

WILTON[®]

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WMH TOOL GROUP

Operating Instructions — Parts Manual

7 x 12 Cut-off Band Saw

Models: 3400/3410



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MORE INFORMATION

Group distributor, or visit wiltontool.com.

WARRANTY

WILTON products carry a limited warranty which varies in duration based upon the product. (MW = Metalworking)

 Hand Tool Accessories Vise Accessories	 Lubrication Striking Tools	 Bench Power Tools Cold Saws Mill/Drill Milling Machines MW Accessories MW Bandsaws MW Drill Presses MW Finishing Equipment	 MW Lathes MW Precision Vises Surface Grinders Tapping	 Clamps Fastening Tools Hand Tools-General Purpose Hand Tools-Mechanics Multi-Grip® Unbreakable Hammers Unbreakable Sledges Vises (non-precision)
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WHAT IS COVERED?

This warranty covers any defects in workmanship or materials subject to the exceptions stated below. Cutting tools, abrasives and other consumables are excluded from warranty coverage.

WHO IS COVERED?

This warranty covers only the initial purchaser of the product.

WHAT IS THE PERIOD OF COVERAGE?

The general WILTON warranty lasts for the time period specified in the product literature of each product.

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This warranty does not cover defects due directly or indirectly to misuse, abuse, negligence or accidents, normal wear-and-tear, improper repair or alterations, or lack of maintenance.

HOW TO GET SERVICE

The product or part must be returned for examination, postage prepaid, to a location designated by us. For the name of the location nearest you, please call 1-800-274-6848.

You must provide proof of initial purchase date and an explanation of the complaint must accompany the merchandise. If our inspection discloses a defect, we will repair or replace the product, or refund the purchase price, at our option.

We will return the repaired product or replacement at our expense unless it is determined by us that there is no defect, or that the defect resulted from causes not within the scope of our warranty in which case we will, at your direction, dispose of or return the product. In the event you choose to have the product returned, you will be responsible for the handling and shipping costs of the return.

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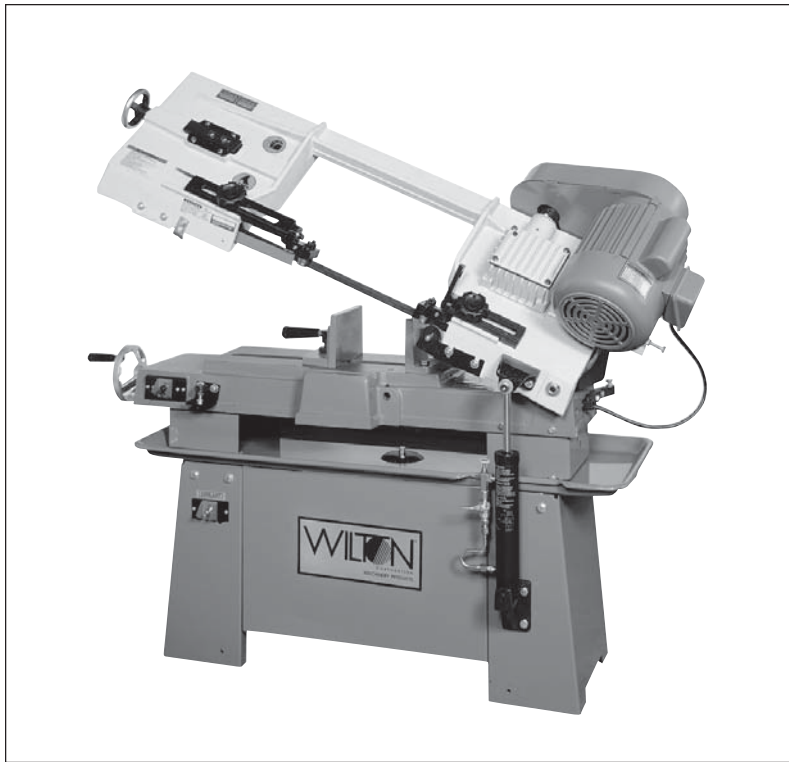
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Table of Contents

Cover Page	1
Warranty	2
Table of Contents	3
General Specifications	4
Warnings	5-6
Using the Vise	7-9
Setting Blade Guides	9
Hydraulic Feed Control	10
Using Stock Stop	10
Changing Blade Speeds	11
Blade Selection	11
Evaluating Cutting Efficiency	11
Blade Break-in Procedures	11
Starting a Cut	11
Angle Cuts	12-13
Replacing Blades	14
Adjusting Blade Tracking	14
Blade Alignment Adjustments	15
When to Adjust Blade Guides	15
Replacing Blade Guides and Support Components	16
Adjust Blade for Parallelism	16
Adjusting Blade Vertical	17
Test Cutting to Verify Adjustment Accuracy	17
Adjusting Guide Bearings	18
Replacing Guide Bearings	18
Adjusting Blade Back Up Bearing	18
Replacing the Drive Wheel	19
Installing the Vertical Sawing Table	19
Replacing Idler Wheel or Bearings	19
Servicing the Hydraulic Control Cylinder	20
Machine Set-up	21
Uncrating and Spotting the Saw	21
Electrical	21
Changing Operating Voltage	21
Installing the Coolant Kit	22
Chip Brush Replacement	22
Adjusting Horizontal Stop and Motor Switch	22
To Replace or Adjust the Horizontal Stop	22
Adjusting the Motor Switch Actuator	22
Troubleshooting	23-24
Replacement Parts and Breakdowns	25-30

General Specifications



The Wilton Models 3400 and 3410 cut-off band saws are designed for high production cut-off work. Four cutting speeds and a hydraulic feed control allows the efficient cutting of virtually any material.

A removable table also allows the saw to function as a vertical band saw.

The Model 3410 is equipped with an optional coolant system which can greatly extend blade life and speed the cutting of a variety of materials which are best cut with cutting fluids and coolants.

The Model 3400 is not equipped with a coolant system. However, the coolant system is available as an add-on kit for customer installation.

Specifications:

Cutting capacity	7 in. (178mm) round bar stock or tubing 9 1/2 in. wide x 7 in. high (240 x 178mm) rectangular stock 12 in. wide x 1 in. high (305 x 25.4mm) flat stock 3 3/4 in. wide x 6 in. high (95.3 x 150mm) at 45 degree angle
Blade speeds	80, 130, 180 and 265 SFM -- belt selectable
Blade drive	Heat treated steel worm pinion driving a bronze worm ring gear in an oil bath
Motor	3/4 HP, 1725 RPM, 115/230V, single phase, capacitor start
Blade guides	Side: Eccentric shaft with sealed ball bearings Rear: Sealed ball bearing
Blade size	3/4 x .032 x 93 in.
Blade wheels	11 7/16 in. (280.56mm) diameter flanged cast iron
Dimensions (LWH)	50 x 18 x 41 in. (1270 x 457 x 1041mm) in lowered position
Weight	275 lbs. (125kg)
Wet cutting package	1 gallon (4.4L) capacity tank with 3GPM (13L/M) pump -- Optional wet kit Part No. 5635500 includes tank with baffle, pump 120V/240V, hoses, flexible nozzle, shut-off valve and required electrics. This kit is delivered installed on Model 3410 saws.
Vertical saw operation	
Table size (LW)	9 1/2 x 10 in. (241 x 254mm)



WARNING

- Misuse of this machine can cause serious injury.
- For safety, machine must be set up, used and serviced properly.
- Read, understand and follow instructions in the operator's and parts manual which was shipped with your machine.

When setting up machine:

- Always avoid using machine in damp or poorly lighted work areas.
- Always be sure machine is securely anchored to the floor.
- Always keep machine guards in place.
- Always put start switch in OFF" position before plugging in machine.

When using machine:

- Never operate with machine guards missing.
- Always wear safety glasses with side shields (See ANSI Z87.1)
- Never wear loose clothing or jewelry.
- Never overreach — you may slip and fall into the machine.
- Never leave machine running while away from it.

- Always shut off the machine when not in use.

When servicing machine:

- Always unplug machine from electrical power while servicing.
- Always follow instructions in operators and parts manual when changing accessory tools or parts.
- Never modify the machine without consulting Wilton Corporation.

You — the stationary power tool user — hold the key to safety.

Read and follow these simple rules for best results and full benefits from your machine. Used properly, Wilton's machinery is among the best in design and safety. However, any machine used improperly can be rendered inefficient and unsafe. It is absolutely mandatory that those who use our products be properly trained in how to use them correctly. They should read and understand the Operators and Parts Manual as well as all labels affixed to the machine. Failure in following all of these warnings can cause serious injuries.

Machinery general safety warnings

1. Always wear protective eye wear when operating machinery. Eye wear shall be impact resistant, protective safety glasses with side shields which comply with ANSI Z87.1 specifications. Use of eye wear which does not comply with ANSI Z87.1 specifications could result in severe injury from breakage of eye protection.

2. Wear proper apparel. No loose clothing or jewelry which can get caught in moving parts. Rubber soled footwear is recommended for best footing.

3. Do not overreach. Failure to maintain proper working position can cause you to fall into the machine or cause your clothing to get caught — pulling you into the machine.

4. Keep guards in place and in proper working order. Do not operate the machine with guards removed.

5. Avoid dangerous working environments. Do not use stationary machine tools in wet or damp locations. Keep work areas clean and well lit. Special electrics should be used when working on flammable materials.

6. Avoid accidental starts by being sure the start switch is OFF" before plugging in the machine.

7. Never leave the machine running while unattended. Machine shall be shut off whenever it is not in operation.

8. Disconnect electrical power before servicing. Whenever changing accessories or general maintenance is done on the machine, electrical power to the machine must be disconnected before work is done.

9. Maintain all machine tools with care. Follow all maintenance instructions for lubricating and the changing of accessories. No attempt shall be made to modify or have makeshift repairs done to the machine. This not only voids the warranty but also renders the machine unsafe.

10. Machinery must be anchored to the floor.

11. Secure work. Use clamps or a vise to hold work, when practical. It is safer than using your hands and it frees both hands to operate the machine.

12. Never brush away chips while the machine is in operation.

13. Keep work area clean. Cluttered areas invite accidents.

14. Remove adjusting keys and wrenches before turning machine on.

15. Use the right tool. Don't force a tool or attachment to do a job it was not designed for.

16. Use only recommended accessories and follow manufacturers instructions pertaining to them.

17. Keep hands in sight and clear of all moving parts and cutting surfaces.

18. All visitors should be kept at a safe distance from the work area. Make workshop completely safe by using padlocks, master switches, or by removing starter keys.

19. Know the tool you are using — its application, limitations, and potential hazards.

20. Some dust created by power sanding, sawing, grinding, drilling and other construction activities contains chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:

Lead from lead based paint

crystalline silica from bricks and cement and other masonry products, and

arsenic and chromium from chemically-treated lumber.

21. Your risk from those exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specifically designed to filter out microscopic particles.

General Electrical Cautions

This saw should be grounded in accordance with the National Electrical Code and local codes and ordinances. This work should be done by a qualified electrician. The saw should be grounded to protect the user from electrical shock.

Wire sizes

Caution: for circuits which are far away from the electrical service box, the wire size must be increased in order to deliver ample voltage to the motor. To minimize power losses and to prevent motor overheating and burnout, the use of wire sizes for branch circuits or electrical extension cords according to the following table is recommended:

Conductor length	AWG (American wire gauge) number	
	240 volt lines	120 volt lines
0-50 feet	No. 14	No. 14
50-100 feet	No. 14	No. 12
Over 100 feet	No. 12	No. 8

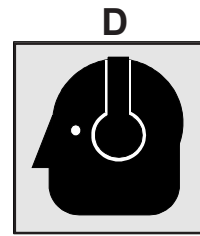
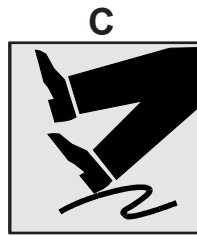
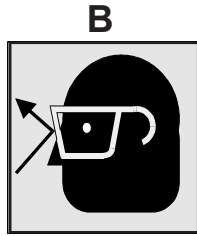
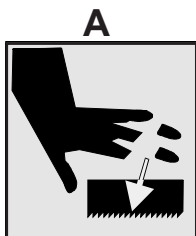
Safety instructions on sawing systems

1. Always wear leather gloves when handling saw blade. The operator shall not wear gloves when operating the machine.
2. All doors shall be closed, all panels replaced, and all other safety guards in place prior to the machine being started or operated.
3. Be sure that the blade is not in contact with the workpiece when the motor is started. The motor shall be started and you should allow the saw to come to full speed before bringing the workpiece into the saw blade.
4. Keep hands away from the blade area. **See figure A.**
5. Remove any cut off piece carefully while keeping your hands free of the blade area.
6. Saw must be stopped and electrical supply must be cut off before any blade replacement or adjustment of blade support mechanism is done, or before any attempt is made to change the drive belts or before any periodic service or maintenance is performed on the saw.
7. Remove all loose items and any unnecessary work pieces from the area before starting machine.
8. Bring adjustable saw guides and guards as

close as possible to the work piece.

