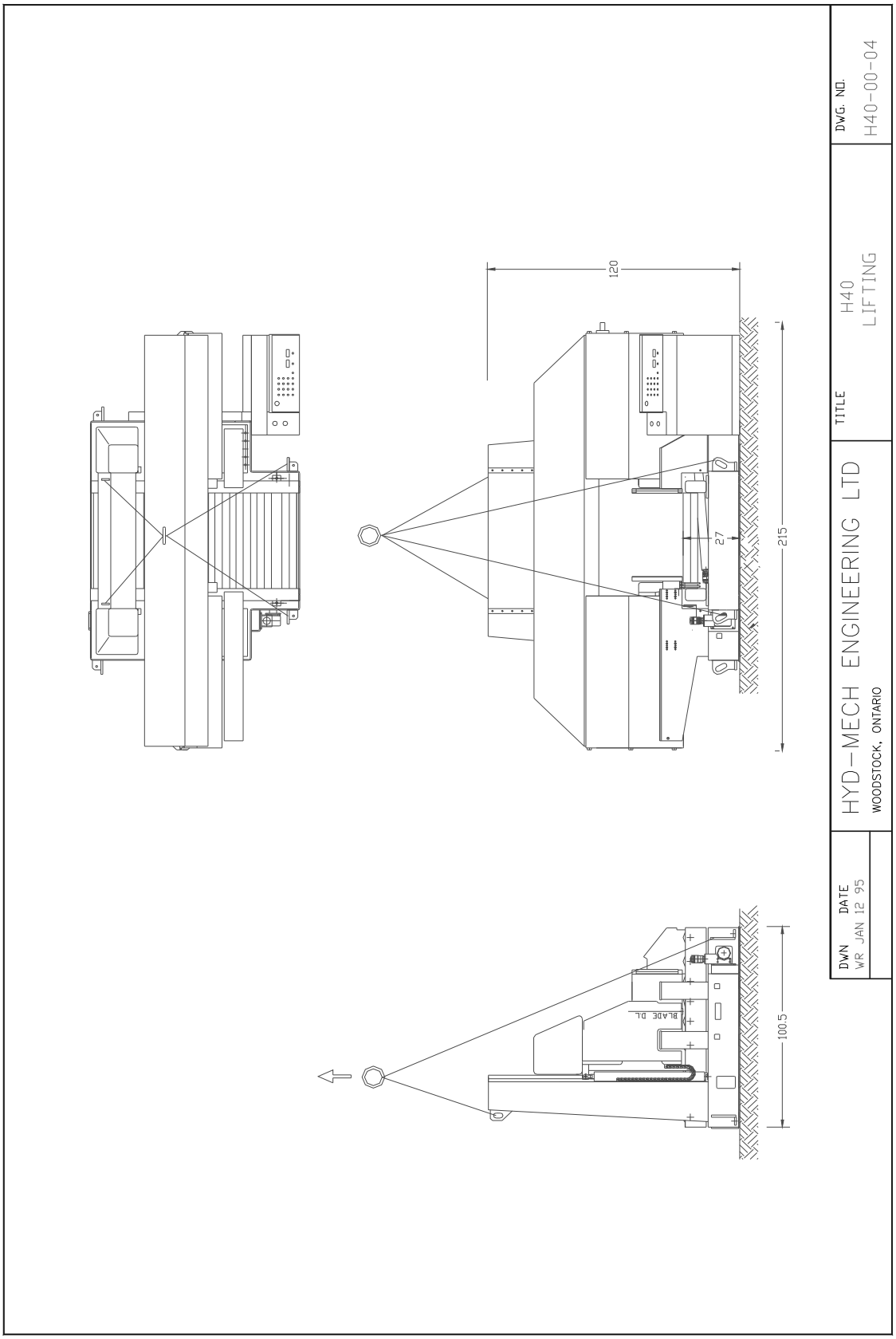
OPERATOR:

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

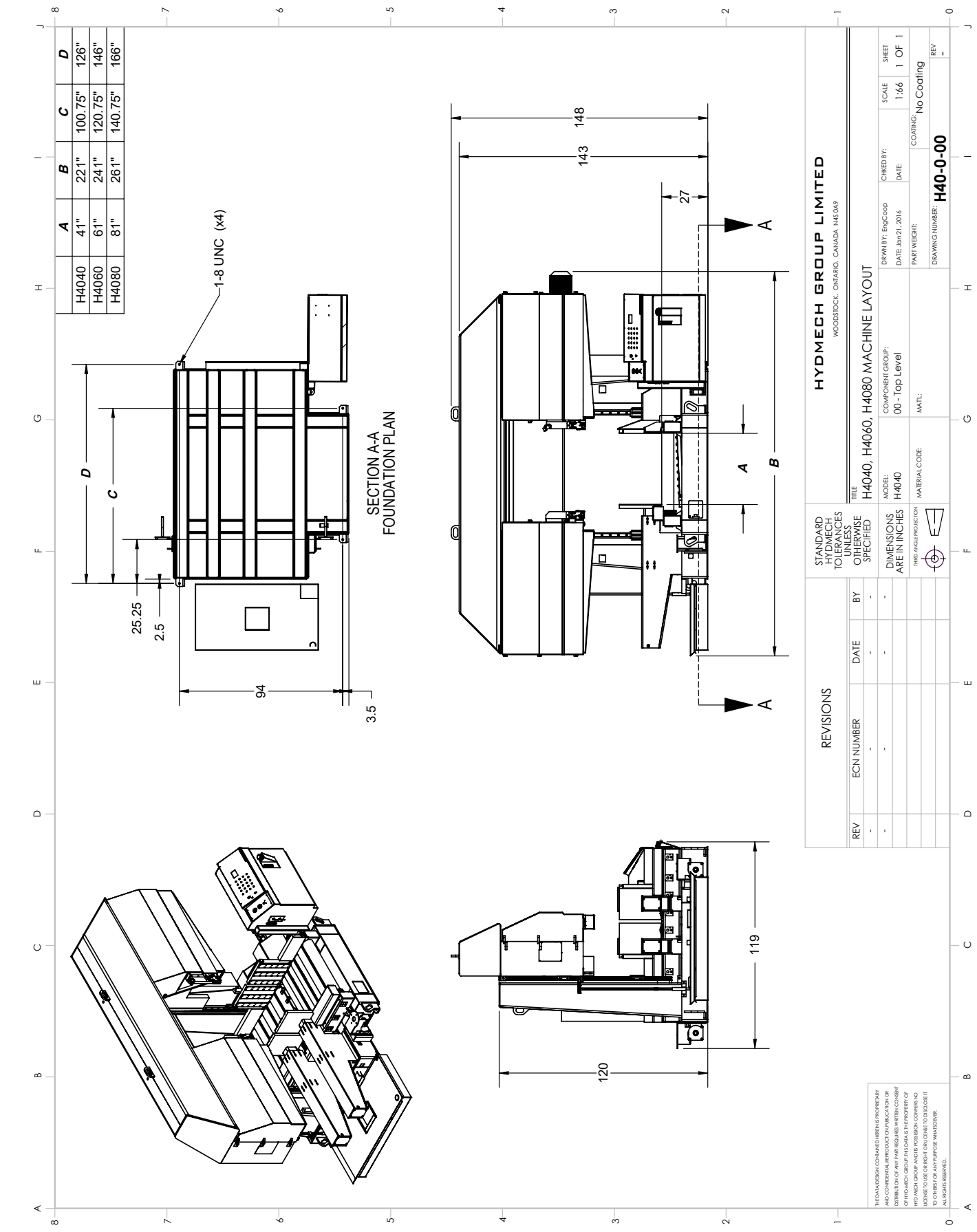
NO MODIFICATIONS TO THE MACHINE ARE PERMITTED WITHOUT PRIOR APPROVAL FRO HYD-MECH. ANY APPROVED MODIFICATIONS SHOULD ONLY BE UNDERTAKEN BY TRAINED PERSONNEL.

LIFTING THE H-40

The machine weight for a H40-40 is 39,000lbs (17690Kg) or 42,000lbs (19051Kg) with the optional outboard vise.
The machine weight for a H40-60 is 42,000lbs (19051Kg) or 45,000lbs (20412Kg) with the optional outboard vise.
The machine weight for a H40-80 is 46,000lbs (20865Kg) or 50,000lbs (22680Kg) with the optional outboard vise.



MACHINE LAYOUT



	A	B	C	D
H4040	41"	221"	100.75"	126"
H4060	61"	241"	120.75"	146"
H4080	81"	261"	140.75"	166"

FOUNDATION, LEVELING AND ANCHORING

Machine location should be carefully selected. A flat concrete floor area should be chosen. It should have enough free space surrounding the machine to enable free access for safe operation and maintenance.

The machine should be leveled in both directions, i.e. along and across its infeed conveyor especially when machine is to be inserted into a larger conveyor system. The photo below shows the conveyor from the infeed side.

Four leveling screws are provided, one in each corner of the machine base. Steel plates are to be placed under each screw to prevent their sinking into the concrete floor.

NOTES: In some cases leveling the saw infeed and auxiliary conveyors with a slight slope towards the blade are recommended. This will prevent coolant from running down the raw stock. (This is especially true when cutting tubing or bundles).

H-40 INSTALLATION PROCEDURE

1) Machine location should be carefully selected. A flat concrete floor area should be chosen and have enough free space surrounding the machine to enable free access for safe operation and maintenance.

2) Cut strapping and remove conveyor drive & chip bucket from saw rollers.

3) Remove coolant tank & position at the left side of the saw (facing from front).

4) Remove leveling pads from inside coolant tank & place under saw base leveling bolts.

5) Check machine level from side to side & back to front. A slight incline (1/8”-1/4” rear of saw higher) will assist coolant flow back into return tray. Ideally if the machine is sitting flat on the floor & the level is good do not touch leveling bolts. If leveling bolt adjustment is necessary use shims supplied and place under 6 corners of base frame. Remove leveling bolts and re-check level. If level is unchanged anchor machine to the floor using adjusting bolt holes.

6) Install infeed conveyor drive with bolts supplied. Install the conveyor drive chain.

For machine shipping purposes the following items have been removed from the saw.

