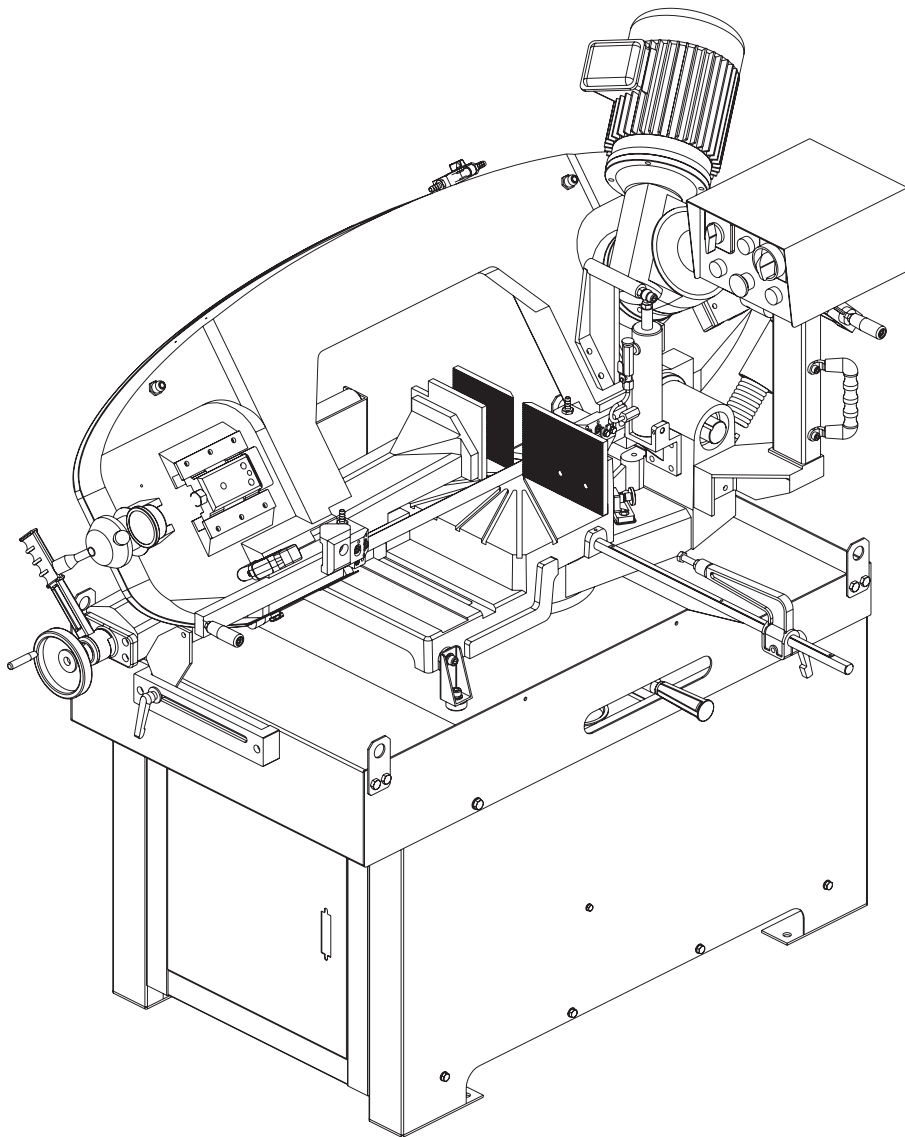


# Manual

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## Metal Cutting Band Saw Model LM-270



***For your safety, please read this manual carefully before operation***




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## SPECIFICATIONS

<b>Motor Power</b>	400V,3~,50Hz,1500/1100W, 4/8pole
<b>Gear rate</b>	25:1
<b>Fly wheel diameter</b>	380 mm
<b>Blade size</b>	3160x27x0.9mm
<b>Blade speed</b>	68 or 34 m/min
<b>Saw arm swivel</b>	45°L, 30°L, 15°L, 0°,15°R,30°R,45°R,60°R
<b>Coolant pump</b>	400V~, 45W
<b>Packing Size</b>	1770x765x1120 mm
<b>Weight</b>	420/490 kg


### Max cutting capacity


mm	0°	45°R	60°R	45°L
	270	240	160	210
	260	220	150	180
	370x220	240x160		180x180


## SAFETY

### For Your Own Safety Read Instruction Manual Before Operating This Equipment

The purpose of safety symbols is to attract your attention to possible hazardous conditions. This manual uses a series of symbols and signal words which are intended to convey the level of importance of the safety messages. The progression of symbols is described below. Remember that safety messages by themselves do not eliminate danger and are not a substitute for proper accident prevention measures.

 **Danger!** Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

 **Warning!** Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

 **Caution!** Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.

**Notice!** This symbol is used to alert the user to useful information about proper operation of the equipment.


### Safety Instructions For Power Tools

1. KEEP GUARDS IN PLACE and in working order.
2. REMOVE ADJUSTING KEYS AND WRENCHES. Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning on.
3. KEEP WORK AREA CLEAN. Cluttered areas and benches invite accidents.
4. DON' T USE IN DANGEROUS ENVIRONMENT. Don't use power tools in damp or wet locations, or where any flammable or noxious fumes may exist. Keep work area well lighted.
5. KEEP CHILDREN AND VISITORS AWAY. All children and visitors should be kept a safe distance from work area.
6. MAKE WORK SHOP CHILD PROOF with padlocks, master switches, or by removing starter keys.
7. DON' T FORCE TOOL. It will do the job better and safer at the rate for which it was designed.
8. USE RIGHT TOOL. Don' t force tool or attachment to do a job for which it was not designed.
9. USE PROPER EXTENSION CORD. Make sure your extension cord is in good condition.
10. WEAR PROPER APPAREL. Do not wear loose clothing, gloves, neckties, rings, bracelets, or other jewelry which may get caught in moving parts. Non-slip footwear is recommended. Wear protective hair covering to contain long hair.
11. ALWAYS USE SAFETY GLASSES. Also use face or dust mask if cutting operation is dusty. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses.
12. SECURE WORK. Use clamps or a vise to hold work when practical. It' s safer than using your hand and frees both hands to operate tool.

13. DON' T OVERREACH. Keep proper footing and balance at all times.
14. MAINTAIN TOOLS WITH CARE. Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.
15. DISCONNECT TOOLS before servicing and changing accessories, such as blades, bits, cutters, and the like.
16. REDUCE THE RISK OF UNINTENTIONAL STARTING. Make sure switch is in off position before plugging in.
17. USE RECOMMENDED ACCESSORIES. Consult the owner' s manual for recommended accessories. The use of improper accessories may cause risk of injury.
18. CHECK DAMAGED PARTS. Before further use of the tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.
19. NEVER LEAVE TOOL RUNNING UNATTENDED. TURN POWER OFF. Don' t leave tool until it comes to a complete stop.

### Additional Safety Instructions For The Metal-Cutting Bandsaw

1. Do not operate your bandsaw with dull or badly worn blades. Dull blades require more effort to use and are difficult to control. Inspect blades before each use.
2. Make sure the blade has been properly tensioned and is tracking on the center of the wheels
3. Always support stock in the vise and make certain it is firmly secured. Never attempt to hold material by hand while sawing.
4. Keep belt guard and bandsaw wheel covers in place when operating the machine.
5. Never force the saw through the cut. Allow the feed cylinder to control the rate of cutting. If the saw blade binds or stalls turn the power off immediately.
6. Never position fingers or thumbs in line with the cut. Serious injury could occur.
7. Periodically check the horizontal stop screw and the automatic shutoff limit switch to make sure they are properly adjusted.
8. Exercise great caution when replacing blades. Wear protective gloves and safety glasses when handling the blade.
9. Support long or heavy workpieces which extend from the machine bed with a roller stand or other support device.
10. Habits-good and bad-are hard to break. Develop good habits in your shop and safety will become second-nature to you.

 **Warning!** Operating this equipment has the potential to propel debris into the air which can cause eye injury. Always wear safety glasses or goggles when operating equipment. Everyday glasses or reading glasses only have impact resistant lenses, they are not safety glasses.

 **Warning!**

Like all power tools, there is danger associated with this Metal Bandsaw. Accidents are frequently caused by lack of familiarity or failure to pay attention. Use this tool with respect and caution to lessen the possibility of operator injury. If normal safety precautions are overlooked or ignored, serious personal injury may occur.

 **Warning!**

No list of safety guidelines can be complete. Every shop environment is different. Always consider safety first, as it applies to your individual working conditions. Use this and other machinery with caution and respect. Failure to do so could result in serious personal injury, damage to equipment or poor work results.

## Lighting and Outlets

Lighting should be bright enough to eliminate shadow and prevent eye strain. Electrical circuits should be dedicated or large enough to handle combined motor amp loads. Outlets should be located near each machine so power or extension cords are not obstructing high-traffic areas. Be sure to observe local electrical codes for proper installation of new lighting, outlets, or circuits.

 **Warning!**

Read the manual before assembly and operation. Become familiar with the machine and its operation before beginning any work. Serious personal injury may result if safety or operational information is not understood or followed.

## Site Considerations

### General Condition

1. Electrical connection: Steady state voltage: 0.9-1.1 of nominal voltage.  
Frequency: 0.99-1.01 of nominal frequency continuously; 0.98-1.02 short time

The mains connection must have maximum 16A fuse.

Electrical supply which has protection devices of under-voltage, over-voltage, over-current as well as a residual current device (RCD) which maximum residual current rated at 0.03A.

2. Altitude are not exceeding 1000m.  
Maximum ambient air temperature is +40°C, minimum ambient air temperature is not less than +5 °C.  
Storage and transportation temperature range is -25°C~+55°C.  
The relative humidity does not exceed 50% at a maximum temperature of +40°C, higher relative humidity may be permitted at lower temperature (e.g. 90%@ 20°C).

