

JET[®]

WMH TOOL GROUP

Operating Instructions and Parts Manual Self-Feed Vertical Band Saw

Models: VSF-14-1 and VSF-14-3



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This manual has been prepared for the owner and operator of a Model VSF-14 Self-Feed Vertical Band Saw. Its purpose, aside from machine operation, is to promote safety using accepted operating and maintenance procedures. To obtain maximum life and efficiency from your band saw and to aid in using the machine safely, please read this manual thoroughly and follow instructions carefully.

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WMH Tool Group warrants every product it sells. If one of our tools needs service or repair, one of our Authorized Repair Stations located throughout the United States can provide quick service or information.

In most cases, a WMH Tool Group Repair Station can assist in authorizing repair work, obtaining replacement parts, or perform routine or major maintenance repair on your JET product.

For the name of an Authorized Repair Station in your area, please call 1-888-594-5866, or visit our web site at www.wmhtoolgroup.com

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Warnings

1. Read and understand the entire owners manual before attempting assembly or operation.
2. Read and understand warnings posted on the machine and in this manual. Failure to comply with all of these warnings may cause serious injury.
3. Replace warning labels if they become obscured or removed.
4. This band saw is designed and intended for use by properly trained and experienced personnel only. If you are not familiar with the proper and safe operation of a band saw, do not use until proper training and knowledge have been obtained.
5. Do not use this band saw for other than its intended use. If used for other purposes, WMH Tool Group disclaims any real or implied warranty and holds itself harmless from any injury that may result from that use.
6. Always wear approved safety glasses/face shields while using this machine. Everyday eyeglasses only have impact resistant lenses; they are not safety glasses.
7. Before operating this machine, remove tie, rings, watches, and other jewelry, and roll sleeves up past the elbows. Remove all loose clothing and confine long hair. Non-slip footwear is recommended. Do **not** wear gloves when operating the saw.
8. Wear ear protectors (plugs or muffs) during extended periods of operation.
9. Some dust created by power sanding, sawing, grinding, drilling and other construction activities contain 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, cement and other masonry products.
 - Arsenic and chromium from chemically treated lumber.Your risk of exposure 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 face or dust masks that are specifically designed to filter out microscopic particles.
10. Do not operate this band saw while tired or under the influence of drugs, alcohol or any medication.
11. Make certain the switch is in the **OFF** position before connecting the machine to the power supply.
12. Make certain the machine is properly grounded.
13. Make all machine adjustments or maintenance with the machine unplugged from the power source.
14. Remove adjusting keys and wrenches. Form a habit of checking to see that keys and adjusting wrenches are removed from the machine before turning it on.
15. Keep machine guards in place at all times when the machine is in use. If removed for maintenance purposes, use extreme caution and replace the guards immediately.
16. Make sure the band saw is firmly secured to the floor before use.
17. Check damaged parts. Before further use of the machine, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function – check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.
18. Provide for adequate space surrounding work area and non-glare, overhead lighting.
19. Keep the floor around the machine clean and free of scrap material, oil and grease.
20. Keep visitors a safe distance from the work area. **Keep children away.**
21. Make your workshop kid proof with padlocks, master switches or by removing starter keys.
22. Give your work undivided attention. Looking around, carrying on a conversation and “horse-play” are careless acts that can result in serious injury.



Warnings (cont.)

23. Maintain a balanced stance at all times so that you do not fall or lean against the saw blade or other moving parts.
24. Use the right tool. Don't force a tool or attachment to do a job for which it was not designed. The right tool will do the job better and safer at the rate for which it was designed.
25. Use recommended accessories; improper accessories may be hazardous.
26. Maintain tools with care. Keep tools sharp and clean for the best and safest performance. Follow instructions for lubricating and changing accessories.
27. Make sure the work piece is securely attached or clamped to the table. Never use your hand to hold the work piece.
28. Never brush away chips while the machine is running. Use the correct speed and feed for the tool. Be sure that the tool is the correct one for your operation.
29. Never stand on a machine. Serious injury could occur if the machine tipped or if the saw blade is unintentionally contacted.
30. Never leave the machine running unattended. Turn the power off and don't leave the machine until it comes to a complete stop.



Warnings for Sawing Systems

31. Always wear leather gloves when handling saw blades. The operator should not wear gloves when operating the machine.
32. All doors should be closed, all panels replaced and other safety guards should be in place prior to the machine being started or operated.
33. Be sure the blade is not in contact with the work piece when the motor is started. The motor should be started and you should allow the saw to come up to full speed before bringing the saw blade into contact with the work piece.
34. Do not allow the saw blade to rest against the work piece when the saw is not running.
35. Keep your hands away from the blade area.
36. The saw must be stopped and the 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.
37. Remove loose items and unnecessary work pieces from the area before starting the machine.
38. Bring the adjustable saw guides and guards as close as possible to the work piece.
39. The work piece, or part being sawed, must be securely clamped before the saw blade enters the work piece.
40. Remove cut off pieces carefully, keeping hands away from the saw blade.
41. The saw must be stopped and the electrical supply cut off or machine unplugged before reaching into the cutting area.



-- SAVE THESE INSTRUCTIONS --

How The VSF-14 Band Saw Operates

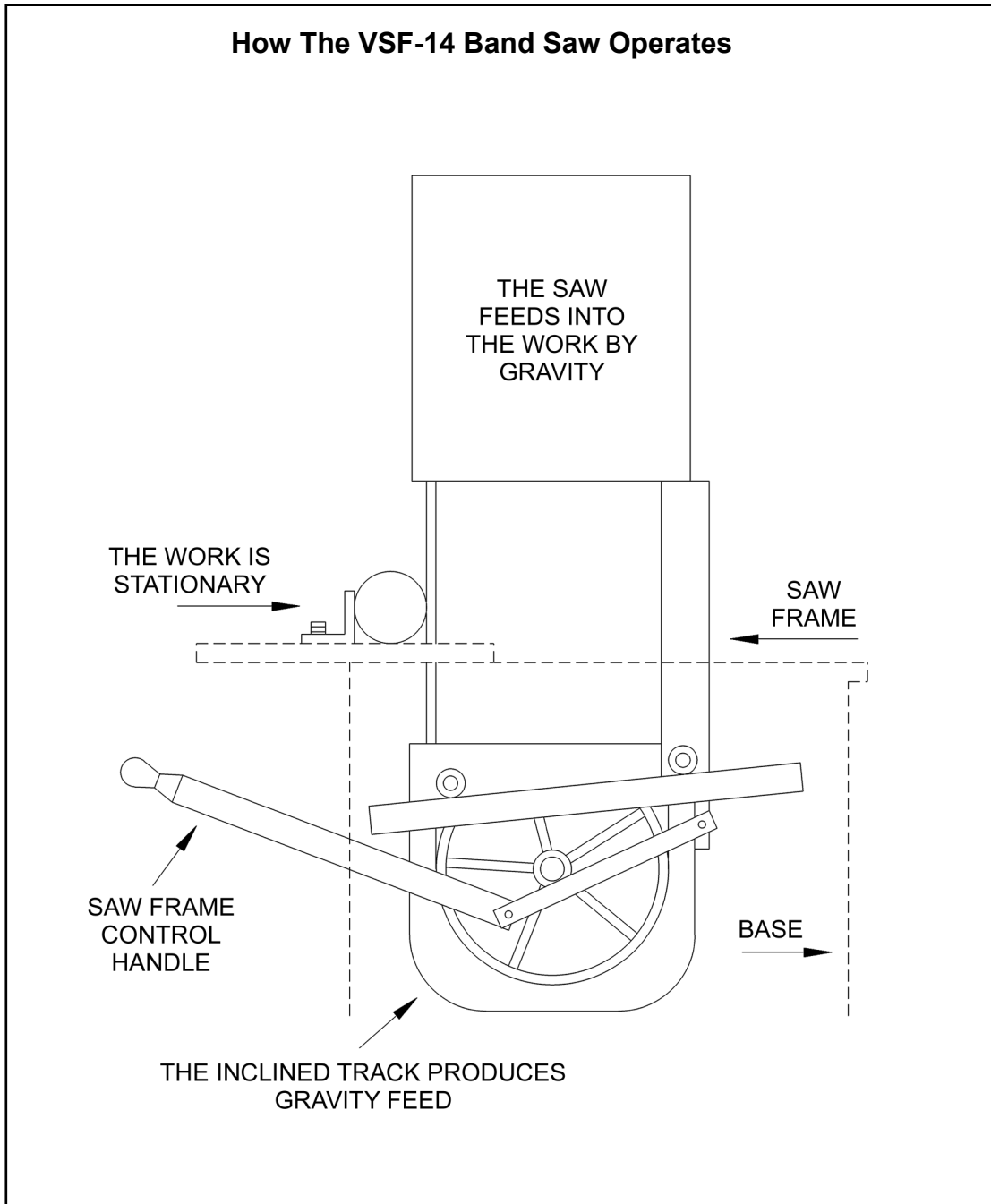


Figure 1: How the VSF-14 Band Saw Operates

Introduction

This manual is provided by JET Equipment covering the safe operations and maintenance procedures for Models VSF-14-1 and VSF-14-3. This manual contains instructions on installation, safety precautions, general operating procedures, maintenance instructions and parts breakdown. This machine has been designed and constructed to provide years of trouble free operation if used in accordance to instructions set forth in this manual. If there are any questions or comments, please contact either your local supplier or WMH Tool Group. WMH Tool Group can also be reached at our web site: www.wmhtoolgroup.com.

