HAFCO METALMASTER

Edition : 2.0
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Instruction Manual

METAL CUTTING BAND SAW
BS-10LS

Order Code: (B021)

MACHINE DETAILS

MACHINE.	METAL CUTTING BAND SAW
MODEL NO.	BS-10LS
SERIAL NO.	
DATE OF MANF.	

IMPORTED BY

AUSTRALIA

HARE&FORBES MACHINERYHOUSE

www.machineryhouse.com.au

NEW ZEALAND

MACHINERYHOUSE

www.machineryhouse.co.nz

NOTE:
This manual is only for your reference. At the time of the compiling of this manual every effort to be exact with the instructions, specifications, drawings, and photographs of the machine was taken. Owing to the continuous improvement of the HAFCO METALMASTER machine, changes may be made at any time without obligation or notice. Please ensure the local voltage is the same as listed on the specification plate before operating any electric machine.

SAFETY SYMBOLS:
The purpose of safety symbols is to attract your attention to possible hazardous conditions

⚠WARNING Indicates a potentially hazardous situation causing injury or death

⚠CAUTION Indicates an alert against unsafe practices.

Note: Used to alert the user to useful information

NOTE:
In order to see the type and model of the machine, please see the specification plate. Usually found on the back of the machine. See example (Fig.1)

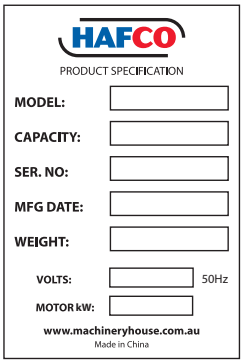


Fig.1

CONTENTS:

1.1 SPECIFICATIONS

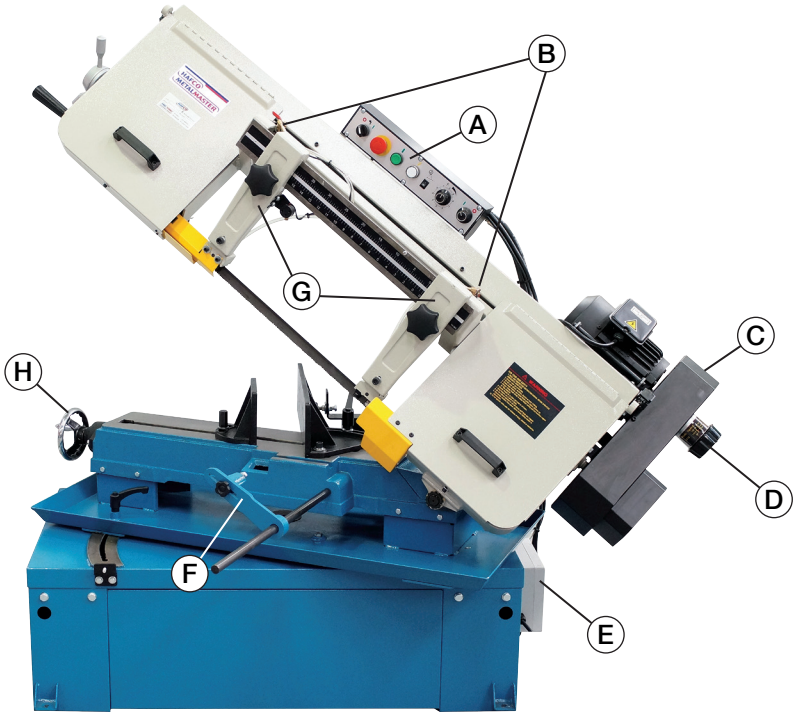
Order Code	B021
Model	**BS-10LS**
Operation Type	Swivel Head
Capacity Round @ 90° (mm)	250
Capacity Round @ 45° (mm)	235
Capacity Square @ 90° (mm)	250
Capacity Square @ 45° (mm)	235
Capacity Rectangle (W x H) @ 90° (mm)	468 x 255
Capacity Rectangle (W x H) @ 45° (mm)	240 x 240
Table Working Height (mm)	675
Cutting Head Beam Type	Manual
Cutting Head Beam Return	Manual Return
Cutting Head Down Feed Control	Adjustable Hydraulic
Vice Clamping Fixture	Manual
Blade Steps / Speeds (m/mm)	Variable 18 - 102
Blade Size (L x W x T) (mm)	3090 x 27 x 0.9
Motor Power (kW / hp)	1.5 /2.0
Voltage / Amperage (V / Amp)	415 / 15
Dimensions (LxWxH) (mm)	1700 x 762 x 1076
Nett Weight (kg)	380

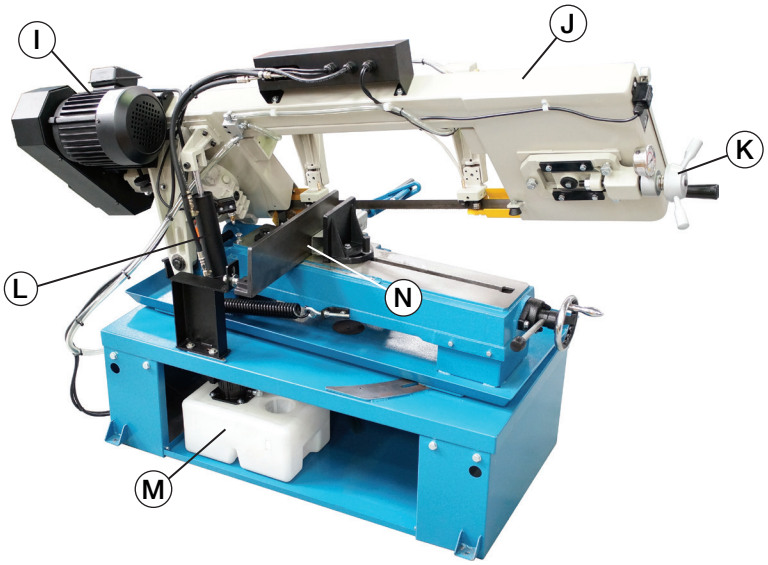
1.2 ACCESSORIES

- Adjustable length stop for repetition cutting
- Wire wheel brush to clean swarf from blade
- Band Saw Blade
- Instruction Manual

1.3 IDENTIFICATION

Become familiar with the names and locations of the controls and features shown below to better understand the instructions when mentioned later in this manual.





A	Control Panel	**H**	Vice Hand Wheel
B	Coolant Valve	**I**	Motor
C	Pulley Cover	**J**	Headstock (Bow)
D	Variable Blade Speed Control	**K**	Blade Tension Handle
E	Electrical Box	**L**	Feed Cylinder
F	Length Stop	**M**	Coolant System
G	Blade Guides	**N**	Vise

2. SAFETY

2.1 GENERAL METALWORKING MACHINE SAFETY

DO NOT use this machine unless you have read this manual or have been instructed in the use of this machine in its safe use and operation.

WARNING!

This manual provides safety instructions on the proper setup, operation, maintenance, and service of this machine. Save this manual, refer to it often, and use it to instruct other operators.

Failure to read, understand and follow the instructions in this manual may result in fire or serious personal injury, including amputation, electrocution, or death.

The owner of this machine is solely responsible for its safe use. This responsibility includes, but is not limited to proper installation in a safe environment, personnel training and authorization to use, proper inspection and maintenance, manual availability and comprehension, of the application of the safety devices, integrity, and the use of personal protective equipment.

The manufacturer will not be held liable for injury or property damage from negligence, improper training, machine modifications or misuse.

- ✓ Always wear safety glasses or goggles.
- ✓ Wear appropriate safety footwear.
- ✓ Wear respiratory protection where required.
- ✓ Gloves should never be worn while operating the machine, and only worn when handling the work piece.
- ✓ Wear hearing protection in areas > 85 dBA. If you have trouble hearing someone speak from one metre (three feet) away, the noise level from the machine may be hazardous.
- ✓ DISCONNECT THE MACHINE FROM POWER when making adjustments or servicing.
- ✓ Check and adjust all safety devices before each job.
- ✓ Ensure that guards are in position and in good working condition before operating.
- ✓ Ensure that all stationary equipment is anchored securely to the floor.
- ✓ Ensure all machines have a start/stop button within easy reach of the operator.
- ✓ Each machine should have only one operator at a time. However, everyone should know how to stop the machine in an emergency.

2.1 GENERAL SAFETY REQUIREMENTS CONT.

- ✓ Ensure that keys and adjusting wrenches have been removed from the machine before turning on the power. Appropriate storage for tooling should be provided.
- ✓ Ensure that all cutting tools and blades are clean and sharp. They should be able to cut freely without being forced.
- ✓ Stop the machine before measuring, cleaning or making any adjustments.
- ✓ Wait until the machine has stopped running to clear cuttings with a vacuum, brush or rake.
- ✓ Keep hands away from the cutting head and all moving parts.
- ✓ Avoid awkward operations and hand positions. A sudden slip could cause the hand to move into the cutting tool or blade.
- ✓ Return all portable tooling to their proper storage place after use.
- ✓ Clean all tools after use.
- ✓ Keep work area clean. Floors should be level and have a non-slip surface.
- ✓ Use good lighting so that the work piece, cutting blades, and machine controls can be seen clearly. Position any shade lighting sources so that they do not cause any glare or reflections.
- ✓ Ensure there is enough room around the machine to do the job safely.
- ✓ Obtain first aid immediately for all injuries.
- ✓ Understand that the health and fire hazards can vary from material to material. Make sure all appropriate precautions are taken.
- ✓ Clean machines and the surrounding area when the operation is finished.
- ✓ Use proper lock out procedures when servicing or cleaning the machines or power tools.

DO NOT

- × Do not distract an operator. Horseplay can lead to injuries and should be strictly prohibited.
- × Do not wear loose clothing, gloves, neckties, rings, bracelets or other jewellery that can become entangled in moving parts. Confine long hair.
- × Do not handle cuttings by hand because they are very sharp. Do not free a stalled cutter without turning the power off first. Do not clean hands with cutting fluids.
- × Do not use rags or wear gloves near moving parts of machines.
- × Do not use compressed air to blow debris from machines or to clean dirt from clothes.
- × Do not force the machine. It will do the job safer and better at the rate for which it was designed.

CAUTION!

It is impossible to cover all possible hazards Every workshop environment is different. These are designed as a guide to be used to compliment training and as a reminder to users prior to equipment use. Always consider safety first, as it applies to the individual working conditions.

2.1 GENERAL SAFETY REQUIREMENTS Cont.

HAZARDS ASSOCIATED WITH MACHINES include, but are not limited to:

- Being struck by ejected parts of the machinery.
- Being struck by material ejected from the machinery.
- Contact or entanglement with the machinery.
- Contact or entanglement with any material in motion.

Health Hazards (other than physical injury caused by moving parts)

- Chemicals hazards that can irritate, burn, or pass through the skin.
- Airborne items that can be inhaled, such as oil mist, metal fumes, solvents, and dust.
- Heat, noise, and vibration.
- Ionizing or non-ionizing radiation. (X-ray, lasers, etc.)
- Biological contamination and waste.
- Soft tissue injuries (for example, to the hands, arms, shoulders, back or neck) resulting from repetitive motion, awkward posture, extended lifting, and pressure grip.

Other Hazards

- Slips and falls from and around machinery during maintenance.
- Unstable equipment that is not secured against falling over.
- Safe access to/from machines. (access, egress)
- Fire or explosion.
- Pressure injection injuries from the release of fluids and gases under high pressure.
- Electrical Hazards, such as electrocution from faulty or ungrounded electrical components.
- Environment in which the machine is used. (in a machine shop, or on a work site)

WARNING!

The machine is the sole responsibility of the owner for its safe use. This responsibility includes but is not limited to proper installation in a safe environment, personnel training, proper inspection and maintenance, manual availability and comprehension. The manufacturer will not be held liable for injury or property damage from negligence, improper training, machine modifications or misuse.

WARNING!

Machines are safeguarded to protect the operator from injury or death with the placement of guards. Machines must not be operated with the guards removed or damaged.

2.2 SPECIFIC SAFETY FOR METAL CUTTING BAND SAW

DO NOT use this machine unless you have been instructed in its safe use and operation and have read and understood this manual

Safety glasses must be worn at all times in work areas

Long and loose hair must be contained.

Gloves must not be worn when using this machine.

Sturdy footwear must be worn at all times in work areas

Close fitting/ protective clothing must be worn

Rings and jewelery must not be worn.

PRE-OPERATIONAL SAFETY CHECKS

1. Ensure no slip/trip hazards are present in workspaces and walkways.
2. Check that all guards are in position.
3. Ensure hydraulic damping mechanism functions.
4. Check that the blade is in good condition.
5. Ensure that blade speed, blade tension and blade tracking are properly adjusted.
6. Check coolant delivery system to allow for sufficient flow of coolant.
7. Locate and ensure you are familiar with the operation of the ON/OFF starter and E-Stop.
8. Faulty equipment must not be used. Immediately report suspect machinery.

