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**128HD**

## **Metal Cutting Band Saw**



### **128HD INSTRUCTION MANUAL**

**“THIS MACHINE IS FOR METAL CUTTING ONLY, IT IS NOT APPROVED FOR CUTTING WOOD.”**

- A. Average Noise Level = continuous level of airborne noise from machines when running at full speed with no load.**
- C. Loudest Noise level = the peak noise level recorded from machines when running at full speed with no load.**

**Based on above two measurements A & C. this hand-saw's equivalent A-weighted sound pressure level at the work station was measured at 70 dB, while its peak C-weighted instantaneous sound pressure value at the work station was measured at 75 dB.**

**CAUTION:**  
**VERTICAL CUTTING IS PROHIBITED IN THE MACHINE. NO VERTICAL CUTTING PLATE PROVIDED, TO PREVENT ANY IMPROPER USE.**

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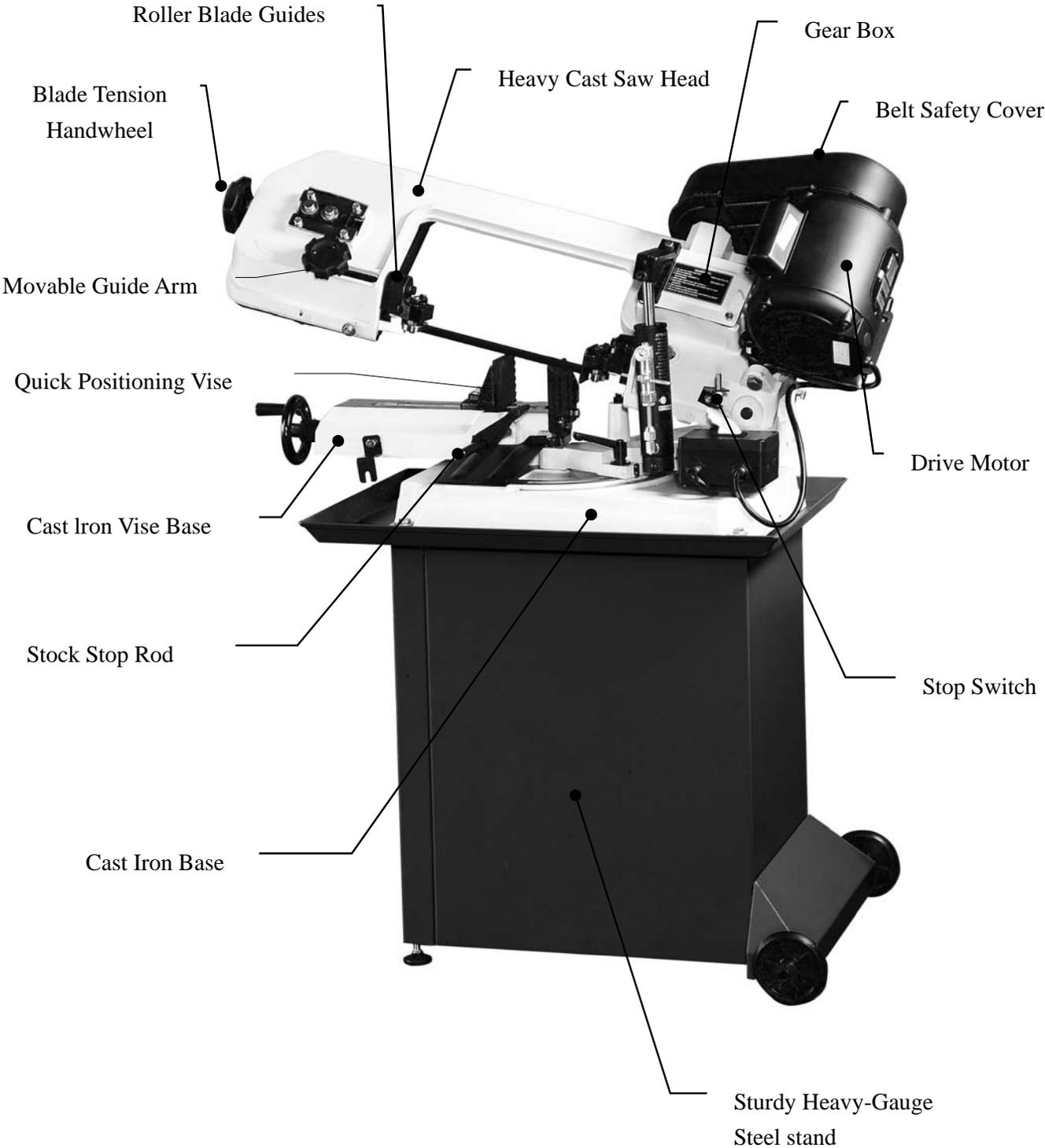
### **WARNING: FAILURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS PERSONAL INJURY**

As with all machinery there are certain hazards involved with operation and use of this machine. Proper use of the machine will considerably lessen the possibility of personal injury. If normal safety precautions are overlooked or ignored, personal injury to the operator may result.

