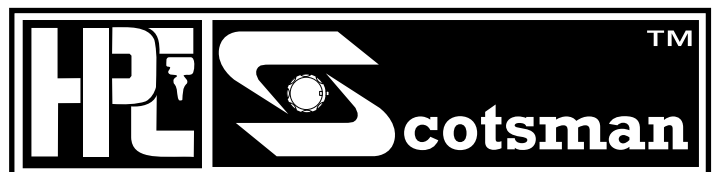
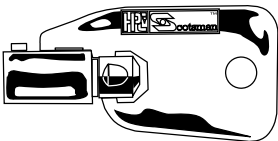
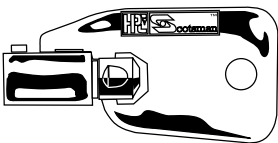
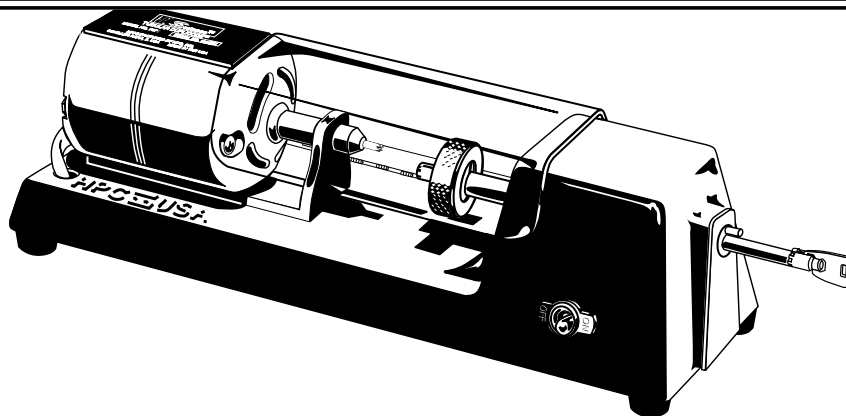


HPC/Scotsman Model 747E

Tubular DuplicutTM

Tubular Key Cutting Machine



Introduction

Congratulations

You have become the owner of the most modern tubular key cutting machine available today. This HPC/Scotsman Tubular Key Cutting Machine provides you with the following features:

Compactness: The small physical size and light-weight construction allows for easy storage, requires minimum bench space, and makes it ideal for shop or mobile service.

Simplicity: The HPC/Scotsman Tubular Key Machine offers fast, easy operation whether duplicating, decoding or cutting to code. The simplicity of the machine also assures you of many years of profitable, accurate key cutting, with a minimum of required maintenance.

Universality: The HPC/Scotsman Model #747E will cut all cuts on standard size of tubular (ace type) keys.

Durability: Every part of the machine is designed and manufactured to provide extended life, giving added trouble-free service. Each machine is unconditionally guaranteed by the manufacturer for 90 days. (Don't forget to fill out and return the warranty card which is provided with this machine).

Accuracy: The HPC/Scotsman Tubular Key Machine is a precision machine which has been properly adjusted before leaving the factory. The factory adjustment of the machine assures you fast, accurate key cutting capabilities. All parts of the machine are manufactured to the highest quality standards, insuring you years of accurate operation.

Definitions of Terms

Tubular Keys: Also known as "Ace Type Keys" or "Round Keys". The tubular key is designed to actuate existing locks which are constructed with the pin tumblers arranged in a circular fashion. The key is constructed with a cylindrical body designed to enter the keyway of such a lock. Various cuts which appear on the circumference of this key allow the pin tumblers of the lock to be depressed to the proper depth thereby meeting a common shearline, and allowing the lock to turn. Proper arrangement and depth of these cuts is critical in order for the lock to be actuated smoothly and efficiently.

"Small" Tubular Keys: Less common than the standard size, this key measures .365"/9.27mm in outside diameter. Use HPC/Scotsman 137SB key blanks.

"Standard" Tubular Keys: This is the most common of the tubular key family. The outside diameter is .375"/9.53mm. Use HPC/Scotsman 137 (steel) or 137B (brass) key blanks.



TUBULAR DUPLICUT™
747E



“Oversize” Tubular Keys: This key is often referred to as the “UL” or “Certified” key and measures .400”/10.16mm in diameter. The lock which this key actuates is UL Rated and is designed with either 10 or 11 pin tumblers. Seven of the pin tumblers are actually sleeves around other pins. These sleeves are usually located around the pins in positions 2-4-6 or 1-3-5-7, but could be around any of the seven pins. The secondary cuts (described below) are responsible for depressing these sleeves to proper depth, thereby meeting the common shearline of the pins. The purpose of this lock is to complicate manipulation by picking.

Primary Cuts: Those cuts most commonly found equally spaced around the circumference of a tubular key. These cuts normally do not penetrate the wall of the key completely. The depth of these cuts is determined by the length of the corresponding pin within the lock. Under the normal conditions these are the only type of cuts which are contained on either the small or standard tubular keys. Explanation of a cut which might penetrate the wall of the key is covered under “Secondary Cuts”.

Secondary Cuts: These cuts are often referred to as “cuts-within-cuts”, most commonly found on the “oversize” keys. The secondary cuts will be found to penetrate completely through the wall of the key. Typical location and purpose of these cuts is explained under “Oversize Tubular Keys” above.

Dead Pin Cuts: These are cuts occasionally found between two “primary cuts” on a standard size tubular key. The lock in which such a key is used has a “dead pin”. This pin is designed to hamper in the event of manipulation by picking, or an unauthorized key tries to enter. The depth of the dead pin cut is normally not critical but must be of sufficient depth to allow the key to enter the keyway to maximum depth.

Duplication: This is the act of directly transferring or tracing cuts as they exist on an original key to a blank key, thereby manufacturing an exact copy. This process is used when the original key is known to actuate the lock smoothly and efficiently. If the original key is in error, or there is a question as to its accuracy, it should be decoded and a precision key cut by code using the code cutting capability of the 747X or 747XU.

Decoding: The act of determining the longitudinal depth of a cut defined as that distance from the end of the key blank to the bottom of the cut. Normally each depth would be assigned a code of 1 through 8. A standard depth increment for most tubular lock manufacturers is .016 of an inch. Therefore a code depth of 1 would have a depth of .016”. A code depth of 2 would be .032”, and so on to a depth of code 8 which would be .128” deep. ONE IMPORTANT EXCEPTION TO THIS RULE is those locks manufactured by Ilco/Unican or those locks known as Dyna-Lok, which have code depth increments of .025 of an inch. Since the 747E uses a standard of .016” depth increments, keys for the locks mentioned are most effectively duplicated rather than cut-to-code.

Cutting to Code: This is the act of cutting a key without the use of an original key. This method of cutting a tubular key can become necessary when: (a) there is no original key or (b) there is a possibility that the original key is inaccurate. If this is the case, the original key should be decoded and cut to code using the code cutting capability of the 747X or 747XU.

Right and Left Cut Keys: These terms refer to a rotation of cuts which are occasionally required on Tubular Keys (usually found on standard size keys only). Some locks are manufactured with the pin tumbler locations rotated 1/2 space right or left of normal position. When referring to a right cut key, the cuts are found to be rotated 1/2 space counterclockwise. Left cut keys have a rotation 1/2 space clockwise.

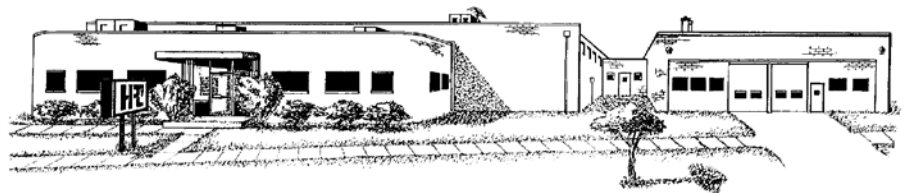
NOTE: Other manufacturers have attempted to copy the unique Scotsman design, but failed to give equal quality for the modest cost of these machines. See page 64 for a description of other models of tubular key machines now available by Scotsman.

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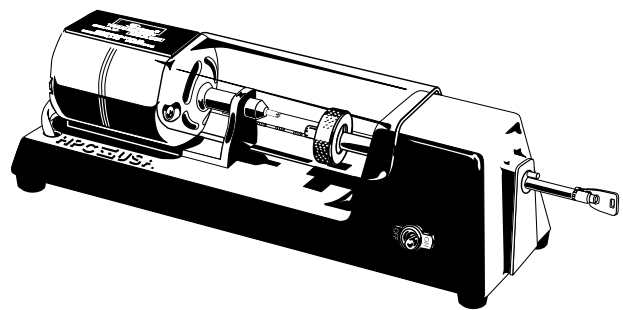
Expect Quality...

Demand HPC.



1.0

PARTS DESIGNATION

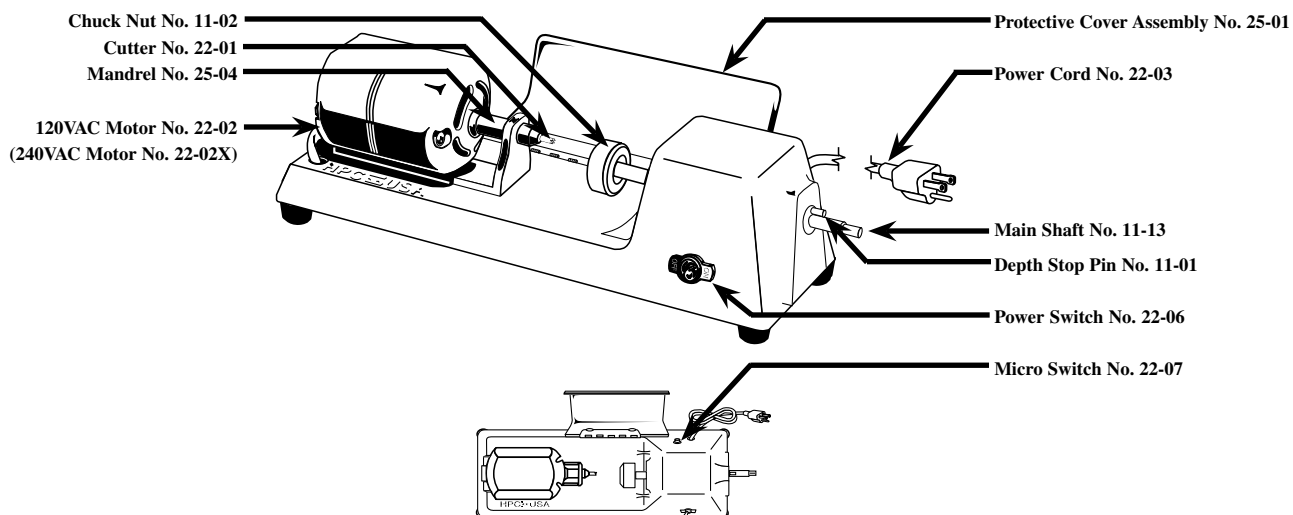


TUBULAR DUPLICUT™
747E



Model 747E Tubular Key Cutting Machine

Parts Designation



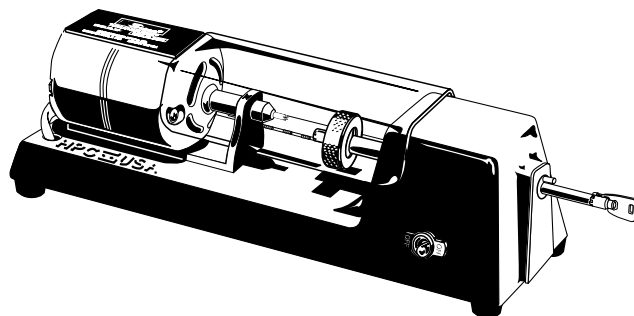
Motor: 120VAC/60 cycle or 240VAC/50 cycle
 (2 amp 1/15hp) (.8 amp 1/13hp)

Weight: 7 lbs./3.2 kg.