OPERATIONAL SAFETY CHECKS

1. Lift the head of unit up and lock it in the upward position.
2. Set the angle of the vice, or check it to ensure its squareness.
3. Clamp work piece firmly into the vice. Long material must be supported.
4. Adjust blade guards to cover unused portion of blade.
5. Ensure hands are away from the blade, and then turn the machine on.
6. Allow the upper head assembly to come down slowly until the teeth are cutting the material.
7. Keep hands away from the point of operation during cutting.
8. Turn off the machine and bring it to a complete standstill if the blade is to be lifted out of an uncompleted or jammed cut.
9. Stop the machine and bring it to a complete standstill before removing scrap pieces from the vice area or making adjustments.
10. Stop the saw immediately if the blade develops a ‘click’. Report it to your supervisor.
11. Ensure the cutting head is locked in the upward position before removing work piece.

AFTER OPERATION

1. Switch off the saw and reset all guards to a fully closed position.
2. Leave the machine in a safe, clean and tidy state.

DO NOT

- Pushing down on the cutting head while it is cutting.
- Leaving the machine running unattended.

3. POWER SUPPLY

3.1 ELECTRICAL REQUIREMENTS

Place the machine near an existing power source. Make sure all power cords are protected from traffic, material handling, moisture, chemicals, or other hazards. Make sure there is access to a means of disconnecting the power source. The electrical circuit must meet the requirements for 415V. To minimize the risk of electrocution, fire, or equipment damage, these machines can be hard wired with installation work and electrical wiring done by a qualified electrician.

NOTE: The use of an extension cord is not recommended as it may decrease the life of electrical components on your machine.

ELECTRICAL REQUIREMENTS

Nominal Voltage..... 415V
Cycle..... 50 Hz
Phase.....Three Phase
Power Supply Circuit.....10 Amps
Full Load Current..... 3.5 Amps

(Full load current rating is also on the specification plate on the motor.)

3.2 FULL-LOAD CURRENT RATING

The full-load current rating is the amperage a machine draws when running at 100% of the output power. Where machines have more than one motor, the full load current is the amperage drawn by the largest motor or a total of all the motors and electrical devices that might operate at one time during normal operations.

Full-Load Current Rating for these machine can be found on the motor nameplate.

It should be noted that the full-load current is not the maximum amount of amps that the machine will draw. If the machine is overloaded, it will draw additional amps beyond the full-load rating and if the machine is overloaded for a long period of time, damage, overheating, or fire may be caused to the motor and circuitry.

This is especially true if connected to an undersized circuit or a long extension lead. To reduce the risk of these hazards, avoid overloading the machine during operation and make sure it is connected to a power supply circuit that meets the requirements.

4 SET-UP

4.1 UNPACKING

This machine was carefully packaged for safe transport. When unpacking, separate all enclosed items from packaging materials and inspect them for shipping damage. If items are damaged, please contact your distributor.

NOTE: Save all the packaging materials until you are completely satisfied with the machine and have resolved any issues with the distributor, or the shipping agent.

When unpacking, check the packing list to make sure that all parts shown are included. If any parts are missing or broken, please contact your distributor.

4.2 CLEAN - UP

The unpainted surfaces of the machine have been coated with a waxy oil to protect them from corrosion during shipment. Remove the protective coating with a solvent cleaner or a citrus based degreaser.

Optimum performance from your machine will be achieved when you clean all moving parts or sliding contact surfaces that are coated with rust preventive products.

It is advised to avoid chlorine based solvents, such as acetone or brake parts cleaner, as they will damage painted surfaces and strip metal should they come in contact. Always follow the manufacturer's instructions when using any type of cleaning product.

4.3 SITE PREPARATION

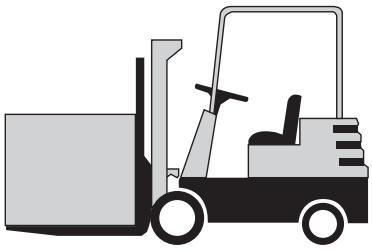
When selecting the site for the machine, consider the largest size of work-piece that will be processed through the machine and provide enough space around the machine for operating the machine safely. Consideration should be given to the installation of auxiliary equipment. Leave enough space around the machine to open or remove doors/covers as required for the maintenance and service as described in this manual.

It is recommended that the machine is anchored to the floor to prevent tipping or shifting. It also reduces vibration that may occur during operation.

4.4 LIFTING INSTRUCTIONS

On the day that the machine arrives, make sure that a forklift or lifting device, with sufficient capacity is available to unload the machine from the vehicle. Ensure access to the chosen site is clear and that doors and ceilings are sufficiently high and wide enough to receive the machine.

⚠WARNING ***This machine is extremely heavy. Serious personal injury may occur if safe moving methods are not followed. To be safe, you will need assistance and power equipment when moving the shipping crate and removing the machine from the crate.***



WARNING!

Make sure everyone is away from the load before hoisting. The load must be under control when lowering loads suspended. Rigging and crane operation must be carried out by persons with approved qualifications.

4.5 ANCHORING TO THE FLOOR

The machine is best mounted on a concrete slab.

Masonry anchors with bolts are the best way to anchor machinery, because the anchors sit flush with the floor surface, making it easy to unbolt and move the machine later if needed. (Fig. 4.1)

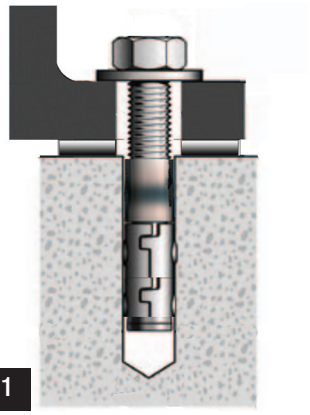


Fig. 4.1

4.6 MACHINE LEVELING

To set your machine up so that it operates to optimum performance, apply the following procedure.

After your machine has been anchored to a concrete slab floor, it then needs to be leveled. Loosen the hold down bolts and place a level on the surface of the working table. Metal shims need to be placed under the corner of the base of the machine until level. Once level then tighten the hold down bolts. (Fig. 4.2).

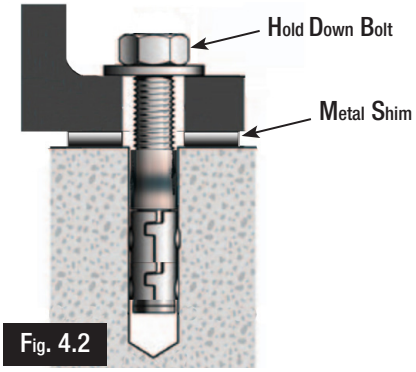


Fig. 4.2

CAUTION!

The machine must not rest on supports other than those defined in Fig. 4.2

4.7 ASSEMBLY

The machine must be fully assembled before it can be operated. First clean any parts that are coated in rust preventative to ensure the assembly process can proceed smoothly.

To assemble machine:

1. Thread work stop rod onto base (see Fig. 4.3).
2. Slide work stop onto the rod, position it as necessary, then tighten set screw. (Fig. 4.3)

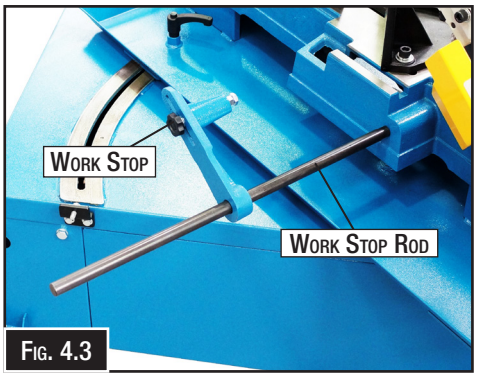


Fig. 4.3

WARNING!

SAFETY FIRST

Make sure that the machine is fully assembled before operating. Failure to do so could cause injury and damage to the machine

Motor Fitting Instructions

This band saw has been supplied with most of the machine assembled.

Please follow the steps below to fit the items shown in (Fig. 4.4)

To assemble Blade Tension Handles:

1. Locate the carton with the handles and work stop. (Fig. 4.4)
2. Take the two handles for the blade tension mechanism and screw them into the hub.
3. Take the black lifting handle and attach it to the end of the headstock. (Bow) (Fig. 4.5)
4. Locate the work stop rod and screw it into the base of the machine, then take the work stop and slide it onto to rod.

Fig. 4.4

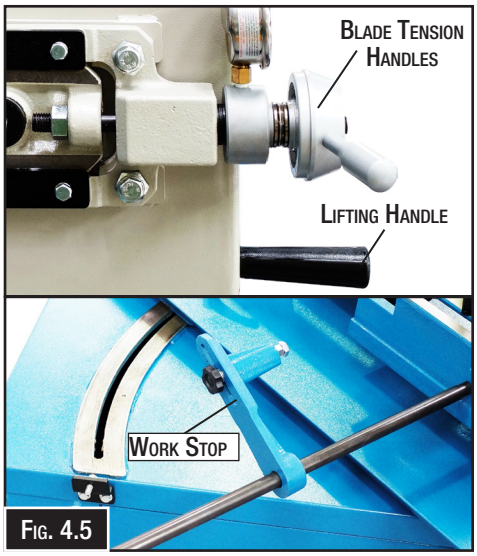


Fig. 4.5

WARNING

DO NOT operate any machine before it is fully assembled and all the safety guards have been fitted and secured. Failure to do so may cause death or severe injury.

4.8 TEST RUN

Once assembly is complete, test run the machine to ensure it is properly connected to the power and safety components are functioning correctly. Check that the direction of the motor is correct and make sure that the machine rotates in the correct direction.

If the direction is incorrect, isolate the machine and have the electrician make changes to the wiring.

If you find an unusual problem during the test run, immediately stop the machine, disconnect it from power, and fix the problem BEFORE operating the machine again. The Troubleshooting table in the Maintenance section of this manual may be able to help. If the problem persists then contact your dealers service technician.

To test run the machine:

1. Connect the machine to the power supply.
2. Make sure that the manual has been read and that the safety instructions at the beginning of the manual are understood. Make sure the machine has been setup correctly.
3. Make sure all tools and objects used during set up have been cleared away from the machine.
4. Turn the machine ON.
5 Make sure that the machine is travelling in the correct direction.
6. Listen to and watch for abnormal noises or actions. The machine should run smoothly with little or no vibration or rubbing noises.
7. Any strange or unusual noises should be investigated and corrected before operating the machine again. Always disconnect the machine from power supply when investigating or correcting potential problems. The troubleshooting chart in the maintenance section may be helpful in rectifying a problem.

Testing The Emergency Stop Button

Make sure that the emergency button is working correctly

1. Twist the top of the Emergency Stop button to ensure that it is in the raised position.
2. Start the machine and then press the emergency stop button. The machine should stop and the power should be cut off. If the machine cannot be started then the emergency stop is working correctly.
3. To reset the Emergency Stop twist the red top until it pops up. The machine should now work again.

5. OPERATION

This machine may perform many types of operations that are beyond the scope of this manual. Many of these operations may be dangerous or deadly if performed incorrectly.

The instructions in this section are written with the understanding that the operator has the necessary knowledge and skills to operate this machine. If at any time you are experiencing difficulties performing any operation, stop using the machine!

If you are an inexperienced operator, we strongly recommend that you read books, trade articles, or seek training from an experienced operator before performing any unfamiliar operations.

Above all, your safety should come first!

5.1 OPERATION OVERVIEW

This overview purpose is to provide a novice machine operator with a basic understanding of how the machine is used during operation, and so that if the machine controls or components are mentioned later in this manual, it will be easy to understand. The overview is not intended to be an instructional guide and is only generic in nature. To learn more about the specific operation, read this entire manual and seek additional training from an experienced machine operator. Another source of information may be found in video's on websites or by reading trade magazines.

To complete an operation:

1. Examine the workpiece to make sure it is suitable for cutting.
2. Select and change the blade that is suitable for the for workpiece material. Fit and verify that the blade is tensioned correctly.
3. Adjust the work length stop if needed for operation.
4. Raise the headstock and lock by turning the hydraulic feed OFF.
5. Adjust the head angle required for the operation and securely clamp the workpiece in the vice. Ensure that the work piece is stable and the cutting area is free of any obstructions.
6. Adjust the blade guide supports as close to work piece as possible.
7. Put on safety equipment such as safety glasses, steel toe boots, and use leather gloves when moving the work piece.
8. Select the correct speed by adjusting the variable speed control, then start the machine.
9. Slowly lower the headstock until blade makes contact with workpiece, then releases headstock. Adjust the hydraulic feed rate to lower the blade into workpiece until cut is finished.
10. When the cut is finished, stop the machine and raise the headstock.

5.2 CONTROLS

The purpose of this control overview is to provide the machine operator with a basic understanding of the machine controls and what they do. It also helps the operator to understand if they are discussed later in this manual.

NOTE: DO NOT start the machine until all of the setup instructions have been performed.

Operating a machine that is not setup correctly may result in malfunction or unexpected results that can lead to serious injury, death or damage to the machine or property.

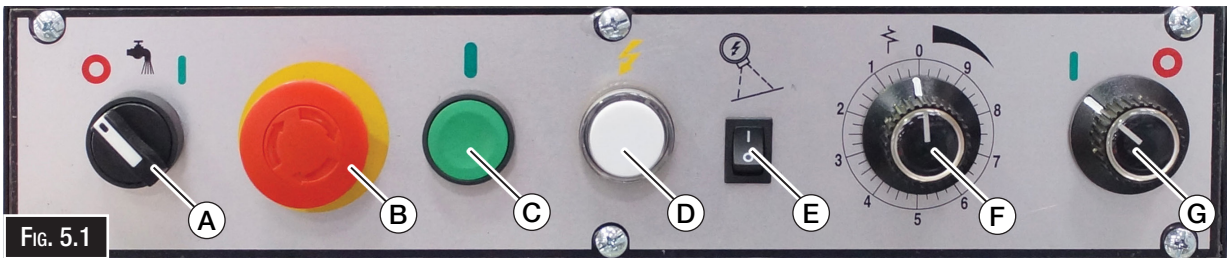


FIG. 5.1

Control Panel:

A. **Coolant Pump Switch:** The coolant pump switch located on the left side of the panel, switches the coolant pump **ON** or **OFF**. The amount of flow is regulated by the "Coolant Shut Off Valve".