9. Always wear protective eye wear when operating, servicing or adjusting machinery. Eyewear shall be impact resistant, protective safety glasses with side shields complying with ANSI Z87.1 specifications. Use of eye wear which does not comply with ANSI Z87.1 specifications could result in severe injury from breakage of eye protection. **See figure B.**
10. Non-slip footwear and safety shoes are recommended. **See figure C.**
11. Wear ear protectors (plugs or muffs) during extended periods of operation. **See figure D.**
12. The workpiece, or part being sawed, must be securely clamped before the saw blade enters it.
13. Remove cut off pieces carefully, keeping hands away from sawblade.
14. Saw must be stopped and electrical supply cut off or machine unplugged before reaching into cutting area.
15. Avoid contact with coolant, especially guarding your eyes.

6



Operating Instructions

Using the vise

The vise on the saw table has two jaws. The jaw closest to the right hand side of the table is the stationary jaw. This jaw is firmly secured to the table using its pivot and lock bolts. When making a straight cut the stationary jaw is at right angles to the saw blade. When making an angle cut, the stationary jaw is first loosened, then adjusted to the desired angle, then secured to the table, again.

The jaw closest to the left hand side of the table is the locking jaw. This jaw clamps the workpiece against the stationary jaw to hold it securely for cutting. The locking jaw can pivot to conform to the angle of the work piece which is held in the stationary jaw.

Before cutting can begin, the vise must be properly set and positioned. The procedures are different for right angle cutting and for angle cutting. Setting procedures are given in the following sections.

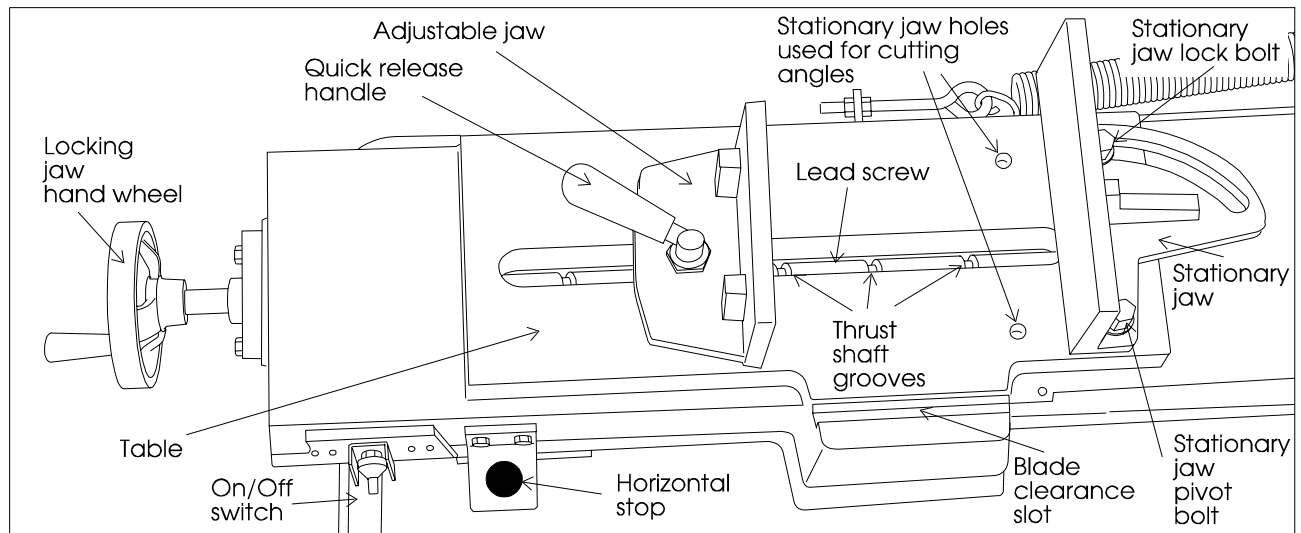


Figure 1: Vise jaw nomenclature

Locking vise jaw

The locking jaw is an assembly which includes the lead screw nut which encases the lead screw, the lead screw shaft (which screws into the lead screw nut,) the thrust shaft, spring, and quick release handle.

The thrust shaft moves up or down when the quick release handle moves up or down.

The thrust shaft has a nut under the quick release handle which adjusts the clamping pressure between the adjustable jaw and the table, itself. When this nut is too tight, the adjustable jaw cannot pivot. When this nut is too loose, the jaw can pivot, and also tilt upward. Therefore, this nut should be *slightly* loose. This will allow the jaw to pivot and conform to any angle at which the stationary jaw is set.

However, you should guard against excessive loosening of this nut. If too loose, the jaw can tilt when it contacts the workpiece and full clamping pressure cannot be effectively applied to the workpiece.

If the shaft is too tight to allow pivoting of the jaw, loosen the shaft *slightly* by turning the nut under the quick release handle counterclockwise. If the jaw tilts exces-

sively, use the nut under the quick release handle to tighten the shaft *slightly* so the jaw slides easily, but flat against the saw table.

The locking vise jaw is tightened or loosened against the workpiece being cut by using the lead screw handle. The handle is attached to a lead screw underneath the saw table. The lead screw has a series of grooves on its length. These grooves capture a thrust shaft on the lower side of the locking jaw. As the lead screw handle is turned, the grooves move to the left or right, and therefore the locking jaw is moved to the left or right to open or close the jaw against any workpiece on the table.

The thrust shaft on the locking vise jaw is a component part of the quick release handle on top of the locking jaw. This quick release handle is spring loaded to force the handle (and, therefore, the thrust shaft) downward.

When you pull up on the quick release handle, the thrust shaft is removed from its groove. This allows you to slide the jaw to a new position on the table. Releasing the handle pushes the thrust shaft against the lead screw shaft. When the lead screw handle is turned, a groove will

eventually catch the thrust shaft and allow you to open or close the locking jaw at its new lead screw position.

When you slide the jaw to a new position, you can see where the nearest lead screw groove is by looking through the slot above the lead screw. (See *Figure 1*.)

Changing the locking jaw location:

1. Lift the quick release handle.
2. Slide the jaw until it contacts the workpiece.
3. Turn the lead screw handle until the thrust shaft drops into a groove.
4. Further turning of the lead screw handle will either clamp or release the workpiece in the vise. Turn clockwise to increase clamping pressure. Turn counterclockwise to release clamping pressure.

Stationary vise jaw

The stationary vise jaw pivots on the pivot bolt, *Figure 1*, and is locked at any required angle by the lock bolt.

There are two different table positions for the stationary vise jaw. One position is used for right angle cuts ("straight" cutting) and the other position is used for cutting of all other angles. Moving the vise from one position to the other requires unbolting and re-bolting the jaw to the saw table.

Four tapped holes in the saw table allow a change of pivot and lock bolt position. The holes in the right-most position closest to the motor are used for right angle cutting. The holes in the left-most position are used for all angle cutting.

Changing the stationary vise jaw position:

1. Remove the pivot and lock bolts.
2. Slide the stationary jaw to the required position on the table.
3. Re-insert the pivot and lock bolts.
4. Adjust stationary jaw angle according to requirements for straight or angle cuts, then tighten both bolts securely.

Adjusting stationary jaw: straight cuts

For accurate right angle or "straight" cutting, adjust the vise as follows:

1. Disconnect the saw from its electrical power source to prevent accidental start-ups.
2. With the saw arm and blade in horizontal position, place a machinist's square against the blade and stationary vise jaw. (See *Figure 2*.)
3. If the vise jaw is not square to the blade, loosen both the pivot and lock bolts shown in *Figure 1*, and adjust the jaw until it is square.
4. Tighten the pivot and lock bolts.
5. Reconnect electrical power to the saw.

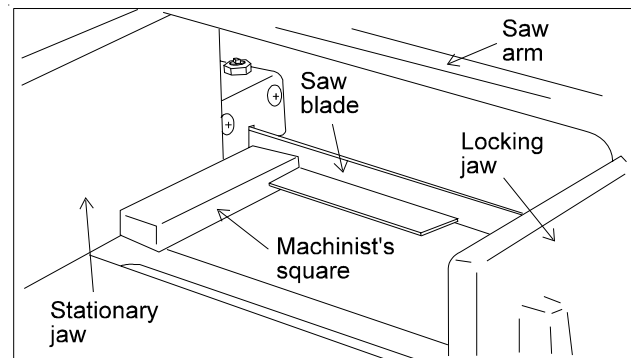


Figure 2: Setting the stationary jaw at right angles to the saw blade.

Adjusting stationary jaw: angle cuts

The angle of the stationary vise jaw with respect to the saw blade is what determines the cut angle on the workpiece. The stationary jaw can be adjusted to any angle between 0 degrees (right angle to the blade) and 45 degrees.

In order to cut angles, however, it will be necessary for you to move the stationary vise jaw to its left-most set of attachment holes as described in the following sections.

After placing the jaw in the angle cutting position, you can adjust to the desired cutting angle using one of the two following methods.

Adjusting angles with the scale on the saw table

There is a scale on the rear of the saw base which can be used to establish the angle of cut.

1. Raise the saw arm to full height and lock it in position with the quick shut-off valve.
2. Slide the locking jaw to full open position.
3. Loosen the pivot and lock bolts shown in *Figure 1*.
4. Lay a straight edge on the saw frame so it contacts the stationary vise jaw. (See *Figure 3*.)
5. Turn the vise jaw until the straight edge is above the angle of cut you require as shown on the angle gauge.
6. Tighten both the pivot and lock bolts.
7. Remove the straight edge and proceed to cut as described in *Angle sawing*.

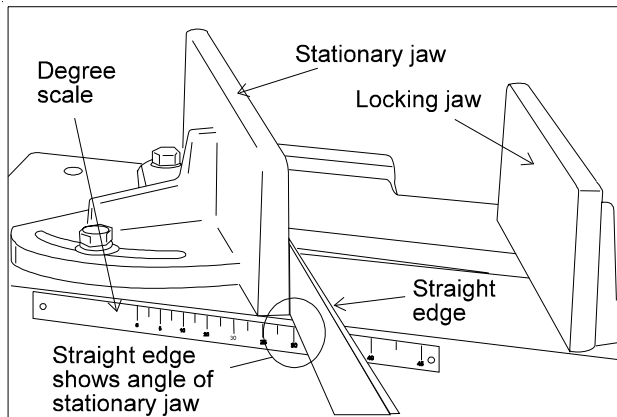


Figure 3: Using table scale to set jaw for angle cuts

Adjusting stationary jaw for high accuracy angle cutting:

1. Raise the saw arm to full height and lock it in position with the shut-off valve.
2. Open the vise to full width.
3. Loosen the pivot and lock bolts shown in *Figure 1*.
4. Open the shut-off valve and lower the saw arm until it is at full horizontal position.
5. Take a machinist's protractor and set it to the angle you need to cut.
6. Lay the protractor on the saw table and place one edge of the protractor against the saw blade and the other edge against the stationary vise jaw. (*Figure 4*.)
7. Adjust the stationary vise jaw until its angle is correct with respect to the blade, then lock the stationary jaw firmly using the pivot and lock bolts.

The saw is now accurately set to the exact angle you have set on the machinist's protractor. You can now saw the workpieces according to instructions on *Angle sawing*.

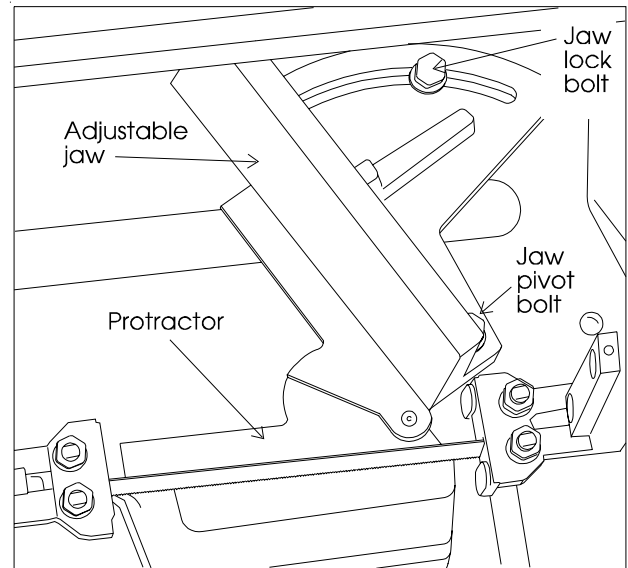


Figure 4: Using a protractor to set jaw angle

Setting the blade guides

To produce accurate cuts the distance between the blade guide/supports must be set correctly. Whenever possible, set the blade guide assembly so it clears the workpiece by approximately 1/8 inch on either side of the workpiece.

The guides may be moved by loosening the lock handles which secure the bracket bars to the saw arm.

There is, however, a limit to how close the guide can be set with respect to the table. When set too close to the blade clearance slot, the guide bearings can hit the table casting and prevent the arm from moving to full horizontal. When this happens, the saw cannot complete its cut.

This won't be a problem with the right-hand guide. On the other hand, the left-hand guide typically cannot be much closer to the right-hand guide than 6 inches or so. Therefore, when cutting smaller section material, be sure the blade is correctly adjusted, tensioned properly, sharp, and appropriate to the type of material being cut.

Controlling the cut: Hydraulic feed control

The weight of the saw arm typically provides all of the force needed to move the saw blade through the workpiece. In fact, if the full weight of the arm is allowed to make the cut, rapid blade wear and poor cutting accuracy will result. Therefore, a hydraulic feed control is provided which gives the operator control over the speed and efficiency of cutting.

