THANK YOU,

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

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

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

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

Thank-you.

HYD-MECH GROUP LIMITED
P.O. BOX 1030, 1079 Parkinson Road
Woodstock, Ontario Canada, N4S 8A4
Phone: (519) 539-6341
Service 1-877-237-0914
Sales 1-877-276-SAWS(7297)
Fax (519) 539-5126
e-mail: info@hydmech.com
TABLE OF CONTENTS

SECTION 0 - SAFETY INSTRUCTIONS

| Summary                                      | 0.1 |
| Foreword                                     | 0.2 |
| Basic Rules                                  | 0.4 |
| Responsibilities of the Owner                | 0.5 |
| Responsibilities of the Operator and Maintenance Personnel | 0.6 |

SECTION 1 - INSTALLATION

| Safety Precautions                           | 1.1 |
| Visual Inspection                            | 1.2 |
| Lifting the S20/23 with a Fork Lift          | 1.3 |
| Wrapped for Shipping                         | 1.3 |
| Levelling the Saw                            | 1.3 |
| Hydraulic Oil                                | 1.3 |
| Wiring Connections for S20/S23               | 1.4 |
| Cutting Fluid                                | 1.4 |
| Power Cable Routing (S20/S23)                | 1.4 |
| Wiring Connections                           | 1.4 |
| Wiring Connections for Machines with VFD Option | 1.5 |

SECTION 2 – OPERATING INSTRUCTIONS

| Hydraulic Controls                           | 2.1 |
| Electrical Controls                          | 2.1 |
| Electrical Controls (S20 VFD / S23 VFD Option)| 2.2 |
| Electrical Controls (S20H VFD / S23H VFD Option)  | 2.3 |
| Hydraulic Controls (S20H VFD / S23H VFD Option)  | 2.3 |
| Blade Basics                                  | 2.4 |
| Optimum Blade Pitch                           | 2.5 |
| Vise Operation                                | 2.5 |
| Head Swing and Brake                          | 2.6 |
| Coolant Controls                              | 2.6 |
| Blade Speed Selection (Not Applicable to S-23)| 2.6 |
| Changing Belt Position                        | 2.7 |
| Guide Arm Position                            | 2.7 |
SECTION 3 - MAINTENANCE & TROUBLESHOOTING
BLADE CHANGING PROCEDURE .........................................................................................3.2
BLADE GUIDE ADJUSTMENT ............................................................................................3.3
BLADE BRUSH ADJUSTMENT ............................................................................................3.4
ANGLE BRAKE ADJUSTMENT ............................................................................................3.4
BELT TENSION ADJUSTMENT (NOT APPLICABLE TO S23) .............................................3.4
HEAD DOWN LIMIT SWITCH ..............................................................................................3.5
LUBRICATION .....................................................................................................................3.5
GEARBOX LUBRICATION S23 ............................................................................................3.6
GEARBOX LUBRICATION S20 WITH VFD OPTION ..........................................................3.6
TROUBLE SHOOTING ........................................................................................................3.7

SECTION 4 - ELECTRICAL
S20 / S23 COMPONENT LAYOUT: VFD OPTION .................................................................4.1
S22H / S23H COMPONENT LOCATION: VFD OPTION ......................................................4.4
FOR ELECTRICAL SCHEMATICs AND COMPONENT PARTS LIST SEE PDF ON ATTACHED CD. .................................................................4.7

SECTION 5 - HYDRAULIC
FOR HYDRAULIC SCHEMATICS AND PLUMBING DIAGRAMS SEE PDF ON ATTACHED CD. ..................................................................................................................5.1

SECTION 6 - MECHANICAL ASSEMBLIES
FOR MECHANICAL ASSEMBLY DRAWINGS SEE PDF ON ATTACHED CD ....................6.1

SECTION 7 - OPTIONS
BLADE BREAKAGE SWITCH (STANDARD ON CE MACHINES) .........................................7.1
MIST COOLANT SYSTEM ....................................................................................................7.1
HYDRAULIC POWER PACK (S20H / S23H): .................................................................7.2
VARIABLE VISE PRESSURE OPTION (S20H / S23H): .................................................7.2
OVERHEAD BUNDLING (HYDRAULIC S20H / S23H) ..................................................7.3
WORK LAMP ASSEMBLY .................................................................................................7.4
MATERIAL STOP .................................................................................................................7.4
FOR OPTIONAL ASSEMBLY DRAWINGS SEE PDF ON ATTACHED CD. ....................7.4

SECTION 8 - SPECIFICATIONS
S20 CUTTING CAPACITY ....................................................................................................8.2
S20 MACHINE LAYOUT (SHEET 1) ....................................................................................8.3
S20 MACHINE LAYOUT (SHEET 2) ....................................................................................8.4
S23 CUTTING CAPACITY ....................................................................................................8.6
S23 MACHINE LAYOUT (SHEET 1) ....................................................................................8.7
S23 MACHINE LAYOUT (SHEET 2) ....................................................................................8.8

SECTION 9 - WARRANTY
WARRANTY .........................................................................................................................9.1
SECTION 0 - SAFETY INSTRUCTIONS

SUMMARY

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

Section 0  SAFETY
Section 2  OPERATING INSTRUCTIONS

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

Put Safety First

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

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

Basic Rules – only use this machine when

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

Owner is responsible to

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

Operator and Maintenance Personnel are responsible to:

- keep all safety equipment in order, check its function at the beginning of each shift, and report any shortcomings
- shut-down machine and report any faults or malfunctions which could impair safety
- understand and obey safety hazard labels
- not to wear un-restrained long hair, loose clothing or 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 in our machines. Some of these dangers are obvious, while others are less evident.

