



MARK V MOUNTED OVERARM PIN ROUTER 555970

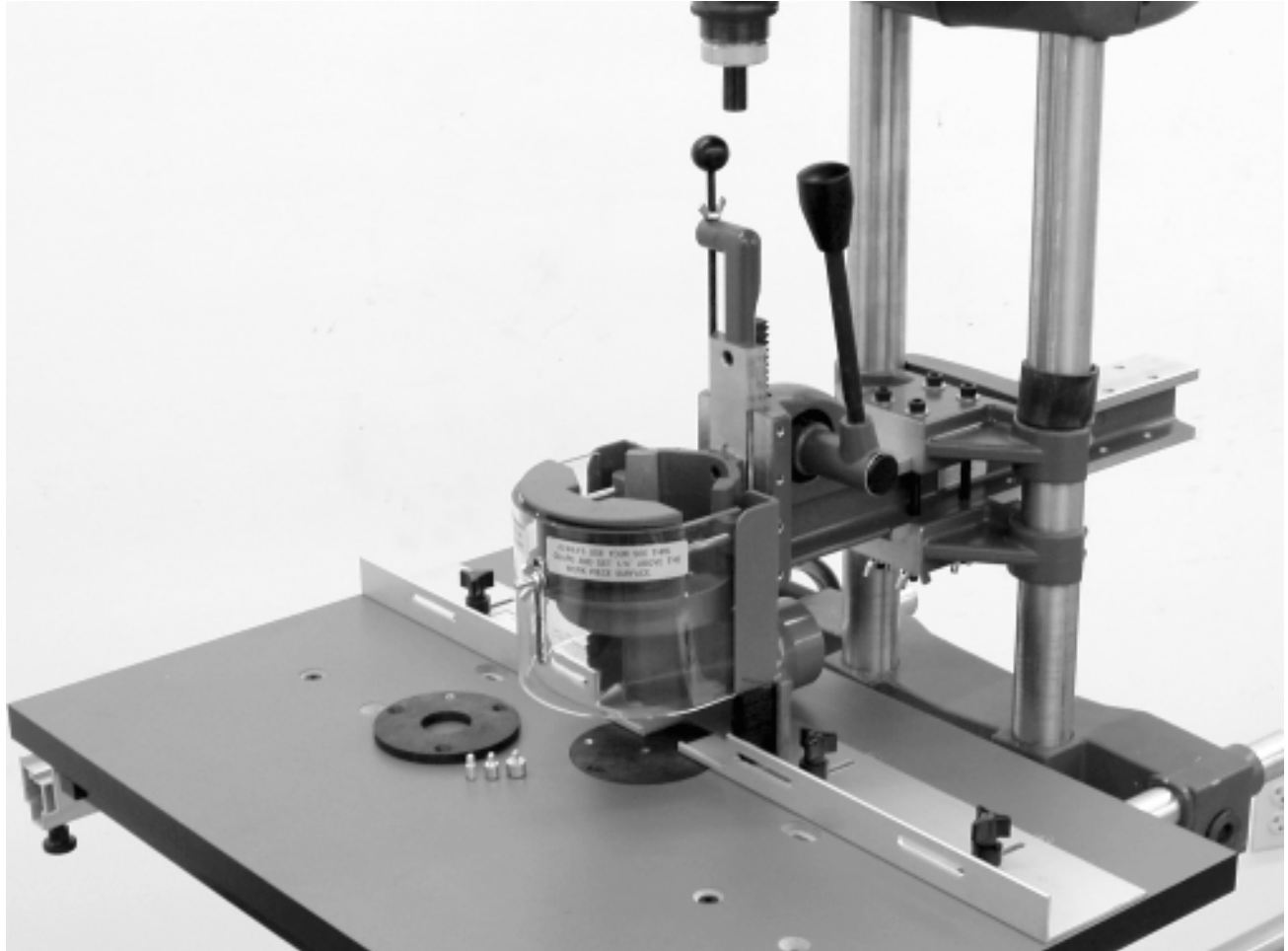


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INTRODUCTION

Shopsmith's MARK-V Mounted Overarm Pin Router can perform many jobs that are normally intended for other tools...and it can usually perform these operations much faster and with far greater precision and repeatability than you could hope to achieve using more conventional methods.

It's called an Overarm Router because it operates with the rotating bit above the workpiece rather than below it...providing a clear view of what's going on at all times while you're cutting...unlike a typical router table set-up where the bit makes its cuts on the underside of your workpiece.

This approach also means that you won't need a costly, under-table router motor lift to help you make precise depth-of-cut adjustments. With the MARK-V Mounted Overarm Pin Router, these adjustments are made using your Overarm Router's Quill Lever, just as you would when drilling holes or performing similar operations with a drill press or your MARK V.

WHAT CAN I DO WITH THIS TOOL?

Those who are familiar with Pin Routers often believe that the only operation such a machine will perform is duplicate routing. This simply isn't true!

In fact, Shopsmith's Overarm Pin Router will perform any operation that can be performed with a typical router table. As a result, you'll soon find yourself reaching for your Overarm Router for a multitude of woodworking operations, including:

- Basic straight-line routing operations
- Routing decorative edges and surface designs on straight, round or curved workpieces of all types, including furniture, cabinets, tabletops, etc.
- Cutting precision dados, grooves, rab-

bets, dovetails and other types of structural joints

- Making all types of stopped cuts
- Repairing furniture and veneers
- Jointing the edges of workpieces
- "Sawing" straight and irregular shapes
- Drilling holes
- Pin routing duplicate workpieces with matchless repeatability

WHAT IS PIN ROUTING?

Pin Routing is a simple operation through which you can quickly and easily make many duplicate copies of a particular project and have each one turn out exactly the same.

In fact, prior to the introduction of CNC (computer numerically controlled) Routers, this was one of the primary processes used by most furniture manufacturers when cutting-out odd-shaped project components.

In a nutshell, here's how it works:

- A template or fixture is created by cutting 3/8" deep grooves (1/4", 3/8" or 1/2" wide) that exactly match the shape of the workpieces you're making
- A straight router bit is then inserted into your router motor...which is mounted in the Overarm Router
- A tracing pin (same size as your straight bit: either 1/4", 3/8" or 1/2") is inserted into the Overarm Router's Table Plate – and the pin and router bit are aligned perfectly with one another
- A workpiece blank is temporarily attached to the back side of the template containing the pattern groove
- The template or fixture is flipped over (workpiece attached) and its groove dropped over the tracing pin
- The router is turned on and the bit lowered into the workpiece while the groove

is traced over the table pin, creating a finished piece that's exactly the same size and shape as the groove in your template or fixture

- Remove the workpiece, replace with a new blank and repeat the process above... as many times as you like

Once you've made a template or fixture, cut out as many parts as you like, then set the template aside until the next time you want to make more of the same project. It will be ready when you are.

We know that you're eager to get started using your Overarm Router, but please take the time to read this manual before you begin. Then keep it handy for future reference.

OVERARM ROUTER SPECIFICATIONS:

Maximum router motor HP	3 hp
Diameters of router motors accepted (round motors only)	2-1/2" to 4"
Throat depth (router bit centerpoint to Way Tubes)*	10-1/2" to 18-1/2"†
Vertical motor travel (lever-controlled)	3-1/2"
Maximum workpiece thickness	Approx 11"‡
Worktable size (laminated-covered MDF)	18-1/2" d x 28" w x 3/4"
Fence size (2)	13-1/4" w x 1-1/4" h
Guide pin diameters furnished	1/4", 3/8" and 1/2"
Starter pin diameter furnished	1/4"
Maximum router bit diameter (with insert)	1-3/8"
Maximum router bit diameter (without insert)	2"
Dust port diameter	2-1/4"

* With a 3-1/2" diameter router motor. Distances will vary, depending on router motor diameter.
 † Maximum dimensions, based on which set of four Arm mounting holes are used
 ‡ Varies, depending on router motor and bit used

SAFETY

WARNING

Read this safety section and complete the Assembly procedures BEFORE operating your Shopsmith Overarm Pin Router

Shopsmith's MARK V-mounted Pin Router offers many built-in safety features. However, the effectiveness of these features depends on you. Power tool safety requires good common sense, and misuse of this tool can cause serious injury.

To protect yourself from injury:

- **READ, UNDERSTAND AND FOLLOW ALL the information in this Owners Manual.**
- **Also, READ, UNDERSTAND AND FOLLOW ALL the information in the Owners Manual that came with your router motor.**
- **READ, UNDERSTAND AND FOLLOW ALL the information in the MARK V Owners Manual.**

Throughout this manual, we list WARNINGS, CAUTIONS, and NOTES. We advise that when you come to one of these listings, please read and understand it fully. Their meanings are:

WARNING

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

CAUTION

A CAUTION is given when failure to follow the directions is likely to result in damage to the equipment.

NOTE

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

EYE PROTECTION

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

- Goggles completely surround and protect your eyes. Many goggles will also fit over regular glasses. Be sure your goggles fit closely, but comfortably.
- Safety glasses don't fog as easily as goggles and can be worn all the time. Regular glasses normally have only impact resistant lenses. They are not safety glasses.
- A face shield protects your entire face, not just your eyes.

HEARING PROTECTION

Prolonged exposure to high intensity noise from high speed power tools will damage your hearing.

- Hearing protectors screen out certain frequencies and noise levels that can damage your hearing. For that reason, we recommend that you ALWAYS wear hearing protection when using your Overarm Pin Router.

GUARDING FOR ROUTING

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 requires additional setup, the protection for you and your family is well worth the effort.

DRESS

Loose hair and clothing which could be entangled in rotating bits are very hazardous.

- Tuck long hair under a hat or tie it up. Do not wear ties, gloves, loose clothing, rings or other jewelry. Roll sleeves up above your elbows.

ELECTRICAL REQUIREMENTS

Follow the electrical requirements that appear in the Owners Manual that came with your router. Do not overload your electrical circuits.

ROUTER MOTOR — OVERARM

Use the following specifications required to mount a router in the OVERARM:

NOTE

Customer Service representatives and Store personnel will help you select the proper motor.

- Use only UL Approved router motors.
- Motor housing must be round, not square, for router arm.
- Motor must be 2-1/2" to 4" in diameter.
- Motor power cord must be located so it comes out the top section of the router.
- Motor power cord should be securely attached to the top of the Arm during operation with tape or rubber bands to keep it safely out of your way during routing.
- Switch must be located so that it can be positioned toward the front of the Overarm Router and be easily accessible during operations.
- You must be able to remove the handles and base from the motor without removing the switch.
- Motor must properly mount on the Overarm Router so that base locating pins on the motor housing do not interfere with the router motor holding clamps.
- Motor must not exceed 3 hp.

SAWDUST AND CHIPS

Sawdust and chips can be a fire hazard and breathing sawdust can be a health hazard. The sawdust from some woods is toxic. To help protect yourself from sawdust:

- Attach your Overarm Pin Router to a dust collection system to help capture flying chips and debris.
- Or wear a close-fitting dust mask. Clean or replace the filters in the mask regularly. Also, open a window or use a fan to ventilate your shop.

MOUNTING ROUTER BITS

- Turn off and unplug the router motor before mounting router bits.
- Follow the recommendations of the router motor manufacturer as to the sizes and types of router bits to use.
- Make sure the router bit is secured properly in the collet. Loose bits could work free and cause serious injury. Insert the bit all the way into the collet and retract it about 1/8" to avoid the transition between shank and cutter.
- If you are using an arbor-style bit with interchangeable cutters, be sure the cutting edge is facing to the left when mounted on the arbor.
- Listen for chatter or signs of looseness at start-up. If you hear, see or suspect problems, stop the tool immediately, unplug it, and check the tool thoroughly. Correct any problem before proceeding. If you are unable to locate the problem, you can contact your Shopsmith Service Representative or store personnel for advice. Never operate the Overarm Router if it is not functioning properly.
- Keep bits clean, maintained and sharp.
- Don't try to make your own collet adapter to hold different sized bits. Balance is important at high speeds, so always buy appropriately sized collets.

GENERAL SAFETY RULES FOR POWER TOOLS

- Know your power tool. Read the owners manual. Learn its application and limitations as well as the specific potential hazards peculiar to this tool.
- Ground all tools (unless double insulated). If tool is equipped with an approved 3-conductor cord and a 3-prong grounding type plug to fit the proper

grounding type receptacle, the green conductor in the cord is the grounding wire. Never connect the green wire to a live terminal.

- Wear proper eye and ear protection. Also, wear a dust mask.
- Keep guards in place. Always keep guards in working order and in proper alignment and adjustment. Most injuries occur on unguarded power tools.
- Remove adjusting keys and wrenches.
- Wear proper apparel. Do not wear loose clothing, ties, gloves, rings or other jewelry. Roll sleeves up above your elbows, wear nonslip footwear, and tuck long hair under a hat.
- Do not operate power tools if you are tired, taking medication, or under the influence of alcohol or drugs.
- Avoid dangerous environments. Don't use power tools in damp, wet or explosive atmospheres.
- Keep work areas well lit, clean, and free from clutter.
- Do not force the tool. It will do the job better and safer at the rate for which it was designed.
- Use the right tool. Don't force a tool or accessory to do a job for which it is not designed.
- For direction of feed — ALWAYS feed the workpiece into the cutter against the rotation of the cutter. NEVER feed the workpiece into the cutter with the rotation of the cutter.
- Check damaged parts. A damaged guard or part should be properly repaired or replaced before further use. If a strange noise or vibration develops, immediately turn off the power, unplug the machine and correct the problem. Never operate a power tool that is not functioning properly.
- Secure workpieces. Use clamps, fixtures, and other devices to hold workpieces when practical. It's safer than using your hands and it frees your hands to operate the tool.
- Do not overreach. Keep proper footing and balance at all times.
- Turn off the tool and wait until it comes to a complete stop before removing workpieces and scraps.
- Do not try to stop the tool by grabbing the workpiece or any part of the tool. Turn off the tool and let it come to a complete stop by itself.
- Do not leave the tool running unattended. Turn power off. Don't leave tool until it comes to a complete stop.
- Avoid unintentional starting. Make sure the switch is in the "off" position before plugging in or unplugging the tool.
- Disconnect tools. Turn off and unplug tools before changing accessories and setups, making adjustments, and performing maintenance and repair.
- Do not stand or lean on the tool. You could fall onto the tool or it could tip over injuring you and/or damaging the tool.
- Maintain tools. Keep parts and tools sharp, clean and maintained according to the Owners Manual.
- Make your workshop childproof. Use padlocks, master switches or remove starter keys.
- Keep children away. All visitors should stay a safe distance from power tools, and wear eye and ear protection.
- Do not permit anyone who is inexperienced to use your power tools without supervision.

