Universal™ II

OPERATION MANUAL

≡ilco

Thank You For Purchasing Your New Ilco UNIVERSAL II Code Machine!

The Ilco Universal™ II is designed for originating commercial, residential, and automotive keys in an efficient, straightforward manner. Incorporating several unique design enhancements not found on competitive products, the Universal II is built to deliver superb accuracy in a "user friendly", simple to operate product. Utilizing a series of "code cards", the Universal II allows the user to quickly change over from cutting keys for one locking system to that of another in just seconds! Simply remove the existing code card from the machine, insert the card for the desired application, and if required, install an alternate cutter featuring a different cut profile; changeover is possible in as little as 10 seconds!

In the following pages, we will introduce you to the Universal II, and the steps involved in using it to originate keys. Please read this manual thoroughly to ensure that you fully understand the operation of the machine and are therefore able to take complete advantage of its many capabilities.

One important feature of the Universal II is that its code cards and accessories will work on competitive "card type" models, and "their" code cards and accessories will work with it also. This is especially important for individuals that have been using card type code machines for several years; the various accessories that were purchased over time for a prior machine will work equally well on the Universal II!

Accurate, easy to operate, simple to calibrate… We are sure you'll find the Universal II to be, feature-for-feature, the best value in a "card type" code machine available today.

Thank you for choosing Ilco!

CONTENTS

IMPORTANT - Please read carefully before operating machine.

Safety begins with education, and continues with proper application. All personnel who operate your machine should read the supplied Operator's Manual for information on how to properly operate it. The likelihood of accidents and miscuts will be greatly reduced.

General safety

- Safety glasses must be worn to reduce the possibility of eye injury while operating or in the immediate vicinity of key cutting equipment.
- Always turn machine off before making adjustments or inserting or removing keys.
- Machine should be located in an area accessible only by authorized operators. Location must be such that customers and other personnel are not subject to potential injury from "flying chips".
- Do not defeat safety features built into your machine. Removal or modification of safety shields, cutter guards, and other safety devices should be strictly forbidden.

Electrical safety

- (120 Volt models) Your machine is designed to operate using 120 Volt A.C. 60 Hz. electrical current. It is supplied with a three-prong power plug which should be used with a properly grounded three-prong outlet only. Do not defeat the safety purpose of the plug by modifying or using with non-grounded outlets!
- To reduce risk of fire or electrical shock, do not expose or operate machine in damp or wet locations.

Grounding instructions

- In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This machine is equipped with an electric cord that has an equipment-grounding conductor and a grounding plug. The plug must be plugged into a machine outlet that is properly installed and grounded in accordance with all local codes and ordinances.
- Do not modify the plug provided - if it will not fit the outlet, have the proper outlet installed by a qualified electrician.
- Improper connection of the equipment-grounding conductor can result in a risk of electric shock. The conductor with insulation

- At no time should the mechanically-driven parts of the machine be touched while it is in operation. The operator should take care to ensure that loose-fitting clothing, long hair, etc. are kept from the area of machine operation.
- Your machine has been specially designed and built for key cutting purposes only and should be operated according to the Operator's Manual. All other uses are strongly discouraged as potentially dangerous, and should not be attempted! Such use will immediately void the machine's warranty.
- Some states have specific age restriction concerning the operation of certain types of equipment. Check local and state ordinances for compliance.

- Electrical problems should be referred to qualified repair technicians. If the machine is under warranty, contact Ilco Unican at the address printed on the cover. (ILCO also offers repair service for out-of-warranty machines. Contact ILCO for details.)
- Always unplug the machine before removing the hood or changing the cutter wheel.

that has a green outer surface (with or without yellow stripes) is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.
- Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the machine is properly grounded.
- Use only 3-wire extension cords that have 3-prong grounding plugs and 3-pole receptacles that accept the machine's plug.
- Repair or replace damaged or worn cords immediately.

