COSEN SAWS

MH-460M

Manual Miter Cutting Bandsaw

(CE & Non-CE models)

Instruction Manual

The Pinnacle of Cutting Performance

Cosen Mechatronics Co., Ltd.

FROM THE MANUFACTURER

Thank you for your purchase of COSEN's bandsaw machine and your trust in the COSEN brand.

We are excited to have you as our valued customer and look forward as much as you do to the accelerated productivity, long-lasting endurance and superb cost-effectiveness this machine is about to bring to you.

To ensure you are fully utilizing our machine and being advantaged in every possible way, please do take your time and read through this instruction manual.

Any comment or suggestion in making our service better, please do not hesitate to let us know. Thank you again!

NOTE:

- Read this instruction manual carefully to familiarize yourself with the installation, operation and maintenance of your COSEN bandsaw machine.
- Operate the machine following the procedures described in the manual to prevent personal injuries or machine damage.
- Keep this manual handy and refer to it whenever you are uncertain of how to perform any of the procedures.
- For technical support or parts purchase, please contact your nearest COSEN representative or our service center:

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Safety rules

- Make sure your work area is cleared of uninvited people and obstacles every time before you start operating the machine.

- Never wear gloves or loose clothing when operating the machine. It may lead to serious injury if they are caught in the running machine. Wrap or cover long hair.

- Use a water-soluble cutting fluid on this machine. Oil-based cutting fluids may emit smoke or catch fire, depending on how they are used.

- Never cut carbon or any other material that may produce and disperse explosive dust. It is possible that sparks from motors and other machine parts will ignite and explode the air-borne dust.

- Make sure any use of fire is prohibited in the shop and install a fire extinguisher or other fire control device near the machine when cutting titanium, magnesium, or any other material that produces flammable chips. Never leave the machine unattended when cutting flammable materials.

- Never adjust the wire brush or remove chips while the saw blade is still running. It is extremely dangerous if hands or clothing are caught by the running blade.

- Never touch the running saw blade with gloves or not. It is dangerous if your hands, clothing or gloves are caught by the running blade.

- Stop the saw blade before you clean the machine. It is dangerous if hands or clothing are caught by the running blade.

- Never start the saw blade unless the workpiece has been clamped firmly. If the workpiece is not securely clamped, it will be forced out of the vise during cutting.

- Take preventive measures when cutting thin or short pieces from the work to keep them from falling. It is dangerous if the cut pieces fall.

- Use roller tables at the front and rear sides of the machine when cutting long work. It is dangerous if the work piece falls off the machine.

- Never step or stand on the roller table. Your foot may slip or trip on the rollers and you will fall.

- Turn off the shop circuit breaker switch before performing maintenance on the machine. Post a sign indicating the machine is under maintenance.

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SAFETY INFORMATION

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Safety is a combination of a well-designed machine, operator's knowledge about the machine and alertness at all times. COSEN's band machine has incorporated many safety measures during the design process and used protective devices to prevent personal injuries and potential risks. Warning labels also serve as a reminder to the operator.

Throughout this manual, you will also see various safety-related symbols indicating important information that you should take note of prior to use of the machine or part of its functions. These important safety instructions do not cover all possible situations that might occur. It is your responsibility to take caution and follow procedures stated in this manual when installing, maintaining and operating your machine. Cosen will not be liable for damages resulting from improper use.

SAFETY INSTRUCTIONS

What the icons and signs in this user manual mean:

	This icon marks **DANGER**; hazards or unsafe practices that may result in **severe personal injury or death.**
	This icon marks **WARNING**; hazards or unsafe practices that may result in **personal injury or damage to the machine.**
	This icon marks **CAUTION**; information that should be read before use to prevent **damage to the machine.**
	Supplementary information to the procedures described in this manual.
	Call your local agent or our service center for help.

This manual has important safety information. Read through it carefully before operating this machine to prevent personal injury or machine damage. Learn the operation, limitation and the specific potential hazards peculiar to this band saw.

Do not operate this machine unless it is completely assembled.

Make sure the power switch is off before plugging in power cord.

Disconnect the power cord before making adjustment, maintenance or blade changes.

Keep all guards and shields in place before installing or starting up the machine.

Wear proper apparel during operation and when servicing the machine.

Keep unauthorized personnel away.

Do not reach over or stand on any part of the machine.

Never hold the material by hand for cutting. Always use the vise and make sure the material is clamped securely before cutting.

It is dangerous to operate the machine when the floor is slippery. Keep the floor clean and dry. Check for ice, moisture, or grease before entering.

Do not use the machine to cut explosive material or high pressure vessels as it will generate great amount of heat during the sawing process and may ignite an explosion.

Keep the work environment safe. Do not use band saw in a damp or wet location.

Never operate while under the influence of drugs, alcohol or medication.

All users must read it before performing any activity on the machine, such as replacing the saw band or doing regular maintenance.

Some personal protective equipment is required for the safe use of the machine, e.g. protection goggles.

Keep blade protection cover and wheel covers in place and in working order.

Use recommended accessories. Improper accessories may be hazardous.

Keep your work area well illuminated at minimum 500 lumen.

Keep your work area clean. Cluttered and slippery floors invite accidents.

Remove adjusting keys, wrenches or any loose parts or items from the machine before turning on power.

Check for damaged parts. Before continuing using the machine, the damaged part should be checked and replaced.

Moving parts should be kept in proper alignment and connection with the machine. Check for breakage, mounting and any other conditions that may affect its operation. Any damaged part or guard should be properly repaired or replaced.

When a workpiece is too long or heavy, make sure it is supported with a roller table (recommended).

Always remember to switch off the machine when the work is completed.

Use a sharp saw blade and keep the machine in its best and safest performance by following a periodical maintenance schedule.

Do not force the band saw beyond its intended use. It is safer to operate with the cutting rate for which it was designed.

SAFEGUARD DEVICES

The safeguard devices incorporated in this machine include the following two main parts:

1. Protection covers & guards
2. Safety-related switches

Protection Covers & Guards

1. Idle wheel housing cover
2. Drive wheel housing cover
3. Gear reducer cover
4. Wire brush belt cover
5. Blade guard cover (left & right)
6. Safety fence (left & right)(CE model only, as shown in Illustration: *Safety Fence*)
7. Chip conveyor cover (CE model only)

 The protection devices should always be mounted on the machine whenever the machine is running.

 Do not remove any of these safeguard devices under any circumstances except when servicing the machine. Even skilled service technicians should still take cautions when performing repairs or service on the machine with any of these protectors removed. It is the responsibility of the user to make sure all these elements are not lost and damaged.

 Take note of the following main moving parts on the machine prior to and during machine operation:

- Saw bow assembly
- Drive and idle wheels
- Blade guide arm
- Saw blade guide rollers
- Quick approach device
- Wire brush
- Chip conveyor (optional)
- Workpiece clamping vises
- Shuttle vises and workbed rollers
- Top clamps (optional)
- Gear reducer

Safety Related Switches

To protect the operator, the following safety related switches on the machine are actuated when the machine is in operation.

Wheel motion detector	This is a proximity sensor used to detect the motion of the drive wheel. Once the saw blade is broken or as soon as it starts slipping, the sensor will detect and stop the drive wheel and the machine.
Power switch	Located on the cover of electrical cabinet, the power switch controls the main power of the machine. Up to your company's internal rules, this power switch can be locked with a padlock or a luggage lock to protect the operator and the machine.
Emergency stop button	Located on the control panel, the button when pressed will stop the machine completely.
Vise clamp switch	This switch assures firm clamping of the workpiece. If the workpiece is not clamped properly, the saw blade is not allowed to run.
Wheel cover interlock switches (CE model only)	Located on the two wheel housings, these switches are used to assure that the machine will stop whenever the wheel covers are open. This device is to protect users from being cut by the running saw blades.

Among all these safety switches, some of them are used to protect the users and some of them are used to prevent damage to saw blades, the workpiece and the machine itself, etc. We have taken every precaution to prevent injury or damage and to provide safe and economical operation of the machine.

EMERGENCY STOP

Designed to be easily accessible, the emergency stop button is located on the left bottom corner on the control panel and is made in red color and rubber material. For CE models, supplementary emergency stop button may be available at other area(s) of the machine depending on machine type. Please refer to *Illustration: Emergency Stop.*

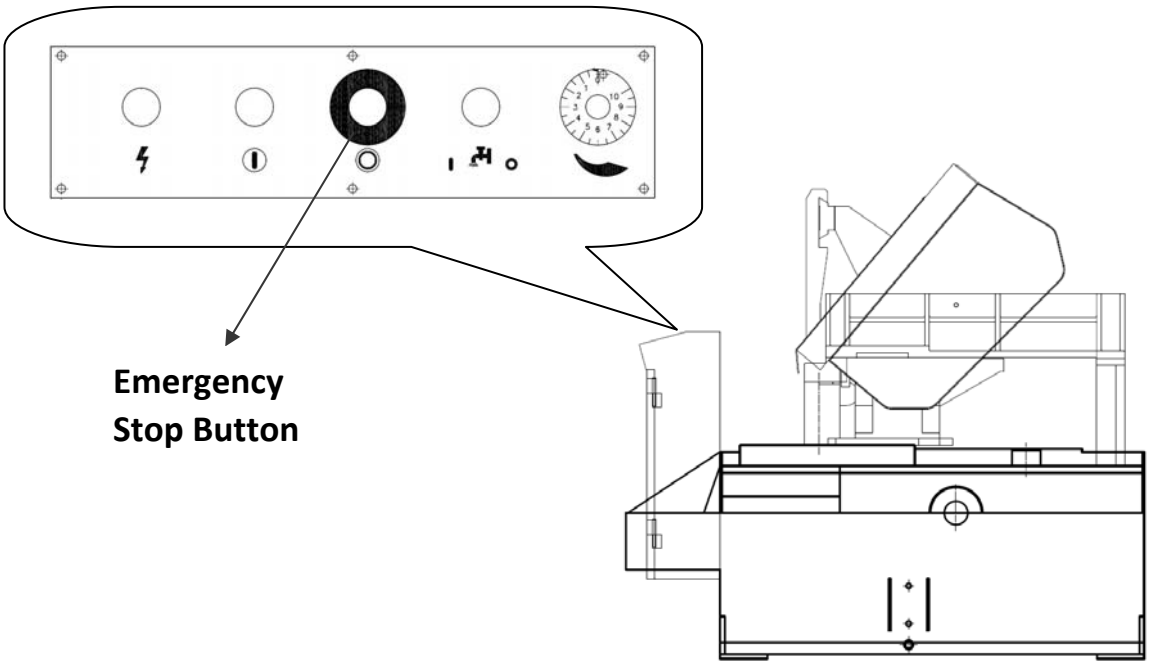
When you press the button, the machine will immediately come to a full stop to avoid injury or damage when an accident occurs. The button will be locked when you press it. To unlock it, pull it upward.

You should press it immediately without any hesitation when observing:

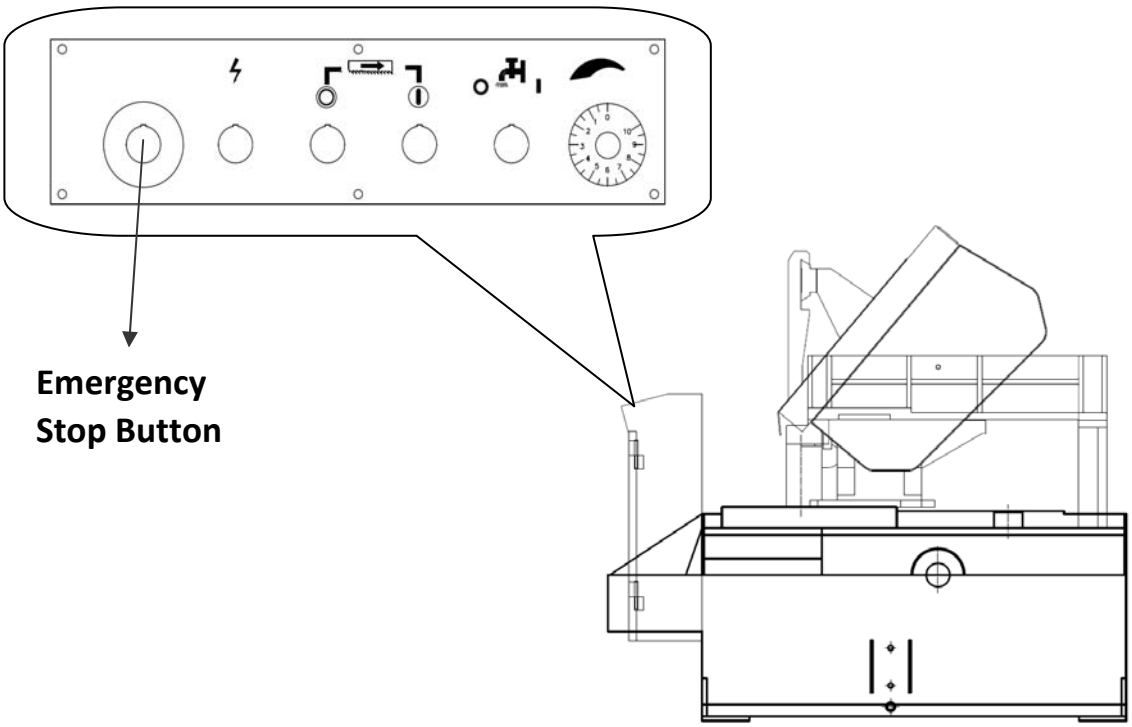
- An emergency situation that would cause any injury or damage
- An abnormal situation or problem such as fire, smoke, abnormal noise and etc.

Illustration: Emergency Stop

Non-CE model



CE model



SAFETY LABELS

Safety-related labels mounted on the machine are categorized into the following four categories. Please read through and understand them before operating the machine. Refer to *Illustration: Safety Labels.*

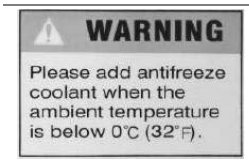
DANGER Labels

A red and white DANGER labels marks s hazards or unsafe practices that will result in severe personal injury or death.

Label	Meaning	Label	Meaning
	Hazardous Voltage TURN POWER OFF before servicing. Failure to following the warning can result in severe injury.		DANGER: Running Blade Blade runs through this area. Keep your hands away from a running blade to avoid severe injury. The arrow indicates direction of the blade.

WARNING Labels

An orange and black WARNING label marks hazards or unsafe practices that can result in severe personal injury or damage to the machine.

Label	Meaning	Label	Meaning
	Cutting Hazard KEEP COVER CLOSED while the blade is running. Turn power off before opening cover. Failure to follow the warning can result in severe injury.		Cutting Hazard KEEP HAND OFF while the blade is running. Turn power off before opening cover. Failure to follow the warning can result in severe injury.
	Please add antifreeze coolant when the ambient temperature is below 0°C (32°F).		Loose Hand Hazard KEEP HAND OFF. Do not touch chip conveyor. Failure to follow the warning can result in severe injury.
	Impact Hazard WEAR SAFET SHOES. Do not approach dropping area during operation.		

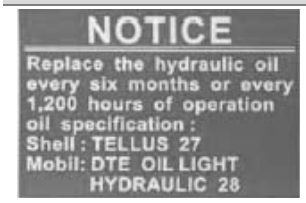
CAUTION Labels

Yellow and black CAUTION labels mark hazards or unsafe practices that can result in considerable personal injury.

Label	Meaning
	Keep hands out of the machine while the blade is running.
	Power to machine must be turned off when changing blades or adjusting wire brush.

NOTICE Labels

Blue and white NOTICE labels mean unsafe practices that could result in damage to products or property.

Label	Meaning
	Replace the hydraulic oil every six months or every 1,200 hours of operation. Oil specification: Shell TELLUS 27 or Mobil DTE OIL LIGHT / HYDRAULIC 28
	To extend blade life, always adjust the location of wire brush so that it is properly touching the blade. Also replace a worn wire brush with a new one.

SAFETY INSTRUCTION Labels

Green and white SAFETY INSTRUCTIONS are important reminders that should be read before operating the machine.

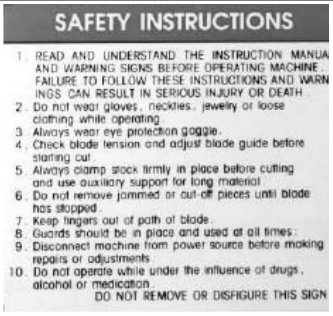
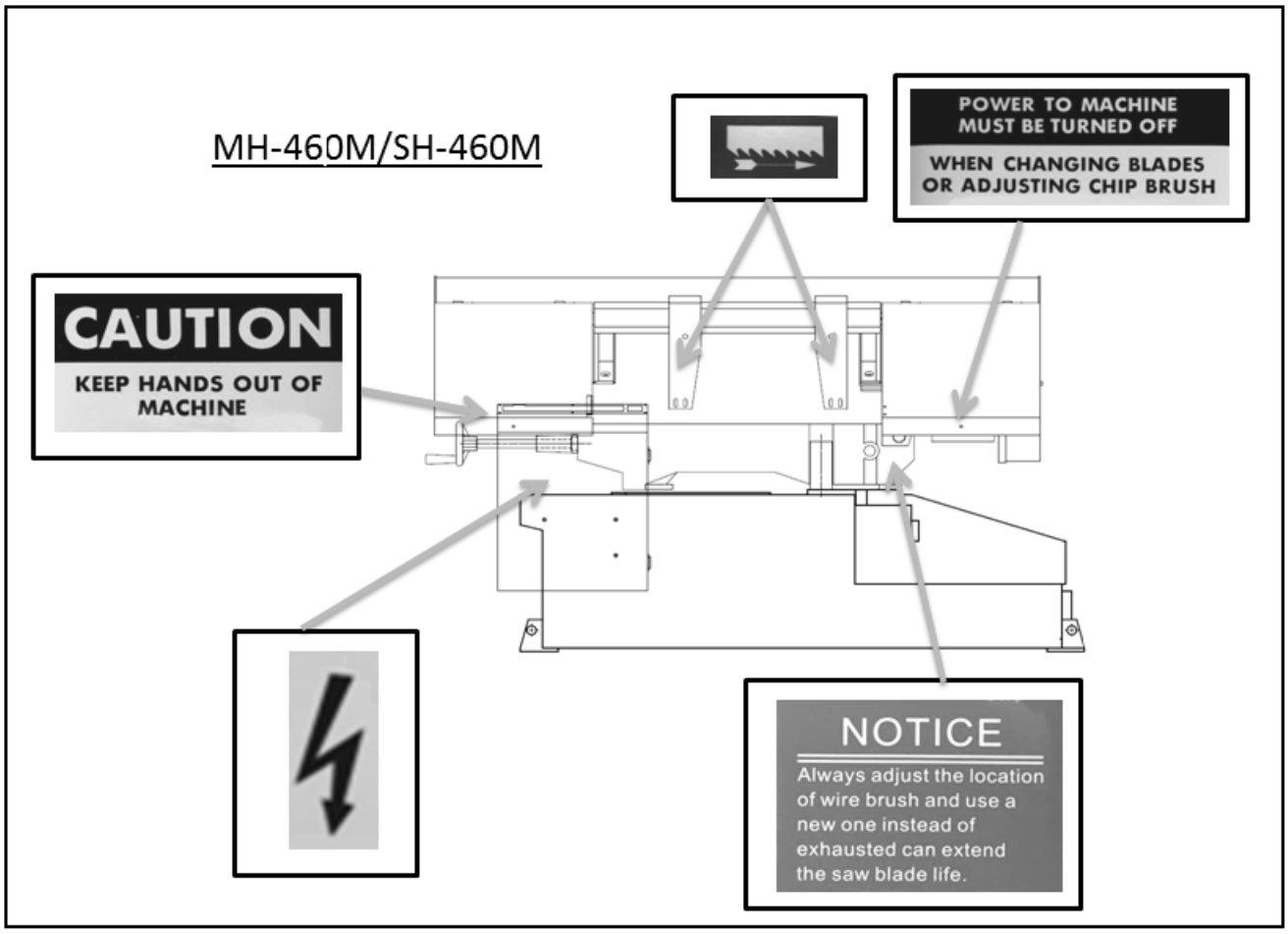
Label	Meaning
	1. Read and understand the instruction manual and warning signs before operating machine. Failure to follow these instructions and warnings can result in serious injury or death. 2. Do not wear gloves, neckties, jewelry or loose clothing while operating the machine. 3. Always wear eye protection goggles. 4. Check blade tension and adjust blade guide before starting to cut. 5. Always clamp stock firmly in place before cutting. 6. Do not remove jammed or cut-off pieces until blade has stopped. 7. Keep fingers out of path of blade. 8. Blade guards should be in place and used at all times. 9. Disconnect machine from power source before marking repairs or adjustments. 10. Do not operate while under the influence of drugs, alcohol or medication.

