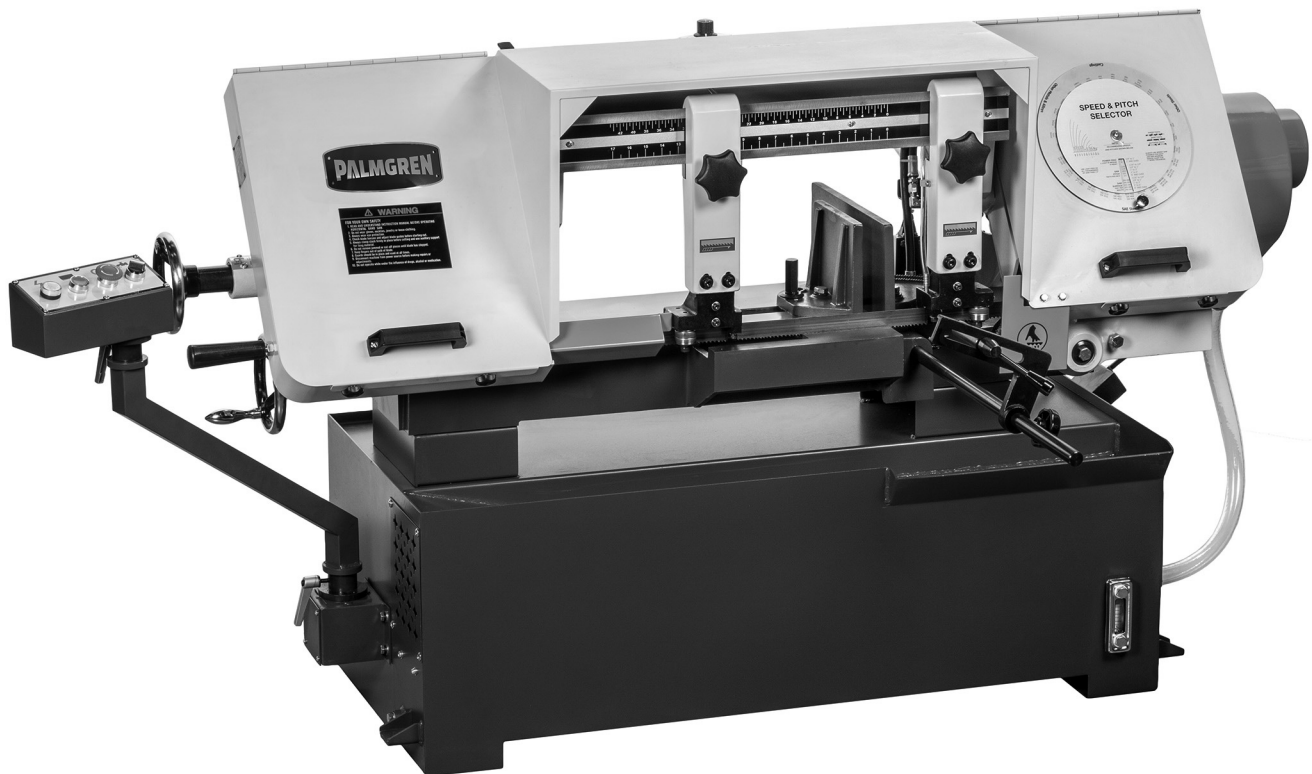


PALMGREN®

10" × 16" VARIABLE SPEED, SINGLE-PHASE BAND SAW



Read carefully and follow all safety rules and operating instructions before first use of this product.

GETTING STARTED

SAVE THIS MANUAL

You will need the manual for the safety warnings and precautions, assembly instructions, operating and maintenance procedures, parts list and diagram. Keep your invoice with this manual. Write the invoice number on the inside of the front cover. Keep this manual and invoice in a safe and dry place for future reference.

STRUCTURAL REQUIREMENTS

Make sure all supporting structures and load attaching devices are strong enough to hold your intended loads. If in doubt, consult a qualified structural engineer.

ELECTRICAL REQUIREMENTS

The power supply to Palmgren Model 9683294 10" x 16" Band Saw needs to be 230V AC, 1-phase, 12.4A, 60 Hz.

TOOLS NEEDED

Standard professional mechanic's hand tool set (socket set, pliers and spirit level, etc.).

UNPACKING

When unpacking, check to make sure all parts listed below are included. If any parts are missing or broken, please contact your local retailer.

IMPORTANT: Many unpainted steel surfaces have been coated with a protectant. To ensure proper fit and operation, remove coating. Coating can be easily removed with mild solvents, such as mineral spirits, and a soft cloth. Avoid getting solution on paint or any of the rubber/plastic parts. Solvents may deteriorate these finishes. Use soap and water on paint, plastic or rubber components. After cleaning, cover all exposed surfaces with a light coating of oil.

CAUTION: Never use highly volatile solvents. Non-flammable solvents are recommended to avoid possible fire hazard.

CONTENTS

- Complete Band Saw
- Depth Stop Rod (for assembly see page 4)
- Operating Instructions
- Chip Tray

UNPACK:

Remove all the over packing materials, but leave unit attached to its pallet. Do not discard packing materials until after the machine has been inspected for damage and completeness. Locate loose parts and set aside.

INSPECT:

After unpacking the unit, carefully inspect for any damage that may have occurred during transit. Check for loose, missing or damaged parts. Shipping damage claims must be filed with the carrier.

This machine and its accessories should be visually inspected before use, in addition to regular periodic maintenance inspections. Be sure that the voltage labeled on the unit matches your power supply.

SAFETY RULES

WARNING: For your own safety, read operating instructions manual before operating tool.

WARNING: Always disconnect the machine from its power source before changing blades or carrying out any maintenance procedure, even in the case of irregular machine operation.

PROPOSITION 65 WARNING: Some dust created by using power tools contain chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Some examples of these chemicals are:

- Lead from lead-based paints
- Crystalline silica from bricks and cement and other masonry products.
- Arsenic and chromium from chemically treated lumber.

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals; work in a well ventilated area and work with approved safety equipment. Always wear **OSHA/NIOSH** approved, properly fitting face mask or respirator when using such tools

WARNING: Always follow proper operating procedures as defined in this manual even if you are familiar with the use of this or similar tools. Remember that being careless for even a fraction of a second can result in severe personal injury.

- Dress properly. Do not wear loose clothing, shirts with sleeves that are too long, gloves that are too big, jewelry or chains as they can be caught in moving parts. Protective, electrically non-conductive clothes and non-skid footwear are recommended when working. Wear restrictive hair covering to contain long hair.
- Use eye and ear protection. Always wear ANSI approved impact safety goggles.
- Stay alert. Watch what you are doing, use common sense. Do not operate any tool when you are tired.
- Guard against electrical shock. Prevent body contact with grounded surface such as pipes, radiators, ranges and refrigerator enclosures.
- Do not operate tool if under the influence of alcohol or drugs. Read warning labels on prescriptions to determine if your judgement or reflexes will be impaired. If there is any doubt, do not operate the tool.
- Give your work undivided attention. Looking around, carrying on a conversation and "horse-play" are careless acts that can result in serious injury.

PREPARE WORK AREA FOR JOB

- Keep work area clean and free of equipment, tools or other objects. Cluttered areas invite injuries. Keep the floor around the machine clean and free of scrap material, oil and grease.
- Observe work area conditions. Do not use machines or power tools in damp or wet locations. Do not expose to rain.
- Keep work areas well-lit. Do not use electrically powered tools in the presence of flammable gases or liquids.
- Keep children away. Children must never be allowed in the work area. Do not let them handle machines, tools or extension cords.
- All internal operations, maintenance, or repairs must be performed in a well-lit area
- Keep visitors a safe distance from the work area.

SAFETY RULES (CONTINUED)

TOOL SHOULD BE MAINTAINED

- Maintain this machine with care. Use a clean sharp cutting blade for better and safer performance. Follow instructions for lubricating and changing accessories. Inspect the power supply cables periodically and if damaged, have them repaired by an authorized technician.
- When servicing, use only identical replacement parts. Use of any other parts will void the warranty. Only use accessories intended for use with this tool. Approved accessories are available from your local retailer.
- The machine must be completely disconnected from its power source before any maintenance or service is performed. Follow OSHA lock-out, tag-out procedures to prevent accidental machine starts.
- Immediately replace any damaged or obscured warning labels that are attached to the machine.
- For your safety, service and maintenance should be performed by a qualified technician.
- Band saw blades are sharp. Use suitable gloves when changing the blade or other adjustments that involve the blade.
- Use recommended accessories; improper accessories may be hazardous.