This machine was designed for specific applications only. We strongly recommend that this machine NOT be modified and/or used for any application other than for which it was designed. If you have any questions relative to applications DO NOT use the machine until you contact the manufacturer and they have advised you.

***Before using this bandsaw, the proper electrical connections specific to this machine must be followed. Trajan Saw Works accepts no responsibility or liability for damages or injuries caused by improper electrical components and/or connections***

**Section 1: Machine Overview**



## **Section 2. Safety**

### **A) OPERATOR SAFETY:**

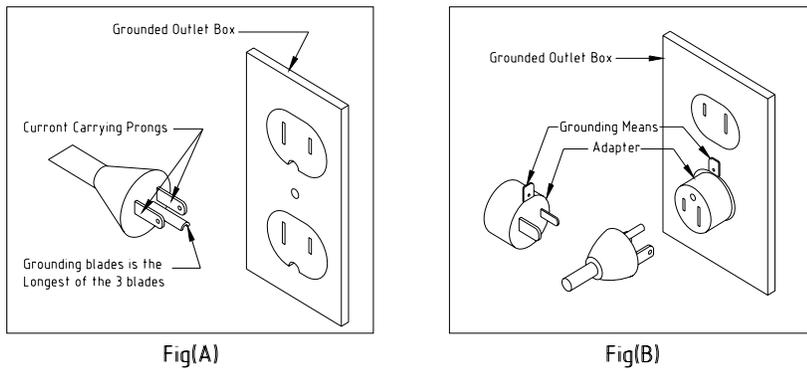
1. WEAR PROPER APPAREL. Avoid loose fitting clothing, jewelry & gloves
2. ALWAYS WEAR EYE PROTECTION
3. NEVER LEAVE THE SAW RUNNING UNATTENDED. TURN POWER OFF.
4. DO NOT OPERATE THE SAW UNDER THE INFLUENCE OF DRUGS, ALCOHOL, OR ANY PERSCRIPTION MEDICATION
5. ALWAYS KEEP HANDS AWAY FROM THE CUTTING AREA
6. STOP THE SAW BLADE BEFORE CLEANING CHIPS OUT OF THE PAN.
7. KEEP ALL GUARDS IN PLACE & IN WORKING ORDER.

### **B) ELECTRICAL SAFETY:**

1. USE PROPERLY RATED POWER UL LISTED EXTENSION CORD  
**Refer to table 72.1**
2. LOCK OUT/TAG OUT To guard against unauthorized operation and avoid accidental starting by unauthorized personel, the use of a lock out padlock is suggested. To lock out the on-off switch, open the padlock, insert through the holes of the switch guard, and close the padlock . Place the key in a location that is inaccessible those not authorized to use the saw.
3. PROPER ELECTRICAL GROUND In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock . This saw is equipped with an electric cord having an equipment-grounding conductor and a grounding plug . The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances. Do not modify the plug provided. If it will not fit the outlet have the proper outlet Installed by a qualified electrician. Improper connection of the equipment-grounding conductor can result In a risk of electric shock.The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor .If repair or replacement of the electric cord or plug is necessary do not connect the equipment-grounding conductor to a live terminal. Check with a qualified electrician or service personnel if the grounding instructions are not completely understood or if in doubt as to whether the tool is properly grounded. Use only

3-wire extension cords that have 3-prong grounding plug and 3-pole receptacles that accept the tool's plug. Repair or replace damaged or worn cord immediately. This saw is intended for use on a circuit that has an outlet that looks like the one illustrated in *Picture 1; Figure A*

**Picture 1**



**Table 72.1**  
Minimum gage of Cord

Ampere Rating	Volts	Total Length of cord in feet			
	120V 240V	25ft 50ft	50ft 100ft	100ft 200ft	150ft 300ft
Not more than/More than	AWG				
0 6	18 16 16 14				
6 10	18 16 14 12				
10 12	16 16 14 12				
12 16	14 12 Not Recommended				

**C) MACHINE SAFETY:**

1. REMOVE ADJUSTING KEYS AND WRENCHES. Form a habit of checking to see that keys and adjusting wrenches are removed from tool before turning it "on".

