H28SV & H32SV

393179

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.

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

Thank you

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 AUG 2016

TABLE OF CONTENTS

SECTION 0 - SAFETY INSTRUCTIONS

SECTION 1 – INSTALLATION

SECTION 2 - OPERATING INSTRUCTIONS

SECTION 3 – MAINTENANCE

SECTION 4 - ELECTRICAL

SECTION 5 - HYDRAULIC

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 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, 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 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 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 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.

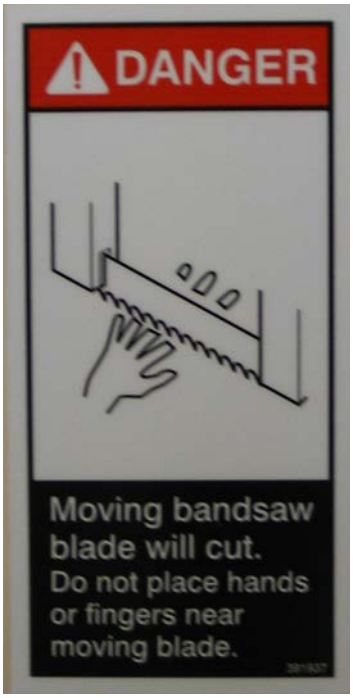
The weight of individual machine components represents stored potential energy that can be released if they fall when disconnected. Secure these components with adequate hoisting gear before disassembly.

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.

Item N0. 391938

Located on the cover of the main electrical panel.

Item N0. 391340

Idler Guide Arm

Drive Guide Arm

Item N0. 391937

Fixed Vise

Shuttle Vise

Item N0. 392801

Item No 391335

SECTION 1 – INSTALLATION

Upon delivery of your new 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

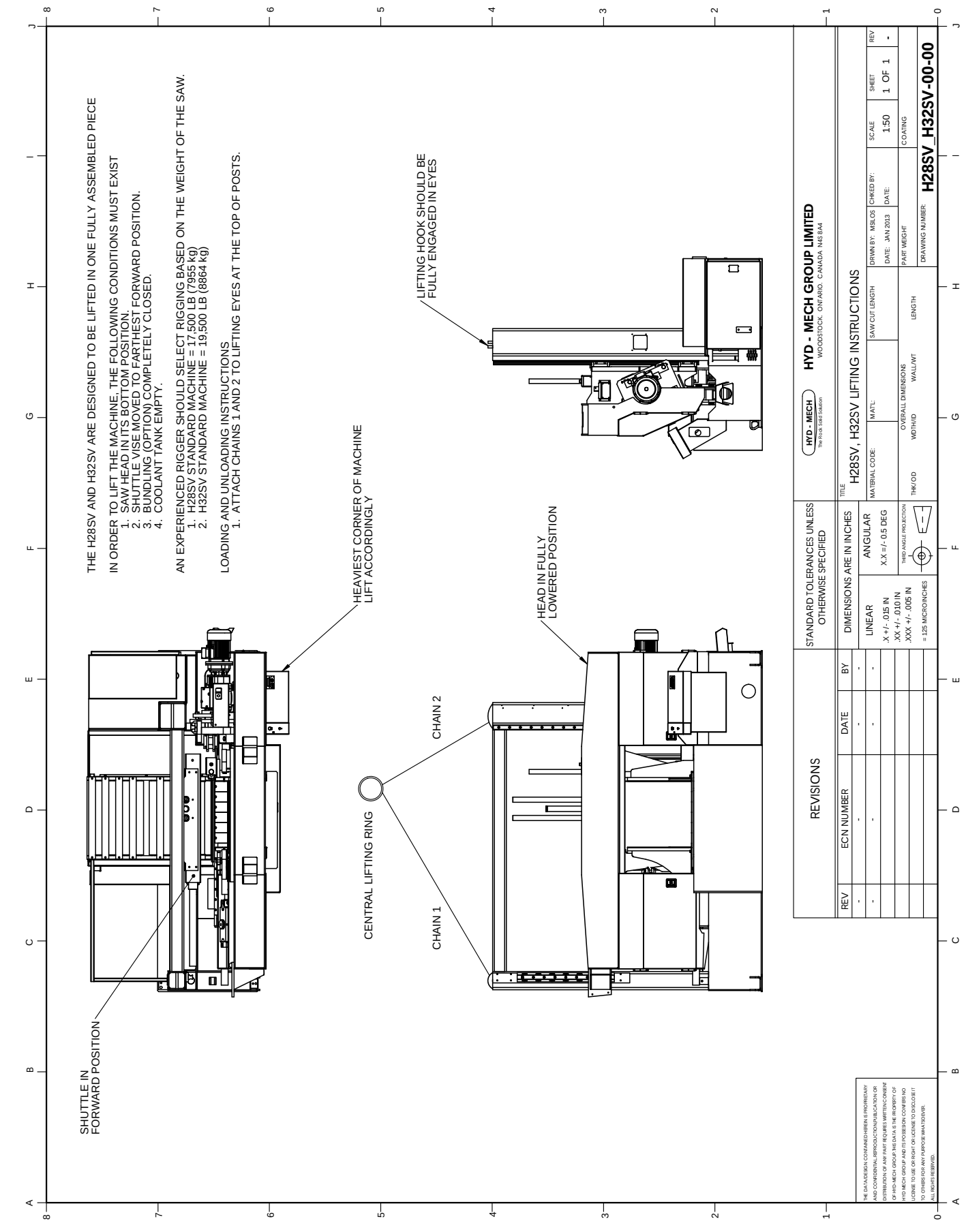
The saw has been designed to give years of reliable service. It is essential that operators be alerted to the safe operation of this saw and the practices to avoid that could lead to injury. The following safety rules are at the minimum necessary for the safe installation, operation, and maintenance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

- POWER HOOK-UPS AND REPAIRS SHOULD ONLY BE ATTEMPTED 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 SAW SHOULD ONLY BE OPERATED ACCORDING TO THE SPECIFICATIONS OF THE SAW. AVOID UN-SAFE USAGE PRACTICES.
- IF AT ANY TIME THE SAW DOES NOT APPEAR TO BE OPERATING PROPERLY IT SHOULD BE STOPPED IMMEDIATELY AND REPAIRED.

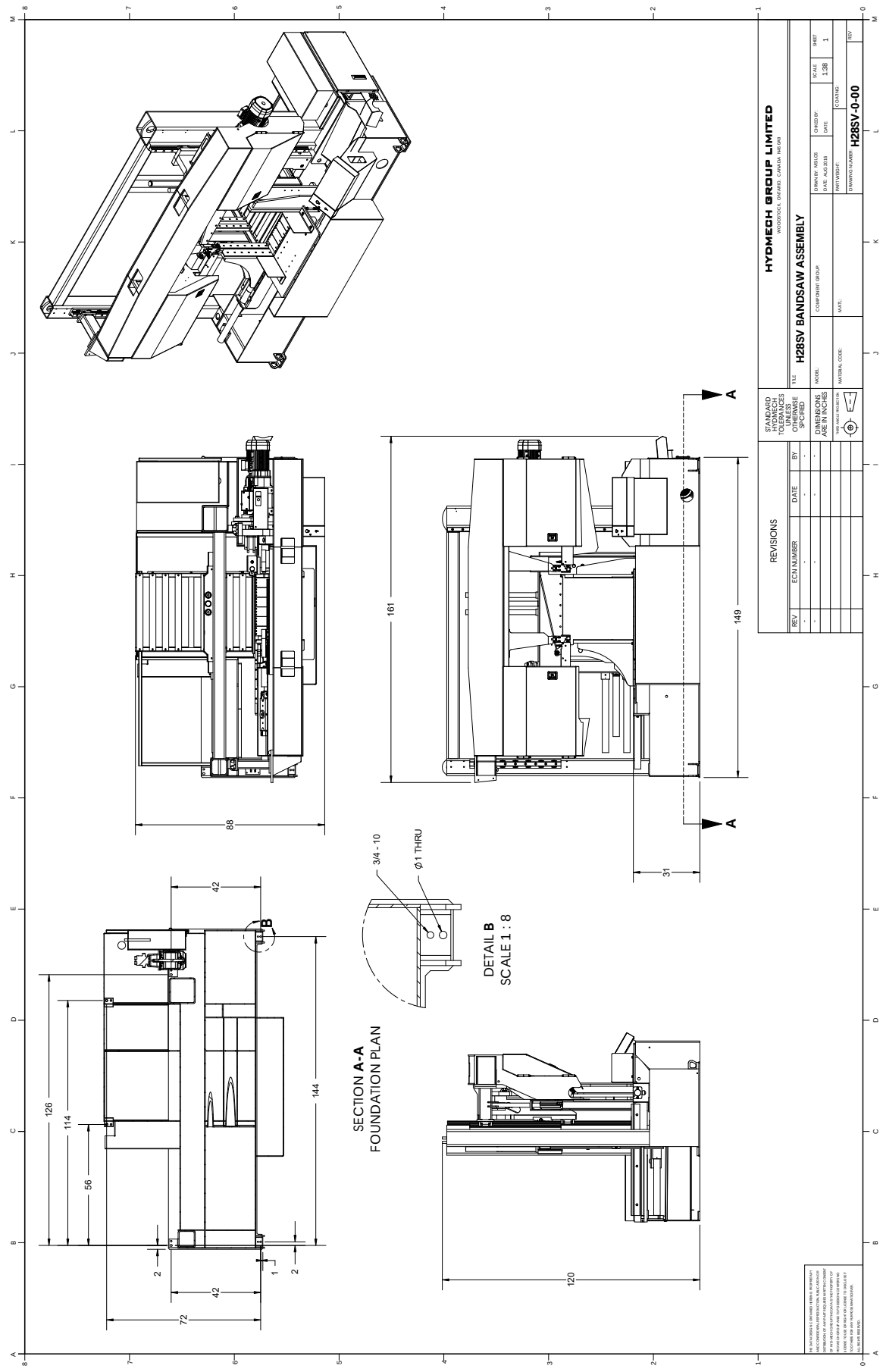
OPERATOR :

- 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 START THE 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.

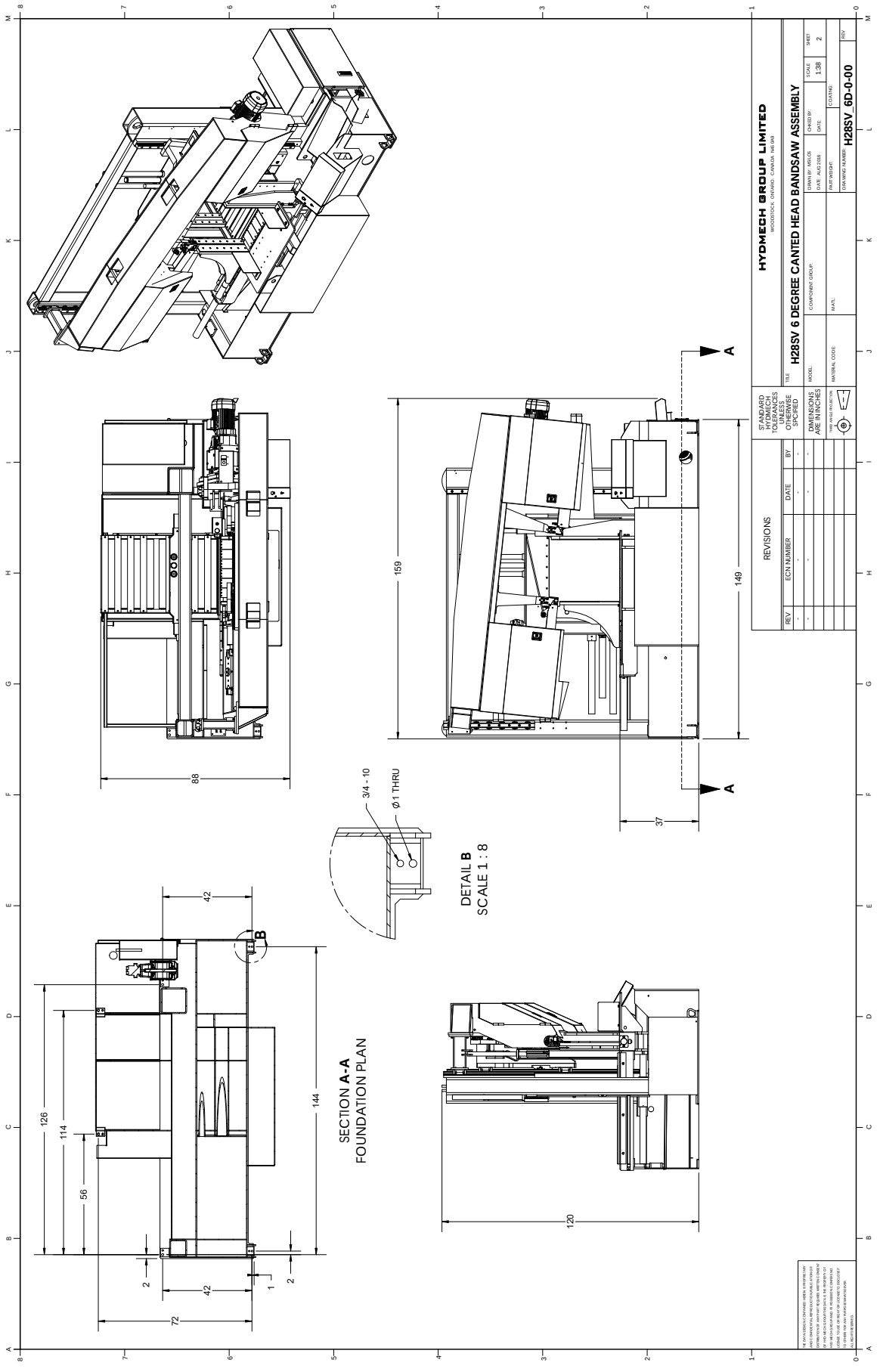
NO MODIFICATIONS TO THE MACHINE ARE PERMITTED WITHOUT PRIOR APPROVAL FROM HYD-MECH. ANY APPROVED MODIFICATIONS SHOULD ONLY BE UNDERTAKEN BY TRAINED PERSONNEL.


THE H28SV AND H32SV ARE DESIGNED TO BE LIFTED IN ONE FULLY ASSEMBLED PIECE
IN ORDER TO LIFT THE MACHINE, THE FOLLOWING CONDITIONS MUST EXIST
1. SAW HEAD IN ITS BOTTOM POSITION.
2. SHUTTLE VISE MOVED TO FARTHEST FORWARD POSITION.
3. BUNDLING (OPTION) COMPLETELY CLOSED.
4. COOLANT TANK EMPTY.
AN EXPERIENCED RIGGER SHOULD SELECT RIGGING BASED ON THE WEIGHT OF THE SAW.
1. H28SV STANDARD MACHINE = 17,500 LB (7955 kg)
2. H32SV STANDARD MACHINE = 19,500 LB (8864 kg)
LOADING AND UNLOADING INSTRUCTIONS
1. ATTACH CHAINS 1 AND 2 TO LIFTING EYES AT THE TOP OF POSTS.
SHUTTLE IN FORWARD POSITION
HEAVIEST CORNER OF MACHINE LIFT ACCORDINGLY
CENTRAL LIFTING RING
CHAIN 2
CHAIN 1
HEAD IN FULLY LOWERED POSITION
LIFTING HOOK SHOULD BE FULLY ENGAGED IN EYES
REVISIONS
REV ECN NUMBER DATE BY
STANDARD TOLERANCES UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
LINEAR
.X +/- .015 IN
.XX +/- .010 IN
.XXX +/- .005 IN
ANGULAR
X.X +/- 0.5 DEG
= 125 MICROINCHES
THIRD ANGLE PROJECTION
HYD - MECH
HYD - MECH GROUP LIMITED
WOODSTOCK, ONTARIO, CANADA N4S 8A4
TITLE
H28SV, H32SV LIFTING INSTRUCTIONS
MATERIAL CODE:
MAT'L:
SAW CUT LENGTH
OVERALL DIMENSIONS
THK/OD
WIDTH/ID
WALL/WT
LENGTH
DRAWN BY: MSLOS
DATE: JAN 2013
CHKED BY:
DATE:
PART WEIGHT
SCALE 1:50
SHEET 1 OF 1
REV -
COATING
DRAWING NUMBER: H28SV_H32SV-00-00
THE DATA DESIGN CONTAINED HEREIN IS PROPRIETARY AND CONFIDENTIAL. REPRODUCTION/PUBLICATION OR DISTRIBUTION OF ANY PART REQUIRES WRITTEN CONSENT OF HYD-MECH GROUP. THIS DATA IS THE PROPERTY OF HYD MECH GROUP AND ITS POSSESION CONFERS NO LICENSE TO USE OR RIGHT OF LICENSE TO DISCLOSE IT TO OTHERS FOR ANY PURPOSE WHATSOEVER.
ALL RIGHTS RESERVED.