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

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

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

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

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

Mandatory Information

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

Section 0 SAFETY
Section 2 OPERATING INSTRUCTIONS

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

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

Everyone involved in operation of this machine must sign below to confirm that:
I have read and understood all parts of Section 0 – Safety, and Section 2 – Operating Instructions.

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
BASIC RULES

Intended Use

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

Exclusion of Misuse

Misuse includes, for example:

- Sawing hazardous materials such as magnesium or lead
- Sawing work pieces which exceed the maximum workload appearing in the Specifications
- Operating the machine without all original safety equipment and guards

Liability

The machine may only be operated:

when it is in good working order, and

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

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

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

Organization of work

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

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

Choice and qualification of personnel

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

Training

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

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

Define responsibilities

Clearly define exactly who is responsible for operating, setting-up, servicing and repairing the machine. Define the responsibilities of the machine operator and authorize him to refuse any instructions by third parties if they run contrary to the machine’s safety.

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

Condition of Machine and Workplace

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

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

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

Safety equipment

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

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

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

Emergency Stop Button (E-Stops)

Always be aware of the location of the Emergency Stop 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 bandsaw machines depends upon work piece size, shape and material, blade type, blade speed and feed rate.

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

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

Workplace

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

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

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

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

On Hyd-Mech machines the Master Disconnect Switch will be of one of three types:
- Rotary switch mounted in electrical control cabinet door and inter-locked with door
- Lever switch mounted in separate box mounted on the machine
- Supply disconnect switch supplied by user at installation and usually wall-mounted within sight of the machine, depending upon local regulations.

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

Residual Risks

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

The line side of the disconnect switch itself remains energized.

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

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

The weight of individual machine components represents stored potential energy that can be released if they fall when disconnected. Secure these components with adequate hoisting gear before disassembly.
SECTION 1 - INSTALLATION

Upon delivery of your new S-20/23 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 S-20/23 has been designed to give years of reliable service. It is essential that operators be alerted to the safe operation of this saw, and the practices to avoid that could lead to injury. The following safety rules are at the minimum necessary for the safe installation, operation, and maintenance of the saw. Take every precaution for the protection of operators and maintenance personnel.

- POWER HOOK-UPS AND REPAIRS SHOULD BE ATTEMPTED ONLY BY QUALIFIED TRADESMEN.
- THE SAW SHOULD BE LOCATED IN AN AREA WITH SUFFICIENT ROOM TO SAFELY LOAD STOCK INTO THE SAW. SECURE THE SAW TO THE FLOOR.
- THE AREA AROUND THE SAW SHOULD BE MAINTAINED IN A CLEAN AND TIDY CONDITION TO AVOID OBSTACLES OPERATORS COULD TRIP OVER.
- THE S-20/23 SHOULD ONLY BE OPERATED ACCORDING TO THE SPECIFICATIONS OF THE SAW. AVOID UNSAFE USAGE PRACTICES.
- IF AT ANY TIME THE SAW DOES NOT APPEAR TO BE OPERATING PROPERLY IT SHOULD BE STOPPED IMMEDIATELY AND REPAIRED.

OPERATOR:

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

NO MODIFICATIONS TO THE MACHINE ARE PERMITTED WITHOUT PRIOR APPROVAL FROM HYD-MECH. ANY APPROVED MODIFICATIONS SHOULD ONLY BE UNDERTAKEN BY TRAINED PERSONNEL.
1. Head - keep away from moving blade
2. Vise - never load stock with the blade moving
3. Head - watch for head descending to the table
4. Pivot - check for head movement blockage
5. Drive - secure pulley cover when running
LIFTING THE S20/23 WITH A FORK LIFT

The S-20/23 is shipped with a shipping pallet attached to the saw. When lifting the pallet with a forklift truck make sure that the load is firmly balanced. The pallet length dimension is 84" (2132 mm). Minimum fork length of 72" (1827 mm) is recommended to safely lift the pallet.

WRAPPED FOR SHIPPING

The S-20/23 is shrink-wrapped for shipping from our plant. Remove the wrapping from around the saw. Complete the inspection for signs of damage. Undo the bolts that hold the saw to the pallet. Retain these bolts to use for leveling. The following photo illustrates the floor mounting plates located at the corners of the saw. The larger diameter hole is used for retaining during shipping and for use with concrete floor anchors. The smaller diameter, threaded holes at each corner are used for leveling the saw properly.

LEVELLING THE SAW

Use a machinist’s level across the vise table to level the saw. Adjust the level with the leveling bolts supplied. Consideration should be given to the flow of the coolant as it returns to the coolant trough at the vise end of the saw. Leveling to give a small incline towards this area helps to ensure the coolant supply returns to the container.

HYDRAULIC OIL

The S-20/23 is supplied with ISO VG22 hydraulic oil. Substitutes must be of the same viscosity in order for the system to work properly.

The cylinder contains oil that should be topped up to the level of the filler plug. Add oil to the cylinder only with the head in the down position. The head cylinder is a self air-bleeding cylinder with a small port in the top plate. If excess oil is displaced from this port, the cylinder is working normally.
CUTTING FLUID

The S-20/23 uses a pump and reservoir to circulate the necessary cutting fluid to the blade for maximum blade life. Your saw blade supplier will be able to provide information to the cutting fluid products that are available for your needs. No cutting fluid (coolant) is supplied with the machine. There are two types of coolant available:

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

POWER CABLE ROUTING (S20/S23)

The main power cable can be routed up through the bottom of the head frame to the access hole in the end of the control panel. Cable liquid tight reliefs should be used to secure the cable into the control panel to ensure there is no movement of the cable when the machine is operated.

WIRING CONNECTIONS

After the machine is leveled and anchored the necessary power hook-up needs to be performed.

In order to provide a safe operation as well as to prevent potential damage to the machine, only qualified personnel should be allowed to do the work. As supplied your new S-20/23 is set to run on three phase voltage or single phase. The supply voltage of the machine displayed on the Serial # Plate and the voltage label.

