9.0 Before Each Use

- For dusty operations, wear a face shield along with safety goggles.
- It is important to choose the right blade for the material and the type of cutting you plan to do. This saw is equipped with a bi-metallic blade which can be used to cut stainless steel, steel, iron, brass, aluminum, wood, plastic.
- Make sure the direction of rotation arrow on the blade matches the direction arrow on the saw. The blade teeth should always point downward at the front of the saw.
- Make sure the blade is sharp, undamaged and properly aligned. With the saw unplugged, push the power-head all the way down. Rotate the blade by hand checking for clearance. If the blade hits anything, make the adjustments shown in the Maintaining Maximum Cutting Capacity section.
- Never cut freehand.
- Make sure the cut-off piece can move sideways after it is cut off. Otherwise, it could get wedged against the blade and thrown violently.
- Never turn the saw "ON" before clearing everything except the work piece beneath the blade.
- Never put lubricants on the blade while it is spinning.

9.1 Whenever Saw is Running

- Never confine the piece being cut out.
- Never hold it, clamp it, touch it, or use length stops against it. It must be free to move sideways. If confined, it could get wedged against the blade and thrown violently.
- Avoid awkward hand positions where a sudden slip could cause a hand to move into the blade.
- Let the blade reach full speed before cutting.
- Feed the saw into the work piece only fast enough to let the blade cut without bogging down or binding.
- Before freeing jammed material, turn the switch off and unplug the saw. Wait for all moving parts to stop.
- After finishing a cut, keep holding the saw bow down, release the switch, and wait for all moving parts to stop before moving your hands.

9.2 Breaking in a Band Saw Blade

Sharp cutting edges with extremely small edge radii are required for high cutting capacity. To achieve the optimal tool life we recommend breaking-in the blade accordingly. The correct cutting speed is determined by the material being cut and its dimensions. It is very important that the new blade is first used with only 50% of the determined feed rate. This will avoid micro-breakages of the blade because of too large chip thicknesses. New band saw blades may tend toward vibrations and vibration sounds. In this case a slight reduction of the cutting speed is helpful. With small workpiece dimensions approximately 300cm² of the material should be cut for breaking-in. If large work piece dimensions are to be cut we recommend a breaking-in period of about 15 minutes. After breaking-in you may slowly increase the feed rate up to the determined value.

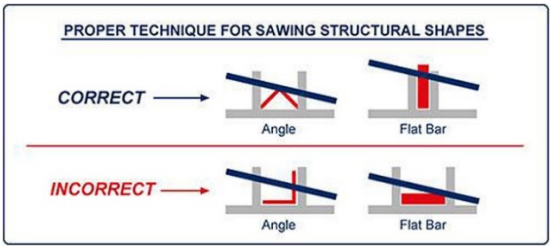

Figure 9-1

9.3 Metal Chip Indicators

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

- Thin or Powdered Chips – increase feed rate or reduce saw speed
- Burned Chips – reduce feed rate and / or saw speed
- Curly Silvery and Warm Chips – optimum feed rate and saw speed

Baileigh Industrial offers a wide selection of tooth styles for various cutting applications. Please phone Baileigh Industrial at (920.684.4990) or fax to (920.684.3944) to have one of our technicians assist you in selecting the proper band saw blade for your cutting applications.

9.4 Blade Terminology

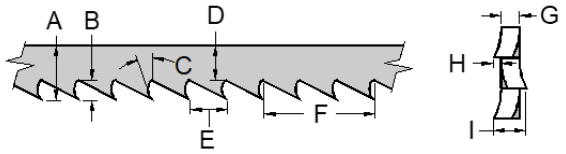

Figure 9-2

Table 9-1

Item	Description	Function
A	BLADE WIDTH	The widest part of the blade measured from the back edge of the blade to the tip of the tooth.
B	GULLET DEPTH	The distance from the tooth tip to the bottom of the curved area.
C	TOOTH RAKE	The angle of the tooth face from a line perpendicular to the length of the blade.

Item	Description	Function
D	BLADE BACK	The distance between the back edge of the blade and the bottom of the gullet.
E	TOOTH PITCH	The distance between tooth tips.
F	TPI	The number of teeth per inch when measured from gullet to gullet.
G	GAUGE	The thickness of the blade.
H	TOOTH SET	The distance a tooth is bent from the blade.
I	KERF	The width of material that is removed by the blade when cutting.

9.5 Width of Blade

The blade width determines the largest and the smallest curve that can be cut. Usually the wider a blade is, the more accurate and straighter it will cut.