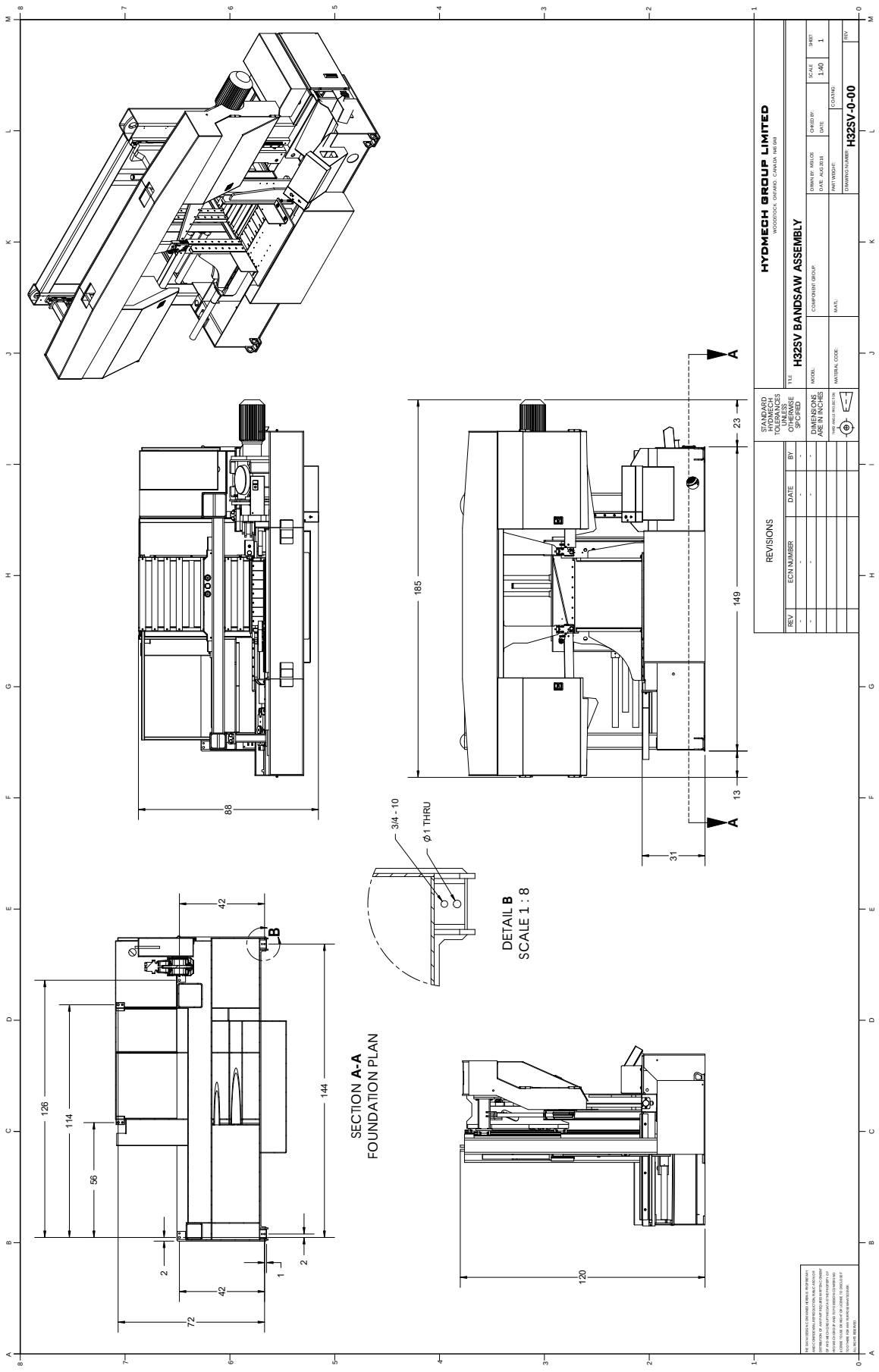
H28SV MACHINE LAYOUT



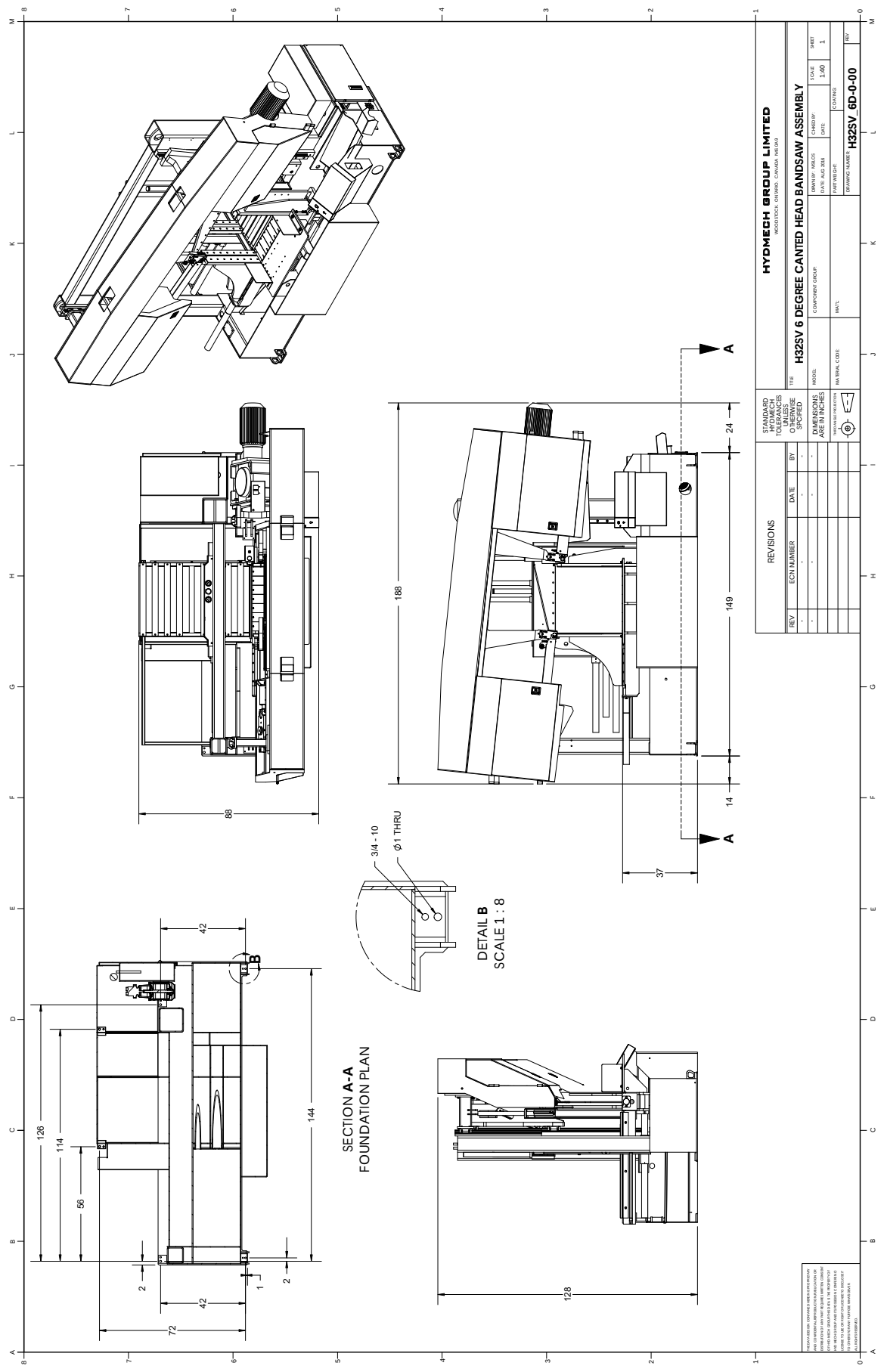
H28SV 6 DEGREE MACHINE LAYOUT



H32SV MACHINE LAYOUT



H32SV 6 DEGREE MACHINE LAYOUT



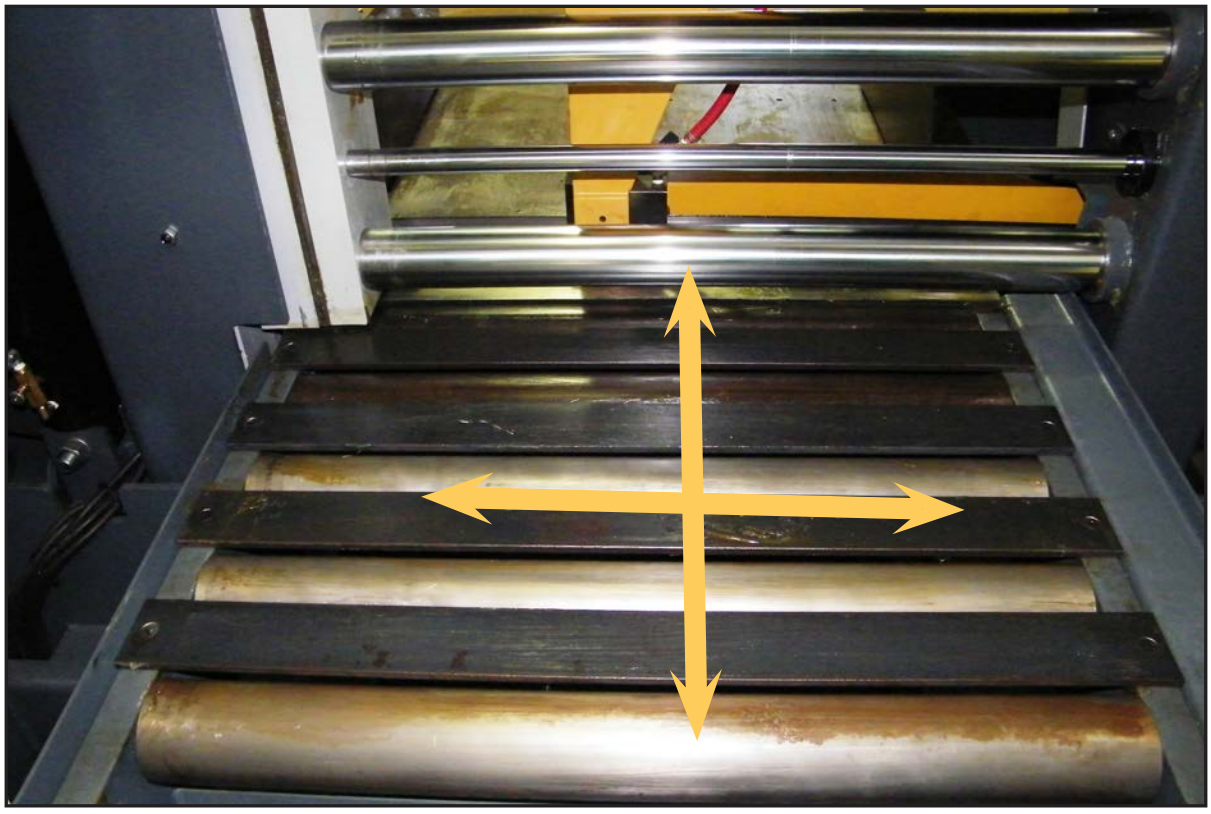
FOUNDATION, LEVELLING AND ANCHORING

The 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.

Machine should be leveled in both directions i.e. along and across its in-feed conveyor especially when machine is to be inserted into a larger conveyor system.

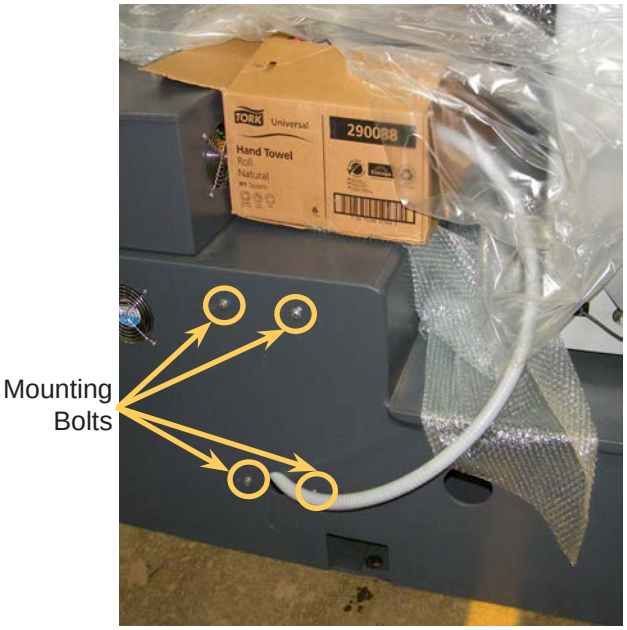
Six leveling screws are provided, one in each corner of the machine base plus one in the hydraulic cabinet. Steel plates are to be placed under each screw to prevent their sinking into the concrete floor. In cases where the machine is to be anchored permanently, anchoring holes are provided. They are located next to the leveling screws.

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



H28SV & H32SV DISCONNECT SWITCH INSTALLATION

Due to shipping, the machine disconnect box has been removed and is located on top of the hydraulic compartment.



1. Remove all four mounting bolts.
2. Push gray conduit back into hydraulic compartment.
3. Open disconnect.
4. Align disconnect enclosure with the four holes on the hydraulic compartment and using the mounting bolts, fix box to hydraulic compartment.
5. For power hook up, see operations manual:
   Section 1 Installation: Wiring Connections

WIRING CONNECTIONS

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

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

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

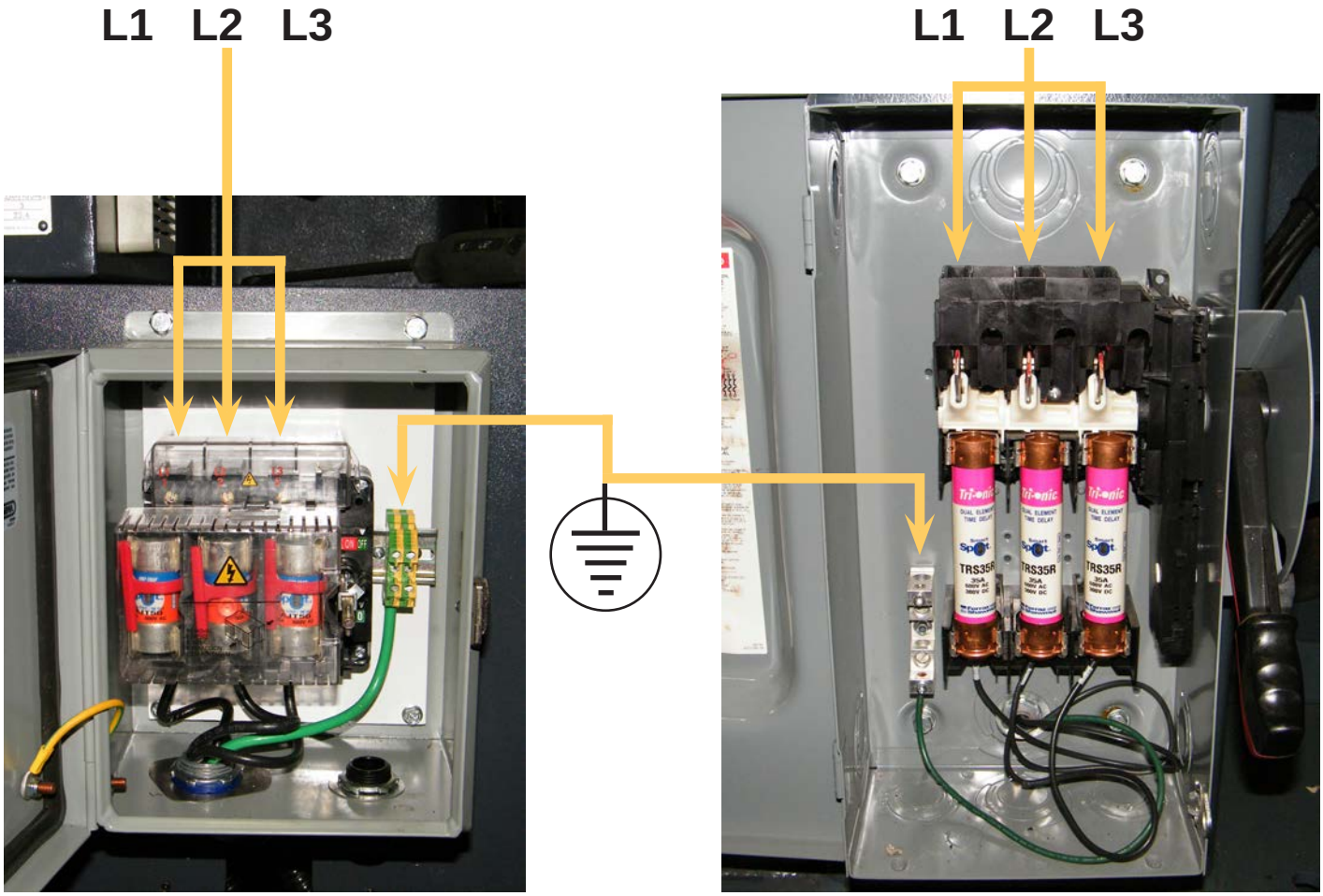
As supplied, the machine is set to run on three phase voltage as indicated on the serial plate and voltage label.

Power connection to the machine is made to L1, L2, L3 and ground terminals in the main disconnect box. (See photo below) For machines equipped with a variable frequency drive unit, an earth ground is recommended.

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: Running the hydraulics “backwards” can damage the hydraulic pump

The machine will have one of the disconnect switches installed as shown below.



EARTH GROUNDING PROCEDURE

1. The customer is to provide and install a ground rod approximately .60 (15mm) diameter, copper clad steel, to be driven no less than 8’ (2.5m) into the ground, no more than 10’ (3m) away from control enclosure.

2. The ground rod is to be connected to customer’s in plant ground system. This connection shall be made directly at the ground rod. (If applicable).

3. It is desirable that the overall resistance to ground measured at the ground rod does not exceed 3 ohms. Customer is advised to consult local power company for further information on grounding.

4. The ground rod is to be connected to the ground terminal in the control enclosure using insulated, stranded copper wire. The wire gauge size is to be determined according to the electrical code of the customers local electrical authority.

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

6. A properly functioning ground system will:
   - provide safety for personnel.
   - ensure correct operation of electrical/electronic apparatus.
   - prevent damage to electrical/electronic apparatus.
   - help dissipate lightning strikes.
   - divert stray radio frequency (RF) energy from electronic/control equipment.

HYDRAULIC OIL AND CUTTING FLUID

The bandsaw is supplied with Texaco Rando HD46 hydraulic oil. If it is necessary to change the oil to a different brand, see the HYDRAULIC SECTION for an equivalent grade of oil.

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

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

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:
For the saw infinitely between 40 to 300 SFM (Surface Feet/Minute) or 12 to 91.5 m/min (Meters/Minute)
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 (8274kP). IF THERE IS NO IMMEDIATE PRESSURE, SHUT THE SAW DOWN AND CHANGE THE PHASE ORDER.

MANUAL OPERATION

Manual Operations can be performed when the PLC 100 controller is set to MAN (AUTO is active when a RED light is on above the AUTO/MAN button). All functions are self-explanatory. Specific control button functions are described on the following pages.

FRONT VISE

This switch has three positions, OPEN, HOLD 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 HOLD 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.

HEAD CONTROL

This switch has three positions: UP, HOLD and DOWN. The switch is inactive unless the PLC is in manual mode. In the UP position, the head will rise until it trips the head up limit, which is adjustable. In the HOLD position the head will stay still. In the DOWN position the head will descend until it reaches the bottom of the stroke. The speed of descent is controlled by the Head Feed and Head Force Limit controls.

BLADE START

The blade can be started only when the hydraulics are running in either manual or auto mode.

