

# **POWERMATIC®**

## **Operating Instructions and Parts Manual Combination Belt/Disc Sander Model 31A**



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# Warranty and Service

Powermatic® warrants every product it sells against manufacturers' defects. If one of our tools needs service or repair, please contact Technical Service by calling 1-800-274-6846, 8AM to 5PM CST, Monday through Friday.

## Warranty Period

The general warranty lasts for the time period specified in the literature included with your product or on the official Powermatic branded website.

- Powermatic products carry a limited warranty which varies in duration based upon the product. (See chart below)
- Accessories carry a limited warranty of one year from the date of receipt.
- Consumable items are defined as expendable parts or accessories expected to become inoperable within a reasonable amount of use and are covered by a 90 day limited warranty against manufacturer's defects.

## Who is Covered

This warranty covers only the initial purchaser of the product from the date of delivery.

## What is Covered

This warranty covers any defects in workmanship or materials subject to the limitations stated below. This warranty does not cover failures due directly or indirectly to misuse, abuse, negligence or accidents, normal wear-and-tear, improper repair, alterations or lack of maintenance. Powermatic woodworking machinery is designed to be used with Wood. Use of these machines in the processing of metal, plastics, or other materials outside recommended guidelines may void the warranty. The exceptions are acrylics and other natural items that are made specifically for wood turning.

## Warranty Limitations

Woodworking products with a Five Year Warranty that are used for commercial or industrial purposes default to a Two Year Warranty. Please contact Technical Service at 1-800-274-6846 for further clarification.

## How to Get Technical Support

Please contact Technical Service by calling 1-800-274-6846. **Please note that you will be asked to provide proof of initial purchase when calling.** If a product requires further inspection, the Technical Service representative will explain and assist with any additional action needed. Powermatic has Authorized Service Centers located throughout the United States. For the name of an Authorized Service Center in your area call 1-800-274-6846 or use the Service Center Locator on the Powermatic website.

## More Information

Powermatic is constantly adding new products. For complete, up-to-date product information, check with your local distributor or visit the Powermatic website.

## How State Law Applies

This warranty gives you specific legal rights, subject to applicable state law.

## Limitations on This Warranty

POWERMATIC LIMITS ALL IMPLIED WARRANTIES TO THE PERIOD OF THE LIMITED WARRANTY FOR EACH PRODUCT. EXCEPT AS STATED HEREIN, ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

POWERMATIC SHALL IN NO EVENT BE LIABLE FOR DEATH, INJURIES TO PERSONS OR PROPERTY, OR FOR INCIDENTAL, CONTINGENT, SPECIAL, OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OF OUR PRODUCTS. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Powermatic sells through distributors only. The specifications listed in Powermatic printed materials and on the official Powermatic website are given as general information and are not binding. Powermatic reserves the right to effect at any time, without prior notice, those alterations to parts, fittings, and accessory equipment which they may deem necessary for any reason whatsoever.

## Product Listing with Warranty Period

90 Days – Parts; Consumable items
1 Year – Motors, Machine Accessories
2 Year – Woodworking Machinery used for industrial or commercial purposes
5 Year – Woodworking Machinery

NOTE: Powermatic is a division of JPW Industries, Inc. References in this document to Powermatic also apply to JPW Industries, Inc., or any of its successors in interest to the Powermatic brand.

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## IMPORTANT SAFETY INSTRUCTIONS

As with all machines, there is a certain amount of hazard involved with the use of this sander. Use the machine with the respect and caution demanded where safety precautions are concerned. When normal safety precautions are overlooked or ignored, personal injury to the operator can result.

**Read, understand and follow** the safety and operating instructions found in this manual. Know the limitations and hazards associated with this machine.

**Electrical grounding.** Make certain that the machine frame is electrically grounded and that a ground lead is included in the incoming electrical service. In cases where a cord and plug are used, make certain that the grounding plug connects to a suitable ground. Follow the grounding procedure indicated in the National Electrical Code.

**Eye safety.** Wear an approved safety shield, goggles, or glasses to protect eyes. (NOTE: Common eyeglasses are only impact-resistant, they are not safety glasses.)

**Personal protection.** Before operating the machine, remove tie, rings, watch and other jewelry and roll up sleeves above the elbows. Remove all loose outer clothing and confine long hair. Protective type footwear should be used. Where the noise exceeds the level of exposure allowed in Section 1910.95 of the OSHA Regulations, use hearing protective devices. Do not wear gloves.

**Guards.** Keep the machine guards in place at all times when the machine is in use. If removed for maintenance purposes, use extreme caution and replace guards on completion of the maintenance task before operating the sander. DO NOT operate the machine with the guards off except for the belt end guard which swings away to allow for contour sanding. Keep that guard in place except when contour sanding and swing it back into position immediately after completing the contour sanding task.

**Work area.** Keep the floor around the machine

clean and free of scrap material, saw dust, oil and other liquids to minimize the danger of tripping or slipping. Make certain the work area is well lighted and that a proper exhaust system is used to minimize dust. Powermatic recommends the use of anti-skid floor strips on the floor area where the operator normally stands and that each machine's work area be marked off. Provide adequate work space around the machine.

**Don't use in dangerous environment.** Do not expose sander to rain or use in damp locations.

**Keep children away.** All visitors should be kept a safe distance from work area.

**Make workshop child proof** with padlocks, master switches, or by removing starter keys.

**Avoid accidental starting:** Make certain motor switch is in off position before connecting power to the machine.

**Operator position.** Maintain a balanced stance and keep your body under control at all times. Do not over-reach. Do not stand in line with the belt in the direction that it is moving when the work stop is not in use.

**Belt and Disc Direction.** Avoid kickback by sanding in accordance with the directional arrows. Proper belt direction is from the idler pulley towards the drive pulley. Proper disc rotation is counterclockwise facing the disc. CAUTION: Sand on the section of the disc from the center to the left edge. DO NOT use the right hand portion for sanding.

**Housekeeping.** Before turning on machine, remove all extra equipment such as keys, wrenches, scrap, and cleaning rags away from the machine.

**Careless acts.** Give the work you are doing your undivided attention. Looking around, carrying on a conversation, and "horseplay" are careless acts that can result in serious injury.

**Disconnect machine** before performing any service or maintenance.

**Hand safety.** Keep fingers and hands away from the belt or disc. DO NOT clear sawdust from the table with the hands; use a brush. On small or thin parts, use a push stick or jig to keep the hands from contacting the abrasive. If using the fence, avoid getting fingers too close to the fence to prevent pinching. Never wear

gloves while operating the sander.

**Machine capacity.** Do not try to force the sander to remove material faster than the power available from the drive motor. The use of light pressure on either disc or belt sanding and moving the part back and forth will maximize belt or disc life, help to minimize the chances of an accident and keep the force within the capacity of the drive motor.

**Machine adjustments.** Make all machine adjustments with power off except belt tracking. Belt tracking should be checked manually before starting the sander, but final adjustment may have to be made after starting up the sander.

**Table safety.** Be sure the table is locked in position before placing stock on it and that its front edge is within 1/16" or less, of the disc or belt.

**Job completion.** If the operator leaves the machine area for any reason, the sander should be turned "off" and the abrasive belt and disc should come to a complete stop before his/her departure. In addition, if the operation is complete, he should clean the sander and the work area. Never clean the sander with power "on" and never use the hands to clear sawdust and debris; use a brush.

**Replacement parts.** Use only Powermatic or factory authorized replacement parts and accessories; otherwise the warranty and guarantee is null and void.

**Misuse.** Do not use this Powermatic sander for other than its intended use. If used for other purposes, Powermatic disclaims any real or implied warranty and holds itself harmless for any injury or damage which may result from that use.

**If you are not** thoroughly familiar with the operation of sanders, obtain advice from your supervisor, instructor or other qualified person.

**Drugs, alcohol, medication.** Do not operate this machine while under the influence of drugs, alcohol, or any medication.

**Prevent unauthorized use:** When the machine is not in use, lock out the switch to prevent accidental or unauthorized starting. To do this, either remove the switch key and store in a place inaccessible to children and others not qualified to use the machine; or purchase and insert a padlock through the hole in the start switch.

**Familiarize yourself with the following safety notices used in this manual:**

**⚠ CAUTION**

This means that if precautions are not heeded, it may result in minor injury and/or possible machine damage.

**⚠ WARNING**

This means that if precautions are not heeded, it may result in serious or possibly even fatal injury.

## Introduction

This manual is provided by Powermatic covering the safe operation and maintenance procedures for a Powermatic Model 31A Combination Belt/Disc Sander. 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 consistent, long-term operation if used in accordance with instructions set forth in this manual. If there are any questions or comments, please contact either your local supplier or Powermatic. Powermatic can also be reached at our web site: [www.powermatic.com](http://www.powermatic.com).

Register your product using the mail-in card provided, or register online:  
<http://www.powermatic.com/us/en/service-and-support/product-registration/>

## Specifications

Model Number .....	31A .....	31A .....
Stock Number (1 Phase model) .....	1791291K .....	
Stock Number (3 Phase model) .....		1791292K
Abrasive Belt Size (in.) .....	6 x 48 .....	6 x 48
Disc Size (in.) .....	12 .....	12
Table Working Height (in.) .....	34 disc, 36 belt .....	34 disc, 36 belt
Sanding Arm Locking Positions (deg.) .....	0, 45 and 90 .....	0, 45 and 90
Disc Table Size (in.) .....	17-1/4 x 9 .....	17-1/4 x 9
Disc Table Tilt (deg.) .....	15 up, 45 down .....	15 up, 45 down
Belt Table Size (in.) .....	13-1/4 x 7-1/2 .....	13-1/4 x 7-1/2
Belt Table Tilt (deg.) .....	45 down .....	45 down
Disc Speed (RPM) .....	2375 .....	2375
Belt Speed (SFPM) .....	2410 .....	2410
Dust Port Diameter (in.) .....	4 .....	4
Dust Collection Minimum CFM Required .....	400 .....	400
Motor .....	1-1/2HP, 1PH, 115/230V .....	2HP, 3PH, 230/460V <sup>1</sup>
	(pre-wired 115V), 60Hz, 14/7A .....	(pre-wired 230V), 60 Hz, 7/3.5A
Recommended circuit <sup>2</sup> .....	30/20 .....	20/10
Overall Dimensions (LxWxH)(in.) .....	24 x 31-1/4 x 54-1/2 .....	24 x 31-1/4 x 54-1/2
Net Weight (lbs.) .....	247 .....	247
Shipping Weight (lbs.) .....	275 .....	275

<sup>1</sup> **NOTE:** For 460V operation, magnetic switch (part no. 31A-MSA-2) must be purchased separately and installed. A qualified electrician is recommended.

<sup>2</sup> Subject to local and national electrical codes.

The above specifications were current at the time this manual was published, but because of our policy of continuous improvement, Powermatic reserves the right to change specifications at any time and without prior notice, without incurring obligations.

**⚠ WARNING** Read and understand the entire contents of this manual before attempting set-up or operation! Failure to comply may cause serious injury.

# Grounding Instructions

## 1. All grounded, cord-connected tools:

In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This tool is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.

Do not modify the plug provided - if it will not fit the outlet, have the proper outlet installed by a qualified electrician.

Improper connection of the equipment-grounding conductor can result in a risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.

Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded.

Use only 3-wire extension cords that have 3-prong grounding plugs and 3 pole receptacles that accept the tool's plug. Repair or replace damaged or worn cord immediately.

## 2. Grounded, cord-connected tools intended for use on a supply circuit having a nominal rating less than 150 volts:

This tool is intended for use on a circuit that has an outlet that looks like the one illustrated in Sketch A in Figure 1. The tool has a grounding plug that looks like the plug illustrated in Sketch A in Figure 1. A temporary adapter, which looks like the adapter illustrated in Sketch B and C, may be used to connect this plug to a 2 pole receptacle as shown in Sketch C if a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet can be installed by a qualified electrician. **This adapter is not applicable in Canada.** The green-colored rigid ear, lug, and the like, extending from the adapter must be connected to a permanent ground such as a properly grounded outlet box.

