



V18

393433

THANK YOU,

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

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

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

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

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

Thank you.

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TABLE OF CONTENTS

SECTION 0 - SAFETY INSTRUCTIONS

SUMMARY	0.1
BASIC RULES	0.3
RESPONSIBILITIES OF THE OWNER.....	0.3
RESPONSIBILITIES OF THE OPERATOR AND MAINTENANCE PERSONNEL.....	0.4
SAFETY HAZARD LABELS	0.6

SECTION 1 - INSTALLATION

SAFETY CONSIDERATIONS	1.1
LIFTING AND SHIPPING	1.2
REMOVING HEAD RESTRAINT.....	1.2
INSTALLATION OF THE CONTROL PANEL	1.3
LEVELLING THE V18	1.4
HYDRAULIC OIL	1.4
CUTTING FLUID	1.4
WIRING CONNECTIONS.....	1.5
BLADE TENSION CHECK	1.5
EARTH GROUNDING PROCEDURE	1.5

SECTION 2 - OPERATING INSTRUCTIONS

START-UP	2.1
CONTROL CONSOLE	2.1
SAW CUTTING CONTROLS	2.2
HYDRAULIC FEED CONTROL.....	2.2
MANUAL OPERATION CONTROLS.....	2.2
ADDITIONAL MANUAL CONTROLS	2.5
BLADE BASICS.....	2.6
CUTTING PARAMETERS CHART.....	2.6
MECHANICAL CONTROLS	2.11
HEAD FORWARD LIMIT SETTING	2.11
CHIP CONVEYOR (OPTIONAL).....	2.11
HYDRAULIC CHIP CONVEYOR (OPTIONAL).....	2.11
COOLANT FLOW.....	2.11
HEAD SWING BRAKE	2.12

SECTION 3 - MAINTENANCE AND TROUBLE SHOOTING

LOCK-OUT	3.1
LOCK OUT PROCEDURE	3.1
BLADE CHANGE PROCEDURE	3.2
BLADE INSTALLATION.....	3.3
BLADE TRACKING	3.3
DRIVE WHEEL ADJUSTMENT	3.3
IDLER WHEEL ADJUSTMENT	3.4
BLADE BRUSH ADJUSTMENT	3.4
BLADE GUIDES	3.4
GEARBOX LUBRICATION (V18 WITH A412 GEARBOX).....	3.5
LUBRICATION.....	3.5
HYDRAULIC MAINTENANCE.....	3.6
TROUBLE SHOOTING GUIDE	3.7
ELECTRICAL TROUBLESHOOTING	3.7
CUTTING AND BLADE TROUBLESHOOTING	3.8
SERVICE RECORD & NOTES	3.10

SECTION 4 - ELECTRICAL

V18 COMPONENT LOCATION.....	4.1
FOR ELECTRICAL SCHEMATICS AND PARTS LIST SEE PDF ON ATTACHED CD	4.8

SECTION 5 - HYDRAULICS

V18 HYDRAULIC PARTS LIST	5.1
GLAND ASSEMBLIES.....	5.2
PISTON ASSEMBLIES.....	5.2
FOR HYDRAULIC SCHEMATICS AND PLUMBING DIAGRAMS SEE PDF ON ATTACHED CD...5.3	

SECTION 6 - MECHANICAL ASSEMBLIES

MECHANICAL ASSEMBLY DRAWINGS & PARTS LIST: SEE PDF ON ATTACHED CD.....	6.1
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SECTION 7 - OPTIONS

OPTIONAL ASSEMBLY DRAWINGS: SEE PDF ON ATTACHED CD	7.1
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SECTION 8 - SPECIFICATIONS

V18 SPECIFICATIONS	8.1
V18 LAYOUT	8.2

SECTION 9 - WARRANTY

WARRANTY	9.1
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SECTION 0 - SAFETY INSTRUCTIONS

SUMMARY

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

Section 0	SAFETY
Section 2	OPERATING INSTRUCTIONS

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

Put Safety First

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

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

Basic Rules – only use this machine when

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

Owner is responsible to

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

Operator and Maintenance Personnel are responsible to:

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

FOREWORD

Put Safety First!

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

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

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

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

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

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

Mandatory Information

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

Section 0 SAFETY

Section 2 OPERATING INSTRUCTIONS

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

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

Signatures

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

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

Name	Date	Signature

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

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

Name	Date	Signature

BASIC RULES

Intended Use

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

Exclusion of Misuse

Misuse includes, for example:

Sawing hazardous materials such as magnesium or lead.

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

Operating the machine without all original safety equipment and guards.

Liability

The machine may only be operated:

When it is in good working order, and

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

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

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

RESPONSIBILITIES OF THE OWNER

Organization of work

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

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

Choice and qualification of personnel

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

Training

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

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

Define responsibilities

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

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

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

Condition of Machine and Workplace

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

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

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

RESPONSIBILITIES OF THE OPERATOR AND MAINTENANCE PERSONNEL

Safety equipment

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

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

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

Emergency Stop Button (E-Stops)

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

Damage

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

Safe operation

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

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

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

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

Faults

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

Safety hazard labels

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

Clothing, jewellery, protective equipment

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

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

Gloves

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

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

Wear protective gloves when handling bandsaw blades at blade changes.

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

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

Hearing protection

Ear protection must be worn whenever necessary.

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

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

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

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

Workplace

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

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

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

Master Disconnect

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

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

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

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

Residual Risks

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

The line side of the disconnect switch itself remains energized.

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

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

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

SAFETY HAZARD LABELS

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

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

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

HAZARDOUS VOLTAGE INSIDE

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

The machine's Electrical Disconnect Switch does disconnect voltage from the machine's circuits; however hazardous voltage is still present inside the main electrical cabinet, on the infeed (line) side of the main fuses. Therefore keep hands and tools away from the infeed side of the control panel main fuses. If these fuses need to be replaced, use a fuse puller.

Allow three minutes after locking-out power before opening any electrical enclosures. Your machine may be equipped with a variable frequency drive that stores high voltage within its capacitors. Three minutes will allow sufficient time for this voltage to safely discharge.

Never spray coolant directly at electrical components or cabinets.



MOVING BANDSAW BLADE WILL CUT

Do NOT operate with guard removed.

Do NOT place hands or fingers near moving bandsaw blade.

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



PINCH POINT

Machine parts may move without warning, either because the machine is operating automatically, or because another person initiates the motion. Keep hands clear of all labelled pinch points, whenever the machine is running. Machine vises can exert great force and cause severe injury. Keep hands clear of vises and work piece when vises are opened or closed. Be aware that vise closing or opening may result in potentially dangerous work piece movement. Be aware also that the opening motion of a vise may create potential pinch points.



MOVING PARTS CAN CRUSH AND CUT

Keep hands clear of chip auger. Lock-out power in accordance with your company's lock-out procedures before attempting to clear a jam in the chip auger.

Be aware that the chip auger may start unexpectedly, either because the machine is operating automatically, or because another person initiates the motion.

If the chip auger is stalled because of a jam, it may start without warning when the jam is cleared, unless the machine power is locked out.



SECTION 1 - INSTALLATION



SAFETY CONSIDERATIONS

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

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

Power hook-up should be performed by qualified personnel.

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

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

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

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

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

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

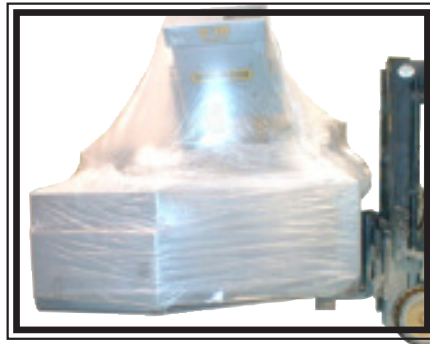
The V18 machine should be used according to its specifications.

The operator must wear eye protection.

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

LIFTING AND SHIPPING

To lift a V18 bandsaw with a forklift, it must have a minimum capacity of 7500 LB. at 48" from the mast as well as 6' forks. Always lift the saw from the front as shown. The forks **must not** be under the electrical / hydraulic cabinet. The saw will have 4 x 4 steel tubes under each leveling foot, these must be removed (save the bolts for anchoring) before positioning the saw.



Lifting the V18 from the rear of the machine.

REMOVING HEAD RESTRAINT

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



Head strut.

INSTALLATION OF THE CONTROL PANEL

The V18 comes equipped with an articulating control panel. This panel is normally removed and placed on the saw table for shipping purposes. The control panel **MUST BE REINSTALLED PRIOR TO MACHINE START UP**. Take lifting precautions when installing the panel as it weights 150 LB.

To re-install the panel, follow these steps:

- 1 Remove all of the packing material.
- 2 Remove the base front cover from the machine to gain access to the interior of the base.
- 3 Lift the panel and move it into position as shown below. Insert the extra length of hoses and conduit back into the front of the saw base enclosure.
- 4 Insert the four studs into their respective holes and fasten the panel using the supplied 3/8-16 UNC nuts and washers.
- 5 Level the panel and fully tighten the nuts to lock assembly in place.
- 6 Place excess cord and hose length neatly inside the base enclosure and replace the base front cover.

WARNING! PANEL WEIGHT 150 LB.



Placing the control panel on to the front hole pattern.