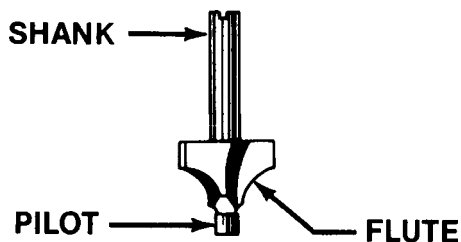
SAFETY RULES FOR THE SHOPSMITH OVERARM ROUTER

- Be sure to read and understand this entire Owners Manual before using the Overarm Router. Also, do not use the Overarm Router unless you are sure it is assembled properly, all safety devices are installed, and you understand the operations you are attempting to perform.
- Keep the guard in place and in working order. Always set the guard no more than 1/4" above the workpiece.
- Keep your hands, fingers and other parts of your body at least 3" away from the rotating bit.
- Use a push stick, push block, feather-board(s), miter gauge with safety grip, fixtures, or other safety devices to maneuver a workpiece into a rotating bit. If a kickback occurs, these devices help to protect your hands and fingers.
- Use only Shopsmith parts and accessories on your Overarm Router. NEVER use non-Shopsmith replacement parts or accessories. They are not designed like Shopsmith parts. Using non-Shopsmith parts may create a hazardous condition and will void your warranty. Follow your router manufacturer's recommendations as to replacement of router parts.
- Do not rout second-hand lumber. If you hit a nail, screw, or other foreign object, you could be hit by pieces of metal or there could be kickback.
- Do not "freehand" rout stock less than 12" X 12" or equivalent.
- Support long boards and sheet materials with a roller stand(s) placed 1' -4' from the worktable.
- Avoid taking deep cuts. With the exception of single-pass dovetail cuts, limit depth-of-cut to 1/4" for each pass when using bits up to 1/2" diameter in hard-wood. Limit depth-of-cut to 3/8" for each pass when using bits up to 1/2" diameter in softwood. When using bits over 1/2" diameter, limit depth-of-cut to half the recommended depths for 1/2" diameter bits.
- Always use a fixture, fence, and/or starter and guide pins to help control the workpiece.
- Always feed the workpiece against the rotation of the bit, not with it. Otherwise the bit will grab and throw the workpiece.
- Keep a firm grip on the workpiece at all times and never hold the workpiece with your hands in line with the router bit.
- Always clamp a straight piece of scrap stock to your worktable surface for use in holding your workpiece against the fence during straight-line routing operations. Also use a long piece of scrap stock to feed a narrow workpiece underneath the guard to complete a cut.
- Cut with the grain instead of against the grain. You will get a smoother cut and the operation will be safer.
- Avoid standing in-line with the workpiece being fed. In the event of a kickback you could be hit.
- Feed the workpiece slowly. Use extra care in routing workpieces that contain figured grain or knots, as these may cause kickbacks.
- When you are routing stock up to 10" wide across the grain, use a piece of scrap stock cut at a 90° angle to guide the workpiece through the cut. The workpiece must extend 5-1/2" away from router bit.
- When stop routing, always use stop block(s) to control the length of cut. Failure to use stop block(s) could cause the bit to grab and throw the workpiece.

- When routing oversize stock, always use at least one push block to help control the workpiece firmly against the fence.
- Do not work with stock that is too small or too large to handle safely; that is warped, bowed or cupped; or that has loose knots or other defects.
- Plan the operation before you begin. If you are in doubt about how to complete an operation safely, do not attempt it. You can contact your Shopsmith Customer Service Representative or Store personnel for advice.
- Secure the router, overarm assembly, depth stop rod, depth control handle, worktable, accessories, safety devices, fences, and fixtures before turning on the motor.

TYPES OF ROUTER BITS

Router bits come in a wide variety of shapes and sizes designed to be used at very high speeds.



The part of the bit mounted in the router chuck is called the shank and the rounded extension beyond the cutter on some bits is called the pilot. The cutting edge of the bit is called a flute. Router bits have one, two or three flutes and the more flutes there are on the bit, the more cuts that can be made per minute. A higher number of flutes reduces the load on the motor and produces a smoother cut.

Quality bits are made of high speed steel, solid carbide or carbide-tipped steel. High

speed steel bits are heat treated for extra hardness and to hold keen cutting edges. Carbide bits (solid or tipped) are the finest bits available today. Although more expensive, they will outlast high speed steel bits at a 15 to 1 ratio on softwoods and are highly recommended for use on hardwoods, plastic laminates, plywood and particleboard.

Router bits are generally classified into four different categories — grooving bits, edge cutting bits, panel bits and laminate and veneer trimming bits. (See Chart.)

CARE AND MAINTENANCE

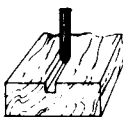
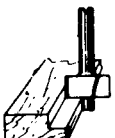

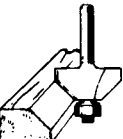
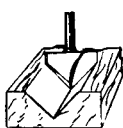
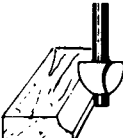
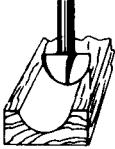
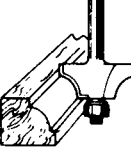
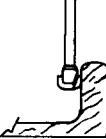

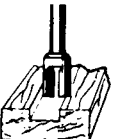
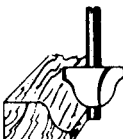
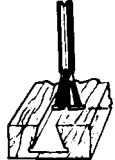

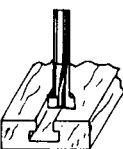
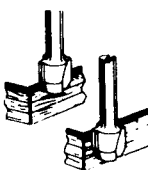
You'll enjoy longer use of your router bits if you make it a point to handle, use and sharpen them properly.

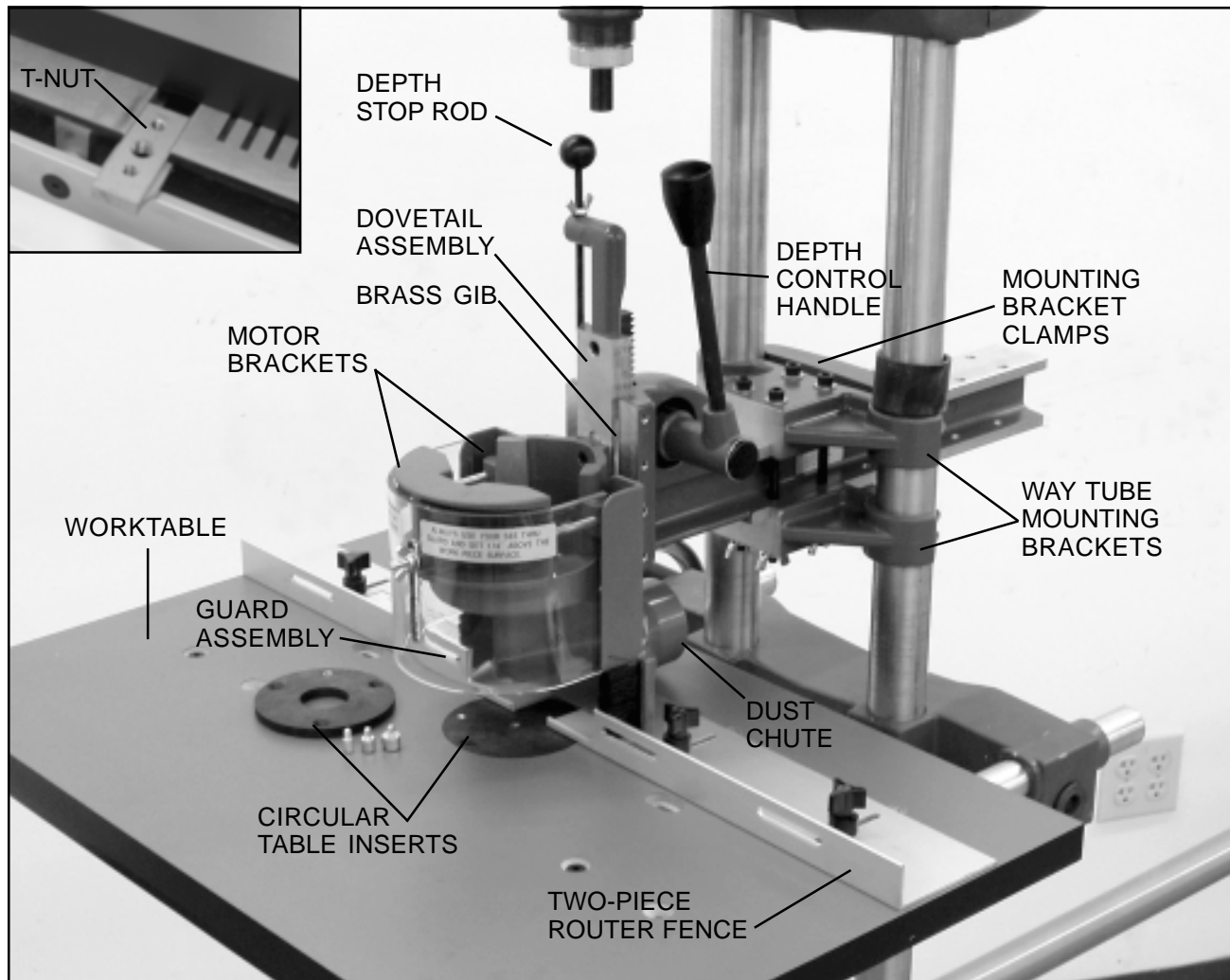
- Use your router bits only for the job they are intended to do.
- Make sure the bit is mounted rigidly in the collet.
- Learn to cut your workpiece at the proper speed to prevent heat buildup that can cause the loss of bit hardness.
- Between operations, set your bits in a safe place where they will not fall or get hit.



Never use solvent on a bearing piloted bit without first removing the bearing.

- After use, clean bits thoroughly.
- Sharpen your bits with a small slip-stone or oilstone with oil. Hone the face of each cutter with light strokes in one direction. Never hone the outside edge because it reduces the diameter of the cutter. Hone each cutter edge with the same number of strokes.
- If the cutting edge is nicked, take the bit to a professional sharpening service.

<p>Grooving Bits These bits are used primarily for work on flat surfaces. They consist of a shank and cutting edge with no pilot.</p>  <p>Veining Bits . . . round bottomed bits for decorative grooves, carving, inlay work and lettering.</p>	<p>Edge Cutting Bits These bits usually have a pilot to guide the bit along the edge of your material as the cut is being made.</p>  <p>Rabbeting Bits . . . for joints along workpiece edges or step cutting.</p>
 <p>Straight Bits . . . flat bottomed bits that cut on the sides and bottom. For routing grooves, cutting dadoes and rabbets, mortising, carving and leveling recesses.</p>	 <p>Chamfering Bits . . . for decorative chamfers on thick edges.</p>
 <p>Vee Groove Bits . . . V-shaped bits for decorative carving, sign work, chamfering edges, fluting and lettering.</p>	 <p>Cove Bits . . . for decorative edging and the concave side of drop-leaf table joints.</p>
 <p>Core Box Bits . . . rounded bits for carving and fluting flat surfaces such as drain-boards, servers and tables.</p>	 <p>Beading Bits . . . for all-purpose edging and the convex side of drop-leaf table joints.</p>
 <p>3-in-1 Bits . . . bits that cut a straight side up to 1-1/4" deep, make a smooth rounded corner and shape a perfectly flat bottom in a single pass.</p>	 <p>Corner Round Bits . . . for decorative edging on all types of projects.</p>
 <p>Hinge Mortising Bits . . . bits specifically designed to mortise areas for hinges. Also used for dadoes, rabbets and stock removal.</p>	 <p>Roman Ogee Bits . . . for large decorative rounded edging.</p>
 <p>Dovetail Bits . . . bits used to form sliding dovetail joints and dadoes in furniture.</p>	<p>Panel Bits</p>  <p>These bits have a tip like a drill bit with a pilot just above it. The tip drills through your workpiece, then the workpiece can be moved to cut grooves and lattice work, cutouts for sinks in countertops, and slots in paneling for electrical boxes.</p>
 <p>Tee Slot Bits . . . T-shaped bits for cutting hanging slots in plaques and picture frames or routing sliding tracks.</p>	<p>Laminate and Veneer Trimming Bits</p>  <p>These bits are designed to trim hard plastic laminates and veneers. Both flush and bevel trim bits are available but only carbide tipped or solid carbide bits should be used for this type of work.</p>



TERMS TO KNOW

It's important that you become familiar with all of your Overarm Router's functions and parts before you begin to use it.

The functioning parts of the Router Arm are:

1. Worktable – Made of a durable laminate-covered MDF (medium density fiberboard) the Overarm Router's Worktable mounts to your MARK's Worktable in one of two ways:

Models 505, 510 and 520 – Mounts into the right-hand Worktable Miter Gauge slot with two sliding T-Nuts and setscrews.

Model 500 – Mounts into the two threaded Table Insert mounting

holes in your Model 500 MARK V with two buttonhead setscrews and washers through the elongated travel slots in the Overarm Router Table surface.

- Two sets of threaded inserts are provided in the Worktable surface for attaching the two-piece Router Fence.
2. Guard Assembly – The clear guard protects your fingers and hands, keeps chips away from you and gives you a clear, open view of the surface being routed at all times.
3. Dust Chute – Your dust collection system attaches to the chute to help collect sawdust and chips.

4. Motor Brackets – Firmly hold any round, hand-held router motor from 2-1/2" to 4" in diameter. These dimensions are for the motor only (the router base is removed during operations).
5. Brass Gib – Adjusts with four Allen set screws to eliminate side-to-side movement of the motor while allowing smooth, vertical movement of the dovetail slide.
6. Depth Stop Rod – Locks into any position to limit your depth-of-cut during operations.
7. Dovetail Assembly – Moves up-and-down by means of a steel rack-and-pinion gear mechanism. The dovetail slide provides 3-1/2" of vertical motor travel.
8. Depth Control Handle – Conveniently raises and lowers the router motor. A simple twist locks the handle in place.
9. Circular Table Inserts – Two provided: One with a 1-3/8" diameter center hole and an offset threaded insert for the Starting Pin (included)...and another with a center threaded insert for the three interchangeable Overarm routing Guide Pins (three included: 1/4", 3/8" and 1/2" diameters).
10. Two-Piece Router Fence – Adjustable aluminum Fences attach to the Worktable mounting holes with threaded plastic Knobs, Spacers and washers for straight-line routing operations.
11. MARK V Way Tube Mounting Brackets – Upper and lower Mounting Brackets attach to the Overarm...then around the MARK V Way Tubes with mating Clamps, supporting the Overarm Router above the Worktable.
12. Mounting Bracket Clamps – Clamp around the "back side" of your Way Tubes with 3" long x 3/8" dia. socket head capscrews, threaded into the holes on the back sides of the Mounting Brackets.
13. SLIDING T-Nuts – Used to attach your Overarm Router Table to your Model 505, 510 or 520 MARK V Worktable.

OVERARM ROUTER ASSEMBLY

WARNING

Your safety and the ability to use your new Shopsmith Overarm Pin Router properly depends on your following these assembly and use instructions exactly.

NOTE

Reference numbers that appear in parentheses following the part names correspond with the numbers on the figures in this section and the exploded view in the Parts List section of this Manual.

TOOLS & SUPPLIES NEEDED:

- 1/8" Allen wrench
- 5/32" Allen wrench
- 1/4" Allen wrench
- 5/16" Allen wrench
- 7/16" Open end wrench
- Furniture or floor paste wax (do NOT use car wax or spray furniture polish)
- Mineral spirits
- Fine file or emery cloth (optional)

BEFORE YOU BEGIN...