9.6 Length of Blade

The length of the band saw blade can be measured with a tape measure at its circumference or by the formula below:

Blade Length = (2 x A) + (3.14 x B)

A = the distance in inches between the band saw pulley centers (when the upper pulley is midway in its adjustment range).

B = the band saw pulley diameter.

9.7 Blade Structure

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

9.8 Blade Type

They differ essentially in their constructive characteristics, such as:

- Shape and cutting angle of tooth
- Pitch
- Set

Shape and angle of tooth

REGULAR TOOTH: O° rake and constant pitch.

Figure 9-3

Most common form for transversal or inclined cutting of solid small and average cross-sections or pipes, in laminated mild steel and gray iron or general metal.

POSITIVE RAKE TOOTH: 9° - 10° positive rake and constant pitch.

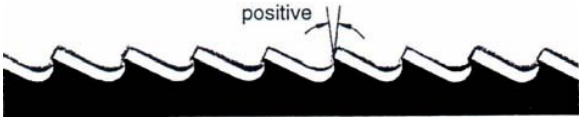

Figure 9-4

Particular use for crosswise or inclined cuts in solid sections or large pipes, but above all harder materials (highly alloyed and stainless steels, special bronze and forge pig iron).

COMBO TOOTH: pitch varies between teeth and consequently varying teeth size and varying gullet depths. Pitch varies between teeth, which ensures a smoother, quieter cut and longer blade life owing to the lack of vibration.

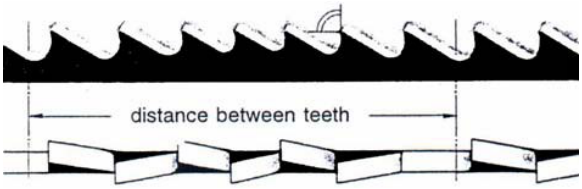

Figure 9-5

Another advantage offered in the use of this type of blade in the fact that with an only blade it is possible to cut a wide range of different materials in size and type.

COMBO TOOTH: 9° - 10° positive rake.

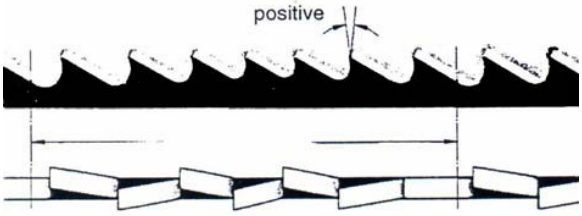

Figure 9-6

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

9.9 Sets

Saw teeth bent out of the plane of the saw body, resulting in a wide cut in the workpiece.

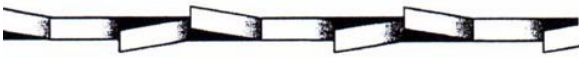

Figure 9-7

REGULAR OR RAKER SET: Cutting teeth right and left, alternated by a straight tooth.

Figure 9-8

Of general use for materials with dimensions superior to 5 mm. Used for the cutting of steel, castings and hard nonferrous materials.

WAVY SET: Set in smooth waves.

Figure 9-9

This set is associated with very fine teeth and it is mainly used for the cutting of pipes and thin section bars (from 1 to 3 mm).

ALTERNATE SET (IN GROUPS): Groups of cutting teeth right and left, alternated by a straight tooth.

Figure 9-10

This set is associated with very fine teeth and it is used for extremely thin materials (less than 1mm).

ALTERNATE SET (INDIVIDUAL TEETH): Cutting teeth right and left.

Figure 9-11

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

10.0 Blade Care

The bandsaw blade is subjected to a tremendous amount of strain. Make sure to always use the appropriate feed rate for the type material you are cutting.

Be sure to select a blade of the proper width, style, and pitch that will produce the best cut in your material. Choosing the wrong blade can produce excess heat that can adversely affect the life of the blade.

A clean blade performs much better than one that is dirty. Blades that are gummed up and dirty offer more resistance when cutting through the material. This in turn creates unnecessary heat in the blade.

11.0 Choosing a Saw Blade

A general purpose blade is furnished with this band saw.

To achieve a quality, economical, and efficient saw cut, the following points must be taken into consideration:

- Type of material being cut (ferrous or non-ferrous)
- Material hardness and physical dimensions
- Blade descent rate
- Longitudinal speed of blade
- Blade tooth profile

Choose a tooth pitch that is suitable for the workpiece. Thin walled profiles, including tubes and pipes require close toothing. At least 3-6 teeth should be in contact with the material while cutting. Large solid or transverse sections require widely spaced toothing to allow for greater volume of chips and better tooth penetration. Soft materials such as plastics, light alloys, mild bronze, Teflon, etc. require widely spaced toothing to avoid clogging.