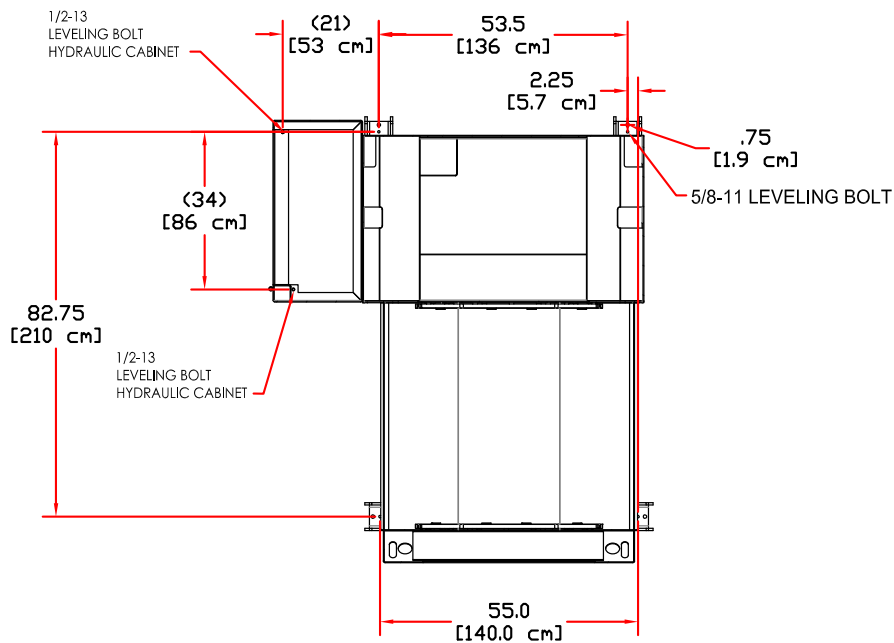
The control panel installed.

LEVELLING THE V18

It is important that the V18 be levelled and provision is made to secure the saw with concrete anchors to the floor.

* See foundation plan below *

Using a machinist's level, level the saw from side to side and from front to back. When any additional conveyor(s) are being attached to the machine, they must be aligned to the table of the machine properly.



FOUNDATION PLAN

HYDRAULIC OIL

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

CUTTING FLUID

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

WIRING CONNECTIONS

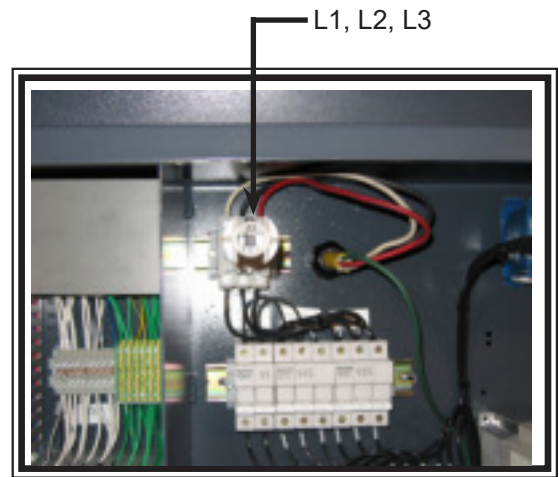
After the machine is levelled and anchored the necessary power hook-up needs to be performed. In order to provide safe operation as well as to prevent potential damage to the machine, only qualified personnel should make the connections.

BEFORE START-UP THE FOLLOWING TWO POINTS SHOULD BE CHECKED

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

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

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



Power connection terminal

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

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

BLADE TENSION CHECK

When the machine is first started, the blade position must be checked. Open the door at the top of the head and see that the blade has not moved off of the wheel. It should not be overhanging the wheel more than 1/4". If it is consult “Blade Tracking” in Section 3. If it has stayed in it's correct position, then check that the blade tension switch is in the “+” position and close the door.



Blade tension switch

EARTH GROUNDING PROCEDURE

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

SECTION 2 - OPERATING INSTRUCTIONS

START-UP

The V18 control console has been designed to simplify the operation of the saw so that the operator has the ability to stop any function at any time, and to be able to control all the functions of the saw remotely.

We can not overstress the importance of familiarizing yourself with the controls of the V18 prior to starting the machine for the first time.

NOTE: WHEN STARTING THE V18 FOR THE FIRST TIME *MAKE SURE* THAT THE PRESSURE IS 650 ± 25 PSI (900psi for extended head machines), *AND* THAT THE BLADE IS RUNNING IN A *COUNTERCLOCKWISE* DIRECTION AS VIEWED FROM THE DOOR SIDE THE OF HEAD.

CONTROL CONSOLE

The operator console has the ability to articulate to suit the preference of the operator. It is arrayed with a complete set of controls to operate both the hydraulic and electrical functions of the saw. All of the selector switches must be placed in their neutral center position for the hydraulics to start. This is a safety feature which is designed to prevent any un-wanted hydraulic actuation without the conscious intervention from the operator.



**V18 Control Console
(Optional Equipment Shown)**

SAW CUTTING CONTROLS

This section has been prepared to give the operator the ability to set up the saw for most cutting situations. The saw is equipped with variable blade speed control and hydraulic feed control, as well as an extensive door chart to guide the operator to the correct setting of these controls.

HYDRAULIC FEED CONTROL

The hydraulic feed controls are located on top of the control console and consist of the Feed Force Setting knob, the Feed Rate knob and the Head Fast Approach lever. These controls allow the operator to independently control both the Feed Force and the Feed Rate; two essential settings which are required for an optional cut.



Feed Force Knob

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

Fast Approach Lever

Depress for fast head approach.

Feed Rate Knob

Used to control the speed of head advancement

MANUAL OPERATION CONTROLS

The electrical switches and buttons on the control panel allow for full manual operation of the V18. The operation of each is detailed on the following pages.



Manual operation controls.

MANUAL OPERATION CONTROLS

TOP ROW



MIST:

This OPTIONAL switch has three positions - AUTO, OFF and ON.

OFF: No mist coolant.

AUTO: The mist coolant sprays only when the Head is advancing into the cut.

ON: Mist coolant sprays any time the machine is under power.



LEFT VISE:

This switch operates the vise on the left side of the blade. If the switch is placed in the neutral (centre) position, the vise jaw will hold it's position. For the blade to start at least one of the vises has to be in the closed position, and the other must be in the closed or open position (not neutral).



HEAD CONTROL:

RETRACT: The head will retract until it reaches the HEAD BACK LIMIT SETTING.

HOLD: The head will remain stationary.

ADVANCE: The head will advance until it reaches the HEAD ADVANCE LIMIT SETTING determined by the vise opening. Advance is controlled by the FEED RATE and FEED FORCE controls.



BLADE START:

This button is only active when the hydraulic system is running. Momentarily depressing this button will start the blade motor. This button is illuminated for operator safety while the blade is running. This button can not start the blade running unless both vises are closed, or one closed and the other open.



HYDRAULIC START:

Starts hydraulic pump motor and energizes the BLADE START BUTTON. This button is illuminated when ON to give the operator an indication that the hydraulic system is running. The head selector switch as well as the both vise selector switches have to be in their neutral centre position for hydraulics to start.



CHIP CONVEYOR:

This OPTIONAL switch controls the direction of the chip conveyor to dump the chips to the left or right side of the machine.

MANUAL OPERATION CONTROLS

CENTER ROW



COOLANT:

This switch has three positions - AUTO, OFF and ON.

OFF: No coolant flow.

AUTO: The coolant flows only when the Head is advancing into the cut.

ON: Coolant flows any time the machine is under power, permitting wash down with the hose.



RIGHT VISE:

This switch operates the vise on the right side of blade. If the switch is placed in the neutral (centre) position, the vise jaw will hold it's position. For the blade to start at least one of the vises has to be in the closed position, and the other must be in the closed or open position (not neutral).



BLADE SPEED:

Blade speed can be adjusted infinitely between 70 to 350 SFM. Clockwise rotation of the knob increases blade speed while counter clockwise rotation decreases blade speed.



BLADE STOP:

Momentarily pressing this button will stop the blade motor.



EMERGENCY STOP:

This button will stop both the hydraulic and blade motors. The head motion will cease. The vises will remain as they are, but if closed, they will gradually lose gripping force. For this reason all long stock should be supported so that it will not fall.

BOTTOM ROW



HEAD SWING LEFT:

Depressing this button fully will cause the head to swing quickly to the left until the button is released or the head reaches the swing limit. Depressing this button partially will cause the head to swing slowly to the left allowing for fine adjustment. The head will only swing when the upper guide arm is fully up and the head is fully retracted.



HEAD SWING RIGHT:

Depressing this button fully will cause the head to swing quickly to the right until the button is released or the head reaches the swing limit. Depressing this button partially will cause the head to swing slowly to the right allowing for fine adjustment. The head will only swing when the upper guide arm is fully up and the head is fully retracted.



GUIDE ARM:

This switch controls the vertical position of the upper guide arm. Guide arm position is very important when cutting as well as affecting the blade life. Placing the upper guide arm as close to the work as possible improves cut accuracy, blade life, and safety (because less blade is left exposed above the work piece). The guide arm must be fully raised before the head can be swung.



