

# **POWERMATIC®**

## **Operating Instructions and Parts Manual 20"x14" Benchtop Woodturner's Lathe Model PM2014**



Shown with optional stand #1792014S  
(ordered separately)

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## 1.0 IMPORTANT SAFETY INSTRUCTIONS


READ ALL INSTRUCTIONS BEFORE USING THIS LATHE.

### **WARNING – To reduce risk of injury:**

1. Read and understand entire owner's manual before attempting assembly or operation.
2. Read and understand the warnings posted on the machine and in this manual.
3. Replace warning labels if they become obscured or removed.
4. This lathe 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 lathe, do not use until proper training and knowledge have been obtained.
5. Do not use this machine for other than its intended use. If used for other purposes, Powermatic disclaims any real or implied warranty and holds itself harmless from any injury that may result from that use.
6. Always wear protective eye wear when operating machinery. Eye wear shall be impact resistant, protective safety glasses with side shields which comply with ANSI Z87.1 specifications. Use of eye wear which does not comply with ANSI Z87.1 specifications could result in severe injury from breakage of eye protection. (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. Do not wear loose clothing. Confine long hair. Non-slip footwear or anti-skid floor strips are recommended. Do not wear gloves.
8. Wear hearing protection (plugs or muffs) if noise exceeds safe levels.
9. Do not operate this machine while tired or under the influence of drugs, alcohol or any medication.
10. Make certain the switch is in the **OFF** position before connecting the machine to the power supply. Turn off all controls before unplugging.
11. Make certain the machine is properly grounded. Connect to a properly grounded outlet only. See Grounding Instructions.
12. Make all machine adjustments or maintenance with the machine unplugged from the power source.
13. 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.
14. Keep safety 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 after maintenance is complete.
15. 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.
16. Provide for adequate space surrounding work area and non-glare, overhead lighting.
17. Keep the floor around the machine clean and free of scrap material, oil and grease.
18. Keep visitors a safe distance from the work area. **Keep children away.**
19. Make your workshop child proof with padlocks, master switches or by removing starter keys. Disconnect machine from power source when not in use.
20. Give your work undivided attention. Looking around, carrying on a conversation and "horse-play" are careless acts that can result in serious injury.
21. Maintain a balanced stance at all times so that you do not fall into the spindle or other moving parts. Do not overreach or use excessive force to perform any machine operation.
22. Use recommended accessories; improper accessories may be hazardous.
23. Maintain tools with care. Follow instructions for lubricating and changing accessories.
24. Turn off machine and disconnect from power before cleaning. Use a brush or compressed air to remove chips or debris; do not use bare hands.
25. Do not stand on the machine. Serious injury could occur if the machine tips over.
26. Keep turning tools sharp and clean for the best and safest performance, and position the tools properly in relation to the workpiece.

27. Never leave the Lathe running unattended. Turn the power off and do not leave the machine until the spindle comes to a complete stop.
28. Use proper extension cord. Make sure your extension cord is in good condition. When using an extension cord, use one heavy enough to carry the current your product will draw. An undersized cord will cause a drop in line voltage resulting in loss of power and overheating. Sect. 7.2, Table 2 shows correct size to use depending upon cord length and nameplate ampere rating. If in doubt, use the next heavier gauge. The smaller the gauge number, the heavier the cord.
29. Never leave the Lathe running unattended. Turn the power off and do not leave the machine until the spindle comes to a complete stop.
30. Remove loose items and unnecessary work pieces from the area before starting the machine.
31. Don't use in dangerous environment. Don't use power tools in damp or wet locations, or expose them to rain. Keep work area well lighted.
32. Check the workpiece carefully for splits, knots or other obstructions which may cause a safety risk while turning.
33. Adjust the tool support to the proper height and position for the work. Rotate the workpiece by hand to check clearance with the tool support.
34. Select the appropriate speed for the turning job at hand. Start at low speed and allow the Lathe to ramp up to operating speed.
35. Never stop a rotating workpiece with your hand.
36. If gluing up a workpiece, always use a high-quality glue of the type necessary for that particular workpiece.

 **WARNING:** This product can expose you to chemicals including lead and cadmium which are known to the State of California to cause cancer and birth defects or other reproductive harm, and phthalates which are known to the State of California to cause birth defects or other reproductive harm. For more information go to <http://www.p65warnings.ca.gov>.

 **WARNING:** Drilling, sawing, sanding or machining wood products generates wood dust and other substances known to the State of California to cause cancer. Avoid inhaling dust generated from wood products or use a dust mask or other safeguards for personal protection.

Wood products emit chemicals known to the State of California to cause birth defects or other reproductive harm. For more information go to <http://www.p65warnings.ca.gov/wood>.

## 1.1 General safety notes

Woodworking machines can be dangerous if not used properly. Therefore the appropriate general technical rules as well as the following notes must be observed.



Read and understand the entire instruction manual before attempting assembly or operation.



Keep this operating instruction close by the machine, protected from dirt and humidity, and pass it over to the new owner if you part with the tool.

No changes to the machine may be made.

Daily inspect the function and existence of the safety appliances before you start the machine.

Do not attempt operation in this case, protect the machine by unplugging the mains cable.

Before operating the machine, remove tie, rings, watches, other jewellery, and roll up sleeves above the elbows.

Remove all loose clothing and confine long hair.

**Wear safety shoes;** never wear leisure shoes or sandals.

Always wear the approved working outfit:

- safety goggles
- ear protection
- dust protection



**Do not wear gloves** while operating this machine.



Install the machine so that there is sufficient space for safe operation and workpiece handling.

Keep work area well lighted.

The machine is designed to operate in closed rooms and must be placed stable on firm and levelled table surface.

Make sure that the power cord does not impede work and cause people to trip.

Keep the floor around the machine clean and free of scrap material, oil and grease.

Stay alert, give your work undivided attention.

Use common sense. Do not operate the machine when you are tired.

Do not operate the machine under the influence of drugs, alcohol or any medication. Be aware that medication can change your behaviour.



Keep an ergonomic body position.

Maintain a balanced stance at all times.

Never reach into the machine while it is operating or running down.



Keep children and visitors a safe distance from the work area.

Never leave a running machine unattended. Before you leave the workplace switch off the machine.

Do not operate the electric tool near inflammable liquids or gases.

Observe the fire fighting and fire alert options, for example the fire extinguisher operation and place.

Do not use the machine in a damp environment and do not expose it to rain.

Wood dust is explosive and can also represent a risk to health.

Dust from some tropical woods in particular, and from hardwoods like beech and oak, is classified as a carcinogenic substance.

Always use a suitable dust collection device

Before machining, remove any nails and other foreign bodies from the workpiece.

Make sure to guide and hold the chisel with both hands safe and tight during machining.

Work only with well sharpened tools.

Machine only stock which is chucked securely on the machine, always check before switching the machine on.

If reversing spindle rotation, make sure face plate, chuck or other work holding is secured with the set screws to the spindle. To avoid threading loose.

Provide workpieces with centre holes before clamping between centres.

Work large and unbalanced workpieces at low spindle speed only.

When sanding, remove the tool rest from the machine.

Workpieces with cracks may not be used.

Use homogenous workpieces only.

Check the workpiece carefully for splits, knots or other obstructions which may cause a safety risk while turning.

Remove the chuck key or dowel pins before turning the machine on.

Always close the belt cover.

Specifications regarding the maximum or minimum size of the workpiece must be observed.

Test each set-up by revolving the work by hand to insure it clears the tool rest and bed. Check setup at the lowest speed before you increase to the operating speed.

Do not remove chips and workpiece parts until the machine is at a standstill.

Never stop work pieces with the hand during run out.

Do not attempt to engage the spindle lock pin until the spindle has stopped.

Never take measurements on a rotating workpiece.

Do not stand on the machine.

Do not obstruct the air flow on heat sinks of AC-drive (allow natural cooling).

Connection and repair work on the electrical installation may be carried out by a qualified electrician only.



(Warning: Wait five minutes for DC-bus capacitors discharge before accessing the AC drive unit.)

Have a damaged or worn power cord replaced immediately.

Make all machine adjustments or maintenance with the machine unplugged from the power source.



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



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



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

## **2.0 About this manual**

This manual is provided by Powermatic covering the safe operation and maintenance procedures for a Model PM2014 Lathe. 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.

This manual is not intended to be a complete instruction guide for woodturning practices, choice of stock, use of after-market accessories, etc. Additional knowledge may be obtained from experienced users or trade articles. Whatever accepted methods are used, always make personal safety a priority.

If there are questions or comments about this product, please contact your local supplier or Powermatic. Powermatic can also be reached at our web site: [www.powermatic.com](http://www.powermatic.com).

Retain this manual for future reference. If the machine transfers ownership, the manual should accompany it.

Register your product using the mail-in card provided, or register online:

<http://www.powermatic.com/us/en/service-and-support/product-registration/>

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## 4.0 Specifications

Table 1

Model number		<b>PM2014-RU</b>
Stock numbers	Lathe	1792014
	Stand (optional accessory)	1792014S
<b>Motor and Electricals</b>		
Motor	Type	Totally-enclosed, fan-cooled
	Horsepower	1 HP
	Motor phase	3 PH
	Motor voltage	230 V
	Cycle	50 Hz
	Motor speed	1400 RPM
	Listed FLA (full load amps)	3.88 A
<b>Input power requirements</b>		<b>1-phase, 230-volt</b>
Drive system		Poly V belt, E-type inverter drive, 3-step pulley
Operating switch		Remote with magnetic base
VFD input amperage		6.5A, 1PH
VFD output to motor		3.88 A (3PH)
Power cord and plug		H05RN-F 3G 1.0mm <sup>2</sup> , VDE
Remote switch cord		AWM 24AWG 300V, 6-1/2 ft.
Recommended circuit size <sup>1</sup>		10 A
Sound emission without load <sup>2</sup>		75 dB at 20 inches (508mm) from motor
<b>Capacities</b>		
Working distance between centers		19-1/4 in. (489mm) stop bolt installed 20-1/4 in. (514.4mm), stop bolt removed
Maximum distance between spindle face and tailstock quill		23 in. (584 mm), stop bolt removed
Working distance between centers with 13" <i>optional</i> bed extension mounted		32-1/4 in. (819mm) with stop bolts installed
Inboard turning	Swing over bed	14-1/4 in. (362 mm)
	Swing over toolrest base	10-3/4 in. (273 mm)
Outboard turning	Recommended maximum spindle load <sup>3</sup>	356 kg (786 lbs.) at 100mm (4 in.) from spindle flange
	Swing over <i>optional</i> 13in. bed extension in low position	20-1/4 in. (514 mm)
	Swing over toolrest base on <i>optional</i> 13in. bed extension in low position	16-3/4 in. (425 mm)
<b>Headstock and spindle</b>		
Spindle speeds (3 belt positions)		Variable: 15~900, 30~1800, 60~3600 RPM
Spindle thread size		M33x3.5mm, RH threads
Spindle direction		Forward/reverse
Headstock spindle taper		#2 Morse
Hole through headstock spindle, diameter		3/8 in. (9.5 mm)
Indexing		24 positions (15° workpiece rotations), positive locking
Faceplate diameter		3 in. (76.2 mm)
<b>Tailstock</b>		
Tailstock quill taper		#2 Morse
Hole through tailstock quill, diameter		3/8 in. (9.5 mm)
Tailstock quill travel		4-1/4 in. (108 mm)
Tailstock quill thread		ACME 5/8 in-11
<b>Tool rest</b>		
Tool rest width		8 in. (204 mm)
Tool rest post diameter		1 in. (25.4 mm)
Tool rest locking		Bushing

Main materials		
Headstock body		Cast iron
Tailstock body		Cast iron
Bed		Cast iron
Tool rest		Ductile iron, FCD45
Tool rest base		Cast iron
Spindle		S45S
Tailstock quill		S45C
Face plate		Cast iron
Dimensions		
Overall size assembled LxWxH	Lathe only	52 x 24 x 18 in. (1321 x 610 x 457 mm)
	Lathe with <i>optional</i> stand at highest position	52 x 25 x 48.5 in. (1321 x 635 x 1232 mm)
	Lathe with <i>optional</i> stand at lowest position	52 x 25 x 38 in. (1321 x 635 x 965 mm)
Distance floor to spindle centerline, lathe on <i>optional</i> stand (adjustable using levelers)		34~44-1/2 in. (864~1130 mm)
Bed gap		1-3/4 in. (45 mm)
Bed width		7 in. (178 mm)
Shipping dimensions LxWxH	Lathe	870 x 480 x 580 mm (33.25 x 18.9 x 22.83 in.)
	Stand ( <i>optional</i> )	650 x 700 x 350 mm (25.59 x 27.56 x 13.78 in.)
	Bed extension ( <i>optional</i> )	300 x 350 x 200 mm (11.81 x 13.78 x 7.84 in.)
Weights		
Lathe	Net weight	183 lbs. (83 kg)
	Shipping weight	205.7 lbs. (93.5 kg)
Stand ( <i>optional</i> )	Net weight	55 lbs. (25 kg)
	Shipping weight	63.8 lbs. (29 kg)
13-in. Bed extension ( <i>optional</i> )	Net weight	29 lbs. (13 kg)
	Shipping weight	30.8 lbs. (14 kg)

<sup>1</sup> Subject to local/national electrical codes.

<sup>2</sup> The specified values are emission levels and are not necessarily to be seen as safe operating levels. As workplace conditions vary, this information is intended to allow the user to make a better estimation of the hazards and risks involved only.

<sup>3</sup> Recommended loading information; does not encompass all types of outboard activity. **CAUTION:** If you suspect a workpiece could result in overweighting of the spindle or instability of the lathe, do NOT attempt to use it.

L = length, W = width, H = height

Items listed as “optional” are purchased separately.

The specifications in this manual were current at time of publication, 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.

## 4.1 Mounting pattern for PM2014 Lathe

If you are not using the accessory Powermatic stand, use this hole pattern in your workbench for securing the PM2014. Workbench holes will be clearance holes for 5/16" screws.