KNOW HOW TO USE TOOL

- The blade must not move when the saw bow is in a suspended mode (or raised).
- Only the blade section used for cutting can be exposed. Use the blade guides to adjust the blade guards.
- Never use the machine without its guards in place and working properly. Keep machine guards in place at all times when the machine is in use. If removed for maintenance purposes, use extreme caution and replace the guards immediately.
- Never put your hands or arms near the cutting area while the machine is operating.
- Perform only one operation at a time.
- Never have several objects in your hands at the same time.
- Keep your hands as clean as possible.
- Do not force tool. It will do the job better and more safely at the rate for which it was intended. Do not use inappropriate attachments in an attempt to exceed the tool capacity.
- Use the right tool for the job. Do not attempt to force a small tool or attachment to do the work of a large industrial tool. There are certain applications for which this tool was designed. Do not modify this tool and do not use this tool for a purpose for which it was not intended.
- Do not overreach. Keep proper footing and balance at all times. Do not reach over or across machines while in operation.
- Remove adjusting keys and wrenches. Check that keys and adjusting wrenches are removed from the tool or machine work surface before attaching it to a power supply. Make a habit of checking to see that keys and adjusting wrenches are removed before turning on the machine.

- Avoid unintentional starting. Be sure the machine is off when not in use and before attaching the machine to a power supply.
- Check for damaged parts. Before using any tool, any part that appears damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment and binding of moving parts; any broken parts or mounting pieces should be properly repaired or replaced by a qualified technician. Do not use the tool if any switch does not turn on and off properly.
- Do not over reach. Maintain a balanced stance at all times so that you do not fall or lean against blades or other moving
- Never hold the material with the saw in the horizontal position. Always use the vise and clamp it securely.
- Read and understand warnings posted on the machine.
- Always provide adequate support for long and heavy material.

DANGER: Failure to comply with all of these warnings may cause serious injury.

WARNING: The warnings, cautions and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

SPECIFICATIONS

MODEL 9683294 10" x 16"

VARIABLE SPEED 1-PHASE BAND SAW

HP	2 HP
Voltage	230V
Amps	12.4 A
Phase	1 PH
RPM	1720
Drive	Variable
Blade Speed	98.5 ~ 347.76
Cut Capacity (W x H)	10" x 16"
Round @ 90°	10"
Round @ 45°	10"
Rectangle @ 90°	7" x 16"
Rectangle @ 45°	10" x 12"
Blade Specs	1" x .035" x 135"
Vise Range	0° to 45°
Low Voltage Control	Yes
Coolant	Yes
Dimensions (L x W x D)	77" x 39.5" x 44.5"
Shipping Weight	706 lbs / 794 lbs

ASSEMBLY

CONTROL BOX ARM

1. The control box arm arrives loose, with only the wires keeping it attached.
2. Match the screw holes on lower box on the arm to the 4 holes on the left side of the band saw, and screw the provided bolts in until the lower box does not move.

LENGTH STOP

1. Locate all length stop parts. Long rod, L-shaped bracket-handle, short rod with handle.
2. Fit the circular hole of the L-shaped bracket around the long rod.
3. Separate the short rod and its handle by unscrewing, and fit the screw section through the slot of the L-shaped bracket. Then rescrew the short rod's handle back on to the short rod's screw.
4. Match the long rod's screw to the hole just beneath the vise as shown below.



Match long rod's screw to hole just below vise.

INSTALLATION

ELECTRICAL CONNECTIONS

WARNING: Make sure unit is off and disconnected from power source before any service or maintenance being made to the machine.

WARNING: This machine must be grounded. To avoid electrocution or fire, any repairs to electrical system should be done only by a qualified electrician, using genuine replacement parts.

- The motor on this machine is designed for operation on the voltage and frequency specified. Normal loads will be handled safely on voltages not more than 10% above or below specified voltage.
- Running the unit on voltages which are not within the range may cause overheating and motor burn-out. Heavy loads require that the voltage at the motor terminals be no less than the voltage specified.
- A cable with three wires is equipped to connect your machine into the 1-phase power supply. Please connect your machine into the power supply with hand operated disconnecting device, which is in compliance with sub-clause 5.3 of EN 60204 such as no fuse breaker or plug/socket combination.
- The connection, disconnection and grounding is carried out through the plug, equipped on the machine. For the safety reason do not change this plug into any other type in any situation.
- For the protection of control device, we recommend the operator to supply a fuse with appropriate current rating, and the total length between fuse and connection terminal shall not exceed 5 feet.

- The exact power source voltage, frequency and number of phase shall be checked according to this manual and specifications.

WARNING: Do not disconnect grounding terminal before disconnecting power source.

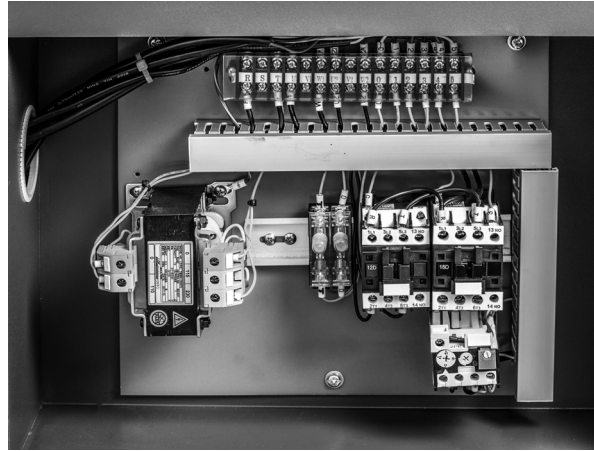


Figure 1 - Electrical wiring panel.

ELECTRICAL SAFETY

- This machine must be grounded in accordance with the National Electrical Code and local codes and ordinances. Any electrical work must be handled by a professional, qualified electrician. To help prevent and protect the user from shock, this machine must be properly grounded.
- Confirm that power supply matches power requirements of the machine before any electrical connection is made to the machine. Before connecting the machine to a power source, ensure that the switch is in the off position.

HANDLING & TRANSPORTATION OF MACHINE

WARNING: Always keep balance of the machine in transportation. Watch the gravity!

WARNING: Drive forklift slowly and carefully.

- The total weight of this machine must be ensured before handling.
- This machine cannot be handled without help of lifting tools.

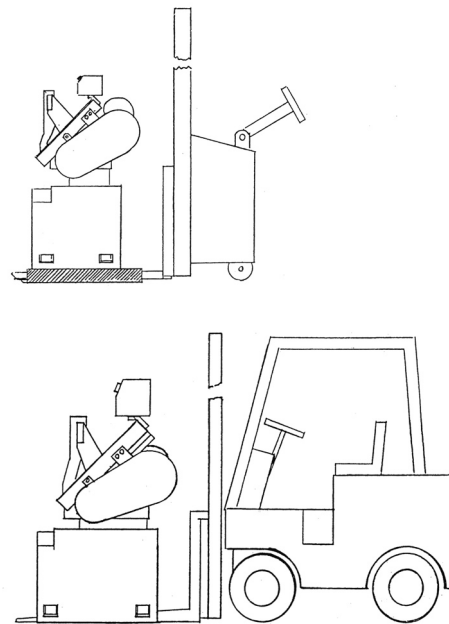


Figure 2 - Transportation methods.

OPERATION

- In the event of incorrect operation or dangerous conditions, the machine may be stopped immediately by pressing the red emergency shut off button on the operator control panel.
- The casual or voluntary opening of the flywheel covers causes a safety switch activation that automatically stops all machine functions. The flywheel cover doors **MUST** be closed tightly to deactivate the safety switches.
- Check Coolant: Low coolant level can cause foaming and high blade temperatures. Dirty or weak coolant can clog pump and cause crooked cuts, low cutting rate and permanent blade failure. Dirty coolant can cause the growth of bacteria with ensuing skin irritation.
- Keep vise slides clean and oiled.
- Clean chips from blade wheels and areas around wheels.
- Saw Guide: Keep saw guide properly adjusted. Loose guide will affect cutting accuracy.
- Saw Blade: Is saw blade sharp?
- Blade Speed: Is blade speed set correctly for workpiece material and shape?
- Check Blade Tension: Particularly after initial cuts with a new blade.