2. **DON'T FORCE THE SAW.** It will do the job better and be safer at the rate for which it was designed.
3. **PROPER USE OF ATTACHMENTS.** Do not use attachment to do a job for which they were not designed.
4. **SECURE WORK.** Use clamps or the saw vise to hold work.
5. **MAINTAIN SAW BLADES IN TOP CONDITION.** Keep saw blades sharp & clean for best performance. Follow instructions for lubricating and changing saw blades.
6. **AVOID ACCIDENTAL STARTING.** Make sure switch is in "OFF" position before plugging in power cord.
7. **ADJUST AND POSITION** the blade guide arm before starting the cut.
8. **KEEP BLADE GUIDE ARM TIGHT,** A loose blade guide arm will affect sawing accuracy.
9. **MAKE SURE** blade speed is set correctly for the material being cut.
10. **CHECK** for proper blade size and type.
11. **STOP** the machine before putting material in the vise.
12. **ALWAYS** have stock firmly clamped in vise before starting cut.

#### **D) WORK ENVIRONMENT SAFETY:**

1. **KEEP WORK AREA CLEAN.** Cluttered, dirty work areas invite accidents.
2. **DON'T USE IN DANGEROUS ENVIRONMENTS.** Don't use power tools in damp or wet locations, or expose them to rain. Keep work area well-lighted.
3. **DON'T** install & use this machine in explosive, dangerous environment.

#### **E) PROPER MAINTENANCE:**

1. **DISCONNECT** machine from power source when making repairs.
2. **CHECK FOR DAMAGED PARTS.** Before further use of the saw, a guard or other part that is damaged should be carefully inspected to ensure that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, broken parts, mountings, and any other conditions that may affect the saw's operation. Any guard or other part that is damaged should be properly repaired or replaced.
3. **DISCONNECT TOOLS** before servicing and when changing accessories such as blades, bits, cutters, etc.
4. **MAKE SURE** that blade tension and blade tacking are properly adjusted.
5. **RE-CHECK** blade tension after initial cut with a new blade.

6. **CHECK COOLANT DAILY** Low coolant level can cause foaming and high blade temperatures. Dirty or weak coolant can clog the pump, cause crooked cuts, rust, low cutting rate and permanent blade failure. Dirty coolant can cause the growth of bacteria with ensuing skin irritation.
7. **WHEN CUTTING MAGNESIUM NEVER** use soluble oils or emulsions(oil-water mix) as water will greatly intensify any accidental magnesium chip fire. See your industrial coolant supplier for specific coolant recommendations when cutting magnesium.
8. **TO PREVENT CORROSION** of machined surfaces when a soluble oil is used as coolant, pay particular attention to wiping dry the surfaces where fluid accumulates and does not evaporate quickly, such as between the machine bed and vise.

#### **F) SPECIFIED USAGE:**

1. This machine should be used only for general metal cutting within the range of cutting capacity..

#### **H) SAFETY FEATURES:**

1. Interlock switch on pulley cover.
2. As soon as the pulley cover is open, machine will stop with the function of this switch. Do not remove this switch from machine for any reason, and check it's function frequently.
3. Interlock switch on cutting area as soon as the cover of cutting area is open, machine will stop at once with the function of this switch. Do not remove this switch from machine for any reason, and check it's function frequently.

### 3. MACHINE SPECIFICATIONS:

	128HDR
Capacity	0°--○ =Ø5" (Ø 128mm) --□ = 5" x 6" (128x 150mm)
	45°--○ =Ø3-3/4" (Ø 95mm) --□ = 3-3/4" x 2-15/16" (95x 75mm)
	60°--○ =Ø1-3/4" (Ø 44mm) --□ = 1-3/4" x 2-3/16" (44x 56mm)
Speeds	60HZ => 80-120-200 FPM      50HZ = >65-95-165 FPM
Motor	1/3HP , 1/2 HP 60HZ=>1725RPM    50HZ=>1420RPM
Blades Size	1/2" x 0.025" x 64 1/2" (12.7 x 0.64x 1635mm)
Dimensions LxWxH	38.5" *20.4" * 41.7" (980x520x1060mm)
Blade Wheels	7-3/8"(187mm) High strength flanged cast iron
Packing	40.2"x 17.5"x18.2" (1020x445x460mm)
N.W./G.W.	78 / 80Kgs
20' Container Q'ty	135 sets

