INTRODUCTION TO "METALSAWZ" BANDSAWS

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INTRODUCTION TO
"METALSAWZ"
BAND SAW MACHINES

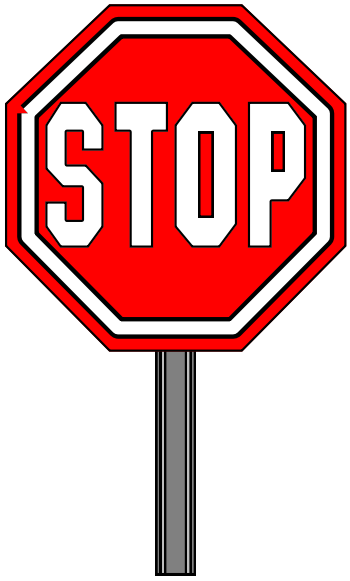
MANUFACTURING METALSAWZ
MetalSawz have been manufactured to operate with the same quality, efficiency and tolerances of machines that cost up to two times the price. The simplicity of the MetalSawz design will allow it to work well beyond its anticipated useful life. Only standard "off the shelf" components have been used to facilitate repair and replacement.

Adjustments are accessible and easily done. With proper use the saw will give years of service and expand the capabilities of your shop. This manual outlines the operations, adjustment and safety procedures.

It is very important that you familiarize yourself with this manual before you begin operation of the saw.

MZ STANDARD SERIES
WITH MZS PACKAGE
WITH MZHD PACKAGE

INSTRUCTIONS
AND
SAFETY PRECAUTIONS



INDUSTRIAL MACHINERY CAN BE DANGEROUS!

READ THE SAFETY MESSAGES BOTH IN THIS MANUAL AND POSTED ON THE MACHINE. A THOROUGH KNOWLEDGE OF THE OPERATION OF THIS MACHINE AND THE HAZARDS IT PRESENTS IS YOUR BEST PROTECTION AGAINST INJURY!

MetalSawz Inc. has made every effort to eliminate potential dangers in its equipment through careful design and guarding. This equipment has the potential to cause serious injury or death if not operated and maintained properly.

SAFETY

WARNING!

READ THIS SIGN BEFORE OPERATING THIS MACHINE.

MISUSE OF THIS MACHINE MAY RESULT IN SERIOUS BODILY INJURY. YOU MUST THEREFORE FOLLOW THESE SAFE OPERATING PROCEDURES.

THIS SAW IS DESIGNED FOR METAL SAWING. DO NOT USE THE MACHINE TO SAW ANY OTHER MATERIAL.

ALWAYS USE SAFETY GUARDS, ENCLOSURES OR TOOLING PROVIDED FOR THE SAFE OPERATION OF THIS MACHINE. DO NOT REMOVE THESE MECHANISMS FROM THIS MACHINE.

ALWAYS USE YOUR EMPLOYER PROVIDED PERSONAL SAFETY EQUIPMENT.

NEVER WEAR GLOVES WHEN OPERATING THE SAW. WEAR GLOVES WHEN HANDLING THE BLADE DURING SET-UP.

ALWAYS POSITION TOP SAW GUIDE AS CLOSE TO WORK-PIECE AS POSSIBLE.

ALWAYS CLAMP WORKPIECE SECURELY.

ALWAYS STOP MACHINE BEFORE REACHING INTO POINT OF OPERATION OR VISE AREA.

ALWAYS REFER TO DATA CHARTS SUPPLIED BY YOUR BLADE SUPPLIER TO CHOOSE APPROPRIATE BLADE, BLADE SPEED OR FEED FOR THE SIZE OR TYPE OF MATERIAL BEING CUT.

REPORT ANY UNSAFE CONDITION TO YOUR EMPLOYER.

A CAREFUL AND KNOWLEDGABLE OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT.

PERSONAL SAFETY PRECAUTIONS

- **QUALIFIED PERSONNEL** must make all electrical connections. *("Entela" evaluates our product for electrical safety and conformity.)*
- **DO NOT** operate the saw before reading the entire manual and familiarizing yourself with the location, function, and safety precautions of the machine.
- **NEVER** allow anyone unfamiliar or untrained to operate the machine.
- **NEVER** place any part of your body near a moving saw blade.
- **KEEP** guards and shields in place and in good working order.
- **USE EXTREME CARE** when making adjustments.

MACHINERY PRECAUTIONS

The caution decal is located on the front top blade cover of the machine and must remain legible. Should it become damaged we will replace it free of charge.

CAUTION

TO AVOID POTENTIAL HAZARDS, OBSERVE THE FOLLOWING PRECAUTIONS WHEN OPERATING OR SERVICING THIS MACHINE.

ALWAYS	WEAR SAFETY GLASSES.
ALWAYS	USE YOUR EMPLOYER PROVIDED SAFETY EQUIPMENT.
ALWAYS	WEAR GLOVES WHEN HANDLING SAW BLADE.
ALWAYS	ADJUST GUIDE POST HEIGHT TO WORKPIECE AND REMOVE LOOSE ITEMS FROM TABLE BEORE STARTING MACHINE.
ALWAYS	REPLACE BAND WHEEL COVER AND SKIRT DOOR AFTER INSTALLING NEW BLADE.
ALWAYS	KEEP FINGERS AND HANDS AWAY FROM MOVING SAW BLADE AND VISE.
ALWAYS	STOP MACHINE BEFORE REACHING INTO THE WORK AREA.
ALWAYS	AVOID CONTACT WITH COOLANT, ESPECIALLY THE EYES.
ALWAYS	USE A HOOK OR RAKE TO REMOVE DEBRIS FROM TABLE.
ALWAYS	MAINTAIN PROPER BLADE GUIDE BEARING CLEARANCE.
ALWAYS	BE AWARE OF PROPER BAND SPEED AND FEED PRESSURE SETTINGS.
ALWAYS	USE VISE PROPERLY.
ALWAYS	LOCK OUT POWER WHEN UNATTENDED.
ALWAYS	DISCONNECT POWER BEFORE REMOVING COVERS TO SERVICE MACHINE.
ALWAYS	REFER TO DATA CHARTS SUPPLIED BY BLADE MANUFACTURERS FOR PROPER SELECTION OF BLADE, SPEED AND FEED FOR THE TYPE AND SIZE OF THE MATERIAL YOU ARE CUTTING.
NEVER	WEAR JEWELRY OR LOOSE CLOTHING WHILE OPERATING MACHINE.
NEVER	SAW UNKNOWN MATERIAL.
NEVER	SAW A WELD OR A TORCH CUT EDGE.
NEVER	OPERATE WITH SAFETY SHIELDS REMOVED.
NEVER	ALLOW DEBRIS TO BUILD UP UNDER SAW OR IN COOLANT SUMP.
NEVER	RUN THE MACHINE WITHOUT A THOROUGH UNDERSTANDING OF ITS OPERATION.
NEVER	LOAD, UNLOAD STOCK OR REMOVE CUT PARTS FROM MACHINE WHILE THE BLADE IS RUNNING.

CONTROLS, OPERATION AND MAINTENANCE OF "METALSAWZ"

MZ1832S

(MODEL SHOWN)

PREPARING THE SAW UPON RECEIPT:

1. Remove steel shipping brackets located at rear.
    i. Small bracket – frame to carriage
    ii. Large bracket – column to carriage
    iii. Reinstall limit switch dog if equipped.
2. Fill hydraulic oil tank with between 20 and 25 gallons "Noco" AWS32 hydraulic oil or equivalent.
3. Do not run saw dry (without coolant). The coolant pump automatically runs when the saw starts.
4. Place coolant pan under the saw while head is in tilt position.
5. Have a qualified electrician connect the saw to a disconnect switch.
6. Grease all grease fittings on band wheel bearings and pivot points.
7. Familiarize yourself thoroughly with this instruction manual, particularly all safety points.

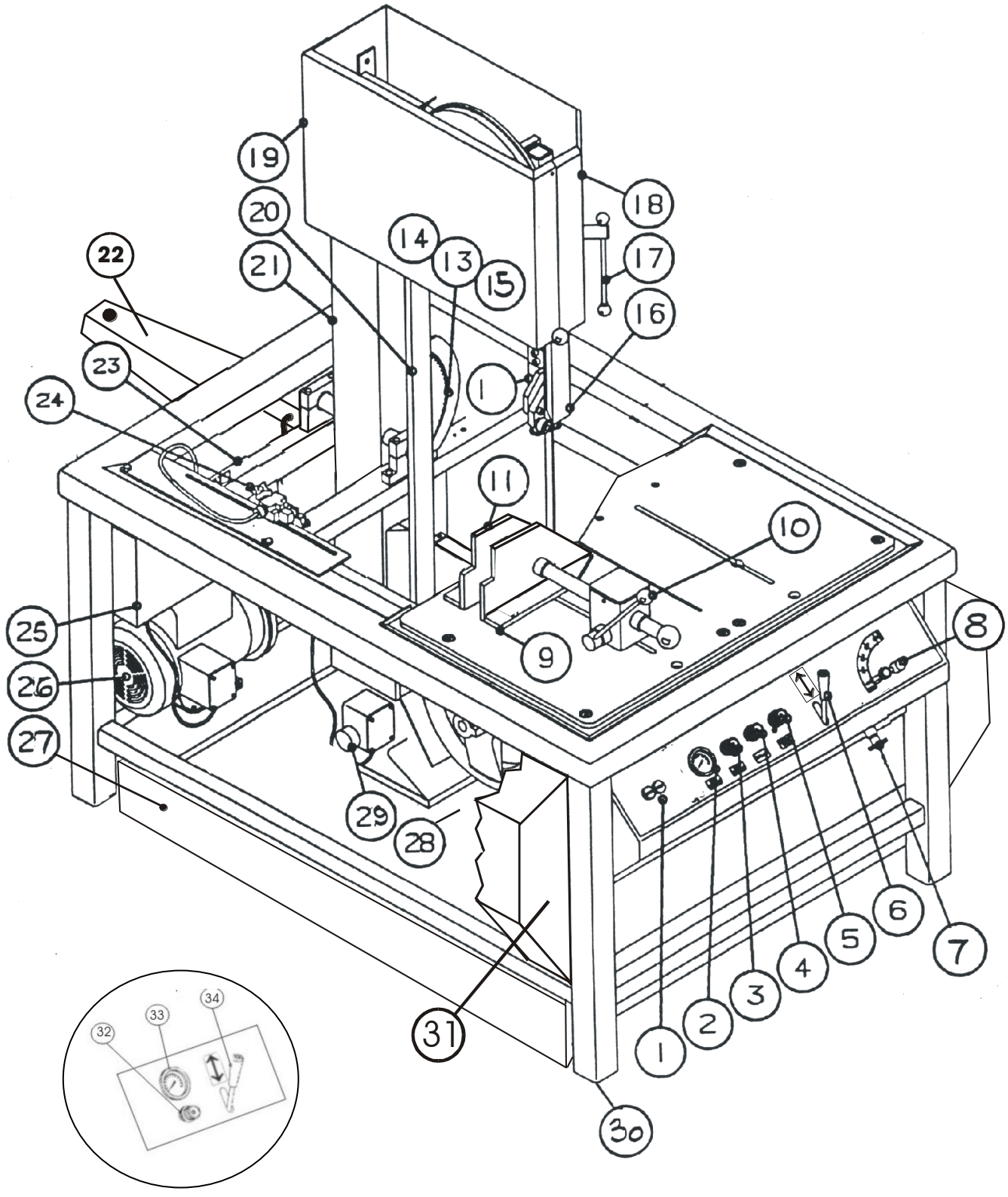
MAINTENANCE PRECAUTIONS:

1. Observe blade tension recommendations and use sharp blades. (Dull blades are dangerous and hard on equipment). Should you use excessive blade tension you will decrease wheel-bearing life.
2. Observe hydraulic oil reservoir level and change filter every 200 hours or when contaminated under normal conditions or sooner under extreme conditions.
3. Periodically clean off chips and debris on the underside of carriage and grease moving parts.
4. Read your manual.

CONTROLS AND OPERATIONS
(SEE FIGURE 1)

ITEM	DESCRIPTION
1	MAIN POWER SWITCH
2	FEED PRESSURE GAUGE
3	APPROACH SPEED CONTROL VALVE
4	FEED PRESSURE CONTROL VALVE
5	COOLANT FLOW CONTROL VALVE
6	CARRIAGE FEED CONTROL VALVE
7	HYDRAULIC HEAD TILT SELECTOR VALVE ("S" and "HD" MODELS ONLY)
8	BAND SPEED CONTROL VALVE
9	VISE ASSEMBLY
10	FRONT VISE JAW (standard left hand shown)
11	FIXED VISE JAW
12	BLADE GUIDE POST
13	HEAD TILT ANGLE INDICATOR
14	HEAD TILT LOCK (not shown)
15	HEAD TILT SCREW (not shown)
16	FRONT BLADE SHIELD
17	POST HEIGHT ADJUSTMENT CLAMP HANDLE
18	FIXED UPPER WHEEL GUARD
19	HINGED UPPER WHEEL GUARD
20	REAR BLADE SHIELD
21	C – FRAME ASSEMBLY
22	CARRIAGE FEED CYLINDER GUARD
23	CARRIAGE ASSEMBLY
24	AUTOMATIC SHUT-OFF SWITCH (IF EQUIPED)
25	ELECTRIC BOX
26	MOTOR AND HYDRAULIC PUMP ASSEMBLY
27	COOLANT TRAY HANDLE
28	COOLANT RECOVERY TRAY
29	COOLANT SUMP PUMP
30	LEVELLING BOLTS
31	REMOVEABLE SIDE PANELS
32	VISE PRESSURE ADJUSTMENT ("S" and "HD" MODELS ONLY)
33	VISE PRESSURE GAUGE ("S" and "HD" MODELS ONLY)
34	VISE PRESSURE VALVE ("S" and "HD" MODELS ONLY)

SAW CONTROLS



(FIGURE 1)

START-UP AND OPERATION

INSTALLATION PROCEDURES

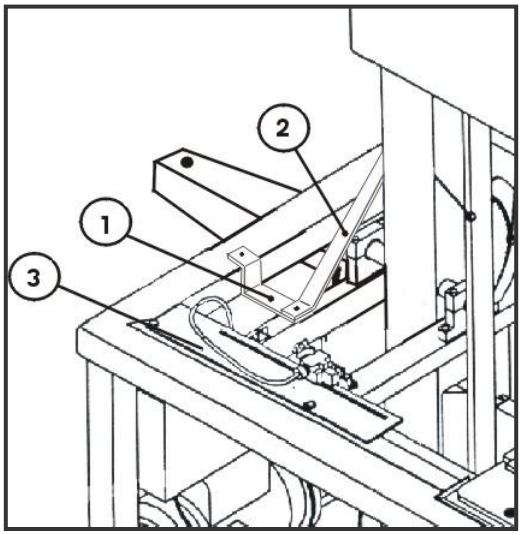
NOTE: This machine has been set-up and tested prior to shipping, but due to the vibrations and stresses of shipping the following procedures should be completed to ensure proper installation.

IMPORTANT!

TO MEET HIGHWAY TRANSPORT REGULATIONS THIS MACHINE IS SHIPPED WITHOUT HYDRAULIC OIL. FILL HYDAULIC OIL TANK WITH BETWEEN 20 AND 25 GALLONS OF "NOCO" AWS32 HYDRAULIC OIL (OR EQUIVALENT) BEFORE STARTING THE MACHINE.

"FAILURE TO COMPLY WILL VOID THE LIMITED WARRANTY."

1. Remove **carriage** and **frame brackets.** Re-install limit switch dog if so equipped. *(Fig. 2, items 1 and 2)*

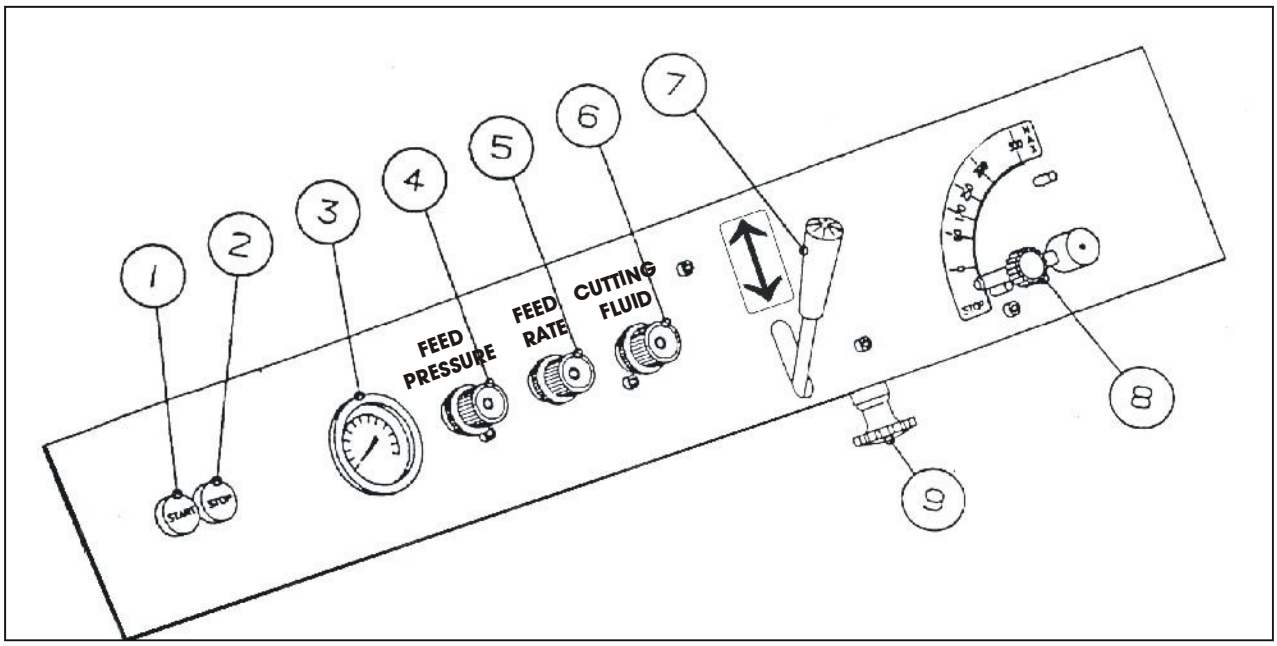


(Figure 2)

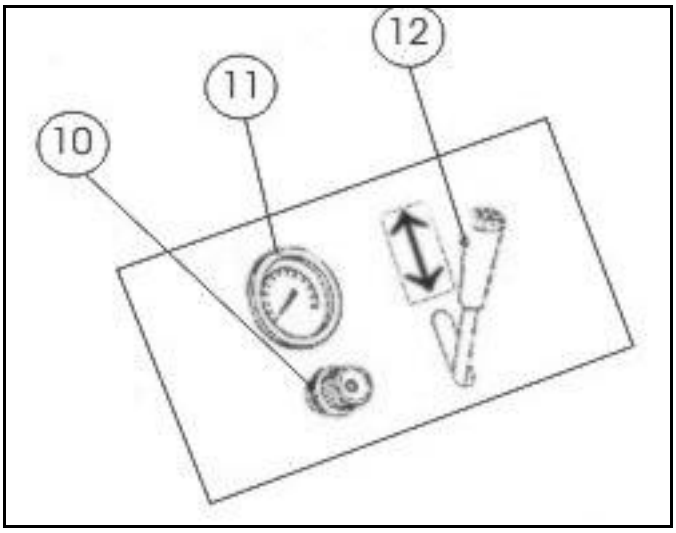
2. With a level placed on the top of the saw frame, adjust leveling screws *(item 30 Fig. 1)* so that the frame is approximately 1/16" lower in the back than the front. With the level placed on the width of the saw and using the leveling screws, level the frame across the width. When you are finished the saw frame should be level across the width. The frame should have no twist.
2. Remove carriage bearing covers left and right side *(Fig. 2, item 3*). This exposes carriage-bearing rolls. All (4) of these bearings should be touching the saw rails. If they are not touching the rails they can be adjusted by loosening the nut on the outside of the carriage and turning the eccentric bolt on the inside of the carriage until the bearing contacts the saw rails. Two (2) eccentrics are placed opposite each other at 90 degrees at the back of the carriage.
4. Have a qualified electrician make electrical connection at this time to a disconnect switch.
5. Check all controls & operations *(Fig. 3)* with the carriage feed lever *(Fig. 3, item 7)* in the **NEUTRAL** position and the band speed valve set at 60 FPM *(Fig. 3, item 8), jog the start/stop buttons (Fig.3, Items 1&2)* to check band wheel rotation. The band saw blade should be rotating in the downward direction.
6. Crank tilt handle on standard model or with the tilt selector valve ("S" and "HD" packages only) in tilt position and using the carriage feed valve, tilt the head 30 degrees left with the head now in the tilt position, next place sump pump (*Fig. 1, item 27)* in sump at the rear of the coolant tray.
7. Fill with required cutting fluid until the fluid is well over the top of the sump pump (approximately 14 gallons of mixed coolant).
8. Move coolant tray into position. Head must be tilted to position tray.
9. Grease four-wheel bearings and two head pivot points with a good quality heavy-duty grease.

YOUR METALSAWZ IS NOW READY FOR OPERATION.

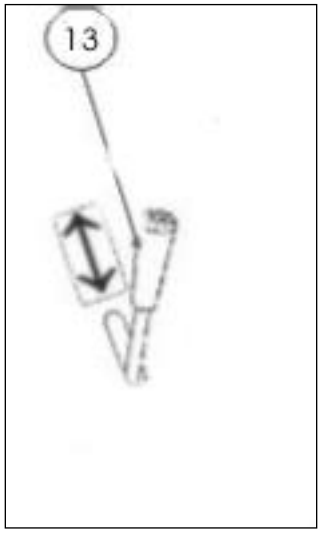
CONTROL PANEL AND OPERATION



(Figure 3)



(Figure 3A)



(Figure 3B)

(Figure 3 and 3a and 3b "S" and "HD" packages only)

CONTROL PANEL

1. Start Button: Starts all electrical circuits, as well as the hydraulic and coolant pumps.

2. Stop Button: Shuts off all electrical circuits.

3. Feed Pressure Gauge: Displays current feed pressure.

4. Approach Speed Valve: Unlock lock nut. Turning valve counterclockwise increases approach speed, turning clockwise decreases approach speed.

5. Feed Pressure Valve: Unlock lock nut. Turning valve counterclockwise reduces feed pressure, turning clockwise increases feed pressure.

6. Coolant Flow Valve: Turning valve counterclockwise reduces coolant flow, turning clockwise increases coolant flow.

7. Carriage Feed Valve: Pushing lever away from you returns carriage to rear of machine. Pulling lever toward you engages the cutting stroke. The middle position is referred to as neutral in this manual.

8. Band Speed Valve: To adjust, unlock lock nut and set to desired band speed.

9. Tilt Selector Valve: **("S" and "HD" packages only)** Toggle this valve and use **Carriage Feed Valve** *(Fig. 3, item 7)* to adjust head tilt angle. Be sure to loosen head tilt lock prior to adjusting and to return selector valve to original position when done. (Leaving head tilt lock "finger tight" generally reduces vibration during head travel.)

10. Hydraulic Vise Valve: **("S" and "HD" packages only)** Pushing lever away from you closes hydraulic vises. Pulling lever toward you opens the vises. The middle position is referred to as neutral in this manual.

11. Vise Pressure Valve: **("S" and "HD" packages only)** To adjust vise pressure, unlock lock nut and set to desired pressure.

12. Vise Pressure Gauge: **("S" and "HD" packages only)** Displays current vise pressure.

13. Hydraulic Lift Arm: **("HD" packages only)** Operates hydraulic lift guide arm up or down so you can adjust blade guides as close to material as possible for best blade life.

INITIAL OPERATION

1. Open approach speed valve (counter clockwise) approximately one turn.
2. Press **START** button to start machine. Check to make sure motor is running in the right direction, as indicated by the arrow on the hydraulic pump. Allow hydraulic oil to warm up before operation.

WARNING! NEVER LEAN AGAINST OR PLACE FINGERS, HANDS OR ANY PART OF THE BODY NEAR MOVING PARTS. FAILURE TO FOLLOW THESE RULES MAY RESULT IN PERSONAL INJURY OR DEATH.

3. Move carriage lever to the **CUT** position.

4. Adjust feed pressure valve until carriage moves freely, but not forcefully; gauge should read between 40 and 60 psi.

5. Ensure nothing is obstructing the cutting path.

6. Adjust approach speed valve so carriage is advancing at a rate of approximately 2 to 3 inches per minute. (Use a scale and stop watch to obtain cutting speed).

7. If saw feed rate is excessive, adjust by closing approach speed valve. If rate needs to be faster, and opening the approach speed valve does not help, increase feed pressure by approximately 10 psi on the gauge with the feed pressure valve.

8. Move carriage lever to the **RETURN** position until rear limit is reached, then move to **NEUTRAL.**

9. Adjust coolant flow valve until desired flow is achieved.

NOTE: These settings are safe for most conditions and materials and are stated here as an initial guideline. For maximum blade life be sure to consult the back of this manual or your blade supplier's blade speed and pitch recommendation chart.

As a general rule:

- Set feed pressure between 70 to 110 psi on gauge (green area on gauge decal), for most cutting applications.
- The slower the approach speed the higher the feed pressure.
- The faster the approach speed the lower the feed pressure.

GUIDE POST HEIGHT ADJUSTMENT

The guidepost should be adjusted as close to the work piece as possible to maintain cutting accuracy. Too much space between the work piece and the blade guide can cause a non-square cut. To adjust, loosen post height adjustment clamp, reposition post and re-tighten clamp. *Make sure adequate lubricant is applied before moving!*

On machines equipped with the optional "Hydraulic Guide Arm", (standard on HD models) simply move guide arm lever forward or backward to lift or lower guide arm.