BLADE SELECTION

- Never use a blade so coarse that less than 3 consecutive teeth are engaged in the workpiece at any one time. (Too few teeth will cause teeth to strip out.)
- Never use a blade finer than required to obtain a satisfactory surface finish or satisfactory flatness. (Too many teeth engaged in the workpiece will prevent attainment of a satisfactory sawing rate; frequently causes premature blade wear; frequently produces "dished" cuts or cuts which are neither square nor parallel.)
- The chart which follows is not expected to be exactly correct for all cases. It is intended as a general guide to good sawing practice. Your blade supplier or factory application engineer should be your most reliable source of correct information for operational details of saw blades and their use.

Workpiece Size (Solid Bars)	Probable Pitch/Teeth Per Inch		
	Best	Second Best	Third Best
Less than 1" Dia. or Sq.	10		
1" Dia. or 1" Sq.	8	10	6
1 ½" Dia. or 1 ½" Sq.	8	10	6
2" Dia. or 2" Sq.	8	6	4
2 ½" Dia. or 2 ½" Sq.	6	8	4
3" Dia. or 3" Sq.	6	4	3
3 ½" Dia. or 3 ½" Sq.	6	4	3
4" Dia. or 4" Sq.	4	3	6
4 ½" Dia. or 4 ½" Sq.	4	3	6
5" Dia. or 5" Sq.	4	3	6
6" Dia. or 6" Sq.	4	3	6
7" Dia. or 7" Sq.	4	3	6
8" Dia. or 8" Sq.	4	3	6
9" Dia. or 9" Sq.	4	3	6

NOTE:

- When standard wall pipe or tubing or thin wall tubing, channel iron, angles I-beams are cut, a 10 pitch saw blade of "wave" set type is frequently used to good advantage. Fewer than 10 teeth per inch of saw will almost never be satisfactory.
- Tubing or structurals with wall thickness or web thickness of 1/2" or more can usually use an 8 or 6 pitch blade satisfactorily.
- When rectangular, solid bar is to be sawed, the work should, whenever possible, be loaded with the thinnest cross section exposed to the blade teeth. The pitch (or number of teeth per inch of blade) selected must provide engagement of at least 3 consecutive teeth in the workpiece. Should application of this rule not be possible because the thinnest cross section is too thin, the piece must be loaded with the wider dimension exposed to the saw teeth and a coarser blade selected from the listing of recommendations for round and square solid bars.

BLADE TEETH PER INCH (TPI)

Choose a blade with the proper number of teeth per inch (TPI) for the material being cut. The following factors should be considered:

- Parts with a thin and/or variable section such as profiles, pipes and plate, need closely spaced teeth, so that the number of teeth used simultaneously in cutting ranges from 3 to 6.
- Parts with large crosscut sections and solid cores need widely spaced teeth to allow for the greater volume of the shavings and better tooth penetration.
- Parts made of soft material or plastic (light alloys, mild bronze, Teflon, wood, etc. also require widely spaced teeth.
- Pieces cut in bundles require combo tooth design.

BLADE STRUCTURE

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

BLADE TYPE

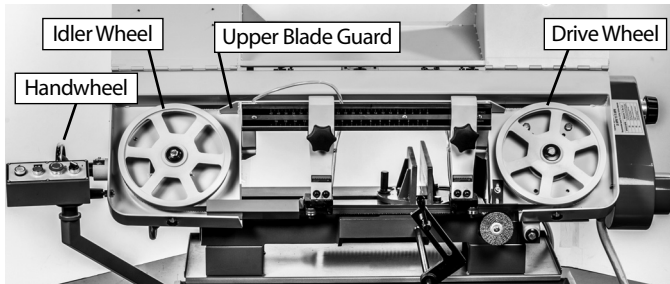
Blades differ because of their construction characteristics, such as:

- Shape and cutting angle of tooth
- Pitch
- Set shape
- Angle (rake) of the teeth

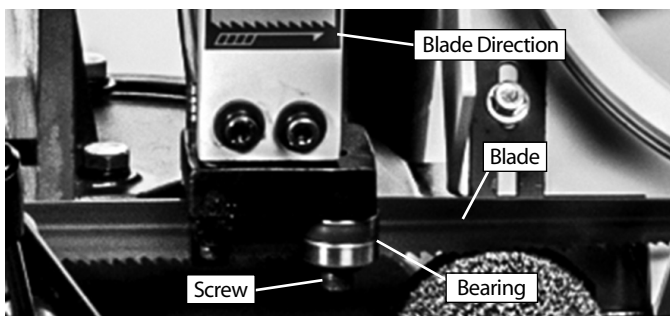
OPERATION (CONTINUED)**REMOVING AND INSTALLING THE BLADE**

When your machine was shipped, a blade was supplied and assembled to the saw. When selecting a new blade refer to page 4 and 5 for information on blade selection. The machine requires a blade 1" x 135" long.

1. Disconnect the machine from the power source.
2. Raise the saw bow about 6" and close the feed control valve by turning it clockwise as far as it will go. (Do not over-tighten.)
3. Open both wheel covers and clean the chips out of the machine.
4. Release blade tension by turning the blade tension hand wheel (Figure 3, page 6) counter-clockwise.

**Figure 3**

5. Slide left blade guide arm to the right as far as possible.
 6. Remove the blade from both wheels and out of each blade guide.
 7. Make sure the teeth of the new blade are pointing in the direction of travel. If necessary, turn the blade inside out.
 8. Position the blade on the wheels and feed through the upper blade guard (Figure 3)
 9. Put light tension on the blade and work it onto both wheels.
- IMPORTANT:** Make sure that the back of the blade is against the wheel flanges of both wheels.
10. Work the blade all the way up between the blade guide bearings with the back of the blade against the back-up bearing, as shown in Figure 4.

**Figure 4**

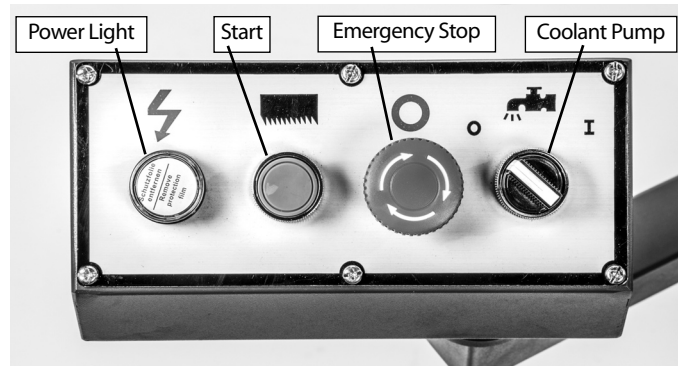
NOTE: If bearings need adjustment, refer to the section Adjusting Blade Guide Bearings, page 6.

11. When you are sure the back of the blade is against the wheel flanges of both wheels and properly inserted into the guides, finish putting tension on the blade. Proper tension is achieved when the pointer is on the left mark of the blade tension scale behind the idler wheel.
12. Jog the power "Start" and "Emergency Stop" (E-Stop) to be sure the blade is in place and tracking properly. If blade is not tracking properly refer to the section Blade Tracking Adjustment, page 6.

STARTING AND STOPPING THE MACHINE

Refer to Figure 5.

The saw bow must be in the raised position before starting the machine. The machine is started by pushing the Start button and will continue to run until the saw bow is in the down position at the end of the cut, or when the Emergency Stop button (E-stop) is pushed. Pushing the E-stop button will stop the motor at any time.

**Figure 5****BLADE TRACKING ADJUSTMENT**

The blade is tracking properly when the back of the blade is against the wheel flanges of both wheels. If the back of the blade is not against the wheel flanges, tighten or loosen screw (Figure 4), until the blade is tracking properly.