S	Outer Diameter of the Tube (inch) /Tooth pitch																
Inches	0.787	1.574	2.362	3.15	4	4.724	6	7.873	11.811	15.75	19.685	23.621	27.5	31.5	35.5	39.5	59
0.079	14	14	14	14	14	14	10-14tpi	10-14tpi	8-12tpi	8-12tpi	6-10tpi	6-10tpi	5-8tpi	5-8tpi	5-8tpi	5-8tpi	5-8tpi
0.118	14	14	10-14tpi	10-14tpi	10-14tpi	10-14tpi	8-12tpi	8-12tpi	6-10tpi	6-10tpi	5-8tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi
0.157	14	14	10-14tpi	10-14tpi	8-12tpi	8-12tpi	8-12tpi	8-12tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi
0.197	14	10-14tpi	10-14tpi	10-14tpi	8-12tpi	8-12tpi	8-12tpi	6-10tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi
0.236	14	10-14tpi	10-14tpi	8-12tpi	8-12tpi	8-12tpi	8-12tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	3-4tpi	3-4tpi
0.315	14	10-14tpi	8-12tpi	8-12tpi	8-12tpi	6-10tpi	6-10tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	3-4tpi	2-3tpi	2-3tpi
0.394		8-12tpi	6-10tpi	6-10tpi	6-10tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	3-4tpi	2-3tpi	2-3tpi	2-3tpi
0.472		8-12tpi	6-10tpi	6-10tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	3-4tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi
0.591		8-12tpi	6-10tpi	5-8tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi
0.787			6-10tpi	5-8tpi	4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi
1.181				4-6tpi	4-6tpi	4-6tpi	3-4tpi	3-4tpi	3-4tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	1.4-2tpi
2						3-4tpi	3-4tpi	3-4tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi
3								2-3tpi	2-3tpi	2-3tpi	2-3tpi	2-3tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi
4									2-3tpi	2-3tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi
6										2-3tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1.4-2tpi	1-1.4tpi	1-1.4tpi	1-1.4tpi
7.873											1.4-2tpi	1.4-2tpi	1.4-2tpi	1-1.4tpi	1-1.4tpi	1-1.4tpi	.75-1.25tpi
9.842												1.4-2tpi	1-1.4tpi	1-1.4tpi	1-1.4tpi	.75-1.25tpi	.75-1.25tpi
11.81													1-1.4tpi	1-1.4tpi	.75-1.25tpi	.75-1.25tpi	.75-1.25tpi
13.778														1-1.4tpi	.75-1.25tpi	.75-1.25tpi	.7-1.0tpi
15.747															.75-1.25tpi	.75-1.25tpi	.7-1.0tpi
17.716																.7-1.0tpi	.7-1.0tpi
19.685																	.7-1.0tpi

S= Wall Thickness

If you have to cut two or more tubes lying side by side please use this table in consideration of the double wall thinckness (s).

Figure 11-1

12.0 Blade Breakage

In some cases, blade breakage is unavoidable due to the stresses that are imparted on the blade. Avoidable breakage is often the result of poor care, or poor operator judgment when it comes to adjusting or mounting the blade or blade guides.

Listed below are some of the more common reasons for blade breakage.

- Top blade guide assembly is set too high above the piece part.

- The blade is tensioned incorrectly.
- Piece part is fed into the blade too quickly.
- Blade teeth are dull or broken.
- Blade is not properly aligned with the guides.
- Forcing a large width blade to cut a small radius.
- Using a blade with an improperly finished weld joint.
- Allowing the blade to run when not in use. (NEVER leave an unattended blade running.)

13.0 Operation

⚠CAUTION

Always wear proper eye protection with side shields, safety footwear, and leather gloves to protect from burrs and sharp edges.

⚠CAUTION

NEVER operate saw without blade guards in place.