## 3. Grounded, cord-connected tools intended for use on a supply circuit having a nominal rating between 150 - 250 volts, inclusive.

This tool is intended for use on a circuit that has an outlet that looks like the one illustrated in Sketch D in Figure 1. The tool has a grounding plug that looks like the plug illustrated in Sketch D in Figure 1. Make sure the tool is connected to an outlet having the same configuration as the plug. No adapter is available or should be used with this tool. If the tool must be reconnected for use on a different type of electric circuit, the reconnection should be made by qualified service personnel; and after reconnection, the tool should comply with all local codes and ordinances.

## 4. Permanently connected tools:

This tool should be connected to a grounded metal permanent wiring system; or to a system having an equipment-grounding conductor.

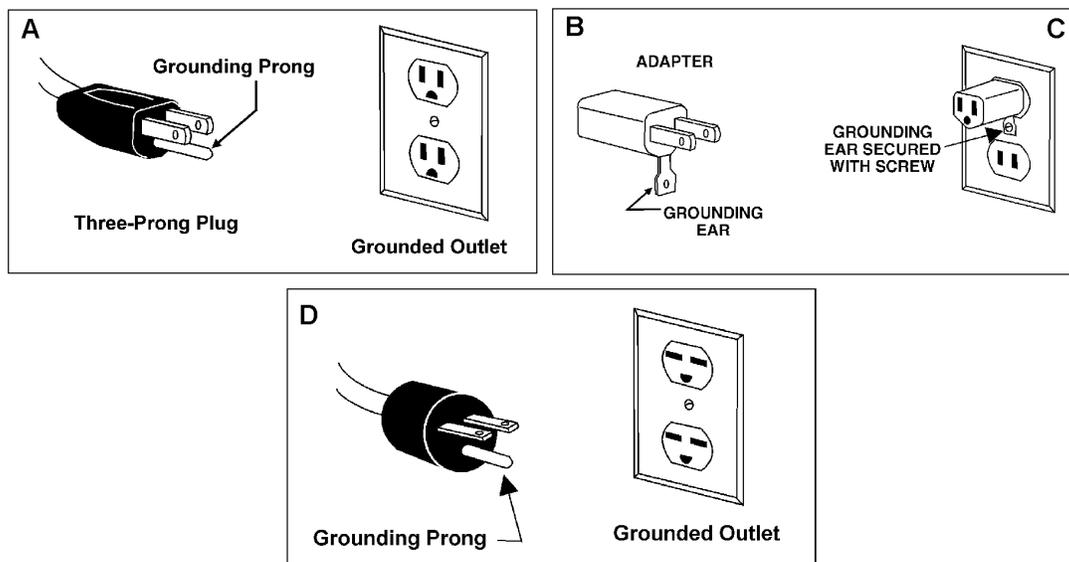


Figure 1

# Dimensions

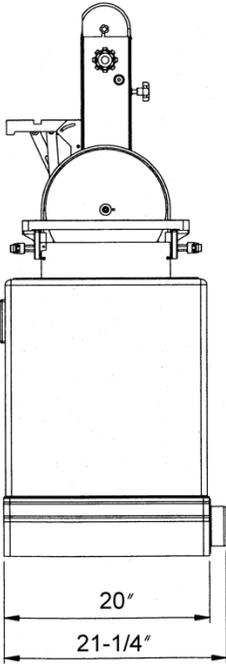
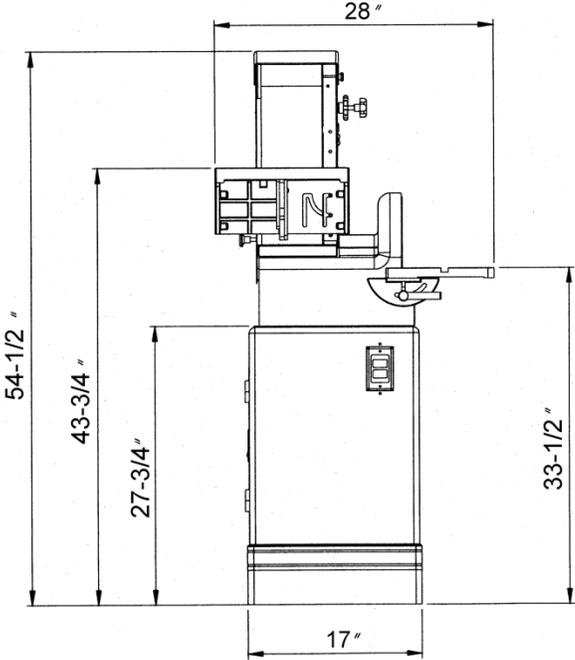
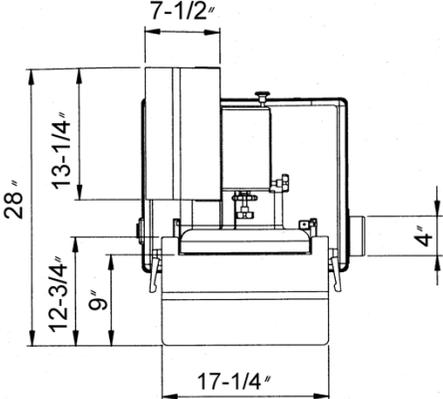
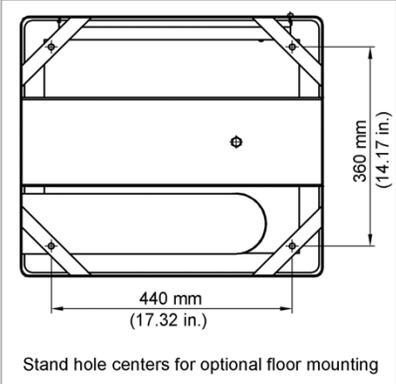


Figure 2

## On-Off Switch Padlock

The single-phase model of the 31A Sander is equipped with a push-button switch that will accept a safety padlock (not included). To safeguard your machine from unauthorized operation and accidental starting by young children, the use of a padlock is highly recommended – see Figure 3.

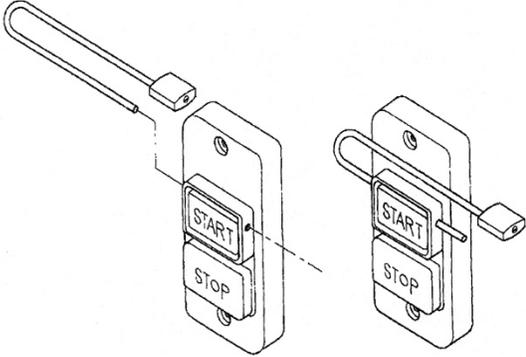


Figure 3

# Unpacking

Open shipping container and check for shipping damage. Report any damage immediately to your distributor and shipping agent. Do not discard any shipping material until the Sander is assembled and running properly.

Compare the contents of your container with the following parts list to make sure all parts are intact. Missing parts, if any, should be reported to your distributor. Read the instruction manual thoroughly for assembly, maintenance and safety instructions.

## Contents of the Shipping Container

### Container #1 (Sander):

- 1 Belt/Disc Sander
- 1 Abrasive Belt, 6" x 48", 60 grit
- 1 Abrasive Disc, 12" dia., 60 grit
- 1 Disc Table Assembly
- 1 Fence Assembly

- 1 Miter Gauge Assembly
- 1 Bag of Fasteners, contains:
  - 2 Socket Head Cap Screws, M10x25 – AA
  - 4 Hex Head Screws, M8 x 25 – BB
  - 4 Lock Washers, M8 – CC
  - 4 Flat Washers, M8 – DD
  - 2 Flat Washers, M10 – EE
- 1 Owner's Manual (not shown)
- 1 Warranty Card (not shown)

### Container #2 (Stand):

- 1 Stand with motor
- 1 Dust Outlet
- 1 Bag of Fasteners, contains:
  - 4 Pan Hd. Flanged Screws, M6 x 12 – FF
  - 2 Pan Head Screws, M5 x 12 – GG
  - 2 Pan Head Screws, M4 x 8 – HH
  - 2 Lock Washers, M4 – JJ
  - 2 Flat Washers, M4 – KK

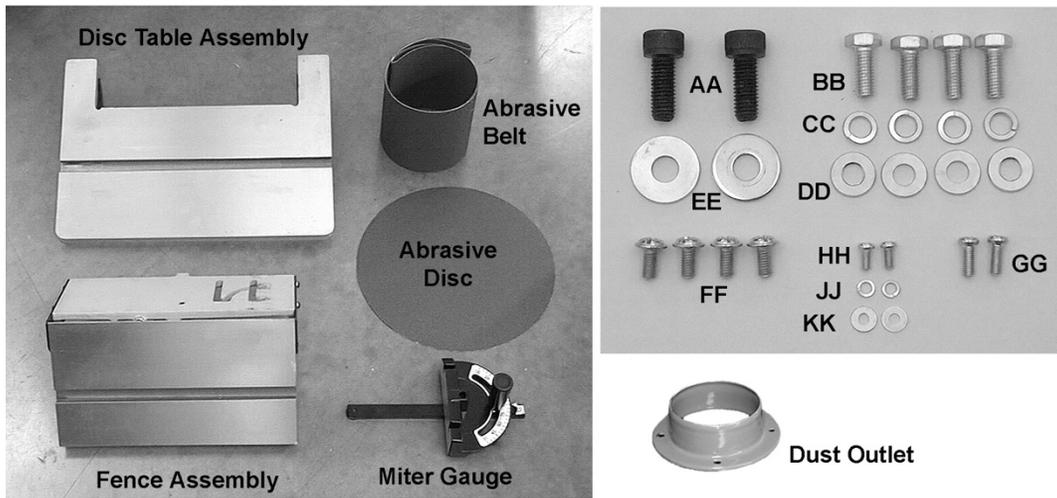


Figure 4

# Assembly

## Tools required:

wrenches – 10, 13 and 17mm  
hex (Allen) wrench – 8mm  
Cross-point screwdriver

## Installing Sander on Stand

Refer to Figure 5:

1. If the machine is to be secured to the floor, use high quality lag screws through the four holes inside the bottom of the stand (see Figure 2 for hole center dimensions). If using a mobile base, be sure to lock the wheels before assembling, operating or making adjustments to the sander. (A mobile base for your sander – part no. 708118 – is available from Powermatic.)
2. The sander is shipped with the belt arm in horizontal position. Pull out on the *index pin* and raise the arm to vertical position, as shown in Figure 5. This will better balance the sander as you place it on the stand. Allow the index pin to pop back in to ensure the belt arm is secure.
3. Position the sander on the stand making sure to orient it properly, as shown. Also, make sure the loose end of the *drive belt* below the disc is pulled down and guided through the rectangular hole in the stand.
4. Secure the sander to the stand with four M8 x 25 *hex head screws* (BB), four M8 *lock washers* (CC) and four M8 *flat washers* (DD). **NOTE:** Hand tighten the screws only until all four are inserted; then tighten them completely with a 13mm wrench.

Refer to Figure 6:

5. The *drive belt* is already mounted on the *disc pulley* behind the disc, as shown in Figure 6. However, it should be checked to ensure that it is in the pulley groove.
6. Loosen the *top hex nut* on the tensioning screw with a 17mm wrench, and rotate the *lower hex nut* to raise the motor platform high enough to position the *drive belt* around the *motor pulley*.
7. When the belt is in the motor pulley groove, tension the belt by rotating the lower hex nut downward out of the way, and tightening the top hex nut to lower the platform. When the belt is tensioned properly, tighten the lower hex nut against the platform to secure the setting.