ADJUSTING FEED RATE

Refer to figure 6.

When the feed control valve is turned clockwise as far as it will go, the saw bow will not move down. By turning the feed control valve counter-clockwise, you regulate the flow of oil from the cylinder and determine the speed at which the saw bow will lower and the blade will feed through the work. Too many factors are involved to make tabulated data practical on feed rates. As a general rule, an even pressure without forcing the blade gives best results. Avoid forcing the blade at the start as this may shorten blade life and produce a bad cut. By inspecting the chips while the cut is being made will indicate whether the feed rate is correct. Fine powdery chips indicate a feed rate which is too light. The teeth are rubbing over the surface instead of cutting. Burned chips indicate excessive feed which causes the teeth to break off as the blade overheats. The ideal feed rate is indicated by chips that have a free curl and this will give the fastest cutting time and longest blade life.

**Figure 6**

OPERATION (CONTINUED)**ADJUSTING BLADE GUIDE BRACKETS**

Refer to Figure 7.

The blade guides should be set as close to the vise jaws as possible. The right blade guide bracket is not adjustable and is set at the factory to clear the right hand vise jaw. The left blade guide bracket can be moved to the left or right depending on the position of the movable vise jaw. To move the left blade guide bracket, loosen the hand knob, position blade guide bracket and tighten hand knob.

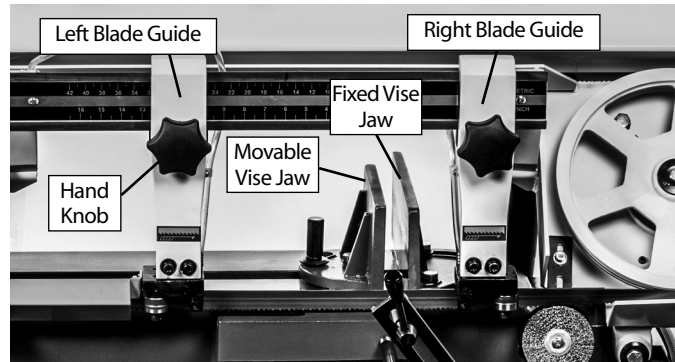


Figure 7

ADJUSTING BLADE GUIDES

If the blade is not perpendicular to the bed or not in line with the blade wheel, adjustment is necessary.

NOTE: there should be a .000 - .001" clearance between the blade and the guide bearings.

The guide bearings are adjusted using an eccentric location system. The inner guide bearings are fixed and cannot be adjusted. The outer guide bearings are mounted to eccentric shafts and can be adjusted.

1. Loosen hex nuts with a hex-head wrench.
2. Rotate the eccentric shaft to locate bearings in desired positions.
3. Maintain eccentric shaft positions and tighten hex nuts.

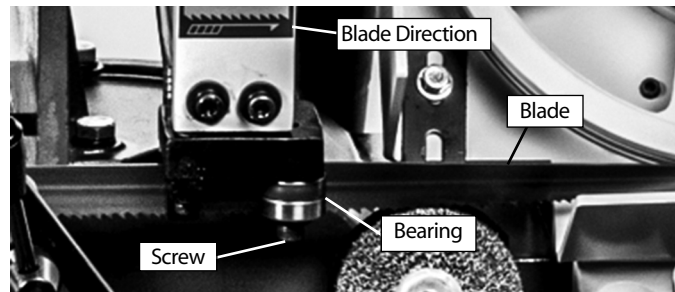


Figure 8 - View from front.



Figure 9 - View from rear.

OPERATING VISE

Refer to Figures 10 and 11.

The workpiece is placed between the vise jaws with the required amount to be cut-off extending out past the blade. To position the moveable vise jaw, simply turn vise handwheel counterclockwise 1/2 turn and move the vise jaw to the desired position. Then tighten vise by turning the handwheel clockwise.



Figure 10 - Position movable vise.

The vise can be adjusted to cut any angle from 0 degrees to 45 degrees by loosening the two handles, one on each jaw. Position the vise jaws to the desired angle and tighten the handles. It is also necessary, when angle cutting, to move the right vise jaw to the left until the workpiece and right vise jaw clear the right blade guide.



Figure 11 - Adjust angle of vise.

OPERATION (CONTINUED)**SETTING UP THE MACHINE FOR OPERATION**

Refer to Figure 12.

1. Select the proper speed and blade for the type of material you are cutting.
2. Make sure blade tension is adjusted properly.
3. Lift the saw bow up and close the feed control valve.
4. Place the stock between the vise jaws, set the stock for the desired width of cut and tighten the vise.
5. Make sure the left blade guide bracket is adjusted as close as possible to the left vise jaw.
6. Turn the feed control valve counterclockwise until the saw blade begins to lower the desired rate of speed.
7. Proceed to cut through the workpiece. The machine will shut off upon completion of cut.

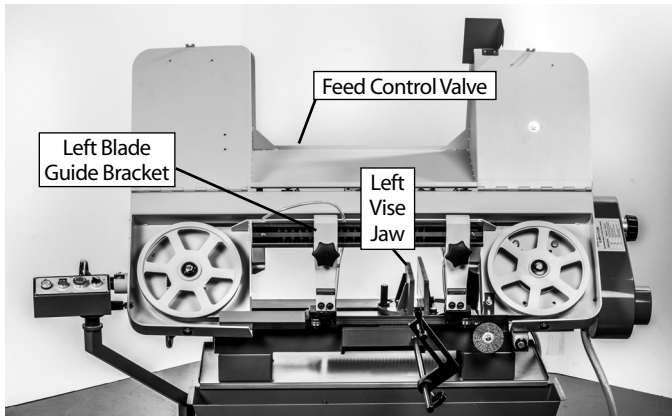


Figure 12

CHANGING SPEEDS

Your machine is provided with a range of speeds, 80 to 250 SFPM. To change speeds, proceed as follows:

1. Machine must be running.
2. Use speed selector as shown in Figure 13. Turn to desired speed.



Figure 13 – Blade speed selector.

CUTTING AND ADVANCE SPEED

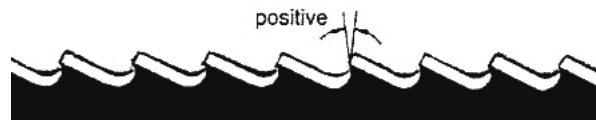
The cutting speed (in/min) and the advance speed (in²/min = area traveled by the blade teeth when removing shavings) are limited by heat build up on the tips of the teeth.

- The cutting speed is dictated by the resistance of the material (R N/mm²), its hardness (HRC) and its dimensions in the widest section.
- An advance speed (= lowering of the saw bow) set too fast tends to cause the blade to deviate from the ideal cutting path, producing misaligned cuts on both the vertical and the horizontal plane.
- The best way to determine the proficiency of these two parameters is to examine the chips from the cut.
- Long spiral-shaped chips indicate ideal cutting.
- Very fine or pulverized chips indicate lack of feed and/or cutting pressure.
- Thick and/or blue chips indicate overload of the blade.

OPERATION (CONTINUED)**BLADE SELECTION GUIDE****TEETH PITCH AND RAKE****Regular tooth**

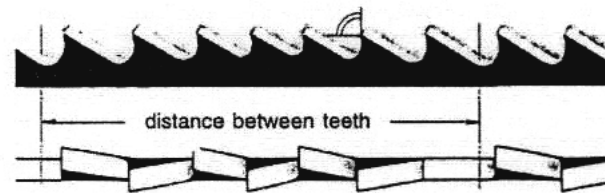
0° rake and constant pitch.

Regular tooth blades are typically used for crosscut or inclined cutting in small solid and average cross-section cuts in or pipes, laminated mild steel, gray iron or general metal.

Positive rake tooth

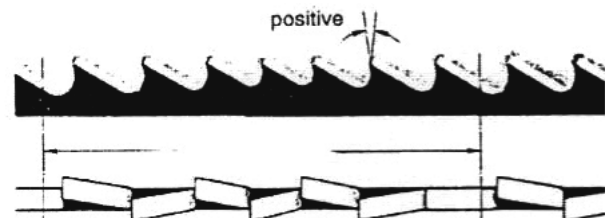
9°-10° positive rake and constant pitch.