MANUAL AND HYDRAULIC DUAL VISES

WARNING! FOR PERSONAL SAFETY, THE VISE MUST BE FULLY OPERATIONAL. IF WORKPIECE IS NOT ADEQUATELY CLAMPED, PERSONAL INJURY OR DAMAGE TO THE MACHINE MAY OCCUR.

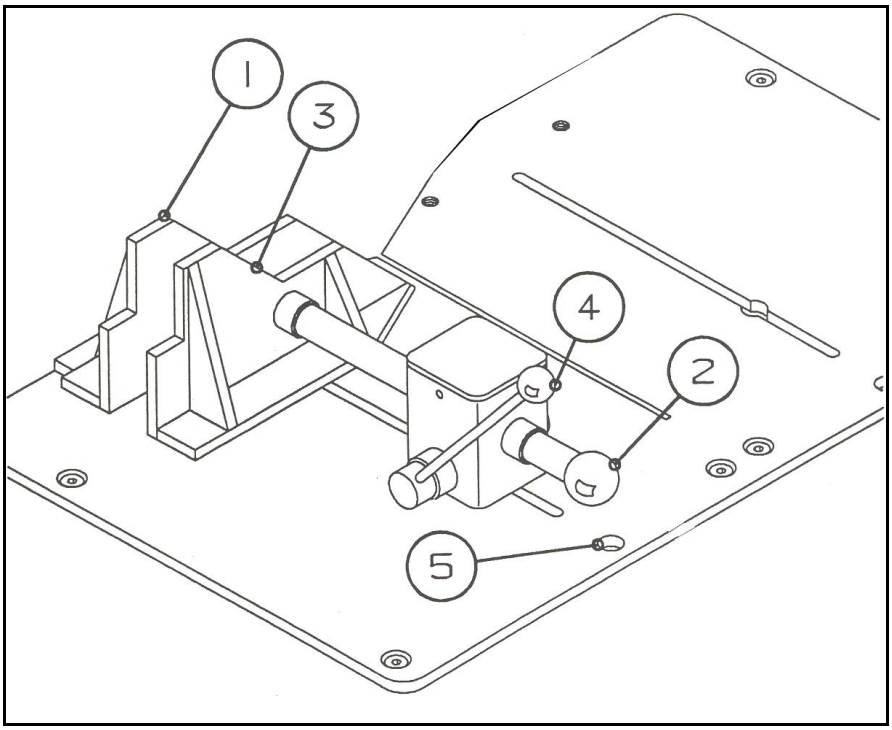
1. Position work piece against the back of the **Rear Vise Jaw** *(Fig.4, item 1).*

2. Push **Vise Ram** *(Fig.4, item 2)* forward stopping **Front Vise Jaw** *(Fig. 4, item 3) ¼"* away from work piece.

3. Pull **Vise Lock Lever** *(fig 4, item 4)* backward with firm, but not overly strenuous force. Only a relatively slight force is required to adequately clamp work piece.

4. Vise may be moved to the second or third position *(item 5)* for cutting depths greater than 7.5 inches by lifting up vise clamp on swivel and positioning the pin in the desired pinhole.

5. For "S" and "HD" models with hydraulic vises, pull lever and set adjustable vise pressure insuring that adequate pressure is applied to hold the material but not too much to crush thin wall tubing etc.

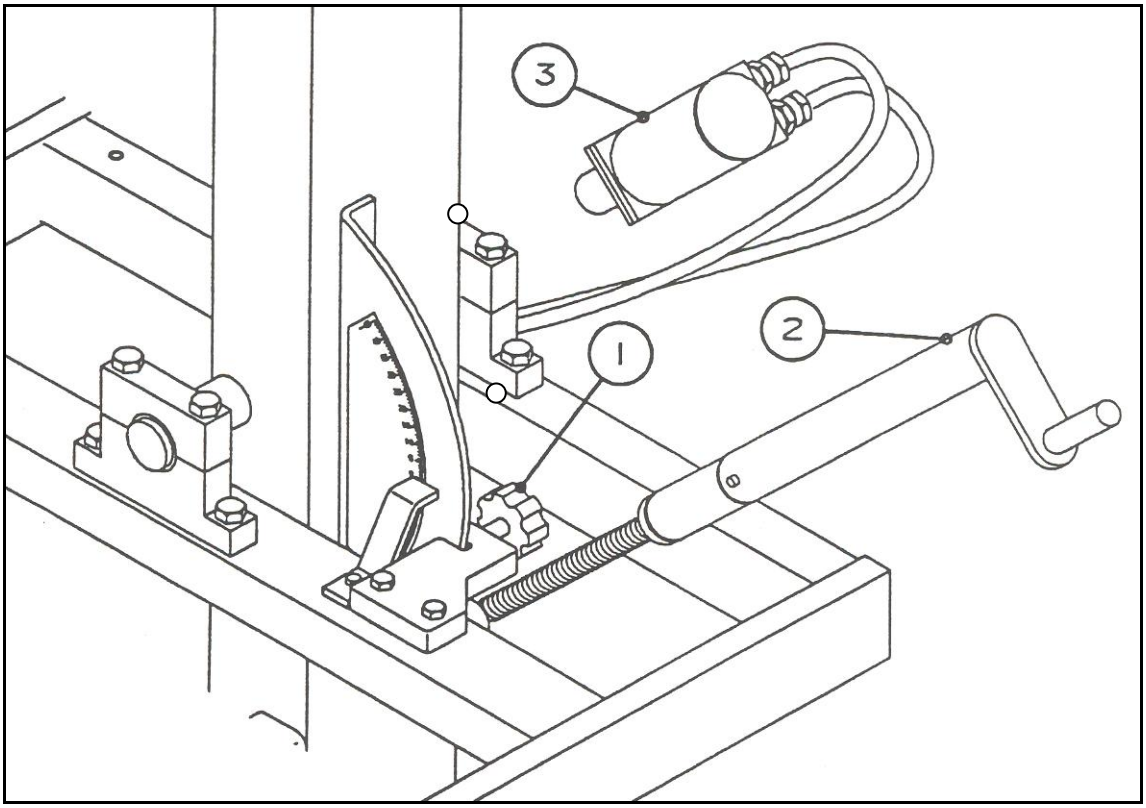


(Figure 4)

MITER CUTTING

1. **Loosen head tilt lock** *(Fig 5, item 1)* and turn **head tilt screw crank** *(Fig 5, item 2)* for adjusting cut to desired angle. Re-clamp head tilt lock. For operation of the **hydraulic tilt on "S" and "HD" Packages** *(Fig 5, item 3)* refer to MANUAL CONTROLS AND OPERATION.

   NOTE: Ensure manual or hydraulic blade guidepost maintains adequate clearance above vise and work piece when adjusting head angle.



(Figure 5)

BLADE REPLACEMENT

1. Open hinged upper wheel guard and loosen front blade guard; push forward. Remove skirt door.

2. Loosen old band by turning **band tension bolt** *(Fig.6, item 1)* clockwise.

3. Slip old band out of blade guide bearing, remove from band wheels and discard.

WARNING! BAND SAW BLADES ARE SHARP. ALWAYS WEAR GLOVES WHEN HANDLING NEW OR USED BLADES. UNSAFE PRACTICES COULD RESULT IN PERSONAL INJURY IF PROPER PRECAUTIONS ARE NOT TAKEN.

4. Examine new blade to ensure teeth are oriented properly. Place new band around wheels.

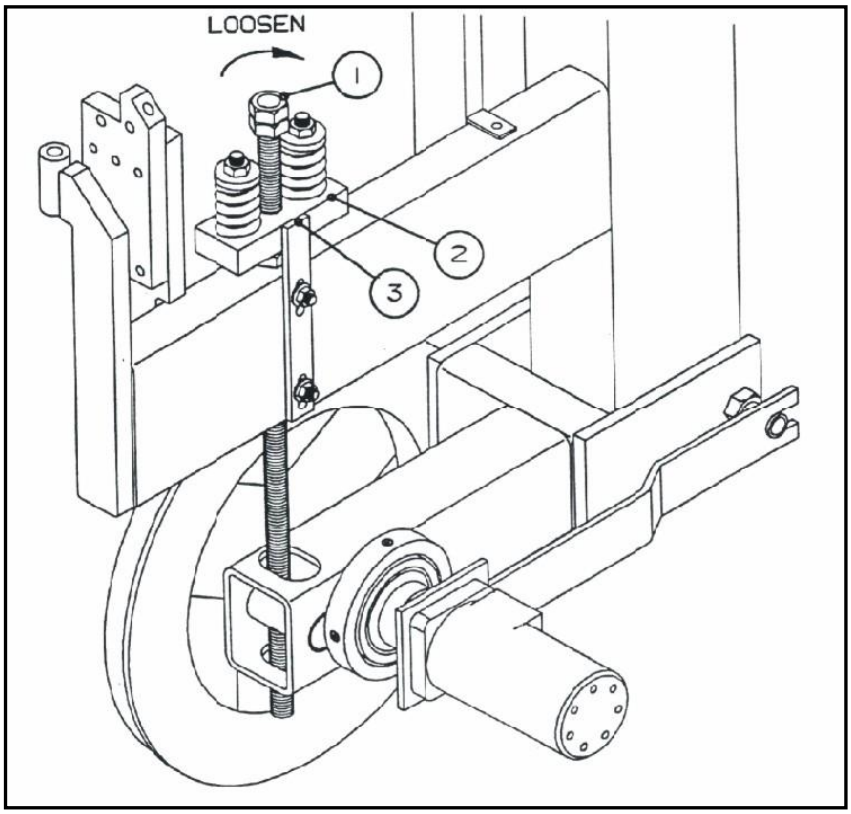
5. Tighten band tension bolt (counterclockwise) enough to keep band from slipping off wheels when twisting into guide bearings.

6. Twist band and slip into upper and lower guide bearing sets simultaneously.

WARNING! ALWAYS REPLACE COVER WHEN TENSIONING BAND. A DEFECTIVE BAND COULD BREAK AND IF UNRESTRAINED, COULD CAUSE SEVERE LACERATIONS.

7. Tighten band tension bolt until **spring bolster** *(Fig. 6A, item 2)* and **tension gauge bar** *(Fig. 6A, item 3)* are level. This factory-preset position will give the band a tension of approx. 17,000 p.s.i. **It is recommended to use 17,000 to 19,000 psi**. If the saw is run for prolonged periods at very high tension be prepared to replace band wheel bearings more frequently. **ANY ADJUSTMENT OF THE TENSION TO MORE THAN 19,000 LBS. BY BANDSAW BLADE VENDORS WILL VOID THE WARRANTY!**

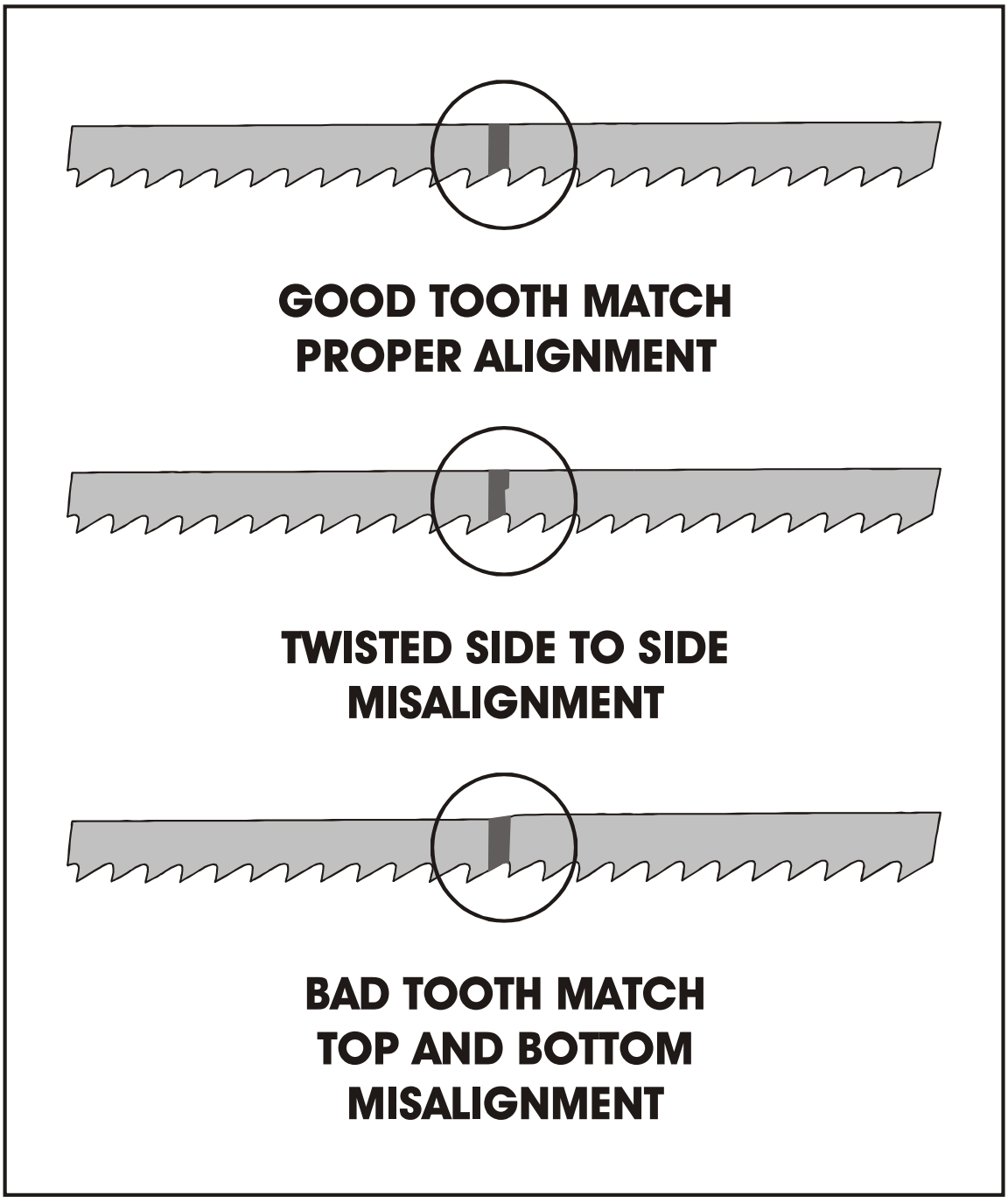
8. Follow blade manufacturers recommendations for break-in procedures.



(Figure 6A)

ALWAYS CHECK THESE POINTS BEFORE INSTALLING A NEW WELDED BAND ON YOUR METALSAWZ.

1. Check for misalignment on the weld either from side to side or top to bottom. (Figure 6B)
2. Check for proper tooth match particularly on a variable pitch tooth blade, for example; a six tooth should follow a 5 tooth on a 5-8 variable pitch blade.
3. Look at the annealing pattern; is the heat pattern even across the width of the blade?
4. Was all the weld flash removed from both sides of the band?
5. Is there still weld flash in the gullet?
6. Was the tooth damaged during the gullet grinding operation?



(Figure 6B)

Any of the above factors could lead to premature blade failure.

METALSAWZ COOLANT PUMP

The Little Giant model #2E-N pump must be run submerged. The pump should be placed in an upright position. The volute must always be in a flooded condition; that is, always under the liquid level.

Do not attempt to restrict the intake side of these pumps. Restricting the intake may cause damage to the seal and may starve the pump.

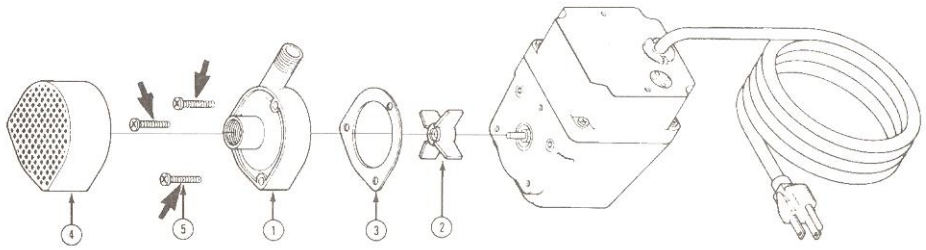
Do not let the unit run dry (without liquid). It is designed to be cooled by pumping fluid. You may damage the seal and the motor may fail if the pump is allowed to run dry.

If the unit is going to be idle for a period of time, follow the cleaning instructions outlined in the next section. Do not let the unit freeze in the wintertime. This may cause cracking or distortion that may destroy the unit.

SERVICE INSTRUCTIONS

MAKE CERTAIN THE UNIT IS DISCONNECTED FROM THE POWER SOURCE BEFORE ATTEMPTING TO SERVICE OR REMOVE ANY COMPONENT!

This unit is permanently lubricated. Oiling is not required. Do not, in any case, open the sealed portion of the unit or remove housing screws. The power cord on these units cannot be replaced. In case of damage the whole unit must be replaced.

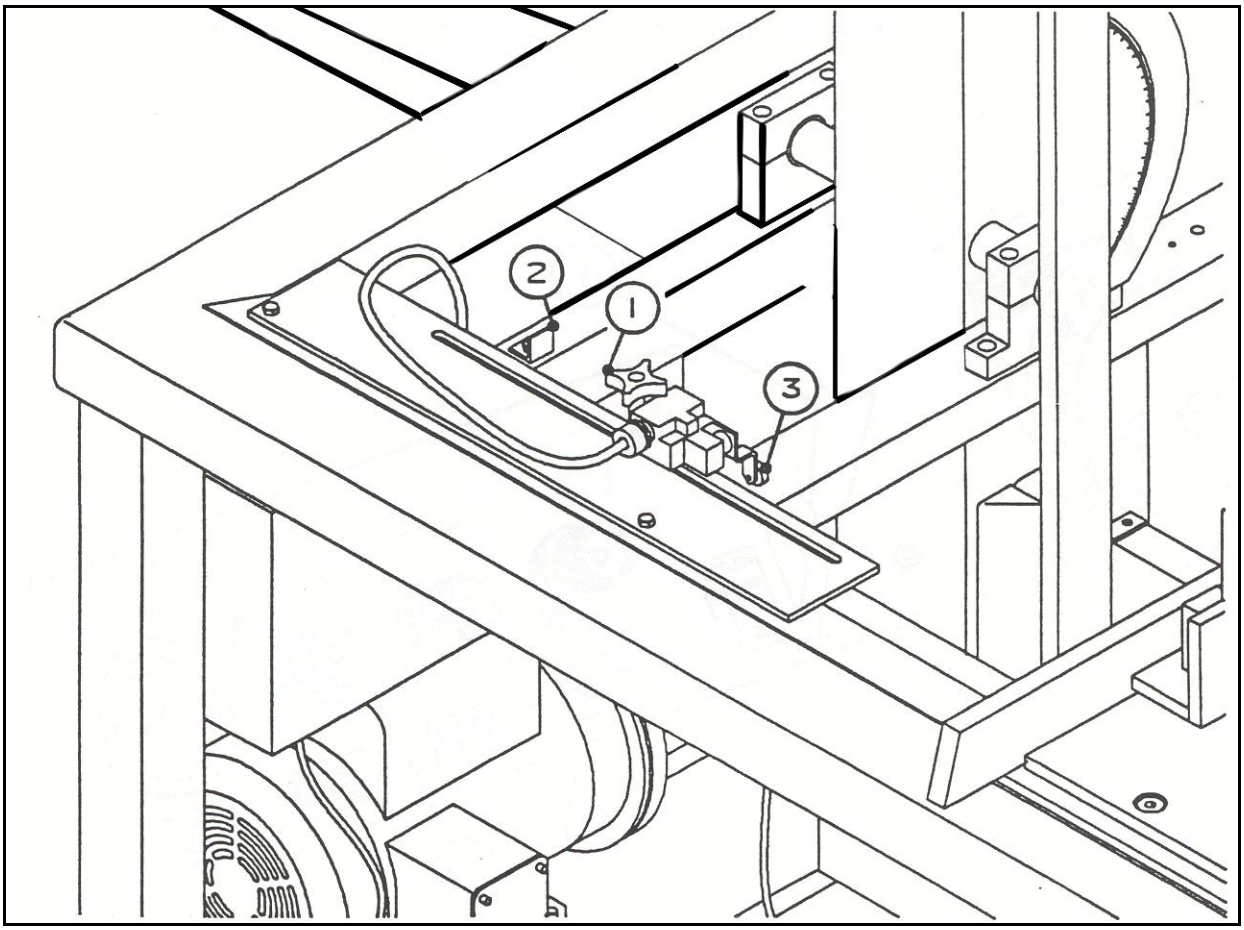


ITEM NO.	P/N	DESCRIPTION	QTY.	CATALOG NUMBER/MODEL									
				502103 2E-N	502203 2E-50238N	502500 2E-38N	502186 2E-NT	502286 2E-38NT	502403 2E-38N	502375 2E-38N-WG	502287 2E-38NT	502038 2E-38N	502216 2E-38NY
1	102333	Volute, Hooded	1	•			•						
1	102334	Volute, 3/8" NPT	1		•	•		•			•	•	•
1	102375	Volute, 3/8" NPT, Black	1						•	•			
2	102470	Impeller, Press-On	1	•	•	•	•	•	•	•	•	•	•
3	102601	Gasket	1	•	•	•	•	•	•	•	•	•	•
4	102909	Screen, Intake	1	•	•	•	•	•			•	•	•
4	102376	Screen, Intake, Black	1						•	•			
5	902413	Screw, Mach #8-32 x 1-1/8"	3	•	•	•	•	•	•	•	•	•	•
6	*929500	Bolt, Eye, #8-32, 18-8 SS*	1									•	

*Part not shown

(OPTIONAL) AUTOMATIC SHUT-OFF SWITCH (depth of cut)

1. Loosen **locking handle** *(Fig. 7, item 1)* on switch.
2. Advance carriage to desired shut-off position.
3. Move switch to location where **actuator angle** *(Fig 7, item 2)* toggles the switch arm *(Fig. 7 item 3).*
4. Tighten lock screw.
5. To return carriage after shut-off, move carriage feed lever to the return position and press the start button.



(Figure 7)

(OPTIONAL) METALSAWZ SPRAY MIST COOLING SYSTEM

COOLANT MIXTURE:
Fill container with clean fresh coolant mixture at 20 or 30 to 1. We recommend a synthetic coolant concentrate. Do not use coolants that separate or settle out, as they tend to clog the liquid line or nozzle. DO NOT use any hazardous or flammable solutions in the unit. Deviations from these proportions may be necessary per your application. One gallon of mixture generally can provide approximately 14 hours of spray per nozzle.

AIR CONNECTION:
Attach the shop air line to the end of the valve body. You will need to supply a 1/8" pipe thread fitting to the end of your air hose. Usual shop line pressure of 80 to 125 PSI is ideal. The cooling effect of the expanding air is greater with higher line pressures and therefore air regulators should not be used. The air volume should be regulated only by the air control needle valve on the top of the valve body.

LIQUID CONTROL:
The liquid control assembly adjusts the amount of liquid in the mist from zero to maximum. Liquid volume is changed without changing the air valve setting.

USE:
Open the air control and the liquid control. Allow sufficient time for the coolant to be drawn from the tank to the nozzle. As the units operate on the siphon principle, there is no pressure in the container. Adjust the liquid volume as needed.

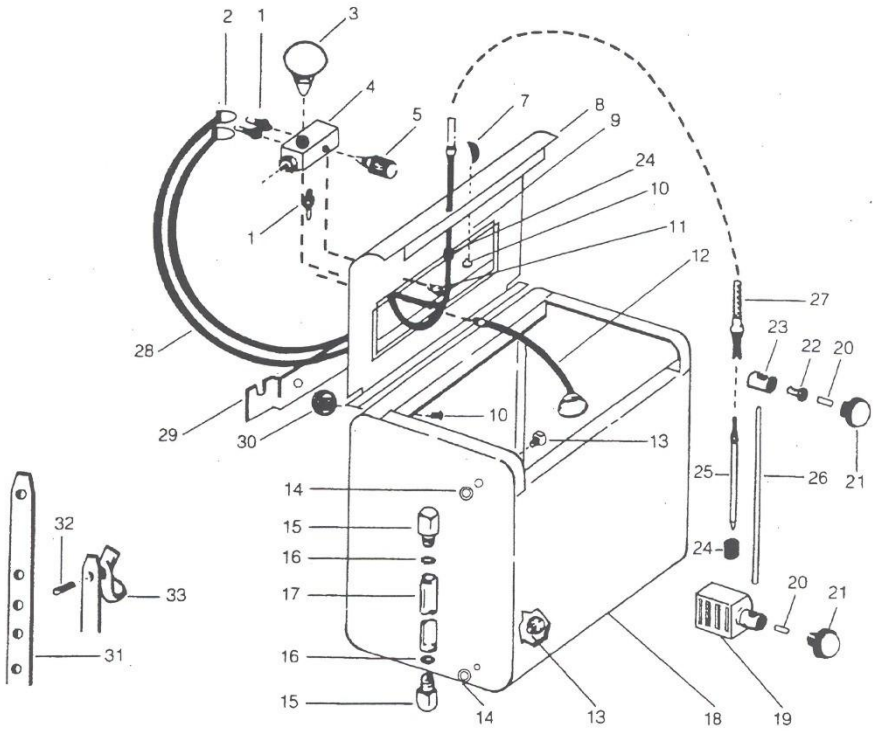
NOZZLE LOCATION:
Maximum cooling will result when the mist is applied at the point of contact between the cutting edge of the tool and the work. Never point the nozzle to spray on the chips.

NOZZLES:
The nozzles supplied with your unit are made to very close tolerances. DO NOT drill, file, or tamper with the nozzle tip. They cannot be repaired.

AIR & COOLANT LINES:
The red tube is the airline. The clear tube is the liquid line. The unit will not work if these lines are reversed.

CLOGGED COOLANT LINES:
Should the coolant line become clogged (usually due to use of unclean mixture), place your thumb and forefinger tightly over the tip of the nozzle. This forces air down the coolant line and pick-up tube back into the container. IF frequent clogging occurs, the tank should be completely cleaned and refilled with fresh mixture. If you are unable to unclog the poly tubing, it can be replaced, thereby saving the braided line.