### Floor Load

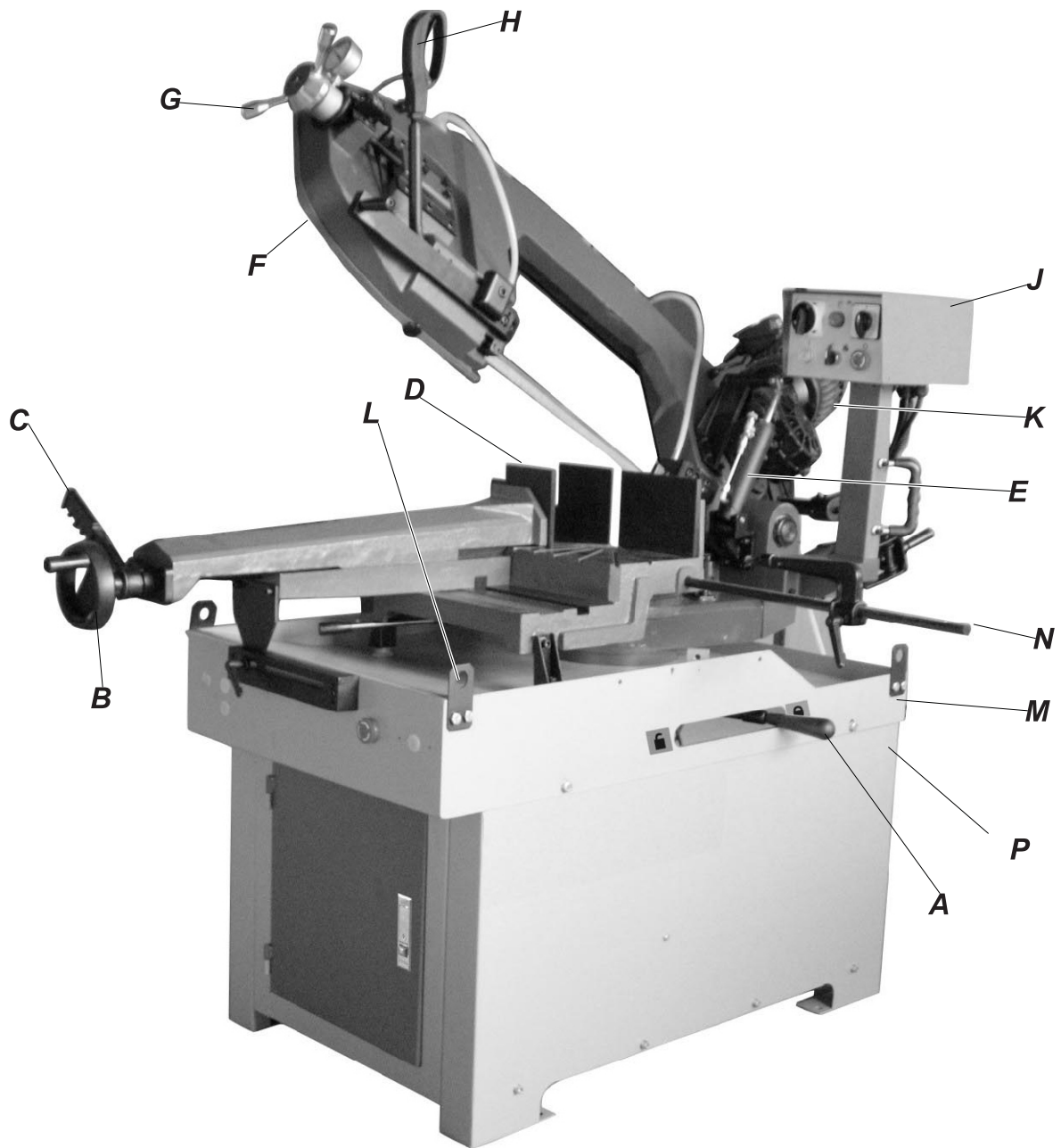
This machine represents a moderately large weight load in a small footprint. Most commercial shop floors will be adequate for the weight of the machine. Some floors may require additional support. Contact an architect or structural engineer if you have any question about the ability of your floor to handle the weight.

To ensure sufficient upright stability of the machine it should be bolted to floor. For this purpose 4 slots are provided in the machine's bracket of work stand.

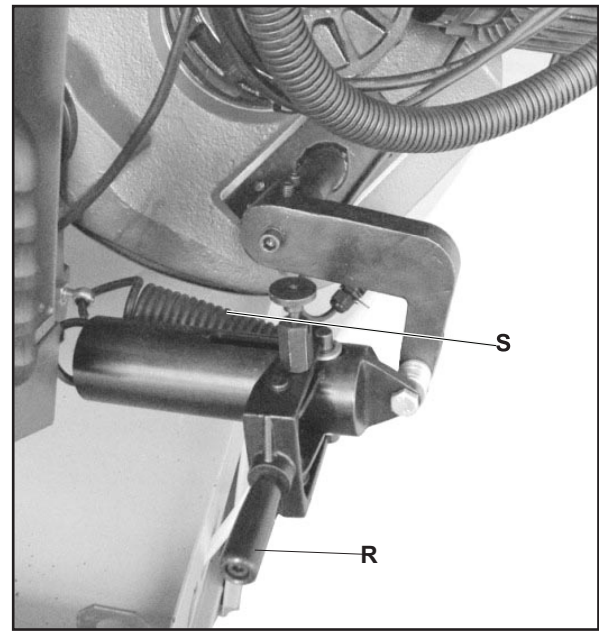
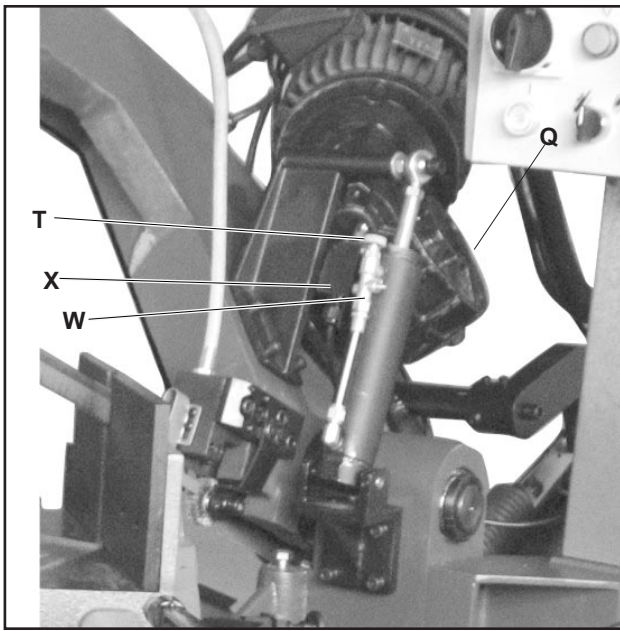
### Working Clearances

Working clearances can be thought of as the distances between machines and obstacles that allow safe operation of every machine without limitation. Consider existing and anticipated machine needs, size of material to be processed through each machine, and space for auxiliary stands and/or work tables. Also consider the relative position of each machine to one another for efficient material handling. Be sure to allow yourself sufficient room to safely run your machines in any foreseeable operation.

## GETTING TO KNOW YOUR METAL CUTTING BAND SAW



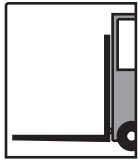
- |   |                                    |   |  |
|---|------------------------------------|---|--|
| A | Saw arm lock lever                 | J | Control panel----Contains On/Off buttons, Power-On indicator light, and the Feed Rate valve. |
| B | Vise hand -wheel                   | K | Main motor   |
| C | Vise quick lock lever              | L | Sling plate  |
| D | Jaw, vise                          | M | Coolant and chip tray  |
| E | Hydraulic cylinder                 | N | Bar stop/ work stop  |
| F | Saw arm                            | P | Machine stand/ Cabinet stand   |
| G | Blade tension adjusting hand-wheel |   |  |
| H | Trigger/ handgrip                  |   |  |



- Q Gear box
- R Fork, Auto/manual changing
- S Saw arm return spring
- T Hydraulic flow control valve
- W Hydraulic flow regulation valve
- X Stroke lower position limit switch

## UNPACKING

The metal bandsaw is shipped from the factory in a carefully packed crate. If you find the machine to be damaged, save the containers and all packing materials, call your agent.



This metal bandsaw is a very heavy machine (400 kgs. shipping weight). DO NOT over-exert yourself while unpacking or moving your machine--get assistance. In the event that your machine must be moved up or down a flight of stairs, be sure that the stairs are capable of supporting the combined weight of people and the machine. Serious personal injury may occur.

When you are completely satisfied with the condition of your shipment, you should inventory its parts.

### Piece inventory

- Main saw unit
- 6- Hex head screw M10x20
- 6- Washer 10mm
- Bar stop/work stop
- 2,5,3,4,6,10 mm allen wrench(5)
- 10-13 duo-open wrench
- 17-19 duo-open wrench
- Machine stand parts
  - Right part
  - Left part
  - Bottom plate
  - Door frame w/door
  - Shelf( V & H)
  - 16-Hex head screw M8x16
  - 20-Washer 8mm
  - 4-Hex nut M8
  - 5-Hex head screw M6x12
  - 5-Hex nut M6
  - 10-Washer 6mm

### Clean Up

The unpainted surfaces are coated with a waxy oil to protect them from corrosion during shipment. Remove this protective coating with a solvent cleaner or citrus-based degreaser. Avoid chlorine-based solvents as they may damage painted surfaces should they come in contact. Always follow the usage instructions on the product you choose for clean up.

#### **Caution!**

Many of the solvents commonly used to clean machinery can be highly flammable, and toxic when inhaled or ingested. Always work in well-ventilated areas far from potential ignition sources when dealing with solvents. Use care when disposing of waste rags and towels to be sure they do not create fire or environmental hazards. Keep children and animals safely away when cleaning and assembling this machine.

#### **Warning!**

Do not use gasoline or other petroleum-based solvents to remove this protective coating. These products generally have low flash points which makes them extremely flammable. A risk of explosion and burning exists if these products are used. Serious personal injury may occur.

#### **Caution!**

All die-cut metal parts have a sharp edge (called "flashing") on them after they are formed. This is generally removed at the factory. Sometimes a bit of flashing might escape inspection, and the sharp edge may cause cuts or lacerations when handled, please examine the edges of all die-cut metal parts and file or sand the edge to remove the flashing before handling.

## ASSEMBLY

This metal cutting bandsaw is completely assembled, just needs to assemble the machine stand.

### Assembling the machine stand

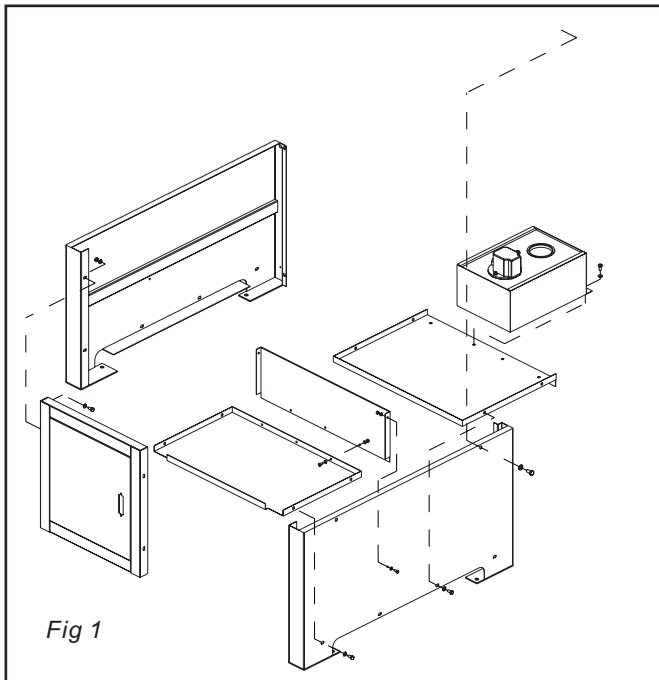
Join the left part, right part to bottom plate with 6-hex head screws M8x16 w/6- 8mm washers.