NOTE: In automatic Mode the head will not descend until the blade has been started, which the PLC will prompt the operator to do so.

HYDRAULIC START

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

CYCLE START / PAUSE

This button starts the cutting cycle and will stay illuminated until the cycle is completed. The PLC control system will prompt you to start the blade if it is not running. The machine will then begin the automatic cycle until completed when it will shut itself off. The current cycle can be PAUSED by pressing this button at any time during a cycle and restarted by pressing it again.

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.

SHUTTLE VISE
This switch has three positions, OPEN, HOLD 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 HOLD 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

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 blade speed will be displayed on the PLC display.

BLADE STOP
Stops the blade. If the blade is stopped during a cycle, the cycle will continue but will not let the head descend until the blade is started.

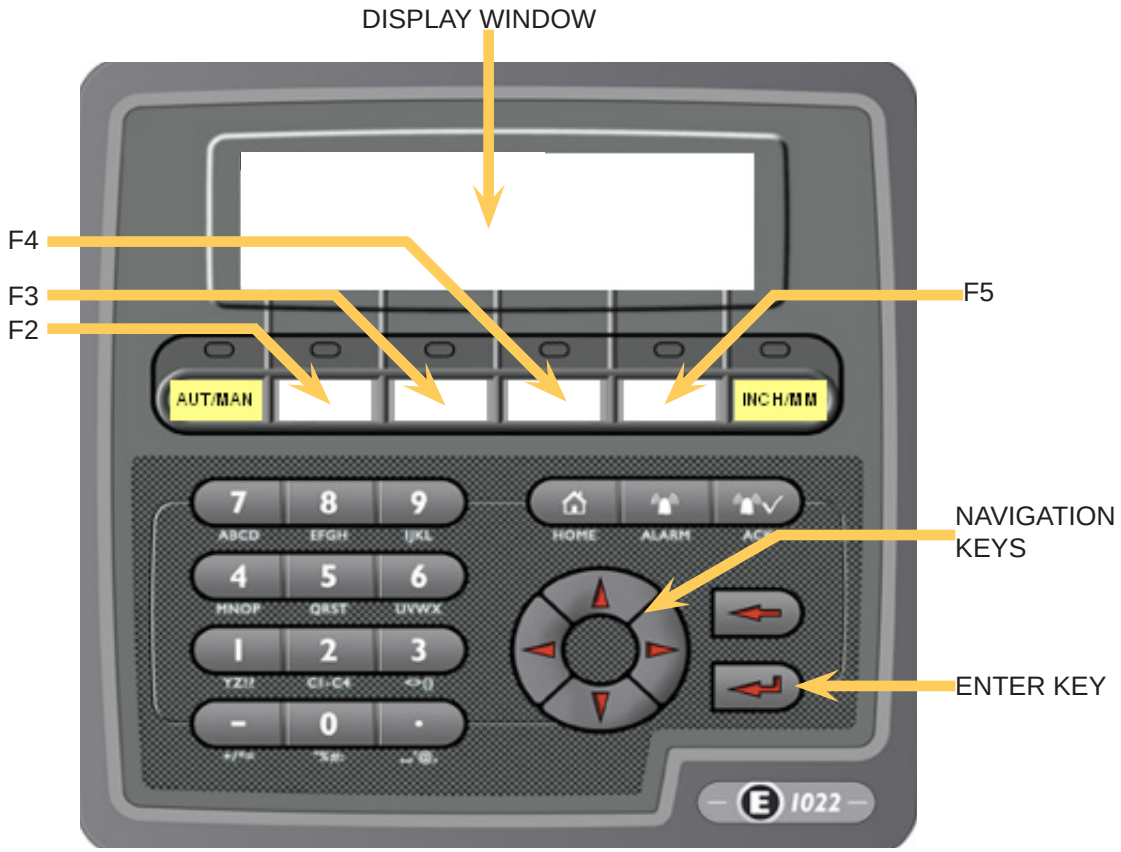
EMERGENCY STOP
This mushroom button stops the blade and hydraulic motors. Both vises will hold their position but, pressure will begin to fall off. Long pieces of work should always be supported so they will not become loose over time and fall while the machine is shut down. This is a latched button and must be pulled out to start the machine.

WORK LAMP
This switch has two positions, OFF and ON.

BLADE CHANGE MODE
This lock is provided for the safety of the operator during the blade changing procedure. When the lock is in the “ON” (I) 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” (O) in order to operate the machine.

LASER (OPTION)
This switch has two positions, OFF and ON.

OPERATION OVERVIEW



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

In manual mode, all functions can be operated by using a combination of selector switches on the control console and the PLC function buttons. Also the operator has the ability to execute a single cut utilizing a preprogrammed “Single Part Cycle”.

In automatic mode, the PLC has the capacity to program and store 99 jobs. Designated job numbers can be programmed for quantity required (maximum of 999 pieces) and lengths from 0.1” to 220” (5588mm).

Jobs can be run individually or in a QUEUE which allows a maximum of 5 jobs to run consecutively and the queue can be repeated automatically as well up to 99 times.

All machine operators should be familiar with the entire operation instructions prior to operating the machine.

NOTE: If an emergency situation arises during any operation, use the large red mushroom “STOP” button located on the control panel to shut down the machine. To operate the machine, the “STOP” button must be pulled out.

ACTIVATING THE PLC

Position the head, fixed vise, and shuttle vise switches to the NEUTRAL (center) positions. If any of these switches are not in the NEUTRAL position, the hydraulics will not start. The PLC control will become active when the HYDRAULIC START button is depressed and “held in” momentarily. First, the HMI and PLC’s current revision number will be shown on the display window and finally the MANUAL MODE display window will appear as shown below. The AUTO/MAN green indicator light will be on and all MANUAL controls are enabled. The “LTH” value (shuttle vise position) will always display zero at start up. The “LTH” value can be reset or cleared at any time in MANUAL mode by pressing the CLEAR function button.

FUNCTION KEY DESCRIPTIONS

If a red indicator light above a function button is illuminated, it means that the function printed in red is enabled. If a green indicator light above a function button is illuminated, it means that the function printed in green is enabled.

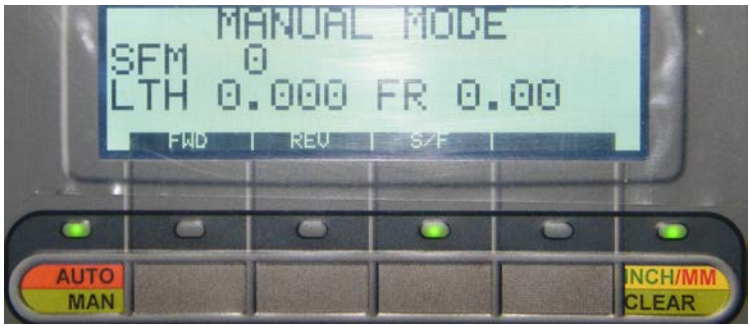
The following are the function keys for AUTO and MAN modes:

AUTO / MAN MODE
- This key will toggle between MAN and AUTO modes. Auto mode cannot be accessed unless the front vise is closed.
- Also used to stop an automatic job in progress by switching to MANUAL mode.

UNLABELLED
- The function of these keys are displayed directly above them. The function will change as the PLC is switched from one mode to another and as the process of each mode is changed.

INCH/MM
- While depressed momentarily, it resets the displayed length value to zero. If held depressed for a few seconds, the displayed length will toggle between millimeters and inches and the blade speed in either surface feet per minute or meters per minute. It becomes disabled once any cycle is initiated.

MANUAL MODE FUNCTION KEY DESCRIPTIONS



While in manual mode, the display will show the current function of the unlabelled key. They are shown below.

FWD: FORWARD - This key will advance the shuttle vise toward the head (home position). If pressed simultaneously with the REV key, (the front vise must be closed and a password is required) the parameters will be displayed.

REV: REVERSE - This key will retract the shuttle vise away from the head (home position). If pressed simultaneously with the FWD key, (the front vise must be closed and a password is required) the parameters will be displayed.

S/F : SLOW / FAST - This key will toggle between slow and fast shuttle speed.

SINGLE PART CYCLE OPERATION

In MAN mode, the PLC allows the operator to initiate a “Single Part Cycle” 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 “Single Part Cycle” operation.
2. Make sure the front vise switch is in the closed position and set the head up limit switch. The AUTO/MAN indicator light will flash alternately green and red.
3. Make sure the head is set so that the blade is above the material and the head selector switch is in the HOLD position.
4. The cursor will be flashing at the LENGTH position. Key in the desired value from 0” to 220” and press enter. If the value is incorrect, re-enter the value and press enter again.

5. If the blade is not running, you will be prompted by the word “BLADE” flashing on the display window. Start the blade and adjust the blade speed as required.

6. When the blade is started, the word “BLADE” will change to the word “CYCLE” flashing on the display window. Press CYCLE START and the cycle will begin.
7. When the cycle button is pressed, the shuttle vise will move forward to the home position before executing the length movement. The head will descend and make the cut.
8. When the cut is completed, the head will rise to the head up limit switch, the blade will stop and the display window will reset for the next cut.
9. To cut another piece, repeat steps 2 through 6.

NOTES:

1. To “PAUSE” the “SINGLE CUT CYCLE”, press the “CYCLE START” button. The “CYCLE START” button will begin to flash and the screen will indicate a paused condition. All movements will immediately cease. To continue the cycle, press the “CYCLE START” button again.
2. To cut multiple pieces, switch to AUTO MODE and follow the automatic procedures.

KERF CORRECTION

When making cuts, the PLC must account for an amount called the “KERF,” which is the material removed by the blade. This value must be entered into the PLC and must be checked and adjusted as required when the blade has been replaced. This is due to the fact that there is a variance in the kerf value from blade to blade. The original value entered is for the blade installed at the time of manufacture. If the kerf value is to be adjusted, its value can be accessed while in Auto Mode. Press and hold the key below the word “KERF” on the display until the display appears as shown. Enter the desired kerf value and press enter.

NOTE: Whenever a new job or new material is being loaded for production, the head up limit switch should be properly set to clear the material, positioned for a trim cut and the front vise closed (in “MANUAL MODE”).

RETURNS TO AUTO MODE

RETURNS TO THE QUEUE

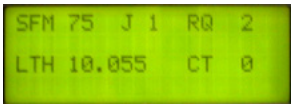
AUTOMATIC OPERATION

When the AUTO/MAN button is pressed, the red indicator light above it will come on, and the blade will stop if it has been running. The screen will change to the JOB display window as shown below and be ready for editing or starting a new job. All manual functions will be disabled.

JOB DISPLAY WINDOW

PROCEDURE FOR EDITING OR STARTING A NEW JOB IN AUTO MODE

1. In AUTO mode, key in a job number from 0 to 99 and press enter. The REQUIRED QUANTITY (RQ), LENGTH (LTH) and QUANTITY CUT (CT) will be displayed. The values displayed can be edited by pressing ENTER after each new value, and the job will be stored in memory with the new values. To navigate through the values, use the CURSOR keys.



2. After the values are entered, press the CYCLE START button. The switch will illuminate and the display window will prompt you to start the blade for a trim cut (if the “Trim Cut” parameter has been selected).

CAUTION:
If the head is in its down position, it will rise to the head up limit so that no damage to the blade will occur.

3. After starting the blade, the head will descend for the cut and the machine will complete the required job.

4. At the completion of the job, the machine will shut down if “0” has been entered in the “POWER DWN TIMER” parameter or continue running for the specified time up to a maximum of 180 minutes.

NOTES:

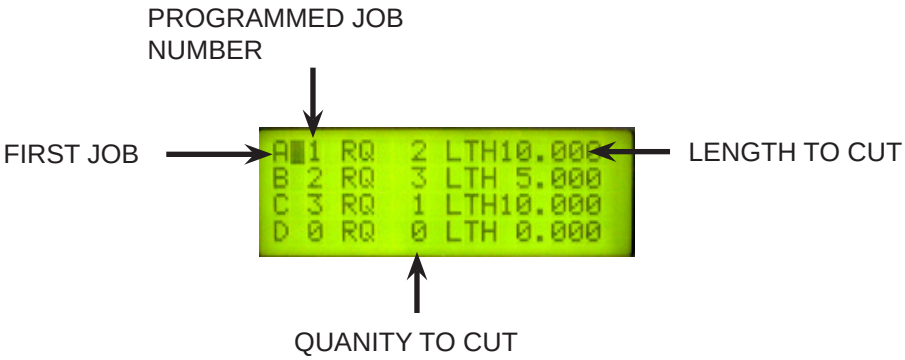
1. The “CT” value is the accumulated total number of parts that have been cut from the JOB number since it was last reset. The machine will only cut the quantity that is the difference between REQUIRED QUANTITY and CUT QUANTITY. When REQUIRED QUANTITY equals CUT QUANTITY, the machine AUTO CYCLE will stop and you will be unable to restart the same job until the “CUT QUANTITY” value has been reset.
2. The AUTO cycle may be exited and stopped at any time by pressing the AUTO/MAN key.

NOTE: Before entering “AUTO MODE” and working with a “QUEUE”, follow the same procedures outlined on the previous page for “SINGLE PART CYCLE OPERATION” with regards to setting up for an initial trim cut.

WORKING WITH A QUEUE

The purpose of a QUEUE is to allow the operator to run several jobs (max of 5) in series if they are of the same material and shape.
In AUTO mode, press the key below the word “QUE” on the display and the display window will appear as shown.

If you choose to VIEW the QUEUE, press the key below the words “VIEW QUE” on the display. The display window will show the jobs in the current QUEUE. Four jobs at a time are shown.



Use the CURSOR buttons to view all the jobs. To run the QUEUE as it is displayed (jobs may be edited in this mode), press the CYCLE START button on the control panel. The screen will now prompt you to start the blade for a trim cut.

If you choose to edit the QUEUE, press the key below the words “CLEAR QUE” on the display. This will clear any jobs that are in the QUEUE and the display window will show an empty Queue. Jobs may be entered and edited in this mode.

To fill the QUEUE, follow these two steps.

1. Key in a job number and press ENTER. If that job number has previously been programmed, its values will be displayed. The cursor will move to the next position in the QUEUE. Up to five jobs may be in the QUEUE at any time. The job values can be edited in this mode.
2. When the desired jobs have been entered, you may press the CYCLE START button on the control panel to execute the jobs in the QUEUE.
   (Follow the same procedures to initiate a cycle as in “AUTOMATIC OPERATION”)

The QUEUE may be exited to the previous screen at any time by pressing the key under JOB. At completion of the “QUEUE,” the machine will shut down if “0” has been entered in the “POWER DWN TIMER” parameter or continue running for the specified time up to a maximum of 180 minutes.

SHUTTLE EMERGENCY STOP

A second emergency stop push button is mounted to the shuttle above the shuttle vise cylinders. This mushroom button stops the blade and hydraulic motors. Both vises will hold their position but, 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.

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 KNOB
Used to set feed force limit (counterclockwise rotation to increase and clockwise rotation to decrease).

FF IS NOT APPLICABLE TO H40 MODEL

EXTRA FINE METERING VALVE
Used to set feed rate (counterclockwise rotation to increase and clockwise rotation to decrease).

FEED RATE KNOB (Fine Metering)
Used to set feed rate (counterclockwise rotation to increase and clockwise rotation to decrease).

The FINE METERING DDF VALVE is equipped with two Feed Control Knobs. Extra fine Micrometer style Knob and Fine Metering Knob. The main difference between both Feed Controls is that the Extra Fine Metering valve does not work with the Feed Force Limit Valve. It is recommended to use only one feed control at a time with the second control valve shut. The choice of control is arbitrary and a matter of trial.
In some cases Extra fine Metering provides better results in others Fine Metering Control.
As a rule of thumb:
Extra Fine metering valve should be used

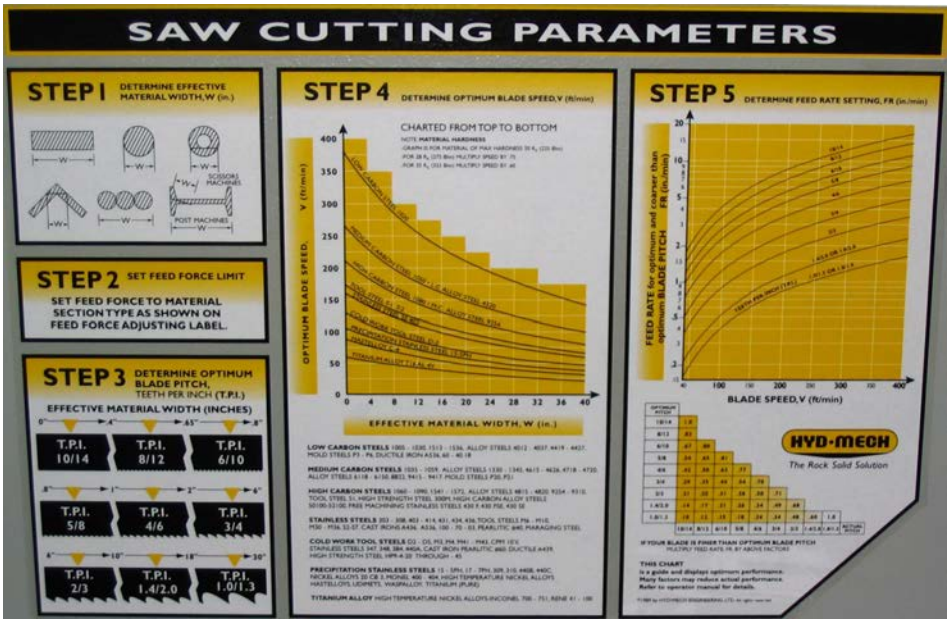
- if required feed is in a range of .12-.25”/min
- and/ or when cutting hard material
- or when work hardening may occur.

Fine metering valve should be used

- When cutting structural steel
- and/ or bundles
- High feed rates required

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.