MAGNET NOZZLE HOLDERS:
The magnet assembly makes it possible to apply mist cooling where permanent installations are not required or wanted.



COBRASAW SPRAY MIST COOLING SYSTEM

#	PART	DESCRIPTION
1	420-4322	Jet 8-32 thread
1a	420-3004	Jet 5-40 thread (before 1991)
2	410-4321	Jet Nut 8-32 thread
2a	410-3025	Jet Nut 5-40 thread (before 1991)
3	420-3016	Air control assembly
4	420-4171	1 Outlet valve body w/jets & nuts
	420-4172	2 Outlet valve body w/jets & nuts
	410-3652	3 Outlet valve body w/jets & nuts
	410-3653	4 Outlet valve body w/jets & nuts
	Valve assemblies include items: 1, 2, 3, 4, & 5.	
	420-4181	1 Outlet valve assembly
	420-4182	2 Outlet valve assembly
	420-3110	3 Outlet valve assembly
	420-3111	4 Outlet valve assembly
5	420-3072	Liquid control assembly
7	260-3328	Knob
8	420-3282-___	Cover Ass'y, specify # outlets includes items 7, 8, 9, & 10
9	410-3321	Catch
10	210-3332	8-32 x 1/4" machine screw
11	210-3060	5-40 x 1/4" machine screw
12	420-3126-2	Pick-up tube assembly
13	410-3263	Retainer Screw
14	230-3331	3/8" OD "O" Ring
15	410-3322	Sight Glass Elbow
16	230-3331	3/8" OD "O" Ring
17	410-3286	Sight glass tube - 5 1/2"
18	420-3341	Tank with sight glass
19	420-3123	UNH Magnet Only

#	PART	DESCRIPTION
20	410-3104	Nylon Pin
21	410-3101	Knob
22	410-3102	Rod Retainer
23	410-3103	Collar
	420-3324	60# MUNH Magnet assembly include items: 19 thru 23 & 26
	420-3344	Swivel Lock Assembly include items: 20 thru 23
24	410-3033	Nozzle Nut**
25	420-3089	3" Straight Nozzle**
	420-3199	3" 45^ Offset Nozzle
	420-3395	3" 90^ Offset Nozzle
	420-3392	5" Straight Nozzle
	420-3393	5" 45^ Offset Nozzle
	420-3394	5" 90^ Offset Nozzle
	** All nozzles include nozzle nut	
25a	260-3032	Nozzle spring guard (not shown) (protects nozzle tip)
26	410-3117	Rod
27	420-3345-04	Air & Coolant Line - 4 ft longer lengths add per ft
	Replacement tubing for air & coolant lines	
28	260-3383	Poly Tubing-per ft - 0 to 49 ft specify red or clear- 50 ft & over
29	410-3326	2RH Wall mounting bracket
30	410-3325	Mounting Nut
31	410-3015	Long Nozzle Holder 7"
32	410-3010	Nozzle Stud
33	210-3055	Wing Nut 1/4-28

MAINTENANCE:
Clean the container periodically with a bleach type mixture.
Clean container before adding new coolant.
Use only fresh clean coolant each time.
Use only enough coolant to do the job since stagnant coolant will set off fungal & bacterial activity in the tank.
Protect air & coolant lines from damage and kinks.
Install nozzle as close to the work as possible.

SPECIFICATIONS 18" x 22"[1]

SAWING CAPACITY	MZ1822	MZ 1822 (S)	MZ 1822 (HD)
90 Degree Cut	18" w x 22" h	18" w x 22" h	18" w x 22" h
45 Degree Cut	18" w x 14" h	18" w x 14" h	18" w x 14" h
60 Degree Cut (Left)	18" w x 11" h	18" w x 11" h	18" w x 11" h
60 Degree Cut (Right)	18" w x 7" h	18" w x 7" h	18" w x 7" h
SPECIFICATIONS			
Cutting Stroke	18"	18"	18"
Blade Guides	Roller Bearing	Roller Bearing	Roller Bearing
Blade Speed	0 to 365 SFPM	0 to 400 SFPM	0 to 400 SFPM
Mitering	+ or – 0° to 60° Left or Right		
Mitering Mode	Manual Crank	Hydraulic Tilt	Hydraulic Tilt
Saw Blade	16'4" x 042" x 1¼"	16'4" x 042" x 1¼"	16'4"x.050"x1½"
Vise	Hydraulic	Hydraulic	Hydraulic
Electric Motor	5 HP	7.5HP	10HP
Hydraulic Pump	6.3 GPM Gear type	6.6 GPM Piston	11.3 GPM Piston
Oil Reservoir Capacity	25 Gallons	25 Gallons	25 Gallons
Hydraulic Oil Type	Lt. Med. Grade AWS 32		
Coolant Pump	6 G.P.M., Submersible		
Coolant Tray Capacity	14 Gallons	14 Gallons	14 Gallons
Overall Height	102.5"	102.5"	102.5"
Saw Table Height	41"	41"	41"
Main Frame Width	68"	68"	681"
Main Frame Length	95.5"	95.5"	95.5"
Coolant Tray	8" x 60" x 58"	8" x 60" x 58"	8" x 60" x 58"
Approximate Weight	3,465 lbs.	3,515 lbs.	3,565 lbs.

STANDARD EQUIPMENT MZ:

Manual vise
Manual tilt
Instruction manual (printed)

STANDARD EQUIPMENT (MZS) PACKAGE:

Electrical package
Hydraulic Vise
Hydraulic tilt
Instruction manual (printed)

STANDARD EQUIPMENT MZHD SERIES:

Electrical package
2 x Hydraulic Vise
Hydraulic tilt
Hydraulic Guide Arm Adjustment
Instruction manual (printed)

OPTIONAL EQUIPMENT MZ SERIES:

Rotary carbide backup guides
Right hand vise
Instruction manual on CD
Electrical package:

- Work light
- Stroke control shut-off
- Blade break switch
- Integrated door shut off switch

CONVEYOR SYSTEMS:

Any combination of infeed and outfeed tables.

COMPOUND ANGLE TABLE:

Ability to miter cut to 45° on both horizontal and 60° on vertical plane.

DOUBLE CUT-OFF SYSTEM:

Two saws on adjustable rails to cut opposing 60° cuts at one time.

[1] Dimensions and Specifications are subject to change without notice!

SPECIFICATIONS 18" x 32

SAWING CAPACITY	MZ 1832	MZ 1832 (S)	MZ 1832 (HD)
90 Degree Cut	18" w x 32" h	18" w x 32" h	18" w x 32" h
45 Degree Cut	18" w x 22" h	18" w x 22" h	18" w x 22" h
60 Degree Cut (Left)	18" w x 16" h	18" w x 16" h	18" w x 16" h
60 Degree Cut (Right)	18" w x 11" h	18" w x 11" h	18" w x 11" h
SPECIFICATIONS			
Cutting Stroke	18"	18"	18"
Blade Guides	Roller Bearing	Roller Bearing	Roller/Carbide
Blade Speed	0 to 365 SFPM	0 to 400 SFPM	0 to 400 SFPM
Mitering	+ or – 0° to 60° Left or Right		
Mitering Mode	Manual Crank	Hydraulic Tilt	Hydraulic Tilt
Saw Blade	18'4" x 042" x 1¼"	18'4" x 042" x 1¼"	18'4" x. 050"x1½"
Vise	Manual	Hydraulic	Hydraulic
Electric Motor	5 HP	7.5HP	10HP
Hydraulic Pump	6.3 GPM Gear type	6.6 GPM Piston	11.3 GPM Piston
Oil Reservoir Capacity	30 Gallons	30 Gallons	30 Gallons
Hydraulic Oil Type	Lt. Med. Grade AWS 32		
Coolant Pump	6 G.P.M., Submersible		
Coolant Tray Capacity	14 Gallons	14 Gallons	14 Gallons
Overall Height	114.25"	114.25"	114.25"
Saw Table Height	41"	41"	41"
Main Frame Width	68"	68"	68"
Main Frame Length	95.5"	95.5"	95.5"
Coolant Tray	8" x 60" x 58"	8" x 60" x 58"	8" x 60" x 58"
Approximate Weight	3,615 lbs.	3,705 lbs.	3,755 lbs.

STANDARD EQUIPMENT MZ:

Manual vise
Manual tilt
Instruction manual (printed)

STANDARD EQUIPMENT (MZS) PACKAGE:

Electrical package
Hydraulic Vise
Hydraulic tilt
Instruction manual (printed)

STANDARD EQUIPMENT MZHD SERIES:

Electrical package
2 x Hydraulic Vise
Hydraulic tilt
Hydraulic Guide Arm Adjustment
Instruction manual (printed)

OPTIONAL EQUIPMENT MZ SERIES:

Rotary carbide backup guides
Right hand vise
Instruction manual on CD
Electrical package:

- Work light
- Stroke control shut-off
- Blade break switch
- Integrated door shut off switch

CONVEYOR SYSTEMS:

Any combination of infeed and outfeed tables.

COMPOUND ANGLE TABLE:

Ability to miter cut to 45° on both horizontal and 60° on vertical plane.

DOUBLE CUT-OFF SYSTEM:

Two saws on adjustable rails to cut opposing 60° cuts at one time.

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SPECIFICATIONS 25" x 36"

SAWING CAPACITY	MZ2532	MZ2532S	MZ2532HD
90 Degree Cut	25" w x 36" h	25" w x 36" h	25" w x 36" h
45 Degree Cut	25" w x 24" h	25" w x 24" h	25" w x 24" h
60 Degree Cut (Left)	25" w x 18" h	25" w x 18" h	25" w x 18" h
60 Degree Cut (Right)	25" w x 13" h	25" w x 13" h	25" w x 13" h

SPECIFICATIONS			
Cutting Stroke	25"	25"	25"
Blade Guides	Roller Bearing	Roller Bearing	Rotary carbide
Blade Speed	0 to 365 SFPM	0 to 400 SFPM	0 to 400 SFPM
Mitering		+ or – 0° to 60° Left or Right	
Mitering Mode	Manual Crank	Hydraulic Tilt	Hydraulic Tilt
Saw Blade	20'4' x 1¼" x 0.042"	20'4' x 0.042" x 1¼"	20'4' x 0. 050"x1½"
Vise	Manual Vise	Hydraulic Vise	Hydraulic Vise
Electric Motor	7.5HP	7.5HP	10HP
Hydraulic Pump	6.3 GPM Gear type	6.6 GPM Piston	11.3 GPM Piston
Oil Reservoir Capacity	30 Gallons	30 Gallons	30 Gallons
Hydraulic Oil Type		Lt. Med. Grade AWS 32	
Coolant Pump		6 G.P.M., Submersible	
Coolant Tray Capacity	18 Gallons	18 Gallons	18 Gallons
Overall Height	125.5"	125.5"	125.5"
Saw Table Height	44"	44"	44"
Main Frame Width	65"	65"	65"
Main Frame Length	119.5"	119.5"	119.5"
Coolant Tray	8" x 68" x 58"	8" x 68" x 58"	8" x 68" x 58"
Approximate Weight.	4445 lbs.	4,595 lbs.	4,645 lbs.

STANDARD EQUIPMENT MZ:

Manual vise
Manual tilt
Instruction manual (printed)

STANDARD EQUIPMENT (MZS) PACKAGE:

Electrical package
Hydraulic Vise
Hydraulic tilt
Instruction manual (printed)

STANDARD EQUIPMENT MZHD SERIES:

Electrical package
2 x Hydraulic Vise
Hydraulic tilt
Hydraulic Guide Arm Adjustment
Instruction manual (printed)

OPTIONAL EQUIPMENT MZ SERIES:

Rotary carbide backup guides
Right hand vise
Instruction manual on CD
Electrical package:

- Work light
- Stroke control shut-off
- Blade break switch
- Integrated door shut off switch

CONVEYOR SYSTEMS:

Any combination of infeed and outfeed tables.

COMPOUND ANGLE TABLE:

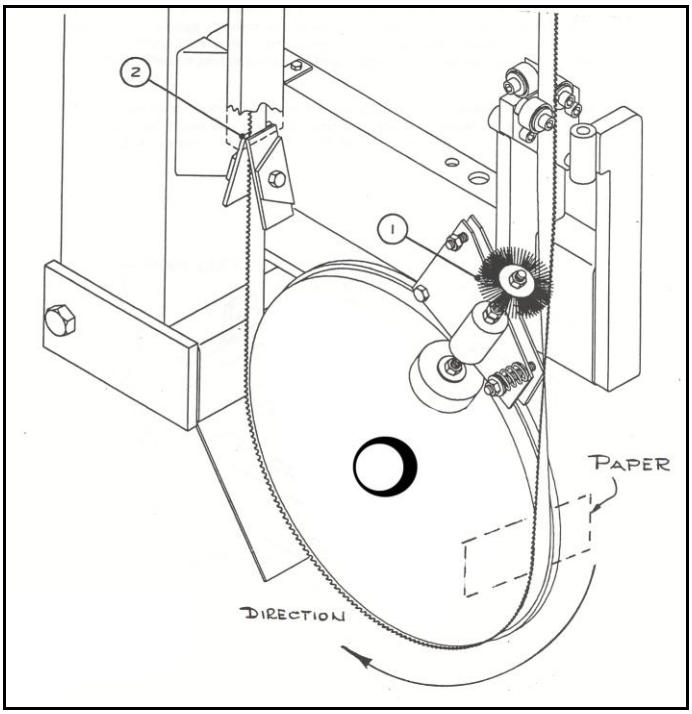
Ability to miter cut to 45° on both horizontal and 60° on vertical plane.

DOUBLE CUT-OFF SYSTEM:

Two saws on adjustable rails to cut opposing 60° cuts at one time.

BLADE CHIP BRUSH ADJUSTMENT

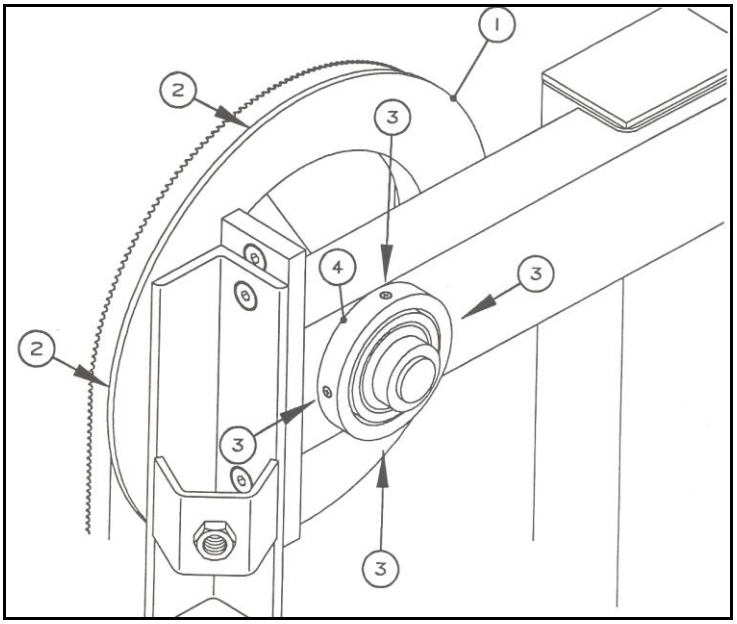
The chip brush *(figure 2, item 1)* is driven by contact with the lower band wheel and should be adjusted so that the brush bristles contact the band saw blade at the bottom of the tooth gullets. Alignment and tension adjustment is made with the mounting nuts.



(figure 2)

BAND WHEEL TRACKING ADJUSTMENT

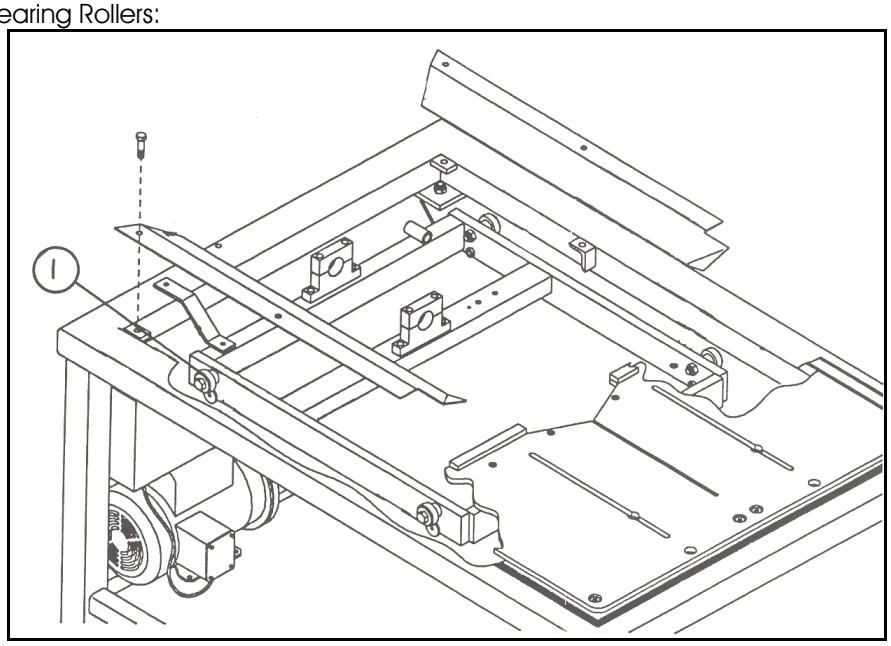
1. With machine running and carriage lever in **NEUTRAL** position set band speed valve between 0 and 60.
2. Observe tracking on both upper and lower Band Wheels (*figures 2 and 3).* The blade should track straight on the wheels, maintaining a uniform distance from the flange approximately .005 - .015. Inserting a piece of notepaper into the wheel *(figure 2)* can check this. If the paper isn't cut during the rotation of the wheel, the clearance is correct. Band saw blades *(figure 3, item 2)* that run too close to the flange *(figure 3, item 1)* fatigue and break prematurely. Adjusting the 4 set screws (figure 3, item 3) located on the bearing housing *(figure 3, item 4)* can make band alignment adjustment.



(figure 3)

CARRIAGE TRACKING ADJUSTMENT

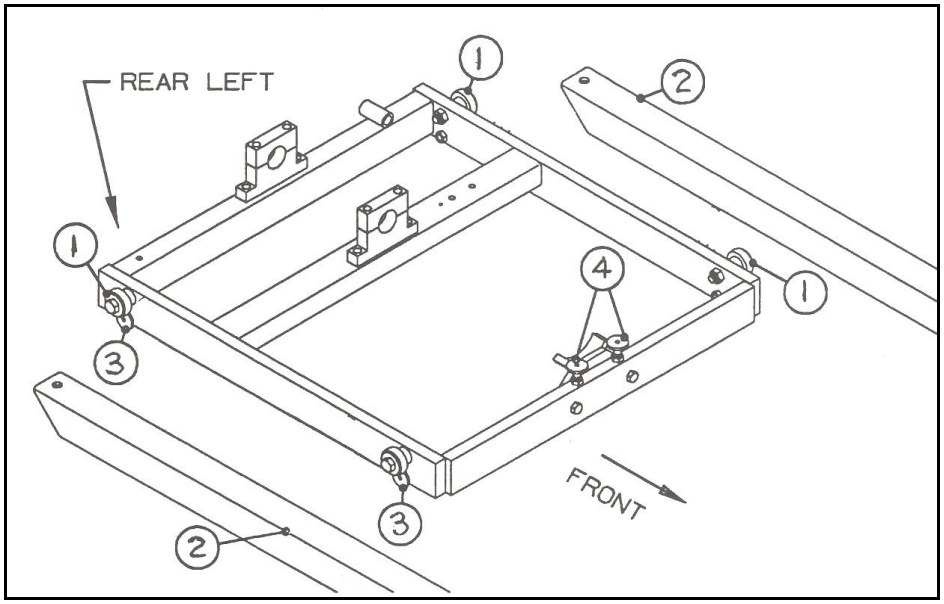
1. Carriage Bearing Rollers:



(figure 4)

With carriage bearing covers removed inspect the carriage bearings *(figure 4, item 1)* to ensure all 4 are firmly contacting the **carriage frame** *(figure 5, item 2).* If adjustment is required, the rear bearings (operator's perspective) are mounted on an eccentric sleeve. Loosen bolt enough to turn sleeve with a wrench, adjust and retighten bolt.

2. Carriage Side Guides:

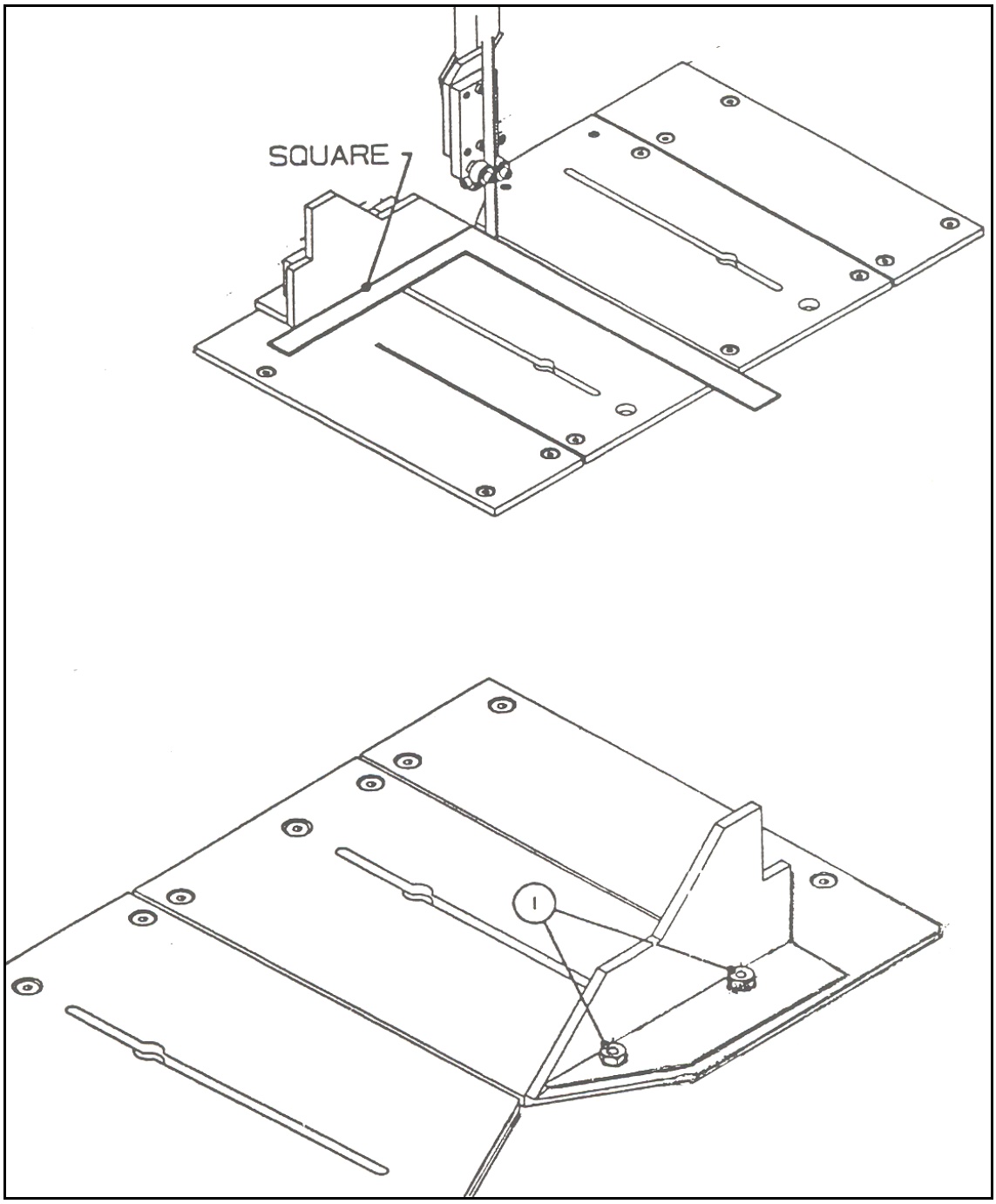


(figure 5)

The **carriage guide bearings** *(figure 5, item 3)* are located on the sides of the carriage frame; maintain carriage alignment with the main saw frame. The bearings located at the front of the carriage frame *(figure 5, item 4)* are necessary to eliminate table vibration during the cutting stroke. The carriage/table contact bearings *(figure 5, item 4)* should be tight under the saw table with no load on table.

NOTE: These bearing bolts are not to be over-tightened, as this will restrict the travel of the carriage. If alignment is necessary, loosen jam nut and tighten bearings to sliding surface with finger pressure only.