Attach the H-shelf to assembled parts with 4--hex head screws M8x16 w/4- 8mm washers.

Attach the V-shelf to assembled parts with 5--hex head screws M6x12 w/10- 6mm washers, 5-hex nuts M6.

Attach the door frame w/door and fasten it with 4-hex head screws M8x16 w/8-8mm washer, 4-hex nuts M8.

Mount the Coolant system assembly to bottom plate with 2-Hex head screws M8x16 w/2-8mm washer.



Carefully lift the saw head onto base, and fasten the machine head by 6-Hex head screw M10x20, and washer 10mm.

### **Warning!**

Before starting to lift the machine make sure that all movable parts have been securely fastened.

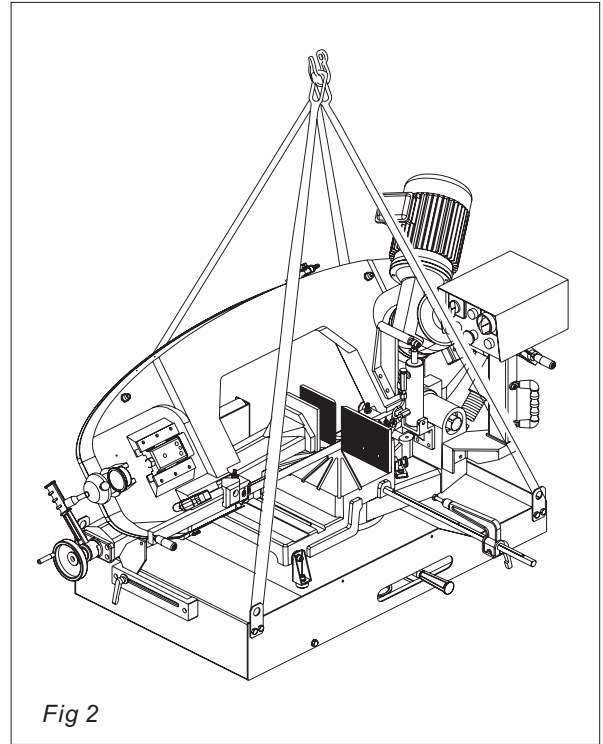
Ensure that the crane's lifting capacity is suitable for the machine. Lift the machine carefully and move it slowly, avoiding bumps or sudden movements.

### **Caution!**

- The lifting and transporting operations can be extremely dangerous if not carried out with maximum caution.
- Move all unqualified personnel away from the area. Clean, clear and close off the installation area.

- Check the condition and suitability of the equipment available.

- Do not touch the suspended loads and remain at a safe distance from them.



### Assemble the loose parts and accessories

Fit the components supplied:

Mount bar stop rod.

Mount and align the roll-supporting arm as per the counter-vice table.

### Dis activation of machine

If the machine is to be out of use for a long period, it is advisable to proceed as follows:

Detach the plug from the electric supply panel,

Loosen blade,

Release the saw arm return spring,

Lowering the saw arm as possible,

Empty the coolant tank,

Carefully clean and grease the machine,

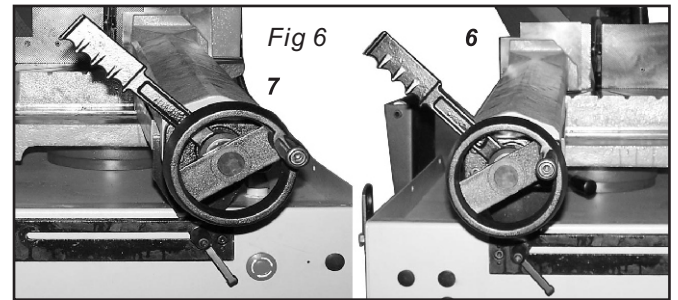
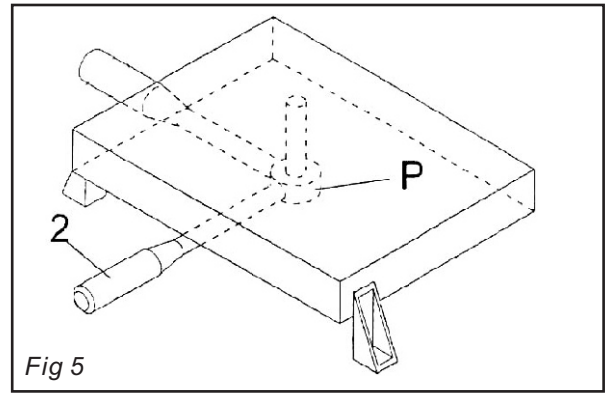
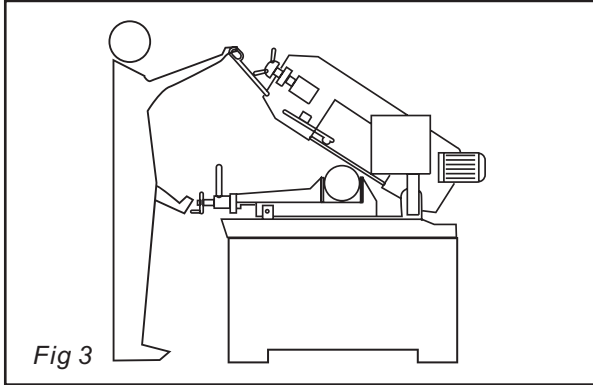
If necessary, cover the machine.



## OPERATION

The machine has been designed to cut metal building materials, with different shapes and profiles, used in workshops, turner's shops and general mechanical structural work.

Only one operator is needed to use the machine, that must stand on the **front** of machine as shown in the picture.



Before starting each cutting operation, ensure that the part is firmly clamped in the vice and that end is suitably supported.

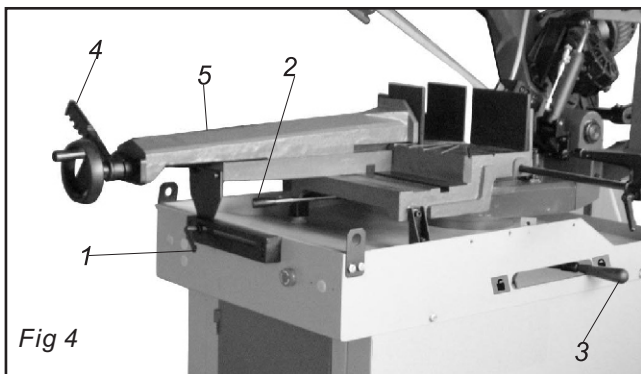
Do not use blades of a different size from those stated in machine specifications.

If the blade gets stuck in the cut, release the running button immediately, switch off the machine, open the vice slowly, remove the part and check that the blade or its teeth are not broken. If they are broken, change the tool.

### Vice adjustment

The device does not require any particular adjustment; in case of excess play of the sliding guide, tighten slide screw more.

To move the vise in either direction, the vise jaw must be unlocked at two points.



Release the track support by turning the handle(1) counter-clockwise.

Release the vise by moving the lever(2) to the left.

The vise (5) may now be moved to right position (7) or left position (6) by pushing it with one hand on the vise and the other hand on the track handle(1).

Once in position, move the lever(2) to the right to lock it into position. If the lever (2) is not between the vise/bed mounts and facing the user, then the vise will not be able to lock. If the vise lever(2) has gone beyond or is obstructed by a vise/bed mount, then use the following procedures.

Adjust the lever(2) by grasping at the pivot point(P) and lowering it, which may assist in the adjustment.

The lever can now be freely rotated into a more convenient position. Some movement of the vise jaw may be required. Raise the lever (2) then move to the right to lock.

Lock the track support(1) by turning handle clockwise.

### Clamping the work piece

Place work piece between the jaws.

Use the hand wheel to approach the vice jaw to the work piece, leaving 3-4mm of space. Lock down work piece by lowering the quick lock lever(4).

When the cutting cycle is finished, release vice by raising the quick lock lever (4). Upon releasing the quick lock lever (4), the vise jaw will open to the same distance that was set initially. This allows for rapid loading of same size material.

These figures below examples of suitable clamping of different section bars, bearing in mind the cutting capacities of the machine in order to achieve a good efficiency and blade durability.

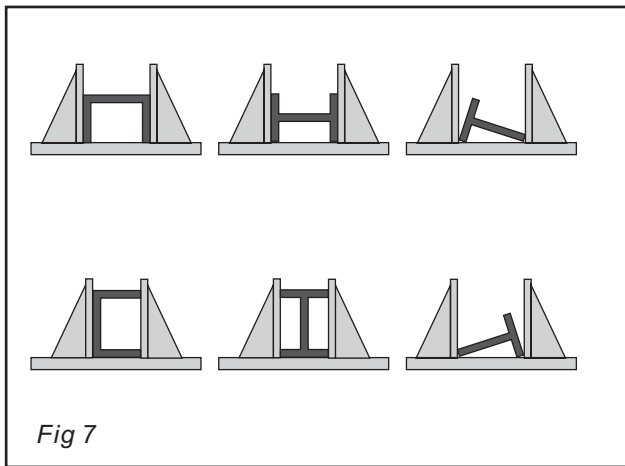
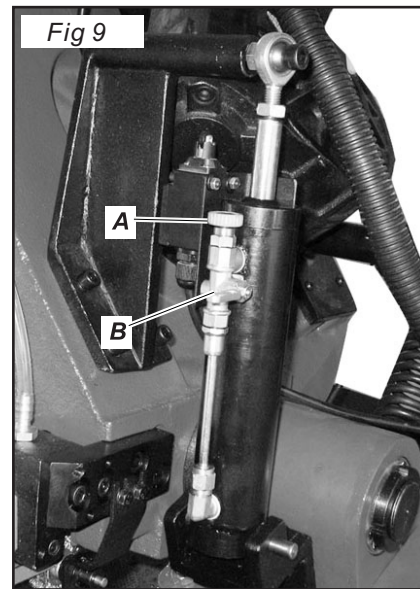


Fig 7



## Adjust cutting angle

Using the right side, angles can be cut up to 60 degrees. This requires that vise jaw to be set on the left side(6, fig6). Use the procedures for **Vise Adjustment**, to place it in left side position.