It's a good idea to clean all major metal parts with mineral spirits to remove any dirt or grease residue. Any burrs found on parts should be removed with a fine file or emery cloth. If required, clean your router motor according to the instructions in its Owner's Manual.

Wax and buff the Worktable surface, applying the wax sparingly, then buffing it out thoroughly. If you apply too much wax or fail to buff it out properly, the wax will mix with the sawdust you generate, impede the movement of the Overarm Router's parts and leave residue on your workpieces.

Remove all accessories from the MARK V's Headstock and prepare the machine as you would for Drill Press operations. Remove the Worktable from the Carriage (this will make it easier for you to raise the machine to vertical position).

Slide the Headstock all the way to the left until it rests against the Way Tube Tie Bar. Tighten the Headstock Lock lever.

Position the Carriage so the distance between the Carriage and the Headstock is about 15". Tighten the Carriage Lock Handle. Raise the MARK V into Drill Press position. NOTE: Shopsmith's Lift-Assist Accessory will make this task much easier.

WHICH MOUNTING HOLES ?

Before mounting the Overarm Router to the MARK V, the two Mounting Brackets (11) must be bolted to the Arm of the tool with four 5-1/4" long x 5/16" dia. socket head cap screws, washers and wing nuts (finger-tight only at this time). Do not install your router motor yet.

There are six pairs of mounting holes in the Arm, providing a total of five mounting po-

sitions in the Brackets. For most operations, the 2nd and 3rd set of holes nearest the business-end of the Arm are used as shown in Figure 1. If you need more throat depth, choose the four holes that best suit your needs.

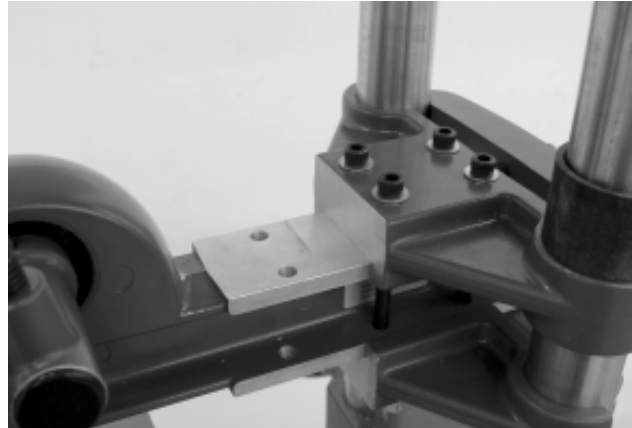


Figure 1. Normal Mounting Position

NOTE

When mounting, drop the capscrews through the TOP of the Brackets and into the Arm, with flat washers and wing nuts on the bottom. This way, the bolts won't drop out of position when you remove the wing nuts and washers to change Arm positions.

INSTALL THE DEPTH STOP ROD (6)

Thread the 1/4"-20 wing nut onto the Depth Stop Rod, then thread the Rod (with wing nut) into the threaded hole in the top of the Dovetail Slide.

Once the Brackets are mounted to the Arm, use the Depth Control Handle (8) to "lower" your Motor Brackets (4) to the "bottom" of their travel in the Dovetail Assembly (7)...and unscrew the Depth Stop Rod (6) so it is all the way to the "top" of its travel.

RE-INSTALL THE MARK V WORKTABLE

Loosen the Table Tilt Lock Lever, tilt your Table to 90° (as you would when setting up for Drill Press) and tighten the Lever. Install the Worktable in the Carriage, slide it “back” until its edge is 3" from the Way Tubes. Tighten the Table Height Lock.

Place a piece of scrap plywood or cardboard on your table. With the Overarm Router’s Deflector (20) resting on your MARK V’s Worktable surface (See Fig. 2), position the semi-circular cut-outs of the Brackets (29) against the Way Tubes. Hold the assembly in position while you screw the two 3" long x 3/8" dia. socket head capscrews through the Clamps (30) and into the threaded holes in the Mounting Brackets (29). See Fig. 3.

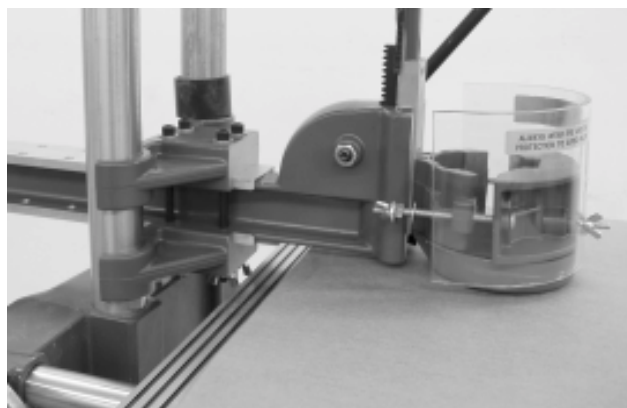


Figure 2. Attaching the Overarm Router to the MARK V



Figure 3. Tighten the Clamp cap screws with the 5/16" Allen wrench.

Adjust the Overarm’s position so the Depth Stop Rod Knob doesn’t collide with the end of the MARK V’s Quill when the Stop Rod is adjusted to its full “up” position and tighten the two large capscrews using a 5/16" Allen wrench.

INSTALL YOUR ROUTER MOTOR IN THE OVERARM

Remove your Router motor from its base (see instructions included with your router.) Place the motor between the front and rear motor Brackets on the Overarm until it bottoms out against the Deflector (20)...then raise it approximately 1/8" to allow for proper air circulation.



Always position the Router Motor so it is raised about 1/8" off the Deflector to allow for proper airflow and cooling during operation. Without this 1/8" clearance, overheating and damage to your router motor will result.

Use a 7/16" open end wrench to tighten the two Motor Bracket nuts (See Fig. 4). Be sure your router’s switch is located for easy accessibility during operations...and that none of the small lugs or other protruding parts on the motor’s housing interfere with a good “seating” in the Motor Brackets. When positioning your router motor, be sure its collet or bit locking nuts are accessible without the need for additional motor adjustments.

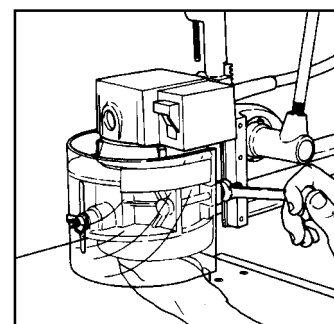


Figure 4. Install the router motor in the Overarm.



Over-tightening the Motor Bracket nuts may cause damage to the motor and/or housing of your router.

INSTALL THE REAR GUARD AND DUST COLLECTOR ASSEMBLY

Install a flat washer over each stud of the front Motor Clamp, and then slip the rear guard/dust chute with strip brushes onto the clamp studs and secure with two more flat washers and wing nuts. See Figure 5 for correct assembly order.

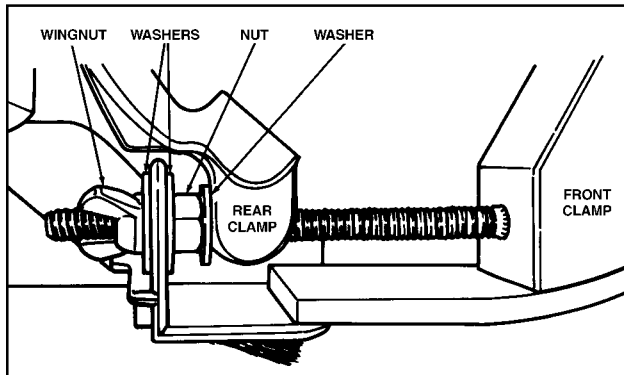


Figure 5. Overhead view of proper motor clamp hardware assembly order (looking down from above).

MOUNT THE OVERARM ROUTER TABLE ONTO THE MARK V WORKTABLE

Model 500

Remove the MARK V Table Insert. Use the two buttonhead Allen capscrews with washers to mount the Overarm Router Table to the MARK V Worktable by inserting them through the two elongated mounting holes in the Router Table and threading them directly into the Model 500 MARK V Table Insert mounting holes (See Fig. 6).

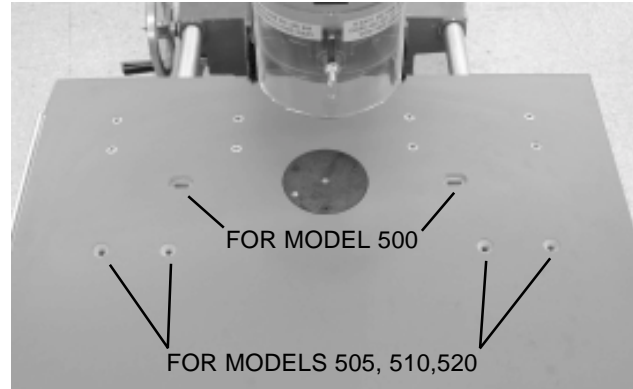


Figure 6. Use the left hole of each pair when mounting the Worktable on Model 505, 510 and 520 MARK V's for most applications. Use counterbored slots for Model 500.

Models 505, 510, 520

Use the sliding T-nuts and 1/4"-20 flat head machine screws provided. Lay the Router Table right-side-up on a flat surface in front of you with the eight threaded insert holes away from you. You will notice two pairs of countersunk holes in the Table surface, about 7-1/2" in from the "front" edge of the Table (See Fig. 6). These are the holes you will use to mount your Overarm Router's Table to your Model 505, 510 or 520 MARK V's Worktable.

For the majority of your conventional and pin routing operations, you will use the two left holes in each pair to mount the Table to the "front" Miter Gauge slot in your MARK V's Worktable. This approach will provide the maximum workpiece support in "front" of your Router bit and motor...and allow you to use your Two-Piece Router Fence (included).

If you would prefer to have more workpiece support "behind" your Router bit and motor, use the two right holes in each pair to mount the Table to the "back" Miter Gauge slot in your MARK V's Worktable. When using this approach, the Table must be rotated 180° and installed with the eight threaded Fence inserts toward the "front" of the Table.

WARNING

This set-up will make it impossible for you to use your Two-Piece Overarm Router Fence safely.

Position the two T-nuts in the “front” Miter Gauge slot of your MARK V’s Worktable, near the two ends of the slot. Lay the Overarm Router Table onto the surface of the MARK V Table.

Align the left hole in the left pair of countersunk mounting holes in your Router Table surface over the outside (or left) 1/4" threaded hole in the left T-Nut. Insert a 1/4"-20 flathead machine screw through the countersunk Table hole and thread it into the T-Nut hole. Use a 5/32" Allen wrench to run the screw down into the hole but do not tighten it at this time.

Slide the Router Table to the right slightly until the left hole in the right pair of countersunk mounting holes in your Router Table surface align over the outside (or right) 1/4" threaded hole in the right T-Nut. Insert a 1/4"-20 flathead machine screw through the countersunk Table hole and thread it into the T-Nut hole. Use a 5/32" Allen wrench to run the screw down into the hole but do not tighten it at this time.

Loosen MARK V Carriage Lock and raise the Worktable and Carriage assembly up on the way tubes to within 5" to 6" of the Deflector bottom (20). Lock the carriage in place.

Extend the Worktable until the bottoms of the MARK V Table Tubes are flush with the bottom of the carriage, then lock the MARK V table into position.

CAUTION

Never operate the Overarm Router unless the Table Tubes are extending flush with the bottom of the Carriage or beyond. Doing so will not provide adequate support for the Table and could result in damage to the machine.

For any operation where the cut profile is such that the Router Bit extends below the top surface of the Worktable, the Table should always be aligned so that its center hole is aligned with the centerpoint of the Router Bit.

CAUTION

Adequate Worktable Support is critical for the best results.

It is recommended that you always use the Telescoping Legs and Connector Tubes that came with your Model 510 or 520 MARK V to support the outer edge of the Overarm Router Worktable during operations.

This is especially true if you’re working with heavier-than-normal workpieces – or if you have the Arm of your Overarm Router extended far forward to provide additional throat capacity.

If you own a Model 505 Anniversary Edition MARK V, you must purchase two Connector Tubes (Part # 514439), two Telescoping Legs (Part # 514529) and two Adjustable Fittings (514620).

If you own a Model 500 MARK V, a single Support Leg (Part # 555627) is available for your machine that attaches around the lip of the front edge of your Worktable.

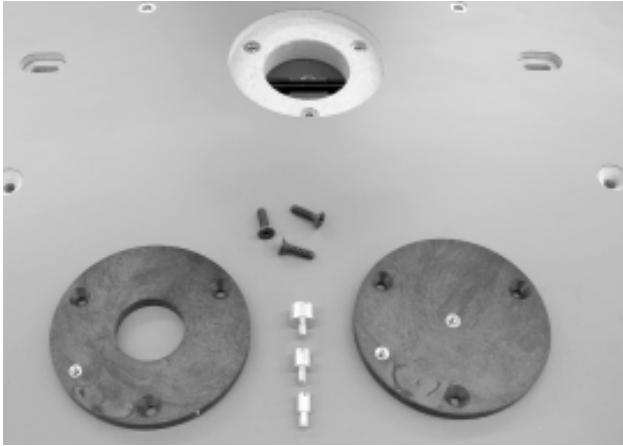


Figure 7. The two Table Inserts: Left insert for common routing operations – Right insert for pin routing.

There are 2 Table Inserts (60/61), see Fig. 7).

- The one on the left in Fig. 7 offers a 1-3/8" diameter round hole in the center and a brass threaded insert at its outer edge for a Starter Pin. This insert is used for most conventional, non pin-routing operations.
- The other features two brass threaded inserts...one in the center and another at its outer edge for a Starter Pin. This insert is used when performing pin routing operations.

Both inserts are installed in the Overarm Router Table surface with three 10-24 x 3/4" machine screws, using a 1/8" Allen wrench.

BRINGING THE INSERT FLUSH WITH THE WORKTABLE SURFACE

It's important to note that the Overarm Router Worktable is made of MDF...an unstable material that can fluctuate in size based on humidity and other factors. It's also important to note that MDF is a wood-based material and holding exact tolerances when machining the Insert cutouts is virtually impossible. For those reasons, we have purposely made the Insert cutout slightly deeper, so the Inserts are sub-flush once installed.

This approach allows you to make whatever minute adjustments may be required to bring the Inserts to a flush position by shimming them with small pieces of masking or duct tape stuck to the underside of the Inserts on either side of the mounting screw holes. Once the Inserts are flush, further adjustments shouldn't be necessary.

Attach the table insert with the 3 screws and the 1/8" Allen wrench provided.

ALIGNMENT AND ADJUSTMENT

RE-POSITIONING THE DEPTH CONTROL HANDLE

If the Depth Control Handle (40) is positioned too far forward or backward for comfortable operation, its position can be changed. Here's how. First, raise the depth stop rod, then loosen the depth control handle by twisting its knob counterclockwise about one-half turn.

Rotate the Depth Control Handle forward so the Router motor is in its approximate cutting position (Typically with the Router collet approximately 2" to 3" above the Worktable surface.)