CARTON CONTENTS

Your new Universal II key cutting system includes the following:

A   1 ea.   Universal II Code machine
B   1 ea.   T14MC Cutter (Installed on machine)
C   1 ea.   TCW-1011 Cutter
D   1 ea.   MCM-CP1 Code Card Set Includes 120 Code Cards)
E   1 ea.   MCM-BIN1 Code Card Binder (with 3 storage panels)
F   1 ea.   MCM-WR1 Wrench (open end)
G   1 ea.   MCM-WR2 Wrench (box end)
H   1 ea.   MCM-SH1 Shim
I   1 ea.   MCM-TSU U-Shaped Tip Stop
J   1 ea.   MCM-TSR Red Plastic Tip Stop
K   1 ea.   Universal II Instruction Manual

Please take care to store the accessory items in a secure location to prevent loss of misplacement.
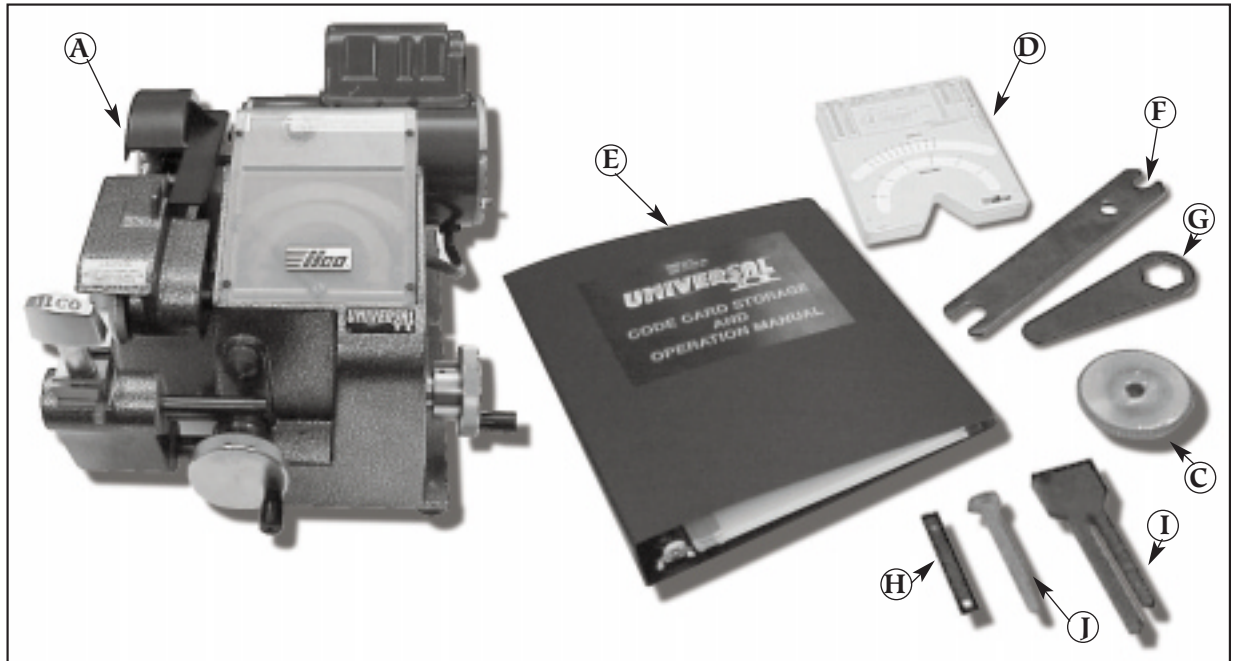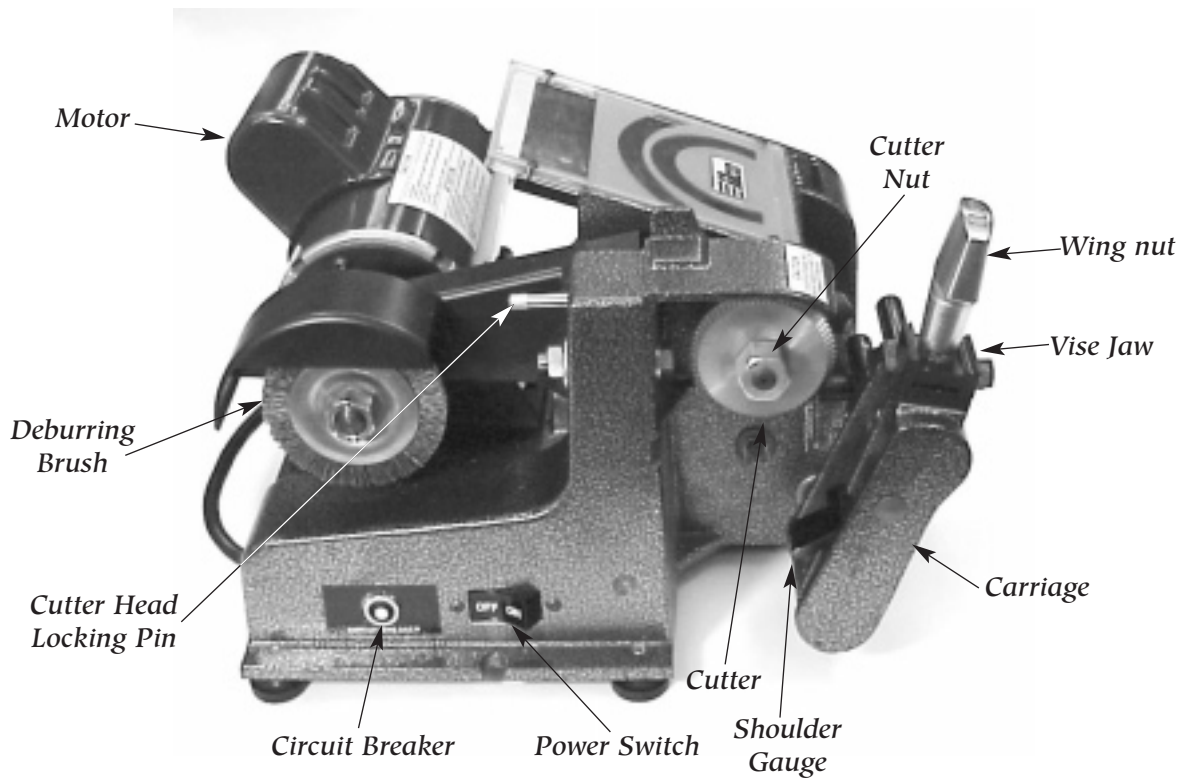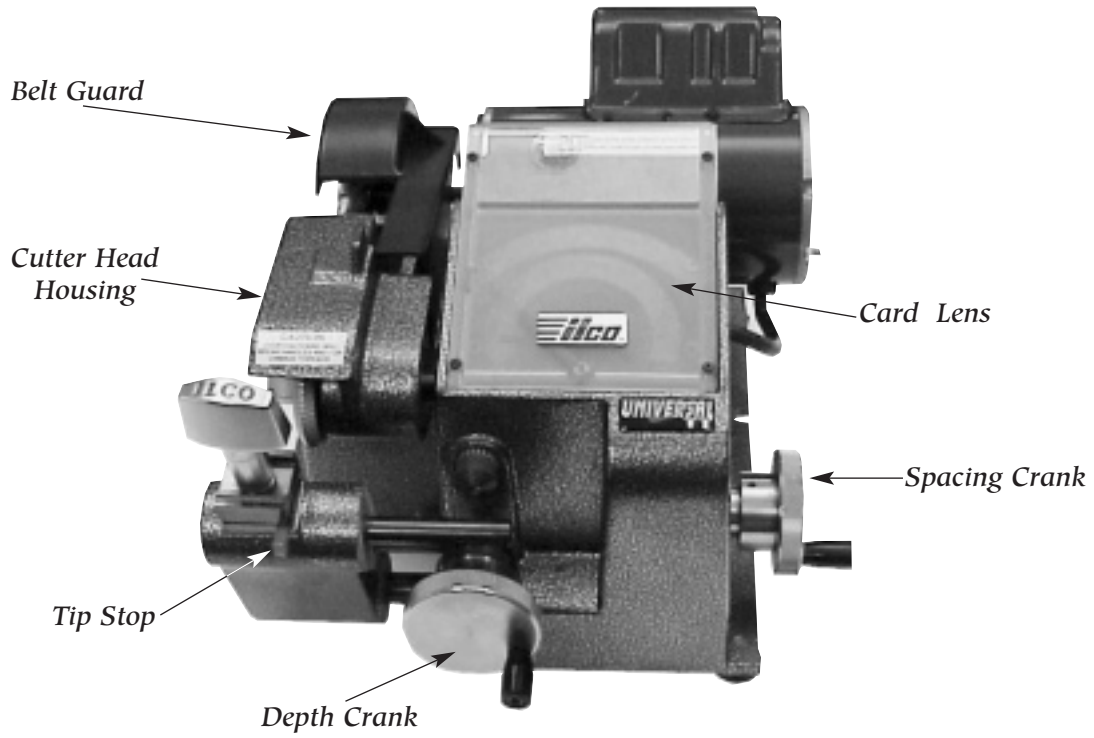

