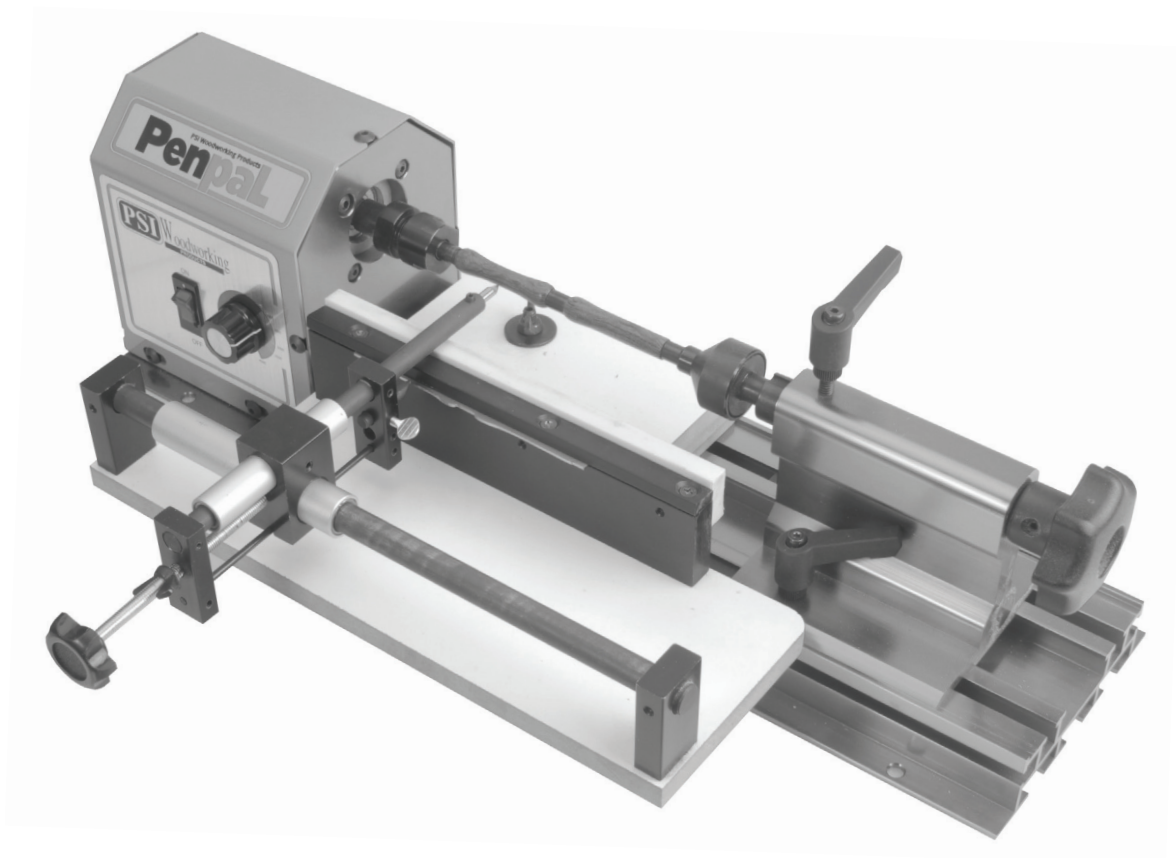


User's manual Lathe Duplicator Attachments for PENPAL Lathe



Warranty

This product is warranted against defects in material and workmanship for a period of two years from the date of the purchase. The warranty applies to the original purchaser of the product and is limited to the repair or replacement of the product or its components at the discretion of PSI Woodworking Products. Excluded are parts, which have been misused, abused, altered, or consumed by normal operation. Also, excluded are direct or consequential damages to persons, properties, or materials. Your invoice serves as proof of purchase and must be referenced to authorize warranty repairs. Please call your dealer for proper authorization prior to return.