13.1 Manual Operation

1. Close the handle on the hydraulic ball valve (I) by turning it counterclockwise (ccw).
2. Turn the flow control knob (AO) clockwise (cw) to shut off the hydraulic flow. This will prevent the saw bow from dropping when the ball valve is opened.
3. Reduce the bow weight. Rotate the wing nut (AP) clockwise (cw) to increase the tension on the spring.
4. Load piece part and clamp securely.
5. Turn the main switch (5) to “ON”. Check to see that the indicator light (1) is lit.
6. Set the blade speed with control knob (4).
7. Set switch (6) to manual mode for trigger operation.
8. While firmly holding the control handle of the saw bow, open ball valve (I) clockwise (cw).
9. Fully open the flow control knob (AO) counterclockwise (ccw).
10. Squeeze the start trigger to energize the blade motor and lower saw bow to begin cutting.
11. When the saw bow reaches bottom limit, the micro switch (M) is actuated and shuts off the saw motor.
12. Return the saw bow to its start position and close ball valve (I).
13. Unclamp and reset the piece part to continue the next cutting cycle.

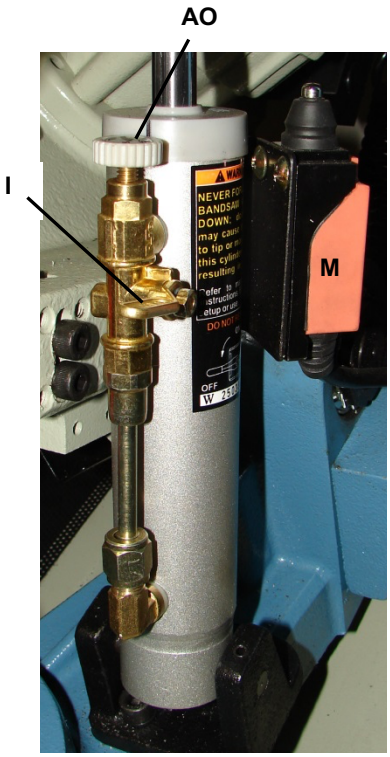

Figure 13-1

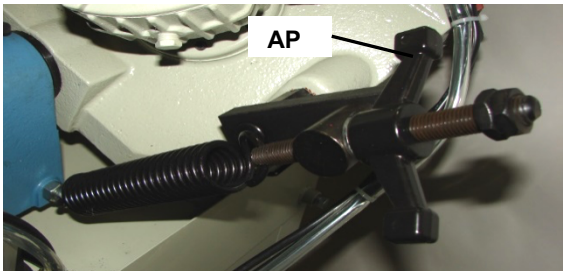

Figure 13-2

IMPORTANT: If an emergency situation should occur: Press the emergency STOP button (3) to immediately shut off all functions of the saw.

Figure 13-3

13.2 Auto Mode Operation

1. Close the handle on the hydraulic ball valve (I) by turning it counterclockwise (ccw).

2. Turn the flow control knob (AO) clockwise (cw) to shut off the hydraulic flow. This will prevent the saw bow from dropping when the ball valve is opened.
3. Increase the bow weight. Rotate the wing nut (AP) counterclockwise (ccw) to decrease the tension on the spring.
4. Load piece part and clamp securely.
5. Turn the main switch (5) to “ON”. (Check to see that indicator light (1) is lit)
6. Set the blade speed with control knob (4)
7. Set switch (6) clockwise (cw) to auto mode for hydraulic cylinder operation.
8. Press the green start button (2). The saw motor and the coolant pump motor should both start.
9. Open the ball valve (I) clockwise (cw).
10. Turn the flow control knob (AO) clockwise (cw) to slow down the descent or counterclockwise (ccw) to speed it up.
11. When saw bow reaches bottom limit, micro switch (M) is actuated and shuts off the saw and pump motors.
12. Grasp the control handle and lift the saw bow to a height slightly above the piece part to minimize the next cut entry time.
13. Close ball valve (I).
14. Unclamp and reset the piece part to continue the next cutting cycle.

These examples below show ways to clamp a variety of cross sections. Always keep in mind the cutting capacity of the saw to achieve efficient saw cuts and long blade life. Do not use blades of a size different from that shown in the technical specification chart.

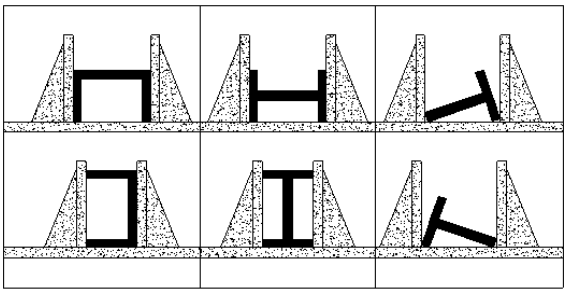

Figure 13-4

14.0 Material Selection

⚠CAUTION

It must be determined by the customer that materials being processed through the machine are NOT potentially hazardous to operator or personnel working nearby.