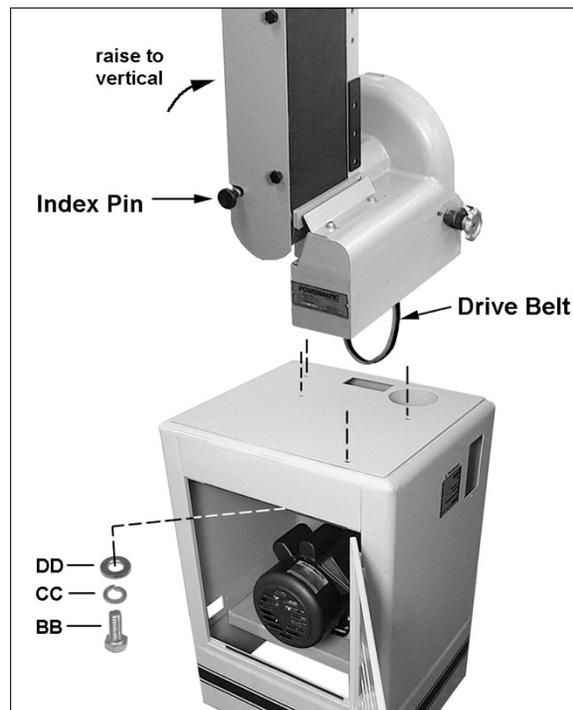


Figure 5

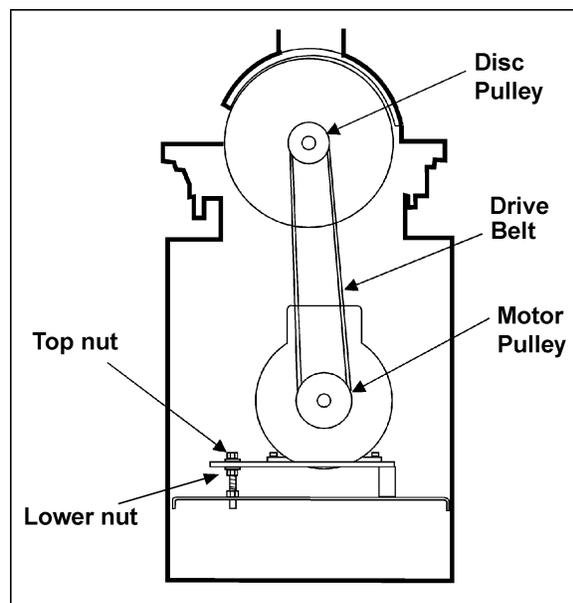


Figure 6

(viewed from front of machine)

**NOTE:** Proper tension is achieved when there is moderate deflection (about 1/2") in the belt midway between the two pulleys. After a period of use, re-check the belt tension, as new belts have a tendency to stretch slightly during the breaking-in process.

## Installing and Tracking Abrasive Belt

To install the abrasive belt, proceed as follows  
Refer to Figures 7 and 8:

1. Loosen the knob (A) and swing the belt end guard (B) out of position.
2. Remove the *side cover* by unscrewing the two *knobs* holding it, and sliding the tabs of the side cover out of the slots of the sander.
3. Loosen the tension knob (C). This will lower the top drum, providing slack for installing the abrasive belt.
4. Slide the abrasive belt onto the drums until it is centered on them.
5. Tighten the tension knob (C).

**IMPORTANT:** Do not over tension, as this can cause the abrasive belt to stretch and weaken.

The abrasive belt must be properly tracked before operating. (Tracking refers to the position of the abrasive belt on the drums while they are in motion.) Proceed as follows:

6. Check tracking *manually* at first, by moving the belt downward with your hand while the machine is off. The abrasive belt should remain at the center of the drums.
7. If the belt veers to one side or the other, loosen the locking wheel (D) and rotate the tracking knob (E) either left or right until the belt centers itself. When manual tracking appears successful, turn the machine on for a moment and confirm that the abrasive belt will remain centered during operation. If needed, continue fine-tuning the adjustment with the tracking screw (E). It may require a combination of tension knob (C) and tracking knob (E) adjustment to achieve a proper setting.
8. When satisfied, tighten the locking wheel (D) against the belt arm to secure the setting.
9. Re-install *side cover* and secure with the *knobs*. Swing the end guard (B) back into position and re-tighten the knob (A).

## Installing Fence

Refer to Figure 9:

**CAUTION** Pinch Point. Before installing the fence, adjust it to a right angle position as shown, and tighten the knob to secure.

1. Tilt the belt arm into horizontal position, and place the fence against the platen in the position shown.

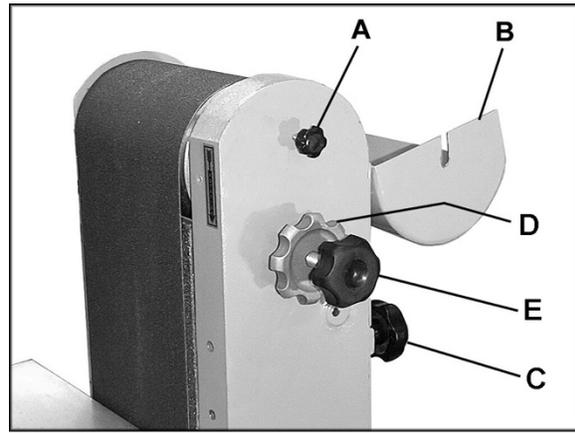


Figure 7

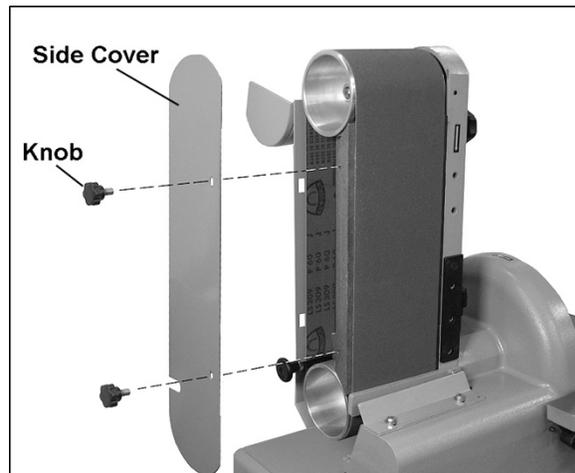


Figure 8

2. Insert the two M10x25 socket head cap screws (AA), with two M10 flat washers (EE), through the fence base and into the threaded holes on the pivot plate, as shown in Figure 9.
3. Tighten the screws with an 8mm hex wrench.
4. Check that the gap between fence and sanding belt is about 1/16". If it is greater than 1/16", loosen (do not remove) the four screws on the sides of the fence assembly with a hex wrench, and push the fence toward the belt until the proper gap is attained.
5. Re-tighten the four screws.

See under "Adjustments" for further instruction on adjusting the fence.

### Installing Abrasive Disc

Refer to Figure 10:

1. Loosen the two screws on the front panel with a 10mm wrench, and pull out on the front panel. The front panel will not remove from the sander, but this will allow more room for positioning the abrasive disc.
2. Remove the backing from the abrasive disc to expose the adhesive, and carefully center it on the sander's metal disc. Press the abrasive disc firmly, working from the center out to prevent creases or air bubbles.
3. Tighten the two screws on the front panel.

When removing an old abrasive disc, use mineral spirits or a similar cleaning product to remove any residual adhesive from the sander's metal disc before installing a new abrasive.

### Installing Table

Refer to Figure 11:

1. On both sides of the sander body, loosen the *locking wheels* (A), and pull the *trunnion holders* (B) out far enough to allow clearance between trunnion holders and sander body.
2. Install the table by sliding the table trunnions into the slots of the trunnion holders. See Figure 11 inset. Be careful not to damage the angle pointer on the left trunnion holder.
3. Slide the *trunnion holders* (B) back in, and re-tighten the *locking wheels* (A).

See under "Adjustments" for further instruction on adjusting the table.

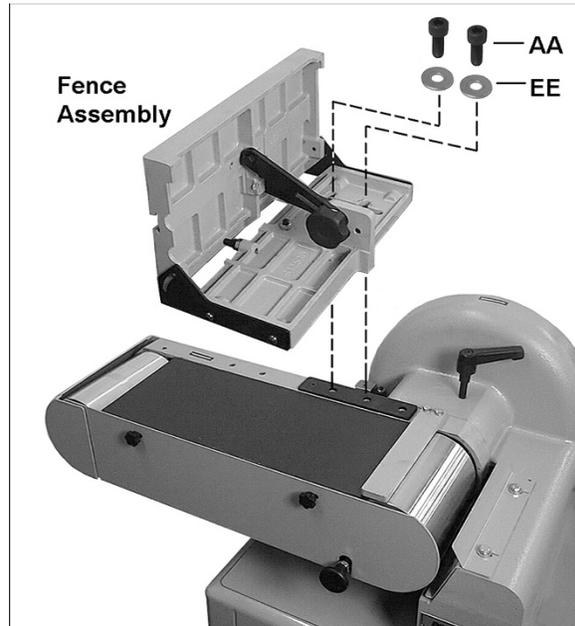


Figure 9

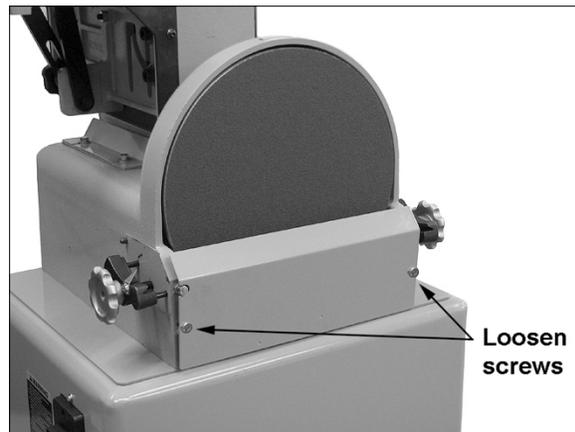


Figure 10

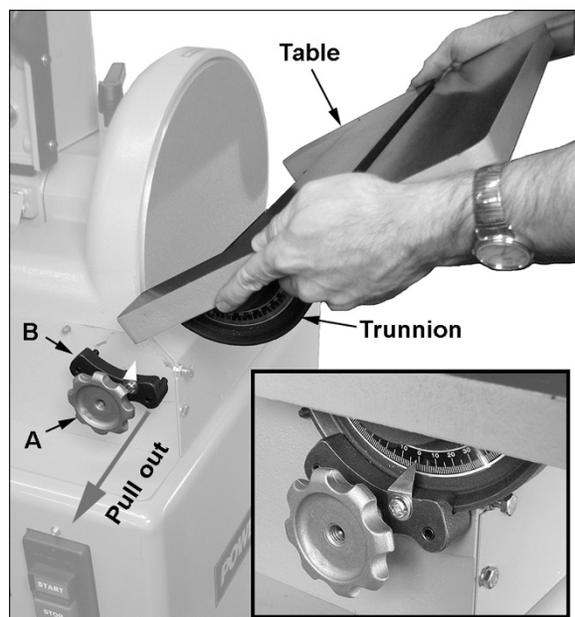


Figure 11

## Dust Outlet and Cord Plate

Refer to Figure 12:

1. Install the *dust outlet* using the four M6 x 12 *pan head flanged screws* (FF).
2. *Single Phase model*: Feed the electrical plug through the hole in the stand, and slide the cord plate through also. Secure the cord plate to the stand using the two M5x12 *pan head screws* (GG) as shown.