Specifications

Model	VSF-14-1	VSF-14-3
Blade Speeds (SFPM)	70, 140, 280, 580	70, 140, 280, 580
Height Capacity (max./in.)	14-1/2	14-1/2
Throat Capacity (max./in.)	8-1/2	8-1/2
Table Size (in.)	18-1/2 x 30-1/2	18-1/2 x 30-1/2
Table Height (in.)	30	30
Blade Wheel Diameter (in.)	14	14
Blade Length (approx./in.)	120	120
Blade Width (in.)	1/8 min. – 1 max.	1/8 min. – 1 max.
Floor Space Required (in.)	40L x 30-1/2W x 63H	40L x 30-1/2W x 63H
Motor	1HP, 1Ph, 115/230V, 60Hz	1HP, 3Ph, 230/460V, 60Hz
Net Weight (lbs.)	551	551

Figure 2: Specifications

Standard Features

- Welded frame and base of heavy gauge steel
- Swivel vise with scale for miter cuts
- Heavy duty precision ground cast iron table
- Four blade speeds (70, 140, 280, 580)
- Hydraulic feed control
- Counterweight for feed control
- Upper guide bar adjustment
- Guide rollers accept blade sizes: 1/8", 1/4", 3/8", 1/2", 5/8", 3/4" and 1"

Standard Equipment

- Four foot pads
- Work light
- Chip tray
- Miter gauge
- Extension roller
- 5/8" Bi-metal blade
- Blade speed and pitch selector
- Conveniently located control panel

Description

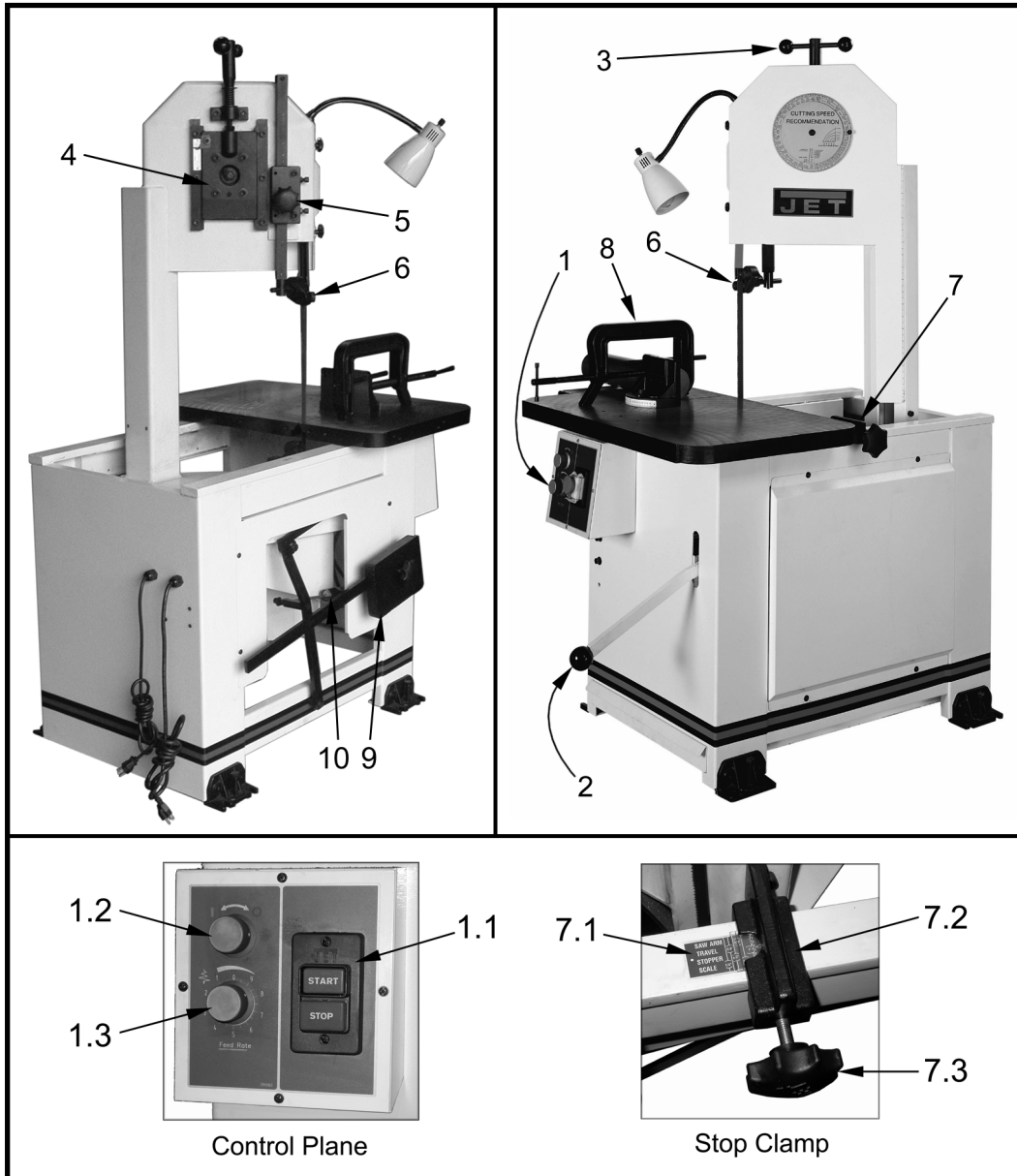


Figure 3: Component Descriptions and Locations

1. CONTROL PANEL – The operating controls for the band saw are located on the base at the front of the machine.
 - 1.1. ON/OFF SWITCH – Turns the machine on or off.
 - 1.2. SAW FRAME RELEASE KNOB – Turning this knob counterclockwise unlocks the release lever (Item 2).
 - 1.3. FEED RATE ADJUST KNOB – Used to adjust the hydraulic feed control rate.
2. SAW FRAME RELEASE LEVER – Pull up on this lever to release the saw frame after unlocking it (Ref Item 1.2) and push down to return the saw frame to its rearmost position.
3. BLADE TENSION HANDLE – Used to set the correct blade tension. Also used to remove and install the saw blade.

4. UPPER BLADE WHEEL BLADE TRACKING ADJUSTMENT (See Blade Tracking Adjustments) – If your saw should get out of adjustment and the blade runs off the wheel or runs back against the lip, loosen the two bottom bolts on the upper wheel slide. Turn the set screw in or out to make the blade run approximately 1/32" away from the lip on the back of the wheel. Tighten the two upper wheel slide bolts. **IMPORTANT:** If the blade is allowed to run against the lip on the wheel it will wear the lip off.
5. GUIDE BAR LOCK – Used to lock the roll guides in position.
6. BLADE GUIDE – Should be adjusted so it clears your work by approximately 1/2". This will insure maximum blade rigidity.
7. STOP CLAMP – Has two uses:
 - 1) It can be set for the depth of cut;
 - 2) If placed behind the frame, it will lock the frame in a forward position for contour work.
- 7.1. Stop Clamp Scale – Shows the maximum depth of cut based on the size of blade you are using.
- 7.2. Stop Clamp – Used with the Stop Clamp Scale (Figure 3 Item 7.1) to select the size of the blade.
- 7.3. Lock Knob – To Lock the Stop Clamp.
8. C-CLAMP VISE – Used to hold stock in place during cutting. Graduations are provided to set angle cuts.
9. COUNTERBALANCE WEIGHT – Used to maintain the blade pressure you desire.
10. HYDRAULIC CYLINDER – This should be adjusted to allow the frame to travel rapidly but not free fall. This is a safety device and therefore should be kept properly adjusted.

Installation

General

- Do not install the machine in a damp, humid, dirty or badly illuminated environment.

Machine Setup

The band saw has been pre-adjusted at the factory and several test pieces have been cut to verify cutting accuracy. Setup of the machine is limited to uncrating the machine, securing it to the shop floor and connecting it to the electrical power source.

1. Remove the saw from the shipping skid; discard any hold-down devices.
2. Place the saw on the shop floor. This machine must be installed on a firm, level surface. Make sure it is mounted securely to the floor using mounting anchors secured through the holes in the base. In addition, adjust the level of the worktable by adjusting the four feet pads.
3. If the saw will be used to cut long pieces of stock, allow plenty of room for the length of the stock.

Electrical Connections

IMPORTANT

A qualified electrician should make the electrical connections following all local and state codes.

WARNING

The machine uses high voltage electrical power that poses a significant risk of serious injury or death if proper precautions are not observed. Make sure the machine is properly grounded.



Connect the machine to the electrical power branch circuit. Observe the following guidelines when connecting the saw to the power source.

1. Make sure the saw is disconnected from the electrical power branch circuit (trip the required circuit breakers or remove the required fuses).

2. Place a warning placard or tag on the service panel to prevent accidental electrical shock.
3. When installing the motor power cord into a receptacle, make sure the plug is compatible with the receptacle.
4. When using hard-wired connections, connect the wires as shown in the wiring diagram.
5. Install the fuses or reset the breakers.
6. Check the operation of the saw.

CAUTION

For circuits that are a long distance 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	
	120 Volt Lines	240 Volt Lines
0 – 50 Feet	No. 14	No. 14
50 – 100 Feet	No. 12	No. 14
Over 100 Feet	No. 8	No. 12

Figure 4: Recommended Main Power Supply Wire Sizes

Cleaning

- All unpainted surfaces of the machine are treated with a rust preventative. Clean all rust protected surfaces with a mild solvent. Do not use paint thinner, lacquer thinner, gasoline or mineral spirits; these will damage painted surfaces.

Operation

General

- Always wear approved safety glasses when using this machine. Before operating the machine, remove tie, rings, watches and other jewelry, and roll sleeves up past the elbows. Remove all loose clothing and confine long hair. Non-slip footwear is recommended. Do **not** wear gloves when operating the saw.
- Never use the machine if it is missing any guards or other safety devices.
- Maintain a balanced stance at all times so that you do not fall or lean against the saw blade or other moving parts.
- Never leave the machine running. Always make sure it has come to a complete stop before leaving the machine.

Controls

- **ON / OFF Switch** (Figure 3 Item 1.1). Located on the right side of the control panel. Press this switch to start or stop the machine.
- **Feed Control Knob** (Figure 3 Item 1.3). Located on the left side of the control panel. The knob is the hydraulic cylinder feed control valve. It is used to set the amount of force that is applied to the saw blade. The feed rate is proportional to the opening of the valve. Increasing the valve opening (counterclockwise) increases the feed rate; decreasing the valve opening (clockwise) reduces the feed rate.
- **Blade Speeds** (Figure 5). The band saw has four blade speeds. The different speeds are obtained by changing the position of the motor drive V-belt on step pulleys. Change blade speeds as follows. Caution: Change speeds only when the machine is not running.

Changing blade speeds:

1. Disconnect the electrical power from the band saw branch circuit to prevent accidental motor start-up.
2. Place the saw frame in the rearmost position by pushing down on the saw frame release lever (Figure 3 Item 2) and lock it by turning the saw frame release knob (Figure 3 Item 1.2) clockwise.
3. Remove the panel on the base to expose the V-belt and pulleys.
4. Lift the motor to loosen the belt.
5. Select the speed using the placard on the saw head. Put the V-belt in the pulley grooves of the pulley for the desired speed (Refer to Figure 5 for belt locations and the speeds available).
6. Lower the motor to tighten the V-belt.

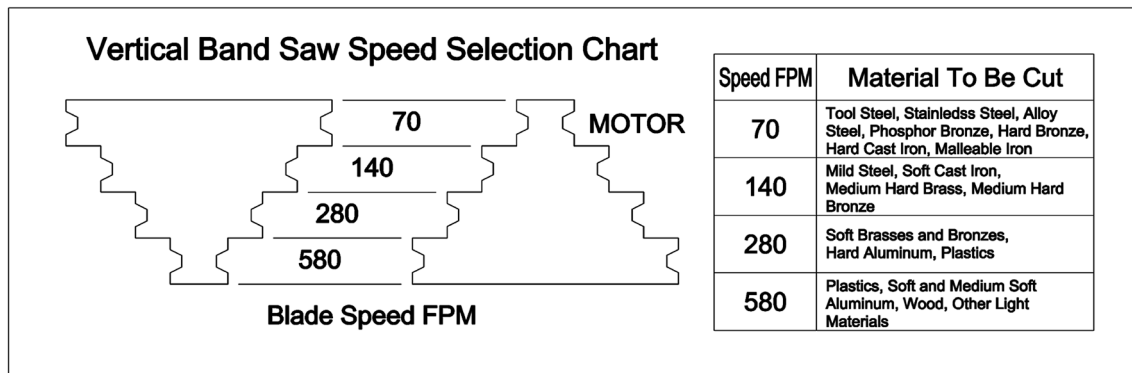


Figure 5: Belt Speed/Position Relationship

Blade Selection

The band saw is delivered with a saw blade that is adequate for a variety of jobs on a variety of common materials. Refer to Figure 5 for the speeds recommended for various materials. These speeds, while appropriate for many common cutting needs, do not encompass the wide variety of special blade configurations (tooth pitch and set) and special alloys for cutting unusual or exotic materials.