- Infeed conveyor gearbox and motor
- Bearing housing support
- Chain guard

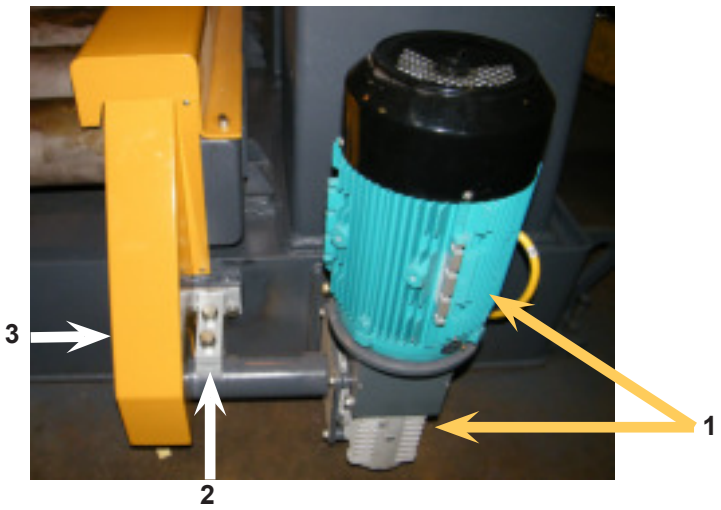
Once the machine has been installed, levelled and anchored the above three items are to be installed as follows:

1. Install the gearbox and motor (1) using the four bolts and use the gearbox as a tensioner by moving it up and down before completely tightening the four bolts.

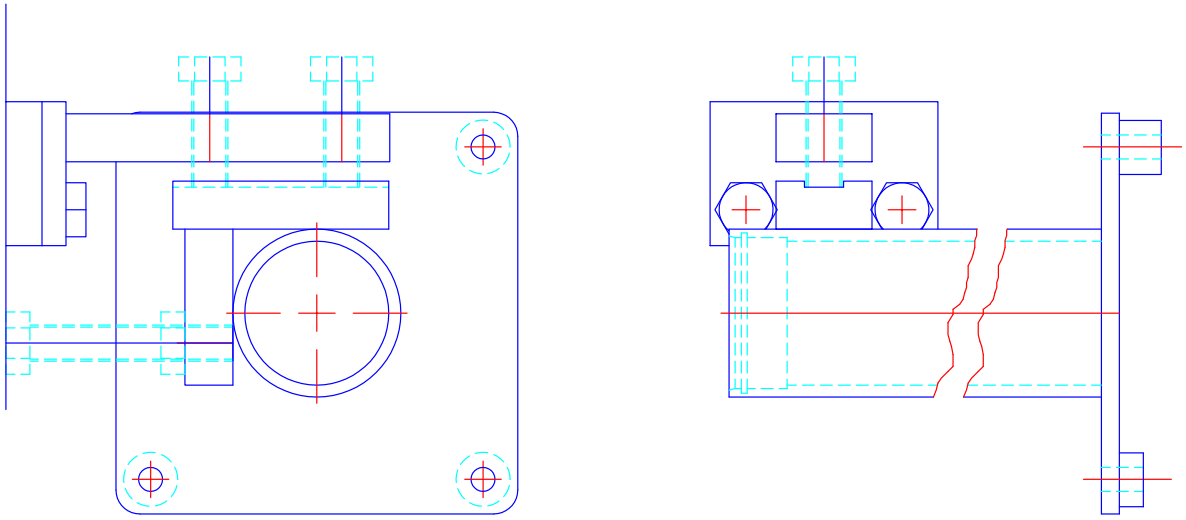
2. Install the chain guard over the sprockets.

3. Install the bearing housing support (2).

4. Install the chain guard (3).



INFEED CONVEYOR DRIVE SUPPORT



HYDRAULIC OIL AND CUTTING FLUID

The H-40 bandsaw is supplied with Texaco 46 hydraulic oil. If it in necessary to change the oil to different brand see the HYDRAULIC SECTION for equivalent grade oil.

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

-Oil based; dilute 1:10 ratio. (one part concentrated coolant to 10 parts water)

-Synthetic; dilute as recommended by the manufacturer.

WIRING CONNECTIONS

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

BEFORE START-UP THE FOLLOWING TWO POINTS SHOULD BE CHECKED:

-Signs of damage that may have occurred during shipping to the electrical cables and the hydraulic hoses.
-The hydraulic oil level is between the upper and lower lines on the level gauge on the front of the control panel base.

As supplied, the machine is set to run on three phase voltage as indicated on the serial plate and voltage label. Power connection to the machine is made to machine disconnect and ground connections inside the electrical panel as shown below.

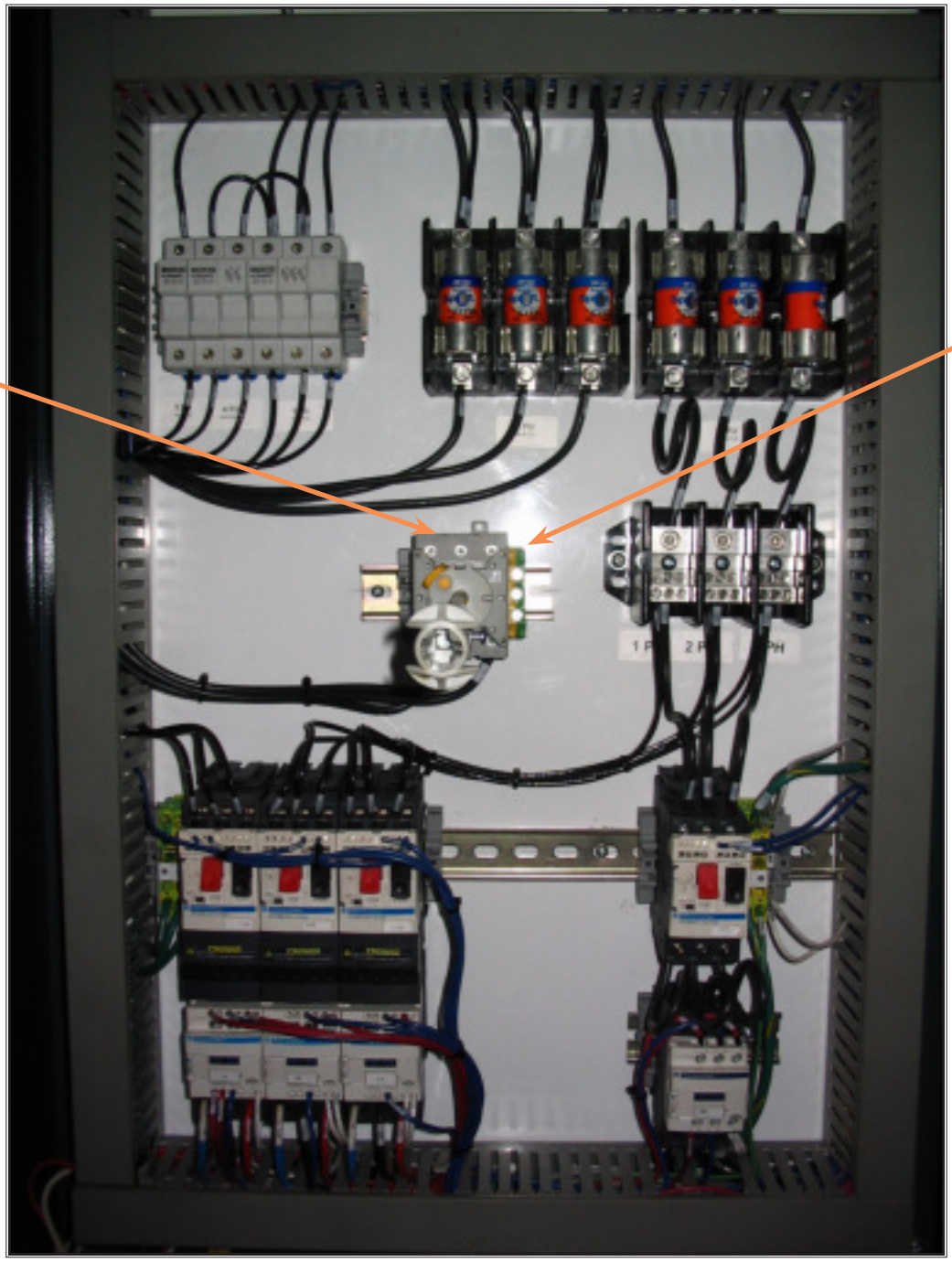
During the initial hook-up it is very important to check that the phase order is correct. This is indicated by the hydraulic pressure gauge registering a pressure rise and the blade running in a counter clockwise direction. If the hydraulics do not register an immediate pressure rise, shut the hydraulics off and change the phase order.

ATTENTION:

1) Running the hydraulics “backwards” can damage the hydraulic pump.

2) After checking the hydraulic pressure and BEFORE INSTALLING the drive chain between the infeed conveyors, check that the conveyors are running in the correct direction. If they are not, change any two phases at the MOTOR JUNCTION BOX for each motor as required.

Power connections should be made by qualified personnel only



Electrical panel located behind the head on the drive side

SECTION 2 - OPERATING INSTRUCTIONS

This section has been prepared to give the operator the ability to set up the saw for most cutting situations. Before cutting any material, the operator should be familiar with all operations and controls as well as the basic cutting theory described below. The saw is equipped with variable blade speed and hydraulic feed control, as well as an extensive door chart to guide the operator to the correct setting of these controls.

BLADE BASICS

Technology is rapidly changing all aspects of production machining. Metal cutoff is no exception. The advances made in the bandsaw blade industry have definitely brought down the cost per cut, despite the three fold higher price of high technology blades. Variable pitch, bi-metal blades (like the 4/6 or 3/4 bi-metal blade supplied with the machine) last much longer, cut faster, and more accurately than conventional carbon steel blades. In order to take advantage of the superiority of bi-metal blades, it is critical to properly “break-in” a new blade. This is accomplished by taking two or three cuts through solid four or five inch diameter mild steel at an extremely slow feed rate. (It is also advisable to utilize a slow blade speed)

These two or three slow cuts sufficiently lap (polish) the teeth on the new blade so that it does not snag the material being cut. Proper break-in will alleviate blade vibration; improve surface finish, accuracy, and blade life.

After “break-in”, the following six points must be closely monitored to ensure long blade life:

1. Proper blade tension should be maintained. (See Section 3, Maintenance and Troubleshooting)
2. Generous coolant application is essential with most materials. A high quality and well mixed coolant will extend blade life, and also increase cutting rate and quality. On those materials where coolant is undesirable for cutting, a slight coolant flow or periodic oiling of the blade is necessary to prevent the blade from being scored by the carbide guides.
3. The stock being cut must be securely clamped in the vises.
4. The proper feed force should be chosen. (see Saw Cutting Parameters: Step 2)
5. The proper blade speed must be selected. (see Saw Cutting parameters: Step 4)
6. The proper feed rate must be applied. (see Saw Cutting Parameters: Step 5)

VARIABLE SPEED CONTROL

Blade speed can be adjusted infinitely between 75 and 270 SFM (Surface Feet/Minute) (23 to 82 m/min) Adjustment should be made only when the blade is running. Clockwise rotation of the knob increases blade speed while counter clockwise rotation decreases blade speed.

THE CONTROL PANEL

START-UP

The control console has been designed to simplify the operation of the saw, to give the operator the ability to stop any function at any time, and to be able to control all the functions remotely. We cannot overstress the importance of familiarizing yourself with the controls prior to starting the machine.

