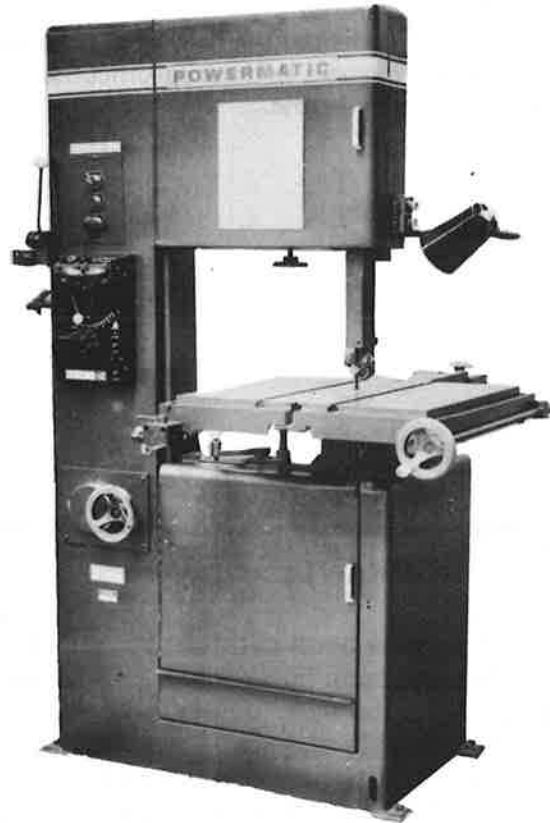


**Model 88**  
**20" (508mm) Band Saw**

# OPERATING INSTRUCTIONS

Price \$2.50



# POWERMATIC®

Strength and performance right down the line.

POWERMATIC  OUDAILLE, INC.  
McMinnville, Tennessee 37110

AC 615-473-5551

# FOREWORD

## SAFETY FIRST!

This manual has been prepared for the owner and those responsible for operating of a Powermatic Model 88 Band Saw. Its purpose, aside from machine operations is to promote safety through the use of accepted operating practices. Read the safety and operating instructions thoroughly before operating the machine.

In order to obtain the maximum efficiency from your Powermatic Band Saw, follow all instructions in the operating and maintenance manuals carefully.

The specifications put forth in this manual were in effect at the time of publication. However, owing to Powermatic's policy of continuous improvement, changes to these specifications may be made at any time without obligation on the part of Powermatic Houdaille, Inc.

## WARRANTY

This machine and its component parts have been carefully inspected and performance tested at various stages of production and each finished machine is subjected to a final inspection before shipment. We agree that for a period of eighteen (18) months or 3000 hours of use, whichever occurs first from date of delivery from our authorized dealer, to repair or replace, at our option, any machine (or component part thereof) proving defective within the above period, F.O.B. our plant, providing such machine (or component part) is returned prepaid to our plant, or to a designated service center of the undersigned, for our examination. This warranty does not include repair or replacement required because of misuse, abuse, or because of normal wear and tear. Nor does it include electrical motors and electrical components which are warranted by their manufacturer and which should be taken to their local authorized repair station for service. Cost of removal, shipment and reinstallation are not covered hereby. Further, we cannot be responsible for the cost of repairs made or attempted outside of our factory or designated service center without our authorization. No claims will be honored if Serial No. plate has been removed. THIS WARRANTY IS MADE EXPRESSLY IN PLACE OF ALL OTHER WARRANTIES OR GUARANTEES, EXPRESS OR IMPLIED, WITH RESPECT TO FITNESS, MERCHANTABILITY, QUALITY OR OPERATIVENESS. THIS WARRANTY IS MADE ONLY TO THE ORIGINAL PURCHASER, AND BECOMES EFFECTIVE ONLY WHEN THE ACCOMPANYING CARD IS FULLY AND PROPERLY FILLED OUT AND RETURNED TO THE FACTORY WITHIN TEN (10) DAYS FROM DATE OF DELIVERY.

**POWERMATIC**  **HOUDAILLE, INC.**  
McMinnville, Tennessee 37110

## BAND SAW SAFETY INSTRUCTIONS

1. **Read, Understand, and Follow** the safety and operating instructions found in this manual. Know the limitations and hazards associated with this band saw. A safety rules decal is installed on each machine to serve as a reminder of basic safety practice.
2. **Grounding the Band Saw:** Make certain that the machine frame is electrically grounded and that a grounding lead is included in the incoming electrical service. In cases where a cord and plug are used, make certain that the grounding lug connects to a suitable ground. Follow the grounding procedure indicated by the National Electric Code.
3. **Eye Safety:** Wear an approved safety shield, goggles, or glasses to protect eyes when operating the band saw.
4. **Personal Protection:** Before operating the machine, remove tie, rings, watch and other jewelry and roll up sleeves above the elbow. Remove all loose outer clothing and confine long hair. Hearing protectors should be used when noise exceeds the level of exposure allowed in Section 1910.95 of the OSHA regulations. Do not wear gloves.
5. **Work Area:** Keep the floor around the machine clean and free of scrap material, chips, oil, grease, coolant, tools or accessories to minimize the danger of slipping or tripping. Be sure the table is free of all scrap, foreign material and tools before starting a cut. Powermatic recommends the use of anti-skid floor strips on the floor area where the operator normally stands and that each machine work area be marked off. Make certain the work area is well lighted and ventilated. Where dust or fumes present a hazard, provide proper exhaust system. Provide for adequate work space around the machine.
6. **Guards:** Keep the machine guards in place and doors closed at all times when the machine is in use. If removed or opened for maintenance purposes, use extreme caution and replace the guards and close doors on completion of the maintenance task before using the band saw.  
**DO NOT OPERATE THE MACHINE WITH THE GUARDS OFF OR THE DOORS OPEN!**
7. **Do Not Overreach:** Maintain a balanced stance and keep your body under control at all times. Do not overreach.
8. **Use Blades that are in Good Condition:** Blades that are not sharp or having missing teeth can require excessive force or could break. Examine the backs of the blades. If it is rolled over, do not use the blade. Do not exceed 500 SFM using high speed steel blades.
9. **Hand Safety:** Keep hands away from the blade while it is in motion. Always adjust the guide bar to be as close to the top of the work piece or fixture as possible to minimize blade exposure. Do not open the upper or lower band saw doors while the machine is under power. Do not position hands on stock in line with the band saw blade.
10. **Wheel Rotation:** Be sure the band saw wheels rotate clockwise when under power.
11. **Machine Adjustment:** Make all adjustments with power off except wheel speed and feed rate.
12. **Machine Capacity:** Do not make any cuts requiring more power than is available on the machine. Do not exceed table carrying capacity of 500 lbs, evenly distributed.
13. **Avoid Accidental Starts:** Make certain the motor switch is in the "off" position before connecting power to the band saw.
14. **Careless Acts:** Give the work you are doing your undivided attention. Looking around, carrying on a conversation and "horseplay" are careless acts that can result in serious injury.
15. **Job Completion:** If the operator leaves the machine area for any reason, the band saw should be turned off and come to a complete stop before his departure. In addition, if the operation is complete, he should clean the band saw and work area. Never clean the machine with the power "on" and never use the hands to clear chips or sawdust. Use a brush.
16. **Disconnect Machine:** Before performing any service or maintenance and when changing blades.