Date Purchased: _____ Invoice No.: _____

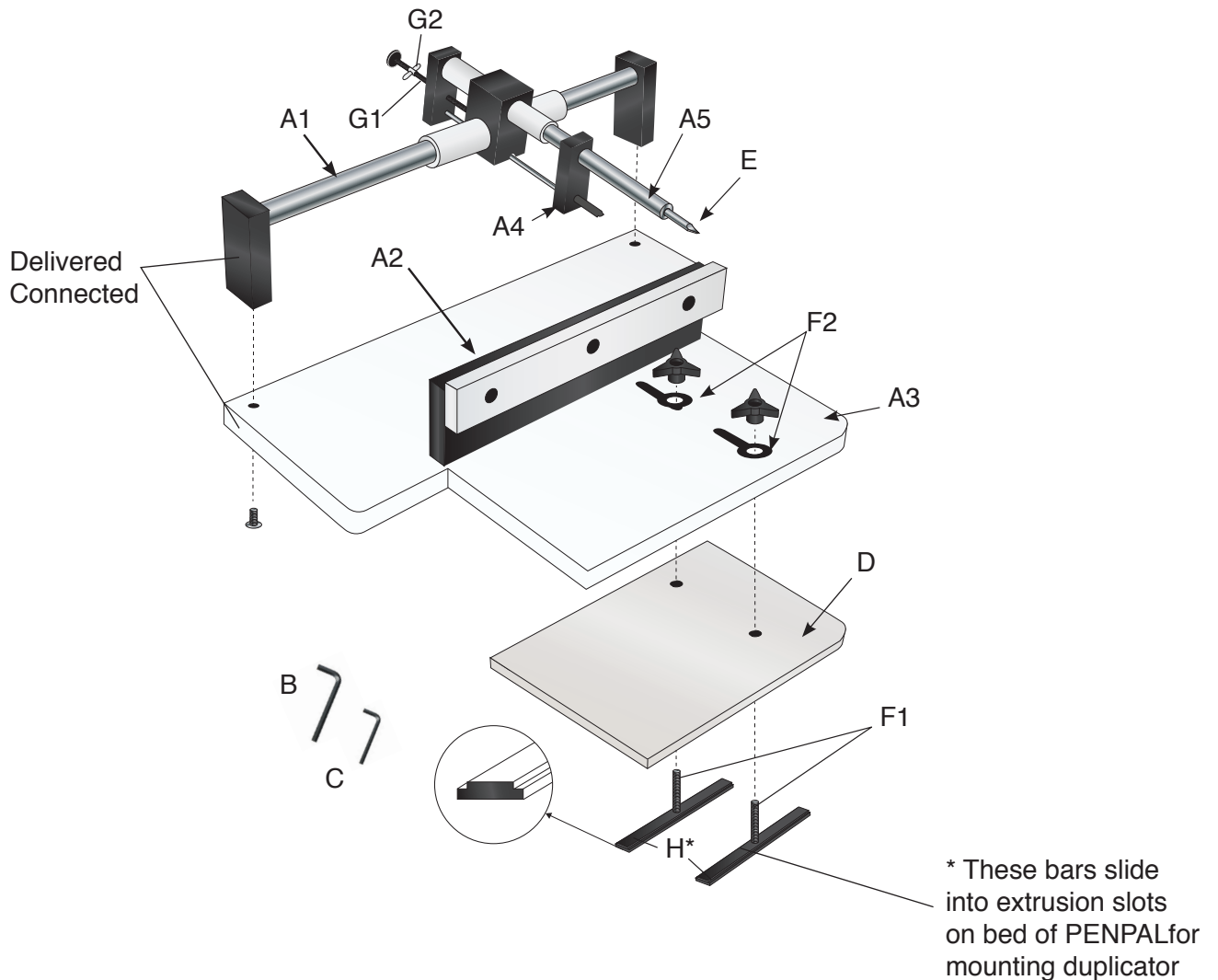
PLEASE READ AND PRACTICE SAFE TURNING TECHNIQUES**Guidelines for Safe Turning**

1. Always wear safety goggles or safety glasses and a full-face shield when needed. Use a dust mask in dusty working conditions. Wear hearing protection during extended periods of operation.
2. Tie back long hair, do not wear gloves, loose clothing, jewelry or any dangling objects that may catch in rotating parts or accessories.
3. Check the owner/operator's manual for proper speed recommendations. Use slower speeds for larger diameter or rough pieces, and increased speed for smaller diameters and pieces that are "true" or cylindrical. If the lathe is shaking or vibrating, lower the speed. If the work piece vibrates, always stop the machine to check the reason.
4. Check that all clamping devices, such as on the tailstock and cutter holder are tight.
5. Rotate your work piece by hand to make sure it clears the template holder and bed before turning the lathe "on". Be sure that the work piece turns freely and is firmly mounted. Make adjustments with the lathe turned "off".
6. Use only defect-free stock, without cracks, splits, checks or knots which could chip and fly out, causing serious injury.
7. Hold the cutter holder firmly on the tool rest.
8. Always move the cutter to the side before sanding or polishing.
9. Perform periodic maintenance on your lathe and duplicator. Keep cutter sharp. Check for damaged parts, alignment, binding of moving parts, and other conditions that may affect its operation.
10. Don't use your lathe in damp or wet locations. Do not use in presence of flammable liquids or gases. Keep your work area well lit.
11. Remove chuck keys and adjusting wrenches prior to turning. Form a habit of checking for these before switching on the lathe. Never leave the lathe running unattended. Turn power off. Don't leave the lathe until it comes to a complete stop.

Specifications:

Max Spindle Length: 7"

Diagram 1- Duplicator Components

**A. Duplicator platform includes:**

- A1. Cross slide bar
- A2. Template holder/tool rest
- A3. Mounting Platform
- A4. Follower Assembly
- A5. Cutter Slide Assembly

B. 2mm Allen wrench

C. 2.5mm Allen wrench

D. Mounting Subbase

E. #SS cutter

F. Mounting Assembly includes:

F1. Mounting Bolts (2)

F2. Mounting Washers (2)

F3. Mounting Knobs (2)