VISE ALIGNMENT



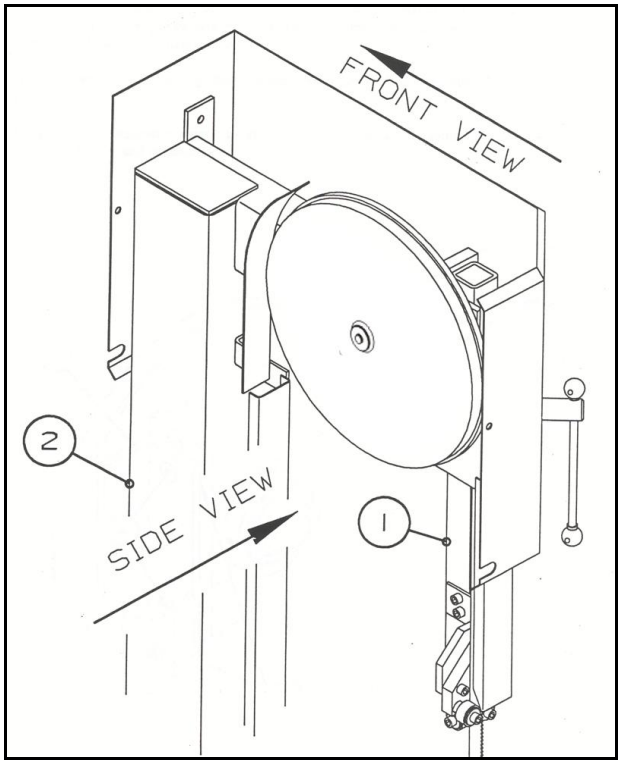
(figure 6)

1. Lay a square flat on the saw table against the back of the vise.

2. Advance the carriage checking clearance between band and square.

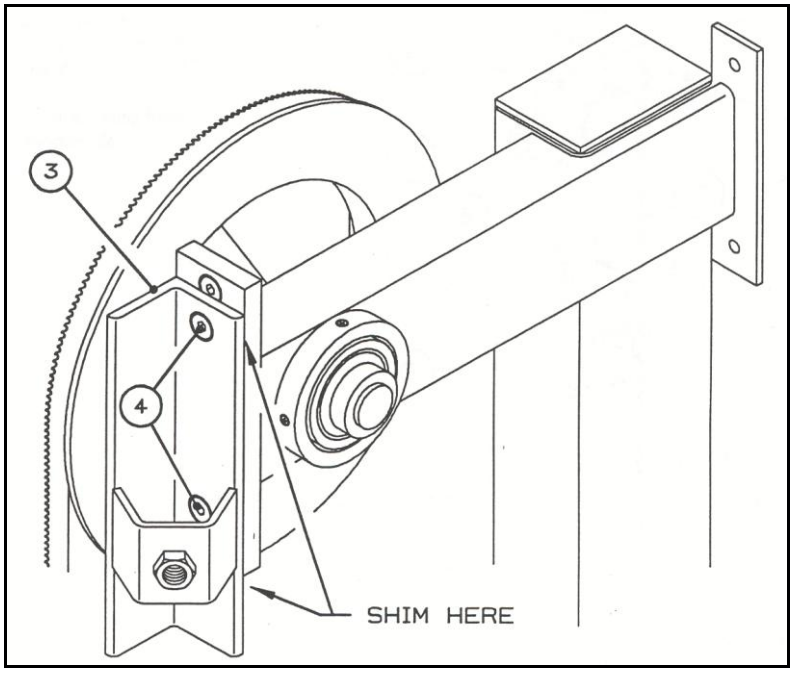
3. If the vise is not parallel to the travel of the carriage, loosen bolts *(figure 6, item 1)* mounting vise to table and adjust vise alignment. Re-tighten mounting bolts.

GUIDE POST ALIGNMENT ADJUSTMENT



(figure 7)

1. Inspect alignment of Guidepost *(figure 7, item 1)* in relation to **C-Frame** *(figure 7, item 2).* The post should be parallel with the main upright of the c-frame both front and side views *(see illustrations).*



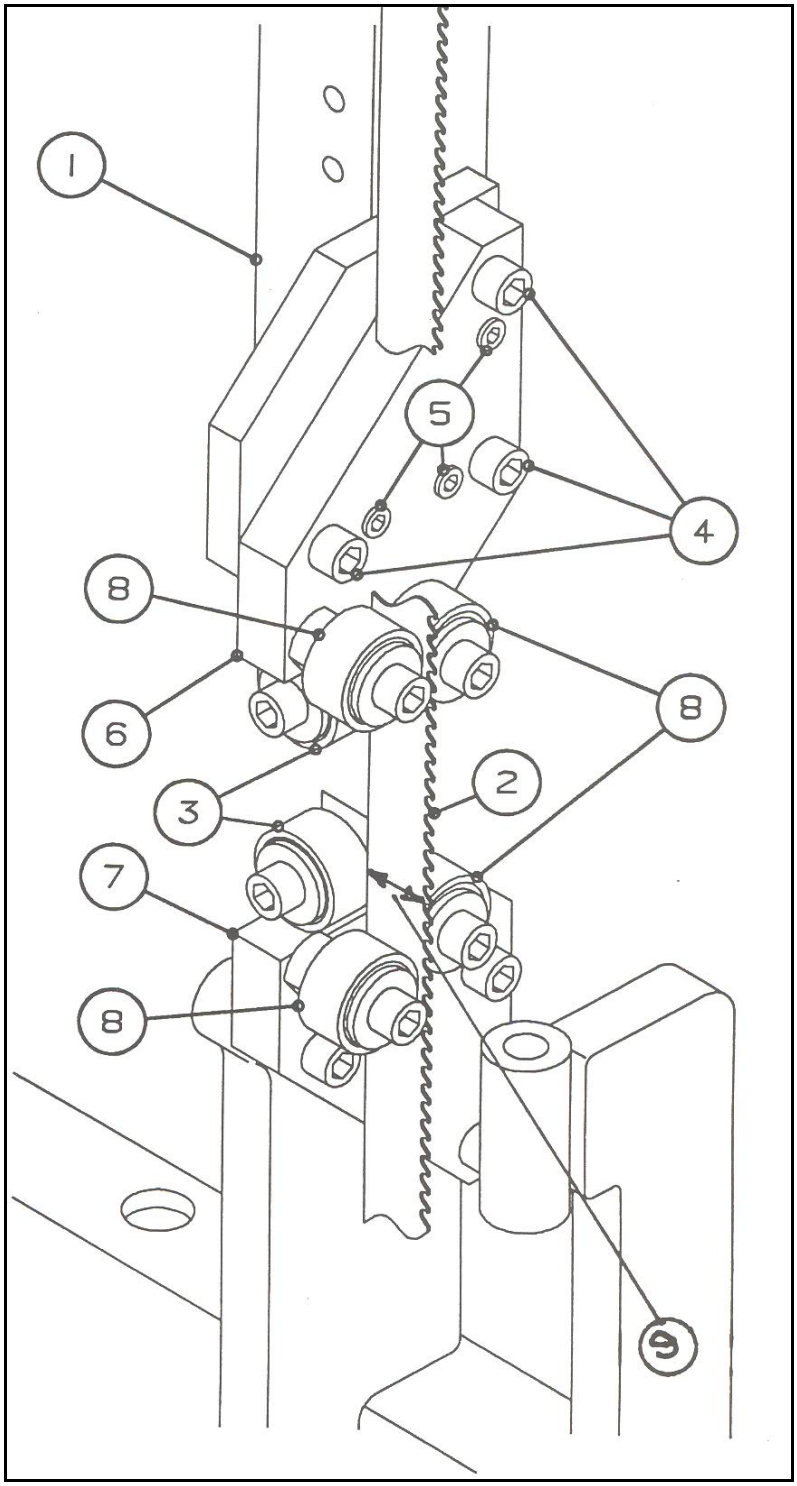
(figure 8)

2. If adjustment is required to align from the side view, shim **guidepost saddle** *(figure8, item 3)* as necessary.

3. If adjustment is required to align from the front view, loosen **saddle mount bolts** *(figure 8, item 4),*

4. Reposition saddle, and retighten bolts.

BAND GUIDE BLOCKS

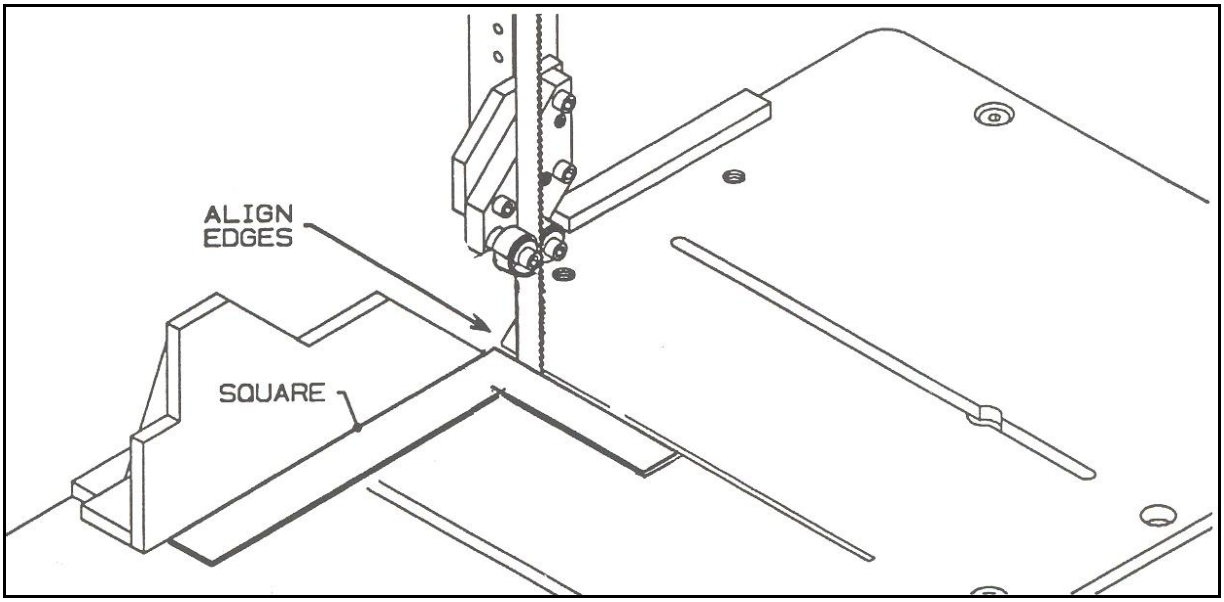


(figure 9)

1. Lower **guidepost** *(figure 9, item 1)* to lower limit. Inspect **saw blade** *(figure 9, item 2)* and **band thrust bearings** *(figure 9, item 3).* Adjust if you are unable to turn bearing by hand (MZ and MZS model) or if band does not contact both upper and lower thrust bearing faces (MZHD model). To align, loosen mount bolts *(figure 9, item 4)* and adjust set screws *(figure 9, item 5)* on faces of the **band guide blocks** *(figure 9, items 6 and 7)* until blade makes light * contact with both bearings, and remains square with saw table. Do not re-tighten mounting bolts until completing step 2 and 3.

   * *Over stressing blade will shorten life.*

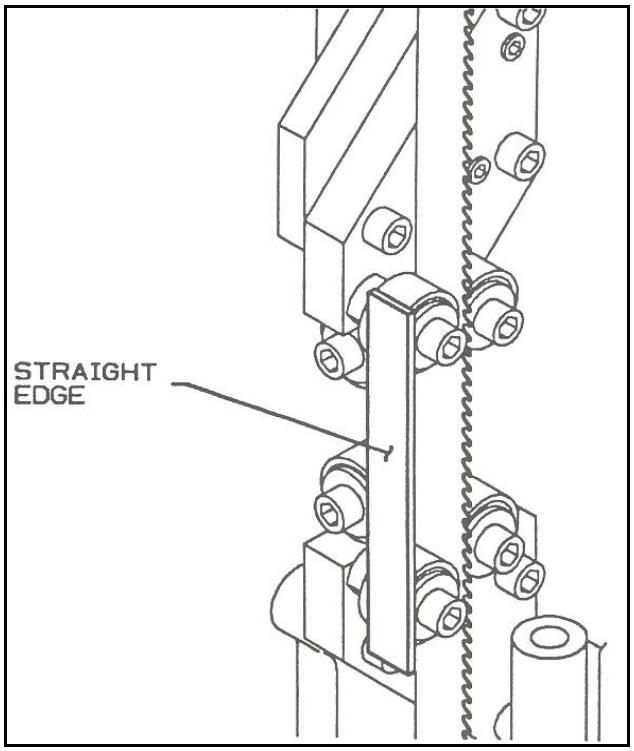
2. Lower Band Guide Block *(figure 9, item 7)*



(figure 10)

Place a square flat on the saw table against the back of the vise; slide the square along the vise until it contacts the blade. The square should be flat against the vise and flat across the width of the blade at the gullet bottom *(figure 9, item 9).* If the blade is misaligned with vise, adjust appropriate screws *(figure 9, item 5)*

3. Upper Band Guide Block *(figure 9, Item 6)*



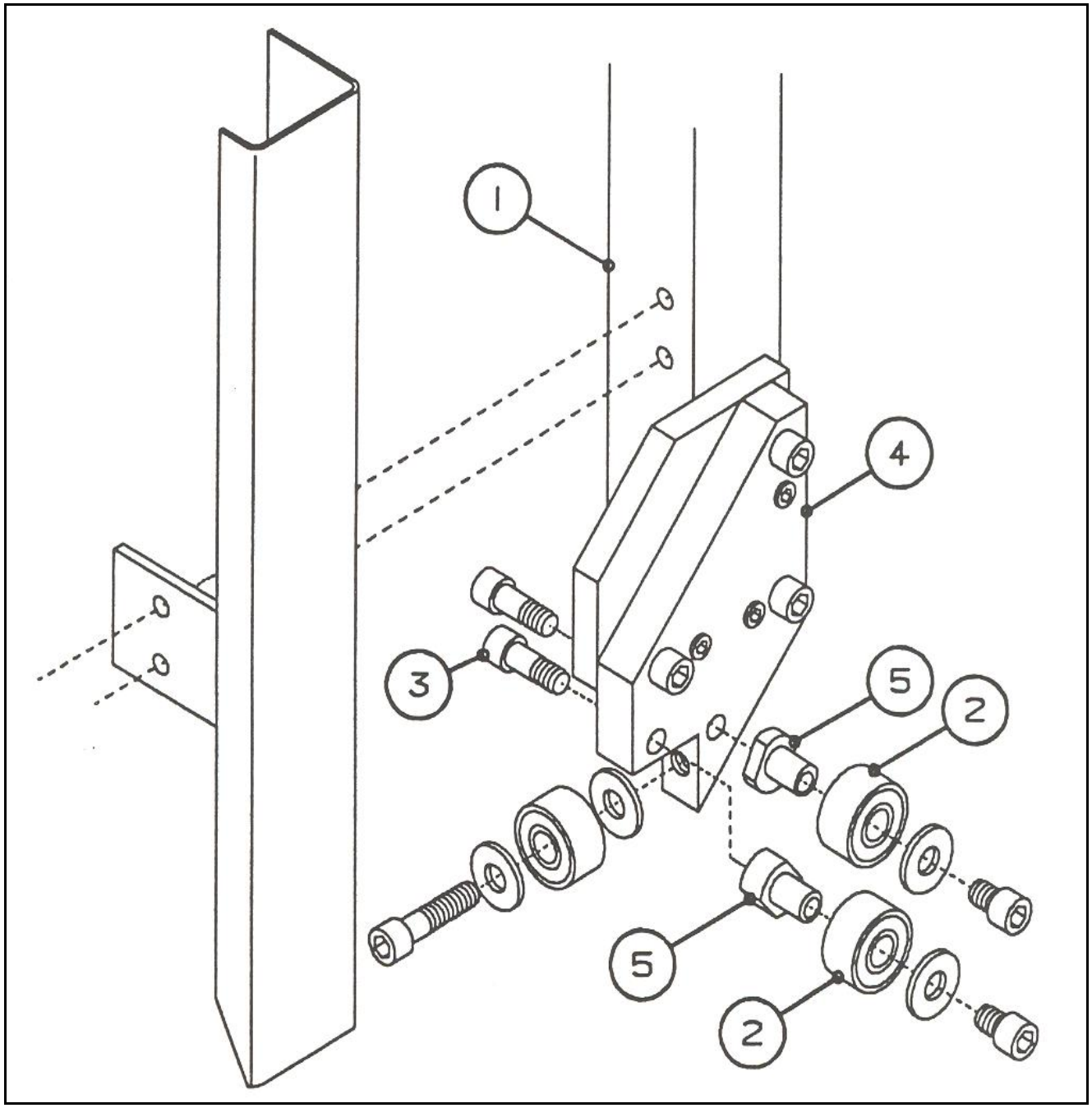
(figure 11)

With upper guide block in the lowest position, place flat side of straight edge on faces of upper and lower band guides bearings. If straight edge doesn't make full contact with both bearings (i.e. straight edge) adjust appropriate screw in upper guide block *(figure 9, item 5).* Re-tighten upper and lower block maintaining bolts *(figure 9, item 4).*

BAND GUIDE BEARINGS WITH OR WITHOUT SOLID CARBIDES BACKUP GUIDES

Lower guidepost *(figure 12, item 1)* to lower limit. Inspect saw blade and **band guide bearings** *(figure 121, item 2).* Replace if damaged. (If carbide guides are installed; loosen, turn a few degrees and re-tighten.) If band is not square with bearing faces *(refer to figure 13a),* the guide bearings are too loose.

If adjustment is required loosen bolt *(figure 12, item 3)* on rear of **band guide block.** *(figure 12, item 4)* The guide bearings are mounted on **eccentric sleeves** *(figure 12, item 5), which* can be adjusted with a wrench. Re-tighten bolt.



(figure 12)

BAND GUIDE BEARINGS ADJUSTMENT

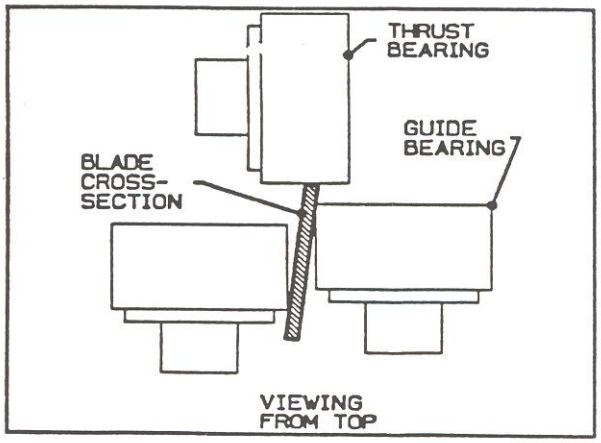


Figure 13 Guide Bearings Too Loose
INCORRECT

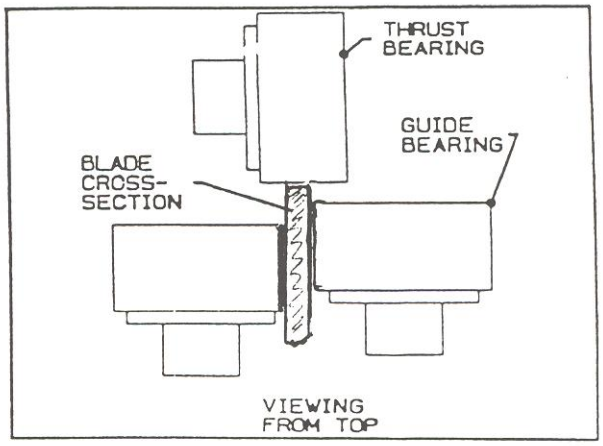
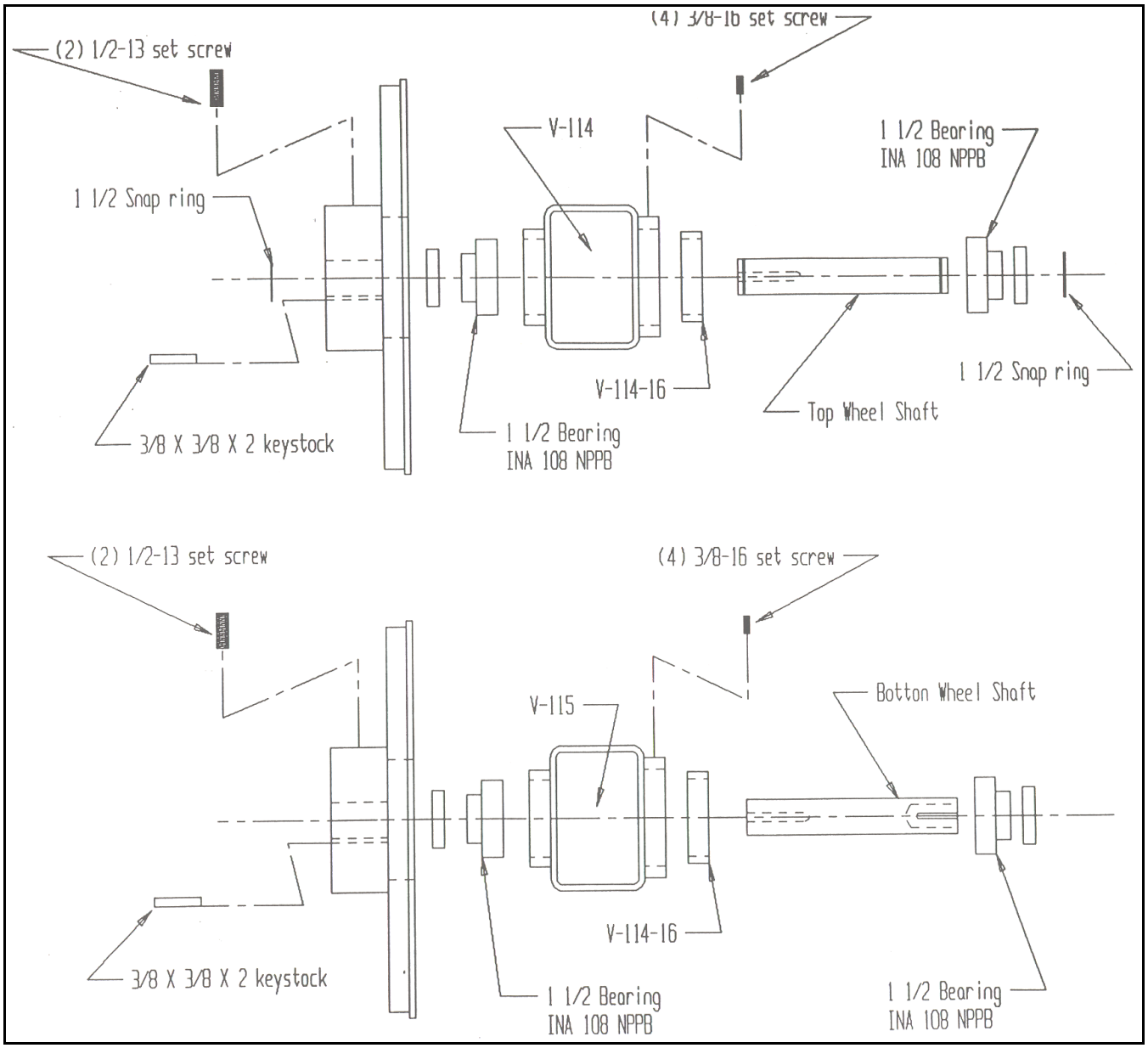


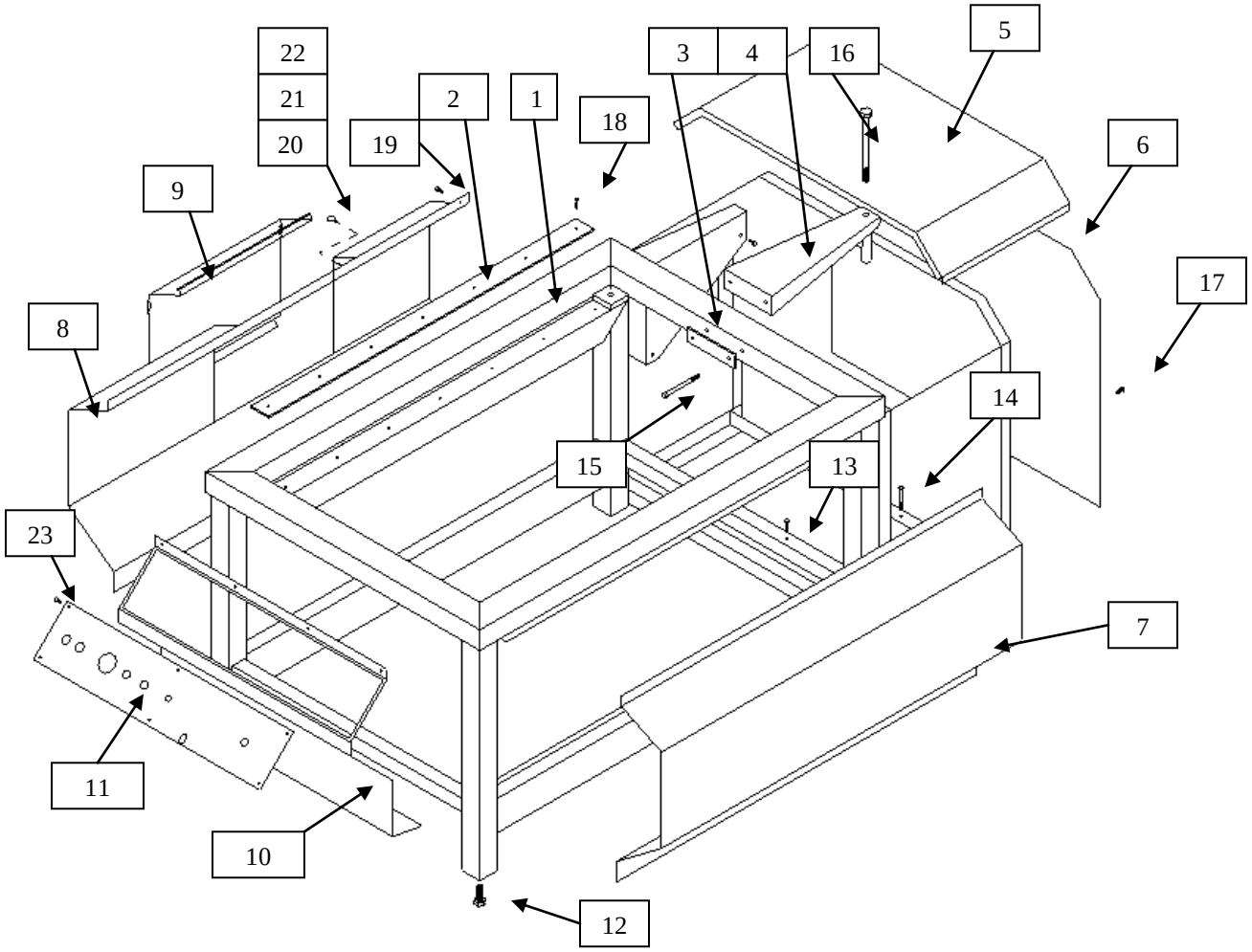
Figure 14 Guide Bearings Correct
CORRECT



(figure 15)