The hydraulic feed control is a single-acting hydraulic cylinder attached between the saw base and saw arm. The hydraulic control cylinder has two flow controls. The control needle valve -- used by the operator to control the rate of cutting -- is on top of the cylinder. A quick shut-off valve is located in a hydraulic line on the outside of the cylinder.

The control cylinder is *single-acting* because it can be used to resist motion in the downward direction, only. The control cylinder offers no resistance to upward movement.

The amount of downward force can be controlled by using the needle valve on top of the cylinder. When the needle valve is closed the cylinder is "locked." With the needle valve open slightly, the cylinder permits slow, or light downward force. As the needle valve is opened further, increasing weight of the saw arm presses on the blade and workpiece.

The needle valve is opened, during any cut, until the operator determines that the saw is operating efficiently. This is usually evaluated by observing chip formation. See the section on *Blade Selection*, for more information on evaluating cutting efficiency.

The quarter-turn quick shut off valve in the external line of the control cylinder can be turned to lock the cylinder at any time. For instance, it can be used to lock the blade above the work piece to allow you to measure the length of cut on the workpiece. Or, it can be used for making repeated cuts after the needle valve has been set for best cutting efficiency. (This is described in the next section.)

To close the hydraulic control circuit and lock the cylinder, turn the quick shut off valve handle so it is at right angles to the hydraulic line or hydraulic cylinder.

To open the hydraulic control circuit and return feed control to the needle valve, turn the quick shut off handle so it is parallel with the hydraulic line or hydraulic cylinder.

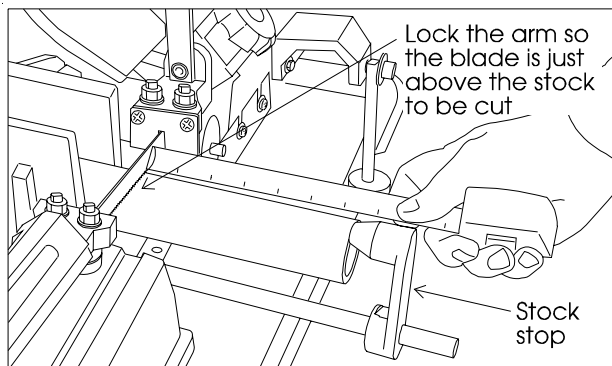


Figure 6: Using the stock stop

Using the stock stop for repeated cuts

If you are cutting multiple pieces of stock, all to the same specified length, use the stock stop.

1. Lower the saw arm to its horizontal position.
2. Loosen the stock stop set screws as necessary to slide the stop upward and more-or-less into position. (There are two set screws which are used to lock the stop stock in position. One is on the saw table and is typically used to adjust the distance between the stop and the blade. The other set screw is on the stop, itself, and is typically used to adjust the height of the stop above the table. However, you can use any combination of set screws you find convenient to adjust the stop to the distance and height which works for the stock you are cutting.)
3. Using a ruler or scale, measure the distance between the blade and stock stop.
4. When the correct cut-off distance is obtained, be sure the stock stop is at a position which allows the cutoff piece to fall away from the blade as the cut is completed. Then, tighten the stock stop set screws securely.
5. Raise the saw arm.
6. Place a workpiece in the saw vise and slide the workpiece so it contacts the stock stop.
7. Open the hydraulic control cylinder quick shut off valve and move the saw blade to just above the workpiece - then close the needle valve so the arm is locked in position.
8. Measure the distance between the end of the workpiece and the blade to verify that you have set the stock stop at the correct distance. (See *Figure 6*.)
9. When you are satisfied that your cut-off distance is correct, you may begin cutting by turning on the saw and opening the needle valve until the blade is cutting efficiently.

To continue making multiple cuts take the following steps:

1. *Do not change the setting on the needle valve.*
2. Raise the saw arm so it clears the stock being cut and lock the hydraulic control cylinder using the quick shut off valve.
3. Release the vise slightly using the handle wheel -- move the stock up to the stock stop -- tighten the vise again.
4. Turn on the saw and open the quick shut off valve. Because you established an efficient cutting rate on the previous cuts using the needle valve, there is no reason to change its setting. The quick shut off, alone, can be used to begin and complete the cut.

Changing blade speeds

The Models 3410 and 3400 are 4-speed cut-off saws. The different speeds are obtained by changing the position of the drive V-belt which connects the motor pulley to the drivewheel gearbox pulley.

To change blade speeds:

1. Disconnect the saw from its electrical power source to prevent any possibility of accidental motor start-up.
2. Allow the saw arm to rest at its full horizontal position.
3. Open the pulley cover to expose the V-belt and pulleys.
4. Loosen the motor plate lock bolt jam nut and lock bolt.
5. Loosen the jam nuts on the motor plate adjustment bolts, then loosen the motor plate adjustment bolts so the motor can slide on its mounting plate to where the V-belt can be removed from the pulleys.
6. Put the V-belt in the pulley position for the speed you require --- refer to *Figure 7* for belt locations and speeds available.
7. Tension the belt by adjusting the motor adjustment bolts until the V-belt has one belt's width of slack when pressed firmly in the center of its travel.
8. Reverse steps 1 through 5, above, to complete the speed change.

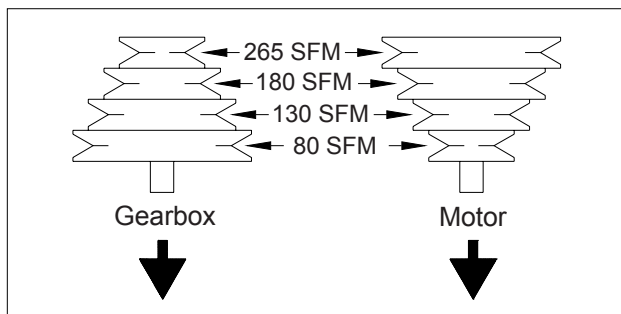


Figure 7: Belt position/speed relationships

Blade selection

The saw is delivered with a blade adequate for a variety of cut-off jobs on a variety of common materials. Wilton also can provide you with other blades. See the parts listings for available blade types. See *Table 1*, for some recommended speeds for various materials. However, these selections, while appropriate to the many of shop cutting needs, don't begin to exhaust the wide variety of blades of special configuration (tooth pitch and set) and special alloys for cutting unusual or exotic materials.

For very high production on cutting of special materials, or to cut hard-to-cut materials such as stainless steel, tool steel, titanium, etc., you can ask your industrial distributor for more specific blade recommendations. Also, the supplier who provides the workpiece material should be prepared to provide you with very specific instructions regarding the best blade (and coolant or cutting fluid, if needed) for the material or shape supplied.

Evaluating cutting efficiency

Is the blade cutting efficiently? The best way to determine this is to observe the chips formed by the cutting blade.

If the chip formation is powdery, then the feed is much too light, or the blade is too dull.

If the chips formed are curled, but colored -- that is, either blue or straw colored from heat generated during the cut -- then the feed rate is too high.

If the chips are slightly curled and are not colored by heat -- the blade is sufficiently sharp and is cutting at its most efficient rate.

Blade break-in procedures

New blades are very sharp and, therefore, have a tooth geometry which is easily damaged if a careful break-in procedure is not followed. You may want to consult manufacturers' literature for break-in of specific blades on specific materials. However, the following procedure will be adequate for break-in of Wilton supplied blades on lower alloy ferrous materials.

1. Clamp a round section work piece in the vise. The work piece should be 2 inches or larger in diameter.
2. With the saw on low speed, begin the cut with a *very light feed rate*.
3. After the saw has completed 1/3rd of the cut, increase the feed rate *slightly* and allow the saw to complete the cut.
4. Without disturbing the position of the needle valve, begin a second cut on the same or similar work piece.
5. After the blade has completed about 1/3rd of the cut, increase the rate of feed and observe chip formation until cutting is at its most efficient rate (see *Evaluating blade efficiency*, above) ...then allow the saw to complete the cut. The blade can now be considered ready for regular service.

Starting a cut

To avoid blade damage, follow these procedures:

1. Never start a cut with the blade resting on the workpiece.
2. Never start a cut on a sharp edge. If the workpiece has a sharp edge, use a file to knock off the sharp edge before lowering the blade onto the workpiece.
3. Have the motor on and running at full speed before cutting.
4. Use the hydraulic control cylinder needle valve to begin the cut of any single piece (although succeeding pieces of the same type can be started using the quick shut off valve.)
5. If you use coolant or cutting fluid, turn on the flow of coolant before starting a cut.

Right angle cuts -- single pieces of stock

1. Raise the saw arm to its full up, open position.
2. Pull up on the quick release handle on the locking vise jaw and slide the vise jaws apart.
3. Place the stock on the saw table, between the vise jaws. If the stock is long, support the stock with appropriate infeed and outfeed supports.
4. Pull up on the quick release handle and slide the locking vise jaw up against the workpiece.
5. Turn the lead screw handle until the quick release thrust shaft falls into a groove on the lead screw and puts light clamping pressure on the workpiece.
6. Lower the saw arm until the blade is just above the workpiece.
7. Lock the saw arm in position by turning the hydraulic feed needle valve clockwise.
8. Adjust the position of the stock until the cut-off distance you require is directly under the blade.
9. Tighten the vise so the workpiece is clamped firmly.

Note: if you are sawing a workpiece with a sharp edge up -- use a file to knock off the sharp edge before beginning any saw cuts. This will prevent damage to teeth on the blade. See *Figure 8* for details.

10. Turn the saw switch ON and allow the motor and blade to come up to full speed.
11. If using a coolant system, turn on the valve at the nozzle.
12. Carefully open the hydraulic control needle valve open (counterclockwise) so the cutting arm lowers *gently* into the workpiece and begins cutting.
13. Continue to open the hydraulic control valve until an efficient cutting rate is established.
14. When the saw completes its cut, the motor will shut off and the cut piece will fall away from the table.
15. If you are using a coolant system, turn it off the valve at the nozzle.

Table 1: Suggested cutting speeds

Suggested cutting speeds for a variety of materials. Speeds are recommended speeds for a 4 inch thick work piece, a bi-metal blade, dry cutting. (No cutting fluid. Speeds may be increased when cutting fluid is used -- observe chip formation to determine most efficient cutting rate.)

Decrease these speeds 30-50% for carbon steel blades. Increase speed 15% for materials 1/4 inch thick, 12% for materials 3/4 inch thick, 10% for materials 1 1/4 inch thick, and 5% for 2 1/2 inch thick material. Decrease speed 12% when cutting eight inch material. When selecting blade tooth pitch, be sure to have two or more teeth in contact with the material at all times to avoid tooth breakage.

Angle cutting

1. Raise the saw arm to full height and lock it in position with the quick shut off valve.
2. Slide the vise open.
3. Set the stationary vise jaw to the angle required according to the instructions in *Adjusting stationary vise jaw*.
4. Put the workpiece in position on the saw table.
5. Adjust the locking vise jaw to the workpiece using instructions in *Adjusting the locking jaw*.
6. Adjust the blade guide/support bearing brackets according to instructions in *Setting the blade guides*.
7. Release the quick shut off valve and lower the arm and blade to just above the workpiece, then lock the arm in position using the hydraulic cylinder control needle valve.
8. Adjust the workpiece to the required cut-off position under the blade.
9. Tighten the vise securely.
10. If you are starting your cut on a sharp edge, use a file to knock off the sharp edge so the blade isn't damaged at the start of the cut.
11. If using coolant or cutting fluid, turn on valve at the nozzle.
12. Turn the saw switch ON.
13. Open the hydraulic cylinder needle valve until the blade contacts the workpiece and establishes a cut -- then open the control cylinder valve until the blade is cutting efficiently.
14. When the cut is completed the motor will turn off and the cut piece will fall away from the saw. Turn off the coolant flow and repeat the steps above as necessary to continue with more cuts.

Note: the stock stop can be used for multiple angle cuts in the same way as described for straight cuts. See *Using the stock stop* for repeated cuts.