Connection from the main power supply is made to the L1, L2, L3 (L1 and L2 for single phase) and ground terminals between the contactor and the transformer.

Supply conductor should be rated for the current supplied and should be protected by time delay fusing rated for the amperage stated on the machine serial plate.

Check for

- Signs of damage to the electrical cables from shipping or installation.
- Correct phase order. The blade should be running in the counter clockwise direction. If the blade direction is wrong, two lines should be reversed.

Wiring connections for S20/S23
Wiring Connections for machines with VFD option

L1, L2, L3, and ground terminals found inside of the box

The power cable should be routed through the hole found at the bottom right of the box. A suitable strain relief should be used.
SECTION 2 – OPERATING INSTRUCTIONS

The operator control panel provides the operator with all the controls necessary to operate the saw after the cutting angle has been set and the stock has been loaded and secured. All of the electrical functions and the Feed Rate setting are operated from the control panel.

**HYDRAULIC CONTROLS**

**FEED RATE KNOB** - Controls feed rate of the head. This rate can be set on the scale of 1 to 10. As the number increases so does the feed rate.

**HEAD CONTROL LEVER**

- **HOLD** - Stops and holds the Head at the current position.
- **FEED** - The Head will descend at the rate set by the Feed Rate knob.
- **DOWN** - Allows for rapid approach of the blade to the workpiece.

**ELECTRICAL CONTROLS**

**FUSE** - Check if power fails. Twist & pull to remove the fuse.

**COOLANT Switch** -
- **OFF**: No coolant flow.
- **ON**: Coolant flow when blade is running.
- **WASH**: Constant flow

**START Button** - This button starts the saw blade. The blade will not start with the Head in the down position or if any safety interlock switches (if equipped) are not closed.

**STOP Button** - Pressing the RED mushroom button will STOP the blade.
**ELECTRICAL CONTROLS (S20 VFD / S23 VFD OPTION)**

**Blade Speed (1BS)** – Blade speed can be adjusted infinitely between 75 to 350 SFM “Surface Feet/Minute” (22 to 110 m/min). Adjustment should be made only when the blade is running.

**Coolant Switch (1SS)** –

- **ON:** Constant flow.
- **OFF:** No coolant flow.
- **AUTO:** Blade running.

**Blade Start (5PB)** – A green push button. The blade will not start with the head in the down position, if any safety switches are not closed, or if the emergency stop is depressed.

**Emergency Stop (1PB)** – This red mushroom head push button will stop the blade.

NOTE: Hydraulic controls are the same as the S20/S23 machine.
ELECTRICAL CONTROLS (S20H VFD / S23H VFD OPTION)

Coolant Switch (1SS) – ON: Constant flow.
OFF: No coolant flow.
AUTO: Blade running.

Blade Speed (1BS) – Blade speed can be adjusted infinitely between 75 to 350 SFM “Surface Feet/Minute” (22 to 110 m/min). Adjustment should be made only when the blade is running.

Blade Start (5PB) – A green push button. The blade will not start with the head in the down position, if any safety switches are not closed, or if the emergency stop is depressed.

Blade Stop (4PB) – This black push button will stop the blade motor.

Hydraulic Start (2PB) - This green push button will start the hydraulic system. It will illuminate when pressed and held momentarily. The hydraulics will not start if the emergency stop is depressed.

Emergency Stop (1PB) – This red mushroom head push button will stop the blade and hydraulic motors. The vise will hold its position, but pressure will begin to drop off. Long pieces of material should always be supported so they will not fall while the machine is shut down.

HYDRAULIC CONTROLS (S20H VFD / S23H VFD OPTION)

VISE CONTROLS

OPEN The vise will open when the lever is pushed up.

HOLD The vise will hold its position when the lever is in the center position.

CLOSE The vise will close when the lever is pushed down.

NOTE: See Section 7 if the bundling option is present.

HEAD CONTROLS

UP The head will rise as long as the lever is pushed up.

HOLD The head will stay at its current position when the lever is in this position.

DOWN The head will descend at the set Feed Rate.

FEED RATE DIAL The speed at which the head will descend can be set on the scale of 1 to 10. As the number increases so does the feed rate.
BLADE BASICS

Technology is rapidly changing all aspects of production machining. Metal cutoff is no exception. The advances made in the band saw blade industry have definitely reduced the cost per cut, despite the three-fold increase in price of high-technology blades. Variable pitch, bi-metal blades (like the 4/6 or ¾ 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.

A. A new blade must be properly “broken-in”. Proper break-in will alleviate blade vibration, improve surface finish, accuracy and extend blade life. The most convenient way to do this is to cut the intended work-piece at the standard recommended blade speed for that material, but with a feed rate reduced to about 25% of normal. Near the end of the first cut, increase the feed rate again and once again when the blade approaches the end of the second cut. Keep increasing feed rate in this fashion so that normal feed rate is reached after 100-120 sq inches of cutting.

B. Generous coolant application is essential with almost all materials. A high quality and well mixed coolant will dramatically extend blade life, increase cutting rate and improve surface finish. On those materials where coolant is undesirable, a slight coolant flow or periodic oiling of the blade is necessary to prevent the blade from being scored by the carbide guides.

C. The stock being cut must be securely clamped in the vises. Stock movement during cutting will strip blade teeth. Noticeable stock vibration reduces performance and blade life. Consideration should be given to reorient the stock or additional clamping measures (wood between vise jaws and work-piece).

D. The proper blade speed for the work-piece material must be selected. Use the following chart as a starting point.

- Blade speeds higher than recommended will quickly dull the blade. Blue chips are evidence of excessive blade speed.
- Lower than recommended speeds will not prolong blade life and will require reduced feed rate, but, reduced speeds may be helpful in reducing vibration and would increase blade life in that case.