A coarse blade could be used for a solid steel bar, but a finer tooth blade would be used on a thin-wall steel tube. In general, the blade choice is determined by the thickness of the material; the thinner the materials; the finer the tooth pitch.

A minimum of three teeth should be on the work piece at all times for proper cutting. The blade and work piece can be damaged if the teeth are so far apart that they straddle the work piece.

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

Blade Removal and Installation



Use leather gloves when changing the saw blade to protect your hands from cuts and scratches. Use protective eye wear that meets ANSI SPECIFICATION Z87.1.



Disconnect the band saw from its electrical power source.

1. To remove the blade, place the saw frame in the rearmost position by pushing down on the saw frame release lever (Figure 3 Item 2) and lock it by turning the saw frame release knob (Figure 3 Item 1.2) clockwise.
2. Remove the panel on the base to expose the lower blade wheel.
3. Open the panel on the saw head to expose the upper blade wheel.
4. Remove the blade safety guard.
5. Turn the blade tension handle (Figure 3 Item 3) counterclockwise until the blade hangs loose.
6. Use leather gloves to prevent cuts and scratches. Pull the blade off the drive wheels and out of the blade guides. Store the removed blade carefully before proceeding.
7. To install the blade, slide the new blade into the blade guides.
8. Place the blade over the bottom wheel.
9. Place the blade over the top wheel. The teeth must point down toward the table.
10. Push the blade so it is seated against the shoulders of the wheels.
11. Turn the blade tension handle clockwise enough to hold the blade firmly in place.
12. Reconnect the saw to its electrical power source.
13. Turn the machine on to allow the blade to position itself. Check and adjust the tracking of the blade. Refer to Blade Tracking Adjustments in this manual.
14. Turn the blade tension handle clockwise to finish tightening the blade. Do not over-tighten the blade; tighten it just enough so it does not slip while cutting.
15. Install the wheel guards and blade covers.

IMPORTANT The most common causes of your band saw not cutting straight are:

1. Blade tension is set to low.
2. The blade is either dull or worn on one side.
3. The blade is upside down. The teeth must point down toward the table.

Blade Break-In Procedures

New blades are very sharp and, therefore, have a tooth geometry that is easily damaged if a careful break-in procedure is not followed. Consult the blade manufacturer's literature for break-in of specific blades on specific materials. However, the following procedure will be adequate for break-in of JET-supplied blades on lower alloy ferrous materials.

1. Clamp a section of round stock in the vise. The stock should be two inches or larger in diameter.
2. Operate the saw at low speed. Start the cut with a very light feed rate.
3. When the saw has completed about 1/3 of the cut, increase the feed rate slightly and allow the saw to complete the cut.
4. Keep the feed rate at the same setting and begin a second cut on the same or similar work piece.
5. When the saw has completed about 1/3 of the cut, increase the feed rate while watching the chip formation until cutting is at its most efficient rate (refer to Evaluating Cutting Efficiency in this manual). Allow the saw to complete the cut.
6. The blade is now considered ready for use.

Controlling the Cut

Hydraulic Feed Control

The weight of the saw frame provides the force needed to cut through the work piece. The saw has a hydraulic cylinder that controls the feed rate.

The hydraulic feed control circuit consists of a single-acting hydraulic cylinder and a flow-control valve. The feed control cylinder resists motion in the forward direction to control

the feed rate. The control cylinder offers no resistance when the saw frame is moved backward. A knob on the control panel controls the rate at which the saw frame moves forward. The control knob (needle valve) controls the rate at which the hydraulic fluid is released from the hydraulic cylinder. When the needle valve is closed, the cylinder is locked. With the needle valve slightly open, the cylinder permits slow, or light, force. Opening the needle valve further increases the feed rate and applies more force to the saw blade and the work piece.

The needle valve is adjusted until the saw is operating efficiently. The efficiency of operation is usually evaluated by observing chip formation. (Refer to Evaluating Cutting Efficiency for more information on cutting efficiency.)

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 dull.
- If the chips formed are curled, but colored – 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.

Setting the Vise for Angle Cuts

The vise can be adjusted through a 45° arc. Adjust as follows:

1. Loosen the hex head bolt and remove the taper pin on the vise.
2. Rotate the vise to the desired angle. For accurate cuts, use a variable protractor to set the position of the jaw; align one side of the protractor with one side of the blade.
3. Re-install the taper pin and tighten the hex head bolt on the vise.

Setting the Vise for Square Cuts

The procedure for setting the vise for square cuts is identical to setting for angle cuts (see Setting the Vise for Angle Cuts) except that a machinist's square is used to position the vise.

Work Setup

1. Move the saw frame to its rearmost position by pushing down on the saw frame release lever (Figure 3 Item 2) and lock it in place by turning the saw frame release knob (Figure 3 Item 1.2) clockwise.
2. Turn the c-clamp handle counterclockwise enough to fit the stock.
3. Place the work piece on the worktable. For long work pieces, provide support at the other end. If necessary, provide additional downward clamping to hold the work piece securely on the worktable.
4. Clamp the work piece in the vise by rotating the c-clamp handle clockwise.



Do not allow the blade to rest against the work piece when the saw is not cutting.

Setting the Blade Guide Bracket

The band saw has an adjustable blade guide bracket. The blade guide bracket allows you to set the blade guide for varying heights of work pieces.

To make accurate cuts and prolong blade life, the blade guide bracket should be set one inch above the piece to be cut. Adjust the bar position as follows:

1. Place the work piece in the vise and clamp tightly.
2. Loosen the locking knob on the back of the guide bracket (Figure 3 Item 5).
3. Slide the guide bracket to the desired position.
4. Tighten the locking knob to secure the guide bracket.

Starting the Saw

▲WARNING

Never operate the saw without the blade covers in place.

▲CAUTION

Make sure the blade is not in contact with the work piece when the motor is started. Do not force the saw through the work piece.

1. Make sure that the saw frame is in the rearmost position and turn the saw frame release knob (Figure 3 Item 1.2) to the OFF (clockwise) position.
2. Clamp the work piece in the vise. (Refer to Figure 6 for examples of how different shaped work pieces are clamped in the vise).
3. Be sure that the blade is not in contact with the work piece when the motor is started.
4. Start the motor and allow the saw to come up to speed.
5. Turn the feed rate knob clockwise all the way. This closes the hydraulic valve and stops the feed rate.
6. Turn the saw frame release knob counterclockwise to the ON position.
7. Pull up on the saw frame release lever (Figure 3 Item 2) to release the saw frame.
8. Slowly let the saw feed into the work piece by turning the feed rate control knob (Figure 3 Item 1.3) counterclockwise until the proper feed rate is reached (See Evaluating Cutting Efficiency).
9. **Do not force the cut.** Let the weight of the saw provide the cutting force.
10. At the end of the cut, push down on the saw frame release lever to move the saw frame back to the rearmost position and turn the saw frame release knob clockwise to lock it.

Service and Maintenance

Adjustments

The efficient operation of the band saw is dependent upon the condition of the saw blade. If the performance of the saw begins to deteriorate, the first item that you should check is the blade.

If a new blade does not restore the machine's cutting accuracy and quality, refer to the troubleshooting guide (or the blade manufacturer's guide) for conditions to consider and adjustments that can be made to increase the life of the blade.

To change the blade, refer to the blade changing procedures in the Blade Selection section of this manual.

Blade Tracking Adjustments

Blade tracking has been tested at the factory. Adjustment is rarely required when the blade is used properly and if the blade is correctly welded. (Refer to Figure 7 for location of blade tracking adjustment setscrew).

1. Place the saw frame in its rearmost position by pushing down on the saw frame release lever (Figure 3 Item 2) and lock it in place by turning the saw frame release knob (Figure 3 Item 1.2) clockwise.
2. Make sure the blade is properly tensioned.

NOTE: Keep proper tension on the blade at all times using the blade tension adjustment.

3. Loosen the two bottom bolts (Figure 6, Item B) on the wheel slide.

CAUTION

While performing the following steps, keep the blade from rubbing excessively on the shoulder of the wheel. Excessive rubbing will damage the wheel and/or the blade.

4. Start the saw. Turn the setscrew to tilt the idler wheel until the blade is touching the shoulder of the idler wheel.
5. Turn the setscrew (Figure 6, Item A) so the blade starts to move away from the shoulder of the wheel; then immediately turn the setscrew in the other direction so the blade stops; then moves slowly towards the shoulder.

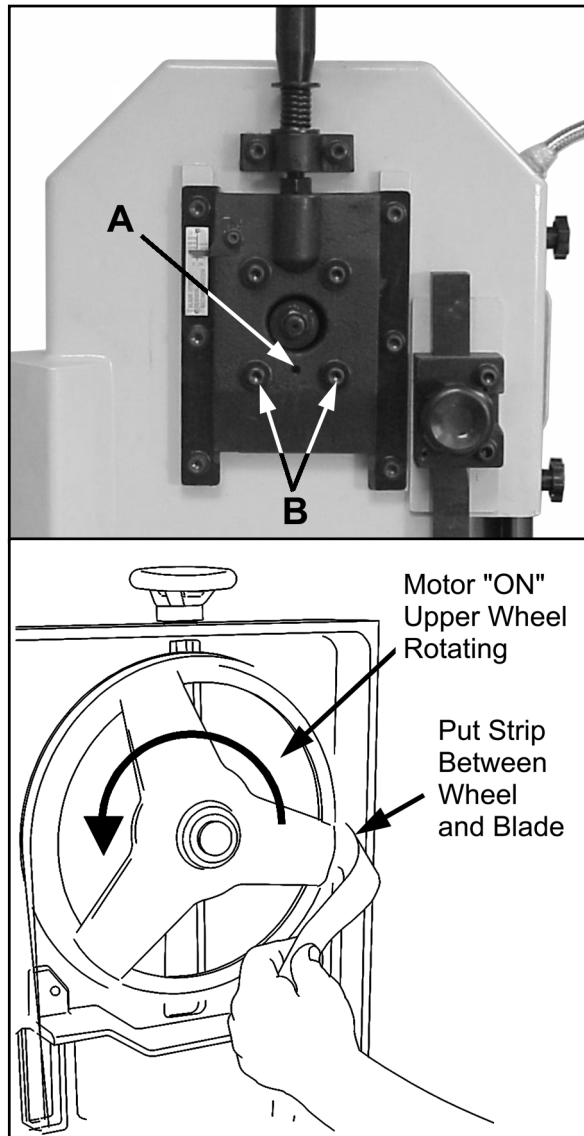


Figure 6: Blade Tracking Adjustment

⚠WARNING

Keep your fingers clear of the blade and wheel to avoid injury.