If the handle position is uncomfortable, reposition it by twisting the handle counterclockwise about one-half turn...grasping the clutch and handle assembly...and pulling it outward (to the right) to disengage it from the rack. Move it to a comfortable position and push it back inward (to the left) to re-engage the rack and pinion mechanism. Twist the Depth Control Handle clockwise to lock your height setting. If this is difficult, loosen the setscrew (41) until the clutch and handle snap in and out easily.

CAUTION

Before disengaging the Clutch and Handle assembly, always adjust the Depth Stop Rod so it makes contact with the top of the Arm or hold the Dovetail Slide so the Router Motor doesn't drop and damage your workpiece or the Worktable.

ADJUSTING THE BRASS GIB

The tightness of the Brass Gib should be adjusted so the Router Motor won't slip and drop abruptly when the Depth Control Handle is unscrewed prior to re-setting your depth-of-cut.

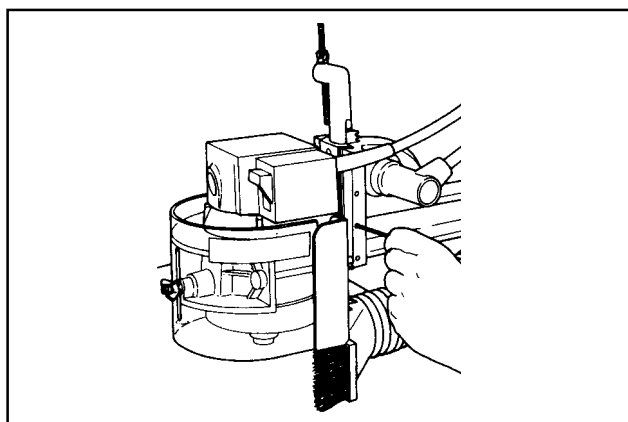


Figure 8. If required, use a 1/8" Allen wrench to achieve proper Gib pressure.

If it does slip, the Brass Gib is set too loose against the side surface of the Dovetail Slide. To adjust the Gib, use a 1/8" Allen wrench to tighten the four setscrews (26) uniformly in small increments until the proper Gib pressure is achieved (see Figure 8). When adjusted properly, the Depth Control Handle should move the motor freely without any "slop" between the arm and the dovetail slide.

ROUTER BIT TO GUIDE PIN ALIGNMENT

When performing pin routing operations, it's critical that the Router Bit and Guide Pin be in perfect alignment with one another.

To check this alignment, insert a 3/8" diameter straight Router Bit into the collet of your Router Motor and tighten securely. Screw the 3/8" Guide Pin into the threaded center hole in the Overarm Router Table Insert. Lower the motor so your Bit is approximately 1" above the Guide Pin.

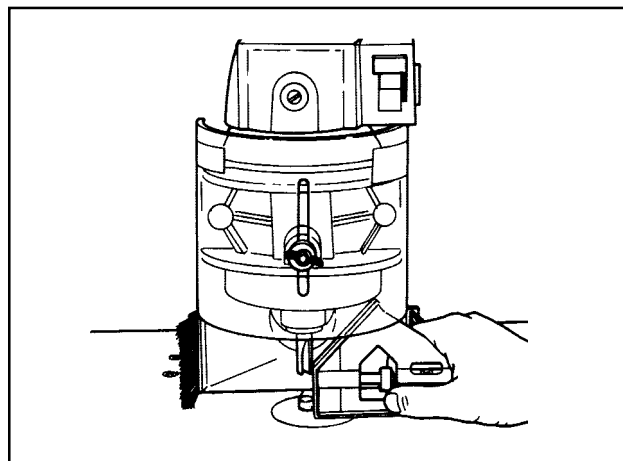


Figure 9. Use the handle portion of a combination square as a gauge for checking the bit-to-guide-pin alignment at three points, 90° apart.

Use the base of the combination square (See Fig. 9) to check Bit-to-Guide-Pin alignment at three points 90 degrees apart. If the Bit and Guide Pin are not in perfect alignment, front-to-back and/or left-to-right Worktable adjustments will be required.

Front-to-back adjustments are made by loosening the MARK V Table Height Lock Knob and using the MARK V's Table Height adjustment handles or knobs.

Left-to-right adjustments are made on MARK V Models 505, 510 and 520 machines by loosening the two 1/4"-20 flathead machine screws that hold the Overarm Router

Table to the MARK V Worktable...then sliding the table left or right and tightening the screws once proper alignment is achieved.

On Model 500 MARK V's, these adjustments are made by loosening the two roundhead machine screws in the elongated slots to the left and right of the Router Table Insert cut-out.

OVERARM PIN ROUTING OPERATIONS

SAFETY FIRST

WARNING

To protect yourself from injury, read, understand, and follow all the instructions in the safety section before you operate the routing system.

USING YOUR SHOPSMITH OVERARM PIN ROUTER

The information in this section of your manual will provide the basic understanding you'll need to perform overarm routing operations. To get the "feel" of your Overarm Pin Router, it's best to practice doing simple work before you tackle more difficult operations.

There are two ways to use this versatile tool:

1. As a duplication tool...for making multiples with fixtures or other guiding devices
2. As an overhead routing tool...for performing common routing operations such as decorative edging, dadoing, grooving, mortising and creating other types of specialized joinery.

Before we look at each of the different types of operations in-depth, let's review some basic Overarm Routing guidelines that apply to both approaches.

GENERAL GUIDELINES FOR BOTH TYPES OF OVERARM ROUTING

1. Installing the Router Bit...Always insert the router bit all the way into the router motor's collet...then retract it about 1/16" to 1/8" to avoid locking the router collet on the transition between the shank and the cutter of the router bit.

WARNING

Always make sure the router bit is secured properly in the collet. Loose bits can easily work free and cause serious injury.

2. Mounting your accessories... Depending on the type of routing you're doing, mount the pin insert, appropriate starter and/or guide pins, fixture, fences, and/or other safety devices to help you maintain control of your workpieces during operation and avoid personal injury.

WARNING

- **Always use a starter pin, guide pin, fixture, fence, shop-made feather-board(s), push stick, push block or other safety device to control workpieces. Never freehand rout stock less than 12" x 12" or equiva-**

lent size. Small workpieces can be very difficult to control during operations without appropriate holding and guiding devices.

- For overarm routing operations, the Table Insert must always be positioned with the threaded brass starter pin hole to the left of the threaded Guide Pin hole or center hole (depending on which Insert you're using).

3. Setting your final depth-of-cut... With the Depth Control Handle unscrewed about one-half turn, lower the router motor by rotating the Depth Control Handle counter-clockwise. Position your workpiece next to the bit and determine your final depth-off-cut. Tighten the Depth Control Handle to lock the motor in position, then screw the Depth Stop Rod downward until it contacts the Overarm casting. Tighten the wing nut to lock the Rod in position

WARNING

- Avoid taking deep cuts. Your depth-of-cut should typically be limited to no more than 1/4" for each pass when using bits up to 1/2" diameter in hardwoods.
- For single-pass dovetail bits, always cut a groove first, then cut the dovetail profile in the groove.
- Limit your depth-of-cut to 3/8" for each pass when using bits up to 1/2" diameter in soft woods.
- When using bits over 1/2" in diameter, limit your depth-of-cut to half

the recommended depths for bits less than 1/2" diameter.

4. Adjusting the Guard... Lower the Guard so it clears the workpiece by 1/4", then tighten its wing nut securely.

WARNING

- Never rout without the Guard in place
- Always position the Guard about 1/4" to not more than 1/2" above the workpiece surface.

5. Making your cut... Loosen the Depth Control Handle, raise the motor and re-tighten the Handle. Set the workpiece in position on the Worktable.

Turn on the motor, loosen the Depth Control Handle and pull it forward to lower the router bit slowly into your workpiece until the approximate depth for the first pass is reached.

Tighten the depth control handle, then make your cut... ALWAYS moving the workpiece counter-clockwise, AGAINST the rotation of the Router Bit.

WARNING

ALWAYS move your workpiece **AGAINST** the direction of the rotating router bit and **NEVER WITH** the rotation of the bit. Moving **WITH** the rotation of the bit is referred to as a "climb-cut", which could cause the bit to grab the workpiece, resulting in personal injury.

Re-position the depth control handle for each additional pass until the final depth-of-cut is attained. Once you've completed your final pass, loosen the Depth Control Handle, raise the motor, retighten the Handle and turn off the motor. Only when the motor has stopped completely should you remove and inspect your workpiece.

NOTE

The quality of your cut will depend on three factors: (1) The depth-of-cut, (2) Your feed rate and (3) The condition of your Router Bit. Shallow cuts, a slow feed rate and a sharp Bit will always produce the best quality cut.

AN IMPORTANT NOTE ABOUT ROUTER MOTOR SPEEDS

Router motors operate at the highest speeds of any woodworking tools. For this reason, unsightly burn marks can often appear where the Bit meets the wood. This is especially true with hard woods such as maple, cherry, oak, etc. which are best worked at slower speeds.

Here are three valuable tips for avoiding burn marks:

1. Always use sharp, clean bits.
2. Never attempt to make deep cuts in a single pass. Taking multiple light passes will always produce better results. For best results, make the depth-of-cut on your final pass 1/16" or less.
3. Always work in a continuous motion without dwelling and don't forget to raise the rotating bit from the workpiece before turning the motor off.
4. If your Router is a single speed model, consider purchasing a plug-in after-

market electronic router speed control device. Such devices are fairly inexpensive and allow you to slow your Router motor down to the correct speed for making smooth, burn-free cuts on even the hardest of woods.

ROUTER DUPLICATION USING SHOP-MADE FIXTURES

If you're planning to make a large quantity of the same product, the fixture duplicating method is best for speed and accuracy – and making your own fixtures to cut out and shape these products is easier than you might think.

Fixtures are usually made from plastic laminate-covered materials such as countertop cut-outs for sinks. That's because these materials will hold up under continuous use much better than ordinary wood. Sink cut-outs are readily available at plumbing supply houses, from contractors, at cabinet shops, or even at many home centers or hardware stores...and are usually very inexpensive.

TYPES OF FIXTURES

There are three basic types of fixtures for pin routing:

1. Screw-down fixtures...are the easiest fixtures to make, but require more time to attach and remove your workpieces than clamp-in or profile fixtures. With this type of fixture, screws (or nails) are used to hold your workpiece to the fixture.

When building a screw-down fixture, be sure to position the screw holes so your router bit will not cut into the screws once the workpiece is attached. The ex-

ample fixture shown in Figure 10 will produce two different sized oval picture frames, one oval plaque and a rectangular picture frame with an oval opening...all from a single workpiece.

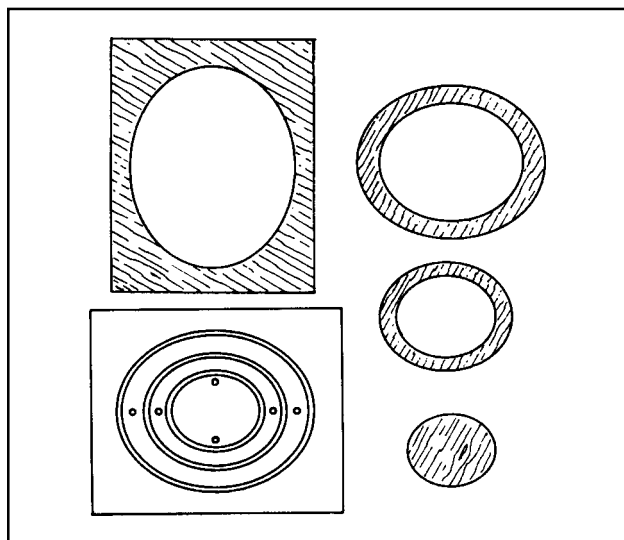


Figure 10. A typical screw-down fixture (lower left) — and the projects made with it.

CAUTION

Be sure to use screws to hold every piece of stock that will be separated when you make your through-cuts. If you fail to do this, once these cuts are made, scrap stock could be caught by your rotating router bit, causing a dangerous kick-back. This does not apply to the outside scrap piece that may be removed after you make your first cut.

NOTE

When using screw-down fixtures for mass-production, it's a good idea to use your original fixture to make several more of the same design. This way, you won't be continually removing and replacing workpieces to make different types of cuts with different profile bits.

2. Clamp-in fixtures...are best used when the outside profile of the product you're building is already cut, since any cutting on outside edges will damage the clamping device (See Fig. 11).

In our example, we've used a clamp-in fixture to cut out a coach lantern that just happens to have straight, square outside edges. This fixture features attached sides that form a perimeter around your workpiece (protruding above the surface of the fixture, not quite as high as your workpieces will be thick)...and uses a straight, wooden clamping bar on the left side that's clamped down with thumbscrews threaded through ordinary drive-in T-nuts.

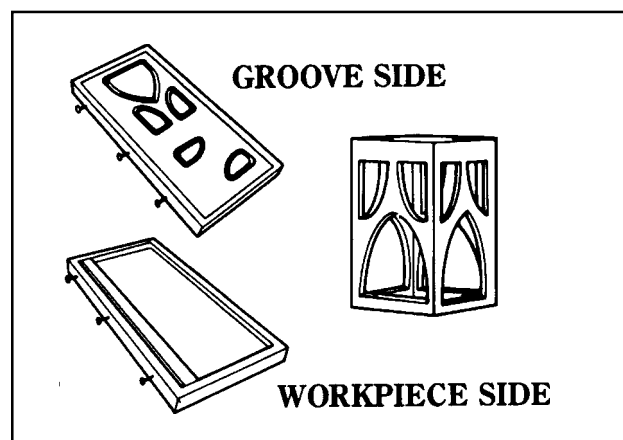


Figure 11. A typical clamp-in fixture and the project made with it.

As an alternative to this side clamping method, the clamp could just as easily work from the top of the fixture, as long as your clamping device won't interfere with your cuts.

3. Profile fixtures...are used for shaping edges only, such as candle sconces or the tops of picket fences (See Fig 12). This type of fixture features protruding screw or nail tips which help hold the workpiece in position in the fixture and

keep it from sliding around while you make your cuts. To seat the stock in a profile fixture, just position it properly and tap it gently with the heel of your hand or a non-metallic mallet to seat the screw or nail tips.

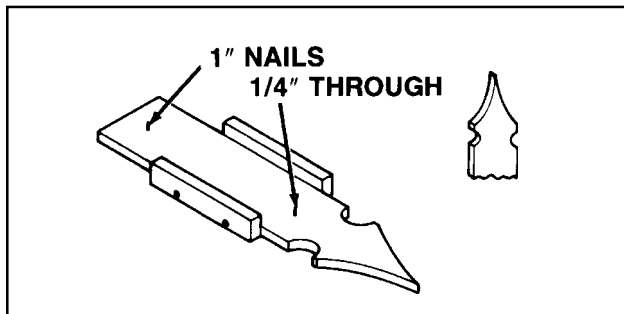


Figure 12. A typical profile fixture and the picket fence top made with it.

AN OVERVIEW OF PIN ROUTING WITH FIXTURES

The basic principle of all Pin Routing fixtures is the same, no matter which style of fixture you decide to use, with one difference:

- With screw-down and clamp-in style fixtures, a template is first cut and guided against the Table Pin, while the router bit transfers the design to the laminate side of the fixture. This process creates the fixture grooves that will guide the Router Bit as it cuts your duplicates.
- With profile style fixtures, the cut-out template IS the fixture.