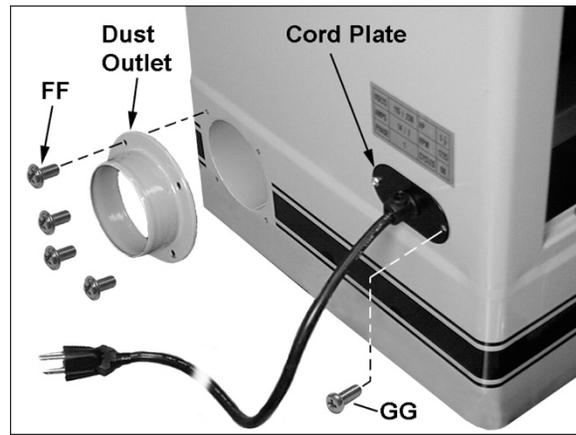


Figure 12

## Switch (Single Phase Model)

Refer to Figure 13:

1. Place the *push button switch* into the rectangular opening from inside the stand.
2. Secure the switch to the outside of the stand, using two M4x8 *pan head screws* (HH), two M4 *lock washers* (JJ) and two M4 *flat washers* (KK).

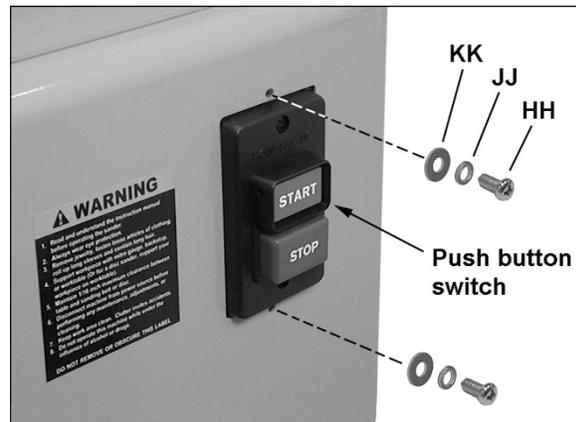


Figure 13  
(single phase model)

## Electrical Connections

### **⚠ WARNING**

**Electrical connections must be made by a qualified electrician in compliance with all relevant codes. This machine must be properly grounded to help prevent electrical shock and possible fatal injury.**

The 31A Sander is equipped with either a **single phase 115/230 volt** motor (pre-wired 115V); or a **three phase 230/460 volt** motor (pre-wired 230V).

The **three phase** sander is not equipped with a plug. You may either install a UL/CSA listed plug suitable for 230 or 460 volt operation, or “hard-wire” the sander directly to a service panel. *The installer shall follow local regulations and National Electrical Code, ANSI/NFPA 70 installation requirements.* If the Sander is to be hard-wired to a panel, make sure a disconnect is available for the operator. During hard-wiring of the machine, make sure the fuses have been removed or the breakers have been tripped in the circuit to which the Sander will be connected.

If connected to a circuit protected by fuses, use time delay fuse marked “D”.

Make sure the voltage of your power supply matches the specifications on the motor plate of the sander.

It is recommended that the **single phase** sander be connected to a dedicated 30 amp circuit (for 115V) or 20 amp circuit (for 230V) with circuit breaker or time-delay fuse marked “D”.

It is recommended that the **three phase** sander be connected to a dedicated 20 amp circuit (for 230V) or 10 amp circuit (for 460V) with circuit breaker or time-delay fuse marked “D”.

**NOTE: Local codes take precedence over recommendations.**

### **Converting from 115 Volt to 230 Volt (Single Phase Only)**

To convert from 115V to 230V (1 phase model), consult the diagrams inside the cover of the motor junction box, to determine how to switch the motor leads. A similar diagram is also found at the back of this manual.

The 115V attachment plug supplied with the sander must be replaced with a UL/CSA listed plug suitable for 230V operation. Contact your local authorized Powermatic service center or qualified electrician for proper procedures to install the plug. The sander must comply with all local and national codes after the 230 volt plug is installed.

## Converting from 230 Volt to 460 Volt (Three Phase Only)

Consult the wiring diagram inside the starter box cover. A similar diagram is also included at the back of this manual. The sander must comply with all local and national codes after being wired.

1. Replace the current contactor with the 460V magnetic contactor (part no. 31A-MSA-2; purchased separately).
2. Re-connect the incoming leads to the motor in accordance with 460 volt operation, as shown in the wiring diagram.
3. If using a plug, install a proper UL/CSA listed plug suitable for 460 volt operation.

## Three-Phase Test Run

On the **three-phase** unit, after wiring has been completed, you should check that the wires have been connected properly:

1. Connect machine to power source and press the start button.
2. The sanding disc and belt should move in accordance with the arrow directions on the machine. If the movement is backward, stop the machine and **disconnect machine from power**.
3. Switch any two of the three wires at "R,S,T".

## Grounding Instructions

(Refer to page 7 for more information on grounding this machine.) This machine must be grounded. In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock.

Improper connection of the equipment-grounding conductor can result in a risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes, is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.

Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded.

Repair or replace a damaged or worn cord immediately.

## Extension Cords

An extension cord is not recommended; if possible, position your Sander within reach of the power supply. If an extension cord becomes necessary, make sure the cord rating is suitable for the amperage listed on the machine's motor plate. An undersize cord will cause a drop in line voltage resulting in loss of power and overheating.

Use the chart in Figure 14 as a general guide in choosing the correct size cord. If in doubt, use the next heavier gauge. The smaller the gauge number, the heavier the cord.

### Recommended Gauges (AWG) of Extension Cords

Amps	Extension Cord Length *					
	25 feet	50 feet	75 feet	100 feet	150 feet	200 feet
< 5	16	16	16	14	12	12
5 to 8	16	16	14	12	10	NR
8 to 12	14	14	12	10	NR	NR
12 to 15	12	12	10	10	NR	NR
15 to 20	10	10	10	NR	NR	NR
21 to 30	10	NR	NR	NR	NR	NR

\*based on limiting the line voltage drop to 5V at 150% of the rated amperes.

NR: Not Recommended.

Figure 14

## Adjustments

Before putting power to the sander, inspect the machine thoroughly. Check to ensure that all screws are tight, all mechanical functions work freely, belt runs freely and tracks properly, and the disc runs freely, does not come into contact with the guard or table, and the abrasive remains firmly adhered to the sander's metal disc.

Turn the motor on and check for proper rotation direction of the belts. The sanding belt should move from the idler pulley toward the drive pulley, while the disc should rotate counter-clockwise with the operator facing the disc. Arrow labels are affixed to the sander to indicate these directions.

### Platen Adjustment

The platen should not require attention on your new sander. After prolonged use, however, the platen may occasionally need re-adjustment. To do this, proceed as follows.

Refer to Figure 15:

1. Swing the end guard out of position and remove the side cover. Remove the abrasive belt.
2. Using a 6mm hex wrench, loosen the two socket head cap screws inside the belt arm and shift the platen as needed. The platen should be  $1/32''$  to  $1/16''$  above the tangent points of the pulleys and in contact with the belt at both ends. A straight edge can be used with the abrasive belt to align the platen, as shown in Figure 15.
3. Re-tighten the socket head cap screws.

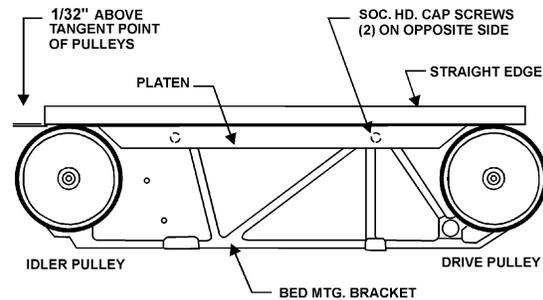


Figure 15

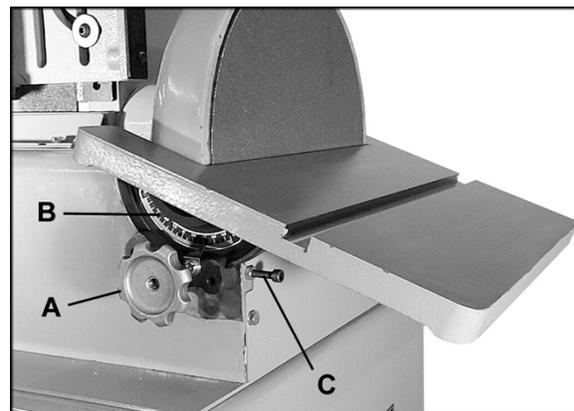


Figure 16

### Sanding Table Adjustment

Refer to Figures 16 and 17:

The sanding table may be adjusted from any angle from 15 degrees up, to 45 degrees down. To adjust, loosen the locking wheels (A) on both sides and pivot the table to the desired angle as shown on the trunnion scale (B). Re-tighten the locking wheels (A).

A 45-degree stop (C) is located under the table. Use an angle measuring device to confirm that the angle of the table against the stop is 45 degrees. If it is not, adjust by loosening the hex nut and screwing the stop in or out as needed. Re-tighten hex nut.

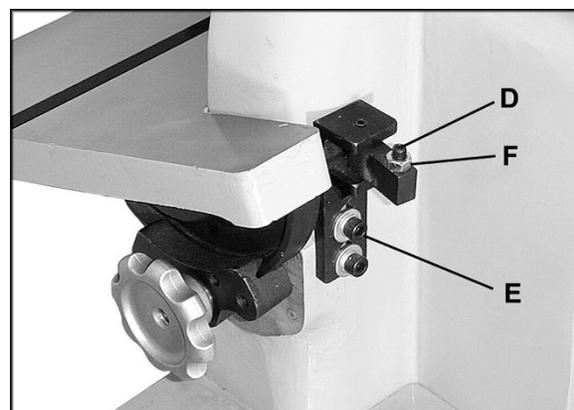


Figure 17

A zero-degree stop screw (D, Figure 17) is located behind the disc. The block should be set for quick placement of the table to the zero position (90 degree table). The block must be swung out of position for the table to be tilted downward. If major adjustment of the zero-degree stop is necessary, loosen the socket head cap screws (E) and raise or lower the bracket. For fine adjustment, loosen the hex nut (F) and turn the stop screw (D) in or out as needed. Re-tighten hex nut (F).

Periodically check zero position on the table by using a combination square. The angle between the table and disk should be 90 degrees when the trunnion pointer is at zero.

## Work Stop

Your sander is equipped with a work stop for use with the belt arm in the horizontal position (see Figure 25). When installed, the work stop will prevent a work piece from being thrown from the belt. If removed for through-sanding, the work stop should be immediately reinstalled after the through-sanding operation (unless the fence attachment is used in its place for 45-degree or vertical positions of the arm). Use a 10mm hex wrench to remove or install the work stop.

## Belt Arm Positioning

Your sander is equipped with an index pin arrangement to lock the belt arm in 0-degree, 45-degree, and 90-degree positions. To position the belt arm:

1. Loosen the *locking handle* shown in Figure 18.
2. Pull out on the index pin (Figure 19), and swing the belt arm into the desired position. Then release the index pin.
3. Check that the index pin has gone into position by attempting to move belt arm back and forth.
4. Re-tighten locking handle (Figure 18).

When positioning the arm at any non-standard angle, make sure the locking handle is tightened securely.

NOTE: If the locking handle conflicts with the motion of the belt arm, pull up on the handle and rotate it out of the way, then release it, making sure it re-seats itself properly.

