Tubular Duplicut™
Tubular Key Cutting Machine
No. 747E

Exploded View & Parts List Inside

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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 for duplicating standard-size tubular keys. 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. (Remember 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 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.
“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. Three or four 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. However, the HPC High Security Tubular Pick (No. TLP-UL) will defeat these locks.

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 HPC Tubular Duplicode™ No.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. NOTE: There are some locks that use other increments, such as Dyna-Lok that uses .025”.

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 lock should be decoded and a new key cut to code using the code cutting capability of the HPC Tubular Duplicode™ No.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. The Tubular Duplicut™ will also duplicate cuts in these offset spacings.
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PARTS DESIGNATION
Model 747E Tubular Key Cutting Machine Parts Designation

Motor: 120VAC/60 cycle or 240VAC/50 cycle
(1.2 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
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 3/8" (.375", 9.5mm).
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.)
Firmly Hand tighten Chuck nut.

Close cover.
Turn machine on.
Begin to push shaft in and rotate to first position to be cut.
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.”
Wait for cutter to stop spinning, then lift the cover.
Turn chuck nut counterclockwise to loosen.
Remove keys. Deburr the duplicate key as needed and test in lock.
3.0

CHANGING CUTTERS
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
WEB THICKNESS
.004" (0.1mm) to
.007" (0.18mm) TYPICAL

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. Turn machine over to expose adjustment bolts.
Note adjustment screws and motor mounting bolts.
Loosen both motor mounting bolts 1/4 turn.
If Dim. X is less than .320” (8.13mm):

Move cutter up and increase web thickness by turning ALL 4 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 ALL 4 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.
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.
5.0

Cutter Alignment
Load (2) blank keys.
Push shaft to engage cutter and check to see if cutter is centered on tang.
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 turn upside down.
Slightly loosen both motor mounting bolts.
Turn both top screws clockwise 1/4 turn, and...
Turn both bottom screws counterclockwise 1/4 turn.
Retighten both motor mounting bolts and check alignment.

**NOTE:** You may need to re-adjust for web thickness; be sure to check this after alignment is complete. See Section 4 for details.
If cutter is off in an upward position-
Unplug machine and turn upside down. Slightly loosen the motor mounting bolt.
Turn both top screws counterclockwise 1/4 turn, and...
Turn both bottom screws clockwise 1/4 turn.
Retighten the motor mounting bolts and check alignment.

**Note:** You may need to re-adjust for web thickness; be sure to check this after alignment is complete. See Section 4 for details.
6.0

EXPLODED VIEW AND PARTS LISTING
HPC/Scotsman No. 747E Key Machine Exploded View
## Parts List

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<th>Description</th>
<th>Cat. No.</th>
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<td>1.</td>
<td>Motor with Power Switch (120 VAC)</td>
<td>22-57</td>
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<td></td>
<td>(240 VAC)</td>
<td>22-59</td>
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<td>3.</td>
<td>Socket Head Set Screw No. 10-32 x 3/16 long</td>
<td>22-14</td>
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<td>4.</td>
<td>Mandrel</td>
<td>25-04</td>
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<td>Carbide Cutter</td>
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<td>6.</td>
<td>Lexan Cover</td>
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<td>7.</td>
<td>Flat Head Cap Screw No. 6-32 x 1/4 long</td>
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<td>8.</td>
<td>Buttonhead Cap Screw No. 10-32 x 1/4</td>
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<td>9.</td>
<td>Hex Nut No. 6-32</td>
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<td>10.</td>
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<td>11.</td>
<td>Hinge</td>
<td>11-03</td>
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<tr>
<td>12.</td>
<td>Depth Stop Pin</td>
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<td>13.</td>
<td>Chuck Nut</td>
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<tr>
<td>14.</td>
<td>Screw No. 8-32 x 3/8 long</td>
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<tr>
<td>15.</td>
<td>Rubber Feet</td>
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7.0
Preventive Maintenance, Warranty, and Service Center Information
LUBRICATION, PREVENTIVE MAINTENANCE, REPAIRS and WARRANTY

1 - **WARRANTY** - The Tubular Duplicut™ is fully warranted for 90 days from the date of purchase, against factory defects in material and workmanship. Mail the Warranty Card and a copy of your invoice to us immediately, to validate your warranty. Should your machine require factory repairs, contact the HPC Service Center. During the 90 day warranty period, you will be billed for handling and shipping only.

2 - **MOTOR** - The motor is equipped with sealed bearings that require no lubrication.

3 - **BEARINGS AND SLIDING SURFACES** - These are to be given a light coat of grease at least every 6 months.

4 - **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.

5 - **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.
HPC SERVICE CENTER

If your HPC Key Machine should require service, please note the following information:

**HOURS:** The HPC Service Center answers questions involving key machine repair and replacement parts Monday through Friday from **8:00 am to 3:30 pm**

Please call **800-323-3295** (HPC) or **800-434-8960** (Hudson Lock Company)

**REPAIRS:** We recommend the replacement of cutters, brushes and external parts, the preventive maintenance and recalibration (as outlined in this manual) be the only repairs or adjustments that are done by the user. Internal parts and mechanisms should be factory-repaired only. Additional repair charges may be incurred by attempting to make these types of repairs by yourself.

**FACTORY SERVICE:** If you need to send your HPC key machine in for repair, first call the HPC Service Center to obtain a Repair Order number, then follow these instructions:

Include a letter explaining the problem you are having, as well as any other work you want done on the machine. Make sure your business name, address and phone number, as well as the name of the contact person are on the letter.

Your machine should be equipped with an HPC cutter when it is sent in for repairs. If you are sending in a Blitz™ or CodeMax™ machine also include the Black Horseshoe Tip Stop to insure proper tip gauge calibration. Please do not send in any other accessories (such as other cutters and code cards).

Pack the machine securely in a box strong enough to prevent damage during shipping (preferably the original box).

The Repair Order Number should be marked on the outside of the box.

All machines must be shipped prepaid. Collect shipments will not be accepted.

**REPAIR CHARGES & ESTIMATES:** Upon receipt and evaluation of your machine our technicians will provide a written estimate (by fax) of the repair charges. Some problems may be detected only while the repair work is being done. If after informing you of the repair estimate it becomes apparent that the cost will be higher, you will be notified of the additional charges before any additional work is done.

**REPLACEMENT PARTS:** Key machine parts can be purchased through an Authorized HPC Distributor or directly from the HPC Service Center. When ordering parts over the phone, please have 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.

**PAYMENT:** Payment for parts and repair is required at the time of repair and before the parts are shipped. We accept payment by credit card (Visa, Mastercard or Discover) or by check. Repaired machines and parts can also be sent C.O.D. with an extra charge. If you wish to have your Authorized HPC Distributor billed for the parts or repairs, the distributor must call us with approval of the billing and provide a purchase order number for the parts or work being done, before the machine is repaired or parts are shipped. Unless otherwise specified, key machines that are not under warranty will be shipped C.O.D. with an extra charge after the repairs have been made.

**LOANER MACHINES:** Sorry, but we do not have loaner machines available.

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