NOTE:

1. ALL SWITCHES MUST BE IN THE CENTER NEUTRAL POSITION TO START THE MACHINE!
2. WHEN STARTING THE MACHINE FOR THE FIRST TIME MAKE SURE THAT BLADE IS MOVING IN A COUNTERCLOCKWISE DIRECTION, AND THAT THE HYDRAULIC PRESSURE IS:
   -1200 PSI FOR H-40/40 AND H-40/60
   -1300 PSI FOR H-40/80

MANUAL OPERATION

Manual Operations can be performed by using the control buttons on the HMI. All functions are self-explanatory. Specific control button functions are described on the following pages.

EMERGENCY STOP
Stops blade and hydraulic motors. Head motion will stop and vise clamping pressure will begin to fall off. Long pieces of work should always be supported so they will not become loose over time and fall while the machine is shut down. This is a latched button and must be pulled out to start the machine.

BLADE STOP
When depressed the blade will stop. Blade motor will stop automatically when head reaches head down limit switch.

HEAD CONTROL
This switch has three positions: UP, HOLD, and DOWN. UP causes head to rise until it mechanically cannot raise any higher or the switch is moved to HOLD. In HOLD head movement stops. In the DOWN position the head will descend until it reaches the lower limit switch. The speed or rate of descent is controlled by the FEED RATE VALVE.

CONVEYOR FORWARD
When depressed, the selected conveyor's rollers rotate in a direction which would move material forward from behind the saw head toward the front of the machine. Releasing the push button deactivates conveyor motor(s) and movement will stop.

FRONT VISE
This switch has three positions, OPEN, NEUTRAL and CLOSE. With the switch held in the OPEN position the vise will open all the way or until the switch is released. With the switch in the NEUTRAL position, the vise will stay where it is and will not move freely although it will not resist a large force indefinitely without creeping. In CLOSE, the vise will close all the way, or until it encounters enough resistance to stop it.

HYDRAULIC START
To start the hydraulic system, the switches for the head and vises must be in the “NEUTRAL” position. The “HYDRAULIC START” button must be depressed and held in momentarily until the PLC display becomes active.

BLADE START
Starts the blade when depressed. Only active with hydraulics running and saw head up, off of lower limit switch.

GUIDE ARM
Three position, spring centered switch. When held to the IN position, the moveable guide arm will move in toward the fixed guide arm. OUT retracts the moveable arm away from the fixed guide arm. When released, the switch returns to the center position allowing no guide arm movement. **ENSURE CLEARANCE BETWEEN GUIDE ARM AND VISES AT ALL TIMES.**

CONVEYOR REVERSE
When depressed, the selected conveyor’s rollers rotate in a direction which would move material toward the back of the machine. Releasing the push button deactivates conveyor’s motors and movement will stop.

REAR VISE
This switch has three positions, OPEN, NEUTRAL and CLOSE. With the switch held in the OPEN position the vise will open all the way or until the switch is released. With the switch in the NEUTRAL position, the vise will stay where it is and will not move freely although it will not resist a large force indefinitely without creeping. In CLOSE, the vise will close all the way, or until it encounters enough resistance to stop it.

BLADE SPEED
Allows for increase or decrease of blade speed while blade motor is running.

COOLANT
This switch has three positions, AUTO, OFF, and ON. In the ON position, the coolant system will operate when there is power to the machine; this allows using the wash gun to clean the machine. In the OFF position, the coolant system is inactive. In the AUTO position the coolant system will only run when the blade is on. The coolant system can also be run **only when both the blade is on and the head is descending by selecting this option in the PLC parameters.**

CONVEYOR SPEED
Allows for increase or decrease in speed of selected conveyor(s) when FORWARD or REVERSE push buttons are depressed.

SAFETY LOCK
This lock is provided for the safety of the operator during the blade changing procedure. When the lock is in the “ON” position, the door interlocks are disabled and the only functions that are active are the HEAD and BLADE TENSION controls. All other controls are inactive. After the blade has been changed the lock must be switched to “OFF” in order to operate the machine.

LASER
This option switch has two positions, OFF & ON.

CONVEYOR SELECT
Three maintained positions: INFEED, BOTH, and OUTFEED. Selects the conveyor(s) to move when the CONVEYOR FORWARD or REVERSE PUSH BUTTONS are used.

BLADE TENSION
Located in the idler wheel box, is a three position maintained switch: Normal running position is +/RUN. This position will keep constant tension on the blade. In the center HOLD position the idler wheel is held in position with not tension applied to the blade. The “-“ position retracts the idler wheel, releasing blade tension and allowing for blade removal.

DISPLAY
The following information is displayed on the E1012 HMI:

1. Head Height. (Inches)
2. Feed Rate. (Inches/minute)
3. Blade Speed. (surface feet/minute)
4. Cutting Time Elapsed.
5. Cut Time Remaining.
   (Before Head Down switch is activated)

When the machine is initially powered the LCD will show company logo and software version. On activation of a push button or selector switch the LCD display will show the head height.

Depressing the button under B RUN will change the screen to show FEED RATE and BLADE SPEED.

Depressing the button under TIME will change the screen to show CUTTING TIMES.

Depressing the button under EXIT will change the display to the previous screen.

HYDRAULIC FEED CONTROL

The Hydraulic Feed Control is located to the left of the control panel. These controls allow independent control of Feed Force (FF) and Feed Rate (FR)

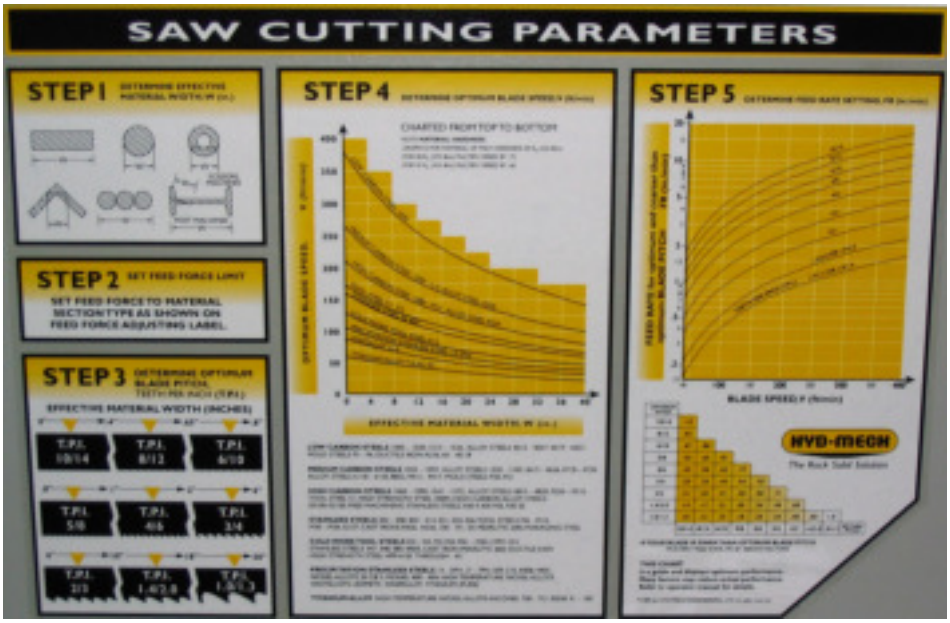
FAST APPROACH LEVER. DEPRESS FOR FAST HEAD DESCENT

FEED FORCE IS FACTORY PRESET AND CANNOT BE ADJUSTED ON ANY H40 MODEL.

FEED RATE KNOB
USED TO SET FEED RATE (COUNTERCLOCKWISE ROTATION TO INCREASE AND CLOCKWISE ROTATION TO DECREASE).

CUTTING PARAMETERS CHART

A full size CUTTING PARAMETERS CHART is mounted on the front of the saw. The chart contains five steps for the operator to follow in order to achieve optimum performance of the saw. These steps are detailed on the following pages.



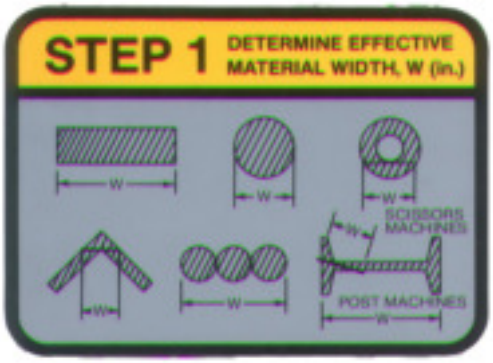
Saw Cutting Parameters Chart

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.



Material Width Chart

NOTES:

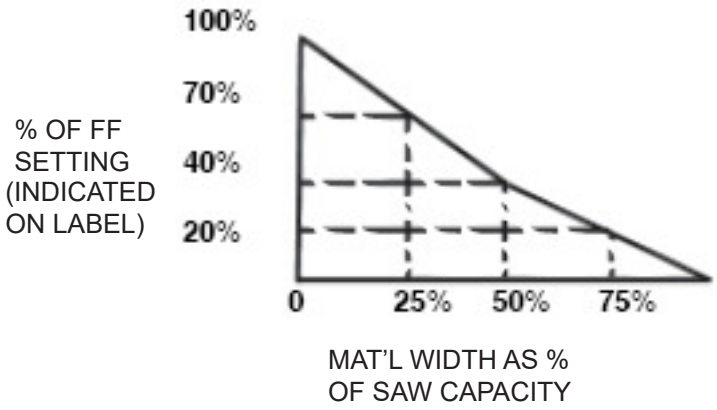
1. Effective material width, as determined here in STEP 1, can be thought of as the average width of material “seen” by each tooth, and it is used in STEPS 3 and 4.
   In Example #1, for an 8” (200 mm) diameter solid, Effective Material Width is 8” (200mm).

STEP 2: SET FEED FORCE LIMIT **(DOES NOT APPLY TO H40 MACHINES AS FEED FORCE IS FACTORY PRESET)**

The Feed Force Limit is the maximum amount of force with which the head is allowed to push the blade into the work-piece.