All MetalSawz Models

Main Frame - Covers

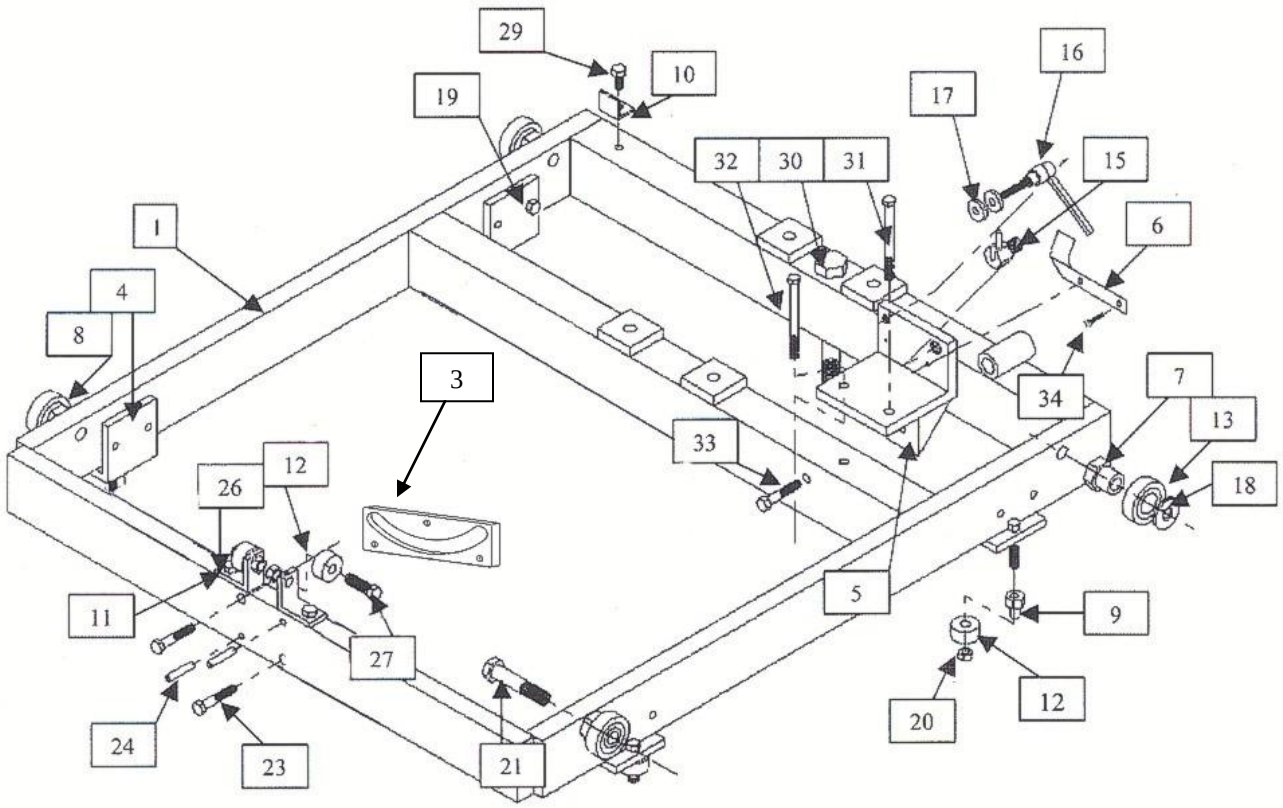


Item #	Description	Part #	Item #	Description	Part #
1	Main Frame	120-W01	13	B-N-L	5/16-18 x 1 1/2
2	Carriage Track	100-F01	14	B-N-L	5/16-18 x 3
3	Cylinder Support	110-F01	15	B-N-L	3/8-16 x 5
4	Cylinder Bracket	110-W01	16	B-LN	¾-10 x 8
5	Top Cover	1000-S01	16	SAE Washer 5 pc	¾- SAE
6	Rear Cover	1000-S05	17	Tapping Screw	#10 x 3/4
7	Right Skirt	1000-S04	18	Flathead Screw	¼ - 20 x 1/2
8	Left Skirt	1000-S02	19	Socket head Screw	¼-20 x ¾
9	Skirt Access Door	1000-S03	20	¼ turn Handle	CV18100111
10	Front Control Panel	1000-S12	21	¼ turn Handle	CV18100112
11	Control Panel Face	800-P01 -P02	22	¼ turn Handle	CV18100113
12	Leveling Bolt	¾-10 x 2	23	B –L	¼ -20 x 3/4

Note: Can be obtained locally. B-Bolt, N-Nut, L-Lock washer, LN-Locknut

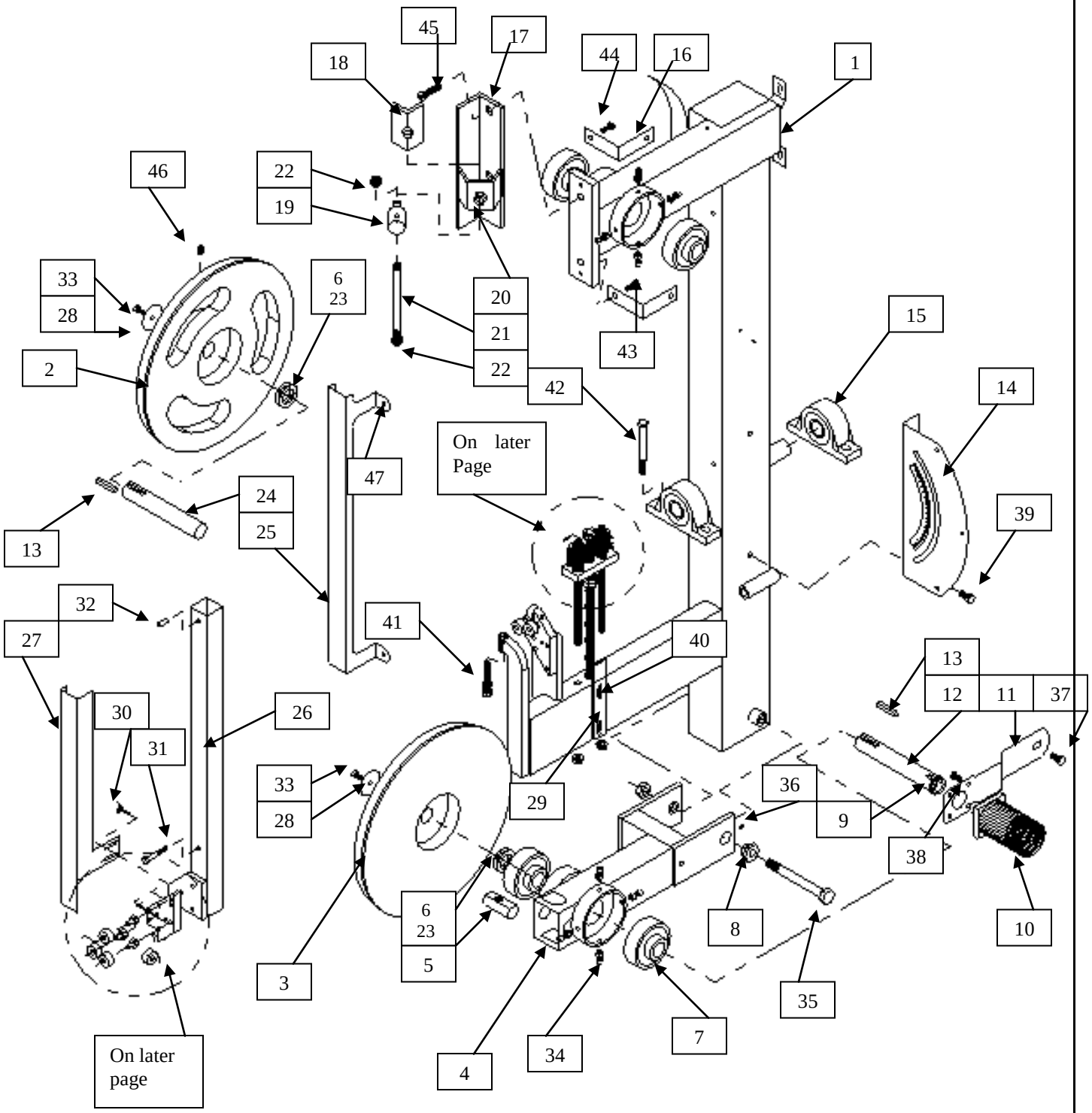
All MetalSawz Models

Carriage



Item #	Qty	Description	Part #	Item #	Qty	Description	Part #
1	1	Main Frame	200-W01	18	4	SAE Washer	5/8
				19	8	B-L	3/8-16 x 1
3	3	Head Pivot Support	200-M01	20	4	SAE N-L	3/8 –16
4	4	Side Track Guide	210-W01	21	4	B-N-L	5/8-11 x 3 1/2
5	1	Tilt Clamp Mount	500-F01	22	4	B-L-W	M12-1.75 x 40
6	1	Tilt Indicator	500-P02[	23	2	B-L-F	3/8-16 x 1 1/2
7	2	Rear Roller Eccentric	200-M02	24	2	Spring Pin	5/16 x 1 1/2
8	2	Front Roller Bushing	200-M03	25	6	B-JN-L	3/8-16 x 1
9	4	Side Roller Eccentric	600-M02	26	2	B-L	3/8-16 x 3/4
10	1	Limit Switch Bracket	1500-F01	27	2	B-L-W	M12-1.75 x 40
11	2	Table Support Bracket	200-F03	28	1	B-L-F	3/8-16 x 1 ¼
12	6	Small Roller	600-B01	29	1	B	3/8-16 x 1 1/4
13	4	Carriage Roller	200-B02	30	1	B-LN	3/4 10 x 6
				31	1	B-N-L	3/8-16 x 4
15	1	Lock Pin	500-HW01	32	1	B-N-F-L	3/8-16 x 5
16	1	Adj Lock Handle		33	1	B-N-L	3/8-16 x 3
17	2	Adj Clamp Washer		34	2	B-L	10-24 x 2

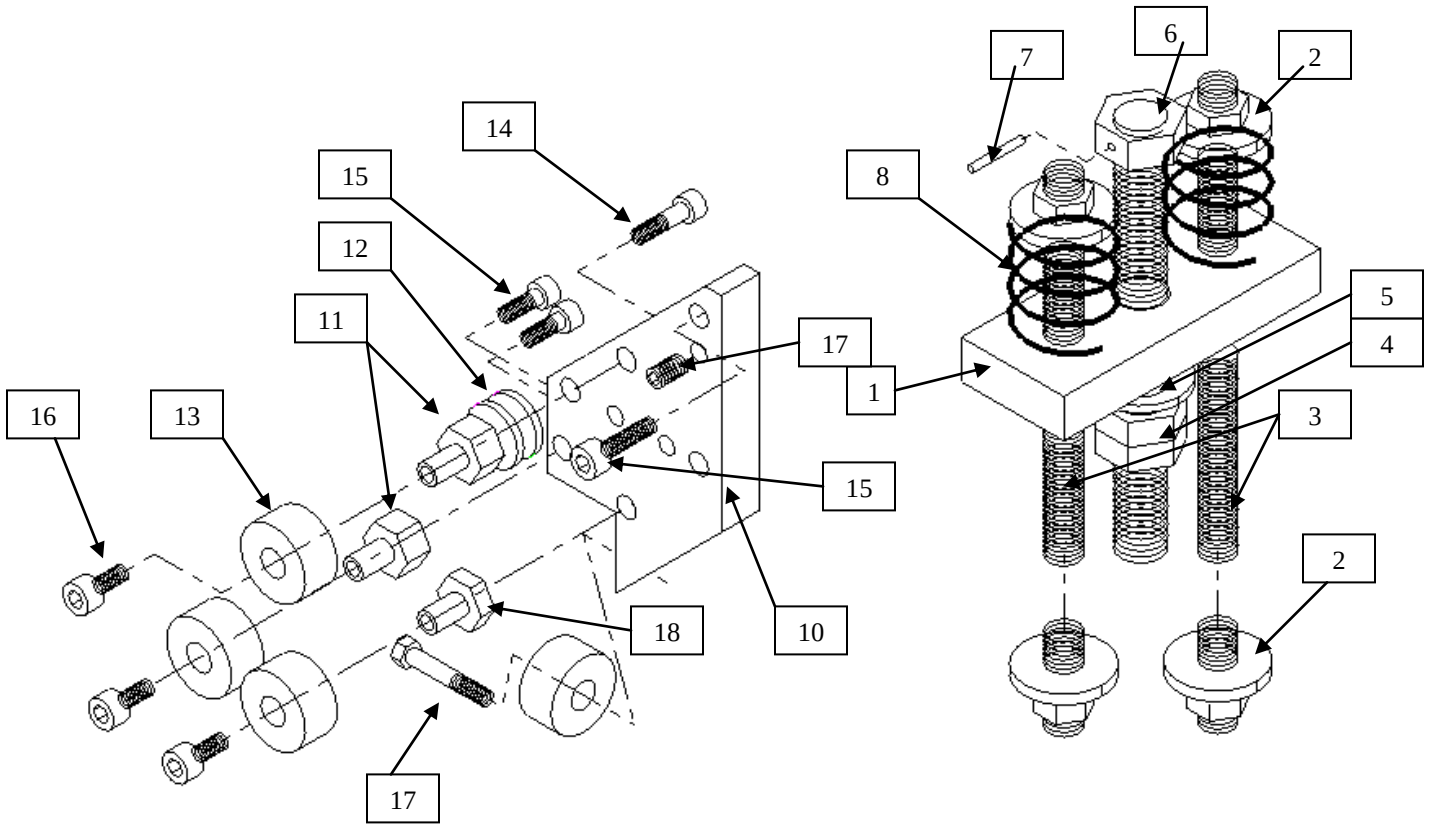
All MetalSawz Models



All MetalSawz Models

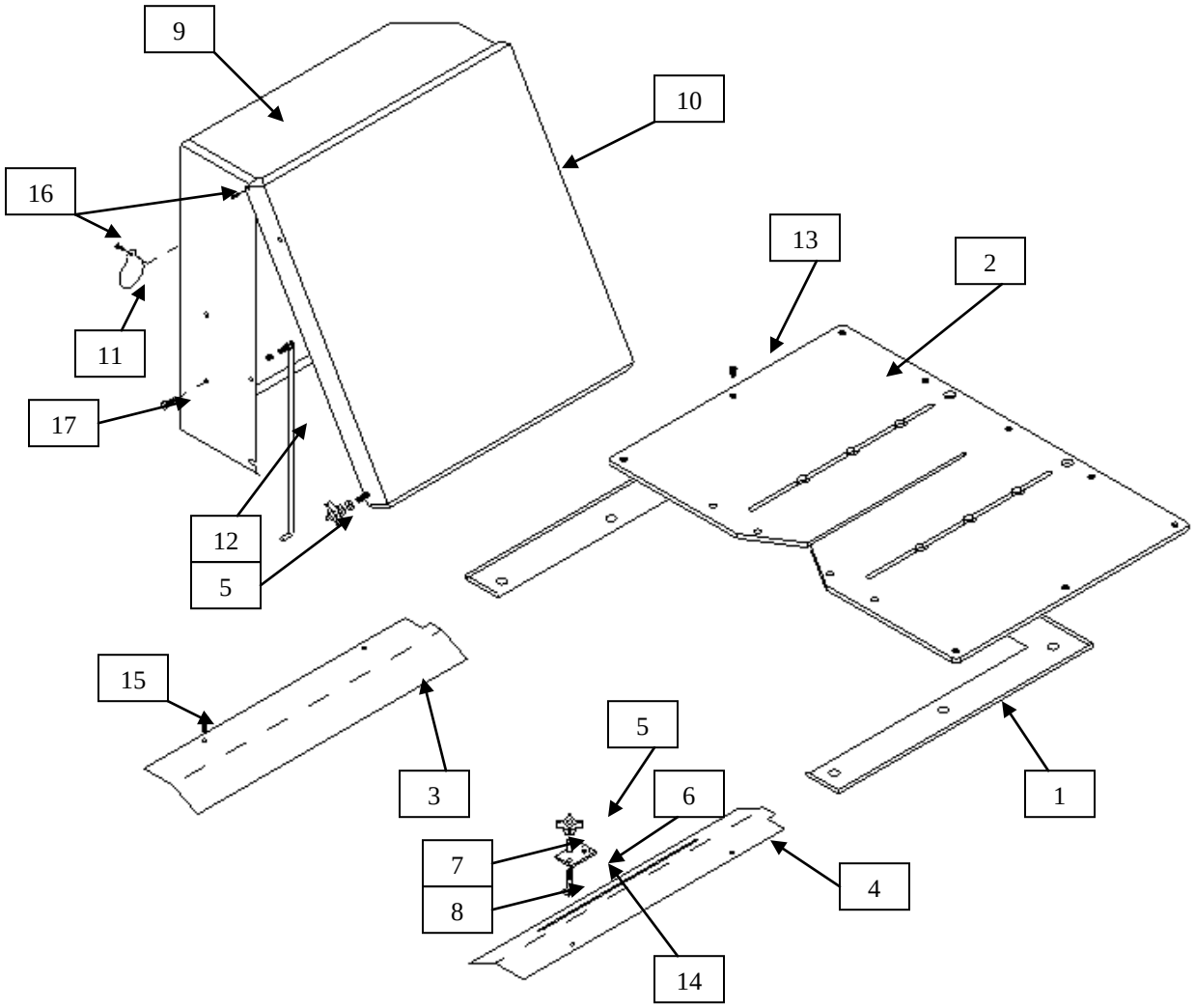
Item #	Qty	Description	Part #	Item #	Qty	Description	Part #
1	1	C Frame	300-W01–W02	25	1	Rear Band Guard	1000-P01
2	1	Top Band Wheel	600-S01	26	1	Top Band Guide	600-W01
3	1	Bottom Band Wheel	600-S01	27	1	Front Band Guard	1000-P02
4	1	Lower Rocker Arm	310-W01	28	2	QD Bushing	700-HW01
5	1	Band Tension Nut	310-M03	29	1	Band Tension Gauge	330-F01
6	2	Wheel Spacer	700-F02	30	2	Wing Bolt-FW	¼ x ¾
7	4	Wheel Shaft Bearing	300-B01	31	1	B-N-L	3/8 x 2 1/2
8	2	Rocker Eccentric	310-M02	32	1	Spring Pin	3/8 x 1
9	1	Snap Ring		33	3	B-L-L	3/8 x ¾
10	1	Motor	TBO330FS100AAAB	34	8	Socket head screw	3/8 x 1 ½
11	1	Motor Bracket	300-P03			N-L	3/8
12	1	Lower Wheel Shaft	700-M01	35	1	B - LN	¾ x 9 ½
13	2	Band Wheel Key		36	2	Setscrew	¼ x 3/8
14	1	Tilt Protractor	500-P01	37	1	B-JN – FW	½ x 2 #5
15	2	C Frame Bearing	200-B01	38	4	B - L	3/8 x ¾
16	2	Cowl Brackets	300-f06	39	2	B – L – FW	½ x 1
17	1	Top Band Guide Mount	600-S02	40	2	B – L – FW	3/8 x ¾
18	1	Top Band Guide Clamp	600-S03	41	1	Bronze bolt/jam nut	½ x 2 ½
19	1	Band Guide Clamp Bolt	300-M02	42	4	B-L-N-FW	½ x 5 ½
20	1	Clamp Bolt Brass Washer		43	1	B-L-FW	3/8 x 1
21	1	Clamp Handle	300-M03	44	1	B-L-FW	3/8 x 1 ¼
22	2	Handle Ball End		45	2	Countersink FW-N-L	½ x 2
				46	4	Setscrew	½ x 1
24	1	Top Wheel Shaft	700-M02	47	2	B-L	3/8 x ¾

All MetalSawz Models



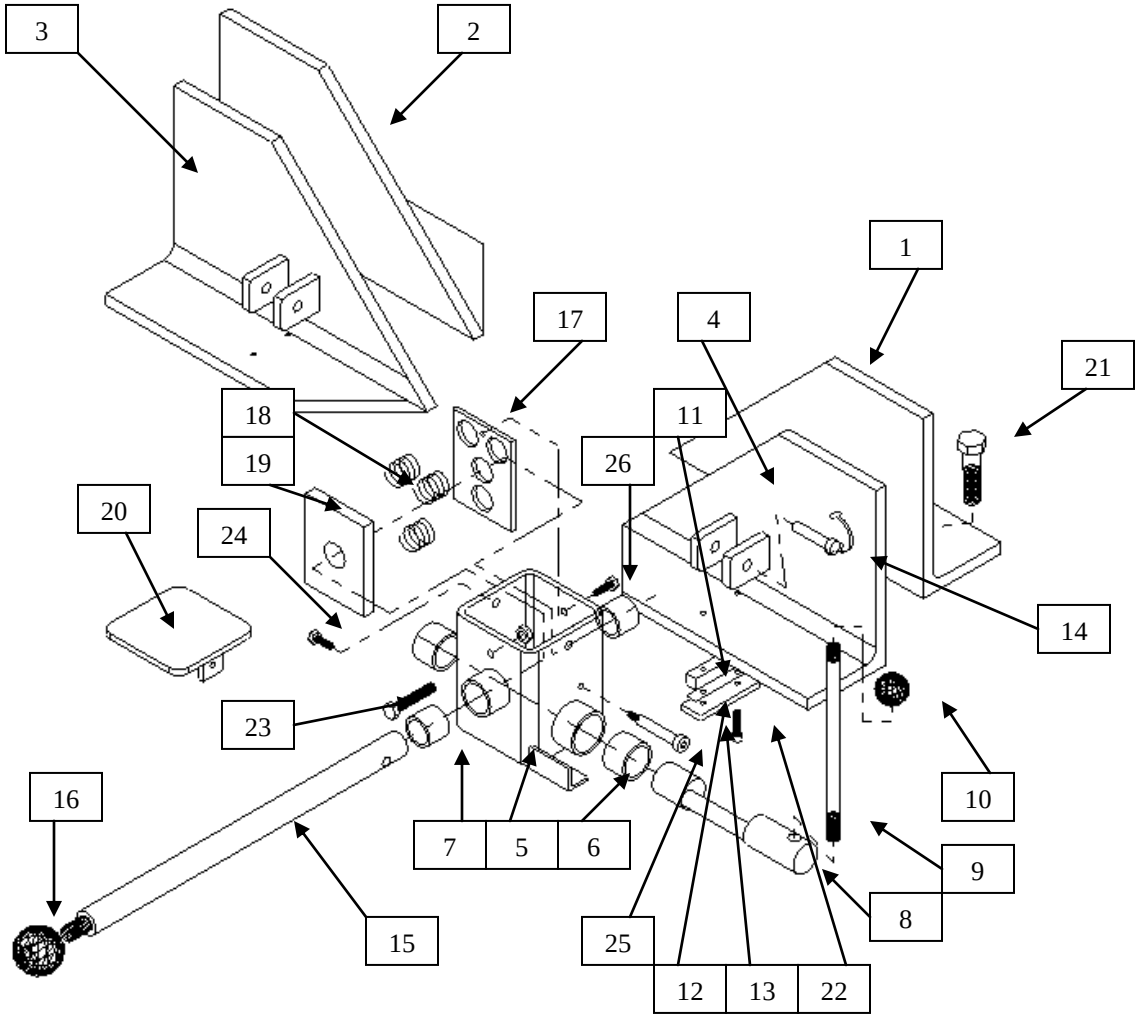
Item #	Qty	Description	Part #	Item #	Qty	Description	Part #
1	1	Band Tension Equalizer	330-F03	10	2	Band Guide Block	600-M01
2	4	Locknut – Flat washer	½ - 13	11	3	Band Eccentric long	600-M03
3	2	Threaded Rod	½ -13 x 12	12	2	Spacer Washer	
4	2	Jam nut	¾-10	13	6	Band Guide Roller	600-B01
5	1	SAE Washer	¾	14	1	SHCS – L	3/8 – 16 x 2
6	1	Locknut	¾-10	15	4	SCHS – L	3/8-16 x 1 1/4
7	1	Spring Pin	1/8 x 1	16	6	SAE –W- SHCS –L	3/8-16 x 5/8
8	2	Tension Spring	330-HW01	17	2	B-N-L-W	M12-1.75 x 40
9	1	Threaded Rod	¾ - 10 x 21	18	2	Band Eccentric short	600-M02

All MetalSawz Models



Item#	Qty	Description	Part#	Item#	Qty	Description	Part#
1	1	Splash Tray	1000-S11	10	1	Top Cowl Door	1000-S09
2	1	Table	130-P01	11	1		
3	1	Right Splash Shield	1000-S10	12	1	Door Stay	1000-F02
4	1	Left Splash Shield	1000-S10	13	9	Low head Screw	
5	2	4 Prong Handles		14	2	Screw	10-24 x 1
6	1	Switch Slider	1500-F02	15	4	Wiz lock bolt	3/8 x 1
7	1	Spacer	1500-F01	16	3	B-FW LN	¼ x ¾
8	1	T Bolt		17	4	Wiz lock N-FW-L	3/8 x 1
9	1	Top Cowl	1000-S08				