Machine Size: 16"W x 4"D x 4 1/2" H
 40cm W x 10cm D x 11.5cm H

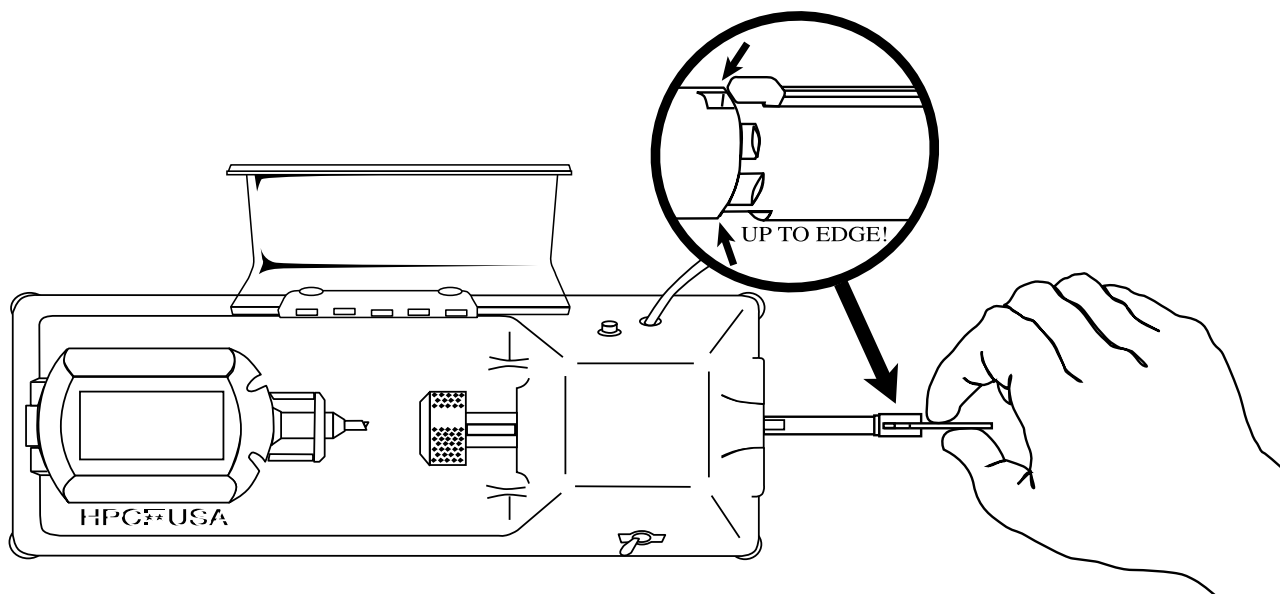
2.0

DUPLICATING

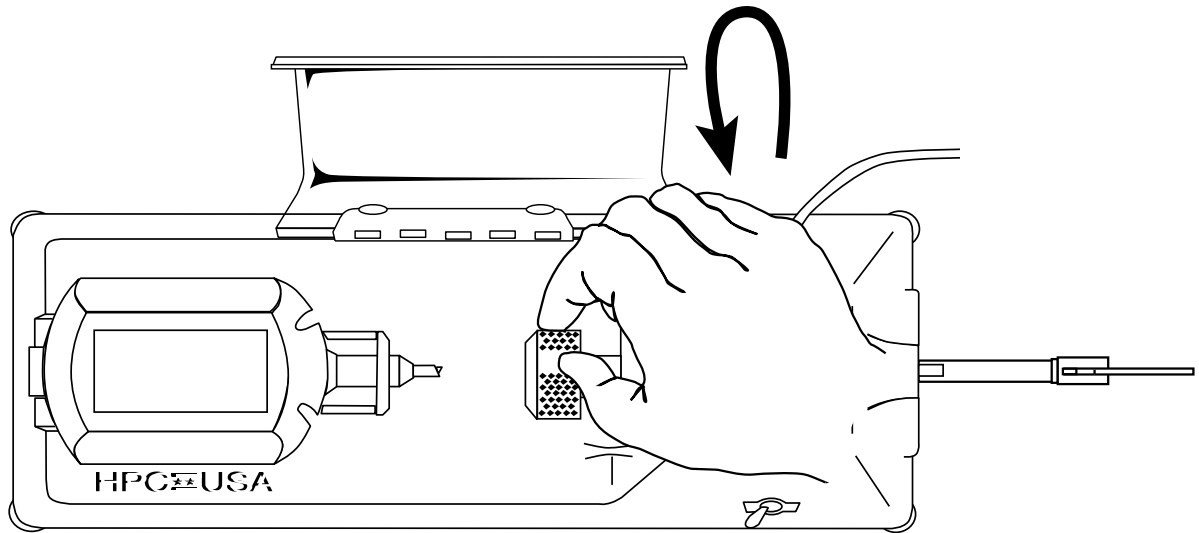


TUBULAR DUPLICUT™
747E



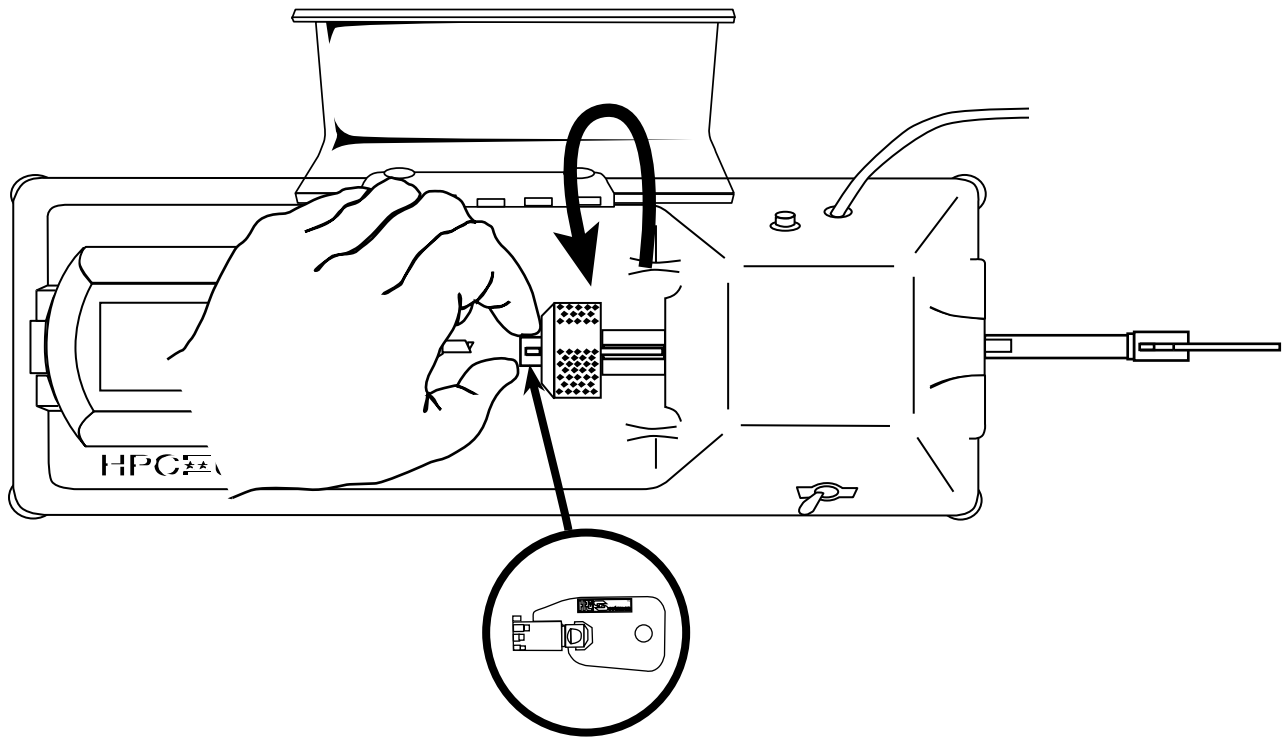


Place key to be duplicated on the end of shaft. Make certain the tang inside the key aligns with the slot on the shaft. The leading edge of the key must touch the edge of the shaft.

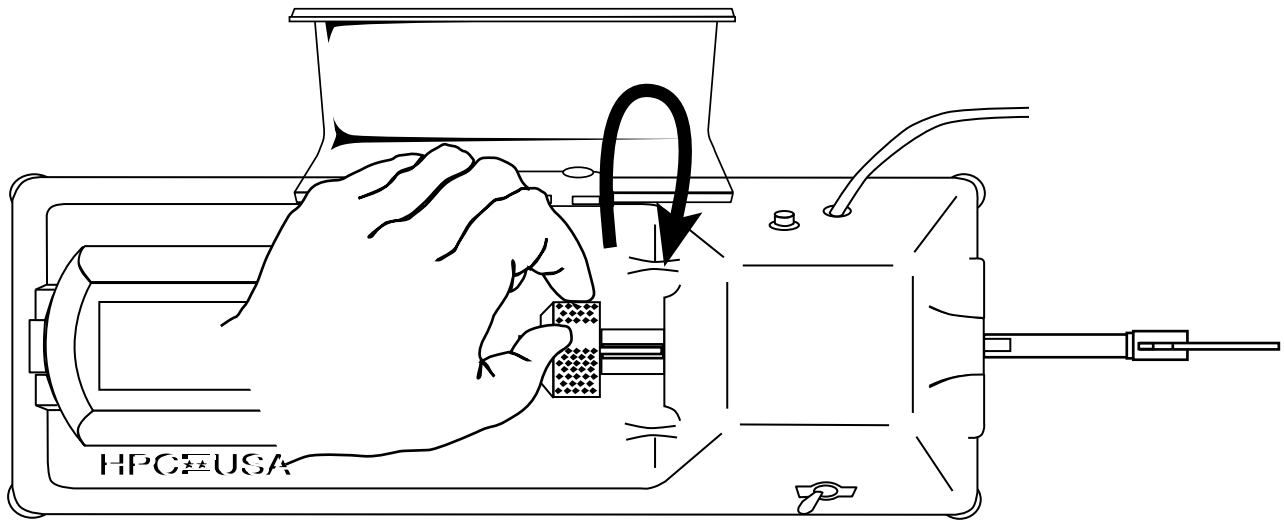


Loosen chuck nut by turning counterclockwise.

Important: Do not remove the chuck nut.

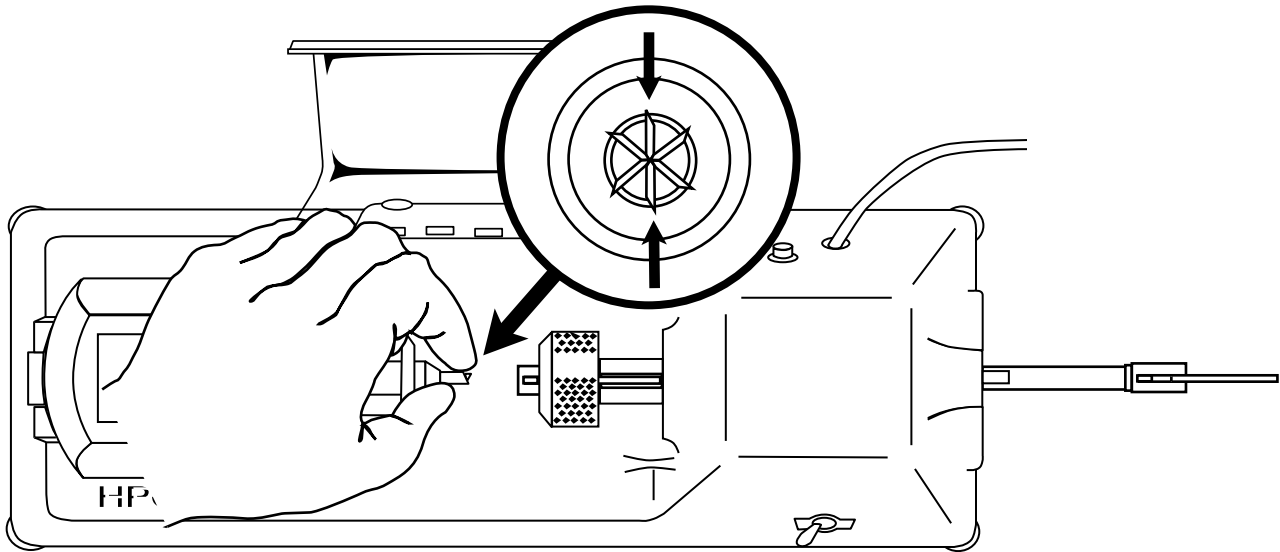


Insert key blank into chuck with tang on top and leave end of key sticking out of chuck approximately $\frac{3}{8}$ " (.375", 9.5mm).

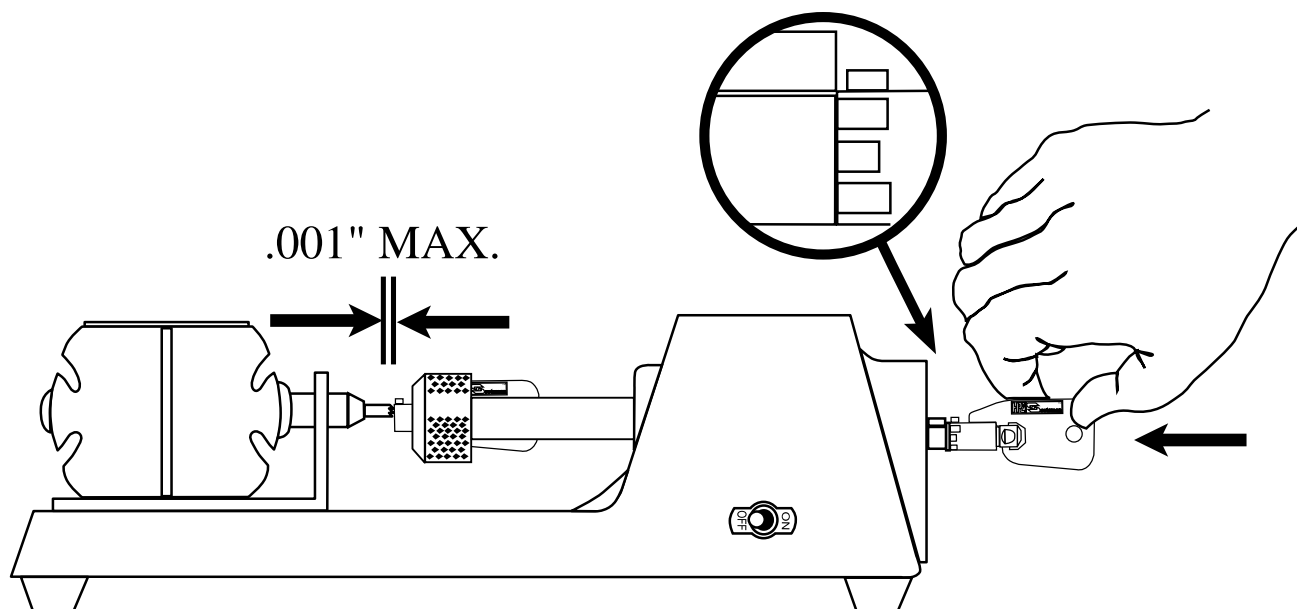


Firmly **hand tighten** chuck nut.

NOTE: Do not overtighten, as key must be able to move during indexing.

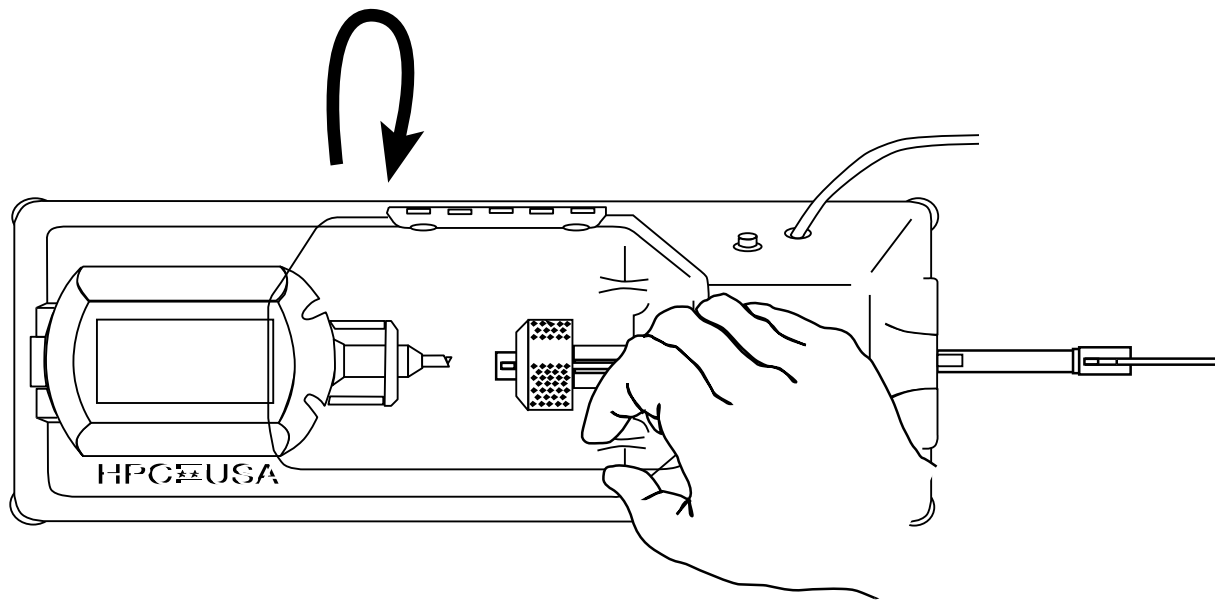


Turn cutter to “flute down” position, (so one flute on the cutter is positioned straight up and one down).

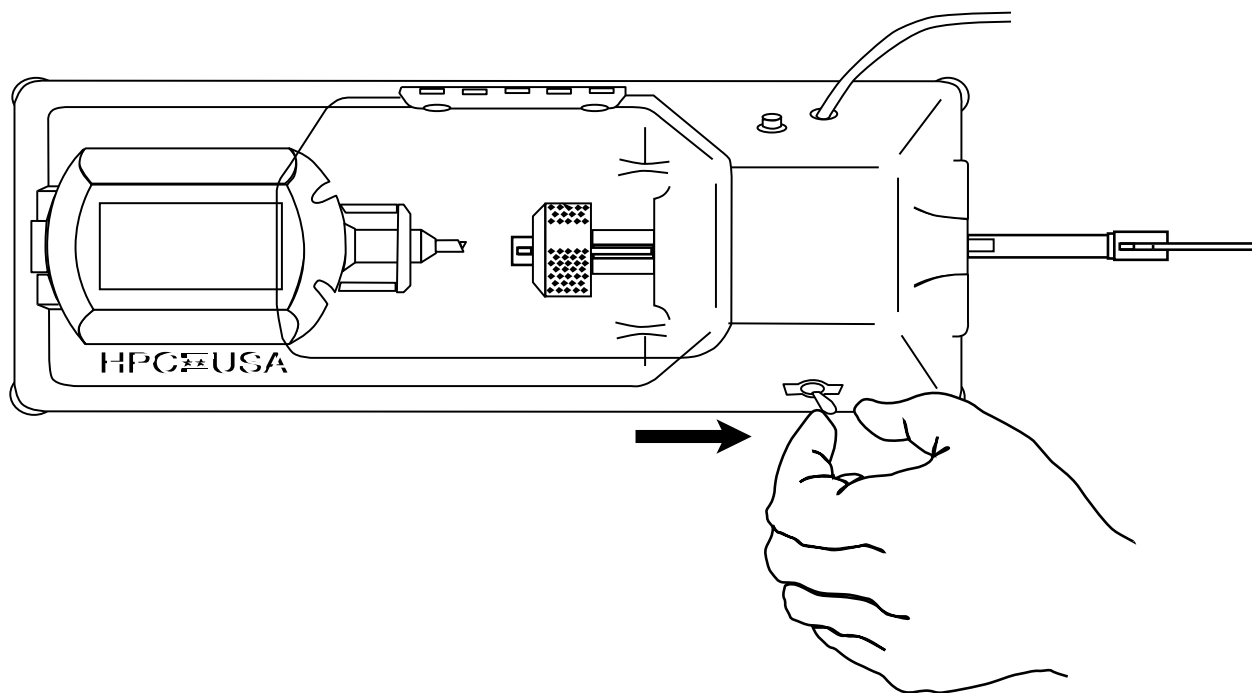


With machine switched “off”, firmly push shaft with key until shaft stops. The key should recess into the chuck, into proper position. The gap between the key blank and cutter must be .001” (.025mm) or less.