Illustration: Safety Labels



HEARING PROTECTION

 Always use ear protection!

When your machine is running, noise generated by the machine may come from the following:

- Saw blade during cutting or material feed mechanism
- Wire brush unit
- Chip conveyor unit
- Speed reducer
- Hydraulic motor/pump
- Belt transmissions variable speed motors
- Blade motor
- Coolant pump
- Drive wheel
- Parts not assembled tightly causing mechanical vibration

Our products pass noise testing less than 78 dBA. Noise level vary according to working conditions and we recommend ear plugs or other hearing protection at all time. If your machine produces an undesirable noise while it is running, you should:

1. Make sure all maintenance tasks have been performed following the prescribed maintenance schedule (Refer to Section 8).
2. If maintenance does not seem to solve the problem, follow the troubleshooting procedures under Section 9.

CE COMPLIANCE

Cosen's CE model is designed to satisfy regulations of the Council Directive on the approximation of the laws of the Member States relating to machinery (2006/42/EC) - Annex I Essential health and safety requirements relating to the design and construction of machinery.

RISK ASSESSMENT

Risk assessment generally takes account of intended use and foreseeable misuse, including process control and maintenance requirements. We made every effort to avoid any personal injury or equipment damage during the machine design stage. However, the operator (or other people) still needs to take precautions when handling any part of the machine that is unfamiliar and anywhere on the machine that has potential hazards (e.g. the electrical control box).

Section 2

GENERAL INFORMATION

SPECIFICATION

MACHINE PARTS IDENTIFICATION

FLOOR PLAN

This band saw machine is designed by Cosen's R&D engineers to provide you the following features and advantages:

Safety

- This machine is designed to fully protect the operator from its moving parts during cutting operation.
- The machine and each compoment has passed strict testing (Council Directive on the approximation of the laws of the Member States relating to Machinery).
- The machine will shut off automatically when the saw blade is broken, protecting both the operator and the machine.

Convenience & High-Performance

- The machine is designed in the way that the operation and adjustment can be easily performed.
- The machine will stop automatically when out of stock.
- Dual valve system is designed to achieve optimal cutting performance with the simple setting of feed rate and perspective cutting pressure for different material.

Durability

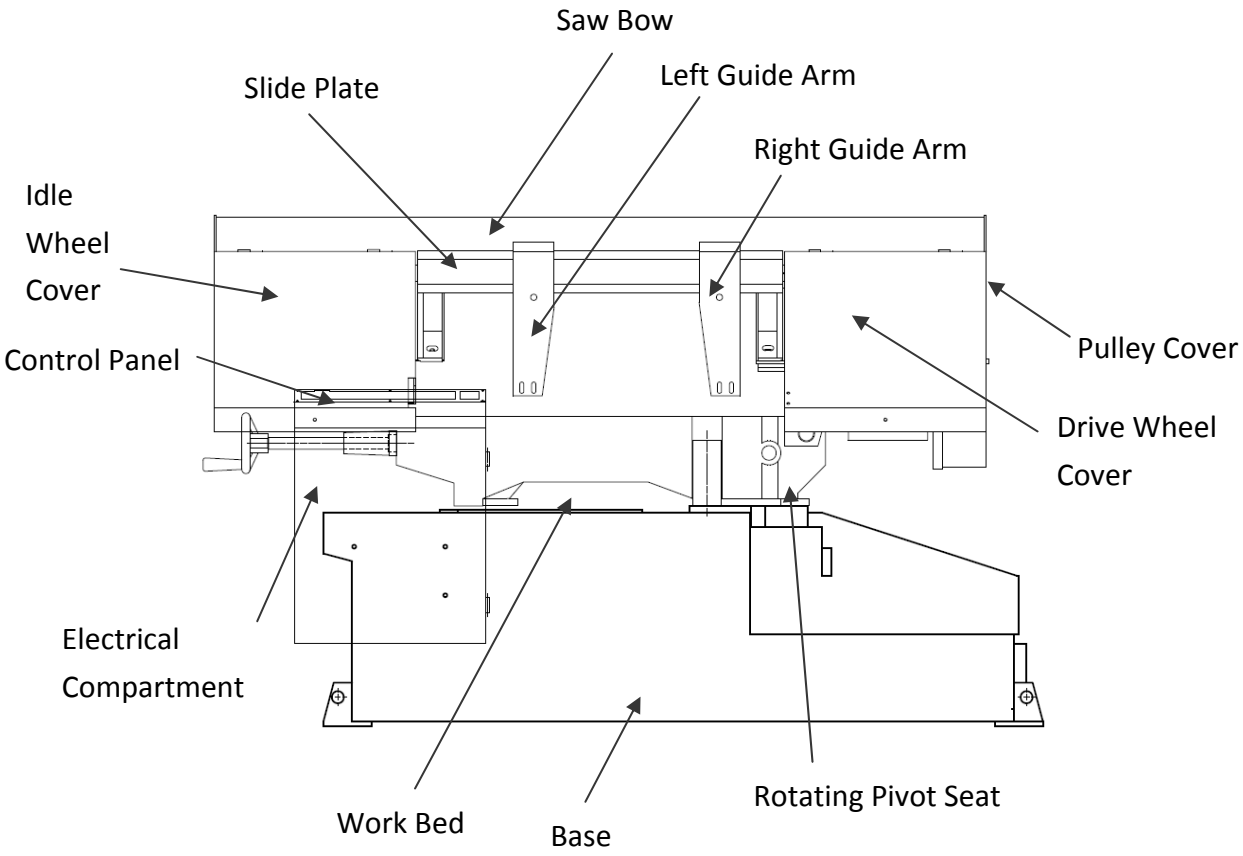
- The intended life-span of the machine is counted based on regular daily operation. It is calculated with the life expectancy of 10 years under normal operating condition and exact attention to the maintenance schedule.

  8 hours × 5 days × 52 weeks × 10 years ＝ 20,800 hours

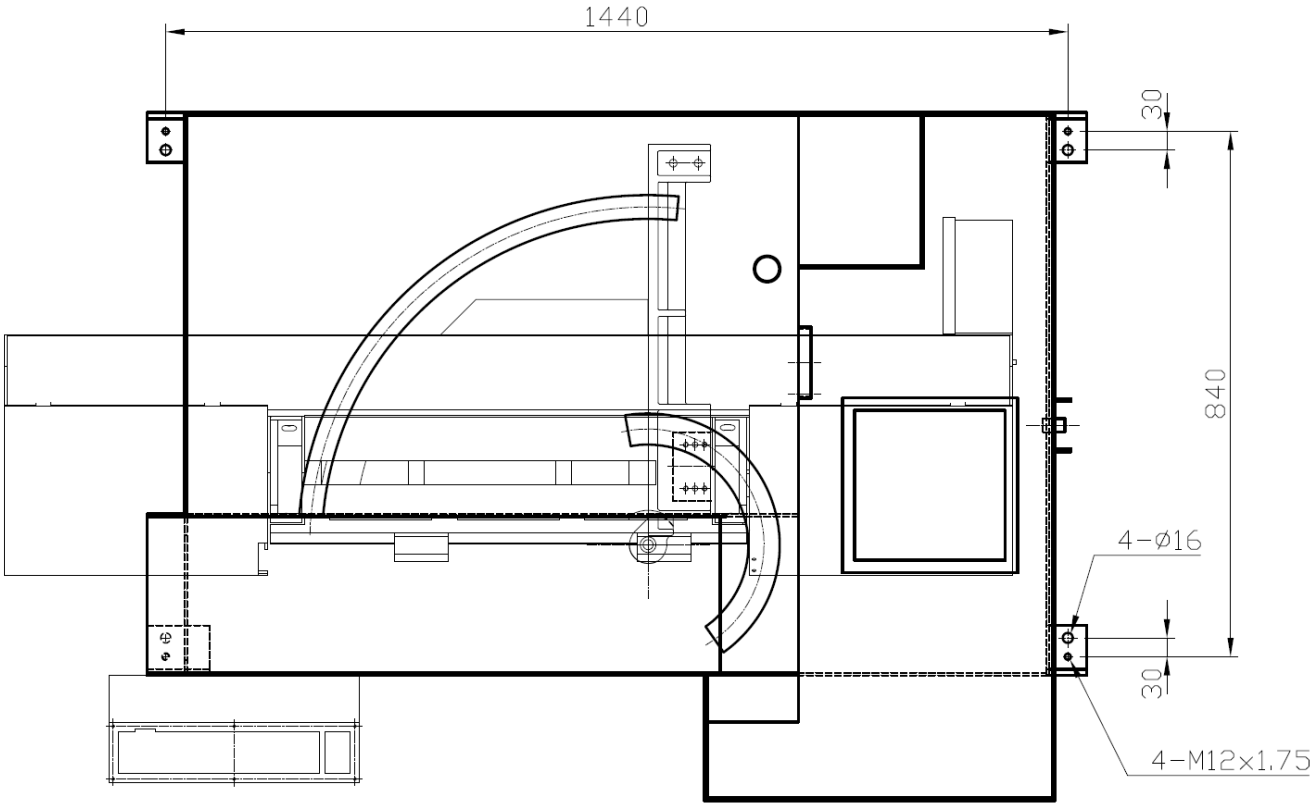
SPECIFICATION

Model		MH-460M		
Capacity	Angle	0°	-45°	-60°
	Round	250 mm (9.8”)	230 mm (9.1”)	110 mm (4.3”)
	Square	230 mm (9.1”)	230 mm (9.1”)	110 mm (4.3”)
	Rectangular (H x W)	230 x 460 mm (9.1” x 18.1”)	230 x 230 mm (9.1” x 9.1”)	110 x 110 mm (4.3” x 4.3”)
Saw Blade	Speed	60Hz: 23, 37, 58, 93 m/min (75, 121, 190, 305 fpm) 50Hz: 19, 31, 45, 67 m/min (62, 102, 157, 256 fpm) Stepless: 20~71 m/min (66~233 fpm)		
	Size (L x W x T)	3,505 x 27 x 0.9 mm (138” x 1.06” x 0.035”)		
	Tension	Manual		
	Guide	Interchangeable tungsten carbide		
	Cleaning	Steel wire brush		
Motor Output	Saw Blade	2 HP (1.5 kW)		
	Coolant Pump	1/8 HP (0.09 kW)		
Coolant Tank Capacity		40 L (10.4 gal)		
Workbed Height		640 mm (25.2”)		
Weight	Net	550 kg (1,210 lb)		
	Gross	650 kg (1,430 lb)		
Floor Space (L x W x H)		1,751 x 1,100 x 1,052 mm (69.0 x 43.3” x 41.4”)		
Operating Environment	Temperature	5~40°C (41~104°F)		
	Humidity	30%~95% (without condensation)		

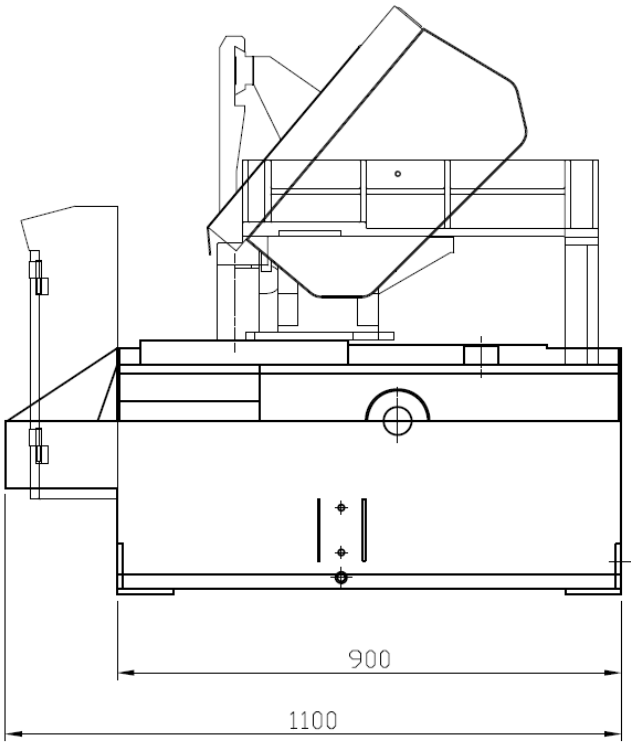
MACHINE PARTS IDENTIFICATION



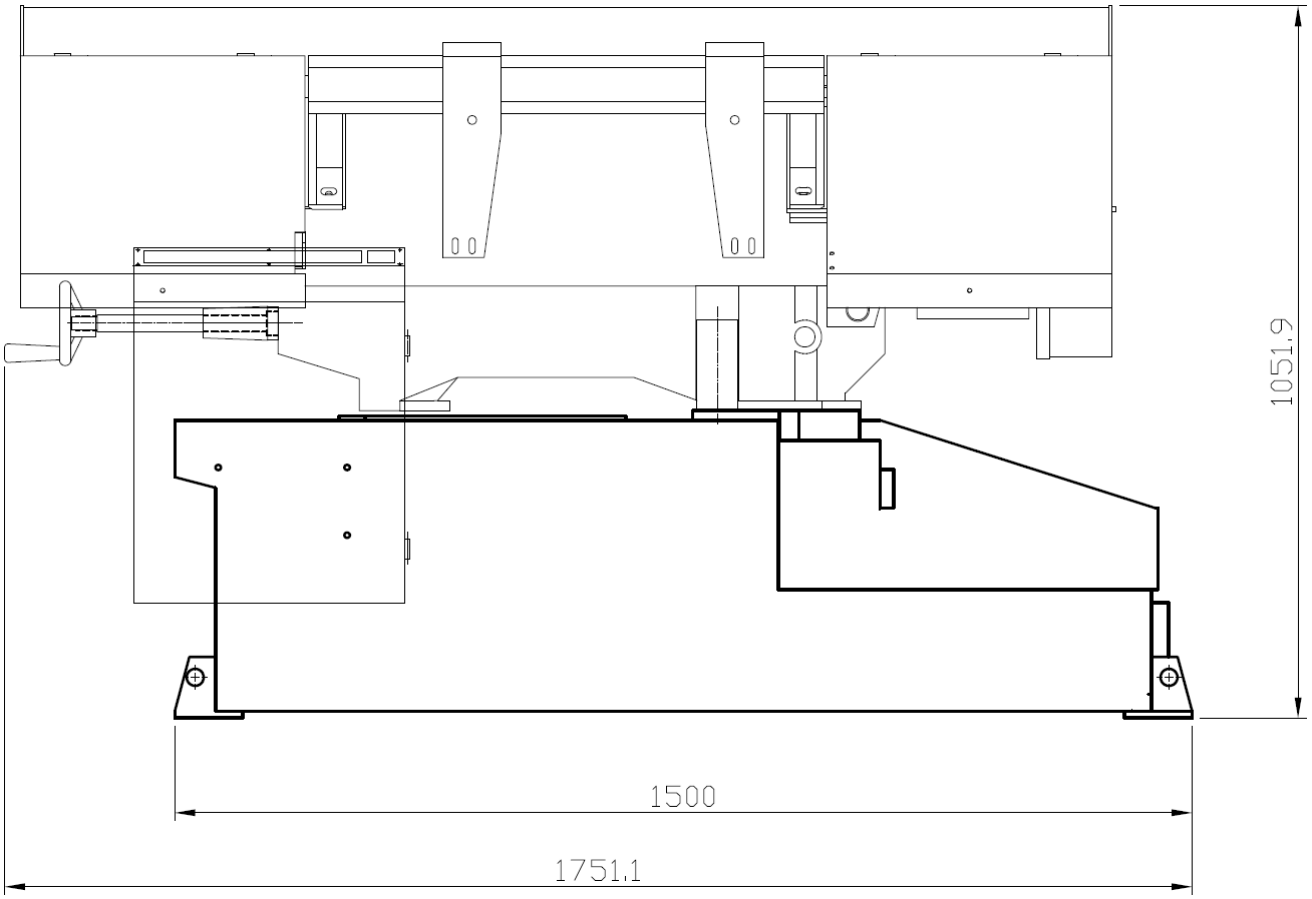
FLOOR PLAN



Machine top view



Machine side view



Machine front view

Section 3

MOVING & INSTALLATION

LOCATION & ENVIRONMENT

For your safety, please read all information regarding installation before proceeding. Install your machine in a place satisfying all of the following conditions:

Space:

- Leave enough free space around the machine for loading work and unloading cut-off pieces as well as for maintenance and inspection. Refer to *Section 2 General Information - Specification* for machine dimensions and floor space.