## BAND SAW SAFETY INSTRUCTIONS, cont'd

17. **Replacement Parts:** Use only Powermatic or factory authorized replacement parts and accessories; otherwise, the warranty will be null and void.
18. **Misuse:** Do not use this Powermatic band saw for other than its intended purpose. If used for other purposes, Powermatic disclaims any real or implied warranty and holds itself harmless for any injury which may result from that use.

Do not equip your Powermatic band saw with a motor larger than 3 HP at 1800 RPM. Doing so voids the warranty and Powermatic holds itself harmless from any injury that may result.

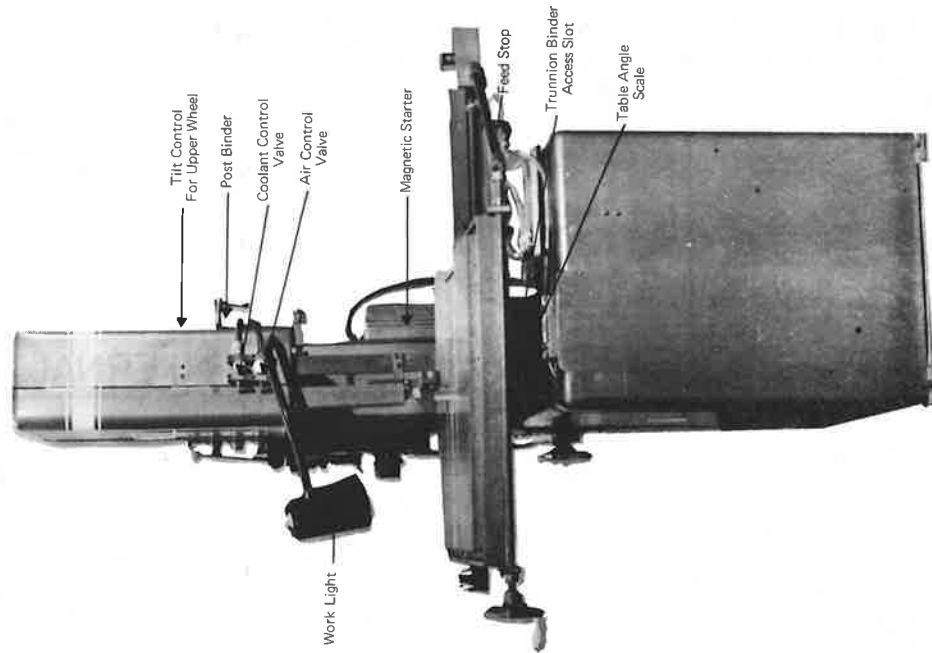
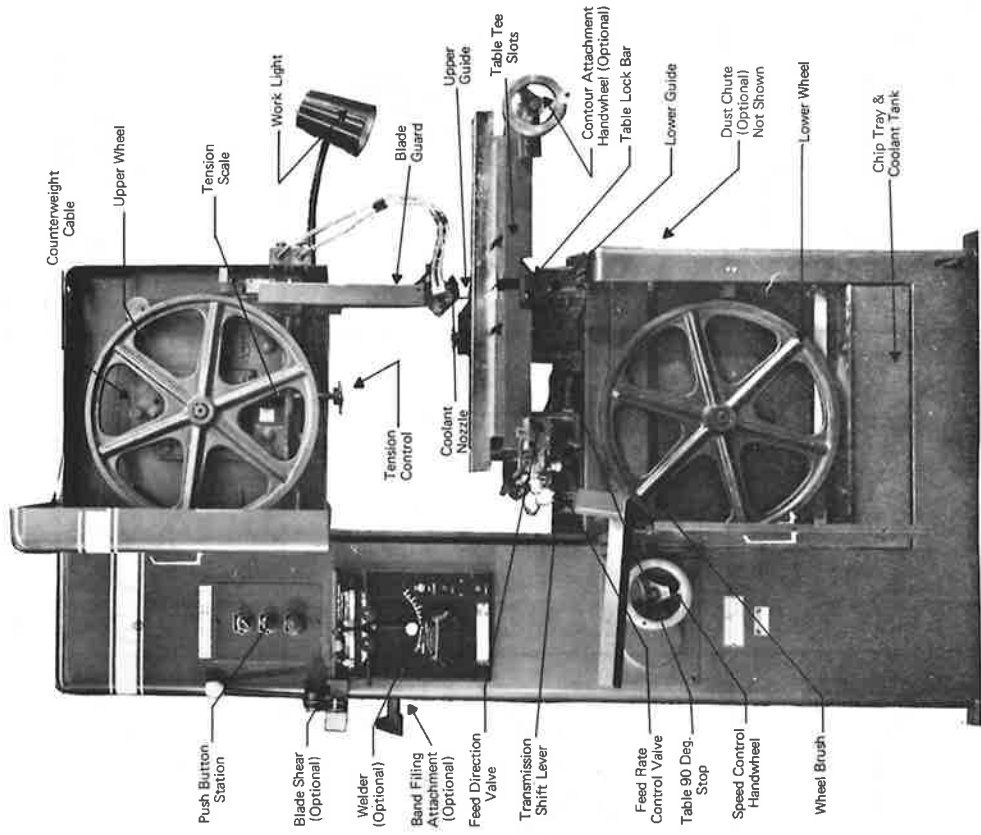
### MACHINE SPECIFICATIONS

Table Size	-----	24" (609mm) X 24" (609mm)
Table Tilt	-----	45° Right – 15° Left
Throat, Blade to Column Guard	-----	19-3/4" (501mm)
Maximum Work Thickness	-----	12" (305mm)
Table Travel	-----	0–10" (0–25mm)
Table Rate of Speed	-----	0–58 in/min. (0–1473 mm/min.)
Table Feed Force	-----	0–300 lbs. (0–136kg)
Speed Range:		
Low (infinitely variable)	-----	47–470 rpm
High (infinitely variable)	-----	520–5200 rpm
Blade Width Capacity	-----	1/8–1" (3–25mm)
Blade Length	-----	149–152" (3785–3861mm)
Upper Wheel Adjustment	-----	1-1/2" (38mm)
Band Saw Wheel Diameter	-----	20" (508mm)
Hydraulic Pump	-----	1-1/2 gpm @ 100 psi (94.6 cm <sup>3</sup> /s @ .689 mpa)
Coolant Capacity	-----	3 gal. (1136 cm <sup>3</sup> )
Main Drive Motor	-----	2 or 3 hp (1.5 or 2.24 kw)
Weight Domestic Crated	-----	1500 lbs. (680 kg)