### 4. MACHINE FEATURES

1. Special designed horizontal band saw.
2. Offers three speeds for cutting metal.
3. Shuts off automatically when material is cut.
4. No noise while operating.
5. Casters quick and easy moving.
6. 2 Way swivel saw arm provides +60°~-45°swivel cutting.
7. Quick positioning vise provides easy clamping on work piece.
8. Built-in shelf for storing tools.

## 5. DELIVERY & INSTALLATION

### 3-1.Unpacking

1. Transport to desired location before unpacking
2. Transportation after unpacking, please use heavy duty fiber belt to lift up the machine.
3. Finish removing this wooden case/crate from the machine. Unbolt the machine from the crate bottom. Carefully lift the machine to a sturdy stand or work bench. For best performance, through .

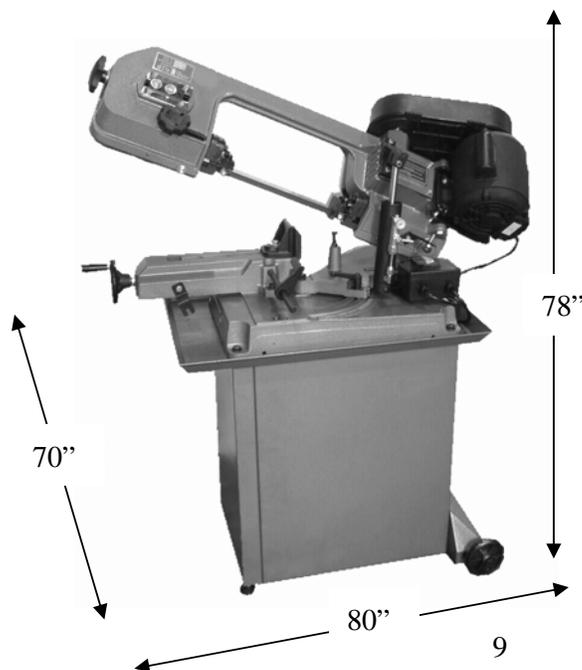
### Transportation Recommendations:

1. As this machine weights 78kgs(172lbs) it is recommended that the machine be transported with help of lifting jack.
2. Tighten all locks before operation.
3. ALWAYS Keep proper footing & balance while moving this machine, and only use heavy duty fiber belt to lift the machine.

### 3-2.Installation:

1. BE SURE all locks of head-stock & column are tighten before operation.
2. TURN OFF the power before wiring & be sure machine iS properly grounded.Overload & circuit breaker is recommended for safety wiring.
3. CHECK carefully if main shaft in clockwise direction while running test. If not, reverse the wiring then, repent the test till spindle direction is correct.

## 6. MINIMUM ROOM SPACE FOR MACHINE OPERATION



## 8. SAW OPERATION

The Hexagon Head Stop Screw (A) should be adjusted to proper height when machine has finished the cut



### 1. Operation Sequence

- (1) Raise the saw head to vertical position.
- (2) Adjust the stop limit switch so the motor stops just after the work-piece is cut off.
- (3) Adjust the stock stop to the desired length position.
- (4) Open vise to accept the work-piece to be cut. If the piece is long, support the end with proper roller tabling.
- (5) Rotate the vise hand wheel to tighten the work-piece.
- (6) Turn on the motor start switch, and adjust the blade speed to proper setting for the material being cut
- (7) Let the saw head down slowly to enter the work-piece to minimize blade tooth strippage do to excessive entry speed.

Adjust cutting pressure to attain proper pressure. To increase the feed, turn the feed screw adjustment (at left of base) counter clockwise: to decrease turn clockwise. Do not adjust more than one turn at a time.

### 2. Helpful Cutting Hints

- (1) The harder the material to be cut, the slower the cutting speed should be.
- (2) Use of cutting fluid is recommended when the blade speed is higher.

### 3. Blade Speeds

When using your band saw always change the blade speed to best suit the material being cut. The following material cutting chart gives suggested setting for several materials.