HEAD RETRACT LIMIT OVERRIDE:

This button overrides the head retract limit switch to allow the head to retract further in order to allow easier blade removal. Depressing this button will also permit the head to be advanced without starting the blade.



BLADE CHANGE KEYLOCK

This lock is provided for the safety of the operator during the blade changing procedure. When the lock is in the "ON" position, the hydraulics may be started with the side covers and the drive box door open, and the only functions that are active are HEAD, GUIDE ARM and BLADE TENSION controls. When the blade has been changed, the lock must be switched to the "OFF" position in order to operate the machine.

ADDITIONAL MANUAL CONTROLS



BLADE TENSION:

The Blade Tension switch is located on the side of the electrical enclosure, and its used when adjusting or changing the blade which is detailed in Section 3 of this manual. During cutting the Blade Tension switch must be in the "+ RUN" position.

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 saw) 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.)

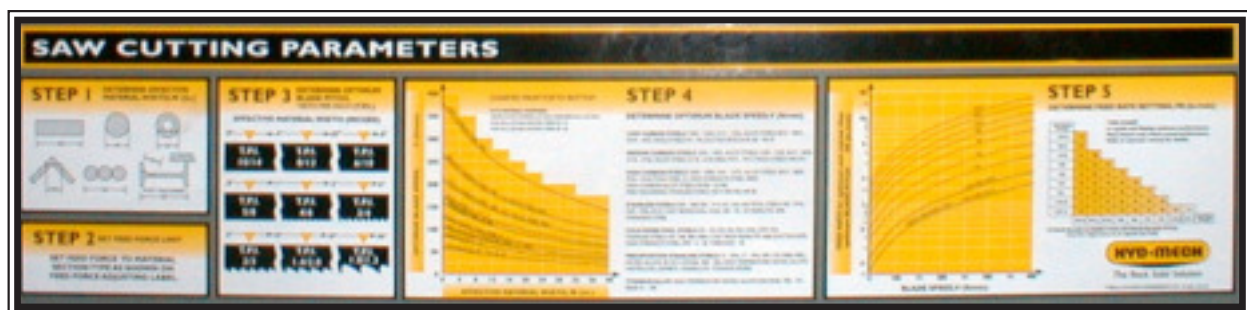
These two or three slow cuts sufficiently lap (polish) the new blade so that it does not snag the material being cut. Proper break-in will alleviate blade vibration, improve surface finish, accuracy, and blade life.

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, Blade Changing)
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. (Saw Cutting Parameters: Step2)
5. The proper blade speed must be selected. (Saw Cutting parameters: Step 4)
6. The proper feed rate must be applied. (Saw Cutting Parameters: Step 5)

CUTTING PARAMETERS CHART

A full size PARAMETERS CHART is mounted on the front of the base. The chart contains five steps for the operator to follow in order to achieve optimum performance of the saw. Details of these steps are explained in detail beginning with step 1 below and on the following pages.



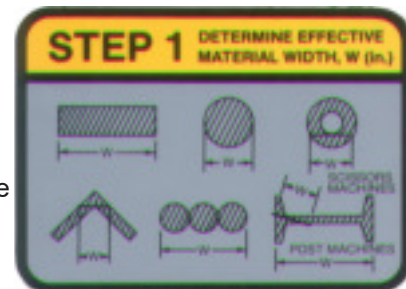
Saw Cutting Parameters Chart

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.



NOTES:

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

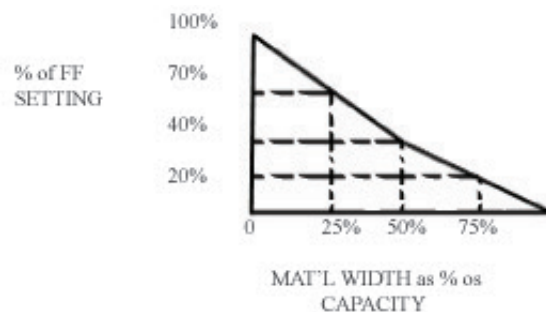
STEP 2, SET FEED FORCE LIMIT

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

CUTTING SOLIDS

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

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



For OPTIMUM BLADE SELECTION, see STEP 3

CUTTING STRUCTURALS

A reduced Feed Force Setting is used when cutting structurals:
For structurals, a blade finer than Optimum can be used for more efficient cutting.

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

BLADE	FF
① OPTIMUM PITCH FROM STEP 3	20%
② PITCH FINER THAN OPTIMUM	0%

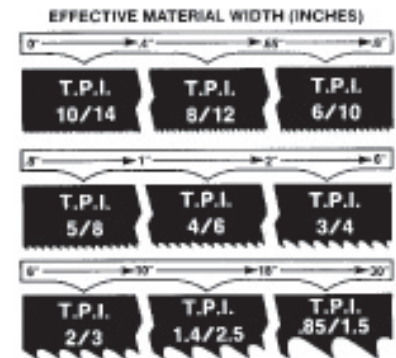
STEP 3, DETERMINE OPTIMUM BLADE PITCH - TEETH PER INCH (T.P.I.)

Selecting a blade with proper tooth pitch is important in order to achieve optimal cutting rates and good blade life.

For cutting narrow or thin wall structural materials a fine blade with many teeth per inch (T.P.I.) is recommended. For wide materials a blade with a coarse pitch should be used. The sketch can be referenced for the blade pitch changes for differing effective material widths.

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

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



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

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

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

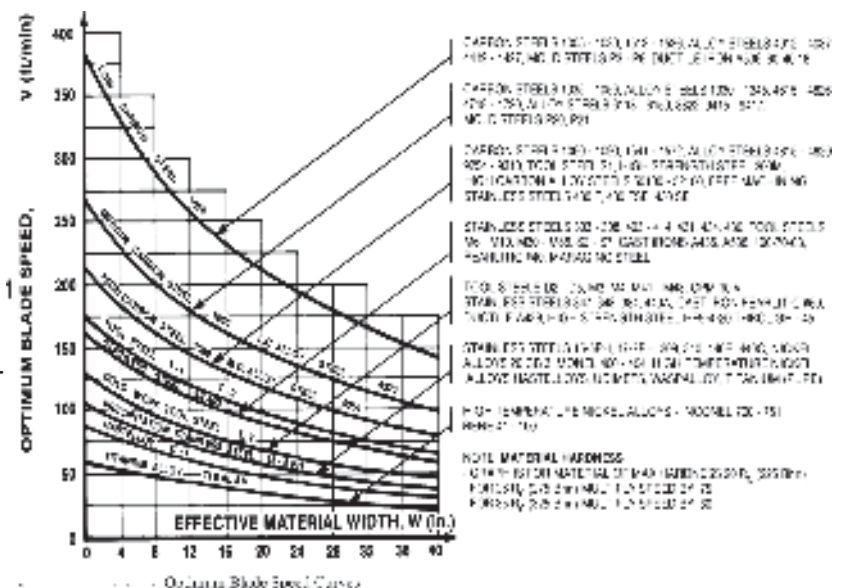
In Example #1

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

For 8" (200mm) diameter, 1045 Carbon Steel solid bar 200 ft/min (60m/min) is the optimum blade speed.

NOTE: 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.

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

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

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

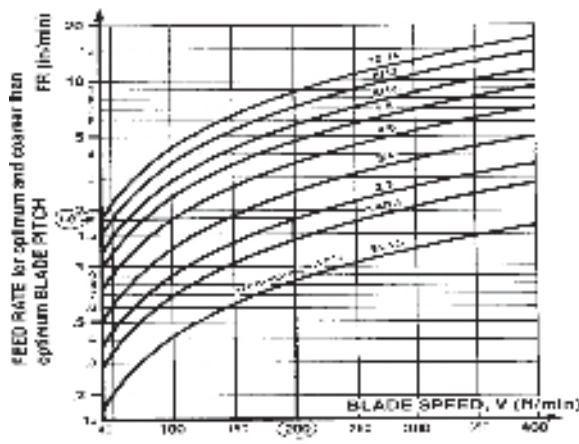
The FEED RATE Knob controls FEED RATE of the blade descent in the range 0 to 15 in/min (380mm/min). The FEED RATE should be adjusted only in one direction (from "O" to required value). If you go too far, go back to "O" and come back up. To set FEED RATE for particular cutting situations use the Graph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



Feed Rate Knob

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

- On the horizontal axis (blade speed axis), find 200 ft/min(60mm/min).
- Find the point where a vertical line from 200 ft/min (60mm/min) would intersect the 2/3 blade pitch curve.
- From this intersection point run horizontally left to the vertical (FEED RATE) axis, to arrive at 1.8 in/min (45mm/min) FEED RATE. Thus 1.8 in/min (45mm/min) is the FEED RATE for cutting 8" (200mm) diameter 1045 Carbon Steel when the optimum 2/3 pitch blade is used.



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.

NOTE: Use the following chart when cutting solids. For structurals, see "CUTTING STRUCTURALS" in STEP 2.