E. The proper feed rate must be applied. Feed rate is the speed at which the head free falls and is set with the feed rate control knob. The head will descend more slowly when the blade encounters the work-piece but the force of the blade on the work will not be changed unless the setting is changed. Verification of proper feed rate is provided by the appearance of the cut chips which ideally form nicely curled clock springs (note that cast irons and interrupted cuts result in short, broken chips even at ideal feed rates). Excessive feed rate will result in short blade life and/or crooked cuts.

### BLADE BASICS - CUTTING SPEEDS FOR VARIOUS MATERIALS

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Blade Speed (in SFM)</th>
<th>Coolant Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Cutting Steel 1100 &amp; 1200 Series</td>
<td>310</td>
<td>YES</td>
</tr>
<tr>
<td>Low &amp; Medium Carbon 1008 - 1045</td>
<td>220</td>
<td>YES</td>
</tr>
<tr>
<td>High Carbon Steel 1045 - 1065</td>
<td>140, 220</td>
<td>YES</td>
</tr>
<tr>
<td>Alloy Steels</td>
<td>140, 220</td>
<td>YES</td>
</tr>
<tr>
<td>Tool Steels</td>
<td>90, 140</td>
<td>YES</td>
</tr>
<tr>
<td>Pipe &amp; Structural</td>
<td>140, 220</td>
<td>YES</td>
</tr>
<tr>
<td>Nickel Base Alloys</td>
<td>140, 220</td>
<td>YES</td>
</tr>
<tr>
<td>Cooper Base Alloys</td>
<td>90, 140</td>
<td>YES</td>
</tr>
<tr>
<td>Stainless Steels 430F, 416, 420F, 303</td>
<td>140, 220</td>
<td>YES</td>
</tr>
<tr>
<td>Cast Iron</td>
<td>140, 220</td>
<td>YES</td>
</tr>
</tbody>
</table>

**Blade Speed Selection Chart**

---

HYD-MECH
OPTIMUM BLADE PITCH

Teeth per inch (T.P.I.)

Selecting a blade with a 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 is recommended. For wide materials a blade with a coarse pitch should be used.

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. However, 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 become 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.

MECHANICAL CONTROLS

VISE OPERATION

The material clamping vise is a cam operated double handle locking vise. The saw operator can push the vise handle to close the jaw on the material and then lock it from either side of the saw. The handles have two positions, forward toward the stock to unlock the vise and away from the stock to lock.

![Vise Handles](image)
HEAD SWING AND BRAKE

An integral function of the S-20/23 Series II is the ability to make mitered cuts at angles between 90° and 45°. The Head swing of the S-20/23 Series II is easily changed to set a different cutting angle by first releasing the Angle Brake lever, and then manually moving the Head to the cutting angle desired. An angle scale with a pointer in clear view of the saw operator allows for accurate setting of the cutting angle.

The Angle Brake lever is then locked in position by pushing it into the down position. Note that the angle brake should be locked into position whenever cutting with the saw. To set the saw to the 90° position, set the Head in the fully down position and move the Head until the frame meets the 90° stop bolt which is located on the vise post.

COOLANT CONTROLS

The main coolant control is found on the control panel.

The S-20/23 Series II band saw 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 should flood the blade as it moves through the carbide pads into the material to be cut. The guide arm outlets should be adjusted to apply an even covering of coolant to the blade.

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. When cutting wide work pieces the flexible nozzle should be used to direct extra coolant into the saw kerf at about mid span of the cut.

BLADE SPEED SELECTION (not applicable to S-23)

The blade speed of the S-20 can be changed between four different speeds. The speed is determined by the ratio of the pulleys that drive the V belt. The four pulley sets give the optional speeds of 90, 140, 220 and 310 ft/min.

Note: Blade drive with single phase motors have only three speeds available.
CHANGING BELT POSITION

To change the blade speed of the S-20 it is necessary to release the V belt tension and move the belt to another set of pulley grooves. The tension on the V belt is maintained by means of a toggle handle assembly that moves the motor. As the handle is moved to its locking position the motor is driven tight against the V belt. The toggle handle can be adjusted to change the effective tension on the V belt by setting the lock nuts which mount the handle to the motor mount plate. The motor mount plate pivots on rubber bushings that support the motor.

GUIDE ARM POSITIONING

The S-20/23 Series II guide arms are adjustable to accommodate varying material widths. The guide arms should be adjusted as close to the material width as possible while still allowing the material to pass between them. This process of matching the guide arm width to the material size is important to optimize blade life.

To adjust the guide arms the locking handles are loosened and then the guide arms will slide on the main guide bar that holds them. To loosen the handle it should be turned counter clockwise and to tighten the handle, turn it clockwise. The photo illustrates the Guide Arms with the handles in the LOCKED position.

Guide Arms with Handles Locked (4 to 6 o’clock position)
Carbide Levers in Tensioned Position (Upright)
SECTION 3 - MAINTENANCE & TROUBLESHOOTING

Switch off before beginning work.

- The emergency switch, which is used to turn the hydraulics off, should not be the only means of shutting the power off before cleaning or performing maintenance to the machine. The main power disconnect should be switched off and locked.
- When performing maintenance on the electrical system the main disconnect, which supplies power from the electrical service to the machine, should be switched off.
- Allow three minutes after turning off the power from the main electrical service to the saw before opening any electrical enclosures. Your machine might be equipped with a variable frequency drive unit which stores electricity inside its capacitors which require a minimum of three minutes to completely discharge.

LOCK-OUT

Purpose:
To prevent injury to workers caused by unexpected start-up of machines being worked on.

OR
Where the starting of a machine or device may endanger the safety of a worker.

a) Control switches or other control mechanisms shall be locked out;

AND

b) Other effective precautions necessary to prevent such starting shall be taken.