B. **Emergency Stop Button:** When this button is pressed the machine will shut down. The power will be locked off until the button is reset, by twisting the top and allowing the button to pop up.

C. **Power ON Button:** This button switches the motor **ON** and starts the blade moving.

D. **Power On Lamp:** Illuminates when power is applied to the machine.

E. **Power On Laser Switch:** This switch is used to switch the laser line marker ON.

F. **Feed Control Knob:** This knob is used to set the amount of downward force that is applied to the saw blade. The feed rate is proportional to the opening of the valve. Increasing the valve opening, increases the feed rate; decreasing the valve opening, reduces the feed rate.

G. **Feed Shut-Off Valve: Shuts Off the valve to the feed control and** starts or stops the feed.

H. **Coolant Shut Off Valve:** This valve controls the flow of the coolant. (Fig. 5.2)

I. **Blade Tension Knob and Gauge:** Rotate clockwise to increase or counterclockwise to decrease blade tension. (Fig. 5.3)

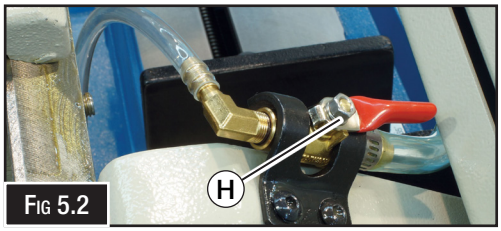


FIG 5.2

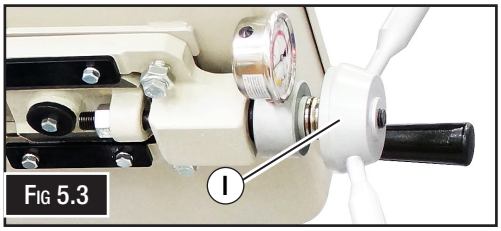


FIG 5.3

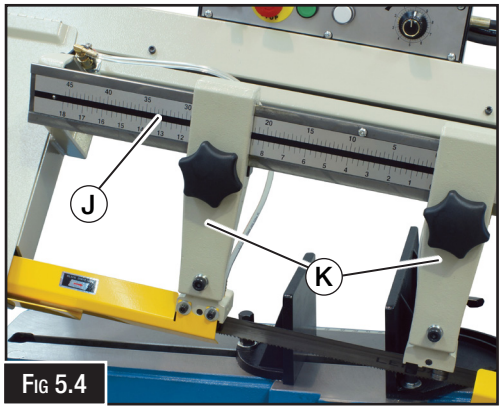


FIG 5.4

J. **Blade Guide Scale:** Displays position of blade guide arms relative to fixed vice jaw.

K. **Blade Guide Arms:** Hold blade guides that support band saw blade. Arms should be placed as close to the work piece as possible during cutting.

L. **Work Stop:** Quickly positions workpiece during repetitive cutting operations. (Fig. 5.5)

M. **Fixed Vise Jaw:** Can be adjusted to cut angles from 45° to 90°. (Fig. 5.5)

N. **Movable Vise Jaw:** Features quick-release that allows jaw width to be adjusted when changing from one work piece size to another. (Fig. 5.5)

O. **Vice Hand Wheel:** Adjusts position of movable vise jaw relative to fixed vice jaw. (Fig. 5.5)

P. **Quick Release Vice Handle:** Allows for vice once it has been set to quickly release the vice when production requires it. (Fig. 5.6)

Q. **Head Swivel Clamp:** Clamps the head after it has been swiveled for angle cutting or straight cutting. (Fig. 5.7)

R. **Variable Speed Control:** Adjusts the speed of the blade. (Fig. 5.8)

Note: The speed should only be adjusted when the blade is running. Adjust the blade speed slowly.

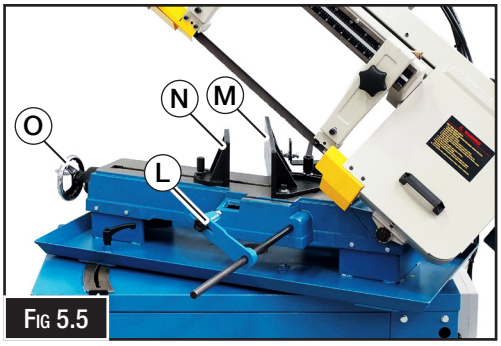


Fig 5.5

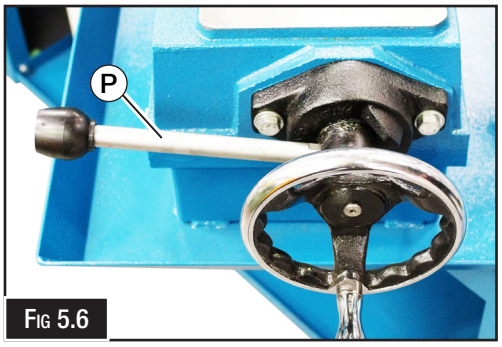


Fig 5.6

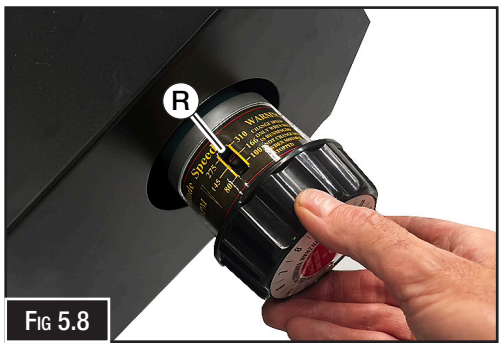


Fig 5.8

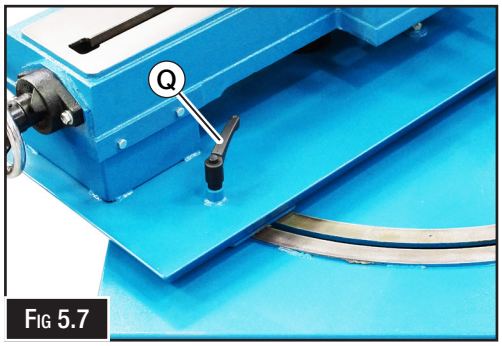


Fig 5.7

5.3 LASER GUIDE LINE (Fig. 5.9)

The band saw is fitted with a laser line which is a precision accessory that projects a red laser beam onto the workpiece, indicating the exact cut path of the blade to enhance accuracy and safety. It is mounted on the headstock and helps with set-up by indicating the cutting line.

The laser line is operated by a switch on the control panel.

NOTE: DO NOT at any time look directly into the source of the laser. This can cause permanent damage to the eyes.


Fig 5.9

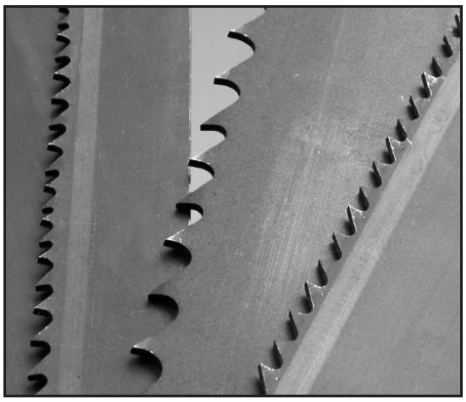
5.4 BLADE SELECTION CHARTS

Band saw tooth size is determined by the size of the cross section to be cut. In general cutting thinner sections requires more teeth per inch, thicker sections require coarser pitches, or less teeth per inch.

To select an appropriate tooth size please refer to the table immediately below unless material to be cut is a tube, in which case refer to the larger table below. For general purpose cutting use a constant pitch blade, for more aggressive production cutting of harder to cut materials use a variable pitch blade.

SOLID SECTION

Section Size (mm)	Constant Pitch (TPI)	Variable Pitch (TPI)
Up to 10	24 or 18	14/18 or 10/14
10 - 15	14	8 - 12
16 - 30	10	6 - 10
31 - 50	8	5 - 8
51 - 80	6	4 - 6
81 - 120	4	3 - 4
121 - 200	3	1 - 3
Over 200	2 or 1.25	1.4 - 2 or 0.8 - 1.3



TUBE SECTION

Wall Thickness (mm)	Outside diameter of tube or maximum profile section length (mm)												
	20	40	60	80	100	120	150	200	300	500	600	700	800
2	14	14	14	14	14	14	10-14	10-14	8-12	8-12	6-10	5-8	5-8
3	14	14	10-14	10-14	10-14	10-14	8-12	8-12	6-10	6-10	5-8	5-8	5-8
4	14	14	10-14	10-14	8-12	8-12	6-10	6-10	5-8	5-8	4-6	4-6	4-6
5	14	10-14	10-14	8-12	8-12	6-10	6-10	5-8	5-8	4-6	4-6	4-6	4-6
6	14	10-14	10-14	8-12	8-12	6-10	6-10	5-8	5-8	4-6	4-6	3-4	3-4
8	16	10-14	8-12	8-12	6-10	6-10	5-8	5-8	4-6	4-6	3-4	3-4	3-4
10		8-12	8-12	6-10	6-10	5-8	5-8	4-6	4-6	3-4	3-4	3-4	3-4
12		8-12	6-10	6-10	5-8	5-8	4-6	4-6	3-4	3-4	3-4	3-4	2-3
15			6-10	5-8	5-8	4-6	4-6	4-6	3-4	3-4	3-4	2-3	2-3
20				5-8	4-6	4-6	4-6	3-4	3-4	2-3	2-3	2-3	2-3
30					4-6	4-6	3-4	3-4	3-4	2-3	2-3	2-3	2-3
50						3-4	3-4	3-4	2-3	2-3	2-3	2-3	2-3
75							2-3	2-3	2-3	2-3	2-3	1.4-2	1.4-2

SELECTING THE TEETH PER INCH

Selecting the right band saw blade for metal involves matching the Teeth Per Inch (TPI) to the material thickness: more teeth (10–24 TPI) for thin metal to prevent snagging, and fewer teeth (2–6 TPI) for thick, solid stock to ensure efficient cutting and chip removal. A good rule of thumb is to have at least 3-6 teeth in the workpiece at all times.

Always use large teeth (low TPI—Teeth Per Inch) when cutting thick solid materials, because they provide aggressive cutting action, deep gullets for chip clearance, and prevent overheating. Using too many teeth (fine teeth) on thick metal can cause the gullets to clog, resulting in excessive heat and premature blade failure.

5.5 SETTING THE WORK STOP

The work stop is used to setup the saw for making multiple cuts of the same length (Fig. 5.10).

To **Set The Work Stop:**

1. Loosen the screw in the work stop arm.
2. Slide the work stop along the rod to the desired length.
3. Adjust the work stop so it contacts the end of the workpiece.
4. Loosen the work stop knob and slide it down as close to the bottom of the cut as possible. Tighten the knob. (Fig. 5.9)

CAUTION: Do not allow the blade to rest on the workpiece when the saw is not cutting.

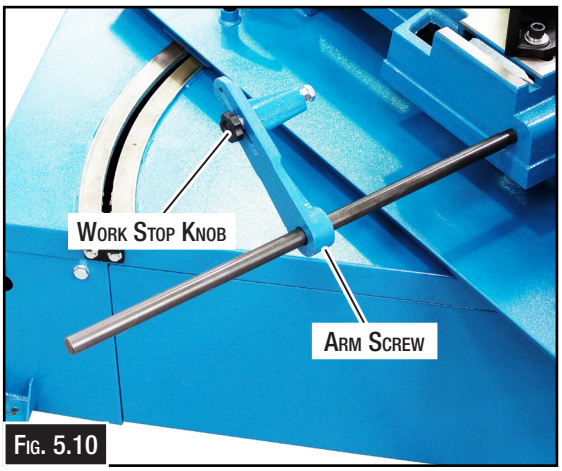


Fig. 5.10

5.6 SELECTING THE SPEED

The "best" speed for a metal cutting band saw varies significantly by material, ranging from approximately 20-150 m/min (65-500 ft/min), with the specific optimal speed determined by the material's hardness and thickness. Slower speeds are for hard materials like tool steel (e.g. 25-36 m/min), while faster speeds are for softer metals like copper alloys (e.g. 147 m/min) or aluminium (which can go up to the maximum speed of the saw to prevent chip welding). See charts below.

SUGGESTED SPEED CHART

Material	Speed (M/Min)	Drive Motor Pulley
Tool Steel, Stainless Steel, Alloy Steels	38 ~ 52	1
Medium to High Carbon Steel	51 ~ 70	2
Low Carbon Steel Soft Brass	136 ~ 184	3
Cast Iron, Working Tool Steels	55 ~ 70	2
Aluminum, Copper, Plastics	100 ~ 138	4

TROUBLESHOOTING BY CHIP APPEARANCE

Hard, blue, or brown chips: Speed is too high; slow it down.