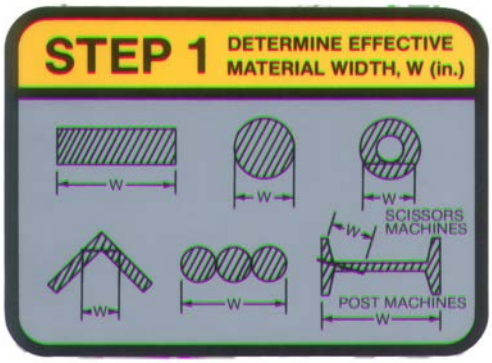
Saw Cutting Parameters Chart

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:

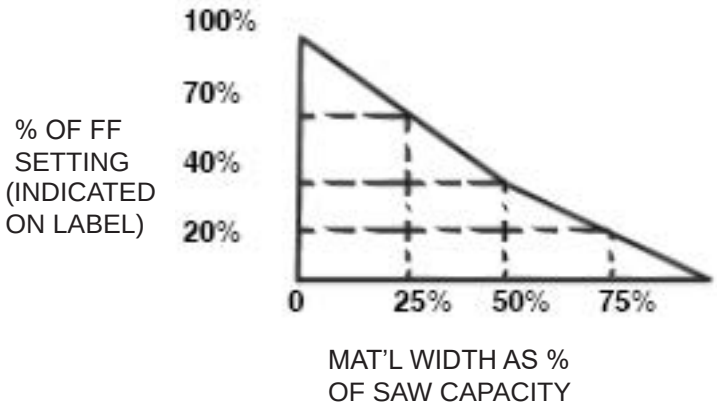
1. Effective material width, as determined here in STEP 1, can be thought of as the average width of material “seen” by each tooth, and it is used in STEPS 3 and 4.
   In Example #1, for an 8” (200 mm) diameter solid, Effective Material Width is 8” (200mm).

STEP 2: SET FEED FORCE LIMIT

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.



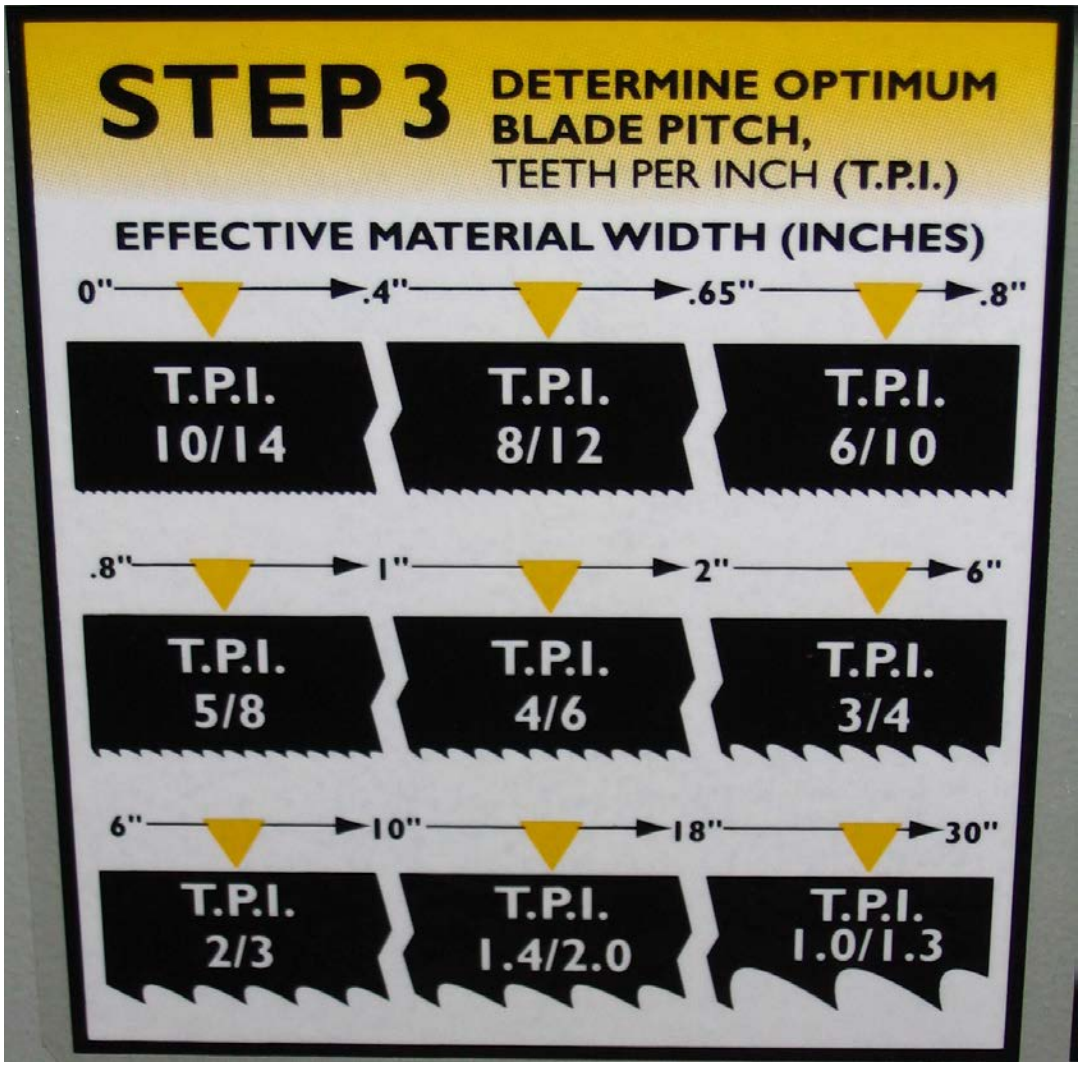
EXAMPLE: When cutting a solid which is 1/2 of machine capacity using the graph, locate 50% on the horizontal line and travel upwards to the plotted line and then travel directly across to the vertical FF Setting line. The point that you have arrived at shows a setting of 40% for a piece 50% of capacity.

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)

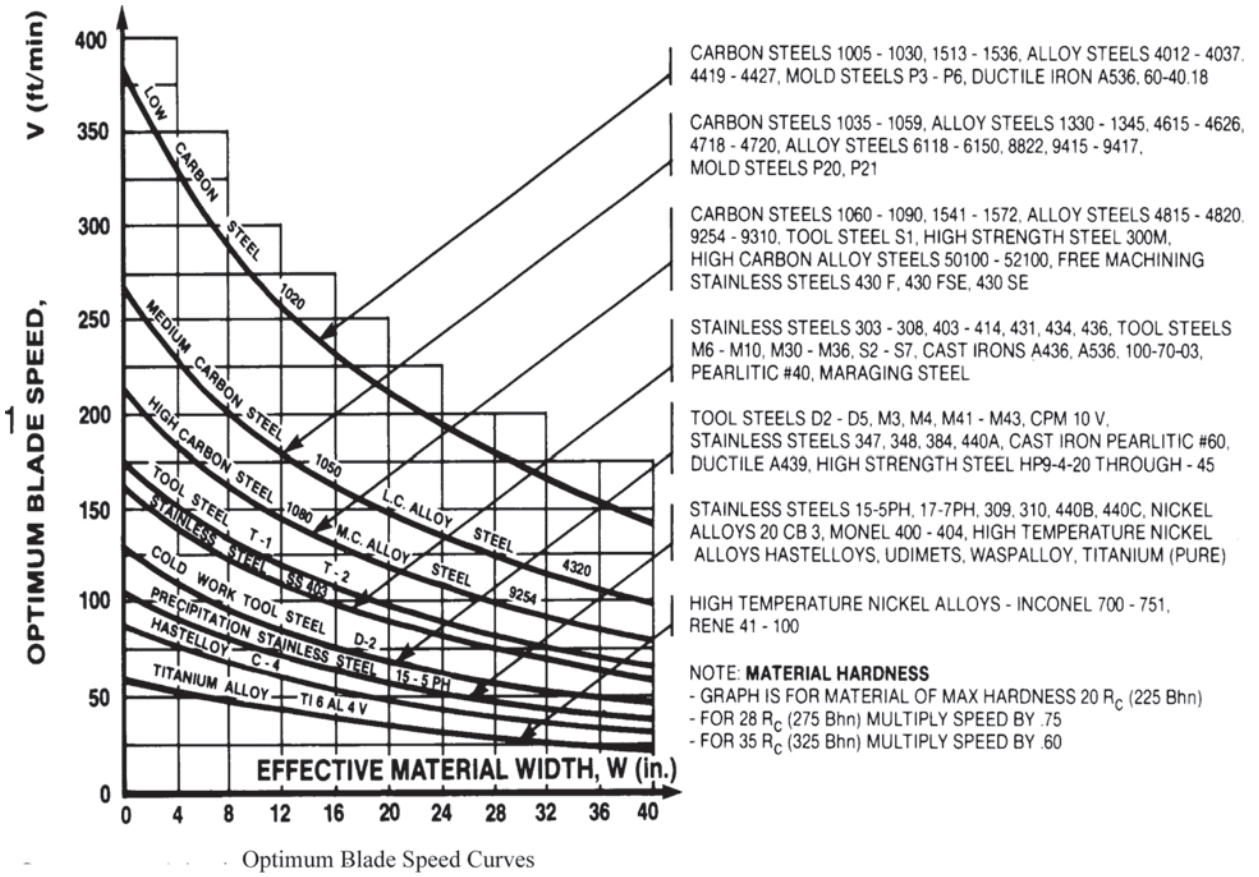
It is impractical to change the blade to the proper pitch every time a different width of material is cut and it is not necessary, but remember that the optimum blade will cut most efficiently. Too fine a blade must be fed slower on wide material because the small gullets between the teeth will get packed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

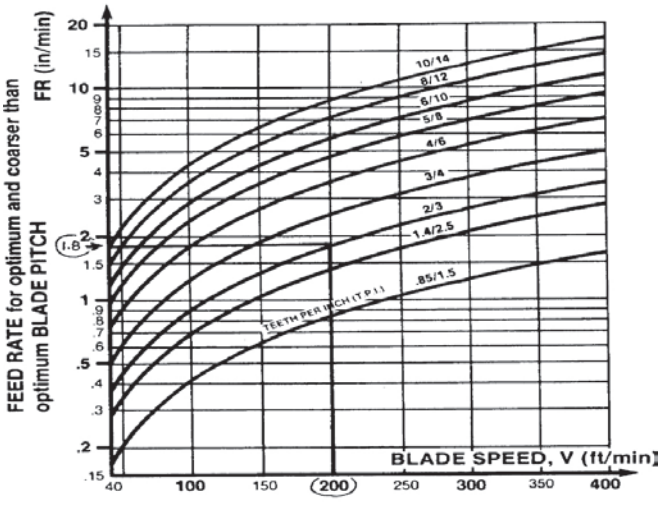
#	MATERIALS	OPTIMUM	BLADE SPEED
		(ft/min)	(m/min)
1	5” (125mm) Diameter Solid Carbon Steel	225	70
2	12” (300mm) I-Beam	290	90
3	4” x 4” (100mm x 100mm) Rect. Tube 1/4” (6mm) Wall	350	110
4	4” (100mm) 400 Stainless Steel	140	45
5	2” x 2” (50mm x 50mm) Rect. Tube 1/4” (6mm) Wall		
	Bundle 5” x 5” pcs. 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 PITCH	10/14	8/12	6/10	5/8	4/6	3/4	2/3	1.4/2.5	.85/1.5	ACTUAL PITCH
10/14	1.0									
8/12	.83									
6/10	.67	.80								
5/8	.54	.65	.81							
4/6	.42	.50	.63	.77						
3/4	.29	.35	.44	.54	.70					
2/3	.21	.25	.31	.38	.50	.71				
1.4/2.5	.17	.20	.25	.31	.40	.57	.80			
.85/1.5	.10	.12	.15	.18	.24	.34	.48	.60	1.0	

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

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)

ADDITIONAL CUTTING SETUP EXAMPLES, continued

EXAMPLE # 3

Material:

Bundle low carbon steel 2” x 2” Tube with 1/4” wall, 12 piece bundle (50mm x 50mm with 6mm wall)

Dimensions: 6” x 8” (150mm x 200mm)

Step 1 Effective Material Width: 5” (.6 X 8”) 120mm (.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 (100m/min)

Step 5 Feed Rate for 3/4 TPI blade: 4.0 in/min (100mm/min)

ADDITIONAL CONTROLS

COOLANT FLOW

The main coolant control is found on the control panel.

WASH: Coolant flows any time the machine is under power, permitting wash down with spray nozzle without running machine.
OFF: No coolant flow.
ON: The coolant flows only when the blade is running or when the blade is running and the head is descending. This is selectable via the PLC parameters.

A generous flow of coolant should be applied in order to increase production and blade life.

The bandsaw is equipped with two independently controlled coolant spouts that are capable of supplying a generous flow of coolant to the blade.

The left guide arm supplies a flow of coolant that floods the blade as it moves through the carbide pads into the material to be cut. The adjustable spout on the left guide arm should be set with the blade speed to provide the flood of coolant necessary.

The right guide arm provides a coolant flow through the flexible hose that can be pointed directly where necessary. This flexible hose should be used when cutting solid bars, bundles or wide structurals. Set the flow of coolant directly into the opening in the material where the blade is cutting.

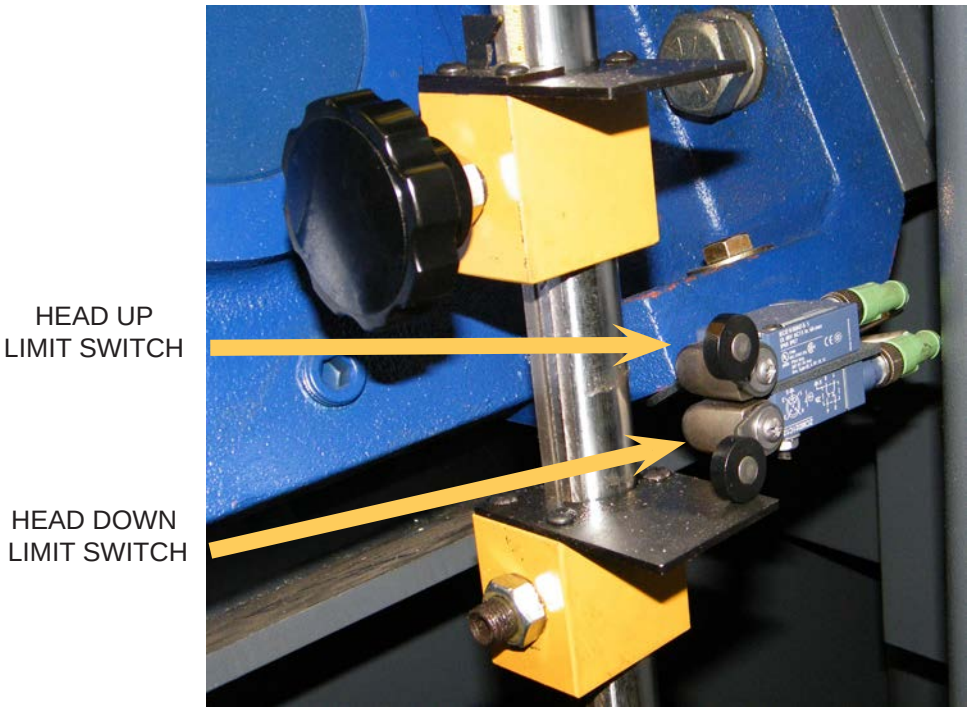
NOTE:
When cutting materials that do not need constant coolant, such as Cast Iron, some coolant flow is required for blade lubrication to prevent blade scoring by the carbide pads as the blade moves through them.

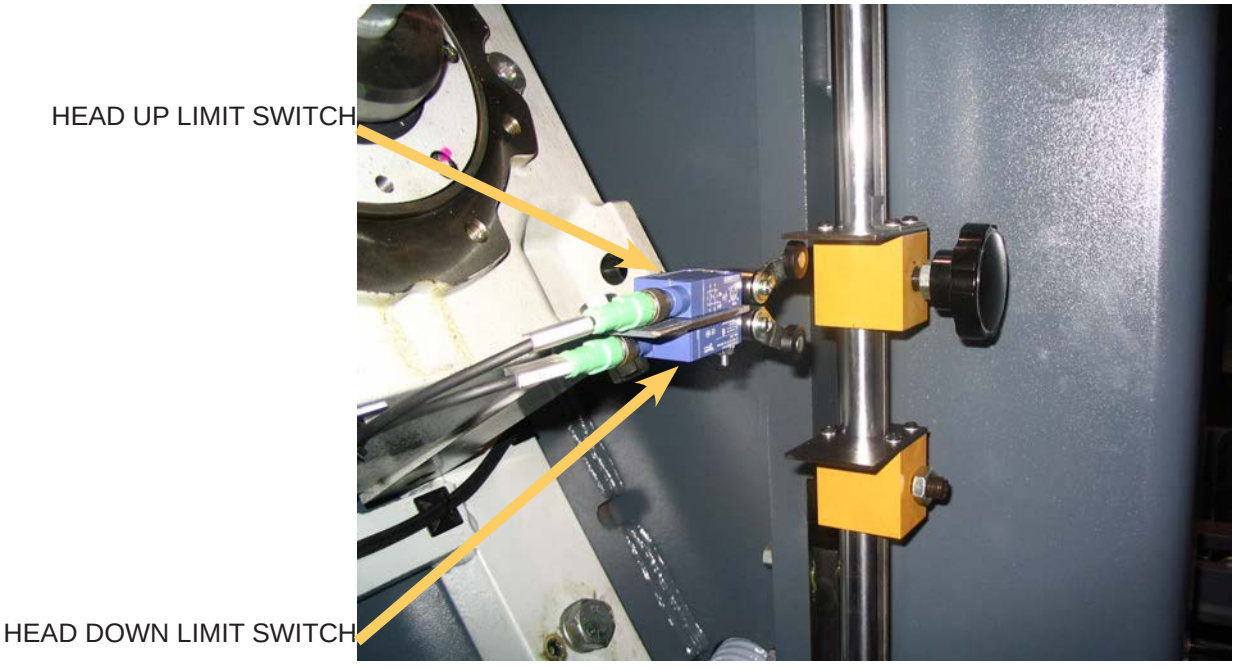
HEAD UP and DOWN LIMIT SETTING

The head up limit is used to restrict the distance the head travels for each stroke. It can be adjusted at any time by moving the switch trip plate to any position on the vertical bar. The trip plate & switches are found behind the head on the drive end near the gear box.

Head Up Limit: In order to maximize production in the automatic, cycle the Head Up Limit should be set to just clear the height of the material.

