



Shopsmith[®] Mark 7 Home Workshop System

MARK 7

Summary Manual

Designed and Built in Dayton, Ohio.

WARNING

Read the **SAFETY** information in the Introduction section and complete the **ASSEMBLY AND ALIGNMENT** procedures before operating the Shopsmith Mark V.

Use only Shopsmith parts and accessories on your Mark V. Using non-Shopsmith parts may create a hazardous condition and will void your warranty.

SAFETY

Safety First

The Shopsmith Mark 7 has many built-in safety features. But, the effectiveness of these features depends on you. To protect yourself from injury:

- ◆ **KNOWING YOU CAN BE HURT IS MORE IMPORTANT THAN THE MOST EFFICIENTLY DESIGNED GUARD ON A TOOL.**
- ◆ **THIS MACHINERY MAY CAUSE SERIOUS INJURY IF THE SAFETY RULES ARE NOT STUDIED AND FOLLOWED.**
- ◆ **READ, UNDERSTAND AND FOLLOW ALL THE INFORMATION IN THIS OWNER'S MANUAL.**

The meanings of **WARNINGS**, **CAUTIONS**, AND **NOTES** are:

WARNING

A **WARNING** is given when failure to follow the directions could result in injury, loss of limb, or life.



A **CAUTION** is given when failure to follow the directions could result in temporary or permanent damage to the equipment.

NOTE

A **NOTE** is used to highlight an important procedure, practice or condition.

NOTE

It is important to provide adequate lighting in your shop area.

Eye Protection

- Always wear eye protection when you use power equipment. Use goggles, safety glasses or a face shield to protect your eyes.

Ear Protection



Use only tools made in conformity to EN-847-1.

The average noise level is 86 db. Hearing protection recommended.

- Prolonged exposure to high noise levels from high speed power equipment can damage your hearing.

Sawdust and Chips

NOTE

Shopsmith Mark 7's are fitted to use with Dust Collection equipment. We recommend the Shopsmith DC3300 Dust Collection System.

- Sawdust and chips can be fire hazards and breathing sawdust can be a health hazard. Sawdust may cause you physical discomfort, especially if you have emphysema, asthma, or an allergic reaction. The sawdust from some woods can also be toxic.

Saw Guards

- Most shop accidents happen on the table saw. For this reason, **always keep the upper and lower saw guards in place whenever you operate the Mark 7 in the table saw mode.** The **ONLY** exception to this rule is when you need to saw part way through stock— such as when cutting a rabbet or groove, or when using the dado or molder accessory. Then you must remove the upper saw guard. Whenever you remove the upper saw guard, **KEEP** the lower saw guard in place and work with extreme caution.

Table Saw Kickback

- Table saw accidents are often associated with kickback. Kickback is the ejection of the stock from the saw back toward the operator. Kickback causes loss of control and your hand could be thrown into the blade or you could be hit by

flying stock. Never stand directly in the line of rotation of a moving blade. This lessens your chances of being hit by flying stock, if a kickback occurs. Kickback is caused by:

- The kerf of the stock closing up and **pinching** the rear of the saw blade.
- The stock **wedging** between the rip fence and the rear of the saw blade.
- The stock **binding** against the sides of the blade as it passes through the stock.

To Prevent Kickback:

- Always keep the upper and lower saw guards in place. An anti-kickback mechanism on the guards helps prevent the stock from binding the blade and the stock from being thrown back toward the operator. Make sure the riving knife is aligned properly with the blade.
- Never cut stock freehand. Always use a push stick, push block, fence straddler, feather board, fixture, rip fence or miter gauge to guide and support the stock.
- Never reach over the blade while the machine is running. You could slip or twist the stock, causing a kickback. Use a rear support table or a roller stand to help support the stock and turn off the machine before removing stock or scraps.
- Keep blades sharp, properly set and free of pitch. Well maintained blades minimize the likelihood of kickback.
- Avoid cutting wet or pitchy wood.
- The anti-kickback mechanism is not effective when 8" diameter blades are used.
- When **cross cutting**, always use the miter gauge and hold the stock firmly against the protractor.
- When **cross cutting**, never use the miter gauge with the rip fence unless you mount a stoop block to the rip fence to prevent the stock from binding between the rip fence, miter gauge and blade.
- When **ripping**, always use the rip fence to guide and support stock.
- Make sure the rip fence is parallel to the blade. If the rip fence closes in toward the rear of the blade, the rip fence will tend to wedge the stock against the blade.
- When **cross beveling**, always place the miter gauge on the downward side of the worktable.
- When **rip beveling**, always mount the rip fence on the downward side of the worktable.

- Always cut with the smooth, hard surface of the stock against the worktable. Anti-kickback mechanisms may not be effective when cutting smooth, hard surfaces.

Router/Shaper Guarding

- Most shop accidents happen to woodworkers who fail to follow instructions, or fail to use guards and safety devices. Although proper use of guards and safety devices often require additional set-up, the protection for you and your family is well worth the effort..

Electrical Requirements

- Pay particular attention to the connection between your power equipment and your power source. Before you plug in your Mark 7, check the voltage and the amperage of the circuit you will be using. The wall receptacle and wires in the circuit must be rated for at least 15 amps.
- The rating of the components in the circuit wires and receptacles must be high enough to handle the load (in amps) of that motor, plus any other tools or appliances you may have plugged into the same circuit and running at the same time.

Circuitry

- The Mark 7 PowerPro Headstock can operate on both 120 and 240 volts. The internal computer will adapt to the current in use. To change between currents, refer to Page E-2.

Mark 7 Utilizing a 115 Volt current

- The Mark 7 DVR motor, when operating with 10/115 volts is rated at 1-3/4 hp. It can "pull" up to 13-14 amps when running under a heavy load. The headstock motor runs on standard U.S. house current- 120 volts, 60 hz. The wire size (gauge) in the circuit you use must be rated for at least 15 amps. Using wire and receptacles rated to handle 20 or 25 amps will give you an even bigger safety margin.

Fuses

- We recommend you install circuit breakers or fuses which are time-delayed. Fusetron T-15 fuses are recommended. **Do not use fuses or circuit breakers larger than 15 amps.** When you first turn on the machine, the motor pulls

Safety Rules for the Shopsmith Mark 7

- Read, understand and follow the Mark 7 Owner's Manual and the manual for every power tool you use.
- Additional warnings, cautions and instructions and operating techniques are provided in the Shopsmith book, Power Tool Woodworking for Everyone.
- Keep your hands, fingers and other parts of your body at least 3" away from any moving blade, cutter or disc.
- Wear proper eye and ear protection. Also, wear a dust mask.
- Ground all equipment (unless double insulated.)
- Use clamps, fixtures or the miter gauge to secure stock. When appropriate, use a push stick, push block, fence straddler, feather board, miter gauge with safety grip or other safety devices to maneuver stock past a moving blade, cutter or disc.
- Keep all guards in place and in working order. Most injuries occur on unguarded power equipment.
- Never stand directly in the line of rotation of a moving blade, cutter, disc. If a kickback occurs, you could be hit by the stock or injured by contacting a moving blade, cutter or disc.
- Do not wear loose clothing, ties, gloves, or jewelry. Roll sleeves up above your elbows, wear non-slip footwear, and tuck long hair under a hat.
- Never operate power equipment if you are fatigued, taking medication, or under the influence of alcohol or drugs.
- Do not work with stock that is too small or too large to handle safely, or that has loose knots or other defects.
- Plan the operation and safety precautions before you begin.
- Turn off the main power switch on the Mark 7 and wait until all cutters, blades or discs come to a complete stop before removing stock and scraps.
- Turn off and unplug the Mark 7 before making adjustments, changing modes or performing maintenance.
- Make sure the main power switch is in the "off" position before plugging or unplugging the Mark 7.
- Secure the headstock lock, carriage lock, table height lock, table tilt lock and quill lock (if quill is used), before turning on the Mark 7.
- Make sure accessories, safety devices and fixtures are properly adjusted and secured before turning on the Mark 7. Also, check the arbor set screw periodically.
- Remove adjusting keys and wrenches from the Mark 7 before turning it on.
- Never exceed the maximum recommended speed for the operation. When using "combination" setups (such as table saw– jointer), never exceed the maximum speed for the slowest accessory.
- Never try to stop the Mark 7 or accessory by grabbing the stock, any part of the machine, or by forcing material against a cutter, blade or disc.
- Never leave the Mark 7 running unattended. Turn off the power. Don't leave until the machine comes to a complete stop.
- Do not overreach or hurry. Keep proper footing and balance at all times.
- Never reach under the worktable while the machine is running.
- Never use a carbide-tipped blade or cutter to machine second-hand lumber. You could be hit by pieces of metal.
- Repair or replace damaged parts before further use. If a strange noise or vibration develops, turn off and unplug the machine. Correct the problem.
- Use only recommended Shopsmith parts and accessories on your Mark 7. **NEVER** use non-Shopsmith replacement parts or accessories. Use only tools made in conformity to EN-847-1. They are not designed like Shopsmith parts. Using non-Shopsmith parts may create a hazardous condition and will void your warranty.
- Keep all tools, cutters and blades for the Mark 7 and accessories sharpened.
- Keep all hand tools and power tools cleaned and maintained.
- Do not use the Mark 7 or an accessory to do a job for which it was not designed.
- Never mount an accessory on an auxiliary spindle unless it is designed to operate there. Consult the accessory's manual for the proper spindle on which to mount the accessory.
- Make sure the machine rests firmly on the floor when in use– not up on the retractable casters.
- Do not force the stock. Always feed stock against the rotation of the blade, cutter or disc. Let the blade, cutter or disc get up to full speed before you feed the stock.
- Make sure the stock rests firmly against the worktable, miter gauge, and/or rip fence.
- Do not use warped or twisted stock.
- Whenever you extend the quill, do not let go of the quill lever unless you first secure the quill feed lock.
- Do not work with long boards or sheet materi-

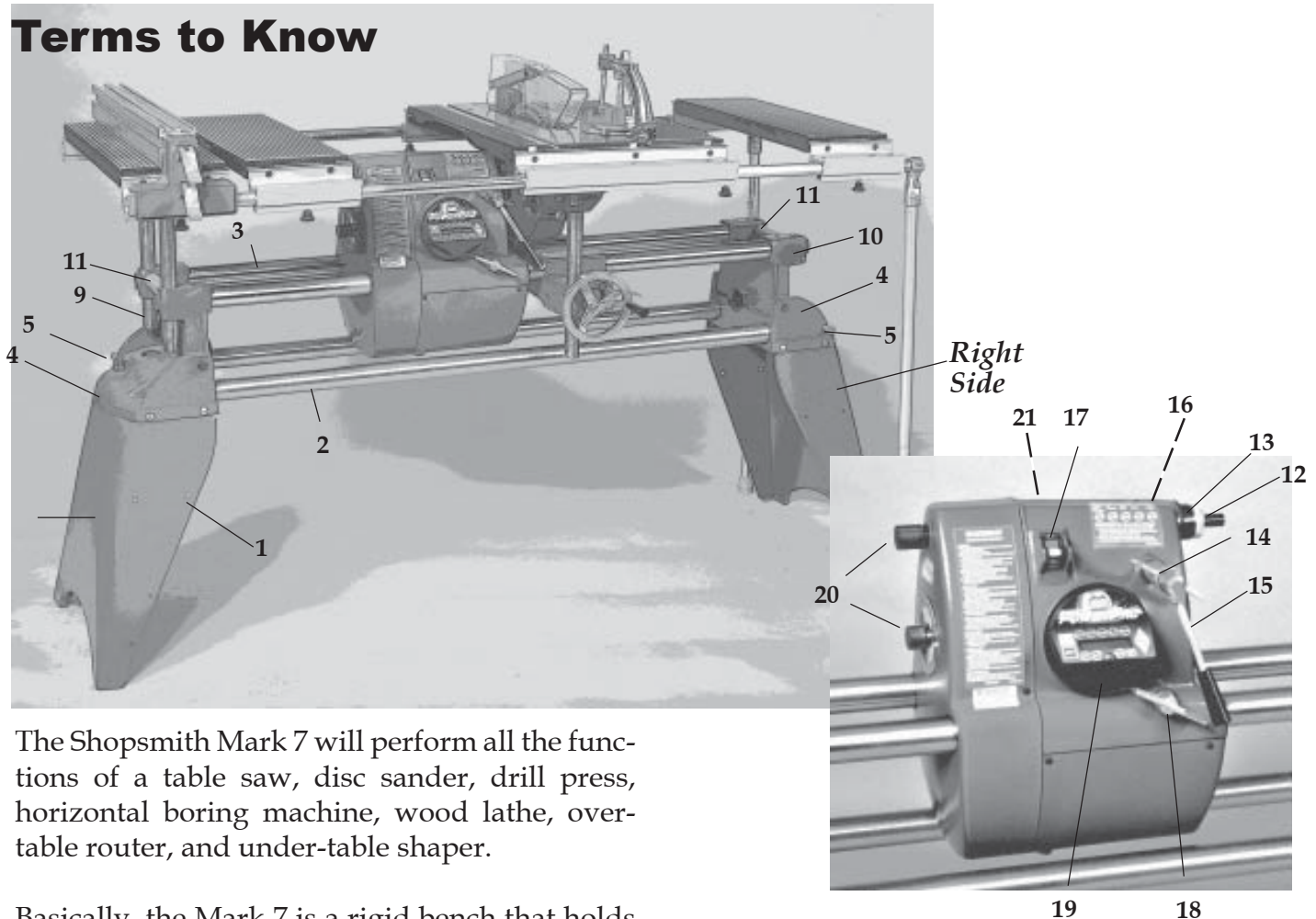
als by yourself, unless you use a large rear support table or roller stands. Never try to work with boards the are too large for you to handle safely. It is best to have a helper.

- Never stand or lean on the machine. You could fall on it or it could tip over.
- Keep work areas well lit, clean and free from clutter.
- Make sure the Mark 7 casters are fully retracted before you begin operations.
- Do not use power equipment in damp, wet or explosive atmospheres.
- Keep visitors a safe distance from power equipment, and make them wear eye and ear protection.
- "Child-Proof" your workshop by using the program locking mechanism on the PowerPro Headstock and unplugging the equipment.

NOTE

See additional and specific safety warnings at the beginning of each "Operation" section.

Terms to Know



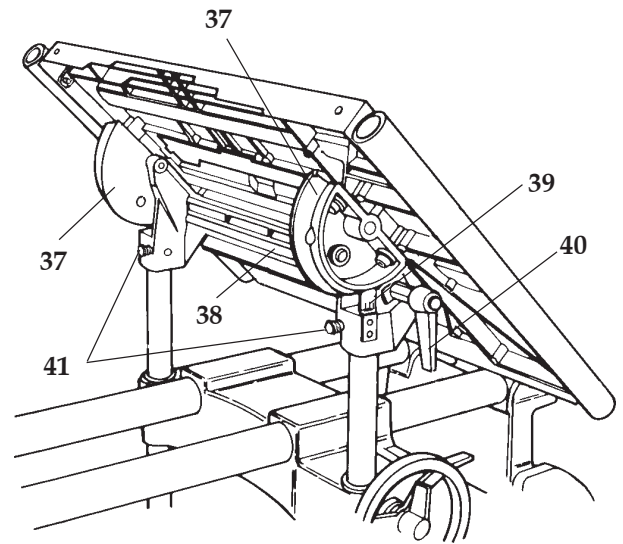
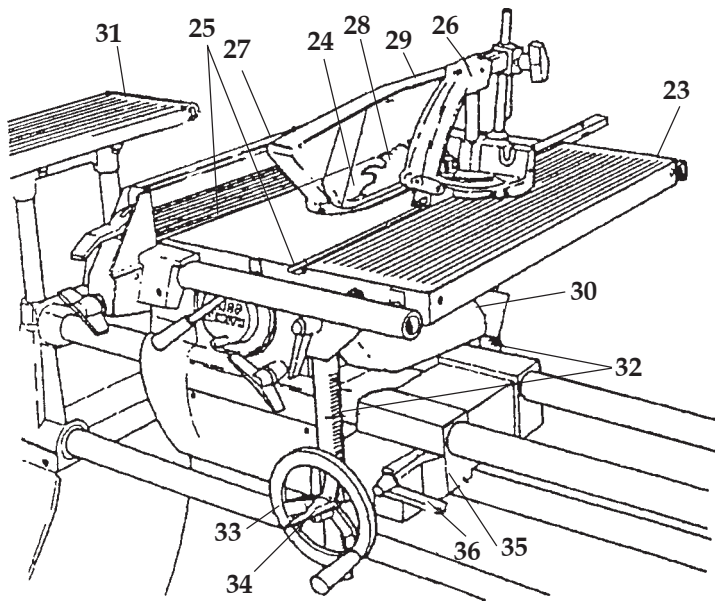
The Shopsmith Mark 7 will perform all the functions of a table saw, disc sander, drill press, horizontal boring machine, wood lathe, over-table router, and under-table shaper.

Basically, the Mark 7 is a rigid bench that holds the headstock and the worktable system. The upper part of this bench can be positioned horizontally or vertically. The headstock and the worktable slide independently and are positioned along the upper tubes.

You can mount accessories to the headstock and operate them at different speeds. The worktable can be positioned over, under or beside these accessories to hold stock at various angles. In this way, the bench, headstock, worktable, and accessories combine to make a unique, capable and versatile woodworking system.

Before you proceed, familiarize yourself with the Mark 7's basic parts:

1. Legs -- Support the way tubes and bench tubes.
2. Bench Tubes - Hold the Mark 7 rigid.
3. Way Tubes - Allow the headstock and carriage to slide.
4. Base (left and right) - Allows the way tubes to pivot to either a horizontal or vertical position.
5. Base Lock (left and right)- Secures the Mark 7 in the vertical position.
9. Power Base Mount (left)- Holds the extension table and the major accessories (Shopsmith Bandsaw, Jointer, Belt Sander, Scroll Saw, and Strip Sander).
10. Base Mount (right)- Holds the extension table, planer, and lathe tailstock.
11. Accessory Mount Locks- Secure the extension table, Major Accessories, and the lathe tailstock.
12. Main Spindle- Mounts the saw blades, sanding discs, and other accessories.
13. Quill- Extends and retracts up to 4-1/4".
14. Quill Lock- Secures the quill.
15. Quill Feed Lever- Extends the quill and main spindle out from the headstock.
16. Quill Feed Stop- Stops the quill at predetermined distances out from the headstock-not shown.
17. Power Switch- Turns the Mark 7 operating system on and off. Has a removable safety key to prevent unauthorized use of the Mark 7.
18. Headstock Lock- Secures the headstock on the way tubes.
19. PowerPro Controller - Controls the Mark 7 operating system. Turns on and controls the speed



and direction of the main and auxiliary spindles. Has a built in speed chart to determine proper operating speeds. Has a programmable lock to prevent unauthorized use.