G. Depth Adjustment Includes

G1. Depth Adjustment Bolt & Knob

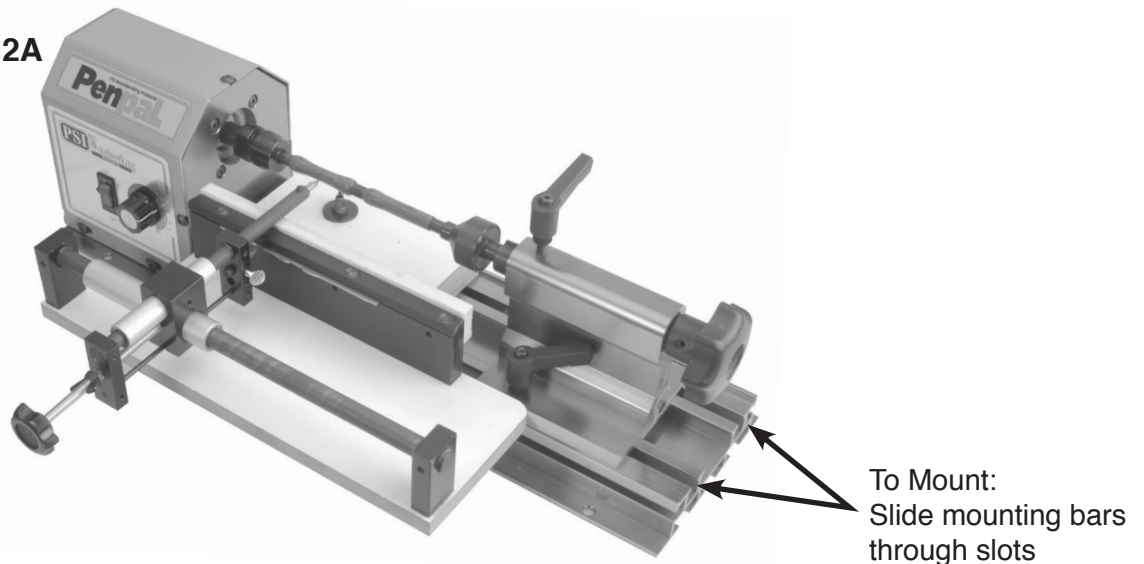
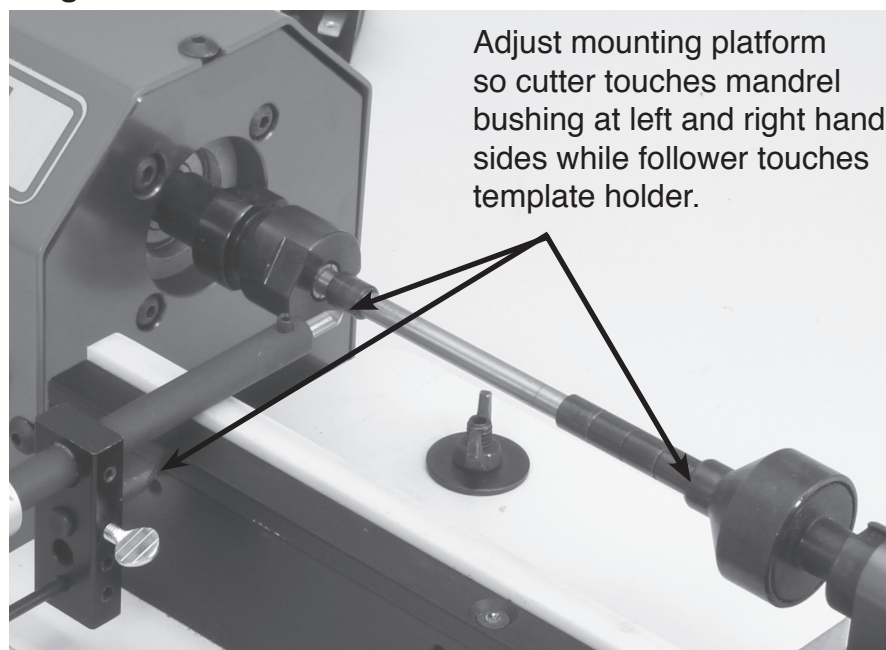
G2. Depth Adjustment Nut

H. Mounting Bars**Assembly:**

- Slide cutter (E) into front of cutter slide assembly (A5). Tighten with Allen wrench (C)
- Screw wing nut (G2) onto depth bolt (G1). Then screw through rear end block of Cutter Slide assembly (A5)

Lathe Mounting and Setup Instructions:

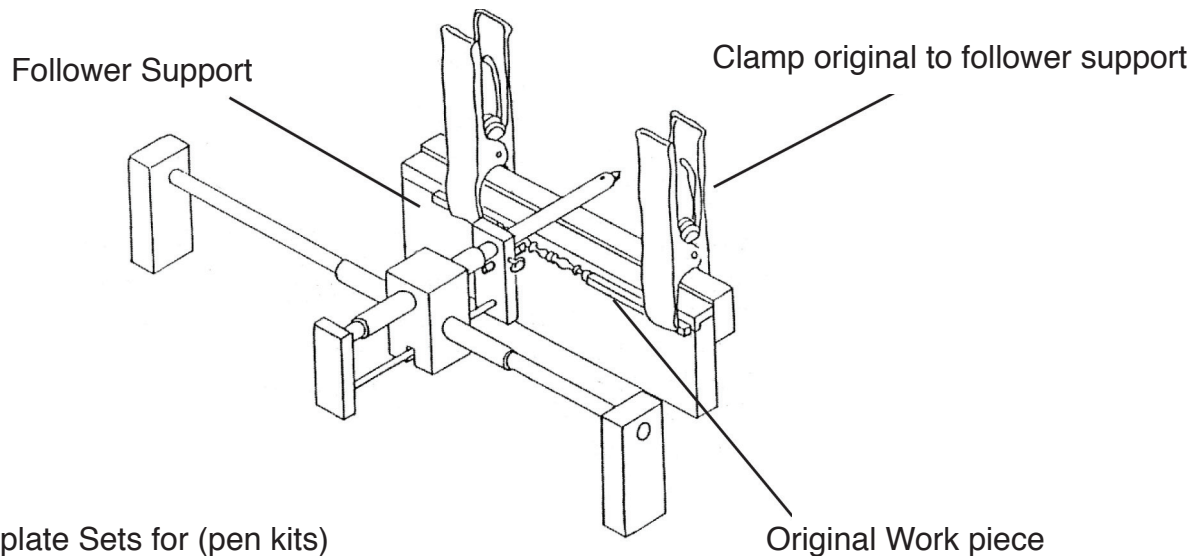
1. Mount duplicating attachment on your lathe as indicated in diagram 2A.
2. Mount tail stock assembly on the right side .
3. The duplicator must be parallel to the lathe. To accomplish this: Mount the mandrel on the PENPAL. Move the cutter point to the left side of the mandrel. With the cutter point and the bushing just touching, tighten the template guide pin in place resting against the front of the template holder.
4. Slide the cutting assembly to the right, and with the template guide pin still resting against the front of the template holder, move the duplicator board forward or back to bring the point of the cutter into position so it is just touching the bushing at the right side. Tighten duplicator mounting bolts. (Use a plier to simplify turning of the mounting bolts.)
5. The height of the cutter tool tip needs to be on the exact center line of the lathe spindle. This is accomplished by adjusting the plastic tool rest of the template holder up or down. Loosen the screws on the back side and adjust the level of the cutter tip even with the spur drive on the headstock.