LOCK-OUT PROCEDURE

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

1. Operator shuts down the machine
2. The person in charge should follow Lockout procedures as is required by his organization.
NOTE: Wear gloves for protection from the sharp blade.

1. Open the idler wheel and drive wheel doors and swing the head to 45° as this will make it easier to grip the blade closer to both wheels.
2. Loosen the Blade Tensioner by turning counter clockwise.
3. Loosen the carbide tension handles by turning counter clockwise ¼ turn.
4. At the top of the head, the saw blade runs in a protective channel. Grip the blade at each end of this channel and twist the blade teeth down past the channel and slide the blade forward. Let the blade rest on the out-feed table, and then slide the blade down and out of the carbide guides.
5. Your new blade will be in a coil. While wearing gloves, hold the blade away from yourself, and twist the blade to uncoil it. Do not let the blade teeth bounce on the concrete floor as this may cause some damage.
6. Place the new blade in the carbide guides and then slide the blade over the wheels. The teeth should be pointing towards the drive side as they pass through the carbide guides.
7. With the blade in place, turn the tensioner handle clockwise until the large black washer contacts the stop bolt. This will set the blade tension correctly.
8. With the blade tension set, turn the two carbide-locking handles clockwise to the locked position. Jog the blade a few rotations to check that the blade is not moving in or out on the blade wheels. NOTE: As the blade tracking will stay fairly constant, it should be checked occasionally as shown on the drive wheel-tracking photo below. The blade teeth should protrude from .185” to .200” from the face of the blade wheels. If the tracking requires adjustment, follow the instruction below.
9. BLADE TRACKING ADJUSTMENT – First, inspect the blade wheels for wear or damage and repair as required. Blade tracking adjustment should always begin at the wheel where the tracking is farthest out of specification. Using the instructions below, adjust the worst wheel, jog the blade and recheck both wheels. Repeat this process until both wheels are within specification.
   a. IDLER WHEEL ADJUSTMENT S-20 Line
      On the blade tensioner slide assembly, there are three 9/16” hex head bolts. Loosen the two bolts at the left end by ¼ turn. Loosen the single bolt at the right side of the slide assembly by ½ turn. In the two holes above and below this bolt are two 3/16” Allen key set screws. Turn both set screws ¼ turn and tighten the hex bolt at the right, and then the two bolts at the left. Turning the setscrews clockwise will pull the blade onto the wheel, and turning counter clockwise will push the blade off the wheel. Each ¼ turn will move the blade approximately .02” (5.1mm). There is also a single setscrew at the left end of the slider. Turning it clockwise will push the blade off the wheel.
   b. IDLER WHEEL ADJUSTMENT S-23 Line
      The tracking is adjusted by regulating the “push” set screws and the “pull” hex bolts. Before making any adjustments, bolts A & B should be loosened but remain snug. This will allow easy movement for the slide assembly. It should be noted that most adjustments can be made with the B & D bolts. Loosening bolt B and turning in set screws C by equal amounts will move the blade off the wheel. Loosening bolt B and turning in set screws D by equal amounts will move the blade on to the wheel. After each C or D adjustment, tighten bolts A & B, run the blade and then check the tracking.
   c. DRIVE WHEEL ADJUSTMENT – On the wall behind the drive wheel are two adjusting bolt assemblies and two hex bolts. Loosen all four of them with a ¾” socket and turn the larger hex head bolts ¼ turn with a 1 1/8” socket and extension and then tighten the two bolts in the assemblies. Then tighten the two hex bolts at the left. Turning the 1 1/8” bolts clockwise will pull the blade onto the wheel and turning counter clockwise will push the blade off. Each ¼ turn will move the blade approximately .02”.
10. Check the blade brush adjustment (p. 3.4) to be sure the blade is being cleaned properly.
BLADE GUIDE ADJUSTMENT

At the bottom of the guide arms are the carbide blade guide assemblies, the photo shows the carbide-locking handle. These assemblies will need to be adjusted occasionally as the carbide pads become worn. To adjust properly, follow this simple procedure. Loosen the hex nut on the locking handle with a 9/16 wrench and turn the handle clockwise until it rests against the coolant tap on the idler guide arm or the roll pin on the drive guide arm. Turn the setscrew clockwise with a 3/16 Allen key until tight and then loosen 1/8 turn and tighten the hex nut. This should put just enough pressure on the blade to permit you to push the blade down approximately 1/8".
BLADE BRUSH ADJUSTMENT

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

As shown, there are two springs on socket head screws holding the brush assembly against the blade. There is also an adjusting socket set screw with a hex nut on it. Loosen the hex nut with a 9/16” wrench and turn the setscrew counter clockwise with a 3/16” Allen key. This will move the brush closer to the blade. Adjust the setscrew so that the brush cleans to the bottom of the blade gullets and tighten the hex nut.

ANGLE BRAKE ADJUSTMENT

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

ANGLE BRAKE ADJUSTMENT PROCEDURE:

Step 1 – Loosen locking cap screws “B” with a ¼ Allen key
Step 2 – Tighten all 4 setscrews “A” until snug with a 5/32 Allen key
Step 3 – Back out the “A” screws ¼ turn
Step 4 – Tighten the locking cap screws “B”
Step 5 – Swing the head to 45° and back to ensure that the head moves freely and does not bind on the pivot surfaces. Continue to step 6 if necessary.
Step 6 – Adjust the clamping force bolt “C” with a ¼” wrench. If not tightened enough, the locking handle will “bottom out” and not hold the head firmly.

BELT TENSION ADJUSTMENT (Not applicable to S23)

Drive belt tension is maintained by the locking of a toggle clamp assembly. The release of the toggle clamp permits the drive belt to be loosened so that the blade speed can be changed by selecting a different pulley ratio.