Using the left side, angles can be cut up to 45 degrees. This requires the vise jaw to be set on the right side(7,fig6). Use the procedures for **Vise Adjustment**, to place it in right side position.

Unlock lever (3,fig4) and use the handle under the control box to rotate the saw frame arm until you reach mechanical stop and check if the index corresponds to desired degrees; if not , operate on the set screws to make measures meet.

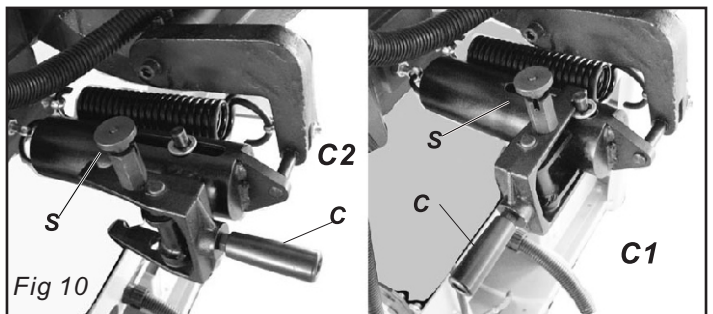


Fig 10

Move the handle to the auto position (**C2**,fig10).Lift the spring knob (**S**) and secure its pin into its slot.

Use manual/auto selector(**SA2** fig8) to select auto.

Select cutting speed by turning speed selector(**SA1** fig8).Turtle is low speed, rabbit is high speed, and 'O' is neutral.

Turn main connect switch (**QS** fig8) to the ON position.

Check that the indicator light (**HL1**) is on.

Load work piece and clamp it properly.

Press start/reset button(**SB2**) to start machine.

Check that the blade is running in the correct direction.

Slightly pull the saw arm down to get rid of air bubbles from the hydraulic cylinder.

Adjust hydraulic flow control valve(**A**) by slightly turning the valve counter-clockwise to let saw arm descend and start cutting.

Press the emergency push button (**K** fig 11 or **SB1** fig8) down to shut off all functions. To release the emergency shut off rotate emergency push button (**K** or **SB1**) clock-wise. The button will pop up and then the cutting cycle can be restarted.

In general, start cuts by slightly turning hydraulic flow control valve(**A**) counter-clockwise from 2 to 3 to control the saw arm descent rate. If the arm descends too quickly, turn hydraulic flow regulation valve (**B**) counter-clockwise all the way back to stop its descent.

## Operation cycle

### ! Caution!

Before operation, all the main organs of machine must be set in optimum conditions.

### Auto cutting operation

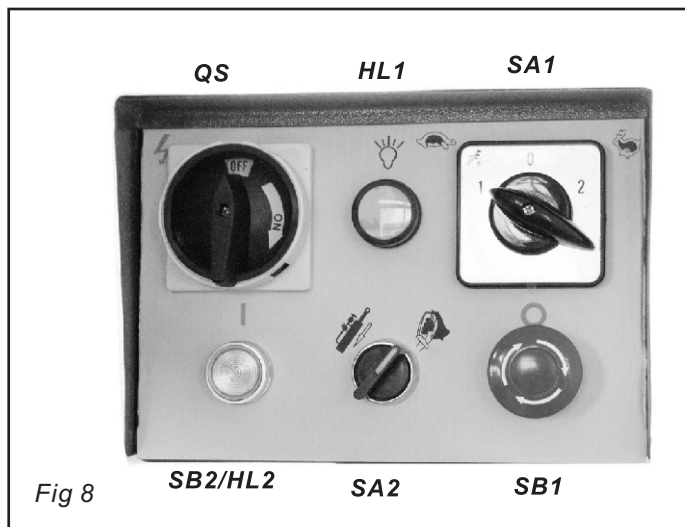
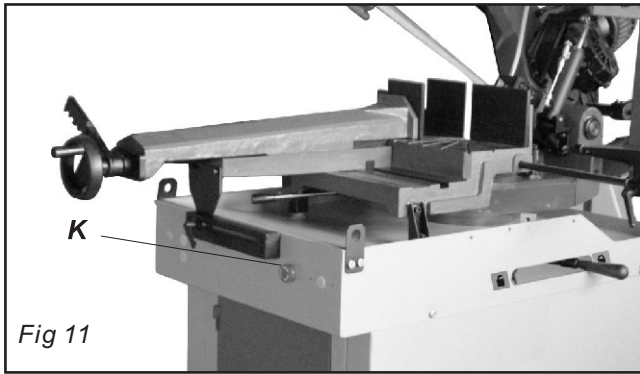


Fig 8

Close the hydraulic flow control valve(**A**) by turning the valve clockwise all the way to the end.

Raise the saw arm.

Lift the spring knob (**S**) to release the pin from its slot. This will free the fork handle( **C**).



A saw arm dropping too quickly can cause the blade to stall on the work pieces and the machine will shut off. Push down the emergency push button (K or SB1) to immediately stop all machine functions.

Fully open the hydraulic flow control valve(A) by turning the valve counter-clockwise all the way to the end.

Press trigger switch(J) to start operation.

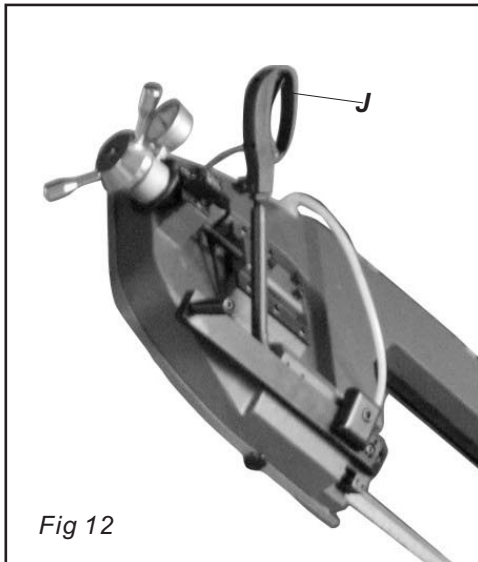
If cutting pipe with thin walls, reduce the saw arm descent rate by adjusting the flow control valve(A).

Press the emergency push button(K fig11, or SB1 fig8) down to shut off all functions.

To release the emergency push button(K fig11, SB1 fig8) rotate the mushroom shaped button clock-wise. The button will pop up and then the cutting cycle can be restarted.

### Trigger switch (manual cutting) operation

Full close the hydraulic flow control valve(A) by turning the valve clockwise all the way to the end.



Raise the saw arm as possible.

Lift the spring knob (S) to release the pin from its slot. This will free the fork handle(C). Move the handle to the manual position (C1, fig10). Lift the spring knob(S) and secure its pin into its slot.

Use manual/auto selector(SA2) to select handle icon.

Select cutting speed by turning speed selector(SA1). Turtle is low speed, rabbit is high speed, and 'O' is neutral.

Turn main connect switch(QS) to the ON position. Check that the indicator light(HL1) is on.

Load work piece and clamp it properly.

Fully open the hydraulic flow regulation valve(B) by turning the valve clockwise all the way to the end.

## ADJUSTING

### Blade tension adjusting

The ideal tension of the blade is achieved rotating the hand wheel until it touches the micro switch, that actuates the operation of the machine is actuated.

**The position of this switch is factory set during inspection**, after having tightened the blade on the lengthening values indicated by its manufacturer as per specific dimensions set with the help of a special instrument. When replacing the blade, if the thickness and the width differ, it will be necessary to correct the projection of the switch. For this purpose we suggest to strictly select blades having the same features as mounted originally.

Proper blade tension is 12 to 14 MPa as measured on a blade tension gauge.

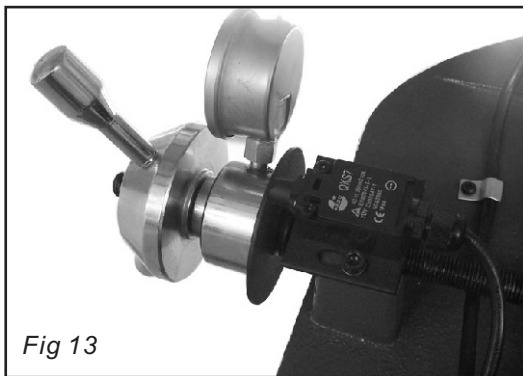


Fig 13

### Adjusting the blade guide

Disconnect the machine from the power source.

Use a Allen wrench to loosen allen screw (A) on the square lock plate.

Hold the handle(B) and slide blade guide block as close as possible to the material without interfering with the cut.

Tighten the allen screw(A).

Reconnect the machine to power source.

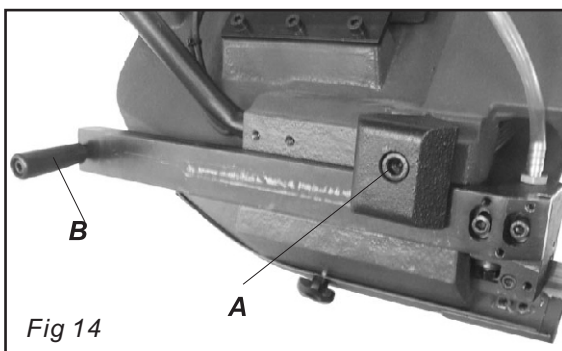


Fig 14

### Blade guide block

The blade is guided by means of adjustable pads set place during inspection as per the thickness of the blade with minimum play as shown in the figure.

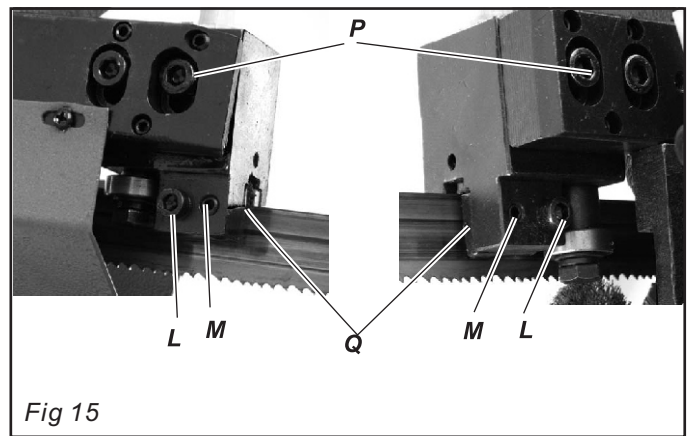


Fig 15

In case the blade needs to be replaced, make sure to always install 0.9mm thick blades for which the blades guide pads have been adjusted.