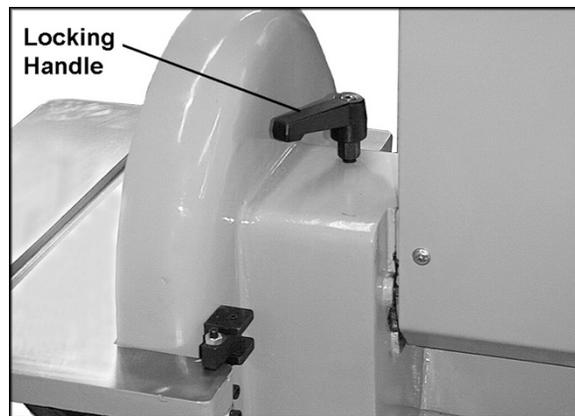


Figure 18

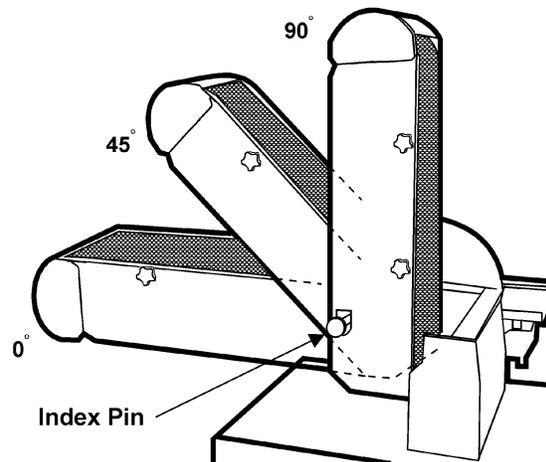


Figure 19

## Operation

The belt and disc sander can be equipped with a variety of abrasives and grit sizes to handle a wide variety of materials, from soft woods to hardened steel. It can be used to rapidly remove material and produce a mirror finish. Using various types of fixtures, they can be used to sand template forms, angles, freehand contours, and flats on edges, surfaces and ends.

## Template Forms

A template similar to that shown in Figure 20 can be made to facilitate sanding multiple pieces to the same size.

## Fence/Table

Refer to Figure 21:

The fence attachment is used with the belt sander and can be positioned alternately as a table (with the belt arm in upright position) or as a fence (with the belt arm in horizontal position). The fence attachment surface has a slot for a miter gauge when the attachment is used as a table. The fence attachment can be tilted between 90-degree and 45-degree angles by loosening the knob (A) on the center portion of the attachment. Manually move the fence to the desired angle and tighten the knob (A).

To position the fence at an angle across the belt (for skew sanding as shown in Figure 22), use a 3/16 hex wrench to loosen the two socket head screws (B, Figure 21). Rotate the fence attachment by sliding it around the bolts using the curved slot (C). When the desired position is reached, re-tighten the screws (B).

To change the fence attachment from fence to table, or vice-versa, remove the two socket head screws (B). Remove the fence attachment and rotate the pivot plate (D, Figure 23) 180 degrees lining the holes up with the holes in the sander. Place the fence attachment on the pivot plate with the table perpendicular to the belt. Line up the slots with the holes on the pivot plate and the sander, then replace and tighten the screws (B).

**CAUTION** Always mount the base of the fence attachment *through the pivot plate (D, Figure 23)*. Failure to do so could lead to damage to the fence attachment and also ruin the sanding belt.

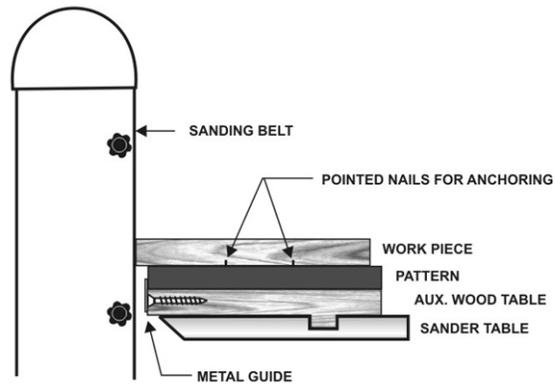


Figure 20

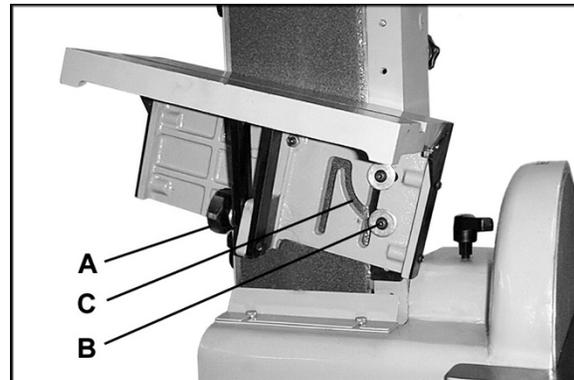


Figure 21



Figure 22

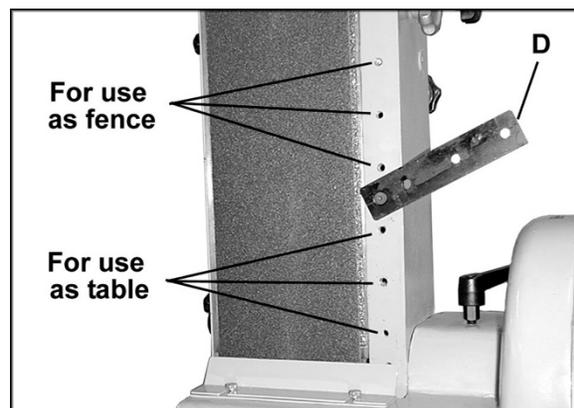


Figure 23

The chart on page 20 lists the various grits and materials used and lists the grit symbols. It is generally better to start with a slightly coarser abrasive than would seem practical because it will give faster material removal, generate less heat, and will sand more freely. As it dulls, it will tend to act like a finer abrasive.

Too often, the user will expect one belt or disc to take care of all situations; however, the materials to be sanded, the desired finish and the amount of material to be removed all have an effect on the selection grade of grit, abrasive material and construction. Contact suppliers of abrasive belts and discs for recommendations on the work to be done.

## Types of Operations

Flat surface sanding is demonstrated in Figure 24, where the major surface is sanded in a flat plane.

Edge sanding is a common type of long surface sanding that can be done using the fence. See Figure 25.

Edge sanding and flat surface sanding can also be done with the belt arm in a vertical position, by using the fence assembly as a table.

Miters and compound miter cuts can be sanded using the table and the miter gauge. Special fixtures can also be designed to use on the table for circular and form sanding.

Contour sanding can be done using the idler pulley with the end guard swung down. See Figure 26.

**⚠ CAUTION** Always swing the end guard back into position and fasten it down immediately after the completion of any operation that required the end guard to be moved out of position.

**⚠ CAUTION** Keep in mind that abrasive sanding develops heat, so burns can occur on wood if you try to remove material too fast. With metal, it may be necessary to have a container of water nearby to keep the workpiece cool enough to hold it by hand.

Flat surface and contour sanding can be done in the horizontal, 45-degree, and vertical position of the belt arm. To change position, pull out the index pin and swing arm to the desired position, then release index pin (see Figure 19).

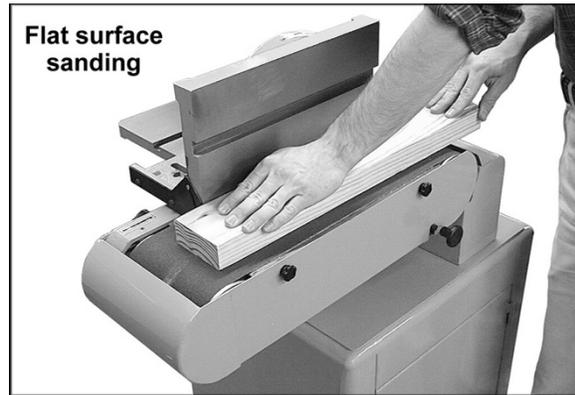


Figure 24

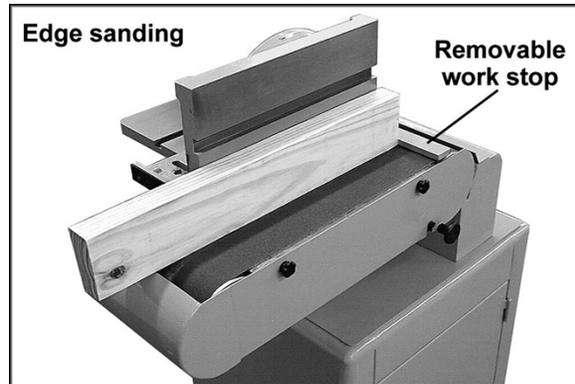


Figure 25

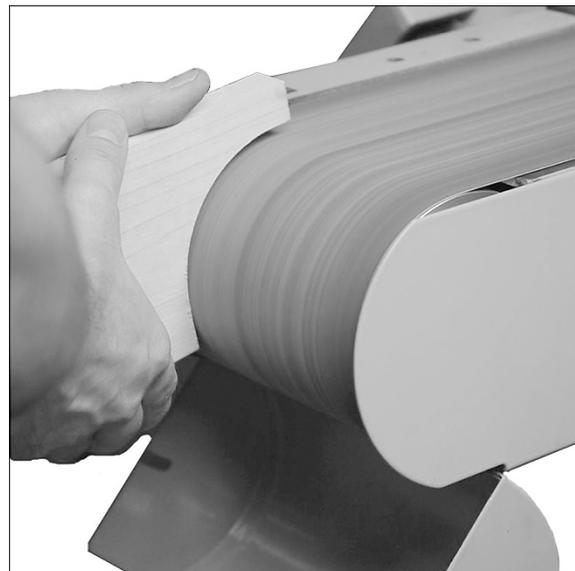


Figure 26

## User-Maintenance

### **⚠ WARNING**

**Before doing maintenance on the sander, disconnect it from the electrical supply by pulling out the plug or switching off the main switch! Failure to comply may cause serious injury.**

Make periodic or regular inspections to ensure that your sander is properly adjusted, that all screws are tight, the belt is in good condition, that dust has not collected in the motor or electrical enclosures and there are no loose or worn electrical fittings or wiring.

If the power cord is worn, cut, or damaged in any way, have it replaced immediately.

Keep the fence and table surfaces clean and free of rust.

### Lubrication

Periodically lubricate the following parts on the 31A Sander:

Use a good quality, non-hardening **grease** on:

- Idler slide (Figure 27)
- Table trunnion (shown in Figure 11)

Use **SAE No. 10 Oil** on these:

- Internal threads of table locking wheels (A, Figure 16)
- belt arm index pin (shown in Figure 5)

All bearings on the Model 31A Sander are sealed for life and require no lubrication.

### Replacing Drive Belt

1. Remove disc table and loosen front panel (see Figure 10).
2. Remove disc abrasive to access screw at center of disc.
3. Remove screw and washer, and remove disc from shaft.
4. Raise motor platform high enough to remove drive belt from pulleys (see Figure 6).
5. Install new belt and tension it by lowering motor plate.
6. Reassemble disc, washer, screw, and tighten front panel.

NOTE: New belts may have a tendency to stretch slightly during initial use. Re-check belt tension after first few hours of operation.