The basic, four-step Pin-Routing process, in a nutshell:

1. Make a template in the shape of your desired finished piece.
2. Use the template to cut the grooves in the laminate side of your fixture
3. Attach a workpiece blank to the opposite side of the fixture

4. Trace the grooves you cut in step two over the Table Pin, transferring your design to the workpiece

Now, let's review the specific procedures for making the various types of fixtures and using them to duplicate your projects.

HOW TO MAKE SCREW-DOWN AND CLAMP-IN FIXTURES

The fixture-making process is really quite simple. Here's the step-by-step process:

1. Make a Template – Start by tracing a full-size pattern for your project onto a piece of 1/2" thick solid (without voids) plywood or MDF.

Why 1/2" thick? Because the screw-in Pins that you'll be routing against (and over) are 3/8" high and the template must be thicker than the height of the pin to allow for free movement.

Cut out your shape carefully with a Bandsaw and/or Scroll Saw. Keep outside of your cutting lines at all times. Always leave a small amount of material that you can sand down to its exact shape when you've finished with a drum sander or your choice of sanding device.

Alternative Method

As an alternative to making a template from scratch, you can also use an existing item as your fixture-making template. In our Figure 13 example, we've screwed an existing awards plaque to our fixture blank.

With the item attached to the particle-board side of your fixture blank, trace it against the table pin to form the grooves in the laminate side of your fixture (See Fig. 14).

WHY MAKE A GROOVED FIXTURE?

The question is often asked...

”Why should I cut grooves in a fixture instead of just screwing a template to one side of the fixture, the workpiece to the other, and guiding my template against the Table Pin, as I would when making the fixture?”

The answer is simple. When guiding your fixture against a Table Pin, you must constantly maintain a steady pressure against the Pin at all times. A momentary lapse in concentration can easily result in a cut going outside your desired shape. As a result, against-the-pin routing is always a slower, more risky process than dropping the fixture over the Table Pin.

When routing over a Table Pin, the Pin is *captive* in its groove and cannot go outside your desired shape unless the fixture is raised off the table surface, *releasing* the Pin from its groove. Over-the-Pin routing allows you to move more rapidly through the cut, with little fear of slip-ups that could ruin your workpieces.

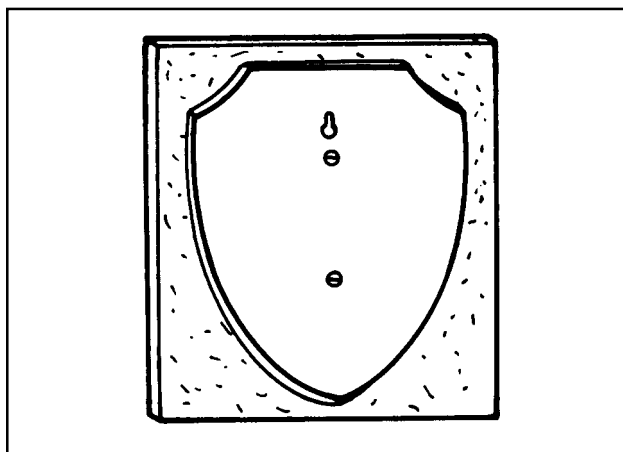


Figure 13. Using an existing item (in this case a plaque) as a template for making your fixture

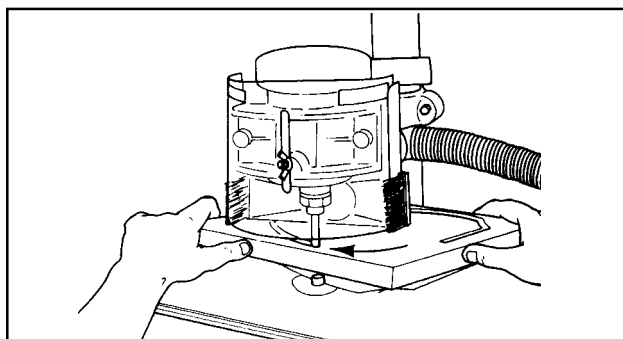


Figure 14. Guide the edge of your existing item against the pin to cut a matching groove in the laminate side of your fixture.

2. Cut out your fixture blank – As mentioned, fixtures should be made of a laminate-covered material, such as 3/4" thick sink cut-outs. Be sure to make your fixture blank about 4" longer and 4" wider than your finished project, so you have room to grip your fixture and still keep your hands well out of harm's way.
3. Mount your template to the fixture blank – Mount it to the non-laminate-covered side of your fixture blank. Center the template in the fixture and use screws or nails to hold the template firmly in position. Be sure to put screws or nails through each segment of the template and don't forget to counter-sink all screw or nail heads to keep them from marring your Router Table surface.

If there are to be multiple grooves in your fixture (such as those in Figure 10), be sure to leave adequate space between the template segments for your Guide Pin to ride in while you make your fixture.

For most applications, we recommend using a 3/8" diameter Guide Pin.

IMPORTANT: The distances between your template segments must remain exact, all the way around its perimeter. Any variations here and your fixture will not function properly.

4. Set up your Overarm Router for fixture-making – For most projects, we recommend using a 3/8" Guide Pin and a matching 3/8" carbide-tipped straight router bit. Align the Pin and bit exactly with one another as shown in Figure 8. Adjust the Overarm Router's Depth Stop Rod to make a cut 7/16" deep (remember...the Guide Pins are 3/8" high). Lower your see-through Guard to about 1/2" above the fixture surface. Attach your dust collection hose to the port.
5. Cut the outside groove first – With the router motor turned off, position your fixture blank on the Overarm Router's Table...laminated side up and template side down. Move the outside edge of your template forward until it rests solidly against the Guide Pin.

Turn on your router (and dust collector) and slowly lower the rotating bit into the top of your fixture. Lock the Depth Control Handle into position and make an initial cut about 1/8" deep. Rotate your workpiece slowly and cautiously in a counter-clockwise direction (Against the rotation of the bit) – being careful to maintain a steady, even pressure against the Table Pin at all times – until you've completed the first 1/8" deep pass.

Repeat the process above two more times, until you've created a guide groove in the laminate side of your fixture that's 7/16" deep.

6. Cut all remaining guide grooves – Follow the same procedures outlined in step #5 above. Remove the template pieces from the particleboard side of the fixture.
7. **SCREW-DOWN FIXTURES** – Drill your mounting screw pilot holes through the laminate side of your fixture, being sure to countersink your screw heads well below the surface.

CLAMP-IN FIXTURES – Attach sides around the perimeter of your fixture (protruding above the surface of the fixture, but not quite as high as your workpieces will be thick). For durability, use oak, maple or similar hard woods for the sides and clamping bar. Before attaching the side you select to contain your clamp-down thumbscrews, insert ordinary drive-in, threaded T-Nuts from the **INSIDE** of your frame piece. Cut a straight, wooden clamping bar to fit inside the perimeter. Once assembled, tightening the thumbscrews will press the clamping bar against the blank workpiece, holding it in position while you cut out your shape. See Figure 15.

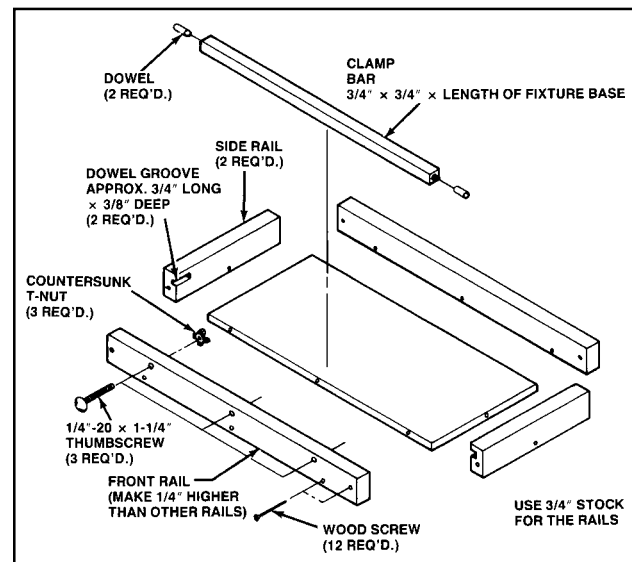


Figure 15. Construction of a typical clamp-in fixture

8. Save your fixture-making templates – Set your templates aside in the event you need to make more fixtures or replace one that has been damaged.

HOW TO MAKE PROFILE FIXTURES

Profile fixtures are used for shaping the outside edges of workpieces only. In our picket fence example (See Fig. 12), the protruding screw or nail tips and sides hold the workpiece in position during operations.

Here's the simple, three-step process:

1. Cut the profile shape – In our example, we selected a piece of 3/4" thick, laminate-covered sink cut-out for our fixture base that was the same, exact width as our fence pickets. Make it a minimum of 18" long, if possible to provide adequate support for the workpiece. We used a bandsaw to cut out the profiled shape on one end of our fixture...then sanded the edges smooth with a drum sander.
2. Attach fixture sides, if practical – Since our fence pickets will have straight sides, we were then able to attach 8" long side pieces to the fixture, being sure to keep them away from the shaped area so they won't interfere with the router bit while we're making our cuts. Make the sides out of an appropriate hardwood such as oak, maple, hickory or ash.
3. Install holding points – Use 8-penny nails or 1" long drywall screws with sharp points...driven up through the bottom of the fixture, so they protrude no more than about 1/4" above the surface. We prefer screws because they won't drive back out when you tap the workpiece down onto the fixture.

If you're able to include sides on your fixture to help hold your workpiece, you should only need two or three holding points. If your workpiece is odd-shaped and sides are not an option, you may need more holding points. Be sure screw or nail heads are countersunk below the surface of the fixture bottom.

NOTE

If you're planning to make a large quantity of any project, it's often a good idea to make several identical fixtures. This is especially true if you'll be using different shaped router bits to cut out your shape, form decorative edges and cut sliding dovetails, grooves, dados or rabbets using different bits.

This way, you can have several components mounted in their fixtures and make a number of cuts with the same profile bit, instead of frequently changing from bit-to-bit.

HOW TO USE PIN ROUTING FIXTURES

Routing over a pin with a screw-down fixture

As we've explained, with a screw-down fixture (See Fig 16), your workpiece is secured to the non-grooved (particleboard) side of the fixture with screws. The fixture is then flipped over and the grooves (in the shape of your intended finished piece) in the laminate side of the fixture are traced over the Guide Pin.

This process transfers your design exactly to the workpiece you've mounted to the opposite (or particleboard) side of the fixture.

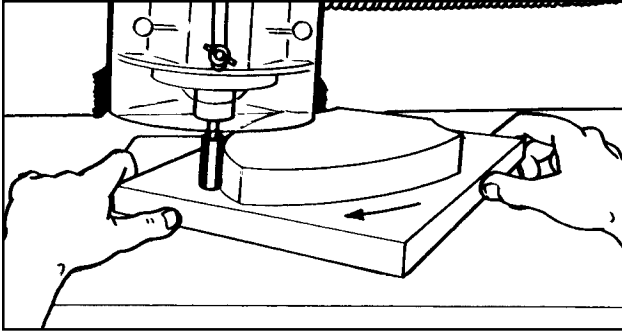


Figure 16. Routing with a screw-down fixture.

Screw-down fixtures are the easiest type of fixture to use and generally take less time to make than clamp-in fixtures. As shown in our example, they can be used to duplicate such things as award or tole painting plaques, round or oval picture frames and similar items.

If you're making a large quantity of duplicate products, assembly and disassembly time can be reduced by using needlepoint utility screws to eliminate starter holes, and a power screwdriver or variable speed reversible hand drill with a screwdriver bit to drive them into position.

This approach may not work and pilot holes could be required if the screws are near the edges of your workpieces. And remember... making several identical fixtures also will speed up large quantity production time.

NOTE

In our plaque example, by adding an additional groove to the fixture (see broken lines in Figure 17) and making the overall size of the fixture larger, you can actually form three projects from a single piece of stock .

(1) A square picture frame with a plaque-shaped opening.

- (2) A plaque-shaped picture frame with a plaque-shaped opening.
- (3) A smaller plaque for tole painting or decoupage.

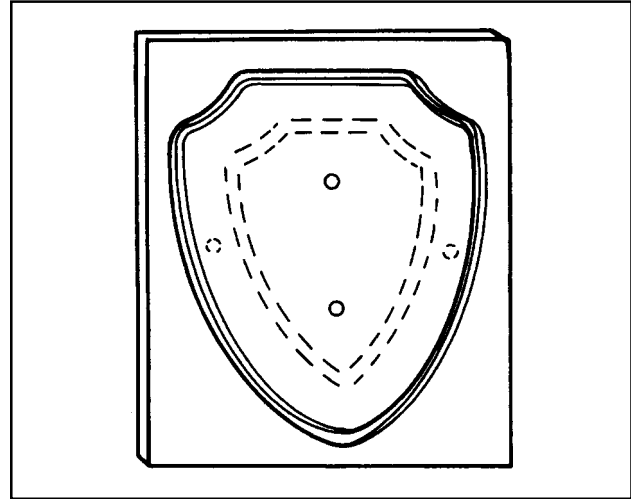


Figure 17. Getting multiple projects from a single workpiece.

Step 1: Screw the appropriate sized guide pin into the center hole of the Router Table Insert and align it with the same sized router bit, as explained previously.

Step 2: Drop the fixture groove over the Table Pin, turn on your router motor, and set your final depth-of-cut so the bit just barely breaks through the surface of the particleboard side of your fixture. Turn off your router motor.

Step 3: Attach your workpiece to the fixture

Step 4: Drop the fixture groove over the Table Pin, turn on your router motor, plunge your rotating bit into the workpiece about 1/4" and start moving your fixture (with workpiece attached) in a counter-clockwise motion until you've completed your initial cut in the first groove.

Step 5: Repeat the process for each groove in your fixture.

Step 6: Remove your completed project from the fixture, attach a new workpiece blank and repeat steps 4, 5 and 6.

NOTE

- Apply a coating of furniture PASTE wax to the Guide Pin, the bottom of your fixture and the insides of the grooves to ease the movement of the fixture through your cuts. Be sure to buff out the wax and not leave blobs in the grooves that could mix with sawdust and inhibit proper fixture movement.
- When guiding the fixture over the pin, always move in a counter-clockwise direction, against the rotation of the bit and maintain a steady force against the same groove wall (push in against the inner wall — or pull out against the outer wall) throughout your cut. Don't let the fixture shift from wall-to-wall against the Guide Pin.

Routing over a pin with a clamp-in fixture

With a clamp-in fixture (See Fig 18), your workpiece is secured to the non-grooved (particleboard) side of the fixture by a movable clamp bar. The fixture is then flipped over and the grooves (in the shape of your intended finished piece) in the laminate side of the fixture are traced over the Guide Pin.

As with a screw-in fixture, this process transfers your design exactly to the workpiece you've mounted to the opposite (or particleboard) side of the fixture.