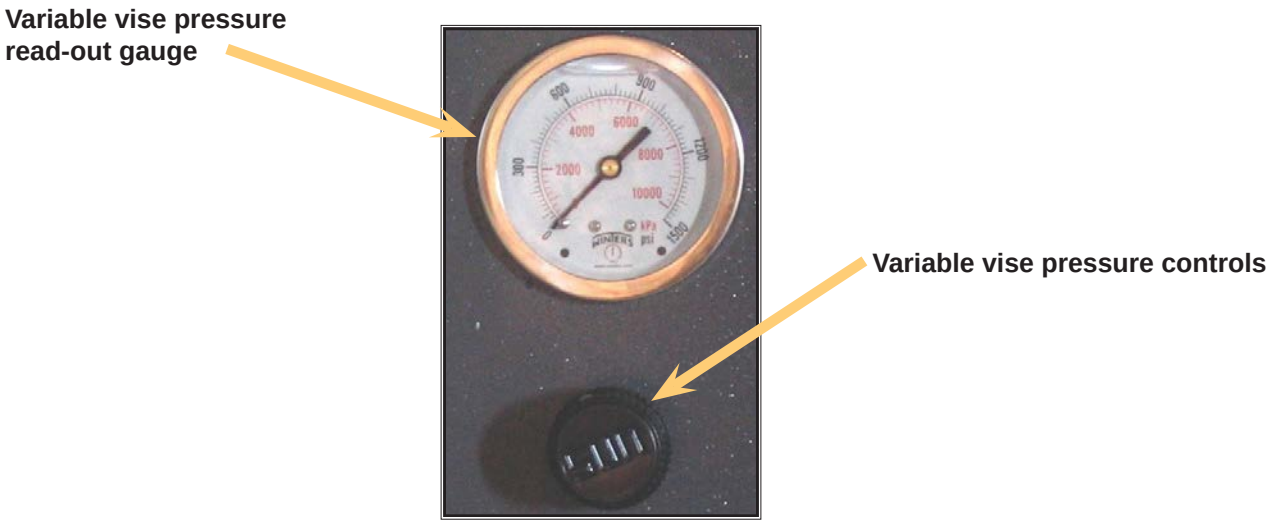
Head Down Limit: This limit is factory set and under ordinary cutting requirements should not be changed. If changed, it may cause the machine to malfunction in the automatic cycle.





VARIABLE VISE PRESSURE (OPTION)

This option allows the operator to adjust the vise pressure. This can be valuable when cutting light structurals and tubes. By reducing the vise pressure from the system pressure, (1200 PSI or 8274kP) distortion of materials is prevented. The controls are located at the drive end of the machine next to the hydraulic compartment.



BUNDLING OPTION

The bundling vises can be operated in direct conjunction with the front and shuttle vises. Either bundling can be turned on or off at any time. The speed at which the bundling jaws close can be adjusted as required by turning the flow control valve for each bundling cylinder.

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 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.
4. 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.
5. Work on the locked-out machine may now proceed.

Machine Power Disconnect is located at the back of the machine .
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. Open the front vise about 12". This will 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. Remove the blade guard.
5. Open both blade wheel doors.
6. 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.
7. Pull the top strand of the blade down out of its slot above the cutting area and forward out of the slots on the inside walls of the blade wheel housings.
8. Pull the lower strand of the blade down out of the blade guides.
9. 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 front of the saw where it passes around the wheels, and with the teeth in the cutting area pointing towards the drive wheel. This may require that the blade be turned inside out before installation.

1. With the blade change mode key switch remaining in the 'ON' position, turn the blade tension switch to the ' – ' 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 front 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

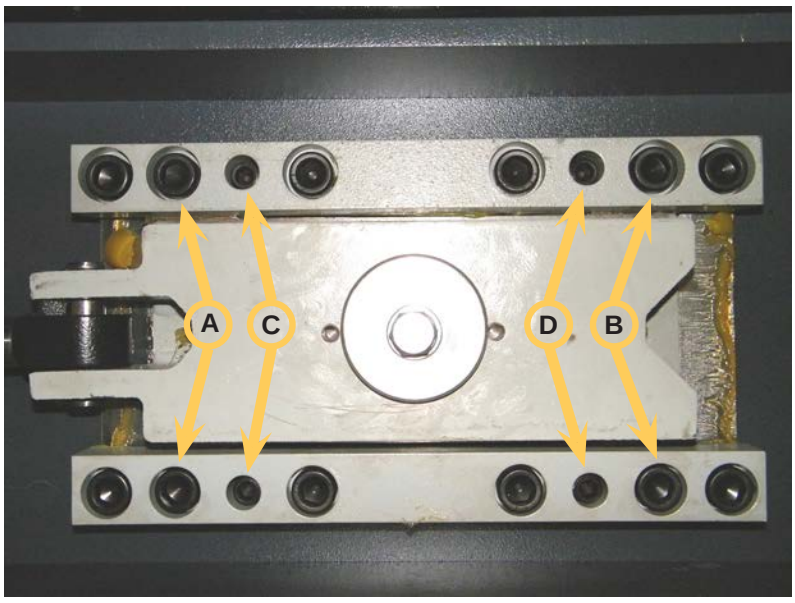
The blade brush is properly set when the machine leaves the factory but it will wear during operation and needs to be adjusted periodically. The blade brush assembly is found behind the drive side door and is shown below. To adjust the assembly, loosen the hex nut, turn the set screw counter clockwise until the wires on the brush touch the bottom of the blade gullets and tighten the hex nut. The brush should be replaced as it becomes worn to approximately 70% of its original 3" diameter. Replacements can be purchased through your Hyd-Mech Group Limited dealer.

BLADE TRACKING ADJUSTMENT

Blade tracking is set so the teeth of the blade protrude .340" (8.6mm) +/- .01" (.25mm) for an H28SV, and .370" (9.4mm) +/- .01" (.25mm) for an H32SV from the face of the idler and drive wheels. Adjustments should always begin with the wheel that measures farthest out of specification.

IDLER WHEEL TRACKING

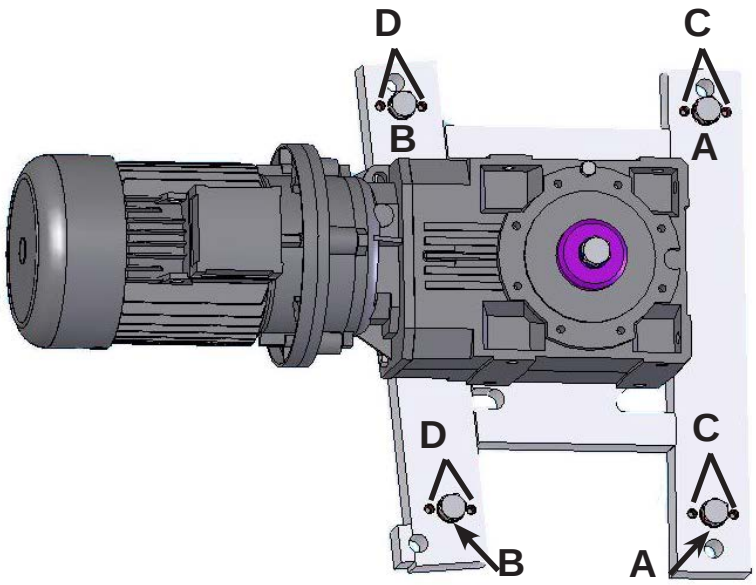
Release blade tension before adjusting. Adjust tracking by regulating "push" set screws and "pull" bolts. Loosening bolts "A" and turning in set screws "C" by equal amounts will move the blade OFF the wheel. Loosening bolts "B" and turning in set screws "D" by equal amounts will move the blade ON to the wheel. After each "C" or "D" set screw adjustment, tighten bolts "A" or "B", turn tension switch to "+RUN", run the blade for a moment and recheck the tracking.



Idler wheel tracking bolts & set screws

H28SV DRIVE WHEEL TRACKING

Release blade tension before adjusting. Loosening bolts “A” and turning in set screws “C” by equal amounts will move the blade OFF the wheel. Loosening bolts “B” and turning in set screws “D” by equal amounts will move the blade ON to the wheel. After each “C” or “D” set screw adjustment, tighten bolts “A” or “B”, turn tension switch to “+ RUN”, run the blade for a moment and recheck the tracking.



H28SV GEARBOX LUBRICATION (A603 GEARBOX)

The Bonfiglioli A603 gearbox used on the saw is supplied with 15 litres (3.96 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.

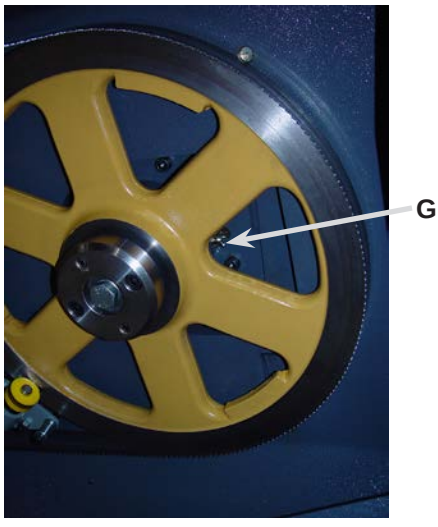
The suggested oil change interval is given below:

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

Oil can be changed by draining through plug, E, and filling at plug F. 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.

OUTPUT SHAFT LUBRICATION

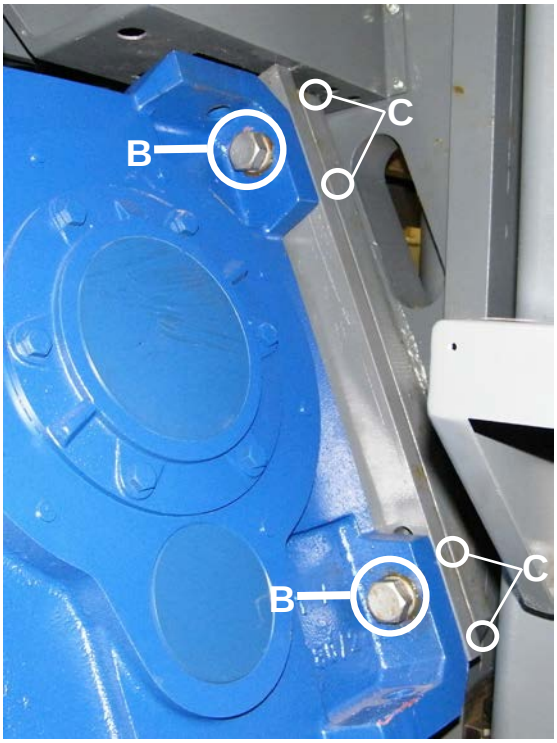
Always follow Lock-out Procedures before performing this lubrication.
Band tension load is carried by a grease lubricated spherical bearing. A grease fitting is accessible through the spokes of the blade wheel, as shown at point G in the accompanying illustration. Lubricate once per year with 30 ml [1 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.
Vise jaw guides, infeed rollers and bundling assemblies also require periodic greasing.



H32SV DRIVE WHEEL TRACKING

Release blade tension before adjusting. Loosen support hex nuts and set screws “A”. On bolts “B”, there is a jam nut between the gearbox and mounting plate; loosen this jam nut. Turning bolts “B” out by equal amounts ¼ turn at a time and tightening set screws “C” will push the blade OFF the wheel. Loosening set screws “C” and tightening bolts “B” will pull the blade ON the wheel. Snug up bolts “A”, turn tension switch to “+RUN”, run the blade for a moment and check the tracking. When adjustment is completed, tighten the jam nuts on bolts “B”, support set screws “A” and jam nuts.

There is an identical set of “B” and “C” screws, etc. on the wheel side of the gearbox. These may be used when the set shown will not set tracking as desired. This set may be accessed through the drive wheel wall. It may be necessary to turn the drive wheel.



Set screws “C” are on the reverse side of the mounting plate

H32SV GEARBOX LUBRICATION

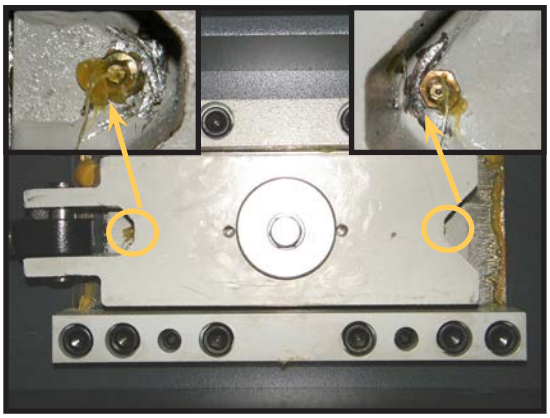
The saw with the PM80 gearbox requires 32 litres (8.44 US gallons) of Mobil SHC 630 synthetic oil.. This oil has an ISO Viscosity Grade of 220 that is optimum for ambient temperatures from 20-40 Deg C [70-104 Deg F]. If the machine will be operated for prolonged periods at ambient temperatures below 20 Deg C [70 Deg F] an oil of ISO Viscosity Grade 150 should be substituted.

The suggested oil change interval is given below:

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

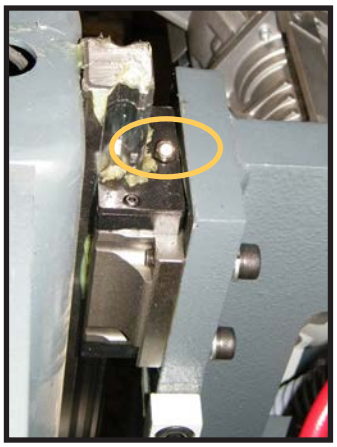
LUBRICATION

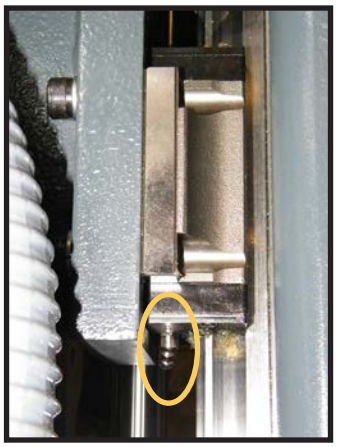
The design of the saw is intended to minimize maintenance, although periodically certain moving parts do require lubrication. We recommend that this periodic lubrication be done once a month using any general-purpose grease. In addition to the grease points shown, vise jaw guides, infeed rollers and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



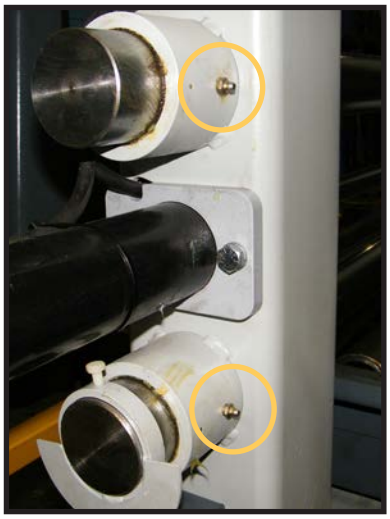
Idler Wheel Slider Assembly
Grease Nipple

Shuttle Shaft Bearing Housings
x2





Head Linear Guide Blocks
x3



Shuttle Vise Grease Nipples
x2

Guide Arm Grease Points
x4

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 9.5 US gallons (36 Litres).

NOTE: The H-32 is shipped from the factory with TEXACO RANDO HD46 hydraulic oil. Generally any brand of recognized mineral hydraulic oil with the same properties should be compatible with TEXACO RANDO HD46 oil, but to avoid any risk we suggest staying with TEXACO RANDO HD46. 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.

It is recommended to change the oil every 3000 hours of operation on once a year.

Recommended replacement oils:	Chevron	AW Hydraulic Oil 46
	ESSO	NUTO H46
	Mobil	Mobil DTE 25
	Texaco	Rando HD 46
	Shell	Tellus 46

3. OIL TEMPERATURE – Oil temperature is indicated by a thermometer contained in the level gauge. Oil temperature during steady operation should stabilize at about 50-55°F (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 and should not require further attention except precautionary observation at start-up and every few days thereafter.

5. BLADE TENSION – Is preset at the factory and should under normal conditions not require attention. For adjustments, see the hydraulic schematic.

CLEANLINESS

The heavy-duty design should endure heavy operating conditions and provide the customer with flawless machine performance. To extend good performance some care is required especially as cleanliness is concerned.

The following areas should be kept clean:

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

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

TROUBLESHOOTING

PROBLEM		PROBABLE CAUSE		SOLUTION	
1	Saw is cutting out of square vertically.	1a.	Blade worn.	1a.	Replace blade.
		1b.	Low blade tension.	1b.	Tension blade.
		1c.	Blade guides.	1c.	Check for worn guides.
		1d.	Excessive feed rate.	1d.	Reduce.
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.	Reset blade tension.
		3b.	Improper tracking.	3b.	Set tracking.
4	Blade stalls in cut.	4a.	Not enough blade tension.	4a.	Tension blade.
		4b.	Excessive feed force.	4b.	Reduce.
		4c.	Excessive feed rate.	4c.	Reduce.
5	Blade vibrates excessively.	5a.	Blade speed too fast.	5a.	Reduce.
		5b.	Guide arms too far apart.	5b.	Adjust accordingly.
		5c.	Not enough blade tension.	5c.	Tension blade.
6	Excessive blade breakage.	6a.	Excessive blade tension.	6a.	Reduce blade tension.
		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 blade 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 faulty.
9	Saw will not start.	9a.	Safety relay is not energized	9a.	1.Ensure all Emergency Stop push buttons are released. 2.Ensure Door interlock switches are not activated.(Close Drive & Idler doors)
		9b.	Motor overload has tripped.	9b.	Depress each of the over-load buttons located in the electrical box. Depressing one button at a time and trying to start the saw will indicate which motor was overloaded.
		9c.	Control circuit fuse has blown.	9c.	Replace the fuse in the control panel. Random blowouts may occur but a quickly repeated blowout points to an internal wiring fault.
		9d.	Vise or head selector switch not in the center (neutral) position.	9d.	Turn all switches to the center (neutral) position.