Holes in lathe base are threaded 5/16"-18, 3/4 in. deep. Only four of the holes need be used when mounting to a workbench.

Use four 5/16"-18 bolts of appropriate length with washers; insert through workbench and into lathe base.

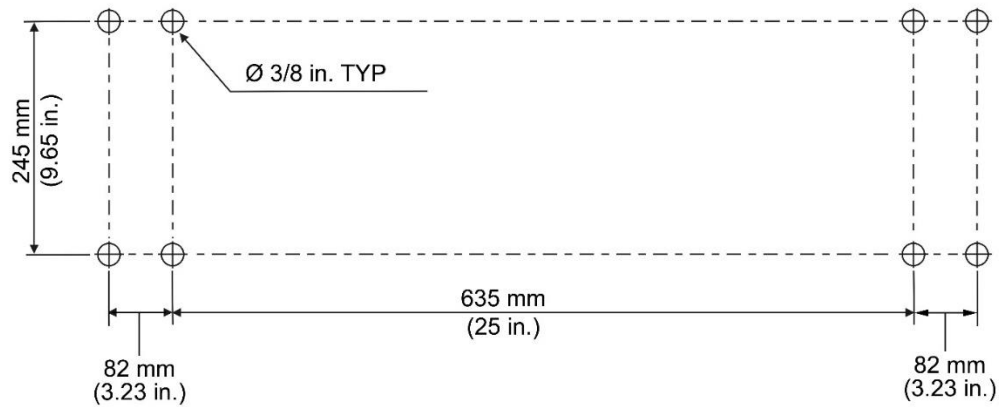


Figure 4-1: mounting pattern for workbench

## 5.0 Features and Terminology

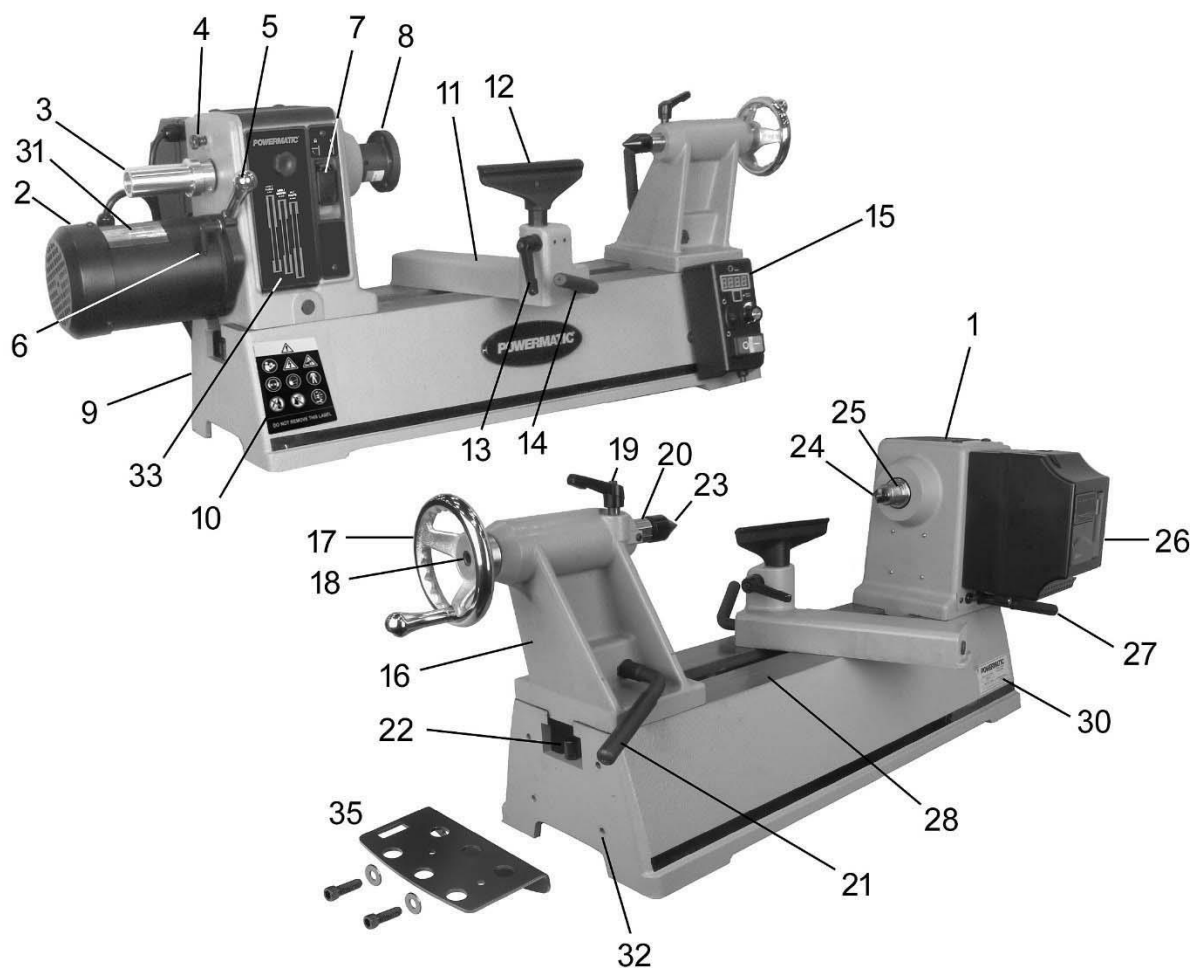


Figure 5-1: features and terminology

- |                                    |   |
|------------------------------------|---|
| 1. Headstock                       | 19. Tailstock spindle locking handle          |
| 2. Motor, 1HP                      | 20. Tailstock spindle                         |
| 3. Handwheel                       | 21. Tailstock locking handle                  |
| 4. Indexing pin                    | 22. Stud (x2)                                 |
| 5. Motor tension handle            | 23. Live cone center                          |
| 6. Motor tension lock handle       | 24. Spur center                               |
| 7. Spindle lock                    | 25. Spindle                                   |
| 8. Face plate, 3in.                | 26. Variable frequency drive (Inverter)       |
| 9. Bed                             | 27. Headstock locking handle                  |
| 10. Warning label                  | 28. Bed ways                                  |
| 11. Tool rest base                 | 30. ID/serial no. label                       |
| 12. Tool rest, 8in.                | 31. Motor label                               |
| 13. Tool rest locking handle       | 32. Mounting holes for optional bed extension |
| 14. Tool rest base locking handle  | 33. Pulley cover (with belt change graphic)   |
| 15. Remote switch box              | 35. Tool caddy                                |
| 16. Tailstock                      |   |
| 17. Tailstock handwheel            |   |
| 18. Hole through tailstock spindle |   |

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

NOTE: Figures in this manual may show the lathe with optional accessories, which are purchased separately.

## 6.0 Setup and Assembly

### 6.1 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 Lathe 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.

### 6.2 Contents of shipping container

See Figure 6-1.

- 1 Lathe with headstock, tailstock, and tool rest base (not shown)
- 1 Knockout rod
- 1 Face plate 3in.
- 1 Face plate wrench
- 1 Toolrest, 8in.
- 1 Spur center 1in.
- 1 Cone live center
- 2 Socket head cap screws, 3/8 x 1-1/4
- 2 Flat washers, 3/8
- 1 Tool caddy
- 1 Owner's manual (not shown)
- 1 Product registration card (not shown)



Figure 6-1: accessories included

### 6.3 Tools required for assembly

8mm hex key ("Allen wrench")

**⚠WARNING** The Lathe must be disconnected from power during assembly. Use an assistant or a hoist to help lift items.

1. Remove any screws or straps that hold the Lathe parts to the pallet, and remove protective wrapping. Set all boxes containing accessories to the side.
2. The Lathe should be located in a dry area, on a sturdy bench or the Powermatic accessory stand (#1792014S), and with sufficient lighting. Leave plenty of space around the machine for operations and routine maintenance work.  
  
(If the accessory stand was purchased, refer to the assembly instructions that accompany it.)
3. Exposed metal areas of the Lathe, such as bed ways and spindles, have been factory coated with a protectant. This should be removed with a soft cloth and a cleaner-degreaser. Clean the bed areas under headstock, tailstock and tool support base. Do not use an abrasive pad, and do not allow solvents to contact painted or plastic areas.
4. Apply a light coat of SAE10 oil to the exposed metal areas to impede rust.

### 6.4 Tool caddy

The tool caddy may be mounted to the lathe bed with the provided screws and washers. See Figure 5-1. It may also be mounted to the optional extension bed.

### 6.5 #6294755 Bed extension (OPTIONAL)

*If you did not purchase the optional 13-inch bed extension, proceed to sect. 6.6.*

To mount bed extension to Lathe:

1. Slide tailstock away from edge of bed, and unscrew stud (A, Figure 6-2).
2. Have an assistant hold bed extension flush to end of Lathe bed, and insert four 3/8 x 1-3/4 socket head cap screws with lock washers and flat washers (provided with extension bed) through holes in bed extension into threaded holes on Lathe (8mm hex wrench). Make screws snug but do not fully tighten. See Figure 6-2.
3. Adjust extension bed to lathe bed, aligning top surface and inside ways as closely as possible. Make screws snug but *do not fully tighten yet*.
4. Slide tailstock over joint where beds meet, so that clamping nut is centered over joint, as shown in Figure 6-2. Firmly tighten tailstock clamping handle; this will align the beds.

**IMPORTANT:** Top surface of bed extension **must** be flush with surface of lathe bed, and inside ways must be aligned, to allow smooth movement of tailstock across joint.

5. Tighten screws securely.
6. Unlock tailstock and slide it back and forth to test smoothness of joint. Make any additional adjustments as needed.
7. Install stud at end of bed extension.



Figure 6-2: optional 13" bed extension

#### Lower position:

If lathe is mounted to the optional Powermatic stand, the bed extension may be mounted in lower position. See Figure 6-17. Three screws will be used instead of four.

Lower position is used for bowl turning when headstock is at outboard end of lathe bed, as shown in Figure 6-17. An optional toolrest post extension (B, Figure 6-17) is included with the extension bed, and can be used to elevate toolrest when using extension bed in lower position.



Figure 6-3

## 6.6 Headstock utility holes

Two M12-1.5P threaded holes are provided atop the headstock, protected by rubber bungs. These holes can be used to attach accessories (not provided), such as lighting, guarding or dust collection. Use a flat blade screwdriver to unscrew the bungs. Note: The holes should remain covered if not being used, to prevent debris from entering the headstock.

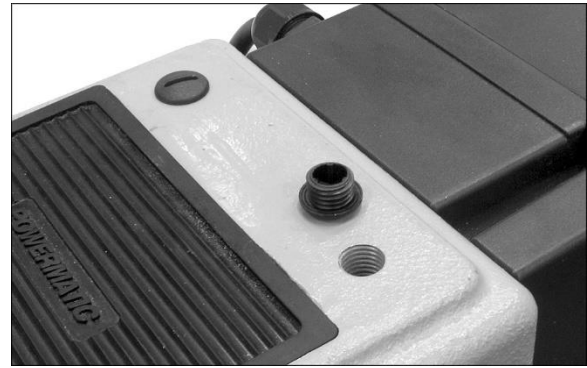


Figure 6-4: utility holes

## 7.0 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 Lathe will operate on **single phase, 120 volt** power supply. The Variable Frequency Drive, or "inverter," converts the incoming power to the necessary input for the 3-phase motor.

It is recommended that the lathe be connected to a 15 amp circuit with circuit breaker or time delay fuse. **Local codes take precedence over recommendations.**

### 7.1 GROUNDING INSTRUCTIONS

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. 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.

**⚠WARNING** 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. Failure to comply may cause serious or fatal injury.

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.

This tool is for use on a nominal 230-V circuit, and has a grounded plug.

## 8.0 Adjustments

### 8.1 Headstock/tailstock movements

To slide headstock or tailstock, loosen locking handle (A, Figure 8-1) until head/tailstock can slide freely. When head/tailstock is positioned, swing locking handle until it tightens securely.

To remove headstock, tailstock or tool support base from bed, unscrew and remove stud at either end (B, Figure 8-1). NOTE: After re-mounting these items on the Lathe, always insert stud.

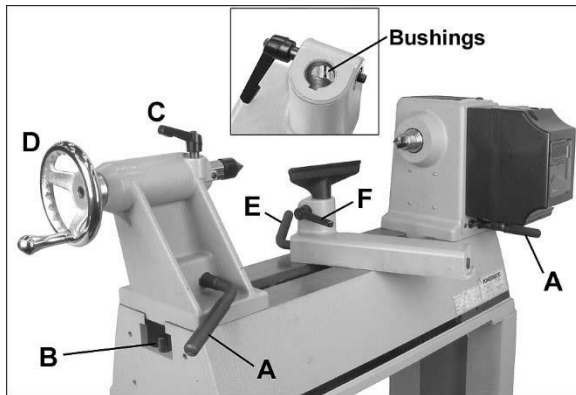


Figure 8-1: headstock, tailstock, tool support

#### Inboard turning:

For most spindle turning operations, the headstock will be positioned at left end of bed, and only the tailstock moved to accommodate the workpiece. Loosen locking handle (C, Figure 8-1) to advance or retract tailstock quill by rotating handwheel (D). Retighten handle (C) before operating lathe. *Lock tailstock in position before operating.*

#### Outboard turning:

For outboard turning, remove tailstock and tool rest assembly from bed, and slide headstock to opposite end of bed, as shown in Figure 8-2. *Lock headstock in position before operating.*

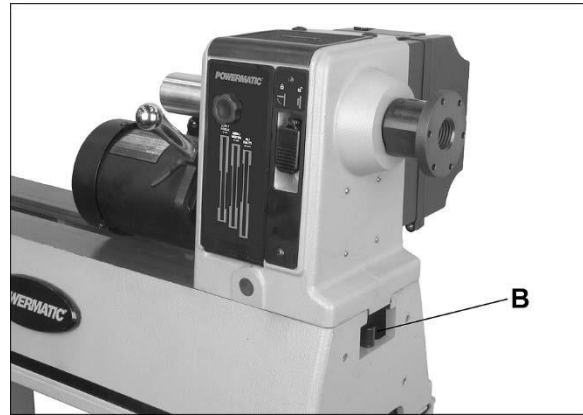


Figure 8-2: outboard turning position

### 8.2 Tool support

An 8-inch toolrest is provided with your Lathe. It allows adjustment for height, position on the bed, and angle to the work.