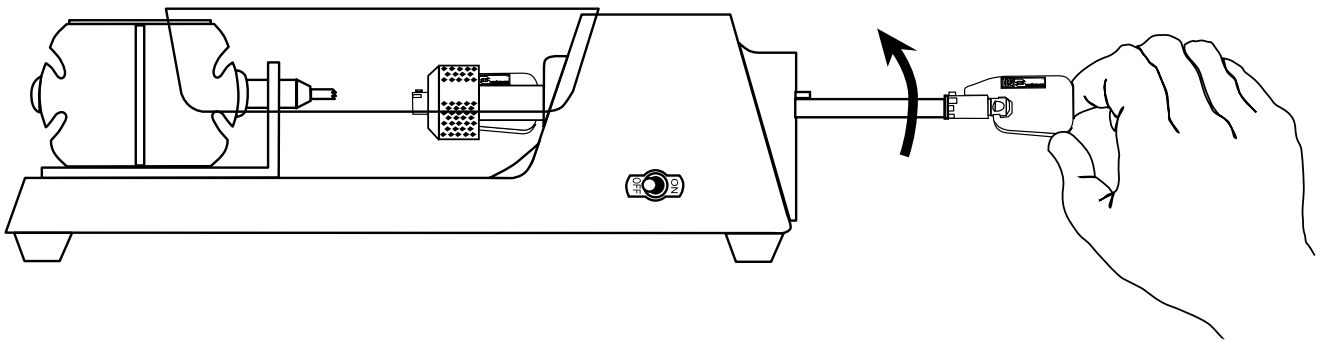
Cutter should just barely scrape key blank when turning by hand. Rotate the original key to 3 other positions to verify the blank is properly positioned. If key face is not flat, accuracy will be compromised).



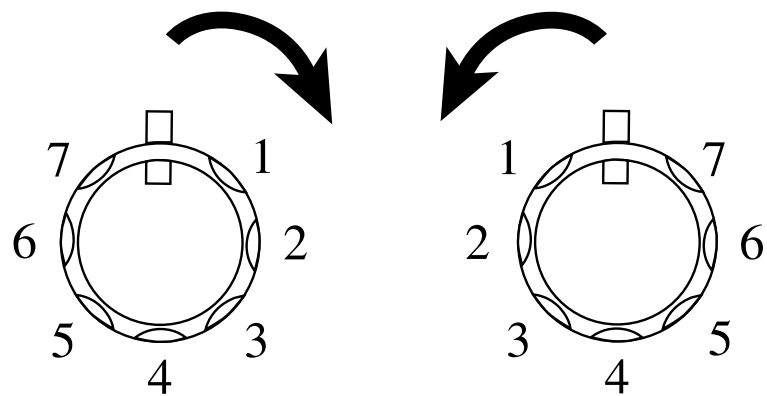
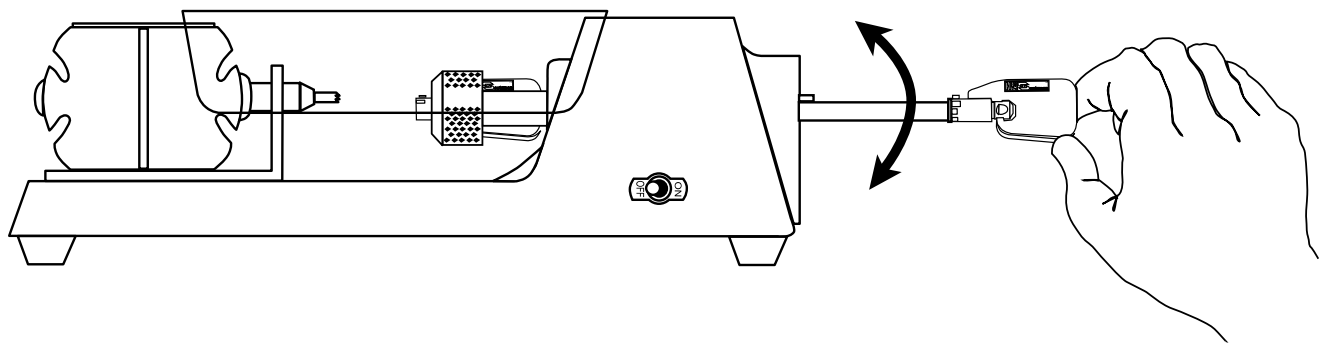
Close cover; this automatically engages the safety switch.



Turn machine on.



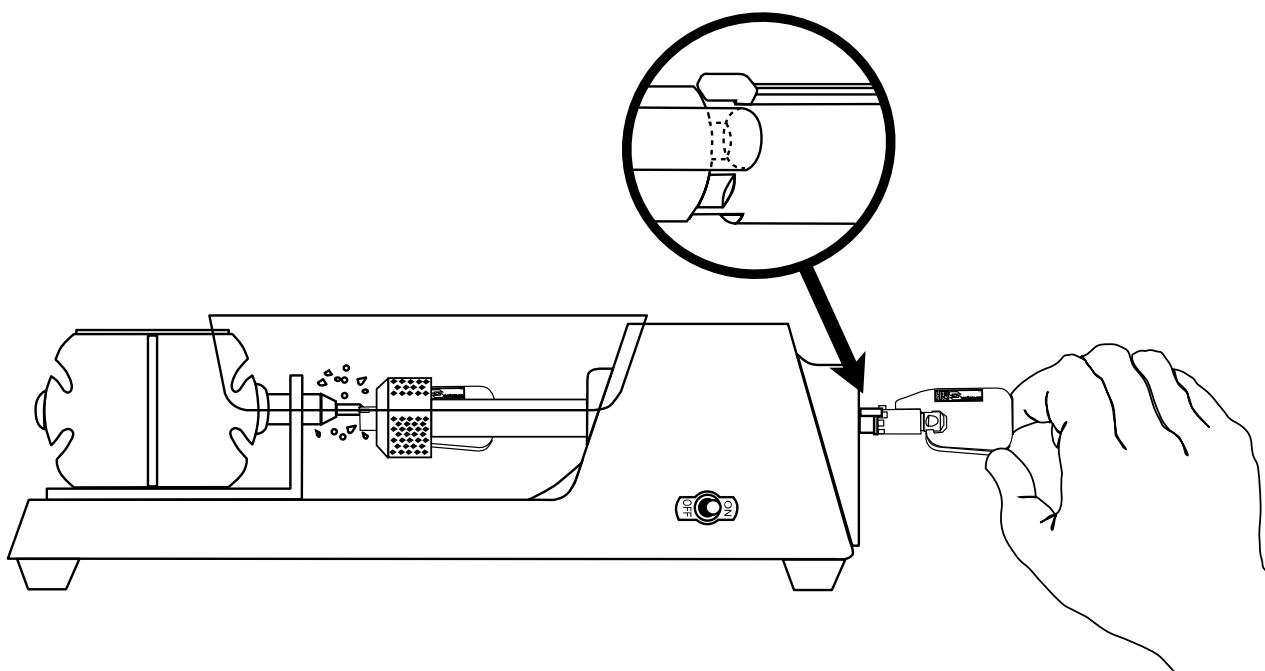
Begin to push shaft in and rotate to first position to be cut.



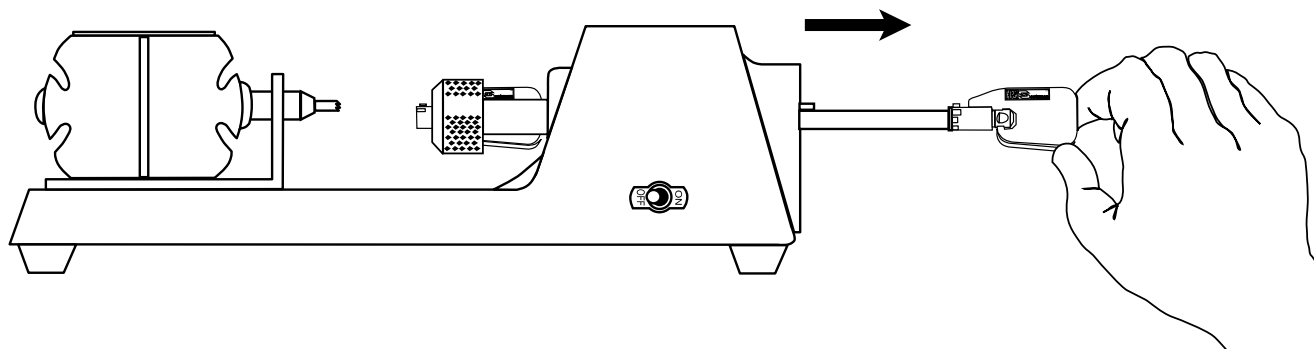
FORT • GEM®

CHICAGO • ACE®

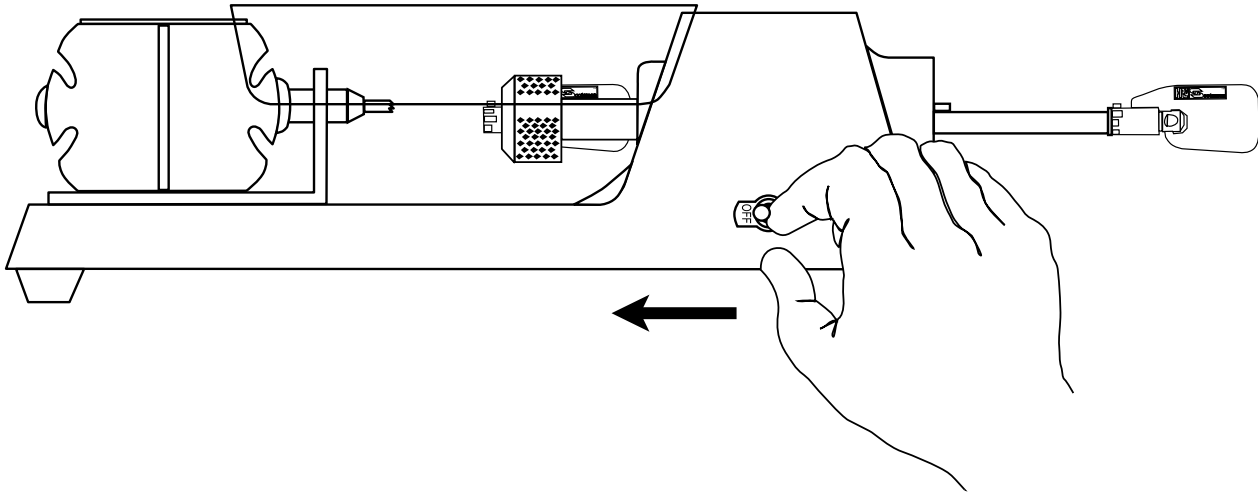
NOTE: Most popular manufacturers' spacing rotation.



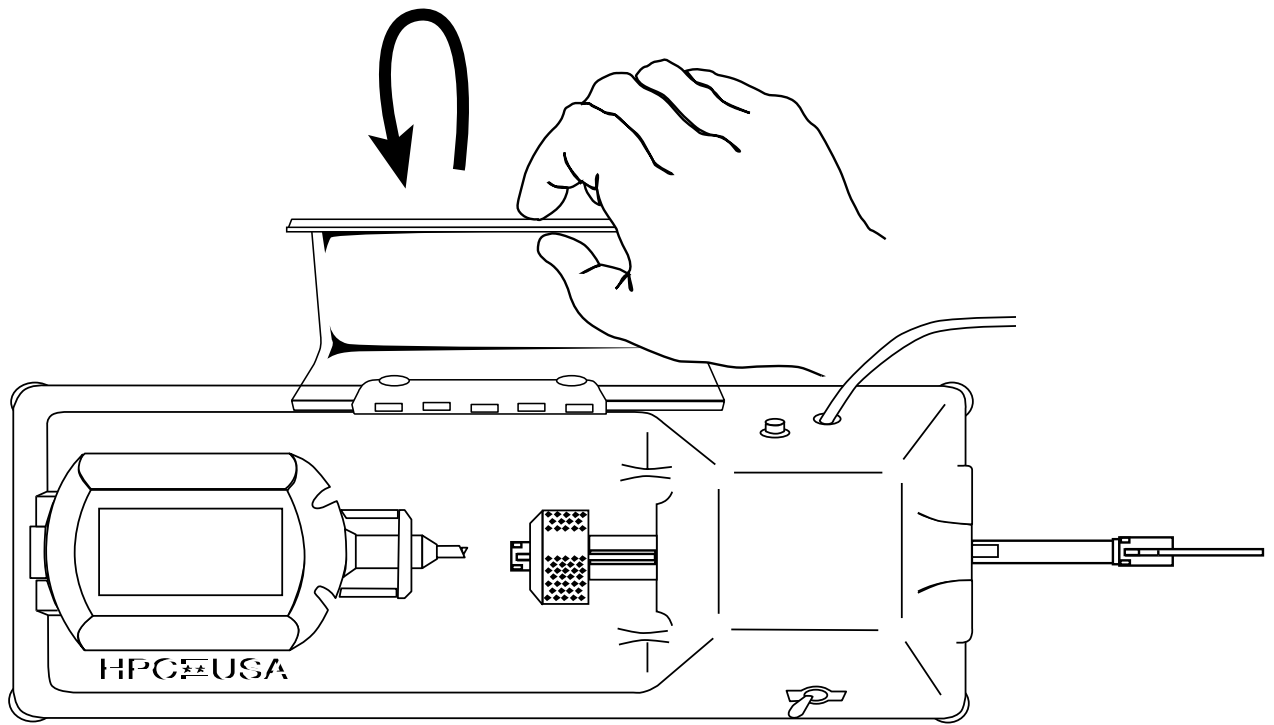
Using a slow, steady movement, engage cutter and push the original key all the way to fully engage stop pin on each cut.



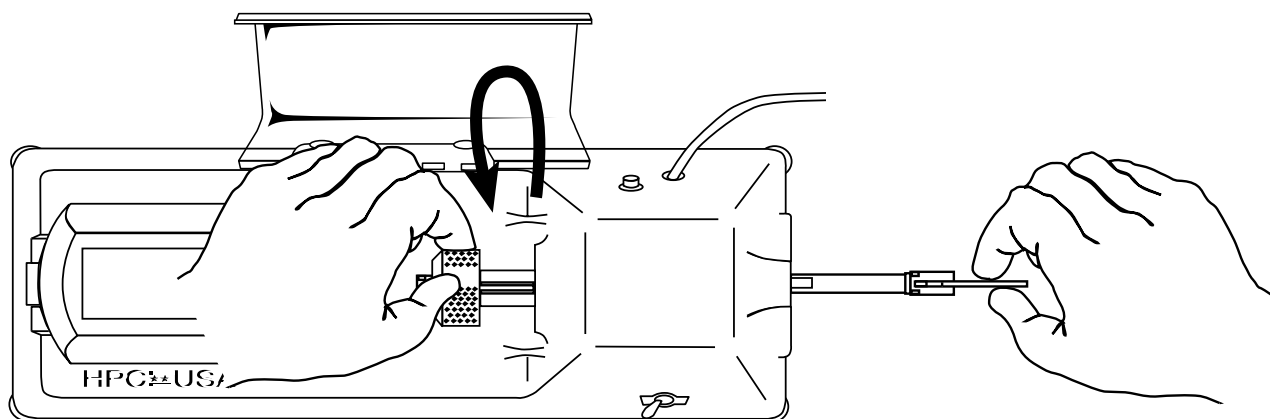
Slowly release shaft, and rotate to next position to be cut.
Continue this procedure until all cuts are completed.