6. Turn the setscrew to stop the motion of the blade on the wheel as it gets closer to the wheel shoulder. Put a six-inch length of paper between the blade and the wheel. The paper should not be cut as it passes between the wheel shoulder and the blade.
7. Turn the setscrew a small amount. Repeat the insertion of the paper between the wheel shoulder and the blade until the paper is cut in two pieces.

NOTE: You may have to repeat the check with the paper several times before the blade and the shoulder cut the paper into two pieces. Do not hurry the adjustment. 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 setscrew slightly in the counterclockwise direction. This assures that the blade is not touching the shoulder of the wheel.
9. Shut off the saw.
10. Tighten the two bottom bolts on the upper wheel slide (Figure 6, Item B).

Blade Guide Bearing Adjustment

Proper adjustment of the blade guide bearings is critical to efficient operation of the band saw. The blade guide bearings are adjusted at the factory. They should rarely require adjustment. When adjustment is required, readjust immediately. Failure to maintain proper blade adjustment may cause serious blade damage or inaccurate cuts.

It is always better to try a new blade when cutting performance is poor. If performance remains poor after changing the blade, make the necessary adjustments.

If a new blade does not correct the problem, check the blade guides for proper spacing. For most efficient operation and maximum accuracy, provide 0.001" clearance between the blade and the guide bearings. The bearings will still turn freely with this clearance. If the clearance is incorrect, the blade may track off the drive wheel.

⚠WARNING

Disconnect the band saw from its electrical power source.

⚠CAUTION

Check the blade to make sure the welded section is the same thickness as the rest of the blade. If the blade is thicker at the weld, the guide bearings may be damaged.

If required, adjust the guide bearings as follows:

1. The upper and lower blade guides are adjusted the same way.
2. Loosen the blade guide setscrews with an Allen wrench.
3. Position the bearing by turning the eccentric shafts. Set the clearance to approximately 0.001". (See Figure 7).
4. Tighten the blade guide setscrews with the Allen wrench.
5. Use the same procedure to adjust the other blade guide bearing.
6. When the adjustment is correct, the guide bearings should rotate freely with slight pressure of the finger (blade stopped).

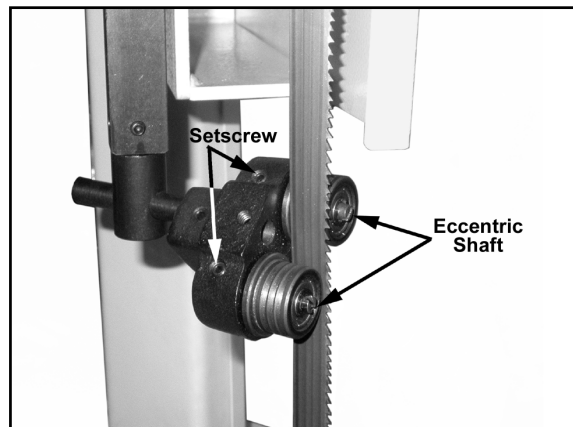


Figure 7: Guide Bearing Adjustment

Cleaning

1. Clean off any oil and grease on the machine surfaces.
2. After cleaning, coat the machined surfaces of the band saw with medium consistency machine oil. Reapply the oil coating at least every six months.
3. Clean up accumulated saw cuttings after use. Make sure the lead screw and the rapid nut are kept free from saw cuttings and other material that would cause damage.

Lubrication

Lubricate the following components at the recommended intervals using the lubricants specified:

1. Ball bearings: the bearings are lubricated and sealed – periodic lubrication is not required.
2. Blade guide bearing: the bearings are lubricated and sealed – periodic lubrication is not required.
3. Upper wheel bushing: six to eight drops of oil each week.
4. Pivot points, shafts and bearing areas: six to eight drops of oil each week.

Changing the Drive Motor V-Belt

⚠WARNING Disconnect the band saw from its electrical power source.

1. Move the saw frame to its rearmost position and by pushing down on the saw frame release lever (Figure 3 Item 2) and lock it in place by turning the saw frame release knob (Figure 3 Item 1.2) clockwise.
2. Remove the panel on the base to expose the belt and pulleys.
3. Pivot the motor upwards to loosen the belt.
4. Remove the worn belt.
5. Put the replacement belt in the pulley position for the speed you require. (Refer to Figure 5 for belt locations and the speeds available).
6. Tighten the belt by pivoting the motor downward.
7. Replace the panel and unlock the saw frame.

Chip Brush and Chip Scraper Replacement

The purpose of the chip brush and chip scraper is to remove chips from the saw teeth, the saw blade and the lower blade wheel so an excessive amount of chips doesn't get into the wheel guard section of the saw. With extended use, this brush and/or scraper will become worn and will require replacement.

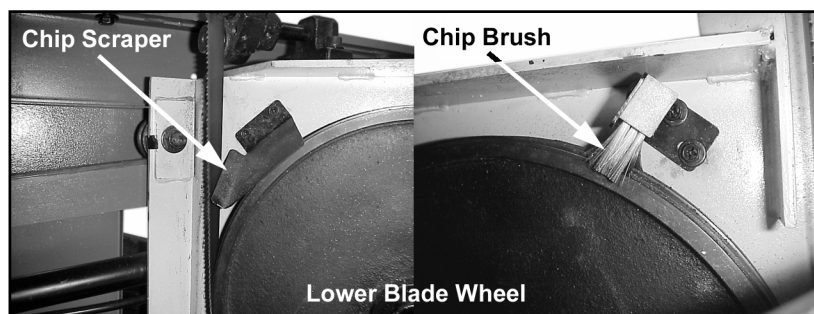


Figure 8: Chip Brush and Chip Scraper Locations

⚠WARNING

Disconnect the band saw from its electrical power source.

1. Remove the two screws and washers holding the brush or scraper on.
2. Remove the worn brush or scraper.
3. Install the replacement brush or scraper.
4. Install the two screws and washers.
5. Adjust the brackets, if necessary, so that the brush makes slight contact with the lower blade wheel and the scraper is as close as possible to the saw blade without touching it.

Blade Guide Bearing Replacement**⚠WARNING**

Disconnect the band saw from its electrical power source.

1. Remove the saw blade. (Refer to Blade Removal and Installation).
2. Remove the bearing locking screw
3. Remove the damaged bearing and bushing.
4. Separate the damaged bearing from the bushing.
5. Install the replacement bearing on the bushing.
6. Install the bearing locking screw.
7. Install the saw blade. (Refer to Blade Removal and Installation).
8. Adjust the bearing clearance. (Refer to Blade Guide Bearing Adjustment).

Drive Motor Replacement**⚠WARNING**

Disconnect the band saw from its electrical power source.

1. Remove the drive motor V-belt. (Refer to Changing the Drive Motor V-Belt).
2. Loosen the setscrew that holds the motor pulley to the shaft and remove the pulley.
3. Open the motor junction box and disconnect the power cord wires from their terminals.
4. Remove the nuts, washers and bolts that secure the motor to the mounting plate.
5. Installation of the motor is the reverse of the above steps. (Refer to Changing the Drive Motor V-Belt and the electrical schematics at the end of this manual).

Adjusting or Replacing the Counterbalance

The counterbalance is located on the base of the saw. It is used to adjust the amount of force the saw puts on the work piece when the hydraulic control cylinder is open.

⚠WARNING

Disconnect the band saw from its electrical power source.

1. Lock the saw frame in its rearmost position by pushing down on the saw frame release lever (Figure 3 Item 2) and lock it in place by turning the saw frame release knob (Figure 3 Item 1.2) clockwise.
2. Turn the handle on the counterweight counterclockwise to loosen it (Figure 3 Item 9).
3. Slide the counterweight along the bar to the proper location.
4. Turn the handle on the counterweight clockwise to tighten it (Figure 3 Item 9).

Replacing the Drive Wheel (Lower Wheel)

⚠WARNING Disconnect the band saw from its electrical power source.

1. Remove the saw blade. (Refer to Blade Removal and Installation).
2. Loosen the setscrew in the wheel hub.
3. Pull the wheel from the speed reducer shaft.
4. Examine the drive edge and shoulder of the wheel for damage. Replace the wheel if it's damaged.
5. Install the wheel.
6. Tighten the setscrew in the wheel hub.
7. Install the saw blade. (Refer to Blade Removal and Installation).

Replacing the Idler Wheel or Bearings (Upper Wheel)

⚠WARNING Disconnect the band saw from its electrical power source.

1. Remove the saw blade. (Refer to Blade Removal and Installation).
2. Remove the retaining ring and shim from the shaft.
3. Remove the wheel and the bronze bearing.
4. Examine the drive edge and shoulder of the wheel for damage. Replace the wheel if it's damaged.
5. Install the bearing and the wheel.
6. Install the retaining ring and shim on the shaft.
7. Install the saw blade. (Refer to Blade Removal and Installation).

Troubleshooting

Problem	Probable Cause	Suggested Remedy
Excessive Blade Breakage	<ol style="list-style-type: none"> 1. Material is loose in the vise. 2. Incorrect speed or feed. 3. Blade pitch is too coarse for the material. 4. Incorrect blade tension. 5. Saw blade is in contact with the work piece before the saw is started. 6. Blade rubs on the wheel flange. 7. Misaligned blade guides. 8. Cracking at the weld. 	<ol style="list-style-type: none"> 1. Clamp work securely. 2. Check the <i>Machinist's Handbook</i> for the speed/feed appropriate for the material being cut. 3. Check the <i>Machinist's Handbook</i> for the recommended blade type. 4. Adjust the blade tension just to the point where the blade does not slip on the wheel. (Refer to Figure 3 Item 3). 5. Start the motor before placing the saw blade against the work piece. 6. Adjust the blade tracking. (See Blade Tracking Adjustment). 7. Adjust the blade guides. (See Blade Guide Bearing Adjustment). 8. Use a longer annealing cycle.
Premature Blade Dulling	<ol style="list-style-type: none"> 1. Blade pitch is too coarse. 2. Blade speed is too high. 3. Inadequate feed pressure. 4. Hard spots in the work piece. 5. Scale on/in the work piece. 6. Work hardening of material (especially stainless steel). 7. Insufficient blade tension. 8. Operating the saw without pressure on the work piece. 	<ol style="list-style-type: none"> 1. Use a finer tooth blade. 2. Use a lower blade speed. (See Figure 5). 3. Decrease the feed pressure. (See Figure 3 Item 1.3). 4. Increase the feed pressure (hard spots). (See Figure 3 Item 1.3). 5. Reduce the blade speed and increase the feed pressure (scale). (See Figure 3 Item 1.3 and Figure 5). 6. Increase the feed pressure. (See Figure 3 Item 1.3). 7. Increase the tension to the proper level. (See Figure 3 Item 3). 8. Do not run the blade in/on the material at idle.
Blade Is Twisting	<ol style="list-style-type: none"> 1. Blade is binding in the cut. 2. Blade tension is too high. 	<ol style="list-style-type: none"> 1. Decrease the feed pressure. (See Figure 3 Item 1.3). 2. Decrease the tension on the blade. (See Figure 3 Item 3).