Thin, curled, silver chips: Good speed and feed rate.

Hard, thick, heavy chips: Increase speed or reduce feed pressure.

If you are unsure of the exact speed for your material, start with a slower speed and increase it gradually until you achieve efficient cutting without overheating the blade.

5.7 CHANGING THE SPEED

To Change Blade Speeds:

1. Set the arm at the full horizontal position.
2. Turn the band saw ON and allow the motor to reach full speed.
3. Rotate the speed adjustment knob clockwise to decrease blade speed and counter clockwise to increase the blade speed. (Fig. 5.11)

Note: The viewing window and indicator on the side of knob displays the approximate speed setting.

Fig. 5.11

5.8 FEED CONTROL

The weight of the saw head provides the force needed to cut through the workpiece. The cut-off saw has a hydraulic cylinder that controls the feed rate of the saw. The hydraulic feed control circuit consists of a single-acting hydraulic cylinder and a flow-control valve. The feed control cylinder resists motion in the downward direction to control the feed rate.

The control cylinder offers no resistance when raised upward. (Fig. 5.12)

A knob on the control panel (Fig. 5.13) controls the rate at which the saw head is lowered. The control knob needle valve controls the rate at which the hydraulic fluid is released from the hydraulic cylinder. When the needle valve is closed, cylinder is locked. With the needle valve slightly open, the cylinder permits slow, or light, downward force.

Opening the needle valve further increases the feed rate and applies more weight to the saw blade and workpiece. The needle valve is adjusted until the saw is operating efficiently. The efficiency of operation is usually evaluated by observing chip formation. If the chips formed are curled, but colored-blue or straw colored from heat generated during the cut then the feed rate is too high. If the chips are slightly curled and are not colored by heat-the blade is sufficiently sharp and is cutting at its most efficient rate.

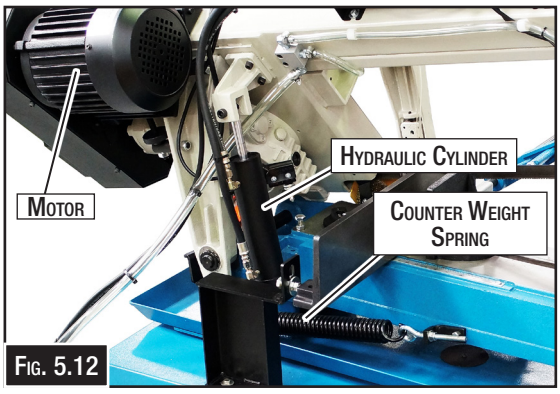


Fig. 5.12

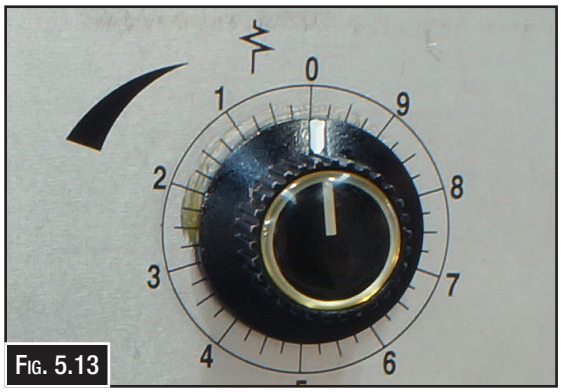


Fig. 5.13

Note: The feed dial is not rated at any value but only an indication for increase or decreasing the feed rate. Observe chips that exit the cut, and increase or decrease feed rate according to chip characteristics. (Fig. 5.13)

5.9 BLADE BREAK IN

New blades are very sharp, and therefore have a tooth geometry that is easily damaged if a careful break-in procedure is not followed. Consult the blade manufacturer's literature of break-in of specific blades on specific materials. However, the following procedure will be adequate for break-in of Hafco supplied blades on lower alloy ferrous materials.

1. Clamp a section of round stock in the vice. The stock should be 2 inches or larger in diameter.
2. Operate the saw at low speed. Start the cut with a very light feed rate.
3. When the saw has completed 1/3 of the cut, increase the feed rate slightly and allow the saw to complete the cut.
4. Keep the hydraulic cylinder needle valve in the same position and begin a second cut on the same or similar workpiece.

5.10 SETTING THE MACHINE FOR ANGLE CUTS

The band saw bed moves to a maximum angle of 0-50°. This adjustment allows alignment with a conveyor positioned at 90° to the machine (see the digital scale shown in the photos at the maximum setting). The bed can be locked at any position between 0° and 50° using the handle.

The vice operates independently and can be adjusted between 0° and 45°. If the setup is intended to align with a 90° conveyor running from the rear of the machine, both the bed and the vice would need to be set to 45°.

Adjusting For Angle Cutting:

1. DISCONNECT THE MACHINE FROM POWER!
2. Raise the headstock all the way, then use feed stop control dial to keep it from lowering.
3. Open the vice up and then loosen the clamp handle on the fixed jaw. (Fig. 5.15)
4. Move the fixed jaw until it lines up with the angle required, then secure the jaw with the lock. (Fig. 5.14)

NOTE: For accurate angle setting use a protractor and set the angle from machined slot in the table.

5. Loosen the movable jaw clamp nut, then close the vice until the two jaws meet. Lock the jaw. (Fig. 5.16)
3. Release the angle lock and move the machine head to line up with the work piece on the roller conveyor or stand. (Fig. 5.17)

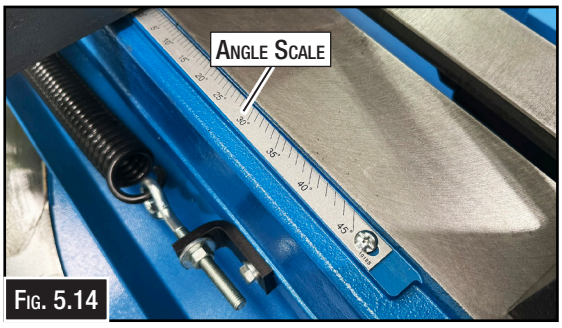


Fig. 5.14

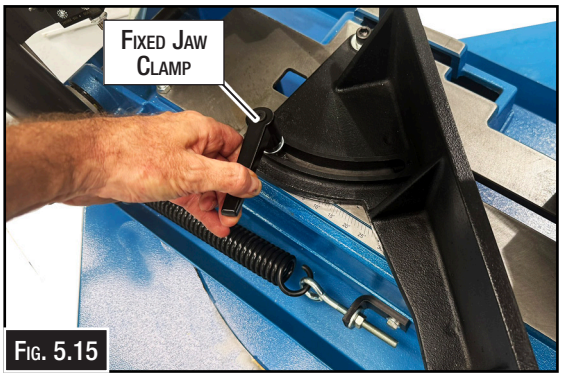


Fig. 5.15

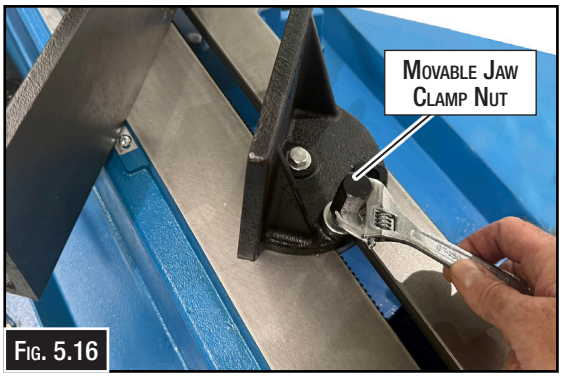


Fig. 5.16

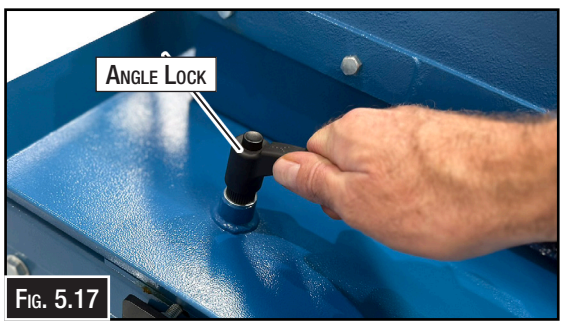


Fig. 5.17

5.11 SETTING THE VICE FOR SQUARE CUTS

The procedure for setting the vice for square cuts is identical to the setting for angle cuts, except that a machinist's square is used to position the fixed vice jaw.

Align one side of the square with the side of the slot in the table. (Fig. 5.18)

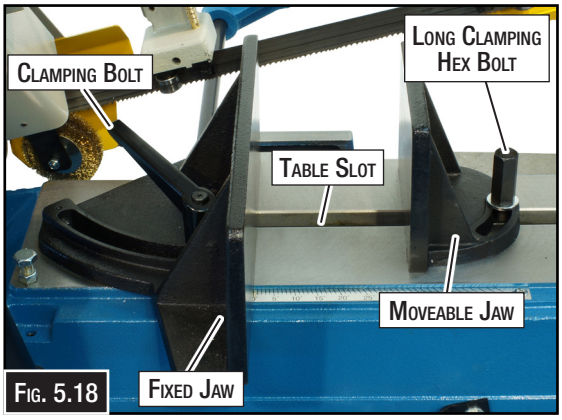


Fig. 5.18

⚠ *CAUTION!*

Make sure the blade is not in contact with the workpiece when the Motor is started. Do not drop the saw Head on the workpiece or force the saw through the workpiece.

SETTING THE MACHINE HEAD

The procedure for setting the machine head for square cuts is identical to the setting for angle cuts, except that the head sits against a mechanical stop. (Fig. 5.19)

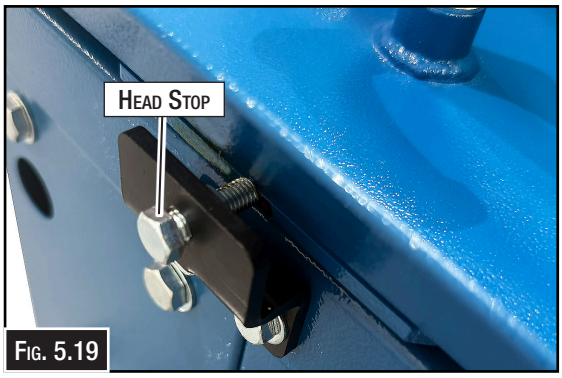


Fig. 5.19

5.12 BLADE GUIDE SUPPORTS SETTING

The band saw has adjustable blade guide supports (Fig. 5.20). The blade guide support allows you to set the blade guide for varying widths of workpieces.

To make accurate cuts and prolong blade life, the blade guide supports should be set close to the work piece. The blade guide support should be set so it just clears the piece to be cut. Adjust the bar position as follows:

1. Place the workpiece in the vice and clamp tightly.
2. Loosen the locking knobs on the front of the guide supports.
3. Slide the guide supports so the gap between them will clear the work piece.
4. Tighten the locking knobs to secure the guide supports.

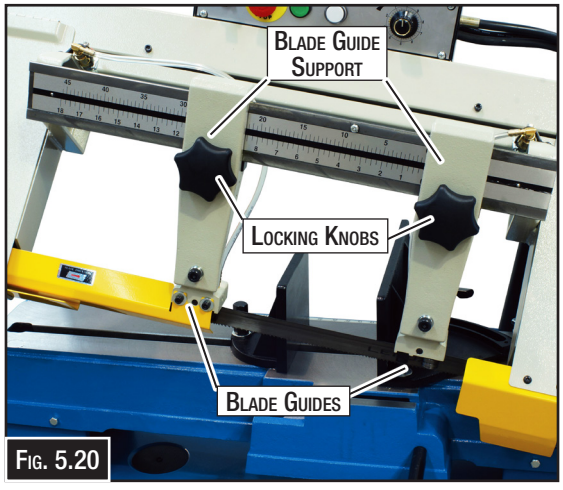


Fig. 5.20

CAUTION!

This work piece may not appear to be heavy, but damage to the back or legs can occur if lifting practices are not followed. When lifting bend the knees and keep the back straight.

5.13 CHANGING THE BLADE

Blades should be changed when they become dull, damaged, or when you are using materials that require a blade of a certain type or tooth count.

To change the blade:

1. DISCONNECT THE MACHINE FROM THE POWER
2. Raise the saw head to the fully UP position. Lock the hydraulic cylinder to hold the saw head in place.
3. Open the wheel guards on the sides of the saw head (guards at both ends are hinged.) (Fig. 5.22)
4. Undo the 3 screws and remove the left blade guard. (Fig. 5.23)
5. Turn the blade tension handle until the blade hangs loose.
6. Use leather gloves to prevent cuts or scratches. Pull the blade off the drive wheels and out of the blade guides. Store the removed blade carefully before proceeding. (Fig. 5.24)
7. Slide the new blade into the blade guides, then loop the blade over the upper and lower drive wheels. Install the new blade so the vertical side of the teeth contacts the workpiece first.
8. Push the blade so it is seated against the shoulders of the wheels. When it is seated against the shoulder turn the blade tension handle clockwise to increase the tension. Do not over-tension the blade; tighten it just enough so it does not slip while cutting.
9. When the blade is properly tensioned, reconnect the saw to electrical power source.
10. Check and adjust the tracking of the blade. Refer to Blade tracking adjustment.
11. Install the wheel guards and the blade covers.
12. Put 2 to 3 drops of oil on the blade.