Optimum Blade Pitch (TPI)	10/14	8/12	6/10	5/8	4/6	3/4	3/3	1.4/2.5	.85/1.5	10/14	8/12	6/10	5/8	4/6	3/4	3/3	1.4/2.5	.85/1.5	Actual Feed Rate
10/14	1.0																		
8/12		.83																	
6/10			.67	.60															
5/8				.54	.45	.41													
4/6					.42	.35	.31	.27											
3/4						.29	.25	.24	.24	.19									
3/3							.21	.21	.21	.20	.19	.17							
1.4/2.5								.17	.20	.25	.31	.40	.57	.60					
.85/1.5									.10	.12	.13	.15	.18	.24	.34	.45	.60	1.0	
IF YOUR BLADE IS FINER THAN OPTIMUM BLADE PITCH MULTIPLY FEED RATE, F11 BY ABOVE FACTORS																			

ADDITIONAL CUTTING SETUP EXAMPLES

EXAMPLE # 2

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

- STEP 1** Effective Material Width: 4 1/2" (.75 X 6) 114mm (19 x 6)
STEP 2 Feed Force limit setting for 6" Diameter material. Refer to Feed Force Limit, Setting in Step 2
STEP 3 Optimum blade pitch (TPI): 3/4 T. P. I.
Actual blade pitch on the saw: 4/6 T. P. I.
STEP 4 Optimum blade speed for 4 1/2" effective 225 ft/min (70m/min) material width
Blade speed reduced by hardness factor : 225 ft/min X .60 = 135ft/min or
(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) or (45mm/min x .70= 31.5mm/min)

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)

MECHANICAL CONTROLS

HEAD FORWARD LIMIT SETTING

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

TO SET LIMIT:

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



Head forward limit switch

CHIP CONVEYOR (optional)

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



Manual chip conveyor handle and chip bucket.

HYDRAULIC CHIP CONVEYOR (optional)

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

COOLANT FLOW

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

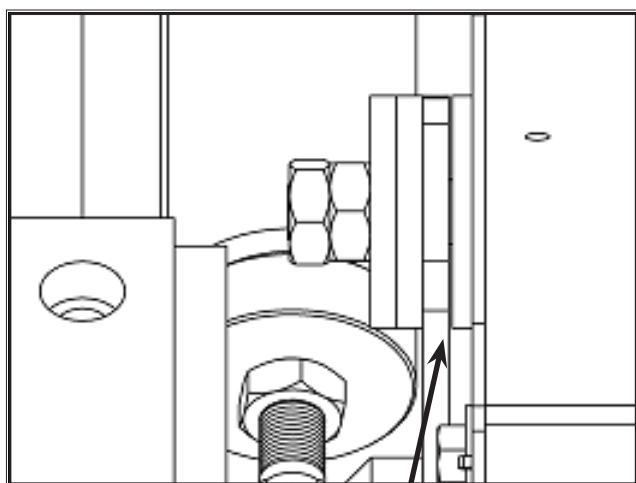
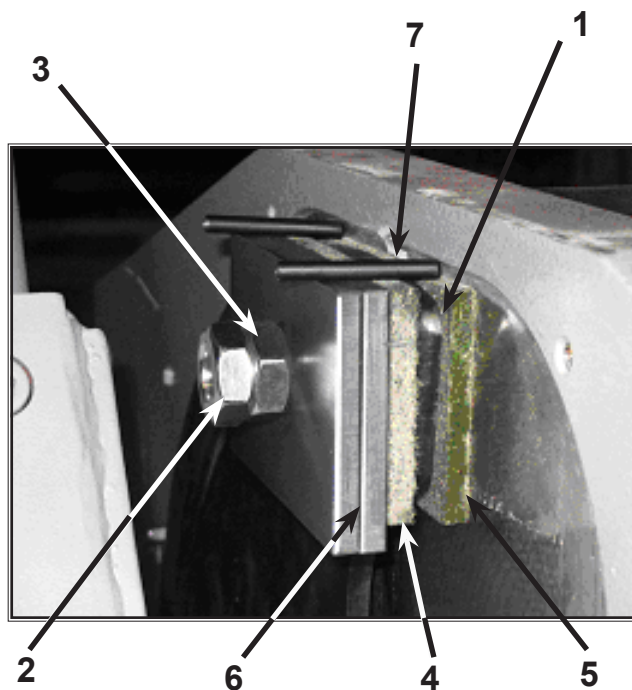
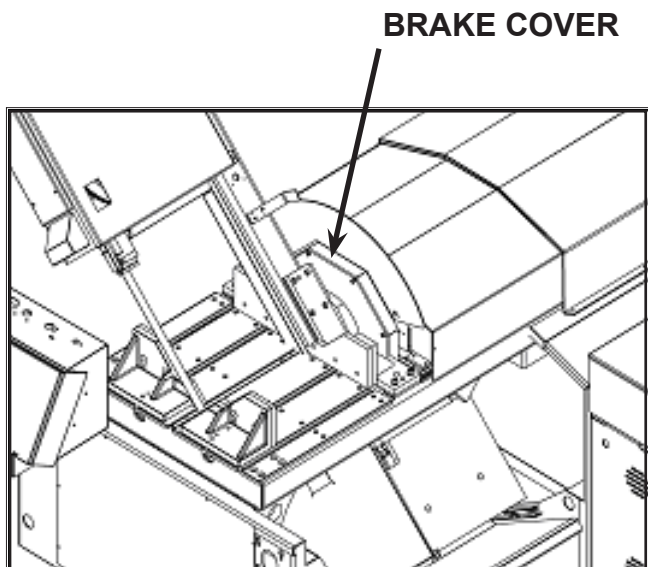
NOTE: When cutting materials that do not need coolant (cast iron) some coolant flow is required to provide blade lubrication in order to prevent blade scoring by the carbides.



Coolant adjusting tap and wash hose

HEAD SWING BRAKE

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



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

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

SECTION 3 - MAINTENANCE AND TROUBLE SHOOTING

LOCK-OUT

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

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

LOCK OUT PROCEDURE

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

1. Operator shuts down the machine. (The head should be swung to 45° left or right before any hydraulic service is performed to prevent the head from moving unexpectedly).
2. The person in charge should follow Lockout procedures as is required by his organization. The main power disconnect box is supplied with a suitable mechanism for this purpose as shown below.



The main power disconnect switch used for safety lockout purposes.

BLADE CHANGE PROCEDURE

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

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

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

This key switch has 2 positions:

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

ON = Hydraulic motor can be started.

Blade Tension is operative.

All other hydraulic functions and blade start are inoperative.

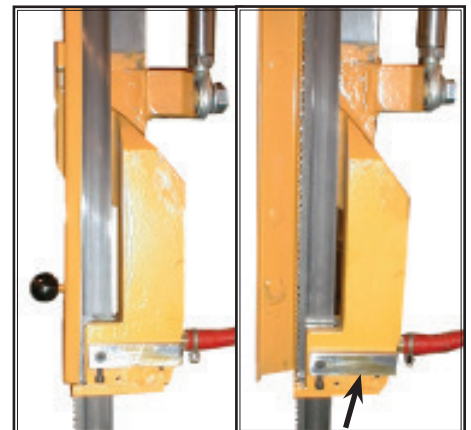


BLADE REMOVAL

1. With the Blade Change Mode key switch in 'OFF', the blade stopped and the hydraulics ON, retract the saw head in the full retract position. Press the HEAD RETRACT LIMIT OVERRIDE button and turn the head control switch to retracted on the operator panel. This will drive the Head past the Head Back Limit Switch creating a wider gap between the blade and cutting table allowing easier removal of the blade.
2. Turn the blade change key switch to the 'ON' position.
 - Hydraulics will continue to run, but only the Blade Tension Switch is functional. The blade wheel doors can be opened without the hydraulics shutting down.
3. The V18 blade is only exposed to the operator at the cutting area. A hinged cover protects the operator from the blade between the Idler wheel assembly and the actual cutting area. A black knob on the cover allows it to be easily pulled open.
4. It is necessary to release the carbides from the locked position so that the blade can be easily removed. As shown in the photo the carbides are released by turning the lock bars 270 degrees counter clockwise. The top carbide lever is shown in the photo. The bottom lock lever is on the lower guide arm.
5. Turn the Blade Tension Switch from the TIGHTEN position (< + >), through the unmarked, central HOLD position, and briefly to the LOOSEN position (> - <).
 - By jogging the switch between hold and loosen, it is possible to regulate the degree of looseness of the blade. It is helpful to have the blade just loose enough that it stays on the wheels and in the blade guides, but can be manually pulled off the wheels and out of the guides.
6. Pull the blade forward out of the slot on the inside walls of the blade wheel housings and out of blade guides.
7. Store or dispose of the used blade.



Head retract limit override button.