This blade is used for crosscut or inclined cuts in solid sections or large pipes, including all harder materials (highly alloyed and stainless steels, special bronze and forge pig iron).

Combo tooth

This blade has pitch variations between teeth and variations in teeth size along with variable gullet depths. These unique parameters ensures a smoother, quieter cut, and longer blade life due to the lack of vibration.

Another advantage offered by the use of this blade is its ability to cut wide range of different material sizes and shapes.

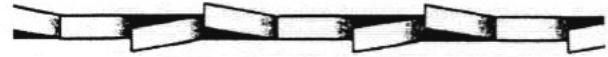
Combo tooth

9°-10° positive rake.

This blade type is suitable for the cutting of section bars and large and thick pipes as well as for the cutting of solid bars at machine capacity. Available pitches: 3-4, 6-8.

TEETH SET

Saw teeth are slightly bent out of the plane of the saw body, resulting in a wide cut in the workpiece. This parameter is called "tooth set."

Regular or raker set

The cutting teeth are set right and left, alternated by a straight tooth.

For use for materials with dimensions greater than .2". Used for the cutting of steel, castings and hard nonferrous materials.

Wavy set (in smooth waves).

This tooth set is associated with very fine teeth and is mainly used for the cutting of pipes and thin section bars (from .04" to .118").

Alternate set (grouped teeth)

Teeth are set in alternate groups of both right and left separated by a straight tooth.

This tooth set is used for smooth cuts in extremely thin materials (less than .04").

Alternate set (individual teeth)

The cutting teeth are individually set right and left.

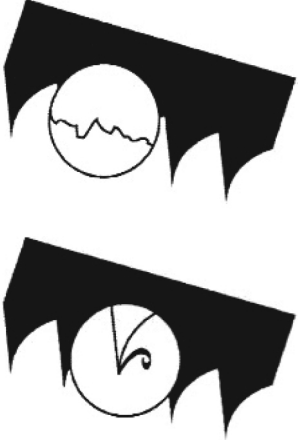
This type of tooth set is used for the cutting of nonferrous soft materials, plastics and wood.

TROUBLESHOOTING



SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Motor will not start; fuses or circuit breakers blow	<ol style="list-style-type: none"> 1. Short circuit in line cord or plug 2. Short circuit in motor or loose connection 3. Incorrect fuses or circuit breakers in power line 4. Motor overloaded 5. Bandwheel door covers are open 	<ol style="list-style-type: none"> 1. Inspect line cord or plug for damaged insulation and shorted wires. Replace damaged wires and/or components. 2. Inspect all lead terminals on motor for loose or worn insulation on wires. Tighten any loose connections. Replace or repair motor. 3. Install correct fuses or circuit breakers 4. Reduce load on motor 5. The bandwheel doors must be completely closed and latched
Motor fails to develop full power (power output of motor decreases rapidly) with decreased voltage at motor terminals	<ol style="list-style-type: none"> 1. Power Line overloaded 2. Undersized wires or cords too long 3. General overloading at power company's facilities 	<ol style="list-style-type: none"> 1. Reduce the load on the power line 2. Increase the wire sizes or reduce the length of cords 3. Request a voltage check from the power company
Motor overheats	<ol style="list-style-type: none"> 1. Motor overloaded 2. Air circulation around motor is restricted 	<ol style="list-style-type: none"> 1. Reduce load on motor 2. Clean motor to provide normal air circulation around motor
Motor stalls (resulting in blown fuses or tripped circuit breakers)	<ol style="list-style-type: none"> 1. Short circuit in motor; connections loose; or shorted terminals; or worn insulation on lead wires 2. Low voltage line conditions 3. Incorrect fuses or circuit breakers in power line 4. Motor overloaded 	<ol style="list-style-type: none"> 1. Inspect all lead terminals on motor for loose or worn insulation on wires. Tighten any loose connections. Replace or repair motor. 2. Correct low voltage line conditions 3. Install correct fuses or circuit breakers 4. Reduce load on motor
Frequent opening of fuses or circuit breakers	<ol style="list-style-type: none"> 1. Motor overloaded 2. Incorrect fuses or circuit breakers 	<ol style="list-style-type: none"> 1. Reduce load on motor 2. Install correct fuses or circuit breakers
Motor problems in general	Various causes	To troubleshoot and service the motor consult a qualified technician
Motor running too hot	<ol style="list-style-type: none"> 1. Blade tension too high 2. Blade too coarse for work (especially when cutting pipes) 3. Blade too fine for work (heavier, soft materials) 4. Gears need lubrication 	<ol style="list-style-type: none"> 1. Reduce tension on the blade 2. Change the type of blade. See OPERATION BLADE SELECTION GUIDELINES page 9. 3. Change the type of blade. See OPERATION BLADE SELECTION GUIDELINES page 9. 4. Check oil bath and add lubrication as needed

NOTES

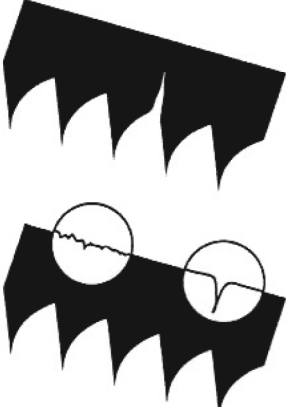
TROUBLESHOOTING (CONTINUED)

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
<p>Tooth breakage</p> 	Cut advancing too quickly	Decrease cutting advance, exerting less cutting pressure. Adjust the braking device.
	Wrong cutting speed	Change speed and/or type of blade. See OPERATION - BLADE SELECTION GUIDELINES page 9.
	Wrong tooth pitch	Replace blade choosing the proper tooth pitch. See OPERATION - BLADE SELECTION GUIDELINES page 9.
	Chips sticking to the teeth and in the gullets or material that gums	Check to ensure the coolant outlet hole on the left blade guide is not clogged and the coolant flow is adequate to remove of chips from the blade.
	Defects on the material or material too hard	Material surfaces can be oxidized or covered with impurities making these areas harder than the blade itself. Materials may have hardened areas or inclusions inside the section due to production materials such as castings and welding wastes, etc. Avoid cutting these materials. In a situation where a cut has to be made use extreme care, cleaning and removing hard impurities as quickly as possible.
	Ineffective gripping of the part in the vise.	Check the gripping of the part being cut. Tighten the vise as needed.
	The blade gets stuck in the material	Decrease the cutting advance and exert less cutting pressure.
	Starting cut on sharp or irregular section bar	Pay more attention when you start cutting. Slowly and carefully start the cut.
	Poor quality blade	Switch to a superior quality blade.
	Previously broken tooth left in the cut	Remove in the broken tooth from the cut.
	Resuming a cut on a previously made groove	Make the cut elsewhere, turning the part over.
	Vibrations	Check the grip of the part being cut to ensure it is being held securely in the vise.
	Wrong tooth pitch or shape	Replace blade choosing the proper tooth pitch or shape. See OPERATION - BLADE SELECTION GUIDELINES page 9. Adjust blade guides.
Insufficient lubricating, refrigerant, or wrong lubricant viscosity	Check level of liquid in the tank. Increase the flow of lubricant. Check to ensure the hole and the liquid outlet pipe are not blocked. Check the lubricant viscosity.	
Teeth positioned in the direction opposite the cutting direction	Remove the blade and reinstall it with the teeth cutting in the proper direction.	