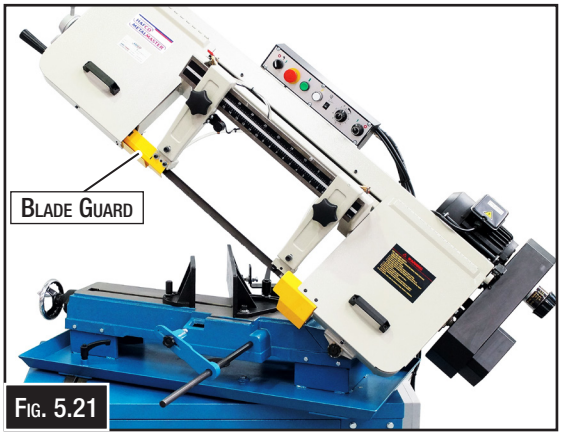


Fig. 5.21


Fig. 5.22


Fig. 5.23

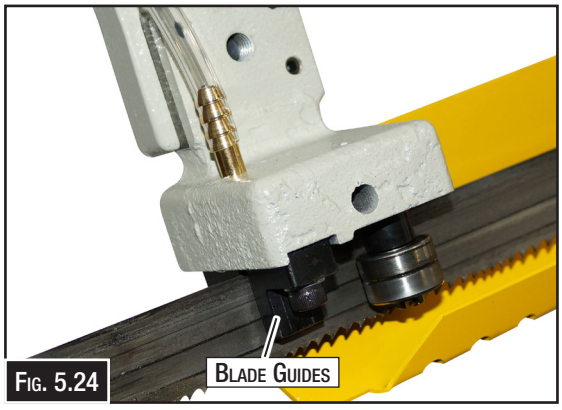


Fig. 5.24

WARNING!

Blades are very sharp. If not careful serious injury can result from touching the blades with bare hands. Leather work gloves should be worn when handling these blades.

5.14 TENSIONING THE BLADE

Correct blade tension is essential to avoid blade twist, vibration, or slippage on the wheels. A blade that is correctly tensioned will give straight cuts, long blade life, and efficient cutting times.

There are three major signs of incorrect blade tension: 1) The blade stalls in the cut and slips on the wheels, 2) the blade frequently breaks, and 3) the band saw does not make straight cuts.

To Tension The Blade:

1. Make sure blade is tracking properly (refer to Blade Tracking on Page 24 for details).
2. DISCONNECT MACHINE FROM POWER!
3. Loosen and slide left blade guide arm as far left as it will go, then secure. (see Fig. 5.25)
4. Turn tension handle clockwise to tighten blade or counterclockwise to loosen the blade. (Fig. 5.26)
5. Tighten blade until tension gauge needle moves into the green section of scale for 27mm wide blades, as shown in Fig. 5.27.

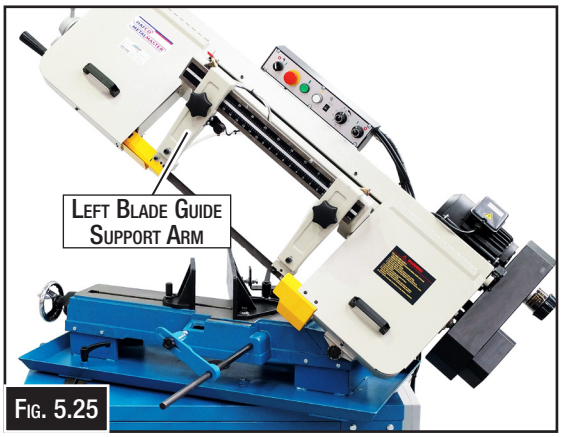


Fig. 5.25

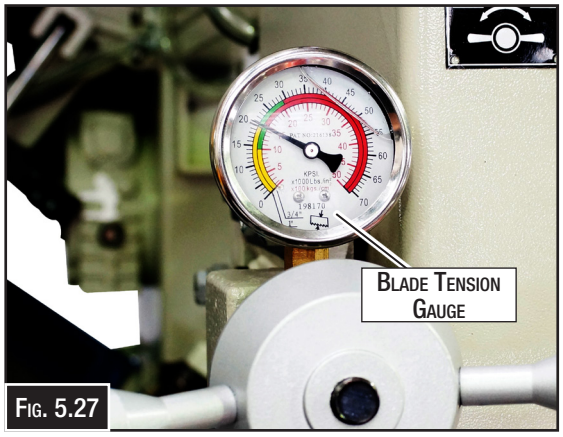


Fig. 5.27

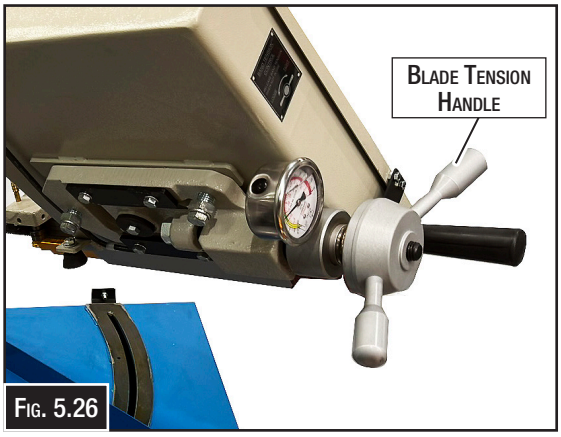


Fig. 5.26

5.15 COOLANT

The coolant tank and motor are housed in the base of the machine and can be accessed from the rear of the machine. (Fig. 5.28)

The general-purpose coolant is a mixture of soluble oil and water. Mix one part of soluble oil to twenty parts of water.

For the coolant pump to operate properly the coolant needs to be above the minimum line on the tank.

There are numerous coolants on the market that are formulated for special applications. Consult your local distributor for details in the event you have a long range production task, or are required to cut some of the more exotic materials.

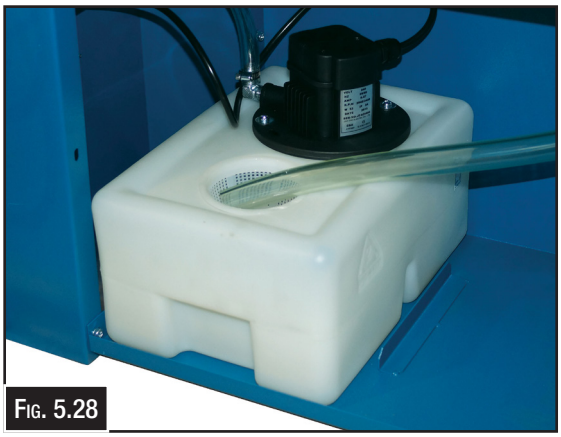


Fig. 5.28

6. MAINTENANCE

⚠ WARNING ***Before maintaining or cleaning the machine, turn off the circuit breaker, or disconnect the machine from the power supply. Post a sign to inform other workers that the machine is under maintenance.***

For optimum performance from the machine, it is important that the machine is well cleaned and maintained. Follow the maintenance schedule listed in the following section and refer to any specific instructions given.

6.1 SCHEDULE

Daily Check

- Loose mounting bolts.
- Worn or damaged wires.
- Check/adjust lubrication.
- Any other unsafe condition

Cleaning

Cleaning the machine is relatively easy. Wipe down all unpainted and machined surfaces daily to keep them rust free and in top condition. This includes any surface that is vulnerable to rust if left unprotected. Use ISO 68 machine oil or any other quality metal lubricant.

6.2 LUBRICATION

Lubricate the following components at the specific frequencies and using the lubricants defined as follows:

1. Ball bearings are lubricated and sealed-periodic lubrication is not required.
2. Blade guide bearings are lubricated and sealed, periodic lubrication is not required.
3. Upper wheel bushing-six to eight drops of oil each week.
4. Pivot points, shafts and bearing machine surfaces, six to eight drops of oil each week.
5. Replace the oil in the gearbox every 12 months
6. Change coolant on a frequency depending on the type of coolant being used. Oil based coolants can sour. Refer to the coolant supplier's instructions for change frequency.

6.3 CLEANING

1. Clean off any preservative on machine surfaces
2. After cleaning, coat machined surfaces of the machine with a medium consistency machine oil. Re-apply the oil coating at least every six months.
3. Clean up accumulated saw cuttings after use. Make sure the lead screw and rapid nut are kept free from saw cuttings and other material that would cause damage.
4. Clean the chip sludge from the coolant tank. Change the coolant on the frequency as instructed by the coolant supplier.

6.4 BLADE TRACKING ADJUSTMENT

Blade tracking has been tested at the factory. Adjustment is rarely required when the blade is used properly or if the blade is correctly welded. (Refer to Fig. 6.1) for location of blade tracking adjustment screws. ***This procedure should only be carried out by your service engineer***

1. Put the saw head in the vertical position. Open the wheel guards.
2. Remove both of the blade-guide bearing bracket assemblies.
3. Make sure the blade is properly tensioned.

NOTE: Keep proper tension at all times using blade tightening assembly.

4. Loosen the hex jam nut in the top head near the blade tension, until it is snug against the slide casting.

CAUTION: While performing the following, keep the blade from rubbing excessively on the shoulder of the wheel. Excessive rubbing will damage the wheel and/or the blade.

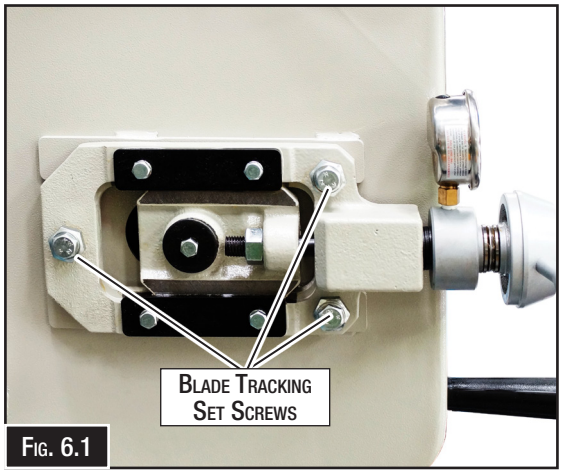


Fig. 6.1

5. Start the saw. Turn the setscrew to tilt the idler wheel until the blade is touching the shoulder of the idler wheel.
6. Turn the setscrew so the blade starts to move away from the shoulder of the wheel, then immediately turn the setscrew in the other direction so the blade stops. Then move the blade slowly toward the shoulder.
7. Turn the setscrew to stop motion of the blade on the wheel as it gets closer to the wheel shoulder. Put a 6-inch length of paper between the blade and the wheel as shown in Fig. 6.2. The paper should not be cut as it passes between the wheel shoulder and the blade.
8. Turn the setscrew a small amount. Repeat the insertion of the paper between the wheel shoulder and the blade until the paper is cut in two pieces.

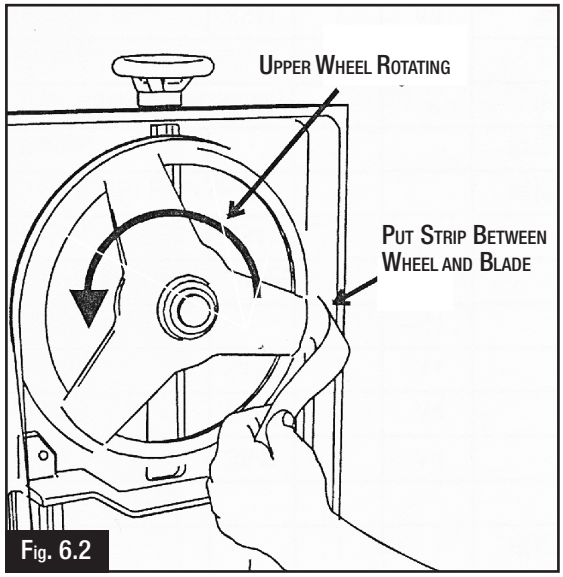


Fig. 6.2

WARNING: KEEP FINGERS CLEAR OF THE BLADE AND WHEEL TO AVOID INJURY.

NOTE: You may have to repeat the check with the paper several times before the blade and the shoulder cut the paper into two pieces. Do not hurry the adjustment. Patience and accuracy here will pay off with better, more accurate, quieter cutting and much longer machine and blade life.

9. When the paper is cut, turn the setscrew slightly in the counterclockwise direction. This assures that the blade is not touching the shoulder of the wheel.
10. Shut off the saw and tighten the hex jam nut against the setscrews and casting.
11. Install the top and bottom blade guide assemblies. Position the guides so the top bearing just touches the blade.
12. Close and secure the wheel covers.

6.5 BLADE GUIDE ADJUSTMENT

Proper adjustment of the blade guide bearings is critical to efficient operation of the band saw. The blade guide bearings are adjusted at the Factory and they should rarely require adjustment. When adjustment is required, readjust immediately. Failure to maintain proper blade adjustment may cause serious blade damage or inaccurate cuts.

It is always better to try a new blade when cutting performance is poor. If performance remains poor after changing the blade, make the necessary adjustments.