Clamp-in fixtures take longer to make than screw-down fixtures and function much like screw-down fixtures, except that the workpiece is clamped into rather than screwed to, the fixture. As a result, they offer the advantages of greatly reduced

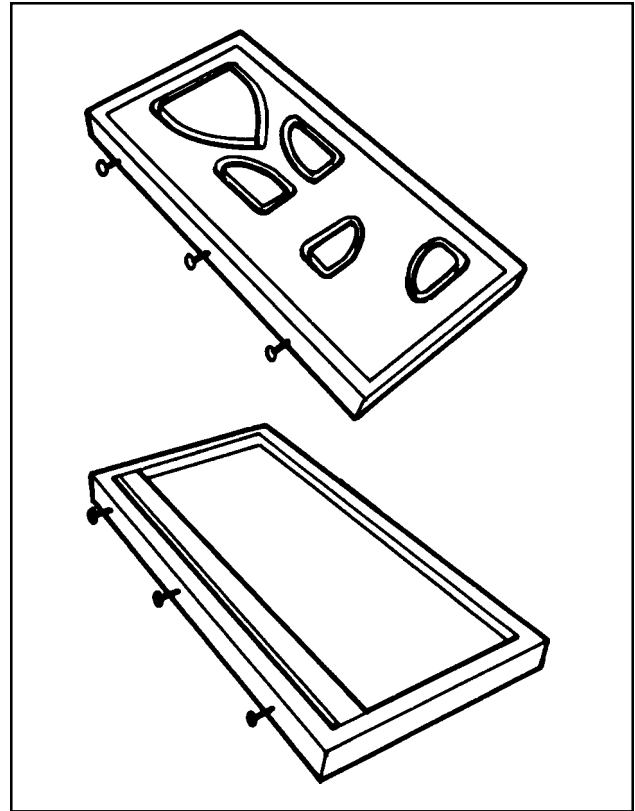


Figure 18. A typical clamp-in fixture.

workpiece insertion and removal times and not damaging any surface of the workpiece.

Clamp-in fixtures are best for projects where only internal cuts are made and two opposing sides of the workpiece can be left uncut and used to clamp against. (The clamp and fixture could be designed to follow a profile of a workpiece.)

Step 1: Screw the appropriate sized guide pin into the center hole of the Router Table Insert and align it with the same sized router bit, as explained previously.

Step 2: Drop the fixture groove over the Table Pin, turn on your router motor, and set your final depth-of-cut so the bit just barely breaks through the surface of the particleboard side of your fixture. Turn off your router motor.

Step 3: Clamp your workpiece firmly to the fixture.

Step 4: Drop the fixture groove over the Table Pin, turn on your router motor, plunge your rotating bit into the workpiece about 1/4" and start moving your fixture (with workpiece attached) in a counter-clockwise motion until you've completed your initial cut in the first groove (See Fig. 19).

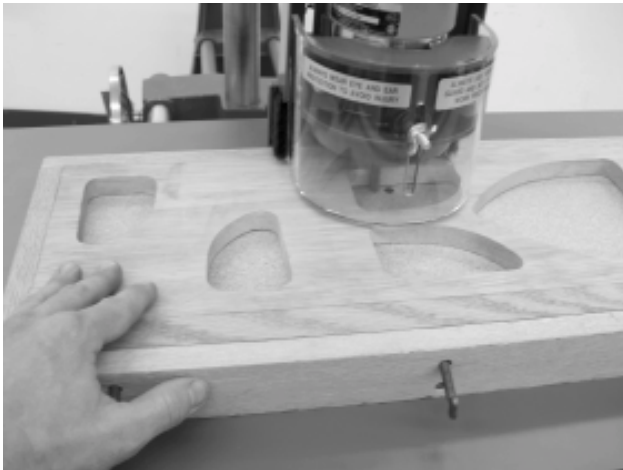


Figure 19. Routing with a clamp-in fixture.

Step 5: Repeat the process for each groove in your fixture.

Step 6: Remove your completed project from the fixture, clamp a new workpiece blank into position and repeat steps 4, 5 and 6.

Routing against a pin using a profile fixture

Our example profile fixture shown in Figure 20 is used to cut the shaped tops of fence pickets. Similar fixtures could be used for the tops of wall sconces, shaped fence or porch rail balusters and similar projects. You can even make double-ended fixtures, with a different design on each end.

Blank workpieces can be inserted and removed from profile fixtures very rapidly and they're usually much easier to make than screw-in or clamp-in fixtures because they require no template (they are the template) and have no grooves.

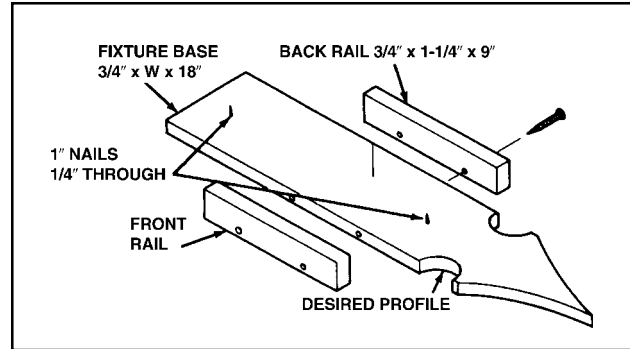


Figure 20. Construction of a typical profile fixture.

However, this lack of guiding grooves means that you must be certain to maintain a constant, steady pressure against the edge of the fixture throughout the routing process. A momentary loss of concentration could ruin your project and result in personal injury.

Here's the 4-step process for using a profile fixture:

Step 1: Screw the appropriate sized guide pin into the center hole of the Router Table Insert and align it with the same sized router bit, as explained previously.

Step 2: Position the workpiece on top of the fixture with its tip either flush with or protruding 1/8" beyond the end of the fixture so the router Guide Pin will engage the fixture before the router bit begins cutting the workpiece. Tap the workpiece firmly with a mallet or the heel of your hand to "seat" it properly in the fixture.

Step 3: Cut one side of your profile. Once again, it's important that you be careful to maintain a constant, steady pressure against the Guide Pin throughout the cut.

Step 4: Rotate the fixture and cut the opposite side of your profile. Remove the workpiece and repeat the process with all subsequent workpieces.

Cutting decorative internal and external edges using a fixture

Figure 21 shows a finished plaque, still attached to its fixture. Only the top surface of the edge was cut.

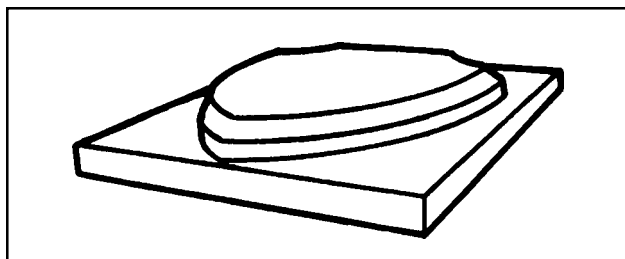


Figure 21. A plaque with external decorative edging completed. We used a 1/2", non-piloted core box bit to form our example edge.

Step 1. Set your router bit to produce the desired depth-of-cut. To do this, use your fixture to cut out a practice sample of your finished product. Be sure it's the same thickness as the finished piece you plan to make. Use this practice sample to make a few cuts until you achieve your desired profile.

NOTE

When using a fixture to guide your workpiece through decorative edging cuts, you can alter the profiles produced by changing to a Guide Pin that's smaller than your groove and/or changing the side of the fixture groove you guide against.

During operation, it's important that you always guide your fixture against the same side of the groove throughout your cut. If you're using the outside edge of the groove, you must pull against the Guide Pin as you make your cut. If you're using the inside edge of the groove, you must push against the Guide Pin as you make your cut. Remember...changing groove sides in mid-cut will alter the profile of the cut and ruin your edge.

Step 2. Cut the edge. The routing method used is similar to routing against a pin. Remember to always move the fixture against the rotation of the bit, and keep the same wall of the groove against the Guide Pin at all times. Usually, only two passes are required to achieve the final depth-of-cut. It's OK to make about 75 percent of the cut on the first pass, and the balance on the second.

Cutting decorative surface features using a fixture

An unlimited variety of attractive surface decorations can be created by guiding an existing (or additional) groove in your fixture over a Guide Pin, such as our Figure 22 example of cutting a V-groove in the surface of an oval picture frame.

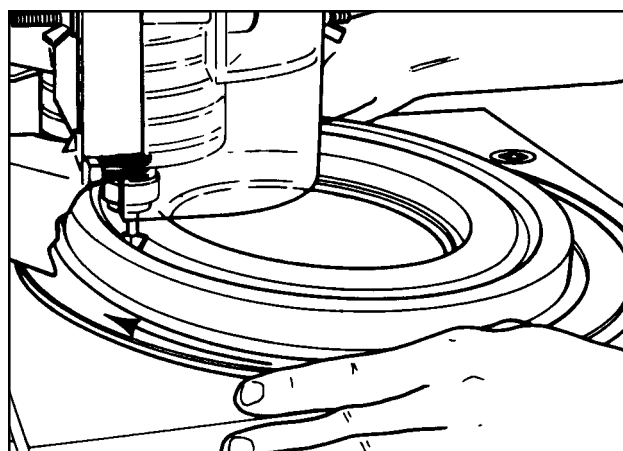


Figure 22. Using a V-groove bit to cut a decorative surface feature in an oval picture frame.

Since the entire bit is in contact with the workpiece while making surfacing cuts, you must always use a Guide Pin that's the same size as the groove in your fixture for safety reasons. As a result, the profile of your cut is controlled entirely by altering the depth-of-cut of the bit. Decorative surfacing cuts cannot be made with a piloted router bit unless a straight bit is used first to form a groove that the pilot can ride in.

CONVENTIONAL ROUTING OPERATIONS WITH THE OVERARM ROUTER

The Shopsmith Overarm Pin Router is also well suited for more ordinary routing operations...functioning in a very similar fashion to more conventional under-table router set-ups. There are a few differences:

- With the Overarm Router, your rotating bit is almost always in plain view, providing an added measure of accuracy.
- Changing your depth-of cut (and seeing your change as you make it) is a much simpler matter with an Overarm Router. For maximum efficiency, under-table routing requires a special router lifting device. Such devices often expensive, adding a couple of hundred dollars to the cost of a router table.
- The improved visibility of your work-in-process also makes forming stopped cuts (such as travel slots, grooves, dadoes and mortises) much easier and safer with an Overarm Router.

ROUTING AGAINST A TABLE PIN

Against-the-Guide-Pin routing is usually performed with a non-piloted router bit – on a workpiece with irregular or rounded edges that cannot be guided by the Fences. That's because the job of the pilots (solid or bearing-types) on piloted Bits are to control your lateral depth-of-cut...and the profile they're making.

Since non-piloted Bits have no pilots to control their lateral depths-of-cut, you must rely on Guide Pins to control this for you. Some typical against-the-Pin operations include creating special rabbet cuts (usually with straight bits or slot cutters) and making deco-

rative cuts with non-piloted profile Bits. Here's the step-by-step process.

1. Set up your Overarm Router, following the "General guidelines for overarm routing" on page 18 in the front section of this Manual.
2. Once you get started, always set your depth-of-cut to make your first pass very shallow. Doing so will give you far better control over the accuracy of your cut, since the rotating bit is much less likely to grab or pull your workpiece off your planned profile when your cuts are shallow.

NOTE

In some cases, your lateral depth-of-cut must also be adjusted to produce the profile you desire. With straight-edged workpieces, this can be accomplished by sliding your guiding Fence in or out. With irregular-shaped edges, just change the size of the Guide Pin you're using.

3. Screw the appropriate sized Guide Pin into the threaded hole in the center of the Pin Routing Table Insert and tighten it securely.
4. Position the Table Insert as shown in Figure 23 and screw the 1/4" Starter Pin into the threaded hole just to the left of the center hole in the Plate. Tighten securely. When installing the Table Insert, the Starter Pin must always be positioned in the Insert so it is to the left of the Guide Pin.
5. Prepare to make your cut. Lower the Router into the position and lock it securely. Turn on your Router motor. Resting the edge of your workpiece against the Starter Pin, ease it gradually into the rotating bit to start your cut. Continue

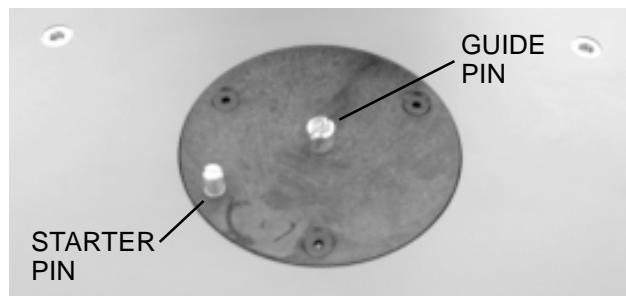


Figure 23. Use the Pin Routing Table Insert when routing against a pin.

moving your workpiece into the bit until the edge of your stock also makes contact with the Guide Pin.

Once contact is made with the Guide Pin, move the workpiece around and away from the Starter Pin, maintaining contact with the Guide Pin at all times until you've completed your cut.

Re-position the Depth Control Handle for each subsequent pass until your desired final depth-of-cut is reached. Once you've completed the final pass, loosen the Depth Control Handle, raise the Router, re-tighten the Handle and turn off the Motor. Only when the Motor has stopped completely should you remove and inspect the workpiece.

USING PILOTED BITS FOR DECORATIVE EDGING

Cutting decorative edges on workpieces with piloted bits is a common operation for a hand-held router. With this operation, the Bit pilot controls your lateral depth-of-cut, while the vertical depth-of-cut is controlled by the plunge mechanism of your hand-held router (in the case of plunge-style routers), or by changing the height relationship between the router motor and its base through some other method.

With the Overarm Router, the process is almost identical...with two differences:

- First and foremost, with the Overarm Router, your hands are used to grip the workpiece instead of the router motor. This provides improved visibility of the cut and allows you to rout the edges of workpieces that may be too small or oddly-shaped to grip properly with clamping devices.

WARNING

NEVER attempt to work with a small piece of stock less than 12" x 12" or that puts your hands closer than 3" from the guard.

- And secondly, with the Overarm Router, your stock is supported by the Worktable, while your vertical depth-of-cut is controlled with micro-precision by the up-down action of the Arm.

Piloted router Bits come in two styles: 1) Bits with solid steel pilots...or...2) Bits with a ball bearing pilot.

When making cuts with a piloted Bit, your up-down depth-of-cut — and the number of cuts you'll have to make to form the complete profile — can vary, based on two factors:

- The amount of stock that must be removed to produce the profile you want. If you're forming an edge on thick stock, you may not be able to cut a full profile all at once without workpiece burning or tear-out. In these cases, you'll have to make more than one pass...lowering the Arm with each subsequent pass until the profile you desire is achieved.

- The hardness of the stock you're cutting. If you're working with hard maple, oak, ash, cherry, hickory or other tough stock, it may be necessary to make two or three passes to produce your full profile without burning or tear-out.

Performing these operations is basically the same, whether you're cutting an external edge or an internal edge.