CUTTING SOLIDS

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



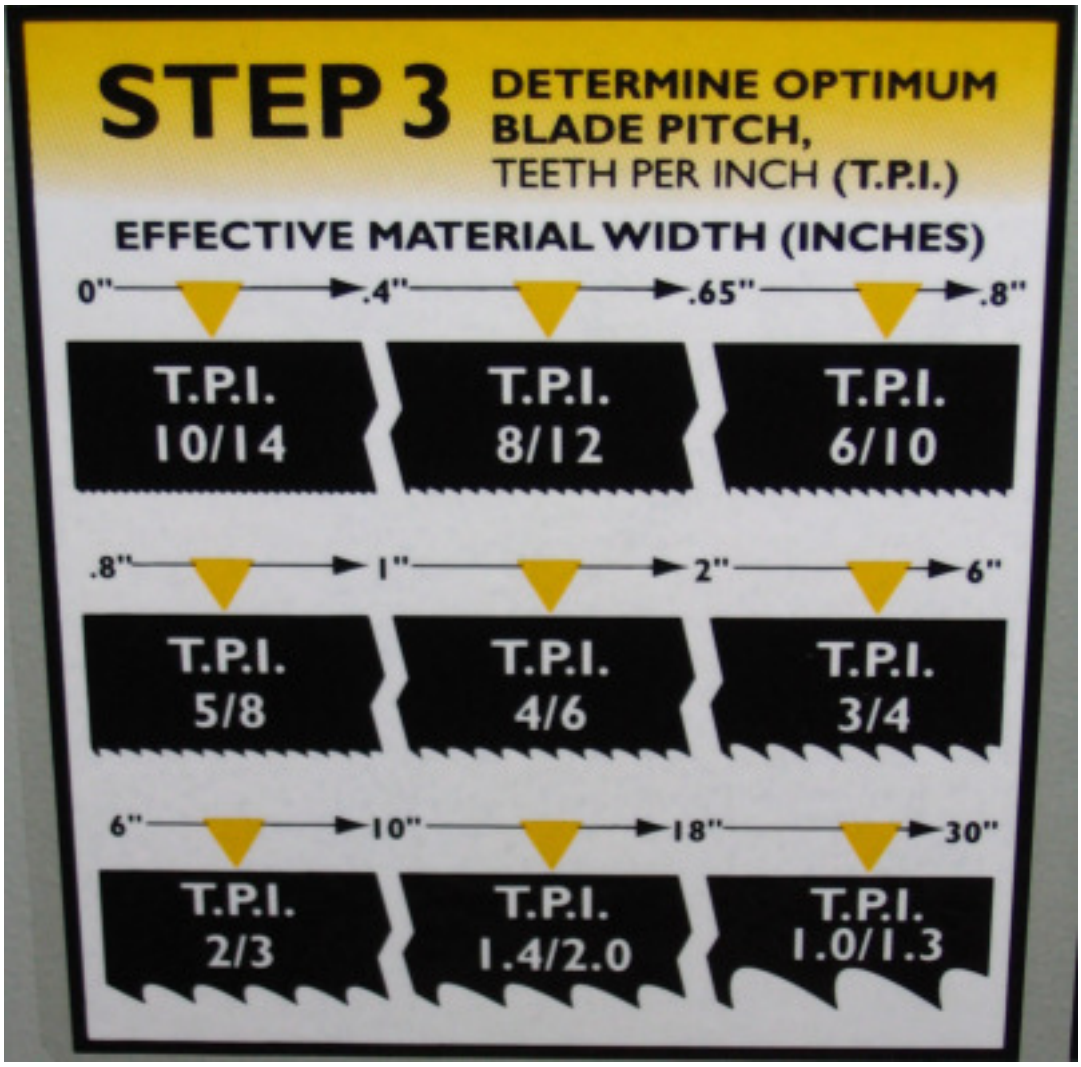
EXAMPLE: When cutting a solid which is 1/2 of machine capacity using the graph, locate 50% on the horizontal line and travel upwards to the plotted line and then travel directly across to the vertical FF Setting line. The point that you have arrived at shows a setting of 40% for a piece 50% of capacity.

CUTTING STRUCTURALS: A reduced Feed Force Setting is used when cutting structurals.

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.



Optimum Blade Pitch (T.P.I) for Material Width (Inches)

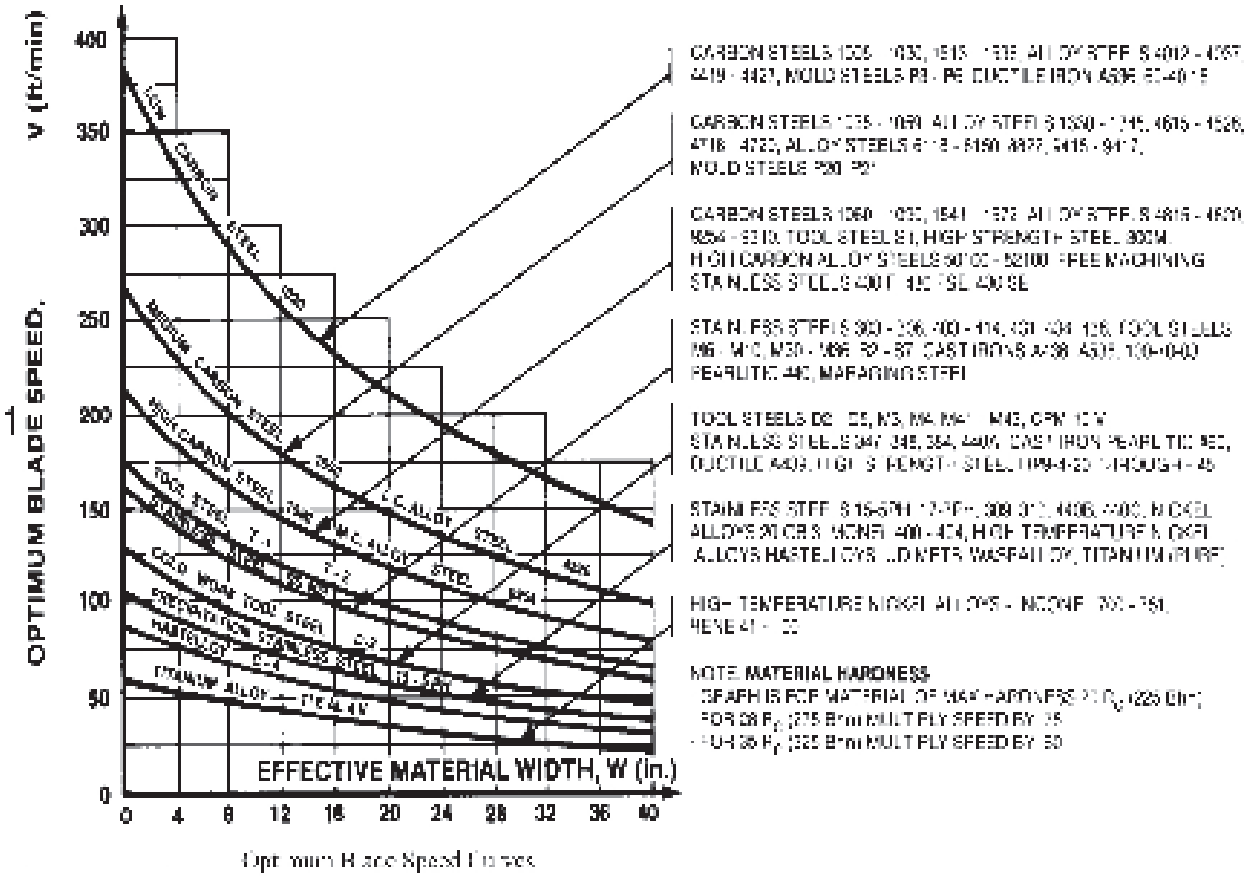
It is impractical to change the blade to the proper pitch every time a different width of material is cut and it is not necessary, but remember that the optimum blade will cut most efficiently. Too fine a blade must be fed slower on wide material because the small gullets between the teeth will get packed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

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.



Optimum Blade Speed Curves

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.

Example #1

1. 8” (200mm) diameter #1045 Medium Carbon Steel solid bar is to be cut.
2. On the graph above find the Medium Carbon Steel Curve which represents the optimum blade speeds for 1045 Carbon Steel.
3. On the horizontal axis (effective material width axis) find number 8 which represents effective material width of an 8” (200mm) diameter solid.
4. Find the point where a vertical line from 8” (200mm) intersects the Medium Carbon Steel Curve.
5. From this intersection point run horizontally left to the vertical axis (optimum blade speed axis) and find the point marked “200”.
6. For 8” (200mm) diameter, 1045 Carbon Steel solid bar 200 ft/min (60m/min) is the optimum blade speed.

NOTE:

1. 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.

2. Material Hardness - The graph above 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.

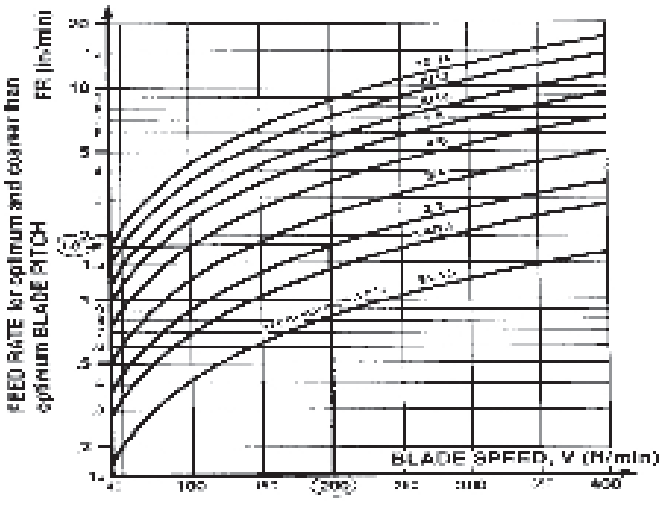
#	MATERIALS	OPTIMUM	BLADE SPEED
		(ft/min)	(m/min)
1	5” (125mm) Diameter Solid Carbon Steel	225	70
2	12” (300mm) I-Beam	290	90
3	4” x 4” (100mm x 100mm) Rect. Tube 1/4” (6mm) Wall	350	110
4	4” (100mm) 400 Stainless Steel	140	45
5	2” x 2” (50mm x 50mm) Rect. Tube 1/4” (6mm) Wall		
	Bundle 5” x 5” pcs. 10” x 10” (500mm x 500mm)	325	100
6	3” x 3” (75mm x 75mm) Inconel	60	20

Materials and Blade Speed

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

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

The FEED RATE Knob controls FEED RATE of the blade descent. 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.



Feed Rate Calculation

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:

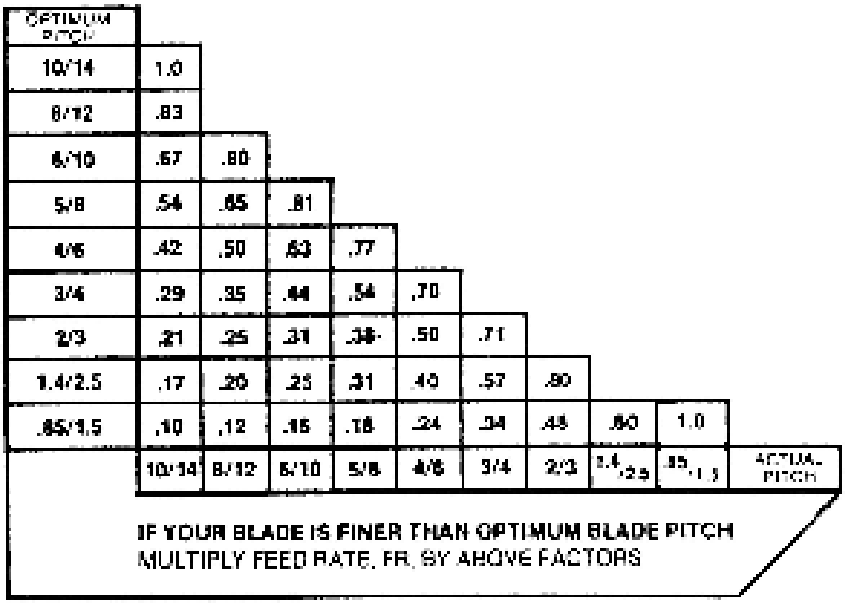
1. On the horizontal axis (blade speed axis), find 200 ft/min (60mm/min).