20. Auxiliary Spindles- The upper spindle powers the Bandsaw, Belt Sander, and Strip Sander. The lower spindle powers the Jointer and Scroll Saw.
21. Logo Cover- (hidden from view) Allows access to inside of headstock, used mainly for cleaning.
22. Belt Cover- Allows access to the belts and pulleys.
23. Worktable - Holds the stock and provides a working surface.
24. Table Insert- Used for sawing, sanding, drilling and boring. It can be replaced with inserts for dadoing, molding, drum sanding and shaping.
25. Miter Gauge Slots- Guide and secure the miter gauge.
26. Miter Gauge with Safety Grip- Holds stock firmly at various angles. It slides freely or locks in the miter gauge slots.
27. Pro Style Rip Fence- Mounts to the table and is used as a guide, support or stop. It automatically aligns itself parallel to the blade. Holes in the fence are used to mount fixtures and fence extensions. Includes an adjustable scale to quickly set-up and align distance between the operating tool and the rip fence.
28. 10" Saw Blade- Mounts to the 1-1/4" arbor which then mounts to the main spindle. This saw blade is use for both crosscutting and ripping.
29. Upper Saw Guard- Provides a physical barrier between you and the part of the blade above the table. An anti-kickback mechanism helps control kickbacks.
30. Lower Saw Guard- Protects you from the part of the blade or cutter below the table. The saw guard has a dust chute. The lower saw guard is also used with the sanding disc.
31. Extension Table- Mounts in either base mount to provide extra support for the stock.
32. Table Support Tubes- Support the table above the bench. Each tube has racks that mesh with pinions in the carriage to raise and lower the table. Can be reversed for under table operations.
33. Table Height Crank- Turns the pinions in the carriage which raise and lower the table.
34. Table Height Lock- Secures the table at any height.
35. Carriage- Slides along the way tubes and holds the table support tubes and the lathe tool rest.
36. Carriage Lock- Secures the carriage on the way tubes.
37. Trunnions- Allows the table to tilt up to 90° left and 45° right.
38. Table Tie Bar- Supports the table support tubes and the trunnions.
39. Table Tilt Indicator- This vernier scale indicates the table angle.
40. Table Tilt Lock- Secures the table at any angle, up to 90° left and 45° right.
41. Table Stops- When properly adjusted, these bolts stop the table at 90° left, 45° right and 0°. (Note: the two 90° table stop bolts are shown.)

The following accessories come with the Mark 7, but are not shown on the illustrations.

Sanding Disc— Mounts to the main spindle and is used for disc sanding.

Drill Chuck and Key— Mounts to the main spindle. The key locks the bit in the chuck.

Router Chuck— Mounts to the main spindle. Accepts router bits with 1/2" Shank.

Router Shield Assembly— See through shield clamps around quill adjacent to the main spindle for over-table operations. Provides a physical barrier between you and the router bit.

Router/Shaper Table Insert - Mounts to main worktable. Allows for arbors to work above or below table line.

Lathe Tool Rest Assembly— Mounts in the carriage to support and guide lathe chisels. It has two mounting positions.

Lathe Drive Center— Mounts to the main spindle and turns the stock when the spindle is turning.

Lathe Cup Center— Mounts in the tailstock and supports stock when spindle turning.

Tailstock— Mounts in the base mount and holds the cup center in line with the drive center.

Shaper Arbor with Collars— Mounts to the main spindle. Accepts 1/2" bored shaper cutters.

Shaper Shield Assembly— See through shield mounts to the table miter slots or rip fence for under-table operations. Provides a dust chute to attach dust collection. Provides a physical barrier between you and the shaper cutter.

Pro Table System Rip Scale— Provides an adjustable scale to quickly setup and align distance between the operating tool and the rip fence.

Coupling Kit— Connects the Major Accessories to the headstock.

Safety Kit— Includes a push stick, push block, feather board and fence straddler. Used to help guide and hold stock safely during operations.

Goggles— For protection of your eyes. To be worn during all operations.

Arbor Wrench and Allen Wrenches— Used for alignment, adjustment and to mount accessories.

Specifications

The specifications of the Shopsmith Mark 7 will give you an idea of its capabilities—

Capacities

The work capacity of the Mark 7 depends on these seven modes:

- **Table Saw**

As a table saw, the Mark 7 accepts 10" saw blades. The maximum depth of cut at 0° is 3-1/4". With the table tilted at 45°, the maximum depth of cut is 2-3/8".

- **Disc Sander**

As a disc sander, the Mark 7 mounts a 12" diameter sanding disc, giving you 113 square inches of sanding surface. The size of stock that you can sand is limited only by what you can safely handle.

- **Drill Press**

As a drill press, the Mark 7 used a chuck that accepts drill bits with shanks 5/64" to 1/2" in diameter. The throat capacity is 8-1/4", enabling you to drill the center of a 16-1/2" circle. With a 5-1/2" long bit mounted in the chuck, the maximum distance from the bit to the table is 22". If you remove the table, the maximum distance from the bit to the floor is 54".

- **Horizontal Boring Machine**

The Mark 7 uses the same drill chuck used in the drill press mode. The table can be lowered 2-3/8" below the chuck, enabling you to bore the center of boards up to 4-3/4" thick. The width and length of boards that you can bore is limited only by what you can safely handle.

- **Lathe**

As a lathe, the Mark 7 handles both spindle and faceplate turning. The swing over the way tubes is 16-1/2", and the maximum distance between centers is 34". The tool rest and arm will pivot a full 360°, and can be locked in place in any position between the centers.

- **Router**

As a router, the Mark 7 can be operated as either an over-table router or under-table router. Available router

chucks accept both 1/2" and 1/4" shank bits. Engineered to withstand the side thrusts necessary for routing operations.

• *Shaper*

As a shaper, the Mark 7 can be operated as either an over-table or under-table shaping system. Standard shaper arbor with collars accepts 1/2" bored cutters. Can be operated in both forward and reverse (with cutters reversed) modes creating more profiles with cutters. Maximum cutter diameter is 2-1/8".

Bench

The Mark 7 is mounted on two steel legs and is held rigid by four steel tubes. The two upper tubes, or way tubes, can be locked in either a horizontal or vertical position.

Headstock

The Mark 7 is powered by a DVR Motor System which controls the Mark 7 operating system. Turns on and controls the speed and direction of the main and auxiliary spindles. All three spindles revolve on permanently-lubricated, sealed ball bearings. The system has a built in speed chart to determine proper operating speeds. Has a programmable lock to prevent unauthorized use.

Speed

A DVR Motor system makes it possible to adjust the speed of the main and upper auxiliary spindle from 250 rpm to 10,000 rpm. The lower auxiliary spindle turns 1.6 times faster than the other two, or between 400 rpm and 16,000 rpm.

Worktable

The Mark 7 worktable is made of die-cast aluminum grooved and machined smooth. It can be tilted from 90° left to 45° right, and raised from 2-3/8" below the center of the main spindle to 8-1/4" above it with the work angle set at 0°. The worktable can be reversed for under-table operations.

Overall Dimensions

Overall, the Mark 7 is 71" long, 25-1/2" wide, and 46-1/2" high in the table saw mode, or 76-1/4" high in the drill press and shaper mode.

WARNING

- Turn off and unplug the Mark 7 before performing any Assembly and Alignment procedure.

CLEAN AND WAX

CAUTION

Use paste floor or paste furniture wax. They protect and lubricate. Do not use car wax or spray furniture wax.

1. Use a rag and denatured alcohol to clean the Mark 7, tables, tubes and accessories. If you find any burrs, remove them with a fine file.
2. Use a clean, dry rag and furniture paste wax to wax and buff:
 - the worktable (shown in Figure C-7) and extension table surfaces
 - way tubes
 - rip fence
 - miter gauge bar
 - quill
 - mounting holes in the power and base mounts

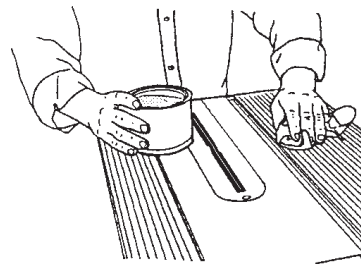


Figure C-7

- a. Do not wax the trunnions on the worktable. When you wax and buff the quill do not leave any wax in the racks. If you do, the wax will mix with sawdust and impede the movement of parts.
3. After you apply wax to the mounting holes in the Power base mount (left and right), wrap a rag around a scrap of wood and buff out the wax thoroughly. See Figure C-8.

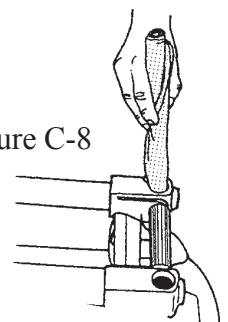


Figure C-8

Alignment of Mark 7

NOTE

IF YOU EXPERIENCE DIFFICULTY WITH THE BLADE OR BIT BURNING THE WOOD, INACCURATE CUTS, OR KICKBACK., REFER TO THE ALIGNMENT SECTION OF THIS MANUAL.

SAFETY

WARNING

Make sure the unit is turned off and unplug the Mark 7 before performing any ALIGNMENT procedure.

1. Complete **ALL** of the following procedures—and then recheck them at regular intervals. You **MUST** use an accurate combination square for alignment and adjustment. To check that your square is accurate, select a board with at least one straight and true edge. Place the square against the good edge and draw a line across the width. Flop the square over and hold it against the same edge and draw another line next to the first one. If the lines are parallel, your square is accurate.
2. All the parts and accessories which support or guide the stock **MUST** be aligned **parallel with** or **perpendicular to** the main spindle's plane of rotation. During the following alignment procedures the saw blade (provided in the accessories box) will represent the main spindle's plane of rotation.

NOTE

If you have installed casters (optional) on your Mark 7, make sure they are retracted and the legs on the Mark 7 sit firmly on a level floor. Do this now. Also, remember that your Mark 7 could possibly go out of alignment if it is moved to an area with varying floor levelness. Remember to recheck alignment and make needed adjustments after moving your Mark 7, if needed.

ADJUST THE CARRIAGE LOCK

1. If the carriage lock handle (187) does not lock into the horizontal position or the carriage moves out of position, the lock needs adjusting. To adjust the lock, use a 1/2" socket with an extension and ratchet handle to tighten or loosen the nut located at the back of the carriage assembly, as shown in Figure C-8.

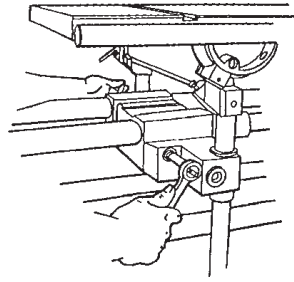


Figure C-8

2. When the carriage lock handle locks into the horizontal position and the carriage no longer moves when the handle is in the horizontal position, tighten the nut a final 1/4 turn.

WARNING

The carriage lock handle **MUST** lock into the horizontal position, otherwise the carriage lock may vibrate loose.

SET THE WORKTABLE'S 90° LEFT STOP

WARNING

Always make sure the Mark 7 headstock and carriage are locked and all casters are raised off the floor before lifting the Mark 7 into the vertical drill press position.

3. Unlock the carriage and headstock. Move the headstock to the middle of the way tubes. Then move the carriage between the headstock and base mount (right side).

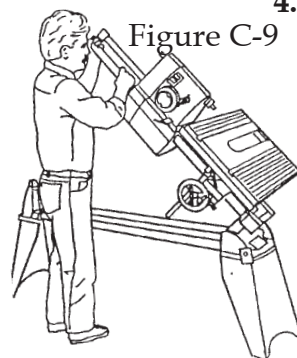


Figure C-9

4. Tighten the headstock and carriage locks. Place the Mark 7 in the vertical position by loosening the Power Base Mount knob, firmly grasping the way tubes near the power base mount end, and lifting the tubes into the 90° position, as demonstrated in Figure C-9.
5. See Figure C-10. Use your fingers to screw in the base lock. Note the base lock is slightly off center to the countersink found in the bench base, as shown in Figure C-11. This offset allows the base lock to more firmly hold the base in place.

Figure C-10

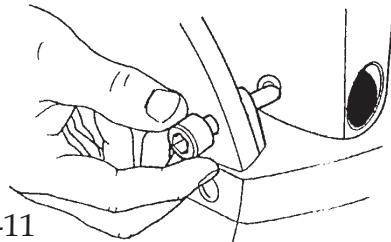
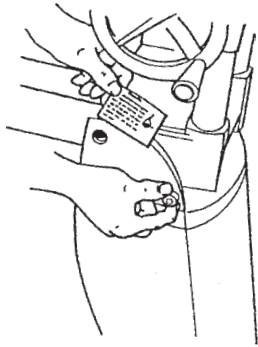


Figure C-11

6. Move the worktable into the 90° position by loosening the table tilt lock, as seen in Figure C-12, then putting the worktable in the horizontal 90° position, see Figure C-13. Retighten the table tilt lock only enough to allow movement with firm pressure.

Figure C-12

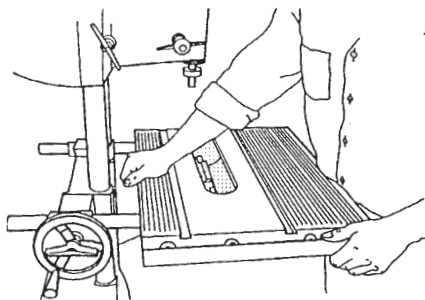
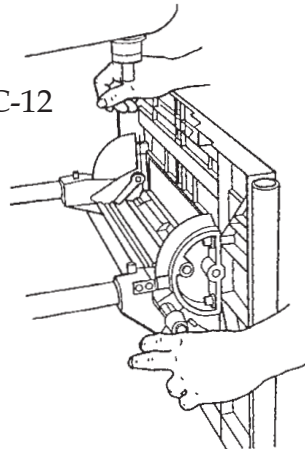


Figure C-13

7. Use a 5/32" Allen wrench to remove the table insert, as demonstrated in Figure C-14.
8. To install the drill chuck, mount the chuck on the spindle and align the chuck's set screw with the spindle knob's set screw, as shown in Figure C-15. This allows the chuck's set screw to set on the flat part of the spindle. Use a 5/32" Allen wrench to securely tighten the drill chuck's set screw.
9. Install a 3/8" to 1/2" straight drill bit in the drill chuck and use the chuck key to lock it place. See Figure C-16.

Figure C-14

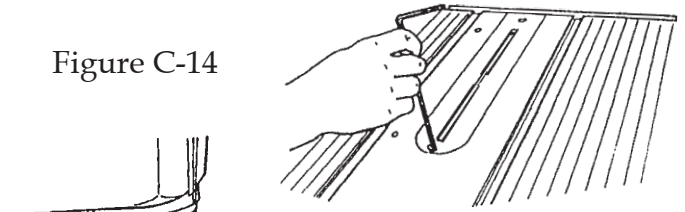


Figure C-15

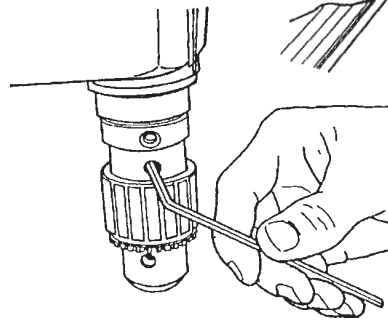
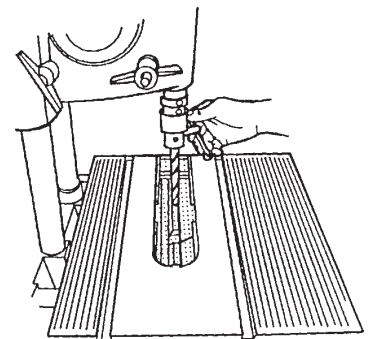


Figure C-16



chuck while holding the combination square against the drill bit and the table. If the bit is not straight DO NOT use it for these alignment instructions.

10. With the drill bit above the table opening, use the quill feed to extend the bit 1/2" into the table opening, as in Figure C-17.

Figure C-17

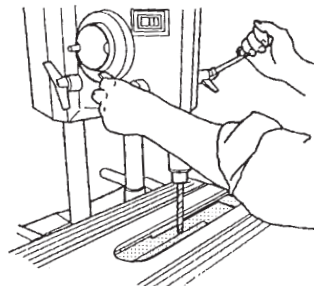


Figure C-18

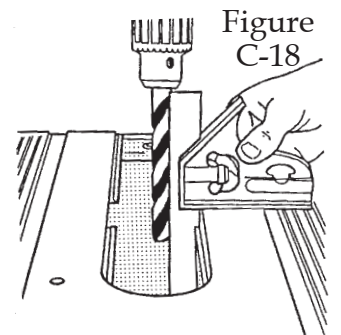
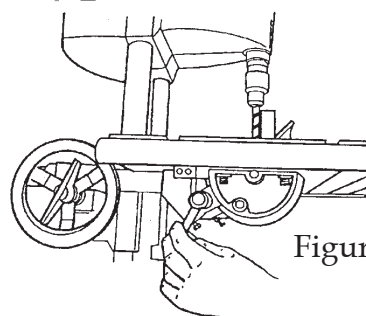


Figure C-19



NOTE

Check the straightness of the drill bit by rolling it on a flat surface. You can also hand-rotate the drill

11. Set the combination square against the bit and table, as shown in Figure C-18. The square should contact the bit along its entire length. When the table is exactly perpendicular to the drill bit, lock the table, as seen in Figure C-19.

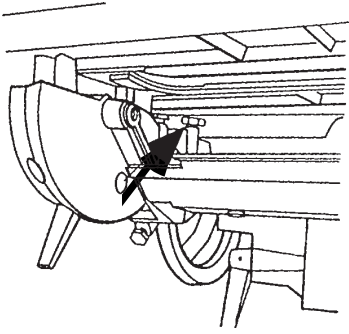
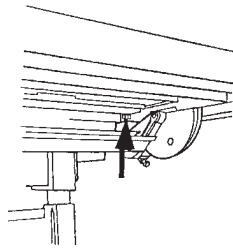


Figure C-20

Figure C-21



12. Both 90° stops (shown in Figs. C-20 and C-21) should contact the underside of the table. If they don't, use a 1/2" wrench to adjust the stops.
13. Recheck the setting by loosening the tilt lock, moving the table, and then repeating Steps 11 and 12. (Rechecking the settings is very important!)

SET THE WORKTABLE'S 0° STOP

14. Remove the drill bit and drill chuck from the spindle.
15. Loosen the base lock. Firmly grasp the way tubes and lower the headstock into the horizontal position, then engage the power mount knob.
16. Loosen the table tilt lock and place the table in the horizontal "0" position. Retighten the table tilt lock only enough to allow movement with firm pressure.
17. Mount the saw blade on the arbor:
 - a. Remove the arbor nut by turning it clockwise, as seen in Figure C-22. Hold the arbor with the threaded part pointing to the left.
 - b. Hold the blade with the teeth pointing toward you, as shown in Figure C-23, then insert the arbor through the hole. Replace

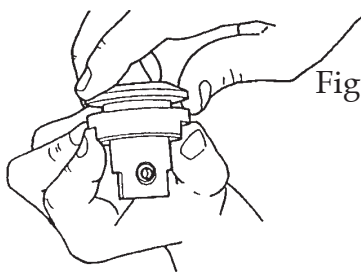


Figure C-22

Figure C-23

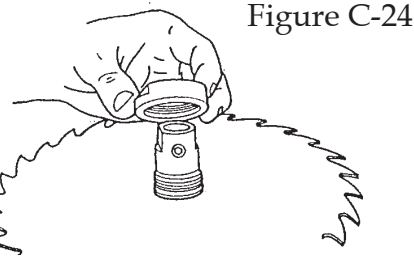
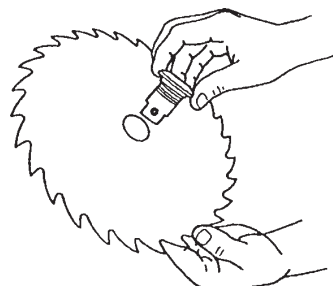


Figure C-24

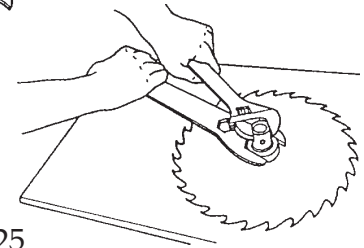


Figure C-25

- c. Place the blade and arbor on your workbench with the nut pointing up.
- d. Hold the arbor with an adjustable wrench and tighten the arbor nut with the arbor wrench, as demonstrated in Figure C-25. Another way to tighten the arbor nut is to clamp the arbor in a bench vise, and tighten the nut with the arbor wrench.