1. Stop the blade motor. Undo the cover latch and swing the pulley cover away.
2. At the midpoint between pulleys, you should be able to push the belt in ½”. Too much or too little movement will cause slippage or abnormal wear on the belt and other drive system parts.
3. If adjustment is needed, loosen the lock nut with a 9/16” wrench and turn the adjusting bolt until the belt tension is set.
4. Tighten the lock nut. Test the belt on all speeds, and then close the cover.
**HEAD DOWN LIMIT SWITCH**

The head down limit switch operates to cut power to the blade motor and the coolant pump motor when the Head has descended to the bottom of its travel in the Manual mode. The Head is adjusted so that the blade will descend slightly past the level of the vise wear strips. This setting is critical to ensure that the blade has cut fully through the stock.

The Head Down Limit switch is made with the Head fully down and when the spring post contacts the limit switch at the top of its travel. The Head Down Limit switch is located on the head frame near the pivot point as shown in the photo.

Adjustment of the limit switch is made by changing the position of the set bolt, which is located on the end of the spring post. Lengthening the set bolt will cause the limit switch to activate sooner as the spring post meets the limit switch roller. Shortening the setting bolt by turning it into the spring post will lengthen the time before the Head Limit Switch is activated.

**LUBRICATION**

The S20/23 was designed to minimize the maintenance requirements, however moving assemblies and contact faces need lubrication on a regular schedule. The lubrication requirements are primarily the saw pivot points which are equipped with grease fittings, and metal to metal surfaces that require lubrication to prevent wear and seizure.

General purpose grease is suitable for lubrication.

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

Monthly lubrication is recommended.
GEARBOX LUBRICATION S23

The Bonfiglioli W110 gearbox used on the S23 is supplied with 1.5 litres (0.40 US gallons) of Shell Tivella S320 synthetic oil. This oil has an ISO Viscosity Grade of 320 that is optimum for ambient temperatures from 20-70 Deg C (70-140 Deg F). Bonfiglioli recommends that, should a lubricant other than the approved Shell type be used, this be equivalent viscosity wise and of the synthetic type. The lubricant must also have the necessary EP and anti-foaming additives. Subsequent oil changes should be made every 600 to 12000 hours of operation depending on load conditions. The intervals, however, should not exceed 4 years.

GEARBOX LUBRICATION S20 with VFD Option

The Bonfiglioli W86 gearbox used on the S20 is supplied with 0.64 litres (0.17 US gallons) of Shell Tivella S320 synthetic oil. This oil has an ISO Viscosity Grade of 320 that is optimum for ambient temperatures from 20-70 Deg C (70-140 Deg F). The W86 was designed to be a sealed unit, so no oil change should be necessary. However, if the oil needs to be changed, Bonfiglioli recommends that, should a lubricant other than the approved Shell type be used, this be equivalent viscosity wise and of the synthetic type. The lubricant must also have the necessary EP and anti-foaming additives.
<table>
<thead>
<tr>
<th>#</th>
<th>PROBLEM</th>
<th>PROBLEM CAUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cutting out of square vertically.</td>
<td>Carbide guide adjustment incorrect (adjust).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Feed rate excessive (reduce).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blade worn (replace).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Guide arms too far apart.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blade pitch incorrect.</td>
</tr>
<tr>
<td>2</td>
<td>Cutting out of square horizontally.</td>
<td>Angle not set correctly (adjust).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stock not square in vise. (reset material)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Angle pointer out of adjustment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stock is not secure in the vise. (reset vise)</td>
</tr>
<tr>
<td>3</td>
<td>Head cylinder creeps:</td>
<td>Cylinder cup seal defective (replace).</td>
</tr>
<tr>
<td></td>
<td>In Hold</td>
<td>3 position valve defective (replace).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hydraulic hose leaking.</td>
</tr>
<tr>
<td></td>
<td>In Feed Position</td>
<td>Loosen jam nut and readjust pointer with feed rate at zero.</td>
</tr>
<tr>
<td>4</td>
<td>Blade tracking incorrect.</td>
<td>Improper tension (adjust).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tracking needs adjustment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wheel is worn or in poor condition.</td>
</tr>
<tr>
<td>5</td>
<td>Blade stalls in cut.</td>
<td>More tension needed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excessive feed rate (reduce).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blade pitch incorrect.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carbide guides overtightened.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>More Blade tension needed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Guide arms too far apart.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Feed rate too slow (increase).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carbide guides worn or loose (adjust or replace).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOTE: New blades tend to vibrate until they are “broken in”.</td>
</tr>
<tr>
<td>7</td>
<td>Excessive blade breakage</td>
<td>Excessive blade tension (reduce).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excessive feed rate (reduce).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Top guide(s) damaged (replace).</td>
</tr>
<tr>
<td>8</td>
<td>No coolant flow.</td>
<td>No coolant (add).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check coolant ports for blockage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Line blockage (blow out lines with compressed air).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coolant pump inoperable (replace).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coolant pump has lost its prime, Loosen screws, sink pump in coolant.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When coolant starts flowing, tighten screws.</td>
</tr>
<tr>
<td>9</td>
<td>Blade will not start.</td>
<td>Lift head off limit switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control fuse blown.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Push reset button.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If present, Check safety door interlock switches.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VFD error - find cause, resolve, and then reset. (OPTION)</td>
</tr>
<tr>
<td>10</td>
<td>Machine stops before cut is completed</td>
<td>Adjust head down limit switch bolt.</td>
</tr>
</tbody>
</table>
The electrical schematics show some components labeled as TB1 to TB2 and these components are physically mounted on din rails. The illustration below shows the location of the Din rails with the installed components and the designated TB number.

The following pages will show and explain in brief how to understand the correlation between the electrical schematic and the control panel with regards to TB1 and TB2.
A close up view of TB1 is shown. It is located in the main panel (MP).