### BELTS

<u>LOCATION</u>	<u>POWERMATIC NO.</u>	<u>INDUSTRY NO.</u>	<u>NO. REQ.</u>
Between Variable Speed Pulleys	----- 6077143	----- 1922V426	----- 1
Between Countershaft & Transmission	----- 6077141	----- 7M1180	----- 3
Between Compressor & Motor	----- 6077076	----- 7M710	----- 1
Between Hydraulic Pump & Motor	----- 6077142	----- 7M615	----- 1

# MODEL 88 FEATURES



**SHOWN IN THE FOLLOWING FIGURES ARE SOME OF THE TYPICAL OPERATIONS PERFORMED ON BAND SAWS.**

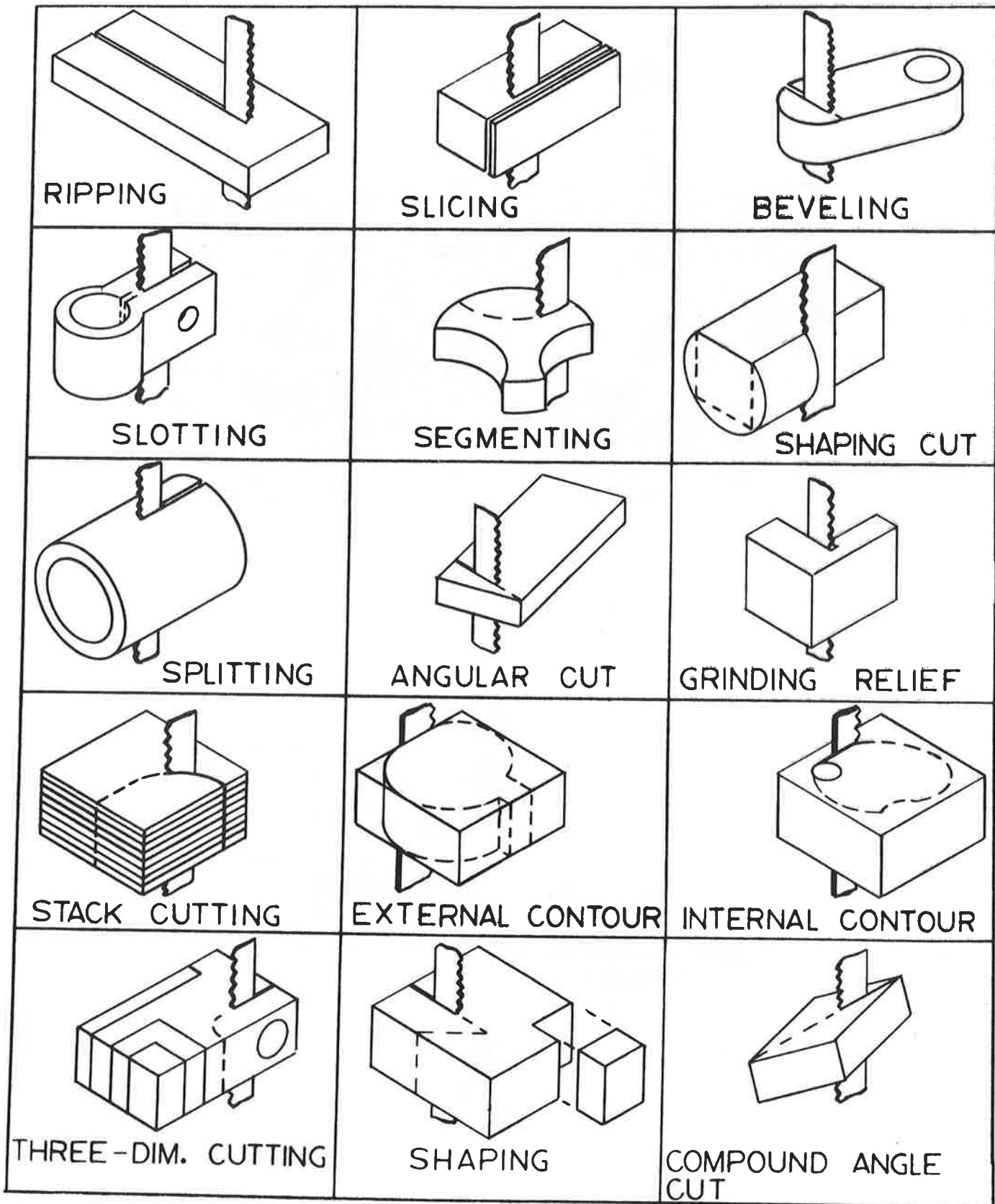


FIGURE 2

## GENERAL BAND—SAWING INSTRUCTIONS

### PRODUCTION APPLICATION CHECK LIST

1. Plan sequence of cuts.
2. Select saw blade and install saw guides.
3. Install and tension saw band.
4. Select and mount tooling.
5. Set work stops.
6. Set band speed.
7. Run through without parts.
8. Adjust coolant if used.
9. Set feed.
10. Run one part and time cut.
11. Check cutting rate.
12. Adjust feed and set-up.
13. Examine chip formation.
14. Check completed parts.
15. Change band when required.
16. Clean out chip drawer.

### SAW OPERATIONS

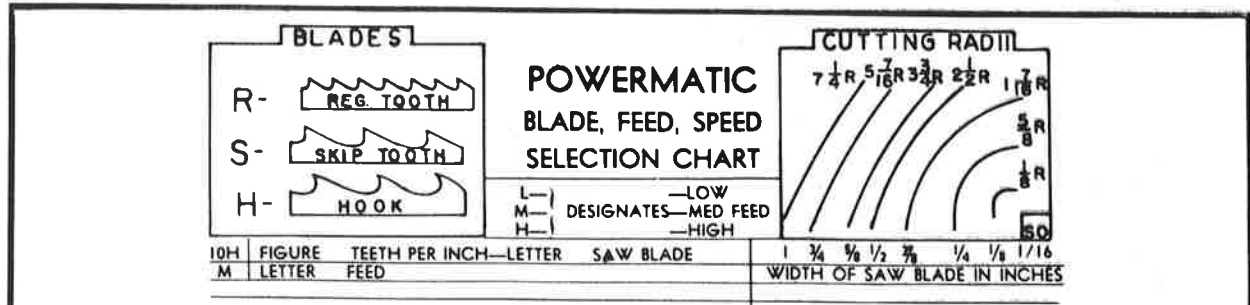
The two types of sawing operations that can be performed on a Powermatic Model 88 Band Saw are straight and contour cuts.