NOTE

The only time the saw blade is used without the upper or lower saw guards is during alignment and only after the Mark 7 is turned off and unplugged.

18. Mount the saw blade on the spindle and align the arbor set screw with the spindle knob's set screw, then use a 5/32" Allen wrench to tighten the arbor set screw, as seen in Figure C-27.
19. Reinstall the table insert in the worktable.
20. Raise the worktable so that it clears the top of the saw blade.

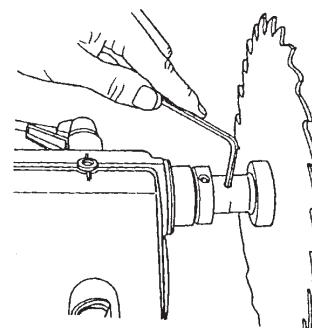


Figure C-27

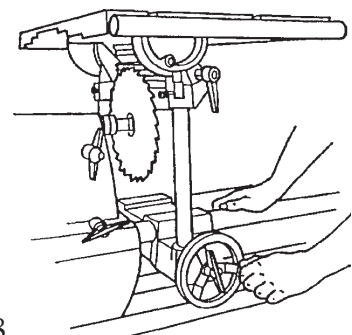


Figure C-28

21. Loosen the carriage lock and slide the carriage so the saw blade is directly beneath the slot in the table insert. See Figure C-28.
22. Lower the worktable (but not all the way down) so the saw blade comes through the slot. Lock the table height, as seen in Figure C-29.

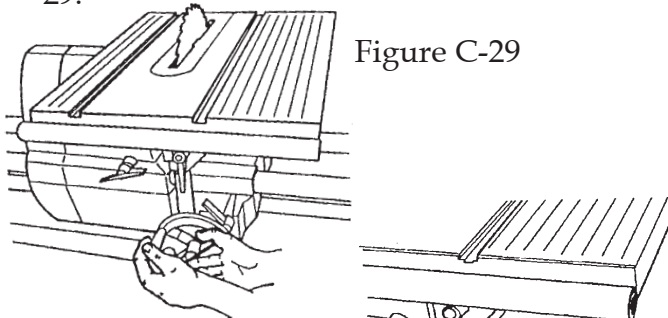


Figure C-29

Figure C-30

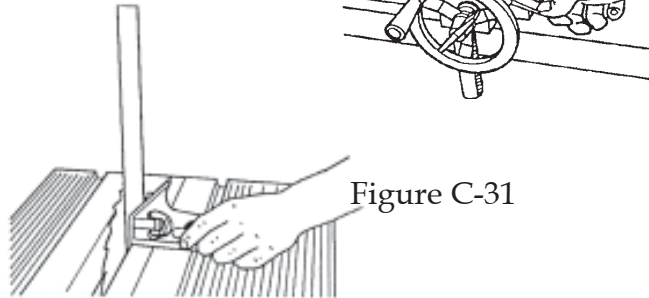


Figure C-31

23. Tighten the carriage lock, as shown in Figure C-30.
24. Place the combination square against both the saw blade and worktable, see Figure C-31. Make sure the square's blade does **not** touch a saw tooth and **does** rest in a gullet between teeth.
25. If the worktable is not exactly perpendicular to the saw blade, adjust the worktable so it is perpendicular to the saw blade, then tighten the tilt lock.
26. To adjust the 0° stop, simultaneously depress the table stop pin and use a 1/2" wrench to adjust the stop bolt. The stop bolt should just contact the side of the stop pin. Once the stop bolt is adjusted, the stop pin will "lock" back when the tilt lock is tightened, as shown in Figure C-32.

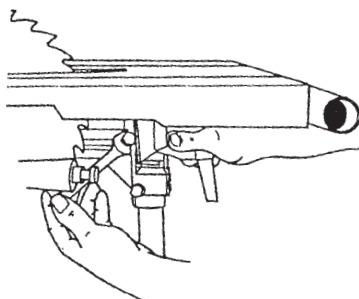
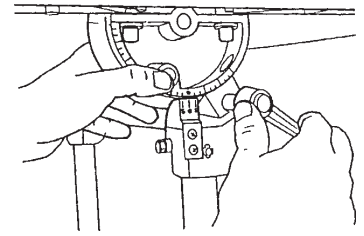


Figure C-32

Figure C-33



27. Loosen the tilt lock, move the worktable, then depress the 0° stop pin until the stop bolt contacts it. Tighten the tilt lock, and recheck the setting by repeating Steps 24 through 26. See Figure C-33. (It is very important to recheck the setting!)

ADJUST THE TABLE TILT INDICATOR

28. Tighten the table tilt lock and check that the "0" mark on the indicator aligns with the "0" mark on the trunnion.
29. To adjust the scale, use a medium Phillips screwdriver to loosen the two screws which hold the indicator to the tie bar. Then while holding the indicator in position so the "0"s are aligned, retighten the screws.

ADJUST THE WORKTABLE'S 45° STOPS

30. Loosen the table height lock and raise the table until it clears the saw blade. Tighten the height lock.
31. Loosen the tilt lock and tilt the worktable to the right until it makes contact with the two 45° stop bolts.
32. Tighten the tilt lock only enough to allow movement with firm pressure.
33. Loosen the quill feed (shown in Figure C-35) and extend the quill so the saw blade is centered beneath the slot in the table insert. When it is centered, lock the quill feed.
34. Lower the worktable so the saw blade extends through the slot. See Figure C-36. Lock the table height.

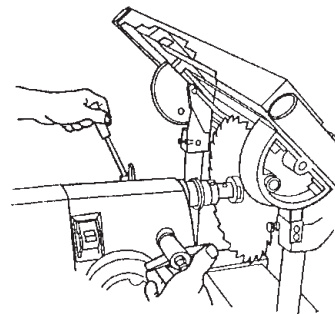


Figure C-35

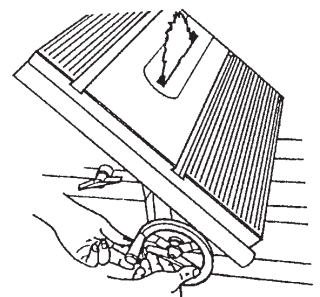
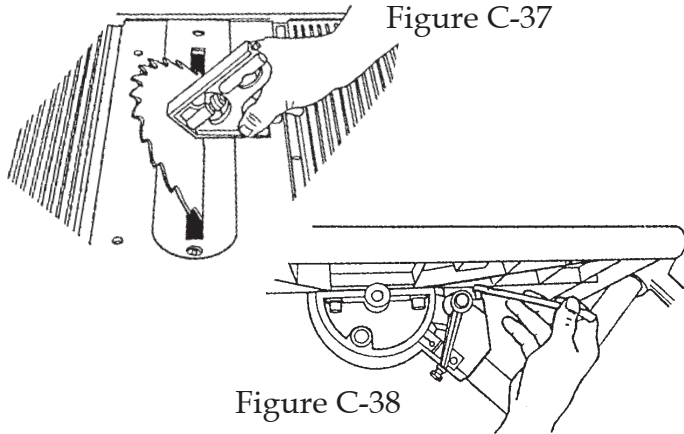
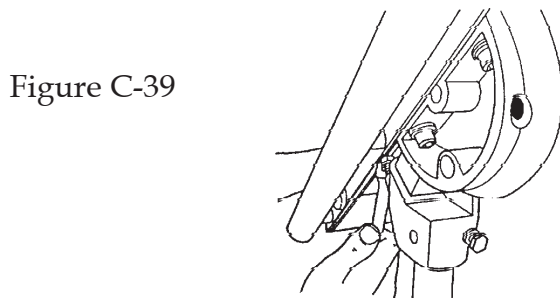


Figure C-36

35. Remove the blade from the combination square and place the square against the saw blade and the worktable, as shown in Figure C-37. Make sure the combination square doesn't rest on the table insert.
36. If the worktable is not exactly 45° to the saw blade, adjust the worktable so it is.



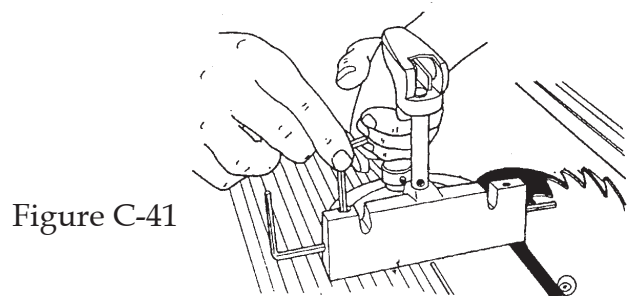
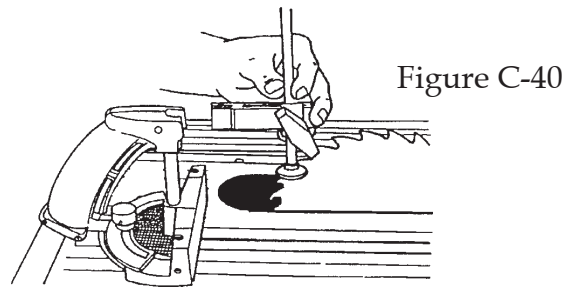
37. Tighten the tilt lock, then use a 1/2" wrench to adjust the 45° stop on the front side of the worktable (shown in Figure C-38) and the back side of the worktable (as shown in Figure C-39). The stops should just contact the underside of the table.



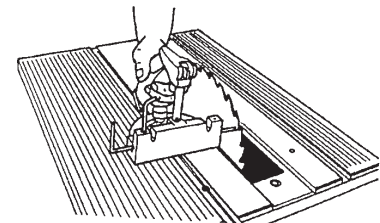
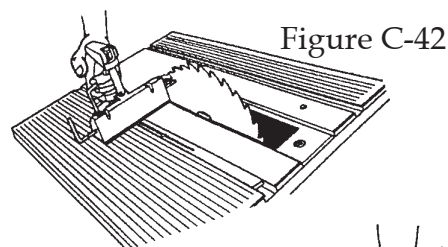
38. Loosen the tilt lock and move the table. To recheck the 45° stops, repeat Steps 33 through 37. (It is very important to recheck the setting!)

ALIGN THE MITER GAUGE SLOTS

39. Return the worktable to the horizontal "0" stop and tighten the tilt lock. The carriage lock and headstock lock should also be tightened. Remove the table insert.
40. Place the miter gauge in the right miter gauge slot, and use a 5/32" Allen wrench to remove the quick clamp from the safety grip, as shown in Figure C-40.
41. Insert the long 5/32" Allen wrench through the miter gauge. Borrow a set screw from the lathe tool rest and use the short 5/32" Allen



wrench to install it in either top miter gauge hole, as seen in Figure C-41. Place the tip of the long wrench against the front side of the saw blade and tighten the set screw.



42. Move the miter gauge from front to back along the saw blade, as shown in Figures C-42 and C-43. If it hangs up on the blade or a gap develops, the miter gauge slots need to be aligned. Make sure the Allen wrench does not contact a saw blade tooth, because the tooth "set" will cause misalignment.
43. If the miter slots need to be aligned, do the following:
- Tilt the table to 45° and tighten the tilt lock.
 - Use a 5/16" Allen wrench to loosen all four bolts (147) which hold the worktable to the trunnions, as pointed out in Figure C-44. Loosen the bolts only enough to allow movement with firm pressure. See Figure C-45.

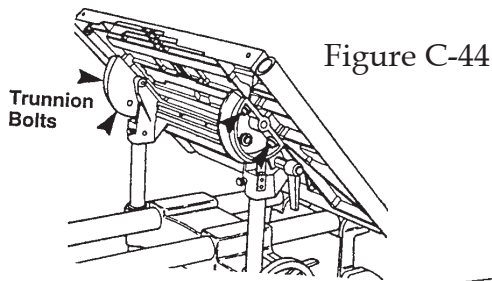


Figure C-44

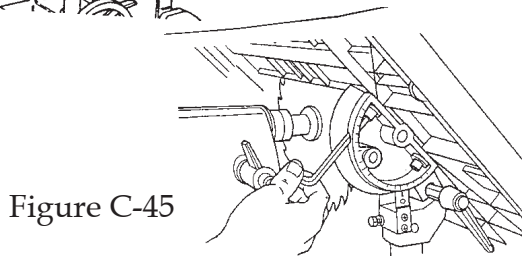


Figure C-45

NOTE

If you find it difficult to loosen the bolts, consider using a T-handle Allen wrench, or use a boxed wrench for extra torque. Another alternative is to use the hanging hole in an adjustable wrench, as demonstrated in Figure C-46.

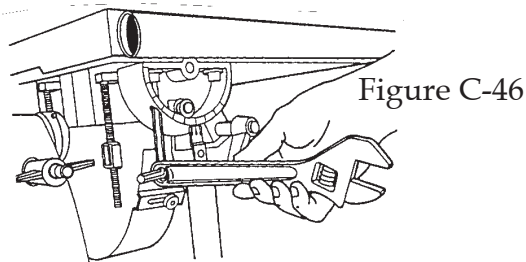


Figure C-46

- c. Position the worktable back to the horizontal "0" and tighten the tilt lock.
- d. Adjust the worktable, then again move the miter gauge and wrench along the face of the saw blade until the wrench tip consistently contacts the entire blade surface.
- e. When the miter gauge slot is aligned, use the 5/16" Allen wrench to retighten the two trunnion bolts which are closer to the headstock. Then loosen the table tilt lock, tilt the worktable to 45°, and **retighten the table tilt lock**. Use the 5/16" Allen wrench to retighten the other two trunnion bolts.
- f. Loosen the table tilt lock and move the table, then return it to the horizontal "0" position. Recheck the slot alignment. If it is off, repeat Steps d and e.

NOTE

Tighten the bolts only after the table tilt lock is secured. Otherwise the worktable will bow or bind the next time the table tilt lock is tightened.

INSTALL THE TABLE INSERT IN THE WORKTABLE

44. Place the table insert in the worktable recess. Use a 5/32" Allen wrench to start both screws.
45. First tighten the rear screw. Then the front of the insert will be sprung slightly above the table. Level the insert by placing your hand on the front of the insert, as in Figure C-47, and slowly turning the front screw until it draws the front of the insert flush with the worktable surface.

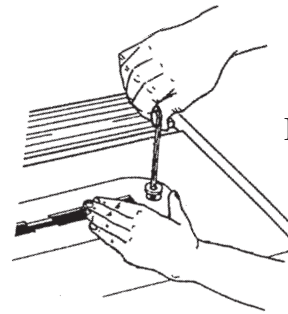


Figure C-47

ADJUST THE MITER GAUGE GLIDES

46. Place the miter gauge in the worktable's miter gauge slot. See Figure C-48.

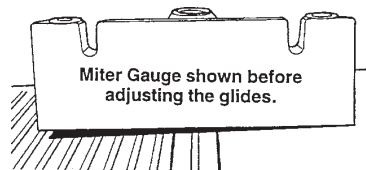


Figure C-48

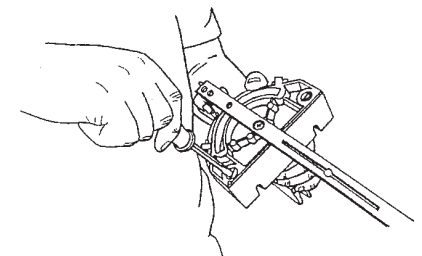


Figure C-49

47. Check to see if the miter gauge wobbles side-to-side. Also, slide it back and forth in the slot to check if the miter gauge scrapes against the table. If the miter gauge rocks or scrapes the table, adjust the glides.
48. If the glides need to be adjusted, do the following:
 - a. Remove the miter gauge from the slot and turn it over.
 - b. Use a medium screwdriver to screw the glides in or out, as shown in Figure C-49, so that the glides hold the miter gauge 1/64" to 1/32" off the worktable and the miter gauge does not rock in the slots.
 - c. Return the miter gauge to the slot and recheck and readjust it, if needed.

ADJUST THE MITER GAUGE FACE

49. Remove the safety grip from the miter gauge. Make sure you keep the small, thin washer.
50. Put the miter gauge in the right slot and place the combination square against the saw blade and miter gauge face, as seen in Figure C-50.

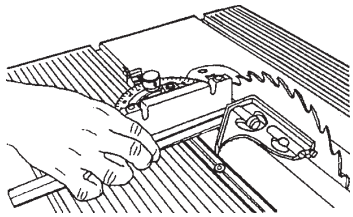


Figure C-50

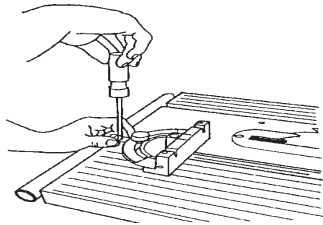


Figure C-52

51. If the miter gauge face is not perpendicular to the saw blade, do the following:
 - a. Use a long Allen wrench to loosen the lock knob and adjust the miter gauge so it is perpendicular to the saw blade, then tighten the lock knob. See Figure C-51.
 - b. Use a medium screwdriver, loosen the screw which holds the indicator plate, and set its "0" to the miter gauge's "90". Tighten the screw. See Figure C-52.

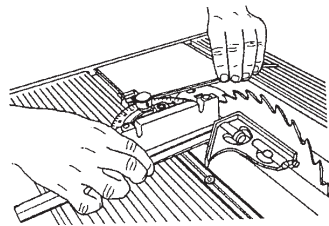


Figure C-51

ADJUST THE 90° POSITIVE STOP

52. Use a small screwdriver to back out the 90° stop screw 2 to 3 turns, see Figure C-53.
53. Depress the plunger, then turn the stop screw until you feel it touch the plunger.
54. To recheck the stop setting, repeat Steps 50 through 53.

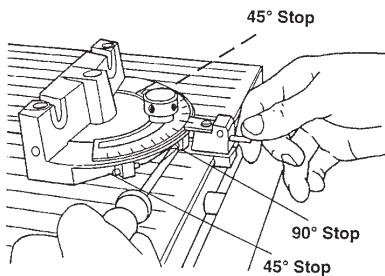


Figure C-53

ADJUST BOTH 45° STOPS

55. Loosen the lock knob and pull out the plunger. Then, at the same time, rotate the miter gauge and push in the plunger until it hits the 45° stop (there is one on each side of the 90° stop).

56. Use a combination square to set the miter gauge face at 45° to the saw blade. If the 45° stop needs adjustment, use a medium screwdriver to back out the 45° screw 2 to 3 turns.
57. Depress the plunger, then turn the stop screw until you feel it touch the plunger.
58. To recheck the stop setting, repeat Steps 52 through 57.
59. To adjust the other 45° stop, repeat Steps 55 through 58.

REMOVE THE SAW BLADE

60. Loosen the table height lock and raise the table so that it clears the saw blade, then tighten the lock. Unlock the carriage lock and move the worktable to the right.
61. Use the 5/32" Allen wrench to loosen the arbor set screw. Remove the saw blade.
62. Unlock the table height lock and lower the table to a comfortable working height. Tighten the lock.