Diagram 2A**Diagram 2B**

Duplicating Using an Original Work piece

If small enough, clamp the work piece to the follower as shown in Diagram 3. For round pieces, cut the piece in half lengthwise and clamp (or glue) to the follower for support.

Diagram 3- Copying an Original Work piece

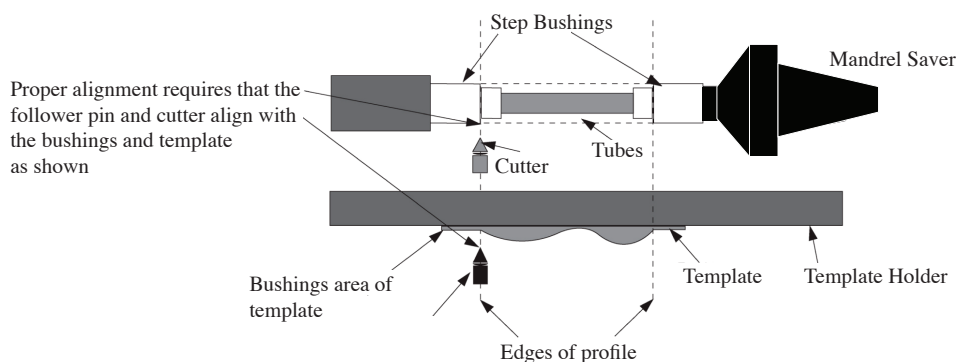


Using PSI Template Sets for (pen kits)
Preliminary Preparation

1. Select the kit you intend to make and remove the brass tubes. Mount the kit's bushings and tubes onto the mandrel without wood (see Diagram 4 below)

2. Loosen the screws on the top of the template holder. Insert the steel template under the holder bar, press the template forward into the holder as far as possible. Hand tighten down the bar to hold the template so that it slides left to right and front to back (under enough pressure not to fall out).

Diagram 4- Setup Using a Pen Mandrel Project



The PSI template profiles are designed to use the kit bushings as the primary setup indicator. The following steps discuss how to align the cutter to a bushing and then position and secure the follower pin and template to ensure a precise setup. Note that this setup has to be done only one time (for a particular project).

Setting the Cutter Depth Alignment

3. Secure the bushings and tube(s) on the pen mandrel. Secure the tailstock to the mandrel and tighten the locking nut.

4. Position the point of the cutter exactly to the inside edges of the left hand bushing (if the bushings are step bushings, position the cutter exactly to the inside edges of the left-most part of the wood blank will rest.) Refer to Diagram 4.

5. Loosen the follower pin wing bolt. The follower will slide freely front to back in its holder. Slide the template along the holder until the bushing area of the template is in front of the follower's point. (Do not tighten the template in its holder yet.) Slide the follower forward until it barely touches the template (somewhere in the bushing area of the template.) You can now lock the follower pin in place. Note: you can use a plier to tighten the follower's wing screw (but don't over tighten it to avoid stripping the bolt.)

Determining the Template Left to Right Alignment

6. With the cutter still positioned at the right outside edge of the left bushing, slide the template to the left until the left side of the cutting profile touches the point tip of the follower pin. Refer to Diagram 4. (Note: some template profiles have straight edges and will not allow the point to match the left-hand template edges when the cutter is positioned up against the bushing. In this case back off the follower before sliding the template into position.)

7. With the follower and template now in position, you can now lock the template in place by tightening down the locking screws. Slide the cutter to the right hand bushing and check the depth of the follower point. You may have to adjust the template in the holder front to back to match the proper depth on both right and left bushings (this may be necessary if the duplicator was not setup to be perfectly aligned to the lathe.)