## MATERIAL CUTTING CHART

Material	Speed		Belt Groove Used	
	50Hz	60Hz	Motor Pulley	Saw Pulley
Tool, Stainless or Alloy Steel, Bearing Bronzes	20 MPM	24 MPM	Small	Large
Mild Steel, Hard Brass or Bronze	29 MPM	37MPM	Medium	Medium
Soft Brass, Aluminum, other light materials	50 MPM	61 MPM	Large	Small

#### 4. Blade selection

1. A 14-tooth per inch, general-use blade is furnished with this metal cutting band saw. Additional blades in many tooth sizes are available.
2. The choice of blade pitch is governed by the thickness of the material to be cut.
3. The thinner work-piece. The more teeth needed.
4. Improper blade tooth selection can result in severe damage to the work-piece and to the saw blade.

#### 5. Changing blades

- (1) Raise the saw head to it's upright position and release band tension by rotating the tension handwheel in a counter clockwise direction.
- (2) Install the new blade as follows: Place the saw blade around the band wheels. Adjust the blade tension slightly until the blade just makes contact with the bottom of the blade guides. Rotate the saw blade so that it slips into the blade guides
- (3) Adjust the blade tension by turning the tension handwheel clockwise until it is properly adjusted. Do not tighten excessively.
- (4) Replace the blade guard.

## 6. Starting Saw

- (1) Never operate saw without the blade guards in place.
- (2) Be sure the blade is not in contact with the work when the motor is started.
- (3) Start the motor and allow the saw to come to full speed before starting the cut.
- (4) Do not drop or force the head, let the saw provide the cutting force by the proper setting of the cutting pressure.
- (5) Proper feed is important, excessive pressure can break the blade or stall the saw. Insufficient pressure dulls the blade rapidly.
- (6) Never use a new blade to complete previously started cut.
- (7) Do not start cutting on the sharp corners.

## 9. BI-METAL SPEEDS AND FEEDS

These figures are a guide to cutting 4"(100mm) material (with a 314 Vari-Tooth) when using a cutting fluid.

Increase Band Speed:      15% When cutting 1/4"(6.4mm) material (10/14 Vari-Tooth)  
    12% When cutting 3/4"(19 mm) material (6/10 Vari-Tooth)  
    10% When cutting 1-1/4"(32 mm) material(5/8 Vari-Tooth)  
    5% When cutting 2-1/2" (64 mm) material(4/6 Vari-Tooth)

Decrease Band Speed:      12% When cutting 8"(200mm) material(2/3 Vari-Tooth)

MATERIAL	ALLOY ASTM NO.	BAND SPEED	
		FT./MIN	M/MIN
Copper Alloy	173,932	314	96
	330,365	284	87
	623,624	264	81
	230,260,272	244	74
	280,264,632,655	244	74
	101,102,110,122,172	234	71
	1751,182,220,510	234	71
	625,706,715,934	234	71

	630	229	70
	811	214	65
Carbon Steel	1117	339	103
	1137	289	88
	1141,1144	279	85
	1141 HI STRESS	279	85
	1030	329	100
	1008,1015,1020,1025	319	97
	1035	309	94
	1018,1021,1022	299	91
	1026,1513	299	91
	A36(SHAPES),1040	269	82
	1042,1541	249	76
	1044,1045	219	67
	1060	199	61
	1095	184	56
Ni-Cr-Mo Alloy Steel	8615,8620,8622	239	73
	4340,E4340,8630	219	67
	8640,	199	61
	E9310	174	53
Tool Steel	A-6	199	61
	A-2	179	55
	A-10	159	49
	D-2	90	27
	H-11,H-12,H-13	189	58
Stainless Steel	420	189	58
	430	149	46
	410,502	140	43
	414	115	35
	431	95	29
	440C	80	24
	304,324	120	36
	304L	115	35
	347	110	33
	316,316L	100	30
	416	189	58

## TELLTALE CHIPS

Chips are the best indicator of correct feed force. Monitor chip information and adjust feed accordingly.

Thin or powdered chips – increase feed rate or reduce band speed.



Burned heavy chips – reduce feed rate and/or band speed.



Curly silvery and warm chips – optimum feed rate and band speed.