Loosen locking handle (E, Figure 8-1) to slide support base forward or back, and angle it to the bed. Tighten locking handle securely before operating Lathe.

Loosen small handle (F, Figure 8-1). Make sure clamp bushings (inset, Figure 8-1) are spread apart sufficiently to accept tool support post.

Adjust height of tool support and angle it to the work. Tighten handle (F) before operating Lathe.

NOTE: Locking handle (F) and clamp bushings can be removed from hole and inserted from opposite side for convenience.

### 8.3 Cam tightness

If headstock, tailstock or tool rest base does not properly tighten down against bed when locking handle is tightened, adjust as follows. Figure 8-3 uses tailstock as example.

1. Unscrew and remove stud, and slide tailstock off end of bed.
2. Turn tailstock on its side, and tighten lock nut with a wrench. See Figure 8-3.
3. Mount tailstock on bed and test the adjustment. When adjustments are complete, re-insert stud at end of bed.

### 8.4 Locking handles

Locking handles, such as C and F, Figure 8-1, can be rotated to more convenient position. Lift up on handle, rotate it on pin, then release it, making sure it seats on pin.

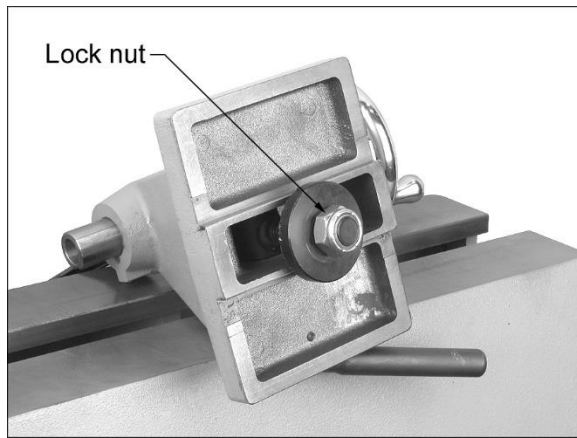


Figure 8-3: cam adjustment

## 8.5 Indexer

The indexer has 24 evenly spaced holes concentric to the spindle, and is used to create evenly spaced features in a workpiece, while keeping the lathe spindle locked; for example, when cutting flutes on a spindle blank with a router, while the spindle blank is secured between lathe centers. Numbers 1 through 24 are inscribed on top sheave (K, Figure 8-4) for reference. When lathe is powered, however, the LED display can be used for rapid locating of index positions, as follows.

1. Connect lathe to power source.
2. Push index button (G, Figure 8-4). The LED display will change from RPM setting to index setting.
3. Use handwheel (H) to rotate workpiece to desired position.
4. Push in index pin (J, Figure 8-4) and rotate workpiece slightly until pin engages hole. Then screw index pin (J) further into headstock to lock spindle.
5. Cut first flute in workpiece.
6. Push index button (G) to set engaged index position at zero.
7. Unscrew index pin (J) to release spindle, then rotate workpiece until next desired hole shows on readout.
8. Engage index pin, and rout second flute. Continue the process.

Example: If 6 evenly-spaced flutes are needed around full workpiece circumference, use positions 0, 8, 16, 24, 32, and 40.

**IMPORTANT: When finished indexing, unscrew and release index pin before turning on spindle.**

The LED display will revert to RPM setting when lathe spindle is turned on.

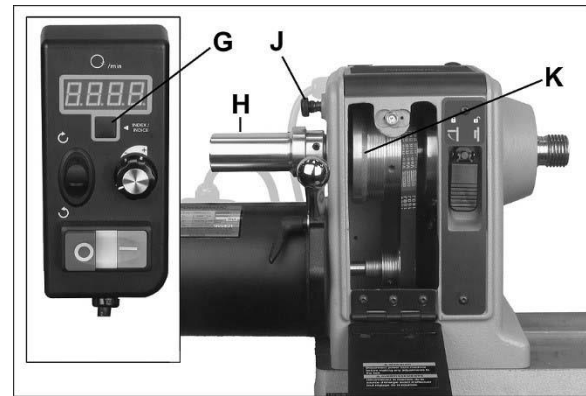


Figure 8-4: indexer

## 8.6 Centers: installing/removing

### 8.6.1 Headstock spur center

1. To *install* the spur center, the spur center should first be mounted to your workpiece; see sect. 10.3 for details). Clean tapered end of center and inside of headstock spindle, then push center into spindle.

2. To *remove* the spur center, first remove workpiece from Lathe. Insert knockout rod (Figure 8-5) through hole in handwheel and firmly tap tapered end of spur center.

**IMPORTANT:** Hold the center by either placing thumb and forefinger on outside diameter of spur center, or wrapping the center with a rag. The center can be damaged if allowed to fall.



Figure 8-5: removing center from headstock

### 8.6.2 Tailstock live center

1. Clean the tapered end of center and the inside of tailstock spindle.
2. Install the provided live center by pushing it into tailstock spindle. It should resist any attempt to pull it out by hand.
3. To remove the center from the tailstock, loosen locking handle (C, Figure 8-6) and retract quill by rotating handwheel counterclockwise until center dislodges on its own. Hold the center with one hand to prevent it from falling out of spindle, which can damage it.

A drill chuck with #2 Morse taper (not provided) can be mounted to the tailstock for end-drilling with a bit.

The hole through the tailstock can be used for deep hole drilling, such as for a lamp spindle. A hollow center (not provided) is mounted and an auger (not provided) is passed through the tailstock into the workpiece.

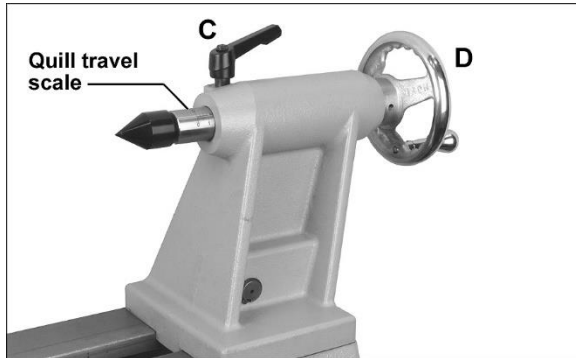


Figure 8-6: installing center in tailstock

## 8.7 Face plate: installing/removing

1. Disconnect Lathe from power source.
2. Mount faceplate to your bowl blank.
3. Pull up spindle lock tab (Figure 8-7) and rotate handwheel until lock engages spindle. Continue holding tab in raised position.
4. Install faceplate onto threads of headstock spindle and rotate clockwise hand-tight. When the Lathe is turned on (forward rotation), the rotational force will snug the faceplate even farther onto the threads.

### **WARNING**

If at any time you will be **reversing** spindle rotation, make sure the two set screws in the faceplate are tight. (One of these is shown in Figure 8-7.) Failure to do this may cause faceplate to loosen from headstock spindle.

5. Release tab to disengage lock. Note: Rotate spindle slightly to ensure lock has disengaged.
6. To *remove* faceplate, back off the two set screws (Figure 8-7) with 3mm hex wrench. Pull up spindle lock tab and turn faceplate counterclockwise with faceplate wrench, as shown.

### **CAUTION**

Failure to back off set screws before attempting removal of faceplate may result in damage to spindle threads.



Figure 8-7: installing/removing faceplate

## 8.8 Speed change

1. Disconnect Lathe from power source.
2. Pull open access door on headstock.
3. Loosen pivot lock handle (L, Figure 8-9) and lift tension handle (M, Figure 8-9) to raise motor. Tighten pivot lock handle (L, Figure 8-9) to hold motor in raised position.
4. There should be sufficient slack in belt to reposition it to the other steps on the sheaves. The label on the access door shows the required belt position. A similar graphic is shown in Figure 8-8.

5. Loosen pivot lock handle (L, Figure 8-9) and lower motor to tension belt. Be sure that V-grooves of belt seat properly in corresponding grooves of sheave. Do not overtension; a very light pressure on the tension handle (M) is adequate to prevent belt slippage.
6. Tighten pivot lock handle (L).



Figure 8-8

## 8.9 Sheave and belt alignment

1. The motor and spindle sheaves are aligned by the manufacturer, but if any service is performed that affects their alignment it is very important that they be realigned. To realign them, loosen two set screws on spindle sheave (one is shown at N, Figure 8-9) with a hex key, and nudge spindle sheave into proper position. Retighten both set screws.
2. When sheaves and belt are properly aligned, there should be no unusual pulsing sounds or noise coming from the belt.

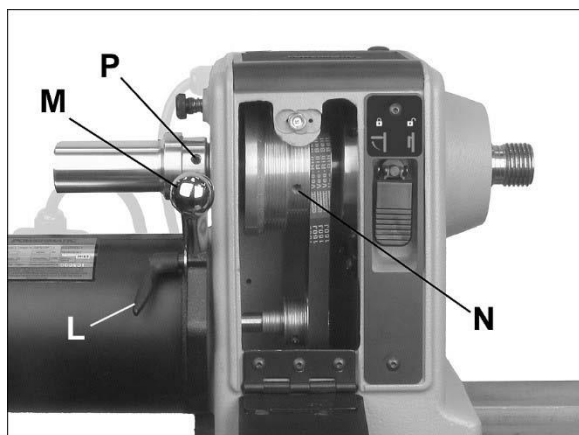


Figure 8-9: sheave/belt alignment

## 8.10 Sheave/drive belt replacement

**IMPORTANT:** Replacing spindle sheave or belt can be a challenging procedure. If you do not feel confident performing this action, take the headstock to an authorized Powermatic service center.

1. **Disconnect lathe from power source.**
2. Loosen lock handle (L, Figure 8-9) and lift handle (M) to raise motor.
3. Tighten lock handle (L) to hold motor in raised position. Slip belt off lower pulley.
4. Loosen two set screws on handwheel (P, Figure 8-9) with a 3mm hex wrench, and unscrew handwheel off spindle (NOTE: Left-hand threads; rotate clockwise to loosen).
5. Tap left end of spindle with a rubber mallet, or a steel face hammer against a block of wood, to push it to the right, just enough to remove sheave or belt. (**Never** use a steel face hammer directly against spindle.) Prevent the top sheave from being forced into the sensor/encoder assembly; if necessary loosen sheave set screws and slide it to the left.
6. If replacing sheave, loosen two set screws (N, Figure 8-9), and slide sheave off spindle. Install new sheave, *loosely* securing the two set screws at first. Make sure the sheave is oriented properly.
7. Push spindle back into place. Make sure the sensor collar is positioned over the sensor for the digital readout to function.
8. Check for any spindle play or “runout” at this point. If it exists, see *sect. 13.0*.
9. Reinstall handwheel and tighten set screws (P, Figure 8-9).
10. Align new sheave (see *sect. 8.9*) then tighten two set screws (N, Figure 8-9) securely on sheave.
11. Loosen lock handle (L) and allow motor to lower. Do not over-tension; a very light pressure on tension handle (M) is adequate to prevent belt slippage.
12. Tighten lock handle (L).

## 9.0 Operating controls

### 9.1 Remote switch box

See Figure 9-1.

The switch box has a magnetic base, and may be conveniently placed anywhere on the lathe body.

**(A) LED Readout:** Displays spindle speed when lathe is operating. Displays indexing position when lathe is stopped and index button (E) has been pushed.

**(B) Spindle start/stop:** Push green button to activate spindle; red to stop.

**(C) Spindle direction:** Can be activated while spindle is turning – spindle will automatically slow to a stop before reversing direction.

**⚠ WARNING** When turning with a face plate, make sure both set screws on the face plate are tight (see Figure 8-7) before reversing spindle. Failure to comply may cause face plate to spin loose from spindle.

**(D) Speed control dial:** Always start Lathe at lowest speed, with dial rotated all the way counter-clockwise.

**(E) Index button:** Push to set index reference to zero. See sect. 8.5.

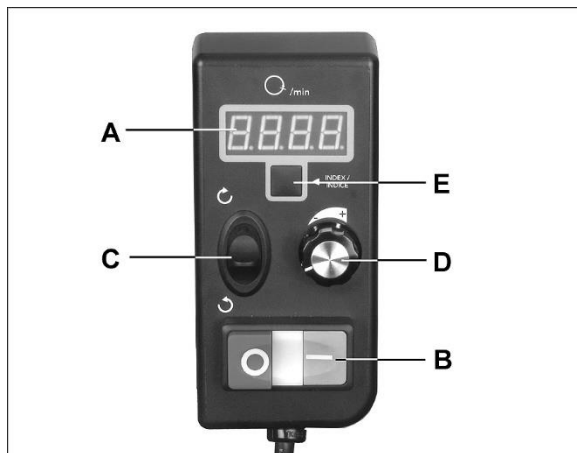


Figure 9-1: operating controls

### 9.2 Variable frequency drive (inverter)

The PM2014 Lathe uses the latest technology in A.C. inverter drives to provide infinitely variable spindle speeds within the specified ranges. The inverter controls the speed of the motor by varying the frequency of the voltage supplied to the motor. The inverter provides an acceleration ramp that eliminates the shock of normal starting.

Also, a braking feature eliminates long coasting periods after the Lathe is turned off.

The A.C. Inverter does not require any programming – it is pre-programmed by the manufacturer. **Use only the controls on the switch box to operate lathe.**

If an inverter error occurs, the LED on the switch box will show “Err”. Contact Powermatic technical service at 1-800-274-6846.

**⚠ CAUTION** A lightning strike or power surge may cause the inverter to fail. When lathe is not in use, disconnect power plug, or have a 3-pole disconnect installed on the power side.