Finishing the Setup

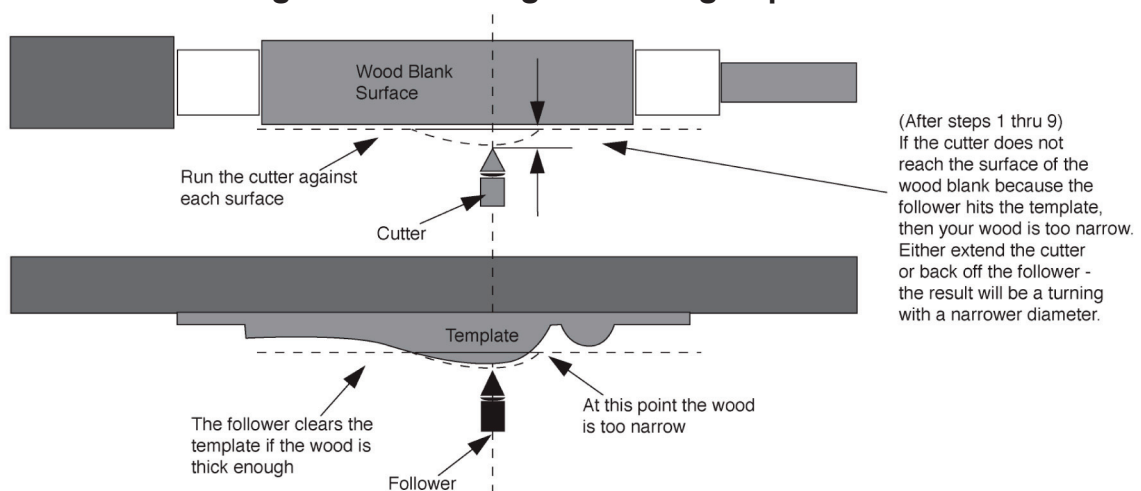
8. When preparing your kit's wood blanks for turning a) Make sure that the blanks are exactly the same length as the brass tubes since all templates are designed to exactly match these tube lengths. b) Cut your wood blanks thick enough to make sure the template profile does not extend beyond the outer surface of the blank. (You can test your wood blank by following the procedure listed under 10b.) Note: PSI kits, bushings and templates have been designed to match every time. If the tubes or bushing do not match then it is possible that another vendor supplied your kit or bushings. Contact PSI for bushings and kits that are guaranteed to match the template profile.

9. With the left hand bushing fixed in its setup position, assemble your blanks and bushings onto the mandrel (matching the template directions). To ensure proper setup check these items:

a) With the cutter pressed against any bushing, the follower point should barely touch the template. If not, adjust the duplicator or template mounting as necessary.

b) Check that your wood is thick enough to match the widest diameter of the template's profile (see the Diagram 5 below). To do this, press the cutter point to the flat of your wood blank and slide the cutter left to right across the surface. Do this for each of the four surfaces. The follower must clear the template across all of the flats. If the follower hits the template, your wood is too narrow but all is not lost. You may be able to turn a thinner profile to match the minimum diameter of the blank.

Diagram 5- Checking the Cutting Depth



To match the minimum diameter, push the cutter towards the point on the flat that results in largest gap between the flat and the cutter point (because the follower pin will be hitting the template). Loosen the follower pin, press the cutter forward until it hits the wood flat, back off the follower pin so that it hits the template while the cutter is still touching the wood. Tighten the follower. Follow step 10 b below to check whether or not your profile is too narrow.

Adjusting the Thickness of the Turned Profile

10. You can easily turn a thinner or thicker profile by adjusting the follower pin depth.

a) For a thinner profile (or this if your blank is not quite thick enough) you can back off the follower pin from the template. Note that the difference in your workpiece's finished diameter will be double the distance that you've backed off. You can check to make sure your profile is not too narrow as follows

b) With the profile diameter thinner there is now a chance that your cut may be too deep and hit the brass tube. Check this by mounting up a set of brass tubes onto the bushings (without wood mounted on). Run the follower pin across the template profile and watch the cutter tip. If the tip hits the tube at any point then the profile diameter is too thin and you will have to change to a set of thicker blanks or adjust the depth accordingly.

Cutting & finishing with the Duplicator (Diagram 6)

1. Pull tool holder back before turning the machine on. Never allow cutter to contact mandrel or mandrel saver.
2. Place hands comfortably on each side of cutter assembly, with fingers guiding the cutter side to side and forward and back always keeping the tool holder down against the plastic tool rest.
3. With the lathe on start at one end, slide cutter to the other end, removing a small amount of material with each pass. Cutting may be done in either direction.
4. When the guide pin comes into contact with the template or original turning, it will start to follow the contour as you cut.
5. Continue cutting, leaving the deepest cuts until last for increased stability. If the deepest cuts are made too soon, the work piece may flex and break.
6. Move the cutter from side to side as you progress into deep cuts to provide clearance for the cutter bit and to prevent binding.
7. After completing the cutting, make a final pass to clean up the surface.
8. If there are flat areas on your completed turning, it means the cutter needs to be adjusted to cut deeper. Do this by moving the guide pin back a tiny bit ($1/64"$ or less) and turning the work piece again.
9. When your turning is complete, rest the cutter assembly off to one side, out of the way of the work piece and moving lathe parts. (see diagram 7)
10. Sand and finish your project.

Diagram 6 - Cutting Technique

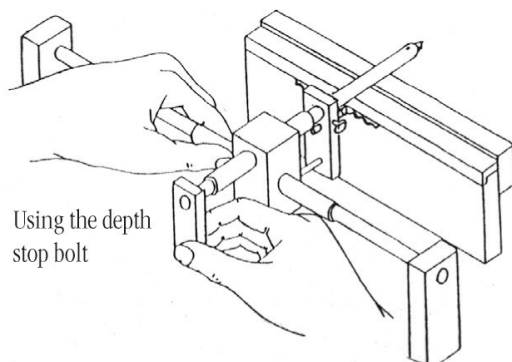
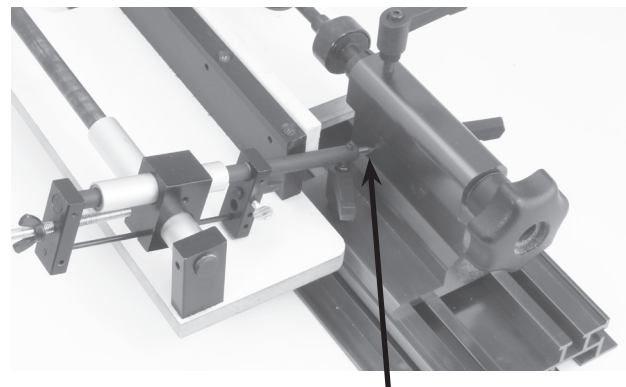