Material	Speed
Structural steel shapes	165
Low carbon steel	160-165
Medium carbon steel	115
High carbon steel	90-100
Cr-moly steel	105-135
Ni-Cr-moly steel	90-115
Chromium steel	80-140
Cr-vanadium steel	105-115
Tool steel	40-80
Stainless steel	40-70
Free machining steel	80-100
Cast iron	55-90
Copper alloy (CU-Zn)	55
Bronze	90
Al-bronze	40
Monel	40-45
Titanium alloy	25-40
Aluminum (T-6+)	80-160

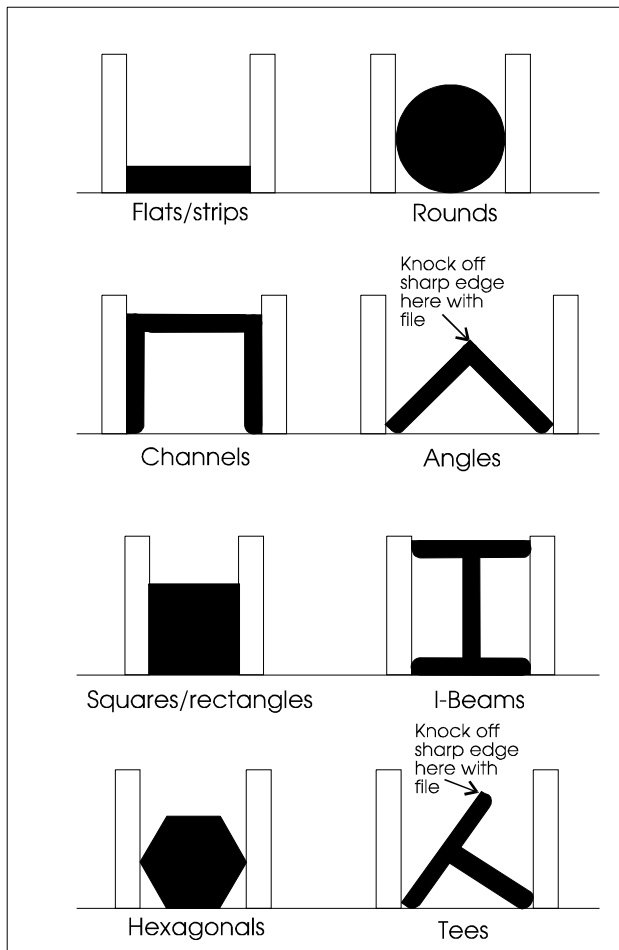


Figure 8: Placing workpieces in the vise

Maintenance

Replacing blades

1. Disconnect the saw from its electrical power source to prevent accidental start-ups.
2. Raise the saw arm to its full vertical position and lock it in place using the quick shut off valve on the hydraulic control cylinder.
3. Lift the safety cover in the lower portion of the blade guard door by sliding it upward. There is no need to remove it completely from its slot.
4. Remove the two screws with plastic knobs which hold the blade guard door closed and swing the door open to expose the drive and idler wheels, and the blade.
5. Turn the blade tension handle counterclockwise until the blade hangs loose in the saw arm.
6. Use leather gloves to prevent cuts and scratches and use protective eyewear which meets ANSI Specification Z87.1. and pull the blade off of the drive wheels and out of the blade guides. Store the blade carefully before proceeding.
7. Slide the new blade into the blade guides -- then loop the blade over the upper and lower drive wheels.

Note: it is possible to install the blade backwards. The teeth on the blade should be pointing downward, toward the motor, at the time the blade is installed.

8. Push the blade so it is seated against the shoulders of the wheels. When it is seated against the shoulders...
9. ...turn the blade tension wheel clockwise to increase tension on the blade. Don't over-tension the blade. Tension it enough so it doesn't slip while cutting.
10. When you are satisfied that the saw is tensioned correctly, reconnect the saw to its electrical power source.
11. Check the tracking of the blade according to instructions in the section on *Adjusting blade tracking*, below.
12. Close the wheel guard door and secure it using the two plastic knobbed screws.
13. Slide the safety cover downward in its slot until it is fully closed.
14. The new blade is installed and ready for the *Blade break-in procedures*.

Adjusting blade tracking

If the blade is fully tensioned, release tension slightly before attempting to adjust the saw blade tracking. A badly worn or bent blade will be extremely difficult to track properly -- if it can be tracked successfully, at all. The track of the saw blade is adjusted using the track adjustment mechanism on the idler wheel. The track adjustment tilts the wheel to "steer" the blade on the wheels. Tracking adjustment is performed with the saw arm in vertical position, blade guard doors open and the saw running. Therefore, **USE EXTREME CAUTION WHEN PERFORMING BLADE TRACKING CHECKS AND ADJUSTMENTS.**

To adjust blade tracking:

1. Loosen the sliding plate draw block bolt slightly so the adjustment set screw will be able to move the draw block.
2. Turn the coolant pump switch OFF, if coolant is used.
3. Turn the saw ON.
4. Insert a 4mm hex wrench in the socket head track adjustment set screw.
5. Turn the track adjustment set screw so the blade starts to move away from the shoulder -- then immediately turn the screw the other direction so the blade stops -- then moves *slowly toward* the shoulder.
6. Use the blade tracking adjustment screw to *stop the motion of the blade* on the wheel as it gets close to the shoulder. Now, put a strip of paper between the blade and wheel as shown in *Figure 9*. **KEEP FINGERS CLEAR OF THE BLADE AND WHEEL.** (That's why the paper strip should be at least 6 inches long.)
7. The paper should not be cut, this first attempt. Next, turn the track adjustment set screw a tiny amount more and repeat the insertion of the paper between the blade and wheel.

You may have to repeat this step several times before the blade and shoulder cut the paper into two pieces. Don't be in a hurry. Patience and accuracy here will pay off with better, more accurate, quieter cutting and much longer machine and blade life.

8. When the paper is cut, turn the adjustment screw counterclockwise, *slightly*. This assures that the blade is not touching the shoulder of the wheel.
9. Tighten the two bolts which hold the draw block.

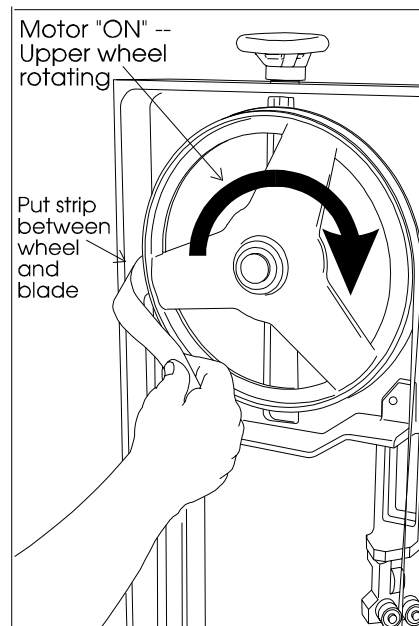


Figure 9: Inserting the paper strips between the blade and wheel to adjust blade-to-shoulder clearance

Blade alignment adjustments

The blade can suffer from several out-of-adjustment conditions. These conditions are shown in *Figure 10*.

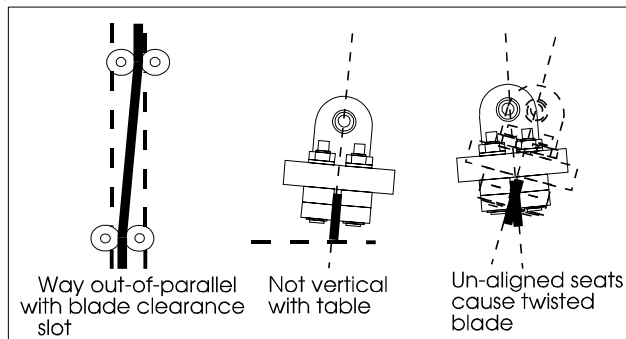


Figure 10: Blade alignment fault conditions

Establishing a reference surface for blade adjustment

So long as major changes and adjustments to the blade guide system are not made, you will not have to perform the following procedure. However, assuming the "worst possible case" -- someone dismantles all of the guides and components -- here is how to determine a baseline reference surface for subsequent blade guide system adjustments.

1. Disconnect the saw from its electrical power source to prevent accidental start-ups.
2. Be sure the blade is fully tensioned and in good condition. Use of a new blade is best for this operation.
3. Remove the blade guide, brackets, and all blade guiding and supporting components which normally capture and guide the blade at the cutting position.
4. Lower the saw arm to full horizontal position.
5. Place a machinists square against the blade and adjust the stationary vise jaw so it is at right angles to the blade.
6. You have established a reference surface at the stationary vise face. All subsequent adjustments of blade parallelism and vertical can be made using the stationary vise face or the saw table.

When to adjust the blade guides

The blade guides, when installed at the factory, have been adjusted for maximum sawing effectiveness and, if not disturbed, damaged or worn, should require no field adjustment other than moving the guide brackets as needed to clear the workpieces being sawed.

However, if the components get out of alignment or need replacement the following instructions give you the complete method for adjusting the system.

In particular, there five planes, angles or clearances which need to be considered.

1. The blade must run parallel to the saw blade clearance slot. (See *Figure 10*.)
2. The blade must be square with the vise jaws. (See *Figure 2*.)
3. The blade must be vertical and square with respect to the saw table and must not be twisted. (See *Figure 10*.)
4. The guide bearings must provide the correct side clearance and support for the blade.
5. The blade back-up bearing must be correctly placed behind the blade.

As we say, so long as no component relationships are disturbed, the factory settings should be adequate to your tasks. However, parts wear or damage does occur. When parts are replaced, adjustment of the blade positioning will almost certainly be necessary.

Of course, regardless of whether or not a component has been disturbed or replaced, at any time you are not getting the cutting action or accuracy you expect, or whenever the troubleshooting chart recommends it, you can and should check the blade support components.

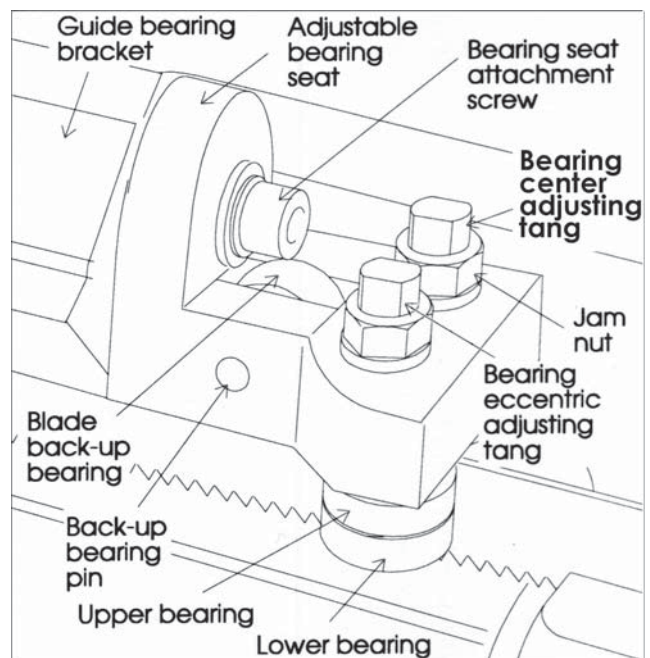


Figure 11: Nomenclature for blade guide assembly and its components

Replacing blade guide and support components

All component parts are secured with nuts, bolts, washers, or snap rings. To remove and replace any component, first remove the blade according to instructions in *Replacing blades*. Then remove and replace the faulty component(s).

The guide and support bearings are mounted on eccentric shafts to permit adjustment of the bearing axis. See *Figure 11*. By loosening the eccentric lock nuts and using a wrench to turn the eccentric, all clearances and positions can be adjusted.

Replacing a blade guide bearing is covered in the section on *Replacing guide bearings*.

In the case of replacing a single faulty component (such as a single bearing or pair of bearings on an eccentric) you do not necessarily have to adjust all of the other components -- however, their adjustment should be checked when any other adjustment is made.

Before making any adjustments be certain to disconnect the saw from its electrical power source to prevent accidental motor start-ups.

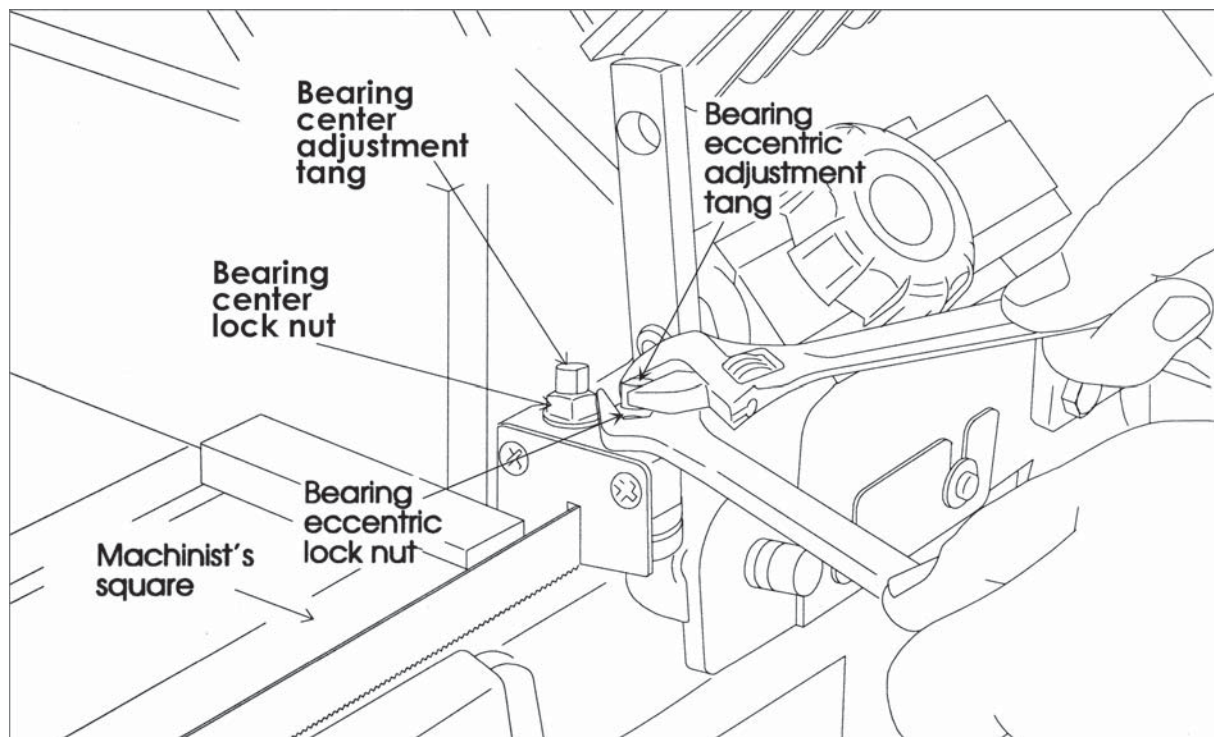
Adjust blade for parallelism:

1. Use a new blade or a blade in nearly new condition and have it fully tensioned and tracking correctly before making any adjustments.
2. Be sure the stationary vise jaw is at a right angle to the blade. If you are not certain the jaw is correctly adjusted, use the procedure under *Establishing a reference angle*, to be sure the jaw is correctly set.
3. Lower the saw arm to full horizontal position.
4. Use a machinist's protractor against the stationary vise jaw and check the blade for parallel. If the blade is

parallel to the stationary jaw, no further parallelism adjustment is required. However, if the blade is at an angle to the jaw, determine which bearing set you are going to move and the direction in which you need to move it. Then proceed to the following steps.