When selecting materials keep these instructions in mind:

- Material must be clean and dry. (without oil)
- Material should have a smooth surface so it processes easily.
- Dimensional properties of material must be consistent and not exceed the machine capacity values.
- Chemical structure of material must be consistent.
- Buy certificated steel from the same vendor when possible.

15.0 Maintenance

⚠WARNING

Make sure the electrical disconnect is OFF before working on the machine.

⚠WARNING

Maintenance should be performed on a regular basis by qualified personnel.

⚠WARNING

Always follow proper safety precautions when working on or around any machinery.

15.1 Daily Maintenance

- Check daily for any unsafe conditions and fix immediately.
- Check that all nuts and bolts are properly tightened.
- Do a general cleaning by removing dust and metal chips from the machine.
- Inspect the saw blade for wear.
- Clean the lubricating coolant drain screen.
- Top off the coolant tank.
- Check that the blade guards and emergency stop button are in good working order.
- When through using saw for the day, raise the bow to its up position and release some of the blade tension.

15.2 Weekly Maintenance

- On a weekly basis clean the machine and the area around it.
- Apply rust inhibitive lubricant to all non-painted surfaces.
- Wipe and grease the vise screw and sliding surfaces.
- Inspect blade brush and clean if needed.
- Clean coolant pump strainer basket.
- Remove chips from inside the guard housing for the saw blade.
- Use compressed air to clean the blade guides and guide bearings.

15.3 Monthly Maintenance

- Check the tightening of the motor flywheel screws.
- Check the blade guide bearings for wear. (replace if necessary).
- Tighten any loose bolts or screws on the gear motor, pump, and safety switches.
- Clean coolant tank.
- Grease saw head pivot.

15.4 Oils for Lubricating Coolant

Any 10:1 (water to coolant) solution will work, however we recommend Baileigh Industrial B-Cool 20:1 (water to coolant) biodegradable metal cutting fluid. It has excellent cooling and heat transfer characteristics, is non-flammable, and extends blade and machine life. Each gallon of concentrate makes 21 gallons of coolant.

15.5 Coolant System Maintenance

1. Disconnect Power from the Saw!
2. To clean the tank, first remove the pipe plug (AQ) to drain the coolant.
3. Take off the screen (AR) by removing (4) screws.
4. Remove the pump (AS) by taking out (2) socket cap screws.
5. After tank is completely drained use a vacuum cleaner to remove all chips and debris.
6. Replace the plug.
7. Thoroughly clean the pump (AS) and replace.
8. Fill the tank with coolant to approximately 1" below the screen.
9. Replace the screen (AR).
10. Removable drip tray (AT) shown in place.

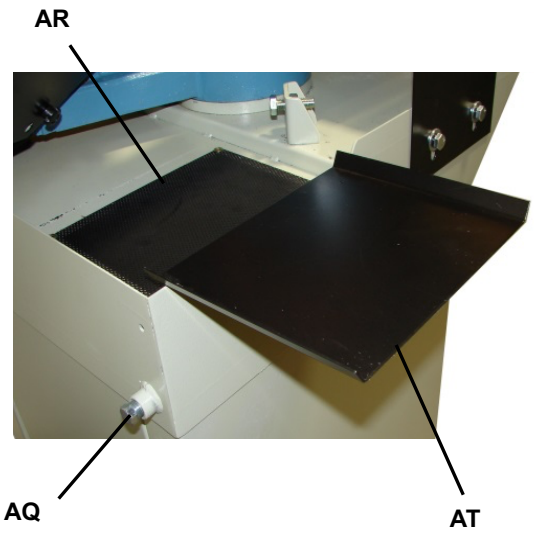

Figure 15-1

Figure 15-2

15.6 Oil Disposal

Used oil products must be disposed of in a proper manner following your local regulations.

15.7 Gearbox Maintenance

The gearbox requires periodic changing of the oil. Complete the first change after the initial 6 months of operation and then change annually thereafter.

1. Disconnect Power from the Saw!
2. Raise the saw bow to a vertical position. Note: You may have to back off the upper travel adjusting bolt.
3. Remove the oil drain plug (AU) and drain the oil into a catch basin. Loosening oil fill plug (AV) will help oil to drain.
4. After draining, replace drain plug (AU).

5. Return the saw bow to a horizontal position.
6. Remove the fill plug (AV and add 0.32 quart of gear oil. (For reference use SHELL type gear oil or Mobil gear oil #90).