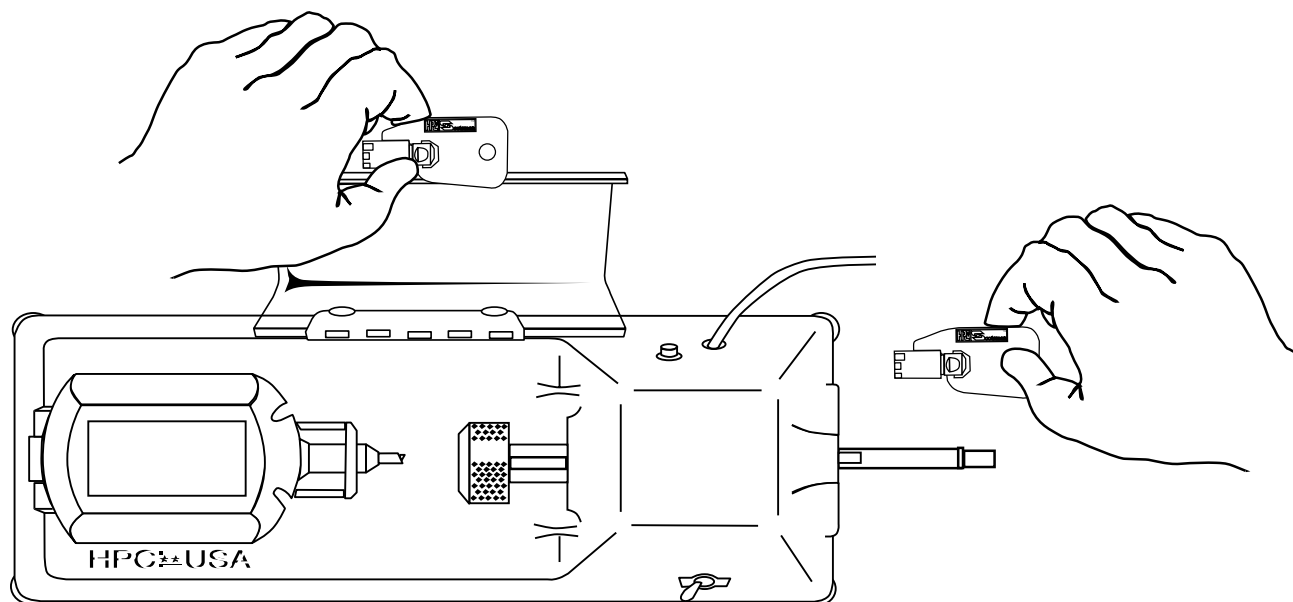
When all positions have been cut, switch machine to “off.”



Lifting cover disengages power for added safety.

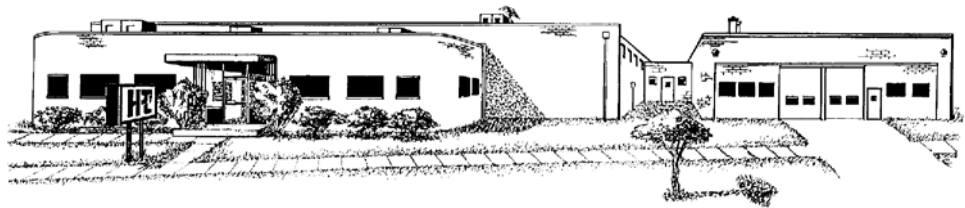


Turn chuck nut counterclockwise to loosen.



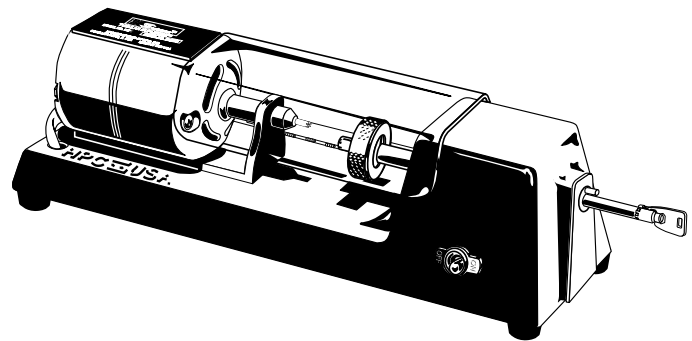
Remove keys and deburr the duplicate key, as needed.

HPC, Inc.
**Designer and
Manufacturer of
Security Products
since 1956.**



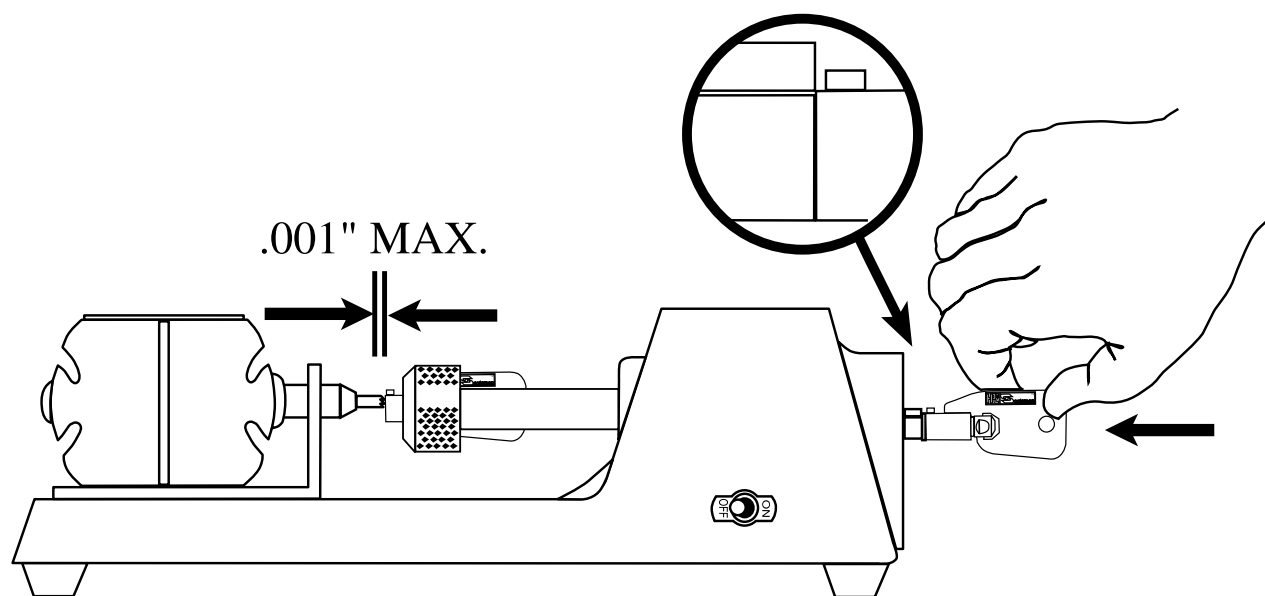
3.0

CHANGING CUTTERS



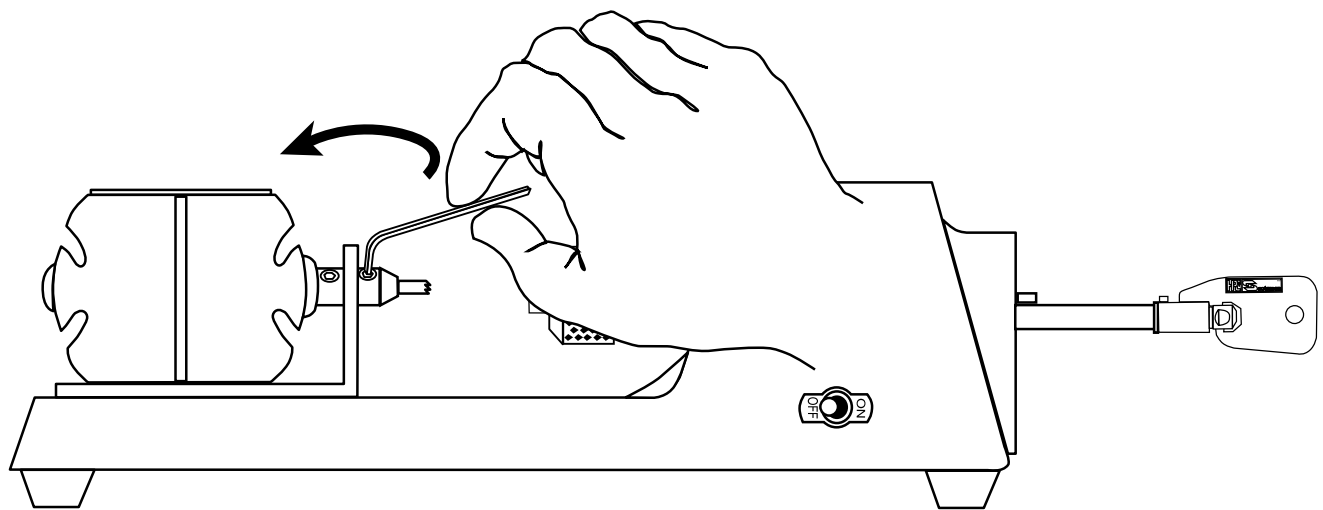
TUBULAR DUPLICUT™
747E



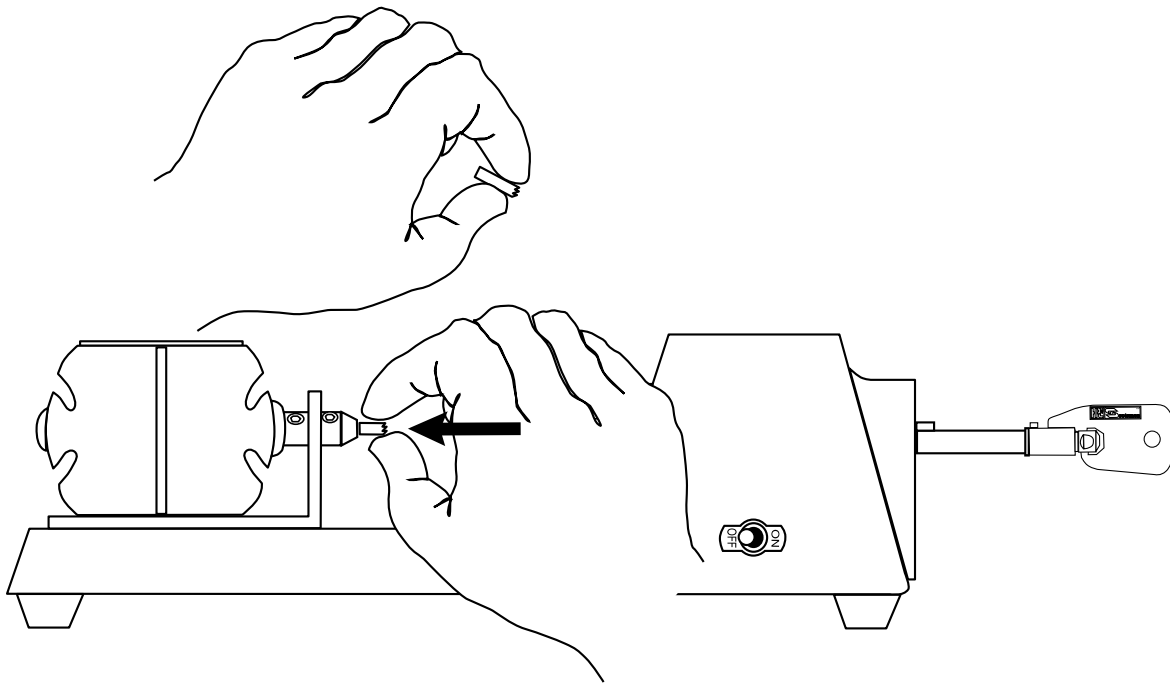


Before removing dull cutter, verify the setup is still accurate using 2 blank keys.

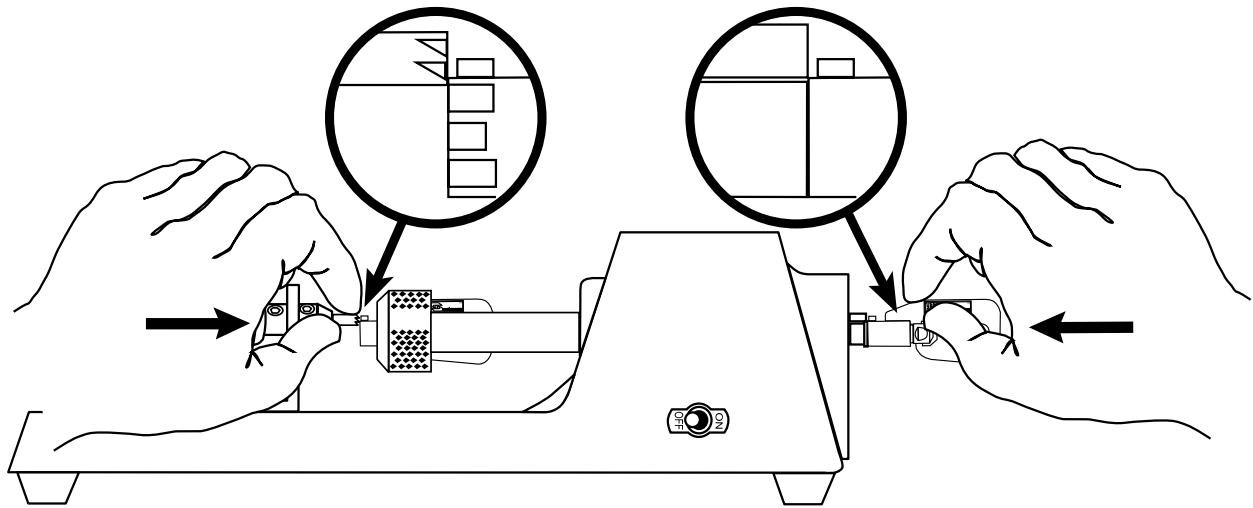
NOTE: Refer to the “Duplicating” section for details on indexing.



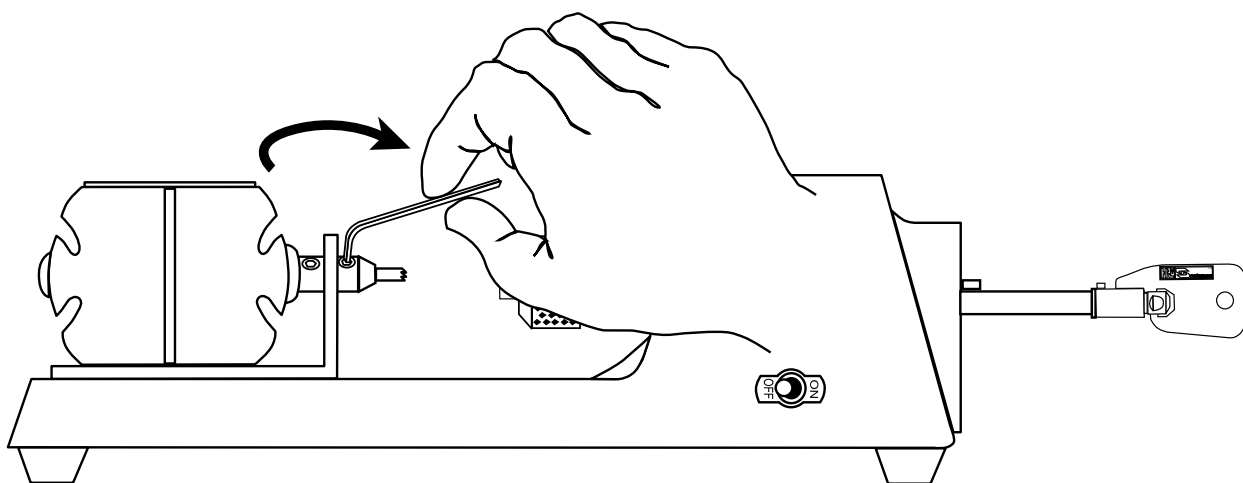
Loosen set screw by turning counterclockwise.



Remove dull cutter and replace with new cutter (No. 22-01).
Firmly tighten set screw. Do not overtighten, as cutter must move during indexing for proper calibration.

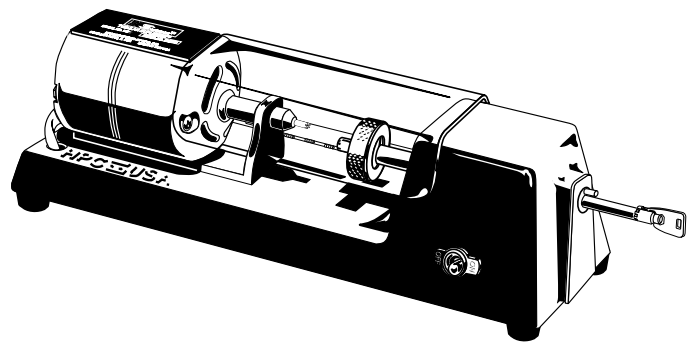


With keys still in place, push shaft to full stop position. Pull cutter forward to engage key. The cutter should just barely touch the key.



Slowly release shaft and final tighten set screw.