Environment:

- Well lighted (500 lumen at minimum).
- Floor kept dry at all times in order to prevent operators from slipping.
- Away from direct exposure to the sunlight
- Room temperature between 5˚C to 40˚C.
- Humidity level kept at 30%~95%“(without condensation) to avoid dew on electric installation and machine.
- Away from vibration of other machines
- Away from powders or dusts emitted from other machines
- Avoid uneven ground. Choose a solid level concrete floor which can sustain weight of both machine and material.
- Limit the operation area of the machine to staff only.

UNPACKING & INSPECTING

- Unpack your machine carefully to avoid damage to machine parts or surfaces.
- Upon arrival of your new band saw, please confirm that your machine is the correct model and it comes in the same specification you ordered by checking the model plate on the machine base.
- It is also imperative that a thorough inspection be undertaken to check for any damage that could have occurred during shipping. Pay special attention to machine surface, equipments furnished and the electrical and hydraulic systems for damaged cords, hoses and fluid leaks.
- In the event of damage caused during shipping, please contact your dealer and consult about filing a damage claim with the carrier.
- Your machine comes in with a set of tools for you to maintain the machine. The accessories furnished are as follows:

1.	Tool box	1 pc
2.	Grease gun	1 pc
3.	Screwdriver (+, -)	2 pcs
4.	Open-ended spanner	3 pcs
5.	Hexagon wrench	1 set
6.	Chip spade (only for manual models)	1 pc
7.	Operation manual	1 pc

 Should you find any missing accessories, please contact your local agent immediately.

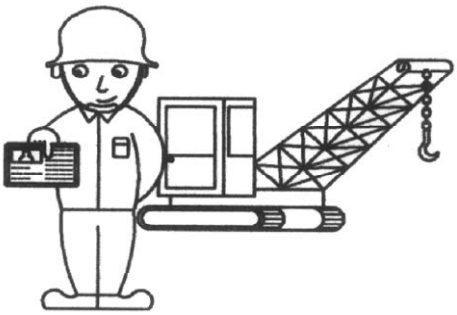
LIFTING

When moving the machine, we strongly suggest you choose any one of the methods described below to move your machine.

1. Use a crane

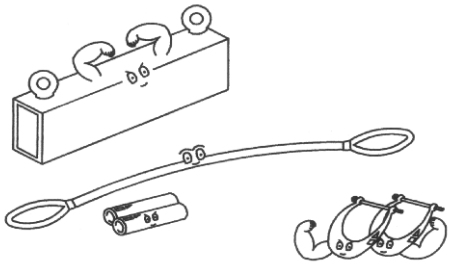
Move the machine to its location by using a crane and a wire rope sling that can fully withstand the weight of the machine (refer to machine specification under Section 2 *General Information*).

- Machine lifting is likely to damage the machine if not performed properly.

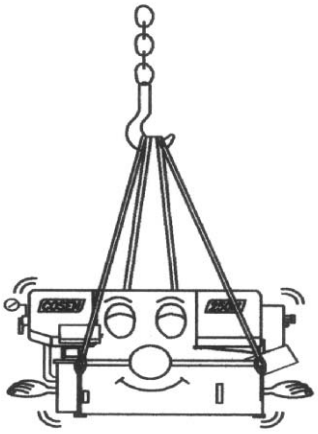


You must have a qualified crane operator to perform the job.

- You must use tools and equipment with the proper tensile strength and use proper method when moving your machine.



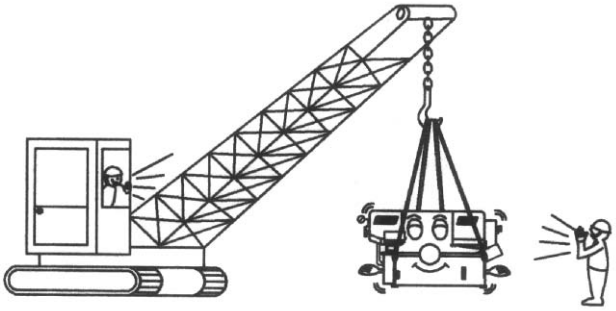
- Apply the wire rope sling to the lifting hooks on the four ends of the machine.



- Slowly lift the machine. Be sure to protect the machine from impact or shock during this procedure. Also watch out your own fingers and feet to avoid injuries.

- Keep the machine well balanced during lifting process and make sure the wire rope does not interfere with the saw frame.

- When you work together with more than two people, it is best to keep constant verbal communication with each other.



2. Use a forklift

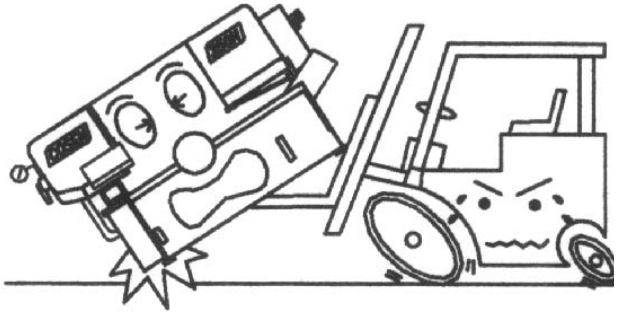
Most users choose this method to move their machine because it is easy to set up. Make sure that the lifting rod can fully withstand the weight of the machine. (Refer to *Section 2 – General Information for Specifications)*

- Machine lifting is likely to damage the machine if not performed properly.

  You must have a qualified forklift operator to perform the job.

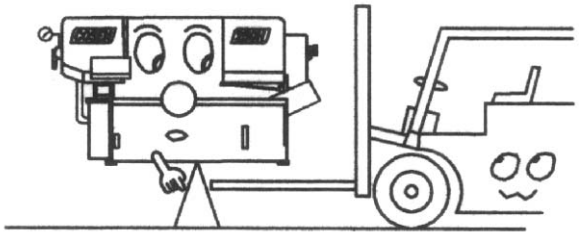
- You must apply proper forklift technique to avoid damage to the machine.

  Make sure the forks are able to reach in at least 2/3 of the machine depth.



- You must keep the machine balanced at all times.

  Make sure the forks are centered before use.



(Illustration only. Refer to *Illustration: Lifting Points* for exact locations.)

3. Use rolling cylinders

You can use rolling cylinders to move your machine in a small machine shop environment.

- You must use rolling cylinders made in material of proper compressive strength.

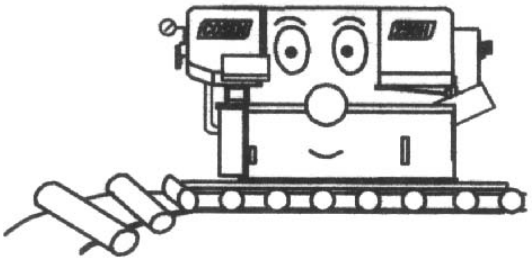
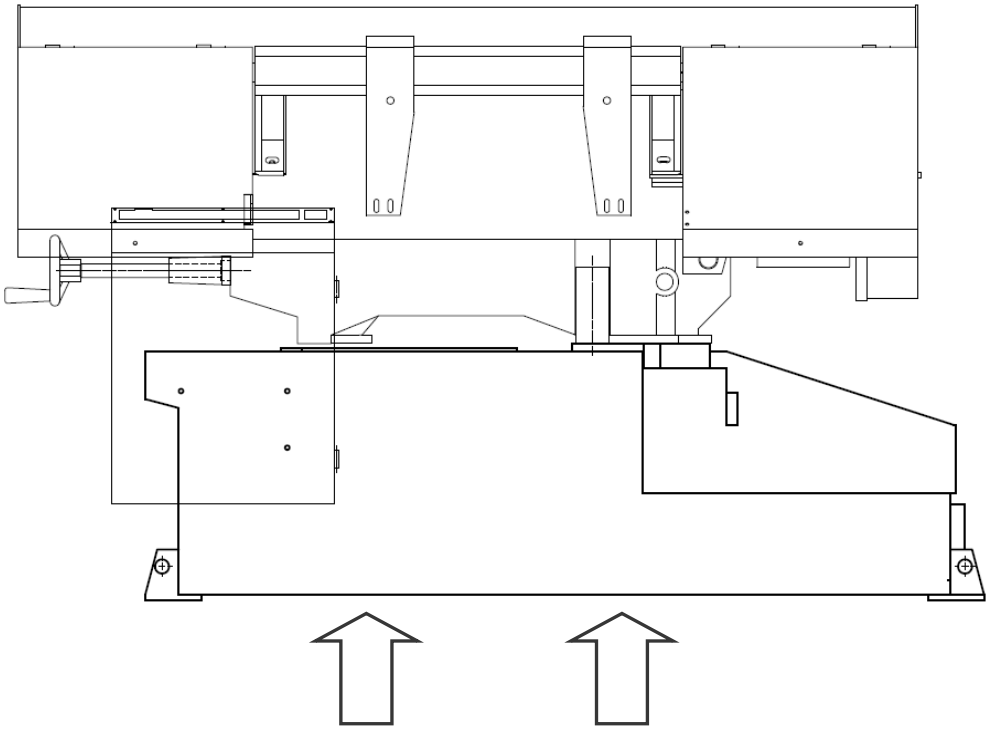


Illustration: Lifting Points



Minimum weight capacity for each lifting rod: **1 ton**
Total number of lifting rod required: **2**

REMOVING SHIPPING BRACKET

- After the machine has been properly positioned, remove the shipping bracket that is used to lock the saw frame and the saw bed.
- Retain this bracket so that it can be used again in the event that your machine must be relocated.

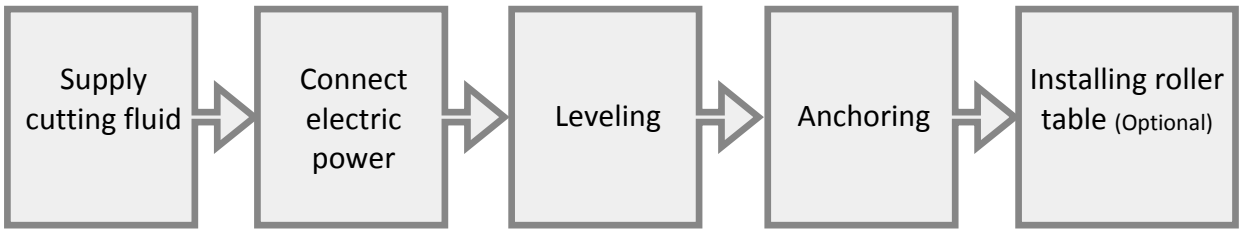
CLEANING

After the machine has been placed at the designated position, remove the rust-preventive grease with wiping cloth dampened with cleaning oil or kerosene. Apply machine oil to machine surfaces that are prone to rust.

Do not remove the rust-preventive grease with a metal scraper and do not wipe the painted surfaces with solvent as doing so would damage surface paint.

INSTALLING

Cosen's bandsaw machine is relatively easy to install. Follow these easy steps to install your machine.



Supplying cutting fluid

Fill the coolant tank to the middle level of the sight gauge by pouring the coolant from above the chip conveyor.

Use the sight gauge to check the coolant level remaining in the tank.

Always check the coolant supply before starting the machine. If the coolant pump is started without enough coolant supply in the tank, the pump and its drive motor may be damaged.

Refer to specification chart under Section 2 *General Information* for tank capacity.

Consult your coolant supplier for bandsaw use regarding coolant type and mix ratio.

Connecting electric power

Have a qualified electrician make the electrical connections.

If the power supply voltage is different from the transformer and motor connection voltage shown on the label attached to the electrical compartment of the machine, contact COSEN or your agent immediately.

Connect to power supply independently and directly. Avoid using the same power supply with electric spark machines such as electric welder. Unstable electric tension may affect your machine's electric installation from working properly.

Ground the machine with an independent grounding conductor.

Supply voltage: 90% - 110 % of nominal supply voltage.

Source frequency: 99% - 101 % of nominal frequency.

Refer to the specification chart under Section 2 for total electric power consumption of the motors and make sure your shop circuit breaker is capable of this consumption amount. Also use a power supply cable of proper size to suit the power supply voltage.

1. Turn off the shop circuit breaker.
2. Make sure the machine circuit breaker switch on the electrical compartment door is turned to OFF.
3. Remove the screw securing the electrical compartment and then open the door.
4. Pull the power supply cable and grounding conductor through the power supply inlet into the electrical compartment. (Shown right)
5. Connect the power supply cable to the circuit breaker (N.F.B.) to the R, S and T terminals, and connect the ground cable to the E terminal.
6. Close the compartment door and fasten the screw back.
7. Turn on the shop circuit breaker and then turn the machine circuit breaker switch to ON. The *Power Indicator* on the control panel will come on.
8. Pull to unlock the *Emergency Stop* button and press the *hydraulic ON* button to start the hydraulic motor.
9. Make sure the sawing area is clear of any objects. Start the blade and check the blade rotation. If the electrical connections are made correctly, the blade should run in a counterclockwise direction. If not, shut the hydraulics off, turn off the machine as well as the shop circuit breaker. Then swap the power the power cable conductors connected to R and T terminals.
10. Repeat step 6 to 9 to ensure the electrical connections are in the right order.

Leveling

Place spirit level on the vise slide plates and the work feed table.

Level the machine in both directions i.e. along and across the machine. Adjust the level of the machine by turning the leveling bolts.

Make sure all leveling bolts evenly support the machine weight.

Anchoring the machine

Normally there is no need to anchor the machine. If the machine is likely to vibrate, fix the machine to the floor with anchor bolts.

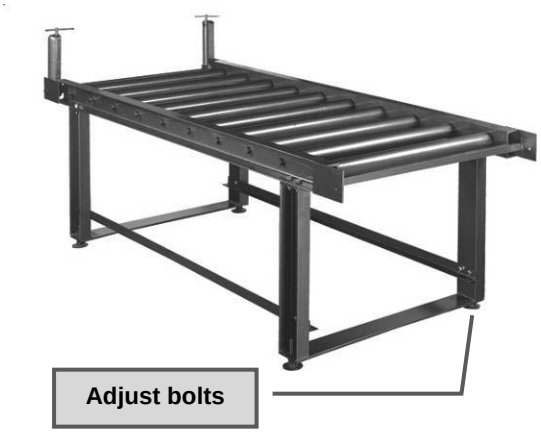
Shock absorption steel plates are provided and can be placed under each leveling bolt to prevent their sinking into the concrete floor.

Installing roller table (optional)

The roller table is used to support long material at the rear and/or the front of the machine.

If you have ordered the optional roller table for cutting long material, position it before or behind the machine.

Level the roller table and the stand with the machine by adjusting the leveling bolts.



Installing Fire Control Device

Install a fire extinguisher or any other fire control device in the shop in case a fire breaks out.

RELOCATING

We recommend you follow these procedures when relocating or shipping your machine to other place:

1. Descend the saw frame to its lowest position then turn off the power.
2. Fix the saw frame using the shipping bracket that originally came with the machine.
3. If you are shipping the machine, pack the machine carefully with industrial plastic wraps to protect it from dust.
4. Use a crane or forklift to raise it. If a crane is used to lift the machine, ensure that the lifting cable is properly attached to the machine.
5. Do not forget to include the equipments originally furnished including the shock absorption steel plates and the instruction manual.

Section 4

OPERATING INSTRUCTION

SAFETY PRECAUTIONS

For your safety, please read and understand the instruction manual before you operate the machine. The operator should always follow these safety guidelines:

- The machine should only be used for its designated purpose.
- Do not wear gloves, neckties, jewelry or loose clothing/hair while operating the machine.
- For eye protection, always wear protective safety glasses.
- Check the blade tension and adjust blade guides before starting the machine.
- Use auxiliary clamping or supporting devices to fix material in place before cutting long workpieces. Always make sure the material is clamped firmly in place before starting to cut.
- Do not remove jammed or cut-off pieces until the blade has come to a full stop.
- Keep fingers away from the path of the blade.
- Protection devices should be in place at all times. For your own safety, never remove these devices.
- Disconnect machine from the power source before making repairs or adjustments.
- Wear protection gloves only when changing the blade.
- Do not operate the machine while under the influence of drugs, alcohol or medication.
- Do not take your eyes off the machine while in operation.
- Do place warning signs to mark out machine work zone and restrict entry to be staff-only.

BEFORE OPERATING

Choosing an appropriate saw blade and using the right cutting method is essential to your cutting efficiency and safety. Select a suitable saw blade and cutting method based on your work material and job requirements e.g. cutting accuracy, cutting speed, economic concern, and safety control.

Wet cutting

If you choose dry cutting or low-speed cutting, the chips may accumulate in machine parts and may cause operation failure or insulation malfunction. We suggest you choose wet cutting to avoid machine damage.

Cutting unknown materials

Before cutting an unknown material, consult the material supplier, burn a small amount of chips from the material in a safe place, or follow any other procedure to check if the material is flammable.

 Never take your eyes off the machine while in operation.

Cutting fluid

For cooling and lubrication purpose, we recommend you use water-soluble cutting fluids. The following table lists out its pros and cons for your reference.

Pro	Con
• Have a high cooling effect • Not flammable • Economical • Does not require cleaning of the cut products	• Remove machine paint • Lose its rust protection effect if deteriorated • Tend to create foam • Subject to decay • Decline in performance, depending on the quality of the water used for dilution

 Never use water as your coolant.

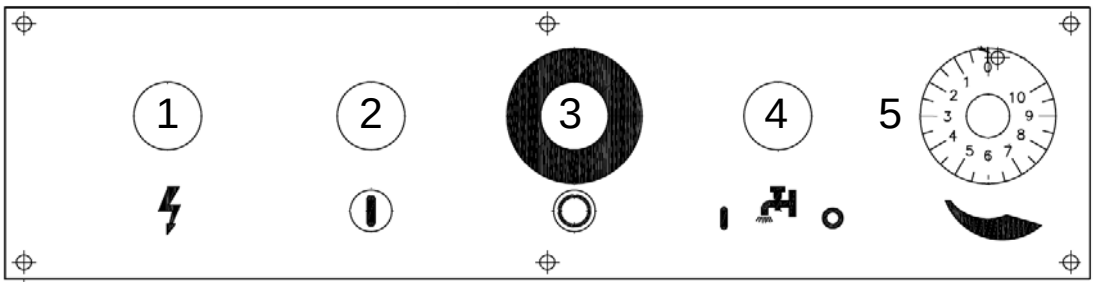
 Always add coolant into water for better mix result.