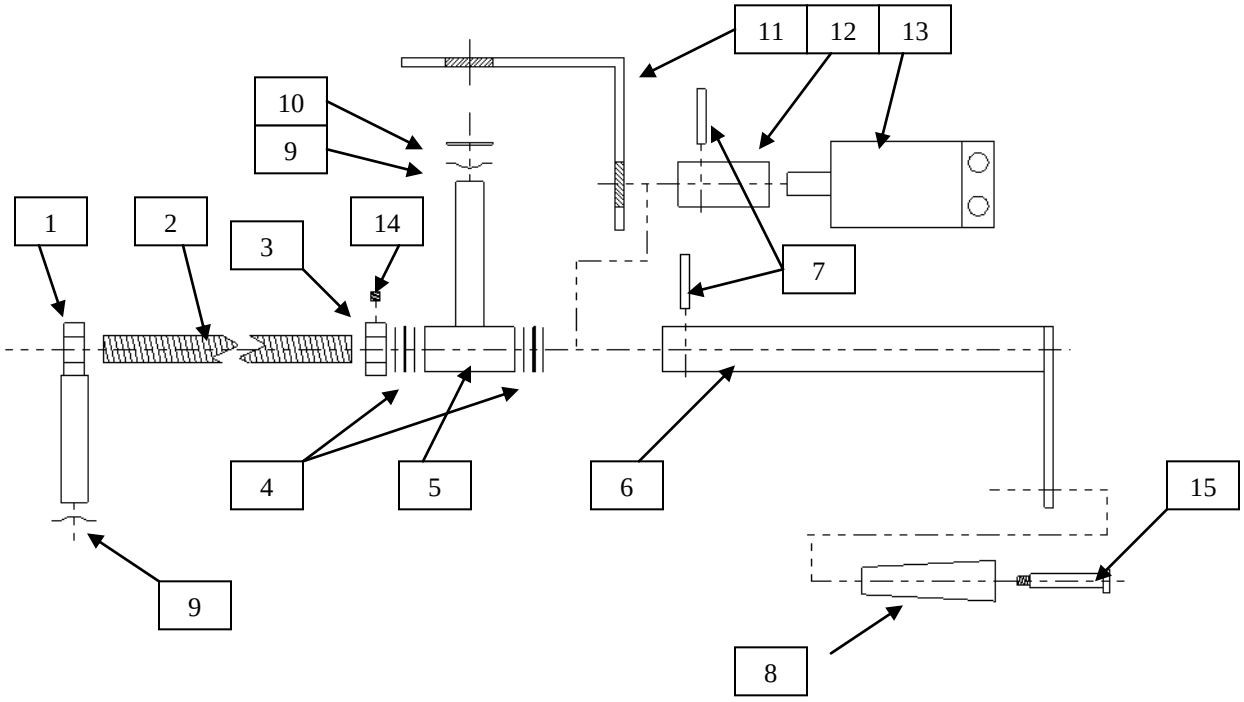
All MetalSawz Models



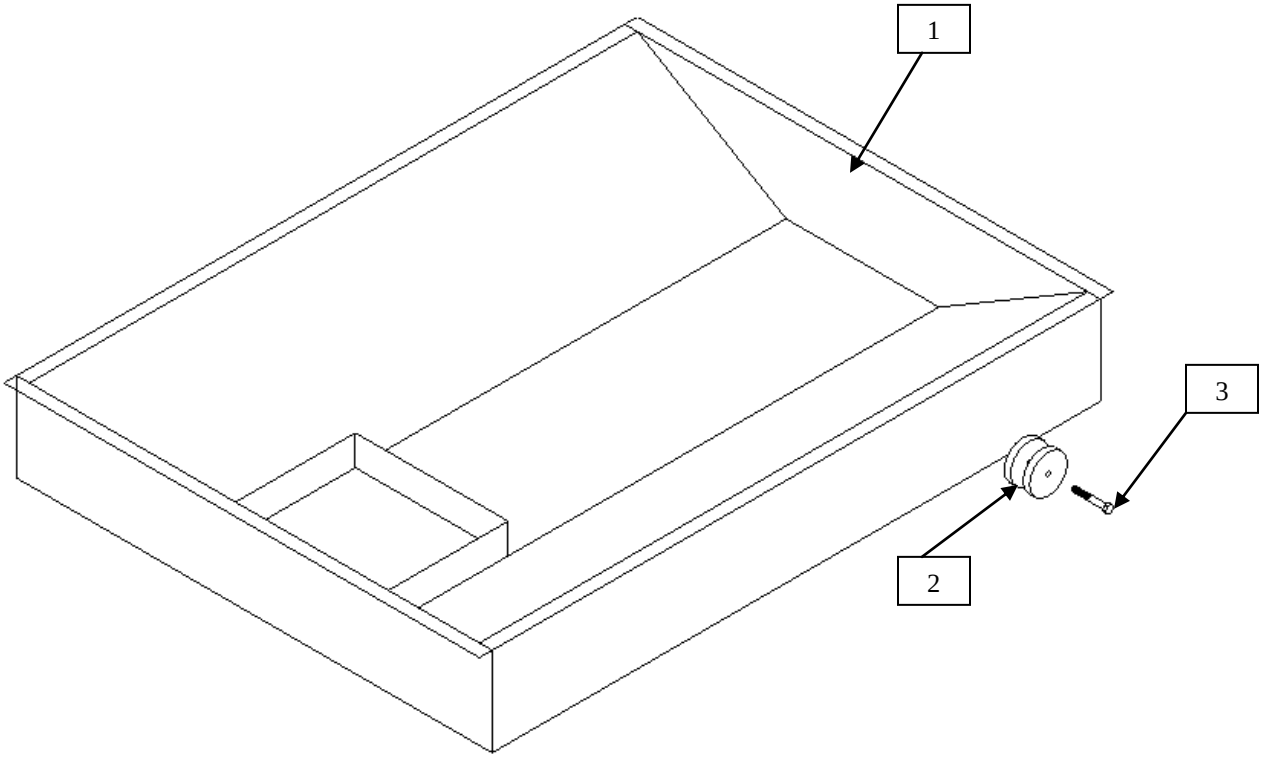
Item#	Qty	Description	Part#	Item#	Qty	Description	Part#
1	1	Right Rear Jaw	430-S03	14	2	Lock Pin	
2	1	Left Rear Jaw	430-S01	15	2	Vise Slider Handle	400-M02
3	1	Left Front Jaw	430-S02	16	2	Slider Handle End	
4	1	Right Front Jaw	430-S04	17	2	Spring Holder	400-F01
5	2	Vise Clamp Body	400-S01	18	6	Spring	
6	4	Side Bushing		19	2	Lock Plate	400-M03
7	4	End Bushing		20	2	Cover	400-S02
8	2	Vise Eccentric	400-M05	21	4	B-L	5/8 –11 x 2
9	2	Vise Handle	400-M01	22	4	B –L	¼ x 1 ¼
10	2	Handle Ball End		23	2	B –N	3/8 x 2
11	2	Vise Slider Guide	430-S02	24	4	B – L	¼ x ¾
12	2	Guide Shim		25	2	Shoulder Bolt	3/8 x 2
13	2	Guide Retainer	430-S03	26	2	B –L	¼ x 3/4

All MetalSawz Models

Tilt Control

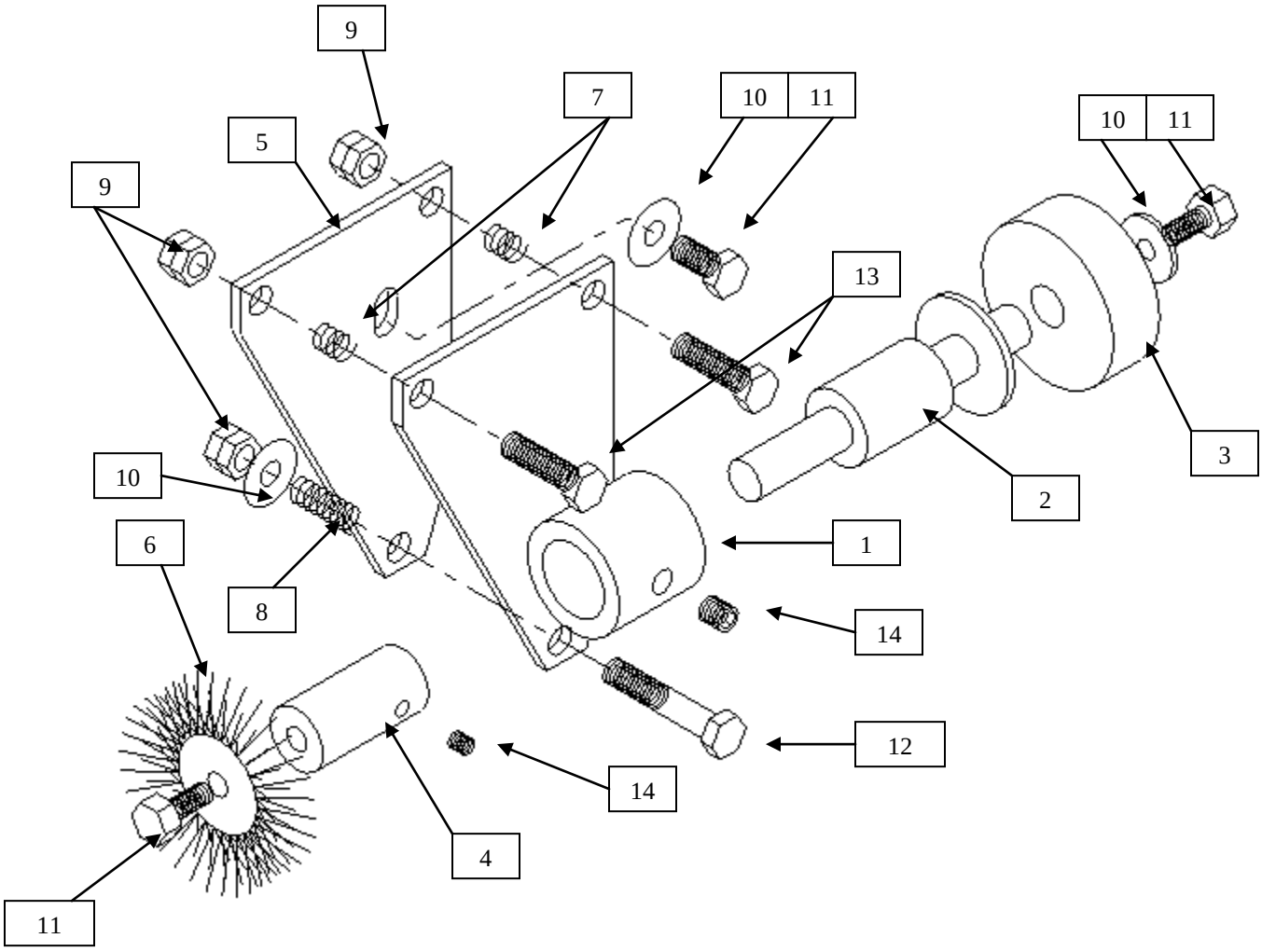


Item#	Qty	Description	Part#	Item#	Qty	Description	Part#
1	1	Lower Tilt Nut	500-F07	9	As req.	Wave Washer	
2	1	Tilt Adjusting Screw	500-F03	10	1	SAE Washer	
3	1	Anti Backlash Nut	500-F04	11	1	Motor Mount	510-P03
4	2	End Thrust Bearing	330-B01	12	1	Motor Coupling	510-M01
5	1	Upper Tilt Mount	500-F05	13	1	Tilt Motor	129-0004-002
6	1	Crank	500-F02	14	1	Setscrew	¼ -20 x ¼
8	1	Handle		15	1	Shoulder Bolt	3/8 x 2



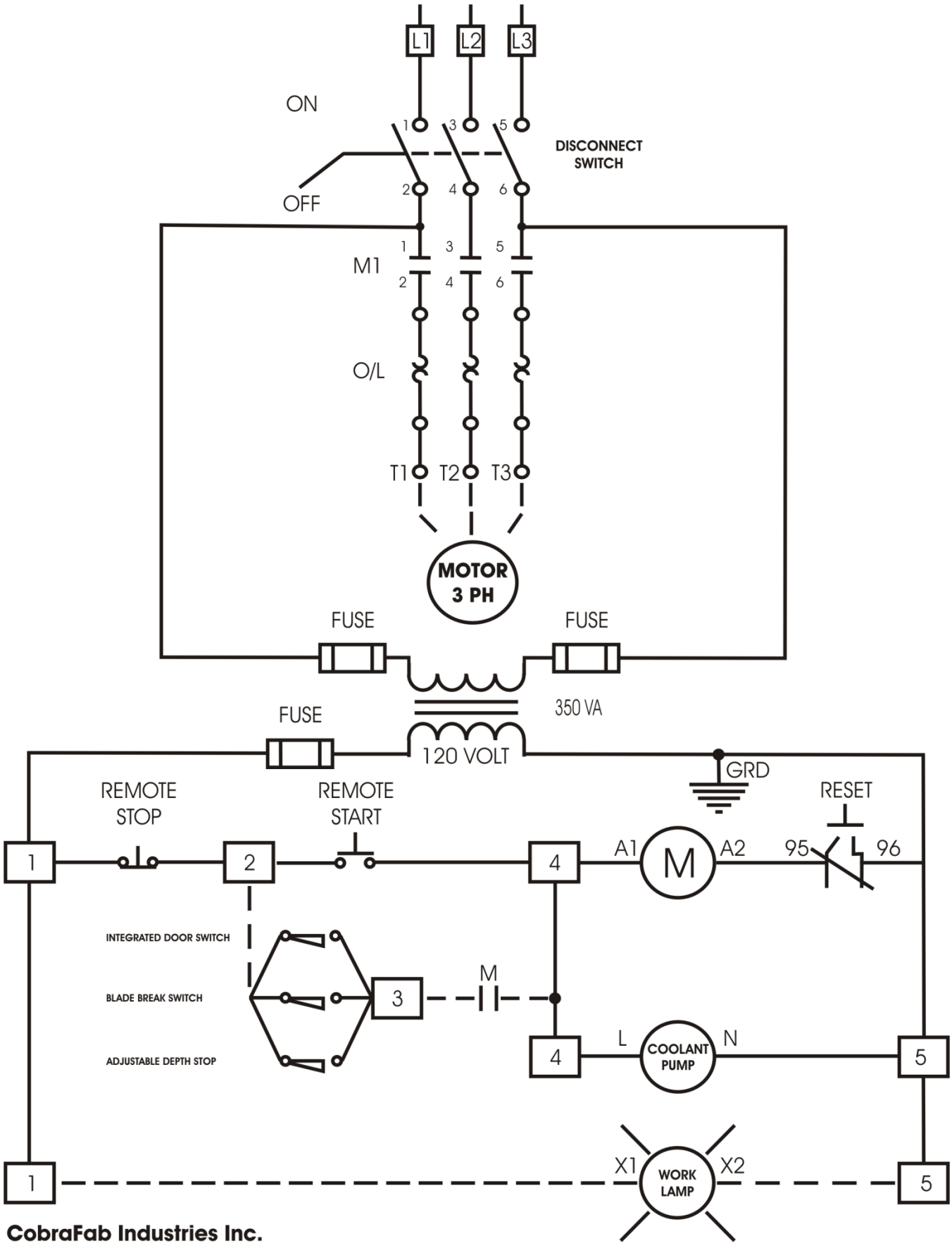
Item#	Qty	Description	Part#
1	1	Coolant Tray	1000-S12
2	8	Tray Wheel	1000-F04
3	4	B LN	3/8 –16 x 3

All MetalSawz Models

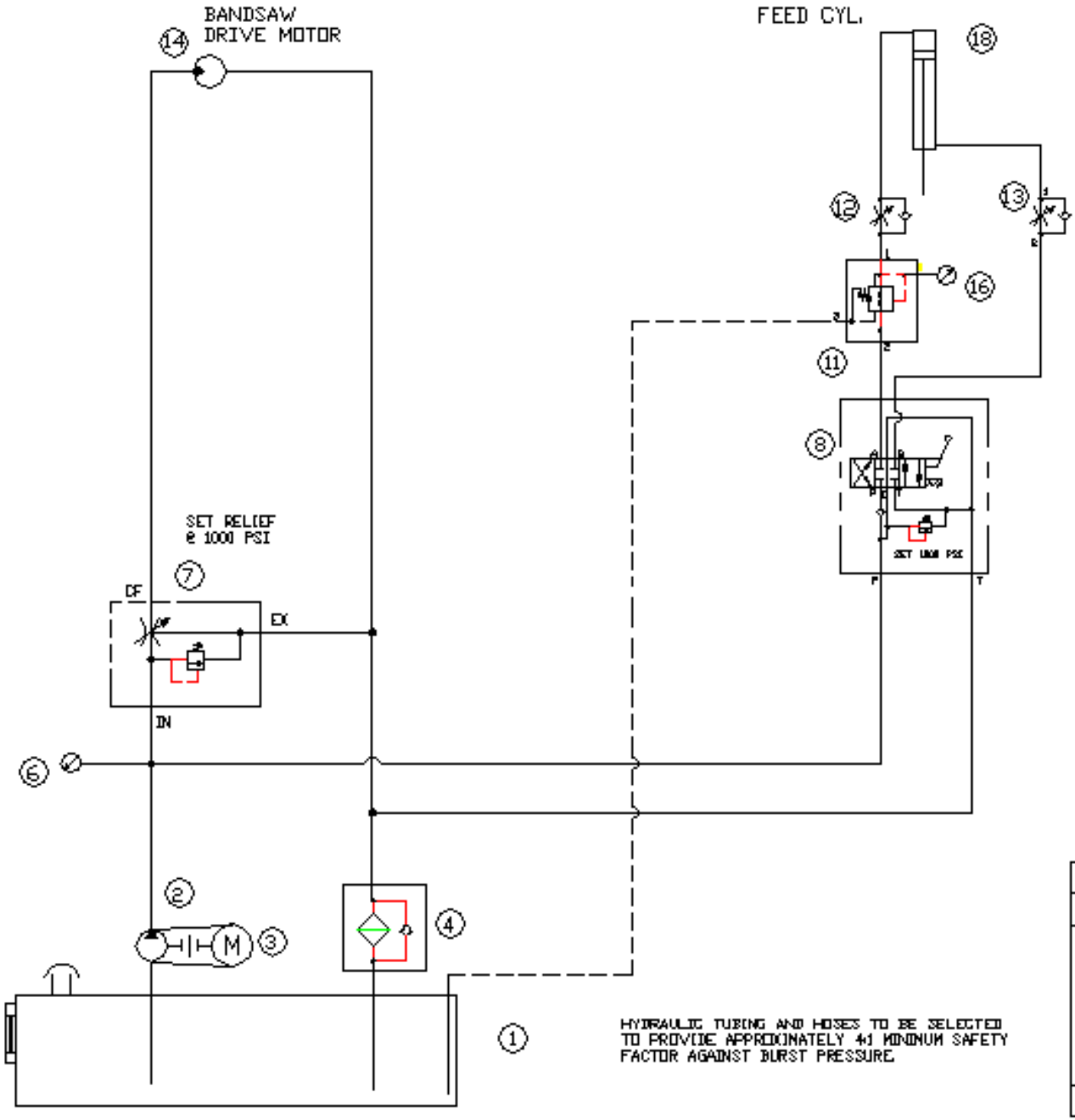


Item#	Qty	Description	Part#	Item#	Qty	Description	Part#
1	1	Floating Mount	340-F03	9	6	Jam nut	3/8-16
2	1	Bearing	600-B01	10	4	Flat washer	3/8
3	1	Tire	340-F01	11	3	B-L-	3/8-16 x ¾
4	1	Brush Coupler	340-M01	12	1	B	3/8-16 x 2 1/2
5	1	Fixed Mount	340-F02	13	2	B	3/8-16 x 1 ½
6	1	Wire Brush		14	1	Setscrew	3/8 –16 x 3/8
7	2	Short Spring		15	1	Setscrew	¼-20 x 1/4
8	1	Long Spring					

BAND SAW ELECTRICAL SCHEMATICS *(Please check schematic which came with the machine for proper fuse ratings.)*



CobraFab Industries Inc.
Dwg. No. 03-15-06



ITEM	QTY	MODEL NUMBER	DESC.	MFG.
1	1	30 GALLON TANK	RESERVOIR	COBRAFAB
2	1	PZG 2AR 140SL	PUMP	MARZOCCHI
3	1	5 HP	ELEC MTR	BALDOR
4	1	GLE-30	FILTER	GRESEN
5		NOT USED		
6	1	0-1500 PSI 2 1/2" DIAL	GAUGE	WIKA
7	1	FCR-51-B SAE(0-5 GPM)	FLOW CONT.	BRAND
8	1	2000S1417050-DS	DIR. VALVE	BUCHER
9		NOT USED		
10		NOT USED		
11	1	PPDB-DCN-EFI	REDUCER	SUN
12	1	F-400-S	FLOW CONT.	PARKER
13	1	NCCB-DCN-GAC	FLOW CONT.	SUN
14	1	TB0330FS10AAAB	HYD. MOTOR	PARKER
15		NOT USED		
16	1	0-600 PSI 2 1/2" DIAL	GAUGE	WIKA
17		NOT USED		
18	1	4.5"X 18"STR.X.75"ROD	CYLINDER	COBRAFAB

ITEM	QTY	MODEL NUMBER	DESCRIPTION	VENDOR
MATERIAL LIST.				

COBRASAW MODEL VH

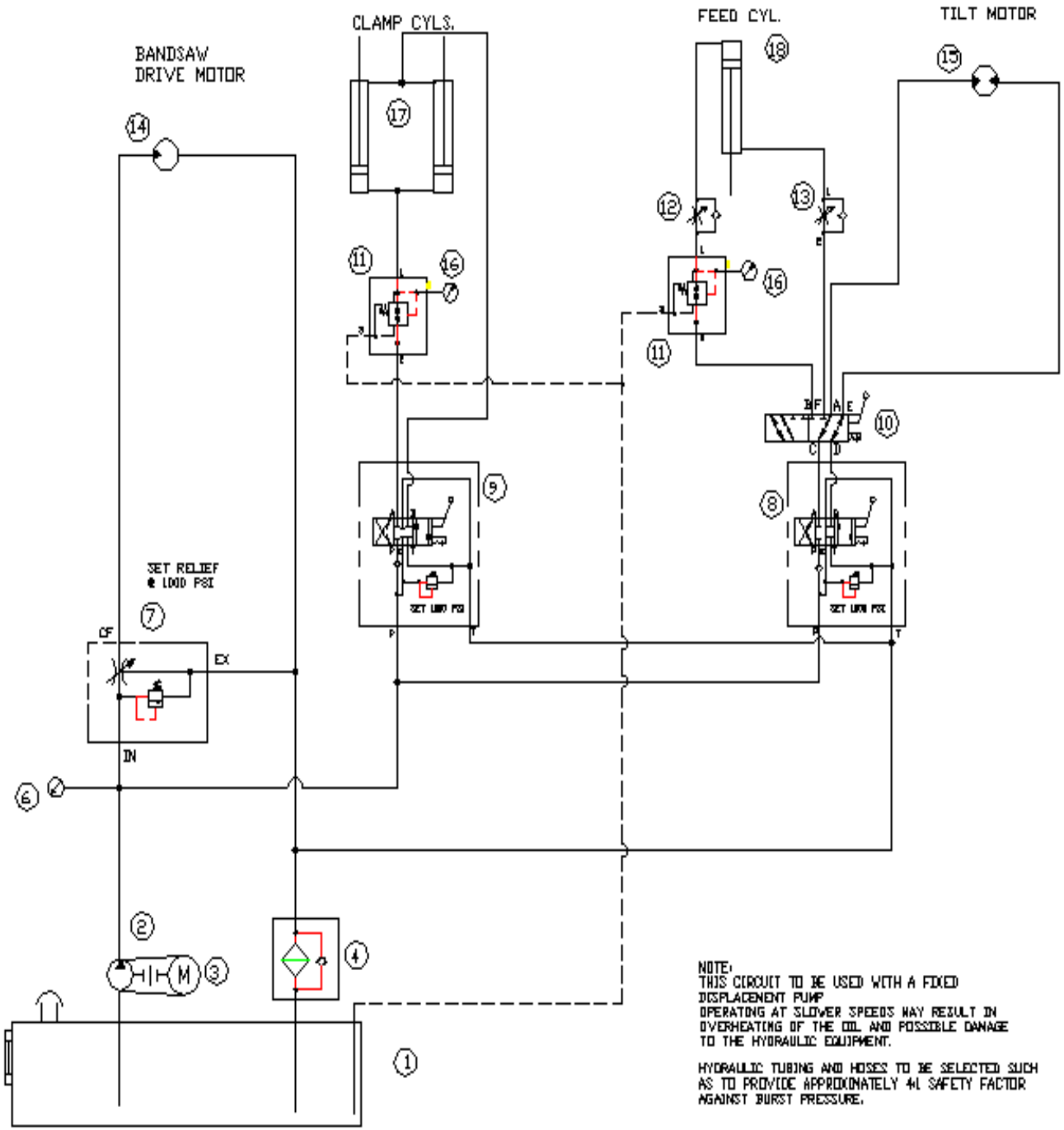
TITLE: HYDRAULIC BANDSAW CIRCUIT

DRAWN BY:
CHECKED BY:
DATE: Dec. 4, 2002

SCALE:
DWG NO. D-1016
REV

CUSTOMER PURCHASE ORDER NO:
CPM REFERENCE NO:

REVISIONS: DATE | BY | REV



ITEM	QTY	MODEL NUMBER	DESC.	MFG.
1	1	30 GALLON TANK	RESERVOIR	COBRAFAB
2	1	PZG 2AR 1403	PUMP	NARIOCHI
3	1	7.5 HP ELECTRIC MOTOR		
4	1	GLF-30	FILTER	GRESEN
5		NOT USED		
6	1	0-3000 PSI 2 1/2" DIAL	GAUGE	
7	1	FCR-5L-8 2AEC0-5 GPM	FLOW CONT	BRAND
8	1	200151417030-DS	DIR. VALVE	BUCHER
9	1	200151417034-DU	DIR. VALVE	BUCHER
10	1	DS-JADD-SP	DIVERTER	PRINCE
11	2	PPDR-DEN-EFJ	REDUCER	SUN
12	1	F-400-S	FLOW CONT	PARKER
13	1	MCCB-DCJN-GAL	FLOW CONT	SUN
14	1	T80C30FS100AAAB	HYD. MOTOR	PARKER
15	1	129-0004-00P	HYD. MOTOR	CHAR LYNN
16	2	0-1000 PSI 2 1/2" DIAL	GAUGE	
17	2	2" X 8" STR. X 1" ROD	CYLINDER	COBRAFAB
18	1	3.5"X 18"STR.X.75"ROD	CYLINDER	COBRAFAB

NOTE:
THIS CIRCUIT TO BE USED WITH A FIXED DISPLACEMENT PUMP
OPERATING AT SLOWER SPEEDS MAY RESULT IN OVERHEATING OF THE OIL AND POSSIBLE DAMAGE TO THE HYDRAULIC EQUIPMENT.