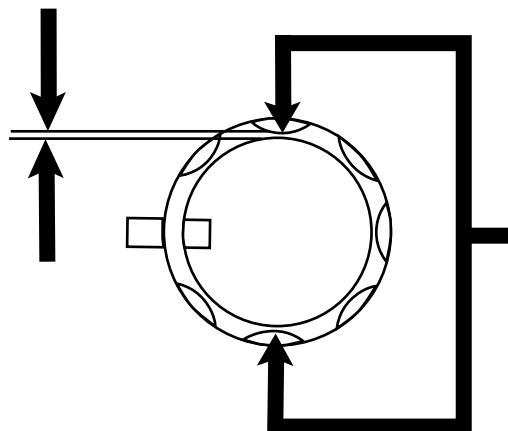
4.0 CUTTER ADJUSTMENT



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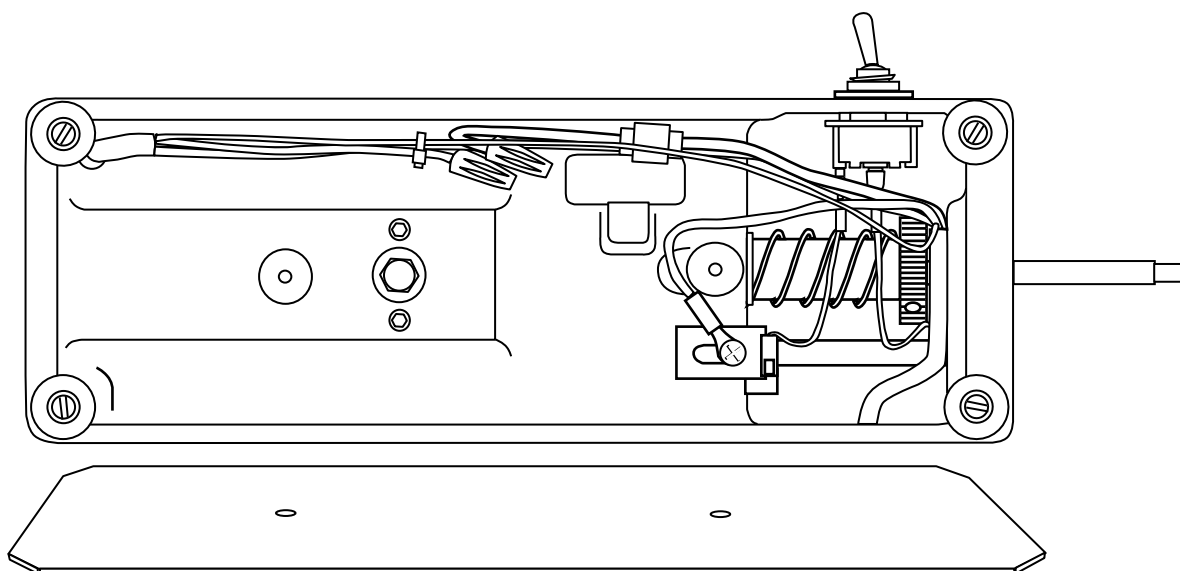


WEB THICKNESS
.004" (10mm) to
.007" (.007mm) TYPICAL

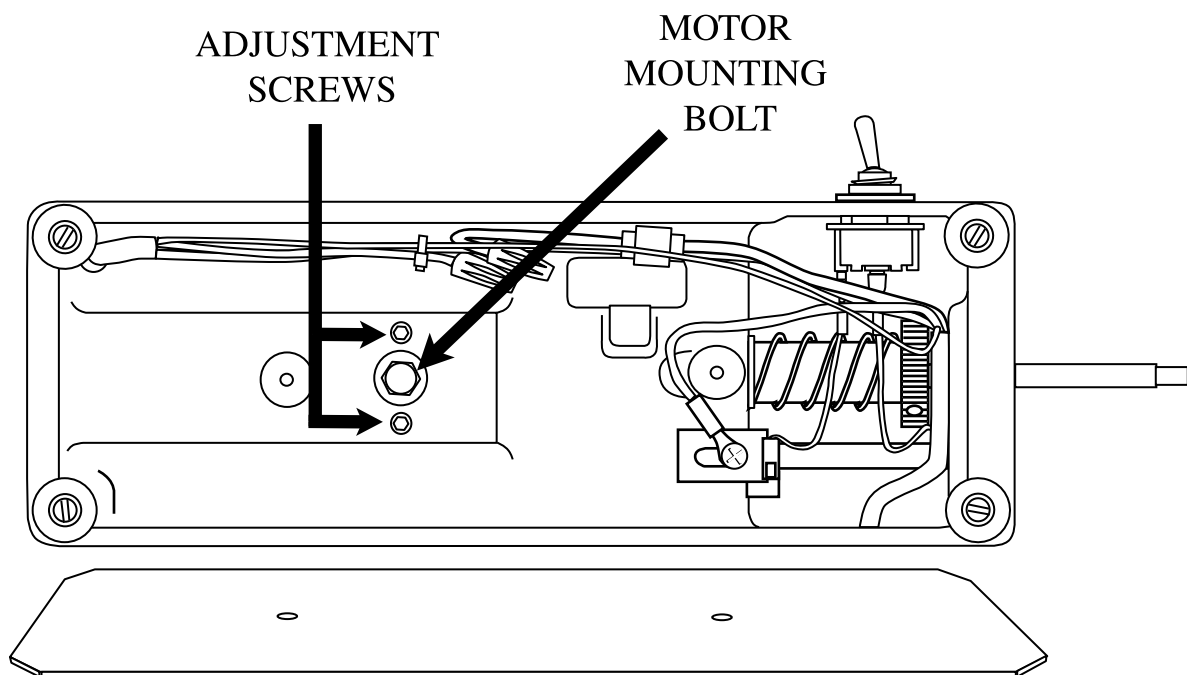


DIM. X ON A
STANDARD KEY:
.320" (8.13mm) to
.326" (8.28mm)

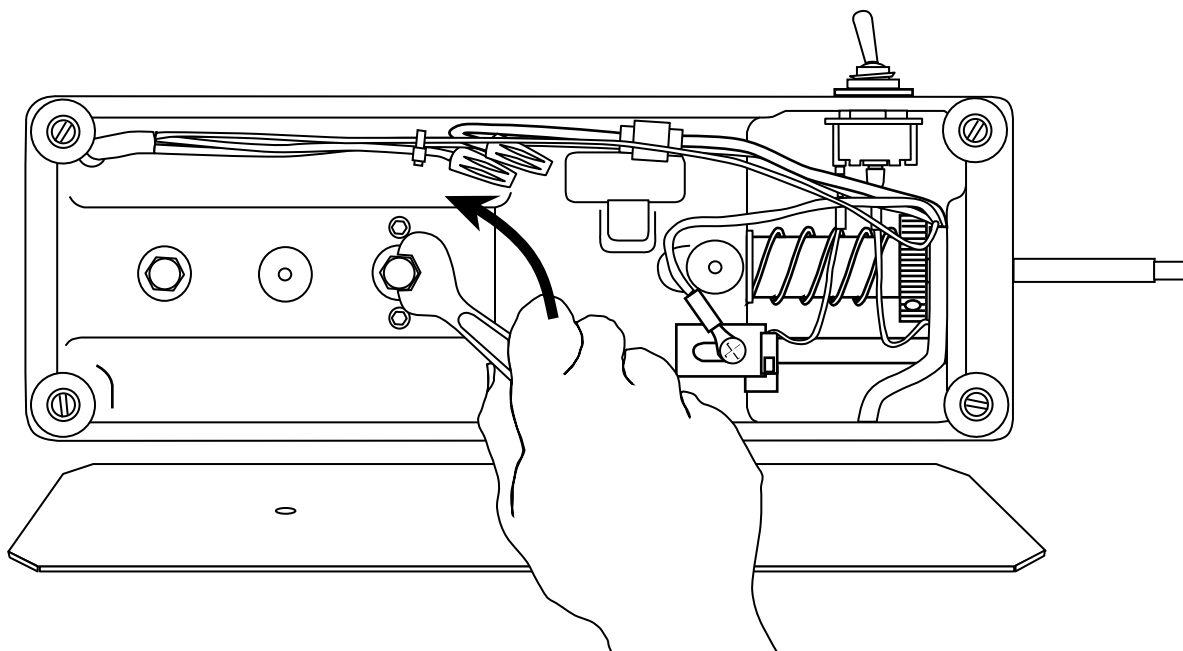
Cut sample key to any depth and check Dim. "X" distance across cuts using dial caliper. If the distance is outside of the range indicated above, proceed as follows...



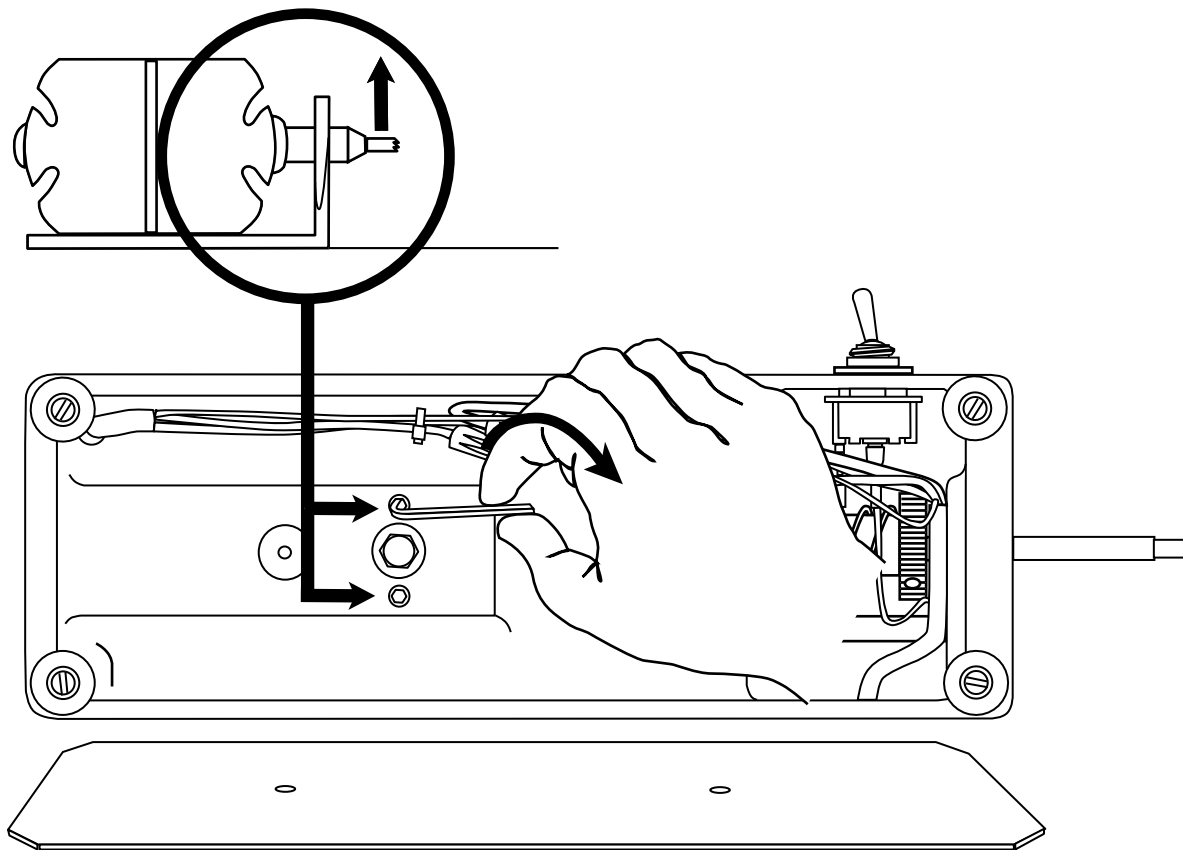
Switch to “off” and unplug the machine. Remove bottom cover to expose adjustment bolts.



Note adjustment screws and motor mounting bolts.



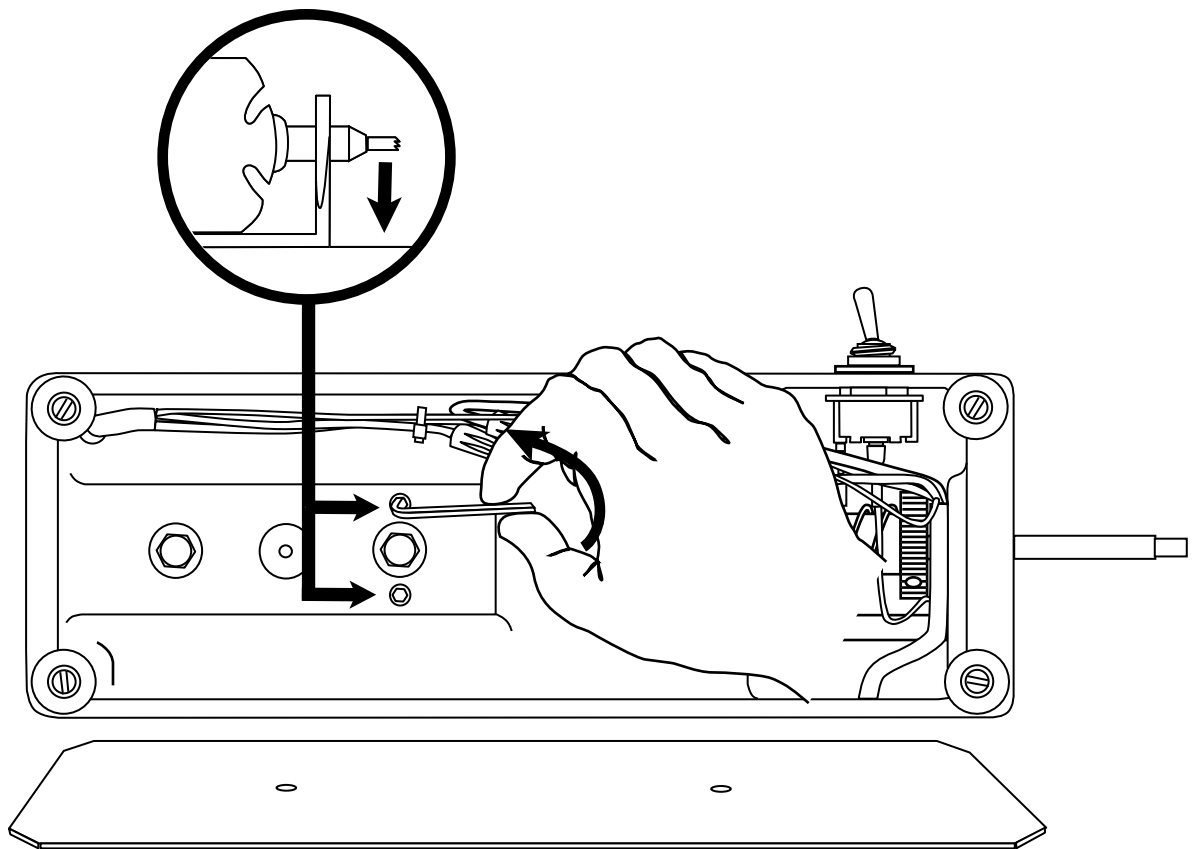
Loosen inside motor mounting bolt 1/4 turn.



If Dim. X is less than .320" (8.13mm):

Move cutter up and increase web thickness by turning **BOTH** adjustment screws clockwise.

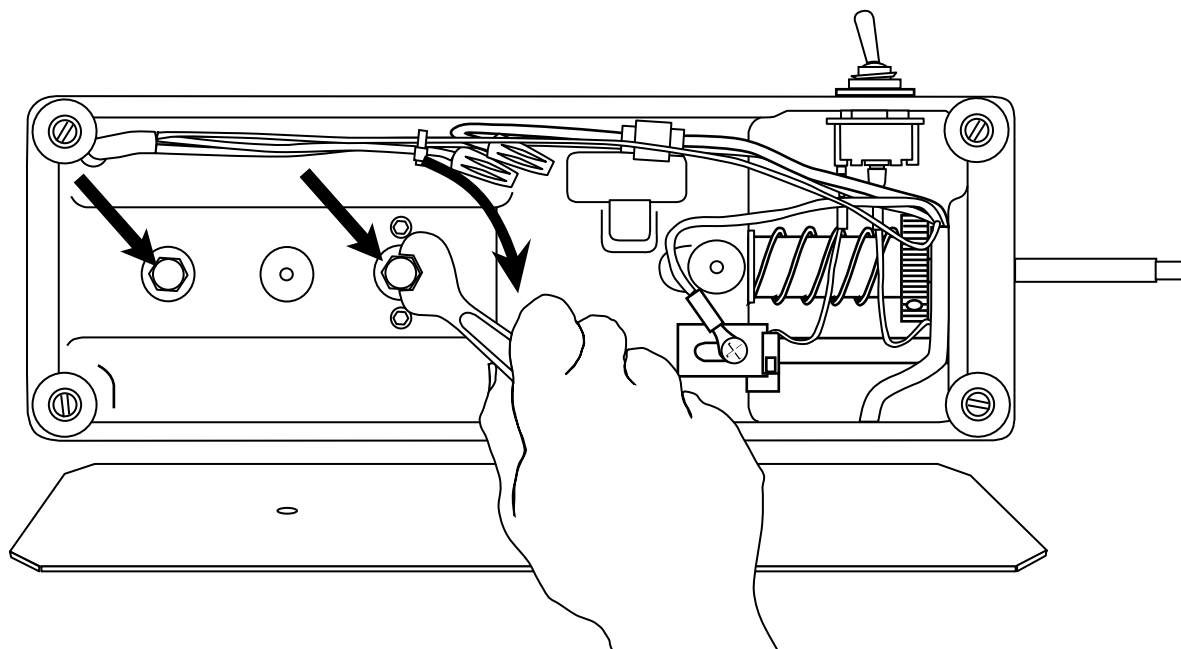
NOTE: a 1/8 clockwise turn will increase web thickness by approximately .005" (.127mm) and increase Dim. X by approximately .010" (.254mm).