In the case of toothed blade with different thickness adjustment should be carried out as follows:

Loosen allen screw (L), adjusting the set screw (M), the movable teeth (Q) will far away or close to the blade.

Make sure that between blade and two side teeth there is 0.05mm of play.

Then re-tighten allen screw (L).

Make sure that between blade and upper teeth of the pad this is at least 0.2~0.3 mm of play; if necessary, loosen the allen screws(P) that fasten the block and adjust accordingly.

### Changing the blade

**Warning!**

**Before performing the following operations, the electric power supply and the power cable must be completely dis-connected.**

Lift the saw arm.

Loosen the blade with the hand-wheel, slide the mobile blade guide to far away as possible, remove the blade guard lock knob, remove the blade guard and remove the old blade, from the flywheel and the blade guide block.

Assemble a new blade by placing it first between the pads and then on the race of flywheels, paying particular attention to the cutting direction of the teeth.

Tension the blade and make sure it perfectly fits inside the seat of the flywheels.

Assemble the blade guard, and fasten it with relative knobs.

Check the safety microswitch is activated otherwise when electric connection will be restored the machine will not start.

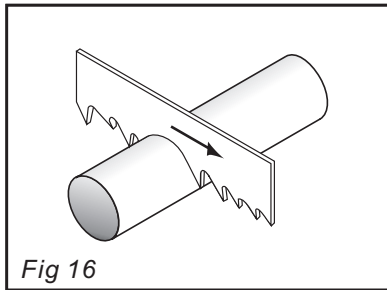


Fig 16

**Always assemble blades having dimensions specified in this manual and for which the blade guide heads have been set.**

**This metal cutting bandsaw can not accept thick than 0.9mm blade.**

### Checking the adjustment of the blade

Use a strip of scrap paper and slide it between the blade and the flywheel while it is running.

if the paper is cut then the blade is riding too close to the flange. Re-adjust.

if you notice that the blade is riding away from the flange. Then re-adjust.

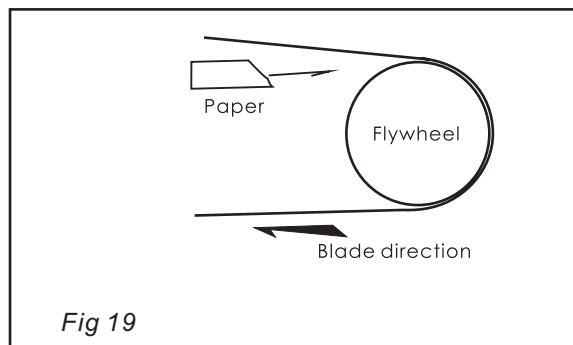


Fig 19



### Warning!

**Always assemble blades having dimensions specified in this manual and for which the blade guide heads have been set.**

### Adjusting the blade to the flywheel

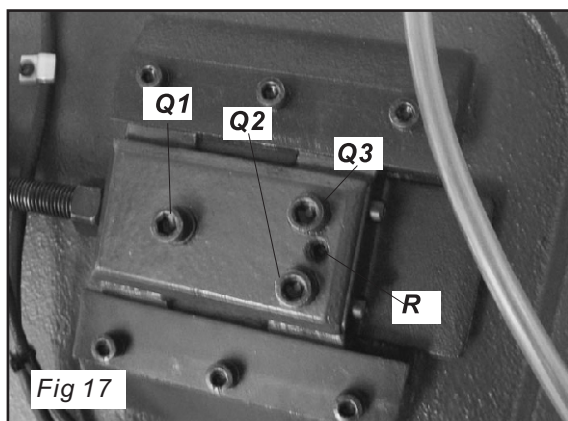


Fig 17

Loosen the hex screws (Q1,Q2,Q3).

Use an allen wrench on set screw ( R ) to adjust the tilt of the flywheel.

Turning the set screw clockwise will tilt flywheel so that the blade will ride closer to the flange.

Turning the set screw counter-clockwise will tilt flywheel so that the blade will ride away from the flange.

After the adjustment is finished fasten the hex screw in this order: Q3, Q2, Q1.

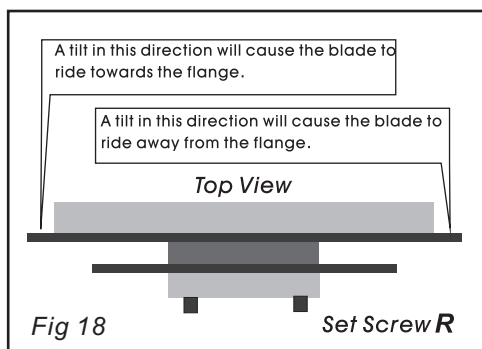


Fig 18

## MAINTENANCE

The maintenance jobs are listed below, divided into Daily, Weekly, Monthly and 6-monthly intervals. If the following operations are neglected, the result will be premature wear of the machine and poor performance.

### Daily maintenance

General cleaning of the machine to remove accumulated shavings.

Clean the lubricating coolant drain hole to avoid excess fluid.

Top off the level of lubricating coolant.

Check blade for wear.

Rise of saw frame to top position and partial slacking of the blade to avoid useless yield stress.

Check functionality of the shields and emergency stops.

### Weekly maintenance

Thorough cleaning of the machine to remove shavings, especially from the lubricant fluid tank.

Removal of pump from its housing, cleaning of the suction filter and suction zone.

Use compressed air to clean the blade guides (guide bearing and drain hole of lubricating cooling).

Cleaning flywheel housing and blade sliding surface on flywheels.

### Monthly maintenance

Check the tightening of the motor flywheels screws.

Check that the blade guide bearings on the heads are perfect running condition.

Check the tightening of screws of the gear motor, pump, and accident protection guarding.

### 6-monthly maintenance

Continuity test of the equipotential protection circuit.

### Maintenance of other machine parts

The worm drive gearbox mounted on the machine is maintenance-free guaranteed by its manufacture.

### Oils for lubricating coolant

Considering the vast range of products on the market, the user can choose the one most suited to their own requirements, using as reference the type SHELL LUTEM OIL ECO. THE MINIMUM PERCENTAGE OF OIL DILUTED IN WATER IS 8-10%.

### The gear box

The gear box requires periodic changing of oil. The oil must be changed by the first 6 months of a new machine and every year thereafter.

#### *To change the gear box oil*

Disconnect the machine from the power source.

Raise the saw arm to vertical position.

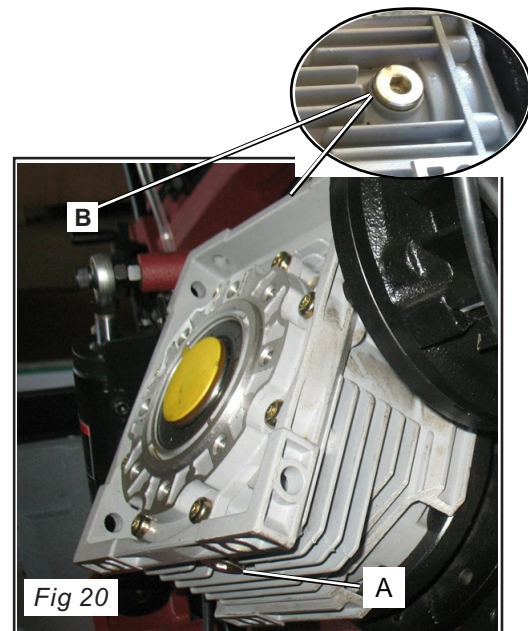
Draw off gear oil by loosening the allen head screw ( A )

Replace the screw after oil completely flows off.

Place the saw arm back to horizontal position.

Fill Gear box with approximately 0.6 liter of gear oil through the hole of the vent screw ( B ).

For reference, use SHELL type gear oil or Mobile gear oil #90.



### Special maintenance

Special maintenance must be conducted by skilled personal. We Advise contacting your nearest dealer and/or importer. Also the reset of protective and safety equipment and devices ( of the reducer), the motor, the motor pump, and other electrical components requires special maintenance.

## BLADE CHOICE

Selecting the right blade for the job depends on a variety of factors, such as the type of material being cut, hardness of the material, material shape machine capability, and operator technique.

The chart below is a basic starting point for choosing blade type based on teeth per inch (TPI) for variable tooth pitch blades and for standard raker type bi-metal blades/HSS blades. However, for exact specifications of bandsaw blades, contact the blade manufacturer.

To select the correct blade TPI:

1. Measure the material thickness. This measurement is the length of cut taken from where the tooth enters the workpiece, sweeps through, and exits the workpiece.
2. Refer to the "Material Width/Diameter" row of the blade selection chart and read across to find your workpiece thickness you need to cut.
3. Refer to the "Material Shapes" row and find the shape and material to be cut.

4. In the applicable row, read across to the right and find the box where the row and column intersect. Listed in the box is the minimum TPI recommended for the variable tooth pitch blades.

5. The "Cutting Speed Rate Recommendation" section of the charts offers guidelines for various metals, given in feet per minute (speed FPM) and meters per minute in parenthesis. Choose the speed closest to the number shown in the chart.

(The next page "Blade Structure" is for reference only.)

Material Width/Diameter		Material Shapes		Teeth Per Inch (TPI)																				
				TOOTH SELECTION																				
				mm	50	75	100	150	200	250	300	350	400	450										
○	H	△			5/8		4/6		3/4				2/3											
●				4/6		3/4		2/3		1.4/2.5				1.5/.8										
■					3/4		2/3		1.4/2.5				1.5/.8											
				inch	2	2½	3	3½	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Material	Speed RPM (M/Min)	Material	Speed RPM (M/Min)	Material	Speed RPM (M/Min)	Material	Speed RPM (M/Min)
Carbon Alloy	196~354 (60) (108)	Tool Steel	203 (62)	Alloy Steel	196~354 (60) (108)	Free-Machining Stainless Steel	150~203 (46) (62)
Angle Steel	180~220 (54) (67)	High Speed Tool Steel	75-118 (25) (36)	Mold Steel	180~220 (54) (67)	Gray Cast Iron	108~225 (33) (75)
Thin Tube	180~220 (54) (67)	Cold-Work Tool Steel	95-213 (29) (65)	Water Hardening Tool Steel	180~220 (54) (67)	Ductile Austenitic Cast Iron	65~85 (20) (26)
Aluminum Alloy	220~534 (67) (163)	Hot-Work Tool Steel	203 (62)	Stainless Tool Steel	220~534 (67) (163)	Malleable Cast Iron	321 (98)
Copper Alloy	229~482 (70) (147)	Oil-Hardening Tool Steel	203-413 (62) (65)	High-Speed Tool Steel	229~482 (70) (147)	Plastics	220 (67)

## Blade Structure

Bi-metal blade are the most commonly used. They consist of silicon-steel blade backing by a laser welded high speed steel (HSS) cutting edge. The type of stock are classified in M2, M42, M51 and differ from each other because their major hardness due to increasing percentage of Cobalt (Cc) and molybdenum (Mo) contained in metal alloy.