## 10.0 Operation

The information which follows is general in nature and not intended to be a complete course in wood turning. Much knowledge can be gained by discussions with experienced woodturners or by consulting books, trade articles, and internet forums. Above all, simple trial and error will aid in developing proficiency in the craft.

### 10.1 Inspection

Before operating the lathe, check that everything is in proper working order:

1. Level your machine; If using the optional stand, adjust the leveling feet.
2. Check bearings; there should be no endplay or spindle runout.
3. Check belt; it should be snug but not overly tight.
4. Bed ways; keep clean, use steel wool to remove any rust spots, and apply paste wax to prevent buildup of rust and finishes.
5. Tool support; use a mill file to remove nicks and dings.
6. Spindle tapers; should be clean and free of dust and chips for proper seating of tapers.
7. Tailstock; clean and lubricate quill and locking device.
8. Lighting; proper lighting is essential to eliminate shadows and reduce eye strain.

### 10.2 Turning tools

If possible, select only fine quality, high-speed steel turning tools. High-speed steel tools hold an edge and last longer than ordinary carbon steel. As one becomes proficient in turning, a variety of specialty tools for specific applications may be acquired. The following tools provide the basics for most woodturning projects (see Figure 10-1):

**Skews** – 1-1/2" and 1" or 1-1/4", used to make finishing cuts and details.

**Large Roughing Gouge** – 1" to 1-1/4", used to eliminate waste wood.

**Spindle Gouges** – 1/4", 3/8", 1/2", used to turn beads, coves and other details.

**Deep Fluted Bowl Gouge** – 1/4", 3/8" and 1/2", used for turning bowls & plates.

**Square Scraper (Bedan)** – 3/8" or 1/2", used to create square shoulders.

**Large Round Nose (Domed) Scraper** – 1-1/2", used to reduce ridges on interior of bowls, round edges of bowls, etc.

**Parting Tool** - 1/8", used for scraping, making a cut-off, or to set diameters for sizing.

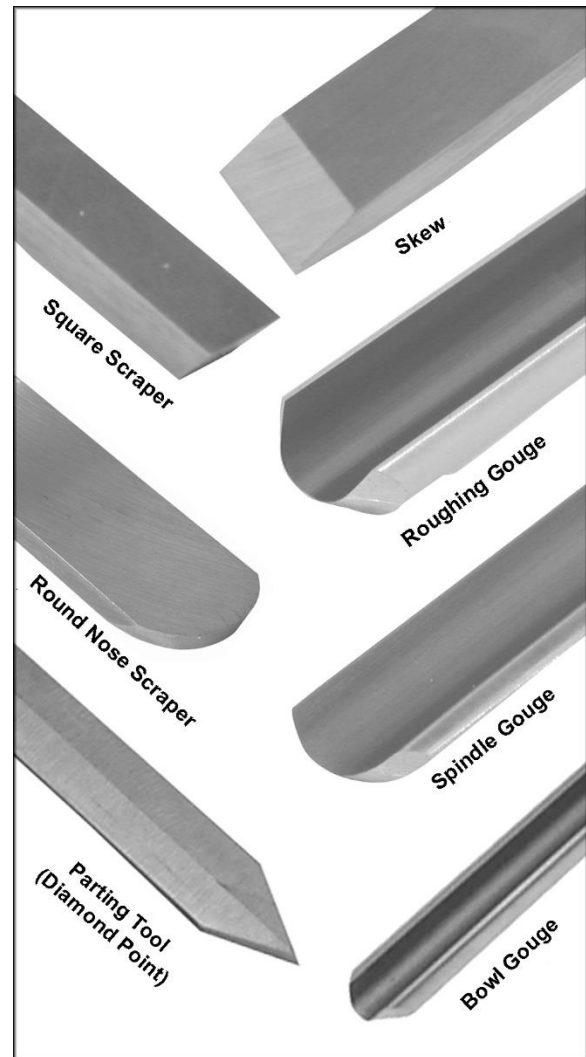


Figure 10-1: Basic Turning Tools

For safety and best performance, *keep tools sharp*. If a tool stops cutting or requires excessive pressure to make a cut, it needs to be sharpened. A number of brand name sharpening jigs and fixtures are available; however, a woodturner should learn to sharpen tools freehand.

For best results, use a slow speed grinder (1800 rpm) fitted with a 60-grit aluminum oxide wheel (for shaping) and a 100-grit alum. oxide wheel (for final sharpening and touchup). The grinder should be located near your lathe and at a comfortable height. A diamond dresser will keep the wheels true and eliminate glazing.

Never allow the tool to rest in one place on the wheel; keep it moving and use a light touch.

Carbon steel tools can overheat easily and should be cooled frequently. If the edge turns blue, it has lost its temper and should be ground past the blue area. High-speed steel tools are not as likely to overheat, but can be damaged if allowed to get red hot. High-speed steel tools should not be quenched for cooling. Honing with a diamond lap or slipstone will save trips to the grinder and keep the edge fresh.

## 10.3 Spindle turning

Spindle turning takes place between the centers of the lathe. It requires a spur or drive center in the headstock and a live or dead center in the tailstock. A cup center rather than a cone center in the tailstock will often reduce the risk of splitting the stock.

Figure 10-2 shows the basic profile shapes in spindle turning.

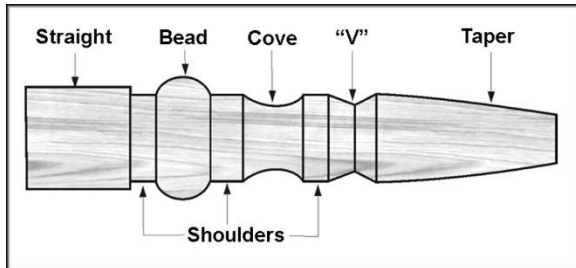


Figure 10-2

### 10.3.1 Stock selection

Stock for spindles should be straight grained and free of checks, cracks, knots and other defects. It should be cut 1/8" to 1/4" larger than the finished diameter and may require additional length so the ends can be removed later. Larger stock should have the corners removed to produce an octagon making the piece easier to rough down to a cylinder.

1. With a combination square, or plastic center finder for round stock, locate and mark center on each end of the workpiece. Accuracy is not critical on full rounds but extremely important on stock where square sections are to remain. Put a dimple in the stock with an awl or nail, or use a spring-loaded automatic center punch.
2. Extremely hard woods may require kerfs cut into the ends of the stock (Figure 10-3) using a band saw, so the wood will accept the spur center and the live center.

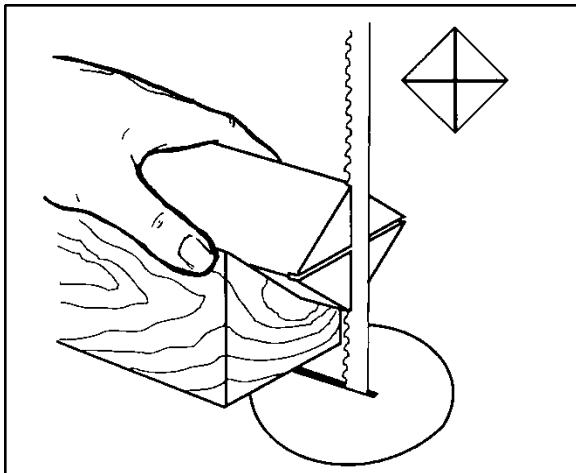


Figure 10-3

3. Drive the spur center about 1/4" into the workpiece, using a wood mallet or dead blow hammer as shown in Figure 10-4. Be careful

that you do not split the workpiece. **Never use a steel face hammer and never drive the workpiece onto the spur center while it is mounted in the Lathe spindle.**

4. Make sure the headstock is locked to the Lathe bed.
5. Clean the tapered end of the spur center and the inside of the headstock spindle.
6. Insert the tapered end of the spur center (with the attached workpiece) into the headstock spindle.
7. Support the workpiece while bringing the tailstock into position about 1" away from the end of the workpiece. Lock the tailstock to the bed.

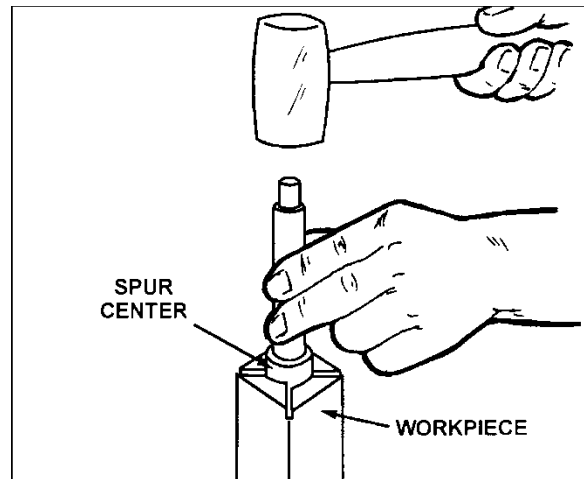


Figure 10-4

8. Advance the tailstock spindle with the handwheel in order to seat the live center into the workpiece. Use enough pressure to secure the workpiece between the centers so that it won't fly off, but do not use excessive pressure.
9. Tighten the spindle locking handle.

### CAUTION

The tailstock ram is capable of exerting excessive pressure against the workpiece and the headstock. Apply only sufficient force with the tailstock to hold the workpiece securely in place. Excessive pressure can overheat center bearings and damage both workpiece and Lathe.

10. Move tool support into position. It should be parallel to the workpiece, just below the centerline and approximately 1/8" to 1/4" from the corners of the workpiece to be turned, as in Figure 10-5. Tighten support base to Lathe bed.
11. Rotate workpiece by hand to check for proper clearance.
12. Start lathe at lowest speed and bring it up to the appropriate RPM for the size of workpiece used. Consult digital readout on the headstock.

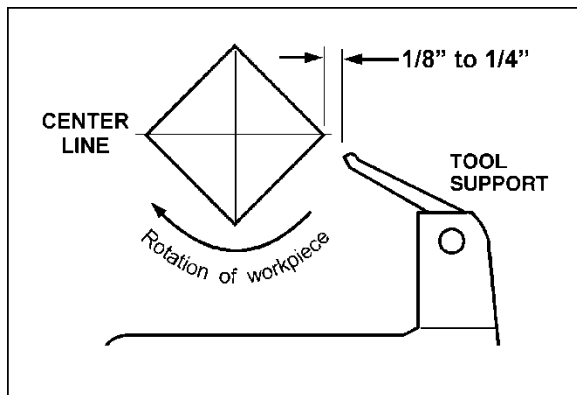


Figure 10-5

### 10.3.2 Cutting techniques

#### Roughing out

1. Begin with a large roughing gouge. Place the tool on the tool support with the heel of the tool on the surface to be cut.
2. Slowly and gently raise tool handle until cutting edge comes into contact with the workpiece.
3. Beginning about 2" from the tailstock end of the workpiece, roll the flute (hollowed-out portion) of the tool in the direction of the cut. See Figure 10-6. Make long sweeping cuts in a continuous motion to rough the piece down to a cylinder.

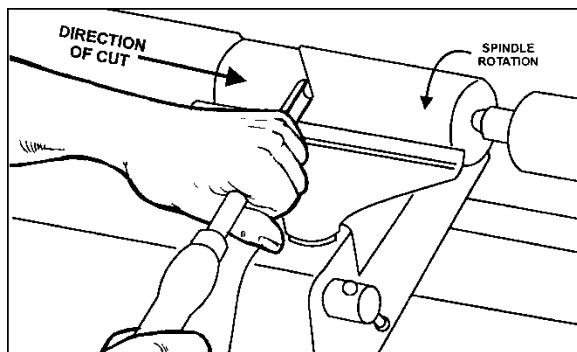


Figure 10-6: roughing out

4. Keep as much of the bevel of the tool as possible in contact with the workpiece to ensure control and avoid catches. NOTE: Always cut down-hill, or from large diameter to small diameter. Always work *toward* the end of a work-piece, never start cutting at the end.
5. Once the workpiece is roughed down to a cylinder, smooth it with a large skew. Keep the skew handle perpendicular to the spindle and use only the center third of the cutting edge for a long smoothing cut (touching one of the points of the skew to the spinning workpiece may cause a catch and ruin the workpiece).
6. Add details to the workpiece with skew, parting tool, scraper or spindle gouge.

#### Beads

1. Make a parting cut for what is to be a bead to the desired depth. Place the parting tool on the tool support and move tool forward to make the full bevel of the tool come into contact with the workpiece. Gently raise handle to make cut to the appropriate depth.
2. Repeat for other side of the bead.
3. Using a small skew or spindle gouge, start in the center between the two cuts and cut down each side to form the bead. Roll the tool in direction of cut.

#### Coves

1. Use a spindle gouge. With the flute of the tool at 90 degrees to the workpiece, touch the point of the tool to the workpiece and roll in towards the bottom of the cove. See Figure 10-7. **Stop at the bottom; attempting to go up the opposite side may cause the tool to catch.**
2. Move the tool over the desired width of the cove.
3. With the flute facing the opposite direction, repeat step 1 for other side of cove. Stop at bottom of cut.

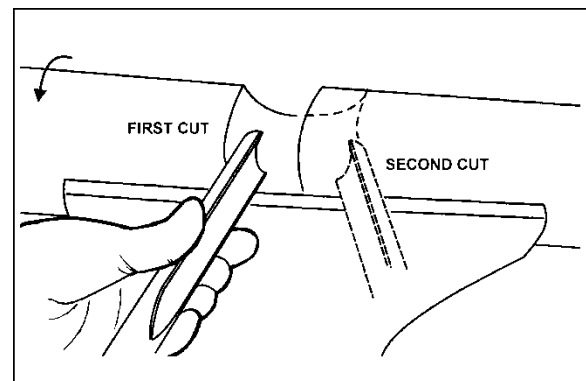


Figure 10-7: coves

#### "V" Cuts

1. Use the long point of the skew. (NOTE: Do not press the long point of the skew directly into the workpiece to create the "V"; this will result in a burned or burnished "V" with fibers being rolled up at both sides.)
2. Lightly mark the center of the "V" with the tip of the skew.
3. Move the point of the skew to the right half of the desired width of your cut.
4. With the bevel parallel to the right side of the cut, raise the handle and push the tool in to the desired depth, as shown in Figure 10-8.