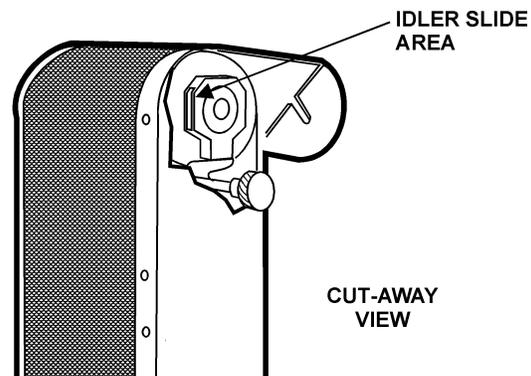


Figure 27

## Guide to Sanding Belts and Discs

	ALUMINUM OXIDE, SILICON CARBIDE		EMERY
	Mesh Number	Comparable Grit Symbol	Grit Grade
Extra Fine	600 500 400 360 320	9/0	
Very Fine	280 240 220	8/0 7/0 6/0	
Fine	180 150 120	5/0 4/0 3/0	Fine
Medium	100 80 60	2/0 0 1/2	Medium
Coarse	50 40	1 1-1/2	
Very Coarse	36 30 24	2 2-1/2 3	Extra Course
Extra Course	20 16 12	3-1/2 4 4-1/2	

## Troubleshooting 31A Belt/Disc Sander

Trouble	Probable Cause	Remedy
Sander will not start.	Disconnected from power source.	Check connection to source.
	Incorrect voltage.	Make sure power source matches voltage of sander, as shown on motor name plate.
	Switch is not activating.	Repair or replace switch.
	Motor is faulty.	Repair or replace motor.
Abrasive belt won't track properly.	Platen is shifted or worn.	Raise platen to 1/32" beyond the apex of the drum. See page 15.
	Belt is stretched unevenly.	Replace belt.
	Drum is worn.	Replace drum.
Abrasive disc comes free of aluminum disc.	Improper bond.	Clean adhesive off aluminum disc, then re-apply adhesive and re-mount abrasive disc.
Abrasive belt slips or stalls on application of pressure.	Abrasive belt tension is inadequate.	Tighten abrasive belt (page 11).
	Excessive pressure.	Reduce pressure against belt.
	Drive belt is loose.	Properly tension drive belt (page 10).
Aluminum disc stalls.	Drive belt is loose.	Properly tension drive belt (page 10).
	Disc shaft key is missing.	Replace key.
Excessive abrasive belt replacement.	Using too much pressure when sanding.	Reduce pressure against belt.
	Not using full width of belt.	Stroke across full width of belt to disperse wear.
Belt arm won't index.	Index pin is stuck.	Remove arm and free index pin.
	Broken spring.	Remove arm and replace spring.

## Replacement Parts

Replacement parts are listed on the following pages. To order parts or reach our service department, call 1-800-274-6848 Monday through Friday, 8:00 a.m. to 5:00 p.m. CST. Having the Model Number and Serial Number of your machine available when you call will allow us to serve you quickly and accurately.

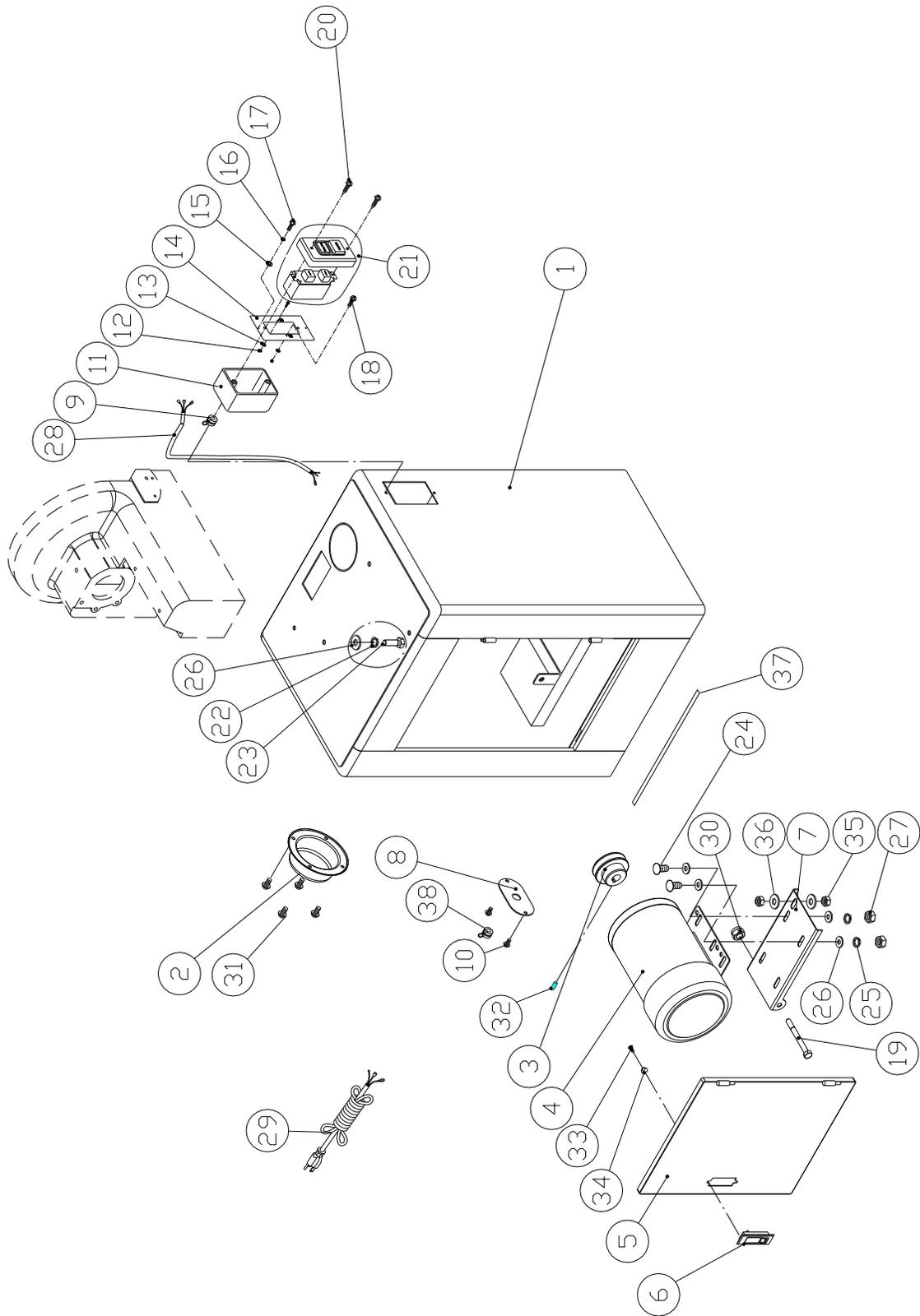
Non-proprietary parts, such as fasteners, can be found at local hardware stores, or may be ordered from Powermatic. Some parts are shown for reference only, and may not be available individually.

## Parts List: 31A Stand Assembly (1PH)

Index No.	Part No.	Description	Size	Qty
1	JT9-31A-78	Stand		1
2	JT9-31A-79	Dust Outlet		1
3	JT9-31A-80	Motor Pulley		1
4	JT9-31A-81	Motor	1.5HP, 1PH, 115/230V	1
5	JT9-31A-82	Door		1
6	JT9-31A-83	Door Latch Assembly		1
7	JT9-31A-84	Motor Mounting Bracket		1
8	JT9-31A-85	Cord Plate		1
9	JT9-31A-86	Strain Relief		2
10	JT9-TS-1533042	Pan Head Screw	M5 x 12	2
11	JT9-31A-87	Switch Box		1
12	JT9-TS-1540031	Hex Nut	M5	2
13	JT9-31A-88	Star Washer (External)	M5	2
14	JT9-31A-89	Switch Cover		1
15	CM9-TS-1550021	Flat Washer	M4	2
16	JT9-TS-1551021	Lock Washer	M4	2
17	JT9-31A-90	Pan Head Screw	M4 x 8	2
18	JT9-31A-91	Pan Head Screw	M5 x 8	2
19	JT9-31A-219	Hex Head Screw	M10 x 160	1
20	JT9-31A-93	Self Tapping Screw	M3.5 x 38	2
21	JT9-31A-94	Switch	1PH	1
22	JT9-TS-1551061	Lock Washer	M8	4
23	JT9-31A-223	Hex Head Screw	M8 x 20	4
24	JT9-31A-95	Hex Head Screw	M8 x 25	4
25	JT9-TS-1551061	Lock Washer	M8	4
26	JT9-TS-1550061	Flat Washer	M8	12
27	JT9-TS-1540061	Hex Nut	M8	4
28	JT9-31A-97	Motor Cord	1PH	1
29	JT9-31A-98	Power Cord	1PH	1
30	JT9-31A-99	Hex Nut	M10	1
31	JT9-31A-21	Pan Head Screw w/ Flange	M6 x 12	4
32	JT9-TS-1523041	Socket Set Screw	M6 x 12	1
33	JT9-31A-100	Pan Head Screw	M4 x 5	2
34	JT9-31A-101	Spacer Washer		2
35	JT9-31A-99	Hex Nut	M10	2
36	JT9-5051911	Flat Washer	M10	2
37	JT9-150527	Sponge		2
38	JT9-998630	Strain Relief	7P-2	1
	JT9-31A-102	Warning Label (not shown)		1
	**	Black Stripe (not shown)		per ft.
	CM9-3312341	Powermatic Label (not shown)		1

\*\* These parts are shown for reference only and are not available for order individually. Non-proprietary parts, such as fasteners, can usually be found at local hardware stores.