There are several key factors to consider in choosing a blade:

**Tooth Pitch**---The number of teeth per inch (TPI) on the blade, also known as tooth pitch. Select a pitch which will assure that at least three teeth are contacting the workpiece while cutting. This helps to distribute the cutting forces and avoids tooth breakage.

**Tooth Form**---There are four common forms of teeth on the blade: buttress, claw-tooth, precision and tungsten carbide. Precision is the most common and is the type supplied with this saw.

**Tooth Set**---Set is the degree to which the teeth are bent away from the blade. Typical tooth set styles are raker, wave and straight set.

Always select and use good-quality saw blades and choose the right blade for the job. Discuss your cutting requirements with your saw blade dealer to make sure you are getting the type of blade which best suits your need. Poor quality blades and improper use are often the cause of premature blade failure.

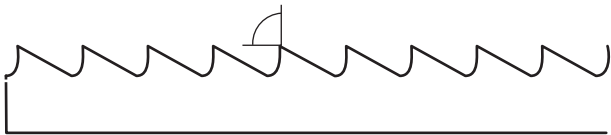
Many conditions can lead to breakage. Blade breakage is, in some cases, unavoidable, since it is the natural result of the peculiar stresses that bandsaw blades are subjected to. Blade breakage is also due to avoidable causes.

Avoidable breakage is most often the result of poor care or judgement on the part of the operator when mounting or adjusting the blade or support guides. The most common causes of blade breakage are:

- (1) faulty alignment and adjustment of the guides;
- (2) insufficient number of teeth contacting the cut;
- (3) feeding too fast;
- (4) tooth dullness or absence of sufficient set;
- (5) excessive tension;
- (6) using a blade with a lumpy or improperly finished weld; and
- (7) continuously running the bandsaw when not in use.

### REGULAR TOOTH

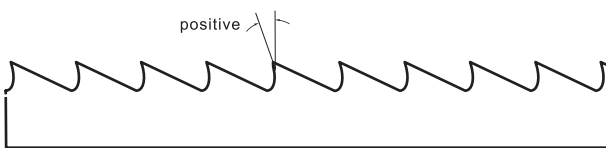
0° rake and constant pitch



Most common form for transversal or inclined of solid small and average cross-sections or pipes, in laminated mild steel and gray iron or general metal.

### POSITIVE RAKE TOOTH

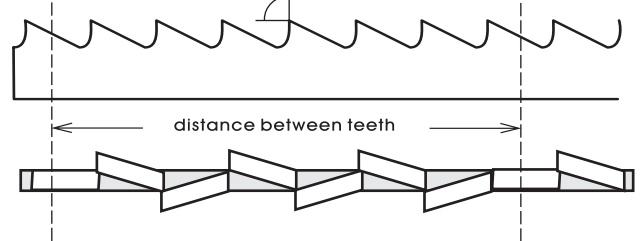
9°-10° positive rake and constant pitch



Particular use for crosswise or inclined cuts in solid sections or large pipes, but above all harder materials (highly alloyed and stainless steels, special bronze and forge pig iron).

### COMBO TOOTH

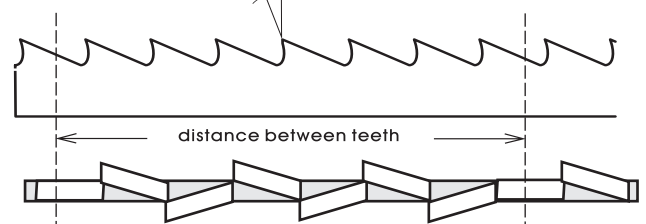
Pitch varies between teeth and consequently varying teeth size and varying gullet depths. Pitch varies between teeth, which ensures a smoother, quieter cut and longer blade life owing to the lack of vibration.



Another advantage offered in the use of this type of blade in the fact that with an only blade it is possible to cut a wide range of different material in size and type.

### COMBO TOOTH

9°-10° positive rake



This type of blade is the most suitable for the cutting of section bars and large and thick pipes as well as for the cutting of solid bars at maximum machine capacity. Available pitches: 3-4/4-6.

### Sets

Saw teeth bent out the plane of saw body, resulting in a wide cut in the work-piece.

#### Regular or Raker Set

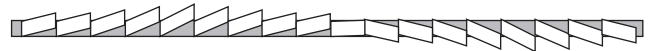
Cutting teeth right and left, alternated by a straight tooth.



Of great use for materials with dimensions superior to 5mm. Used for cutting of steel, castings and hard nonferrous materials.

#### Wavy Set

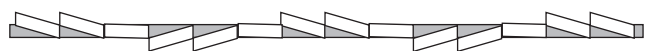
Set in smooth waves.



This set is associated with very fine teeth and it is mainly used for cutting of pipes and thin section bars (from 1-3mm).

#### Alternate Set (in groups)

Groups of cutting teeth right and left, alternated by a straight tooth.



This set is associated with very fine teeth and it is used for extremely thin materials (less than 1mm).

#### Alternate Set (individual teeth)

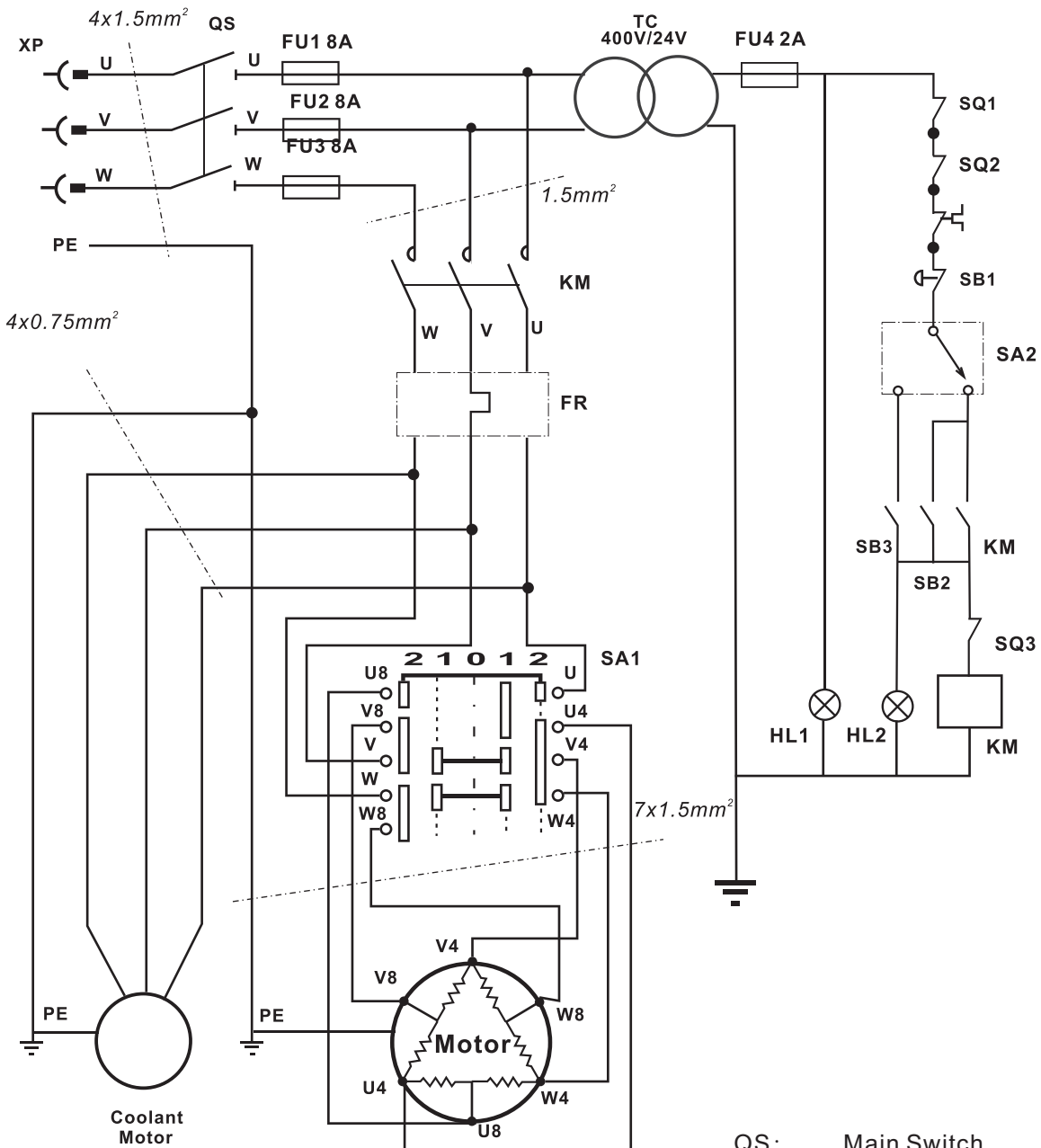
Cutting teeth right and left.



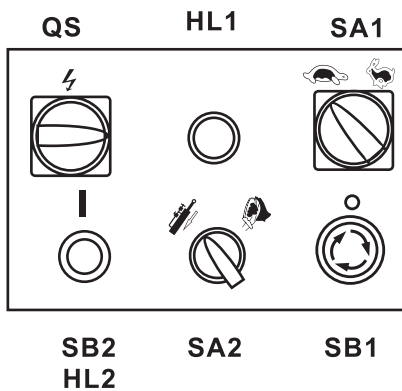
This set is used for the cutting of nonferrous soft materials, plastics and wood.



# ELECTRICAL SYSTEM



## 3~ Motor






- QS: Main Switch
- SA1: Hi/Low Speed Control
- SA2: Mode Switch
- KM: Contactor
- FR: Thermal protector
- TC: Transformer
- FU1-3: Fuse 8A
- FU4: Transformer Fuse 2A
- HL1: Power Light
- HL2: Run Light
- SB1: Emergency Stop Button
- SB2: **ON** Button
- SB3: Button on Grip-hand
- SQ1-3: Limit Switch

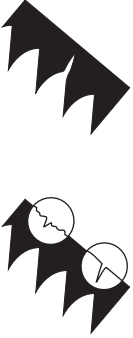
## TROUBLESHOOTING


This chapter lists the probable faults and malfunctions that could occur while the machine is being used and suggests possible remedies for solving them.

The first paragraph provides diagnosis for TOOL and CUTS, the second for ELECTRICAL COMPONENTS.