ALIGN THE RIP FENCE

63. Place the miter gauge in the left slot of the worktable on the infeed side. Place the Rip Fence on the right side of the saw table.
64. Insert the long 5/32" Allen wrench through the miter gauge and secure it using the short 5/32" Allen wrench and a set screw borrowed from the tool rest.
65. Move the fence toward the Allen wrench until it just touches it.
66. Lock the lower fence lock handle first, then lock the upper fence lock handle to secure both ends of the fence.
67. Slide the miter gauge back and forth in the slot. The tip of the Allen wrench should keep in slight contact with the fence. Watch that you don't scratch the fence.
68. If the Allen wrench pulls away from or binds against the fence, the fence needs aligning. If so, do the following:
 - a. Using the short 5/32" short Allen wrench, loosen the four button head cap screws, located on the top of the fence, slightly. They should be just tight enough to require firm pressure to align the fence.
 - b. Raise the upper fence lock handle only to unlock the rear of the fence.
 - c. Adjust the rear end of the fence so that it just touches the Allen wrench as the miter gauge slides along the fence.
 - d. When alignment is reached, lock the upper fence lock handle. Slide the miter gauge back and forth to double check

your alignment. Using the short 5/32" Allen wrench, tighten the four button head cap screws completely.

ALIGN THE EXTENSION TABLE

NOTE

These instructions are for aligning the extension table on the right side of the headstock. You can also follow these same procedures to align it to the left side of the headstock.

For most projects, align the extension table on the right side, since it can usually be used when placed on the left side. However, once the extension table is aligned on the right side, it cannot be transferred to the left side and still maintain precise alignment. If you wish precise alignment on the left side, repeat the following instructions— but place the extension table on the left side in the headstock.

69. Mount the extension table in the Mark 7's accessory base mount (on the right side) at a comfortable height, as shown in Figure C-55. Use a 1/2" wrench to loosen the bottom nuts holding the table base to the table approximately 1/4" from the table. This will allow you room for later adjustment.

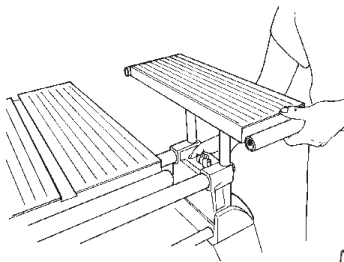
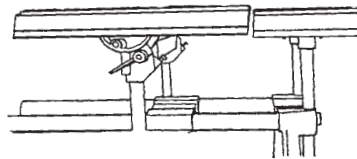


Figure C-55

Figure C-56



70. The worktable should already be mounted in the carriage mount. Move the worktable next to the extension table and adjust it to about 1/4" above the extension table, as seen in Figure C-56.
71. Hold a straightedge against the **infeed edge** of both the worktable and extension table tubes, as in Figure C-57. Line up the extension table's infeed edge with the worktable's infeed edge. The elongated holes in the extension table's base permit you to slide the extension table forward and backward.
72. Hold a straightedge on the **infeed top surface** of both the worktable and the extension

table, as shown in Figure C-58. As needed, adjust the top nuts located on the infeed side of the extension table, in order for the straightedge to be level across both the worktable and the extension table infeed sides. See Figure C-59.

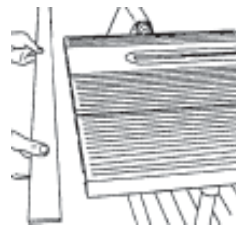


Figure C-57

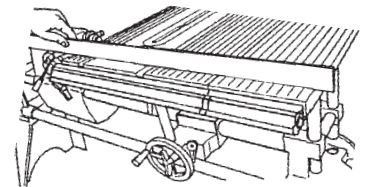


Figure C-58

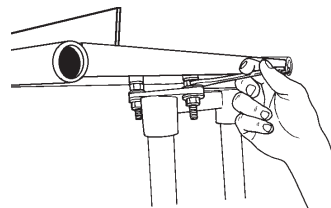


Figure C-59

73. Hold the straightedge on the **outfeed top surface** of both the worktable and the extension table, as seen in Figure C-60. As needed, adjust the top nuts located on the outfeed side of the extension table, in order for the straightedge to be level across both the worktable and the extension table outfeed sides.
74. Double check the levelness at the infeed and outfeed sides of the table surfaces. All four top nuts (those nearest the table) used in leveling the extension table should be touching the base.

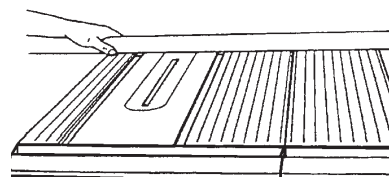


Figure C-60

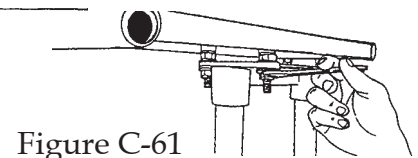


Figure C-61

75. When the tables are aligned on three sides—**infeed side edge** (along the table tubes, as in Figure C-57), **infeed top surface** (as in Figure C-58), and **outfeed top surface** (as in Figure C-60) —securely tighten the bottom nut on each of the four studs, as seen in Figure C-61.



DO NOT overtighten the nuts. Tighten the nuts until they bottom out, then no more than 1/8 additional turn. Overtightening the nuts will stretch and damage the threads.

NOTE

If you move the Mark 7 to another location— especially one with an uneven floor— remember to re-check the extension table alignment.

ALIGN THE EXTENSION TABLE RAILS (EXTRUSIONS)

- 76. Place the straightedge along the infeed-side tops of both the worktable and extension table tubes, as shown in Figure C-62.
- 77. If the extension table's tube is not aligned with the worktable's tube, use a 7/16" wrench to slightly loosen both keps nuts (248) attaching the tube to the extension table. Make the needed adjustments, then retighten the nuts. See Figure C-63.

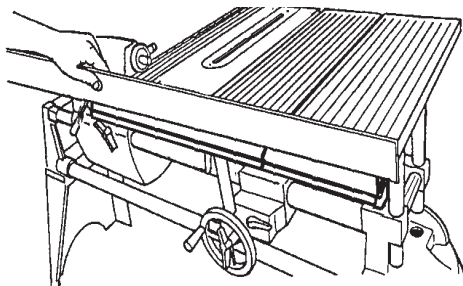


Figure C-62

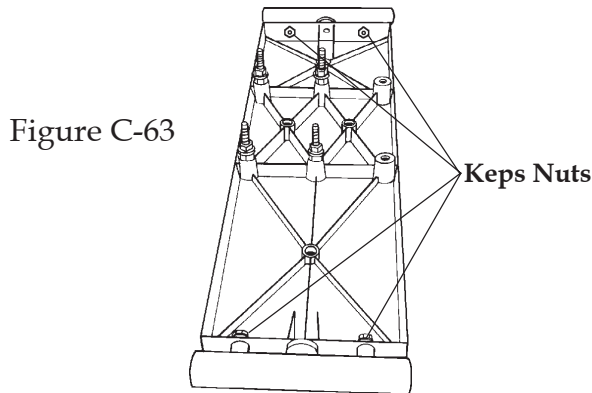


Figure C-63

- 78. Repeat Steps 85 and 86 for the extension table's tube located on the outfeed-side.

MOUNT THE SAW GUARD

- 79. Loosen the accessory mount lock and remove the extension table. Loosen the table height lock and remove the worktable. Place the saw blade and arbor in the lower saw guard cover.

- 80. Fit the lower saw guard's clamp on the spindle quill. Line up the arbor set screw with the spindle knob's set screw (where the spindle flat is located). Use a 5/32" Allen wrench to tighten the arbor set screw, as shown in Figure C-64.
- 81. Use the 5/32" Allen wrench to tighten the socket head screw on the saw guard collar, as seen in Figure C-65.

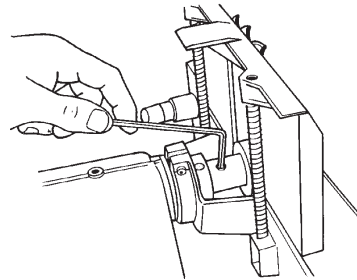


Figure C-64

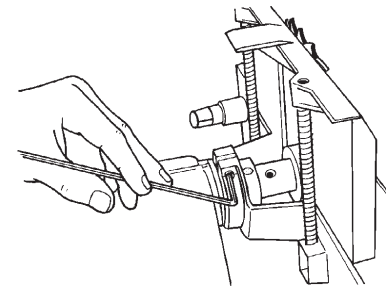


Figure C-65

INSTALL THE RIVING KNIFE

- 82. Loosen the guard lock knob and insert the upper saw guard's riving knife between the guard and the lock plate, as demonstrated in Figure C-66.

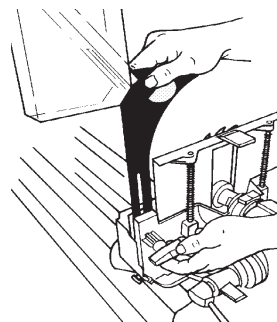


Figure C-66

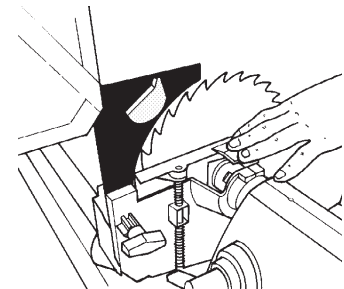


Figure C-67

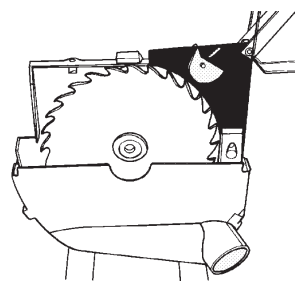
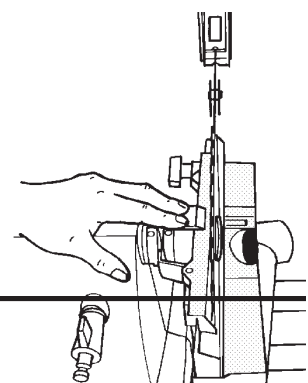


Figure C-68



83. Make sure the riving knife is fully seated between the guard and the lock plate, as in Figure C-67. The curved portion of the riving knife should be very close to the saw blade teeth (about 1/8"), as illustrated in Figure C-68. Tighten the guard lock knob). Look to see if the riving knife is centered with the saw blade, as shown in Figure C-69.
84. If the riving knife is not centered with the saw blade, follow these steps:
- Notice which way the riving knife is not centered with the saw blade.
 - Unclamp and remove the upper saw guard, then remove the saw blade and lower saw guard.
 - Use a 5/32" Allen wrench to adjust the stop screw located below the lower saw guard's collar, as shown in Figure C-70.
 - If the riving knife is to the **left** of the saw blade, back out the stop screw (counterclockwise).
 - If the riving knife is to the **right** of the saw blade, screw in the stop screw (clockwise).
 - Re-install the saw blade, lower saw guard and riving knife, according to Steps 88 through 92. If the riving knife is still not centered on the saw blade, repeat this Step 93.

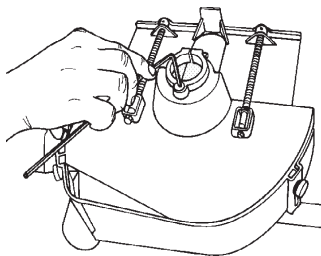


Figure C-70

Figure C-71

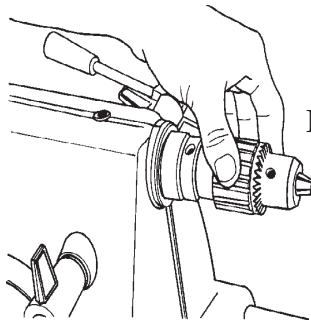
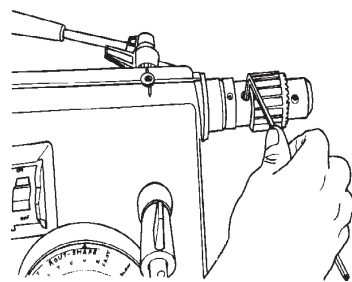
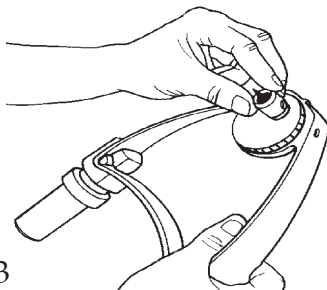


Figure C-72

Figure C-73



ALIGN THE LATHE CENTERS

85. Remove the saw guards and the saw blade, then loosen the carriage and headstock locks. Move the headstock and carriage all the way to the right and lock them in place.
86. Mount the drill chuck on the spindle, as shown in Figure C-71. Completely close the chuck jaws, as in Figure C-72.
87. Mount the cup center into the tailstock's adjustable center, as seen in Figure C-73, then mount the tailstock into the base mount (right side). Tighten the mount lock.
88. Loosen the quill lock. Extend the quill (seen in Figure C-74), so the drill chuck almost touches the cup center point and the center point could fit into the chuck jaws.
89. If the center point does not "fit" into the chuck jaws, determine whether you need to adjust the cup center point horizontally and/or vertically. Then do the following:
- To adjust the cup center point **horizontally**, loosen the set screw that locks the adjustable center, see Figure C-75. Rotate the adjustable center as needed to line up the cup center with the drill chuck, then tighten the set screw.
 - To adjust the cup center point **vertically**, loosen the mount lock, then loosen the tailstock stop collars. Raise or lower the tailstock in the base mount until the cup center point vertically lines up with the drill chuck, then tighten the mount lock. Press the stop collars down firmly against the base mount and tighten the collar set screws, as shown in Figure C-76.

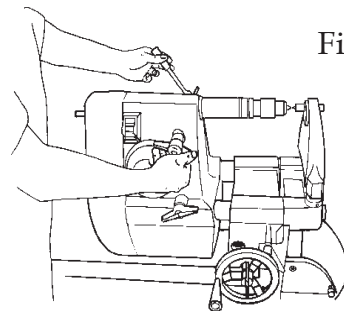


Figure C-74

Figure C-75

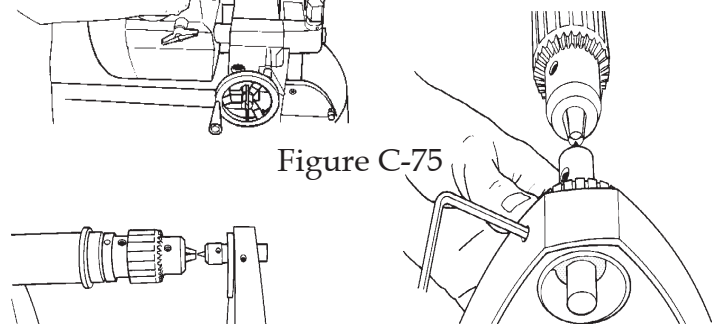
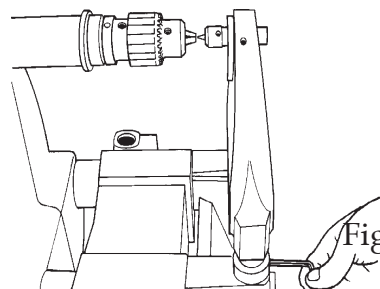


Figure C-76



Shopsmith PowerPro® Headstock Operations

Operating your new Shopsmith PowerPro® Headstock

Your new *Shopsmith PowerPro*® Headstock features a touch pad control panel that is simple to understand and easy to use. From the moment you first turn your new PowerPro Headstock on, to the moment you turn it off, you will quickly discover that its intuitive design will become second nature to you.



CONTROL PANEL SCREEN

PRESET SPEED PADS



The Preset Speed Pads are used with the motor turned off. Use these pads to move quickly to a base speed for the general woodworking operations listed below.

- 900 RPM** Drilling & Turning
- 1350 RPM** Disc Sanding, Strip Sanding & Belt Sanding
- 2000 RPM** Scroll Sawing
NOTE: Must then press **CONFIRM** to start.
- 3450 RPM** Sawing & Jointing
NOTE: Must then press **CONFIRM** to start.
- 9500 RPM** Routing & Shaping
NOTE: Must then press **CONFIRM** to start.



NEVER depress the Control Panel keypads with a sharp object such as a pencil, pen, or even a fingernail, as doing so will damage the keypads and void the Warranty. Use only the soft PAD of your finger or thumb to depress the keypads.



A review of the keypads and their functions:



The ON Pad is used to start the DVR Motor in your PowerPro Headstock.

NOTE



The PowerPro keypad will not be activated until your machine's Main Power Switch is flipped to the ON position.



The OFF Pad is used to stop the Motor in your PowerPro Headstock.

NOTE

The OFF Pad also serves as a Reset when you wish to exit the Speed Chart function or erase error messages.



UP RPM is used to increase the speed in as little as 1 RPM increments. Holding the pad down will increase the motor speed throughout its full speed range. Increases may be made either before the motor is started or after it is running.



DOWN RPM is used to decrease the speed in as little as 1 RPM increments. Holding the pad down will decrease the motor speed throughout its full speed range. Decreases may be made either before the motor is started or after it is running.



UP/DOWN RPM is also used in the speed chart mode to scroll between operation choices.



FWD / REV is used with the motor turned off. Use this pad to change the rotational direction of the spindle from Forward (main spindle turning toward you) to Reverse (main spindle turning away from you) and back again. The direction of rotation, either Forward or Reverse will always be shown on the Control Panel screen.

NOTE

You will have to press Confirm every time you select Reverse. FWD / REV is also used to move back to previous levels within the Speed Chart.



CONFIRM is used when prompted to do so on the Control Panel screen.

NOTE

- **You will press CONFIRM for any speed above 1500 RPM.**
- **You will press CONFIRM to start the motor in reverse each time you use it.**
- **You will press CONFIRM after selecting chart each time you move to the next level in the Speed Chart.**
- **You will press CONFIRM to set or unset the lockout code.**



CHART is used to access the internal Speed Chart in the Control Panel. Use the speed chart to find and set the correct speed for a specific operation and tool.

NOTE

The Chart function must be used when motor is off

- Press the CHART Pad to activate. Press the CONFIRM Pad to select a setting.
- Use the UP RPM or DOWN RPM Pads to scroll through the various operations or machines - then press CONFIRM to make the selection.
- Use the UP RPM or DOWN RPM Pads to scroll through the listing of diameters for available bits, cutters, blades or turning stock. The

FWD / REV Pad can be used to return to a previous level. Then press CONFIRM to select an option.

- Use the UP RPM or DOWN RPM Pads to scroll through the listing of material choices. The *FWD / REV* Pad can be used to return to a previous level. Then press CONFIRM to select an option.
- Use the UP RPM or DOWN RPM Pads to scroll through the listing of recommended bits, cutters and blades for the above material choice. The *FWD / REV* Pad can be used to return to a previous level. Then press CONFIRM to select an option.
- When you have made your final selection, the selected speed/direction will appear, along with Ready to Run, on the Display.
- At this point, press ON to start the machine at the displayed speed.
- If the displayed speed exceeds 1500 RPM, you will be asked to press CONFIRM and the machine will start.
- If Reverse direction is to be used for the operation, you will be asked to CONFIRM and the machine will start.



LOCK is used to secure the Machine from unauthorized use. Once locked, you need to enter a four-digit password to unlock and use your machine.

- Your machine comes to you, pre-programmed with an unlocked code ("0000").
- If you have no reason to LOCK your machine, you do not need to do anything with the LOCK feature. However, if you wish to use the LOCK feature, you will need follow the instructions listed below to set a new four digit password and then enter this password each time you turn on the Main Power Switch. The machine will not operate until the password is properly entered.
- Of course, you always have the option of turning off the LOCK feature at any time by simply returning the machine to the unlocked code ("0000"). You can do this at any time, as long as you remember the replacement password that you have set.