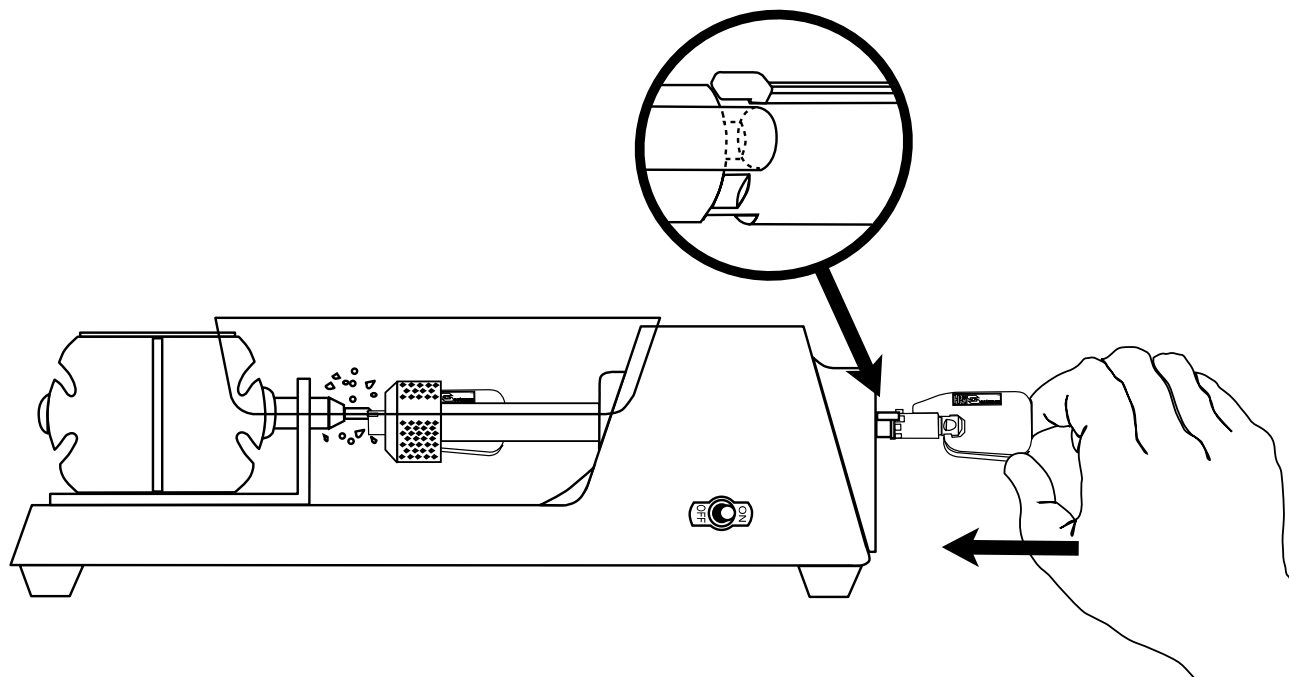
If Dim. X is greater than .326" (8.28mm):

Move cutter down and decrease web thickness by turning **BOTH** adjustment screws counterclockwise.

NOTE: a 1/8 counterclockwise turn will decrease web thickness by approximately .005" (.127mm) and decrease Dim. X by approximately .010" (.254mm).



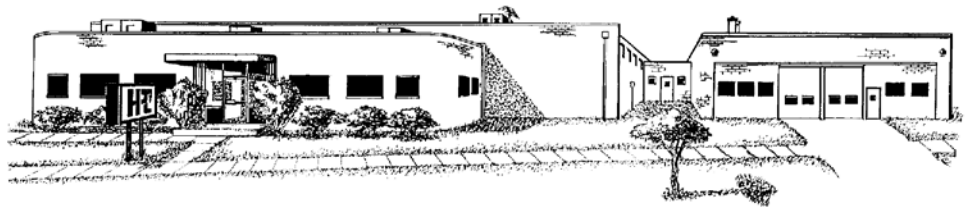
Retighten **BOTH** motor mounting bolts. Replace bottom cover.



Cut a key and check Dim X.

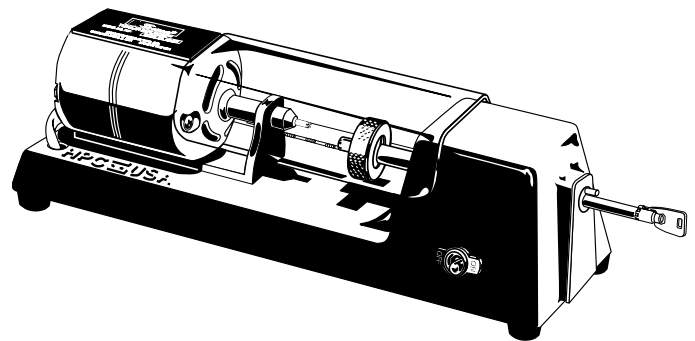
NOTE: to minimize waste of key blanks during adjustment, it will be advantageous to start adjustment with the cutter being too **high**. This will enable you to cut the same key until proper adjustment is obtained.

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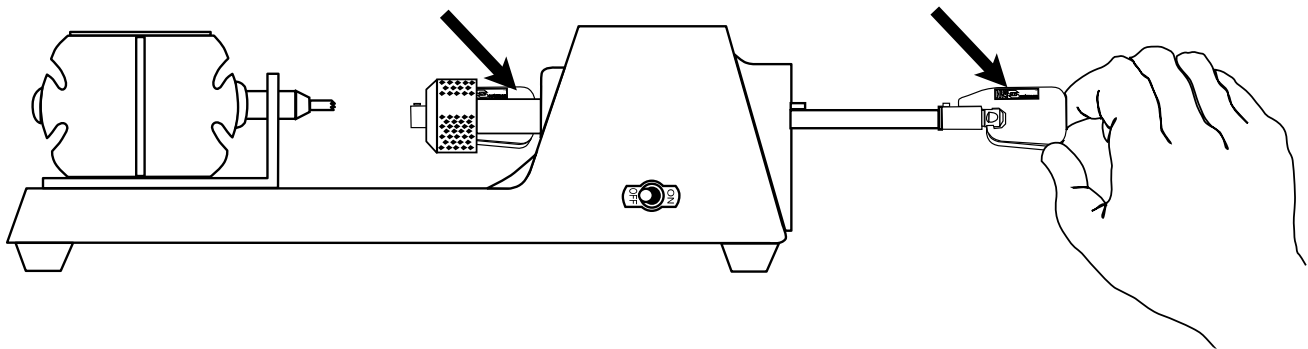
5.0

CUTTER ALIGNMENT

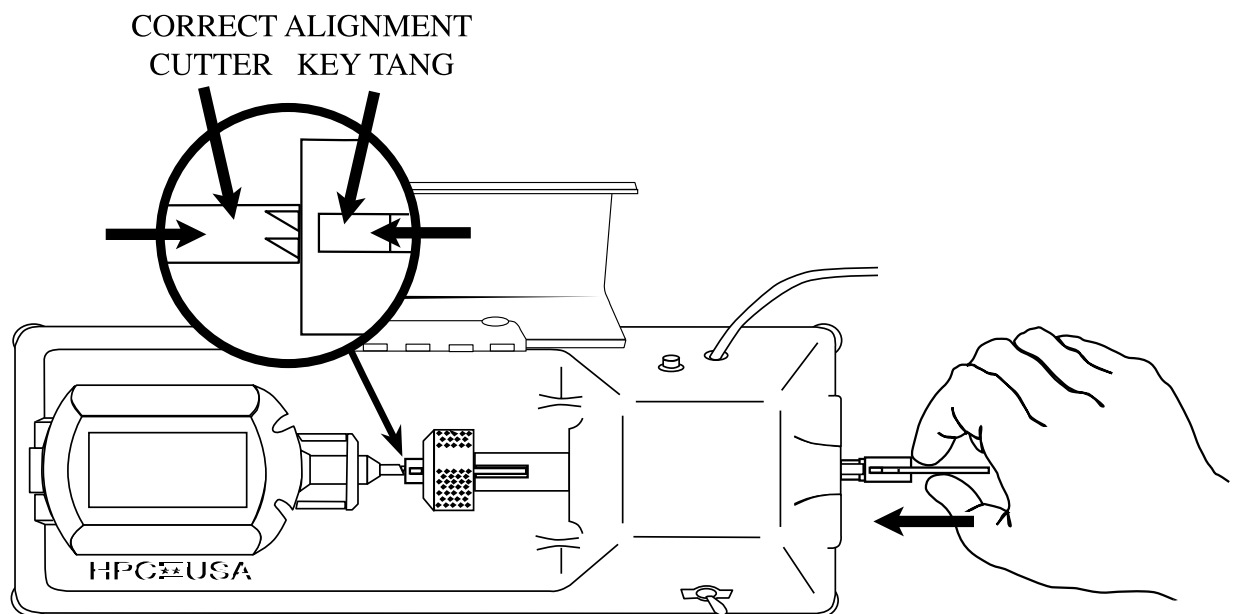


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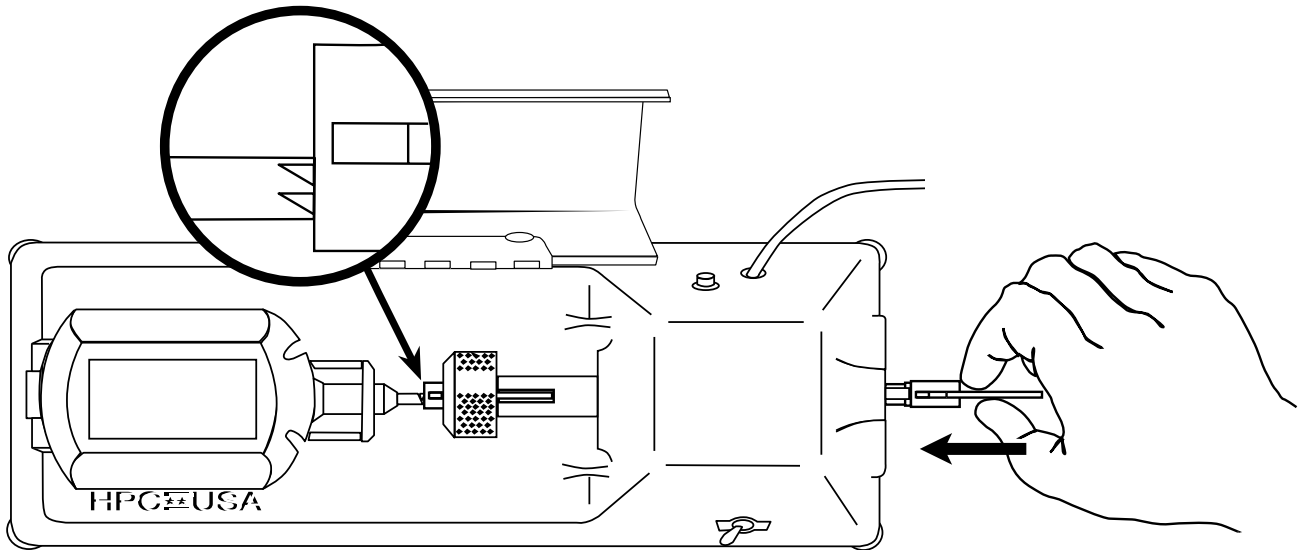


Load (2) blank keys.



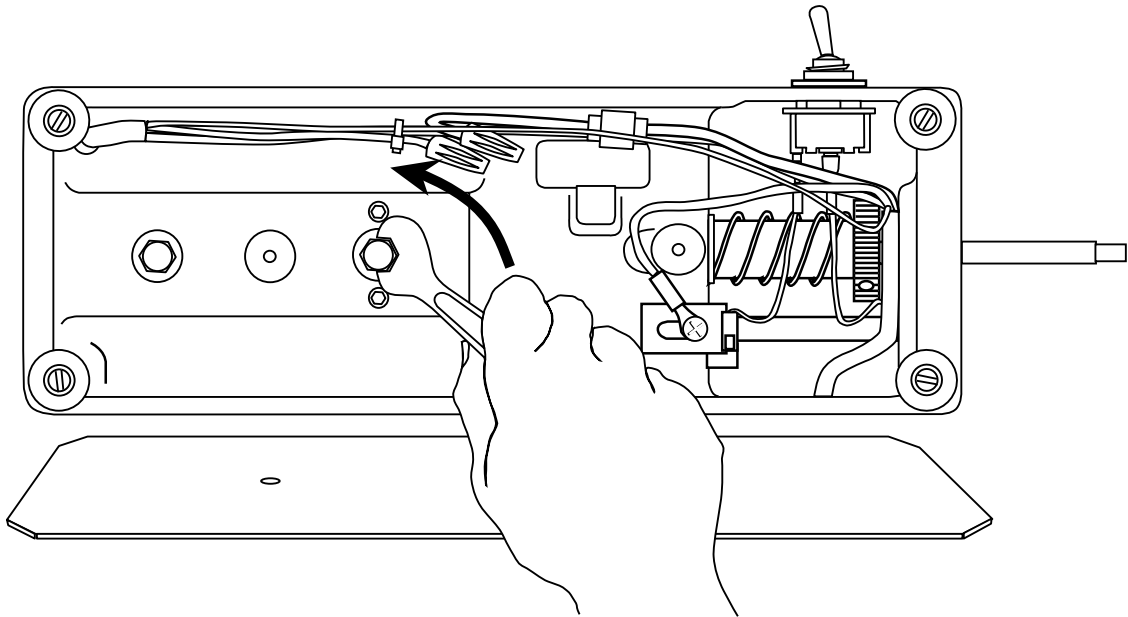
Push shaft to engage cutter and check to see if cutter is centered on tang.