 Consult your coolant supplier for bandsaw use regarding coolant type and mix ratio.

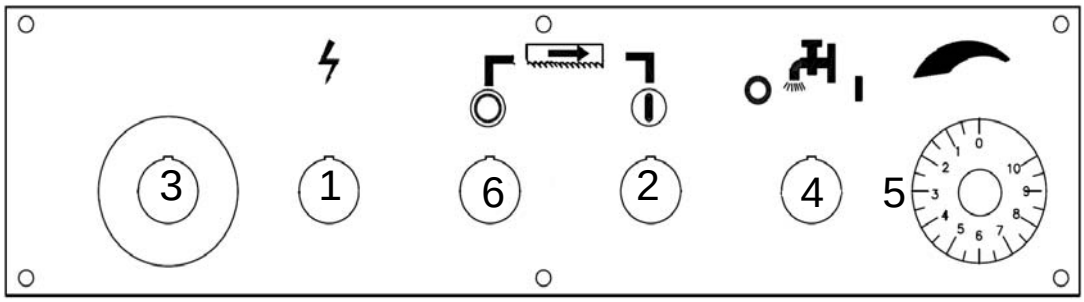
 Before starting a cutting job, make sure there is sufficient amount of coolant in the tank. Check the fluid level through the sight gauge. Please refer to machine specifications in this manual (Section 2) for tank capacity.

CONTROL PANEL

The control panel is located on the top of the electrical box. The operator must fully understand the function of each switch and button before operating the machine.



Non-CE Model



CE Model

No.	Control Function	No.	Control Function
1	Power indicator lamp	4	Coolant On/Off switch
2	Blade start button	5	Blade descend speed control knob
3	Emergency stop button	6	Blade stop button

Control Buttons

1. Power indicator lamp

When the lamp is on, it indicates the power to the machine is turned on.

2. Blade start button

Press this button to start the blade motor.

Make sure the material is securely clamped by the vise before cutting.

3. Emergency stop button

Press this button to stop the machine in an emergency. When the button is pressed, it brings the machine to a full stop. The button locks when pressed. In order to unlock it, please turn the button clockwise.

4. Coolant on/off switch

When this switch is set at "I", the coolant pump operates and the cutting fluid will be injected. When this switch is set at "0", the coolant pump stops and cutting fluid supply will be terminated.

5. Blade descend speed control knob

- This knob is used to adjust the descend speed of the saw blade.
- Turning the knob clockwise increases the blade descend speed.
- Blade descend speed is a determining factor to a good cutting time and quality cutoff surface.
- Also commonly known as the flow control valve

6. Saw blade stop button

Press this button to stop the blade motor.

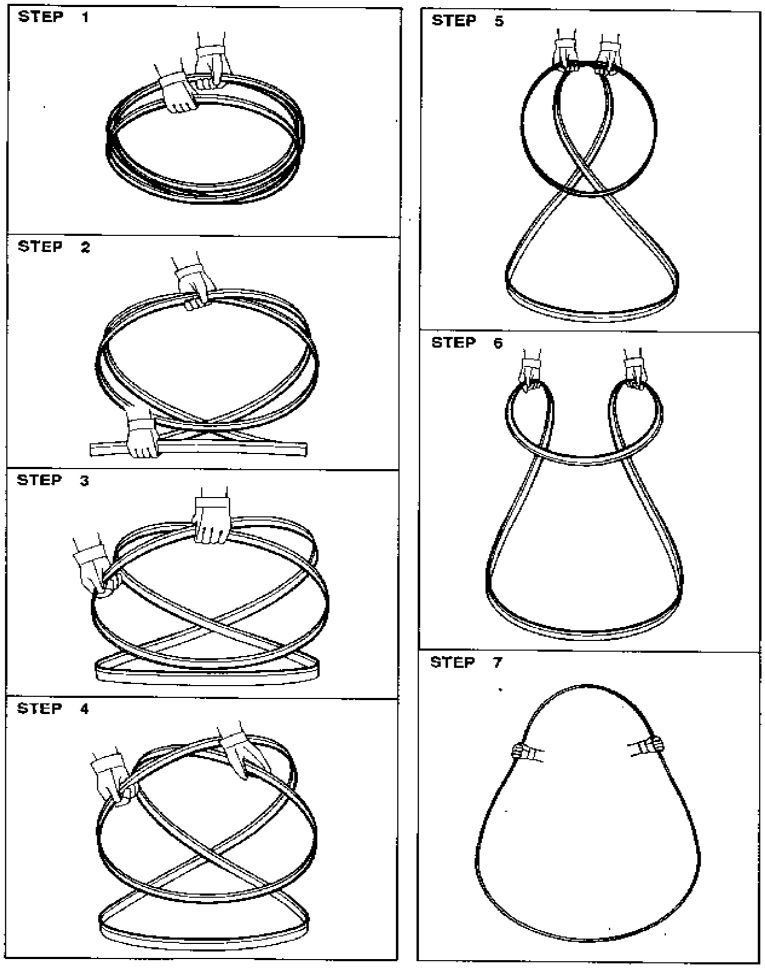
 The saw blade will automatically stop when the material has been cut through. For non-CE model, please make use of the *emergency stop* button in an emergency.

UNROLLING & INSTALLING THE BLADE

Always wear leather gloves and protection glasses when handling a blade.

Unrolling the blade

Please follow the procedures illustrated below.



Unroll and roll the blade

Installing a new blade

Step 1 - Select the most suitable saw blade for your workpiece considering the size, shape and material.

Step 2 - Turn on the machine power.

Step 3 - Press the *saw bow up* button and elevate the saw bow to the highest position.

Step 4 - Release blade tension by turning the blade tension handle counterclockwise. The idle wheel will then move slightly toward the direction of the drive wheel.

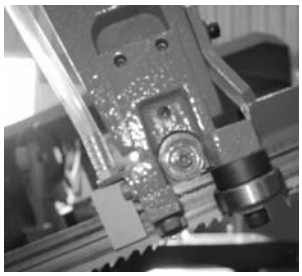
Step 5 - Open the idle and drive wheel covers.

Step 6 - Loosen the screw and lower the wire brush.

Step 7 - Remove the old blade. If necessary, clean the carbide inserts before installing a new saw blade.

Step 8 - Place the new blade around the idle wheel and the drive wheel.

Step 9 - Insert the blade into the left and right tungsten carbide inserts. The back and the sides of the blade need to be touching the inserts as well as the adjacent rollers.



Step 10 - Place the blade to the drive wheel and press the back of the blade against the flange of the drive wheel.

Step 11 - Make sure the back of the blade is also pressed against the flange of the idle wheel.

Step 12 - Apply tension by turning the blade tension handle clockwise. Make sure you have proper blade tension. Proper tension exists when the blade does not slip on the drive wheel when cutting.

Step 13 - Make sure the sides of the blade are in close contact with the carbide inserts.

Step 14 - Gently close the idle and drive wheel covers.

Step 15 - Press the *saw blade start* button to start the blade. Allow the blade to run for a few rotations then press the *saw bow up* button to elevate the saw bow. Open the wheel covers and make sure the blade has not fallen off the drive and idle wheels. If the blade has shifted, follow the same procedure to reinstall the blade again.

Step 16 - Adjust wire brush to a proper position. Refer to *Adjust wire brush* in this section.

SELECTING BLADE SPEED

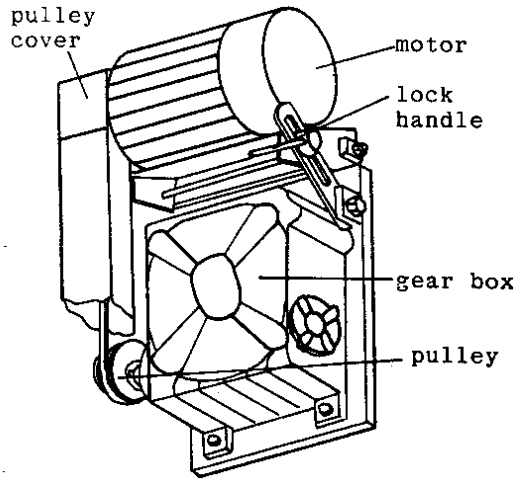
Blade speed selection should be made according to the material being cut. The following chart provides information on blade speed and is used for reference only.

Material	Speed		Pulley Groove Used	
	50 Hz	60 Hz	Motor pulley	Saw Pulley
High speed alloy, stainless and heavy cross section material	57	68	Smallest	Large
Tool, stainless and alloy steel, bearing bronze	100	120	Small	Medium
Cast iron, mild steel, hard brass, bronze	164	196	Medium	Small
Plastic, copper, soft brass, aluminum, other light materials	277	330	Large	Smallest

Some materials due to manufacturing processes such as certain types of cast iron pipe or materials containing certain types of welds cannot be cut on the machine.

ADJUSTING BLADE SPEED

4 Speed Step Pulley



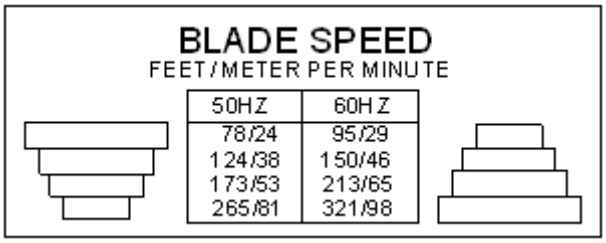
Step 1 - Remove pulley cover.

Step 2 - Loosen lock handle.

Step 3 - Position belt in proper grooves according to below speed selection chart attached on the pulley cover.

Step 4 - Make sure the belt is tightly and securely positioned in the groove and tighten lock handle.

Step 5 - Install pulley cover back in place.



Speed Selection Chart

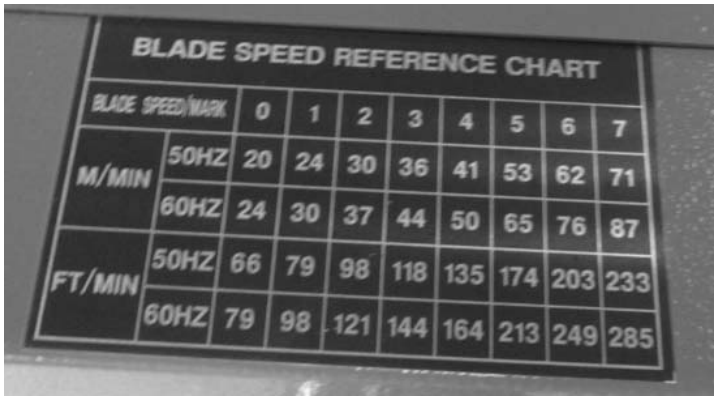
Variable Stepless Pulley Drive

Infinitely variable blade speed is easily achieved with this optional device. Our variable stepless pulley drive assembly allows the operator to select the optimum speed for best performance in all cutting applications.

Turn the blade speed control knob clockwise to decrease blade speed; counterclockwise to increase speed.

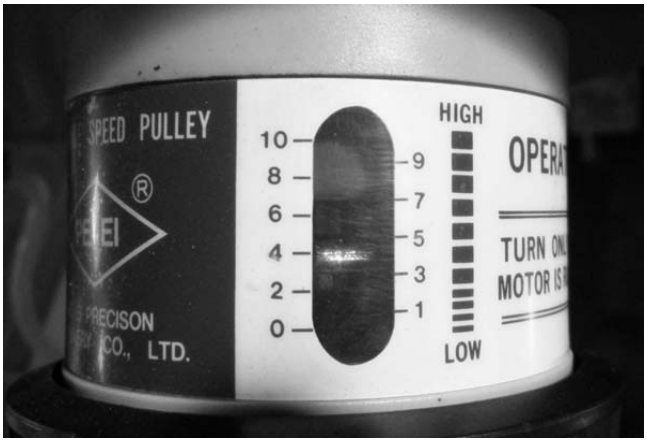
On and behind the control knob is also the speed mark indicator showing current speed level. Refer to the blade speed reference chart posted on the pulley cover to see the actual blade speed in m/min or ft/min.

Blade Speed Control Knob



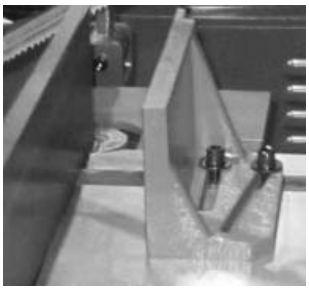
BLADE SPEED/MARK		0	1	2	3	4	5	6	7
M/MIN	50HZ	20	24	30	36	41	53	62	71
	60HZ	24	30	37	44	50	65	76	87
FT/MIN	50HZ	66	79	98	118	135	174	203	233
	60HZ	79	98	121	144	164	213	249	285

Blade Speed Reference Chart



Speed Mark Indicator

ANGLE CUTTING

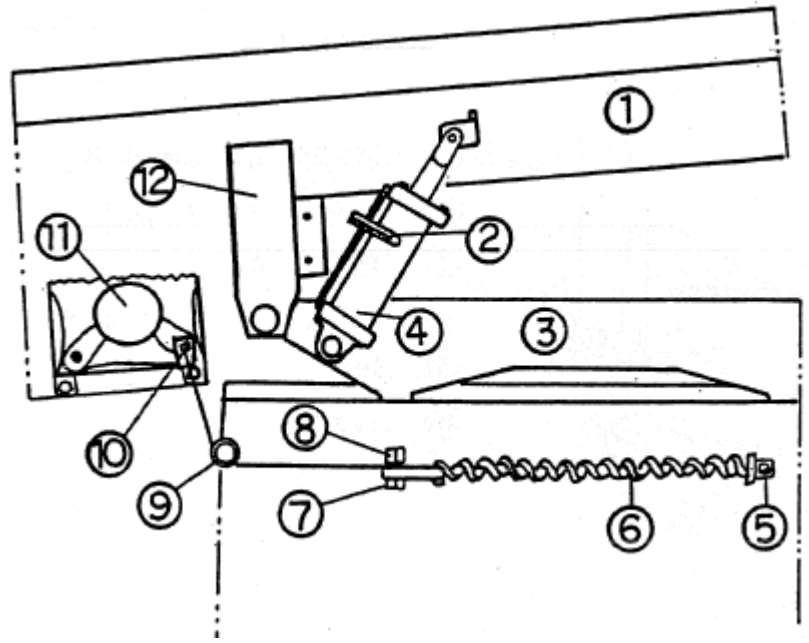


The swivel sawhead allows the user to cut at any angle between 0° (straight cut) and 60° (miter cut). The angles have been accurately configured before machine shipment.

For your miter-cutting jobs, simply loosen the angle lock handle, swivel the saw bow until the pointer points to your desired angle and lock the saw bow via angle lock handle. Also loosen the vise bolts and adjust the vise position according to the miter cut angle.

ADJUSTING FEED RATE (CUTTING PRESSURE)

To obtain desired feed rate (cutting pressure), the “hydraulic cylinder” (#4) and “feed tension spring” (#6) are to be adjusted together.



1. Saw bow
2. By-pass valve (Do not make adjustment here.)
3. Workbed
4. **Hydraulic cylinder**
5. Bracket
6. **Feed tension spring**
7. Lock nut
8. Adjustment screw
9. Wire rope guide wheel
10. Lock screw
11. Gearbox
12. Screw bow bracket

- Feed pressure is the amount of pressure forcing the blade downward into the material.
- Proper feed pressure is important. Excessive pressure can break the blade or stall the saw. Insufficient pressure rapidly dulls the blade.
- The hydraulic cylinder regulates the rate at which the blade is lowered into the material being cut. Adjusting the *blade descend speed control knob* provides an infinite choice for feed rate.
- When cutting workpiece of 2 mm thick or below, please adjust the *blade descend speed control knob* to between “1~2” gradually; when cutting workpiece of 3 mm and above, to “3~4” gradually.

The by-pass valve (#2) has been factory adjusted and should not be altered.

- Using *blade descend speed control knob* while repositioning your workpiece: When repositioning your workpiece, raise the saw head halfway up and turn the *blade descend speed control knob* clockwise all the way pass “0” to hold the saw head in position.

ADJUSTING VISE

Always use the vise to clamp the work. Never hand-hold the work for cutting.

Clamp material securely by turning the vise hand wheel clockwise.

Vise hand wheel

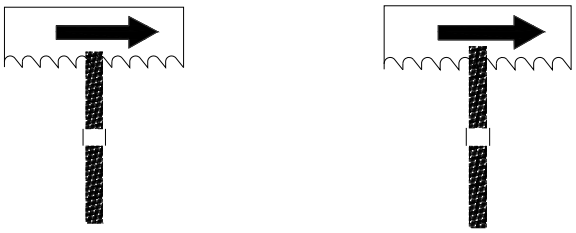
ADJUSTING WIRE BRUSH

Follow these steps to adjust wire brush to appropriate position:

Step 1 - Open the drive wheel cover.

Step 2 - Adjust the screw to make brush move up / down until it makes proper contact with the saw blade (see below illustration).

Step 3 - Close the drive wheel cover.



ADJUSTING SAW ARM

Locking Handle

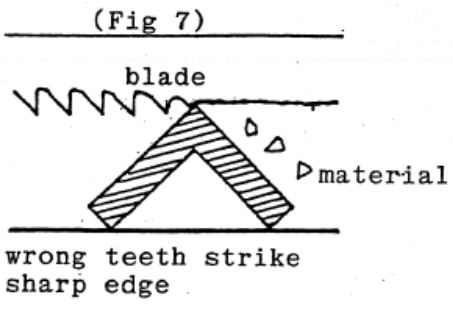
Adjust the blade guide (guide arm) position based on the size of your workpiece:

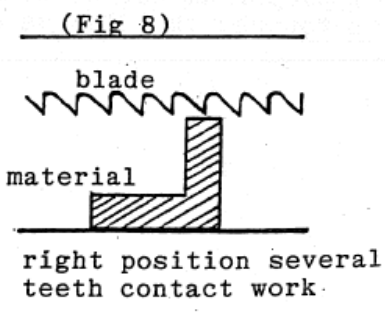
Step 1 – Loosen the blade guide locking handle. Then adjust the guide arm to a position suitable for your workpiece size.

Step 2 – After adjustment is made, tighten the blade guide locking handle.

CUTTING IRREGULAR CROSS SECTION

When cutting irregularly-shaped material, if possible, avoid positioning the work in the way that the cut would be started on a sharp corner. Arrange your workpiece in the way that as many teeth as possible will be applied to the work at one time.





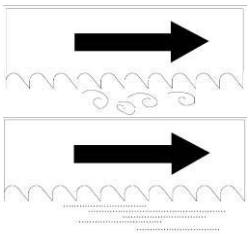
ADJUSTING COOLANT FLOW

Step 1 – Press the *power on* button to start the saw blade drive motor.