Using your new Shopsmith PowerPro® Headstock



Turn on the Main Power Switch. Your old On/Off switch is now the Main Power Switch. From this point on, you will use this Switch only to power-up or shut down the Machine electronics or to turn off the machine in an emergency.

- Each time you turn on the Main Power Switch, you will first see a quick series of warning messages, followed by 500 RPM, Ready To Run, indicating that the machine is ready to go.
- To power-down the machine, simply turn off the Main Power Switch. There will be a ten-second delay, during which nothing will seem to happen. If you should accidentally turn the Main Power Switch off during this period, you can turn it back on and continue to operate your PowerPro Headstock as if you had not turned off this switch.
- Once the control panel readout begins to blink, the machine is shutting down. When the panel goes dark, the machine will be completely shut down.

NOTE

If your PowerPro Headstock is operating and you lose power, your headstock will turn off. If you leave the main power switch on, when the power is returned the electronics will automatically come back on. However, the spindle will not turn on unless the ON pad is pushed.

Getting Started

Decide which woodworking operation you wish to perform and mount the appropriate accessories. Select one of the following:



1. Press the ON pad to start the machine at 500 RPM. Be sure that the item mounted on the machine is rated for 500 RPM or more. You may then increase or decrease your speed from this point by depressing either the UP RPM or DOWN RPM keypad.



2. With the headstock off, press one of the five Preset Speed Pads on the Control Panel. The display will then show the speed you selected and the words Ready to Run. Press the ON pad and off you go, *EXCEPT*:
 - 2a. If you press one of the high speed Pads (over 1500 RPM), you will be required to press the CONFIRM Pad after you press the ON Pad. The machine WILL then start after you press CONFIRM.
 - 2b. If you press the FWD / REV Pad to reverse the motor direction.
 - You will be required to press the CONFIRM Pad after you press the ON Pad every time you start in reverse direction.



NOTE

- After reversing the motor, each time you restart the machine, it will start again in reverse direction, until you press the FWD / REV pad again.
- Once the Main Power Switch is turned off, the machine will re-set to Forward direction when powered-up.
- When you choose a speed greater than 1500 RPM AND the reverse direction, you will be asked to press the CONFIRM Pad twice; Once for the high speed, and Once again for the reverse direction. The machine will start when you press the CONFIRM Pad the second time.

START-UP SAFETY CAUTIONS



Whenever you press the CONFIRM Pad, the machine will always start immediately at the speed you set and/or in reverse direction. **BE PREPARED FOR THIS START-UP.**

REMEMBER...



- You always have the option of increasing or decreasing the 500 RPM start-up speed by depressing the UP RPM or DOWN RPM Pad, then the ON Pad to start at a different speed. If this speed exceeds 1500 RPM, you will also have to press the CONFIRM Pad before the machine will start and that it will start immediately, so **BE PREPARED FOR THIS START-UP.**



- You always have the option of using the CHART Pad to access the internal Speed Chart for help in selecting the proper speed for a specific operation.



- You can set a speed, then press the FWD / REV Pad to reverse the direction of the Motor. You will have to then press CONFIRM to start the Motor in reverse direction.

ONCE AGAIN...



Whenever you press the CONFIRM Pad, the machine will always start immediately at the speed you set and/or in reverse direction. **BE PREPARED FOR THIS START-UP.**

Mode Setups

The Mark 7 Model converts to seven modes—table saw, disc sander, drill press, horizontal boring, lathe, over-table router and under-table shaper.

NOTE

These Mode Setup procedures assume that there is nothing mounted to any spindle and all alignments and adjustments have been completed.

One of the most useful features about the Mark 7 is that you can "borrow" angles and setups from one mode to the other. This greatly improves the accuracy of your woodworking.

To "borrow" a setup, don't break down the machine completely as you change from mode to mode. For example, if you need to cut a miter, sand it smooth, and then bore for dowels, keep the table and the miter gauge in the same position as you move from table sawing to disc sanding to horizontal boring. This will ensure that your stock is cut, sanded, and bored precisely the same. It also saves you setup time.

As you change from one mode to another, keep these four safety rules in mind:

1. **Turn off and unplug the Mark 7 before you break down one mode and set up another.** It

is dangerous for you to start accessories at a speed higher than recommended by the built-in speed chart. Be sure to consult speed chart before beginning and operation.

2. **Make sure that accessories are properly mounted on the main spindle.** The flat on the main spindle is ground with a "reverse taper" to keep accessories secured.
 - a. To properly mount an accessory, push it onto the main spindle **all the way**. Then use a 5/32" Allen wrench to tighten the setscrew against the flat of the spindle. (See Figure C-77.) To make sure the accessory is securely mounted, rock the accessory back and forth slightly as you tighten the setscrew and then again after it is tight, while keeping the spindle from turning. If the accessory seems to loosen, tighten the setscrew again until you've removed any "play."
3. Check all locks before turning on the machine. To properly secure a lock, spin it until it stops, then tighten it an extra 1/4 turn.

CAUTION

Be careful not to overtighten locks. Overtightening locks may damage the way tubes, table support tubes, or other parts of the machine.

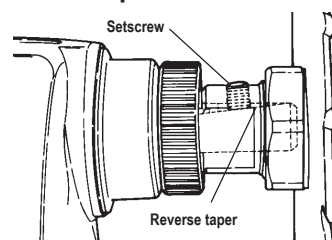


Figure C-77

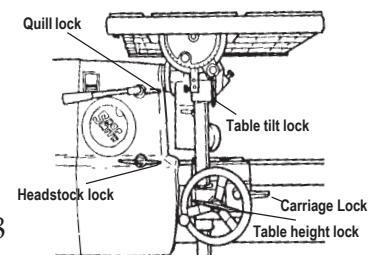


Figure C-78

To be sure all locks are as they should be, make a five-point check before you turn on the Mark 7. With a clockwise sweep of your hand, check each of these locks in succession: table tilt lock, carriage lock, table height lock, headstock lock, and quill lock. See Figure C-78. The carriage lock handle must be secured in the horizontal position. The quill lock should be loose in the drilling and boring modes, and for some sanding operations.

When changing from a horizontal to a vertical position, secure the base lock. When changing from vertical to horizontal, secure the power mount and base mount knobs. If you're mounting accessories in the power mount or base mount, secure the mount locks.

4. **After you power on the Mark 7, but before you begin working, set the correct speed for the operations.** This is important! It's unsafe to run the lathe at table sawing speeds, and time-consuming to run the table saw at lathe speeds. To find the proper speeds, refer to the "Speed Charts" in the Operations section.

The worktable and other accessories are often used in more than one mode:

Worktable

1. When you change modes, you will spend most of your time rearranging the worktable.
 - a. **To change the height of the worktable,** simply loosen the table height lock and turn the table height crank. Retighten table height lock.
 - b. **To change the table tilt,** loosen the table tilt lock and tilt the table to the right or left. The table tilt mechanism has positive stops to help you quickly adjust the table to 0°, 45° right and 90° left. To use the 0° stop, loosen the tilt lock, push in the table stop pin on the front left of the front trunnion and tilt the table until the stop pin hits the stop. To use the 45° right and 90° left stops, loosen the tilt lock and tilt the table to 45° right or 90° left.
 - c. **To determine the table tilt angle,** use the trunnion and the vernier scale. If the desired angle is divisible by 5, align the angle on the trunnion with 0° on the scale. To set an angle that is not divisible by 5, first find the nearest angle that is divisible by 5 and is smaller than the desired angle. For example, if you want to tilt the table to 17°, the nearest angle that is smaller than 17° but divisible by 5 is 15°. Next, subtract the smaller angle from the desired angle, $15^\circ - 17^\circ = 2^\circ$. Tilt the table so that the 15° mark on the trunnion goes 2° past the 0° mark on the scale. See Figure C-79.
 - d. **To dismount the worktable,** raise the table above the blade and slide the carriage to the

right. Tilt the table 90° left and lock. Loosen the table height lock and pull the table straight up. See Figure C-80.

- e. **To remount the worktable,** loosen the table height lock and place the support tubes in the carriage. For most operations, the trunnion (see figure C-79) should be facing the front of the Mark 7. For under-table operations such as the shaper, the trunnion should be facing the back of the Mark 7. Gently rock the table front-to-back until the racks engage the pinions and the tubes drop smoothly into the holes. Sometimes it helps to slowly turn the table height crank clockwise while you rock the table. This will position the support tubes at exactly the same height and get the racks started properly in the pinions. Lower the table, loosen the tilt lock, set the desired position and secure the tilt lock.

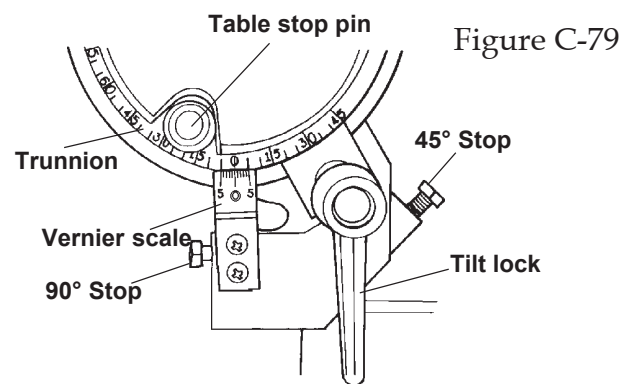


Figure C-79

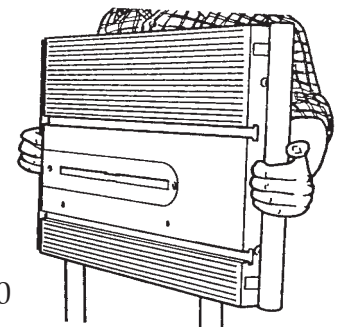


Figure C-80

- f. **To change the worktable,** for under-table operations, such as the shaper, dismount the worktable as described in paragraph d. Turn the worktable 180° and remount the worktable as described in paragraph e.

Accessories

The miter gauge, rip fence and extension table are designed to be used in more than one mode.

Miter Gauge

1. The miter gauge mounts in the worktable slots. The face of the miter gauge angles from 30° right to 30° left (a 120° swing) and has three positive stops – 90°, 45° right, and 45° left. To use the stops, loosen the lock knob, push in the plunger and turn the miter gauge until the stop hits the plunger. See Figure C-81.



Figure C-81

2. When the miter gauge is in the desired position, spin the knob tight and insert the long 5/32" Allen wrench in one of the holes in the knob to tighten it an extra 1/4 turn.

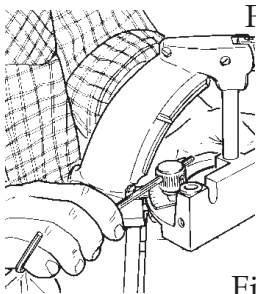


Figure C-82

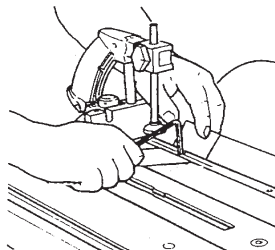


Figure C-83

3. The miter gauge slides or locks in the slots. To lock the miter gauge bar in the slot, put a piece of paper under the bar and mount the bar in a slot. Then turn the tapered screw located in the middle of the bar clockwise until the miter gauge is secure in the slot.
4. The miter gauge has a special safety grip and quick clamp that helps hold stock securely in the miter gauge. The quick clamp can be adjusted to accommodate any size stock up to

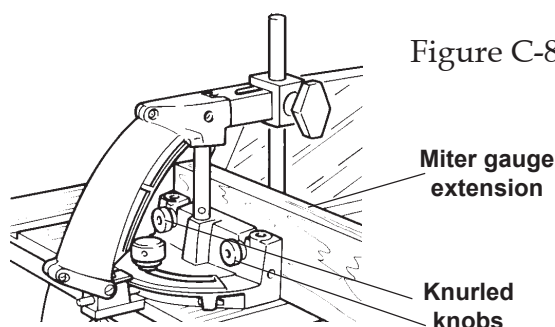


Figure C-84

4-1/4" thick simply by loosening the knob and raising or lowering the rod and shoe assembly. If you need to perform an operation where the quick clamp would be in the way, you can remove it by loosening the setscrew at the top, near the back of the arm. As shown in Figure C-84.

5. The miter gauge has two slots, so that you can attach a miter gauge extension. As shown in Figure C-85.

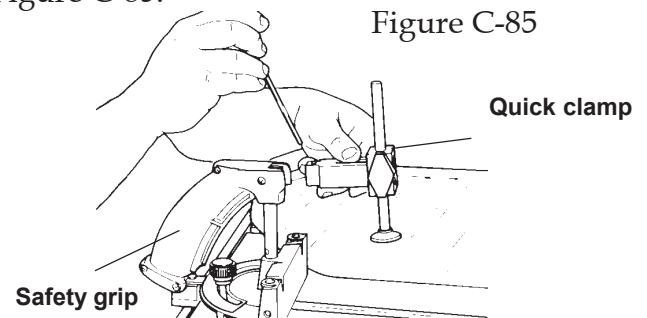


Figure C-85

Rip Fence

1. As you lock the lower handle on the rip fence's base assembly, the infeed clamp pulls the fence so that its base rests flush against the table rails (extrusions) and is automatically aligned to the blade or disc. The upper handle locks the fence to the outfeed table rails (extrusions).
2. There are t-tracks on the side and top of the fence so that you can mount auxiliary fences or special jigs. The slot in the top also mounts the mortising hold down.

Extension Table

1. The extension table mounts in the base and power mounts (the left and right sides of the headstock). If you frequently perform operations where you need support on both ends of the Mark 7, you can order an additional extension table or use the telescopic legs and connector tubes.
2. To adjust the height of the extension table, first be sure the worktable height is set properly. Then lay a long, straight board across both tables. Raise or lower the extension table to where the board rests flush against both tables. For alignment instructions, see Alignment in this section.

Table Sawing Operations

NOTE

The Speed Chart for the Mark 7 is programmed into the control panel of the PowerPro headstock.

Safety

WARNING

Before performing table sawing operations:

- Read and understand, and follow the SAFETY section.
- Complete ALL the Assembly and Alignment procedures
- Set up the table saw mode according to the instructions found below and Alignment section.
- Secure locks.

Table Saw Mode Safety

- Always keep the upper and lower saw guards in place. The ONLY exception is when you saw part way through stock— such as when cutting a rabbet or groove, or when you use the dado or molder accessory. Then you must remove the upper saw guard. However, always keep the lower saw guard in place and work with extreme caution. Use safety devices to move the stock past the unguarded blade. NEVER place your hands over the blade even if the blade is covered by the stock.
- The saw blade should never protrude more than 1/4" above the stock.

To prevent kickback:

- Never make freehand cuts.
- Never reach over the saw blade while the machine is running.
- Keep blades sharp, properly set and free of pitch.
- Avoid cutting wet or pitchy wood.
- When cross cutting, always use the miter gauge with the safety grip.
- If you use the rip fence with the miter gauge, always clamp a stop block to the rip fence.

- When ripping, always use the rip fence and make sure that it is parallel to the blade.
- When beveling, always mount the rip fence or the miter gauge on the downward side of the worktable.
- Always cut with the smooth, hard surface of the stock against the worktable.
- Make sure that the riving knife on the saw guard system is properly aligned with the saw blade.
- Do not rip large sheets of plywood or similar materials by yourself. Get at least one helper.
- Use only 10" saw blades with the Mark 7. The only exceptions are Shopsmith-recommended molding heads and dado blades.
- Always use the proper table insert for the operation.
- Always install the upper saw guard so that the riving knife is very close (1/8") to the saw blade.
- Never place the miter gauge in the left side of the worktable when the worktable is set to 45°. The saw blade could cut into the miter gauge.
- Never operate the table saw at higher than recommended speeds.

Setting Up the Table Saw Mode

1. Turn off and unplug the Mark 7.
2. Position the headstock so that you can reach the main spindle. Tighten the quill lock.

3. Mount the lower saw guard on the quill so that the stop screw below the collar butts against the stop collar on the quill. Align the ridge on the headstock with the slot in the collar. Tighten the screw on the collar. See Figure C-85. Loosen the two knobs and slide the guard cover to the right.

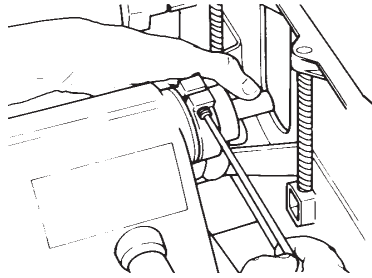


Figure C-85

4. Mount the saw blade on the arbor. Remove the arbor nut by turning it clockwise. Hold the arbor with the threaded part pointing to the left. Mount the blade with the teeth pointing toward you. Replace the nut and finger tighten.
5. Place the blade and arbor on your workbench with the nut pointing up. Hold the arbor with an adjustable wrench and tighten the arbor nut with the arbor wrench.
6. Mount the saw blade on the main spindle. Tighten the setscrew against the flat of the spindle. Slide the guard cover in toward the blade.



Always move the guard cover in toward the blade before lowering the worktable. Otherwise, you will damage the guard.

7. Raise the worktable as high as it will go. Slide the carriage toward the headstock until it butts against the rubber spacer. Lower the worktable so that the blade protrudes 1/4" higher than the thickness of the stock. The blade should be centered in the table insert. Secure the table height and carriage locks.
8. Install the upper saw guard. Grasp the top of the riving knife, with the guard up, and slide the guard through the table insert into the lower saw guard. See Figure C-86. Tighten the guard lock knob.

WARNING

When the riving knife is properly installed, it will be 1/8" from the saw blade. If the clearance is greater than 1/8", the riving knife needs to be checked. It should not be binding against the back of the table insert.

Also, always secure the guard lock knob even when the upper saw guard is not being used.

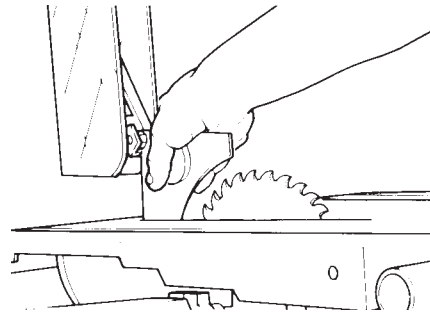


Figure C-86

9. Check all locks. The table tilt lock, carriage lock, table height lock, headstock lock and quill lock should all be securely tightened.

Table Sawing Speeds

NOTE

The speeds designated on the speed charts are suggested speeds.

Before you begin any table saw operation, know the correct speed at which to set the speed dial. The correct speed is determined by the operation and the type of stock you're sawing. To determine the right speed for the job, refer to the chart programmed into the PowerPro Headstock.

Crosscutting

General Crosscutting

1. Place the miter gauge in the slot on the same side of the saw blade where you'll be standing. Position the miter gauge square to the blade.
2. Mark the board where you want to cut it. Set the stock against the protractor face. Adjust the stock so the blade cuts on the waste side of the line. Adjust the quick clamp to the thickness of the stock.

3. Set the stock against the miter gauge face, so that the blade cuts on the waste side of the line.
4. Squeeze the safety grip and turn on the Mark 7. Set to the correct speed, then guide the stock past the blade. Use your free hand to help keep the stock against the miter gauge face. See Figure D-1.