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



Blade tension switch

BLADE INSTALLATION

NOTES ABOUT NEW BLADES:

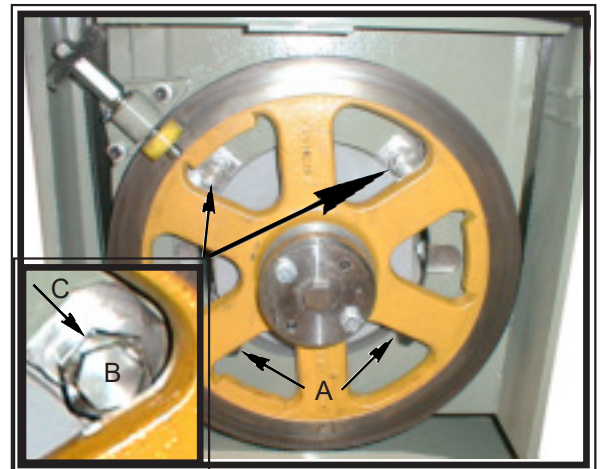
- It is helpful to have two people to install a new blade.
 - A new blade will come folded into a compact coil. Follow the blade manufacturer's instructions for safely unfolding blade.
 - The blade must be installed with the teeth facing out towards the front of the saw where it passes around the wheels,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

BLADE TRACKING

First, inspect the blade wheels for wear or damage and repair as required. Blade tracking adjustment should always begin at the wheel where the tracking is farthest out of specification. Using the instructions below, adjust the worst wheel, jog the blade and check both wheels. Repeat this process until both wheels are within specification (.200-.220" of tooth overhang from the front of the wheel). Both the drive and idler wheels are factory set a certain distance from the wall behind the wheel. Adjustment should not be required unless the wheel is being replaced. On the drive wheel there is a large hex head bolt and four set screws in a "push/pull" arrangement. For the idler wheel there is single adjuster assembly in the centre of the idler shaft under the cover on the front of the head. Hyd-Mech Service should be contacted before making any adjustment to the wheel position.

DRIVE WHEEL ADJUSTMENT

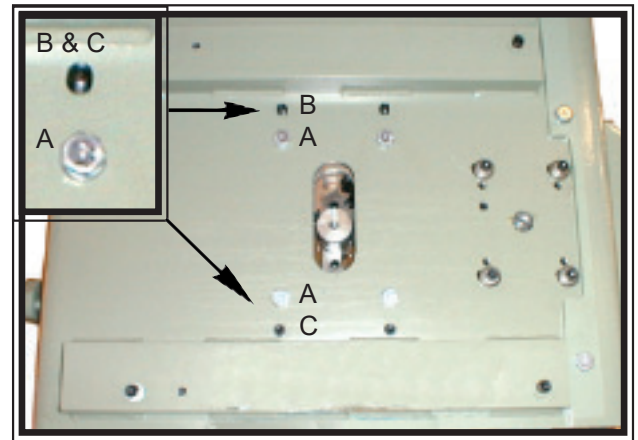
Adjustments should be made with the blade tension released slightly. The drive wheel has two mounting bolts and two adjusting bolt assemblies. The mounting bolts (A) should be loosened but remain snug before making any adjustment to the bolt assemblies (B & C). Both of the bolt assemblies should be adjusted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



Drive wheel mounting bolts and tracking bolt assemblies.

IDLER WHEEL ADJUSTMENT

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

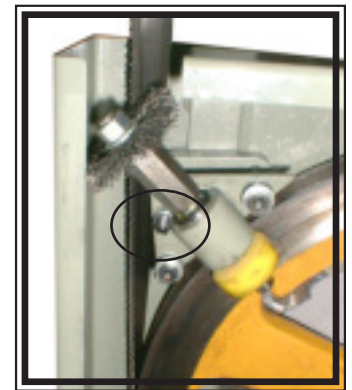


Idler wheel tracking bolts (A) and set screws (B & C) with the cover removed.

BLADE BRUSH ADJUSTMENT

The blade brush is properly set when the machine leaves the factory but it will wear during operation and needs to be adjusted periodically. The blade brush assembly is shown right. In order to adjust it, the nut on the adjusting screw needs to be loosened and the screw turned counter clockwise to move the brush closer to the blade until the wires on the brush touch the bottom of the blade gullets. If a new brush is being installed, then the adjusting screw must be turned clockwise in order to move the new brush away from the blade so that the wires are touching the bottom of the gullets.

If the brush gets worn to approximately 70% of its original 3" diameter it should be replaced. A brush may be purchased from your HYD-MECH dealer.



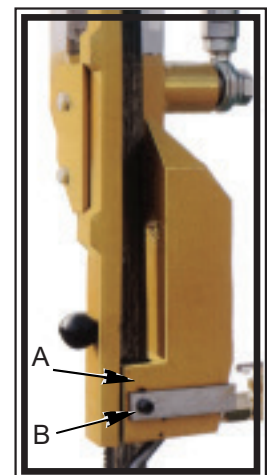
Blade brush & adjusting screw (circled).

BLADE GUIDES

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

In the event that the pads must be replaced, refer to the exploded parts drawing in Section 6.

Blade guide adjusting screws.



GEARBOX LUBRICATION (V18 WITH A412 GEARBOX)

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

The suggested oil change interval is given below:

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

LUBRICATION

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

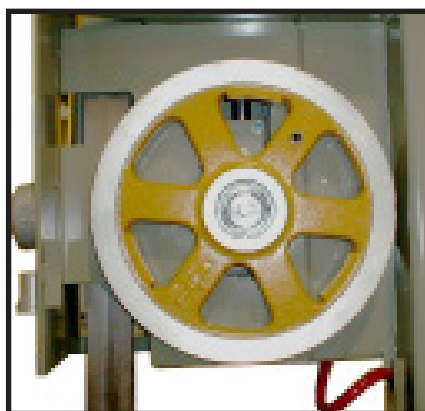
In addition to the grease fittings shown, it is good practice to maintain a constant greased surface on the vise ways. As the vises are precision fit to the vise table, the constant friction of metal to metal can be effectively alleviated with the application of a general purpose grease. If the saw is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



One of 4 linear bearing block grease nipples. There is one at each corner of the head carrier cover.



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



Idler wheel slide assembly grease nipples are found behind the wheel. One above and one below the wheel shaft. A flexible grease gun hose with a 45° fitting is required to apply the grease.

HYDRAULIC MAINTENANCE

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

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

CANFLO - RSE-30-10

GRESEN - K-23018

LHA - SPE-15-10

ZINGA - AE-10

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

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

Recommended replacement oils:

Chevron - AW Hydraulic Oil 46

Conoco - Super Hydraulic 46

Mobil - Mobil DTE 25

Esso - NUTO H46

Shell - Tellus 46

3 HYDRAULIC OIL CHANGE - Oil visual inspection should be conducted with every filter change for the following signs of degradation:

Milky or hazy oil colour

Burnt smell

Varnish or sludge formation

Increased viscosity

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

4. OIL TEMPERATURE - Oil temperature is indicated by a thermometer contained in the level gauge. Oil temperature during steady operation should stabilize at about 50 - 55°F (10° - 13°C) above room temperature. Thus in a 70°F (21°C) shop one might expect an oil temperature of about 120°F (49°C). Oil temperature should never exceed 160°F (71°C).

5. OIL PRESSURE - Oil pressure is factory set to 650 psi and should not require further attention

NOTE: For extended head, pressure is factory set at 900 psi

Filter



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

TROUBLE SHOOTING GUIDE

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

- NOTES:**
- 1) IF THE BLADE IS RUNNING CLOCKWISE OR THE HYDRAULIC PUMP IS NOISY SHUT THE SAW DOWN IMMEDIATELY!**
 - 2) IF THE DRIVE MOTOR IS TO BE REPLACED, IT MUST BE REPLACED WITH A NON-VENTED MOTOR TO PREVENT COOLANT LEAKING INTO THE MOTOR.**
 - 3) THE HEAD SHOULD BE SWUNG TO 45° LEFT OR RIGHT BEFORE ANY HYDRAULIC SERVICE IS PERFORMED TO PREVENT THE HEAD FROM MOVING UNEXPECTEDLY.**

ELECTRICAL TROUBLESHOOTING

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

CUTTING AND BLADE TROUBLESHOOTING

PROBLEMS	CAUSE	SOLUTION
1) Saw is cutting out of square.	1a) Blade is worn.	1a) Change the blade and check alignment with new blade.
	1b) Blade guide is worn or not adjusted.	1b) Replace the worn guide or adjust the guide until the blade is cutting square.
2) Blade comes off wheels.	2a) Blade tension is insufficient.	2a) Blade tension is determined by system pressure. Check. (Extended head, check if blade tension gauge reads 650psi.)
	2b) Blade tracking out of adjustment.	2b) Have tracking set to blade specification.
3) Blade stalls while cutting.	3a) Blade tension is insufficient.	3a) Blade tension is determined by system pressure. Check. (Extended head, check if blade tension gauge reads 650psi.)
	3b) Excessive feed force.	3b) Reduce the Feed Force pressure and attempt cut.
4) Blade vibrates excessively.	4a) Blade tension is insufficient.	4a) Blade tension is determined by system pressure. Check. (Extended head, check if blade tension gauge reads 650psi.)
	4b) Blade speed excessive.	4b) Reduce the blade speed to eliminate vibration.
	4c) Guide arms too far apart.	4c) Adjust the distance between the guide arms to minimum possible.
5) Excessive blade breakage.	5a) Excessive feed rate.	5a) Reduce the feed rate and check system pressure.
	5b) Excessive blade tension.	5b) Blade tension is determined by system pressure. Check.
6) Tooth strippage.	6a) Blade Pitch is too fine.	6a) Select a blade with a coarser pitch for cutting.
	6b) Blade brush is not cleaning.	6b) Replace or adjust the blade brush.
	6c) Excessive feed rate.	6c) Reduce the feed rate. Check calculations for rate.
	6d) Excessive feed force.	6d) Reduce the feed force pressure maximum setting.
7) No coolant flow.	7a) Coolant reservoir low or empty.	7a) Add coolant to the reservoir. Check for leaks.
	7b) Coolant line is blocked.	7b) Use compressed air to blow obstruction out of the line.
	7c) Coolant pump not operating.	7c) Check the pump output and replace if necessary.