INCORRECT ALIGNMENT
CUTTER IS TOO FAR DOWN

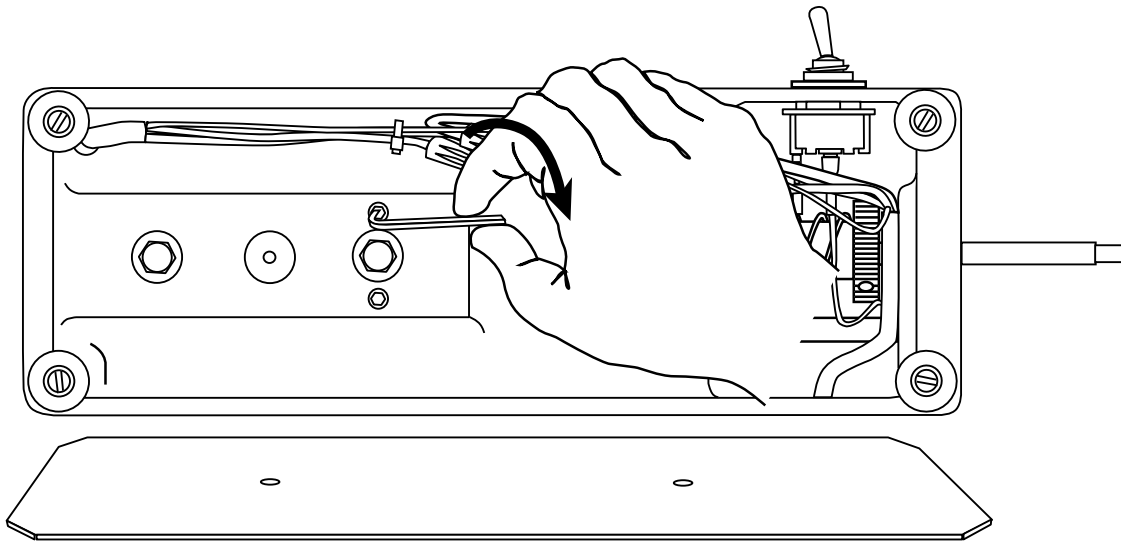


If cutter is **off** in a **downward position-**

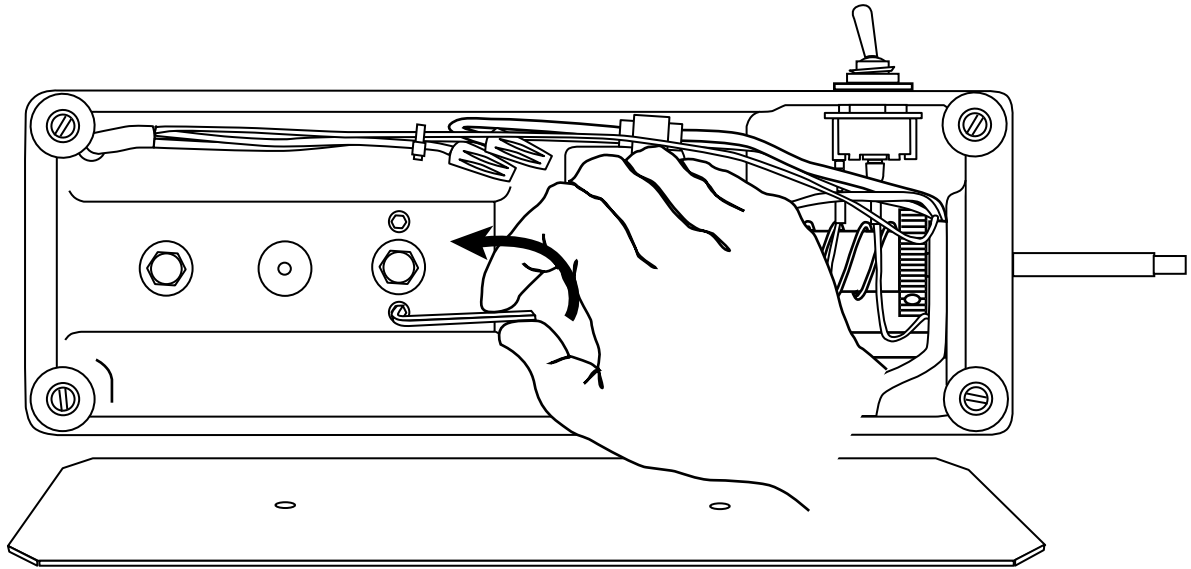
NOTE: If cutter is off in an upward position, turn to page number 49.



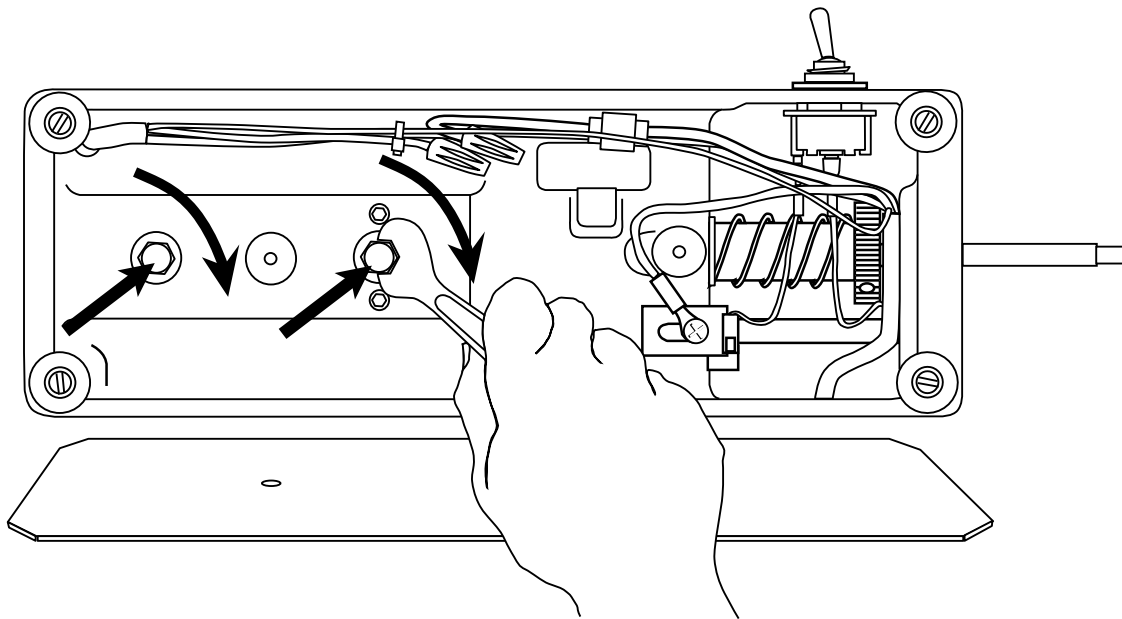
Unplug machine and remove bottom cover. Slightly loosen inside motor mounting bolt.



Turn top screw clockwise 1/4 turn, and. . .



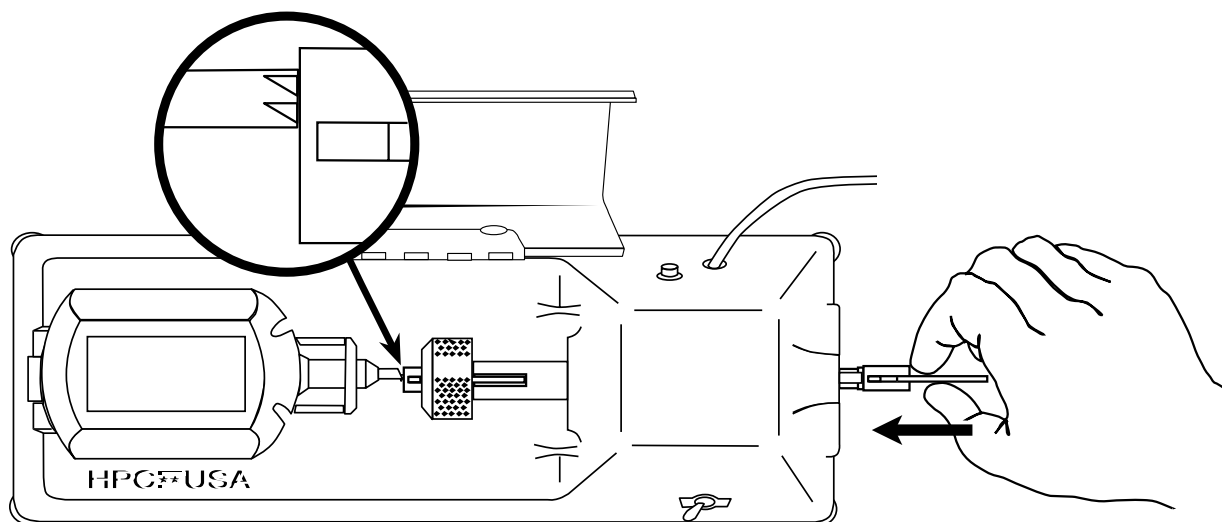
turn bottom screw counterclockwise 1/4 turn.



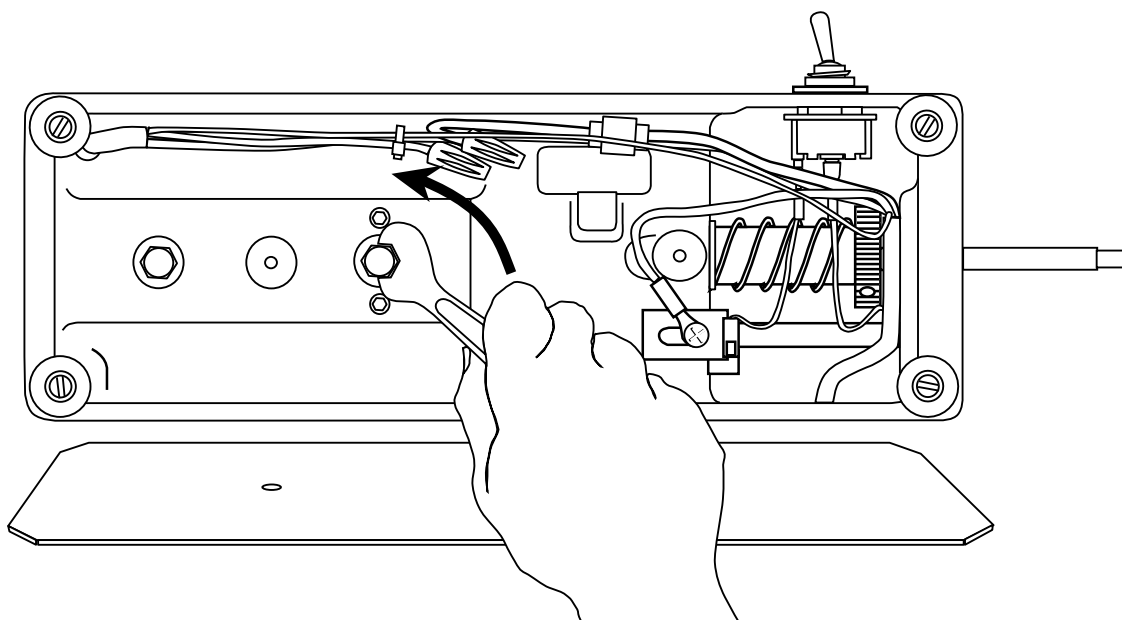
Retighten the motor mounting bolts and check alignment. If alignment is correct, replace bottom cover.

NOTE: You may need to re-adjust for web thickness; be sure to check this **after alignment is complete.** See section (4) for details.

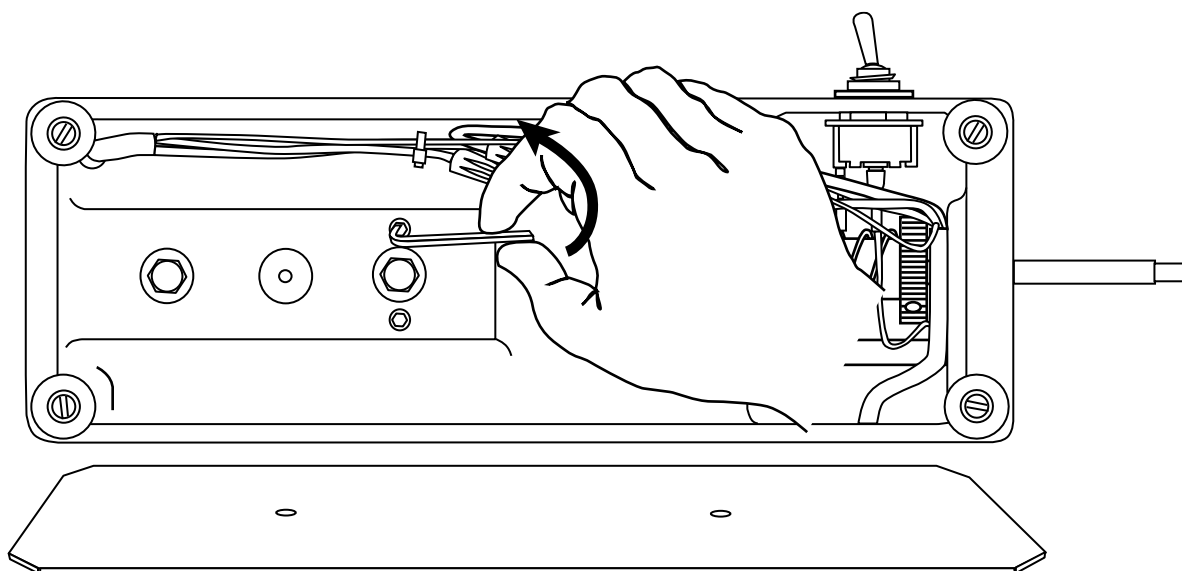
INCORRECT ALIGNMENT
CUTTER IS TOO FAR UP



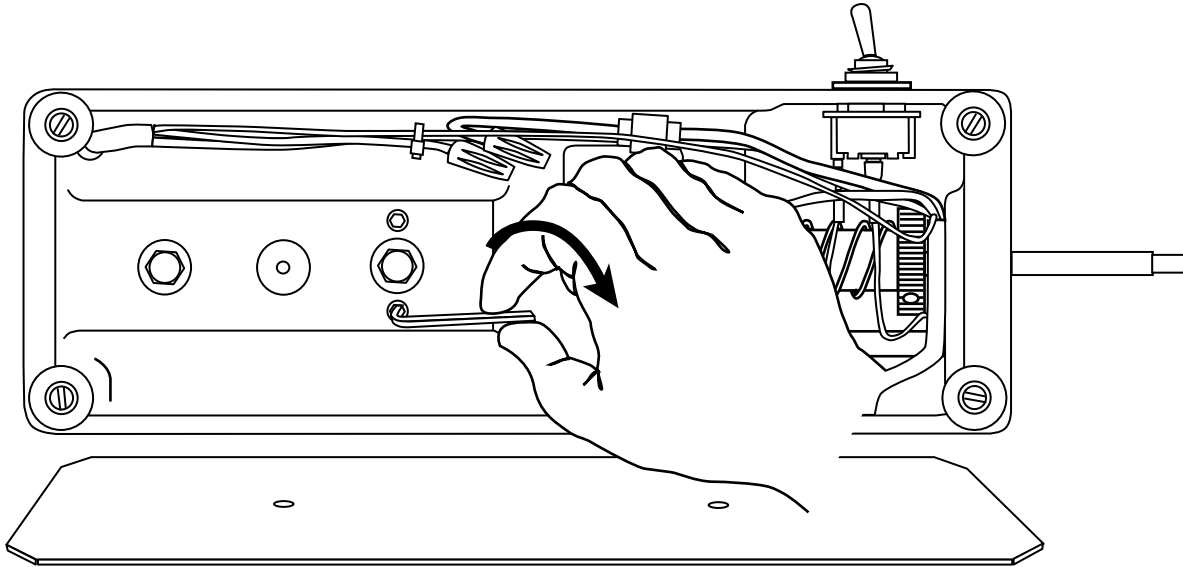
If cutter is **off** in an **upward** position-



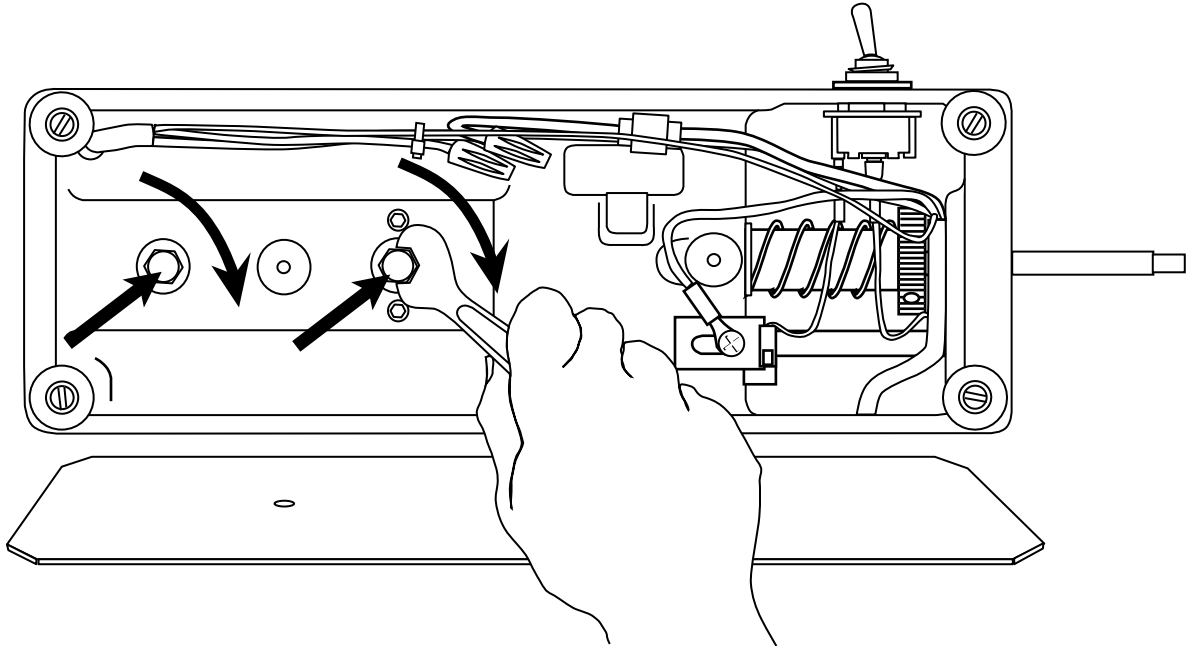
Unplug machine and remove bottom cover. Slightly loosen inside motor mounting bolt.