TROUBLESHOOTING (CONTINUED)


SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Premature blade wear 	Faulty running-in of blade	See OPERATION - BLADE SELECTION GUIDELINES page 9.
	Teeth positioned in the direction opposite of the cutting direction	Remove the blade and reinstall it with the teeth cutting in the proper direction.
	Poor quality blade	Switch to a superior quality blade.
	Cut advancing too quickly	Decrease cutting advance, exerting less cutting pressure. Adjust the braking device.
	Wrong cutting speed	Change speed and/or type of blade. See OPERATION - BLADE SELECTION GUIDELINES page 9.
	Defects on the material or material too hard	Material surfaces can be oxidized or covered with impurities making these areas harder than the blade itself. Materials may have hardened areas or inclusions inside the section due to production materials such as castings and welding wastes, etc. Avoid cutting these materials. In a situation where a cut has to be made use extreme care, cleaning and removing hard impurities as quickly as possible.
	Insufficient lubricating refrigerant or wrong emulsion	Check level of liquid in the tank. Increase the flow of lubricant. Check to ensure the blade guide outlet hole and the liquid outlet pipe are not blocked. Check the lubricant viscosity.
Blade breakage/damage 	Faulty welding of blade	Switch to a superior quality blade.
	Cut advancing too quickly	Decrease cutting advance, exerting less cutting pressure. Adjust the braking device.
	Wrong cutting speed	Change speed and/or type of blade. See OPERATION - BLADE SELECTION GUIDELINES page 9.
	Wrong tooth pitch	Replace blade choosing the proper tooth pitch. See OPERATION - BLADE SELECTION GUIDELINES page 9.
	Ineffective gripping of the part in the vice	Check the gripping of the part being cut. Tighten the vise as needed.
	Blade touching material at beginning of cut	At the beginning of the cutting process, never lower the saw bow into the material before starting the machine.

**TROUBLESHOOTING (CONTINUED)**

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Blade breakage/damag 	Blade guide pads not adjusted properly or dirty because of lack of maintenance	Check the adjustment of the blade guides. See OPERATION SET-UP / Blade guide insert adjustments on page 7. Extremely tight tolerance guiding may cause cracks and breakage of teeth. Use extreme care when cleaning.
	Blade guide block too far from material to be cut	Set the left blade guide arm closely to the material being cut so that only the blade section used in the cut is free, this will prevent deflections that stress the blade,
	Improper position of blade on flywheels	The back of blade rubs against the support due to deformed or poorly welded bands (tapered), causing cracks and swelling of the back contour. Replace the defective blade with a new one.
	Insufficient lubricating coolant or wrong emulsion	Check level of lubricating coolant level in the tank. Increase the flow of lubricating coolant, checking to ensure the hole and the liquid outlet pipe are not blocked. Check the emulsion percentage.
Streaked or etched bands	Damaged or chipped blade guide pads	Replace the blade guide pads.
	Tight or loose blade guide bearings	Correctly adjust the guide bearings. See OPERATION SET-UP / Blade guide insert adjustments on page 7.
Blade cuts crooked	Blade not parallel in relation to the counter vise	Check the blade guide blocks to ensure they are fastened tightly to the counter vise. Adjust the blocks vertically and if necessary adjust the stop screws of the degree cuts.
	Blade not perpendicular due to the excessive play between the guide pads and misalignment of the blocks	Check and adjust the blade guides for proper tolerances. See OPERATION SET-UP / Blade guide insert adjustments on page 7.
	Cut advancing too fast	Decrease the speed of the cut advance, exerting less cutting pressure. Adjust the braking device.
	Worn out blade	Move the blade close to material being cut so that only the blade section used in the cut is free, This will prevent deflections that would excessively stress the blade. Replace the blade.
	Wrong tooth pitch	Replace blade choosing the proper tooth pitch. See OPERATION - BLADE SELECTION GUIDELINES page 9.
	Broken teeth	The lack of teeth can cause deflection during the cut; check the blade for broken teeth and replace it if necessary.
	Insufficient lubricating coolant or wrong emulsion	Check level of lubricating coolant level in the tank. Increase the flow of lubricating coolant, checking to ensure the outlet hole on the left blade guide arm and the liquid outlet pipe are not blocked. Check the emulsion percentage.



TROUBLESHOOTING (CONTINUED)

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Faulty cut	Worn out bandwheels. Flywheel housing full of chips	The support and guide flange of the bandwheels are so worn they cannot maintain the proper alignment of the blade causing 'faulty cutting'. The blade rolling and drawing tracks can have become tapered. Replace the bandwheels. Clean out chips with compressed air.
Streaked cutting surface 	Cut advancing too fast	Decrease the speed of the cut advance, exerting less cutting pressure. Adjust the braking device.
	Poor quality blade	Replace blade with a superior quality blade.
	Worn out blade or with chipped and/or broken teeth	Replace it with a new blade.
	Wrong tooth pitch	The teeth in the blade being used are probably large. Use a blade with higher TPI. Replace blade choosing the proper tooth pitch.
	Blade guide block too far from material to be cut	Move the blade close to material being cut so that only the blade section used in the cut is free, This will prevent deflections that would excessively stress the blade. See OPERATION SET-UP / Blade guide insert adjustments on page 7.
	Insufficient lubricating coolant or wrong emulsion	Check level of lubricating coolant level in the tank. Increase the flow of lubricating coolant, checking to ensure the hole and the liquid outlet pipe are not blocked. Check the emulsion percentage.
Noise on guide blocks	Chipped bearings	Dirt and/or chips have come between the blade and guide bearings. Replace the chipped bearings.

MAINTENANCE

Safety precautions should be observed before and during any maintenance actions are taken.

- Keep saw clean and dry. Sweep off spots where chips have collected and wipe spots where coolant has splashed
- Lubricate unpainted surfaces with a light application of medium consistency machine oil to prevent corrosion after cleaning
- Grease the vise lead screw if vise action becomes difficult
- Replace dull blades and blades which are missing teeth. A clean saw with sharp blade will yield the best cuts
- Internal parts of the band saw have been completely lubricated at the factory and do not need to be re-lubricated

WARNING: Make certain the unit is disconnected from the power source before attempting to service or remove any component. If power cord is worn, cut or damaged in any way, have it replaced immediately by a qualified electrician.