Step 2 – Lower the saw bow.

Step 3 – Use the flow control valve (shown below) to adjust the amount of fluid flowing to the cutting area.

Adjust the flow amount if you observe the following changes to the chips generated from cutting.



If the chips are sharp and curved, increase the coolant flow amount.

If the chips are granulated, decrease the coolant flow amount.

INSTALLING MATERIAL STOP BRACEKT

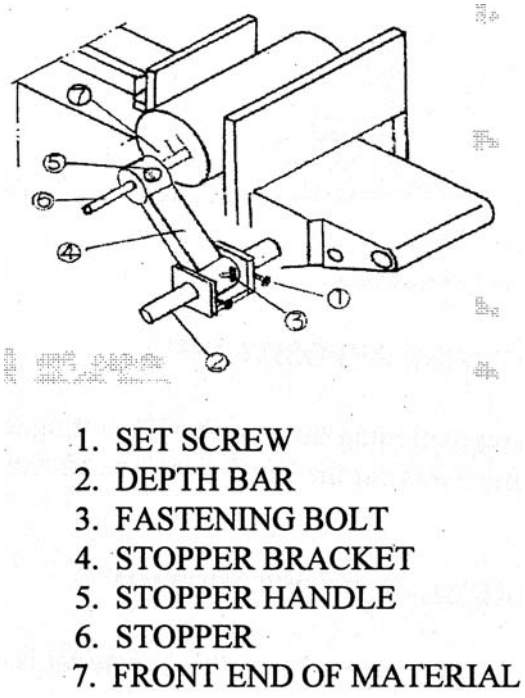


Fig 9 Material Stop Bracket

Step 1 - Install the depth bar (Fig 9, #2) and tighten the set screw (Fig 9, #1). (The depth bar is taken off from the machine base during transit for safety reason.

Step 2 - Lift the saw bow and clamp material securely with vise.

Step 3 - Lower the saw bow to allow about 1 mm clearance between saw blade teeth edge and the top of the material. Then measure your desired cutoff length.

Step 4 - Loosen the fastening bolt (Fig 9, #3)

Step 5 - Slide and position the stopper (Fig 9, #6) so that the end of stopper faces the direction of the front end of the material. Then tighten the stopper handle (Fig 9, #5) to fix the stopper in the bracket (Fig 9, #4).

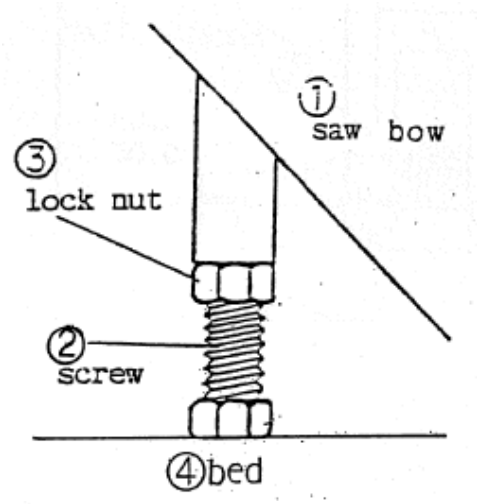
Step 6 - Move the stopper bracket (Fig 9, #4) toward the workpiece so the stopper end just touches the front of the material, then tighten the fastening bolt (Fig 9, #3).

ADJUSTING HORIZONTAL STOP SPRING CUSHION

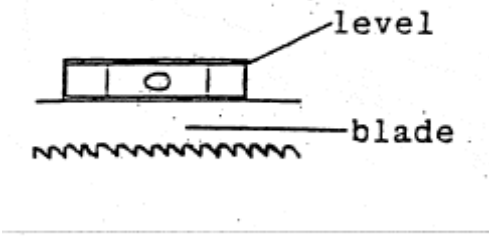
Always make sure the power cord is disconnected from power source when making adjustments.

Complete Cut – Adjusting Horizontal Stop Spring Cushion

The workpiece should be able to cut through completely. If it does not, please follow these steps to adjust the horizontal stop spring cushion.



(Fig 10)



(Fig 10-A)

Step 1 - Place a level on the workbed (Fig 10, #4) to make sure the bed is level.

Step 2 - Loosen the lock nut (Fig 10, #3) and lower down the saw bow. Place the level on top of the saw blade (Fig 10-A) to check its leveling against the bed horizontal line. Adjust the screw (Fig 10, #2) until the blade is level.

Step 3 - Tighten the lock nut (Fig 10, #3) when leveling is obtained.

If the saw blade top line is not leveled against the bed horizontal line, the workpiece will not be able to cut off completely.

Automatic Shut-Off – Adjusting Horizontal Stop Spring Cushion

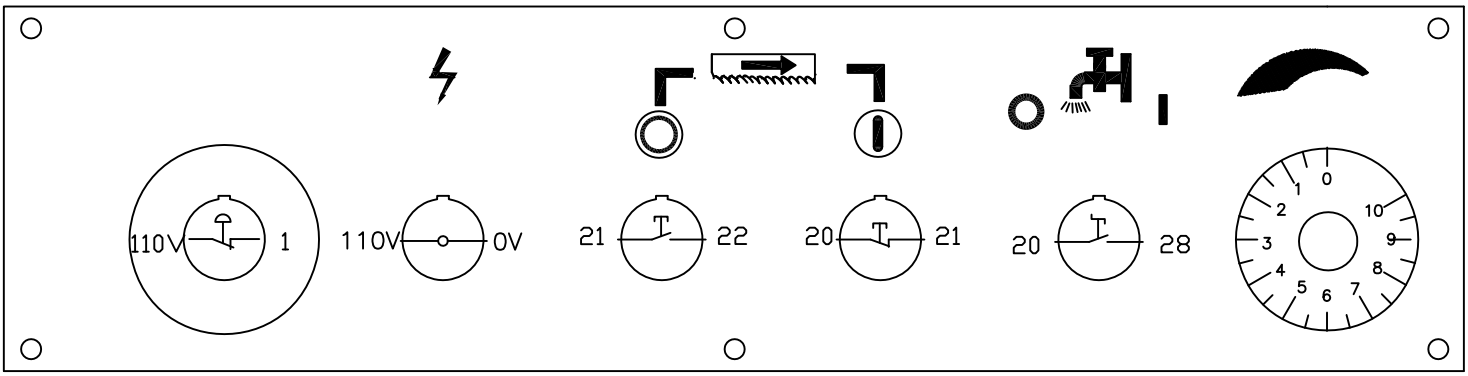
The motor should shut off immediately after the blade has cut through the material and right before the head comes to rest on the horizontal stop spring cushion. If it does not, the spring cushion must be adjusted.

1. Check the horizontal stop spring cushion. Refer to “Complete Cut – Adjusting Horizontal Stop Spring Cushion.”
2. Raise the saw head and press the power on button to ON. Lower the saw head slowly and observe the switch mechanism.

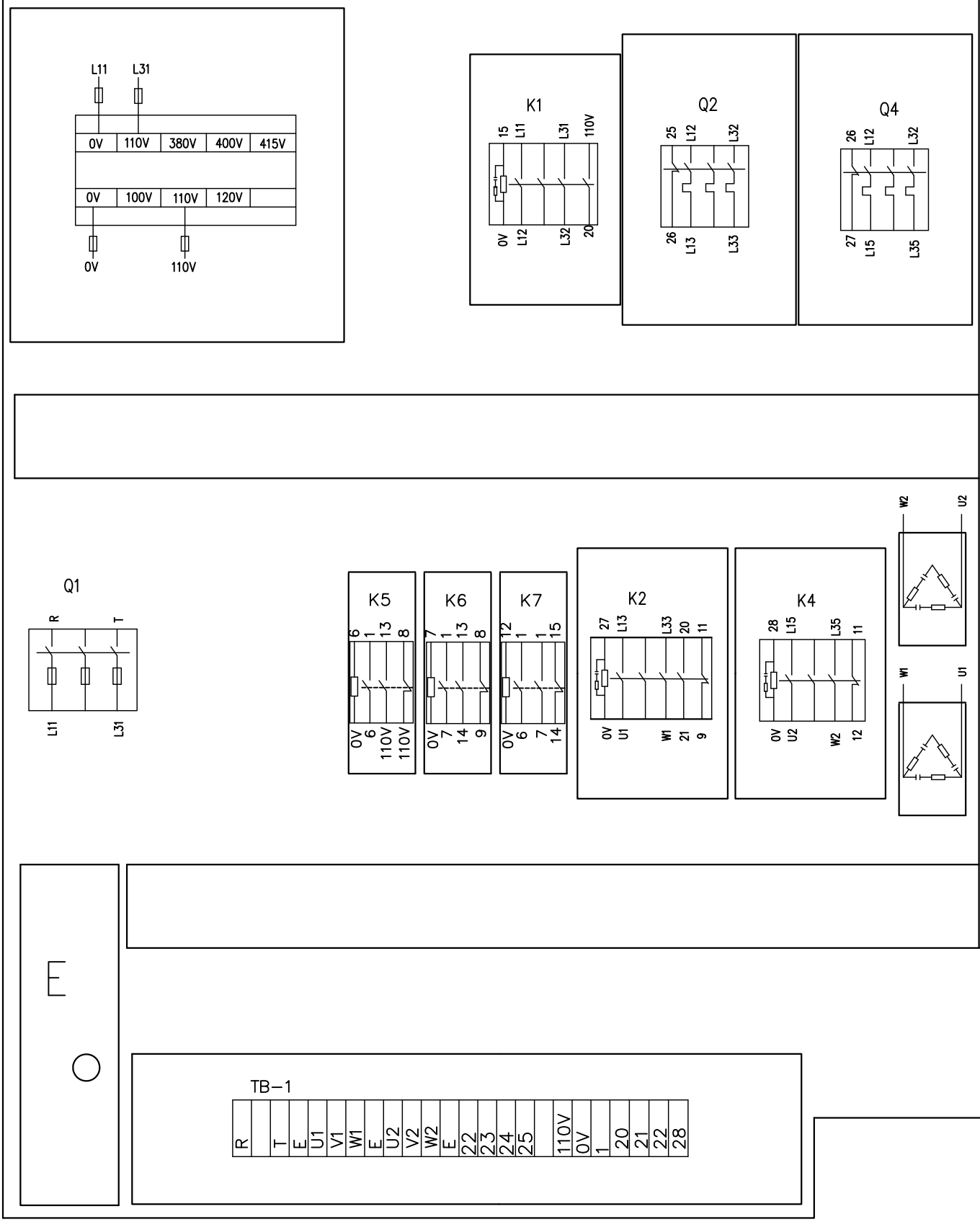
Section 5

ELECTRICAL SYSTEM

ELECTRICAL CIRCUIT DIAGRAMS



高聖機械工業股份有限公司 Cosen Machinery Industrial Co., Ltd.	圖名	面板配置圖	圖號	EL-MH460M-000S0-A	繪圖	陳偉崧	日期	1010306	版本
					審核		日期		S0



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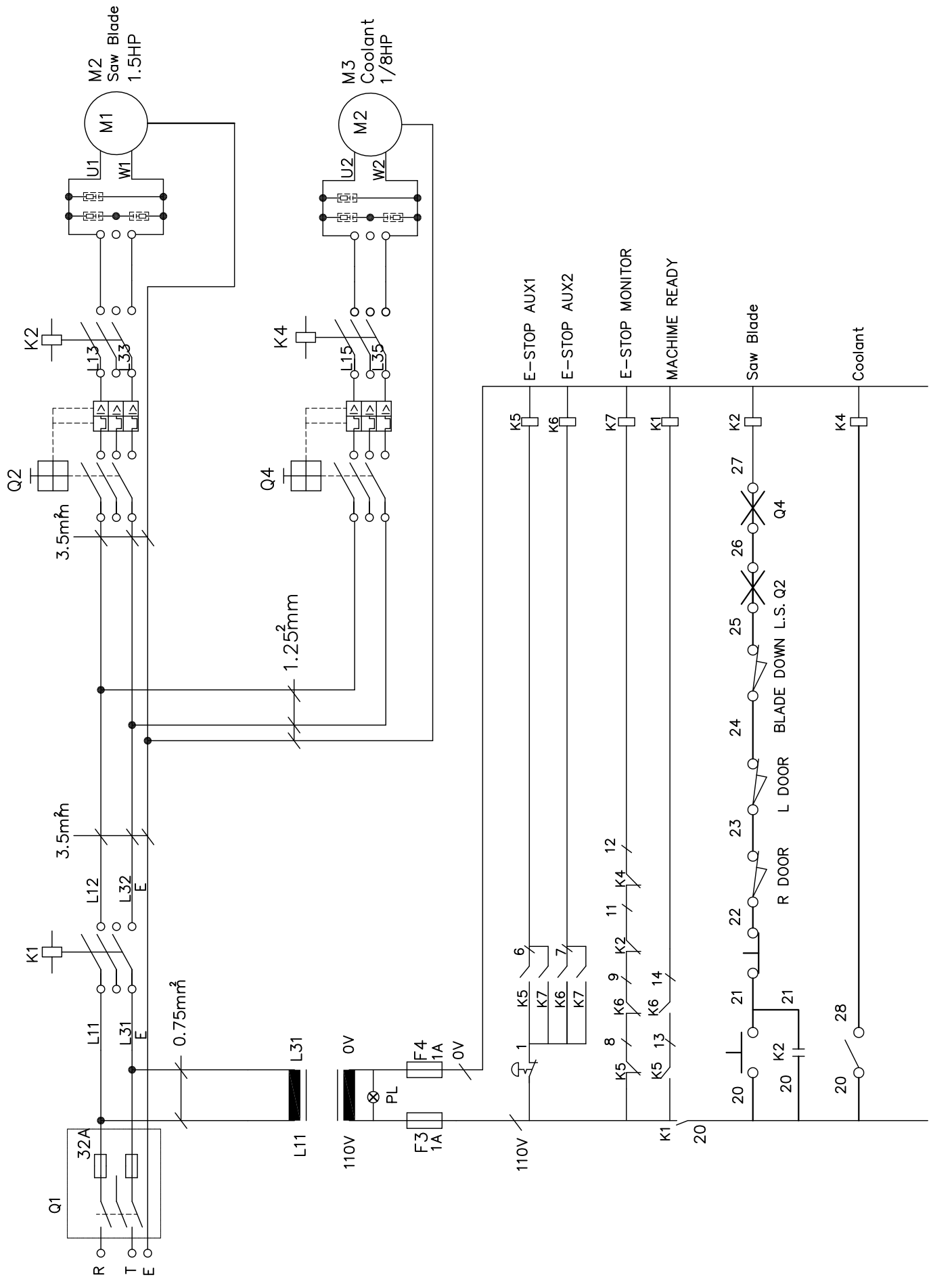

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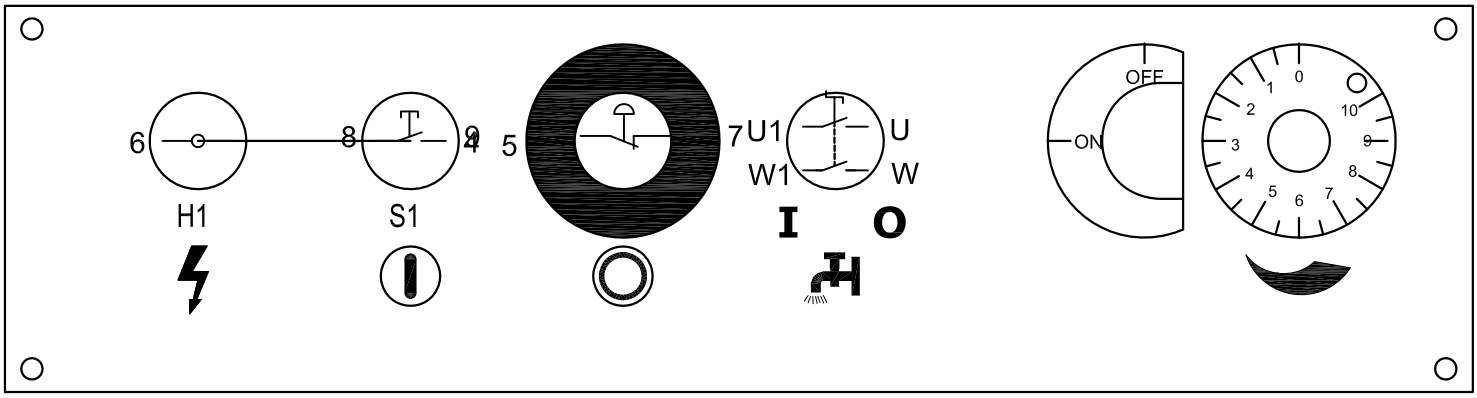