On straight cuts, hydraulic table feed is used to make the operation easier and more efficient than on a manual feed saw. Contour cuts may be made either by using hydraulic feed or manually as when using a circle cutting attachment.

For all straight sawing operations:

1. Using the speed and feed chart (Fig. 3) or a good band sawing reference, select the speed, feed rate, blade (with reference to the radius chart when applicable), and coolant recommendations for the material and thickness to be cut.
2. Install the blade and adjust the tension using the tension scale. Check to see if the blade is centered on the wheels against the backup bearing of the upper guide and within 1/32" of contacting the upper guide backup bearing. Tilt the upper wheel as required to give these conditions. If these conditions are not met, see the band saw alignment section of the maintenance manual for readjustment.
3. Change or install the inserts for the blade width to be used. Slide the right hand lower guide insert to lightly contact the blade and lock in place. Bring the lower guide left hand insert to be against the side of the blade tight enough to give a slight drag as the band is pulled out by hand and then lock it in position. Align the upper guide inserts in the same fashion. If the blade to be used is less than 1/2" width, a 3/16" spacer block is used behind upper guide and the lower guide support should have the step side in it facing towards the trunnion. The opposite is true for blades 1/2" wide or wider.
4. Install the work squaring bar or other work holding or guiding device.
5. Unlock and angle the table if required by the operation to set it at the desired angle and re-lock. CAUTION: With the blade tilted, be sure a rail or other device is used to prevent the cut-off portion from falling to the floor and causing injury.
6. Momentarily start and stop the machine to be sure the wheels rotate in the correct clockwise direction. If the direction is not clockwise, have the problem corrected as indicated in the maintenance section.
7. Check the position of the transmission shift lever to see if it is in the proper range for the desired speed. If not, rotate the lower wheel manually and shift into the correct range.
8. Be sure both upper and lower doors are closed. Start the machine and adjust the speed with variable speed handwheel to set the desired surface speed.

# SPEED AND FEED CHART



**ALL FIGURES BELOW ARE A STARTING GUIDE**

MATERIAL	BLADE PITCH WORK THICKNESS & FEED				REG BLADE SPEED WORK THICKNESS				HSS BLADE SPEED WORK THICKNESS				COOLANT	POLISHING SPEED WORK THICKNESS				FILING SPEED WORK THICKNESS					
	1/2	1	3	6 & OVER	1/2	1	3	6 & OVER	1/2	1	3	6 & OVER		1/2	1	3	6 & OVER	1/2	1	3	6 & OVER		
	10R/M	8R/H	4H/H	3H/H	175	175	150	150	350	350	300	275		YES	4500	4000	3500	3000	120	110	100	90	
STEEL	1015 1035	10R/M	8R/H	4H/H	3H/H	175	175	150	150	350	350	300	275	YES	4500	4000	3500	3000	120	110	100	90	
	1065 1095	10R/M	8R/H	4H/H	3H/H	125	100	80	80	200	200	200	160	YES	4500	4000	3500	3000	120	100	90	80	
	1320 1345	10R/M	8R/H	4H/H	3H/H	125	100	80	70	150	150	150	100	YES	3000	2500	2000	2000	120	100	80	80	
	2317 2345	10R/M	8R/H	4H/H	3H/H	100	100	80	80	150	150	150	125	YES	3500	3000	2500	2000	90	70	60	50	
	3115 3150	10R/M	8R/H	4H/H	3H/H	125	100	80	80	180	180	180	150	YES	3000	3000	2500	2000	70	70	50	40	
	4017 4068	10R/M	4H/H	4H/H	3H/H	130	115	90	90	180	180	180	150	YES	3500	3000	2500	2000	60	50	40	30	
	4130 4150	10R/H	8R/H	4H/H	3H/H	110	85	60	60	175	175	160	130	YES	3500	3000	2500	2000	60	50	40	30	
	4317 9850	10R/H	8R/H	4H/H	3H/H	90	65	50	50	170	170	170	130	YES	3000	3000	2500	2500	50	50	40	40	