FAULT	PROBABLE CAUSE	REMEDY
<p>Tooth Breakage</p> 	<p>Too fast advance</p> <p>Wrong cutting speed</p> <p>Wrong tooth pitch</p> <p>Chips sticking onto teeth and in the gullets or material that gums</p> <p>Defects on the material or material too hard</p> <p>Ineffective gripping of the part in the vise</p> <p>The blade gets stuck in the material</p> <p>Starting cut on sharp or irregular section bars</p> <p>Poor quality blades</p> <p>Previously broken tooth left in cut</p> <p>Cutting resumed on a groove made previously</p> <p>Vibrations</p> <p>Wrong tooth pitch or shapes</p> <p>insufficient lubricating, refrigerant, or wrong emulsion</p>	<p>Decrease advance exerting less cutting pressure. Adjust the braking device.</p> <p>Change speed and /or type of blade .See chapter on "Material classification and blade selection", in the section Blade selection table according to cutting and feed speed.</p> <p>Choose a suitable blade. See Chapter "Material classification and blade selection".</p> <p>Check for clogging of coolant drain holes on the blade-guide blocks and that flow is plentiful in order to facilitate the removal of chips from the blade.</p> <p>Material surface can be oxidized or covered with impurities making them, at the beginning of the cut , harder than the blade itself , or have harder areas or inclusions inside the section due to impurities used as casting sand, welding wastes, etc. Avoid cutting these materials or in a situation a cut has to be made use extreme care, cleaning and remove any such impurities as quickly as possible.</p> <p>Check the gripping of the part.</p> <p>Reduce feed and exert less cutting pressure.</p> <p>Pay more attention when you start cutting.</p> <p>Use a superior quality blade.</p> <p>Accurately remove all the parts left in.</p> <p>Make the cut elsewhere, turning the part.</p> <p>Check gripping of the part.</p> <p>Replace blade with a more suitable one. See "Material classification and blade selection" in the Blade Types selection. Adjust blade guide pads.</p> <p>Check level of liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked .Check the emulsion percentage.</p>

FAULT	PROBABLE CAUSE	REMEDY
<p>Premature Blade Wear</p> 	<p>Faulty running-in of blade</p> <p>Teeth positioned in the direction opposite the cutting direction</p> <p>Poor quality blade</p> <p>Too fast advance</p> <p>Wrong cutting speed</p> <p>Defects on the material or material too hard</p> <p>insufficient lubricating refrigerant or wrong emulsion</p>	<p>See “Material classification and blade selection” in the Blade running –in section.</p> <p>Turn teeth in correct direction.</p> <p>Use a superior quality blade.</p> <p>Decrease advance, exerting less cutting pressure. Adjust the braking device.</p> <p>Change speed and /or type of blade. See chapter on “Material classification and blade selection” , in the section Blade selection table according to cutting and feed speed.</p> <p>Material surface can be oxidized or covered with impurities making them, at the beginning of the cut, harder the blade itself , or have hardened area or inclusion inside the section due to productive agents used such as casting sand, welding wastes, etc. Avoid cutting these materials or perform cutting with extreme care, cleaning and remove such impurities as quickly as possible.</p> <p>Check level of liquid in the tank. Increase the flow of lubricating coolant, checking that the coolant nozzle and pipe are not blocked. Check the emulsion percentage.</p>
<p>Blade Breakage</p> 	<p>Faulty welding of blade</p> <p>Too fast advance</p> <p>wrong cutting speed</p> <p>Wrong tooth pitch</p> <p>Ineffective gripping of the part in the vice</p> <p>Blade touching material at beginning of cut</p> <p>Remedy</p>	<p>The welding of blade is of utmost importance. The meeting surfaces must perfectly match and once they are welded they must have no inclusion or bubbles; the welded part must be perfectly smooth and even. They must evenly thick and have no bulges that can cause dents or instant breakage when sliding between the blade guide pads.</p> <p>Decrease advance, exerting less cutting pressure. Adjust the breaking device.</p> <p>Change speed and /or type of blade.</p> <p>See chapter on “Material classification and blade selection” , in the section Blade selection table according to cutting and feed speed.</p> <p>Choose a suitable blade .See Chapter “Material classification and blade selection” .</p> <p>Check the gripping of the part.</p> <p>At the beginning of the cutting process, never lower the saw arm before starting the blade motor.</p>

FAULT	PROBABLE CAUSE	REMEDY
	<p>Blade guide pads not regulated or dirty because of lack of maintenance.</p> <p>Blade guide block too far from material to be cut.</p> <p>Improper position of blade on flywheels.</p> <p>Insufficient lubricating coolant or wrong emulsion.</p>	<p>Check distance between pads (see “Machine adjustments” in the Blade Guide Blocks section): extremely accurate guiding may cause cracks and breakage of the tooth. Use extreme care when cleaning.</p> <p>Approach head as near as possible to material to be cut so that only the blade section employed in the cut is free, this will prevent deflections that would excessively stress the blade.</p> <p>The back of blade rubs against the support due to deformed or poorly welded bands (tapered), causing cracks and swelling of the back contour.</p> <p>Check level of liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hose and the liquid outlet pipe are not blocked. Check the emulsion percentage.</p>
Steaked or etched bands	<p>Damaged or chipped blade guide pads.</p> <p>Tight or slackened blade guide bearings.</p>	<p>Replace them.</p> <p>Adjust them (see Chapter “Machine Adjustments” in Blade guide section).</p>
Cuts off the straight	<p>Blade not parallel as to the counter service.</p> <p>Blade not perpendicular due to the excessive play between the guide pads and maladjustment of the blocks.</p> <p>Too fast advance.</p> <p>Worm out blade</p> <p>Wrong tooth pitch</p>	<p>Check fastenings of the blade guide blocks as to the counter-vice so that they are not too loose and adjust blocks vertically; bring into line the position of the degrees and if necessary adjust the stop screws of the degree cuts.</p> <p>Check and vertically re-adjust the blade guide blocks; reset proper side guide play (see Chapter “Machine adjustments” in Blade guide section).</p> <p>Degree advance, exerting less cutting pressure. Adjust the braking device.</p> <p>Approach it as near as possible to material to be cut so that only the blade section employed in the cut is free, this will prevent deflection that would excessively stress the blade.</p> <p>Replace it. Blade with major density of teeth is being used, try using one with less teeth (see Chapter “Material classification and blade selection” in the Blade Types section).</p>

FAULT	PROBABLE CAUSE	REMEDY
	<p>Broken teeth.</p> <p>Insufficient lubricating refrigerant or wrong emulsion.</p>	<p>Irregular work of the blade due to the lack of teeth can cause deflection in the cut; check blade and if necessary replace it.</p> <p>Check level of liquid in the tank. Increase the flow of lubricating coolant, checking that the hole and the liquid outlet pipe are not blocked .Check the emulsion percentage.</p>
<p>Faulty cut</p>	<p>Worn out flywheels Flywheel housing full of chips</p>	<p>The support and guide flange of the band are so worn out that they cannot ensure the alignment of the blade, causing faulty cutting; blade rolling and drawing tracks can have become tapered. Replace them. Clean with compressed air.</p>
<p>Streaked cutting surface</p> 	<p>Too fast advance</p> <p>Poor quality blade</p> <p>Worn out blade or with chipped and/or broken teeth</p> <p>Wrong tooth pitch</p> <p>Blade guide block too far from material to be cut</p> <p>Insufficient lubricating coolant or wrong emulsion</p>	<p>Decrease advance, exerting less cutting pressure. Adjust the breaking device.</p> <p>Use a superior quality blade.</p> <p>Replace it.</p> <p>Blade used probably has too large teeth, use one with more teeth (see “Material classification and blade selection” in the Blade Types section).</p> <p>Approach it as near as possible to material to be cut so that only the blade section employed in the cut is free, this will prevent deflections that would excessively stress the blade.</p> <p>Check level of liquid in the tank. Increase the flow of lubricating refrigerant, checking that the hole and the liquid outlet pipe are not blocked .Check the emulsion percentage.</p>
<p>Noise on guide blocks</p>	<p>Chipped bearings Worn out or damaged pads</p>	<p>Dirt and /or chips between blade and guide bearings. Replace them. Replace them.</p>

FAULT	PROBABLE CAUSE	REMEDY
The band rotation motor does not work.	<p>"SA1" two speed switch</p> <p>Main motor over-load relay</p> <p>"SB1" emergency switch</p> <p>"SB2" start push button</p>	<p>It must be exactly turned towards Rabbit or Turtle sign.</p> <p>Push down FR1 red button. After a motor cooling time of 5 minutes, if there is no current continuity on these two wires, the motor must be replaced.</p> <p>Reset emergency switch (see operation procedure).</p> <p>Check the functioning and /or possible damage. If so, replace it.</p>
Machine does not work.	<p>Fuses "FU"</p> <p>"SQ1" automatic shut-off limit switch</p> <p>"SQ2" blade cover limit switch</p> <p>"SQ3" blade broke limit switch</p> <p>Speed switch "SA1" in position "0"</p> <p>Emergency button "SB1" on</p> <p>"SB3" trigger switch</p> <p>Main motor</p>	<p>Check electrical efficiently. If not, replace the fuse.</p> <p>Refer to the operation procedure and adjust the switch if machine doesn't shut off after the material completely cuts. Replace it if it damaged.</p> <p>Check closing of the fly wheel cover. Check the efficiency of the device; replace it if damaged.</p> <p>Check the efficiency of the device; replace it if damaged.</p> <p>It must be exactly turned to the Rabbit or Turtle sign.</p> <p>Reset the emergency switch by following the steps of operation procedure. Check electrical efficiency, if not, replace it.</p> <p>Check the efficiency of the device; replace it.</p> <p>Check current continuity on the two wires in the prone, if not, replace the motor.</p>
Motor stopped with pilot light "HI2" lit.	<p>"SB3" trigger switch</p> <p>Main motor</p>	<p>Check the efficiency of the device; replace it if it damaged.</p> <p>Check that it is burnt and that it turns freely. Replace it if it damaged.</p>