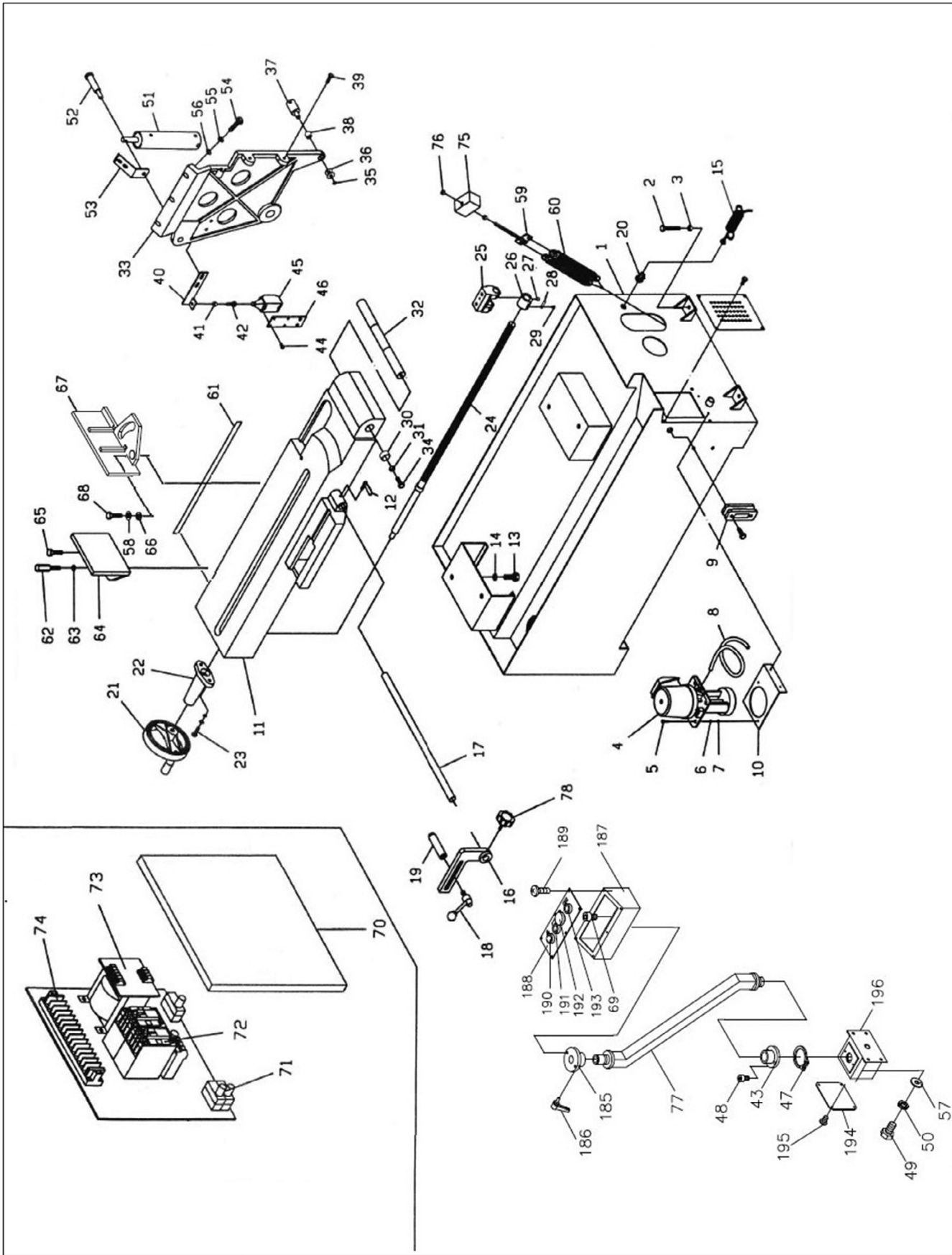


Figure 14 — Replacement Parts Illustration for model 9683294 10" x 16" Variable Speed 1-Phase Band Saw

REPAIR PARTS LIST FOR MODEL 9683294 10" X 16" VARIABLE SPEED 1-PHASE BAND SAW

Ref. No.	Description	Part No.	Qty.	Ref. No.	Description	Part No.	Qty.	Ref. No.	Description	Part No.	Qty.
1	Base	9645825.01	1	31	Washer, 1/2"	*	2	61	Angle Scale	9645859.01	1
2	Screw, M12x70	*	4	32	Pivot Shaft	9645844.01	1	62	Screw, 1/2"x1-1/2"	*	1
3	Nut, M12	*	4	33	Pivot Bracket	9645845.01	1	63	Washer, 1/2"	*	2
4	Coolant Pump	9645826.01	1	34	Screw, 1/2"x3/4"	*	2	64	Vise Jaw, Left	9645860.01	1
5	Screw, M6x12	*	2	35	Retaining Ring, S12	9645846.01	1	65	Screw, 1/2"x1-1/2"	*	1
6	Spring Washer, M6	*	2	36	Washer, 1/2"	*	2	66	Washer, 1/2"	*	2
7	Washer, M6	*	2	37	Spring Pull Axis	9645847.01	1	67	Vise Jaw, Right	9645861.01	1
8	Hose	9645827.01	1	38	Bushing	9645848.01	1	68	Screw, 1/2"x1-3/4"	*	2
9	Oil Gauge	9645828.01	1	39	Screw, 5/16"x1"	*	2	69	Screw, Cap, 1/4"x3/4"	*	2
10	Pump Seat	9645829.01	1	40	Regulating Seat	9645849.01	1	70	Electric Cabinet Box	9645862.01	1
11	Bed	9645830.01	1	41	Nut, 3/8"	*	1	71	Fuse	9645863.01	1
12	Screw, 5/16"x7/8"	*	1	42	Screw, 3/8"x1"	*	1	72	Magnetic Switch	9645864.01	2
13	Screw, 1/2"x1"	*	4	43	Swivel Bushing	9645850.01	1	73	Transformers	9645865.01	1
14	Spring Washer, 1/2"	*	4	44	Screw, M6x12	9645851.01	4	74	Terminal Strip	9645866.01	1
15	Electric Wire	9645831.01	1	45	Limit Switch	9645852.01	1	75	Spring Protective Casing	9645867.01	1
16	Work Stop Bracket	9645832.01	1	46	Micro Fast Piece	9645853.01	1	76	Nut, 3/8"	*	3
17	Work Stop Rod	9645833.01	1	47	C-Ring, S-32	*	1	77	Column, Control	9645868.01	1
18	Locking Screw	9645834.01	1	48	Screw, Cap	*	2	78	Knob	9645869.01	1
19	Screw, 1/2"	*	1	49	Bolt, Hex, M8x16	*	4	185	Swivel	9645870.01	1
20	Electric Wire Protective Casing	9645835.01	1	50	Washer, Lock, M8	*	4	186	Handle, Locking, M8x20	9645871.01	2
21	Hand Wheel Assembly	9645836.01	1	51	Hydraulic Cylinder Assembly	9645854.01	1	187	Box, Control	9645872.01	1
22	Lead Screw Bracket, 1-1/4"	9645837.01	1	52	Cylinder Pin, Top	9645855.01	1	188	Panel, Control	9645873.01	1
23	Screw, 5/16"x1/4"	*	2	53	Hydraulic Mounting Plate, Top	9645856.01	1	189	Screw, Slotted, 3/16"x1/4"	*	6
24	Vise Lead Screw	9645838.01	1	54	Screw, 3/8"x2"	*	3	190	Lamp, Electric Power on	9645874.01	1
25	Lead Screw Bracket	9645839.01	1	55	Spring Washer, 3/8"	*	3	191	Switch, Start	9645875.01	1
26	Acme Nut	9645840.01	1	56	Washer, 3/8"	*	3	192	Switch, Stop	9645876.01	1
27	Button	9645841.01	1	57	Flat, Washer, M8	*	4	193	Pump, Coolant	9645877.01	1
28	Retainer	9645842.01	2	58	Spring Washer, 1/2"	*	2	194	Cover, Box	9645878.01	1
29	Screw, M5x0.8	*	1	59	Spring Pull Rod	9645857.01	1	195	Screw, Pan Head, 3/16"x1/4"	*	4
30	Needle Bearing, CB3020	9645843.01	2	60	Spring	9645858.01	2	196	Base, Box	9645879.01	1

(Δ) Not shown. (N/A) Not available as repair part. (*) Standard hardware item, available locally.