4. Keep the bearing eccentric from moving by putting a wrench on the adjustment tang of the eccentric. (See *Figure 12*.)
5. Loosen the eccentric lock nut so you can rotate the eccentric using the adjustment tang.
6. Turn the eccentric until you have shifted the bearing assembly to where you want it to move.
7. Tighten the eccentric lock nut.
8. Adjust the bearing on the other side of the blade so the bearing clearance adjustment is correct. **YOU MUST PERFORM THIS STEP.** The blade is being twisted by the bearing assemblies and a lot of pressure is being exerted by the blade against the bearings. See *Adjusting guide bearings*.
9. Check the blade for squareness and vertical and re-adjust as necessary until it is parallel to the clearance slot, square to the vise jaw, vertical to the table, with side guide bearings correctly adjusted.

Figure 12: Adjusting blade parallelism using the support bearing eccentrics. Use two wrenches -- one to lock and unlock the lock nut, the other to adjust the bearings using the tang on the guide bearing shaft.



Adjusting blade vertical:

The blade guide bearing seat can rotate as needed to make the blade vertical to the saw table. Follow these instructions.

1. With the saw arm in horizontal position, put a machinist's square on the table, and against the blade, as shown. The blade should be square (vertical) to the table. If not...
2. Slightly loosen the socket head cap screw which secures the bearing seat to the bracket bar.
3. Use a wrench to rotate the seat until the blade is vertical. (See *Figure 13*.)
4. Tighten the socket head cap screw securely.
5. Check the other blade guide for vertical. Adjust, if necessary.
6. After adjusting for vertical, **RECHECK THE BLADE FOR PARALLEL**. Changes in vertical can easily result in changes in parallelism. See *Adjusting blade parallelism*.

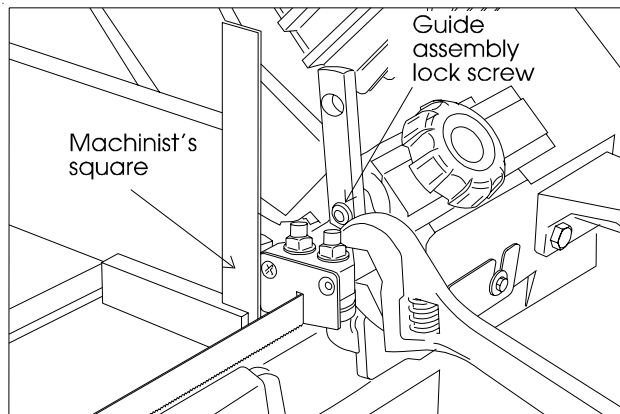


Figure 13: Adjusting blade vertical

Test cutting to verify adjustment accuracy

Test cuts can be used to determine whether or not you have adjusted the blade accurately. Use 2 inch bar stock to perform these test cuts, as follows:

1. With the bar stock securely clamped in the vise, make a cut through the bar stock. (See *Figure 14*.)
2. Mark the top of the bar stock.
3. Move the bar stock about 1/4 inch past the blade so you can begin a second cut.
4. Rotate the bar stock 180 degrees so the mark you made is now at the bottom of the cut.
5. Make a cut through the bar stock.
6. Use a micrometer to measure the thickness variation between the top and bottom of the disc you have cut from the bar stock. Unless things are truly perfectly aligned, there is almost certain to be a certain amount of "wedge" to the shape of the disc you have cut. The saw blade can be considered correctly adjusted when the variation measured is no more than .012 inch across the face of the disc.

If you do not have a 2 inch bar stock available for a test cut, use a larger diameter test work piece rather than a smaller one. The maximum thickness variation on any test piece should be no more than .003 inches, per side, per inch of stock diameter.

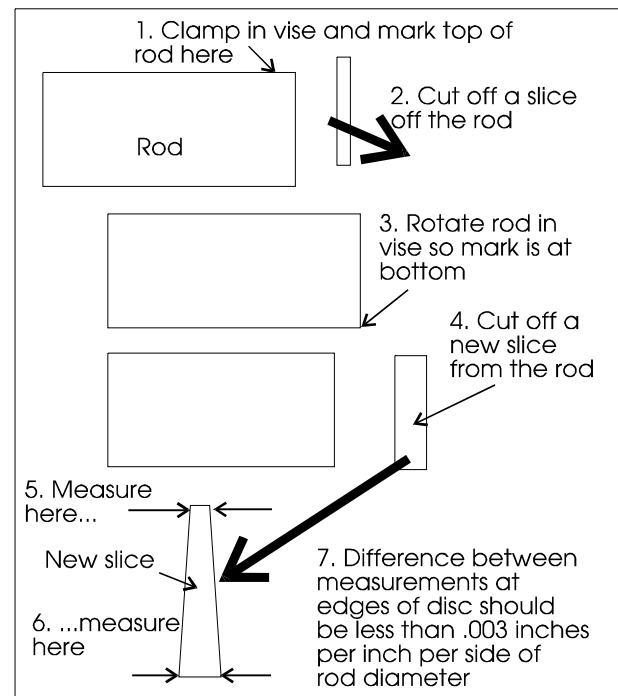


Figure 14: Step-by-step method to produce a test disc which can be measured for "wedge" - a measurement for testing cutting accuracy.

Adjusting guide bearings

There are eight side blade guide/support bearings. These bearings are installed in the bearing seat, and the seat is attached to the sliding adjustment bracket.

These bearings are stacked, with *two* bearings on each adjustment eccentric. The width of each pair of stacked bearings is slightly less than the width of a blade.

The force against each of the bearings in each stack is not equal. This is because the bearings are twisting the blade. This puts a much higher force against the two bearings which are doing most of the twisting. Look at *Figure 15* for a diagram which shows this effect.

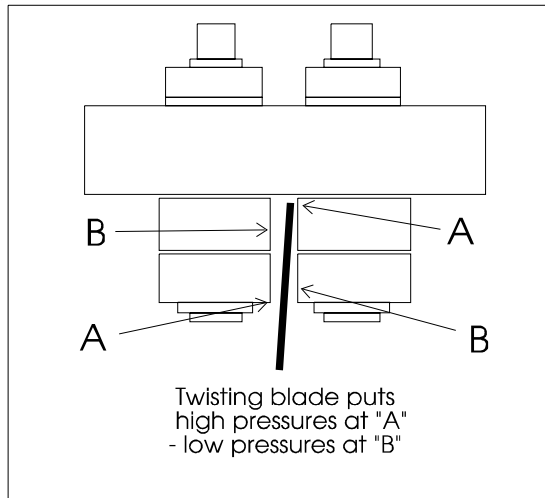


Figure 15: Guide bearing forces. Blade twist and clearance is exaggerated for demonstration. In practice, the blade will be standing vertical between the bearings when they are adjusted correctly.

The bearings are adjusted by moving the eccentrics as required, and by using your fingers to twist the bearings to see if they can rotate, and how difficult it is to rotate them.

The bearing clearance is correctly adjusted when the bearings labeled with an "A" in *Figure 15* cannot be turned at all, and when bearings labeled with a "B" in *Figure 15* can *barely* be turned with your fingers.

If the supporting bearings don't turn at all -- the set-up is too tight. If they can be turned easily using your thumb and forefinger -- the set-up is too loose.

To adjust:

1. Put a wrench on the adjustment tang of the bearing set you want to adjust. This prevents the eccentric from turning.
2. Use another wrench to loosen the lock nut for the eccentric bolt.
3. Turn the eccentric using the adjustment tang to loosen or tighten the bearing set, as needed.
4. Tighten the jam nut.
5. Check bearing tightness on both sides of the blade.

Re-adjust as required until the conditions described in the above paragraphs is obtained.

Replacing guide bearings

1. Remove the blade as outlined in steps 1 through 6 of *Replacing blades*.
2. Remove the jam nut on the eccentric upon which you are going to replace bearings.
3. Remove the clip which secures the bearings on the eccentric shaft.
4. Tap the old bearings off and press the new bearings on.
5. Replace the snap ring which secures the bearings on the eccentric.
6. Reinstall the eccentric in its position and tighten the jam nut loosely on the eccentric.
7. Install the blade according to instructions 7 through 14 in *Replacing blades*.
8. Adjust bearing clearance according to instructions in the previous section: *Adjusting guide bearings*.

Adjusting blade back-up bearings

The back-up bearings support the rear of the saw blade as it takes the pressure of cutting. (Refer to *Figure 11*.)

1. Being careful not to disturb the vertical angle of the guide bearing seat, loosen the socket head cap screw which secures the seat.
2. Move the seat downward until the back-up bearing just barely touches the back of the blade.
3. Tighten the socket head cap screw securely.
4. Perform this same operation on the other back-up bearing, if required.

After adjusting the back-up bearings, CHECK FOR BLADE VERTICAL according instructions in *Adjusting blade vertical*. It is very easy to disturb the vertical plane of the blade while performing this adjustment, and a blade which is not vertical will NOT cut straight.

Replacing the drive wheel

1. Complete steps 1 through 6 in *Replacing blades*.
2. Remove the snap ring which secures the lower wheel to the gearbox output shaft.
3. Pull the wheel off of the gearbox output shaft using a suitable puller.
4. **Inspection:** Examine the wheel for damage on its drive edge, shoulder, or the shaft boss. Replace if any faults are found.
5. Reinstall the wheel by pressing and/or tapping it back onto the shaft using a soft-faced mallet.
6. Reinstall the snap ring which retains the wheel on the shaft.
7. Complete steps 7 through 14 of *Replacing blades* and any steps in *Adjusting blade tracking*, as needed to complete the installation.

Installing the vertical sawing table

1. Disconnect the saw from its electrical power source to prevent accidental motor start-ups.
2. Raise the saw to full vertical position and lock in position using the quick lock valve.
3. Remove the two flat head cap screws which hold the small cutting plate to the bearing seat.
4. Place the large vertical cutting plate in position and use the two flat head cap screws to attach it firmly to the bearing seat.
5. Reconnect the saw to electrical power and it is ready to use as a vertical band saw.

Replacing idler wheel or bearings

1. Complete steps 1 through 6 in *Replacing blades*.
2. Remove center bolt and washer from the idler wheel.
3. Remove the two bolts which hold the sliding plate draw block in the sliding plate and remove the wheel and draw block from the saw as an assembly.
4. Using a suitable puller or press, pull or press the wheel, complete with bearings, off of the draw block.
5. Using a suitable puller, remove the two bearings from inside the wheel hub.
6. **Inspections:** Inspect the bearings for evidence of leakage and turn them to feel for roughness or other internal flaws. Replace if leaking or roughness is felt. Examine the wheel for damage on its drive edge, shoulder, or the bearing mounting boss. Replace if any faults are found.
7. To install new bearings use a suitable press to press them in the center of the wheel until the races are flush with the shoulder inside the wheel hub. (See *Figure 17*.)
8. Press the bearing and wheel assembly onto the shaft of the sliding block.
9. Reinstall the washer and bolt which retain the wheel on the shaft.
10. Reinstall the draw block and wheel assembly to the saw arm using the bolts to secure it to the plate.
11. Complete steps 7 through 14 of *Replacing blades* and any steps in *Adjusting blade tracking*, as needed to complete the installation.