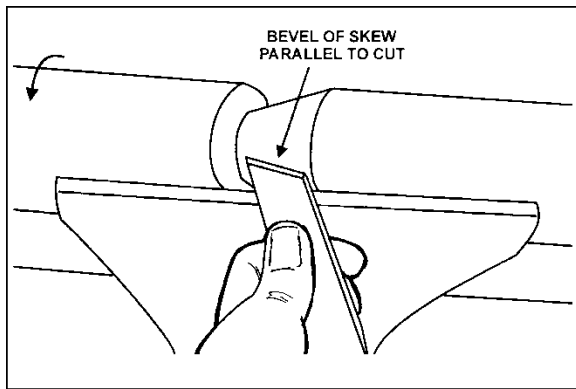


Figure 10-8: V-cuts

5. Repeat from the left side. The two cuts should meet at the bottom and leave a clean "V" cut.
6. Additional cuts may be taken to add to either the depth or width of the cut.

### Parting Off

1. Use parting tool.
2. Adjust lathe speed to lower RPM for parting through a workpiece.
3. Place tool on tool support and raise the handle until it starts to cut and continue to cut toward the center of the workpiece.
4. Loosely hold on to the piece in one hand as it separates from the waste wood.

### 10.3.3 Sanding and Finishing

Leaving clean cuts will reduce the amount of sanding required. Move the tool support out of the way, adjust the lathe to a **low speed**, and begin with fine sandpaper (120 grit or finer). Coarser sandpaper will leave deep scratches that are difficult to remove, and dull crisp details on the spindle. Progress through each grit without skipping grits (for example, do not jump from 120 grit to 220 grit). Fold the sandpaper into a pad; do not wrap sandpaper around your fingers or the workpiece. To apply a finish, the workpiece can be left on the lathe.

Turn off the lathe and use a brush or paper towel to apply the finish. Remove excess finish before restarting lathe. Allow to dry and sand again with 320 or 400 grit sandpaper. Apply second coat of finish and buff.

## 10.4 Face plate and bowl turning

Face plate turning is normally done on the inboard side of the headstock over the bed. Larger workpieces must be turned on the outboard side (remove tailstock and tool support base, and move headstock to opposite end of bed).

### 10.4.1 Mounting stock

Use of a face plate is the most common method for holding a block of wood for turning bowls and plates:

1. Select stock at least 1/8" to 1/4" larger than each dimension on the finished workpiece.
2. Always select the largest diameter face plate that can be used for the workpiece to be turned.
3. True one surface of the workpiece for mounting against the face plate.
4. Using the face plate as a template, mark the location of the mounting holes on the workpiece, and drill pilot holes of the appropriate size. Face plates are drilled for No. 12 screws. (Phillips and square drive screws will hold up better than slotted screws. Sheet metal screws are case hardened with deeper and sharper threads than wood screws.)

If the mounting screws on the face plate interfere with the workpiece, a glue or waste block can be used:

5. Make a block the same diameter as the face plate, Figure 10-9. Both waste block and workpiece should have flat surfaces for gluing.
6. Glue the block to the workpiece. Avoid using brown paper or newspaper between the waste block and workpiece. It may work fine if you are using scrapers, but a slight catch with a bowl gouge can separate the two.

NOTE: When using a waste block, be careful with the adhesive you select. Dry workpieces can be bonded with ordinary white or yellow glue but must be clamped to ensure a good bond. Green workpieces require cyanoacrylate type glue.

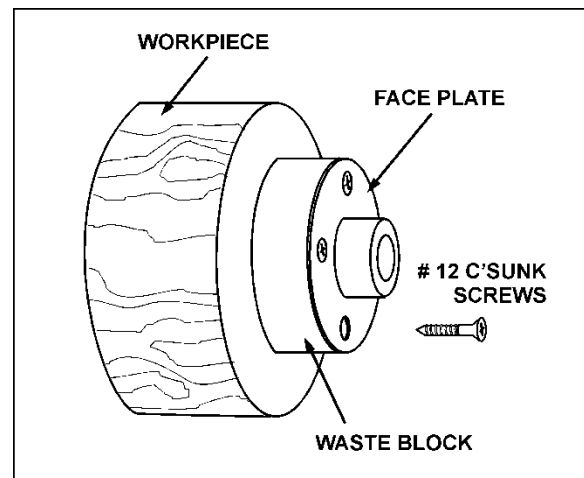


Figure 10-9: faceplate mounting

### 10.4.2 Faceplate or chuck?

While faceplates are the simplest, most reliable method of holding a block of wood for turning, chucks can also be used. As there are dozens of chucks to choose from, the woodturner should first consider all the different types of turning that will be done, and read reports or discuss with other turners who own chucks before making a decision.

A chuck is not a requirement, but is handy when working on more than one piece at a time. Rather than removing screws, you simply open the chuck and change workpieces.

The most popular ones are four jaw scroll chucks with a variety of jaws to accommodate different size tenons. Most also come with a screw chuck as well.

### 10.4.3 Wood selection

Firewood is the cheapest, most widely available stock to use while learning to turn bowls. Simply waste wood for a while practicing turning techniques. Develop skill with each tool before attempting to make a finished piece. It is best to start with dry wood, without worrying about drying or distortion. Once turning becomes comfortable, try green wood which cuts very easily. As the turner gains experience, he or she will find extraordinary grain and figure in the form of burls, crotches and bark inclusions.

### 10.4.4 Checks and cracks

Green wood will check and crack. For best results, leave logs in as long a length as you can handle. As the material starts to dry, surface cracks will develop on the ends of the log. Cut off two to three inches and you should find good, sound wood. Also cut the log in half along the pith to avoid having it in the finished piece. Most checks radiate from the pith.

As you turn bowls from green wood, make sure you maintain a consistent wall thickness throughout the piece. Leaving a piece thick in some areas and thin in others will cause the wood to dry unevenly and promote checks and cracks.

### 10.4.5 Distortion

Distortion is a problem associated with turning green wood. It will vary from one type of wood to the next. Typically, fruitwoods tend to distort more than others. It also varies with the time of year the tree was cut and how the logs are stored.

### 10.4.6 Tools for bowl turning

The deep fluted bowl gouge is the most essential and versatile tool for most bowl and plate turning. The bowl gouge is heavier and easier to control than other types of gouges. It also allows removal of wood much faster and with less vibration than other gouges. Most average sized bowl work can be accomplished with a 3/8" or 1/2" bowl gouge. A 1/4" bowl gouge is best suited for smaller bowls and light finishing cuts. Larger 3/4" and 1" bowl gouges are only used for extremely large pieces.

Large domed scrapers can also be used to help clean up the interior surfaces of bowls. A light touch with the scraper slightly tilted will eliminate some of the ridges occasionally left by an inexperienced bowl gouge.

## 10.4.7 Bowl Turning Techniques

### To Shape Outside of Bowl:

1. Odd shaped burls, crotches and other irregular shaped blanks require special preparation before mounting in a chuck or onto a faceplate. Remove the bark, if there is any, from what appears to be the center of the top of the workpiece.
2. Drive spur center into the top of the workpiece with a mallet or dead blow hammer.
3. Slip the spur center into the headstock taper and bring the tailstock with a live or ball bearing center into position. Lock the tailstock to the bed and advance the tailstock spindle in order to seat the cup center into the workpiece. Tighten the ram locking handle.
4. Turn workpiece by hand to ensure proper clearance.
5. Start lathe at lowest speed and bring it up to the maximum safe speed for the size of work to be turned (see *sect. 14.0*). If the machine starts to vibrate, lower the speed until vibration stops.
6. Rough out the outside of the bowl with the 1/2" deep fluted bowl gouge, holding the handle of the tool firmly against your hip. For best control, use your whole body to move the gouge through the workpiece.
7. As the bowl takes shape, work on the bottom (tailstock end) to accommodate attaching a face plate.
8. Turn a short tenon (about 1/8" long) the size of the hole in the faceplate. See Figure 10-10. This will allow centering the workpiece when the faceplate is attached.

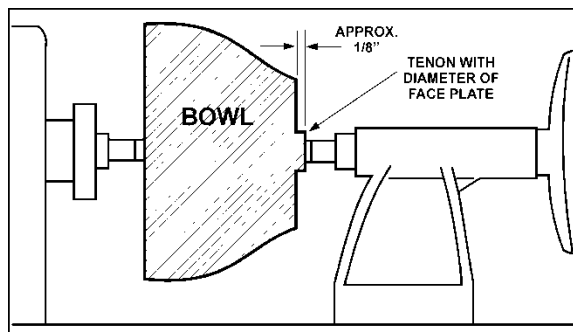


Figure 10-10

(NOTE: If you plan to use a chuck, turn a tenon of the appropriate length and diameter to fit your chuck.)

9. Stop the lathe, remove workpiece and attach face plate or chuck (see *sect. 10.4.1, Mounting Stock*).

**⚠ WARNING** The surfaces of faceplate and workpiece should mount flush to each other.

10. Finish turning the outside of bowl with 1/2" or 3/8" bowl gouge. Leave additional material at base of bowl for support while turning interior. This will be removed later.

#### To Shape Interior of Bowl:

1. Stop the lathe and move tailstock away. (You may want to remove the center from the tailstock to avoid bumping it with your elbow.)
2. Adjust tool support in front of the bowl just below centerline, at a right angle to the lathe ways.
3. Rotate workpiece by hand to check clearance.
4. Face off top of bowl by making a light shearing cut across the top of workpiece, from rim to center.
5. Place 1/2" bowl gouge on tool support at center of the workpiece with the flute facing top of bowl. The tool handle should be level and pointed toward the four o'clock position, as shown in Figure 10-11.

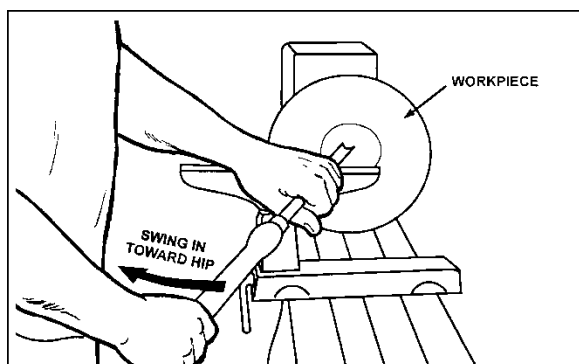


Figure 10-11

6. Use the left hand to control cutting edge of gouge, while right hand swings tool handle around toward your body (Figure 10-11). The flute should start out facing top of workpiece, and rotate upward as it moves deeper into the bowl to maintain a clean even curve. As the tool goes deeper into the bowl, progressively work out toward the rim. It may be necessary to turn the tool support into the piece as you get deeper into the bowl.

(NOTE: Try to make one, very light continuous movement from the rim to the bottom of the bowl to ensure a clean, sweeping curve through the piece. Should there be a few small ridges left, a light cut with a large domed scraper can even out the surface.)

7. Develop wall thickness at the rim and maintain it as you work deeper into the bowl (Once the piece is thin toward the bottom, you cannot make it thinner at the rim). When the interior is finished, move the tool support to exterior to re-define bottom of bowl. (General rule of thumb: the base should be approximately 1/3 the overall diameter of the bowl).
8. Work the tight area around faceplate or chuck with 1/4" bowl gouge.
9. Begin the separation with a parting tool, but do not cut all the way through yet.

#### 10.4.8 Sanding and finishing

1. Remove the tool support and adjust lathe speed to approximately 500 RPM. High speed can build friction while sanding and cause heat check in some woods.
2. Begin with fine sandpaper (120 grit) and progress through each grit, using only light pressure. Coarser sandpaper tends to leave deep scratches that are hard to eliminate. Use power-sanding techniques to avoid concentric sanding marks around your finished piece. Avoid rounding over the rim and foot with sandpaper; try to keep details crisp. Finish sanding with 220 grit.
3. Remove sanding dust with tack rags or compressed air and, with lathe turned off, apply first coat of finish. Let stand for several minutes, wipe off excess. Allow to dry before sanding again with 320 or 400 grit sandpaper.
4. Turn lathe back on and continue the separation cut almost all the way through the base. Stop at about 3" and use a small fine tooth saw to separate the bowl from the waste.
5. Apply second finish coat and allow to dry before buffing.

## 11.0 User-maintenance

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

Maintenance on the PM2014 Lathe should be performed at periodic intervals to ensure that the machine is in proper working order, that all fasteners are tight, and all necessary adjustments have been made. Frequency of inspection will of course depend upon how often the machine is used.

### **Some specific areas of attention:**

Remove foreign matter from bed, faceplate and spindle nose with a cleaner-degreaser.

Wipe a light coat of SAE10 oil on the lathe bed so that headstock, tailstock and tool support base will slide easily. Clean any rust spots that may develop on the bed with a commercial rust remover.

Extend the tailstock quill and wipe on a light coat of SAE10 oil with a soft rag. Avoid getting oil inside the quill where the center is inserted.

Use compressed air or a vacuum in the headstock interior, in order to keep sawdust and chips from accumulating on belts and sheaves. **CAUTION: Wear safety glasses when using compressed air.**

Also blow off debris that accumulates on the inverter. Do NOT disassemble inverter to clean.

Frequently clean out the tapers on both headstock and tailstock. Commercially available taper cleaners may be acquired from tool stores.

Check belt for wear or hard spots and replace as required. Verify alignment of belt sheaves.

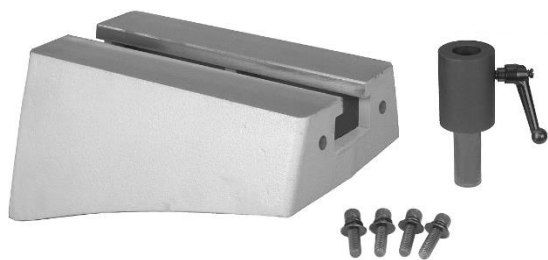
Check tightness of headstock, tailstock, and tool rest when locked to bed. Make adjustments as needed.