## 10. MACHINE ADJUSTMENT

### 10-1. Blade tracking on the Blade Wheels

- (1) Remove the blade guards.
- (2) Turn the blade tension handwheel counterclockwise so that the blade loosens slightly.
- (3) Adjust the hex-hole screw in the hole of slide block until the front blade wheel rises slightly so the blade will be kept in position.
- (4) Tighten the blade tension handwheel until the blade obtains the proper tension.
- (5) Check the tracking by turning on the machine. If the blade slides forward, go back to step 3 until the rear blade touches the flange of blade wheel.
- (6) Turn off power to the machine.
- (7) Replace the blade guards.

### 10-2. Blade Guide Bearing Adjustment

**Attention: This is the most important adjustment on your saw. It is impossible to get satisfactory work from your saw if the blade guides are not properly adjusted.**

**Note: There should be from .000 (just touching) .001 clearance between the blade and guide bearing. To obtain this clearance adjust as follows:**

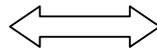
- (1) Each of two guide bearing is mounted to an eccentric bushing and can be adjusted.
- (2) Loosen the nut while holding the bolt with an allen wrench.
- (3) Position the eccentric by turning the bolt to the desired position of clearance. (The blade will be completely vertical when it is cutting.)
- (4) Tighten the nut
- (5) Adjust the second blade guide bearing in the same manner.

10-3. Blade Tension Adjustment:

- (1) Make sure the motor is shut off.
- (2) Make sure the blade is properly in the blade guides and against the flanges of the band wheels.
- (3) Adjust the blade tension by turning the tension handwheel in a clockwise direction until the proper tension is achieved
- (4) Start the blade motor to rotate the blade.
- (5) Stop the blade motor and check for proper tension and placement of the blade on the band wheels and in the blade guides.

**STEP 1** Turn simultaneously with adjusting set screw to make the blade track against the shoulder of the pulley

*To relieve blade tension*



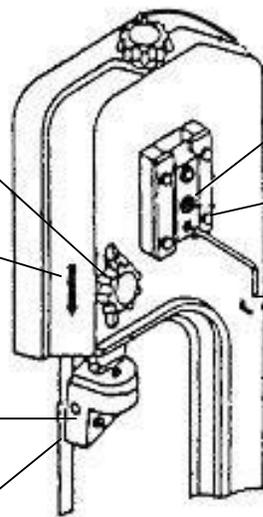
*To increase blade*

Adjust the blade adjustable seat according to the material size

The arrow indicates the direction of blade movement

**STEP 6** Adjust guide assembly to where the blade just touches the back-up bearing

**STEP 5**



**STEP 2** Loosen this hex head screw before turning the adjusting set screw

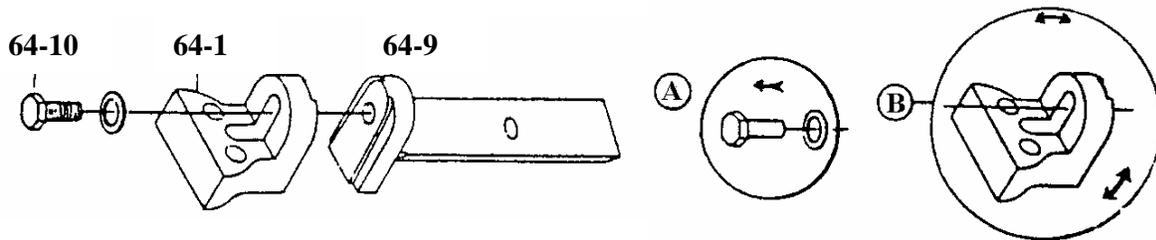
**STEP 4** Tighten this hex head screw after set-screw is adjust.

**STEP 3** Turn simultaneously with blade tension knob to make blade track against shoulder of pulley.

Note: Please, refer to the instruction manual if you have trouble operating the saw.

#### 10-4. Method of adjusting the blade:

- A. Loosen the screw # 64-10.
- B. Adjust the blade adjustable seat # 64-1 to make the blade vertical to bed.
- C. Place the square on the bed to check if the blade is vertical, if not, repeat the process A to C.
- D. Tighten the screw # 64-10.



#### 10-5. Hydraulic Feed Adjustment

1. To adjust the feeding rate while cutting, Turn the descent valve (A) clockwise for faster feeding, counterclockwise for slower feeding.
2. When the saw head is feeding too fast, raise the saw arm, then reduce the feed rate to prevent blade damage.