If a new blade does not correct the problem, check the blade guides for proper spacing. For most efficient operation and maximum accuracy, provide 0.025mm clearance between the blade and the guide bearings. The bearings will still turn freely with this clearance. If the clearance is incorrect, the blade may track off the drive wheel. If required, adjust the guide bearings as follows:

To Adjust The Backing Bearings:

1. Make sure blade is tensioned and tracking correctly before making the adjustments,
2. DISCONNECT MACHINE FROM POWER!
3. Raise the headstock high enough to give you room to work, then lock in place.
4. Remove blade guard from left blade arm.
5. Loosen cap screw on right blade guide arm (facing front of machine), as shown in Fig. 6.3.
6. Using a Hex key move the assembly up or down until the backing bearing lightly touches the back of the blade, then tighten cap screw. (Fig. 6.4)

Note: If it is difficult to slide blade guide assembly onto blade, adjust blade guide roller bearings and carbide guides away from blade.

7. Repeat Step 5 for left blade guide arm.

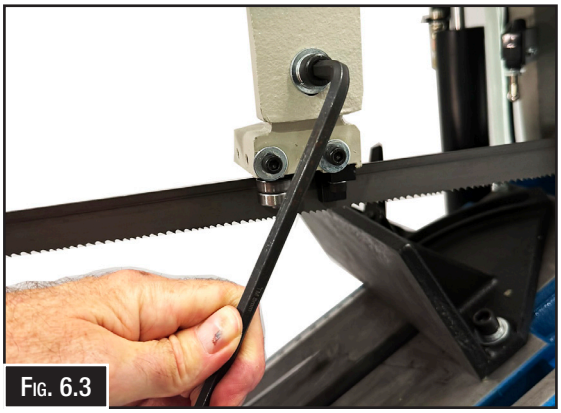


Fig. 6.3

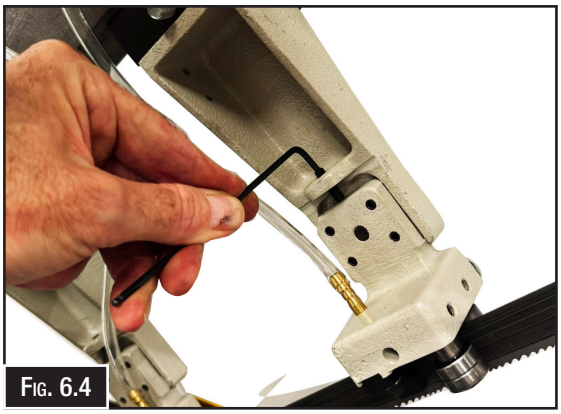


Fig. 6.4

To Adjust The Guide Bearings:

1. Loosen set screws shown to allow guide bearings on front blade guide arm to turn.
2. Turn eccentric shaft with a screwdriver and adjust guide bearings so they lightly contact blade or have maximum clearance of 0.05 mm.

Note: Since bearings twist blade into position, it is acceptable if there is 0.025 - 0.05mm gap between blade and front or back of bearing. Just make sure not to squeeze blade too tightly with bearings.

3. After the guide bearings are set, you should be able to rotate them although they will be hard to move with your fingers. (Fig. 6.5)
4. Tighten set screws.

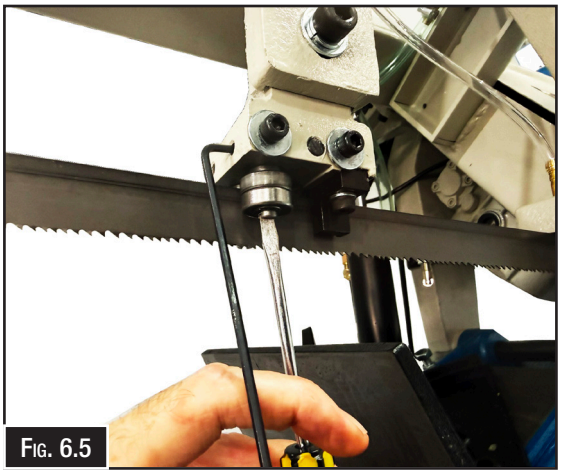


Fig. 6.5

6.5 BLADE GUIDE ADJUSTMENT Cont.

To Adjust The Guide Bearings Cont:

5. Adjust the carbide blade guides so they make the same contact with blade as the guide bearings. (Fig. 6.6)
6. Reposition right blade guide arm flush with right end of blade guide scale, so it does not contact vice during operation.
7. Adjust blade guide bearings on left blade guide arm in same manner.
8. Re-install blade guard onto left blade arm.

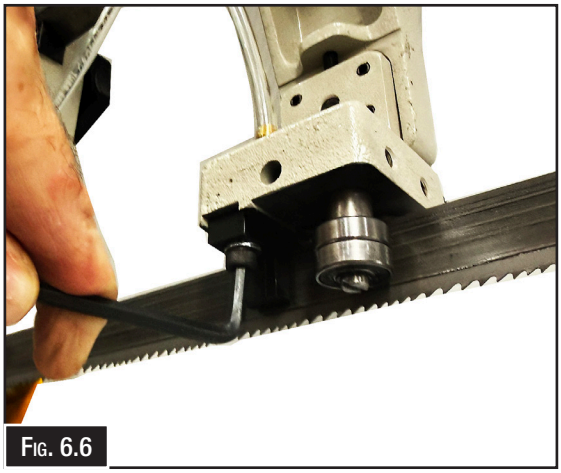


Fig. 6.6

6.6 CHIP BRUSH REPLACEMENT

The purpose of the brush is to remove chips from the saw teeth and off of the blade so excessive amounts of chips don't get into the wheel guard section of the saw.

To Replace The Brush:

1. DISCONNECT THE MACHINE FROM THE POWER.
2. Remove the nut and screw. Remove the worn brush and spacer. (Fig. 6.7)
3. Install the spacer and replacement brush, screw and nut.
4. Adjust the bracket, if necessary, so the brush makes slight contact with the saw blade.

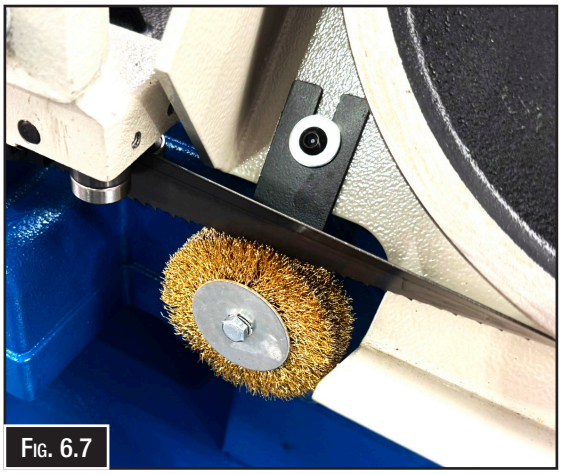


Fig. 6.7

6.7 ADJUSTING THE LIMIT STOP

Adjust the limit switch stop so that the machine will stop when the saw has cut through the workpiece.

1. DISCONNECT THE MACHINE FROM THE POWER.
2. Lift headstock, then adjust feed rate dial as needed, and lower headstock.
3. Listen for click from limit switch when headstock reaches bottom of its travel. If switch does not click, loosen jam nut, slightly adjust stop bolt, and repeat until satisfactory. (Fig. 6.8)
4. Tighten jam nut against the base to prevent stop bolt from loosening during use.

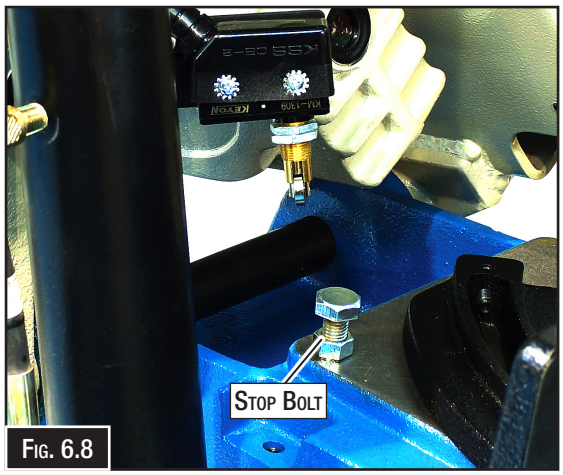


Fig. 6.8

6.8 TROUBLESHOOTING

Review the troubleshooting and procedures in this section if a problem develops with your machine. If you need replacement parts then follow the procedure in the beginning of the spare parts section or if additional help with a procedure is required, then contact your distributor.

Note: Make sure you have the model of the machine, serial number, and manufacture date before calling.

Symptoms	Possible Cause	Possible Solution
Motor stalls	1. Excessive belt tension 2. Excessive head pressure. 3. Excessive blade speed. 4. Improper blade selection	1. Adjust belt tension so that belt does not slip on drive belt under moderate pressure. 2. Reduce head pressure. 3. Refer to “Selecting The Speed” on page 17. 4. Refer to “Blade Selection Chart” page 16.
Cannot make square cut.	1. Dull Blade. 2. Guide rollers not adjusted properly. 3. Vise jaw not adjusted properly. 4. Excessive head pressure.	1. Replace The Blade. 2. Refer to “Blade Guide Adjustment” page 25. 3. Check the vice jaws. 4. Reduce the feed rate.
Increased cutting time	1. Dull Blade. 2. Insufficient head pressure. 3. Reduced Blade speed.	1. Replace the blade. 2. Increase the feed rate. 3. Refer to “Selecting The Speed” on page 17.
Will not cut	1. Motor running in wrong direction. 2. Blade teeth pointing in wrong direction. 3. Hardened material	1. Reverse rotation of motor. 2. Remove blade, turn blade inside out and Re-install blade. 3. Use special alloy blades. (Consult your industrial distributor for recommendation on type of blade required)
Motor will not start	1. Overload relay activated. 2. Magnetic switch open, or protector open. 3. Low voltage. 4. Open circuit in motor or loose connections.	1. Reset the relay. 2. Reset protector by pushing red button. (inside electric box.) 3. Check power line for proper voltage. 4. Inspect all lead terminations on motor for loose or open connections
Motor will not start, fuse or circuit breakers “blow”.	1. Short circuit in line, cord or plug. 2. Short circuit in motor or loose connections. 3. Incorrect fuses or circuit breakers in power line.	1. Inspect line, cord and plug for damaged insulation and shorted wire. 2. Inspect all lead terminations on motor for loose or shorted terminals or worn insulation on wires. 3. Install correct fuses or circuit breakers.
Motor fail to develop full power.	1. Power line overloaded with lights, appliances and other motors. 2. Under size wires or circuit too long. 3. General overloading of local power facilities.	1. Reduce the load on the power line. 2. Increase wire sizes, or reduce length of wiring. 3. Request a voltage check from the power company
Motor overheat	1. Motor overloaded. 2. Air circulation through the motor restricted	1. Reduce load on motor. 2. Clean out motor to provide normal air circulation through motor.
Motor stalls	1. Short circuit in motor or loose connections. 2. Low voltage. 3. Incorrect fuses or circuit breakers in power line. 4. Motor overloaded.	1. Inspect terminals in motor for loose or shorted terminals or worn insulation on lead wires. 2. Correct the low line voltage conditions. 3. Install correct fuses circuit breakers. 4. Reduce motor load.
Frequent opening of fuses or circuit breakers.	1. Motor overloaded 2. Incorrect fuses or circuit breakers.	1. Reduce motor load. 2. Install correct fuses or circuit breakers.
Teeth stripping	1. Too few teeth per inch. 2. Loading of gullets. 3. Excessive feed. 4. Work not secured in vise.	1. Use finer tooth blade. 2. Use coarse tooth blade or cutting lubricant. 3. Decrease feed. 4. Clamp material securely.

WARNING!

Make sure the machine is turned OFF and the cord is disconnected from the power source before installing/removing and servicing any component of the machine.

6.8 TROUBLESHOOTING Cont.

Symptoms	Possible Cause	Possible Solution
Blade breakage	1. Teeth too coarse. 2. Misalignment of guides. 3. Dry cutting 4. Excessive speed 5. Excessive feed	1. Use a finer tooth blade. 2. Adjust saw guides. 3. Use cutting lubricant. 4. Lower speed. See Operating Instructions “Selecting the Speed” Page 17. 5. Reduce feed pressure. Refer to Operating Instructions “Feed Control” Page 18.
Blade breakage	1. Excessive tension. 2. Wheels out of line	1. Tension blade to prevent slippage on drive wheel while cutting. 2. Adjust wheels
Blade cut Run-out or Run-in	1. Guides out of line. 2. Excessive pressure. 3. Support of blade insufficient. 4. Material not properly secured in vise. 5. Blade tension incorrect.	1. For a straight and true cut, realign guides, check bearings for wear. 2. Conservative pressure assures long blade life and clean straight cuts. 3. Move saw guides as close to work as possible. 4. Clamp material in vice, level and secure. 5. Loosen or tighten tension on blade.
Blade twisting	1. Blade not in line with guide bearings. 2. Excessive blade pressure. 3. Blade binding in cut.	1. Check bearings for wear and alignment. 2. Decrease pressure and blade tension. 3. Decrease feed pressure.
Premature tooth wear	1. Dry cutting. 2. Blade too coarse. 3. Not enough feed. 4. Excessive speed	1. Use lubricant on all materials, except cast iron. 2. Use finer tooth blade. 3. Increase feed so that blade does not ride in cut. 4. Decrease speed.

WARNING!

Electricity is dangerous and could cause death
All electrical work must be carried out by a qualified electrician.

WARNING!

If the machine is to be hardwired to the power source, we strongly recommend securing your machine to the floor. Consult with your local electrician to ensure compliance with local codes.