For example, if the electrical schematic shows a terminal, described as TB1 1

This indicates that the terminal is located on din rail TB1 and is terminal #1.

TB1 5 This would indicate that the terminal is mounted on TB1 and is terminal #5.
TB2 is located in the HMI panel (Human Machine Interface). This houses the selector switches and push buttons.

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

```
  TB2
  3
```

This indicates that the terminal is located on din rail TB2 and is terminal #3.
S22H / S23H Component  Location: VFD Option

The electrical schematics show some components labeled as TB1 and TB2 and these components are physically mounted on din rails. The illustration below shows the location of the Din rails with the installed components and the designated TB number.

The following pages will show and explain in brief how to understand the correlation between the electrical schematic and the control panel with regards to TB1 and TB2.
A close up view of TB1 is shown. It is located in the main panel (MP).

For example, if the electrical schematic shows a terminal, described as TB1 1

This indicates that the terminal is located on din rail TB1 and is terminal #1.

TB1 3  This would indicate that the terminal is mounted on TB1 and is terminal #3.
TB2 is located in the HMI panel (Human Machine Interface). This houses the selector switches and push buttons.

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

TB2
4

This indicates that the terminal is located on din rail TB2 and is terminal #4.
**DT (Device Tag)**

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

DT, CR6 is the Coolant relay labeled CR6.

DT, LS2 is the limit switch for Head Down function labeled LS2.

DT, MS 2M is the contactor labeled MS 2M.

DT, SS1 is the selector switch for Coolant Control, labeled SS1

**Page and Row Numbers**

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

1. **Page.** This refers to the current page number

2. **Pg.** This refers to the total number of pages in the entire project and is for internal HYD-MECH use only.

On each Page there are a row of 4 digit numbers on the left of the page. For example, Page 15 shows the numbers from 1500 to 1539. The first 2 digits refer to the page number, which in this case is page 15. The latter 2 digits refer to the row number, which in this case are from 00 to 39.

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

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

The concept of the TB1 & TB2 arrangement also applies to the S23H machine.

**FOR ELECTRICAL SCHEMATICS AND COMPONENT PARTS LIST SEE PDF ON ATTACHED CD.**
SECTION 5 - HYDRAULIC

FOR HYDRAULIC SCHEMATICS AND PLUMBING DIAGRAMS
SEE PDF ON ATTACHED CD.
SECTION 6 - MECHANICAL ASSEMBLIES

For Mechanical Assembly Drawings see PDF on attached CD
SECTION 7 - OPTIONS

BLADE BREAKAGE SWITCH (Standard on CE machines)

Blade breakage switch shuts down blade drive and hydraulic pump motor (S22H, S23H option) in case blade band tension is lost or the blade snaps. It will disable machine operation until the new blade is installed and tensioned. Note: Blade breakage will not disengage head feed operation.

MIST COOLANT SYSTEM

Mist coolant - the air powered pump delivers a regulated number of pulses of lubricant to a single applicator nozzle. The unit has two control screws. Pulse/Minute - adjusts rate of lubricant use. About 8 to 12 pulse per minute is optimum - more is not better. Air Screw - regulates the jet of air that projects the lubricant from the nozzle onto the blade. Adjustment should be such that lubricant covers the blade without blowing the mist beyond the back edge of the blade.

Note: A new blade may require initial lubrication with a small quantity of mist coolant applied directly to the blade at the idler guide arm to prevent blade squealing.
HYDRAULIC POWER PACK (S20H / S23H):

System operates head up and vise.
Power pack is mounted on the door at the drive side of the infeed table. Parts consist of .25 Hp (.19 kW) electric motor, relief valve assembly, gear pump and tank assembly
This option requires special heads and vise cylinder.

1. HYDRAULIC OIL - Machine hydraulic reservoir is filled with mineral oil Texaco Rando HD46. In case of changing the brand, hydraulic system should be drained and thoroughly flushed. Following is a list of recommended replacement oils:
   - Texaco Rando HD46
   - CHEVRON ECO Hydraulic oil AW ISO 46
   - MOBIL DTE 25
   - ESSO NUTO H46
   - SHELL TELUS OIL 46
2. HYDRAULIC OIL LEVEL - Semitransparent plastic reservoir allows for easy oil level visual inspection. Oil level should be maintained so the reservoir is always 75-90% full. The useable volume of oil reservoir is 1 US Gallons (3.8 L).
3. HYDRAULIC OIL CHANGE - It is recommended to change oil after every 1500 hours of operation or once a year.
4. OIL TEMPERATURE - Oil temperature during steady operation should stabilize at about 55-60F (30-33 C) above room temperature. Thus in a 70F (21 C) shop one might expect an oil temperature of about 130F (54 C).
   Oil temperature should never exceed 176F (80 C).
5. HYDRAULIC PRESSURE - Hydraulic pressure is factory set at 450-500PSI (3100-3450 kPa) and should not require any further attention.

VARIABLE VISE PRESSURE OPTION (S20H / S23H):

Vise clamping adjustment is located on the face of the hydraulic power pack door. Clamping pressure is indicated by the pressure gauge adjacent to the pressure control knob. Turning the knob clockwise increases clamping pressure. The clamping pressure can be changed infinitely from 50PSI to 600PSI, full pump pressure. It has to be taken under consideration that clamp pressure setting will affect the clamp speed. The actual usable low clamp pressure setting may be higher than achievable by controls and is limited by mechanical friction of the vise assemblies.
Vise clamping pressure components can be accessed easily for service by opening the power pack door.
1. The relative speed of the bundling jaws and vise can be adjusted with the needle valves at each cylinder.