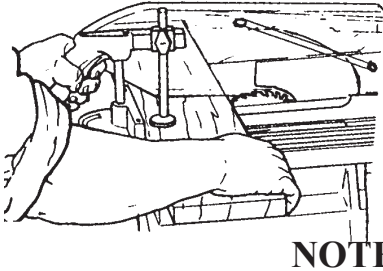


Figure D-1

NOTE

When crosscutting stock resulting in narrow scrap, move the blade close to the table insert on the scrap side of the blade. This will help keep small pieces of stock from falling through the insert.

5. Don't feed the stock any faster than the saw will cut. If the machine bogs down, slow your feed rate and let the saw get back up to running speed.
6. When you've finished the cut, turn off the On/Off Button on the control panel board and turn off the Mark 7. Let the blade come to a complete stop, then remove the stock from the miter gauge and brush away scraps.

WARNING

Always let the blade come to a complete stop before removing stock or scrap. Also, if you need to actually touch the blade, make sure the Mark 7 is turned off and unplugged.

Ripping

WARNING

When ripping, make sure the rip fence is parallel to the blade and that the edge of the stock against the fence is straight. Otherwise you're likely to get a kickback.

Also, never reach over or around the blade to catch your stock, even with the upper saw guard in place. A kickback can drag your hand back under the guard and into the blade.

General Ripping

1. Mount the rip fence to the worktable. Move the fence the desired distance away from the saw blade, then lock it. Use the quill feed to make fine adjustments. See Figure D-6.

NOTE

When properly aligned, the rip fence automatically sets itself parallel to the blade. However, on critical setups, it's wise to check this. Measure the distance from the rip fence to the tip of a saw tooth (that is set toward the fence) at both the front and back of the machine.

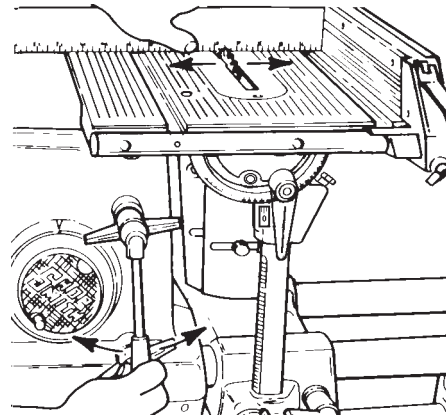


Figure D-6

2. Mount a feather board in front of the blade to help hold the stock against the fence.

WARNING

Always mount the feather board in front of the blade. Otherwise you could create a kickback.

3. Turn the machine on and set the correct speed. Feed the stock into the blade while keeping it pressed firmly against the fence. Use a push stick or push block to finish the cut. See Figure D-7.

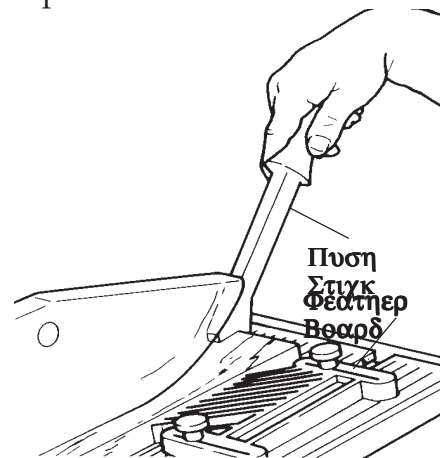


Figure D-7

Disc Sanding Operations

NOTE

The Speed Chart for the Mark 7 is programmed into the control panel of the PowerPro headstock.

Safety

WARNING

Before performing disc sanding operations:

- READ, UNDERSTAND, and FOLLOW the SAFETY section and mode safety below.
- Complete ALL the Assembly and Alignment procedures.
- Secure locks.

Disc Sander Mode

- Maintain a 1/16" maximum clearance between the worktable and the disc. The one exception is when you use the quill to advance the disc. Then maintain a 1/2" maximum clearance.
- Always use a table to support the stock. Never sand freehand.
- When using the quill feed to advance the disc, back up the stock with the rip fence. If the stock is too long to back up, clamp the stock to the worktable. Also, attach the quill feed lever to the side of the headstock where it can be reached without reaching over the disc.
- Do not turn on the power with the stock laying on the worktable or already in contact with the disc.
- Always sand on the downward motion-side of the disc.
- Do not sand the end grain of stock wider than 5-1/2". The rotation of the disc may lift the stock off the table.
- Never operate the disc sander at a higher than recommended speed.

Setting Up the Disc Sander Mode

1. Turn off and unplug the Mark 7.
2. Mount the sandpaper on the sanding disc. If you are mounting sandpaper for the first time, clean the disc with denatured alcohol and a clean rag to remove the protective oil. Otherwise the sandpaper will not stick. Press the sandpaper firmly on the disc and smooth it from the center toward the edge.

3. Position the headstock so that you can reach the main spindle.
4. Mount the lower saw guard on the main spindle and open it up by loosening the cover lock knobs and sliding the cover to the right. Tighten the guard lock knob.
5. Mount the sanding disc all the way onto the main spindle. Tighten the setscrew against the flat of the spindle. Move the guard cover towards the disc until it is 1" away. Tighten the two knobs. See Figure C-87



Figure C-87

6. On the work table, install the disc sander table insert (555116).
7. Position the table 1/16" away from the disc 1/2" away if you are going to use the quill feed. Adjust the table height so that the table surface is slightly above the center of the disc.
 - For angle sanding, raise the table above the disc and slide the table to the left until the disc aligns with the table slot. Loosen the cover lock knobs and slide the guard cover toward the disc as far as possible. Lower the table over the disc. Tilt the table to the desired angle while extending the quill. Slide the guard cover to the right until it hits the tie bar. Secure the lock knobs.
8. Check all locks. The table tilt lock, carriage lock, table height lock, headstock lock and quill lock (if not used) should be securely tightened.

WARNING

Do not attempt to move the headstock when the machine is in the vertical position; the headstock could fall on you.

Disc Sanding Speeds

Before you begin any disc sanding operation, know the correct speed at which to set the control panel. The correct speed is determined by the operation and the type of material you're sanding. To determine the right speed for the job, refer to the Internal Speed Chart for Disc Sanding.

General Sanding

Position the carriage so that the table is no farther than 1/16" away from the disc (if you're not using the quill feed), or 1/2" (if you are using the quill feed). Maintain these clearances during sanding. Position the table surface near the center of the disc. Maintain these clearances during sanding. Always sand on the downward motion side of the disc with the disc either through the insert or next to the table.

End-Grain Sanding

1. Mount the miter gauge in the left slot and position it so that it will guide the stock against the downward side of the disc. Then lock the gauge in the slot. Use the speed chart to determine the proper speed and select prior to turning on the Mark 7.

NOTE

When end-grain sanding, set the speed a little slower than you would for other types of sanding. End grains "burn" easily.

2. If you're feeding the stock into the disc, place the stock against the miter gauge and feed it toward the disc until it contacts the abrasive. Hold it there for a few seconds, back it off, then feed it forward again. See Figure D-18.

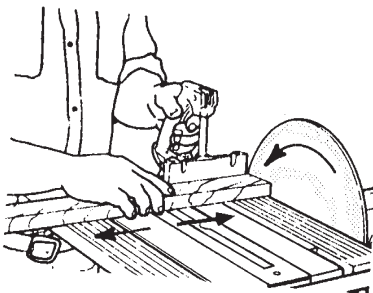


Figure D-18

3. If you're using the quill feed, advance the disc until it contacts the stock. Hold it there for a few seconds, back it off, and feed it forward again. See Figure D-19.

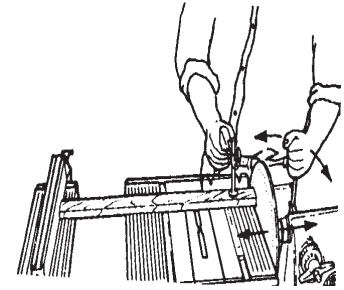


Figure D-19

Sanding to Length

1. Mount the rip fence to the table or the extension table to use as a backstop. Position the backstop so it holds the end of the stock about 1/2" away from the sanding disc when the quill is completely retracted.
2. Adjust the quick clamp to the thickness of the stock. Mount and lock the miter gauge in the left slot. Set the depth control. Position the stock against the miter gauge and the rip fence, so that it overhangs the table slightly. Be sure the stock doesn't contact the sanding disc.
3. Squeeze the safety grip with one hand, then turn on and adjust the Mark 7 speed. Feed the disc forward with the quill until it just contacts the stock. Back it off, then advance it again. Don't extend the quill all the way at this time, just sand until the end is smooth. Then, turn the stock and sand the other end. This time, advance the disc until the depth control stops it. See Figure D-20. Repeat this procedure as needed with the other boards you need to sand. When finished, they will all be exactly the same length.

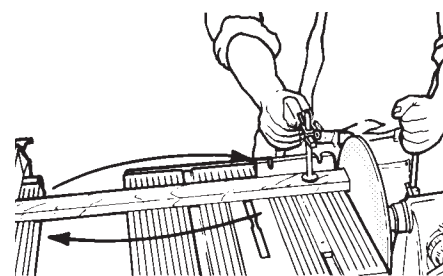


Figure D-20

Vertical Drilling Operations

NOTE

The Speed Chart for the Mark 7 is programmed into the control panel of the PowerPro headstock.

Safety

WARNING

Before performing vertical drilling operations:

- Read the SAFETY section and below.
- Complete ALL the Assembly and Alignment procedures.
- Set up the drill press mode according to the instructions following.
- Remove the key from the chuck.
- Secure locks.

Vertical Drill Press and Horizontal Boring Modes

- Keep your hands away from the bit when you advance the quill.
- NEVER leave the key in the chuck. Remove the key from the chuck IMMEDIATELY after securing the bit.
- Never wear jewelry, gloves, ties, loose clothing or clothing with long sleeves. Keep long hair tucked under a hat. Jewelry, gloves, ties, clothing and hair could become entangled in the bit.
- Position the worktable at mid-chest level whenever possible.
- Use the rip fence as a backstop and hold the stock firmly against both the worktable and the fence. If you can't use the rip fence, use the miter gauge or clamp the stock to the worktable.
- Use only accessories and bits designed to be mounted in power drills.
- Never drill or bore metal freehand. Always clamp the metal to the worktable and back-up stock, or the rip fence and back-up stock.
- Never use the drill at a higher than recommended speed.

Setting Up the Vertical Drill Press Mode

1. Turn off and unplug the Mark 7.
2. Position the headstock 10" away from the power mount (left side), and the carriage

20" away from the base mount. Tighten the headstock and carriage locks. **DO NOT OVER TIGHTEN.**

3. Position the worktable surface just above the top of the headstock. Tighten the table height lock. Then loosen the tilt lock and tilt the table to the left 90°. Tighten the tilt lock.
4. Mount the drill chuck all the way onto the main spindle. Tighten the setscrew against the flat of the spindle.
5. Loosen the power base mount lock. Grasp the way tubes with both hands, closest to the power base mount, then raise the machine into the vertical position. Tighten the base lock, rock the way tubes side-to-side. Retighten if possible. This helps to take the play out of the base pivot and keeps the Mark 7 from wobbling.

NOTE

The base lock does not fit dead center in the hole, but off to one side, as shown in FigureC-88.

6. Move the quill feed handle to the back of the headstock if you desire.
7. Mount a drill bit in the chuck and tighten with the chuck key.
8. Mount drill guard on quill and tighten.

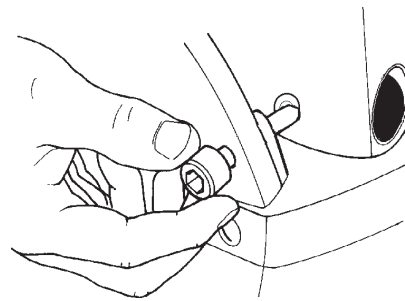


Figure C-88

WARNING

Never leave the key in the chuck. Remove the key immediately after securing the bit.

Also, do not attempt to move the headstock when the machine is in the vertical position; the headstock could fall on you.

9. Check all locks. The table tilt, carriage, table height, headstock and quill (if not used) locks should be secure.

Vertical Drilling Speeds

Before you begin any vertical drilling operation, know the correct speed at which to set the speed dial. The correct speed is determined by the operation and the type of material you're drilling. To determine the right speed for the job, refer to the **Drilling Speed Chart** programmed into the Mark 7 Control Panel. This chart is intended as a general guide when using **most popular drill bits**. If you use other bits, follow the manufacturers recommendations.

General Drilling

There are two basic types of holes: holes that you drill completely through the stock, and holes that only go part way through the stock.

Drilling Through

1. Mount the rip fence on the table to use as a backstop. (If there's no room for the rip fence, use the miter gauge).
2. Clamp a scrap of wood on the table to keep the drill bit from drilling into the table and the stock from splintering where the drill bit exits. This scrap should be wider than the stock.
3. Mark the holes on the stock, and lay it on top of the scrap. Adjust the rip fence to position the hole where you want it. Make fine adjustments with the table height crank. See Figure D-23.

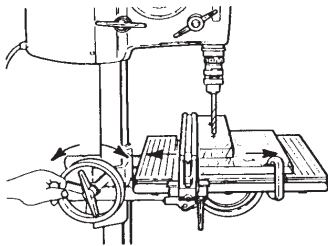


Figure D-23

4. To position the table assembly on the way tubes, hold the carriage so that it won't drop against the base mount, then loosen the carriage lock. Adjust the table height so that the tip of the drill bit is $1/4''$ - $1/2''$ above the stock, and tighten the lock.
5. Remove the stock and extend the quill so that the cutting flutes of the drill bit touch the scrap wood. Set the depth control to $1/8''$ and tighten the depth control lock. See Figure D-24. Then let the quill retract. Position the stock under the drill bit. Hold it against the table and rip fence. Extend the quill with the machine off to check where the drill bit will drill.

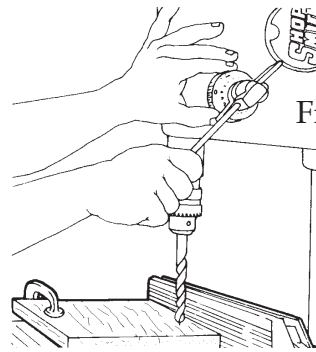


Figure D-24

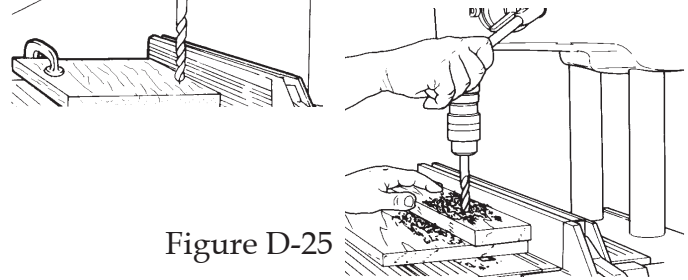


Figure D-25

6. Adjust the speed, turn on the Mark 7, and feed the drill bit into the stock slowly. See Figure D-25. When drilling deep holes, retract the drill bit now and then to clear chips from the hole. When you feel the depth control stop the quill, retract the drill bit. Turn off the machine. Let it come to a stop, then remove the stock.

Drilling Part Way

1. Same as "Drilling Through" except extend the quill until the cutting flutes of the drill bit just touch the stock. Then set and lock the depth control.
2. Then drill the holes you need. The depth control will stop the quill when the drill bit reaches the proper depth in the stock. All the holes you drill at any one depth control setting will be exactly the same depth.

Avoiding Tear-Out

1. Prevent rough, splintery edges where the drill exits the stock by moving the scrap block every time you drill a new hole- this way there's always a firm surface to back up the stock. Or, if using brad-point drill bits, you can use the depth control to avoid tear-out.
2. With the Mark 7 turned off, extend the quill until the pilot of the brad point drill bit touches the scrap wood. Lock the quill. Set the depth control to "0" and lock it in place. Unlock the quill and let it retract.
3. Drill the holes you need, letting the depth control stop the quill. Turn off the Mark 7, and turn the stock over. There will be a tiny pinhole where the pilot started to come through the stock. Use this pinhole to line up the drill bit, then finish drilling the hole from the other side. Since brad-point drill bits have spurs that cut the wood grain smoothly when they enter the wood, there will be no tear-out on either side of the stock.

Horizontal Boring Operations

NOTE

The Speed Chart for the Mark 7 is programmed into the control panel of the PowerPro headstock.

Safety

WARNING

Before performing horizontal boring operations:

- Read the SAFETY section and following.
- Complete ALL the Assembly and Alignment procedures.
- Set up the horizontal boring mode according to the instructions found following.
- Remove the key from the chuck.
- Secure locks.

Vertical Drill Press and Horizontal Boring Modes

- Keep your hands away from the bit when you advance the quill.
- NEVER leave the key in the chuck. Remove the key from the chuck IMMEDIATELY after securing the bit.
- Never wear jewelry, gloves, ties, loose clothing or clothing with long sleeves. Keep long hair tucked under a hat. Jewelry, gloves, ties, clothing and hair could become entangled in the bit.
- Position the worktable at mid-chest level whenever possible.
- Use the rip fence as a backstop and hold the stock firmly against both the worktable and the fence. If you can't use the rip fence, use the miter gauge or clamp the stock to the worktable.
- Use only accessories and bits designed to be mounted in power drills.
- Never drill or bore metal freehand. Always clamp the metal to the worktable and back-up stock, or the rip fence and back-up stock.
- Never use the drill at a higher than recommended speed.

Setting Up the Horizontal Boring Mode

1. Turn off and unplug the Mark 7.
2. Position the headstock so that you can reach the main spindle.

3. Mount the drill chuck all the way onto the main spindle. Tighten the setscrew against the flat of the spindle.
4. Position the worktable edge 4" away from the drill chuck. Adjust the table height so that the table is below the drill chuck.
5. Mount a drill bit in the chuck and tighten with the chuck key.
6. Mount drill guard onto quill and tighten setscrew.

WARNING

Never leave the key in the chuck. Remove the key immediately after securing the bit.

7. Check all locks. The table tilt lock, carriage lock, table height lock, headstock lock, and quill lock (if not used) should all be securely tightened.

Horizontal Boring Speeds

Before you begin any horizontal boring operation, know the correct speed at which to set the speed dial. The correct speed is determined by the operation and the type of material you're boring. To determine the right speed for the job, refer to the Horizontal Boring Speed programmed into the Mark 7 Control Panel.

General Boring

There are two basic types of holes: holes that you bore through the stock, and holes that only go part way through the stock.

Boring Through

1. Mount the rip fence on the table to use as a backstop. (If there's no room for the rip fence, use the miter gauge.)
2. Clamp a scrap of wood on the fence to keep the bit from boring into the fence and the stock from splintering where the bit exits. This scrap should be taller than the fence.
3. Mark the holes on the stock, and lay it against the scrap. Make fine adjustments with the table height crank. See Figure D-34. Clamp the stock to the table.

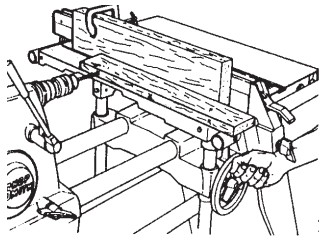


Figure D-34

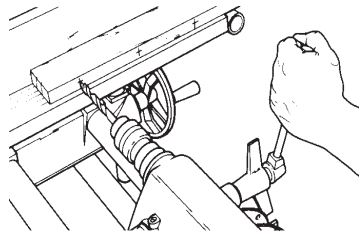


Figure D-35

4. Extend the quill so that the cutting flutes of the bit touch the scrap wood. Set the depth control to 1/8" beyond and tighten the depth control lock. Then let the quill retract. Position the stock in front of the bit and hold it against the table and rip fence. Extend the quill with the machine off to check where the bit will drill.
5. Set the speed, turn on the Mark 7, and feed the bit into the stock. See Figure D-35. When boring deep holes, it will be necessary to retract the bit now and then to clear chips from the hole. When you feel the depth control stop the quill, retract the bit. Turn off the machine. Let it come to a stop, then remove the stock.