HYDRAULIC TUBING AND HOSES TO BE SELECTED SUCH AS TO PROVIDE APPROXIMATELY 4:1 SAFETY FACTOR AGAINST BURST PRESSURE.

ITEM QTY MODEL NUMBER DESCRIPTION VENDOR

MATERIAL LIST.

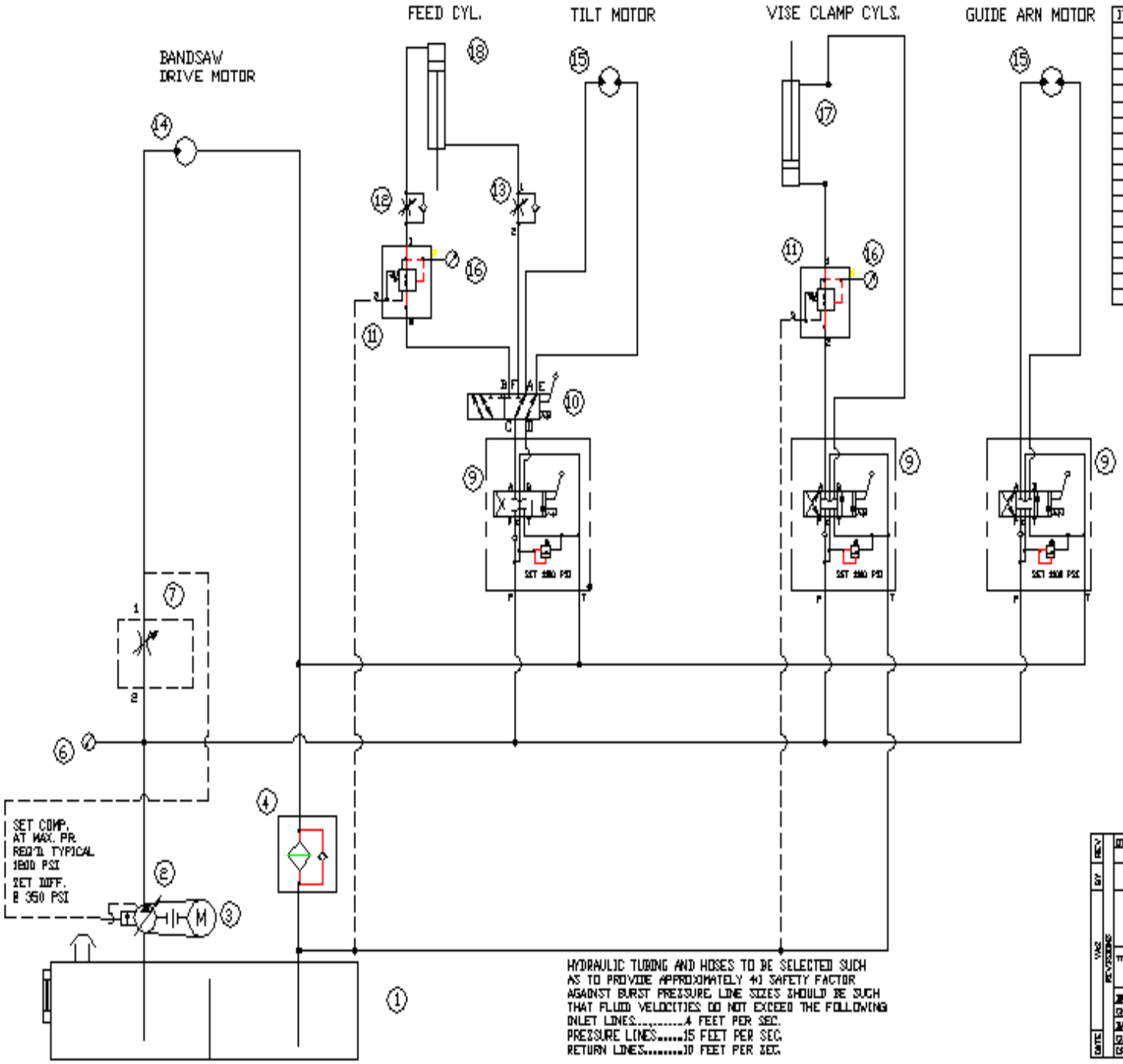
COBRASAW MODEL VH
WITH (H) PACKAGE

TITLE HYDRAULIC BANDSAW CIRCUIT

DRAWN BY:
CHECKED BY:
DATE: Aug 25, 1993

SCALE:
DRAWING NO. D-1017
REV

CUSTOMER PURCHASE ORDER NO:
CSM REFERENCE NO.



ITEM	QTY	MODEL NUMBER	DESC.	MFG.
1	1	30 GALLON TANK	RESERVOIR	COBRAFAB
2	1	PVP 23 OR 16 36A2D	PUMP	PARKER
3	1	7.5 OR 10 HP	ELEC MTR.	BALDOR
4	1	RLE-30	FILTER	GRESEN
5		NOT USED		
6	1	0-1500 PSI 2 1/2" DIAL	GAUGE	WIKA
7	1	NRV2-10-L-SH-05	FLOW CONT.	VICKERS
		NOT USED		
9	9	200051417034-10	DIR. VALVE	BUCHER
10	1	DS-(A)D	DIVERTER	PRINCE
11	8	PPDR-DEN-EFI	REDUCER	SUN
12	1	F-4DN-S	FLOW CONT.	PARKER
13	1	NCCD-DCN-GAJ	FLOW CONT.	SUN
14	1	TB0390FS100AAAB	HYD. MOTOR	PARKER
15	2	DNM 50 151G0094	HYD. MOTOR	DANFOSS
16	2	0-600 PSI 2 1/2" DIAL	GAUGE	WIKA
17	2	1.5"X 8" STRX 1" ROD	CYLINDER	COBRAFAB
18	1	1.5"X 18"STRX.75"ROD	CYLINDER	COBRAFAB

HYDRAULIC TUBING AND HOSES TO BE SELECTED SUCH AS TO PROVIDE APPROXIMATELY 4:1 SAFETY FACTOR AGAINST BURST PRESSURE. LINE SIZES SHOULD BE SUCH THAT FLUID VELOCITIES DO NOT EXCEED THE FOLLOWING
INLET LINES.....4 FEET PER SEC.
PRESSURE LINES.....15 FEET PER SEC.
RETURN LINES.....10 FEET PER SEC.

ITEM	QTY	MODEL NUMBER	DESCRIPTION	VENDOR
		MATERIAL LIST.		

COBRASAW MODEL VH WITH (S) OR (HD) PACKAGE

HYDRAULIC BANDSAW CIRCUIT

DRAWN BY:
CHECKED BY:
DATE: Aug 25, 2004
SCALE:
SHEET: 1-1018
REV: B
CUSTOMER PURCHASE ORDER NO.
DSH REFERENCE NO.

HYDRAULIC PRODUCT SAFETY

WARNING: Valve lever (spool) may "stick" (not centred) under certain conditions allowing the hydraulic equipment to continue to operate and could cause serious injury, death or equipment failure.

VALVE SAFETY: Read and follow instructions carefully. Failure to observe instructions and guidelines may cause serious injury, death or equipment failure. A sticking valve (spool bind) may be caused by one or more of the following factors:
DIRTY OIL: Oil must be filtered to a minimum of 10 microns. Filters should be changed regularly; spin-on types after 50 hours of initial use and then after every two hundred and fifty hours of use. Use of a condition indicator is recommended.
OIL REQUIREMENTS: Premium quality anti-wear type oil. Certain synthetic oils may cause spool seals to swell and the valve to stick.
MAINTENANCE: Make sure all bolts are tightened and torqued to the recommended specification. Bent or broken parts should not be used. Replace immediately. Always use exact replacements.

PUMPS & MOTORS SAFETY:
A relief or bypass is installed in your hydraulic system to protect pump from breakage due to over pressurization. Use proper oil as noted in the technical service manual.

CYLINDER SAFETY:
Check clevis clearances before, during, and after extending the cylinder and before using the cylinder under pressure to avoid possible injury, or bent or broken rods caused by binding.

PINHOLE LEAKS:
If you observe a pinhole leak, discontinue use of the component. If oil has penetrated your skin or contacted your eye, seek medical attention immediately!

TROUBLESHOOTING

FINDING AND SOLVING PROBLEMS: Please read and observe the HYDRAULIC PRODUCT SAFETY SHEET before proceeding further. Your safety is important to us!

Gradual loss of pressure or flow resulting in a loss of power is common in hydraulic system failure. Any one of the system's components may be at fault. These step-by-step procedures should help you locate and remedy the problem quickly.

1. SYSTEM INOPERATIVE
- No oil in system, insufficient oil in system. Fill system. Check for leaks.
- Wrong oil in system. Refer to specifications. Change oil.
- Filter dirty or clogged. Drain oil and replace filter or filter element.
- Oil line restriction. Oil lines dirty or collapsed. Clean or replace.
- Air leaks in pump suction line. Repair or replace as necessary.
- Worn or dirty pump. Clean, repair or replace. Check alignment. Check for contaminated oil. Drain and flush system.
- Badly worn components (valves, cylinders, etc.) Examine and test for internal or external leakage. Replace faulty components. Check for cause of wear.
- Leakage. Check all components, particularly the relief valve for proper settings. Refer to technical manuals.
- Slipping or broken pump drive. Repair or replace belts, couplings etc. Check for proper alignment or tension.

2. SYSTEM OPERATES ERRATICALLY
- Air in system. Check suction side of system for leaks. Repair.
- Cold oil. Allow ample warm-up period.
- Dirty or damaged components. Clear or repair as necessary.
- Restrictions in Filters or lines. Clean and/or replace elements or lines.

3. SYSTEM OPERATES SLOWLY

- Oil viscosity too high, cold oil. Allow oil to warm up before operating machine.
- Air in system. Check suction side for leaks. Repair.
- Badly worn pump, valves, cylinder, etc. Repair or replace as needed.
- Restrictions in filters or lines. Clean and/or replace elements or lines.
- Improper adjustments. Check orifices, relief valves, etc. Adjust per manual.
- Oil leaks. Tighten fittings. Replace seals or damaged lines.

4. SYSTEM OPERATES TOO FAST

- Wrong size of incorrectly adjusted restrictor. Replace or adjust as necessary.

5. OVERHEATING OF OIL IN SYSTEM

- Oil passing through relief valve for excessive time. Return control valve to neutral when not in use.
- Incorrect oil, low oil, dirty oil. Use recommended oil, fill reservoir, clean oil, and replace filter elements.
- Excessive component internal leakage. Repair or replace component as necessary.
- Restriction in filter or lines. Clean and/or replace elements or lines.
- Insufficient head radiation. Clean dirt and mud from reservoir and components.
- Malfunctioning component. Repair or replace.

6. FOAMING OIL

- Incorrect, low or dirty oil. Replace, clean or add oil as needed.
- Air leaks. Check suction line and component seals for suction leaks. Replace.

7. NOISY PUMP

- Low oil level, incorrect oil, foamy oil. Replace, clean or add oil as needed.
- Suction line plugged or too small, inlet screen plugged. Clean or replace

8. BLOWN SHAFT SEAL

- Pump: wrong pump shaft rotation. Replace seal. Refer to installation instructions.

9. LEAKY PUMP OR MOTOR

- Damaged or worn shaft seal. Replace seal. Check for misalignment.
- Loose or broken parts. Tighten or replace.

10. CONTROL VALVE DOES NOT CENTRE (Binding)

- See Hydraulic Product Safety sheet.
- Valve linkage misaligned. Repair.
- Tie-bolts too tight (stack valves). Loosen as necessary.
- Valve damaged. Repair or replace.
- Handle bracket screws loose. Tighten.

11. CONTROL VALVE LEAKS EXTERNALLY

- Tie-bolts too loose (stack valves). Tighten as necessary.
- Seals damaged or worn. Replace.
- Back pressure or restriction in tank line. Check quick couplers. Use power beyond when necessary.
- Cracked port or body. Replace.

12. CYLINDER LEAKS EXTERNALLY

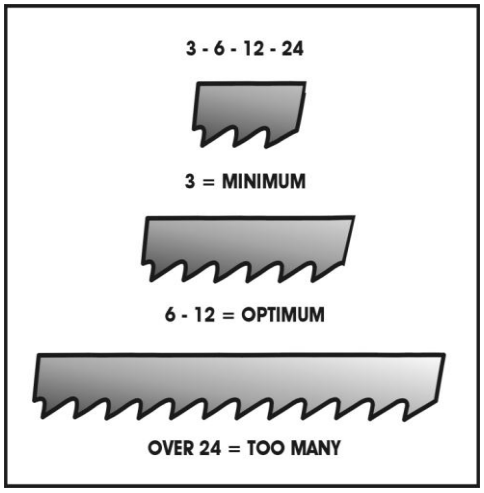
- Seals damaged or worn. Replace.
- Rod damaged. Replace.

FACTORS THAT AFFECT CUTTING ON YOUR METALSAWZ

There are several factors that affect band sawing efficiency on your MetalSawz; blade tooth selection, blade "break-in" procedure, band speed, feed rates, vise loading, lubrication, the blade cleaning brush, the condition of the blade weld, the material you are cutting as well as many other factors.

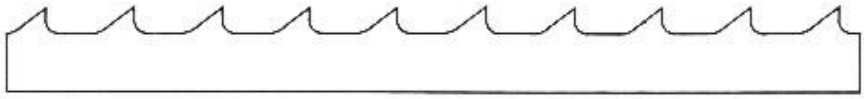
TOOTH SELECTION

The basic rule is to keep between 6 – 12 teeth in the material. Fewer than this risks tooth strippage and gullet clogging. This range can be achieved through the correct combination of tooth pitch and vise loading. Most blade manufacturers today produce a " variable pitch" tooth pattern in which the spacing between tips is not uniform. Varying tooth pitch tends to break up harmonic vibrations resulting in reduced noise and improved cutting performance. A variable pitch band is a particularly good choice when cutting structural steels. Remember when following the 3-6-12-24 rule to use the average tooth size when using a variable pitch tooth pattern. If there is a condition where there are too few teeth and too many teeth in the material (i.e. an I-beam), slightly increase speed and decrease the feed. ***It is conservatively estimated that between 75 to 90 percent of blade failures result from wrong tooth selection. For example, selecting the wrong tooth pitch or pattern may cause crooked cutting, tooth stripping, band breakage, slow cutting rate and in some cases damage to the machine.*** Ask your blade supplier for a "Speed Chart" for recommended tooth pitches, feeds and speeds.

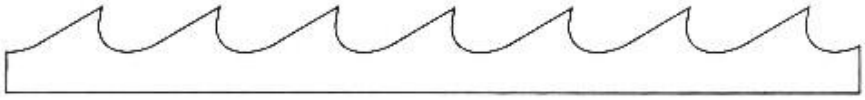


Regular tooth
Recommended for use on all ferrous metals and for general purpose cutting. It has a full round smooth gullet.

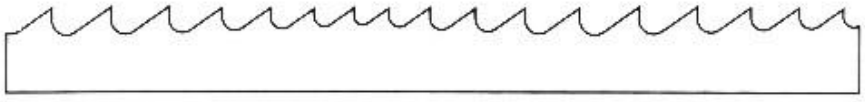
Skip tooth
Features a flat gullet which gives larger chip clearances when cutting ferrous and non-ferrous metals, woods and plastics. Used at high speeds.



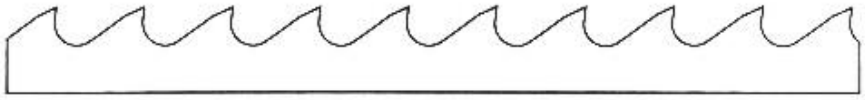
Hook tooth
This tooth form has a lengthened gullet and the tooth face has a postive rake of 10°
It is most suitable for non-ferrous metals.



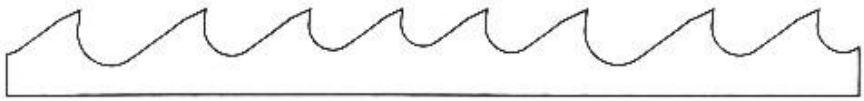
Variable Tooth Form
Varied tooth sizes, set at regular intervals, with each tooth achieving a slightly different cutting angle. Recommended for interrupted cutting eg Pipes, Tubes.
The variable tooth form, minimises chatter and reduces disruptive and costly vibration.



Positive Rake
Bimetal bandsaws are available with a positive rake for regular teeth. This enables faster and more efficient cutting on difficult to machine materials.

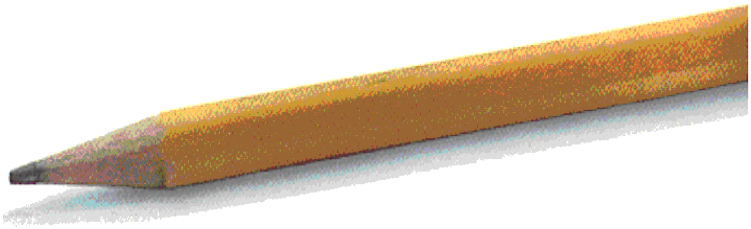


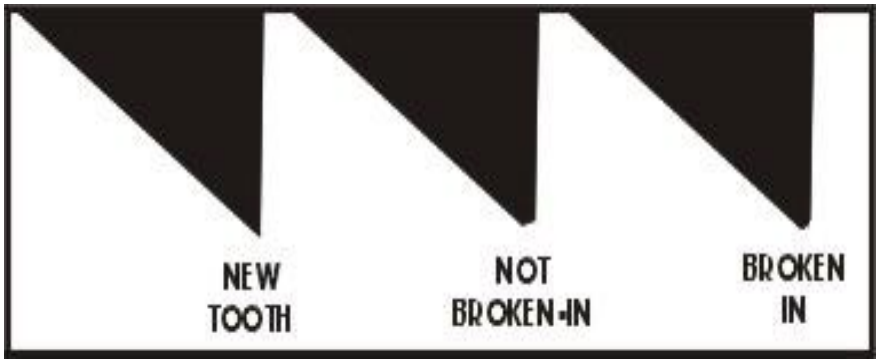
Positive Rake Variable Pitch
For faster and more efficient cutting of difficult materials (where there is a variety of sizes to cut or on interrupted cutting).



BLADE BREAK-IN

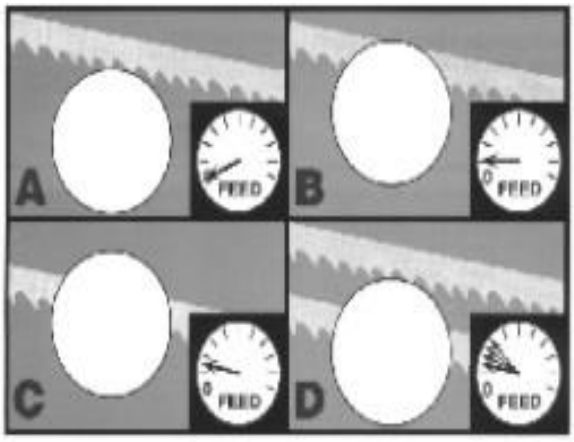
Have you tried writing with a newly sharpened pencil? The point breaks off as you start to write and you are left with a ragged tip. This is the same result you'll get if you try cutting with a new blade without break-in. It won't work efficiently and you might even chip off teeth and ruin the blade. A broken-in blade retains its sharpness longer, can penetrate better and has the strength to withstand the cutting force. Proper blade break-in is the single most important step in sawing. With break-in the blade will cut: 1) faster, 2) straighter, and 3) longer because tooth sharpness will be retained longer. We recommend break-in for all blades except when cutting severely work hardening materials. To break-in a blade maintain normal blade speed and start off a new blade with a very low feed pressure and gradually increase to achieve normal feed pressure. The number of cuts before reaching full normal feed pressure varies according to the type of material. If the material is difficult to cut, begin break-in with a heavier feed so the material does not work harden and damage the tooth.





The process of blade break-in removes the dead sharp point and featheredge and places a fine radius on the tooth tip. This radius allows the chip to shear away from the work piece readily and also gives the required support to the tooth tip, which undergoes extreme forces during the cutting process.

BREAK-IN PROCEDURE



STEP (1) Set recommended blade speed.

STEP (2) Set feed rate at half of normal, begin "Break-in".

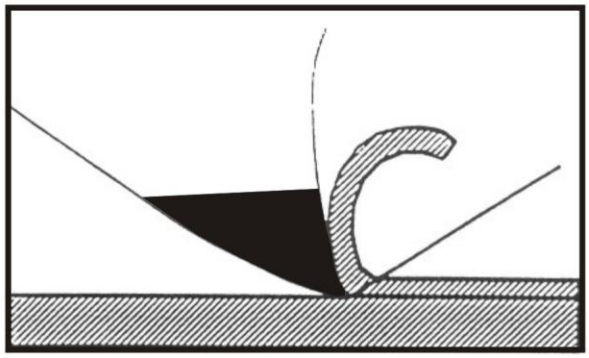
STEP (3) Increase feed slightly after cutting a distance equal to the width of the blade.

STEP (4) Increase feed again at the halfway point. Finish cut.

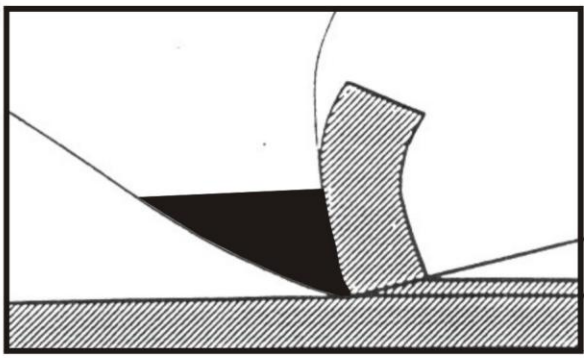
STEP (5) Start cut at same feed rate as last cut. Repeat step 5 until at least 100 sq. in. has been cut in soft material or 50 sq. in. in hard material.

BAND SPEED

Band speed refers to the rate at which the blade cuts across the face of the material being worked. A faster band speed achieves a higher more desirable shear plane angle and hence more efficient cutting. Band speed is restricted however, by the machinability of the material and how much heat is produced by the cutting action. Too high a band speed or very hard metals produce excessive heat resulting in reduced blade life.

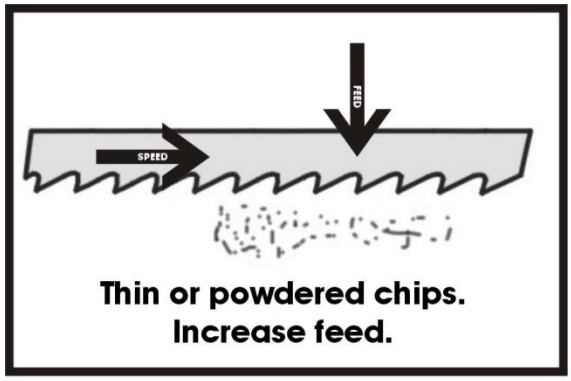


Higher band speed

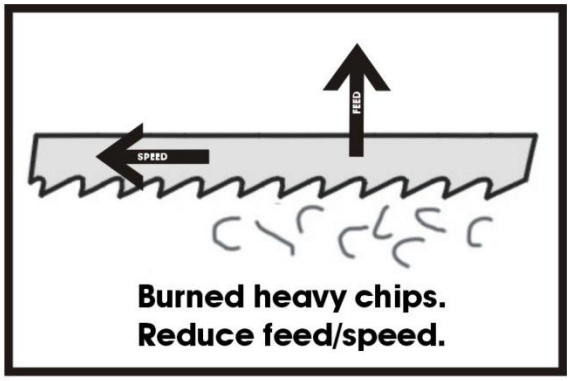


Lower band speed

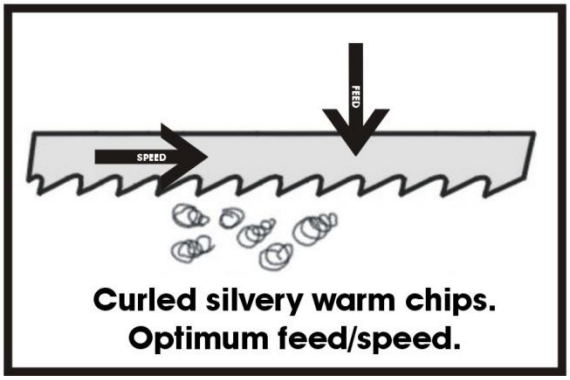
How do you know if you are using the right band speed? Look at the chips: check their shape and color. The goal is to achieve chips that are thin, tightly curled and warm to the touch. If the chips have changed from silver to golden brown, you are forcing the cut and generating too much heat. Blue chips indicate extreme heat, which will shorten blade life.



Thin or powdered chips.
Increase feed.



Burned heavy chips.
Reduce feed/speed.



Curled silvery warm chips.
Optimum feed/speed.