<i>PROBLEMS</i>	<i>CAUSE</i>	<i>SOLUTION</i>
8) Head will not advance.	8a) The feed rate valve is closed.	8a) Pointer is at "0". Turn the Feed Rate Knob counter clockwise to open.
	8b) The Feed Force limit is too low.	8b) Increase the Feed Force limit.
	8c) Pointer out of adjustment.	8c) Loosen pointer lock nut. Turn the knob clockwise to "0". Tighten lock nut.
9) Head advances with feed at "0".	9a) Pointer stopped but valve open.	9a) Loosen pointer lock nut. Turn the knob clockwise to "0". Tighten lock nut.
	9b) Fast Approach is open. Blocked lever.	9b) Adjust Fast Approach lever. Phone factory for details.

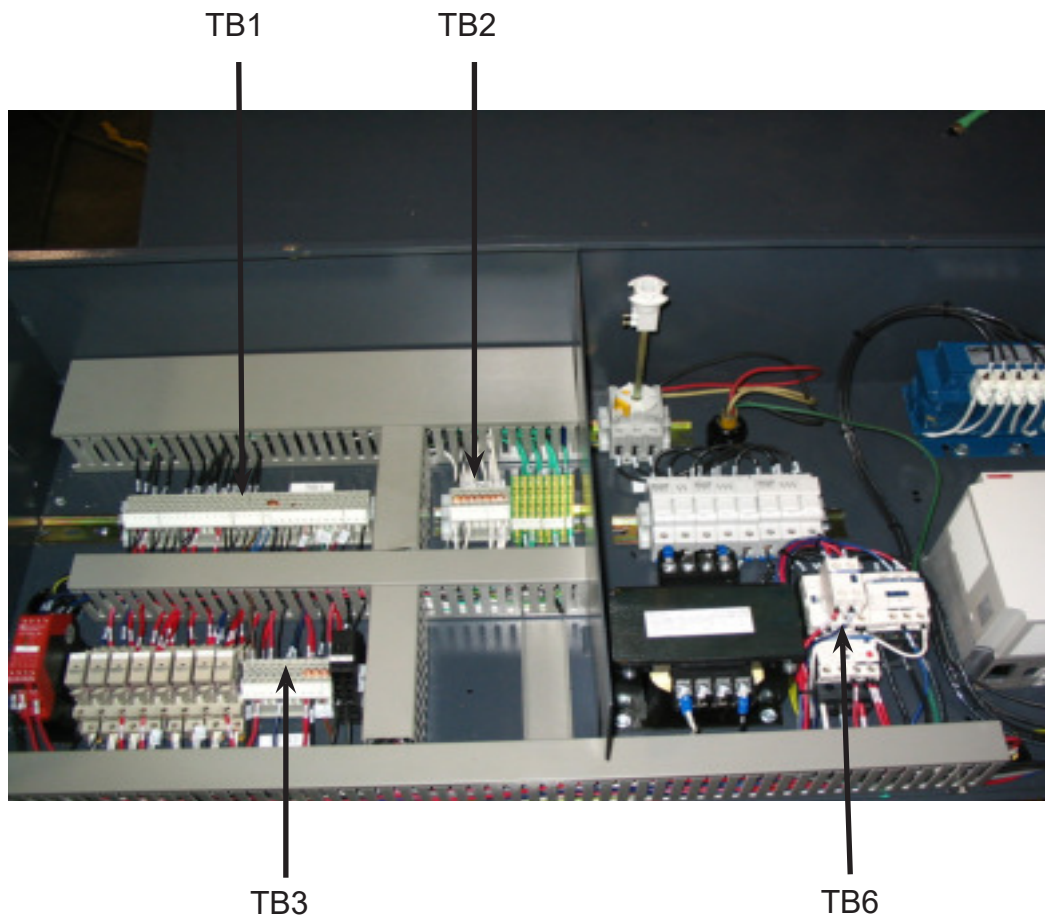
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SECTION 4 - ELECTRICAL