高聖精密機電股份有限公司 COSEN MECHATRONICS CO., LTD.	圖名	Control Panel Layout 面板配置圖	圖號	EL-MH460M-001S0-A	繪圖	鍾泓龍	日期	1020221	版本
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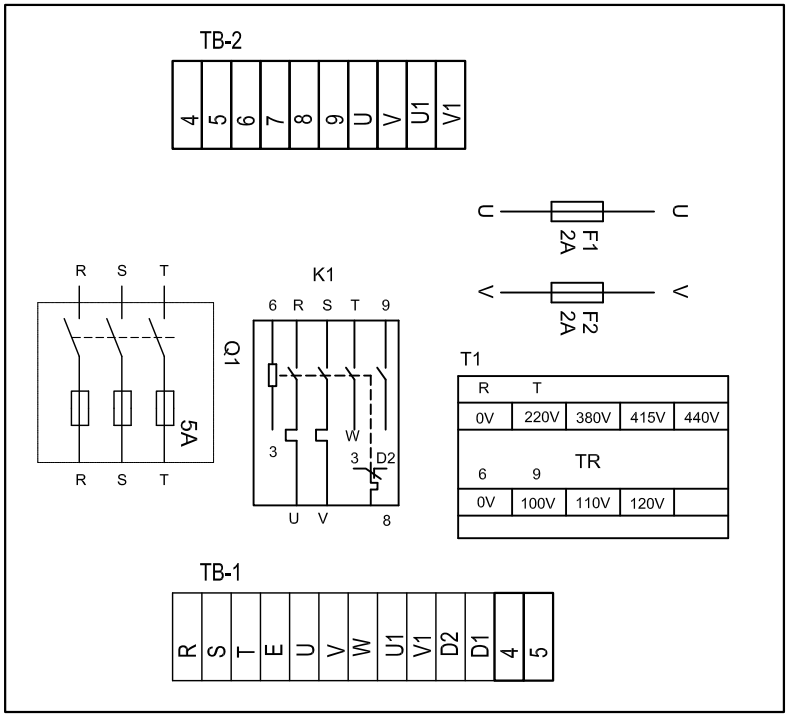
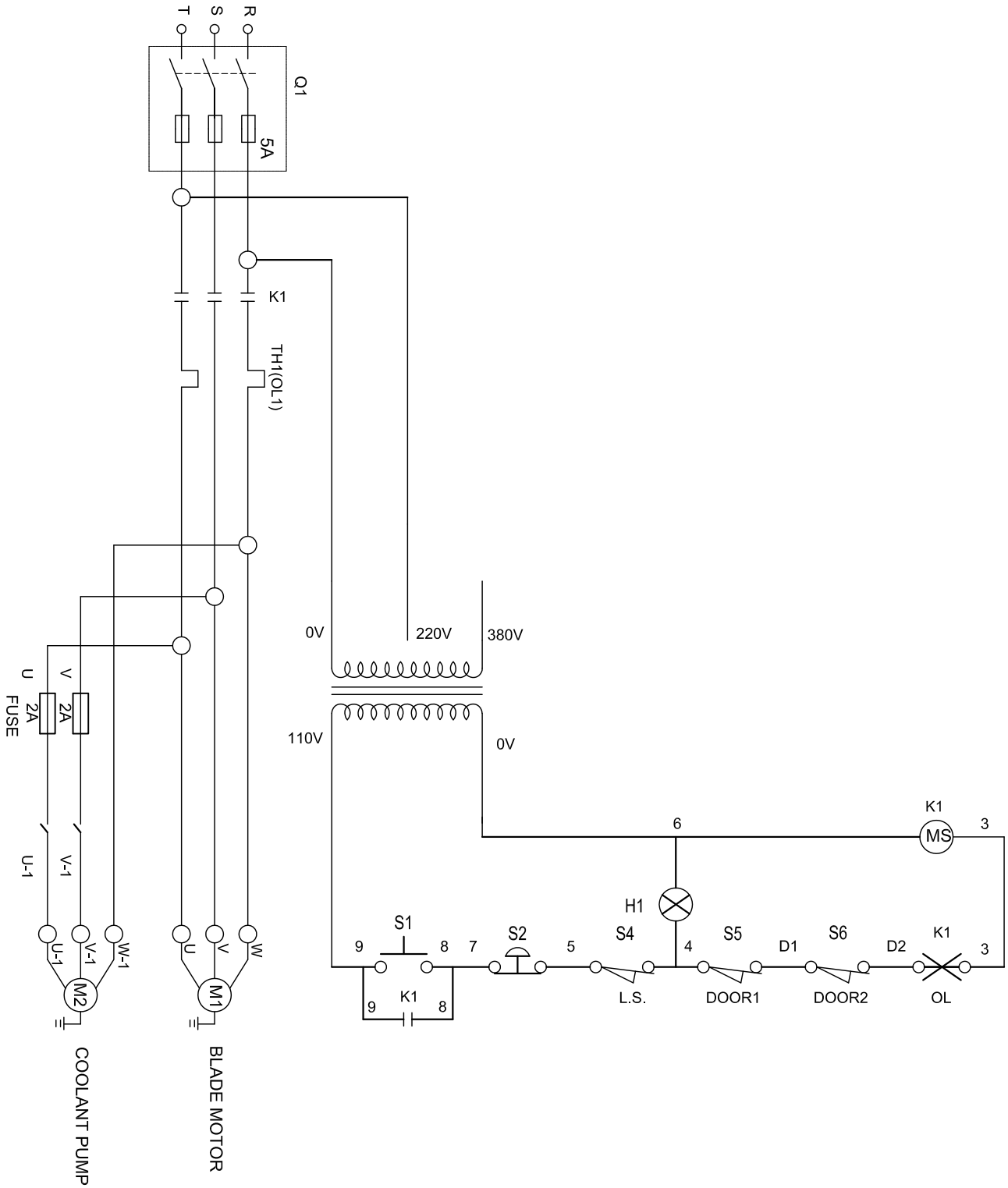


高聖精密機電股份有限公司 COSEN MECHATRONICS CO., LTD.	圖名	Circuit Board Layout 線路板配置圖	圖號	EL-MH460M-001S0-A	繪圖	鍾泓龍	日期	1020221	版本
					審核		日期		S0

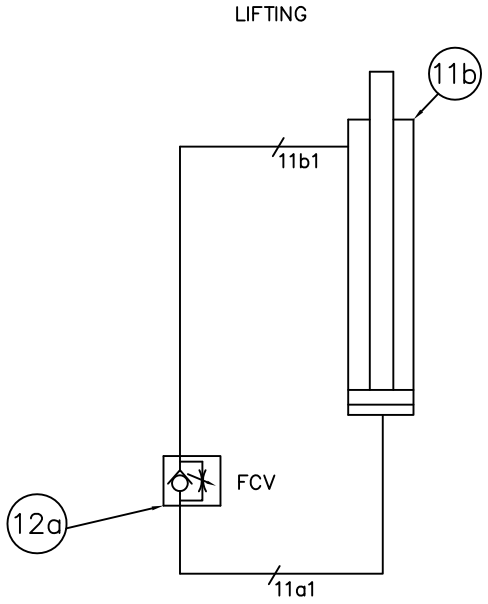


高聖精密機電股份有限公司 COSEN MECHATRONICS CO., LTD.	圖名	Power Supply Layout 動力配置圖	圖號	EL-MH460M-001S0-A	繪圖	鍾泓龍	日期	1020221	版本
					審核		日期		S0

HYDRAULIC SYSTEM

HYDRAULIC DIAGRAMS

MH-1016JA/MH-1016JAM/MH-460M HYDRAULIC CIRCUIT



COSEN MECHATRONICS CO.,LTD.			DRAW	20161110	SHELBY
			CHECK		
TITLE	MH-1016JA/MH-1016JAM/MH-460M HYDRAULIC CIRCUIT		APPROVED		
05MH-1016JA/05MH-1016JAM/05MH-460M ALL TYPE	VERSION	1-0		DATE	NAME

BANDSAW CUTTING: A PRACTICAL GUIDE

INTRODUCTION

Our bandsaw machines are designed to be installed with high quality using high speed saw blades for maximizing productivity. To be able to use this kind of high performance bandsaw blade, the machine has to be of rugged design, has high quality saw blade guides, has sufficient motor horse power for high saw band speeds, and has to be able to apply necessary tension to the saw bands. Your machine has all these features to provide a better service for you.

The saw blade is guided through the cutting area by roller guides to keep it straight as it comes off the driving wheels. The precision carbide inserted guides then hold the blade securely and accurately throughout the sawing process. The tension of the saw blade is adjusted through the tensioning device on the strong saw bow. The cutting feed and down feed pressure of the blade is regulated automatically by hydraulic regulation.

SAW BLADE SELECTION

The factors affecting cutting performance are:

- Type of material
- Material size and shape
- Guide spacing
- Blade selection
- Blade speed and feed
- Tooth form and spacing
- Blade tension
- Blade vibration
- Coolant

Fig. 7.1 Description of Band

- Depending on the hardness of the material the cutting rate will increase or decrease. For example, it takes more time to cut stainless steel than to cut cast iron.
- The surface conditions will also affect the cutting rate. If there are places on the surface on the material which are hard, a slower blade speed will be required or blade damage may result.
- It will be slower to cut tubing than to cut solids, because the blade must enter the material twice, and because coolant will not follow the blade as well.
- Tough or abrasive materials are much harder to cut than their machinability rating would indicate.
- Tooth spacing is determined by the hardness of the material and its thickness in cross section.
- Tooth set prevents the blade from binding in the cut. It may be either a "regular set" (also called a "raker set") or a "wavy set".
- The regular or raker set is most common and consists of a pattern of one tooth to the left, one tooth to the right, and one which is straight, or unset. This type of set is generally used where the material to be cut is uniform in size and for contour cutting.
- Wavy set has groups of teeth set alternately to right and left, forming a wave-like pattern. This reduces the stress on each individual tooth, making it suitable for cutting thin material or a variety of materials where blade changing is impractical. Wavy set is often used where tooth breakage is a problem. This is shown in Fig. 7.2 as follows:

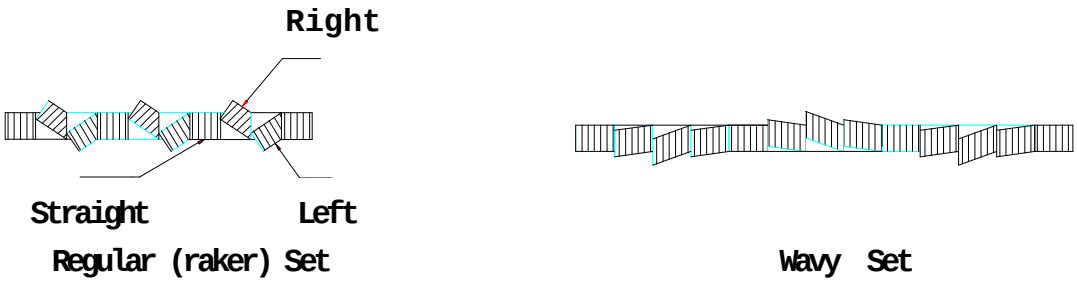


Fig. 7.2 The Saw Set

Material size and shape

The optimum material width for a band saw blade is 1 inch wide by 0.35 inch thick and is about 5 inches long. Below this width tooth loading may become excessive and the cutting rate must be reduced. Above this width blade control begins to be lost, as discussed below. Since the blade "sees" only that material it is cutting, the shape of the stock being cut will also affect cutting speeds, particularly if the piece is excessively wide or if it varies in the dimensions being cut.

Guide spacing

The rigidity of the blade is a function of guide spacing, with rigidity being reduced to the third power as the distance between the guides increases. For example, with guides spaced 2 inches apart, blade deflection might be approximately 0.2. Under the same conditions, but with the guides spaced at 4 inches apart, blade deflection would be approximately 0.8.

This is a much simplified version of the formula, because it does not consider band tension or guide design. It is important to recognize, for example that rollers are considered as a pivotal contact. Whereas carbide faces could be considered as anchored supports. A more complete deviation, including band tension and guide design, is included in Roark's handbook, "Formula for stress and strain".

Blade selection

There are different types of blades available. Please contact a bandsaw blade manufacturer for advice.

Blade speed and feed

Blade speed is generally limited by vibration and the ability to keep the blade sufficiently cool to avoid dulling the teeth. A blade which is running fast and taking a very light cut will dull quickly because the tips of the teeth will overheat from the rubbing action. If, however, we force the blade teeth deeper into the material, the blade will be less sensitive to heat, because the teeth are cutting more and rubbing less.

Tooth form and spacing

The selection of a tooth form generally is determined by the material to be cut. There are three general factors to consider: tooth form, style or shape of the teeth; tooth spacing, the number of teeth to the inch; and tooth set, which provides clearance for the body of the blade. Three styles of tooth are shown in Fig. 7.3 below:

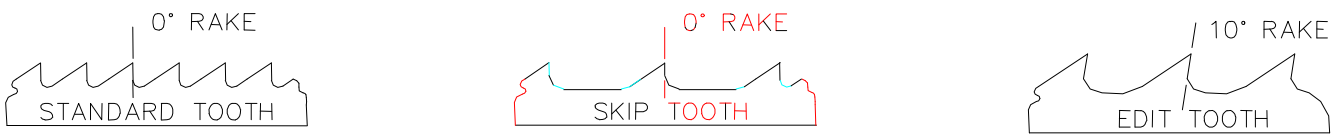


Fig. 7.3 Three Styles of Tooth

SOME SAWING PRACTICES

Saw Pitch Selection

Sawing “Rules of Thumb”:

1. The thinner the stock, the finer the saw pitch.
2. The thicker the stock, the coarser the saw pitch.
3. The more difficult the stock, the finer the saw pitch.
4. The softer the material , the coarser the saw pitch.

Always have at least three teeth in contact with the material being cut.

Material Size and Saw Pitch

Anytime during the cutting operation, at least three teeth must be in contact with the material being cut. Figure 7.4 shows some sawing practices:

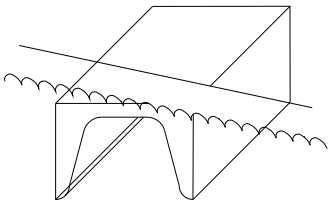
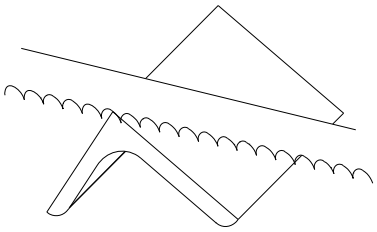
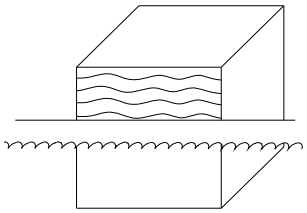
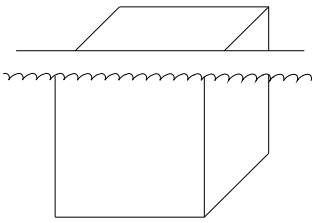
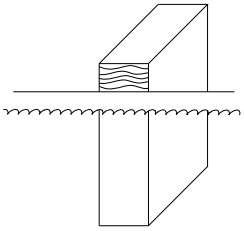
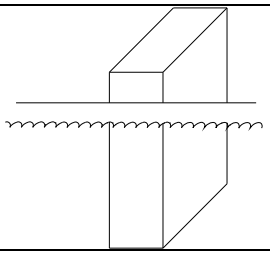
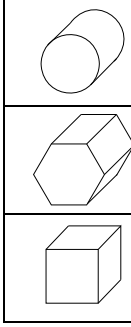
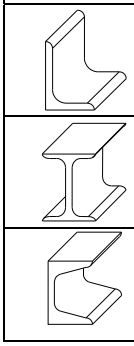
SAWING PRACTICES	
CORRECT	**INCORRECT**
	
several teeth contact work	teeth strike sharp edge
	
Coarse teeth clear chips freely	Teeth too fine for large solids
	
Three or more teeth on cutting wall	Coarse teeth rip on thin wall

Fig. 7.4 Some sawing practices

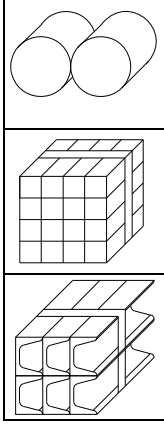
Solid Stock:

STYLE	up to 25 mm (1”)	25-100mm (1-4”)	100-250mm (4-10”)
	8-10 TPI (Teeth per inch)	6-8 TPI	3-4 TPI

Structurals:

STYLE	up to 10 mm (3/8”)	10-20mm (3/8-3/4”)	above 20mm (3/4”)
	10-8 TPI	8-10 TPI	6-8 TPI

Solid Bundle:

STYLE	up to 20 mm (3/4”)	20-80mm (3/4–3 1/4”)	above 80mm (3 1/4”)
	8 - 10 TPI	2 - 8 TPI	4 - 6 TPI

Section 8

MAINTENANCE & SERVICE

INTRODUCTION

For the best performance and longer life of the band saw machine, a maintenance schedule is necessary. Some of the daily maintenance usually takes just a little time but will give remarkable results for the efficient and proper operation of cutting.

BASIC MAINTENANCE

It is always easy and takes just a little effort to do the basic maintenance. But it always turns out to be a very essential process to assure the long life and efficient operation of the machine. Most of the basic maintenance requires the operator to perform it regularly.

MAINTENANCE SCHEDULE

We suggest you do the maintenance on schedule.

Before beginning a day's work

1. Please check the hydraulic oil level. If oil level volume is below 1/2, please add oil as necessary.(Filling up to 2/3 level is better for system operation.)
2. Please check the cutting fluid level, adding fluid as necessary. If the fluid appears contaminated or deteriorated, drain and replace it.
3. Please check the saw blade to ensure that it is properly positioned on both the drive and idle wheels.
4. Please make sure that the saw blade is properly clamped by the left and right inserts.
5. Please check the wire brush for proper contact with the saw blade. Replace the wire brush if it is worn out.

After ending a day's work

Please remove saw chips and clean the machine with discharging the cutting fluid when work has been completed.

 Do not discharge cutting fluid while the saw blade is operating because it will cause severe injury on operator's hand.

 Be sure the saw blade is fully stop, it will be performed after working inspection.

Every month

Please apply grease to the following points:

1. Idle wheel
2. Drive wheel
3. Blade tension device

Recommended Grease:

- Shell Alvania EP Grease 2
- Mobil Mobilplex 48

Every three months

Replace the transmission oil after operating for three months (or 600 hours).

Recommended Grease:

- Shell Alvania EP Grease 2
- Mobil Mobilplex 48 (600W Cylinder oil)

Every six months

1.Clean the filter of the cutting fluid.

2.Replace the transmission oil for every half of a year(or 1200 hours).

Check the sight gauge to ascertain the transmission level.

Recommended TRANSMISSION OIL

- Omala oil HD220
- Mobil comp 632 600W Cylinder oil

3.Replace the hydraulic oil.

Recommended HYDRAULIC OIL

- Shell Tellus 27
- Mobil DTE OIL light Hydraulic28

STORAGE CONDITIONS

Generally, this machine will be stored on the following conditions in future:

(1) Turn off the power.

(2) Ambient temperature: 5℃ ~ 40℃

(3) Relative humidity: 30%~95% (without condensation)

(4) Atmosphere: use a plastic canvas to cover machine to avoid excessive dust, acid fume, corrosive gases and salt.

(5) Avoid exposing to direct sunlight or heat rays which can change the environmental temperature.

(6) Avoid exposing to abnormal vibration.

(7) Must be connected to earth.