## DIAGRAM & PARTS LIST

No	Description	Size	Q'ty	No	Description	Size	Q'ty
1	Base(Bottom Plate)		1	40-1	Bolt Guide		1
2	Base (Left Part)		1	40-2	Spring Washer	8	2
2-1	Nut	M8	4	41	Set Screw	M6x12	4
3	Base (Right Part)		1	42	Washer		1
4	Door frame		1	43	Handle	M8x25	1
4-1	Hex.Cap Bolt	M8x16	4	44	Rooler Stand		1
4-2	Washer	M8	8	45	Hex.Cap Bolt	M12x25	2
5	Door		1	46	Spring Washer	12	2
6	Lock		1	46-1	Washer	12	2
7-1	H-shelf		1	47	Roller		1
7-2	V-shelf		1	48	Ball Bearing	6004ZZ	2
8	Hex.Cap Bolt	M8x16	10	48-1	C-Ring	20	2
8-1	Washer	8	10	49	Roller Shaft		1
11	Coolant Tank		1	50	Allen Screw	M10x20	2
12	Hex.Cap Bolt	M8x16	2	60	Handle		1
12-1	Washer	8	2	60-1	Allen Screw	M8x20	2
13	Coolant Gauge		1	60-2	Nut	M8	2
14	Hex.Cap Bolt	M10	2	61	Handle		1
15	Tank Cover		1	62	Nut	M12	1
16	Filter		1	63	Locking Lever		1
17	Pump		1	63-1	Set Screw	M10x16	1
18	Allen Screw	M6x25	2	64	Allen Screw	M10x35	1
18-1	Washer	6	2	64-1	Spring Washer	10	1
23	Hose	5/16"x235cm	1	65	Shaft Nut		1
23-1	Hose	1"x45cm	1	65-1	Oil Seal		1
24A	Coolant and Chip Tray		1	65-3	Disk		1
24-1	Sling plate		4	65-4	Spring Washer	8	4
24-2	Hex.Cap Bolt	M10x20	4	65-5	Allen Screw	M8x35	4
24-3	Nut	M10	4	66A	Shaft		1
24-4A	Block Plate		1	68	Swivel Arm		1
25	Mounting Bracket		2	68-1	Hex.Cap Bolt	M10x35	1
26	Spring Washer	10	4	69	Scale		1
27	Allen Screw	M10x20	4	70	Rivet	2.5x6	2
28	Washer	10	4	71	Pin		1
29	Hex.Cap Bolt	M10x20	4	72	Hollow Pin	Φ2.5x16	1
29-1	Washer	10	4	73	Spring		1
30	Hex.Cap Bolt	M12x40	2	74	Bushing		1
31	Nut	M12	2	75	Bracket		1
36	Emergency Switch		1	76	Spring Washer	8	2
37-1	Plug		5	77	Allen Screw	M8x25	2
39	Track		1	78	Konb		1
40	Allen Screw	M8x35	2	79	Jam Nut	M40	1

<b>No</b>	<b>Description</b>	<b>Size</b>	<b>Q'ty</b>	<b>No</b>	<b>Description</b>	<b>Size</b>	<b>Q'ty</b>
80	Star Washer	40	1	124	Setting Washer		1
81	Anti-Dust Cover	40	2	125	Lock Lever Device		1
82	Ball Bearing	32008	2	127	Handle		1
83A	Shaft		1	128	Setting Plate		1
84	Hex.Cap Bolt	M10x45	1	129	Bushing		1
85	Nut	M10	2	130	Allen Screw	M8x20	2
86A	Pointer		1	130-1	Spring Washer	M8	2
87	Allen Screw	M5x8	1	131	Electric Box Holder		1
88A	Cover		1	132	Spring Washer	8	4
88-1	Hollow Pin	Φ6x20	2	133	Allen Screw	M8x20	4
88-2	Set Screw	M8x10	1	135	Allen Screw	M8x20	2
89	Allen Screw	M8x35	5	136	Spring Washer	8	2
89-1	Spring Washer	8	5	137	Control Box		1
92A	Table		1	149	Supporting Bracket		1
92-1	Set Screw	M6x12	1	149-1	Shaft		1
94	Bar-Stop-Rod		1	150	Set Screw	M8x10	1
95	Bar-Stop		1	150-1	Allen Screw	M8x20	4
95-1	Hex.Cap Bolt	M10x50	1	150-2	Spring Washer	8	4
95-2	Nut	M10	1	151	Reduction Unit		1
96	Handle	M10x35	1	151-1	Vent Screw		1
97	Scale		1	152	Key	8x7x30	1
98	Rivet		3	153	Hex.Cap Bolt	M8x25	4
99	Chip Gutter		1	153-1	Spring Washer	8	4
100	Allen Screw	M6x8	2	154	Motor		1
102	No-Burr Jaw		1	155	Key	8x7x30	1
103	Allen Screw	M6x15	2	186	Allen Screw	M10x35	4
104	Counter Vise Jaw		1	186-1	Spring Washer	10	4
105	Allen Screw	M6x15	2	193B	Saw Arm		1
106	Vise Jaw		1	193-1	Set Screw	M8x10	2
107	Flat Head Machine Screw	M6x15	2	194	Allen Screw	M10x35	4
108A	Vise		1	194-1	Spring Washer	M10	4
109	Dovetail Plate		1	195	Limit Switch		1
110	Thin Nut	M8	3	195-1	Switch Pin		1
111	Set Screw	M8x25	3	196	Allen Screw	M4x35	2
115	Spring Washer	8	4	197	Allen Screw	M10x35	4
116	Allen Screw	M8x20	4	197-1	Spring Washer	10	4
117	Hand Wheel		1	198	Pipe Fitting Seat		1
118	Set Screw	M6x10	1	199	Ronud Head Screw	M6x30	2
120A	Vise Seat		1	200	Coolant Switch		1
122	Vise Setting Plate		1	202	Pipe Fitting	1/4Px5/16	1
123	Allen Screw	M10x30	2	203	Pipe Fitting	1/4Px5/16	2



<u>No</u>	<u>Description</u>	<u>Size</u>	<u>Q'ty</u>	<u>No</u>	<u>Description</u>	<u>Size</u>	<u>Q'ty</u>
204	Hose	5/16"x40cm	1	250	Set Screw	M6x12	3
205	Hose	5/16"x90cm	1	251	Allen Screw	M8x20	2
206	Drive Flywheel		1	252	Setting Bracket		1
207	Washer		1	253	Allen Screw	M12x50	1
207-1	Spring Washer	M10	1	254	Handle		1
208	Hex.Cap Bolt	M10x25	1	256	Guide Bracket		1
209A	Idle Flywheel Shaft		1	257	Spacer,Guide		2
210	Roller Bearing	32007	2	258	Washer	8	4
211	Idle Flywheel		1	259	Hex Head Screw	M8x35	2
212	Star Washer	35	1	260	Allen Screw	M6x8	1
212-1	Anti-Dust Cover	35	2	261	Blade Guard		1
213	Jam Nut	M35	1	262	Bearing	608-2Z	4
215A	Saw Blade		1	263	Hex Head Screw	M8x20	2
216B	Blade Cover		1	264	Spring Washer	8	4
216A-1	Extension		1	265	Set Screw	M6x16	2
216A-2	Ronud Head Screw	M6x8	2	266	Allen Screw	M6x25	2
217	Plum Screw	M6x10	4	267	Upper Teeth		2
219	Ronud Head Screw	M4x8	2	268	Fixed Teeth		2
220	Nut	M4	2	269	Adjustable Teeth		2
222	Handle		2	270	Allen Screw	M5x8	2
223	Handle Wheel		1	271	Blade Guard		1
223-1	Thrust Bearing	51103	1	272	Guide Bracket		1
223-2	Blade Tension Gauge		1	273	Pipe Fitting	1/4Px5/16	2
223-3	Plate		1	274	Allen Screw	M6x12	2
224	Special Spring Washer		10	275	Ball Bearing Bracket		1
225	Tension Shaft		1	276	Set Screw	M612	3
229	Plate		1	277	Allen Screw	M10x20	2
230	Allen Screw	M6x12	2	278	Washer	5	2
231	Limit Switch		1	279	Allen Screw	M8x20	2
232	Hex.Socket Cap Bolt	M4x25	2	280	Brush		1
239	Nut	M16	1	281	Brush Clamp		1
240A	Slide Bracket		1	282	Set Screw	M5x5	1
240A-1	Spring Washer	10	3	283	Set Bushing		1
240A-2	Allen Screw	M10X45	3	284	Hex.Cap Screw	M6x12	2
240A-3	Set Screw	m10X25	1	285	Washer	6	2
244	Cover Plate		1	286A	Lead Screw		1
245	Allen Screw	M6x8	2	286-1	Spring		1
246	Gib		2	286-2	Set Screw	M6x25	1
247	Spring Washer	8	6	286-3	Nut	M6	1
248	Allen Screw	M8x20	6	286-4	Allen Screw	M6x10	1
249	Blade Guide Movable Rod		1	286-5	Big Washer	6	1
249-1	Set Screw	M8x10	1	287	Setting Seat		1

<u>No</u>	<u>Description</u>	<u>Size</u>	<u>Q'ty</u>	<u>No</u>	<u>Description</u>	<u>Size</u>	<u>Q'ty</u>
287-1	Bushing		1	307	Konb		1
288	Lead Screw Seat		1	307-1	Bushing		1
289	Bearing Bushing		1	308	Shaft		1
289-1	Ball Bearing	2035	2	309	Arm		1
289-2	Nut		1	310	C-Ring	12	3
289-3	Hollow Pin	Φ6x35	1	311	Allen Screw	M10x25	1
291	Trigger Switch		1	312	Spring Washer	10	1
292	Pipe		1	313	Post		1
292-1	Nut	M16	1	314	Set Screw	M10x16	3
293	Nut	M12	2	315	Hydraulic Cylinder Post		1
294	Spring Hook		2	316	Spring Washer	8	4
294-1	Spring Hook		1	317	Allen Screw	M8x25	4
294-2	Nut	M10	1	318	Round Head Screw	M5x10	2
295	Spring		1	319	Limit Switch		1
295-1	Spring		1	320	Allen Screw	M6x8	2
296	Spring Seat		1	320-1	Washer	6	2
297	Spring Bushing		1	321A	Adjusting Bracket		1
298	C-Ring	12	4	322A	Hydraulic Cylinder		1
298-1	Washer	12	2	323	Allen Screw	M10x40	1
299	Shaft		1	324	Nut	M10	1
300	Pin		1	325	Ball bearing 6007		2
301	Hollow Pin	2.5x16	1	326	C-ring 62		2
302	Spring		1	327	Spacer, bearing		1
303	Fork		1	328	Sleeve,		1
304	Nut	M10	1	329	Ball bearing 6007		2
305	Adjusting Bracket		1	330	Slap catcher		1
306	Shaft		1				

**NOTE:** The above specifications and the constructions were current at the time this manual was published, but because of our policy of continuous improvement, we reserve the right to change specifications and the constructions without notice and without incurring obligations.



*When ordering repair parts, always give the following information:  
Model number, Part number, Part description  
i.e. Model: L M - 2 7 0 , 154, Motor*