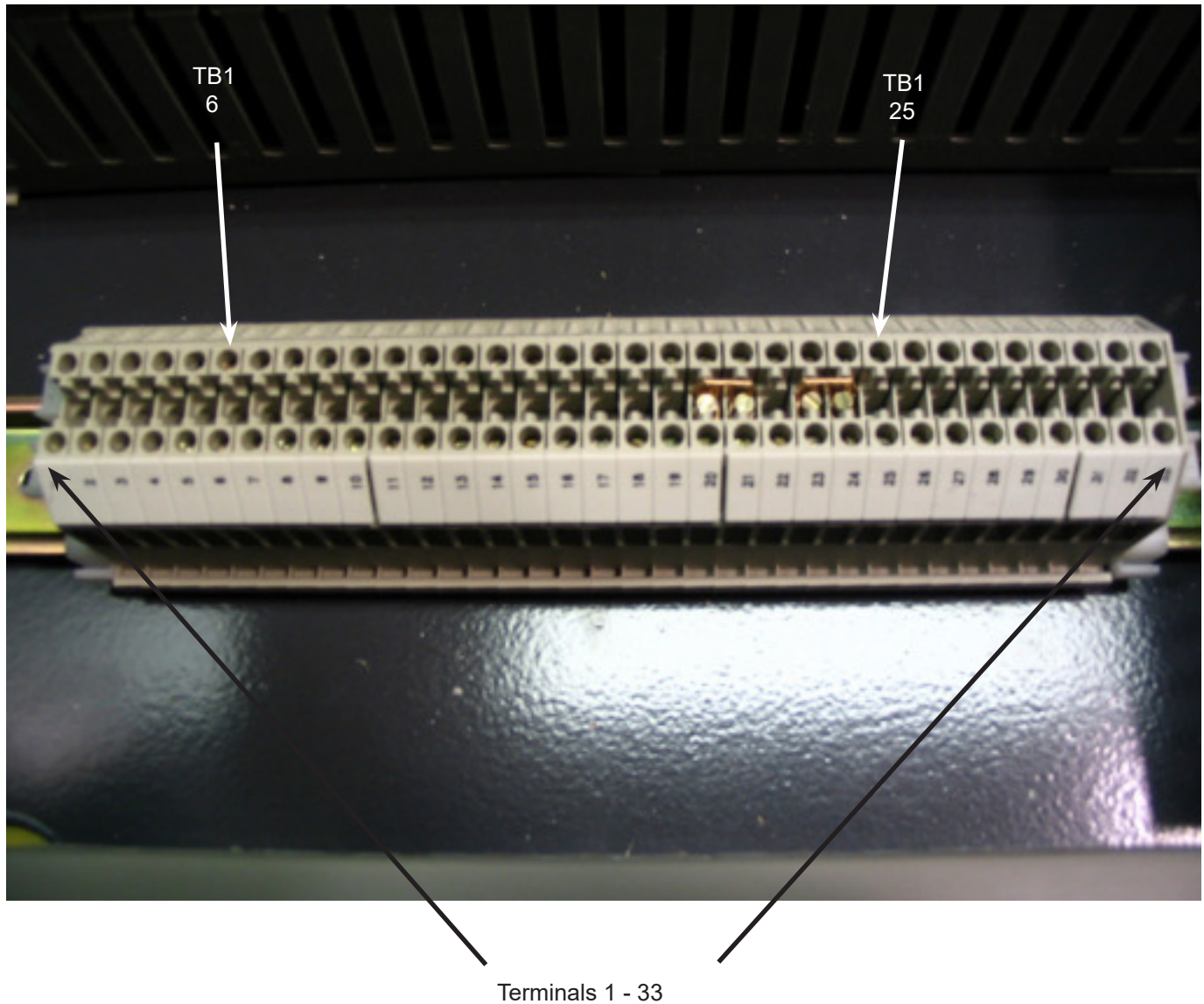
V18 COMPONENT LOCATION

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



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

TERMINAL BLOCK 1



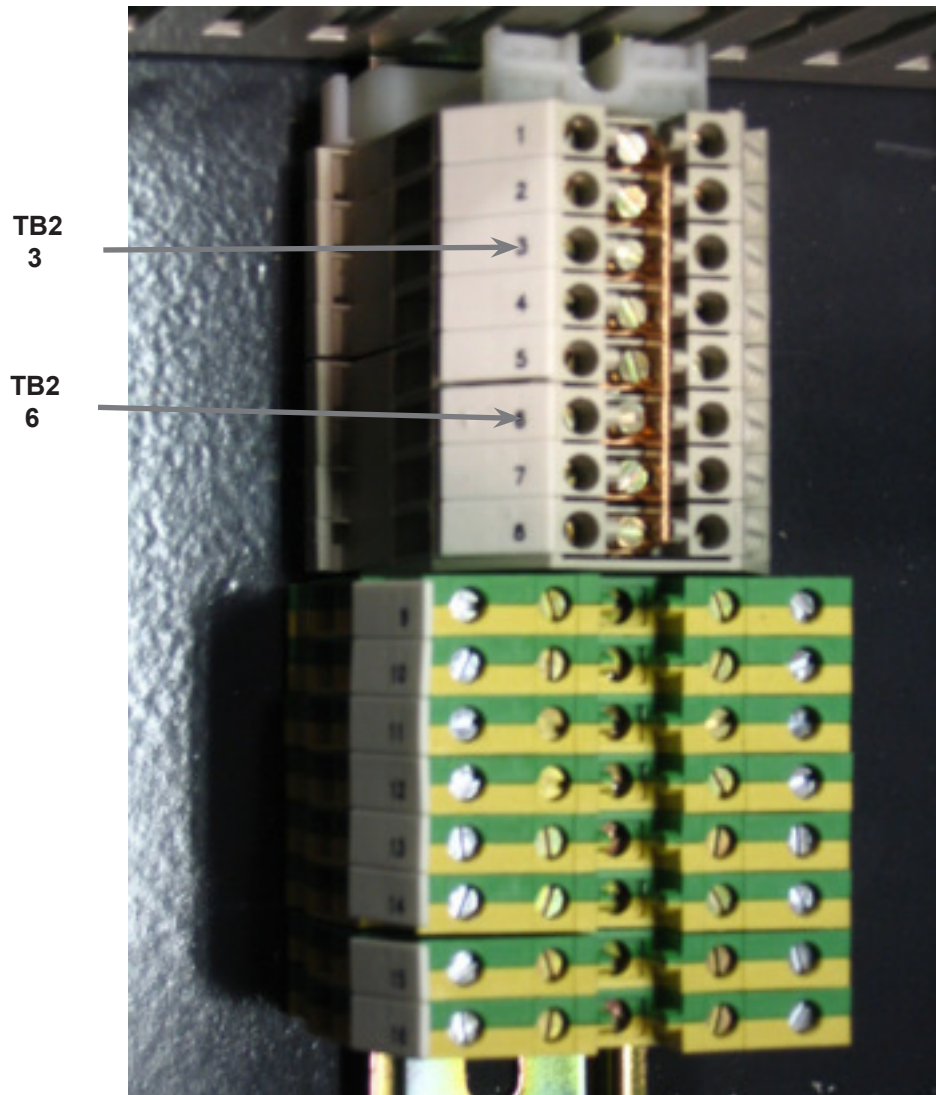
Page 4.1 shows the position of TB1 in the control panel. It can be seen that TB1 has only terminals mounted to it.

For example, if the electrical schematic shows a terminal, described as $\begin{matrix} \text{TB1} \\ 6 \end{matrix}$

This indicates that the terminal is located on din rail TB1 and is terminal #6.

$\begin{matrix} \text{TB1} \\ 25 \end{matrix}$ would indicate that the terminal is mounted on TB1 and is terminal #25.

TERMINAL BLOCK 2



A close up view of TB2 is shown.

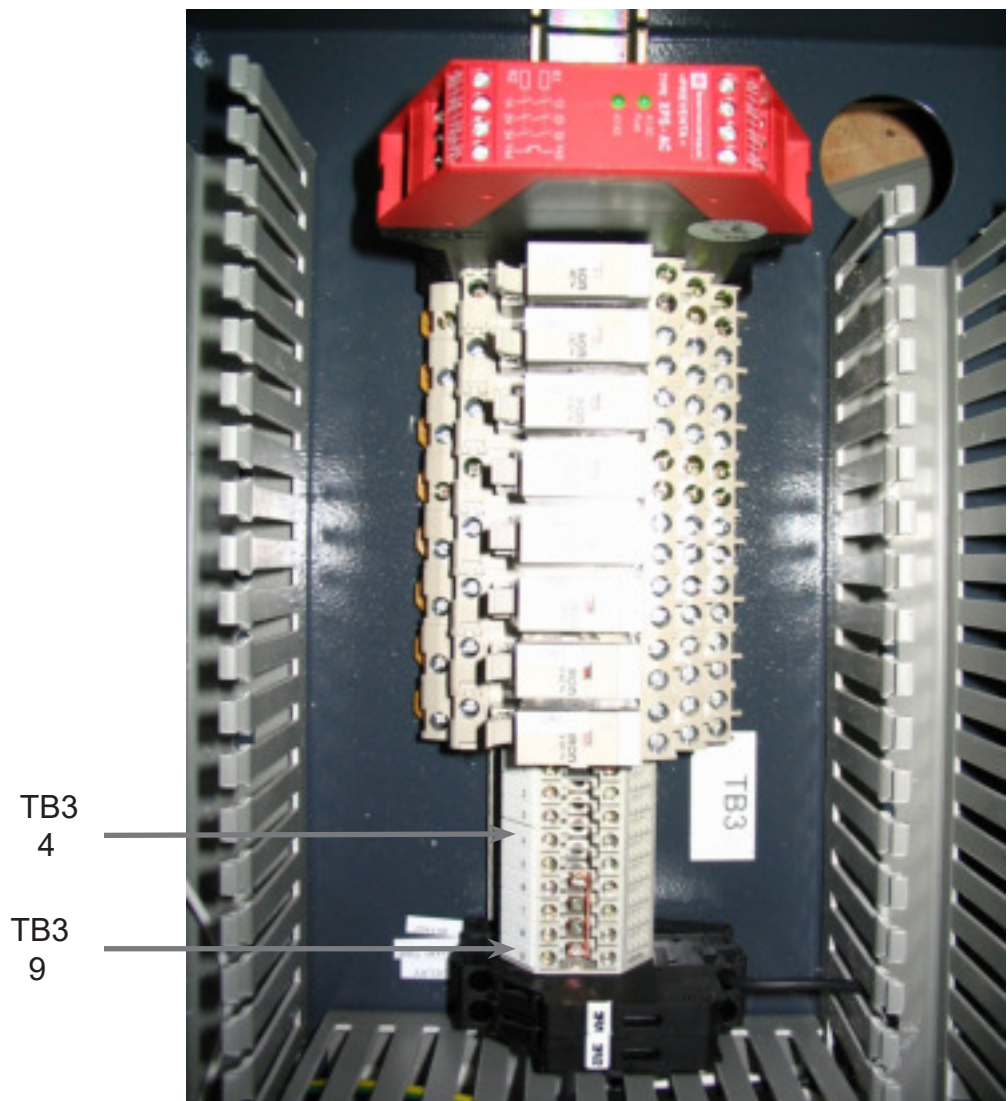
Page 4.1 shows the position of TB2 in the control panel.

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

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

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

TERMINAL BLOCK 3



A close up view of TB3 is shown.

Page 4.1 shows the position of TB3 in the control panel.

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

TB3
4

This indicates that the terminal is located on din rail TB3 and is terminal #4.

TB3
9

 would indicate that the terminal is mounted on TB3 and is terminal #9.

TERMINAL BLOCK 3. Close up view of Control Relays



TERMINAL BLOCK 4 (TB4): See page 4.7

TERMINAL BLOCK 5 (TB5) : TB5 IS NOT USED on the V18 machine

TERMINAL BLOCK 6



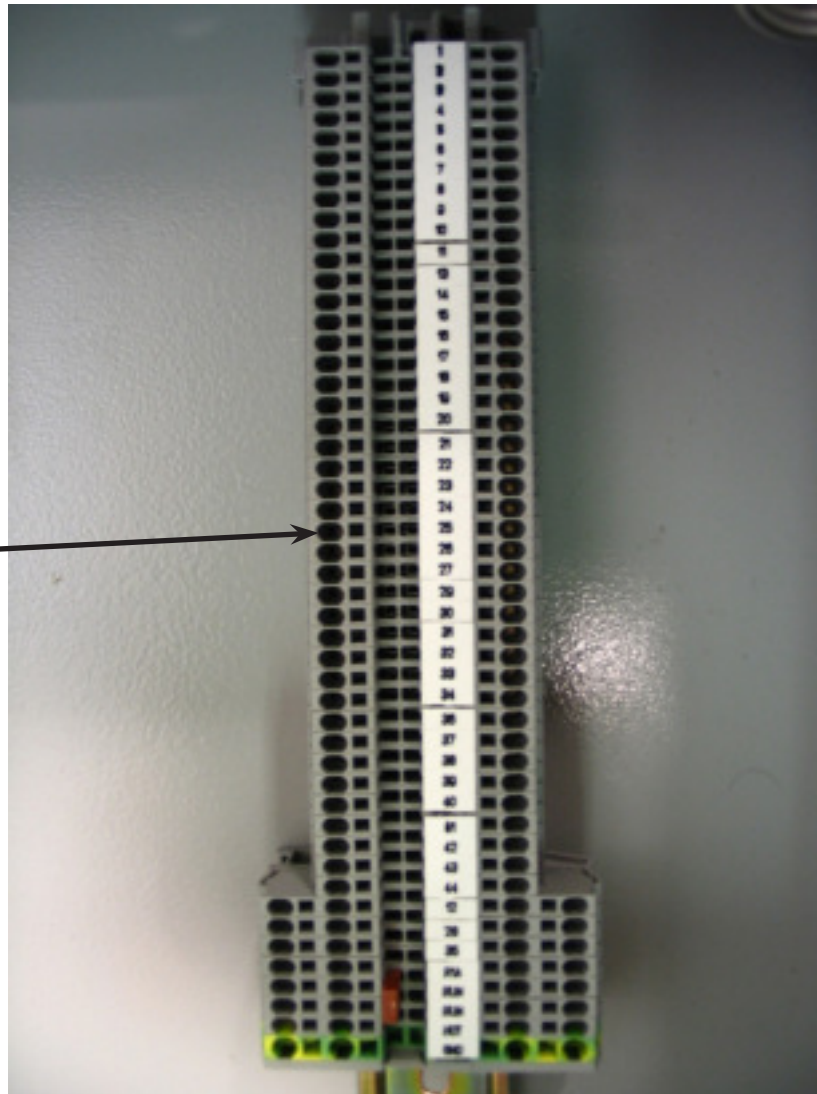
TB6 Contains ground terminals (partially visible) mounted either side of the contactors MS1M & MS2M and are indicated on the schematic as:

TB6 & TB6
1 2

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

TERMINAL BLOCK 4

TB4
25



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

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

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

DT (Device Tag)

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

DT, CR20 is the Left Vise control relay labeled CR20.