Boring Part Way

1. This operation is similar to boring through, except you should extend the quill until the cutting flutes of the bit just touch the stock. Then set the depth control and lock it. The depth control will stop the quill when the bit reaches the proper depth.
2. All the holes you bore at any one depth control setting will be exactly the same depth. When you need to bore a number of holes all at the same height, such as when doweling stock edge-to-edge, hold the stock down with equal pressure at each hole.

Avoiding Tear-Out

1. Prevent rough, splintery edges where the drill exits the stock— by moving the scrap block every time you drill a new hole— this way there's always a firm surface to back up the stock. Or, if you're using brad-point bits, you can use the depth control to avoid tear-out.

2. With the Mark 7 turned off, extend the quill until the pilot of the brad point bit touches the scrap wood. Lock the quill. Set the depth control to "0" (zero) and lock it in place. Unlock the quill and let it retract.
3. Bore the holes you need, letting the depth control stop the quill. Turn off the Mark 7 and turn the stock over. There will be a tiny pinhole where the pilot started to come through the stock. Use this pinhole to line up the bit, then finish boring the hole from the other side. Since brad-point bits have spurs that cut the wood grain smoothly when they enter the wood, there will be no tear-out on either side of the stock.

Lathe Turning Operations

NOTE

The Speed Chart for the Mark 7 is programmed into the control panel of the PowerPro headstock.

Safety

WARNING

Before performing lathe turning operations:

- Read the SAFETY section and lathe mode following.
- Complete ALL the Assembly and Alignment procedures.
- Secure locks.

Lathe Mode Safety

- When turning glued up stock, make sure glue joints are strong. Glue the stock and leave it clamped for at least 24 hours prior to turning.
- Never wear jewelry, gloves, ties, loose clothing or clothing with long sleeves. Keep long hair tucked under a hat. Jewelry, gloves, ties, clothing and hair could become entangled in the stock.
- Do not turn stock with splits, loose knots, or other defects that could cause the stock to break, splinter, or come loose when turning.
- Cut stock that is larger than 3" x 3" into an octagon. This removes excess stock and makes turning safer and easier.
- When mounting stock between the centers, the spurs of the drive center and the cup of the cup center must penetrate at least 1/16" into the stock. Do not use a center if the point is damaged. The stock could be thrown from the lathe.

- Wax or soap the end of the stock that mounts to the cup center. This lubrication helps keep the cup center from wearing into the stock and causing the stock to loosen on the lathe.
 - When mounting stock to a faceplate, use #12 x 1-1/4" long screws. The screws must penetrate at least 3/4" into the stock. If the screws are being driven into the end grain, the screws must penetrate at least 2" into the stock. Use #12 x 2-1/2" long wood screws before mounting, to minimize imbalance by cutting the stock round.
 - Position the tool rest no more than 1/4" from the stock. Maintain this distance while turning. Before turning on the machine, rotate the stock by hand to make sure it clears the tool rest. Never turn without the tool rest.
 - During turning, periodically turn off the machine and check to make sure the stock remains securely mounted.
 - Do not lean across or reach underneath the lathe while it is running.
 - Do not touch the rotating stock while the tool rest is mounted.
 - Round all stock at speeds recommended in the speed chart of the PowerPro Control Panel.
 - Feed the tool ever slowly into the stock. Hold the tool firmly in both hands and against the tool rest.
 - Never try to stop the lathe by grabbing the stock or any part of the machine.
 - Do not part the stock completely or turn the spindle down to such a small diameter that it snaps.
 - Always remove the tool rest before sanding the turned stock on the lathe.
 - When turning heavy stock, use the center post position on the tool rest arm.
 - Balance and round all heavy stock at very slow speed. Then turn the heavy stock at speeds recommended in the speed chart of the PowerPro Headstock. There is a risk that heavy stock can be thrown from the lathe, so do not place yourself in the plane of the heavy stock's rotation.
 - Never use the lathe at a higher than recommended speed.
3. Position the headstock so that you can reach the main spindle.
 4. Mount the tool rest in the carriage so the rack engages the pinion.
 5. Mount the drive center all the way onto the main spindle. Tighten the setscrew against the flat of the spindle.
 6. Mount the tailstock in the base mount (right side) and tighten the power mount (left side) lock.

NOTE

When you get ready to break down the lathe mode, you will probably find the cup center is "stuck" in the tailstock. If this is the case:

- a. Remove the tailstock from the machine.
- b. Lay it over the edge of a workbench so the eccentric mount is supported by the table and the center is hanging free.
- c. Tap the back side of the center with a nylon or rawhide mallet to pop it loose. Do not use a metal hammer. Hold the center with your free hand so the center does not fall to the floor. Be careful of the sharp point in the center pin.

7. Mount the cup center in the tailstock with the point toward the headstock.
8. Check all locks. The carriage lock, table height lock, headstock lock, and quill lock should all be securely tightened.

Lathe Turning Speeds

Before you begin any lathe turning operation, know the correct speed at which to set the speed dial. The speed is determined by the operation and the type of material you're turning. To determine the speed for the job, refer to the Lathe Turning Speed Chart programmed into the Mark 7 Control Panel.

Turning Know-How

Spindle Turning

This type of turning is done with stock mounted between the drive and cup centers.

Faceplate Turning

This type of turning is done with stock mounted to a faceplate.

Setting Up the Lathe Mode

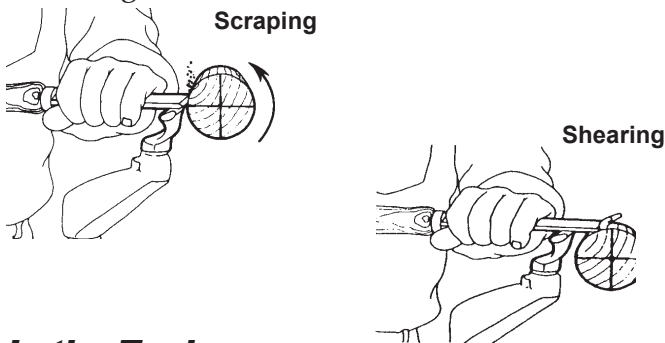
1. Turn off and unplug the Mark 7.
2. Dismount the worktable. Tilt the table to the left 90° and lock it. Loosen the table height lock and pull the table straight up.

Scraping

This technique uses the cutting edge of the tool to scrape the stock. Position the tool rest just below the axis of rotation of the stock so the chisel cuts on center. Slowly feed the chisel toward the stock. The chisel should point directly at the center of the stock.

Shearing

This technique uses the cutting edge of the tool to pare away the stock. Position the tool rest $1/4"$ - $1/2"$ below the top of the stock, and feed the chisel at an angle.



Lathe Tools

Gouges round the stock and make coves; roundnose chisels make coves; skew chisels make beads and cut cylinders; parting tools size and part.

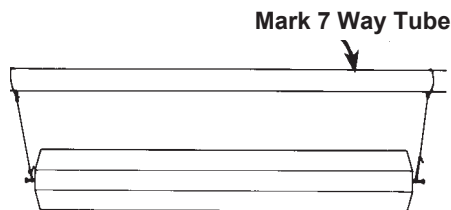


Figure D-41

Balance

1. This is extremely important when turning glued-up stock, long stock and stock more than 3" in diameter. Check the balance of your spindle and faceplate stock after you've marked the centers.
2. To do this, drive a standard 8-penny nail straight into each center. Use suitable string to hang the stock in a level position from the front bench tube of the Mark 7 or a saw horse. The ends of the string should be looped around the nails. See Figure D-41. Gravity will pull the heavy side down. Use a jointer, bandsaw or hand plane to remove no more than $1/32"$ at a time from the heavy side until the stock remains stationary when rotated to three positions 90 degrees apart.

NOTE

For more in-depth Lathe Turning information, please refer to the Mark 7 Owner's Manual.

Under-Table Shaping Operations

NOTE

The Speed Chart for the Mark 7 is programmed into the control panel of the PowerPro headstock.

Safety

WARNING

Before performing Under-Table Shaping operations:

- Read the SAFETY section, especially for the Under-Table Shaping mode.
- Complete ALL the Assembly and Alignment procedures.
- Secure locks.

Router and Shaper Modes

- Always give your worktable extra support by attaching telescoping legs.
- Do not shape or rout second-hand lumber. You could be seriously injured if you hit a nail, screw, or other foreign object. There could be kickback which also could cause serious injury.
- Never exceed recommended operating speeds. Do not use the Mark 7 with the Shopsmith Speed Increaser.
- Turn off and Unplug the Mark 7 before mounting shaper cutters or router bits, or making other adjustments.
- Always mount the appropriate guard assembly for over or under-table operations beginning.
- Do not work with stock that is less than 8" long, or too large to handle safely; that is warped, bowed or cupped; or that has loose knots or other defects.
- The maximum depth-of-cut per pass is $1/8"$ unless otherwise specified.
- Avoid taking deep cuts with a straight or non-piloted router bits. With the exception of single-pass dovetail cuts, limit the depth of cut to $1/4"$ for each pass when using straight or non-piloted router bits up to $1/2"$ in diameter. When using router bits over $1/2"$ in diameter, limit the depth of cut to $1/8"$ per pass.
- Never use router bits or specialty bits larger than $2-1/8"$ in diameter, which have an exposed

- cutting edge of more than 2-1/2".
- The maximum diameter of a shaper or router cutter must not exceed 2-1/8".
- The maximum height a shaper or router cutter can be is 2-1/2" above the surface of the table.
- Make sure that the PowerPro headstock, quill, worktable, carriage, height and tilt locks and arbor are all locked or tightened before operating the Mark 7.
- Before plugging in the Mark 7 to begin operating the machine as a router or shaper, hand-rotate the spindle to assure yourself that the cutter clears the insert, shaper fence, featherboards and the guard assembly.
- Listen for chatter or signs of looseness at start-up. If you hear, see or suspect problems, turn off the power and unplug the machine. Correct any problems before proceeding.
- Always use featherboards when shaping or routing stock less than 3" wide.
- To pin shape or pin rout, use only cutters with pilots or rub collars.
- When pin shaping or routing, always use at least one push block to help control the workpiece.
- Internal routing or shaping of the edge of a hole (or small opening less than 6" in diameter) in any shape should not be attempted.
- Never "freehand" shape or rout. Always use pins with piloted router bits or rub collars with shaper cutters.
- Never attempt pin routing or pin shaping when removing the entire edge of the workpiece.
- Try to feed the workpiece so that the cutter is cutting in the same direction as the wood grain, though this is not always possible.
- Always feed the workpiece against the rotation of the cutter. Otherwise, a kickback will occur.
- Illustrated in Figure 4 is operating in Shaper mode with the PowerPro headstock in Reverse Mode. While operating the headstock in forward mode, all feed direction and cutter rotation will be opposite.
- Feeding the workpiece too fast and/or exceeding the maximum recommended 1/8" depth-of-cut could result in "stalling" the motor or belt slippage.
- Make sure the cutting edge of the shaper cutter faces toward the direction of the workpiece feed. This is right to left in Reverse Mode or left to right in Forward Mode.
- Feed the workpiece at a slow, steady rate. Use extra care in shaping or routing workpieces with figured grain or knots, as these may cause kickbacks.
- Use a push stick to feed workpieces up to 3" wide. When it is necessary to push a narrow workpiece underneath the circular shield, use a

long piece of scrap wood to feed the workpiece into the cutter, and use a featherboard to hold the workpiece in against the shaper fence.

- Always use a fence (like the Shopsmith Shaper Fence) or table insert pins and rub collars to guide and support the workpiece. Failure to do so could result in bodily injury.
- Always use a shaper fence when removing the entire edge of the workpiece.
- Always use a fence (such as the Shopsmith Shaper Fence) when using router bits or shaper cutters without pilots or rub collars.

Setting Up the Under-Table Shaper Mode

1. Turn off and unplug the Mark 7.
2. Using your 5/32" Allen wrench, remove the Saw Table Insert (138) and replace it with the Shaper/Router Table Insert (see figure C-89).

NOTE

If dust collection chute is attached to the bottom of the Shaper/Router Insert, remove prior attaching the insert to the worktable.

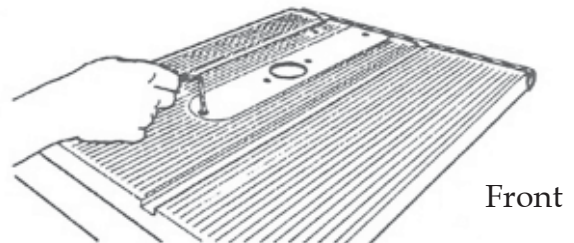


Figure C-89

3. Screw the Shaper Guide Pins into the Shaper/Router Table insert. Tighten slightly with a flat-head screw driver.
4. Slide the Headstock all the way to the left on the way tubes so that the Headstock is up against the Power Base Mount. Tighten the headstock lock.
5. Mount the Shaper Arbor (555117) on the main spindle. Tighten the setscrew against the flat of the spindle.
6. Position the worktable surface just above the top of the Headstock. Tighten the table height lock. Then loosen the tilt lock and tilt the table to the left 90°. Tighten the tilt lock.
7. Using your 5/32" Allen wrench, remove the Tie Bar Guard (155) that is attached to the Tie Bar underneath the worktable.

8. Dismount the worktable by loosening the table height lock and pulling the worktable straight up, as shown in figure C-90.

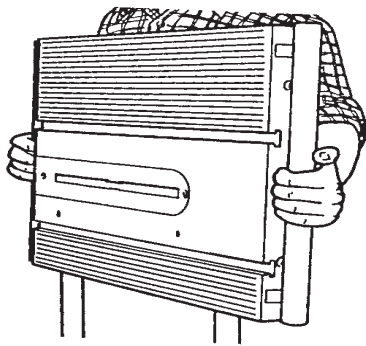


Figure 90

9. Turn the worktable 180° so that the surface of the worktable faces the opposite direction and remount into the carriage. To remount the worktable, loosen the table height lock and place the support tubes in the carriage. Gently rock the worktable front-to-back until the racks engage the pinions and the tubes drop smoothly into the holes. Sometimes it helps to slowly turn the table height crank clockwise while you rock the table. This will position the support tubes at exactly the same height and get the racks started properly in the pinions. Lower the table all the way in and tighten the table height lock.
10. Slide the carriage toward the headstock until it butts up against the rubber spacer next to the headstock. Secure the carriage lock.
11. Check and secure if necessary, the headstock lock, the carriage lock, the table height lock and the worktable tilt lock.
12. Loosen the locking knob on the base mount on the right hand side of the way tubes. Grasp the way tubes with both hands close to the base mount, then raise the machine into the vertical position. Tighten the base lock on the back side of the Mark 7, then rock the way tubes side-to-side. Retighten if possible. This helps take the play out of the base pivot and keeps the Mark 7 from wobbling.
13. Loosen the quill feed lock and the table height lock. With one hand, turn the quill feed to raise the shaper arbor up through the hole in the shaper/router table insert. At the same time, with the other hand, move the worktable in and out by turning the table height crank. Adjust the worktable so that the shaper arbor is centered in the shaper/router table insert. When centered, secure the table height lock and secure the quill lock (with the quill extended so that the shaper arbor is above the worktable).

14. Using a 11/16" wrench, remove the hex nut and rub collars on the end of the shaper arbor. First place a rub collar back on the arbor. Then put the cutter on the arbor. Make sure to position the cutter with the cutting edge facing the direction appropriate for the direction the work piece will be fed into the cutter. See the instructions on page A-12 for rotation information.
15. Install another rub collar onto the arbor. Then place the tongue washer on the arbor with its "tongue" in the arbor's slot. Finally, thread the hex back on the arbor as shown in figure C-91.

WARNING

Always use a rub collar under all shaper cutters. Also, be sure the tongue washer is correctly installed and directly under the top hex nut, and that the nut is tight.

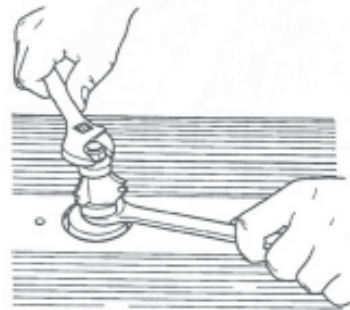


Figure C-91

16. Adjust the height of the cutter to the desired profile by loosening the quill feed lock and rotating the quill feed handle. Be sure to secure the quill feed lock when completed.
17. Attach the Shaper Guard Assembly to the worktable by sliding the T-Nut attached to the post into the T-Slot (Miter Gauge slot) on the worktable closest to the carriage. The T-Nut should be slid in from the outfeed side of the cutter/worktable and positioned so that the guard shield fits over both pins on the Shaper Table Insert. Lower the guard shield so that the bottom is 1/8th inch above the workpiece. Lower the Brush Assembly so that is 1/8th inch above either the workpiece or the worktable, whichever is appropriate.
18. To add dust collection, attach a 2 1/2 inch hose to the top of the shaper guard assembly.

WARNING

When returning from the Shaper mode to other operations using the worktable, be sure to replace the Tie Bar Guard to the Tie Bar located under the Worktable.

Operations

Several things affect the quality of cut made by the Mark 7 including cutter sharpness, cutter speed, cutter diameter, cutter length and profile, feed rate and wood hardness. To get the most from you Mark 7, you must consider all these elements every time you use it. Also, you should carefully choose wood stock with straight grain and free of knots.

Shaping and Routing

You can use pins which thread into the shaper table insert, or a shaper fence when you use the Mark 7 for shaping or routing. However, we strongly recommend using the Optional Shopsmith Shaper Fence whenever possible, since it offers the most support for the workpiece and it provides more efficient dust collection. And you must always use a shaper fence when you remove the entire edge of the workpiece.

NOTE

For more information on the Shaper Fence, please refer to the complete Mark 7 Owner's Manual (522812).

Shaper Cutters

If you are not using Shopsmith Shaper Cutters, make sure that the cutters you use are rated for 12,000 rpm. Shaper cutters can cut many different profiles. A glue joint shaper cutter, for example, is designed to cut the full profile of the workpiece. A combination cutter such as the bead and quarter round, is designed to cut a profile on part of the workpiece edge. This partial cut may constitute the entire operation, or it may be just part of a profile which is produced by several passes with the same cutter or in combination with other cutters

WARNING

Never use shaper bits larger than 2-1/8" diameter, and which have an exposed cutting edge of 2-1/2".

A variety of shapes are possible by changing cutter height, depth of cut, worktable height and sequence of passes. Shaper rub collars control the

lateral depth of cut when pin shaping. Since the collars turn with the cutter, they tend to score the wood. This can be minimized by bearing against the collars with light contact and by keeping collars clean and free of nicks and burrs.

You should sharpen the shaper cutters before you use them. Sharp cutter can determine the quality and efficiency of a cut. Figure D-54 shows a shaper cutter being sharpened on an oil stone. For more information on how to sharpen shaper cutters, see the "Sharpening" Chapter in the Shopsmith book, Power Tool Woodworking for Everyone, 4th edition.