Troubleshooting

Problem	Probable Cause	Suggested Remedy
Unusual Wear On Side/Back Of Blade	<ol style="list-style-type: none"> 1. Blade guides are worn. 2. Blade guide bearings are not adjusted. 3. Blade guide bearing bracket is loose. 	<ol style="list-style-type: none"> 1. Replace the blade guides. (See Setting the Blade Guide Bracket). 2. Adjust the blade guide bearings. (See Blade Guide Bearing Adjustment). 3. Tighten the blade guide-bearing bracket. (See Blade Guide Bearing Adjustment).
Bad Cuts (Crooked)	<ol style="list-style-type: none"> 1. Work piece is not square with the blade. 2. Feed pressure is too high. 3. Guide bearings are not adjusted properly. 4. Inadequate blade tension. 5. Span between the two blade guides is too wide. 6. Dull blade. 7. Incorrect blade speed. 8. Blade guide assembly is loose. 9. Blade guide bearing assembly is loose. 10. Blade track is too far away from the wheel flanges. 11. Guide bearing is worn. 	<ol style="list-style-type: none"> 1. Adjust the vise so that it is square with the blade. (Always clamp the work piece tightly in the vise). 2. Lower the feed pressure. (See Figure 3 Item 1.3). 3. Adjust the guide bearing clearance to 0.001" (0.002" maximum). (See Blade Guide Bearing Adjustment). 4. Gradually increase the blade tension. (See Figure 3 Item 3). 5. Move the blade guide bracket closer to the work piece. (See Setting the Blade Guide Bracket). 6. Replace the blade. (See Blade Removal and Installation). 7. Check the blade speed. (See Figure 5). 8. Tighten the blade guide assembly. (See Setting the Blade Guide Bracket). 9. Tighten the blade guide bearing assembly. (See Blade Guide Bearing Adjustment). 10. Adjust the blade tracking. (See Blade Tracking Adjustment). 11. Replace the worn bearing. (See Blade Guide Bearing Replacement).
Bad Cuts (Rough)	<ol style="list-style-type: none"> 1. Blade speed is too high for the feed pressure. 2. Blade teeth are too coarse. 	<ol style="list-style-type: none"> 1. Reduce the blade speed (See Figure 5). 2. Replace the blade with a finer tooth blade.

Replacement Parts

This section provides exploded view illustrations that show the replacement parts for the Models VSF-14-1 and VSF-14-3 Self-Feed Vertical Band Saw. Also provided are parts listings that provide part numbers and descriptions. The item numbers shown in the exploded views match the item numbers in the parts listing.

Order replacement parts from:

WMH TOOL GROUP
2420 Vantage Drive
Elgin, Illinois 60123
Ph.: 888-594-5866
Fax: 800-626-9676
www.wmhtoolgroup.com

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.

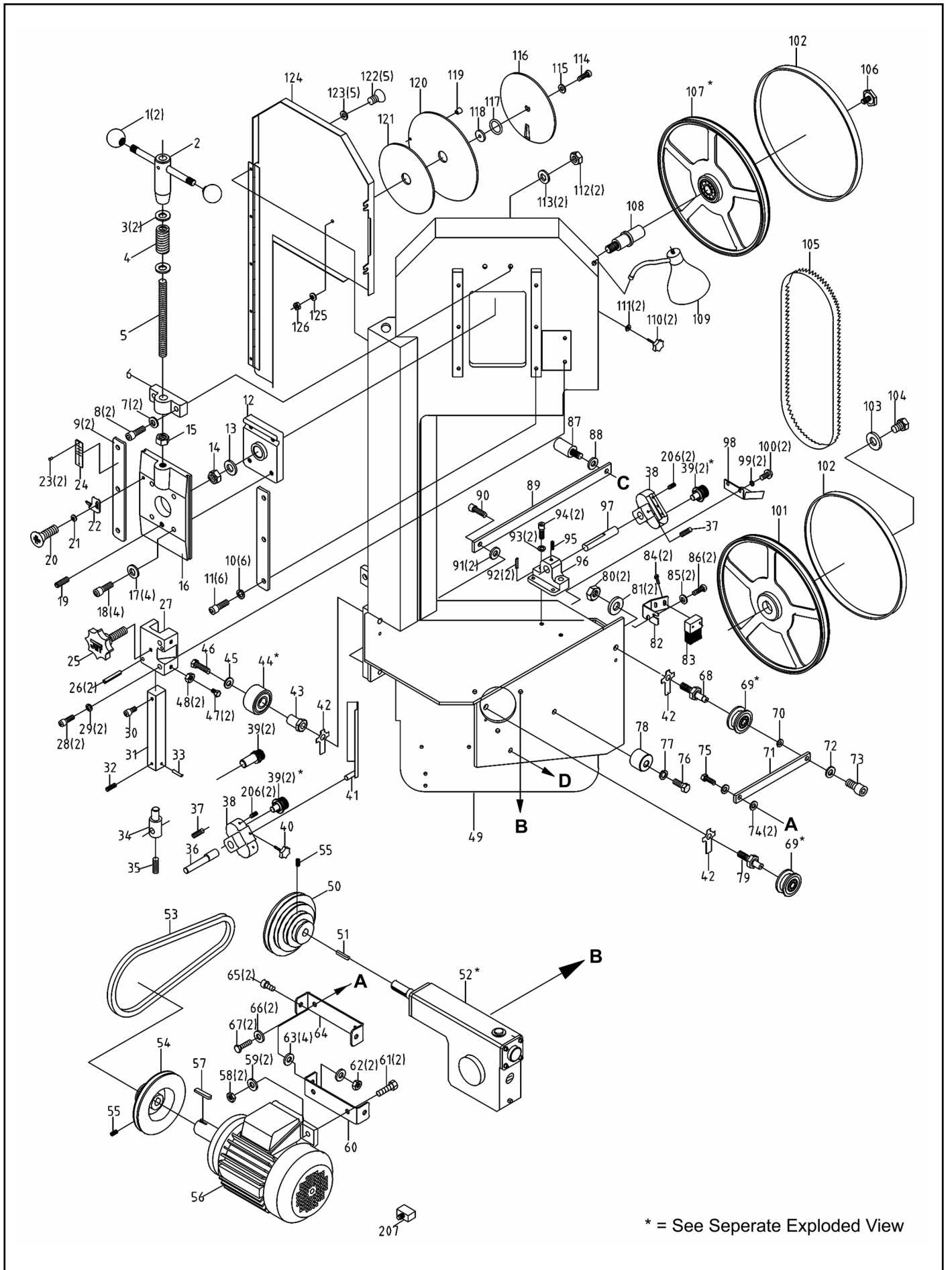


Figure 9: Exploded View of the VSF-14 Saw Frame

Parts List for VSF-14 Saw Frame				
Item	Part No.	Description	Size	Qty.
1	5519711	Blade Tension Knob		2
2	5519712	Blade Tension Handle		1
3	5519718	Flat Washer	5/8" x 40 x T3	2
4	5519713	Spring		1
5	5519714	Screw Rod		1
6	5519715	Bracket		1
7	TS-0680042	Flat Washer	3/8" x 23 x T2	2
8	TS-0209051	Socket Head Cap Screw	3/8-16 x 1-1/2"	2
9	5519716	Blade Wheel Slide Race		2
10	TS-0720091	Lock Washer	3/8"	6
11	TS-0209031	Socket Head Cap Screw	3/8-16 x 3/4"	6
12	5519717	Drive Shaft Holder		1
13	5519718	Flat Washer	5/8" x 40 x T3	1
14	TS-0561072	Hex Nut, Full	5/8-18	1
15	TS-0561072	Hex Nut, Full	5/8-18	1
16	5519719	Blade Wheel Slide		1
17	TS-0680042	Flat Washer	3/8"	4
18	TS-0209091	Socket Head Cap Screw	3/8-16 x 2"	4
19	TS-0060051	Hex Cap Screw	3/8-16 x 1"	1
20	TS-0813021	Flat Slotted Machine Screw	1/4-20 x 3/8"	1
21	TS-0680021	Flat Washer	1/4"	1
22	5519720	Tension Indicator		1
23	5519721	Rivet	2 x 8	2
24	5519722	Tension Label		1
25	5519723	Upper Blade Guide Handle	3/8" x 1"	1
26	5519724	Spring Pin	6 x 50	2
27	5519725	Upper Blade Guide Bracket		1
28	TS-0209091	Socket Head Cap Screw	3/8-16 x 2"	2
29	TS-0680042	Flat Washer	3/8"	2
30	TS-0207011	Socket Head Cap Screw	1/4-20 x 3/8"	1
31	5519726	Upper Blade Guide Slide		1
32	TS-0050021	Hex Cap Screw	1/4-20 x 5/8"	1
33	5519727	Spring Pin	6 x 25	1
34	5519728	Blade Guide Shaft		1
35	TS-0208011	Socket Head Cap Screw	5/16-18 x 3/8"	1
36	5519729	Upper Shaft		1
37	TS-0208021	Socket Head Cap Screw	5/16-18 x 1/2"	2
38	5519730	Blade Guide Mtg. Bracket		2
39*	5519731	Bearing Shaft Assembly		4
40	5519733	Blade Guide Knob	1/4" x 5/8"	1
41	5519734	Saw Blade Safety Cover		1
42	5519735	Special Washer		3
43	5519736	Eccentric Shaft		1
44*	5519737	Smooth Wheel Assembly		1
45	TS-0680061	Flat Washer	1/2"	1
46	TS-0070031	Hex Cap Screw	1/2-13 x 1-1/2"	1
47	TS-0090061	Hex Cap Screw	3/8-16 x 1-1/4"	2
48	TS-0570032	Hex Nut, Full	3/8-24	2
49	5519740	Saw Frame		1
50	5519741	Gearbox Pulley		1
51	5519742	Key	5 x 5 x 40	1
52*	5519743	Gear Box Assembly		1
53	5519766	V-Belt	3V-320	1