METAL CUTTING BAND SAW
BS-10LS

Order Code: (B021)

The following section covers the spare parts diagrams and lists that were current at the time this manual was originally printed. Due to continuous improvements of the machine, changes may be made at anytime without notification.

HOW TO ORDER SPARE PARTS

1. Have your machines model number, serial number & date of manufacture on hand, these can be found on the specification plate mounted on the machine.
2. A scanned copy of your parts list/diagram with required spare part/s identified.

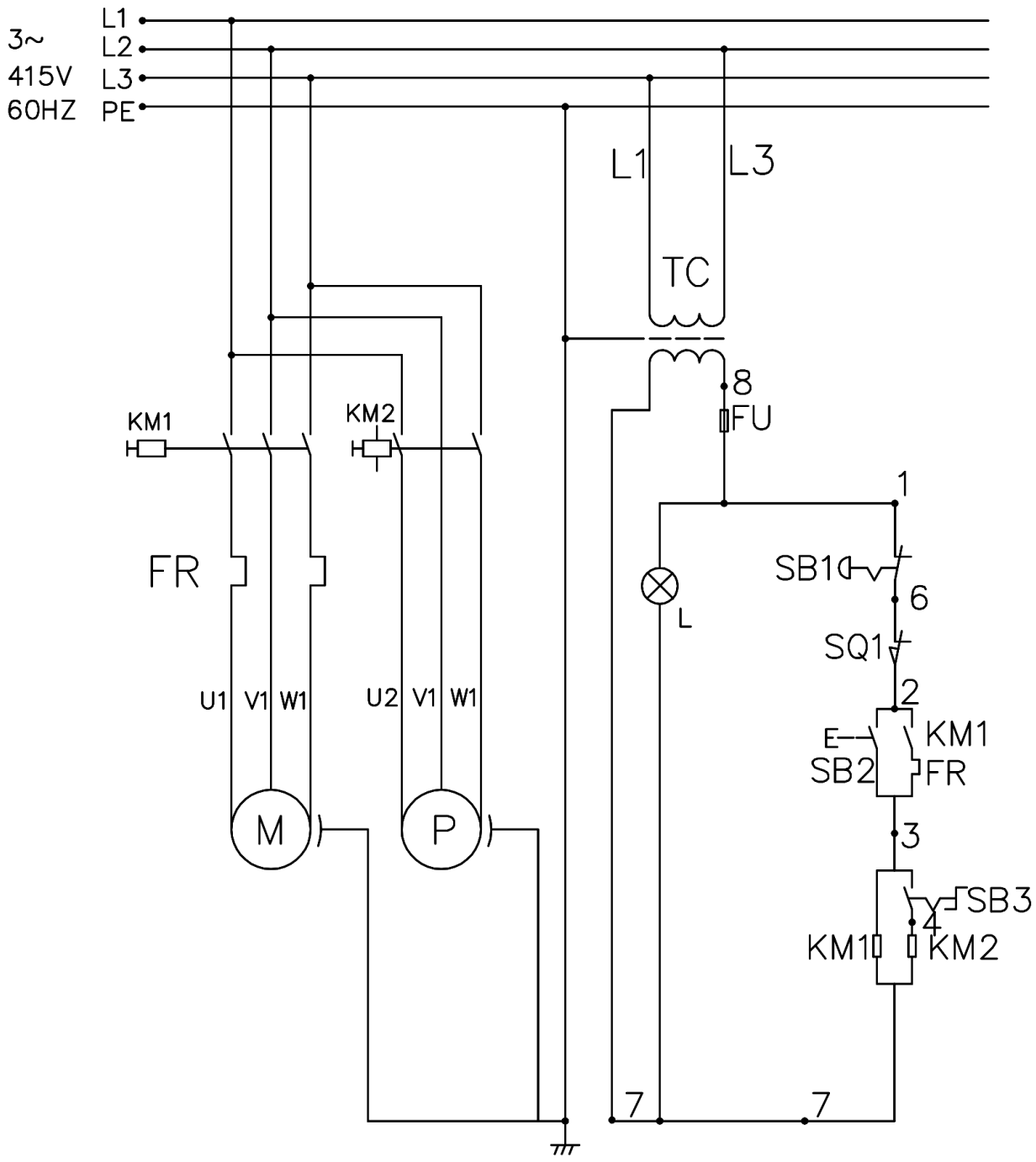
NOTE: SOME PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

3. Go to **www.machineryhouse.com.au/contactus** and fill out the inquiry form attaching a copy of scanned parts list.

WARNING!
Electricity is dangerous and could cause death
All electrical work must be carried out by a qualified electrician.

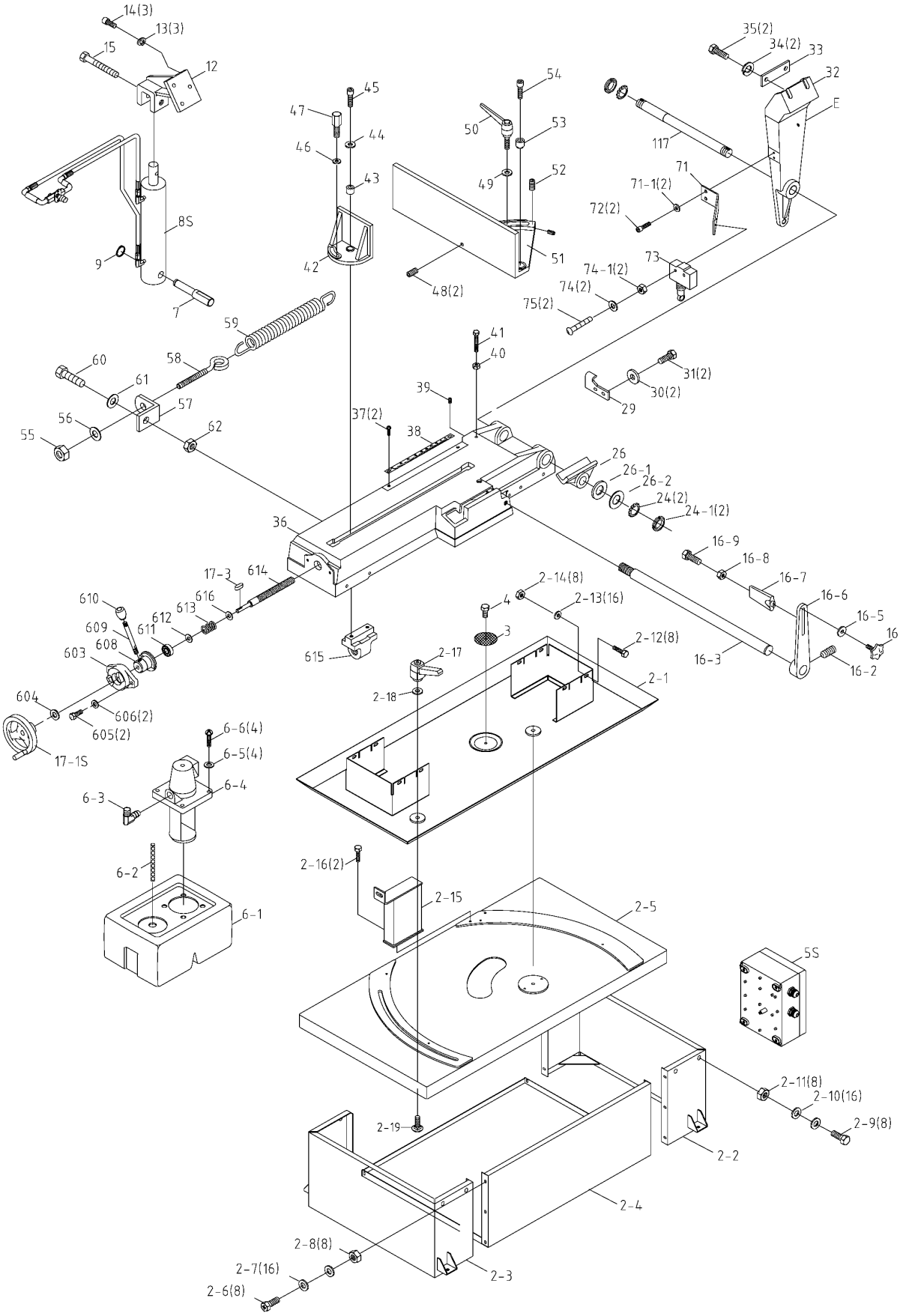
CAUTION!
It is impossible to cover all possible hazards Every workshop environment is different. These are designed as a guide to be used to compliment training and as a reminder to users prior to equipment use. Always consider safety first, as it applies to the individual working conditions.

WIRING DIAGRAM

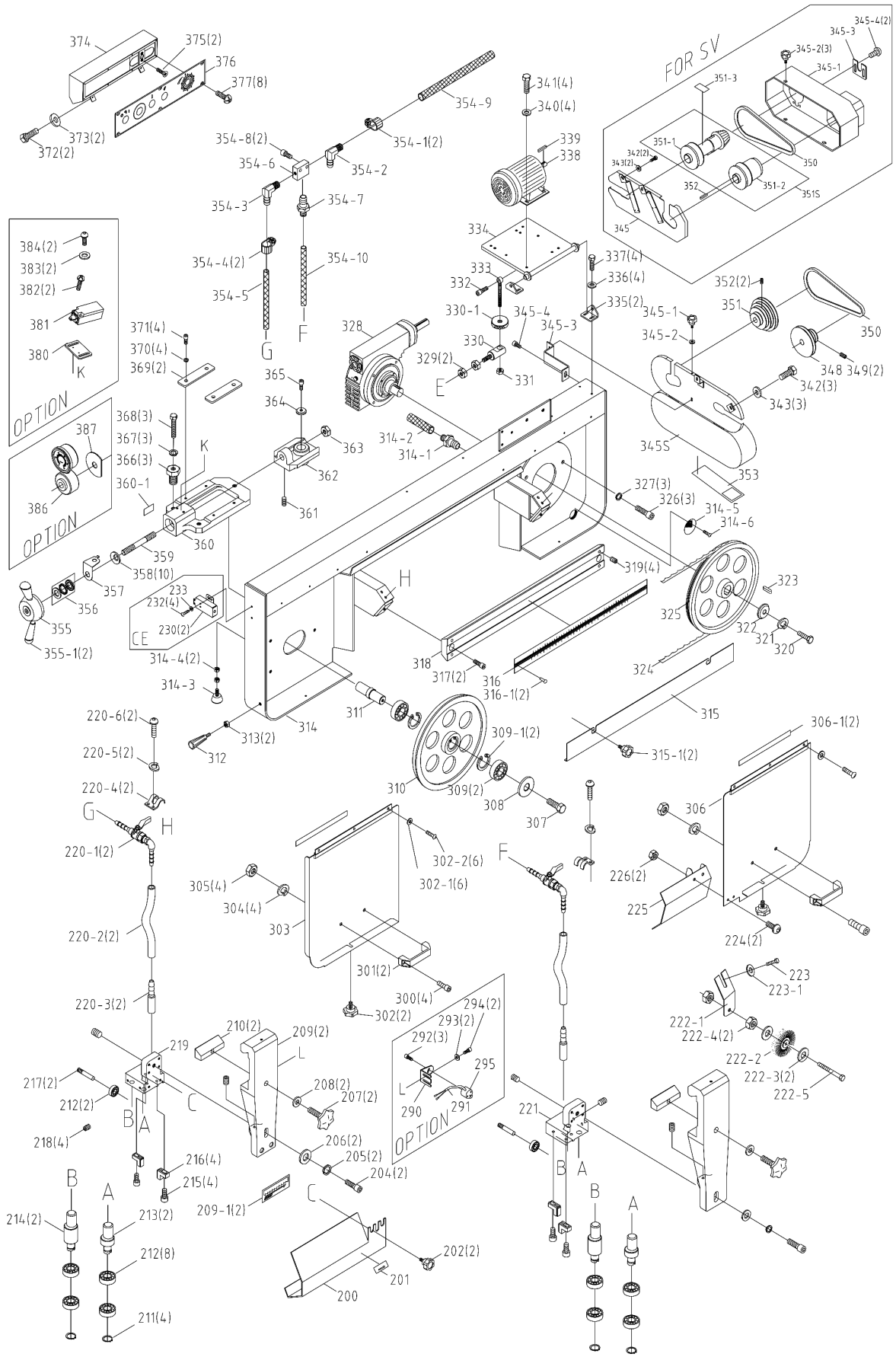


SB1: Emergency stop switch SB2: Start switch
SB3: Pump switch
SQ1: Limit switch
FR: Over load
KM1: Magnetic Contactor
KM2: Pump Relay
L: Signal Light
FU: Fuse base
TC: Transformer
M: 415V motor
P: Pump