### **11.1 Additional servicing**

Any other servicing should be performed by an authorized service representative.

## 12.0 Optional Accessories

Below are some of the accessory items available to enhance the functionality of your PM2014 lathe. These items are purchased separately; contact your Powermatic dealer for more information.



**6294755** – 13-inch bed extension with tool post riser



**6294700** – Tool rest extension



**6294732** – Heavy duty outboard turning stand



**JWL1442-205** – 12-inch tool rest

## 13.0 Troubleshooting PM2014 Lathe

Trouble	Probable Cause	Remedy
Motor fails to develop full power.	Power supply line overloaded.	Correct overload condition.
	Undersized wires in power supply system.	Increase supply wire size.
	Inverter fault (display reads "Err").	Contact Powermatic Technical Service, 800-274-6846.
	Motor fault.	Have motor inspected and replaced.
Motor or spindle stalls or will not start.	Excessive cut.	Reduce depth of cut.
	Improper belt adjustment, or worn or broken belt.	Adjust or replace belt as needed.
	Improper cooling of motor.	Blow out sawdust from motor housing fan.
	Worn spindle bearing(s).	Replace bearing(s).
	Motor fault.	Have motor inspected and replaced.
Excessive vibration.	Workpiece warped, out of round, has major flaw, or was improperly prepared for turning.	Correct problem by planing or sawing workpiece, or discard entirely and use new workpiece.
	Motor mount lock handle is loose.	Tighten lock handle.
	Lathe on uneven surface.	Mount lathe to level, flat surface. Adjust levelers if using stand.
	Worn spindle bearing(s).	Replace bearing(s).
	Improper belt adjustment, or worn belt.	Adjust or replace belt.
Lathe runs at one speed only.	Potentiometer (speed dial) fault.	Replace potentiometer.
	Electronic AC inverter is not programmed properly, or is defective, or there is loose wiring.	Contact Powermatic Technical Service to help identify problem; 800-274-6846
Tools tend to grab or dig in.	Dull tools.	Keep tools sharp.
	Tool support set too low.	Reposition tool support height.
	Tool support set too far from workpiece.	Reposition tool support closer to workpiece.
	Improper tool being used.	Use correct tool for operation.
Headstock moves when applying pressure with Tailstock.	Headstock not locked to bed.	Tighten headstock locking handle.
	Excessive pressure being applied by tailstock (more than 500 lbs. of force).	Slide headstock to left end, then apply pressure to workpiece with tailstock. Apply <b>only</b> sufficient force with tailstock to hold workpiece securely in place.
Tailstock moves when applying pressure.	Locking handle not tightened.	Tighten locking handle.
	Cam lock nut needs adjusting.	Turn tailstock over and tighten cam lock nut.
	Lathe bed and tailstock mating surfaces are greasy or oily.	Remove tailstock and clean surfaces with a cleaner/degreaser. Re-apply light coat of oil to bed surface.
LED display does not work.	Digital sensor out of position or damaged.	Open belt access door and inspect sensor. Reposition or replace.
Spindle has slight wobble (runout)	Bearings are worn or damaged.	Replace bearings.
	Spindle is damaged.	Replace spindle.

Table 2

## 14.0 Recommended lathe speeds (per diameter of workpiece)

Diameter of Work	Roughing RPM	General Cutting RPM	Finishing RPM
Under 2"	1520	3000	3000
2" to 4"	760	1600	2290
4" to 6"	510	1080	1500
6" to 8"	380	810	1125
8" to 10"	300	650	900
10" to 12"	255	540	750
12" to 14"	220	460	640
14" to 16"	190	400	560

Table 3

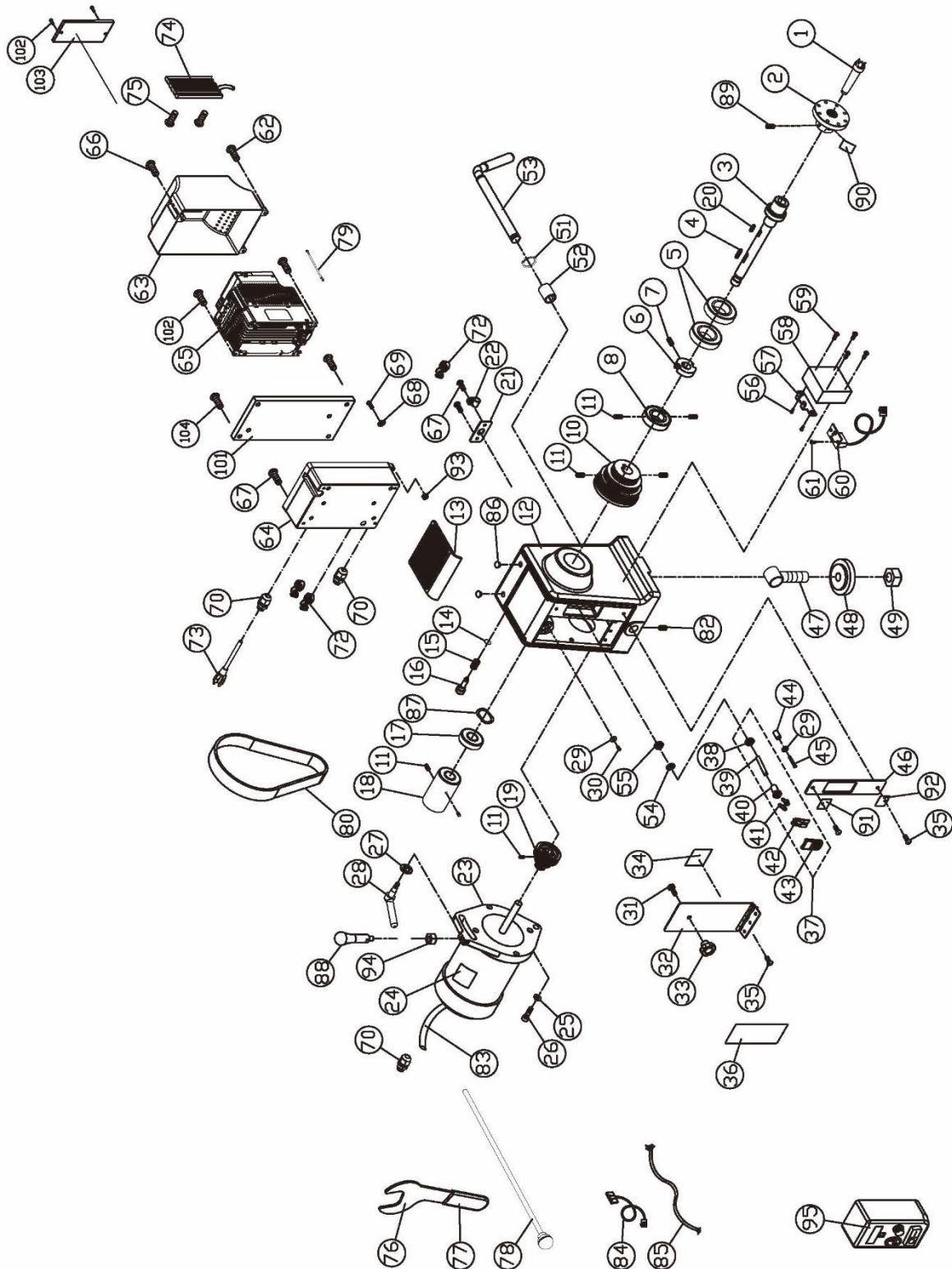
## 15.0 Replacement parts

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.

### 15.1.1 PM2014 Headstock Assembly – Exploded View

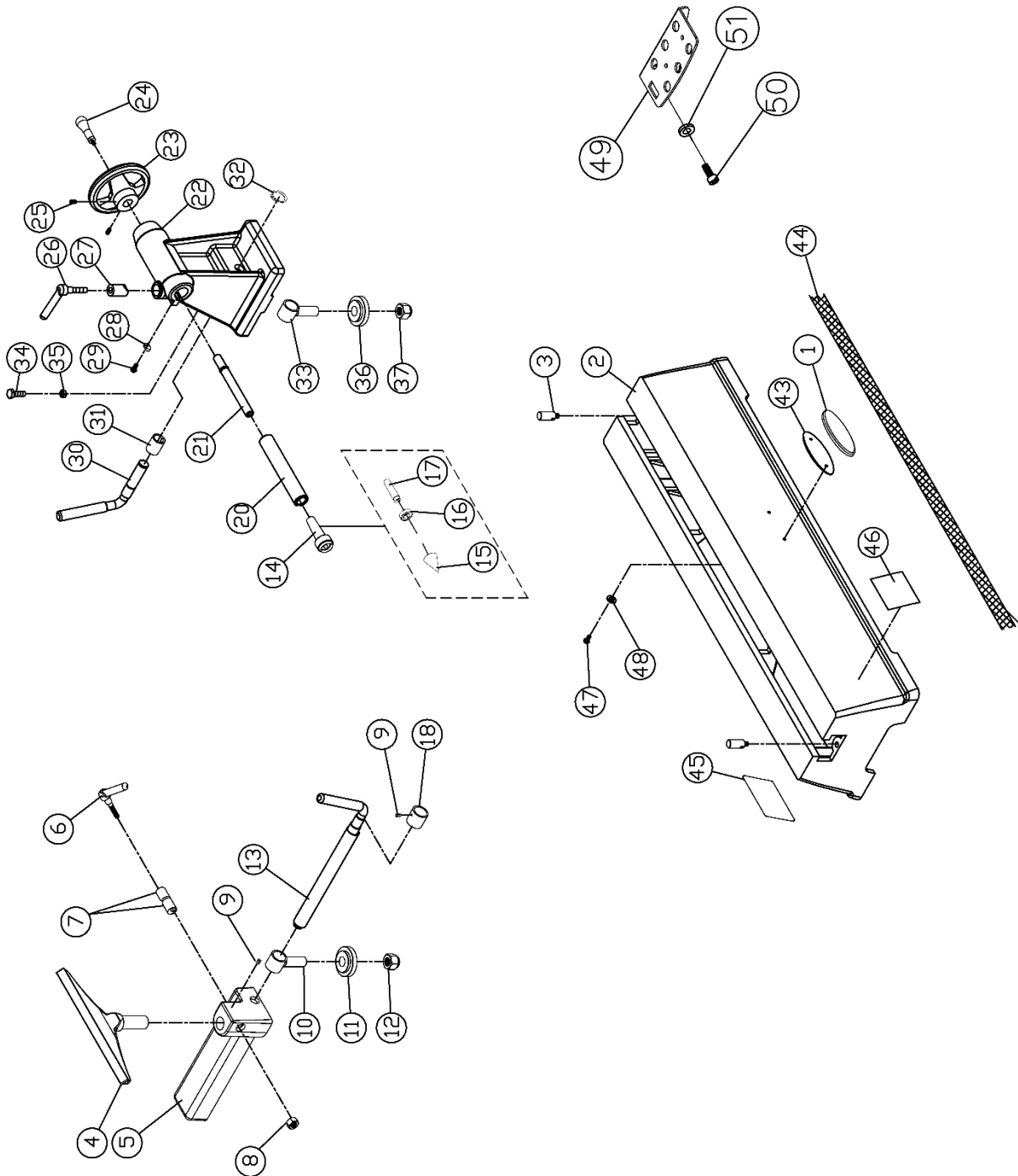


## 15.1.2 PM2014 Headstock Assembly – Parts List

Index No.	Part No.	Description	Size	Qty
	PM2014-HA-RU	Headstock Assembly		1
1	JML-3	Spur Center		1
	JML-3A	Center Point for Spur Center		1
2	6294736E	Faceplate Assembly (includes #89 and 90)	3"	1
3	PM2014-103	Spindle	1-1/4"x 8TPI	1
	PM2014-103E	Spindle	M33x3.5mm	1
4	JML-5	Key	5x5x25 mm	1
5	BB-6005ZZ	Ball Bearing	6005ZZ	2
6	PM2014-106	Stop Collar		1
7	TS-0266022	Set Screw	#10-24x1/4"	1
8	PM2014-108	Sensor Collar Kit		1
10	JWL1221VS-117	Spindle Pulley		1
11	6295796	Nylon Insert Socket Set Screw	1/4"-20x3/8"	8
12	PM2014-112	Headstock		1
13	PM2014-113	Cushion		1
14	JML1014-187	C-Ring	STW-9	1
15	JML1014-188	Spring		1
16	JML1014-189	Index Pin		1
17	BB-6004ZZ	Ball Bearing	6004ZZ	1
18	PM2014-118	Handwheel		1
19	JWL1221VS-240	Motor Pulley		1
20	KF2R5512	Key, Dbl Rd Hd	5x5x12 mm	1
21	3520C-195	Fixed Plate		1
22	JWL1015-172	Clamp	5/16"	1
23	PM2014-123E	Motor	230V	1
	PM2014-MF	Motor Fan (not shown)		1
	PM2014-MFC	Motor Fan Cover (not shown)		1
	PM2014-JB	Junction Box (not shown)		1
	PM2014-JBCE	Junction Box Cover (not shown)		1
24	PM2014-124E	Motor Label		1
25	TS-0720081	Spring Washer	5/16"	1
26	TS-0208071	Socket Head Cap Screw	5/16"-18x1-1/4"	1
27	TS-0680031	Flat Washer	5/16"	1
28	JWL1015-137	Lock Handle	3/8"-16x1"	1
29	3520C-148	Magnet		2
30	F010878	Flat Head Socket Screw	M3-0.5x10	1
31	TS-1482011	Hex Cap Screw	M6-1.0Px10	1
32	PM2014-132	Pulley Access Door (includes #36 & 34)		1
33	PM2014-133	Knob		1
34	3520B-294	Warning Label – Belt Adjustment		1
35	TS-0253031	Socket Head Button Screw	#10-24x1/2"	5
36	PM2014-136	Speed Label		1
37	PM2014-SLA	Spindle Lock Assembly (includes # 38 thru 43)		1
38		Hex Nut	M12-1.75Px6t	1
39		Pin		1
40		Housing		1
41		Link Kit		1
42		Handle		1
43		Pad		1
44	PM2014-144	Seat		1
45	TS-2283302	Pan Hand Screw	M3-0.5x25	1
46	PM2014-146	Plate		1
47	JWL1442-128A	Bolt		1
48	JWL1442-154	Clamp		1
49	TS-0650081	Nylon Nut	3/4"-10	1
51	JWL1640EVS-119	C-Ring	S19	1
52	JWL1442-127	Bushing		1