Parts List for VSF-14 Saw Frame				
Item	Part No.	Description	Size	Qty.
54	5519767	Drive Motor Pulley		1
55	TS-148201	Hex Cap Screw	M6 x 10	2
56	5519768	Motor	1HP, 1 Phase	1
	5521706	Motor	1HP, 3 Phase	1
57	5519769	Key	5 x 5 x 40L	1
58	TS-0570032	Hex Nut, Full	3/8-24	2
59	TS-0720091	Lock Washer	3/8"	2
60	5519770	Motor Mounting Bracket		1
61	TS-0060051	Hex Cap Screw	3/8-16 x 1"	2
62	TS-0570032	Hex Nut, Full	3/8-24	2
63	TS-0680042	Flat Washer	3/8"	4
64	5519771	Motor Mounting Bracket		1
65	TS-0209051	Socket Head Cap Screw	3/8-16 x 1"	2
66	TS-0720091	Lock Washer	3/8"	2
67	TS-0060051	Hex Cap Screw	3/8-16 x 1"	2
68	5519772	Eccentric Bolt		1
69*	5519773	Smooth Wheel Assembly		2
70	5519775	Flat Washer	1/4"	1
71	5519776	Counter Balance Bracket		1
72	TS-0680021	Flat Washer	1/4"	1
73	TS-0207021	Socket Head Cap Screw	1/4-20 x 1/2"	1
74	TS-0680041	Flat Washer	3/8"	2
75	TS-0060071	Hex Cap Screw	3/8-16 x 1-1/2"	1
76	TS-0070041	Hex Cap Screw	1/2-13 x 1-3/4"	1
77	TS-0720111	Lock Washer	1/2"	1
78	5519777	Eccentric Bracket		1
79	5519778	Eccentric Bolt		1
80	TS-0561051	Hex Nut, Full	1/2-13	2
81	TS-0680061	Flat Washer	1/2"	2
82	5519779	Brush Mounting Bracket		1
83	5519780	Brush		1
84	TS-0813032	Slotted Round Head Screw	1/4-20 x 1/2"	2
85	TS-0680021	Flat Washer	1/4"	2
86	TS-0813032	Slotted Round Head Screw	1/4-20 x 1/2"	2
87	5519781	Shaft Bolt		1
88	TS-0680042	Flat Washer	3/8"	1
89	5519782	Handle Lever		1
90	TS-0209061	Socket Head Cap Screw	3/8-16 x 1-1/4"	1
91	TS-0680042	Flat Washer	3/8"	2
92	5519783	Spring Pin	6 x 20	2
93	TS-0720091	Lock Washer	3/8"	2
94	TS-0209081	Socket Head Cap Screw	3/8-16 x 1-3/4"	2
95	TS-0051021	Hex Cap Screw	5/16-18 x 5/8"	1
96	5519784	Lower Blade Guide Bracket		1
97	5519785	Lower Blade Guide Shaft		1
98	5519786	Chip Scraper		1
99	TS-0680021	Flat Washer	1/4"	2
100	TS-0813032	Slotted Round Head Screw	1/4-20 x 1/2"	2
101	5519787	Drive Wheel		1
102	5519788	Plastic Pad		2
103	5519789	Flat Washer	10.5 x 40 x 5	1
104	TS-0060051	Hex Cap Screw	3/8-16 x 1"	1
105	5519790	Saw Blade	5/8" T x 19 x 0.9 x 3048L	1
106	5519791	Bolt		1

Parts List for VSF-14 Saw Frame				
Item	Part No.	Description	Size	Qty.
107*	5519792	Idler Wheel Assembly		1
108	5519795	Idler Wheel Shaft		1
109	5519796	Work Light		1
110	5519797	Door Handle	1/4"	2
111	TS-0680021	Flat Washer	1/4"	2
112	TS-0570032	Hex Nut, Full	3/8-24	2
113	TS-0680042	Flat Washer	3/8"	2
114	TS-0207011	Socket Head Cap Screw	1/4-20 x 3/8"	1
115	TS-0680021	Flat Washer	1/4"	1
116	5519798	Speed Indicator Dial		1
117	5519799	Flat Washer		1
118	5519800	Pad		1
119	5519801	Dial Knob		1
120	5519802	Dial Scale		1
121	5519803	Dial Base		1
122	TS-0813021	Slotted Flat Head Screw	1/4-20 x 3/8"	5
123	TS-0680021	Flat Washer	1/4"	5
124	5519804	Idler Wheel Cover		1
125	TS-0680021	Flat Washer	1/4"	1
126	TS-0561011	Hex Nut, Full	1/4-20	1
206	5521710	Hex Cap Screw	1/8" x 3/8"	4
207	5521711	Overload	16A (1PH Only)	1

* = See Separate Parts List

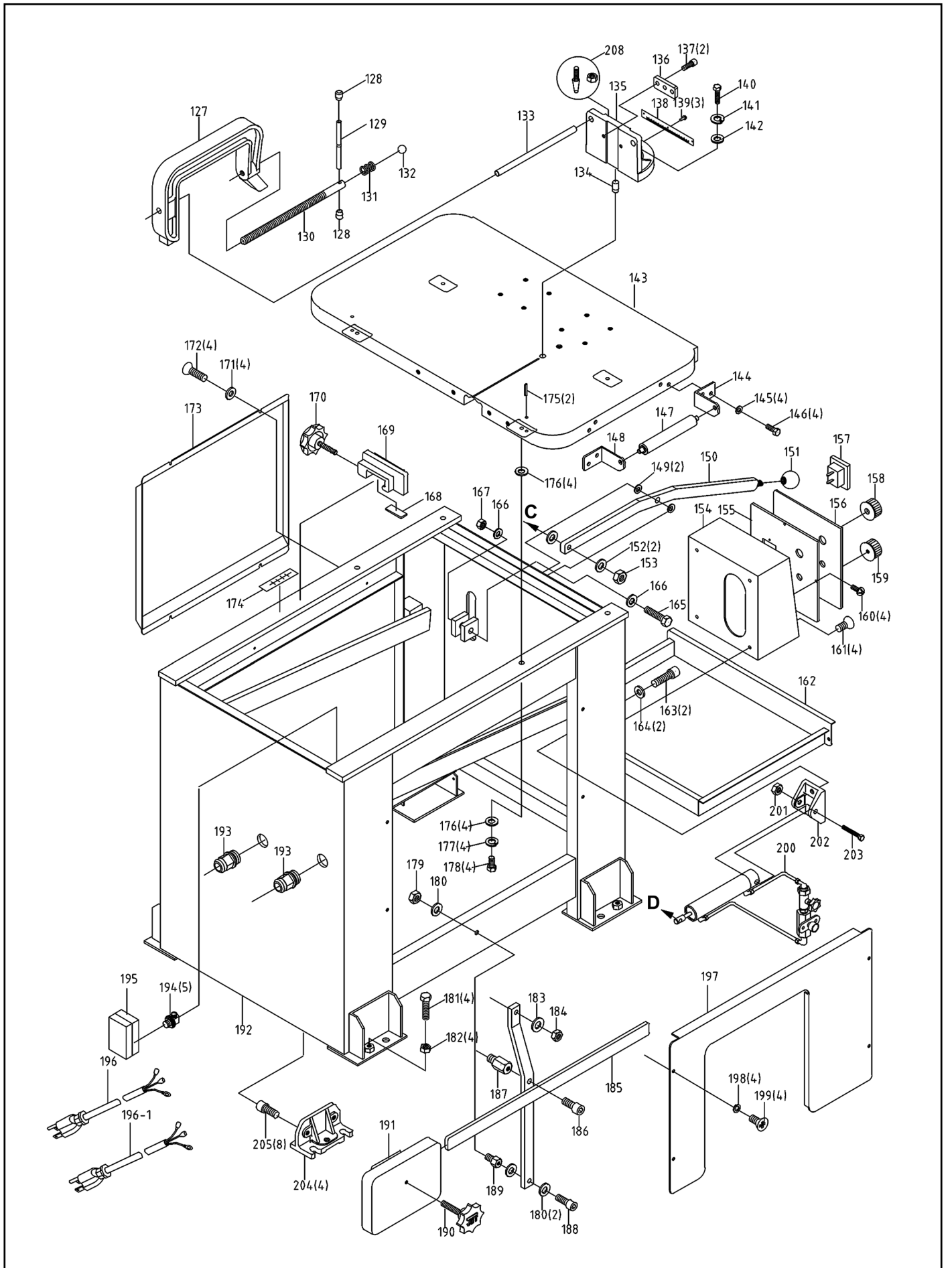


Figure 10: Exploded View of the VSF-14 Base

Parts List for the VSF-14 Base				
Item	Part No.	Description	Size	Qty.
127	5519805	C-clamp Vise		1
128	5519806	C-clamp Knob		2
129	5519807	C-clamp Handle		1
130	5519808	Lead screw		1
131	5519809	Spring		1
132	5519810	Ball	OD = 5mm	1
133	5519811	Shaft		1
134	5519812	Pivot Pin		1
135	5519813	Vise Base		1
136	5519814	Vise Bracket		1
137	TS-0208061	Socket Head Cap Screw	5/16-18 x 1	2
138	5519815	Degree Gauge		1
139	5519816	Rivet	2 x 8	3
140	TS-0209071	Hex Cap Screw	3/8-16 x 1-1/2"	1
141	TS-0720091	Lock Washer	3/8"	1
142	TS-0680041	Flat Washer	3/8"	1
143	5519819	Saw Table		1
144	5519820	Stock Roller Mtg. Bracket		1
145	TS-0720081	Lock Washer	5/16"	4
146	TS-0051051	Hex Cap Screw	5/16-18 x 1"	4
147	5519821	Stock Roller		1
148	5519822	Stock Roller Mtg. Bracket		1
149	TS-0680061	Flat Washer	1/2"	2
150	5519823	Return Lever		1
151	5519824	Plastic Handle		1
152	TS-0680042	Flat Washer	3/8"	2
153	TS-0570032	Hex Nut, Full	3/8-24	1
154	5519825	Control Box		1
155	5519826	Control Panel Cover		1
156	5519827	Control Panel Label		1
157	JMD18-056A	Power ON/OFF Switch	120/220/440V 3 Phase	1
158	5519829	Hydraulic ON/OFF Knob		1
159	5519830	Feed Rate Adjust Knob		1
160	5519831	Slotted Round Head Screw	3/16" x 1/2"	4
161	TS-0813051	Slotted Flat Head Screw	1/4-20 x 5/8"	4
162	5519833	Chip Collector Drawer		1
163	TS-0209031	Socket Head Cap Screw	3/8-16 x 3/4"	2
164	TS-0680042	Flat Washer	3/8"	2
165	TS-0070071	Hex Cap Screw	1/2-13 x 2-1/2"	1
166	TS-0680061	Washer	1/2"	2
167	TS-0561051	Hex Nut, Full	1/2-13	1
168	5519836	Stop Pad		1
169	5519837	Stop Bracket		1
170	5519838	Stop Bracket Knob	3/8" x 2"	1
171	TS-0680021	Flat Washer	1/4"	4
172	TS-0813051	Slotted Flat Head Screw	1/4-20- x 5/8"	4
173	5519841	Right Side Panel		1
174	5519842	Position Label		1
175	5519843	Spring Pin	6 x 45	2
176	TS-0680042	Flat Washer	3/8"	8
177	TS-0720091	Lock Washer	3/8"	1
178	TS-0060051	Hex Cap Screw	3/8-16 x 1"	4
179	TS-0570032	Hex Nut, Full	3/8-24	1
180	TS-0680042	Flat Washer	3/8"	4

Parts List for the VSF-14 Base				
Item	Part No.	Description	Size	Qty.
181	TS-0070071	Hex Cap Screw	1/2-13 x 2-1/2"	4
182	TS-0561051	Hex Nut, Full	1/2-13	4
183	TS-0680042	Flat Washer	3/8"	1
184	TS-0570032	Hex Nut, Full	3/8-24	1
185	5519845	Weight Mounting Bracket		1
186	TS-0208041	Socket Head Cap Screw	5/16-18 x 3/4"	1
187	5519846	Pivot Shaft		1
188	TS-0209091	Socket Head Cap Screw	3/8-16 x 2"	1
189	5519847	Coupler		1
190	5519848	Weight Knob	3/8-16 x 2"	1
191	5519849	Counterbalance Weight		1
192	5519850	Saw Base		1
193	5519851	Connector	PG13.5	2
194	5519852	Connector Mounting Nut		5
195	5519853	Control Box		1
196	5521707	Worklight Power Cable	115V Only	1
196-1	5519854	Power Cable with Plug	115V Only	1
197	5519855	Left Side Panel		1
198	TS-0680021	Flat Washer	1/4"	4
199	TS-081F032	Phillips Pan Head Screw	1/4-20 x 1/2"	4
200	5519857	Hydraulic Cylinder Assy.		1
201	TS-0561031	Hex Nut, Full	3/8-16	1
202	5519858	Cylinder Lower Support		1
203	TS-0060091	Hex Cap Screw	3/8-16 x 2-1/2"	1
204	5521798	Leg		4
205	5521709	Socket Head Cap Screw	3/8-16 x 1"	8
208	5521716	Taper Pin		1