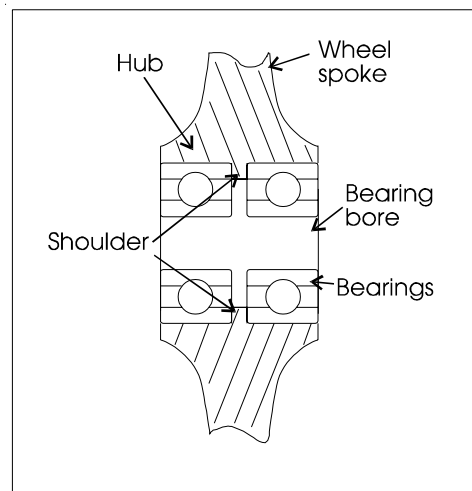


Figure 17: Idler wheel bearing configuration

Servicing the hydraulic control cylinder

Over a long period of service the hydraulic control cylinder may need replacement of its internal seals. Use the following procedure. (See *Figure 18.*)

1. Lower the arm to its horizontal position.
 2. Remove the upper fasteners, lower set screw, and pin which secure the cylinder to the saw arm and saw base.
 3. Working over a container suitable to hold the fluid, pull the control rod to its full extended position.
 4. Remove the nut on the bottom fitting of the valve and line assembly. Being careful not to kink the copper line, remove the end of the line from the fitting in the cylinder.
 5. Slowly push the control rod to its fully collapsed position. This will force most of the hydraulic fluid from the cylinder.
 6. Put the line back into its fitting and tighten its securing nut.
 7. Remove the needle valve assembly from the valve body.
 8. Pull off the plastic cap at the top of the cylinder.
 9. Remove the internal snap ring at the top of the cylinder.
 10. Wrap a rag around the top of the cylinder to catch and cushion the top cap when it is expelled from the cylinder.
 11. Use a source of VERY LOW PRESSURE air and apply pressure to the needle valve cavity in the valve body. The top cap will pop out of the cylinder and into the rag.
 12. Remove the lower snap ring from inside the cylinder.
 13. Slide the piston assembly from the cylinder, complete.
 14. Remove the bottom nut, washer and rubber ring from the bottom of the piston rod.
 15. Remove piston from the rod.
 16. Remove the U-ring from the piston.
 17. Remove the one external and the two internal O-rings from the top cap.
- Discard all soft parts.
18. Clean all metal parts with a suitable solvent.
 19. Use clean hydraulic fluid as a lubricant for all subsequent operations. Install the three O-rings on the top cap and the U-ring on the piston.
 20. Install the piston, U-ring lip down, on the piston rod.
 21. Install the rubber ring against the bottom of the piston and secure it with the washer and nut.
 22. Slide the piston assembly into the cylinder. A slight twisting motion will help ease the U-ring into the cylinder. Push the piston assembly all of the way to the bottom of the cylinder.
 23. Install the bottom snap ring inside the cylinder.
 24. Again working over a container which can catch any spilled fluid, fill the cylinder with hydraulic fluid until it comes out the valve body. Use a high quality hydraulic

jack oil for the hydraulic fluid.

25. Install the top cap on the piston rod and slide it into the cylinder, flush with the bottom snap ring. Again, a slight twisting motion will help ease the top cap into position. You will almost certainly expel some fluid from the valve body while doing this, which is why you are doing it over a container.

26. Reinstall the needle valve assembly into the valve body and tighten it.

27. Install the top snap ring.

28. Install the plastic cap on top of the cylinder.

29. Reinstall the cylinder on the saw by reversing steps 1 to 3, above.

Note: do not dispose of discarded hydraulic fluid carelessly. Use a licensed waste oil disposal service to handle discarded fluids.

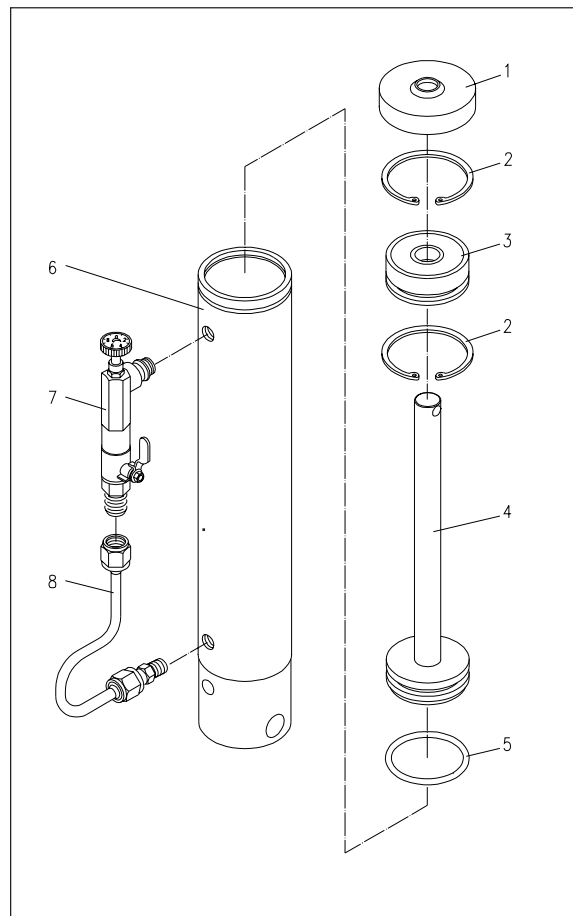


Figure 18: Hydraulic control cylinder exploded view

Machine Set-up

The saw delivered to you has been adjusted at the factory. A number of test pieces have been cut using the saw to verify the accuracy of cutting.

Therefore, the only set-up operations required before releasing the saw for service are spotting the saw and establishing the electrical connections to the motor.

If ordered with the coolant kit, the kit is typically installed at the Wilton factory. However, if the kit is ordered separately by you, it must be installed by a set-up mechanic, so instructions for this task are included in this *Machine set-up* section, as well.

Uncrating and spotting the saw

Spot the saw where it makes the most sense for the operations you will probably be doing. If you are going to be doing cut-off work on very long pieces of stock, allow plenty of room for the stock, infeed and outfeed supports, etc.

Remove the saw from the shipping skid and discard any hold-down devices which might have secured the saw to the skid.

Note the lock plate on the arm of the saw which is secured under the bump rubber. This lock plate must be removed before the saw arm can be raised. You may discard the lock plate and cap screw used to hold it in place. Be sure, however, to replace the nut on the bottom of the horizontal stop.

Electrical

The saw is delivered as either a 120 volt or 240 volt saw, depending upon your order. Wiring diagrams for either type of circuit are shown here.

The motor is connected, internally, to achieve the voltage set-up required. However, you can change the motor's internal wiring connections to change the operating voltage, if necessary.

To change the operating voltage

1. Disconnect the saw from its electrical power source.
2. Open the motor plate. The requirements for either 120 or 240 volt connection will be seen on a diagram inside the motor plate.
3. After making the connections, close the motor plate.
4. If you are using a plug connection to a socket, you will need to use the appropriate plug for the new power source supplying the saw, then plug the cord into the supplying receptacle to reconnect power to the saw.
5. If you are hard wired to a junction box, connect to the wires in the box, close the box, and reestablish power to the branch.
6. The saw is now ready for service.

Note: Wilton recommends that any wiring involving hard wiring of the saw to a branch, or any change of voltage supplied to the motor, be performed by a licensed electrician.

Note: also --- if the coolant kit is installed on the Model 3410 saw is perwired for 120 volt operation . When changing the motor voltage to 240 volts, the coolant pump must be changed to 240 volt following **Figure-20** or the wiring diagram on the pump table.

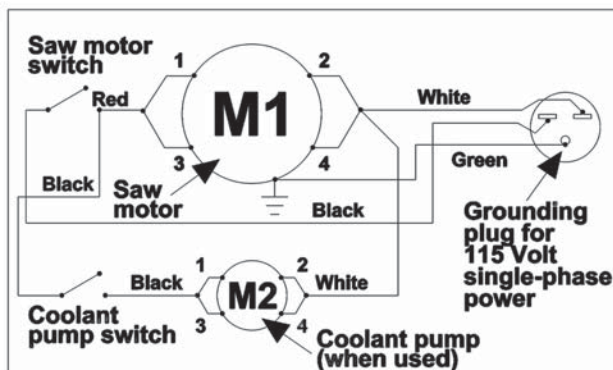


Figure 19: 115 volt wiring diagram

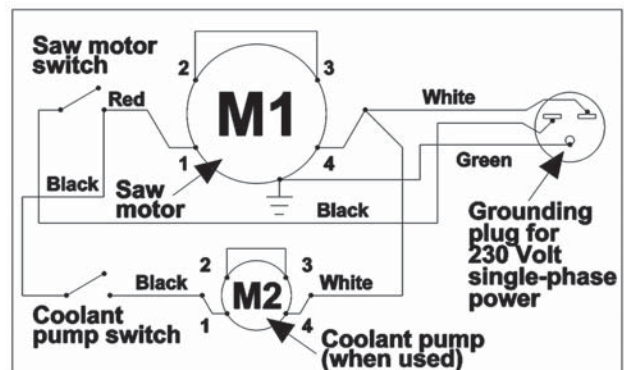


Figure 20: 230 Volt wiring diagram

Installing the coolant kit

1. Install the baffle in the tank so the pump is held at one end of the tank.
2. Put the tank and pump assembly in the flanges which hold it in the saw base. The pump should be at the saw motor end of the base.
3. Install the nozzle assembly in the fixture in the right-hand guide bearing bracket and secure it with the set screw in the fixture.
4. Install the delivery hose between the nipple on the pump and the nipple on the nozzle assembly.
5. Install the return line between the nipple on the table and the empty side of the tank.
6. Wire the pump motor to the pump switch according to the wiring diagram on the facing page. Female spade clips for the pump-to-switch connections are not supplied with the kit and must be sourced locally, by you.
7. Test the system by putting coolant in the tank and turning on the pump switch and motor switch.
8. The system is ready for use on the saw.

Chip brush replacement

The chip brush is a circular wire brush which is mounted in a bracket at the right-hand side of the saw arm. The purpose of the brush is to remove chips from the saw teeth and off of the blade so excessive amounts of chips don't get into the wheel guard section of the saw. The brush shaft spins in the bracket and the shaft is secured using a set screw and collar. With extended use this brush will be worn and require replacement.

1. Disconnect the saw from its power source to prevent accidental motor start-up.
2. Remove the set screw and collar from the brush shaft.
3. Remove the old brush and replace it with a new one.
4. Install the collar and set screw so the brush can spin freely in the bracket.
5. Adjust the bracket, if necessary, so the brush makes light contact with the saw blade.

Adjusting the horizontal stop and motor switch

The horizontal stop and motor switch are located on the front of the saw table at the left hand side. The horizontal stop is a rubber disc, mounted on a flat-headed screw. The screw height, and therefore the horizontal position of the saw arm, is adjusted using two nuts on the screw.

The motor switch is supposed to turn the motor off just before the arm contacts the horizontal stop. In this way a complete cut can be made and the blade can be automatically stopped before the arm is lifted to set up another cut.

Adjust the horizontal stop whenever the rubber disc is worn to the point where the stop requires replacement.

To replace or adjust the horizontal stop:

1. Disconnect the saw from its electrical power source to prevent accidental motor start up.
2. Raise the saw arm to its full up position.
3. Remove the lower nut which secures the horizontal stop screw to the saw and remove the horizontal stop assembly, complete.
4. Install the new horizontal stop and make the nuts which secure it finger tight.
5. Lower the saw arm to its horizontal position.
7. Adjust the horizontal stop height, using the upper and lower nuts, until the saw blade is below the level of the table surface and is fully into the blade relief slot on the table.
8. To be certain the blade has made enough downward travel to make a complete cut on the largest workpiece which fits in the saw:
 - 8.1. Open the adjustable vise jaw to its widest position
 - 8.2. Place a straight edge flat on the saw table and move it to where it contacts the blade.
 - 8.3. The saw blade teeth should be below the saw table along the entire distance you can slide the straight edge. Adjust the horizontal stop until this condition is met.
9. Tighten the horizontal stop nuts securely.
10. Reestablish the electrical connection to the saw and proceed to adjust the motor switch actuator.

Adjusting the motor switch actuator

1. Raise the arm until the switch actuator is not in contact with the switch.
2. Turn the switch ON.
3. Lower the arm until the arm contacts the horizontal stop. The motor switch should shut off the motor *just before the arm contacts the horizontal stop*.
4. If necessary, bend the switch actuator and re-test the system until the correct motor shut-off instant is obtained.

Troubleshooting

Problem	Probable cause	Potential solutions
Excessive blade breakage	Material loose in the vise	<ol style="list-style-type: none"> 1. Use more pressure to tighten vise. 2. Check stationary jaw pivot and lock bolts for tightness. 3. Check quick release handle nut for excessive tightness -- nut should be just tight enough to keep adjustable jaw from tilting when tightening. 4. If you are stacking multiple pieces in the vise, be sure all of the pieces are captured by the vise pressure.
	Incorrect feed or speed	<ol style="list-style-type: none"> 1. Check technical literature for recommended feeds and speeds for the material and blade you are using. 2. Check chip formation to adjust speed and feed to correct rate when sawing.
	Incorrect blade tension	<ol style="list-style-type: none"> 1. Adjust blade tension to where it just does not slip on the wheel.
	Teeth in contact with work before saw is started	<ol style="list-style-type: none"> 1. Be sure the saw motor has come fully up to speed before beginning a cut and be sure the blade is not resting on the workpiece before the motor has come up to full speed.
	Blade rubs on wheel flange	<ol style="list-style-type: none"> 1. Use paper cutting method of adjusting blade tracking. See <i>Blade Tracking Adjustment</i>. 2. Check drive and idler wheels for looseness in mounting parts or worn/damaged bearings.
	Misaligned blade guides	<ol style="list-style-type: none"> 1. Adjust blade guides.
	Blade too thick for wheel diameter	<ol style="list-style-type: none"> 1. Use a thinner blade. Check with your blade supplier for recommendations on blade thickness for a specific wheel diameter.
	Cracking at weld	<ol style="list-style-type: none"> 1. Replace blade.
Premature blade dulling	Teeth too coarse	<ol style="list-style-type: none"> 1. Use finer tooth blade.
	Too much blade speed	<ol style="list-style-type: none"> 1. Try next lower speed or check technical literature for specific recommendations regarding speeds for specific blade and material being cut. 2. Check with materials supplier for recommendations on the workpiece material supplied. 3. If using coolant, check with supplier regarding correct coolant for the job.
	Inadequate feed pressure	<ol style="list-style-type: none"> 1. Increase pressure while observing chip formation to be sure you are cutting efficiently.
	Hard spot or scale on material	<ol style="list-style-type: none"> 1. Reduce speed of blade. 2. Increase feed pressure in scale or hard spots.
	Work hardening of material (especially stainless steel)	<ol style="list-style-type: none"> 1. Work hardening materials such as stainless require a heavy, continuous cut. Be sure you are using a sharp blade, then, if necessary, release some counterbalance spring pressure by loosening the tension nut if work hardening of the material is a problem.
	Blade installed backwards	<ol style="list-style-type: none"> 1. Reinstall blade so teeth point toward right end of saw.
	Incorrect coolant or no coolant	<ol style="list-style-type: none"> 1. Check with materials supplier and/or blade supplier for coolant recommendations. 2. Check with coolant supplier for specific recommendations on the blade and material you are using.
	Insufficient blade tension	<ol style="list-style-type: none"> 1. Increase tension so blade is above the slipping point.
Crooked cuts	Work not square	<ol style="list-style-type: none"> 1. Adjust the stationary vise jaw so it is square to the blade. 2. Clamp work tightly in the vise. 3. Check blade for vertical and adjust, if necessary. 4. Perform test cuts according to instructions on page until cuts are satisfactorily square. 5. Move guide bearings as close as possible to work while still completing the cut. 6. Check guide bearings, seats and brackets for possible looseness or wear.