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

3. 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.

FEED RATE, continued

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 Vs Actual Blade Pitch

ADDITIONAL CUTTING SETUP EXAMPLES

EXAMPLE # 2

Material:

Round Steel Tube SAE 4320 - Hardened to 35 RC (325 Bhn)
Dimensions - 6” O.D. x 4” I.D. (150mm O.D. x 100mm I.D.)

Step 1 Effective Material Width: 4 1/2” (.75 X 6) 114mm (19 x 6)

Step 2 Feed Force limit setting for 6” Diameter material (Refer to Feed Force Limit, Setting in Step 2)

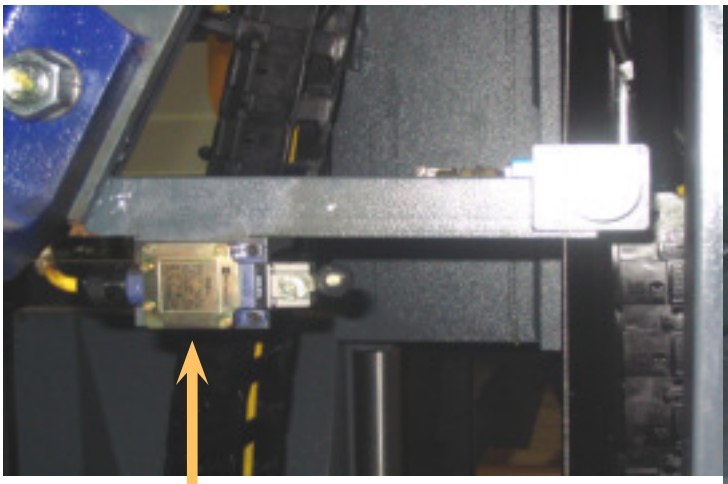
Step 3 Optimum blade pitch (TPI): 3/4 T. P. I.
Actual blade pitch on the saw: 4/6 T. P. I.

Step 4 Optimum blade speed for 4 1/2” effective 225 ft/min (70m/min) material width
Blade speed reduced by hardness factor: 225 ft/min X .60 = 135ft/min (70m/min x .60 = 42m/min)

Step 5 Feed Rate for 3/4 TPI blade: 1.8 in/min (45mm/min)
Feed Rate for 4/6 TPI blade: 1.8 in/min X .70 = 1.3in/min
(reduced by finer than optimum blade pitch factor) (45mm/min x .70= 31.5mm/min)

HEAD DOWN LIMIT SETTING

Head Down Limit: This limit is factory set and under ordinary cutting requirements should not be changed. If changed, it may cause the machine to malfunction in the automatic cycle.



LIMIT SWITCH

HEAD DOWN ADJUSTMENT BLOCK

GUIDE ARM POSITIONING

The adjustable guide arm should always be adjusted with respect to the material width. It will optimize cutting conditions and increase blade life with the guide arm adjusted as close to the material as permitted.

In order to adjust the guide arm, the remote guide arm adjustment switch, located on the control console is used to hydraulically position the guide arm. Turn the switch clockwise to move the guide arm toward the stock. Turn the switch counter clockwise to move the guide arm away from the stock.

ENSURE CLEARANCE BETWEEN GUIDE ARM AND VISES AT ALL TIMES.

H-40 Guide Arm Position

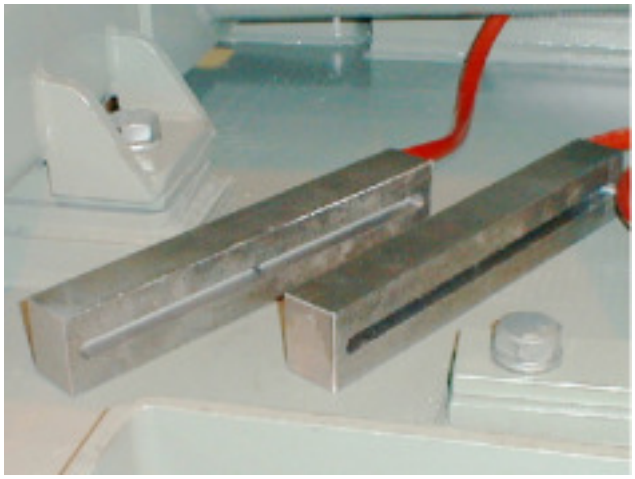
COOLANT CONTROLS

A generous flow of coolant should be applied in order to increase production and blade life. The machine is provided with adjustable coolant on the left side of the operator panel as shown below.

A properly adjusted flow of coolant should cover the blade (from the adjustable guide arm) which in turn will carry it into the cutting area. Additional coolant can be supplied with the coolant bars shown below which are controlled by the knob labeled ‘FLEX HOSE”.

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

Coolant flow controls, found on left side of control console



Coolant Bars can be placed on top of materials for extra coolant coverage. Flow is controlled with the knob labeled “FLEX HOSE”

SECTION 3 – MAINTENANCE

SAFETY DURING MAINTENANCE AND TROUBLESHOOTING

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

LOCK OUT PROCEDURE

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

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

MACHINE DISCONNECT SWITCH USED FOR SAFETY LOCKOUT PURPOSES

Machine Power Disconnect located on the door of the high voltage electrical panel, mounted on the drive side machine post.
1. Ensure switch is in the OFF position.
2. Install padlock and lock it.

RESTORING MACHINE TO USE

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

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

BLADE CHANGE MODE PROCEDURE

Wear safety glasses, gloves, and a long sleeve shirt for protection when handling band saw 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.

This machine is equipped with hydraulic blade tension and a 'Blade Change Mode' key switch, located on the operator control panel.

This key has two positions:

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

ON – Hydraulic motor can be started.
Blade tension is operative.

BLADE REMOVAL

1. With the blade change mode key switch in ‘OFF’, the blade stopped and the hydraulics ON, raise the saw head until the drive door will clear the electrical control panel.
2. Move the guide arm out to provide room between the two guide arms to easily grasp the blade with two hands, BUT DO NOT TOUCH THE BLADE UNTIL THE BLADE CHANGE MODE SWITCH IS TURNED TO THE ‘ON’ POSITION.
3. Turn the blade change key switch to the ‘ON’ position. The hydraulics will continue to run, but only the blade tension switch is functional. The blade wheel doors can be opened without the hydraulics shutting down.
4. Open both blade wheel doors.
5. Release the blade tension by turning the switch briefly to ‘ – ‘. By jogging the switch between ‘HOLD’ and ‘ – ‘, it is possible to regulate the degree of tension on the blade.
6. Pull the top strand of the blade up, out of its slot above the cutting area and forward out of the slots on the inside walls of the blade wheel housings.
7. Pull the lower strand of the blade down out of the blade guides.
8. Store and dispose of the used blade.

BLADE INSTALLATION

NOTES ABOUT NEW BLADES

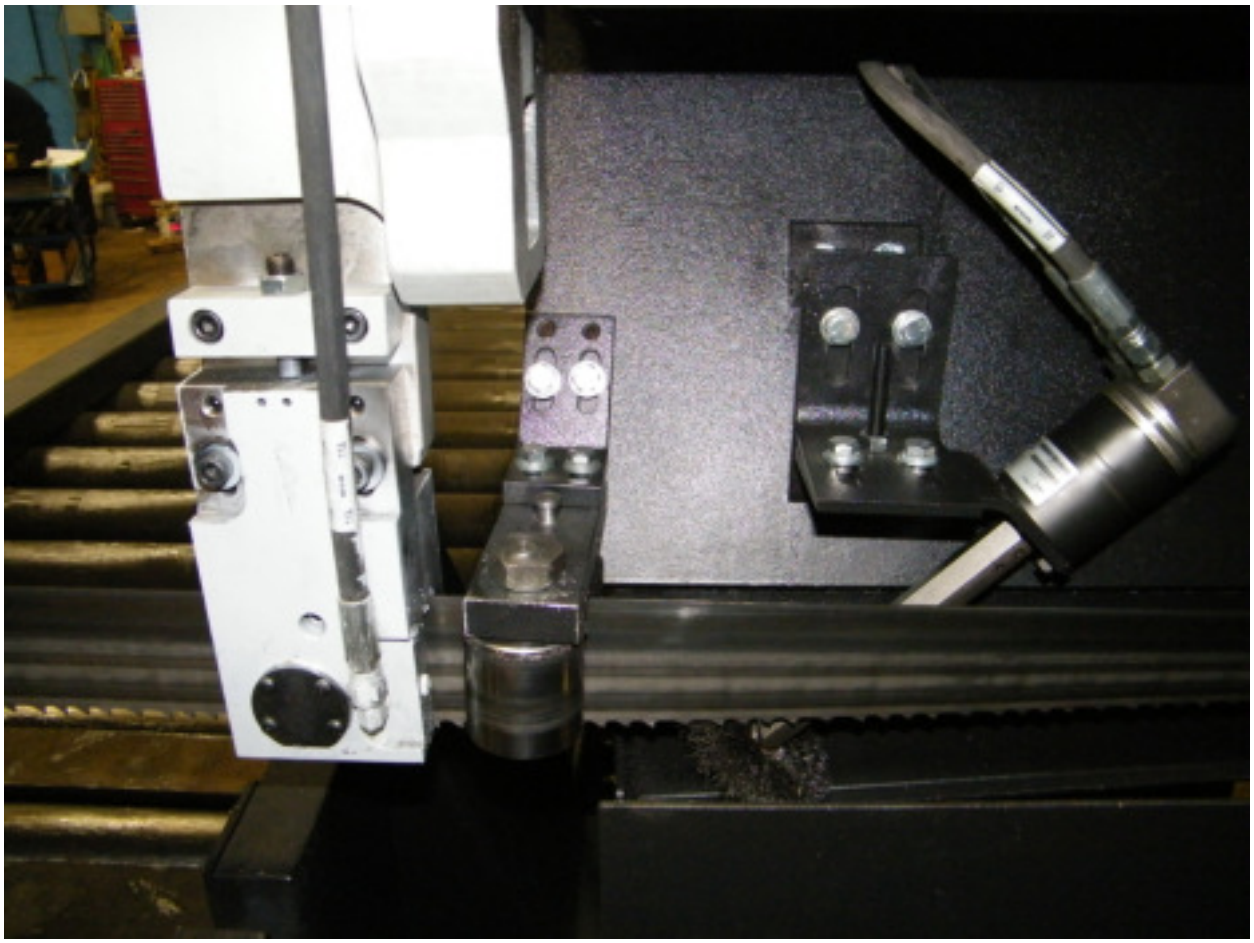
- A new blade will come folded into a compact coil. Follow the blade manufacturer’s instructions for safely unfolding the blade.
- The blade must be installed with the teeth facing towards the rear of the saw where it passes around the wheels, and with the teeth in the cutting area pointing away the drive wheel. This may require that the blade be turned inside out before installation.