Index No.	Part No.	Description	Size	Qty
53	PM2014-153	Eccentric Rod		1
54	PM2014-154	Contact Washer		1
55	PM2014-155	Hex Nut	M12-1.75Px7t	1
56	JWL1642-134	Tap Screw	1/4"x1/2"	2
57	PM2014-157	Bracket		1
58	PM2014-158	Spindle Encoder PCB Assembly		1
59	F010944	Pan Head Machine Screw	M3x20	4
60	JWL1640EVS-125	Sensor for Spindle		1
61	TS-2283102	Pan Head Screw	M3-0.5x10	2
62	TS-081C062	Phillips Pan Head Machine Screw	#10-24x1"	4
63	JWL1640EVS-161E	Inverter Upper Cover		1
64	JWL1640EVS-163	Inverter Lower Box		1
65	PM2014-165E	Inverter, Parameter for PM2014		1
66	TS-081C052	Phillips Pan Head Machine Screw	#10-24x3/4"	1
67	TS-0253031	Socket Head Button Screw	#10-24x1/2"	6
68	TS-0733031	Lock Washer Ext Tooth	#10	1
69	F000648	Phillips Pan Head Machine Screw	#10-24x1/4"	1
70	JWL1440-141	Strain Relief	M16	3
72	SR-6P3	Strain Relief	SR-6P3	3
73	PM2014-173E	Power Cable		1
74	JWL1642-169	Breaking Resistor		1
75	TS-0253031	Socket Head Button Screw	#10-24x1/2"	2
76	JWL1221VS-269E	Wrench (includes #77)		1
77	JWL1221VS-270	Rubber Cover		1
78	PM2014-177	Knock Out Rod		1
79	PM2014-179	Grounding Wire		1
80	PM2014-180	Belt	160J-6	1
82	PM2014-182	Set Screw	#10-24x1/2"	1
83	PM2014-183E	Isolation Motor Cable		1
84	3520C-14110	Signal Cable (Remote switch box to Inverter)		1
85	3520C-181	Signal Cord (Inverter box to Encoder PCB box)		1
86	PM2014-186	Bung		1
87	JML-8	Wave Washer	BWW6203	1
88	4224B-165	Handle		1
89	6295796	Nylon Insert Socket Set Screw	1/4"-20 x 3/8"	1
90	4224B-1124	Warning Label – Faceplate		1
91	PM2014-191	Spindle Lock Label-1		1
92	PM2014-192	Spindle Lock Label-2		1
93	TS-0560071	Hex Nut	#10-24	3
94	TS-0640091	Hex Nut	3/8"-16	1
95	PM2014-195	Remote Control Box Assembly		1
97	PM2014-197	Wire, Main Switch to Inverter (not shown)		1
101	JWL1640EVS-183E	Adaptor Plate		1
102	TS-081C032	Socket Head Button Screw	#10-24x1/2"	4
103	JWL1640EVS-185E	Plate		1
104	PM2014-1104E	Phillips Pan Head Machine Screw	#10-24x7/8"	2

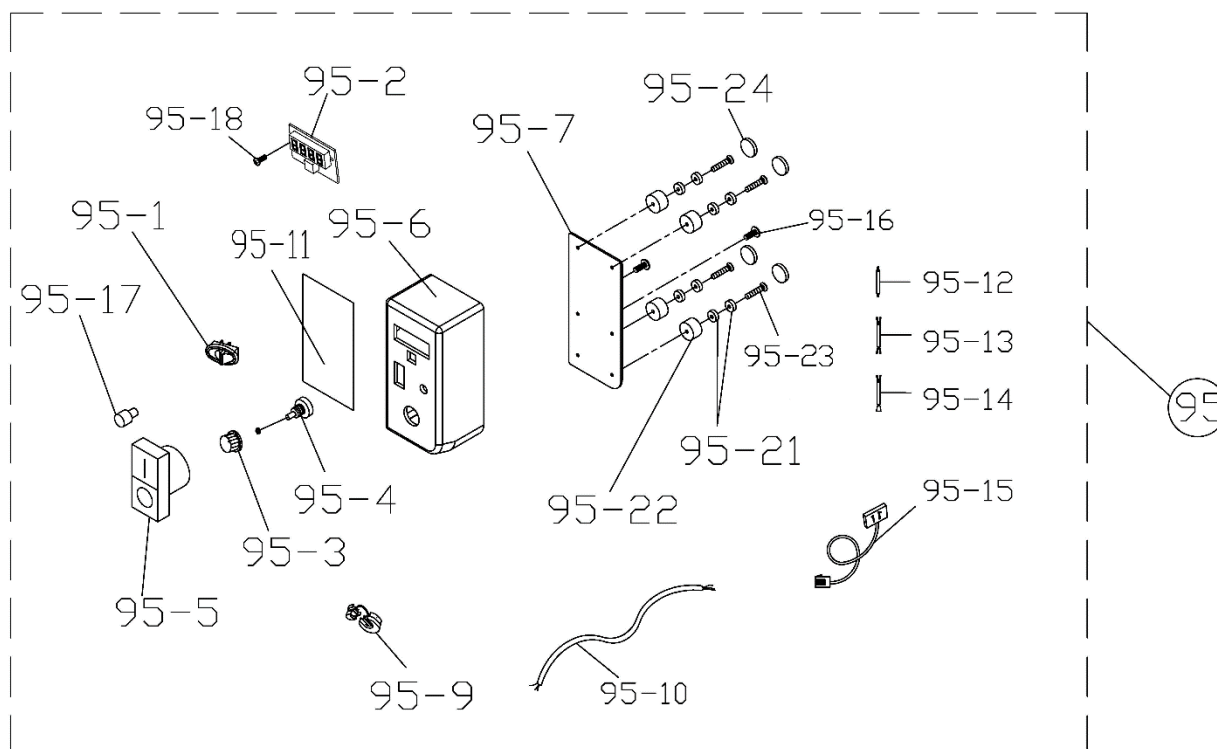
## 15.2.1 PM2014 Bed, Toolrest and Tailstock Assemblies – Exploded View



### 15.2.2 PM2014 Bed, Toolrest and Tailstock Assemblies – Parts List

Index No.	Part No.	Description	Size	Qty
1	PWBS14-254SN	Powermatic Nameplate, Small		1
2	PM2014-202	Bed		1
3	PM2014-203	Stud		2
4	PM2014-204	Toolrest	8"	1
	JWL1442-205	Toolrest, Option	12"	1
	PM2014-TBA	Toolrest Base Assembly (item # 5 thru 13, 18)		
5	PM2014-205	Toolrest Base		1
6	JWL1440-206	Handle		1
7	JWL1440-207	Tool Rest Lock Bushing Set		1
8	TS-0570031	Hex Nut	3/8"	1
9	TS-0267021	Set Screw	1/4"-20x1/4"	4
10	JWL1442-128	Clamp Bolt		1
11	JWL1442-154	Clamp		1
12	TS-0650081	Hex Nylon Lock Nut	3/4"-10	1
13	JWL1442-210A	Tool Support Rod		1
14	PM2014-214	Live Center Kit (includes #15 thru 17)		1
15		Cap		1
16		Ball Bearing	6803-2RS	2
17		Shaft		1
18	JWL1440-213	Bushing		1
	PM2014-TA	Tailstock Assembly (item # 20 thru 37)		
20	JWL1440-219	Quill	MT-2	1
21	JWL1440-220	Lead Screw		1
22	PM2014-222	Tailstock		1
23	PM2014-223	Tailstock Handwheel		1
24	PM2014-224	Tailstock Handwheel Handle		1
25	6295796	Set Screw		1
26	6295910	Lock Handle		1
27	3728005	Quill Lock Sleeve		1
28	JWL1221VS-227	Key		1
29	PM2014-229	Socket Head Round Screw	#10-32x3/4"	1
30	PM2014-230	Eccentric Rod, Tailstock		1
31	JWL1442-127	Bushing		1
32	JWL1640EVS-119	C-Ring	S19	1
33	JWL1442-128A	Bolt		1
34	TS-1482021	Hex Cap Screw	M6-1.0Px12	1
35	TS-1540041	Hex Nut	M6	1
36	JWL1442-154	Clamp		1
37	TS-0650081	Nylon Nut	3/4"-10	1
43	PM2014-243	Backer Plate		1
44	PM2014-244	Stripe		2
45	LM000408E	I.D Label, PM2014		1
46	6294773P	Warning Label		1
47	TS-0207131	Socket Head Cap Screw	1/4"-20x3/4"	2
48	TS-0680021	Flat Washer	1/4"	2
49	JWL1640EVS-349	Tool Caddy		1
50	TS-0209061	Socket Head Cap Screw	3/8"-16x1-1/4"	2
51	TS-0680041	Flat Washer	3/8"	2

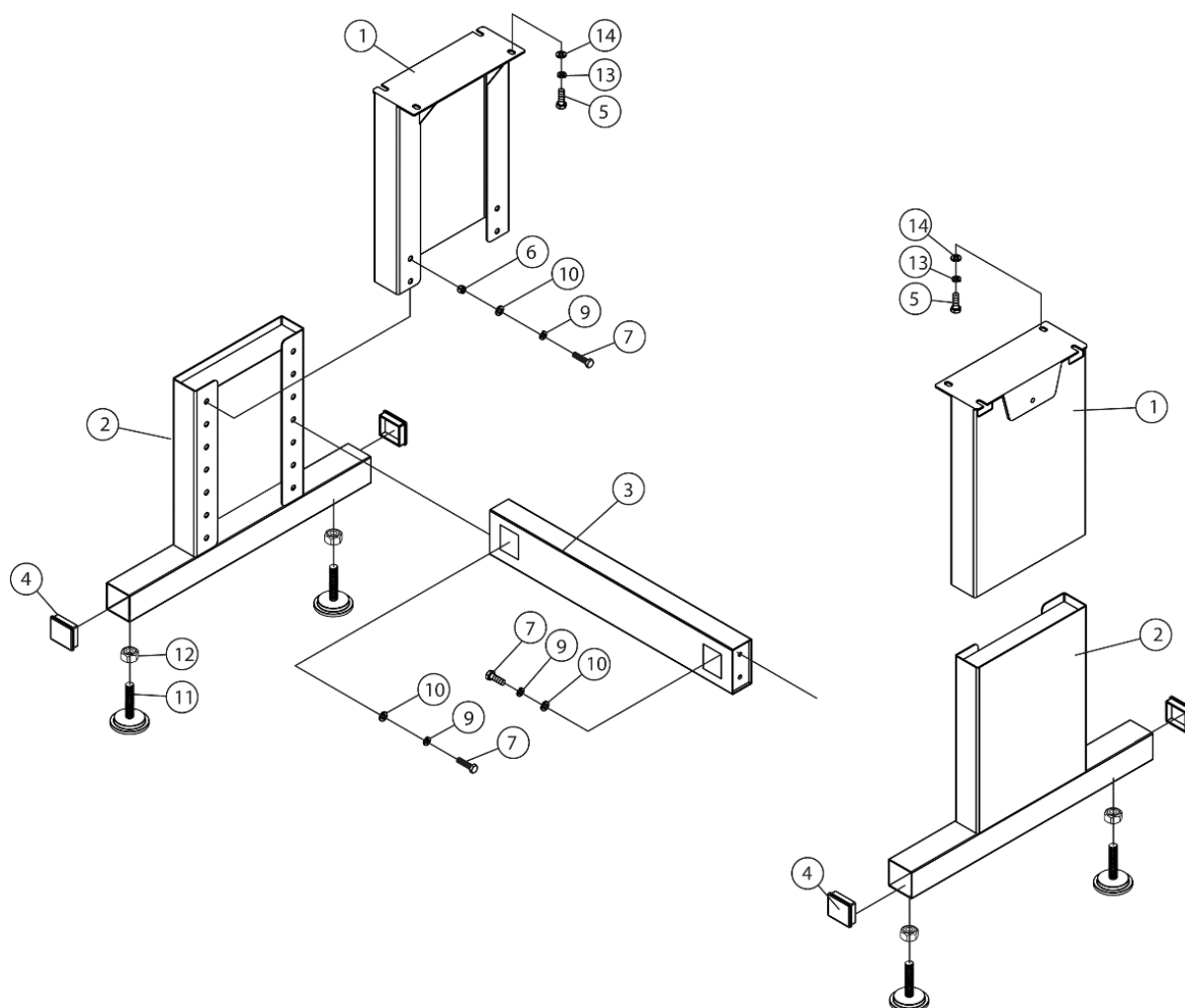
### 15.3.1 PM2014 Remote Control Box Assembly – Exploded View