PROBLEM		PROBABLE CAUSE		SOLUTION	
10	Saw starts but will not run after Start button has been released.	10	On machines so equipped, the out-of-stock or blade breakage limit switch has been tripped.	10	Reload with stock or reset the blade. Hold the hydraulic start button and 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.	11a.	Stop immediately; reverse any two of the three phase connections.
		11b.	If pump is noisy cause may be low hydraulic oil level.	11b.	Stop immediately, add hydraulic oil. (See "Hydraulic Maintenance")
		11c.	Pump-motor coupling has separated.	11c.	Adjust accordingly.
IN MANUAL MODE					
12	No individual function will respond to its manual control switch.	12a.	Observe pilot light(s) on relevant valve. If pilot light fails to go on, problem is electrical.	12a.	This requires the attention of a qualified service person.
		12b.	If pilot light related to inoperative function does light, problem may still be the coil . If problem remains it may result from dirt in the valve spool.	12b.	Disassembly of hydraulic valves should be under taken only by qualified service personnel or those knowledgeable with hydraulic components.
13	Head will not descend.	13a.	Feed Rate Valve is fully closed - pointer is set on "0" or close to "0" in/min.	13a.	Turn Feed Rate Knob in a counter clockwise to open valve.
		13b.	Feed Force Limit is set too low.	13b.	Increase Feed Force Limit.
		13c.	Check for physical interference preventing the head from falling.	13c.	Remove obstructions.
IN AUTOMATIC MODE					
14	Auto cycle will not start.	14a.	No job queue programmed to run.	14a.	Enter job numbers(s) and job data as described in Section 2.
		14b.	Pieces required equals pieces cut.	14b.	Clear pieces cut.

PROGRAMMABLE LOGIC CONTROL

Note:

The PLC is equipped with a lithium battery to keep the program stored while the power is shut down. The battery will need to be replaced every 3 to 5 years, depending on the usage. A visual warning will be displayed on the interface when the battery drains to a certain level. Batteries can be purchased through your Hyd·Mech distributor.

The programmable logic control uses signals from limit switches, control panel switches, encoders (rotary shaft or linear) and information that is programmed into it to supply accurate automatic length control and sawing functions.

The inputs used include:

- Head up limit switch
- Head down limit switch
- Machine function switches and push buttons
- A signal from the auto/manual push button (tells the PLC whether auto or manual operation has been selected).

An encoder is attached the shuttle assembly and travels with the shuttle to provide length information to the PLC. A proximity sensor is mounted through the rear of the idler wheel box. A target for this sensor is mounted on the back of the idler wheel, or, all six spokes of the wheel may be targets to provide blade speed input to the PLC.

The programmed information includes logic put into the PLC by the manufacturer, as well as information programmed into it, through the keypad during assembly. Information from the plant is referred to as the parameters. The parameters are important for the PLC to provide accurate sawing lengths and blade speed display. The following is a description of each parameter and the procedure to access them.

To view the PLC parameters:

In manual mode, with the front vise switch in the “close” position press FWD and REV key simultaneously (not more the 0.5 sec apart). The PLC will prompt you for a password that can be obtained from the Hyd·Mech Group Limited Service Dept. If the password is correct, a screen of parameters will appear. The display will show four lines of parameters at a time. If the length control calibration is necessary, follow the calibration procedure in this section. To move through the parameters use the cursor keys to scroll up or down. To change a parameter, cursor to that parameter line and using the number keys type in the new value and press enter. To leave the parameters press the Auto/Man key.

PLC PARAMETERS

SPEED CONST
Blade speed adjustment number. If the actual blade speed is different than the displayed blade speed, a new speed factor will need to be calculated (providing the WHEEL TRGETS parameter is set correctly). Actual speed ÷ display + adjustment factor X existing speed factor = New Speed Factor

WHEEL TRGETS
Number of targets per revolution of the idler wheel. Can be toggled either 1 or 6.

HGT CLB (Press Enter)
This is to be used only if calibration is required. Call Hyd·Mech Service department for instruction.

ACTUAL HGT
Actual Height Value. Value entered after performing height calibration procedure (described later in this section). This value represents the head full stroke height.

HGT CONST
Height constant. Specifies linear distance of head movement in inches per one pulse of head encoder.

LTH CLB (Press Enter)
Length calibration. This is to be used only if calibration is required. Call Hyd·Mech Service department for instruction.

ACTUAL LTH
Actual Length Value. Value entered after performing length calibration procedure (described later in this section). The PLC uses this value to calculate its length encoder resolution and stroke parameter. Note: If Calibration Procedure is activated and not completed, or activated and a value not entered for ACT LTH, this value will reset to 00.000 and the PLC will not be able to count/display lengths.

LTH CONST
Length constant. Specifies linear distance of shuttle movement in inches per one pulse of shuttle encoder.

ACCEL DIST
Shuttle acceleration distance. Distance, in inches, the shuttle will travel slowly before reaching fast speed while starting to move in either direction. (i.e. 1.000).

DECEL DIST
Shuttle deceleration distance. Distance, in inches, the shuttle will travel slowly reaching before home or target position. (i.e. 1.000)

MIN FST DIST
Minimum fast speed distance. If the programmed length is smaller than this parameter, the shuttle will only move in slow speed.

TARGET WINDOW
Allowable +/- tolerance from programmed length.

FVO DWELL
Delay time for the opening of the fixed VISE in seconds.

SVO DWELL
Delay time for the opening of the shuttle VISE in seconds.

CLOSE TIME
Delay time for the closing of the shuttle or fixed VISE in seconds.

FEED RATE
Activates feed rate display. (Not active on S20A, S23A and H10 machines)

ACTUAL POSITION
If this value is set to “YES,” displays shuttle vise actual position.

HOLD SHT HOME
Hold shuttle VISE home and closed during cut.

BRKN PROX
Allows user to override signal from proximity sensor in case it is broken. (When set to “NO” machine will not run with broken proximity sensor. Set to “YES” allows machine to run).

MIN BLD SPEED
Minimum blade speed on which the PLC will detect the that blade is running

SPD PROX DELAY
Delay in monitoring of the blade speed proximity sensor during acceleration of the blade from start to desired speed set by the potentiometer.

POWER DWN TIMER
If “0” selected, then the machine will shut down after the job is completed. This will allow the machine to continue running for a specified time after the job (in Manual Mode) or the cycle (in Auto Mode) has been completed. Range is from “0” to “180” minutes.

BLADE CLEAR
If set to “YES,” when the AUTO cycle reaches the function of head up, the shuttle will retract the material from the blade by 1/8” before the head will move up. When the head reaches the up position the next length of material is shuttled into position.

TRIM CUT
If “YES” selected the machine will perform a facing cut of the material at the beginning of an automatic cycle.

OUT OF STOCK
Selecting “yes” activates the out of stock option, which prevents the shuttle vise from closing if insufficient length of material is available for the next length advance. Also stops the automatic cycle if there is insufficient length of material.

COOLANT
When “BLD” selected, coolant flows when the blade is running. When “BLD+ DWN” selected, coolant flows when the blade is running and head is moving down.

QUEUE
The queue allows the operator to run several jobs (max 5) in series. If “REPEAT” is selected the above series will be executed the selected number of times.

PLC TROUBLESHOOTING

Problem 1 (for automatic models with a shuttle)

PLC is not measuring lengths

Possible causes:

1. Encoder
   a. Pinion gear is loose on the encoder shaft
   b. A bad encoder

2. Encoder Cable
   a. Bad connections at the encoder or the PLC
   b. Open or shorted wire.

3. PLC Unit
   a. Damaged hardware

4. Display unit
   a. No power from the PLC unit
   b. Damaged hardware

5.Actual Length (Actual LTH)
   a. The parameter value is set to 00.000. Perform a self-calibration procedure and enter the value.

Diagnosis:

1. With the machine in MANUAL mode, bring the shuttle forward to the home position and clear the length display so it reads “0.000”. Run the shuttle, in slow speed, to the rear of the machine and back to the home position. Make sure you move in full complete strokes.
   a. The length should accumulate on the display as a positive number when the shuttle is moving away from the blade and should count back to 0 when coming back. If this is not the case then reverse the green channel wire on the encoder with the white channel wire.
   b. If the display alters between 0.000 and ± 0.001, then the encoder channel is not being recorded correctly.

2. To determine the cause, first, check the encoder cable connections at both ends to be sure all four wires are connected properly.

3. Measure the voltage:
   a. At the encoder connector. Between 0 Volt pin and 24 Volt pin. This voltage should be a minimum of 22 to 26 VDC.
      If the voltage is incorrect, check the encoder cable continuity. If it is ok, there is possible PLC problem.
      If the voltage is correct then proceed to the next step.
   b. At the encoder connector. Between 0 Volt pin and channel A pin, and, between 0 Volt pin and channel B pin. This voltage should be slightly less then the supply voltage at each channel
      If the voltage is incorrect at this point, check for proper continuity of these wires and repair as necessary.

Note:
When checking the encoder cable for continuity, each wire should also be checked for shorting to ground and or to each other. If the voltage to the encoder is correct, proceed to the next step.

4. At the encoder connection of the PLC, between the 0 volt and A&B channels, with the shuttle moving slow, the voltage should be approx. 10 to 13 VDC. Input LED’s X0 and X1 should flicker or go dim with the shuttle moving. If these LED’s show no change with the shuttle moving, the encoder is likely at fault. Check that the pinion gear is securely fastened to the encoder shaft and that it can rotate along the rack as the shuttle moves.

If all mechanical components are functioning correctly then the encoder is defective.
If all test check positive, the problem is in the PLC unit.

Problem 2 (for automatic models with a shuttle)

Inaccurate Lengths in Auto Mode

Possible Causes:

1. Encoder
   a. Pinion not engaging the rack all the way from front to back.
   b. Mechanical interference.
   c. Pinion loose on the encoder shaft.

2. Encoder Cable
   a. Bad connection at encoder or at the PLC.
   b. Intermittent open in one or more signal wires.

3. Improper programmed information
   a. Existing parameter(s) incorrect.
   b. Incorrect blade kerf.

4. PLC
   a. Faulty PLC unit (not repairable in the field)

GENERAL RULES

Normally, three types of length inaccuracies may occur.

1. Inconsistent
   a. Lengths cut are not consistent, error changes. It doesn't matter how long the part required is the error is never the same.
   b. Cause: Most likely a defective electrical, hydraulic or mechanical component.

2. Consistent
   a. Lengths cut are consistent and the error is also consistent. The error always stays the same regardless of part length.
   b. Cause: Kerf Value

3. Linear
   a. Lengths cut are consistent but the error increases as the part length increases. The longer the part the greater the error.
   b. Cause: When the self-calibration is executed, an incorrect "ACT LTH" value was entered.

Diagnosis:
- Check and record the existing parameters. Also check for proper blade kerf. By making a cut part way into a piece of material and measuring the width of the cut, the operator can check the blade kerf.

INCONSISTENT INACCURACY

- With the machine in Manual mode, move the shuttle all the way forward and clear (zero) the length display. Move the shuttle in reverse, in slow speed, all the way to the end of its travel. Return the shuttle forward to the home position, also in slow speed. The display should read 0.000" ± 0.005". Do this test several times to be sure the read-out is repeatable.

Diagnosis:
Following the same procedure, run the shuttle alternating between fast and slow speed going back and forth. Again the display should be able to read 0.000" ± .005" when returning to the home position.

If the display does not read as specified:

- Check the encoder pinion gear to be sure it can run smoothly down the rack and that the gear and rack teeth engage over the entire travel of the shuttle.
- Check that the pinion gear is tight on the encoder shaft.
- Check the encoders cable connections, a loose connection could easily cause this concern.
- Remove the encoder from the machine and check that the shaft can rotate freely. There should be no binding or rough spots felt when spinning the shaft. Plug the encoder cable into the encoder, clear the length display and rotate the shaft as closely as possible to one revolution. The display should ready 3.142" (positive or negative depending on the direction you rotated). Repeat this test 3 or 4 times, spinning the shaft several times between tests.

CONSISTENT INACCURACY (make sure the blade kerf value is correct)

Change the "ACTUAL POS" parameter to YES. This will make the PLC show actual shuttle travel in AUTO

With no material in the machine:

1. Program JOB 1 for 2 pieces of 5" in length. JOB 2 for 2 pieces of 10" in length and JOB 3 for 2 pieces of one complete shuttle stroke length.
2. Enter JOBS 1 to 3 into the QUEUE.
3. Record measurements on the display each time the shuttle vise reaches the target length and closes. It should equal the required length plus the programmed kerf. Check that this measurement is ± .002" for each length.
   If the overshoot / undershoot is very inconsistent, it could be related to an incorrect shuttle cushion period. This may be caused by "DECEL DIST" parameter being set to low, defective fast or reverse output relays on the PLC, or the hydraulic cushion valve (located at the hydraulic manifold) may be faulty.

LINEAR INACCURACY (not valid for machines with linear encoder)

- Load machine with a piece of stock for test cutting.
- Open the parameters screen.
- Initiate the length calibration procedure.
- Re-enter the new "ACT LTH" (actual length) value.
- Re-cut test lengths and check if accuracy is satisfactory.

Note:
Linear inaccuracy may be corrected in two ways, by using the length calibration as described or by adjusting the LTH CONST as follows:

Load the machine with a piece of stock for test cutting
Program he PLC to cut two pieces of 1", 12" and a length equal to a shuttle and a half of the machine being checked.
Make the cuts and measure as accurately as possible.
Using the formula provided, calculate the new parameter "LTH CONST"

Formula for determining new parameter "LTH CONST"
Measured length ÷ programmed length x existing constant = new "LTH CONST"

i.e. Programmed length	=1.00"	Measured Length	=.99"	-.001"
	=12.00"		=11.988"	-.012"
	=60.00"		=59.940"	-.060"

Existing parameter for LTH CONST = 0.001256
11.988 ÷ 12.00 x .0012566 = 0.001255
The new parameter LTH CONST value would then be 0.001255. This value should be entered and the test repeated. Adjust the parameter as necessary.

GENERAL RULE:
Lowering the parameter value = longer shuttle travel = longer parts
Increasing the value = shorter shuttle travel = shorter parts

Problem 3 (for P Models, disregard all references to a shuttle)

Auto Cycle Not Being Completed

In auto mode, the PLC controls the saw functions through output relays. For a certain function to be actuated, the PLC must first see specific input(s). Like the output relays, the input relays are located on the PLC unit. Directly beside the input and output terminals are red LED's (Light Emitting Diode), which will light up when the corresponding input is being received or output being actuated. Observation of these input/output LED's can help diagnose auto cycle problems. Refer to the PLC inputs and outputs in this section. When a problem occurs in the auto mode, the lights should be checked to see if they are coming on at the proper time or if they are coming on at all.

Input LED's
If a specific input light does not come on when expected
- Check for a faulty/mis-adjusted limit switch, push button, encoder or faulty wiring or connections.
- Wiring for each limit switch should be connected from the VDC terminal connection to the particular limit switch, and from the limit switch to the input connector of the PLC.

Note:
All inputs are denoted by an "X"
All outputs are denoted by a "Y"

The following is information on output diagnosis and the sequence of inputs and outputs during the auto cycle.

Auto Cycle Sequence:

After the mode push button is in the auto position, the job has been programmed into the PLC, and the cycle start push button pressed:
1. Hydraulics running, the head should move to its up limit if it is not already there. The shuttle vise should open and come forward to the home position. HUP input light must come on for the cycle to continue.
   a. HUP input on – cycle should continue, if not check outputs per step 2.
   b. HUP input not on – Check that the head up limit switch is being activated. Check the limit switch/limit switch wiring.
2. Front vise should be closed; the shuttle vise should stay open and move back to the programmed length.
   a. FVC output should be on and SVO output will light momentarily, REV output and FST output should be on when the shuttle moves back fast.
3. As the shuttle approaches the target length the FST output should shut off and the shuttle should travel slowly for the DEC DIST parameter (cushion distance). When the shuttle reaches the target length the SVC output should light and the shuttle vise should close on the material.
4. FVO output light should momentarily turn on and the front vise should open.
5. FWD output should light as will the FST for the shuttle to move forward in fast speed. FST will turn off when the shuttle home cushion period is reached and the shuttle should slow down into the home position.
6. FVC output should light and the front vise should close. FWD light should go out, HDN output should come on and the head should start to descend for the cut. If the blade is not running at this time, the cycle will hold until minimum SFM is reached. Depending on "HLD SHTL HM" parameter in the PLC, the shuttle may stay home and closed during the cut or may move back to pick up the next length. HUP input should go out as the head descends and HUP L/S deactivates.
7. After the cut is completed HDN input should light, HDN output should go out, the HUP output should light and the head should move up. When the head reaches it's up limit, HUP input should come on, HUP output should turn off and the cycle repeats with the next length being clamped by the shuttle, the front vise opening and the material being brought forward to the home position.

As mentioned, beside each input and output terminal there is a bank of red LED's. Each light corresponds to an input or output. An input LED will light when it's specific input signal is being received at the PLC and output LED's will light when the PLC commands specific outputs. If an output LED is present but the output does not happen, then either the output relay is faulty/stuck or the output (3 amp) fuse is blown. If a fuse is blown, a shorted directional valve coil, shorted noise suppressor at the coil or shorted wiring could be the cause (a good coil will measure between 30 to 40 ohms). If the fuse is good and no output voltage condition still exists, with the output light on, then the relay is defective. If this is the case the PLC will have to be returned to the manufacturer for repair.

FUSES

The PLC outputs are protected with four glass fuses which are mounted on TB1(Beside PLC).
Fuse "FU8" is a 2 amp instant blow fuse which feeds power to the input side of the PLC thorough input terminal "L"
Fuses "FU3" and "FU5" to "FU7" are 3 amp time delay fuses which each supply power to a specific bank of output relays through that bank of relays "COM" terminal:

FU3 is wired to terminal "COM1" supplying outputs -Y0, Y1, Y2, Y3
FU5 is wired to terminal "COM3" supplying outputs -Y10, Y11, Y12, Y13
FU6 is wired to terminal "COM4: supplying outputs -Y14, Y15, Y16, Y17
FU7 is wired to terminal "COM5" supplying outputs -Y20, Y21, Y22, Y23

Problem 4

No Display

Possible Causes:
1. No power to the PLC
2. PLC unit failure
3. Faulty connection of cable between PLC and Interface

Diagnosis:
a. Check the power led. This light should be on when the PLC is switched on.
b. If the light is on, the PLC may have failed. Check for proper connection of the cable at the PLC and at the interface. Also check the PLC fuse.
c. If the fuse is OK, ensure that power is being supplied to the fuse.

Problem 5

No blade speed display

Possible Causes:
1. Fault at the proximity sensor
   a. Bad sensor, mis-adjusted sensor (the gap should be approx .030" - .040")
   b. Contamination on the end of the sensor.