1. With the blade change mode key switch remaining in the ‘ON’ position, turn the blade tension switch to the ‘ – ‘ position for several seconds until the idler wheel has fully retracted.
2. Insert the lower strand of the new blade into the blade guides.
3. Lift the upper strand of the blade up into its slot above the cutting area, and place it around the blade wheels.
4. Turn the blade tension switch briefly to ‘ +/RUN’ and then leave it in ‘HOLD’ to retain the blade lightly on the wheels.
5. Adjust the blade position on the wheels so that the blade is not crooked on them and the teeth overhang the back edge of the wheels.
6. Turn the blade tension switch to ‘ +/RUN’.
7. Close both blade wheel doors.
8. Turn the blade change mode key switch to the ‘OFF’ position. The hydraulics will shut down.
9. Switch the hydraulics on, then start the blade and run for 20 seconds.
10. Stop the blade.
11. Turn the blade change key switch to the ‘ON’ position.
12. Open the blade wheel doors and inspect the blade tracking, plus the position of the blade brush. Refer to the manual for tracking adjustments.
13. Close the blade wheel doors and turn the blade change mode key to the ‘OFF’ position.
14. Blade change procedure is now complete.

BLADE BRUSH ADJUSTMENT

The blade brush is properly set when the machine leaves the factory, however, it wears out during operation and needs to be adjusted periodically. The blade brush assembly is shown in the photo. In order to adjust it, the nut on the adjusting bolt needs to be loosened and the brush mounting bracket turned until the wires from the brush touch the bottom of the blade gullets as shown and then tighten the adjusting nut.

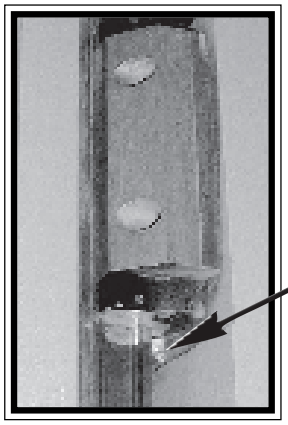
If the brush gets worn to approximately 70% of its original diameter, it should be replaced. A brush may be purchased through a Hyd-Mech Group Limited dealer in your area.



LUBRICATION

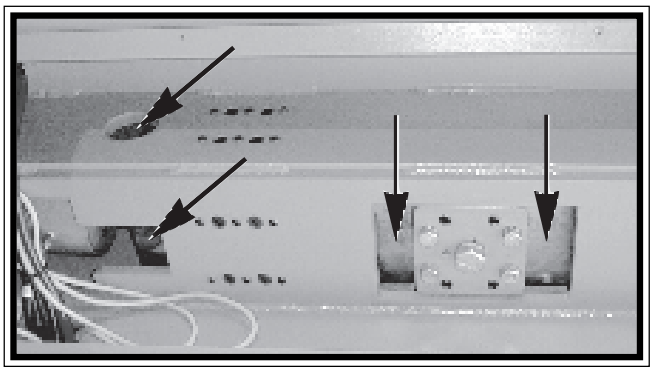
The design of the H-40 was intended to minimize maintenance, although periodically certain moving parts need lubrication. We recommend that this periodic lubrication be done once a month using any general-purpose grease. In addition to the grease points shown, vise jaw guides and infeed rollers require greasing.

Hyd-Mech Group Limited recommends monthly lubrication.

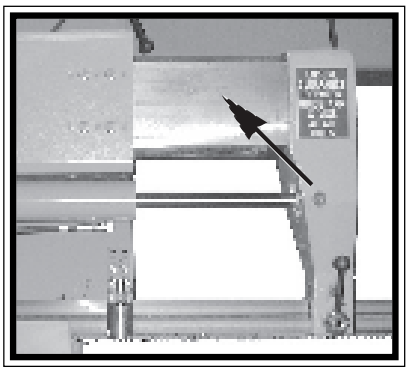


Four linear bearings with a grease nipple.

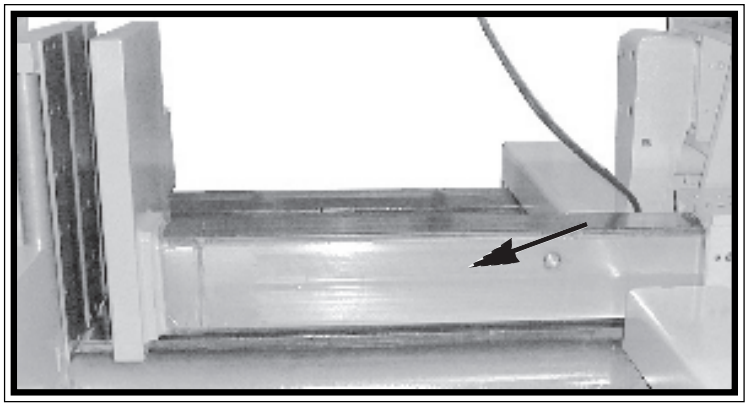
Roller chains.



Apply grease to the four places indicated on the blade tension assembly. (Shown with the cover removed.)



Apply grease to all four sides of the guide arm shaft with it fully extended.



With the vis(s) closed, apply grease to all four sides of the vise shaft.

HYDRAULIC MAINTENANCE

There are only FIVE items of routine maintenance associated with the hydraulic system:

1. OIL FILTER – Ten-micron filtration of the hydraulic oil is provided by a spin-on type filter mounted on the tank return line. The element should be changed after the first 50 Hours of operation and then every 500 working hours. Suitable replacement elements are:

CANFLO	RSE-30-10
GRESEN	K-22001
PARKER	921999
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 the gauge. Hydraulic tank capacity is approximately 17 US gallons.
The machine is shipped from the factory with Texaco Rando HD 46 hydraulic 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
	ESSO	NUTO H46
	Mobil	Mobil DTE 25
	Shell	Tellus 46
	Petro Canada	Harmony AW 46

3. OIL TEMPERATURE – Oil temperature is indicated by a thermometer contained in the level gauge. Oil temperature during steady operation should stabilize at about 50-55°F (10-12° C) above room temperature. Thus in a 70° F (20° C) shop one might expect an oil temperature of about 120° F (50°C) Oil temperature should never exceed 160°F (70°C).

4. OIL PRESSURE – Oil pressure is factory set to 1500 PSI (10339 kPa) for H-40 and should not require further attention except precautionary observation at start-up and every few days thereafter.

CLEANLINESS

The H-40 series design should endure heavy operating conditions and provide the customer with flawless machine performance. To extend good performance some care is required, especially cleanliness. The following areas should be kept clean of dirt, grease and chips:

- ✓ CONTROL CONSOLE
- ✓ DOOR CHARTS
- ✓ WHEEL BOXES
- ✓ BLADE GUIDES

NOTE: All parts should be cleaned before any repair or service is performed on them.

TROUBLE SHOOTING GUIDE

Most problems which may occur have 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.

	PROBLEM	PROBABLE CAUSE	SOLUTION
1	Saw is cutting out of square vertically	1. Blade worn.	1. Change blade.
2	Saw is cutting out of square horizontally	2. Stock not square in vises.	2. Adjust accordingly.
3	Blade comes off wheels.	3a. Not enough blade tension	3a.Blade tension is determined by system pressure. Check that system pressure is as specified above.
		3b. Improper tracking.	3b. Set tracking.
4	Blade stalls in cut.	4a. Not enough blade tension	4a. Blade tension is determined by system pressure. Check that system pressure is as specified above.
		4b. Excessive feed force.	4b. Reduce.
5	Blade vibrates excessive-ly.	5a. Blade speed too fast.	5a. Reduce.
		5b. Guide arms too far apart.	5b. Adjust accordingly.
		5c. Not enough blade tension	5c. Blade tension is determined by system pressure. Check that system pressure is as specified above.

6	Excessive blade breakage.	6a. Excessive blade tension	6a.Blade tension is
			determined by system
			pressure. Check that system
			pressure is as specified
			above.
		6b. Excessive feed rate.	6b. Reduce.
7	Tooth Strippage	7a. Blade pitch too fine	7a.Select coarser pitch.
		7b. Blade brush not cleaning	7b. Adjust or replace brush.
		7c. Excessive feed rate	7c. Reduce
		7d. Excessive feed force	7d. Reduce
8	No coolant flow	8a. No coolant.	8a. Add coolant.
		8b. Coolant line blocked.	8b. Blow out coolant line.
		8c.Coolant pump inoperable.	8c. Check, replace if
			necessary.
9	Saw will not start.	9a.Motor overload has	9a. Depress each of the
		tripped.	overload buttons located
			in the electrical box.
			Depressing one button at a
			time and trying to start the
			saw will indicate which
			motor was overloaded.
		9b. Control circuit fuse has	9b. Replace the fuse with a
		blown.	5 Amp 250 Volt AG1 type
			fuse. Random blowouts
			may occur but a quickly
			repeated blow out indicates
			an internal wiring fault
10	Saw starts but will not run	10.On machines so	10. Reload with stock or
	after Start button has been	equipped, the out-of-stock	re mount blade. Hold the
	released.	blade breakage limit switch	hydraulic start button and
		has been tripped.	release the blade tension
			or open vises far enough
			to deactivate the limit switch.

11	Saw starts but no hydraulic functions.	11a. If blade wheels run clockwise, wrong phase order in power connection to saw. 11b. If pump is noisy cause may be low hydraulic oil level. 11c. Pump-motor coupling has separated.	11a. Stop immediately; reverse any two of the three phase connections. 11b. Stop immediately; add hydraulic oil. 11c. Adjust accordingly.
12	Individual functions will not respond to its manual control switch.	12a. Observe pilot light (s) on relevant valve. If pilot light related to inoperative function fails to light, problem is electrical. 12b. If pilot light related to inoperative function does light, problem may be the coil. If problem remains after swapping coils it probably results from dirt in the valve spool.	12a. Solution usually requires opening the control console, and should be left to some one qualified to work on machine tool electrical systems. 12b. Solution usually requires opening the control console, and should be left to some one qualified to work on machine tool electrical systems.
13	Saw starts but only front vise functions.	13a. Mode selector switch is in “neutral”.	13a. Select “manual” mode.
14	Head will not rise.	14a. Head up limit is set fully down.	14a. Readjust head up limit switch bracket.