* = See Separate Parts List

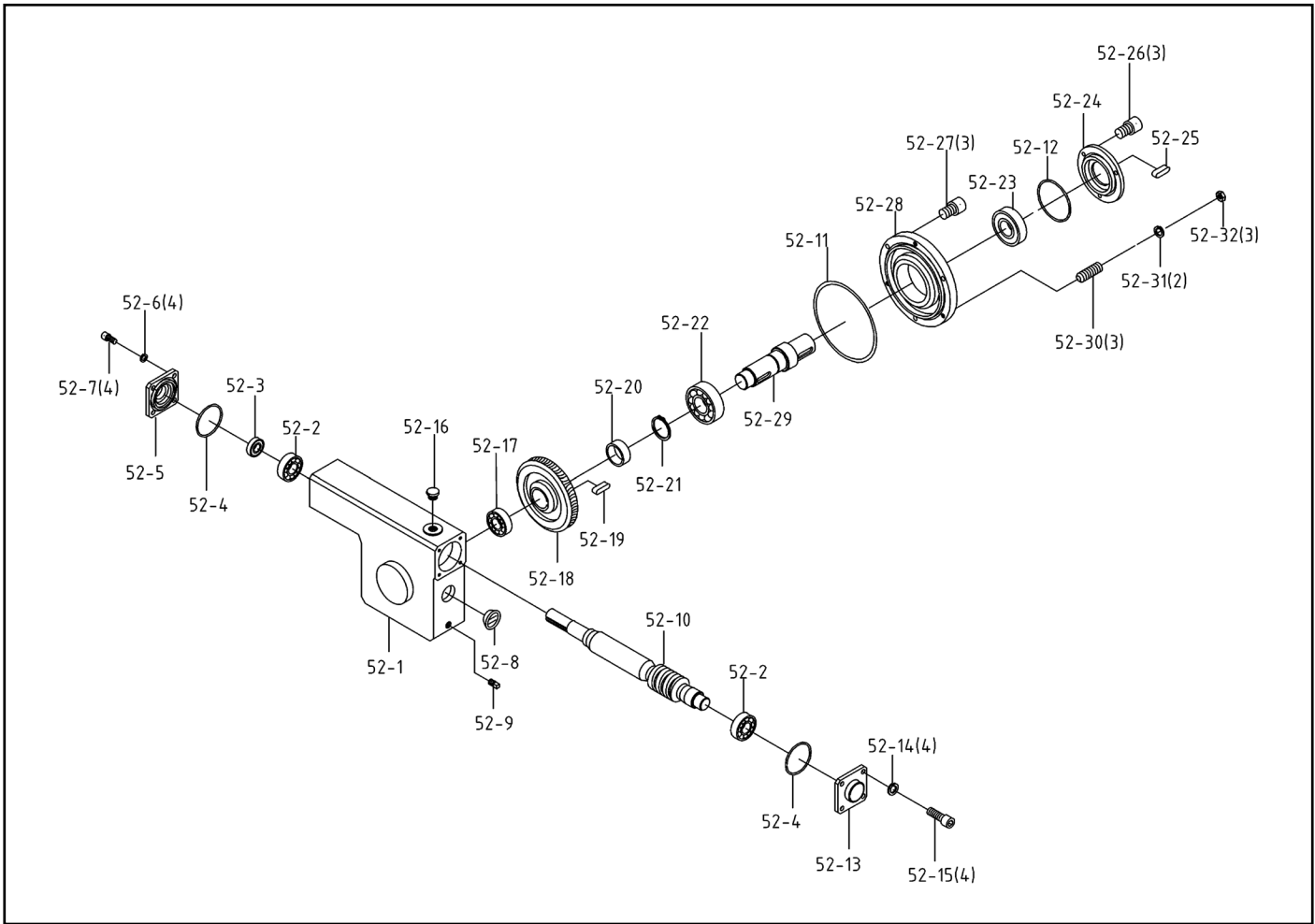


Figure 11: Exploded View of the VSF-14 Gear Box Assembly

Parts List for the VSF-14 Gear Box Assembly				
Item	Part Number	Description	Size	Qty.
52-1	5519744	Gear Box		1
52-2	BB6204Z	Bearing	6204Z	2
52-3	5519745	Oil Seal	TC20 x 32 x 7B	1
52-4	5519746	O-Retainer Ring	ID45.7 x 2.62W	2
52-5	5519747	Gearbox Drive Shaft Cover		1
52-6	TS-0720071	Lock Washer	1/4"	4
52-7	TS-0207041	Socket Head Cap Screw	1/4-20 x 3/4"	4
52-8	5519748	Oil Level Gauge	OD = 26mm	1
52-9	5519749	Oil Plug	PT1/4"	1
52-10	5519750	Worm Shaft		1
52-11	5519751	O-Retainer Ring	ID113.97 x 2.62W	1
52-12	5519752	O-Retainer Ring	ID61.6 x 2.62W	1
52-13	5519753	End Seal Cover		1
52-14	TS-0720071	Lock Washer	1/4"	4
52-15	TS-0207041	Socket Head Cap Screw	1/4-20 x 3/4"	4
52-16	5519754	Ventilation Bolt	5/8"-18UNF	1
52-17	5519755	Bearing	6205Z	1
52-18	5519756	Transmission Gear		1
52-19	5519757	Key	8 x 7 x 28	1
52-20	5519758	Bushing		1
52-21	5519759	C-Retainer Ring	S30	1
52-22	BB6206Z	Bearing	6206Z	1

Parts List for the VSF-14 Gear Box Assembly				
Item	Part Number	Description	Size	Qty.
52-23	5519760	Oil Seal	TC38 x 52 x 7B	1
52-24	5519761	Main Oil Seal Cover		1
52-25	5519762	Key	8 x 7 x 30	1
52-26	5519763	Socket Head Cap Screw	3/16" x 1/2"	3
52-27	TS-0207041	Socket Head Cap Screw	1/4-20 x 3/4"	3
52-28	5519764	Main Shaft Cover		1
52-29	5519765	Main Shaft		1
52-30	TS-0090061	Hex Cap Screw	3/8-16 x 1-1/4"	3
52-31	TS-0720091	Lock Washer	3/8"	3
52-32	TS-0570032	Hex Nut, Full	3/8 -24	3

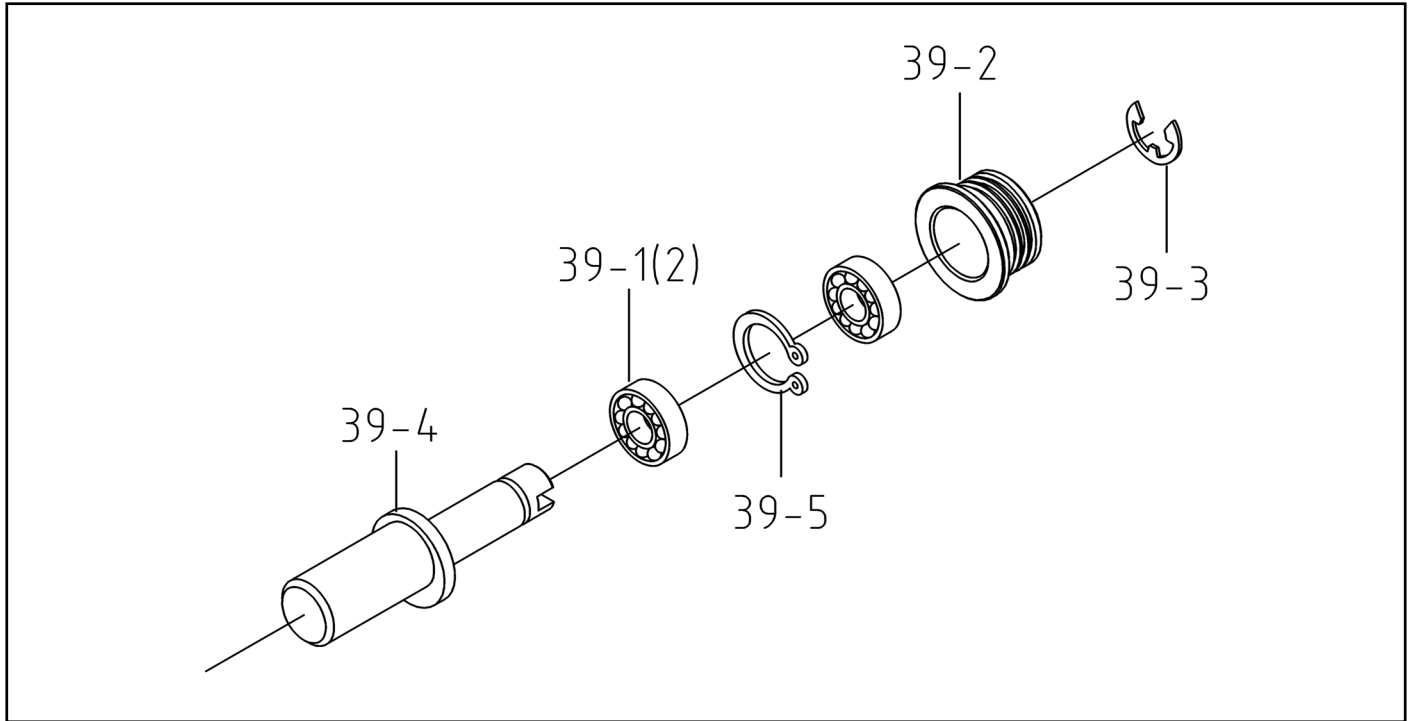


Figure 12: Exploded View of the VSF-14 Bearing Shaft Assembly

Parts List for the VSF-14 Bearing Shaft Assembly				
Item	Part Number	Description	Size	Qty.
39-1	5521712	Ball Bearing	627-2Z	8
39-2	5521713	Blade Wheel		4
39-3	5521714	E Retaining Ring	E7	4
39-4	5519732	Bearing Shaft		4
39-5	5521715	C Retaining Ring		4