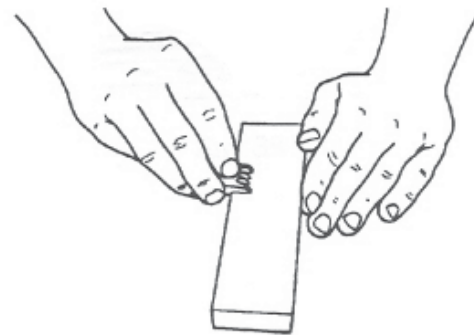


Figure D-54

A 1/2" shaper spindle (555117) with rub collars is included with the Mark 7. You may also purchase the optional Ball Bearing Shaper Spindle (order part number 555472). This spindle has ball bearings in the collars which permit the collars to roll with the workpiece and assure a smooth, burn-free result. This means there is much less tendency for the workpiece surface to be marred as the workpiece presses against the collars during the shaping operations.

NOTE

For more in-depth information on the under table shaping, please refer to the complete Mark 7 Owner's Manual (522812).

Over-Table Routing Operations

Safety

WARNING

Router and Shaper Modes

- ♦ Always give your worktable extra support by attaching telescoping legs.
- ♦ Do not shape or rout second-hand lumber. You could be seriously injured if you hit a nail, screw, or other foreign object. There could be kickback which could cause serious injury.
- ♦ Never exceed recommended operating speeds. Do not use the Mark 7 with the Shopsmith Speed Inserter.
- ♦ Turn off and Unplug the Mark 7 before mounting shaper cutters or router bits, or making other adjustments.
- ♦ Always mount the appropriate guard assembly for over or under-table operations beginning.
- ♦ Do not work with stock that is less than 8" long, or too large to handle safely; that is warped, bowed or cupped; or that has loose knots or other defects.
- ♦ The maximum depth-of-cut per pass is 1/8" unless otherwise specified.
- ♦ Avoid taking deep cuts with a straight or non-piloted router bits. With the exception of single-pass dovetail cuts, limit the depth of cut to 1/4" for each pass when using straight or non-piloted router bits up to 1/2" in diameter. When using router bits over 1/2" in diameter, limit the depth of cut to 1/8" per pass.
- ♦ Never use router bits or specialty bits larger than 2-1/8" in diameter, which have an exposed cutting edge of more than 2-1/2".
- ♦ The maximum diameter of a shaper or router cutter must not exceed 2-1/8".
- ♦ The maximum height a shaper or router cutter can be is 2-1/2" above the surface of the table.
- ♦ Make sure that the PowerPro headstock, quill, worktable, carriage, height and tilt locks and arbor are all locked or tightened before operating the Mark 7.
- ♦ Before plugging in the Mark 7 to begin operating the machine as a router or shaper, hand-rotate the spindle to assure yourself that the cutter clears the insert, shaper fence, featherboards and the guard assembly.
- ♦ Listen for chatter or signs of looseness at start-up. If you hear, see or suspect problems, turn off the power and unplug the machine. Correct any problems before proceeding.
- ♦ Always use featherboards when shaping or routing stock less than 3" wide.
- ♦ To pin shape or pin rout, use only cutters with pilots or rub collars.
- ♦ When pin shaping or routing, always use at least one push block to help control the workpiece.
- ♦ Internal routing or shaping of the edge of a hole (or small opening less than 6" in diameter) in any shape should not be attempted.
- ♦ Never "freehand" shape or rout. Always use pins with piloted router bits or rub collars with shaper cutters.
- ♦ Never attempt pin routing or pin shaping when removing the entire edge of the workpiece.
- ♦ Try to feed the workpiece so that the cutter is cutting in the same direction as the wood grain, though this is not always possible.
- ♦ Always feed the workpiece against the rotation of the cutter. Otherwise, a kickback will occur.
- ♦ Illustrated in Figure 4 is operating in Shaper mode with the PowerPro headstock in Reverse Mode. While operating the headstock in forward mode, all feed direction and cutter rotation will be opposite.
- ♦ Feeding the workpiece too fast and/or exceeding the maximum recommended 1/8" depth-of-cut could result in "stalling" the motor or belt slippage.
- ♦ Make sure the cutting edge of the shaper cutter faces toward the direction of the workpiece feed. This is right to left in Reverse Mode or left to right in Forward Mode.
- ♦ Feed the workpiece at a slow, steady rate. Use extra care in shaping or routing workpieces with figured grain or knots, as these may cause kickbacks.
- ♦ Use a push stick to feed workpieces up to 3" wide. When it is necessary to push a narrow workpiece underneath the circular shield, use a long piece of scrap wood to feed the workpiece into the cutter, and use a featherboard to hold the workpiece in against the shaper fence.
- ♦ Always use a fence (like the Shopsmith Shaper Fence) or table insert pins and rub collars to guide and support the workpiece. Failure to do so could result in bodily injury.
- ♦ Always use a shaper fence when removing the entire edge of the workpiece.
- ♦ Always use a fence (such as the Shopsmith Shaper Fence) when using router bits or shaper cutters without pilots or rub collars.

Setting Up the Over-Table Router Mode

1. Turn off and unplug Mark 7.
2. Move the Headstock approximately 18" from the Power Base Mount on the left hand side of the machine.
3. If using dust collection with router operation, follow instructions a-e below. Otherwise, move on to instruction f.
 - a. Position the worktable surface just above the top of the Headstock. Tighten the table height lock.
 - b. Move the carriage at least 10" away from the headstock.
 - c. Loosen the tilt lock under the worktable and tilt the table to the left 90°. Tighten the tilt lock.
 - d. Using your 5/32" Allen wrench, remove the Tie Bar Guard (155) that is attached to the Tie Bar underneath the worktable.
 - e. Loosen the tilt lock and return the worktable back to the horizontal position. Secure the tilt lock.
 - f. If the dust collection chute is not attached to the bottom of the Shaper/Router Table Insert, attach at this time.

WARNING

When returning from the Router mode to the other operations using the worktable, be sure to replace the Tie Bar Guard to the Tie Bar located under the Worktable.

4. Using your 5/32" Allen wrench, remove the Saw Table Insert and replace it with the Shaper/Router Table Insert.
5. If the Shaper Starter Pins are attached to the Shaper/Router Insert, remove using a flat-head screwdriver.

NOTE

If using the Over-Table Router mode for decorative cuts, leave the Shaper Starter Pins in place.

6. Loosen the tilt lock under the worktable and tilt the table to the left 90°. Tighten the tilt lock.
7. Mount the Router Chuck Arbor (514631) on the main spindle. Tighten the setscrew against the flat of the spindle.

NOTE

There are three setscrews on the Router Chuck Arbor. The one on the far left is used to secure the arbor on the main spindle.

8. Check and secure if necessary, the headstock lock, the carriage lock the table height lock and the worktable tilt lock.
9. Loosen the locking knob on the power base mount on the left hand side of the way tubes. Grasp the way tubes with both hands close to the power base mount, then raise the machine into the vertical position. Tighten the base lock on the front side of the Mark 7, then rock the way tubes side-to-side. Retighten if possible. This helps take the play out of the base pivot and keeps the Mark 7 from wobbling.
10. Insert a Router Bit into the Router Chuck Arbor tighten both set screws.
11. Loosen the quill feed lock and the table height lock. With one hand, turn the quill feed to lower the router chuck arbor down to the hole in the shaper/router table insert. At the same time, with the other hand, move the worktable in and out by turning the table height crank. Adjust the worktable so that the router chuck arbor is centered in the shaper/router table insert. When centered, secure the table height lock.
12. Mount the Router Shield on the quill so the collar on the Router Shield butts up against the stop collar on the quill. Tighten the setscrew on the collar of the guard to secure in place.
13. Attach the rip fence to the worktable on the side closest to the way tubes (behind the router bit). Position the rip fence so that the workpiece will be in alignment with the desired cutting path of the router bit.

NOTE

The worktable can be moved in or out for fine adjustment of the cutting path by turning the table height crank. Be sure to keep the router bit within the hole of the shaper/router insert if cutting on the worktable side edge of the workpiece.

14. Lower the Router Bit by turning the quill feed to the desired depth-of-cut. Secure the quill feed at the position using the quill lock.
15. Loosen the wing nut on the front of the Router Shield and lower the shield so that the bottom on the shield is approximately 1/8" above the workpiece. Secure the wing

- nut. Loosen the wing nuts on both sides of the shield and lower the brush assembly so that it is about 1/8" above the workpiece or worktable/fence, whichever is appropriate.
16. If using the quill feed as a plunge router, set the Feed Stop gauge (34) at 0 and secure the stop handle. Remember that the desired depth-of-cut was set and secured in step 14. Loosen the quill feed lock. The quill feed should now plunge to the desired depth-of-cut.

WARNING

Be sure to use a Featherboard to hold the workpiece against the rip fence while using as a plunge router.

ASSEMBLY and SETUP

Before any routing/slot mortising operations can be performed, you must put together the circular shield and brush assembly and set up the Mark 7 properly.

TOOLS REQUIRED:

- Medium blade screwdriver
- 5/32" Allen wrench

WARNING

Turn off and unplug the Mark 7 during the Assembly and Setup procedure.

1. Assemble the circular shield and brush.
 - a. Place the cap screw through the washer and mounting bracket. Secure the cap screw with the nut.
 - b. Place the mounting bracket into the vertical slot on the circular shield. Make sure the threaded bolt and the guide pin (located just below the threaded bolt) go through the vertical slot. Secure the shield with the washer and wing nut.
 - c. Find the mounting "grooves" on the brush, and slide them (from top down) onto their matching "notches" located on the circular shield, then insert a carriage bolt through each side of the shield, with the bolt head inside the shield and the threads pointing outward. Secure the bolts with washers and wing nuts.

2. Set up the Mark 7 into the vertical position.
3. Attach the circular shield and brush assembly to the Mark 7 quill.
 - a. Using a 5/32" Allen wrench, loosen the screw on the mounting bracket. Slide the mounting bracket assembly as far up the quill as possible. It should fit up against the quill's collar. When in place, tighten the screw (See Figure D-78)



Figure D-78

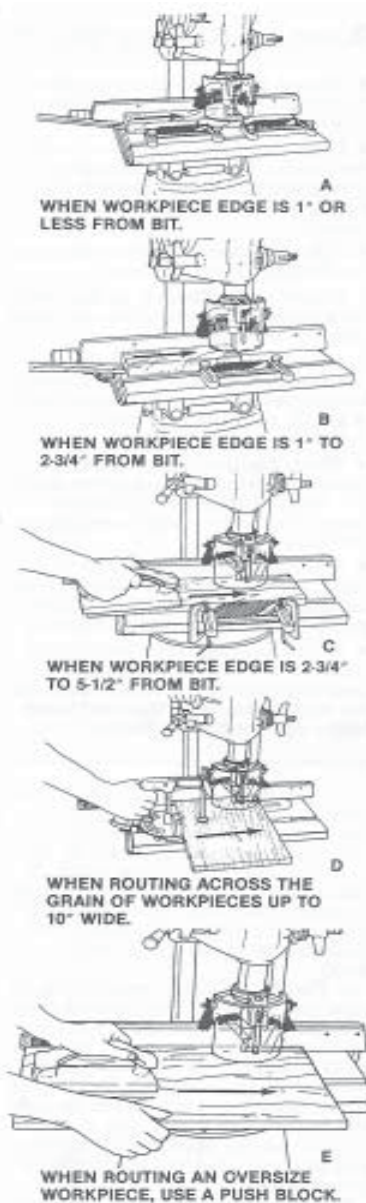
4. Insert a router bit into the router bit chuck and tighten both bits setscrews. (Make sure you use the appropriate chuck with your choice of router bit.)
 - a. Rotate the MARK 7 quill until the flat side of the shaft faces the brush assembly.
 - b. Mount the router bit chuck onto the quill shaft with the chuck's setscrew over the flat side of the shaft.
 - c. Securely tighten the chuck's setscrew over the flat side of the shaft. (You may need to raise the circular shield in order to get your Allen wrench to the setscrew.)
5. If the rip fence is necessary for the function you are doing, mount the rip fence on the worktable. Position the fence so that it supports the workpiece behind the bit.
6. Position the circular shield and brush assembly. Set the depth of cut you will be making. Loosen the front wing nut (8) and lower the shield until it is 1/8" from the top of the workpiece. Tighten the wing nut. You will note that the brush acts as a rear guard and is lowered to the top of the workpiece and/or the rip fence.
7. Position the workpiece according to the following illustrations:

WARNING

- ◆ WHEN WORKPIECE EDGE IS 1" OR LESS FROM BIT, use on feather board on the infeed side and an additional feather board on the outfeed side, both secured in the table

slot. Use a push stick or when it's necessary to push workpiece underneath the shield use a piece of wood. (See A.)

- ◆ WHEN WORKPIECE EDGE IS 1" TO 2 3/4" FROM BIT, use two feather boards as above or use one feather board centered to the cutter, secured in table slot. Use a push stick or piece of wood to push the workpiece under the shield (See B.)
- ◆ WHEN WORKPIECE EDGE IS 2-3/4" TO 5-1/2" FROM BIT, use one feather board centered to the cutter and secured to table with two C-clamps. Use a push block (See C.)
- ◆ WHEN ROUTING ACROSS THE GRAIN OF WORKPIECES UP TO 10" WIDE, use a miter gauge and safety grip. Workpiece must extend 5-1/2" away from bit. (See D.)
- ◆ WHEN ROUTING AN OVERSIZE WORKPIECE, use a push block (See E.)



GENERAL ROUTING

Feed the work against the router bit's direction of rotation. Because the operations described in this section use the rip fence or an auxiliary facing behind the bit, the feed is always from left to right. The cutting action of the bit tends to keep the work against the fence. If you feed from the opposite side, the bit will try to move the work away from the fence.

The width of each cut depends on the size of the route bit being used. The depth of each cut is set by lowering the quill and locking it in position. Turn off the machine to make dept-of-cut adjustments. Routing/Slot Mortising cuts should be made with the speed dial set at 'FAST' and with reasonable feed pressure so the bit can do its job without choking or burning. Do not form deep cuts in a single pass (dovetail cuts are an exception). Deep cuts are easier to make and will be smoother if you get to full depth of cut by making several passes.

The depth of single pass cuts should be limited as follows:

- 1/4" maximum depth of cut for bits up to 1/2" diameter.
- 1/8" maximum depth of cut for bits over 1/2" diameter.
- Less than the above limits when routing extremely hard wood.

Router cuts made with the grain are smoother than against the grain cuts. If you can't work with the grain, feed the stock slower than normal and use less depth of cut for best results.

When making cross grain cuts, some chipping will occur where the bit cuts through, so allow for it by making the cut on an extra-wide piece. Then remove the chipped edge using the table saw or jointer.

NOTE

For more in-depth information and instruction on Over table Routing/Routing, please refer to our Complete Mark 7 Owner's Manual (522812).

Maintenance and Troubleshooting

This section of the Mark 7 Owner's Manual contains maintenance information and a troubleshooting guide. It should cover topics and answer most questions you may have for normal maintenance and problem solving. Follow the maintenance schedule below for as long as you own your Mark 7. Regular maintenance is essential for any tool and machine to perform at its best.

The maintenance intervals shown here are based on normal operation. If you work the machine unusually hard, you'll need to maintain it more often.

To estimate "running time", use this rule of thumb: The average woodworker will use his power tools only 20% of the total time spent in the shop—at the most. If you work in your shop for 25 hours, you've probably logged 4-6 hours on your Mark 7. Average the time you spend in your shop to determine the proper maintenance interval for your machine. But the 50-hour procedure should be performed at least once a year.

MAINTENANCE SCHEDULE

As needed	<ul style="list-style-type: none"> • Clean the saw guards and sanding disc. Refer to Maintaining Accessories. • Sharpen saw blades, drill bits and lathe chisels.
Every 5 hours of running time	<ul style="list-style-type: none"> • Clean the Mark 7. Refer to Cleaning. • Wax the Mark 7. Refer to Waxing.
Every 10 hours of running time	<ul style="list-style-type: none"> • Repeat the preceding steps. • Lubricate the drive shaft and idler shaft. • Check the action on the anti-kickback system and the lower guard, wax the splitter on the lower guard and lubricate the chuck. Refer to Maintaining Accessories. • Check the alignment and adjustment of the power base mounts, carriage locks, worktable stops, table tilt indicator, miter gauge slots, miter gauge, rip fence, extension table and lathe centers. Refer to the Alignment instructions in this manual.

Preparation

WARNING

Turn off and unplug the Mark 7 **BEFORE** you begin any maintenance procedure.

Before you begin a maintenance procedure, remove the blades, bits or any other accessories that are mounted on the machine. Set the machine in the horizontal position and secure the headstock lock. Finally, move the worktable and carriage as far to the right as it will go.

Cleaning

As you work, sawdust will accumulate on and in your Mark 7. This residue can affect its performance. To prevent problems, clean your Mark 7 thoroughly inside and out once every 5 hours of running time or monthly.

Blowing Out the Headstock

1. With a medium Phillips screwdriver, remove the two screws that hold the belt cover. Then slide the belt cover back along the way tubes toward the left. Open the access hole by removing the bottom screw and turning the nameplate 180°.
2. Working through the openings, completely blow out all the sawdust from the inside of the headstock. Use an air compressor. Replace the screw.

Cleaning the Table

3. Clean the miter gauge slots with a clean rag and mineral spirits. With a 5/32" Allen wrench, remove the two screws that secure the table insert. Using a small stick, scrape out any sawdust that has accumulated under the insert.

Cleaning the Racks

4. Extend the quill as far as it will go, lock it in place. With a small stiff brush, brush off the teeth on the bottom of the quill, as demonstrated in Figure E-1.
5. To clean the table rack, remove the table from the carriage. Brush the sawdust from between the teeth on the table support tubes and the pinions in the carriage.

Brushing Off

6. Give the entire machine a good going over

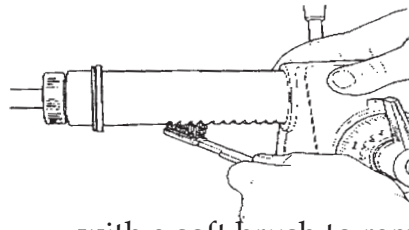


Figure E-1

with a soft brush to remove any remaining sawdust or dirt. If you find any grease or grime on the way tubes, or any other part, clean it off with mineral spirits.

7. When your Mark 7 is clean, wax and buff all parts (refer to Waxing), replace the table in the carriage, reinstall the table insert and belt cover, and reposition the nameplate.

Waxing

CAUTION

Use paste floor or furniture wax. Do not use car wax or spray furniture polish. The Mark 7 needs wax for both protection and lubrication. Car wax offers good protection for metal, but it is extremely hard and has little value as a lubricant. Furniture polish isn't hard enough. Paste floor or furniture wax protects and lubricates.

Every 5 hours of running time, wax and buff the following parts:

- Bench and way tubes
- Worktable surface, miter gauge slots, table support tubes, and the table tubes
- Quill
- Rip fence (both sides)
- Miter gauge bar
- Extension table surface, support tubes, and table tubes
- Mounting holes in the power mount, base mount and carriage.

Storing

- 20.. In normal use, regular cleaning, lubrication, and waxing will prevent the ferrous parts of the Mark 7 from rusting. However, if the machine is to be stored for an extended period or under unusually humid or corrosive conditions, spray the way tubes, saw blades, drill chuck and bits, and any other ferrous parts and accessories with a rust-inhibiting light oil. Remove this oil with mineral spirits and re-wax the Mark 7 before using it again.