15	Head still will not rise or fall,			15a. Observe pilot light (s)			15a. In case of head function
	or any individual function will			on relevant valve. If pilot			check operation of related
	not respond to its manual			light related to inoperative			limit switches. Limit switch
	control switch.			function fails to light, problem			levers should operate
				is electrical.			freely and emit an audible
							click on both depress and
							release. If not replace the
							switch nose. Look for cause
							of switch damage (ie debris
							or maladjustment of switch
							actuator). To check the
							switch unit itself, remove the
							switch lid and wire together
							the two terminals closest
							to the wiring port. If function
							now responds to manual
							switch replace internal
							limit switch unit. If function
							still does not respond then…
							Open panel door to gain
							access to valves. Remove
							coil retaining nut and
							withdraw problem related
							coil, replace it with any
							other coil from the group.
							If the problem remains it
							requires the attention of a
							qualified service person.
				15b. If pilot light related to			15b. Disassembly of
				inoperative function does			hydraulic valves should be
				light, problem may still be			undertaken only by
				the coil (see 15a. Solution).			qualified service personnel
				If problem remains it			or those knowledgable with
				probably results from dirt in			hydraulic components.
				the valve spool.			

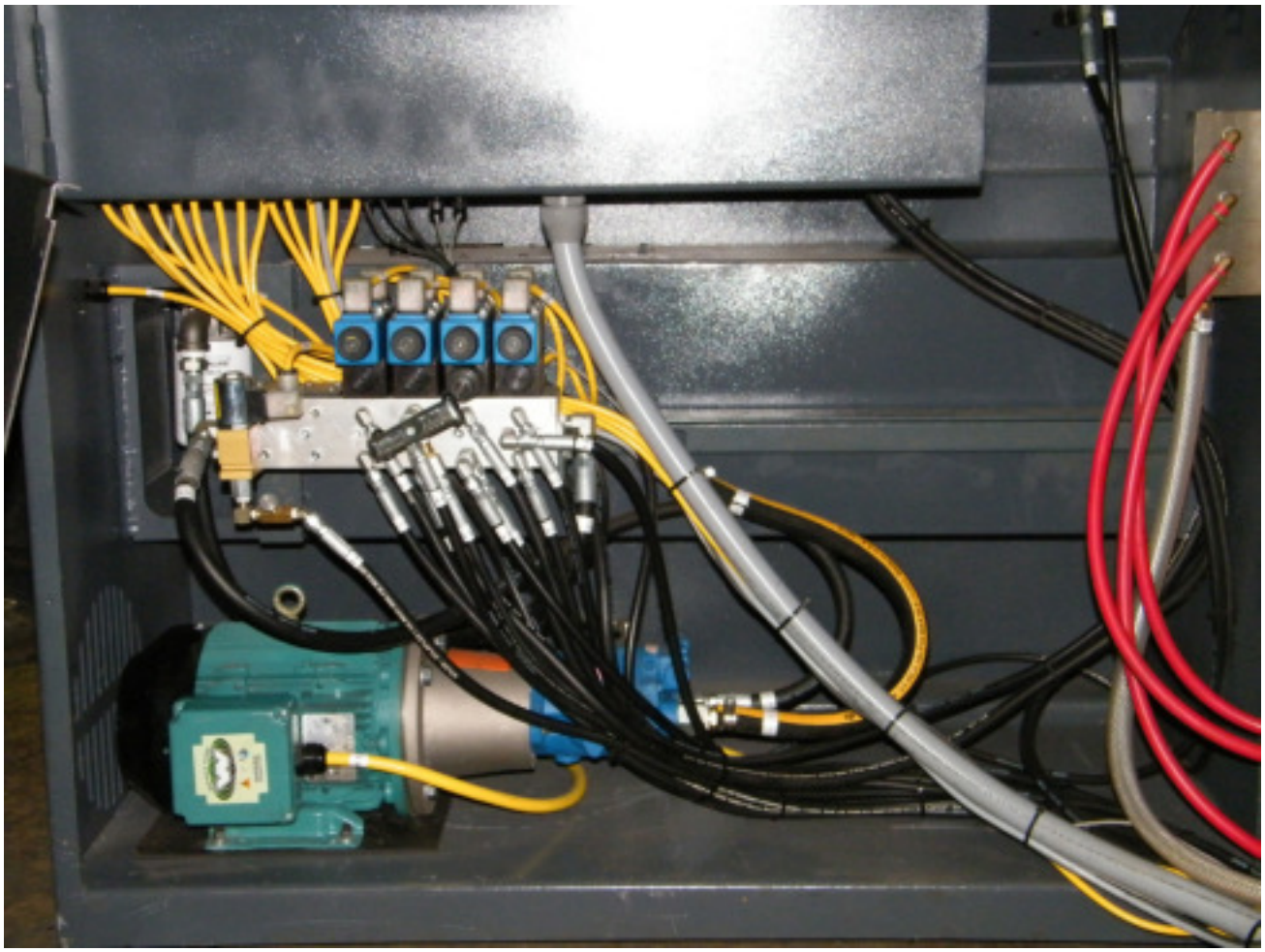
16	Head will not descend.			16a. Feed Rate Valve is			16a. Turn Feed Rate Knob				
				fully closed-pointer is set on			counter clockwise to open				
				“0” or close to “0” in/min.			valve.				
				16b. Feed Force Limit is set			16b. Increase Feed Force				
				too low.			Limit (to at least 150 psi).				
				16c. Pointer is not adjusted.			16c. Loosen printer, turn				
							knob clockwise until it				
							bottoms; tighten pointer at				
							“0”.				
17	Head descends when Feed			17a. Pointer of Feed Rate			17a. Re-adjust pointer. As in				
	Rate Valve pointer is set to			valve is stopped by stop			16c.				
	“0” on the scale and Feed			bolt but not fully closing the							
	Force Limit gauge is more			valve.							
	than 150 psi.										

SECTION 4 - ELECTRICAL

ELECTRICAL SCHEMATICS: SEE PDF ON ATTACHED CD

SECTION 5 - HYDRAULIC SYSTEM

The H-40 hydraulic system does not require any special work on a new machine before its start-up. The hydraulic tank is filled with Texaco Rando 46 hydraulic oil and all machine functions have been tested at the factory to ensure proper operation upon initial start-up.



HYDRAULIC MANIFOLD AND MOTOR ASSEMBLY

LIST OF H-40 HYDRAULIC COMPONENTS

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	2	HEAD CYLINDER	H40-C4-00B
2	1(2)	VISE CYLINDER	V18A-C1-00A
3	1	BLADE TENSION CYLINDER	H40-C5-00A
4	1	GUIDE ARM POSITIONING CYLINDER	H40-C6-00
5	1	MANIFOLD BLOCK MB1	MB6P
6	3(4)	DOUBLE PILOT CHECK	DPCH-1
7	2	PRESSURE GAUGE (1000 PSI)	PG-10
8	1	PRESSURE GAUGE (2000 PSI)	PG-15
9	1	CHIP CONVEYOR DRIVE MOTOR	HM-01 (MG12)
10	1	BRUSH MOTOR	HM-02
11	0(1)	REAR VISE VALVE	DCV3P-AB-T
12	1	FRONT VISE VALVE	DCV3P-AB-T
13	1	HEAD VALVE	DCV3P-AB-T
14	1	BLADE TENSION VALVE	DCV3P-AB-C
15	1	PRESSURE REDUCING VALVE	PRV-2
16	1	GUIDE ARM VALVE	DCV3P-AB-T
17	1	SINGLE SOLENOID TWO WAY VALVE	PV2P-A-C
18	1	RELIEF VALVE	RV7
19	1	FEED RATE VALVE	DF7-0-00
20	1	PUMP	HYP-1
21	1	SUCTION STRAINER	TFS-100-0-P
22	1	RETURN FILTER	SF6520
23	1	COOLER	AO-10
24	2	NEEDLE VALVE	N10BK
25	1	CHECK VALVE	CHV

HYDRAULIC SCHEMATICS & PLUMBING DIAGRAMS: SEE PDF ON ATTACHED CD

SECTION 6 - MECHANICAL ASSEMBLIES

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

SECTION 7 - OPTIONS

OPTIONAL ASSEMBLY DRAWINGS: SEE PDF ON ATTACHED CD

BLADE DEVIATION MONITORING SYSTEM (K10)

General description of the blade deviation monitoring system.

This system monitors lateral blade deviation during cutting. If blade deflection increases beyond the pre-set warning limit, then the monitoring device sends a warning signal by means of flashing beacon mounted on the top of 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 parameter setting:

1. Stop cutting, raise the head and shut down

or

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

Operation of the system

The proximity transducers are enclosed in a housing mounted on the idler and drive side guide arms. The sensors convert the blade lateral deflection to an analog signal, which is sent to the PLC and after a series of calculations is displayed on the operator interface in a form of bar graphs. One bar graph for the transducer mounted on the idler guide arm and the second bar graph for the transducer mounted on the drive side guide arm.

The bar graphs appears in both 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 graphs extend from the screen centre towards the right if blade is deviating toward the front of the saw (cutting into the part), and extends from the screen centre towards the left if blade is deviating toward 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 the 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 finish the cut with present degree of deviation and then shut down.

Procedure to access blade deviation parameters

- To adjust the warning and shutdown limits, enter MONITOR LIMIT SETTING screen by pressing F2 (BLD. LIMITS) access blade deviation limit settings (Figure 1).

The MONITOR LIMIT SETTING screen will be displayed (Fig. 2)

- Enter parameters screen by pressing function key F3.(Labeled: PARMTR) The PARAMETER SETTING screen will be displayed (Fig. 3).
- Change BLADE MONITOR parameter to ON by moving the cursor using the navigation keys to ON/OFF and pressing ENTER. The value of Blade Monitor parameter will change to ON.
- Exit parameter screen by pressing function key F5.

Repeating the above steps will disable the blade monitor option.

Warning and shutdown limits adjustments

To adjust the warning and shutdown limits, enter MONITOR LIMIT SETTING screen by pressing

Press F2 (BLD. LIMITS) to access blade deviation limit settings (Figure 1).

Fig1

Fig2

Press F3 (PARMTR) to access parameters.

Fig3

Use cursor key to scroll through the parameters list.

Press F5 to return to previous screen

The MONITOR LIMIT SETTING screen will be displayed Figure 2.

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

To adjust limits move cursor to number on right hand side of the screen and key in new value from – 100 to 0 for cut out limit and from 0 to 100 for cut in limit.