	4608 4821	10R/M	8R/H	4H/H	3H/H	100	80	60	60	175	175	175	150	YES	3500	3000	2500	2000	60	50	40	40	
	6117 6152	12R/H	8R/H	4H/H	3H/H	110	90	60	60	170	170	170	130	NO	3000	2500	2000	2000	60	50	40	40	
9255 9262	10R/H	6R/H	3H/H	3H/H	125	100	60	60	170	170	170	130	NO	3000	2500	2000	2000	60	50	40	40		
H.S. TOOL STEEL	H-12 H-13	10R/M	8R/H	4H/H	3H/H	80	70	60	50	220	180	140	100	NO	3000	2500	2500	2000	60	50	50	40	
	M-2, M-3	10R/M	8R/H	4H/H	3H/H	90	70	50	50	100	100	80	70	NO	3000	2500	2500	2000	60	50	40	40	
	T-4 T-5	10R/M	8R/H	4H/H	3H/H	90	70	60	50	125	100	80	60	NO	3000	2500	2500	2000	50	40	40	30	
	D7	10R/M	8R/H	4S/H	3S/H	60	60	60	60	90	90	75	60	NO	3000	2500	2000	2000	60	50	40	30	
DIE STEEL	01 02	10R/M	8R/H	4S/H	3S/H	125	100	75	75	200	200	200	175	NO	3000	2500	2000	2000	70	60	50	50	
	W1	10R/M	8R/H	4S/H	3S/H	125	100	75	75	225	225	200	175	YES	3000	2500	2000	2000	60	50	40	40	
	302 304	10R/H	8R/H	6R/H	4H/H	80	80	80	70	125	125	100	100	YES	3000	2500	2000	2000	60	50	40	40	
STAINLESS STEEL	303 416	10R/H	8R/H	6R/H	3H/H	100	100	70	70	175	150	125	125	YES	3500	3000	2500	2000	90	80	70	60	
	316 420	10R/H	8R/H	6R/H	3H/H					90	90	90	70	YES	3000	2500	2000	2000	60	60	50	50	
	321 347	10R/H	8R/H	6R/H	3H/H					90	90	90	70	YES	3000	2500	2000	2000	60	60	50	50	
	430 446	10R/H	8R/H	6R/H	3H/H					90	90	90	70	YES	3000	2500	2000	2000	60	60	50	50	
	440 443	10R/H	8R/H	4H/H	3H/H	125	125	100	75	125	125	100	100	YES	3500	3000	2500	2000	70	60	50	40	
	2014 2018	10R/L	6R/L	4H/M	3H/M	2700	2500	2300	2100					YES	4500	4000	3500	3000	190	160	130	100	
ALUMINUM	2024 5052	10R/L	6R/L	4H/M	3H/M	4500	4500	4500	4500					YES	4500	4000	3500	3000	200	180	170	160	
	6061 6063	10R/L	6R/L	3H/M	3H/M	4500	3800	3200	2600					YES	4500	4000	3500	3000	190	160	130	100	
	DIE CAST	10R/L	6S/L	4H/M	3H/M	1000	700	400	400					YES	4500	4000	3500	3000	130	120	110	100	
	MANG. BRONZE	10R/M	8R/M	4S/H	3S/H	900	800	600	400					YES	4500	4000	3500	3000	100	80	70	60	
	SILICON BRONZE	14R/M	10R/M	6R/H	3S/H	900	800	600	350					YES	4500	4000	3500	3000	90	80	70	60	
	PHOSPHOR BRO.	6R/L	3S/L	3S/M	3S/M	3000	2500	2000	1500					NO	3500	3000	2500	2000	90	80	70	60	
	ALUMINUM BRO.	14R/M	10R/M	6R/M	3S/H	900	600	400	300					YES	4500	4000	3500	3000	80	70	60	50	
	BERYLLIUM #25	10R/L	6R/L	3S/M	3S/H	2500	1600	1200	800					YES	4500	4000	3500	3000	110	90	80	70	
	NI. ALLOY	MONEL	10R/M	8R/H	6R/H	3H/H					90	90	80	60	YES	2500	2500	2000	2000	50	50	40	40
		INCONEL	10R/M	8R/H	6R/H	6R/H					70	60	50	50	YES	3000	2500	2000	2000	50	50	40	40
CASTING	GRAY CAST IRON	14R/M	10R/H	6R/H	3S/H	140	130	100	100					NO	4500	4000	3500	3000	120	110	80	60	
	CAST STEEL	14R/M	10R/H	6R/H	4S/H	135	125	110	100					NO	4500	4000	3500	3000	120	100	90	80	
	DUCTILE IRON	14R/M	10R/H	6R/H	4S/H	130	120	100	80					NO	4500	4000	3500	3000	120	100	90	80	
	MEEHANITE	14R/M	10R/H	6R/H	3S/H	135	125	110	100					NO	4500	4000	3500	3000	120	100	90	80	
	TITANIUM ALLOY	10R/M	10R/H	6R/H	3S/H	100	80	60	60					YES	2500	2000	2000	1500	50	40	40	30	
	MAGNESIUM	10R/L	6R/L	4H/M	3H/H	4500	4000	3500	3500					YES									
	ZINC	8R/L	4S/M	3S/M	3S/H	2600	2000	1500	1000					YES									
NON METAL	CARBON MICA	10R/L	6R/L	3S/M	3S/M	4000	3000	3000	2000					NO									
	ASBESTOS	32R/L				800								NO									
	HARD RUBBER	8R/L	6R/L	3S/M	3S/M	3500	3000	3000	3000					NO	3500	3000	2500	2500	130	90	70	50	
	FORMICA	10R/L	8R/L	6R/M	2S/H	4500	4000	3500	3000					YES									
	MASONITE	14R/M	10R/M	4H/H	4H/H	3000	2500	2000	1500					NO	4500	4000	3500	3000	180	170	160	150	
	MICARTA	10R/L	4S/L	3S/M	3H/M	4500	4000	3500	3000					NO									
PLASTICS	PLEXIGLAS	14R/M	10R/M	4H/H	3H/H	3000	2500	2000	1500					NO	4500	4500	4000	4000	110	90	80	70	
	PAPER	10R/L	6R/L	3S/M	3S/M	3500	3000	2500	1800					NO	3500	3000	2500	2500	170	150	120	120	