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

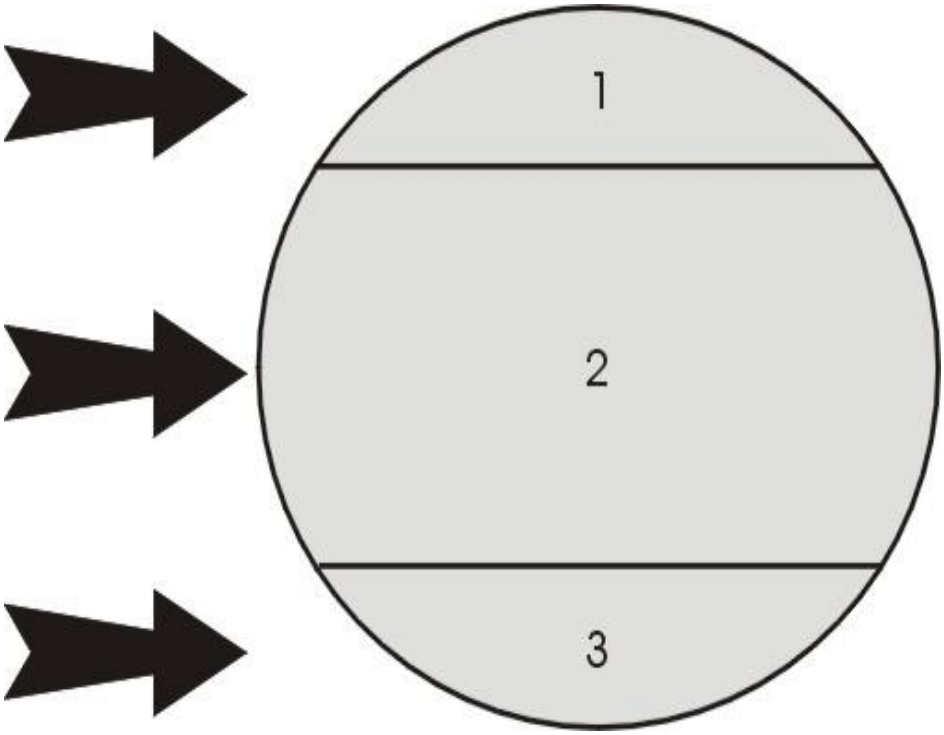
FEED PRESSURE

Once you understand how feed and gullet capacity limit cutting action, you will be able to choose the most effective feed rate for the material being cut. Here is an example. Assume you are cutting a piece of 4" round. There are actually three cutting areas to consider.

1. Entering the material, the blade encounters a small width and therefore meets minimum resistance. Feed rate is the limiting factor here, so you can use a feed setting that maximizes cutting without losing blade life.

2. As the blade moves through the material the width increases, more material fills the gullet area and imposes limitations on feed and depth of penetration. For maximum sawing efficiency in this difficult midsection the blade must have ample gullet capacity, otherwise the feed rate must be reduced accordingly.

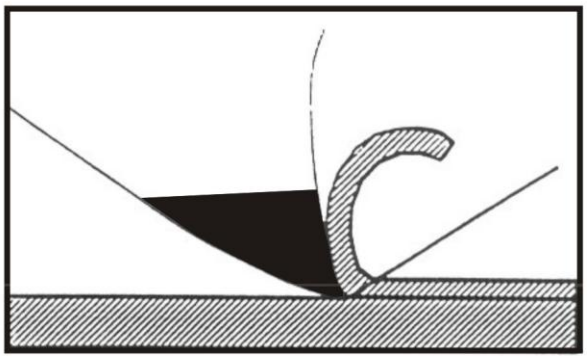
3. As the blade moves out of the difficult cutting area and into an area of decreasing width, the important limiting factor again becomes feed rate and the feed setting can again be increased.



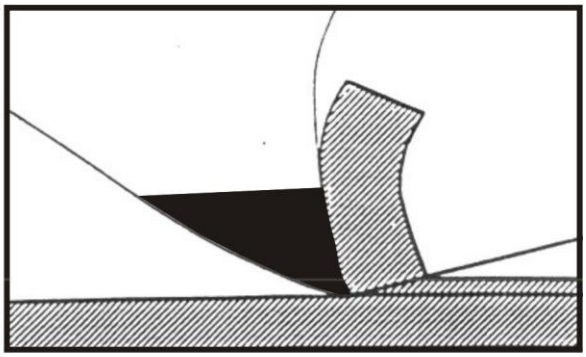
By knowing those portions of the cut which affect only feed rate, you can vary the rate accordingly in order to improve overall cutting efficiency.

HOW CHIPS ARE MADE

If you were to look at a blade cutting metal under a microscope, you would see the tooth tip penetrating the work and actually pushing or shearing a continuous chip of metal. The angle at which the material shears off is referred to as the "shear plane angle". This is perhaps the single most important factor in obtaining maximum cutting efficiency.



Low shear plane = low efficiency

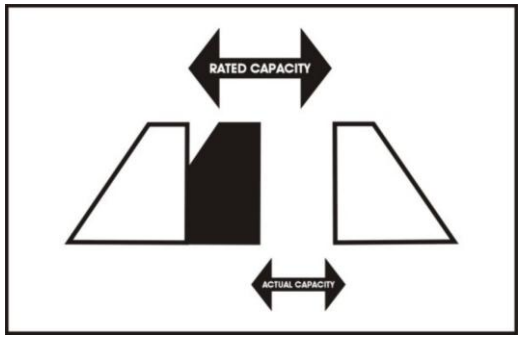


High shear plane = high efficiency

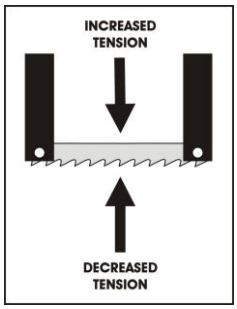
Generally, with a given depth of penetration, the lower the shear plane angle, the thicker the chip becomes and the lower the cutting efficiency. The higher the shear plane angle, the higher the efficiency with thinner chips being formed. Shear plane angle is affected by band speed, feed, lubrication, and blade design.

VISE LOADING AND BEAM STRENGTH

Each MetalSawz model has a stated capacity – but the optimum level is usually lower. Cutting rates are usually best at less than full capacity. When you load smaller bundles, the machine is more likely to run at its optimum because of increased "BEAM STRENGTH". This means more efficient cutting. Beam strength depends on the width of the blade and the distance between guides, the machine type (vertical or horizontal), blade tension and the width of the material being cut. From a practical standpoint, use no more than 1/2 of the saw machine's stated capacity. For harder materials, It is safer to work closer to the 1/3 capacity. An exception is when making only a few cuts on long bar stock. Here the more pieces you stack, the more time you'll save.

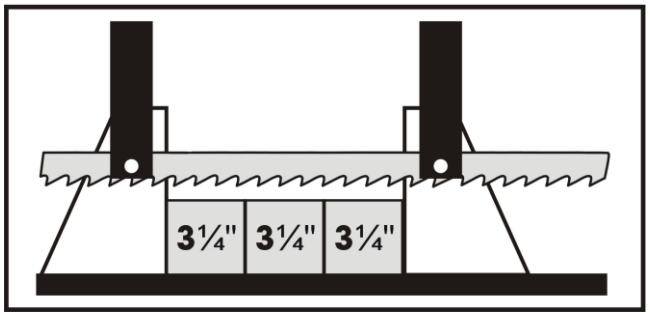


When resistance grows due to increased feed rate or the varying cross section of the material being cut, tension increases on the back edge of the blade and decreases on the tooth edge. This results in compression, forcing the blade into an arc, producing cuts which are no longer square. Beam strength is a blade's ability to counter this resistance during the cutting process. A blade with greater beam strength can withstand a higher feed rate, resulting in a smoother, more accurate cut. Beam strength depends on the width of the blade and the distance between guides, the machine type, blade tension and the width of the material being cut.

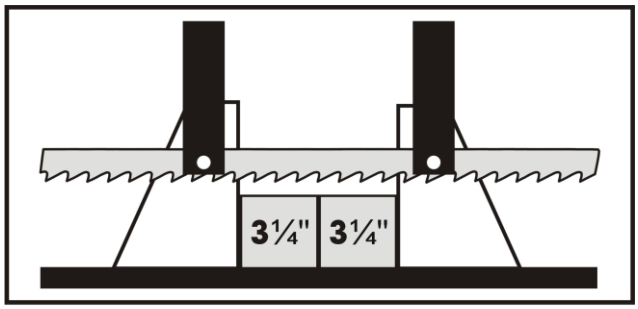


INCREASE BEAM STRENGTH – REDUCE COST PER CUT

Here's an example of how increasing beam strength can improve cutting economy. A customer needed to cut 3¼" squares of 4150 steel on a MetalSawz HM1420 machine with a 1" blade. The operator, trying to cut efficiently, placed three pieces side by side. The three squares together measured 9¾" wide - well within the 20" machine capacity.



DECREASED BEAM STRENGTH



INCREASED BEAM STRENGTH

MetalSawz Technical Services suggested cutting two pieces at a time, which would decrease the guide distance to 8½" (2 x 3¼" plus 1" on either side). Moving the guides closer together permitted higher feed rates. Following these recommendations, the customer achieved 2,200 pieces, extending blade life approximately 10 times!

BLADE BRUSH:

We all know the importance of an oil filter in a car - it clears residue from the motor oil keeping the oil clean and your motor running efficiently. You wouldn't run a car without an oil filter; you shouldn't run your MetalSawz without a good chip brush. A chip brush reduces inefficient cutting. It cleans the blade and keeps the chips from re-entering the cut. Without a chip brush to clear them away, chips re-enter the cut. This causes less efficient cutting with crooked cuts and a poor surface finish: Don't run a saw without a chip brush, or with a worn chip brush. Your saw will cut more efficiently and you'll save money.

CUTTING OIL

Using the wrong weight oil can damage a car and its performance. Did you know that using the improper cutting fluid ratio could have a similar effect on sawing? Watered down cutting fluids increase blade wear, reduce cutting rate and wear out important machine parts. In sawing, lubrication is more important than cooling. When sawing, use the proper cutting fluid ratio - it can cut your costs. In band sawing, cutting fluids function in three ways. First, they cool the blade and the work piece. Second, they lubricate the side of the band, enabling it to pass through the guides without creating excessive frictional heat. Finally, they flush away chips, helping to prevent blade scoring and tooth stripping. When band sawing coolant is a primary concern because heat can soften the teeth, precipitating blade failure. The importance of cutting fluid increases as the cutting rate goes up and the hardness of the material increases. REMEMBER: Always add the oil to the water when mixing cutting fluid. "Oil" means "OIL IN LAST".

MATERIAL/BLADE LIFE

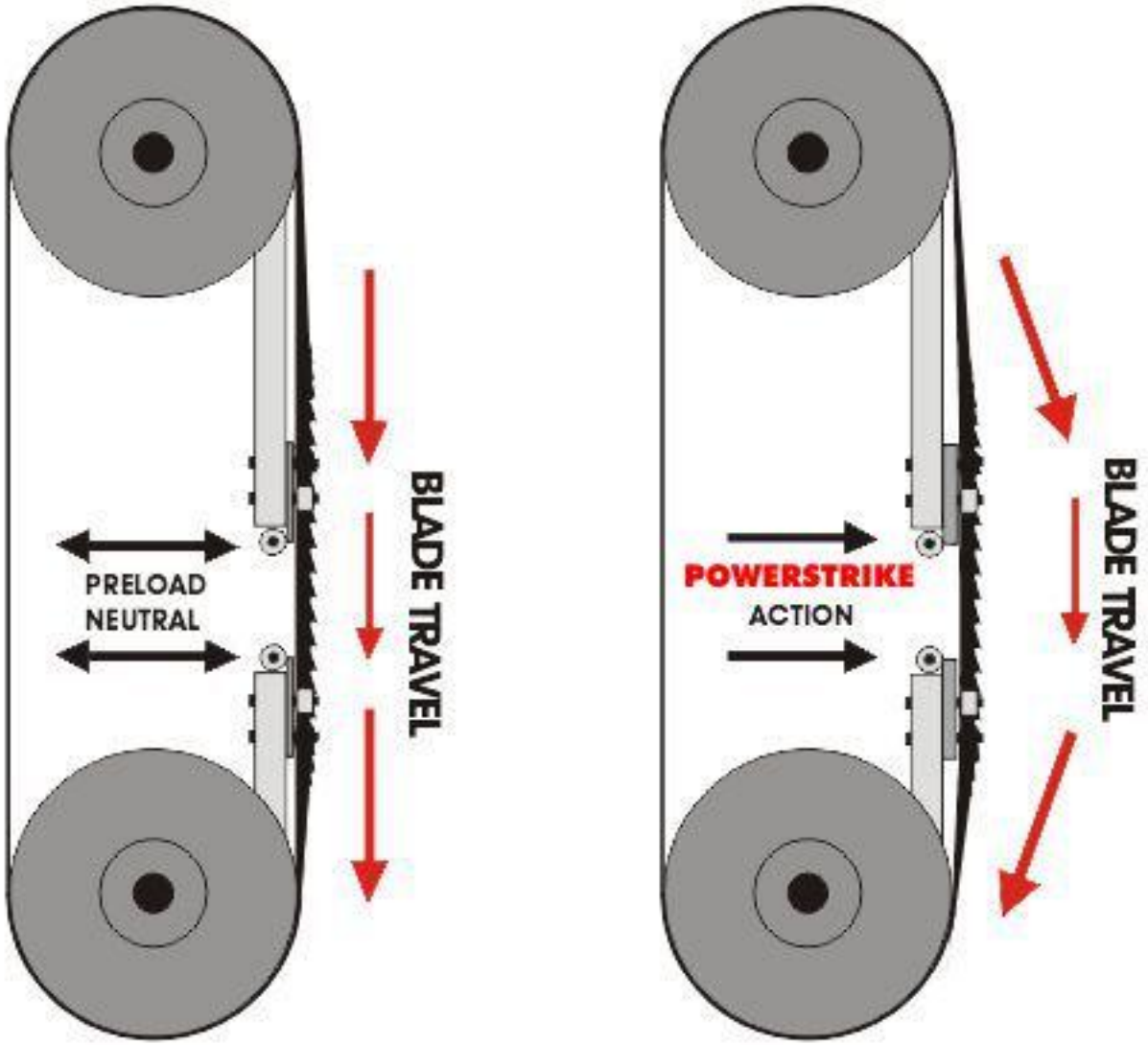
Some manufacturers of bandsaw blades forecast blade life by the number of square inches of material cut per foot of blade length. Unfortunately it is very difficult to predict blade life with any degree of accuracy. There are so many factors involved that have a definite bearing on life – to mention a few:

- Length of the blade.
- Material hardness.
- Scale and surface conditions.
- Consistency of material.
- Coolant type.
- Operator ability.
- Blade speed.
- Blade feed pressure.
- Blade feed rate.
- Blade width.
- Tooth pitch selection.
- Type of tooth.
- Room temperature.

Plus any other factors which change from operation to operation! We suggest that you buy a good quality blade from a knowledgeable blade distributor. His knowledge and expertise is usually supplied free to blade purchasers. ***Take advantage of it!***

METALSAWZ INC.

EXCLUSIVE "POWERSTRIKE" ACTION



POWERSTRIKE Action (exclusive to all **MetalSawz** Models) preloads the saw blade to increase tension between the blade guides by up to 15%. This produces cutting rates approximately 20% faster than conventional saws with no appreciable loss of blade life. This feature also eliminates the need for expensive 'Positive Rake' or 'Hook Tooth' saw blades.

TERMS AND CONDITIONS OF LIMITED WARRANTY

1 – TRANSPORT DAMAGE CLAIM PROCEDURE

- It is **your** responsibility to inspect the machine completely before signing the delivery receipt. (Failure to comply with these procedures may result in your being responsible for the costs in repairing the machine!)

- If damage to the machine is obvious - Note damage and sign **(DAMAGED IN TRANSPORT – SUBJECT TO INSPECTION)** on carrier's delivery receipt. Accept the shipment; it can be returned later if repairs aren't possible in the field.

- Report unseen damage as soon as possible. This makes it easier to prove that it didn't happen in your plant. Inspect machine carefully before moving from the receiving area. Again, if the machine isn't moved it's easier to prove your claim.

- Request a "damage inspection" from the delivering carrier:

- The carrier will send its own people or contract an independent agency to make the inspection.
- The inspector will request a signature on the report and leave a copy.
- The carrier "damage inspection" report isn't necessarily final; if additional damage is found when repairs are started, contact the carrier for another inspection.

- Don't move the equipment from the receiving area and keep all shipping materials until the carrier "damage inspection" report is complete.

- If possible, take photographs of the damage and keep them with your files. Photos could possibly prove a claim at a future date.

- Keep a record of all expenses and be sure they are documented.

2 – INSTALLATION

- Site preparation, installation, and provision of all necessary services shall be the expense and responsibility of the Purchaser. The Purchaser agrees that it has sole responsibility for the proper installation of the equipment including without limitation compliance to all codes and regulations of any local, state, provincial or federal government or authority.

3 – SET-UP AND TRAINING

Due to:

- The simplicity of the MetalSawz in regards to operation and maintenance,
- The comprehensiveness of the "Instruction Manual", and
- The competitive pricing.

We do not include set-up and training. However, if set-up and training is required, we do have qualified technicians on staff whom we can send on relatively short notice. Our only charge for this service is quite reasonable at **$995.00** the first day (transportation, hotel, meals and rental car, if required, included) and **$495.00** each additional day. (If you purchased the machine from a local dealer, he may have been factory trained to help in the installation.)

4 – LIMITED WARRANTY AND DISCLAIMER OF OTHER WARRANTIES

- If any part of the equipment shall prove defective within twelve (12) months from date of shipment, as a result of any faulty workmanship or materials manufactured by MetalSawz Inc. herein referred to as The Company, the Company will repair or replace, at its option, free of charge, FOB Burlington, ON Canada said parts. The factory must complete all warranty repairs.

- The obligation of the Company and the Purchaser's sole and exclusive remedy hereunder shall be limited, at the Company's option, to replacement or repair of any equipment, thereof which is returned to the Company's plant, transportation charges prepaid, and there determined by the Company not to be as warranted. Should the equipment or parts thereof be determined by the Company to be nonconforming so as to preclude the remedying of warranted nonconformity by repair or replacement, the Purchaser's sole and exclusive remedy shall then be the

refund of the purchase price paid with regard to that portion of the equipment alleged to be nonconforming. Notwithstanding the foregoing, the Company shall have no obligations hereunder if all payments from the Purchaser have not been made or the equipment becomes nonconforming in whole or part as a result of installation or repairs not made by the Company, or as a result of removal, improper use, operation above rated capacities and/or temperatures, or misapplication of the equipment after it has been installed in the Purchaser's plant.

- Equipment, parts, and accessories made by other manufacturers are warranted only to the extent of the original manufacturer's warranty to the Company.

- *THIS WARRANTY DOES NOT EXTEND TO, AND THE COMPANY SHALL HAVE NO LIABILITY FOR, ANY LOSS, COST, EXPENSE, LIABILITY, OR DAMAGE (INCLUDING WITHOUT LIMITATION, LOSS OF USE, OR CLAIMED LOSS OF ANTICIPATED PROFITS, BUSINESS INTERRUPTION, INJURIES, OR DAMAGE TO PERSONS OR PROPERTY, ALL LIABILITIES OF THE PURCHASER TO ITS CUSTOMERS OR THIRD PERSONS, AND ALL OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES) WHETHER DIRECT OR INDIRECT, AND WHETHER OR NOT RESULTING FROM OR CONTRIBUTED TO BY THE DEFAULT OR NEGLIGENCE OF THE COMPANY, ITS AGENTS, EMPLOYEES OR SUBCONTRACTORS WHICH MIGHT BE CLAIMED AS THE RESULT, PROXIMATE OR OTHERWISE, OF THE DELAY IN OR INABILITY TO COMPLETE DELIVERY OF, OR THE INSTALLATION OF, OR THE USE OR OPERATION OR THE FAILURE OF THE EQUIPMENT.*

- The Purchaser agrees to indemnify the Company against such loss, cost, expense, liability, or damage, provided, however, that if the Company shall install the equipment, such indemnification shall not apply to injuries or damages to employees of the Company incurred during and as a result of the Company's installation work. The Purchaser shall, however, notify the Company promptly, in any event within thirty (30) days, of any accident or malfunction involving the Company's products which results in personal injury or damage to property although such notification shall not create any liability on the part of the Company.
- *EXCEPT AS SET FORTH HEREIN, IT IS EXPRESSLY AGREED THAT THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, NOR OTHER WARRANTY, EXPRESS, IMPLIED, OR STATUTORY, NOR ANY AFFIRMATION OF FACT, OR PROMISE, BY THE COMPANY WITH REFERENCE TO THE EQUIPMENT OR PARTS THEREOF, OR OTHERWISE, WHICH EXTENDS BEYOND THE TERMS HEREOF.*

5 – CLAIM PROCEDURE UNDER LIMITED WARRANTY

- Purchaser shall notify the Company in writing of any alleged defects within seven (7) days after Purchaser learns of the alleged defects, but in no event later than one (1) year after Purchaser's receipt of the equipment. Failure to give such notice or in any manner changing the equipment shall constitute a waiver of all claims for any defects.

- **NO EQUIPMENT CLAIMED TO BE DEFECTIVE SHALL BE RETURNED, NOR WILL ANY SUCH EQUIPMENT BE ACCEPTED AT THE COMPANY, PRIOR TO OBTAINING THE CONSENT OF THE COMPANY THERETO AND A RETURNED MATERIAL TAG** (contact the Company for information and instructions). No equipment that has been tampered with or altered in any manner will be accepted for repair or replacement. If the aforestated warranty has expired or is not applicable, the Purchaser agrees to pay for all parts, labor and other expense, including all transportation or delivery charges, incident to repairing and returning the equipment.

6 – RISK OF LOSS

- Any risk of loss to the equipment shall rest with the Company up to the time of delivery of the equipment by the Company to the common carrier chosen to transport the equipment. Thereafter, the risk of loss to the equipment shall rest with the Purchaser, including any risk associated with any equipment subsequently returned to the Company. Any breach of this Agreement by either party shall have no effect on the foregoing provisions as to the risk of loss or damage to the equipment.

7 - PATENTS

- In case any suit or proceeding alleging patent infringement is threatened, or instituted against the Purchaser, based upon a claim that an apparatus or any part thereof furnished under the sale contract or this acknowledgement constitutes an infringement of any patent issued prior to the date of the Company's proposal, the Purchaser agrees that no claim shall be made against the Company unless the Purchaser has notified the Company promptly, in writing, of the threat or institution of said suit or proceeding, and unless the Purchaser gives the Company full authority, information, assistance, and cooperation in the investigation of all facts and in the preparation and maintenance of any defense in any such event. It is further agreed that the Company shall have the following options: (1) the Company may defend said suit or proceeding on behalf of the Purchaser and pay all damages and costs awarded therein, against the Purchaser; or (2) the Company may replace said apparatus or part with non-infringing apparatus or part; or (3) the Company may procure for the Purchaser the right to continue using said apparatus or part; or (4) the Company may remove said apparatus or part and refund to the Purchaser the purchase price less thirty-three and one-third percent (33.3%) thereof for each year or fraction of a year since the date the same was purchased by the Purchaser. The foregoing states the Company's entire liability for patent infringement of any apparatus or part furnished hereunder. which liability shall cease and terminate three (3) years following the date of purchase. There are no implied warranties, concerning patents.

8 - REMEDIES

- If the Purchaser defaults in paying or performing any of its obligations hereunder, or becomes subject to insolvency, receivership or bankruptcy proceedings, or makes an assignment for the benefit of creditors, or any of the equipment is misused or substantially damaged, or the Purchaser, without the prior written consent of the Company, sells, transfers, leases or mortgages the same or moves it to another site, or any lien is placed thereon, or other persons have or acquire an interest therein, or it is seized or attached by process of law, then in any such event the Company, with or without notice, may treat all amounts owing hereunder by the Purchaser, regardless of maturity date, to be immediately due and payable (subject to such creditors as are required by law in order to enforce this contract), and when the Purchaser is in default herein, the Company may repossess the equipment, and the Purchaser agrees that it will permit the Company so to do, and in that case (a) the Company, upon such notice, if any, as required by law, may keep the equipment as its own, free from any claim on the part of the Purchaser, retaining as compensation for the use or decrease in value of the equipment all payments made thereon by the Purchaser, or (b) (except in such states as not allowed by law) the Company, within four (4) months from such repossession, upon giving to the Purchaser not less than fifteen (15) days advance written notice of the Company's intention in that regard, may sell the same for the account of the Purchaser either at public sale (at which the Company may bid) or at private sale, whereupon the net proceeds of sale, after paying the Company's costs and expense in repossessing, transporting, reconditioning, storing, and selling the equipment, shell be applied on the unpaid balance of the obligations of the Purchaser hereunder and the surplus, if any, shall be returned to the Purchaser, but if a deficiency remains, the Purchaser shall continue liable to the Company. In exercising any of the remedies aforesaid, the Company shall give such other and additional notices as are required by law.

- In any proceedings or action relating to a default by the Purchaser, the Company shall be reimbursed (if permitted by law) for attorneys' fees and costs incurred by it in respect thereof.

- No remedy provided for herein shall be applicable to the extent that it is not permitted by law.

- When requested by the Company, the Purchaser shall duly acknowledge the sale contract, and execute, acknowledge, and deliver to the Company, in the Company's usual form, any supplement thereto, chattel mortgage, security agreement financing statement, or other appropriate instrument to constitute the equipment as the unencumbered security for the obligations of the Purchaser hereunder, or to enable the Company to comply with all applicable filing or recording laws.

- If in the unrestricted judgment of the Company, either before or after manufacture or shipment of the equipment, the financial responsibility of the Purchaser is such as to indicate inability to pay its obligations, including those hereunder, as they mature, the Company upon giving written notice to the Purchaser may require price within the (10) days after the giving of such notice, irrespective of the terms of payment stated herein.

9 – LIMITATIONS OF ACTIONS

- Any action resulting from any breach on the part of the Company as to the equipment or parts thereof delivered hereunder must be commenced within one (1) year after the cause of action accrues.

10 – FORUM

- It is further agreed that any action to enforce this Agreement or any portion hereof shall be commenced and prosecuted in the Courts of the Province of Ontario in Canada. The parties specifically waive and disclaim any objections as to the jurisdiction of said courts over this Agreement and venue of any action on this Agreement in said courts.

- **THESE STANDARD CONDITIONS OF SALE AND WARRANTY ARE A MATERIAL AND INTEGRAL PART OF ANY PURCHASE CONTRACT BETWEEN METALSAWZ INC. AND ITS CUSTOMER. THE TERMS OF THIS DOCUMENT GOVERN AND CONTROL THIS TRANSACTION NOTWITHSTANDING THE USE OF PURCHASER'S PURCHASE ORDER NUMBER AS AN ACCOMMODATION.**