# 31A Stand Assembly (1PH)

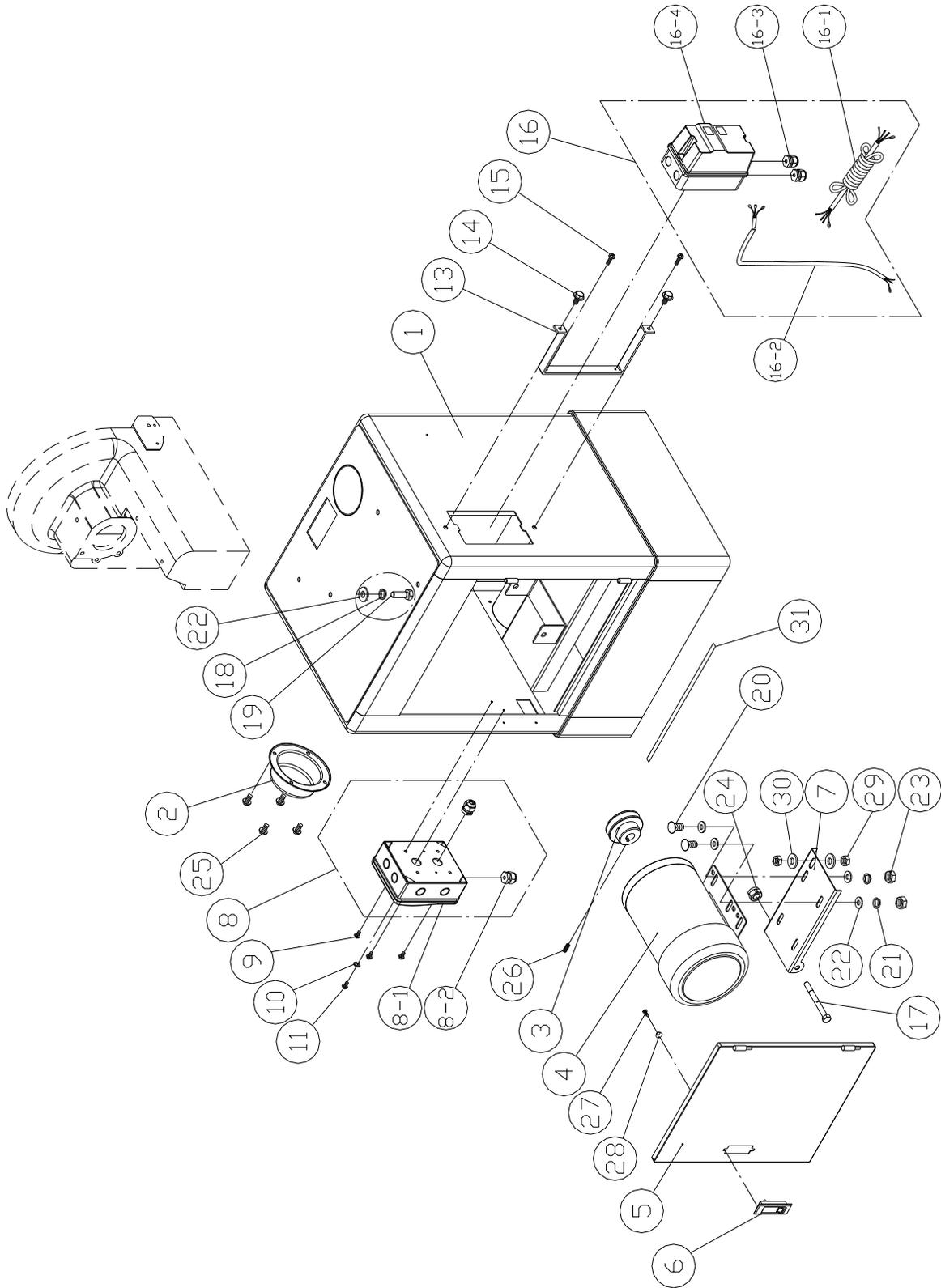


## Parts List: 31A Stand Assembly (3PH)

Index No.	Part No.	Description	Size	Qty
1	JT9-31A-78-3	Stand (3PH)		1
2	JT9-31A-79	Dust Outlet		1
3	JT9-31A-80	Motor Pulley		1
4	JT9-31A-103	Motor	2HP, 3PH, 230/460V	1
5	JT9-31A-82	Door		1
6	JT9-31A-83	Door Latch Assembly		1
7	JT9-31A-84	Motor Mounting Bracket		1
8	PM9-31A-PBA	Power Box Assembly		1
8-1	JT9-31A-208-1	Power Box		1
8-2	JT9-31A-208-2	Strain Relief	PGA13.5	2
9	JT9-TS-1533042	Phillips Pan Head Machine Screw	M5 x 12	3
10	**	Star Washer (External)	M5	1
11	JT9-31A-91	Pan Head Screw	M5 x 8	1
13	JT9-31A-213-1	Switch Plate		1
14	JT9-JC3-119	Hex Flange Bolt	M8 x 12	2
15	JT9-TS-1532042	Phillips Pan Head Machine Screw	M4 x 12	2
16	JT9-31A-MSA-1	Magnetic Switch Assembly	2HP 3PH 230V	1
	JT9-31A-MSA-2	Magnetic Switch Assembly (optional)	2HP 3PH 460V	1
16-1	JT9-31A-16-1	Power Cord	3PH	1
16-2	JT9-31A-16-2	Motor Cord	3PH	1
16-3	**	Strain Relief	PG25A-16B	2
16-4	JT9-31A-16-4	Magnetic Switch		1
17	JT9-31A-219	Hex Head Screw	M10 x 160	1
18	JT9-TS-1551061	Lock Washer	M8	4
19	JT9-31A-223	Hex Head Screw	M8 x 20	4
20	JT9-31A-95	Hex Head Screw	M8 x 25	4
21	JT9-TS-1551061	Lock Washer	M8	4
22	JT9-TS-1550061	Flat Washer	M8	12
23	JT9-TS-1540061	Hex Nut	M8	4
24	JT9-31A-99	Hex Nut	M10	1
25	JT9-31A-21	Pan Head Screw w/ Flange	M6 x 12	4
26	JT9-TS-1523041	Socket Set Screw	M6 x 12	1
27	JT9-31A-100	Pan Head Screw	M4 x 5	2
28	JT9-31A-101	Spacer Washer		2
29	JT9-31A-99	Hex Nut	M10	2
30	JT9-5051911	Flat Washer	M10	2
31	JT9-150527	Sponge		2
	JT9-31A-102	Warning Label (not shown)		1
	**	Black Stripe (not shown)		per ft.
	CM9-3312341	Powermatic Label (not shown)		1

\*\* These parts are shown for reference only and are not available for order individually. Non-proprietary parts, such as fasteners, can usually be found at local hardware stores.

# 31A Stand Assembly (3PH)



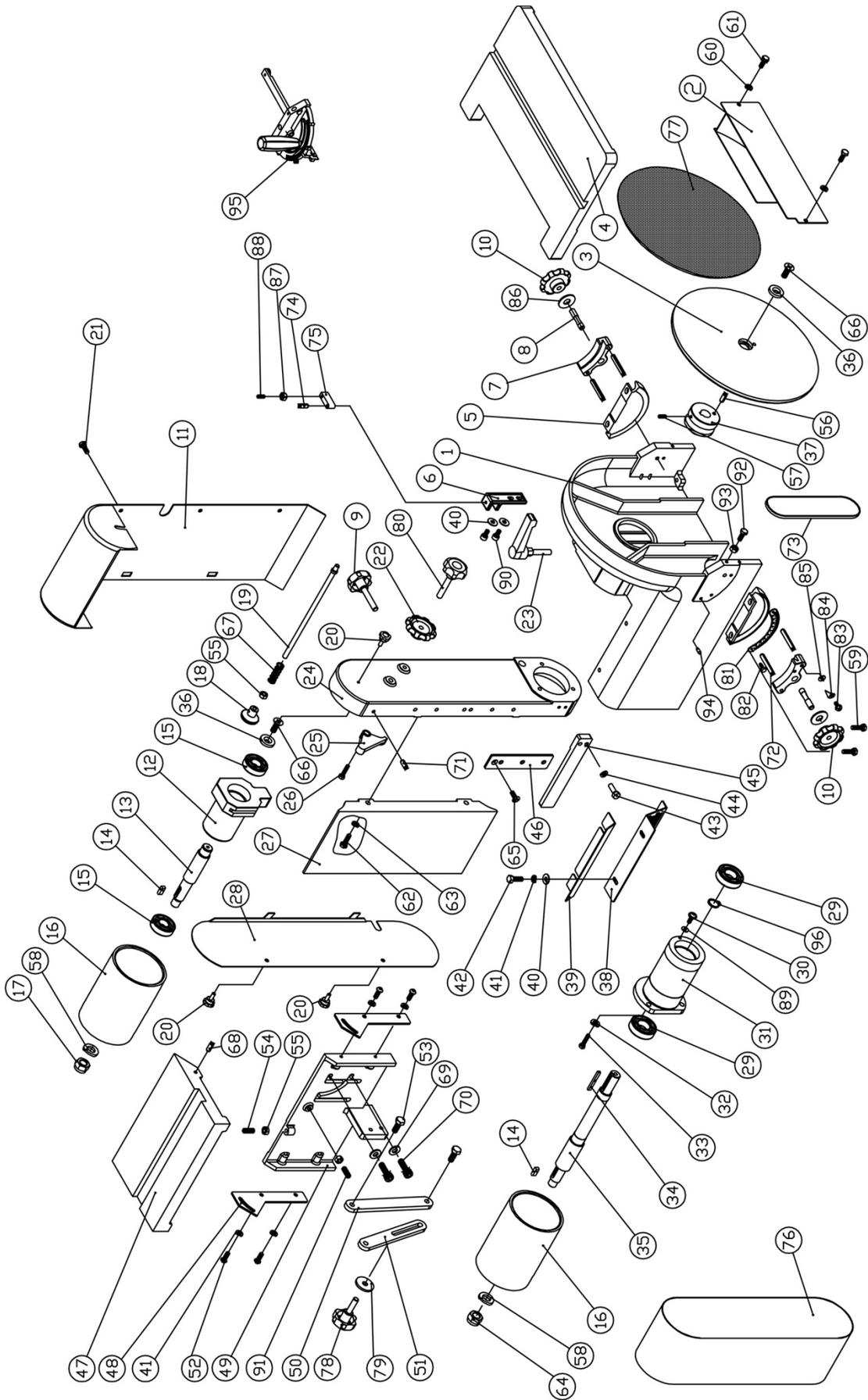
## Parts List: 31A Sander Body Assembly

Index No.	Part No.	Description	Size	Qty
1	JT9-31A-1	Cast Base		1
2	JT9-31A-2	Dust Chute (Disc)		1
3	JT9-31A-3	Sanding Disc		1
4	JT9-31A-4	Disc Table		1
5	JT9-31A-5	Trunnion		2
6	JT9-31A-6	90O Stop Bracket		1
7	JT9-31A-7	Trunnion Holder		2
8	JT9-31A-8	Set Screw	M10 x 55	2
9	JT9-31A-9	Lock Knob	M10 x 57	1
10	JT9-31A-10	Ring Spanner		2
11	JT9-31A-11	Sanding Belt Guard		1
12	JT9-31A-12	Idler Bearing Housing		1
13	JT9-31A-13	Shaft		1
14	JT9-31A-14	Key	6 x 6 x 25	2
15	CM9-BB-6204ZZ	Bearing	6204ZZ	2
16	JT9-31A-16	Aluminum Drum		2
17	JT9-31A-17	Hex Nut (L.H. Threads)	M16 x 2	1
18	JT9-31A-18	Knob		1
19	JT9-31A-19	Index Pin		1
20	JT9-31A-20	Knob	M6 x 12	3
21	JT9-31A-21	Pan Head Screw w/ Flange	M6 x 12	3
22	JT9-31A-22	Locking Handle	M10 x 1.25P	1
23	JT9-31A-23	Lock Handle	M10 x 45	1
24	JT9-31A-24	Side Plate Casting		1
25	JT9-31A-25	Rocker Arm		1
26	JT9-31A-26	Hex Head Bolt		1
27	JT9-31A-27	Platen		1
28	JT9-31A-28	Side Cover		1
29	JT9-BB-6205ZZ	Bearing	6205ZZ	2
30	JT9-31A-30	Pan Head Screw w/ Flange	M5 x 8	1
31	JT9-31A-31	Bearing Housing		1
32	JT9-TS-1551061	Lock Washer	M8	3
33	JT9-TS-1504051	Socket Head Cap Screw	M8 x 25	3
34	JT9-31A-32	Key	6 x 6 x 40	1
35	JT9-31A-33	Shaft		1
36	JT9-31A-34	Special Washer		2
37	JT9-31A-35	Pulley		1
38	JT9-31A-36	Belt Guard		1
39	JT9-31A-37	Guard		1
40	CM9-TS-1550041	Flat Washer	M6	4
41	JT9-TS-1551041	Lock Washer	M6	6
42	JT9-31A-38	Hex Head Bolt	M6 x 12	2
43	JT9-31A-39	Hex Head Bolt	M6 x 20	2
44	JT9-TS-1551041	Lock Washer	M6	2
45	JT9-31A-40	Work Stop		1
46	JT9-31A-41	Pivot Plate		1
47	JT9-31A-42	Fence Table		1
48	JT9-31A-43	Fence End Bracket		2
49	JT9-31A-44	Fence Base		1
50	JT9-31A-45	Long Link		1
51	JT9-31A-46	Short Link		1
52	JT9-31A-47	Socket Head Button Screw	M6 x 12	4
53	JT9-31A-48	Hex Head Bolt		3
54	JT9-31A-49	Set Screw	M8 x 35	1
55	JT9-TS-1540061	Hex Nut	M8	2
56	JT9-31A-50	Spring Pin	6mm dia x 20	1
57	JT9-31A-51	Set Screw	M6 x 8	1