Troubleshooting

	Feed pressure too great	1. Observe chip formation to be sure cutting is efficient.
	Guide bearings not adjusted properly	1. Adjust guide bearings according to instruction in this manual.
	Inadequate blade tension	1. Increase blade tension so blade does not slip on the wheels.
	Blade guides incorrectly spaced	1. Move guide brackets until they just clear the workpiece while making a complete cut. 2. For small section pieces, be sure the blade is sharp and correctly tensioned. Use less feed pressure.
	Dull blade	1. Replace blade when it dulls. 2. Consider using a coolant, if not already used.
	Incorrect speed	1. Check technical literature for recommended speeds and blade type for material being cut -- observe chip formation to verify efficient cutting.
	Blade guide assembly loose	1. Tighten guide bracket.
	Blade guide bearing assembly loose	1. Check tightness of bearing seat bolt.
	Blade tracking too far away from wheel flanges	1. Use paper cutting method of setting blade tracking.
	Worn upper wheel bearings	1. Replace bearings if worn.
	Loose upper wheel mounting assembly	1. Tighten all bolts securing wheel to arm.
Rough cuts	Too much feed or speed	1. Try one step lower speed and observe chip formation for efficient cutting/feed rate.
	Blade too coarse	1. Use finer blade. Check with suppliers for recommendations for the material you are cutting.
	Incorrect blade for material	1. Check with blade suppliers for recommendations for exotic or unusual materials or specifications.
Blade twisting	Cut is binding blade	1. Be sure workpiece is flat on saw table. 2. Decrease feed pressure.
	Too much blade tension	1. Reduce tension to just above point where blade slips.
	Loose guide bearing eccentrics	1. Check eccentric jam nuts for tightness.
	Worn guide bearings	1. Check guide bearings for wear. Replace if necessary.
	Incorrect guide bearing adjustment	1. Adjust guide bearings according to instructions in this manual.
	Loose guide bearing bracket	1. Tighten bracket on saw arm.
Unusual wear on side/back of blade	Loose bearing seat attachment screw	1. Tighten bearing seat attachment screw -- adjust blade for vertical and parallel.
	Blade guides worn	1. Replace.
	Blade guide bearings not adjusted properly	1. Check and adjust for proper clearance.
	Blade guide bearing bracket loose	1. Tighten bracket to saw arm.
Breaking teeth	Blade running on wheel flange	1. Adjust blade tracking using the paper cutting method.
	Teeth too coarse for work	1. Use blade with finer pitch.
	Too heavy feed	1. Decrease feed rate -- observe chip formation to verify efficient cutting.
	Too slow speed	1. Increase blade speed. Check technical literature or blade or workpiece supplier for blade speed recommendations.
	Vibrating work piece	1. Be sure vise is tight. 2. Support slender cross section or long workpieces with appropriate out-feed supports. 3. If stacking pieces in the vise, be sure all workpieces are securely captured by the vise.
	Tooth gullets loading	1. Use coarser blade or one with a tooth geometry more appropriate to the workpiece being cut.
	Blade in contact with workpiece before motor is started	1. Always allow motor to come fully up to speed before beginning cut.
Motor running too hot	Blade tension too high	1. Decrease blade tension to just above slip point.
	Blade too coarse for work (pipes, especially)	1. Use finer pitch blade.
	Blade is too fine for work (heavier, soft material)	1. Use coarser blade.
	Worn transmission and worm gear	1. Replace gears in transmission gearbox.
	Gears need lubrication	1. Check gearbox and add oil as required.

Replacement Parts

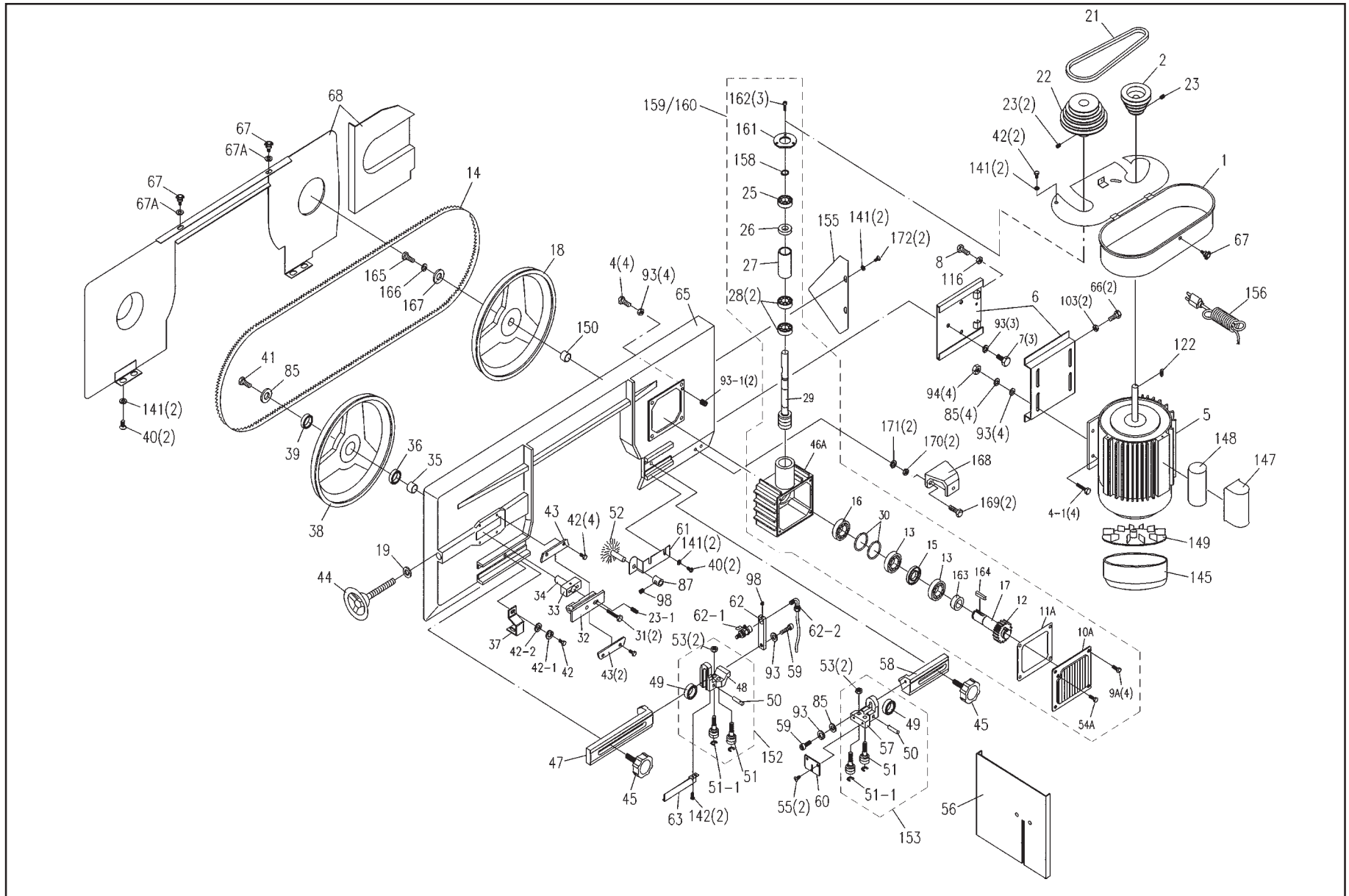
This section provides exploded view illustrations that show the replacement parts for the Model 3400 and 3410 7-Inch x 12-Inch Horizontal Cut-Off Band Saw. Also provided are parts listings that provide part number and description. The item numbers shown on the illustration relate to the item number in the facing parts listing.

Order replacement parts from:

WHM TOOL GROUP
2420 Vantage Drive
Elgin, Illinois 60124
Ph.: 800-274-6848

Identify the replacement part by the part number shown in the parts listing. Be sure to include the model number and serial number of your machine when ordering replacement parts to assure that you will receive the correct part.