FIGURE 3

## SAW OPERATIONS, cont'd

9. The valve handle to set feed direction is directional such that if swung in, table will feed in; if swung out, table will feed will be out towards the operator. Mid-position is a blocked valve or stop position. Measure off a known length in front of the blade and using a stop watch or the second hand of a watch set the approximate feed rate desired.
10. Move the table in to the maximum forward position for the operation to be performed and stop it in that position. Adjust the positive stop at the rear of the table. Move the table to the out position and stop the main drive motor.
11. Mount the part piece and lock it in place by the method to be used for the operation (Fig.4).

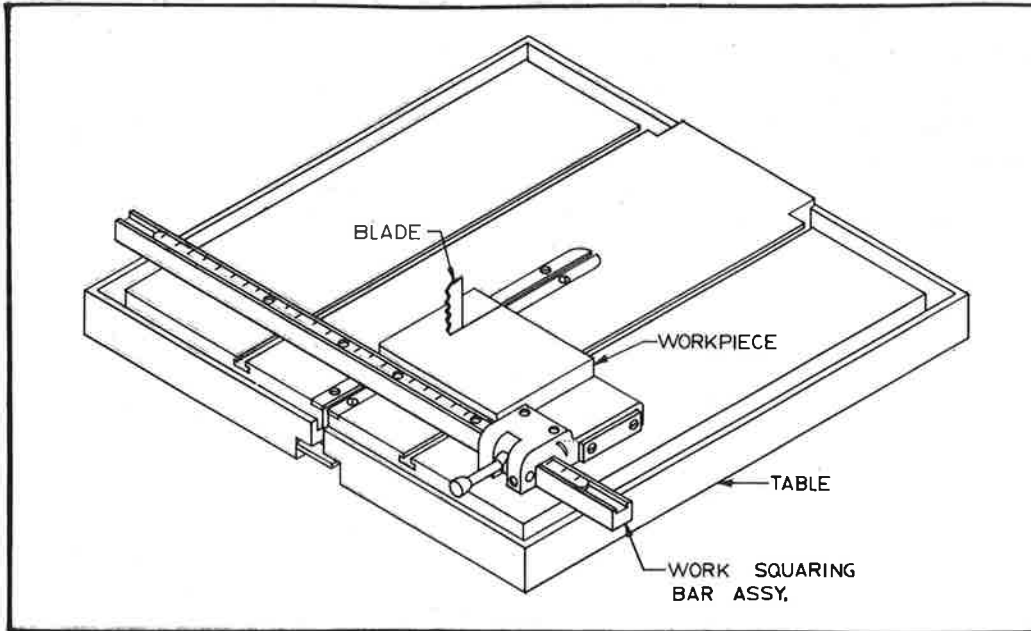


FIGURE 4

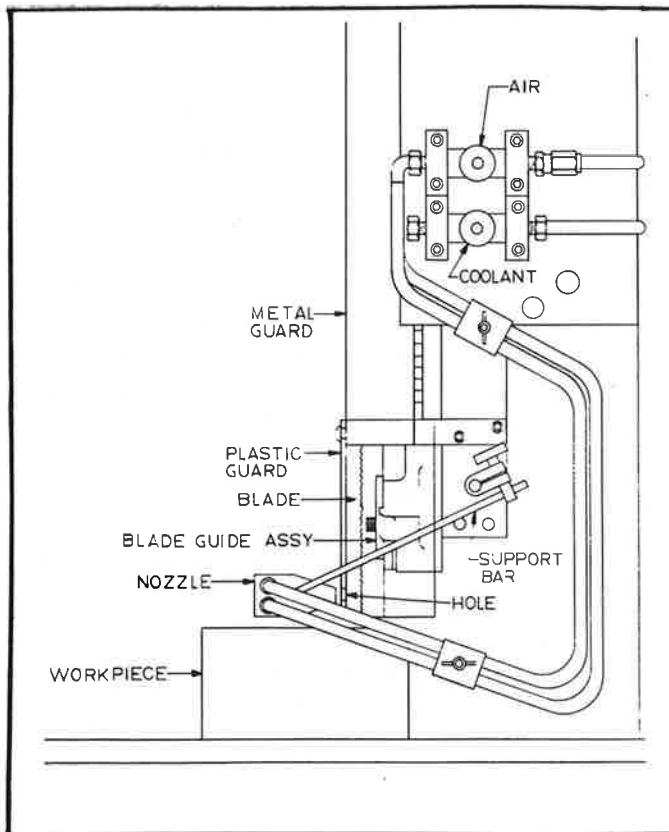


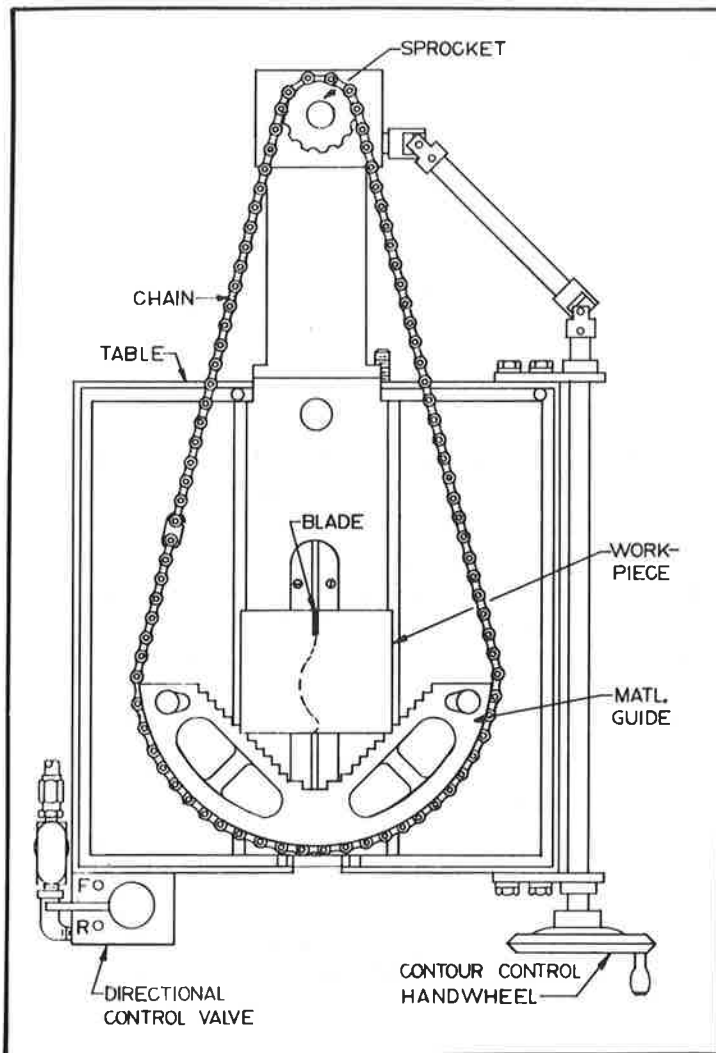
FIGURE 5

12. Adjust the guide post to be as close to the top of the workpiece or fixture as possible and still clear to provide maximum rigidity for the cut. Check the lower guide support; it should be in its maximum up position to bring the lower guide as close as possible to the under side of the table.
13. If coolant is to be used, adjust the coolant nozzle to direct flow through the hole in the blade guard to allow coolant to flow on to the table (Fig. 5). If coolant is not used, the nozzle can be used as a chip blower to keep the top of the workpiece free of chips.

## SAW OPERATIONS, cont'd

14. Make sure your hands are clear of the blade and start the motor.
15. Move the directional feed valve to cause inward motion of the table. If the blade is some distance from the workpiece, note the position of the flow control valve and increase feed to decrease non-cutting time. As the workpiece approaches the blade, slow the feed to less than the recommended rate until the teeth are buried in the work, then increase it back to the original setting. Band sawing is to an extent a matter of feel through the sound of the cut and the chip formation. Through experience, the operator will learn to make adjustments in speed and feed rate to tune the cut for the best combination. As the blade dulls, the feed will slow down automatically because of the increased pressure required to cut the material. Blade life and cut accuracy are reduced by too heavy a feed. Let the blade cut but don't force it. Forcing it may get the operation done sooner but that savings will be lost in reduced blade life and in the time lost in changing blades.
16. At the completion of the cut, reverse the feed direction valve and traverse the table to its out position. If the main drive motor is not stopped between repetitive cuts use extreme caution in keeping the hands and fingers clear of the blade. Use a stick or hook to remove the cut-off piece and use caution in handling it as it can be hot and have sharp edges which can cut. Clear chips with a brush; do not use your hands.

## FOR CONTOUR CUTTING



A fair amount of skill is required to contour cutting as the part is literally steered through the cut and the feed may be forward, stopped, or reversed. To make the operation easier, the machine should be equipped with an electro-hydraulic reversing valve which allows foot control of feed direction. The set-up of the machine is the same as in straight cutting except the installing the workpiece on the table in either the chain is wrapped around the workpiece or the work holding device is attached by chain around the sprocket in the block the blade width is selected must be no on page 8, Fig. 3. Start the cut so that a straight cut comes in line with a scribed contour line. Once the blade is on the line so to speak, keeping it on the line involves the use of the handwheel of the contour attachment and the feed direction valve or direction reversing valve. In learning how to contour cut, keep the feed rate low to make it easier to follow the line.

For internal contour, a starting hole is necessary and the blade will have to be broken, fed through the hole and rewelded before it can be mounted on the band saw wheels. On completion of the cut, it will have to be rebroken to free the part piece.