2. The following steps will ensure the efficient operation of the overhead bundling.
   a) The material should be loaded into the machine vises and advanced to a position where a trim can be performed.
   b) Close the Fixed Vise until the Overhead Bundling Arm is slightly (1/32” to 1/64”) above the material to be cut.
   c) Close the ball valve located on the Fixed Overhead Bundling cylinder to lock the position of the Overhead Bundling Arm and then operate as normal.
WORK LAMP ASSEMBLY

WORK LAMP 371790

MATERIAL STOP

WORK STOP ASSEMBLY S22-G15-00A

FOR OPTIONAL ASSEMBLY DRAWINGS SEE PDF ON ATTACHED CD.
## SECTION 8 - SPECIFICATIONS

<table>
<thead>
<tr>
<th>S20 Bandsaw Specification List</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAPACITY:</strong></td>
</tr>
<tr>
<td>90° Rectangle: 13&quot; x 18&quot;</td>
</tr>
<tr>
<td>90° Round: 13&quot; diameter</td>
</tr>
<tr>
<td>45° Rectangle: 13&quot; x 10.75&quot;</td>
</tr>
<tr>
<td>45° Round: 12&quot; diameter</td>
</tr>
<tr>
<td>60° Rectangle: 13&quot; x 7.25&quot;</td>
</tr>
<tr>
<td>60° Round: 8.5&quot; diameter</td>
</tr>
<tr>
<td><strong>BLADE:</strong></td>
</tr>
<tr>
<td>Length: 13'6&quot;</td>
</tr>
<tr>
<td>Width: 1&quot;</td>
</tr>
<tr>
<td>Thickness: .035&quot;</td>
</tr>
<tr>
<td><strong>BLADE SPEED:</strong></td>
</tr>
<tr>
<td>90, 140, 220, or 320 SFM</td>
</tr>
<tr>
<td>75-350 SFM (Optional VFD)</td>
</tr>
<tr>
<td><strong>BLADE GUIDES:</strong></td>
</tr>
<tr>
<td>Carbide</td>
</tr>
<tr>
<td><strong>BLADE WHEEL DIAMETER:</strong></td>
</tr>
<tr>
<td>16&quot;</td>
</tr>
<tr>
<td><strong>DRIVE:</strong></td>
</tr>
<tr>
<td>Blade drive: 2 hp (3 hp Optional VFD)</td>
</tr>
<tr>
<td><strong>COOLANT TANK:</strong></td>
</tr>
<tr>
<td>6 U.S. Gallons</td>
</tr>
<tr>
<td><strong>VISE CONTROL:</strong></td>
</tr>
<tr>
<td>Manual</td>
</tr>
<tr>
<td><strong>TABLE HEIGHT:</strong></td>
</tr>
<tr>
<td>31&quot;</td>
</tr>
<tr>
<td><strong>MAXIMUM WORK LOAD:</strong></td>
</tr>
<tr>
<td>5,000 lbs</td>
</tr>
<tr>
<td><strong>MACHINE WEIGHT:</strong></td>
</tr>
<tr>
<td>1,800 lbs</td>
</tr>
<tr>
<td><strong>DIMENSIONS:</strong></td>
</tr>
<tr>
<td>80&quot; wide</td>
</tr>
<tr>
<td>77&quot; long</td>
</tr>
<tr>
<td>55.5&quot; high</td>
</tr>
<tr>
<td><strong>OPTIONS:</strong></td>
</tr>
<tr>
<td>• Mechanical overhead bundling clamp</td>
</tr>
<tr>
<td>• 3 hp VFD</td>
</tr>
<tr>
<td>• Outfeed material stop</td>
</tr>
<tr>
<td>• Blade breakage switch</td>
</tr>
<tr>
<td>• Worklight &amp; 500 va transformer</td>
</tr>
<tr>
<td>• Mist Coolant</td>
</tr>
<tr>
<td>• Hydraulic Power Pack</td>
</tr>
<tr>
<td>• Variable Vise Pressure</td>
</tr>
<tr>
<td>• Bundling</td>
</tr>
</tbody>
</table>
GENERAL PLAN VIEW

FOUNDATION PLAN
DIMENSIONS TO ANCHOR POINTS

RECOMMENDED INSTALLATION CLEARANCE
(>31.5(800mm) in work areas,
>23.5(600mm) in maintenance areas)

ANCHOR POINT DETAIL

1/2NC LEVELLING BOLT

25(32)

0.3/4(19) ANCHOR HOLE

SINK HOLE

0.37(10)

ELECTRICAL SUPPLY CONNECTION

CUT @ 90°

1.6(42)

66(168)

68(1728)

18(457) MATERIAL PATH

HEAD SWUNG TO 60°

BLADE WHEEL DOOR CLEARANCE

WITH HEAD FULLY UP

MATERIAL DATUM

CUT @ 90°
<table>
<thead>
<tr>
<th>S23 Bandsaw Specification List</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAPACITY:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>BLADE:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>BLADE SPEED:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>BLADE GUIDES:</strong></td>
</tr>
<tr>
<td><strong>BLADE WHEEL DIAMETER:</strong></td>
</tr>
<tr>
<td><strong>DRIVE:</strong></td>
</tr>
<tr>
<td><strong>COOLANT TANK:</strong></td>
</tr>
<tr>
<td><strong>VISE CONTROL:</strong></td>
</tr>
<tr>
<td><strong>TABLE HEIGHT:</strong></td>
</tr>
<tr>
<td><strong>MAXIMUM WORK LOAD:</strong></td>
</tr>
<tr>
<td><strong>MACHINE WEIGHT:</strong></td>
</tr>
<tr>
<td><strong>DIMENSIONS:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>OPTIONS:</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
SECTION 9 - WARRANTY

Warranty

Hyd-Mech Group Limited warrants parts/components on each new S20/23 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 S20/23, 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 1030
Woodstock, Ontario
N4S 8P6
Phone: (519) 539-6341
Fax: (519) 539-5126
Toll Free: (877) 276-SAWS (7297)
E-mail: info@hydmech.com