Diagram 7 - Cutter position while sanding



Secure cutter under toolrest to keep point out of the way while sanding

Use the depth stop to micro-control your cut depth. (See diagram 9 below) The system also guarantees a straight cut. Turn the knob (G2) counter clockwise to advance the follower in small increments. Lock in position with wing-nut (G2). The end of the bolt will stop the cutting depth independent of the follower and template. As you cut, the depth stop initially will create straight cuts as the wing nut is backed off. The follower pin will hit the template and cause the cutter to follow the template pattern.

Duplicator Template Instructions for Projects Mounted between Centers

Note: Your PENPAL will require appropriate spur center in the headstock & live center in the tailstock. Contact your vendor for these components. Adjust the cutter and follower to align with the headstock spur center and live tailstock as shown in dia 8.

Also Applies to these PSI Spindle projects:

TPL13 - Shoe Horn & Brush Set

TPL14- Wine Bottle Stoppers

TPL15- Candle Holder Spindles

TPL101- Little People

TPL102- Finals

TPL100- Shaker Style Pegs

These projects will be mounted “between centers”. Use a spur center to grab the project wood at the headstock end. The wood will be pressed into the live center point at the tailstock end. Measure the total length of the finished project (between the shoulders of the template). Cut your wood about 2 1/4” longer than the finished product.

Mark the center of each end of the blank. Drill a 1/8” pilot hole into each end. For projects #TPL13 and #TPL15- drill the holes deep enough (about 1”) so that the finished turning will have pilot holes necessary for drilling or mounting hardware.

Position the template into the template holder so that the “center extension” (narrow part of the template) is slid towards the live center on the tailstock. For templates TPL14, TPL100, TPL101, and TPL102, make sure the rounded end of the project is positioned towards the tailstock end. Adjust the cutter and follower as indicated in Diagram 8. Mount the wood after positioning the cutter and followers.

When cutting, leave the deepest cuts for last since the final cuts may separate the project.

Diagram 8

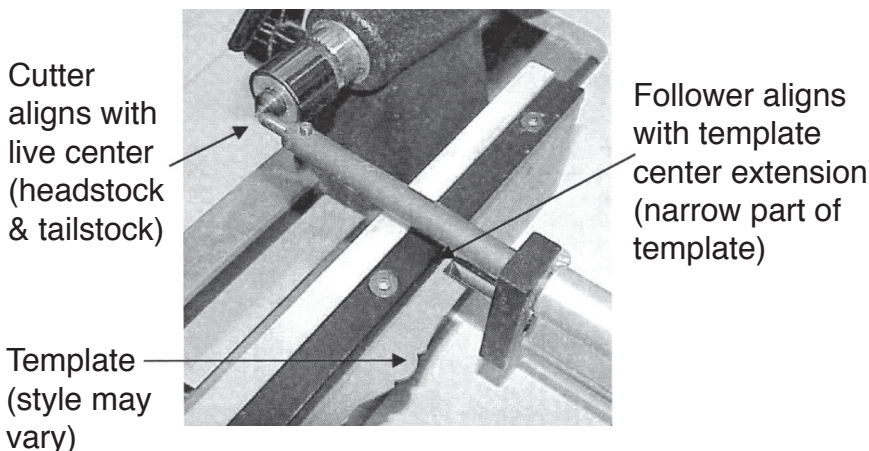
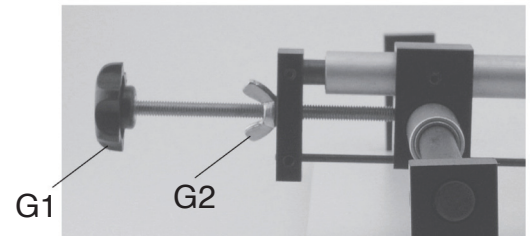