FIGURE 6

## SAW OPERATIONS, cont'd

### HIGH SPEED SAWING APPLICATIONS (USING CARBON SAW BLADE ONLY)

When using the high speed range of its saws, Powermatic recommends carbon blades only for high speed sawing applications. (Never run high speed steel blades over 500 Surface Feet Per Minute.) This refers to sawing of aluminum, magnesium, brass and other free machining metals, as well as wood, plastics, and composition materials at band speeds over 2000 FPM. Short, high speed sawing jobs may be performed with insert guides. Roller guides are preferred, however, and should be used for all long jobs and all production runs except those requiring maximum accuracy.

Most high speed sawing jobs can be fed very rapidly, usually manually, and as fast as the operator's dexterity permits on thin work.

### HIGH SPEED APPLICATIONS CHECK LIST

#### OPERATIONS

1. Check advisability of high speed sawing the material by consulting speed and feed chart.
2. Select sequence of cuts.
3. Select saw blade (carbon blade).
4. Install and tension saw band.
5. Select and mount tooling.
6. Set band speed.
7. Determine fastest practical feed method by trying both power and hand feed methods.
8. Set work stops if job is repetitive.

### FRICTION SAWING OPERATION

In friction sawing, momentary contact between the material being cut and the fast moving saw blade produces enough friction to heat the material to its softening point. As it becomes soft it is cut away by the saw teeth. This method cuts many times faster than conventional methods, and more important, cuts many materials which can be machined in no other way. (Band saw size—limitation 1/2, 3/4, & 1").

1. Coolant:  
Coolant is NOT USED during friction sawing.  
Caution: If an oil based coolant has been used, it will be necessary to drain and clean the coolant system before friction sawing because of the fire danger of sparks falling into the coolant.
2. Saw Blade:  
Worn out saw blades may be used for the occasional friction sawing job. It may be difficult to guide, however, because of the uneven wear. For greatest economy and accuracy, a friction saw blade should be used.  
  
A low speed sawing operation will produce sharply curled chips, the result of a hard shearing action; whereas those chips produced by friction sawing are shorter with less curl and with pronounced cracks and wrinkles.
3. Operation  
The speed should be turned to maximum. Hand feed is satisfactory for friction sawing if a wood pusher stick is used as a safety precaution. Friction sawing of thin material is so rapid that generally hand feed is used. The feed rate is usually limited only by the operator's dexterity. For straight cuts only a guide is needed. The standard angle plate can be used or a bar of steel clamped to the work table the desired distance from saw band by means of the universal clamps.

## SAW OPERATIONS, cont'd

### \*\*IMPORTANT

During friction sawing an extremely sharp burr is produced on the workpiece. Handle with care. Because friction sawing is a dry operation, the dust and fine chips may be objectionable. If much of it is to be done in a general shop area, simple screens can be erected to keep the dust away from other operations. Friction sawing is so fast that work handling may require greater time than sawing. Work flow is therefore very important for production friction sawing.

\*\*Material to be sawed should not exceed 3/16" in thickness. Most steel alloys have a low enough melting point to lend themselves to the friction sawing process. Annealing is not necessary since Rockwell hardness does not make an appreciable difference in friction sawing. The heat penetration into the side wall of the finished cut is almost negligible. If the cut is made too slowly, however, greater penetration will result. The most striking applications of friction sawing will be found in the cutting of stainless steels and armor plate which sometimes cannot be cut by any other method. Materials such as glass, plastics, brass and bronze, magnesium and aluminum do not lend themselves to friction sawing.

### FRICTION SAWING CHECK LIST

#### OPERATIONS

1. Check advisability of friction sawing the material.
2. Select saw blade.
3. Install roller guides, for production runs.
4. Install and tension saw band.
5. Select and mount tooling, if any.
6. Set band speed (5200 FPM).
7. Do not use coolant. Determine fastest practical feed methods.

#### FOR BEST RESULTS

1. Alter speed for best cutting rate and least high speed vibration.
2. Wear safety glasses and gloves. Set up screen to keep chips and dirt in the area.
3. Keep work surface of the machine clean.
4. Arrange work handling for efficient production.

### BAND SAW BLADES

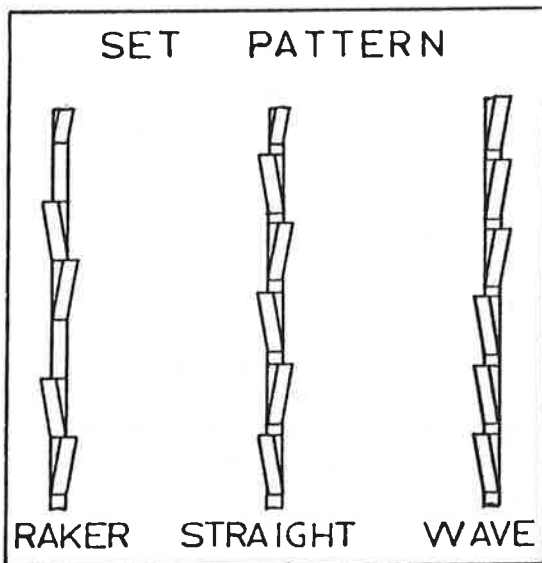


FIGURE 7

Four basic differences are involved in band saw design and these are in the number of teeth (pitch), the tooth form, the set of the teeth and blade material.

The tooth forms are shown in Fig. 3. In general, the thicker the workpiece, the coarser the pitch of the blade used. Follow the recommendations shown in Fig. 3 for pitch selection. Set patterns used on band saw blades are shown in Fig. 7. The raker set is one of the two most commonly used in metal cutting. The other is the wavy set used where to cross section of the work changes such as in cutting of pipe tubing and structurals. The straight set is used for blades to cut wood and plastics. Band materials may be carbon steel, carbon steel with a high speed steel welded edge, carbon steel with carbide tips, carbon steel with diamond tips and high speed steel. CAUTION: Never run a high speed blade over 500 SFM.

## OPTIONAL ACCESSORIES

### CIRCLE CUTTING ATTACHMENT INSTRUCTIONS (OPTIONAL)

The Circle Cutting Attachment is used to cut circles either internally or externally of any radius from 1" to 36".

To mount the Circle Cutting Attachment, install the bar on the table using the two  $\frac{1}{4}$ —20 X  $1\frac{1}{2}$  pan head screws. The two  $\frac{3}{16}$  diameter roll pins will relocate the bar in the proper position.

Install the support member to the left of the blade using the two  $\frac{1}{4}$ —20 X  $\frac{1}{2}$  pan head screws provided. Attach it so that it is parallel to and  $\frac{1}{8}$  inch from the blade.

To set up for a circle, using a tape measure or scale, position the slider such that the  $\frac{3}{16}$  roll pin center line is the exact radius distance of the arc or circle to cut from the blade. Lock the slider in place. On blades up to  $\frac{1}{2}$ " wide, the roll pin should be to the left (toward the blade) of the set screw that locks the slider to the bar and vice versa on blades wider than  $\frac{1}{2}$ ".