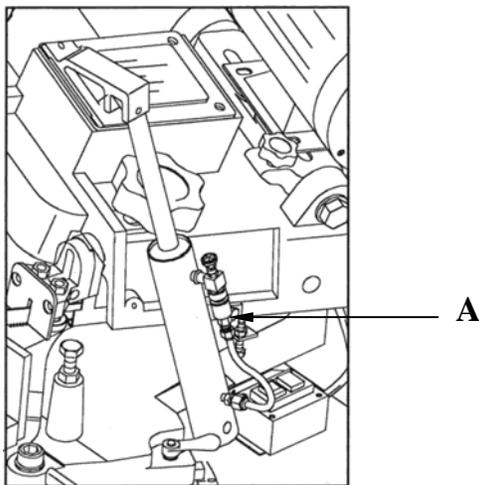
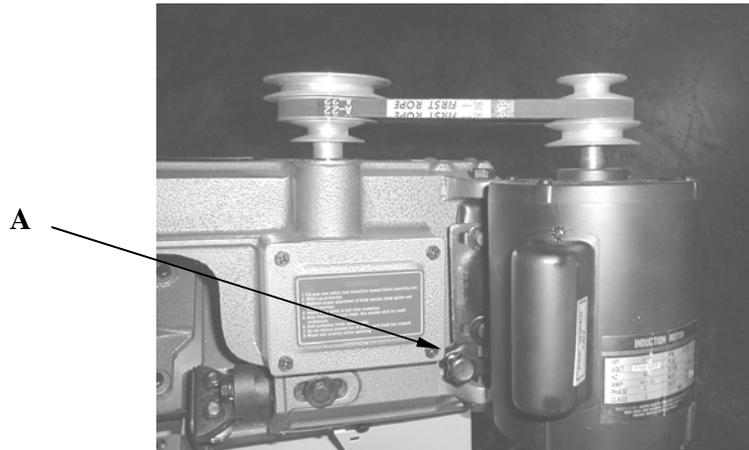


FIG.4-1

## 10-6. BELT INSTALLATION

- (1) After installation of the bell onto pulley, be sure to lock the screws firmly, to prevent the shaking of motor, and the losing of bell.



## 11. SAW MAINTENANCE

That's easier to keep the saw in good condition there by giving its best performance by means of properly maintaining it at all times.

- (1) Daily Maintenance (by operator)
  - (a) Fill the lubricant before starting machine everyday.
  - (b) If the temperature of transmission is over-heating or making excessive noise, stop the machine immediately to check for damage
  - (c) Keep work area clean
- (2) Weekly Maintenance
  - (a) Clean and coat the cross leading screw with oil.
  - (b) Check to see if sliding surface and turning parts lack lubricant. If the lubricant is insufficient, fill it.
- (3) Monthly Maintenance
  - (a) Adjust the gap of slides both on cross and longitudinal feed.
  - (b) Lubricate bearings, worm, and worm shaft to avoid wear.
- (4) Yearly Maintenance
  - (a) Adjust the table to the horizontal position for checking accuracy.
  - (b) Check electric cord, plug, switches, to avoid loosening or wearing at least once a year.

## 12.CLEANING & LUBRICATING

- (1) Your machine has been coated with heavy grease to protect it during shipping. This coating should be completely removed before operating the machine. Commercial degreaser, kerosene or similar solvent may be used to remove the grease from the machine, but avoid getting solvent on belts or other rubber parts.
- (2) Be sure to clean the band saw after operation and coat the machine with oil.
- (3) Using SAE-30 oil to lubricate the components.
- (4) Lubricate the vise lead screw as needed.
- (5) The drive gears will not require a lubricant change more than once a year, unless a leak or over-heating occur.

## 13.TROUBLE SHOOTING

Symptom	Possible Cause(s)	Corrective Action
Excessive Blade Breakage	<ol style="list-style-type: none"> <li>1. Materials loosen in vise.</li> <li>2. Incorrect speed or feed</li> <li>4. Blade teeth spacing too large</li> <li>5. Material too coarse</li> <li>5. Incorrect blade tension</li> <li>6. Teeth in contact with material before saw is started</li> <li>7. Blade rubs on wheel flange</li> <li>8. Miss-aligned guide bearings</li> <li>9. Blade too thick</li> <li>10 Cracking at weld</li> </ol>	<ol style="list-style-type: none"> <li>1. Clamp work securely</li> <li>2. Adjust speed or feed</li> <li>3. Replace with a small teeth spacing blade</li> <li>4. Use a blade of slow speed and small teeth spacing</li> <li>5. Adjust to where blade just does not slip on wheel</li> <li>6. Place blade in contact with work after motor is started</li> <li>7. Adjust wheel alignment</li> <li>8. Adjust guide bearings</li> <li>9. Use thinner blade</li> <li>10. Weld again, note the weld skill.</li> </ol>
Premature Blade Dulling	<ol style="list-style-type: none"> <li>1. Teeth too coarse</li> <li>2. Too much speed</li> <li>3. Inadequate feed pressure</li> <li>4. Hard spots or scale on material</li> <li>5. Work hardening of material.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use finer teeth</li> <li>2. Decrease speed</li> <li>3. Decrease spring tension on side of saw</li> <li>4. Reduce speed, increase feed pressure</li> <li>5. Increase feed pressure by reducing spring tension</li> </ol>