Turn top screw counterclockwise 1/4 turn, and. . .



Turn bottom screw clockwise 1/4 turn.

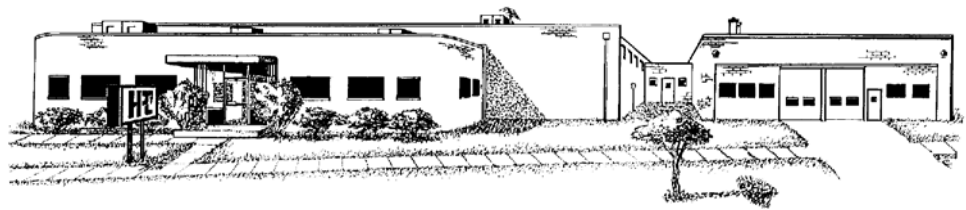


Retighten the motor mounting bolts and check alignment. If alignment is correct, replace bottom cover.

Note: You may need to re-adjust for web thickness; be sure to check this **after alignment is complete**. See section (4) for details.

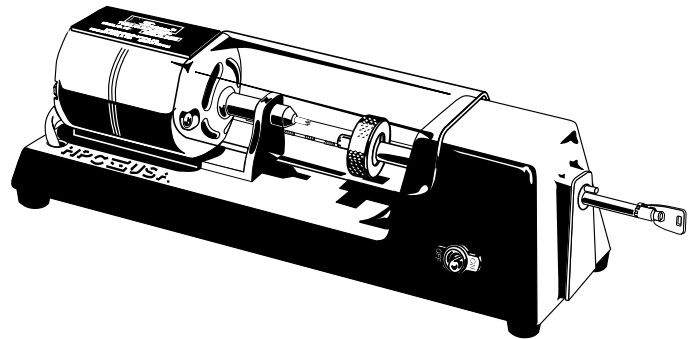
Expect Quality...

Demand HPC.



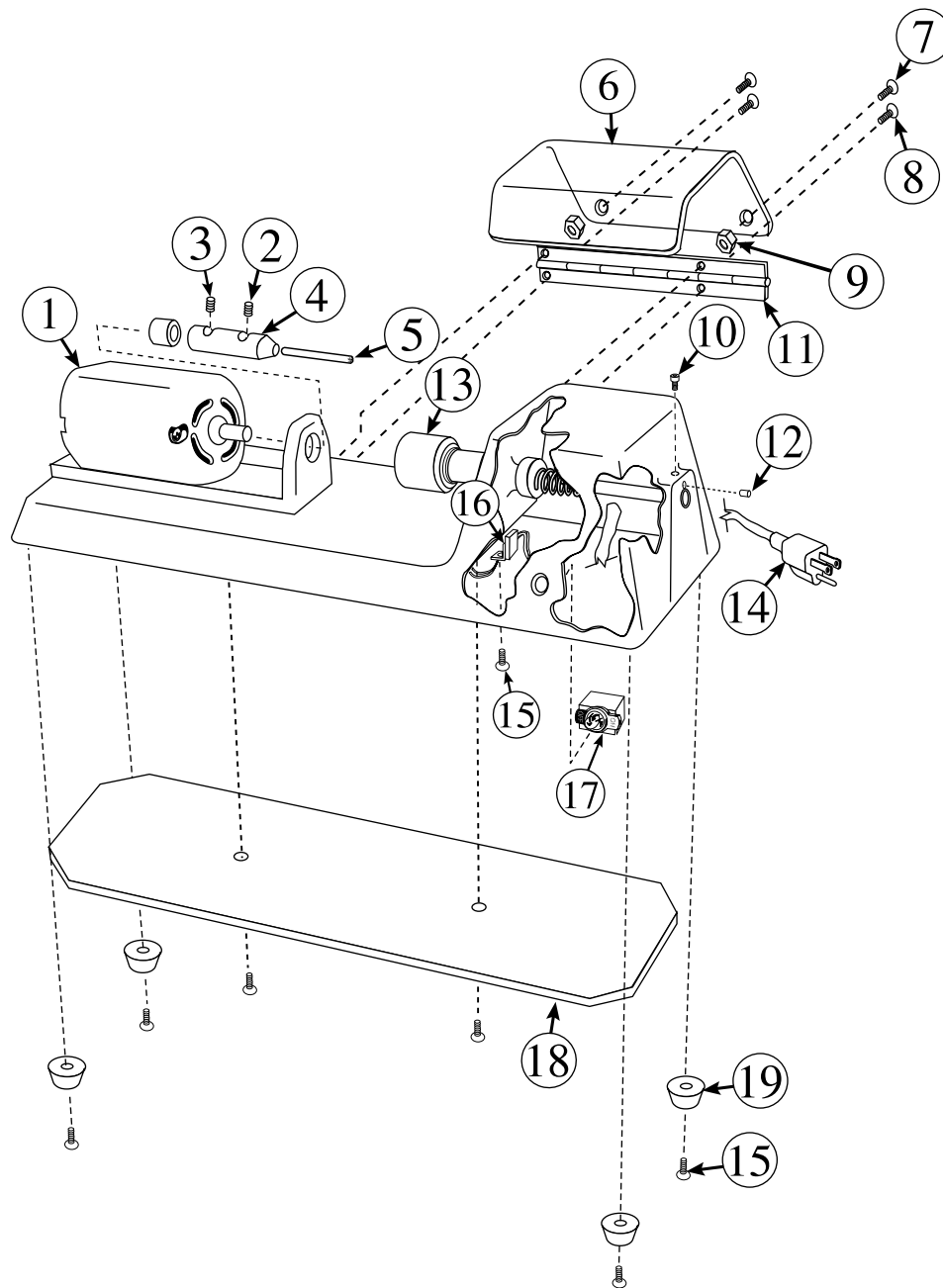
6.0

EXPLODED VIEW AND PARTS LISTING



TUBULAR DUPLICUT™
747E





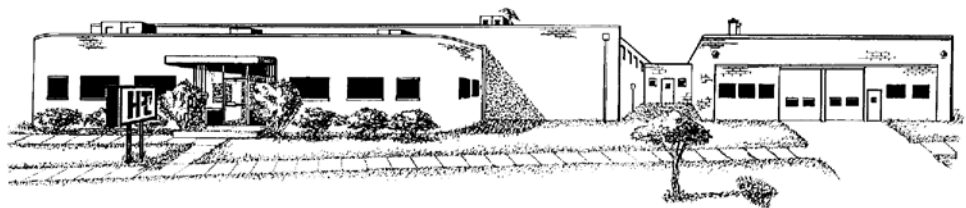
HPC/Scotsman No. 747E Key Machine Exploded View

Parts List

<u>Part No.</u>	<u>Description</u>	<u>Cat. No.</u>
1.	Motor	22-02
2.	Socket Head Set Screw No. 10-32 x 1/8 Long	22-56
3.	Socket Head Set Screw No. 10-32 x 3/16 Long	22-14
4.	Mandrel	25-04
5.	Carbide Cutter	22-01
6.	Lexan Cover	11-04
7.	Flat Head Cap Screw No. 6-32 x 1/4 Long	22-12
8.	Buttonhead Cap Screw No. 10-32 x 1/4	22-18
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16.	Microswitch Assembly	25-02
17.	On/Off Switch	22-06
18.	Bottom Cover	11-07
19.	Rubber Feet	22-11

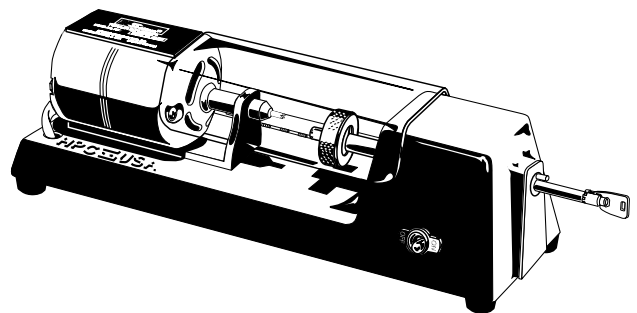


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7.0

PREVENTIVE MAINTENANCE, WARRANTY, AND SERVICE CENTER INFORMATION



TUBULAR DUPLICUT™
747E



LUBRICATION, PREVENTIVE MAINTENANCE, REPAIRS and WARRANTY

- 1 -**MOTOR** - The motor is equipped with sealed bearings that require no lubrication.
- 2 -**BEARINGS AND SLIDING SURFACES** - These are to be given a light coat of grease at least every 6 months.
- 3 -**EXPOSED STEEL SURFACES** - All remaining exposed steel shafts, cutter, etc., should be sprayed with WD-40 or equivalent light oil at least every 6 months. Wipe off any excess.
- 4 -**CLEANING** - Remove all brass chips, dirt and grit from the surface of your machine daily, with a soft bristle brush. Take particular care in keeping the key vise jaw area clean and free of all residue build-up.
- 5 -**WARRANTY** - The 747E Tubular Key Cutting Machine is fully warranted for 90 days from the date of purchase, against factory defects in material and workmanship. Mail the Warranty Card to us immediately, to validate your warranty. Should your machine require factory repairs, it should be packed securely, along with a letter describing the problem in detail, and returned to the factory.

During the 90 day warranty period, you will be billed for handling and shipping only. Neither HPC, Inc. nor our distributors have "loaner machines" available.

HPC SERVICE CENTER

If the need should arise, please note the following in order to assure you, our customer, of prompt service on your key machine repair:

1. The HPC Service Center answers questions involving key machines and related parts Monday through Friday from 8:00 am to 4:30 pm Central time. Please call 800-323-3295.
2. REPAIRS - The preventive maintenance and recalibration of space and depth, as fully outlined in this manual are the only **repairs** or **adjustments** suggested be done by the user. Every effort has been made to thoroughly field test every machine for both permanent shop and service truck installations. Internal operating mechanisms, while extremely simple in function and design, are factory repairable only. Additional repair charges may be incurred by attempting to fix these type of repairs yourself.
3. Parts for repairing any HPC key machine can be purchased directly through the Service Center by calling our toll-free number: 1-800-323-3295. When ordering any parts over the phone, please have a list of the part numbers and descriptions ready to expedite the ordering process. A parts listing and an exploded view drawing is included in this manual. If the parts are needed urgently, express processing is available at an additional charge.
4. If you need to send an HPC key machine in for repair, call the HPC Service Center to obtain a Work Order number. This number should be marked on the outside of the carton. Pack the machine securely in a box strong enough to prevent damage during shipping. Also be sure that your machine is equipped with an HPC cutter when it is sent in for repairs. Include a letter explaining exactly what type of problem you are having and any other work you may want done on the machine. Make sure your address and phone number are on the letter as well as the name of someone we can contact if the need arises while repairing your machine. Our shipping address is:

**HPC, Inc.
Attn. Service Center
3999 N. 25th Avenue
Schiller Park, IL 60176 USA**

5. Payment for parts and repair is by C.O.D., prepayment with order, or Visa/Mastercard credit cards. If you wish to have your HPC distributor billed for the cost of repairs, they will have to call in with approval of the billing and a purchase order number for the work being done, before the machine is repaired. Unless otherwise specified, key machines that are not under warranty will be shipped C.O.D. via UPS after the repairs have been made.
6. If you wish for the service department to call you with an estimate for repair of your machine, please specify this request in writing.
7. If while inspecting your machine our service department discovers additional problems not listed in your note, a service technician will call you with this information and the estimated charges to repair.
8. If no request is made for HPC to call with a repair estimate, but the cost is expected to exceed \$250.00 or 25% of the cost of a new machine, you will be contacted with this information.
9. You will be called if the C.O.D. amount will exceed \$250.00.
10. If after informing you of the repair estimate it becomes apparent that the cost will be higher, you will receive a call informing you of the additional charges before any additional work is done.
11. We are sorry, but neither HPC, Inc. nor our distributors have "loaner machines" available.

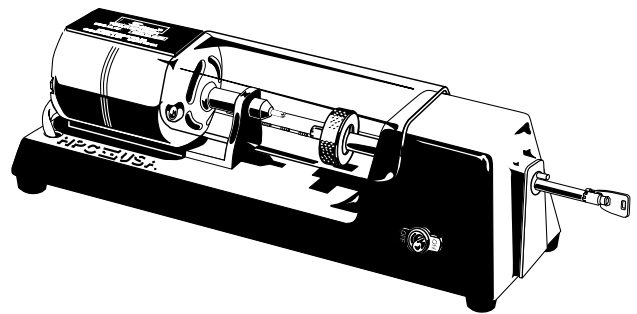


**TUBULAR DUPLICUT™
747E**



7.0

PREVENTIVE MAINTENANCE, WARRANTY, AND SERVICE CENTER INFORMATION



TUBULAR DUPLICUT™
747E



LUBRICATION, PREVENTIVE MAINTENANCE, REPAIRS and WARRANTY

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- 4 -**CLEANING** - Remove all brass chips, dirt and grit from the surface of your machine daily, with a soft bristle brush. Take particular care in keeping the key vise jaw area clean and free of all residue build-up.
- 5 -**WARRANTY** - The 747E Tubular Key Cutting Machine is fully warranted for one year from the date of purchase, against factory defects in material and workmanship. Mail the Warranty Card to us immediately, to validate your warranty. Should your machine require factory repairs, it should be packed securely, along with a letter describing the problem in detail, and returned to the factory.

During the (1) year warranty period, you will be billed for handling and shipping only. Neither HPC, Inc. nor our distributors have "loaner machines" available.

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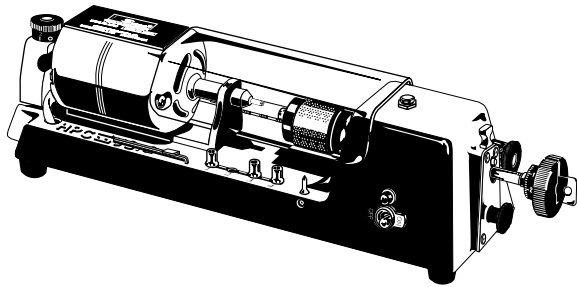


**TUBULAR DUPLICUT™
747E**



HPC/SCOTSMAN TUBULAR LINE

Scotsman Duplicode™

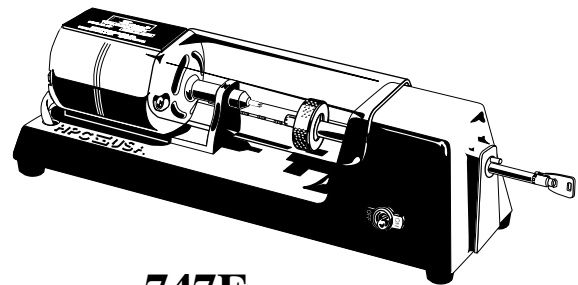


747XU

HPC's new Scotsman 747XU is a lightweight tubular key machine designed to cut all three sizes of tubular keys. The capability of the machine includes dead pin cuts, right and left hand cuts, eight-cuts and double cuts in any position. A unique aspect of the machine is that you can duplicate any key, even if it has non-standard depth increments! The positive decoding mechanism is the first of its kind. This same mechanism allows you to cut by code, leaving you no guesswork!

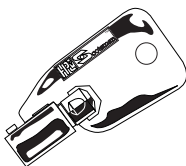
Scotsman Duplicut™

HPC's new Scotsman 747E Econo is a basic no frills tubular key machine. It duplicates in any position or any depth. The Econo Duplicut™ provides an inexpensive standard size tubular key cutting solution.



747E

HPC's New Scotsman Tubular Key Blanks



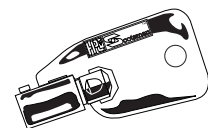
#137 Steel
All Steel Construction
with Nickel Plating
(standard)
.375 diameter



#137B Brass
Unplated Brass Body
with Nickel Plated
Steel Finish
(standard)
.375 diameter



#1375P Brass
Unplated Brass Body
with Nickel Plated
Steel Finish (5 Pin)
.394 diameter



#1375SB Brass
Unplated Small Bore
Brass Body
with Nickel Plated
Steel Finish
.363 diameter