External edges

1. Set up your Overarm Router, following the "General guidelines for overarm routing" on page 18 in the front section of this Manual and install the Bit of your choice.
2. With your router motor turned off, move the workpiece next to the Bit and adjust your up-down depth-of-cut

NOTE

In some cases, your lateral depth-of-cut must also be adjusted to produce the profile you desire. In the case of a bearing-piloted Bit, this is accomplished by changing the size of the bearing. Most Bit manufacturers offer a variety of bearing pilots with the same I.D. (internal diameter) and differing O.D.'s (outside diameters). With a solid-piloted Bit, the lateral depth-of-cut cannot be altered.

3. Screw the 1/4" diameter Starter Pin into the threaded Starter Pin hole in the Pin Routing Table Insert and tighten it securely.
4. Move the workpiece away from the Bit area, turn on the motor and lock everything in position to make your first pass. Resting the external edge of your workpiece against the Starter Pin, ease it gradually into the rotating Bit to start

your cut. When the Bit pilot contacts the workpiece edge, gradually rotate the workpiece off the Starter Pin and continue to move the workpiece against the rotation of the bit, pushing steadily against the Bit Pilot, which now serves as your guide. (See Figure 24). If a second pass is required, repeat the procedure until the desired profile is achieved.

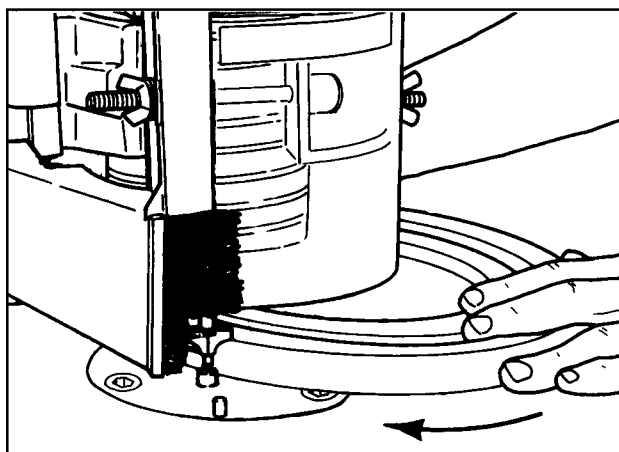


Figure 24. Cutting a decorative external edge on an oval picture frame using a solid pilot router bit.

Internal edges

To decorate the internal edges of projects, follow steps one through three, as outlined above...then move to step four below.

4. Move the workpiece away from the Bit area, turn on the motor and lock everything in position to make your first pass. Resting the internal edge of your workpiece against the Starter Pin, pull it against the Pin. Maintain a steady pulling force against the starter pin until the Bit pilot contacts the workpiece edge, then move it gradually off the Starter Pin and against the rotation of the Bit, as its pilot takes over as your guide. If additional passes are required, repeat this procedure until the desired profile is achieved.

USING NON-PILOTED BITS FOR DECORATIVE EDGING

This method is basically the same as for decorative external or internal edging with a piloted Bit. However, since these Bits have no pilot to control your lateral depth-of-cut, you'll have to rely on a Guide Pin (of a smaller diameter than your router Bit) to control this for you.

One half the difference between the Guide Pin diameter and the outside diameter of your router Bit will be your lateral depth-of-cut.

If using a smaller Guide Pin fails to produce the desired results on a piece of scrap stock, set the machine up so the Guide Pin and the Bit are offset about the same distance as the lateral depth-of-cut you want.

Re-position the edge of the workpiece against the Guide Pin, turn on your router motor and gradually move the workpiece from the Guide Pin into the Bit, taking a very light pass as first.

NOTE

Since the bit and Guide Pin are not in perfect alignment during this operation, it's important that you always keep the workpiece in the same plane throughout the cut. If you begin by feeding the stock into the Bit from a position in front of the Guide Pin and end by feeding the stock into the bit from a position to the left or right of the Guide Pin, you will change your lateral depth-of-cut and not achieve a smooth, consistent profile. It's a good idea to make some practice cuts before attempting this operation on an actual project piece.

When forming decorative edges on straight workpieces with a non-piloted Bit, use your Overarm Router Fence to control your lateral depth-of-cut. If you're working with

round workpieces, build a special V-shaped Fence like the one shown in Figure 25 below.

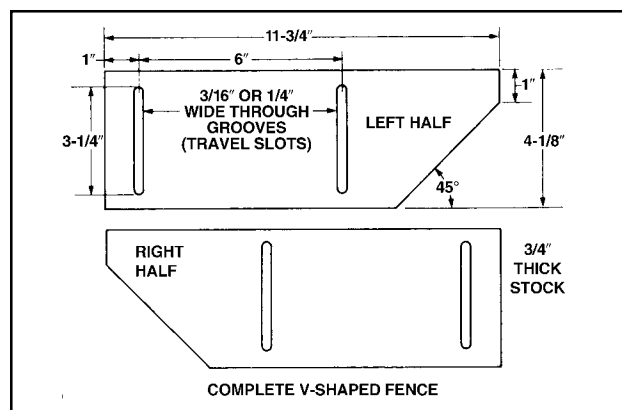


Figure 25. A shop-made, wooden V-shaped Fence like the one shown here is used for edging round workpieces with non-piloted router Bits.

MAKING RABBET CUTS

Rabbets are edge or step cuts for such things as the inside back edges of picture frames (See Fig. 26).

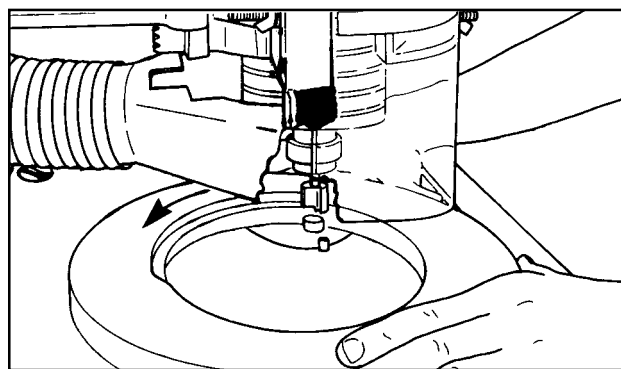


Figure 26. Cutting a rabbet in the back side of a round picture frame.

This method is basically the same as cutting decorative internal edges using a pilot bit...except... a large diameter straight Bit and a Guide Pin are used.

The following equation will help you determine the size Bit and Guide Pin to use for producing a rabbet of a specific size.

$$\frac{\text{Bit dia. minus Guide Pin dia.} = \text{rabbet width}}{2}$$

For example: A 3/4" diameter straight bit minus a 1/4" diameter Guide Pin equals 1/2". 1/2" divided by 2 equals a 1/4 wide rabbet.

STRAIGHT-LINE ROUTING

To perform straight-line routing, you will need to use the two-piece aluminum Overarm Router Fence that came with your machine.

This fence can be used for decorative edging of projects as well as for jointing the edges of workpieces for assembly, making grooves, dados, rabbets, stop cuts and other joints in straight workpieces.

The position of the fence is determined by its intended use. If your operation calls for removing the entire edge of a workpiece, it is important that the outfeed side of the Fence be moved forward to provide adequate support for the stock after its edge has been removed (See Fig. 27).

If you're not going to be removing the entire edge of the workpiece, attach a one-piece shop-made face to the two-piece face; or adjust both sides of your two-piece Fence so that they are exactly in-line, with no offset.

NOTE

Your Overarm Router Table contains eight #10-24 threaded holes in its surface to accommodate the included Router Fence. It also includes four #10-24 x 1" plastic Knobs, four plastic Spacer/Bushings and four #10 Washers for attaching the Fence to the Table.

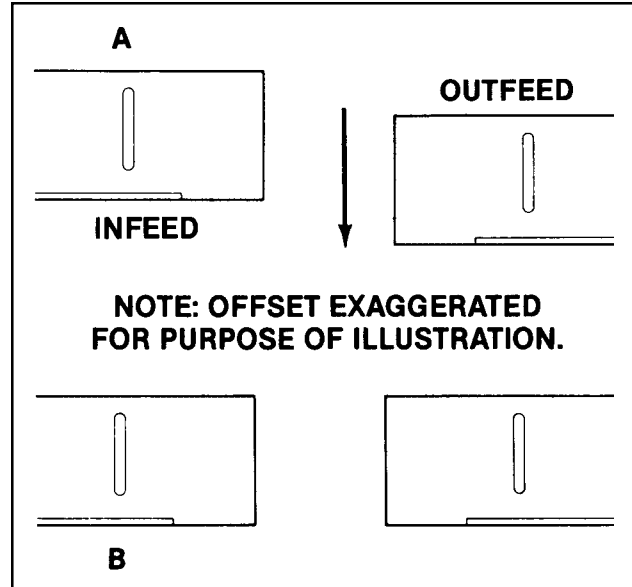


Figure 27. When removing the entire edge of a workpiece, the two halves of the Fence must be offset (A). When removing only a portion of the edge, the two halves of the Fence must be perfectly aligned with one another (B).

CAUTION

If you're using a Bit with a pilot, the pilot must be behind the plane of the Fence's contact surface in order to prevent interference with the leading edge of the workpiece.

Follow all "General guidelines for overarm routing" on page 18 in the front section of this Manual for installing and aligning your router Bit and Guard.

Turn on your router the motor and feed the workpiece from left to right, maintaining pressure against the Fence and Bit throughout the cut.

WARNING

Depending on the size of your workpiece, you may have to use a push stick (see Fig. 28), push block (see Fig. 29) or Feather Board(s) (see Fig. 30) in order to keep your hands at a safe distance when feeding the workpiece against the Fence and Bit.

NOTE

For some operations, you may need to use a featherboard to hold your workpiece down to provide additional accuracy and safety. To do this, you will need to build a vertical Fence extension with a 3/4" wide groove to accommodate the Shopsmith Featherboard (see Figure 30).



Figure 28. Straight-line routing using a push stick.

CUTTING GROOVES AND DADOES

Grooves are cuts made with the wood grain, while dado cuts are made across the grain. Both of these straight line cuts must be performed using a Fence.

Grooves

1. Set up your Overarm Router, following the “General guidelines for overarm



Figure 29. Cross-grain routing using a push block.

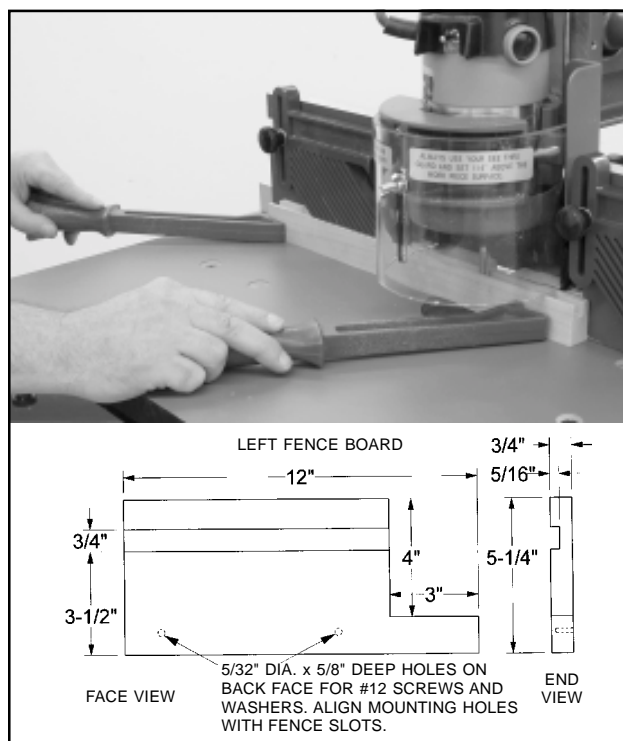


Figure 30. Straight-line routing using feather boards mounted to wooden fence boards and push sticks.

routing” on page 18 in the front section of this Manual and install the Bit of your choice.

2. Install the two-piece Overarm Router Fence, as described in the straight-line routing section above. For this operation, both halves of the Fence should be installed in perfect alignment with one another.

3. Select and install the appropriate straight router Bit and set your depth-of-cut. It's best to make a trial cut in a piece of same-sized scrap stock first, to "prove" the location and depth of your cut, before cutting your actual workpiece. Adjustments to the position of your groove can be made by moving your MARK V Worktable in and out.

Similar adjustments can be made for creating odd-width grooves (or dados) by starting with a Bit that's narrower than your intended groove or dado, then moving the MARK V Worktable in or out to widen your cut.

4. Turn on your router motor and feed the workpiece from left to right (against the rotation of the Bit), maintaining a steady pressure against the fence during the cut (See Fig. 31).



Figure 31. Cutting a groove with the grain by guiding it against the Overarm Router Fence.

Dadoes

The dado-cutting process is identical to the process for cutting grooves, except that you will need to make a wood back-up block to hold the workpiece perpendicular to the Fence and guide it through the cut. If your cut is to be 90° to the edge of your



Figure 32. Cutting a dado across the grain with a wooden pusher. Guide stock against the Fence.

workpiece, be sure your wooden push block has a 90° corner.

Place one of the block's 90° edges against the Fence and the other against your workpiece...then use the block to push the stock through the cut, as shown in Fig. 32.

NOTE

If you're planning to cut a dado that is to be at an angle other than 90°, you'll need to make a push block with one corner cut at the same angle as your intended dado. Then, position one edge of that corner against the Fence and the other against your stock as you guide it through the cut.

WARNING

Always use push sticks, push blocks, and similar safety devices to keep your hands out of harm's way when making your cuts.

Making stopped cuts using the Fence

A stopped cut is any cut made in a workpiece that does not go completely from end-to-end or from side-to-side. Some examples of stopped cuts include mortises, travel slots and similar cuts. If your project calls for square-ended cuts, the rounded ends left by routing will need to be squared with a chisel once you've finished.

Start by following steps one through three outlined above for cutting grooves and dados.

4. Limiting the length of your cut. Mark your workpiece where the stop cut is to start and end. Clamp a stop block or a wooden handscrew clamp onto the Fence to limit the length of your cut. If you're using a stop block, position the block above the worktable so that the sawdust will not be trapped at the side of the stop block (See Fig. 33). If the cut is to be in the center of the workpiece and the workpiece is short enough, use a stop block to limit the travel at both ends.

If the piece is longer than the Fence, screw a suitable extension board to the Fence...then clamp the second stop block to that extension board. Another option for long workpieces is to clamp your stop block directly to your workpiece so that it will limit your cut by engaging the edge of the Router Table.

5. With the router motor turned off, position the workpiece so the bit will be at your starting mark.

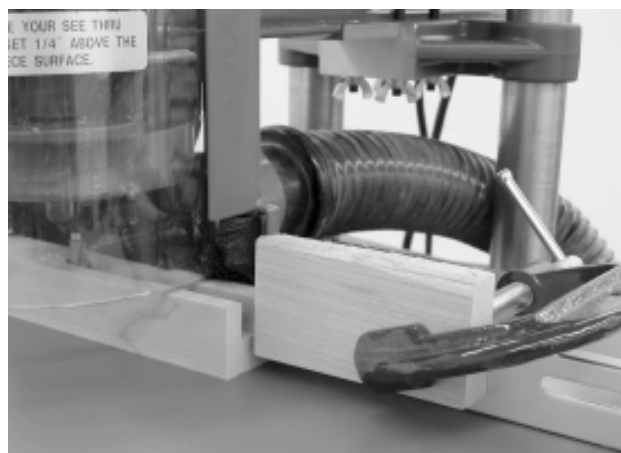


Figure 33. Making a stopped cut for a mortise.