Diagram 9 - Depth Stop Bolt

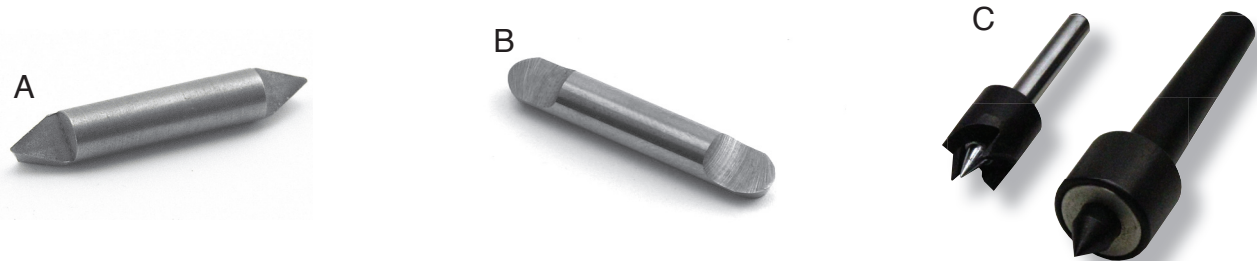


Turn knob G1, counter clockwise to advance cutter

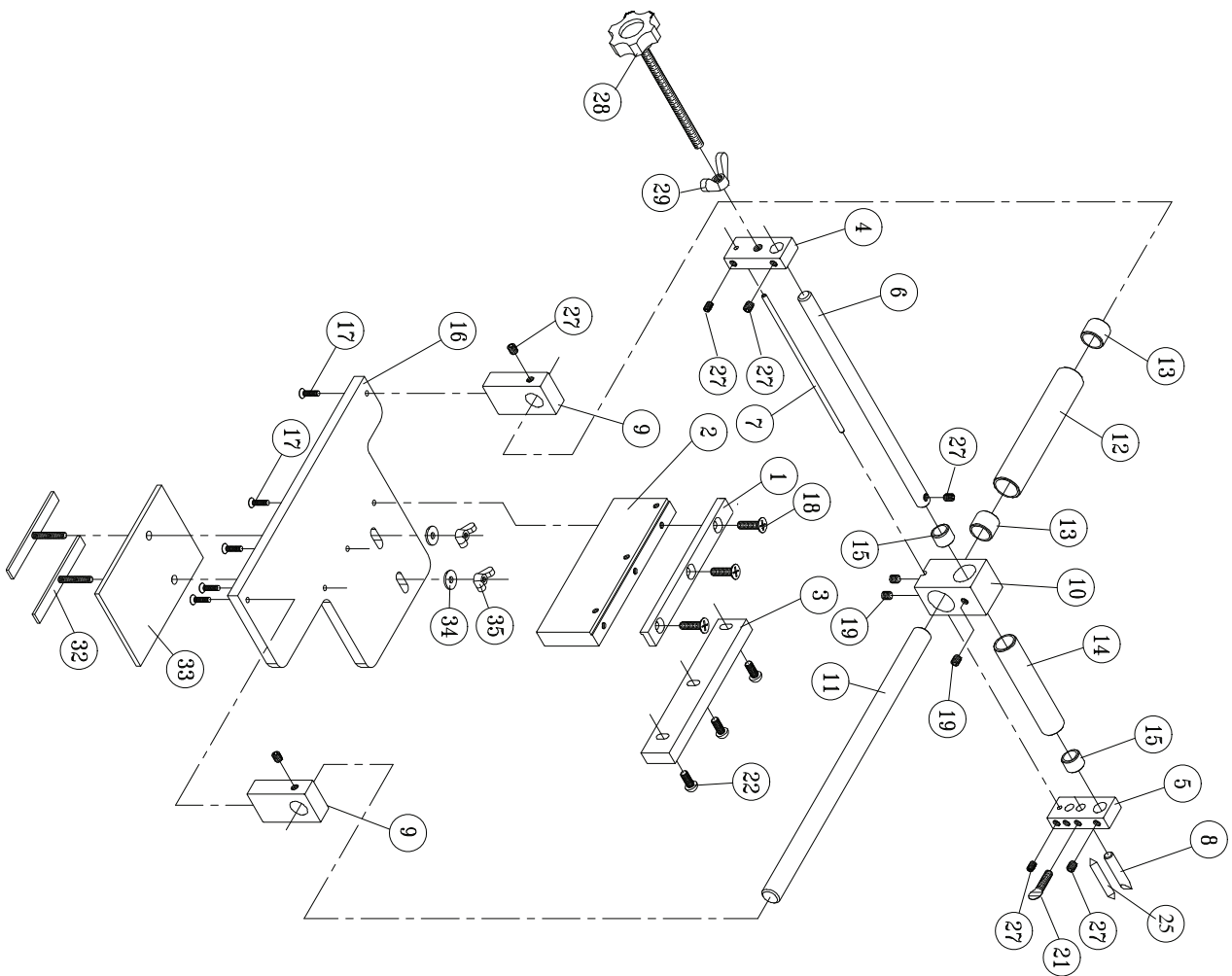
General Information: Hints and Tips about Using Your Duplicator

1. The cutter bit is High Speed Steel and has a point on both ends and should extend about 5/16". Loosen set screw to remove or reverse cutter.
2. To maintain sharpness, never allow the cutter to come into contact with the spur drive or chucks while the lathe is on.
3. Cutters may be re sharpened by hand on a fine, flat stone, such as an Arkansas or India (medium. or hard). All three surfaces should be honed on the stone, bringing the cutter bit to a sharp point.
4. With proper care of the cutter, you should be able to produce several hundred small turnings before re sharpening is needed.
5. It is recommended that you wipe the steel rods of the cutter assembly with some light oil or WD-40 from time to time. Moisture from your hands could cause some rust on the rods. Always wipe on some oil before long term storage.
6. Your work piece should not be any longer than you actually need. Excessive length increases the possibility of spindle whip.
7. With practice, you can free-hand your shapes and then use the original for a template. The original should be of hard wood and polished with wax to provide a smooth surface for the guide pin.
8. To make short dowels, adjust the guide pin in or out to slide along the template holder (without a template) to create a dowel the desired diameter.