Exploded View - Saw Head

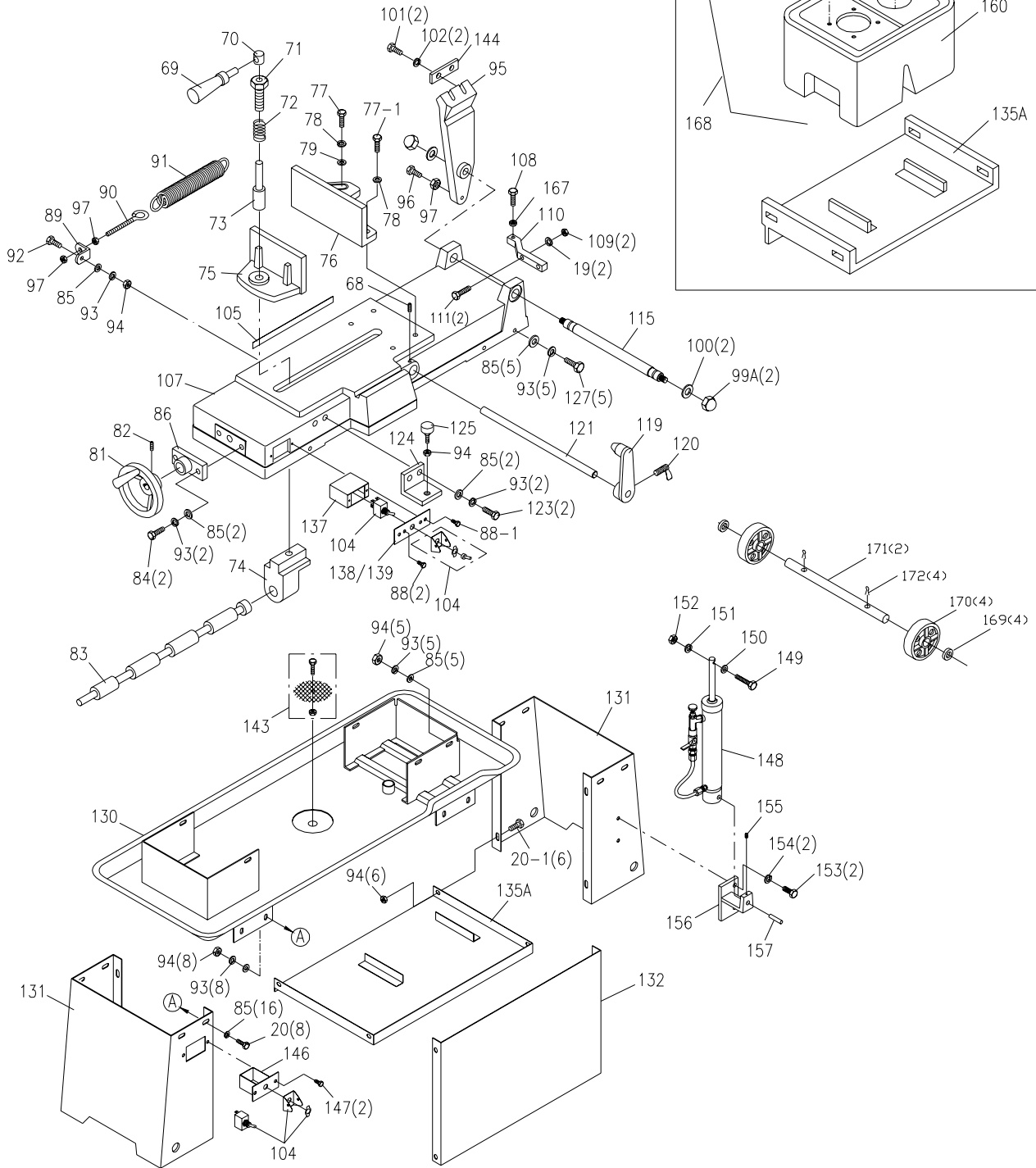


Parts List - Saw Head

Ref. no.	Part.no.	Description	Qty.
1	5710011	Pulley cover	1
2	5710021	Motor pulley	1
4-1	5710041	HH screw 5/16X1	4
5	5710051	Motor 3/4 HP 115V 1PH	1
6	5710061	Motor mount plate assy.	1
7	5710071	HH screw 5/16x5/8	3
8	5710081	HH screw 5/16x1-1/4	1
9A	5710091	Tapping screw 6mmx20	4
10A	5710111	Gearbox cover	1
11A	5710121	Gearbox gasket	1
12	5710131	Trnsmsion gear 20mm bore	1
12	5711921	Trnsmsion gear 25mm bore	1
13	5710141	Ball bearing 6005	2
14		Saw Blade:	
	5632141	3/4 X .032 X 93" 8 TPI	
	5632151	3/4 X .032 X 93" 8 T STND	1
	5632161	3/4 X .032 X 93" 14 TPI	
15	5710161	Oil seal 20.42.7	1
	5711881	Oil seal 25.47.7	
16	5635271	Ball bearing 6004Z	1
	5680391	Ball bearing 6005Z	
17	5710181	Trnsmsion Shaft - 5/8 bore	1
	5711931	Trnsmsion Shaft - 7/8 bore	
18	5710191	Blade whl rear 20mm bore	1
	5711831	Blade whl rear 25mm bore	
19	5710211	Washer 3/8	1
21	5710231	Belt 3V-270	1
22	5710241	Worm pulley	1
23	5710251	Set screw 5/16x3/8	3
23-1	5517501	Set screw 5/16x3/4	1
25	9100451	Ball bearing 6003	1
26	5710281	Oil seal 17.35.7	1
27	5710291	Bearing bushing	1
28	5710311	Ball bearing 6003	2
29	5710321	Worm gear shaft	1
30	5710331	Snap ring 42mm	2
30	5711871	Snap ring 47mm	
31	9052181	HH screw 5/16x1-1/2	2
32	5710351	Blade tension sliding plate	1
33	5710361	Sliding plate draw block	1
34	5710371	Blade wheel shaft - front	1
35	5710381	Bearing bushing	1
36	9100331	Ball bearing 6203	1
37	5710411	Switch actuator	1
38	5710421	Blade wheel - front	1
39	9100331	Ball bearing 6203	1
40	5710441	Phillips screw 1/4x1/2	4
41	5710451	HH screw 5/16x3/4	1
42	5710461	HH screw 1/4x1/2	7
42-1	5517502	Spring washer 1/4	1
42-2	5517503	Washer 1/4	1
43	5710471	Blade tension sliding guides	2
44	5710481	Blade tension adj. knob	1
45	5630601	Knob	2
46A	5710511	Transmission gearbox 42mm	1
	5711861	Transmission gearbox 47mm	
47	5710521	Adjustable bracket bar - front	1
48	5710531	Blade adjustable seat - front	1
49	5632831	Ball bearing 608ZZ	2

Ref. no.	Part.no.	Description	Qty.
50	5710551	Bearing pin	2
51	5710561	Eccentric shaft assy.	2
51-1	5517504	Center shaft assy.	2
52	5710571	Brush	1
53	5710581	Hex nut 3/8x24	4
54A	5710591	Oil plug	1
55	5710611	Phillips screw 1/4x3/8	2
56	5710621	Vertical cutting plate	1
57	5710631	Blade adjustable sear - rear	1
58	5710641	Adjustable bracket bar - rear	1
59	5710651	SHCS 5/16x1-1/8	2
60	5710661	Vertical cutting plate (small)	1
61	5710671	Brush bracket	1
62	5710681	Nozzle bracket	1
62-1	5517505	Valve	1
62-2	5517506	Nozzle cock	1
63	5710691	Blade guard	1
65	5710721	Saw bow (arm)-rounded style	1
	5711821	Saw bow (arm)-square style	
66	5710731	HH screw 5/16x2-1/2	2
67	5710741	Thumb screw	3
67A	5711561	Washer 1/4	2
68	5710751	Blade cover assy early style	1
	5711811	Blade cover assy later style	
85	5710941	Washer 5/16	6
87	5710961	Collar	1
93	5711031	Spring washer 5/16	13
93-1	5517507	Adj. Screw 1/4x3/8	2
94	5711041	Nut 5/16	4
98	5711081	Set screw 1/4x1/4	2
103	5711141	Washer 5/16	2
116	5711281	Hex nut 5/16	1
122	5711351	Key 5mm	1
141	5711561	Washer 1/4	8
142	5711571	Screw 3/16x1/4	2
145	5711391	Cooling fan cover	1
147	5711431	Capacitor cover	1
148	5711471	Capacitor	1
149	5711481	Cooling fan	1
150	5711841	Bushing	1
152	5710531A	Blade guide assy left side	1
153	5710631A	Blade guide assy right side	1
155	5711951	Rubber flap	1
156	5711251	Cord	1
158	5711991	C-clip	1
159	5710511A	Cmplte gearbox 42mm bore	1
160	5711801	Cmplte gearbox 47mm bore	1
161	5517509	Block plate	1
162	5517510	Hex soc. screw 3/16x1/2	3
163	5517511	Bearing bushing	1
164	5517512	Key 6x20	1
165	5517513	HH screw 3/8x1	1
166	5517514	Spring washer 3/8	1
167	5517515	Washer 3/8x35x4	1
168	5517516	Top support	1
169	5517517	HH screw 3/8x1-1/2	2
170	5517518	Spring washer 3/8	2
171	5517519	Nut 3/8	2
172	5517508	HH screw 1/4x3/8	2
	5711421	Junction box cvr (not shown)	1

Exploded View - Saw Base

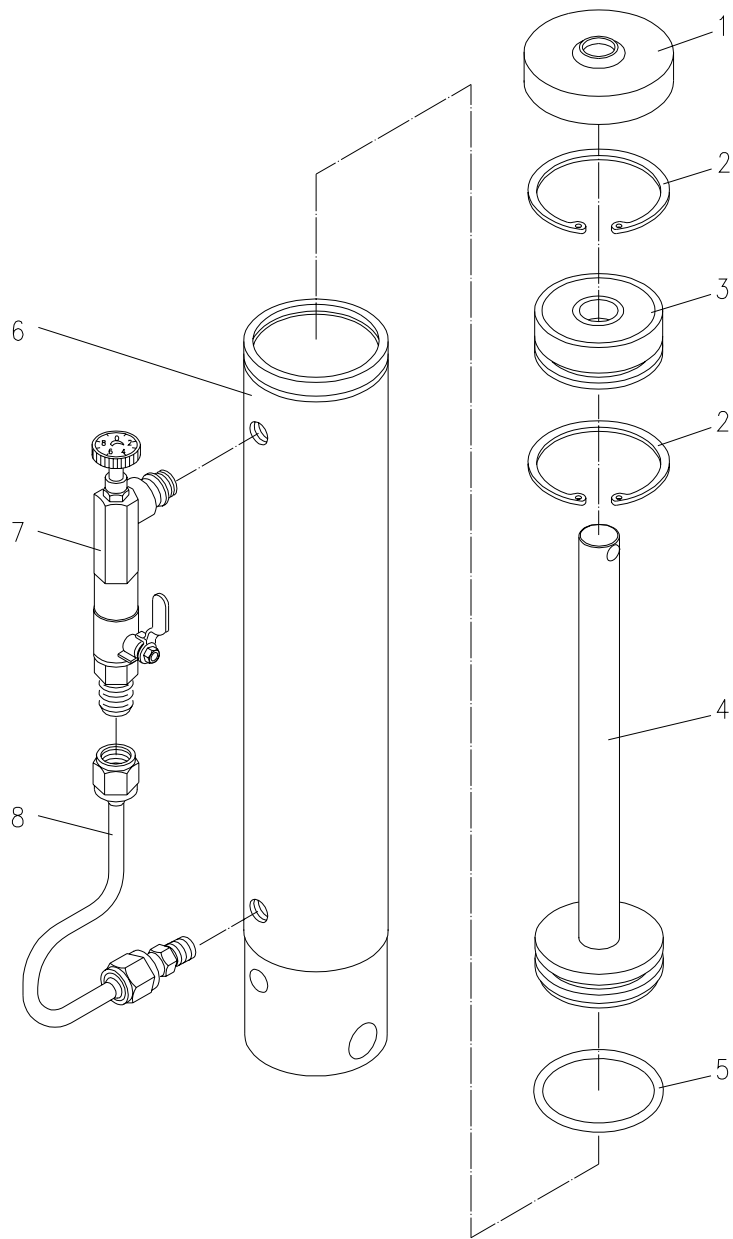


Parts List - Saw Base

Ref. no.	Part no.	Description	Qty.
19	5710211	Spring washer 3/8	2
20	5710221	HH screw 5/16x3/4	8
20-1	5517520	HH screw 5/16x1/2	6
68	5517521	Set screw 5/16x3/8	1
69	5710761	Handle	1
70	5710771	Nut	1
71	5710781	Vise screw	1
72	5710791	Spring	1
73	5710811	Vise thrust shaft	1
74	5710821	Nut seat	1
75	5710831	Vice jaw movable	1
76	5710841	Vice jaw stationary	1
77	5710851	HH screw 1/2x1-1/2	1
77-1	5517522	HH screw 1/2x1-1/4	1
78	5628371	Spring washer 1/2	2
79	5507523	Washer 1/2	1
81	5710891	Handle wheel 13mm	1
82	5711781	Handle wheel 15mm	1
82	5710911	Set screw 5/16x3/8	1
83	5710921	Lead screw - 13mm	1
83	5711791	Lead screw - 15mm	1
84	5710931	HH screw 5/16x1	2
85	5710941	Washer 5/16	37
86	5710951	Lead screw seat	1
88	5517523	RH Ph. Screw 3/16x1/4	2
88-1	5517524	RH Ph. Screw 3/16x3/8	2
89	5710981	Spring handle mount - rear	1
90	5710991	Spring adjustable rod	1
91	5711011	Spring	1
92	5711411	HH screw 5/16x1-1/4	1
93	5711031	Spring washer 5/16	23
94	5711041	Nut 5/16	21
95	5711051	Pivot arm - 5/8 bore	1
	5711751	Pivot arm - 7/8 bore	1
96	5517525	HH screw 3/8x1 3/4	1
97	5517526	Nut 3/8	3
99A	5517527	Fiber hex. nut 1/2	2
100	5711111	Washer 1/2	2
101	5711061	HH screw 3/8x1-1/2	2
102	5711131	Spring Washer 3/8	2
104	5711151	Power switch Assembly	2
105	5711161	Angle scale	1
107	5711181	Table - 5/8 bore	1
	5711761	Table - 7/8 bore	1
108	5711191	HH screw 3/8x1	2

Ref. no.	Part no.	Description	Qty.
109	9056991	Nut 3/8x7x14	2
110	5711221	90 degree support	1
111	5517529	HH screw 3/8x1-3/4	2
115	5711271	Support shaft -5/8	1
	5711771	Support shaft - 7/8	1
119	5711321	Stock stop	1
120	5711331	Thumb screw	1
121	5711341	Stock stop rod	1
123	5517530	HH screw 5/16x3/4	2
124	5711371	Horizontal stop screw support	1
125	5711381	Horizontal stop screw	1
127	5517531	HH screw 5/16x1	5
130	5711441	Trough	1
131	5711451	Floor stand, left	1
131A	5711451R	Floor stand, right	1
132	5711461	Skirt	1
135A	5711491	Shelf	1
137	5711521	Enclosure	1
138	5711531	Gasket	1
139	5711541	Cover plate	1
143	5711261	Screen	1
144	5711961	Spacer	1
161	5711941	Drain hose	1
146	5711971	Switch box	1
147	5711981	Round head screw 3/16x3/8	2
148	5517535	Cylinder	1
149	5517536	Hex. soc. screw M10x40	1
150	5517537	Washer 3/8	1
151	5517538	Spring washer 3/8	1
152	5517539	Nut M10	1
153	5517540	HH screw 3/8x1	2
154	5517541	Spring washer 3/8	2
155	5517542	Set screw	1
156	5517543	Bottom support	1
157	5517544	Support rod	1
160	5042291	Modular box	1
160A	5711452	Plastic funnel	1
162	5042281	Coolant pump 120V/240V	1
163	5517532	HH. screw 1/4x1/2	4
164	5517533	Hose fitting	1
165	5517534	Hose Clamp 13mm	1
166	9307291	Hose	1
167	5517528	Jam nut 3/8	1
168	5635500	Wet kit	2
169	5518228	Flat Washer 5/8	4
170	5518229	Wheel	4
171	5518230	Wheel shaft	2
172	5518231	Split pin	4

Parts List - Hydraulic Cylinder



Ref. no.	Part no.	Description	Qty.
1	5517547	Dust cover	1
2	5517548	Retaining ring	2
3	5517549	Oil-seal	1
4	5517550	Oil-piston	1
5	5517551	O-ring	1
6	5517552	Cylinder body	1
7	5517553	Oil pressure regulator	1
8	5517554	Oil duct	1