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

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

DT, SS4 is the selector switch for Head Control, labeled SS4

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 is a column 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.

**FOR ELECTRICAL SCHEMATICS AND PARTS LIST
SEE PDF ON ATTACHED CD**

SECTION 5 - HYDRAULICS

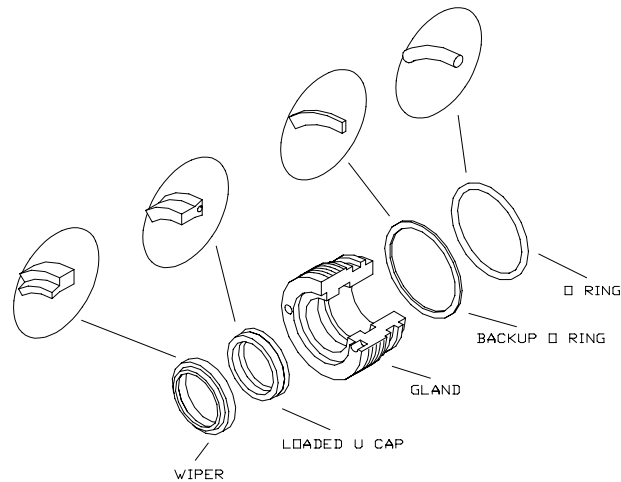
The V18 hydraulic system does not require any special work on a new machine before its start-up. The hydraulic tank is filled with Texaco Rando HD 46 oil and all machine functions have been tested at the factory to ensure the proper operation upon start-up.

V18 HYDRAULIC PARTS LIST

ITEM	QTY	V18 PART NUMBER	DESCRIPTION
1	1	V18-C4-00A	HEAD CYLINDER
2	2	VW18-C3A-00B	WISE CYLINDER
3	1	S25-C5-00	BLADE TENSION CYLINDER
4	1	V18L-C8-00	HEAD SWING BRAKE CYLINDER
5	(1)	V18L-C6-00A	GUIDE ARM CYLINDER
6	1	V18-C7A-00A	HEAD SWING CYLINDER
7	(1)(2)	V18-531-00	BUNDLING CYLINDER (option)
	(1)(2)	V18C-531-00	CANTED HEAD BUNDLING CYLINDER
8	(1)(2)	V18-C10-00	LIFT ROLLER CYLINDER (option)
10	2	363290	WISE VALVES, DCV3P-AB-C
11	1	363290	BLADE TENSION VALVE, DCV3P-AB-C
12	1	363295	GUIDE ARM VALVE, DCV3P-AB-T
13	1	363295	HEAD SWING VALVE, DCV3P-AB-T
14	1	363290	CHIP AUGER VALVE (option), DCV3P-AB-C
15	3	363300	DOUBLE PILOT CHECK VALVE, DPCH-1
16	1	CHB-15C	SWING CUSHION BLOCK
17	1	DDF5-0-00	DOWN FEED VALVE
18	1	MB6PA	MANIFOLD BLOCK (6 position)
19	2(3)	360745	PRESSURE GUAGE (1000psi)
20	1	395410	CHIP AUGER MOTOR (option)
21	1	362745	PUMP
22	1	363110	SUCTION STRAINER
23	1	363105	RETURN FILTER
24	1	EB-01A	EXTENSION BLOCK
25	1	JB-01B	SINGLE JUNCTION BLOCK (VVP OPTION)
26	1	363150	PRESSURE REDUCING VALVE (VVP OPTION)
27	1	363160	SWING CUSHION VALVE
28	1	363160	HOLD VALVE
29	1	363305	PRESSURE REDUCING, blade tension
30	1	363305	PRESSURE REDUCING VALVE, head

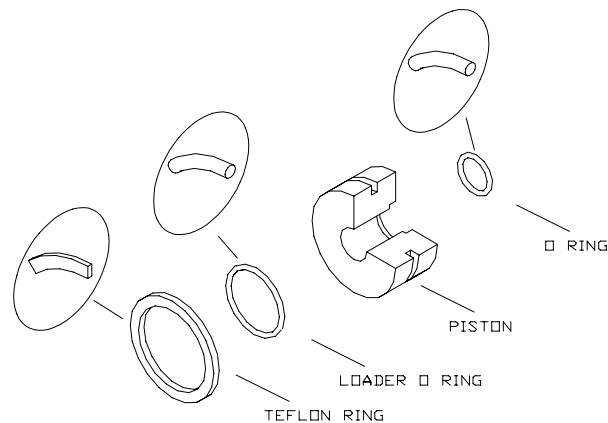
CYLINDER ASSEMBLIES

GLAND ASSEMBLIES



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

PISTON ASSEMBLIES



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

**FOR HYDRAULIC SCHEMATICS AND 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

SECTION 8 - SPECIFICATIONS

V18 SPECIFICATIONS

Capacity	at 90° rectangular	18"x 31"(457mm x 787mm)
	at 90° rectangular	18"x 28"(457mm x 711mm) with 6° option
	at 90° rectangular	18"x18"(457mm x 457mm) with 6° cant option
	at 90° round	17.5" (445mm) with tall vise insert option
	at 45° rectangular	18"x 21"(457mm x 533mm)
	at 45° rectangular	18"x 19"(457mm x 483mm) with 6° option
	at 45° rectangular	18"x12"(457mm x 305mm) with 6° cant option
	at 90° rectangular	18"x 12"(457mm x 305mm) with bundling option
	at 45° rectangular	18"x 6"(457mm x 152mm) with bundling options
	at 90° rectangular	18"x 10"(457mm x 508mm) with 6° cant and bundling
Blade	Length	14'11" (4547mm) - 16'11" (5157mm)
	Width	1 1/4" (31.75mm)
Blade Tension	Hydraulic	
Blade Speed	variable	65 - 385 sf/min (20 - 118 m/min)
Blade Guides	carbide inserts	
Blade Wheel Dia.	19" (483mm)	
Motors	blade drive	7 1/2 HP (5.6 KW)
	hydraulic pump drive	2 HP (1.5 KW)
Pumps	Hydraulic	6 1/2 U.S. Gal. / min (25 Liters / min)
	Coolant	3 1/2 U.S. Gal. / min (13 Liters / min)
Vises	hydraulic full stroke	
Head Swing	hydraulically positioned and locked, full 45° left or right	
Table Height	38" (965mm)	
Feed System	variable pressure 0-300 PSI (0-2068 kPa), variable rate 0-15 in/min (0-380 mm/min)	
System Pressure	650 PSI (4482 kPa)	
Tank Capacity	Hydraulic	8 US Gallons (30 Liters)
	Coolant	30 US Gallons (114 Liters)
Guide Arm	hydraulically positioned and locked	
Machine Weight	4500 lbs (2041 Kg)	
Overall Dimensions	108" (2740mm) high @ 90° x 120" (3048mm) wide x 80" (2032mm) long	



SECTION 9 - WARRANTY

WARRANTY

Hyd·Mech Group Limited warrants parts/components on each new V18 bandsaw to be free from failure resulting from defective material and workmanship under proper use and service for a period of two years following the date of shipment to the user. Hyd·Mech's sole obligation under this warranty is limited to the repair or replacement without charge, at Hyd·Mech's factory, warehouse, or approved repair shop any part or parts which Hyd·Mech's inspection shall disclose to be defective. Return freight must be prepaid by the user.

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

MOTOR, GEARBOX, PUMP, ELECTRIC COMPONENTS, VALVES, HOSES, FITTINGS, and any other items used in the manufacture of the V18, but not originally manufactured by Hyd·Mech are subject to the original manufacturer's warranty. Hyd·Mech will provide such assistance and information as is necessary and available to facilitate the user's claim to such other manufacturer.

Liability or obligation on the part of Hyd·Mech for damages, whether general, special or for negligence and expressly including any incidental and consequential damages is hereby disclaimed. Hyd·Mech's obligation to repair or replace shall be the limit of its liability under this warranty and the sole and exclusive right and remedy of the user.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, WRITTEN OR ORAL, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

This warranty may not be changed, altered, or modified in any way except in writing by Hyd-Mech Group Limited

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