2. Fault at the PLC
   a. Bad connection of sensor wiring
   b. Faulty PLC unit.

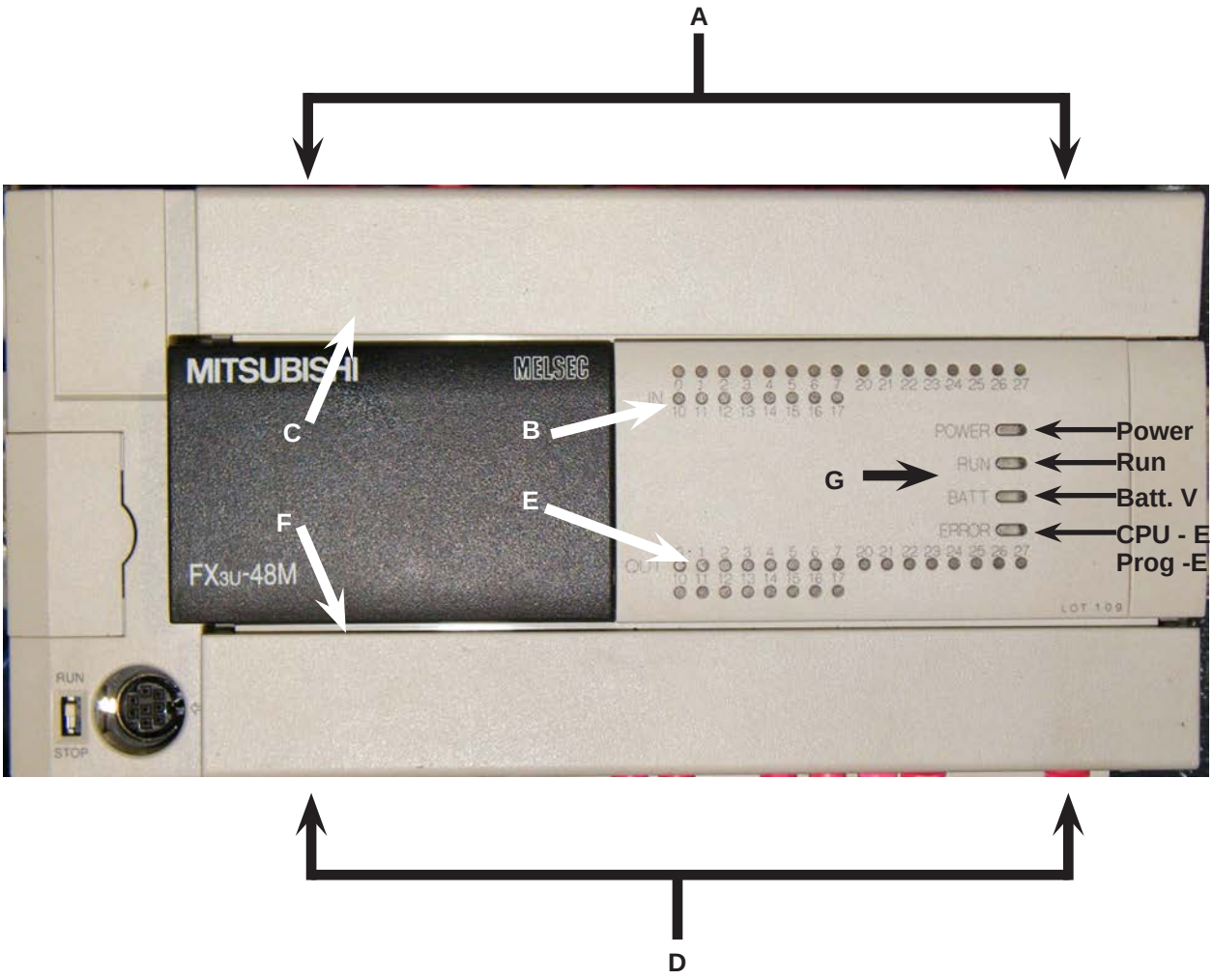
Diagnosis:
- Check for the LED light on the sensor. The light indicates that the sensor has power and is activated. The problem could be with the sensor, signal wire to the PLC or with the PLC itself. With the blade running, the light on the back of the sensor should "pulse". Likewise, the PLC input LED X2, should also be "Pulsing". If both LED's are pulsing with the blade running, the PLC is the problem. If the sensor is pulsing but the input LED on the PLC is not, there is a problem between the sensor and the PLC unit.
- If the LED on the sensor is not on, the problem is with the sensor wiring or the sensor is at fault.

MITSUBISHI PLC INPUTS AND OUTPUTS

Input and output terminal identification:
The top row of identification labels corresponds to the top row of terminals and the bottom row of labels to the bottom row of terminals. Input and output LED numbers correspond to the input or output of the same number. I.E. input LED #0 corresponds to input X0.

PLC status indicators:

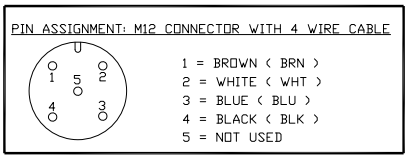
Power	On when power exists to the PLC
Run	On when the PLC is in run mode. If not, check the run/stop switch. It should be in the run position
Batt V	Battery low voltage. If this LED is on, then replace the PLC battery.
Prog E	Flashing LED indicates a program error.
Cpu -E	LED on (Solid). Indicates a CPU error.

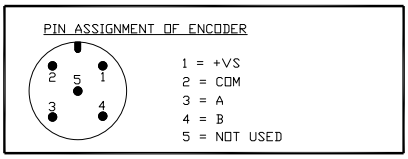


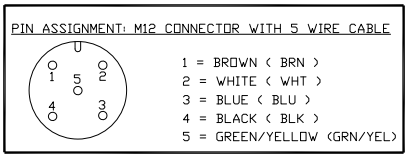
A - Input Terminals
B - Input Indicating LED's
C - Input Terminal Identification
D - Output Terminals
E - Output Indicating LED's
F - Output Terminal Identification
G - PLC Status Indicator Lights

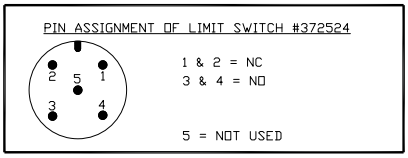
FX3U-48MR-ES			
INPUTS		**OUTPUTS**	
X0	Shuttle Encoder, Channel A	COM1	Fused 120Vac Supply
X1	Shuttle Encoder, Channel B	Y0	Hydraulic Pump Start
X2	Blade Speed or Proximity Switch	Y1	NOT USED
X3	Feed rate encoder A / Angle Encoder A	Y2	NOT USED
X4	Feed rate encoder B / Angle Encoder B	Y3	Blade Pilot Light & Blade Brush
X5	Head Down L/S	COM2	Contact Input Common
X6	Coolant ON	Y4	Forward Rotation Start
X7	Coolant AUTO	Y5	Output Stop
X10	Shuttle Vise Close	Y6	NOT USED
X11	Shuttle Vise Open	Y7	NOT USED
X12	Front Vise Close	COM3	Fused 120Vac Supply
X13	Front Vise Open	Y10	Front Vise Close
X14	Head Up	Y11	Front Vise Open
X15	Head Down	Y12	Shuttle Fast
X16	Blade Start	Y13	2M Contactor
X17	Cycle Start	COM4	Fused 120Vac Supply
X20	Blade Stop	Y14	Shuttle Reverse
X21	(Option) Out Of Stock	Y15	Shuttle Forward
X22	Head Up L/S	Y16	Head Up
X23	NOT USED	Y17	Head Down
X24	(Option) Outboard Vise Close	COM5	Fused 120Vac Supply
X25	(Option) Outboard Vise Open	Y20	Shuttle Vise Close
X26	Blade Deviation	Y21	Shuttle Vise Open
X27	NOT USED	Y22	Coolant
		Y23	Cycle Pilot Light
		Y24	(Option) Outboard Vise Close
		Y25	(Option) Outboard Vise Open
		Y26	Blade Deviation Pilot Light
		Y27	NOT USED

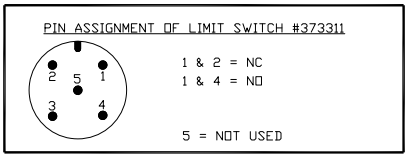
M12 PIN ASSIGNMENTS FOR M12 I/P & O/P DEVICES

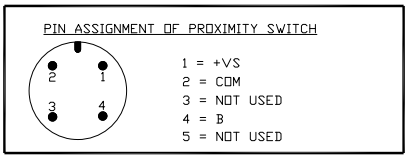










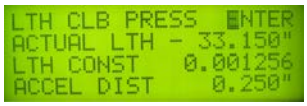


LENGTH CALIBRATION PROCEDURE

Prior to initiating the calibration procedures the following steps are to be taken:

1. The saw must not be in METRIC units.
2. Clear all jobs in the Queue.
3. All “optional” PLC parameters below must be inactive (See page 3.11)
    a. ACTUAL POSITION
    b. HOLD SHT HOME
    c. BRKN PROX
    d. BLADE CLEAR

Length calibration may be achieved in two ways: By inputting the ACTUAL LTH or the LTH CONST parameter.
To determine the ACTUAL LTH value, the LTH CLB (length calibration) procedure must be executed.
In manual mode, position a piece of material, which is longer than the shuttle full stroke length and close the front vise. Simultaneously press the “FWD” and “REV” buttons on the PLC to access the parameters. A password is required at this point, which can be obtained from the Hyd·Mech Service Dept. The screen will then display as follows:



With the cursor at the shown position press the enter button. The cycle start button will start to flash and the “Enter” will change to “On” indicating self calibration mode. Start the blade and the trim cut will be made. After the trim cut is made the head will rise, the shuttle will retract fully in slow speed, clamp the material and come fully forward in slow speed to the home position and make a cut. After the cut is complete “On” will change back to “Press Enter”. Measure the length of the cut part.

Move the cursor down to the “ACTUAL LTH” and enter the length of the cut part plus the actual kerf value. Then exit the parameters by pressing the AUTO/MAN key (the cycle start button will stop flashing). To determine if the encoder channels are connected correctly, observe the actual length parameter for the sign only during shuttle retraction in calibration mode. If the actual length value shows as a negative number, then the channels must be reversed and the calibration procedure repeated.

To determine “LTH CONST” value, use this formula;
LTH CONST = ENCODER PINION CIRCUMFERENCE ÷ ENCODER RESOLUTION
Example:
For a 1” pinion diameter and 2500 PPR encoder:

LTH CONST = π(1”) ÷ 2500PPR = 0.001257

NOTE:
When first entering the parameters screen if not running the self-calibration do not use the enter key but use the cursor keys to scroll through the parameters.

To check length control consistency:

1. Perform test cuts of three different lengths (i.e. 1”, 12”, 20”) and measure as accurately as possible with a Vernier or dial caliper.

2. If the measurements indicate a linear problem (measured length error increases as the programmed length increases) the “ACTUAL LGTH” or “LTH CONST” value will have to be adjusted.

To adjust “ACTUAL LGTH” value The Length Calibration Procedure MUST be performed. This may be done with material in the machine (cut and measure material length) or with no material in the machine (let machine complete the calibration cycle, then enter new value).

If part length error gets longer as the programmed length increases; ACTUAL LTH value should be increased.

If part length error gets shorter as the programmed length increases; ACTUAL LTH value should be decreased.

Make small adjustments at a time (i.e. .020” - .030”) and check with test cuts.

To adjust “LTH CONST”, follow this procedure:

Cut length ÷ Programmed length x Existing “LTH CONST” = New “LTH CONST”

Example:
Cut length of 11.998”, Programmed length of 12”, Existing “LTH CONST” parameter of 0.001256.
11.988 ÷ 12.000 x 0.001256 = 0.001255

The new “LTH CONST” value of 0.001255 should be entered as the “LTH CONST” parameter and test cuts repeated. Adjust the parameter again if necessary.

General rule:
Lowering the “LTH CONST” value = Longer shuttle travel = Longer parts.
Increasing the “LTH CONST” value = Shorter shuttle travel = Shorter parts.

HEAD HEIGHT CALIBRATION PROCEDURE

NOTE:
Remove the head up limit switch target to prevent damage of the head up limit switch during calibration.

Head calibration may be achieved in two ways:
- a: By inputting “ACTUAL HGT” (actual height) parameter or
- b: By inputting “HGT CONST” (height constant) parameter.

To determine “Actual HGT” value, the “HGT CLB” (height calibration) procedure must be executed.

1. Enter the PLC parameter screen as per Length Calibration Procedure above.
2. Using the arrow cursor keys scroll down until the screen displays:

HGT CLB PRESS	ENTER
ACTUAL HGT -	xxxxxx
HGT CONST	xxxxxx

3. With the cursor on the word “ENTER”, press the enter key. The cycle start button will begin to flash, the “ENTER” will change to “ON” (indicating self calibration mode) and the head will move to it’s down limit and then will move up to it’s full upper limit.

4. Measure the distance from the vise horizontal wear strip to the blade teeth tips, and enter this value in the ACTUAL HGT parameter. Measurement must be made along the front vise datum jaw. Input this measurement value & press the enter key. Press the AUTO/MAN key to finish the procedure & exit the parameters screen.

NOTE:
To determine if the encoder channels are connected, observe the actual height value parameter for the sign during head up movement while in calibration mode. If the actual height value shows as a negative number, the channels must be reversed and the calibration procedure repeated.

To determine “HGH CONST” value, use this formula;
ACTUAL FEED RATE ÷ Displayed FEED RATE x HGT CONST = new HGT CONST.

5. Input new HGT CONST & press ENTER.
6. Press the AUTO/MAN key to exit the parameters screen.

SECTION 4 - ELECTRICAL

ELECTRICAL SCHEMATICS: SEE PDF ON ATTACHED CD

SECTION 5 - HYDRAULIC

HYDRAULIC SCHEMATICS & PLUMBING DIAGRAMS: SEE PDF ON ATTACHED CD

SECTION 6 - MECHANICAL ASSEMBLIES

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

SECTION 7 - OPTIONS

OPTIONAL ASSEMBLY DRAWINGS: SEE PDF ON ATTACHED CD

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 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 PLC and after a series of calculations is displayed on the operator interface in a form of a bar graph.

The bar graph 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 graph extends 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.

Setup procedure

There are two ways in which the blade monitor option can be enabled:

1. From the BLADE MONITOR parameter screen:
   - Enter MONITOR LIMIT SETTING screen by pressing function key F5 (labeled: LmtSet) 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 F4.
2. From PLC parameters screen:
   - In Manual Mode, with Front Vise switch in Close position press FWD and REV keys simultaneously (not more than 0.5 sec apart)
   - Enter password

- Change BLADE MONITOR parameter to ON by moving the cursor using the navigation keys to ON/OFF and pressing ENTER

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 F4 (red LED should be ON) and then press function key F5 (Figure 1).

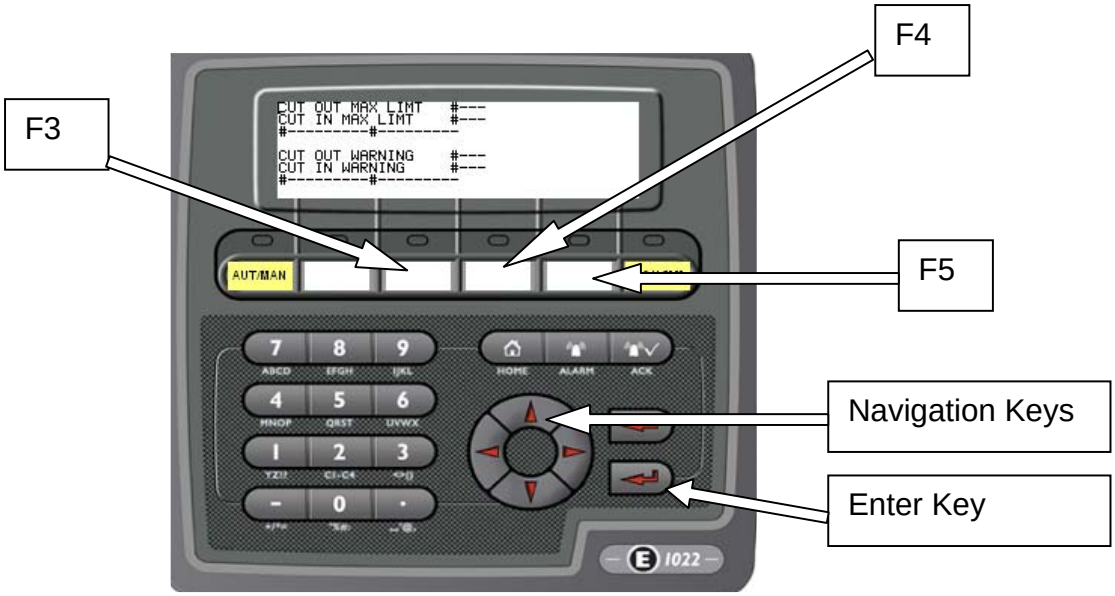


Figure 1

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.

```
CUT OUT MAX LIMT      50
CUT IN MAX LIMT      -50
_____▯▯▯▯▯▯▯▯▯▯▯_____
CUT OUT WARNING       30
CUT IN WARNING       -30
_______▯▯▯▯▯▯▯________
```

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 F4 function key (Figure 1).

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

WARNING RESPONSE TIME	**Xs**
MAX LIMIT RESPONSE TIME	**Xs**
MACHINE RESPONSE IF MAX LIMIT REACHED	
STOP,HEAD UP THEN MACHINE OFF	**YES**
FINISH CUT, THEN MACHINE OFF	**NO**
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.
MACHINE RESPONSE IF MAX LIMIT REACHED	If the shutdown sequence has been executed then the machine will behave in one of two ways
STOP,HEAD UP THEN MACHINE OFF **YES**	Stop cutting, raise the head and shut down
FINISH CUT, THEN MACHINE OFF: **NO**	Finish the cut with present degree of deviation and then shut down
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.