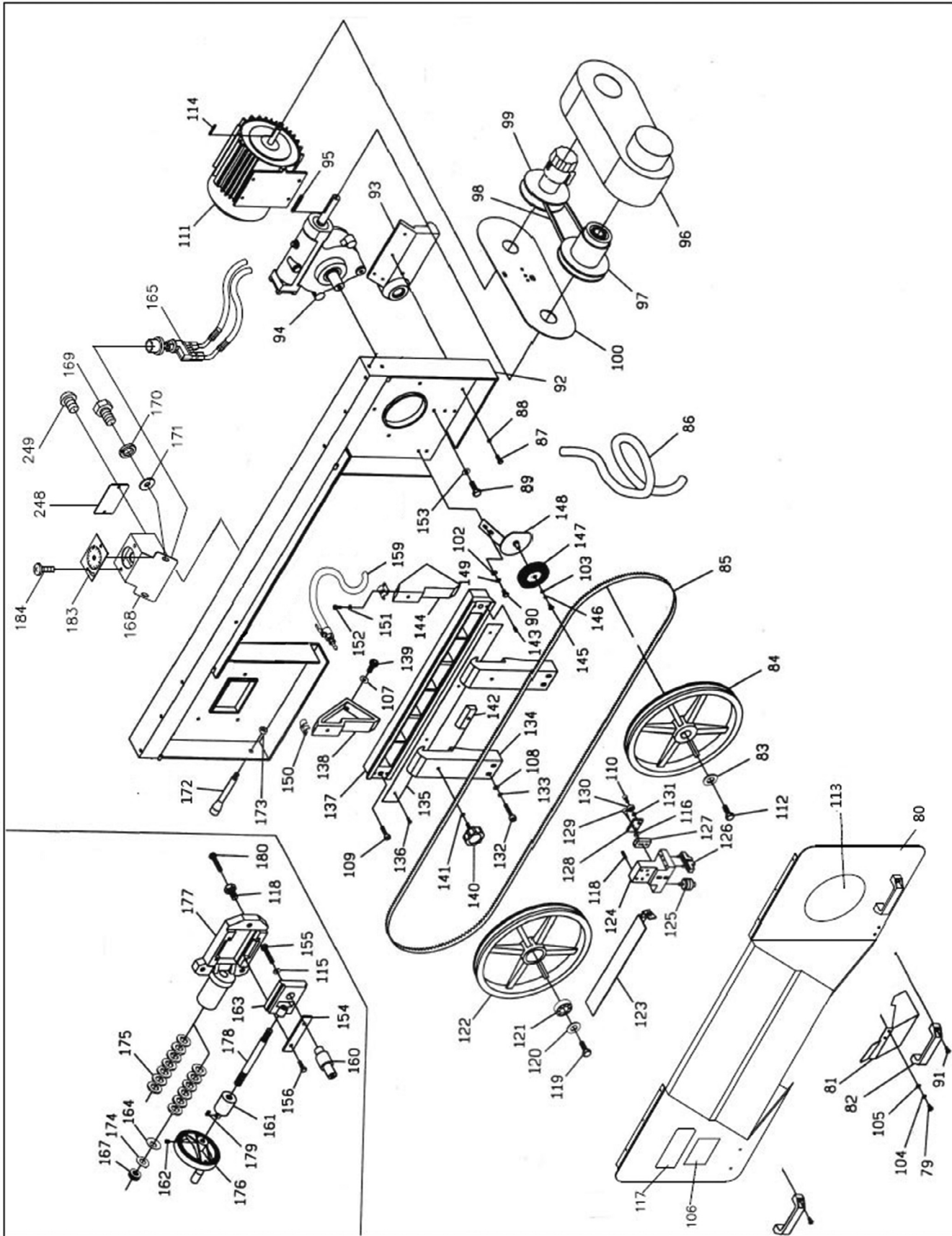


Figure 15 — Replacement Parts Illustration for model 9683294 10" x 16" Variable Speed 1-Phase Band Saw

REPAIR PARTS LIST FOR MODEL 9683294 10" X 16" VARIABLE SPEED 1-PHASE BAND SAW

Ref. No.	Description	Part No.	Qty.	Ref. No.	Description	Part No.	Qty.	Ref. No.	Description	Part No.	Qty.
79	Screw, M6x12	*	2	115	Washer, 1/2"	*	1	149	Spring Washer, 5/16"	*	2
80	Link Cover	9645880.01	1	116	Washer, 5/16"	*	2	150	Fastening Piece	9645911.01	2
81	Wire Brush Guard	9645881.01	1	117	Nameplate	9645895.01	1	151	Spring Washer, 1/4"	*	4
82	Handle	9645882.01	2	118	Screw, M16x30	*	3	152	Screw, 1/4"x1/2"	*	4
83	Washer, 1/2"	*	1	119	Screw, 1/2"x3/4"	*	1	153	Spring Washer, 1/2"	*	4
84	Drive Wheel	9645896.01	1	120	Washer, 1/2"	*	1	154	Gib plate	9645912.01	2
85	Blade	9645884.01	1	121	Bearing 6205Z	*	2	155	Screw, 1/2"x3/4"	*	1
86	Hose	*	1	122	Idle Wheel	9645883.01	1	156	Screw, M8x20	*	4
87	Screw, 3/8"x1-1/4"	*	4	123	Blade Guard	9645897.01	1	159	Flexible Nozzle	9645913.01	1
88	Spring Washer, 3/8"	*	4	124	Guide Bracket, Left	9645898.01	1	160	Blade Wheel Bracket Plate	9645914.01	1
89	Screw, 1/2"x1-1/4"	*	4	125	Bearing, 6201LBZZ	*	8	161	Extension Bar	9645915.01	1
90	Screw, 5/16"x1/2"	*	2	126	Tungsten Carbide Blade Guide	9645899.01	4	162	Screw, 5/16"x1/2"	*	1
91	Screw, M6x12	*	2	127	Elevating Block	9645900.01	1	163	Slide Bracket	9645916.01	1
92	Link Saw Bow	9645885.01	1	128	Active Block	9645901.01	1	164	Pump Switch	9645917.01	1
93	Support Bracket Seat	9645886.01	1	129	Screw, 1/4"x5/16"	*	2	165	Valve, Relief	9645918.01	1
94	Gear Box Assembly	9645887.01	1	130	Bearing 608ZZ	*	4	166	Connection Head	9645919.01	1
95	Key, 7mm	*	1	131	Spring Washer, 5/16"	*	4	167	Bearing, 51104NJK	*	1
96	Pulley Cover	9645888.01	1	132	Screw, 5/16"x1-3/4"	*	4	168	Seat, Oil Pressure	9645920.01	1
97	Gear Box Pulley	9645889.01	1	133	Spring Washer, 5/16"	*	4	169	Bolt, Hex, 5/16"x5/8"	*	2
98	Belt	9645890.01	1	134	Adjustable Bracket Mount,	9645902.01	2	170	Washer, Lock, 5/16"	*	2
99	Motor Pulley	9645891.01	1	135	Angle Scale	9645903.01	1	171	Washer, 5/16"	*	2
100	Speed Change Base Plate	9645892.01	1	136	Screw, M5x0.8	*	4	172	Blade Cover Handle	9645921.01	1
102	Washer, 5/16"	*	2	137	Steel Slide	9645904.01	1	173	Nut, 1/2"	*	2
103	Washer, M6	*	1	138	Blade Bracket-Left	9645905.01	1	174	Washer, 3/4"	*	1
104	Spring Washer, M6	*	2	139	Screw, 1/2"x1"	*	4	175	Special Spring Washer	9645922.01	13
105	Washer, M6	*	2	140	Knob	9645906.01	2	176	Hand Wheel	9645923.01	1
107	Spring Washer, 1/2"	*	4	141	Washer, 3/8"	*	2	177	Slide Bracket	9645924.01	1
108	Washer, 5/16"	*	4	142	Locking Block	9645907.01	2	178	Tension Shaft	9645925.01	1
109	Screw, 3/8"x1"	*	2	143	Screw, 5/16"x1/2"	*	4	179	Key, 5mm	*	1
110	Screw, 5/16"x5/8"	*	4	144	Blade Bracket, Right	9645908.01	1	180	Screw, 3/8"x2-1/2"	*	3
111	Motor	9645928.01	1	145	Screw, M6x10	*	1	181	Plate, Cover	9645926.01	1
112	Screw, 1/2"x3/4"	*	1	146	Spring Washer, M6	*	1	182	Screw, Slotted, M5x8	*	2
113	Saw Band Reference Table	9645894.01	1	147	Wire Brush	9645909.01	1	183	Control Panel	9645927.01	1
114	Key, 7mm	*	1	148	Steel Brush Seat	9645910.01	1	184	Screw, Slotted, 3/16"x3/8"	*	2

(Δ) Not shown. (N/A) Not available as repair part. (*) Standard hardware item, available locally.

PALMGREN WARRANTY

C.H. Hanson / Palmgren warrants their products to be free of defects in material or workmanship. This warranty does not cover defects due directly or indirectly to misuse, abuse, normal wear and tear, failure to properly maintain the product, heated, ground or otherwise altered, or used for a purpose other than that for which it was intended.

The warranty does not cover expendable and/or wear part (i.e. v-belts, screws, abrasives, jaws), damage to tools arising from alteration, abuse or use other than their intended purpose, packing and freight. The duration of this warranty is expressly limited to the terms noted below beginning from the date of delivery to the original user.

The Palmgren branded items carry the following warranties on parts:

All vises, clamps, positioning tables, tombstones, jack screws and vise accessories - LIFETIME.

All bench grinders, drill presses, tapping machines, band saws, lathes, milling machines, arbor presses, abrasive finishing machines and work stands - 3 YEARS.

The obligation of C.H. Hanson / Palmgren is limited solely to the repair or replacement, at our option, at its factory or authorized repair agent of any part that should prove inoperable. Purchaser must lubricate and maintain the product under normal operating conditions at all times. Prior to operation become familiar with product and the included materials, i.e. warnings, cautions and manuals.

Failure to follow these instructions will void the warranty.

This warranty is the purchaser's exclusive remedy against C.H. Hanson for any inoperable parts in its product. Under no circumstances is C.H. Hanson liable for any direct, indirect, incidental, special or consequential damages including loss of profits in any way related to the use or inability to use our products. This warranty gives you specific legal rights which may vary from state to state.

PALMGREN®

Palmgren - a C.H. Hanson Company
2000 N. Aurora Rd., Naperville, IL 60563 U.S.A.
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