TERMINATING THE USE OF THE MACHINE

Waste disposal:

When your machine can not work anymore, you should leak out the oil from machine body. Please storage the oil in safe place with bottom. Ask a environment specialist to handle the oil. It can avoid soil pollution. The oil list in machine:

- Hydraulic oil
- Cutting fluid
- Drive wheel gear oil

OIL RECOMMENDATION FOR MAINTENANCE

Item		Method	Revolution	Suggest oil
Dovetail guide		Keep grease covered. Antirust.	Daily	Shell R2
Roller bearing		Sweep clean and oil with lubricant.	Daily	SEA #10
Bed roller / surface		Sweep clean and oil with lubricant.	Daily	SEA #10
Nipples of bearing		Use grease gun, but not excess.	Monthly	Shell R2
Blade tension device		Use grease gun, but not excess.	Monthly	Shell Alvania EP Grease 2, Mobil Mobilplex 48
Reducer		Inspect once a week. Change oil of 600 hours of using. Change it every year.	Regularly	Omala oil HD220 Mobil Gear 630
Hydraulic system		Inspect half a year. Change oil every year.	Regularly	Shell Tellus 32 Mobil DTE oil Light Hydraulic 24
Bearing	Inserts	Oil with lubricant, but not excess.	Daily	Shell R2
	Band wheel	Oil with lubricant, but not excess.	Weekly	
	Cylinder	Oil with lubricant, but not excess.	6 Monthly	
	Wire brush	Oil with lubricant, but not excess.	6 Monthly	

1. Turn off the stop circuit breaker switch before servicing the machine.

2. Then post a sign to inform people that the machine is under maintenance.

3. Drain all of the cutting fluid and oil off and carefully treat them to avoid pollution.

Section 9

TROUBLESHOOTING

INTRODUCTION

All the machines manufactured by COSEN pass a 72 hours continuously running test before shipping out and COSEN is responsible for the after sales service problems during the warranty period if the machines are used normally. However, there still exist the some unpredictable problems which may disable the machine from operating.

Generally speaking, the system troubles in this machine model can be classified into three types, namely GENERAL TROUBLES, MOTOR TROUBLES and BLADE TROUBLES. Although you may have other troubles which can not be recognized in advance, such as malfunctions due to the limited life-span of mechanical, electric or hydraulic parts of the machine.

COSEN has accumulated enough experiences and technical data to handle all of the regular system troubles. Meanwhile, the engineering department of COSEN had been continuously improving the machines to prevent all possible troubles.

It is hoped that you will give COSEN your maintenance experience and ideas so that both sides can achieve the best performance.

PRECAUTIONS

When an abnormality occurs in the machine during operation, you can do it yourself safely. If you have to stop machine motion immediately for parts exchanging, you should do so according to the following procedures:

- Press HYDRAULIC MOTOR OFF button or EMERGENCY STOP button.
- Open the electrical enclosure door.
- Turn off breaker.

BEFORE ANY ADJUSTMENT OR MAINTENANCE OF THE MACHINE, PLEASE MAKE SURE TO TURN OFF THE MACHINE AND DISCONNECT THE POWER SUPPLY.

GENERAL TROUBLES AND SOLUTIONS

DISCONNECT POWER CORD TO MOTOR BEFORE ATTEMPTING ANY REPAIR OR INSPECTION.

TROUBLE	PROBABLE CAUSE	SUGGESTED REMEDY
Motor stalls	Excessive belt tension	Adjust belt tension so that belt does not slip on drive pulley while cutting (1/2“ Min. deflection of belt under moderate pressure.)
	Excessive head pressure	Reduce head pressure. Refer to Operating Instructions “Adjusting Feed”.
	Excessive blade speed	Refer to Operating Instructions “Speed Selection”.
	Improper blade selection	Refer to Operating Instructions “Blade Selection”.
Cannot make square cut	Dull blade	Replace blade.
	Guide rollers not adjusted properly	Refer to Adjustments.
	Rear vise jaw not adjusted properly	Set fixed vise jaw 90° to blade.
	Excessive head pressure	Reduce head pressure. Refer to operating instructions “Adjusting Feed.”
Increased cutting time	Dull blade	Replace blade
	Insufficient head pressure	Increase head pressure. Refer to Operating Instructions “Adjusting Feed.”
	Reduce blade speed	Refer to Operating Instructions “Speed Selection.”
Will not cut	Motor running in wrong direction	Reverse rotation of motor. (Motor rotation C.C.W. pulley end.)
	Blade teeth pointing in wrong direction	Remove blade, turn blade inside out. Re-install blade. (Teeth must point in direction of travel.)
	Hardened material	Use special alloy blades. (Consult your industrial distributor for recommendation on type of blade required.)

MINOR TROUBLES & SOLUTIONS

TROUBLE	PROBABLE CAUSE	SUGGESTED REMEDY
Saw blade motor does not run even though blade drive button is pressed.	Overload relay activated	Reset
	Saw blade is not at forward limit position.	Press SAW FRAME FORWARD button

MOTOR TROUBLES & SOLUTIONS

TROUBLE	PROBABLE CAUSE	SUGGESTED REMEDY
Motor will not start	Magnetic switch open, or protector open.	Reset protector by pushing red button (inside electric box.)
	Low voltage	Check power line for proper voltage.
	Open circuit in motor or loose connections.	Inspect all lead terminations on motor for loose or open connections.
Motor will not start, fuse or circuit breakers “blow”.	Short circuit in line, cord or plug.	Inspect line, cord and plug for damaged insulation and shorted wire.
	Short circuit in motor or loose connections	Inspect all lead terminations on motor for loose or shorted terminals or worn insulation on wires.
	Incorrect fuses or circuit breakers in power line.	Install correct fuses or circuit breakers.
Motor fail to develop full power. (Power output of motor decreases rapidly with decrease in voltage at motor terminals.)	Power line overloaded with lights, appliances and other motors.	Reduce the load on the power line.
	Undersize wires or circuit too long.	Increase wire sizes, or reduce length of wiring
	General overloading of power company‘s facilities.	Request a voltage check from the power company
Motor overheat	Motor overloaded.	Reduce load on motor
	Air circulation through the motor restricted.	Clean out motor to provide normal air circulation through motor.
Motor stalls (Resulting in blown fuses or tripped circuit breakers)	Short circuit in motor or loose connections.	Inspect terminals in motor for loose or shorted terminals or worn insulation on lead wires.
	Low voltage	Correct the low line voltage conditions.
	Incorrect fuses or circuit breakers in power line.	Install correct fuses circuit breakers.
	Motor overloaded	Reduce motor load.
Frequent opening of fuses or circuit breakers.	Motor overloaded	Reduce motor load
	Incorrect fuses or circuit breakers.	Install correct fuses or circuit breakers.

BLADE TROUBLES AND SOLUTIONS

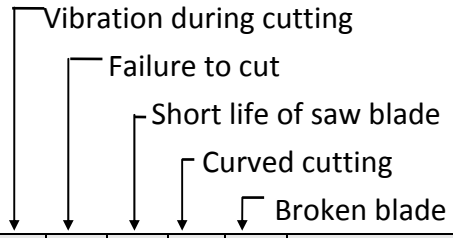
DISCONNECT POWER CORD TO MOTOR BEFORE ATTEMPTING ANY REPAIR OR INSPECTION.

TROUBLE	PROBABLE CAUSE	SUGGESTED REMEDY
Teeth strippage	Too few teeth per inch	Use finer tooth blade
	Loading of gullets	Use coarse tooth blade or cutting lubricant.
	Excessive feed	Decrease feed
	Work not secured in vise	Clamp material securely
Blade breakage	Teeth too coarse	Use a finer tooth blade
	Misalignment of guides	Adjust saw guides
	Dry cutting	Use cutting lubricant
	Excessive speed	Lower speed. See Operating Instructions “Speed selection.”
	Excessive speed	Reduce feed pressure. Refer to Operating Instructions “Adjusting Feed.”
	Excessive tension	Tension blade to prevent slippage on drive wheel while cutting.
	Wheels out of line	Adjust wheels
Blade line Run-out or Run-in	Guides out of line	For a straight and true cut, realign guides, check bearings for wear.
	Excessive pressure	Conservative pressure assures long blade life and clean straight cuts.
	Support of blade insufficient	Move saw guides as close to work as possible.
	Material not properly secured in vise	Clamp material in vise, level and securely.
	Blade tension improper	Loosen or tighten tension on blade.
Blade twisting	Blade not in line with guide bearings	Check bearings for wear and alignment.
	Excessive blade pressure	Decrease pressure and blade tension
	Blade binding in cut	Decrease feed pressure
Premature tooth wear	Dry cutting	Use lubricant on all materials, except cast iron
	Blade too coarse	Use finer tooth blade
	Not enough feed	Increase feed so that blade does not ride in cut
	Excessive speed	Decrease speed

SAWING PROBLEMS AND SOLUTIONS

Other than this manual, the manufacturer also provides some related technical documents listed as follows:

Sawing Problems and Solutions



Vibration during cutting	Failure to cut	Short life of saw blade	Curved cutting	Broken blade		
✓	✓	✓	✓	✓	**Use of blade with incorrect pitch**	**Use blade with correct pitch suited to workpiece width**
✓	✓	✓	✓	✓	**Failure to break-in saw blade**	**Perform break-in operation**
✓	✓	✓			**Excessive saw blade speed**	**Reduce speed**
			✓	✓	**Insufficient saw blade speed**	**Increase speed**
✓		✓	✓	✓	**Excessive saw head descending speed**	**Reduce speed**
✓		✓	✓		**Insufficient saw head descending speed**	**Increase speed**
		✓	✓		**Insufficient saw blade tension**	**Increase tension**
✓		✓	✓	✓	**Wire brush improperly positioned**	**Relocate**
✓		✓	✓		**Blade improperly clamped by insert**	**Check and correct**
✓	✓	✓	✓	✓	**Improperly clamped workpiece**	**Check and correct**
	✓	✓	✓		**Excessively hard material surface**	**Soften material surface**
		✓	✓	✓	**Excessive cutting rate**	**Reduce cutting rate**
	✓	✓			**Non-annealed workpiece**	**Replace with suitable workpiece**
✓		✓	✓	✓	**Insufficient or lean cutting fluid**	**Add fluid or replace**
✓		✓	✓	✓	**Vibration near machine**	**Relocate machine**
		✓	✓		**Non-water soluble cutting fluid used**	**Replace**
✓		✓	✓		**Air in cylinder**	**Bleed air**
✓		✓		✓	**Broken back-up roller**	**Replace**
✓	✓	✓	✓	✓	**Use of non-specified saw blade**	**Replace**
✓	✓	✓	✓	✓	**Fluctuation of line voltage**	**Stabilize**
✓		✓	✓		**Adjustable blade guide too far from workpiece**	**Bring blade guide close to workpiece**
✓		✓	✓	✓	**Loose blade guide**	**Tighten**
		✓		✓	**Blue or purple saw chips**	**Reduce cutting rate**
✓		✓		✓	**Accumulation of chips at inserts**	**Clean**
	✓				**Reverse positioning of blade on machine**	**Reinstall**
✓		✓	✓		**Workpieces are not bundled properly**	**Re-bundle**
✓		✓		✓	**Back edge of blade touching wheel flange**	**Adjust wheel to obtain clearance**
✓	✓	✓			**Workpiece of insufficient diameter**	**Use other machine, suited for diameter of workpiece Replace**
	✓	✓	✓		**Saw blade teeth worn**	**Replace**

RE-ADJUSTING THE ROLLER TABLE

If the feeding table suffers the huge stroke and the alignment is effected, follow the below procedure to adjust.

TOOL, measuring

Measurement, Horizontal balance

Procedure

1. Screw or loosen the adjusting bolt to attain the horizontal balance (leveling) between the roller table and the machine frame.
2. Ensure that the machine frame is not struck by the loaded material on the feeding table.
3. Check the leveling by the measuring tool.
4. After finished the adjusting, fix the roller table.

 **If the feeding table and the machine frame are not positioned under the horizontal balance, the loaded material may be going up gradually and affect the cutting effect.**

PARTS

SPARE PARTS RECOMMENDATIONS

PART LIST

SPARE PARTS RECOMMENDATIONS

The following table lists the common spare parts we suggest you purchase in advance:

Part Name	Part Name
Saw blade	Filter
Wire brush	Steel plates
Carbide inserts	Rollers
Bearings	Belt
Chain	Duster seal
Asbestos	Washer

1. SAW BOW

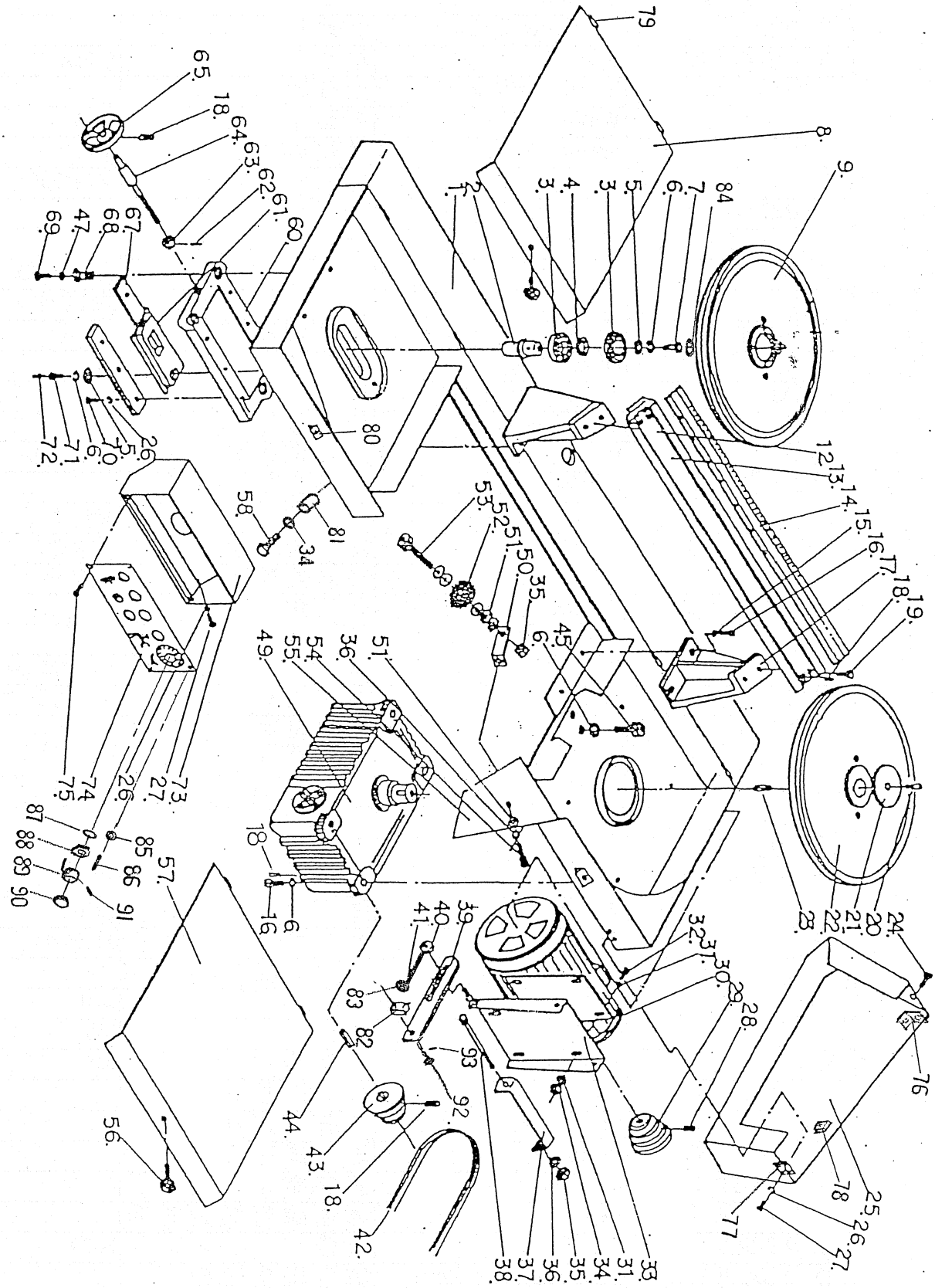

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CHART 1 SAW BOW

NO.	PART NO.	PART NAME	PART NAMEI N CHINESE	PART SPEC.	Q'TY
1	SYM-5001	Saw bow	弓鋸頭		1
2	SJY-1114	Idle wheel shaft	上輪軸		1
3	PP-14130	Bearing	軸承	6205Z	2
4	MAE-2025	Bearing washer	上輪軸墊圈		1
5		Washer	平面華司	M12	2
6		Spring washer	彈簧華司	M12	12
7		Bolt	外六角螺絲	M12*20L	1
8	MJA-2014	Wheel cover (left)	上下輪箱蓋		1
9	MJA-2017A	Idle wheel	上輪		1
10				DELETED	
11				DELETED	
12	SYM-5003	Bracket (left)	左鋸臂滑板固定座		1
13	SJY-1105	Dovetail guide	鋸臂滑板		1
14	MJA-2044	Gauge plate (ruler)	銘板	CS-5	1
15		Spring washer	彈簧華司	M12	4
16		Bolt	內六角螺絲	M12*30L	8
17	SYM-5004	Bracket (right)	右鋸臂滑板固定座		1
18		Set screw	止付螺絲	M8*20L	10
19		Screw	內六角螺絲	M10*30L	4
20		Screw	內六角螺絲	5/16*3/4	1
21	MJA-2013	Washer (B)	下輪軸蓋		1
22	SJY-1118	Drive wheel	下輪		1
23		Key	鍵	10*8*20 mm	1
24	PP-53021	Screw	梅花螺絲	M6*12L	1
25	MJA-2008C	Pulley cover	皮帶輪護蓋		1
26		Spring washer	彈簧華司	M6	14
27		Screw	丸頭螺絲	M6*12L	8
28		Set screw	止付螺絲	M8*10L	1
29	SJY-1119	Motor pulley	馬達普利		1
30	PP-31041	Motor	馬達	2HP,4P	1
31		Washer	彈簧華司	M10	8
32		Screw	外六角螺絲	M10*25L	5
33	MJA-2067	Motor mounting plat	馬達底板		1
34		Nut	螺帽	M10	6
35		Nut	螺帽	M8	2
36		Spring washer	彈簧華司	M8	2
37	MJA-2069A	Bracket	馬達調整架		1
38	MJA-2072	Lock screw	馬達架螺絲		1
39	MJA-2068	Adjusting plate	馬達調整板		1
40	SJY-1127	Lock nut	固定螺母		1
41	SJY-1126	Lever	馬達調整固定把手		1
42	PP-56100	V Belt	皮帶	A-39	1
43	MJA-2011C	Transmission pulley	減速機皮帶輪		1
44		Key	鍵	7*7*25 mm	1
45		Bolt	內六角螺絲	M12*40L	6
46				DELETED	