Index No.	Part No.	Description	Size	Qty
58	JT9-31A-52	Lock Washer	M16	2
59	JT9-31A-53	Hex Head Flange Bolt	M6 x 20	4
60	JT9-31A-54	Lock Washer	M6	2
61	JT9-31A-55	Hex Head Bolt	M6 x 8	2
62	JT9-TS-1504041	Socket Head Cap Screw	M8 x 20	2
63	CM9-TS-2361081	Lock Washer	M8	2
64	JT9-31A-56	Hex Nut (L.H. Threads)	M16 x 2	1
65	JT9-31A-57	Socket Head Flat Screw	M6 x 16	1
66	JT9-31A-58	Socket Head Flat Screw	M8 x 20	2
67	JT9-31A-59	Spring		1
68	JT9-31A-60	Pin	6mm dia x 16	2
69	JT9-5051911	Flat Washer	M10 x 20	2
70	JT9-TS-1505031	Socket Head Cap Screw	M10 x 25	2
71	JT9-31A-61	Roll Pin	6mm dia x 24	2
72	JT9-31A-62	Roll Pin	6mm dia x 45	4
73	JT9-VB-A50	V-belt	A50	1
74	JT9-31A-64	Roll Pin	5mm dia x 30	1
75	JT9-31A-65	Stop Block		1
76	**	Sanding Belt (local purchase)	12" dia	1
77	**	Sanding Disc (local purchase)	6" x 48"	1
78	JT9-31A-68	Lock Knob	8mm x 20	1
79	JT9-31A-69	Flat Washer	M8 x 30 dia	1
80	JT9-31A-70	Lock Knob	M10 x 1.25P	1
81	JT9-31A-71	Tilting Scale		1
82	JT9-31A-72	Rivet	2mm dia. x 5	2
83	JT9-31A-73	Pan Head Screw	M6 x 8	1
84	JT9-31A-74	Pointer		1
85	CM9-TS-1550041	Flat Washer	M6	1
86	JT9-5051911	Flat Washer	M10	2
87	CM9-TS-2311061	Hex Nut	M6	1
88	JT9-TS-1523071	Socket Set Screw	M6 x 25	1
89	JT9-TS-1550031	Flat Washer	M5	1
90	JT9-TS-1503051	Socket Head Cap Screw	M6 x 20	2
91	JT9-TS-1524051	Socket Set Screw	M8 x 20	1
92	JT9-31A-75	Hex Head Bolt	M6 x 25	1
93	CM9-TS-2311061	Hex Nut	M6	1
94	CM9-31A-76	Pin		1
95	JT9-31A-77	Miter Gauge Assembly		1
96	JT9-RS250000	Retaining Ring		1

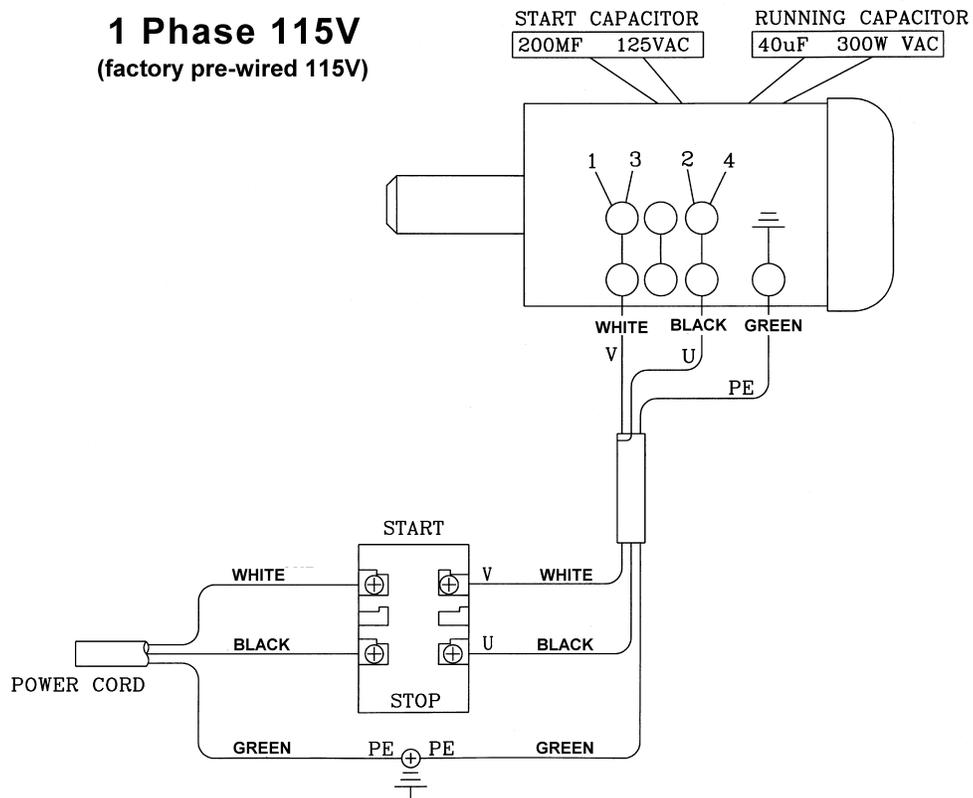
\*\* These parts are shown for reference only and are not available for order individually. Non-proprietary parts, such as fasteners, can usually be found at local hardware stores.

# 31A Sander Body Assembly

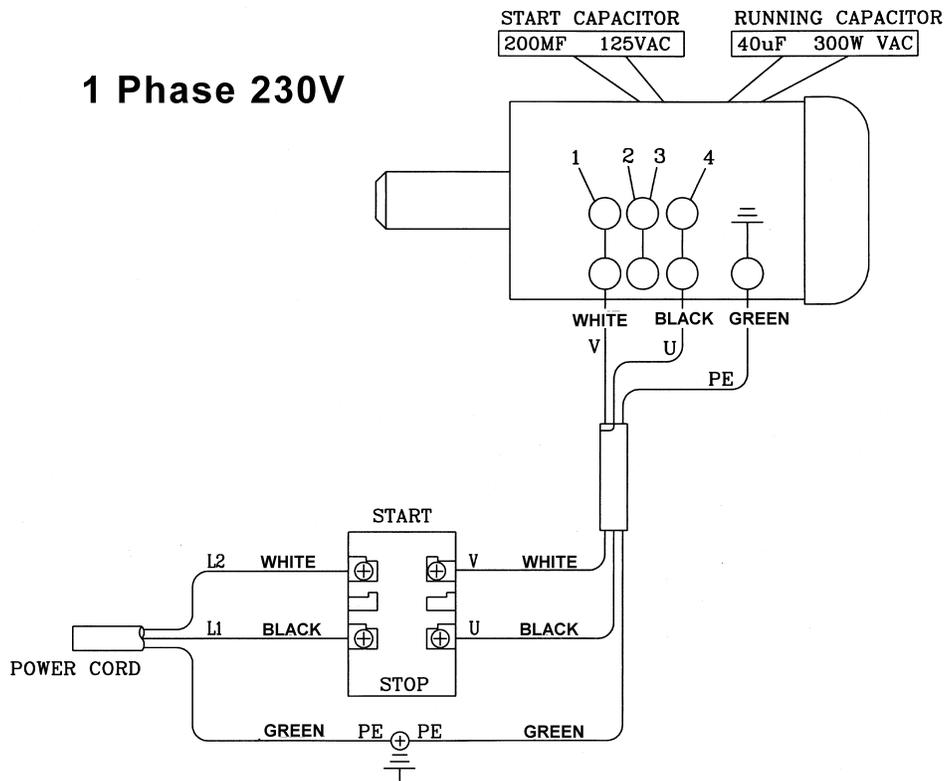


# Electrical Connections (1 Phase)

## 1 Phase 115V (factory pre-wired 115V)

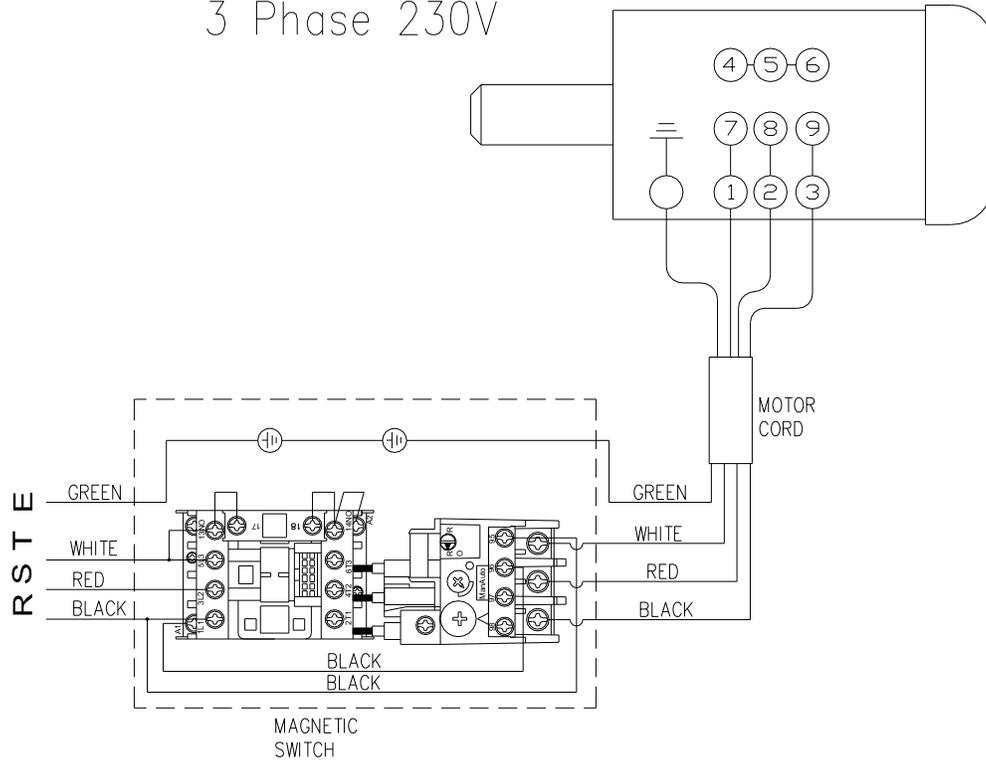


## 1 Phase 230V

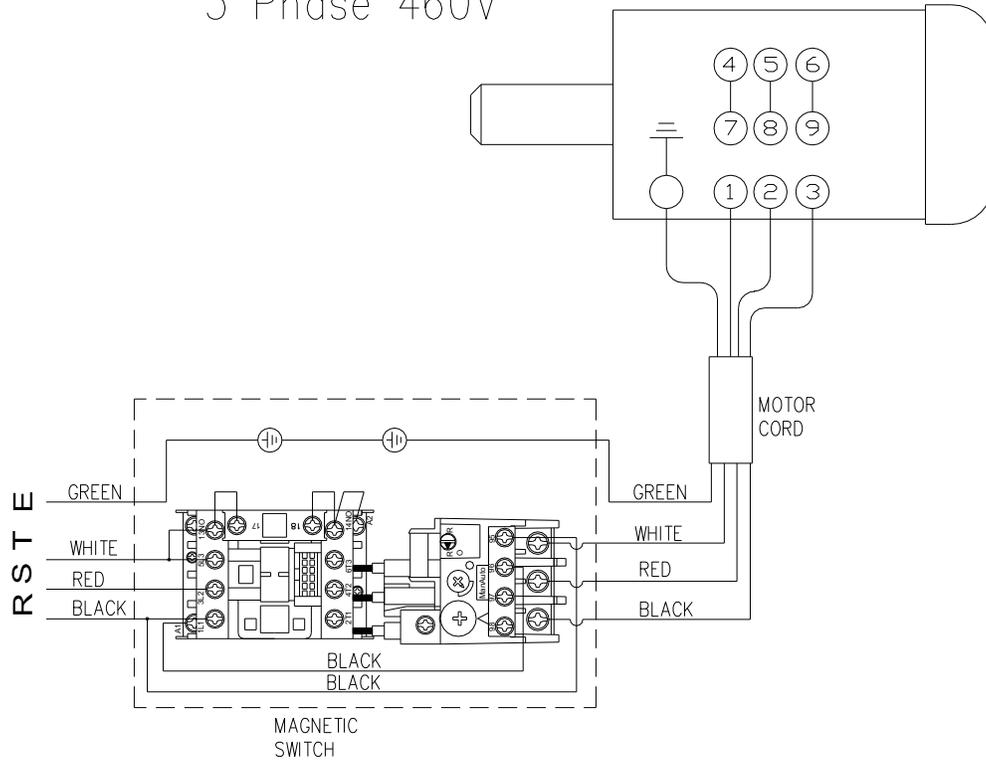


# Electrical Connections (3 Phase)

3 Phase 230V



3 Phase 460V







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