Measure in from one side of the workpiece the radius distance plus not more than  $\frac{1}{32}$ . Scribe a line. Measure in, from a surface adjacent to the first surface, a distance that exceeds the desired radius. Scribe a crossing line. Drill a  $\frac{13}{16}$ " hole in the workpiece deep enough to not bottom out on the  $\frac{3}{16}$  roll pin in the slider. Countersink the hole. Place the workpiece hole down on the table. Slide the first surface used against the blade and drop the hole in the workpiece over the slider pin.

Turn the saw on. Place the left hand over the pin area and press down to level the workpiece on the bar. Rotate the workpiece clockwise into the blade and continue to rotate until the workpiece is complete. Stop the machine and remove the workpiece. This attachment can be used with fixtures on which the workpiece is clamped or held in some fashion, and the pivot hole is in the fixture.

**OPTIONAL ACCESSORIES, cont'd**

3. **3/4" CAPACITY BLADE WELDER:** This accessory allows the operator to weld carbon steel or welded edge band saw blades from 1/16" to 3/4" wide. See the Welder Manual for operation and maintenance.
  
4. **BLADE SHEAR:** Used to square and cut off the ends of band saw blades to prepare them for welding.
  
5. **BAND SAW FILING ATTACHMENT:** Some craftsmen prefer to file the flash from band saw blades after welding instead of grinding it off. The band saw filing attachment provides the means for holding and supporting the blade for filing.
  
6. **90° TWIST BRACKET KIT:** This accessory provides the parts for mounting the guides at 90° from their normal position so that the blade may be twisted to be perpendicular to the guide bar and permit long workpieces such as pipe to be cut off.

**TROUBLE-SHOOTING AND SAWING HINTS**

<b>TROUBLE</b>	<b>POSSIBLE CAUSE</b>	<b>REMEDY</b>
Table Tilt Does Not Hold Position Load.	<ol style="list-style-type: none"> <li>1. Tilt lock is not tightened .</li> <li>2. Tilt lock mechanism is broken or worn.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten tilt lock.</li> <li>2. Replace.</li> </ol>
Table Will Not Tilt.	<ol style="list-style-type: none"> <li>1. Trunnion was not lubricated</li> <li>2. Trunnion is jammed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Lubricate.</li> <li>2. Disassemble and replace jammed parts;</li> </ol>
Table Vibration (while sawing)	<ol style="list-style-type: none"> <li>1. Incorrect band speed.</li> <li>2. Incorrect choice of saw band pitch.</li> <li>3. Worn or improperly adjusted saw guide inserts.</li> <li>4. Worn saw guide backup bearing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check speed and feed chart and correct speed for material.</li> <li>2. Check speed and feed chart and change to correct blade.</li> <li>3. Adjust or replace inserts.</li> <li>4. Replace backup bearings.</li> </ol>
Transmission Will Not Stay In Gear.	<ol style="list-style-type: none"> <li>1. Broken roll pins in shift linkage.</li> <li>2. Shift mechanism in transmission is jammed.</li> <li>3. Sliding clutch jaws in transmission jammed or damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace roll pins.</li> <li>2. Consult factory.</li> <li>3. Consult factory.</li> </ol>
Surface Finish On Work Too Rough.	<ol style="list-style-type: none"> <li>1. Saw guide inserts are worn.</li> <li>2. Saw band speed is too low.</li> <li>3. Saw band pitch is too coarse.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace inserts.</li> <li>2. Increase speed.</li> <li>3. Change to finer pitch blade.</li> </ol>
Saw Band Cutting Inaccurately.	<ol style="list-style-type: none"> <li>1. Worn blade teeth.</li> <li>2. Scale on workpiece was not removed.</li> <li>3. Workpiece hardened by grinding to remove scale.</li> <li>4. Incorrect saw band or insert alignment.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace blade.</li> <li>2. Remove scale.</li> <li>3. Scrap workpiece.</li> <li>4. Realign saw or inserts.</li> </ol>

**TROUBLE-SHOOTING AND SAWING HINTS, cont'd**

TROUBLE	POSSIBLE CAUSE	REMEDY
Saw Band Cutting Inaccurately.	5. Post not square to table. 6. Incorrect band speed used.  7. Incorrect feed force used. 8. Saw guide on upper post not located close enough to work-piece. 9. Incorrect choice of saw band.  10. Incorrect saw band tension.	5. Square post to table. 6. Use table, and change to correct band speed. 7. Reduce feed force. 8. Relocate post as close as possible to top of work-piece or fixture. 9. Use table, and change to correct band. 10. Readjust tension.
Saw Band Teeth Stripping (usually caused by chip welding).	1. Saw band pitch too coarse for thin work section. 2. Work not held firmly.  3. Band speed too low.	1. Change band to finer pitch. 2. Change method of holding work. 3. Increase band speed.
Premature Saw Band Breakage (usually caused by teeth stripping.)	1. Saw band speed too low. 2. Feeding force too high. 3. Pitch of saw band too coarse. 4. Saw guide inserts and backup bearings not properly guiding band. 5. Band tension too high. 6. Defective weld.	1. Increase speed. 2. Decrease feed force. 3. Change band for finer pitch. 4. Check for worn inserts and backup ring and replace if required. 5. Reduce band tension. 6. See Welder Manual for instructions.
Premature Dulling of Saw Band Teeth.	1. Not breaking in saw band on first few cuts. 2. Band speed too high, causing abrasion. 3. Saw band pitch too coarse. 4. Feed pressure too light. 5. Cutting rate too high. 6. Faulty material analysis.  7. Faulty material such as heavy scale, inclusions, hard spots, etc. 8. Saw band vibration.  9. Chipped tooth lodged in cut.  10. Chip welding.	1. Reduce feed pressure and speed on first cuts.  2. Reduce speed. 3. Change to finer pitch blade. 4. Increase pressure. 5. Reduce feed pressure. 6. Determine material and correct speed feed or blade as required. 7. Replace material.  8. Check for unbalance due to worn belts or parts. 9. Stop cut and remove lodged tooth. 10. Reduce speed.
Table Not Feeding.	1. Pump not operating. 2. Pressure too low. 3. Relief valve stuck. 4. Cylinder scored. 5. Piston seals worn. 6. Insufficient oil.	1. Check belt drive. 2. Reset pressure. 3. Free valve in pump. 4. Replace cylinder. 5. Replace seals. 6. Refill reservoir.
Coolant Not Operating.	1. Tank level too low. 2. Pump not operating.	1. Fill tank. 2. Check for electrical supply and repair as required.

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