PARTS DIAGRAM - 1



PARTS DIAGRAM - 2



PARTS LIST

Item	Fig. No.	Description	Qty	Item	Fig. No.	Description	Qty.
2S	189001RS	Stand Complete Assembly	1	30	W018	Washer 5/16"x23xt3mm	2
2-1	189001RA	Coolant Pan	1	31	HS046	Hex. Head Screw M8-1.25Px20L	2
2-2	189001R1	Leg (Right)	1	32	189012	Rear Pivot Bracket	1
2-3	189001R2	Leg (Left)	1	33	191219	Bushing	1
2-4	189001R3	Panel	1	34	HW106	Spring Washer ø10.2-3t	2
2-5	189001R4	Swivel Base	1	35	HS061	Hex. Head Screw M10-1.5Px35L	2
2-6	S204	Hex. Head Screw 1/4"-20*3/4"L	8	36	189002G	Base	1
2-7	W005	Washer 1/4"x16xt1.5	16	37	HE501	Cross Tablet Head Screw M5-0.8Px8L	2
2-8	N003	Hex. Nut 1/4"-20	8	38	187064	Degree-Meter	1
2-9	S010	Hex. Head Screw 3/8"-16*1"L	8	39	HS430	Hex. Headless Screw M8-1.25Px10L	1
2-10	W013	Washer 3/8"x20xt2	16	40	HN005	Hex. Nut M8-1.25P	1
2-11	N005	Hex. Nut 3/8"-16	8	41	HS051	Hex. Head Screw M8-1.25Px45L	1
2-12	HS050	Hex. Head Screw M8-1.25Px40L	8	42	196208	Vice Jaw Bracket	1
2-13	W016	Washer 5/16"x23x2mm	16	43	191209	Bushing	1
2-14	HN005	Hex. Nut M8	8	44	MW013	Flat Washer 3/8"	1
2-15	187034	Angle Position	1	45	MS012	Hex. Head Bolt 3/8"-16 X 1-1/2"L	1
2-16	HS051	Hex. Head Screw M8-1.25Px30L	2	46	HW025	Washer ø10.5*ø27Xt3mm	1
2-17	111039	Knob	1	47	189067	Fixed Bolt	1
2-18	HW030	Washer M10x27x2t	1	48	HS434	Hex. Headless Screw M8-1.25Px30L	2
2-19	HS935	Carriage Screw M10x33L	1	49	HW025	Washer ø10.5*ø27Xt3mm	1
3	191106A	Filter	1	50	191210	Knob	1
4	HS033	Hex. Head Screw M6-1.0Px15L	1	51	187033	Vice Jaw Bracket(Rear)	1
5S	ET1923S	Control Box	1	52	HS422	Hex. Headless Screw M6-1.0Px10L	1
6S	MB13103JS	Pump Set 1/8HP 230V 1P 130MM	1	53	1966004	Bushing	1
6-1	181256	Coolant Tank	1	54	HS261	Hex. Head Screw M10-1.5Px35L	1
6-2	189061	Hose 13x19-350mm	1	55	N005	Hex. Nut 3/8"	1
6-3	103125-4	Coupler PT1/2x3/8	1	56	W014	Washer 3/8"x23xt2	1
6-4	MB13103J	Pump 1/8HP/110V/220V/1PH	1	57	181115	Spring Handle Bracket	1
6-5	W004	Washer 1/4"x19xt1.5mm	4	58	181118	Spring Adjusting Rod	1
6-6	S717	Round Head Screw 1/4"-20*5/8"L	4	59	187068	Spring	1
7	189036	Pivot Shaft	1	60	S022	Hex. Head Screw 5/16"x3/4"L	1
8S	187065BS	Cylinder Assembly	1	61	W016	Washer 5/16"x23xt2	1
9	HCS07	C-Retainer S18	1	62	N007	Hex. Nut 5/16"-18	1
12	189025	Cylinder Upper Bracket	1	71	189034	Limit Switch Support	1
13	W205	Spring Washer 5/16"-2.0t	3	71-1	HW004	Washer ø6.5Xø18Xt1.5mm	2
14	HS244	Hex. Head Cap Screw M8-1.25Px30L	3	72	HS334	Hex. Head Screw M6-1.0PX12L	2
15	HS064	Hex. Head Screw M10-1.5Px50L	1	73	ET1617	Switch (For For CE Only Only)	1
16S	189037S	Length Stop Option Set	1	74	HW002	Washer ø4.3Xø9Xt0.8mm	2
16-2	HS422	Hex. Headless Screw M6-1.0Px10L	1	74-1	HN002	Hex. Nut M4-0.7P	2
16-3	189037	Length Stop Rod For CE Only	1	75	HS513	Cross Round Head Screw M4-0.7P*30L	2
16-4	196213	Plum Screw	1	117	187035	Pivot Shaft	1
16-5	W004	Spring Washer 1/4"x19xt1.5mm	1	200	189023J	Blade Guard (Front)	1
16-6	189038	Support Rod	1	201	196504	Saw Direction Label	1
16-7	1966008	Set Bracket For CE Only	1	202	103127	Knob M6-1.0Px10L	2
16-8	HN006	Hex. Nut M10-1.5P	1	204	HS243	Hex. Head Screw M8-1.25Px25L	2
16-9	HS059	Hex. Head Screw M10-1.5Px25L	1	205	HI105	Spring Washer ø8.2-2.5t	2
17-1S	187055S	Hand Wheel	1	206	HW005	Washer ø8.4*ø17Xt1.6mm	2
	187055	Hand Wheel	1	207	1965015	Blade Adjustable Knob	2
	189055R	Knob	1	208	HW023	Washer ø10.5*ø21Xt2mm	2
	HS422	Hex. Headless Screw M6-1.0P6x10L	1	209	187020	Arm (Left)	2
17-3	HK007	Key 5x5x15L	1	209-1	189077	Label	2
24	HW313	Star Washer AW05	2	210	1965014	Gib	2
24-1	1965043	Model Label AN05	2	211	C100	C-Retainer ø8	4
26	189013	Gap Ring	1	212	CA6082RS	Bearing 608-2RS	10
26-2	189085B	Washer	2	213	189018	EC For CE Only nitric Guide	2
26-1	189085	Washer	2	214	189019	EC For CE Only nitric Guide	2
29	196228	Position Set Bracket	1	215	HS230	Hex. Head Screw M6-1.0Px20L	4

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

PARTS LIST CONT.

Item	Fig. No.	Description	Qty	Item	Fig. No.	Description	Qty.
216	103120	Carbide Guide	4	314-4	HN005	Hex. Nut M8-1.25P	2
217	121061	Bearing Shaft	2	314-5	189080	Filter	1
218	HS421	Hex. Headless Screw M6-1.0Px5L	4	314-6	HT001	Round Head Screw M5-0.8Px10L	1
219	189015	Bearing Bracket (Left)	1	315	187021	Cover	1
220S	189081S	Valve Assembly	2	315-1	103127	Hex. Head Screw M6-1.0Px10L	2
220-1	189081	Valve	2	316	187039	Scale	1
220-2	189088	Hose ø6	2	316-1	HH001	Rivet ø2x5L	2
220-3	189083	Straight Connector	2	317	HS278	Hex. Head Screw M12-1.75P*20L	2
220-4	189084	Press Board	2	318	1965011	Column	1
220-5	HW104	Spring Washer ø6.1*1.9	4	319	HS432	Hex. Headless Screw M8-1.25Px20L	4
220-6	HT016	Button Head Screw M6-1.0P*12L	4	320	HS089	Hex. Head Screw M12-1.75P*30L	1
221	189014	Blade Adjustable (Rear)	1	321	HW107	Spring Washer ø12.2-3.6t	1
222S	189022S	Brush Assembly	1	322	198036	Drive Shaft Washer	1
222-1	189022	Brush Support	1	323	HK053	Key 8x8x30L	1
222-2	191334A	Brush	1	324	1965027	Blade 25*0.9*3090*5/8Tmm	1
222-3	HW004	Washer ø6.5Xø18Xt1.5mm	2	325	196304	Drive Wheel Key 8MM	1
222-4	HN004	Hex. Nut M6-1.0P	2	326	HS258	Hex. Head Screw M10-1.5Px20L	3
222-5	HS037	Hex. Head Screw M6-1.0Px35L	1	327	HW106	Spring Washer ø10.2-3t	3
223	HS032	Hex. Head Screw M6-1.0Px10L	1	328	19116S-3	Gear Box Ass.1:30,Ø22,key=5X5 FOR Pull	1
223-1	HW004	Washer ø6.5Xø18Xt1.5mm	1	328	19116S-1	Gear Box Ass. 1:30,,,Ø22,key=7X7	1
224	HF404	Round Head Screw M6-1.0PX12L	2	329	HN006	Hex. Nut M10-1.5P	2
225	189021	Blade Guard II (Rear)	1	330	187069	Shaft	1
226	HN004	Hex. Nut M6-1.0P	2	330-1	189032	Knob	1
230	189091	Switch Base For For CE Only Only	1	331	HN007	Hex. Nut M12-1.75P	1
232	HS032	Hex. Head Screw M6-1.0P*10L	4	332	HS266	Hex. Head Screw M10-1.5Px60L	1
233	HW004	Washer ø6.5Xø18Xt1.5mm	4	333	105076	Shaft	1
290S	189072S	Infrared Complete	1	334	105050B	Motor Plate	1
290	189074	Bracket , For For CE Only Only	1	335	105079	Motor Bracket	2
291	189072	Infrared	1	336	HW004	Washer ø6.5Xø18Xt1.5mm	4
292	HS558	Round Head Screw M5-0.8P*8L	3	337	HS034	Hex. Head Screw M6-1.0Px20L	4
293	HW003	Washer ø5.3*ø10Xt1mm	2	338	M601	Motor 2HP 110/220V 60HZ	1
294	HS558	Round Head Screw M5-0.8P*8L	2	338	M601	Motor 2HP 110/220V 60HZ	1
295	189073	Bracket	1	339	HK108	Key 7x7x35L	1
300	HS241	Hex. Head Screw M8-1.25Px15L	4	339	HK108	Key 8x7x35L	1
301	1965052	Knob	2	358	198093	Spring Washer øID16.3Xø31.5X1.8t	10
302	103127	Knob M6-1.0Px10L	2	359	198026	Lead Screw	1
302-1	HW003	Washer ø5.3*ø10Xt1mm	6	359	187067	Lead Screw	1
302-2	HT001	Round Head Screw M5-0.8Px10L	6	360	189050	Tension	1
303	187027	Blade Back Cover	1	360-1	189041	Tension Scale	1
303	187027E	Blade Back Cover	1	361	HS423	Hex. Headless Screw M6-1.0Px15L	1
304	HW105	Spring Washer ø8.2-2.5t	4	362	189051	Anchor Block	1
305	HN005	Hex. Nut M8-1.25P	4	363	HN008	Hex. Nut M16XP2	1
306	187026	Cover	1	364	121011	Washer	1
306	187026E	Cover	1	365	HS242	Hex. Head Screw M8-1.25PX20L	1
306-1	189079	Sponge Pad	2	366	189054	Screw	3
307	HS046	Hex. Head Screw M8-1.25Px20L	1	367	HW106	Spring Washer ø10.2-3t	3
308	HW027	Washer ø30Xø16Xt3mm	1	368	HS066	Hex. Head Screw M10-1.5Px60L	3
309	CA6205	Bearing 6025	2	369	189052	Press Board	2
309-1	HCR06	C-Retaining Ring R52	2	370	HW105	Spring Washer ø8.2-2.5t	4
310	105021A	Idler Wheel	1	371	HS240	Hex. Head Screw M8-1.25Px10L	4
311	187056	Shaft	1	372	HF024	Hex. Head Screw M6-1.0Px12L	2
312	189033	Handle	1	373	W005	Washer 1/4"x16xt1.5	2
313	N005	Hex. Nut 3/8"	2	374	187022	Control Box	1
314	187010	Body Frame	1	375	HS622	Flat Cross Head Screw M6-1.0Px12L	2
314-1	HD602	Pipe Connector PT1/2"	1	376	187023	Control Plate	1
314-2	189060	Net Tube 18*24-190mm	1	376	187023A	Control Plate	1
314-3	189087	Screw M8-1.25P	1	377	HE501	Cross Tablet Head Screw M5-0.8Px8L	8

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

PARTS LIST CONT.

Item	Fig. No.	Description	Qty	Item	Fig. No.	Description	Qty.
380S	98150MS	Micro Switch Assembly	1				
380	198150M	Micro Switch Bracket	1				
381	ET-1615	Micro Switch	1				
382	HS513	Round Head Screw M4-0.7Px30L	2				
383	HW005	Washer M5	2				
384	HS219	Hex. Head Screw M5X15L	2				
386	198170	Scale	1				
387	187066	Clamp For For CE Only Only	1				
600S	193055S	Pressure Pump Assembly	1				
603	193055	Pressure Pump	1				
604	HW007	Washer ø12*t2	1				
605	S013	Hex. Head Screw 3/8"*1-1/4"L	2				
606	W013	Washer 3/8"*20*t2	2				
608	193056	Pressure Shaft	1				
609	193059	Knob W/Shaft	1				
610	290086	Plastic Round Knob \RF31\	1				
611	CA51101	Bearing	1				
612	HW007	Washer ø12*t2	1				
613	193058	Spring	1				
614	187028	Acme Screw	1				
615	181138B	Acme Nut m.m	1				
616	W002	Washer 1/2"*28*t2	1				

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

NOTES:

ENVIRONMENT PROTECTION

Recycle unwanted materials instead of disposing of them as waste. All tools, accessories and packaging should be sorted, taken to a recycling centre and disposed of in a manner which is compatible with the environment. When the product becomes completely unserviceable and requires disposal, drain any fluids (if applicable) into approved containers and dispose of the product and fluids according to local regulations.

IMPORTED BY

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