PENPAL DUPLICATOR ACCESSORIES



| | |
|---|------------------|
| A 2 Sided HSS (replacement) cutter..... | #CML-DUPC |
| 2 Sided HSS Carbide Cutter..... | #CML-DUPX |
| B Rounded Carbide Cutter | #CML-DUPRX |
| (for Acrylics & Smoother Finish) | |
| C PENPAL Spur Center and | |
| Live Tailstock Center Set | |
| (for turning between centers)..... | #PENPALDS |
| Duplicator Templates | refer to page 11 |



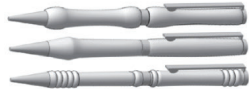
part list

| Ref.no | description | qty | spec |
|--------|-------------|-----|-----------------------|
| 001 | ZCMLDUPX01 | 1 | Template holder |
| 002 | ZCMLDUPX02 | 1 | Tem. support bar |
| 003 | ZCMLDUPX03 | 1 | Plastic tool rest |
| 004 | ZCMLDUP-04 | 1 | Rear cut.assy support |
| 005 | ZCMLDUP-05 | 1 | Rear cut.assy support |
| 006 | ZCMLDUP-06 | 1 | Rear cut.assy support |
| 007 | ZCMLDUP-07 | 1 | Rear cut.assy support |
| 008 | ZCMLDUP-08 | 1 | Rear cut.assy support |
| 009 | ZCMLDUPX09 | 2 | Rear cut.assy support |
| 010 | ZCMLDUP-10 | 1 | Rear cut.assy support |
| 011 | ZCMLDUPX11 | 1 | Rear cut.assy support |
| 012 | ZCMLDUP-12 | 1 | Rear cut.assy support |
| 013 | ZCMLDUP-13 | 2 | Rear cut.assy support |
| 014 | ZCMLDUP-14 | 1 | Rear cut.assy support |
| 015 | ZCMLDUP-15 | 2 | Rear cut.assy support |
| 016 | ZCMLDUPX16 | 1 | Rear cut.assy support |
| 017 | ZCMLDUP-17 | 5 | M5*0.8P*20L |
| 018 | ZCMLDUP-18 | 3 | M4*0.7P*10L |
| 019 | ZCMLDUP-19 | 3 | M5*0.8P*5L |
| 021 | ZCMLDUP-21 | 1 | M4*0.7P*12L |
| 022 | ZCMLDUP-22 | 3 | M4*0.7P*20L |
| 025 | CML-DUPC | 1 | 2 sided |
| 027 | ZCMLDUP-27 | 8 | M4*0.7P*5L |
| 028 | ZCMLDUP-28 | 1 | M6*1.0P*90L |
| 029 | ZCMLDUP-29 | 1 | M6*1.0P |
| 032 | ZCMLDUPX32 | 2 | Rear cut.assy support |
| 033 | ZCMLDUPX33 | 1 | Rear cut.assy support |
| 034 | ZCMLDUPX34 | 2 | 1/4"25*2T |
| 035 | ZCMLDUPX35 | 2 | 1/4"-20UNC |

Steel Profile Template Sets for Duplicating Attachment

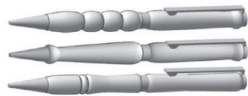


PSI Templates are laser cut from 1/16" steel and fit into all PSI duplicators. Templates enable the illustrated profiles to be cut on a duplicator, exactly the same every time. Template above from #TPL7MM1 set.



"Slimline"™ Pen Set 1. Set of 3.
For all "Slimline" styles.

#TPL7MM1



"Slimline"™ Pen Set 2. Set of 3.
All "Slimline" styles.

#TPL7MM2



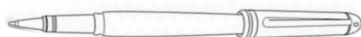
For all "Comfort" pen and pencil Styles.

#TPLCFPEN



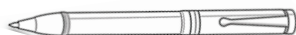
For all "Designer" and "Premium Designer" pens & pencils.

#TPLMONT



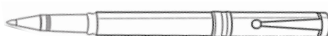
For all "Designer Twist" & "Designer Elite" styles.

#TPLMONTRP2



"Classic"™ twist pen for all styles of #PKPARK.

#TPLPARK



"Classic"™ roller ball and fountain pen.

#TPLPARKRP2

Key for blank size



Requires spindle blank up to 2" square



Requires spindle blank up to 1-1/2" square



Kal-eggoscopes. Set of 3.
For kit #KSEG.

#TPLEG



Mini Penlights. Set of 3.
For kit #PKPLI2.

#TPLPLI2



Keychains. Set of 5.
For kit #PKKEY.

#TPL01



Perfume Pens. Set of 4.
For kit #PKPERE.

#TPL04



▶ turned between centers

Hourglass Spindles. Set of 3.
For kit #HOUR60.

#TPLH60



Tree Ornaments. Set of 3.
For kit #PKORN.

#TPL05



Secret Compartments. Set of 3.
For: #PKSECRET.

#TPLSECRET



▶ turned between centers

Shoe Horn

For: #PKSHORN #TPL13



Perfume Atomizers. Set of 4.
For kit #PKATOM.

#TPL03



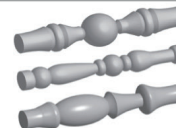
▶ turned between centers

Wine Bottle Stoppers Set of 3.

For: #BS1.

Length 1-1/2" 2-1/4" 2"

#TPL14



▶ turned between centers

Candle Holder Spindles Set of 3.

For: #PKCANKIT1, 2, & 3.

Height 5-1/2"

#TPL15



▶ turned between centers

Candle Holder Bases Set of 3.

2" high, accents 5/8" candle sticks

#TPL103



▶ turned between centers

Shaker Style Pegs Set of 3.

Length 1-1/8" 2-1/2" 3"

Tenon dia 3/8" 3/8" 3/8"

#TPL100



▶ turned between centers

Little people Set of 3.

Length 2-1/4" 2-1/4" 1-7/16"

Tenon dia 3/8" 3/8" 3/8"

#TPL101



▶ turned between centers

Finials Set of 3.

Length 13/16" 1-1/2" 1-7/8"

Tenon dia 3/8" 3/8" 3/8"

#TPL102