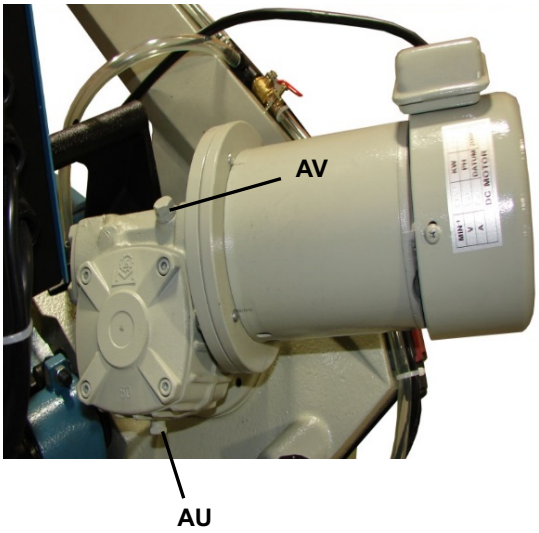

Figure 15-3

15.8 Storing Machine for Extended Period of Time

If the Band Saw is to be inactive for a long period of time, prepare the machine as follows:

- Detach the plug from the electrical supply panel.
- Clean and grease the machine.
- Release tension on the blade or remove blade.
- Drain coolant
- Cover the machine

16.0 Troubleshooting

⚠WARNING **Make sure the electrical disconnect is OFF before working on the machine.**

Table 16-1

Symptom	Possible Cause (S)	Corrective Action
Saw Motor Does Not Stop When Cut is Finished	Actuator on cylinder does not contact switch properly.	Re-adjust actuator or switch.
	Bow down limit switch SQ3 damaged	Replace SQ3
Coolant Motor Does Not Run With Band Saw Motor	Coolant switch not turned ON.	Turn on coolant switch.
	Coolant motor M2 damaged.	Replace M2 motor.
No Power Indicator Light When Main Power Turned On	Fuse may have burned out.	Switch off main power. Replace defective fuse
	Transformer T1 damaged	Replace Transformer
	Power LED HL1 damaged	Replace (white) power LED
Excessive Blade Breakage	Material loose in vise	Clamp work securely
	Incorrect speed or feed	Adjust speed or feed
	Blade tooth spacing too large	Replace with a small tooth spacing blade
	Material too coarse	Use a slow speed blade and small tooth spacing
	Incorrect blade tension	Adjust to where blade does not slip-on wheel
	Teeth in contact with material before saw is started	Start saw and lower into workpiece
	Blade rubs on wheel flange	Adjust wheel alignment
	Misaligned guide bearings	Adjust guide bearings
	Cracking at weld	Weld again, note quality of weld
Premature Blade Dulling	Teeth too coarse	Use finer teeth
	Too much speed	Decrease speed
	Inadequate feed pressure	Decrease spring tension on side of saw
	Hard spots or scale on material	Reduce speed, increase feed pressure
	Work hardening of material	Increase feed pressure by reducing spring tension
	Blade twist	Replace with a new blade, and adjust blade tension
	Insufficient blade	Tighten blade tension adjustable knob
Unusual Wear on Side/Back of Blade	Blade guides worn	Replace
	Blade guide bearings not adjusted properly	Adjust as per operator's manual
	Blade guide bearing bracket is loose	Tighten
Teeth Ripping From Blade	Teeth too coarse for work	Use finer tooth blade
	Too heavy pressure, too slow speed	Decrease pressure, increase speed
	Vibrating work piece	Clamp work piece securely
	Gullets loading	Use coarse tooth blade or brush to remove chips

Symptom	Possible Cause (S)	Corrective Action
Poor Cuts	Feed pressure too great	Reduce pressure by increasing spring tension on side of saw
	Guide bearing not adjusted properly	Adjust guide bearing, the clearance cannot be greater than .001 mm
	Inadequate blade tension	Increase blade tension with tension knob
	Dull blade	Replace blade
	Speed incorrect	Adjust speed
	Blade guide spaced out too much	Adjust guide space
	Blade guide assembly loose	Tighten blade guide assembly
	Blade track too far away from wheel flanges	Re-track blade according to operating instructions
Poor Cuts (Rough)	Too much speed or feed	Decrease speed or feed
	Blade is too coarse	Replace with finer blade
	Blade tension loose	Adjust blade tension
Blade is Twisting	Cut is binding blade	Decrease feed pressure
	Too much blade tension	Decrease blade tension