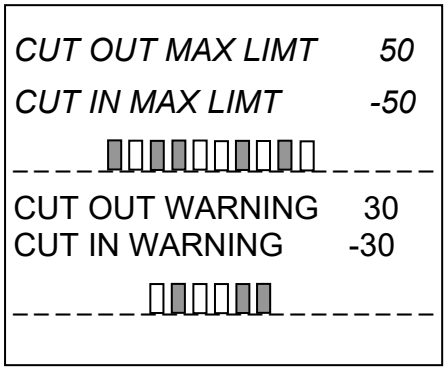


Figure 2 Monitor Limit setting screen.

Cut out maximum limit – (out - cutting towards outfeed, range 0 ~100). This parameter will adjust 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 shutdown sequence is initialized.

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

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

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

To return from the MONITOR LIMIT SETTING screen to Auto or Manual screens, press EXIT F5 function key

To access the parameters screen (Figure 3), press PARMTR (F3) function key.

WARNING RESPONSE TIME	**Xs**
MAX LIMIT RESPONSE TIME	**Xs**
SENSOR	**XXXX**
BLADE DEVIATION MONITOR	**ON**
DISPLAY REFRESH RATE	**2/s**

Figure 3 Parameter screen.

To set any of the numerical parameters, use the NAVIGATION keys (Figure 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.

WARNING RESPONSE TIME	Warning response time (range 2 – 99 seconds)
	If the blade deviation exceeds the preset warning limit for longer than warning response time, then the beacon light mounted on the top of the head will start flashing.
MAX LIMIT RESPONSE TIME	Maximum limit response time – (range 2 – 99 seconds)
	If the blade deviation exceeds the preset shutdown limit for longer than shutdown response time, then the machine will execute shutdown sequence.
SENSOR	(range –2000 – +2000)
	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]
BLADE DEVIATION MONITOR **ON/OFF**	This parameter will activate or deactivate response of the blade deviation monitoring system.
DISPLAY REFRESH RATE	(range 0.1 sec – 10 sec)
	The refresh time is time between bar graph updates. If it is set to low value then the display will flicker do to vibration of the blade, weld passing by the sensor or other irregularities in the blade.

Figure 4 Parameter description chart.

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 display range of0 +/-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 maximum deviation of the cut surface will occur at or near the center of the cut, and will be several times larger than that measured at the sensor.

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

SECTION 8 - SPECIFICATIONS

H4040 SPECIFICATIONS

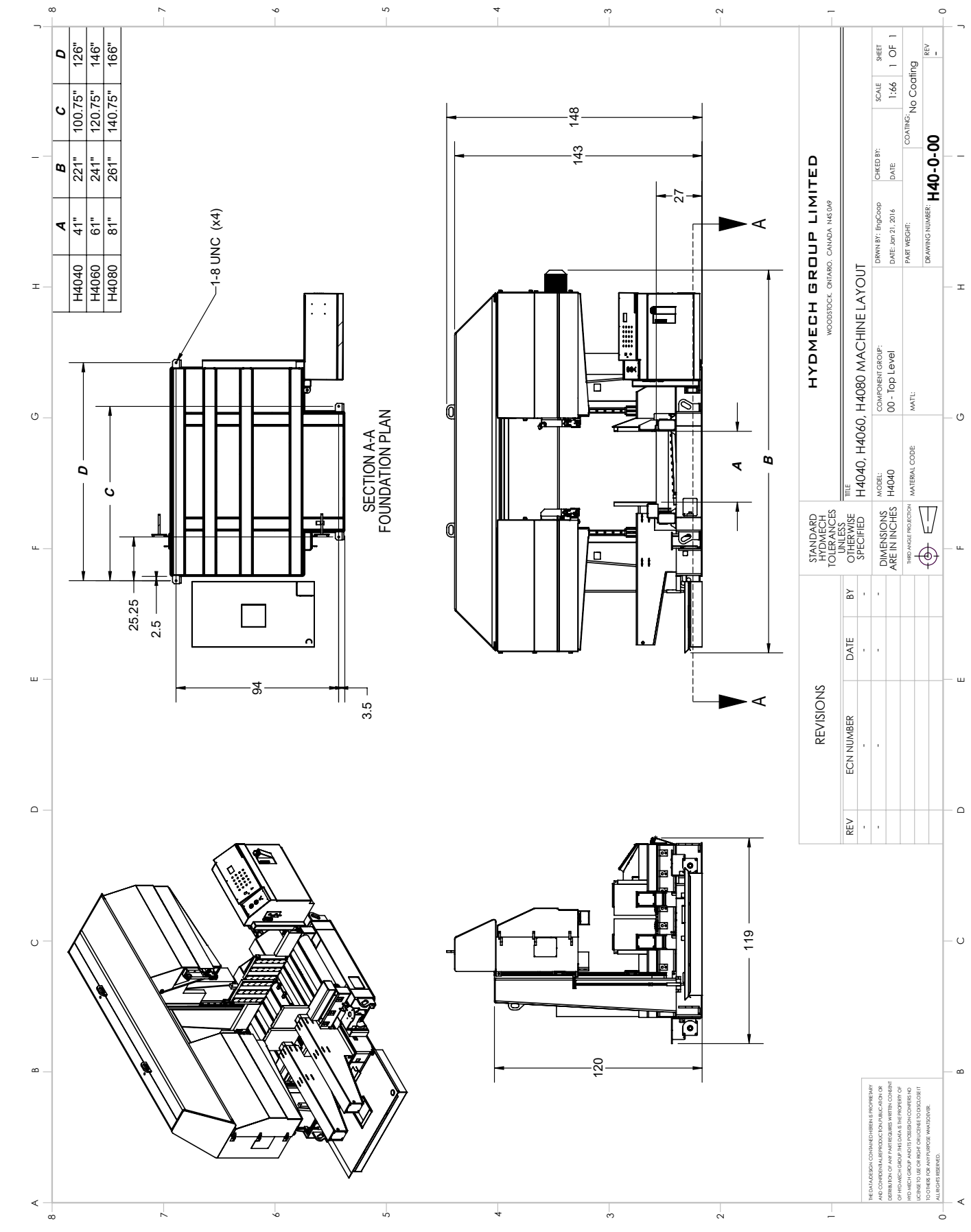
H-40-40 BANDSAW SPECIFICATIONS		
Capacity	round	41" (1042mm)
	rectangular	41"x 41"(1042mm x 1042mm)
Blade	Length	37'-0" (11278mm)
	Width	3" or 2 5/8" (76mm or 67mm)
	thickness	.063" (1.6mm)
Blade Tension	Hydraulic	
Blade Speed	VFD	45 - 225 sf/min (14 - 68 m/min)
Blade Guides	carbide inserts	
Blade Wheel Dia.	45" (1143mm)	
Motors	blade drive	20 HP (15 KW)
	hydraulic pump drive	5 HP (3.7 KW)
Pumps	Hydraulic	6 1/2 U.S. Gal. / min (25 Liters/min) pressure compensated
	Coolant	16.6 U.S. Gal. / min (63 Liters/min)
Hydraulic Tank	17 U.S. Gallons (64.5 Liters)	
Coolant Tank	27 U.S. Gallons (102.5 Liters)	
System Pressure	1200 PSI (8274 kPa)	
Vise Control	hydraulic	
Table Height	27" (686mm)	
Control Panel	Waist Height	
Machine Weight	39,000 lbs (19051 Kg)	
	42,000 lbs (20412 Kg) with optional outboard vise	
Maximum Workload	42000 lbs (19051 Kg)	
Overall Dimensions	221" (5613mm) Wide, 119" (3023mm) Long, 148" (3759mm) High	

H4060 SPECIFICATIONS

H-40-60 BANDSAW SPECIFICATIONS		
Capacity	round	41" (1042mm)
	rectangular	41"x 61"(1042mm x 1550mm)
Blade	Length	40'-4" (12294mm)
	Width	3" or 2 5/8" (76mm or 67mm)
	thickness	.063" (1.6mm)
Blade Tension	Hydraulic	
Blade Speed	VFD	45 - 225 sf/min (14 - 68 m/min)
Blade Guides	carbide inserts	
Blade Wheel Dia.	45" (1143mm)	
Motors	blade drive	20 HP (15 KW)
	hydraulic pump drive	5 HP (3.7 KW)
Pumps	Hydraulic	6 1/2 U.S. Gal. / min (25 Liters/min) pressure compensated
	Coolant	16.6 U.S. Gal. / min (63 Liters/min)
Hydraulic Tank	17 U.S. Gallons (64.5 Liters)	
Coolant Tank	27 U.S. Gallons (102.5 Liters)	
System Pressure	1200 PSI (8274 kPa)	
Vise Control	hydraulic	
Table Height	27" (686mm)	
Control Panel	Waist Height	
Machine Weight	42,000 lbs (19051 Kg)	
	45,000 lbs (20412 Kg) with optional outboard vise	
Maximum Workload	50000 lbs (22680 Kg)	
Overall Dimensions	241" (6121mm) Wide, 119" (3023mm) Long, 148" (3759mm) High	

H-40-80 BANDSAW SPECIFICATIONS		
Capacity	round	41" (1042mm)
	rectangular	41"x 81"(1042mm x 2058mm)
Blade	Length	43'-10" (13361mm)
	Width	3" or 2 5/8" (76mm or 67mm)
	thickness	.063" (1.6mm)
Blade Tension	Hydraulic	
Blade Speed	VFD	45 - 225 sf/min (13.5 - 67.5 m/min)
Blade Guides	carbide inserts	
Blade Wheel Dia.	45" (1143mm)	
Motors	blade drive	20 HP (15 KW)
	hydraulic pump drive	5 HP (3.7 KW)
Pumps	Hydraulic	6 1/2 U.S. Gal. / min (25 Liters/min) pressure compensated
	Coolant	16.6 U.S. Gal. / min (63 Liters/min)
Hydraulic Tank	17 U.S. Gallons (64.5 Liters)	
System Pressure	1300 PSI (8963 kPa)	
Vise Control	hydraulic	
Table Height	27" (686mm)	
Control Panel	Waist Height	
Machine Weight	46,000 lbs (20865 Kg)	
	50,000 lbs (22680 Kg) with optional outboard vise	
Maximum Workload	50000 lbs (22680 Kg)	
Overall Dimensions	261" (6629mm) Wide, 119" (3023mm) Long, 148" (3759mm) High	

LAYOUT DRAWING



SECTION 9 - WARRANTY

WARRANTY

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

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

MOTOR, GEARBOX, PUMP, ELECTRIC COMPONENTS, VALVES, HOSES, FITTINGS, and any other items used in the manufacture of the saw, 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

HYD·MECH GROUP LIMITED
1079 Parkinson Road
P.O. BOX 1659
Woodstock, Ontario
N4S 0A9
Phone: (519) 539-6341
Fax: (519) 539-5126
Toll Free: (877) 276-SAWS (7297)
E-mail: info@hydmech.com