	<ul style="list-style-type: none"> <li>6. Blade twist</li> <li>7. Insufficient blade</li> <li>8. Blade slide</li> </ul>	<ul style="list-style-type: none"> <li>6. Replace with a new blade, and adjust blade tension</li> <li>7. Tighten blade tension adjustable knob</li> <li>8. Tighten blade tension</li> </ul>
Unusual Wear on Side/Back of Blade	<ul style="list-style-type: none"> <li>1. Blade guides worn.</li> <li>2. Blade guide bearings not adjust properly</li> <li>3. Blade guide bearing bracket is loose</li> </ul>	<ul style="list-style-type: none"> <li>1. Replace.</li> <li>2. Adjust as per operators manual</li> <li>3. Tighten.</li> </ul>
Teeth Ripping from Blade.	<ul style="list-style-type: none"> <li>1. Tooth too coarse for work</li> <li>2. Too heavy pressure; too slow speed.</li> <li>3. Vibrating work-piece.</li> <li>4. Gullets loading</li> </ul>	<ul style="list-style-type: none"> <li>1. Use finer tooth blade.</li> <li>2. Decrease pressure, increase speed</li> <li>3. Clamp work piece securely</li> <li>4. Use coarser tooth blade or brush to remove chips.</li> </ul>
Motor running too hot	<ul style="list-style-type: none"> <li>1. Blade tension too high.</li> <li>2. Drive belt tension too high.</li> <li>3. Blade is too coarse for work</li> <li>4. Blade is too fine for work</li> <li>5. Gears aligned improperly</li> <li>6. Gears need lubrication</li> <li>7. Cut is binding blade</li> </ul>	<ul style="list-style-type: none"> <li>1. Reduce tension on blade.</li> <li>2. Reduce tension on drive belt.</li> <li>3. Use finer blade.</li> <li>4. Use coarse blade.</li> <li>5. Adjust gears so that worm is in center of gear.</li> <li>6. Check oil path.</li> <li>7. Decrease reed anti speed</li> </ul>
Bad Cuts (Crooked)	<ul style="list-style-type: none"> <li>1. Feed pressure too great.</li> <li>2. Guide bearings not adjusted properly</li> <li>3. Inadequate blade tension.</li> <li>4. Dull blade.</li> <li>5. Speed incorrect.</li> <li>6. Blade guides spaced out too much</li> <li>7. Blade guide assembly loose</li> <li>8. Blade truck too far away from wheel flanges</li> </ul>	<ul style="list-style-type: none"> <li>1. Reduce pressure by increasing spring tension on side of saw</li> <li>2. Adjust guide bearing, the clearance can not greater than 0.001.</li> <li>3. Increase blade tension by adjust blade tension</li> <li>4. Replace blade</li> <li>5. Adjust speed</li> <li>6. Adjust guides space.</li> <li>7. Tighten</li> <li>8. Re-track blade according to operating instructions.</li> </ul>
Bad Cuts (Rough)	<ul style="list-style-type: none"> <li>1. Too much speed or feed</li> <li>2. Blade is too coarse</li> <li>3. Blade tension loose</li> </ul>	<ul style="list-style-type: none"> <li>1. Decrease speed or feed.</li> <li>2. Replace with finer blade.</li> <li>3. Adjust blade tension.</li> </ul>
Blade is twisting	<ul style="list-style-type: none"> <li>1. Cut is binding blade.</li> <li>2. Too much blade tension.</li> </ul>	<ul style="list-style-type: none"> <li>1. Decrease reed pressure.</li> <li>2. Decrease blade tension.</li> </ul>

**14. ELECTRICAL DIAGRAM**