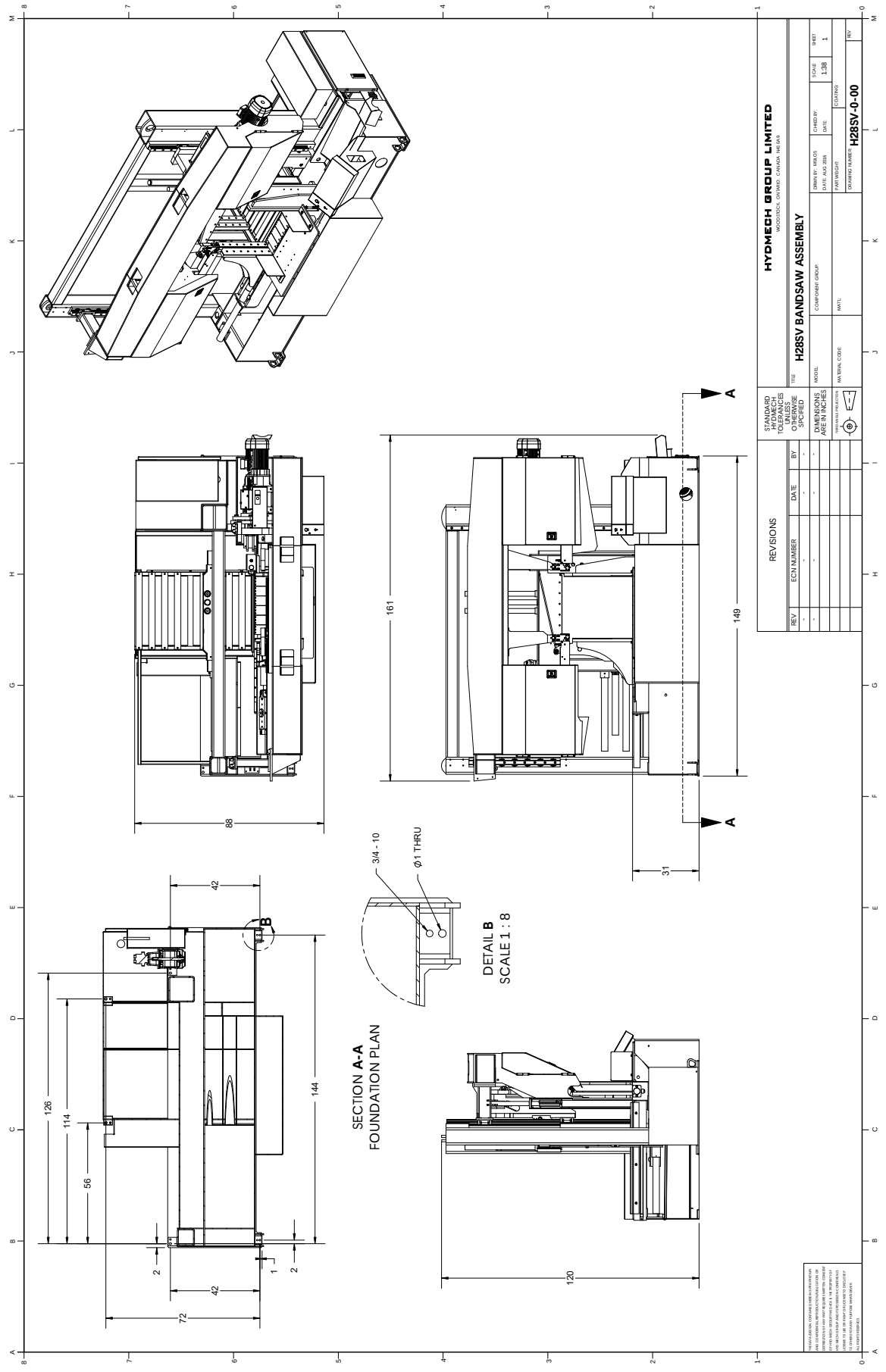
The actual amount is difficult to predict, experience with different work-pieces will provide the best guide.

SECTION 8 - SPECIFICATIONS

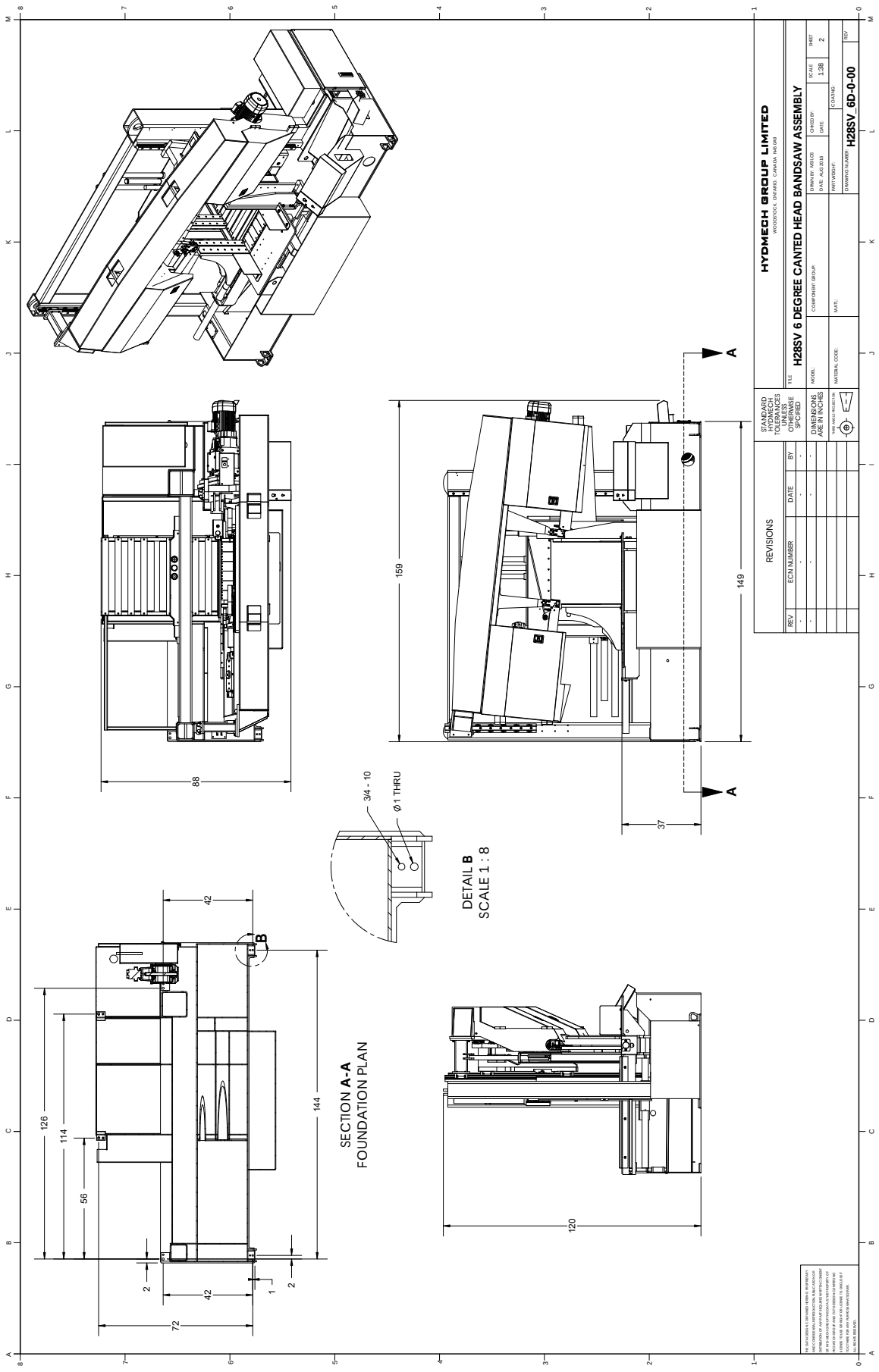
H28SV BANDSAW SPECIFICATIONS

Capacity	Round	28" (711 mm)
	Rectangular	28" (711 mm) wide x 28" (711 mm) high
	6º Cant	28" (711 mm) wide x 24" (610 mm) high
Blade	Length	25'-0" (7620 mm)
	Width	2" (51 mm)
	Thickness	.063" (1.6 mm)
Blade Tension	Hydraulic	
Blade Speed	VFD	40 - 300 sf/min (12 - 91.5 m/min)
Blade Guides	Carbide inserts (water soluble coolant lubricated)	
Blade Wheel Dia.	32" (813mm)	
Motors	Blade drive	10 HP (7.5 KW)
	Hydraulic pump drive	5 HP (3.7 KW)
Pumps	Hydraulic	6 1/2 U.S. Gal. / min (25 Liters/min) pressure compensated
	Coolant	3 1/2 U.S. Gal. / min (13.5 Liters/min)
Hydraulic Tank	11 U.S. Gallons (42 Liters)	
Coolant Tank	40 U.S. Gallons (151 Liters)	
System Pressure	1200 PSI (8274 kPa)	
Vise Control	Hydraulic	
Shuttle Stroke	0-32" (0-813 mm) single stroke, multi-indexing capability	
Table Height	31" (787 mm) or 37" (940 mm) with 6º cant head	
Control Panel	Front of machine	
Machine Weight	17500 lbs (7938 Kg)	
Maximum Workload	30000 lbs (13608 Kg)	
Overall Dimensions	162" (4115 mm) Wide, 90" (2286 mm) Long, 120" (3048 mm) High	

H28SV BANDSAW LAYOUT



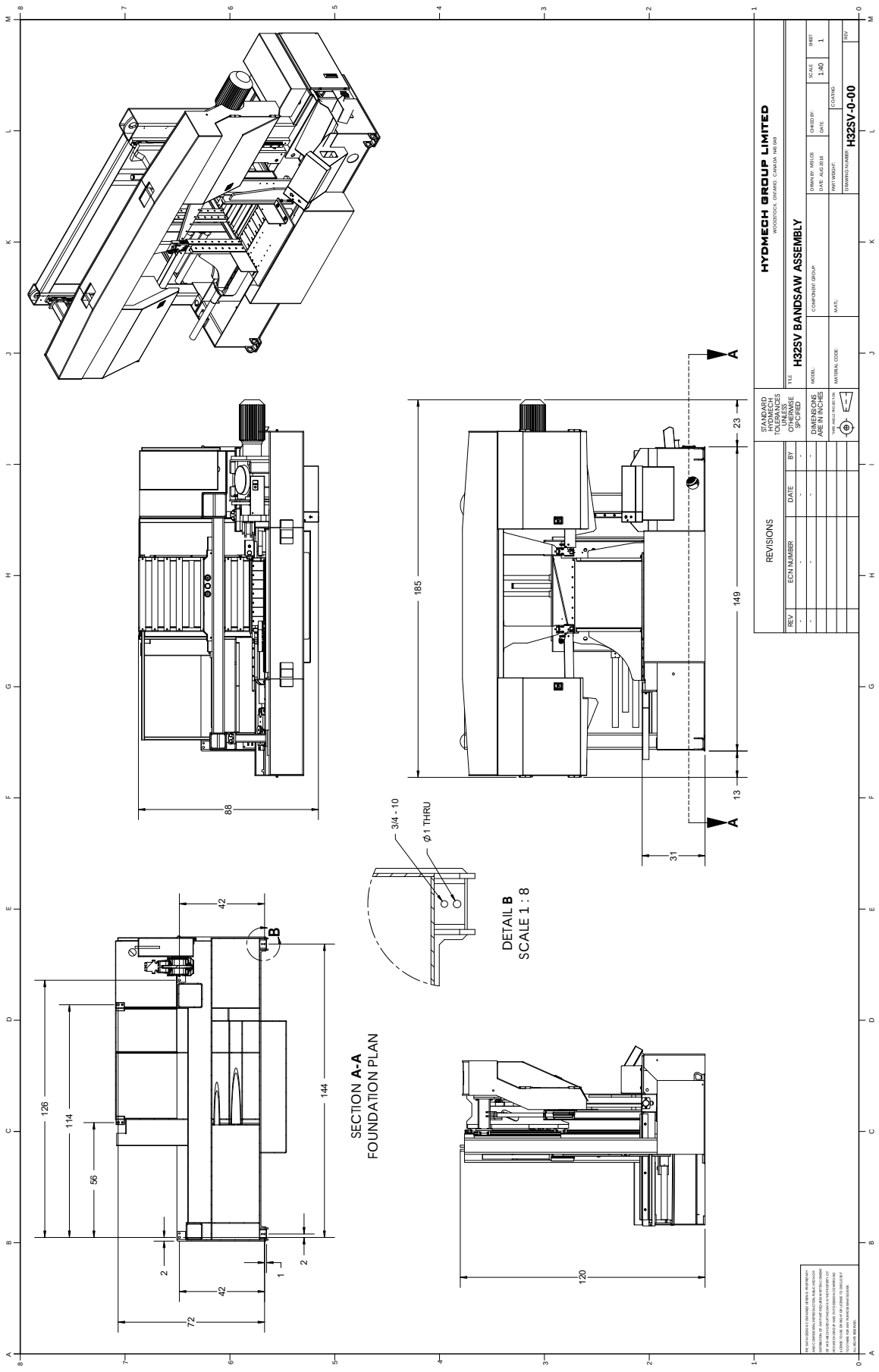
H28SV 6 DEGREE BANDSAW LAYOUT



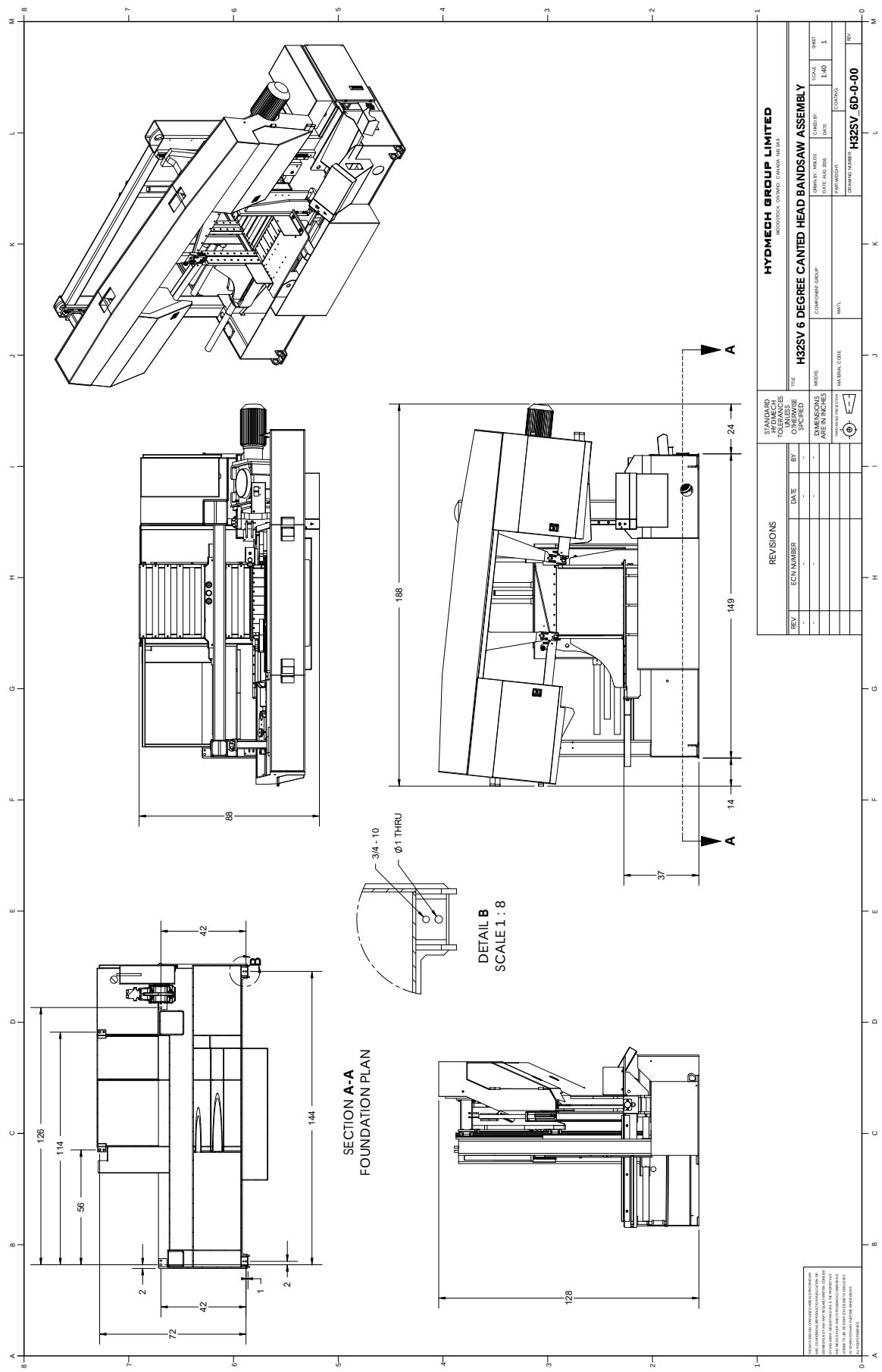
H32SV BANDSAW SPECIFICATIONS

Capacity	Round	32" (813 mm)
	Rectangular	32" (813 mm) wide x 32" (813 mm) high
	6º Cant	32" (813 mm) wide x 28" (711 mm) high
Blade	Length	30'-4" (9246 mm)
	Width	2 5/8" (67 mm)
	Thickness	.063" (1.6 mm)
Blade Tension	Hydraulic	
Blade Speed	VFD	40 - 300 sf/min (12 - 91.5 m/min)
Blade Guides	Carbide inserts (water soluble coolant lubricated)	
Blade Wheel Dia.	38" (965mm)	
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)
	Coolant	3 1/2 U.S. Gal. / min (13.5 Liters/min)
Hydraulic Tank	9.5 U.S. Gallons (36 Liters)	
Coolant Tank	40 U.S. Gallons (151 Liters)	
System Pressure	1300 PSI (8963 kPa)	
Vise Control	Hydraulic	
Shuttle Stroke	0-32" (0-813mm) single stroke, multi-indexing capability	
Table Height	31" (787mm) or 37" (940mm) with 6º cant head	
Control Panel	Front of machine	
Machine Weight	19500 lbs (8845 kg)	
Maximum Workload	30000 lbs (13608 kg)	
Overall Dimensions	185" (4699mm) Wide, 92" (2337mm) Long, 120" (3048mm) High	

H32SV BANDSAW LAYOUT



H32SV 6 DEGREE BANDSAW LAYOUT



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