CHART 1 SAW BOW

NO.	PART NO.	PART NAME	PART NAMEI N CHINESE	PART SPEC.	Q'TY
47		Spring washer	彈簧華司	M10	3
48				DEL	
49	PP-16022	Gear box	減速機	70#	1
50	SJY-1136	Bracket	鋼刷固定板		1
51		Washer	平面華司	M8	6
52	PP-58002	Wire brush	鋼刷	90*8 mm #0.3	1
53		Screw	有頭螺絲	M8*30L	1
54		Screw	有頭螺絲	M8*12L	1
55	MAM-2041	Wire brush cover	鋼刷護蓋		1
56	PP-53030	Knob	梅花螺絲	1/4*3/4"	2
57	MJA-2014	Wheel cover (right)	上下輪箱蓋		1
58		Screw	外六角螺絲	M10*25L	1
59				DELETED	
60	SJY-11029	Tension plate	張力調整滑座		1
61	SJY-11029	Adjusting slide	張力調整板		1
62		Spring pin	彈簧銷	φ 3*25L	1
63	MJA-2024	Collar	張力調整固定圈		1
64	SJY-1115	Blade tensioning scr	張力調整螺桿		1
65	SJY-1103	Hand wheel	手輪		1
66				DELETED	
67	SJY-11029	Guide plate	壓條(半)		2
68	SJY-1104	Adjusting bolt	張力調整螺絲	M16*40L	3
69		Screw	外六角螺絲	M10*50L	3
70		Screw	外六角螺絲	M6*20L	6
71	SJY-1150	Nipple	關節油嘴		1
72		Nipple	油嘴	1/16"	1
73	MJA-4005-CE	Control box	控制箱		1
74	MJA-4005C	Control panel	控制面板		1
75		Screw	圓頭螺絲	M4*5L	6
76	KM-2012	Bracket	輪箱蓋固定板		1
77	MAE-2027B	Hinge	鉸鏈		1
78	SJY-1120	Bracket	護蓋固定板		1
79	MJA-1004	Pin	箱蓋栓		4
80	MJA-2054	Bracket	輪蓋固定板		2
81	SJY-1128	Bracket	鋸弓定位塊		1
82	MJA-2070	Adjusting plate	馬達調整塊		1
83	PP-52040	Plastic ball	塑膠球	3/8"	1
84		Snap ring	扣環	R52	2
85		Nut	螺母	M4	1
86	SJY-2108	Pointer rod	指針擋桿		1
87		Washer	平面華司	φ 16	1
88	MAJ-4010	Nut	六角螺帽		1
89	MAJ-4007	Pointer & Bracket	指針及座		1
90	PP-21010	Knob	旋鈕		1
91		Screw	丸頭螺絲	3/16*3/8"	1
92	MJA-2073	Adjusing nut	調整螺母		1

CHART 1 SAW BOW

NO.	PART NO.	PART NAME	PART NAMEI N CHINESE	PART SPEC.	Q'TY
93		Pin	開口梢	5/32*1 1/4	1
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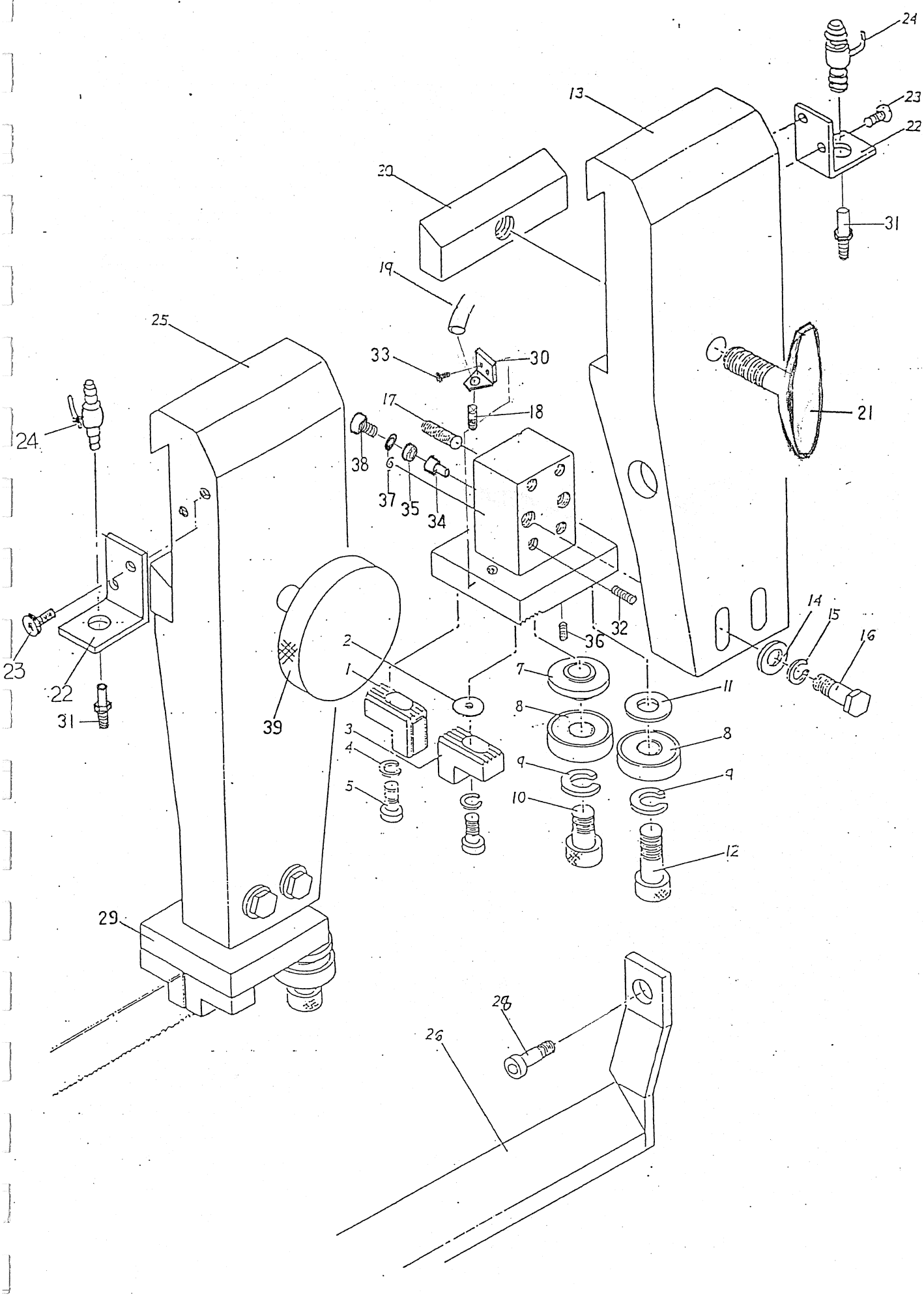
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CHART 2 BLADE GUADE ARMS

NO.	PART NO.	PART NAME	PART NAMEI N CHINESE	PART SPEC.	Q'TY
1	MAB-6006	Tungsten carbide blade guide	鋸片固定塊		2
2				DELETED	
3	MAB-6006	Tungsten carbide blade guide	鋸片固定塊		2
4		Spring washer	彈簧華司	M16	4
5		Bolt	內六角螺絲	M6*25L	4
6	SJY-1111	Guide seat	右導輪座		1
7	MAB-6008	Washer	華司		2
8		Bearing	軸承	6202 ZZ	4
9		Spring washer	彈簧華司	M10	4
10		Bolt	內六角螺絲	M10*38L	2
11		Washer	華司	M10	2
12		Bolt	內六角螺絲	M10*25L	2
13	SYM-8006	Guide arm (right)	右鋸臂		1
14		Washer	華司	M8	4
15		Spring washer	彈簧華司	M8	4
16		Bolt	內六角螺絲	M8*32L	4
17		Screw	止付螺絲	M6*12L	4
18	MAB-6014	Fitting	水管接頭固定塊		2
19		Hose	水管	1/4*3000L	2
20	MJA-2032	Clamping block	鋸臂固定塊		2
21	MJA-2031	Knob	鋸臂把手		1
22	MJA-2041	Bracket	水龍頭座板		2
23		Screw	有頭螺絲	M5*10L	4
24	PP-43132	Coolant valve	開關閥	1/8"	2
25	SYM-8005	Guide arm (left)	左鋸臂		1
26	MJA-2038	Blade guard	鋸臂護蓋		1
27				DELETED	
28		Screw	內六角螺絲	M6*10L	1
29	SJY-1110	Guide seat (left)	左導輪座		1
30	SJY-1134	Bracket	水龍頭固定板		2
31	MJA-2043	Fitting	水管接頭		2
32		Set screw	止付螺絲	M8*16L	2
33		Screw	內六角螺絲	M5*10L	4
34	SJY-1112	Bearing shaft	下壓固定軸		2
35	PP-14211	Bearing	軸承	608 VV	2
36		Set screw	止付螺絲	M6*6L	2
37		Washer	平面華司	M4	2
38		Screw	丸頭螺絲	M4*6L	2
39		Bolt	外六角螺絲	1/2-20UNC*2 1/4	1
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3. BASE ASSEMBLY AND BED

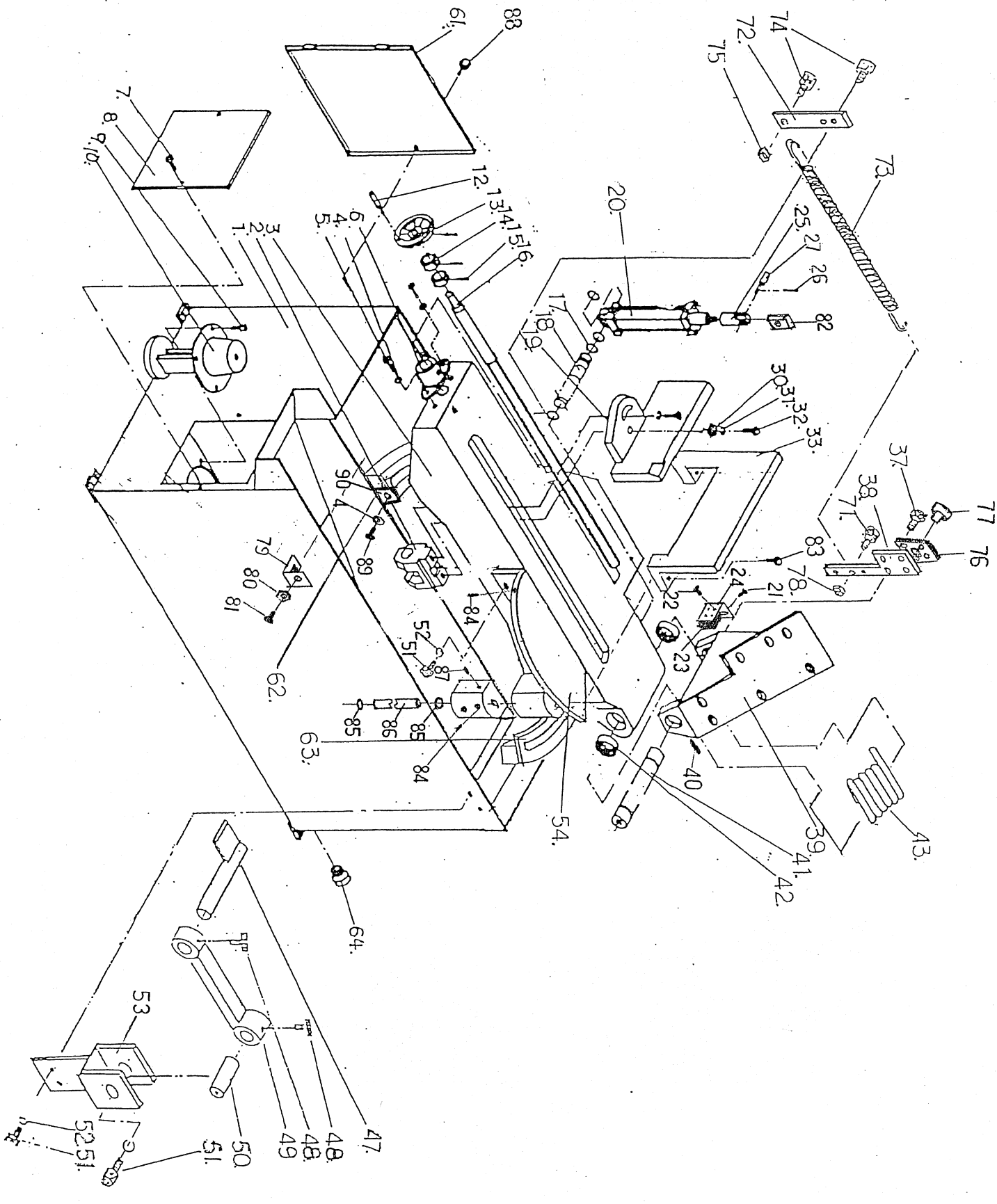

CHART 3 BASE ASSEMBLY AND BED

NO.	PART NO.	PART NAME	PART NAMEI N CHINESE	PART SPEC.	Q'TY
1	MAM-1001-CE	Base	底座		1
2	SJY-1149B	Lead screw nut	導桿螺母		1
3	SYM-6017A	Bed	床面		1
4		Spring washer	彈簧華司	M10	4
5		Bolt	外六角螺絲	M10*25L	2
6	MJA-2012A	Screw sleeve	導螺桿座		1
7		Screw	外六角螺絲	M6*12L	6
8		Pump cover	幫浦護蓋		1
9		Screw	外六角螺絲	M6*20L	4
10	PP-32041	Pump	浸水幫浦	1/8HP,3φ,150L	1
11					
12	PP-52030	Handle	手輪柄	3/8"	1
13	PP-52020	Hand wheel	手輪	6", 20φ	1
14	MJA-1013	Collar	導輪桿固定圈		1
15		Spring pin	彈簧銷	φ 6*30L	1
16	MJA-1014	Vise lead screw	導輪桿		1
17		Snap ring	扣環	A25	1
18	MAM-2032	Cylinder pivot	油壓缸活動軸		1
19	SJY-1151	Movable vise jaw	活動虎鉗		1
20	MJA-1035-CE	Cylinder	油壓缸		1
21		Screw	丸頭螺絲	M6*12L	2
22		Screw	丸頭螺絲	M5*25L	2
23	PP-90010	Limit switch	限動開關	D4MC-5000	1
24	MJA-3102-CE	Switch bracket	限動開關座		1
25				DELETED	
26		Cotter pin	開口銷	5/32*1 1/4"	1
27	MAE-1032	Hinge shaft	油壓缸短插梢		1
28				DELETED	
29	MJA-1024	Depth bar	定寸桿	DELETED	1
30		Washer	平面華司	M12	3
31		Spring washer	彈簧華司	M12	4
32		Bolt	外六角螺絲	M12*48L	4
33	SYM-6002	Fixed vise jaw	固定虎鉗		1
34				DELETED	
35				DELETED	
36				DELETED	
37		Screw	皿頭內六角螺絲	M5*12L	4
38	MAE-5010	Plate	關節座蓋板		1
39	SYM-5002B	Saw bow bracket	關節座		1
40		Set screw	止付螺絲	M6*12L	2
41	SYM-6007	Pivot	關節軸		1
42	PP-13190	Needle bearing	乾式軸承	3015	2
43	MJM-5006B	Spring	回程彈簧		1
44				DELETED	
45				DELETED	
46				DELETED	

CHART 3 BASE ASSEMBLY AND BED

NO.	PART NO.	PART NAME	PART NAMEI N CHINESE	PART SPEC.	Q'TY
47	MBR-9037	Stopper	定寸擋桿		1
48	PP-53009	Lock bolt	梅花螺絲	M10*30L	2
49	MBR-9036	Stopper bracket	定寸滑座		1
50	SYM-6011	Pivot	定寸轉軸		1
51		Screw	外六角螺絲	M8*20L	6
52		Spring washer	彈簧華司	M8	6
53	MAM-1010		定寸座		1
54	MAM-1011		托架		1
55				DELETED	
56				DELETED	
57				DELETED	
58				DELETED	
59				DELETED	
60				DELETED	
61				DELETED	
62	SYM-6008	Turning slide	旋轉軌道 A		1
63	SYM-6009	Turning slide	旋轉軌道 B		1
64		Plug	塞頭	PT 1/2	1
65				DELETED	
66				DELETED	
67				DELETED	
68				DELETED	
69				DELETED	
70				DELETED	
71		Screw	內六角螺絲	M8*20L	1
72	MAE-1033	Bracket	彈簧調整板		1
73	MAE-1039B	Spring	彈簧		1
74	MAM-1034	Bracket	調整板座		1
75		Screw	內六角螺絲	M8*25L	1
76	MLA-1010	Washer	耐磨墊圈		2
77	SYM-5008	Plate	關節墊圈壓板		1
78		Nut	六角螺母	M8	1
79	SYM-6019	Bracket	定位板		2
80		Nut	螺母	M10	2
81		Screw	外六角螺絲	M10*40L	2
82	MJA-1028B	Bracket	油壓缸固定耳		1
83	SYM-6020	Screw	銷螺絲		1
84		Set screw	止付螺絲	M8*16	4
85	PP-13170	Bearing	乾式軸承	2820	2
86	SYM-6013	Rotate shaft	旋轉軸		1
87	SYM-6012	Bracket	旋轉軸固定座		1
88				DELETED	
89		Screw	外六角螺絲	M10*20	2
90	SYM-6014	Fixed nut	固定螺母		2
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Section 11

Warranty

Warranty

New machines are warranted to be free from defects in workmanship and material for a period of one (1) year from the date of shipment by Seller. The warranty period is based on normal usage of two thousand eighty hours (2080) per year and is reduced proportionately for any excess usage. Products, which under normal operating conditions in Buyer's plant are defective in workmanship or material, will be repaired or replaced at the option of Seller.

This warranty does not cover shipping freight charges for either the return of the defective part or for the shipping of the replacement or repaired part.

Seller will have no obligation to repair or replace perishable parts, or materials or parts damaged by misuse, negligence or failure of Buyer to provide appropriate maintenance and service as stated in the operator's manual or industry standard and normally acceptable practices.

This warranty does not apply if the machine has been altered or modified without our prior written consent.

In the case of components or units purchased by Seller including work holding devices, tool holders, motors and controls, the warranty shall not exceed that received by Seller from the supplier of such components or units.

Seller will not assume responsibility for products or components returned to Seller without prior consent or for unauthorized repairs to its products, even though defective.

Electrical Equipment: The warranty available for all electrical components to the Buyer will be voided if the voltage supplied to the machine is found to be outside the stated voltage of the machine by +/- 10% and/or grounded at machine.

Accessories Supplied with Manufacturer's Equipment: The warranties available to the Buyer are those extended by the accessory manufacturer, if any, to the extent they are in force and effect. The ACCESSORY MANUFACTURER'S WARRANTY, if any, is exclusive and is in lieu of all other warranties whether written, oral or implied.

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