6. Turn on the router motor, lower it into your stock, lock it firmly in position, then move the workpiece against the rotation of the bit and through the cut until it contacts the stop block. If your cut is to be deep, multiple passes will be required.

Repairing furniture and veneers

Another handy use for your Shopsmith Overarm Router is the repair of damaged furniture and veneers. This is accomplished by routing out the damaged area, making a plug to match and then gluing it into the routed area.

1. Install the two-piece Overarm Router Fence, as you would for any straight-line routing operation, positioning the faces of both Fences in perfect alignment with one another.
2. Select a straight router Bit that's larger in diameter than your damaged area is wide. If the damaged area is wider than any of your Bits, plan on making multiple passes.

3. Rout out a slot. To repair damage such as that shown in Figure 34, rout out a rounded-end slot that's longer and wider than the damaged area (See Fig. 35). Set your depth-of-cut to be only as deep as the damaged wood. If you're repairing a surface defect on a veneer, cut only to the depth of the veneer.

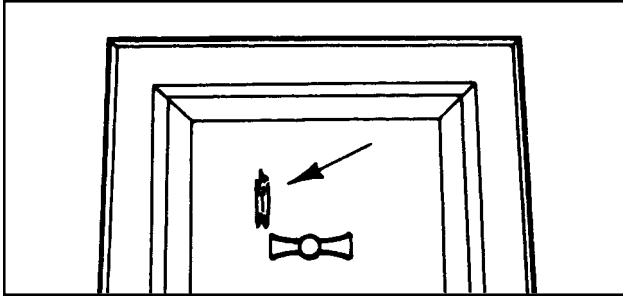


Figure 34. A damaged area on a cabinet door.

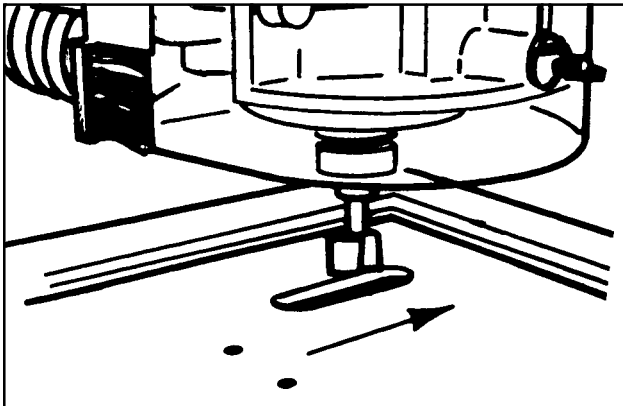


Figure 35. Rout a slot to remove the damaged area.

4. Make the plug. Tape a piece of tracing paper over the slot and pencil an outline about 1/16" larger all around than the slot to allow for sanding your plug to size. Transfer the outline to a piece of the same species of wood. Try to match the wood grain as closely as possible.

Cut out your plug with your Scroll Saw or Bandsaw. If your slot has to go all the way through your wood (as in the

case of our thin panel cabinet door), you can turn the damaged piece over and use a pencil to trace around the outline directly onto your workpiece... rather than using the tracing paper approach. As with the tracing approach, you should cut your plug about 1/16" larger than your routed slot.

- 5: Sand the plug to size. Use a Disc Sander to sand around the edges of the plug with your MARK V Worktable tilted to about a 2° angle so it will be tapered slightly and smaller at the bottom than it is at the top. Start by sanding it to within about 1/64" of your pencil line. Be careful! If you sand it too far, you'll have to make the plug over again (See Fig. 36).

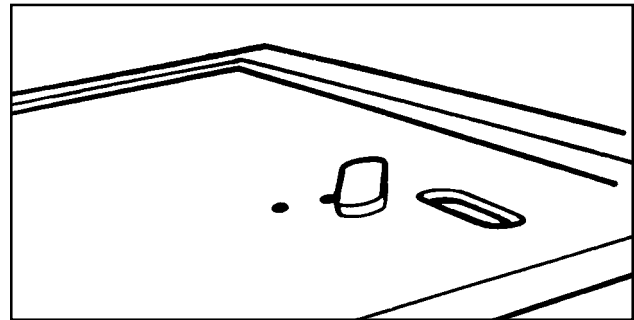


Figure 36. Cut and sand a plug to fit.

Stop frequently and test the plug for size to see if it fits. Continue sanding the edges of the plug until it drops into the opening and its top surface rests flush with the surface of the item you're repairing.

6. Install and finish the plug. Glue the plug into position. If necessary, use glue or plastic wood to fill in any voids on the backside of your restored item left by the plug's taper. Use a test stick method to stain or finish the plug until it matches the original item perfectly.

STRUCTURAL JOINTS

The versatile Shopsmith Overarm Pin Router makes easy work of forming all the joints you need for structural framework- with greater accuracy and finer precision than most other tools. Here are some examples of the joints that can be formed with the Overarm Router (See Fig. 37).

CARING FOR YOUR SHOPSMITH OVERARM PIN ROUTER

As is the case with all Shopsmith tools, your Overarm Router is designed to deliver years of reliable service with a minimum of maintenance. However, like any other power tool, it performs better and safer if you maintain it properly.

WARNING

Always turn off and unplug your router motor before you begin any maintenance procedure.

Before you begin any maintenance procedure, be sure that the motor is unplugged. Then remove the router Bit and any other accessories, Fences or fixtures that are mounted on the Overarm Router.

CLEANING

As you work, sawdust will accumulate on the Overarm Router and this residue can affect its performance. We suggest that you clean the Overarm Router and motor frequently with your shop vacuum. Use brushes on all surfaces and crevice tool attachments to get into the tightest spots.

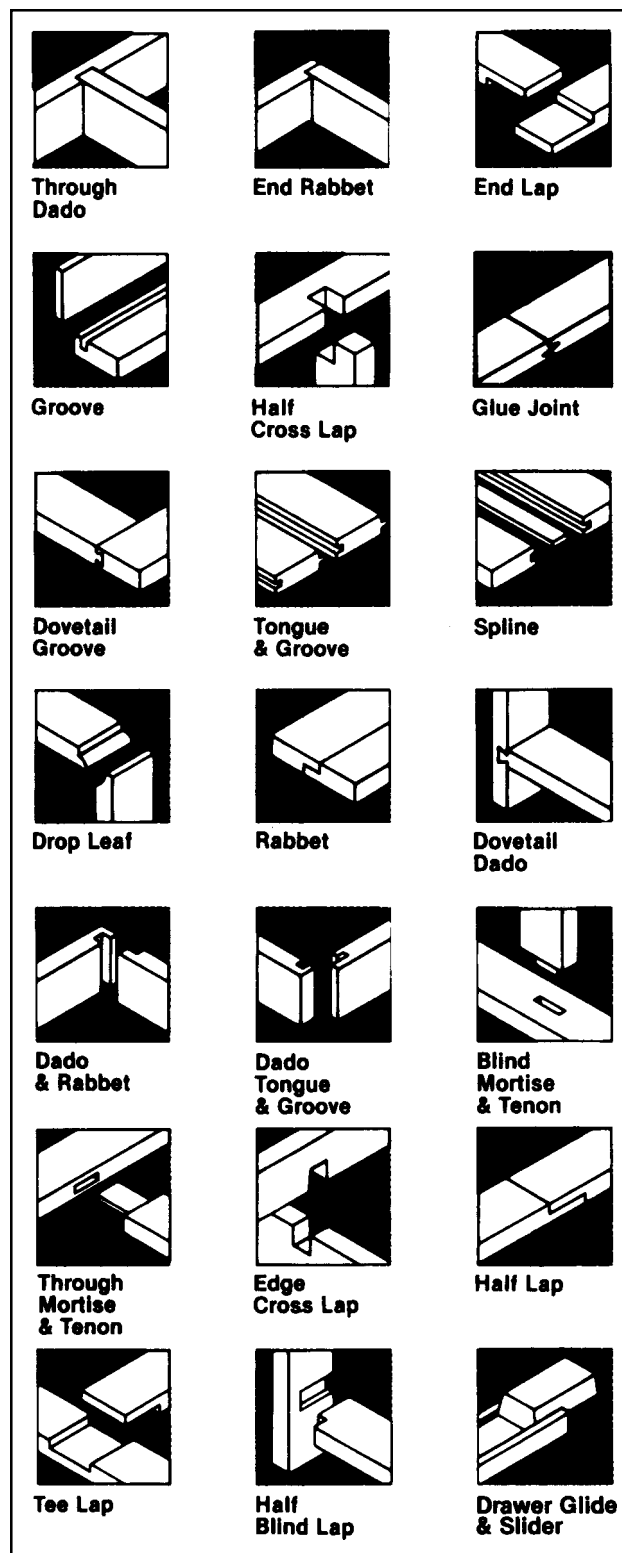


Figure 37. Structural joints that can be formed with the Shopsmith Overarm Pin Router.

After vacuuming, clean all major metal parts of the Overarm Router (except the router motor) with mineral spirits to remove all dirt, grease, and any built-up wood pitch.

Use a clean, slightly damp cloth to wipe all residue from the Guard and Worktable. Clean your router motor as instructed in the router owners manual.

WAXING

After a through cleaning, wax and buff the Overarm Router' Worktable surface. Apply the wax sparingly, then buff it thoroughly. If you apply too much wax or don't buff it thoroughly, the wax will mix with the sawdust, impede the movement of parts, and leave residue on the stock.



Do not wax or use solvents on plastic parts.

RE-ALIGNING AND RE-ADJUSTING

Proper alignment and adjustment of all major parts of your Overarm Router are essential for good woodworking results. Check that:

- The Depth Control Handle works properly
- The Dovetail Slide moves freely without binding

- The router motor holds its position when the Depth Control Handle is unscrewed
- The Worktable slides forward or backward without side play and locks securely in position
- The router Bit and Guide Pin (if being used) are in alignment.

If any part of the Overarm Router requires alignment or adjustment, follow the procedures in the Overarm Router's assembly, setup & alignment, and adjustment sections.

STORING YOUR OVERARM ROUTER

In normal use, regular cleaning, lubricating and waxing will prevent the ferrous parts of the Overarm Router from rusting. However, if the machine is to be stored for an extended period or under unusually humid or corrosive conditions, spray all ferrous parts including pins, bits and accessories with a rust-inhibiting light oil. Remove this oil with mineral spirits and re-wax the Overarm Router before using it again.

ADJUSTING THE BRASS GIB

If you find that your router motor fails to hold its position when the Depth Control Handle is released (unscrewed), adjust the Brass Gib, following the instructions in the Alignment and Adjustment section of this Manual.

MAINTENANCE

The maintenance intervals listed here are based on normal operation and assume that you will be careful not to abuse your Overarm Router. Obviously, if you work the unit unusually hard, you'll need to maintain it more often. If an unusual noise or vibration develops, turn off the motor immediately and check to see what could be causing the problem. Do not operate the routing system again until you have corrected the cause of the unusual noise or vibration.

As needed: Have your router Bits sharpened.

Every 5 hours of running time: Clean the Overarm Router thoroughly. Check alignments and adjustments. Check tightness of all critical hardware.

Every 6 months or as needed: Clean and wax the Overarm Router

To estimate running times, use this rule:

The average woodworker will use power tools only 10 percent of the total time spent in the shop, at the most. You may not use your Overarm Router as much as other power tools. If you work in your shop for 25 hours, you've probably logged less than an hour of running time on your Overarm Router.

TROUBLESHOOTING GUIDE

Problems with your Overarm Router usually have simple solutions. Under normal use, you should rarely have to service the Tool. Most problems can be corrected by simple maintenance, alignment, adjustment or a change in your work habits. This Troubleshooting Guide has been developed to help you diagnose and remedy any problems which may arise when using your Shopsmith Overarm Router.

Problem	Possible Cause	Solution
Poor quality cut	Depth-of-cut excessive Feed rate too fast Router bit dull Overarm or motor loose, causing "wobble"	Reduce depth-of-cut on each pass Feed workpiece into the bit at a slower rate Sharpen or replace bit Tighten Overarm on MARK V Way Tubes, Gibs or Router Motor Clamp
Workpiece "burning"	Dull Router Bit Motor running too fast	Sharpen or replace Bit Slow down your variable speed Router Motor or purchase an electronic motor speed control for single-speed Routers
Guide Pin and Router Bit work out of alignment	Router Table – to MARK V Table mounting screws loose Table Insert loose Arm Clamps loose Motor Clamp and Guard loose	Tighten screws – re-align Pin & Bit Tighten Table Insert - re-align Pin & Bit Tighten Arm Clamps around MARK V Way Tubes – re-align Pin & Bit Tighten Motor Clamp and Guard - re-align Pin & Bit
Depth Control Handle won't hold position when tightened	Loose nut (44) on left side of Clutch Shaft Poor seating surface on Control Handle	Tighten nut (44) Unscrew Depth Control Handle from Clutch Hub and examine seating surface at end of Handle shaft. If surface is rounded, file a new, FLAT seating surface on end of Handle shaft.
Dovetail Slide sticks or grabs	Brass Gib adjusted too tightly	Loosen Gib adjustment setscrews (26)
Depth Control casting won't release	Ball Plunger (41) screwed in too far – or defective	Unscrew Ball Plunger in quarter-turn increments until casting releases from and engages groove in Depth Control casting shaft, replace Ball Plunger if defective.
Walls of your cuts are "stepped"	Worktable and Router Bit are not perpendicular to one another	Adjust MARK V Worktable
Router motor overheats	Motor too close to Deflector (20) Overworking motor Taking too heavy a cut Feeding stock too rapidly through the cut	Loosen motor and raise to allow 1/8" clearance between bottom of router motor and Deflector Stop and allow motor to cool Reduce depth-of-cut Slow down your feed rate
Depth-of cut changes while making a cut	Bit loose in Router motor Router motor loose in Motor Clamp (1 & 9)	Tighten Bit Tighten Clamp, by tightening nuts (7)

How to Order Parts

To order replacement parts, first consult the Parts List. Then write or call for current price information.

How to Return Parts

Should you need to return the equipment, call Customer Services for packing and shipping information.

Customer Services

Where to Write — Send inquiries to:

Shopsmith, Inc.
Customer Services
3931 Image Drive
Dayton, Ohio 45414

Email — techsupport@shopsmith.com

Where to Phone — Shopsmith maintains toll-free telephone numbers during normal business hours.

For service call:

1-800-762-7555 (Continental U.S., Hawaii, Alaska, Puerto Rico and U.S. Virgin Islands)

To place an order call:

1-800-543-7586 (Continental U.S., Hawaii, Alaska, Puerto Rico and U.S. Virgin Islands)

When you write or call, tell us your Customer Number and the Date Code of your equipment. (Your customer number appears on the invoice and the mailing labels of the literature we send you. The date code is stamped on the equipment.)

Please write the numbers in the space provided here.

Customer No. _____

Date Code _____

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Shopsmith Inc.
6530 Poe Avenue
Dayton, OH 45414-2591

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