### 15.3.2 PM2014 Remote Control Box Assembly – Parts List

Index No.	Part No.	Description	Size	Qty
95	PM2014-195	Remote Control Box Assembly (includes # 95-1 thru 95-24)		1
95-1	4224B-148	Switch Fwd. /Rev		1
95-2	3520C-1412	Digital Readout Display		1
95-3	6430047	Knob		1
95-4	6295915	Control Pot Assembly		1
95-5	3520C-1415	Control Switch		1
95-6	3520C-1416	Remote Control Box (includes #41-11)		1
95-7	3520C-1417	Control Box Back Plate		1
95-9	SR-6P3	Strain Relief	SR-6P3	1
95-10	3520C-14110	Signal Cable (Remote switch box to Inverter)		1
95-11	3520C-14111	Control Box Label		1
95-12	3520C-14112	Wire (Control Pot to control switch, White)		2
95-13	3520C-14113	Wire 2 (for control switch, Brown)		1
95-14	3520C-14114	Wire 3 (control switch to Fwd. /Rev Switch, yellow)		1
95-15	3520C-14115	Signal Cable		1
95-16	F010944	Flat Head Socket Screw BO	M3-0.5x20	2
95-17	3520C-14117	LED Light		1
95-18	F010987	Flat Head Socket Screw BO	M3-0.5x10	2
95-21	3520C-148	Magnet		8
95-22	PM2014-19522	Rubber Pad		4
95-23	TS-2283302	Phillips Pan Hd Machine Screw	M3x30	4
95-24	PM2014-19524	Mat		4

### 15.4.1 Stand Assembly (Optional Accessory) – Exploded View

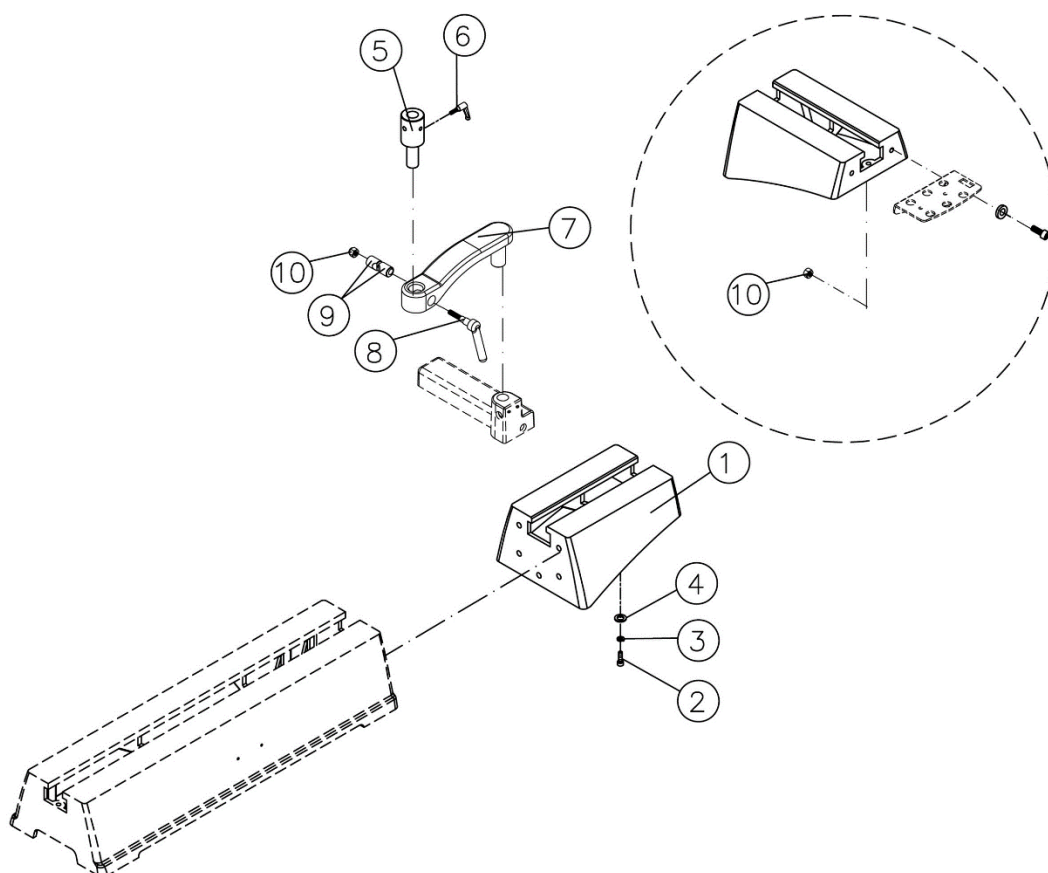


### 15.4.2 Stand Assembly (Optional Accessory) – Parts List

Index No.	Part No.	Description	Size	Qty
.....	1792014S.....	Stand Assembly.....		1
1 .....	PM2014-401.....	Upper Bracket.....		2
2 .....	PM2014-402.....	Leg.....		2
3 .....	PM2014-403.....	Cross Bar.....		1
4 .....	JWL1221VSS-103.....	Cover .....		4
5 .....	TS-0051021 .....	Hex Cap Screw * .....	5/16"-18x5/8"	8
6 .....	.....	Threaded Insert .....	3/8"-16 .....	14
7 .....	TS-0060051 .....	Hex Cap Screw * .....	3/8"-16x1" .....	12
9 .....	TS-0720091 .....	Lock Washer * .....	3/8" .....	12
10 .....	TS-0680042 .....	Flat Washer * .....	3/8" .....	12
11 .....	JWL1642-206.....	Leveler (includes #12) .....		4
12 .....	TS-0570031 .....	Hex Nut.....	3/8"-16 .....	4
13 .....	TS-0720081 .....	Lock Washer * .....	5/16" .....	8
14 .....	TS-0680031 .....	Flat Washer * .....	5/16" .....	14
.....	1792014S-HP.....	Hardware package (items with *).....		

Some parts are shown for reference only, and may not be available individually.

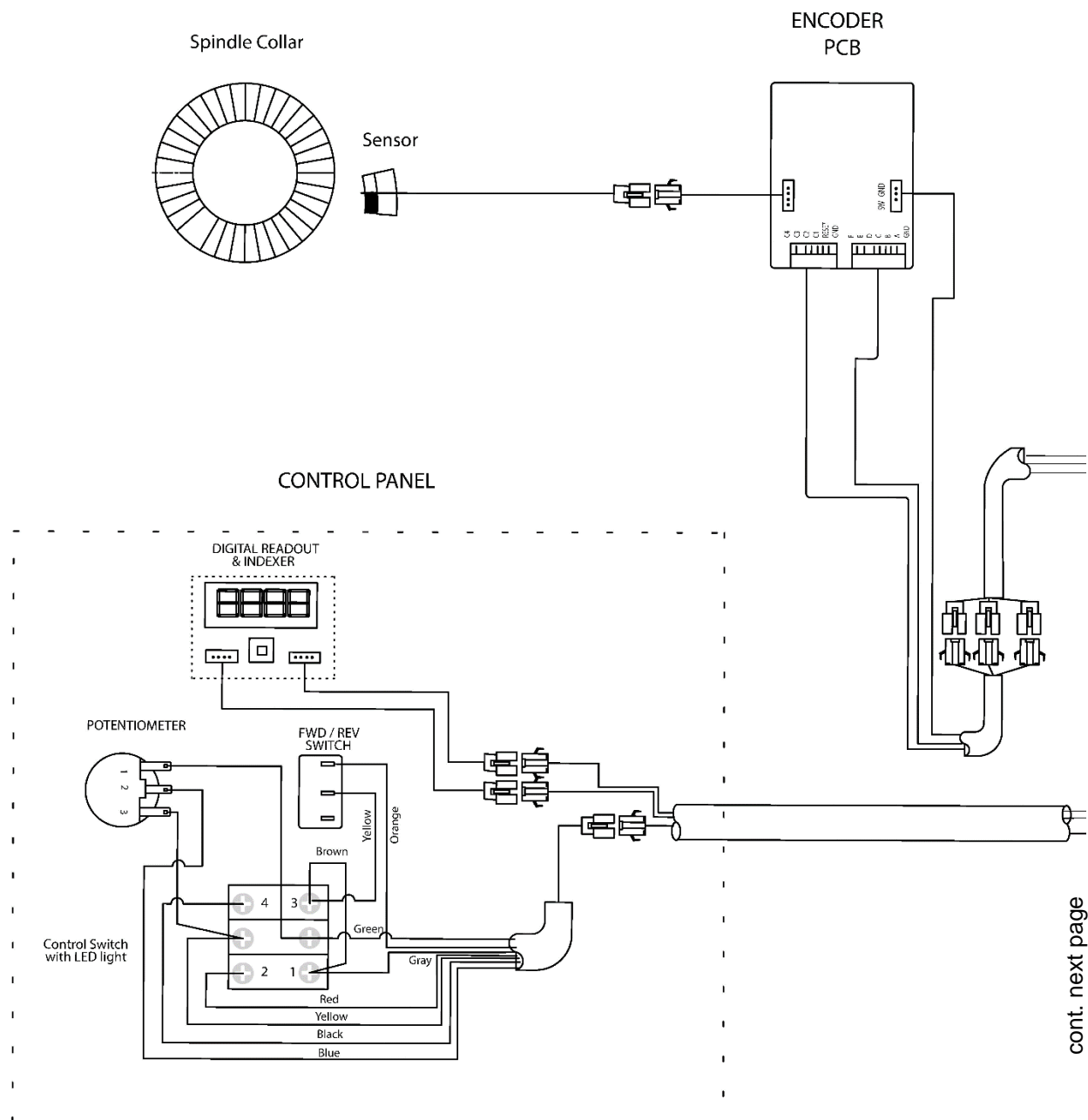
### 15.5.1 Optional Bed Extension Assembly – Exploded View



### 15.5.2 Optional Bed Extension Assembly – Parts List

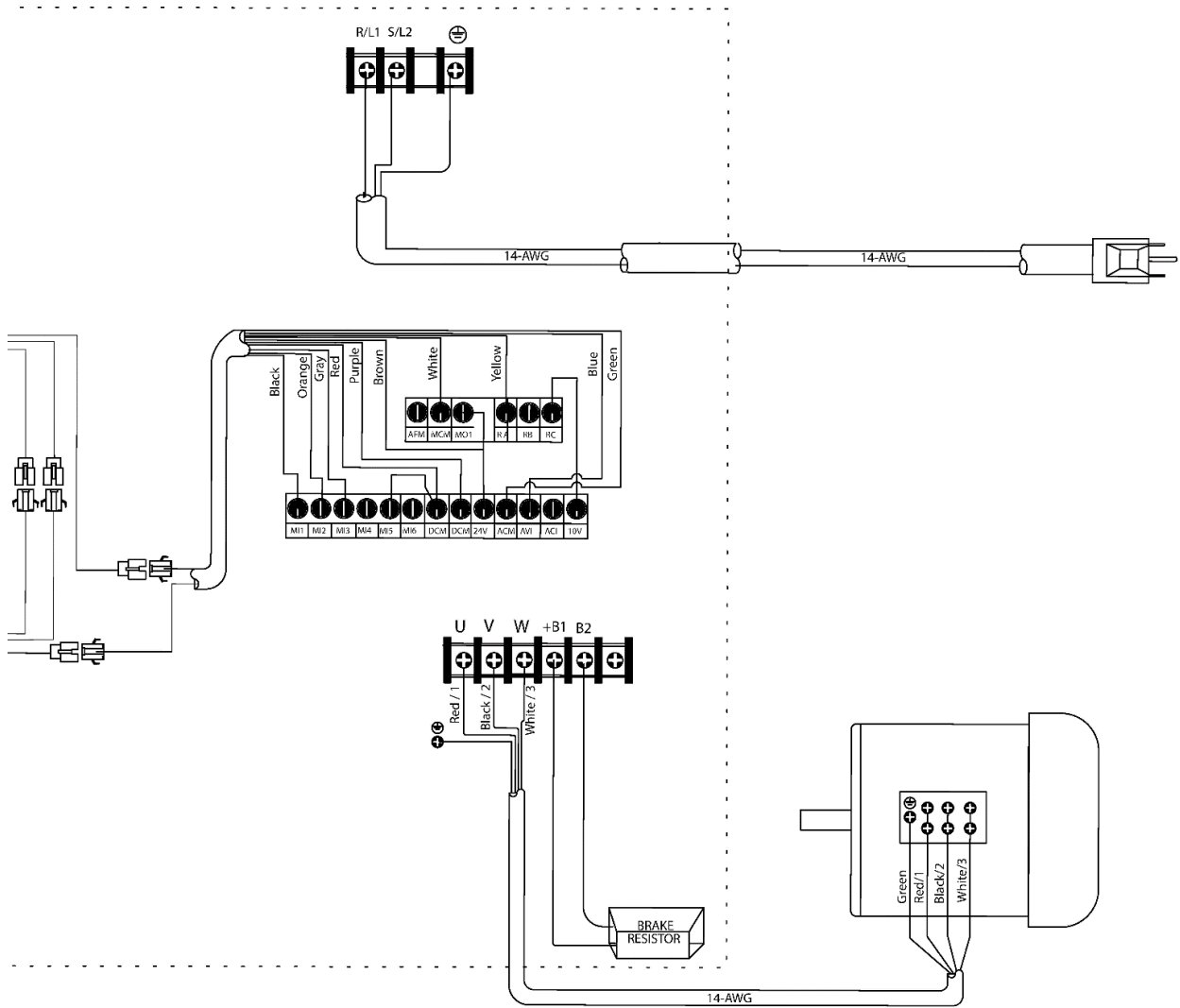
Index No.	Part No.	Description	Size	Qty
.....	6294755	Bed Extension Assembly (item # 1 thru 6)		1
1	PM2014-301	Bed Extension		1
2	TS-0209071	Socket Head Cap Screw	3/8"-16x1-1/2"	4
3	TS-0720091	Lock Washer	3/8"	4
4	TS-0680042	Flat Washer	3/8"	4
.....	PM2014-ERPK	Extension Toolrest Post Kit (item #5, 6)		1
5	PM2014-305	Extension Toolrest Post		1
6	PM2014-306	Locking Handle		1
.....	PM2014-TEA	Toolrest Extension Assembly (item #7 thru 10)		1
7	PM2014-307	Toolrest Extension		1
8	JWL1440-206	Handle		1
9	JWL1440-207	Tool Rest Lock Bushing Set		1
10	TS-0570031	Hex Nut	3/8"	3

## 16.0 Electrical connections – PM2014 Lathe



cont. next page

# INVERTER



cont.







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