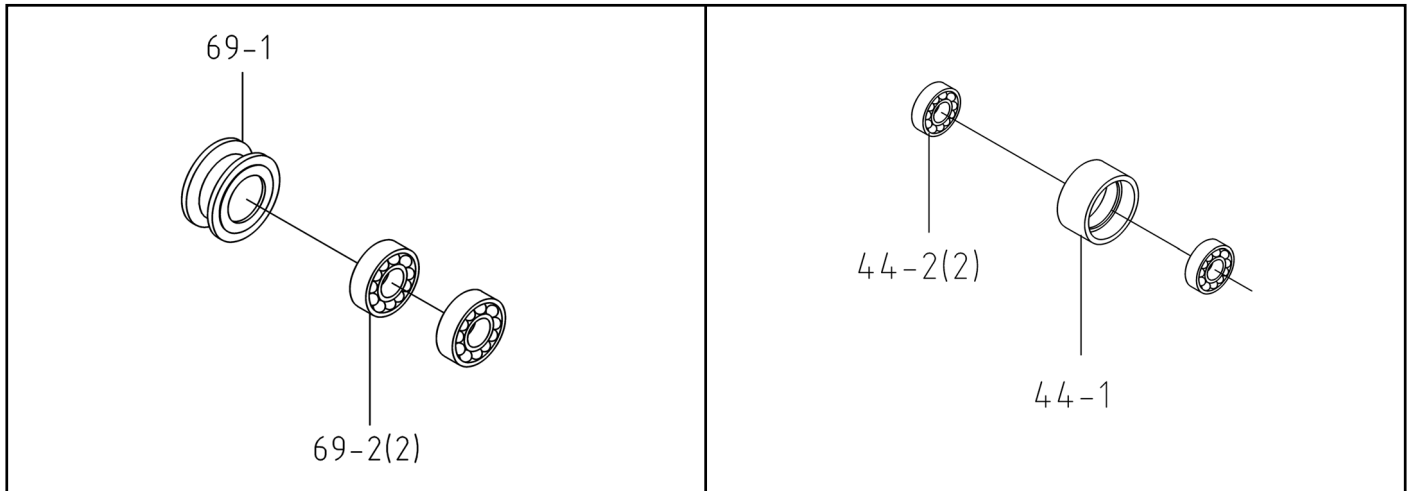


Figure 13: Exploded View of the VSF-14 Smooth Wheel Assembly

Parts List for the VSF-14 Smooth Wheel Assembly				
Item	Part Number	Description	Size	Qty.
44-1	5519738	Smooth Wheel		1
44-2	5519739	Bearing		2
69-1	5519774	Smooth Wheel		2
69-2	BB6201Z	Bearing	6201Z	4

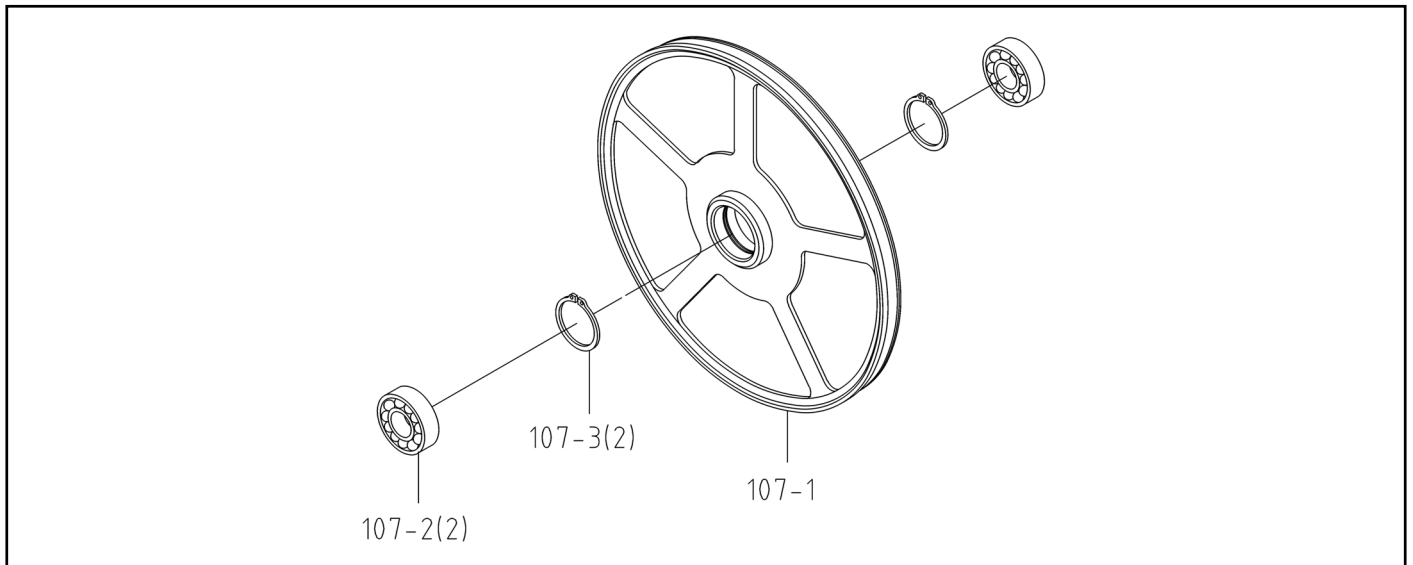
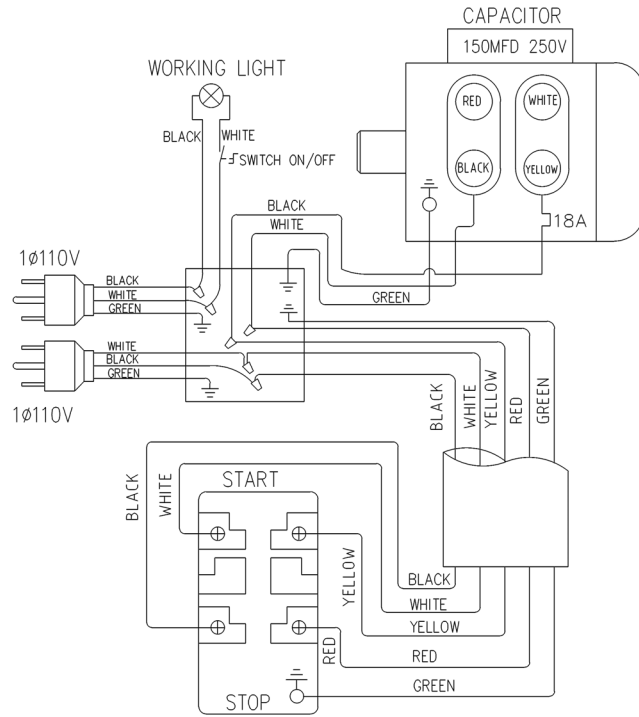


Figure 14: Exploded View of the VSF-14 Idler Wheel

Parts List for the VSF-14 Idler Wheel Assembly				
Item	Part Number	Description	Size	Qty.
107-1	5519793	Idler Wheel		1
107-2	BB6205ZZ	Bearing	6205ZZ	2
107-3	5519794	C-Retainer Ring		2

Electrical Schematics

115 Volts, Single Phase



230 Volts, Single Phase

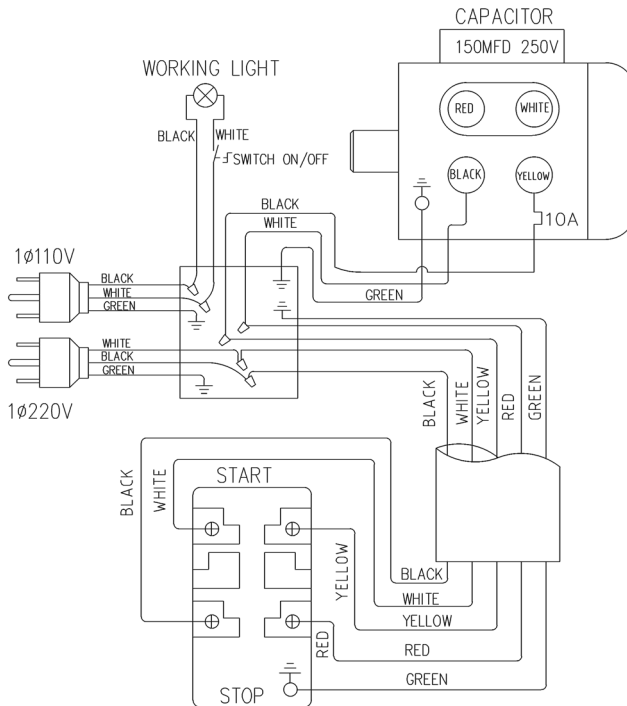
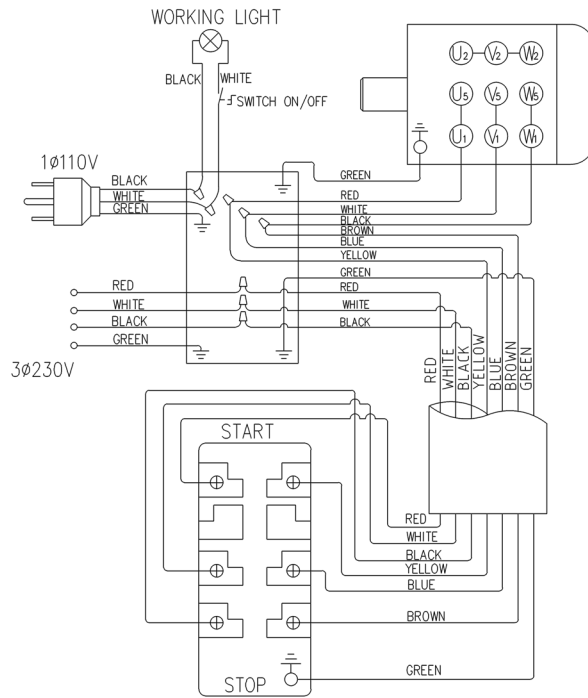


Figure 15: Electrical Schematics for Single Phase Motor

230 Volts, Three Phase



460 Volts, Three Phase

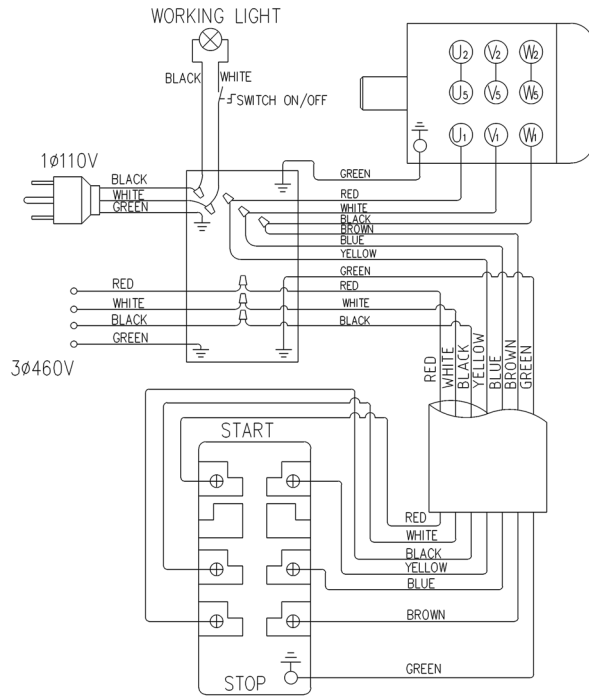


Figure 16: Electrical Schematics for Three-Phase Motor

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