Universal II Code Machine and included accessories

This Operation Manual applies specifically to the Universal II and contains information relative to operation of the machine as well as proper identification of replacement parts. Please retain this manual in a safe place; if ownership of the machine is transferred, the manual should accompany it. When seeking service information about this machine, reference the model number (Universal II), and be prepared to provide the serial number of the unit (located on a metal tag attached to the back of the unit). A Parts List, located at the back of the manual identifies machine components by "Product Number" and "Description"; please use both of these identifiers, along with the serial number of your machine when ordering replacement parts.

OPERATING PARTS

Belt Guard

Cutter Head
Housing

Card Lens

Spacing Crank

Tip Stop

Depth Crank

Motor

Cutter
Nut

Wing nut

Vise Jaw

Deburring
Brush

Cutter Head
Locking Pin

Carriage

Circuit Breaker

Power Switch

Cutter

Shoulder
Gauge

Code Card Storage

Once unpacked, your Universal II should be placed in a *stable, well-lit, non-cluttered* work area prior to use. The Code Cards included with your machine are pre-sorted according to usage (Commercial/Residential and Automotive applications). They are further collated alphabetically. Most users will find it easier to locate cards for specific applications by leaving them in this order. Included with your machine is a Code Card Storage Binder containing (3) Code Card Holders. It is suggested that the Code Cards be placed in their special holders for maximum protection. As insurance against losing Code Cards, it is strongly recommended that they be replaced in the Storage Binder when not being used.

Cutter Storage

The Universal II is supplied with two cutters, with several additional cutter types available separately. To maximize cutter life they should be stored so that they do not bump into each other, or against other metal items. Many users store the cutters on a nail or similarly on a wooden dowel pin when not in use on their machine. Tossing cutters into a drawer or toolbox with other metal items is a sure way to reduce their effective service life.

CODE CARDS

1. **MANUFACTURER/PRODUCT DESIGNATION** - Indicates by manufacturer and lock product type, the application for which the Code Card is designed
2. **JAW POSITION CALLOUT** - Indicates the proper vise jaw position to use for the application
3. **CUTTER CALLOUT** - Lists the proper Ilco cutter to use for the application
4. **ILCO CARD NUMBER** - Indicates the Code Card's unique Ilco/Silca card number designation
5. **REF. CARD NUMBER** - Indicates the corresponding HPC card number
6. **CUT DEPTH SPECIFICATIONS** - Shows bitting numbers and their corresponding cut depths associated with the specific Code Card's intended lock application
7. **SPACING SPECIFICATIONS** - Shows dimensional information relative to cut spacing for the specified application
8. **CODE SERIES CALLOUT** - Provides information relative to possible code series used for the specified application
9. **KEY BLANK CALLOUT** - Provides information relative to key blanks that historically have been used with the specified lock application. Where multiple key blank numbers are given, the first number shown in a grouping (#### / #### / ####) is the Ilco key blank number, the second is its E-Z equivalent, and any additional numbers refer to OEM or other key blank manufacturers. The list of keys shown is in many cases only a representative listing; most manufacturers use multiple key blank profiles with their lock products. Due to space restraints, only the more common key blanks may be listed on a given card.
10. **DEPTH MARKINGS** - Displays the markings that the Depth Needle will need to be aligned with during the cutting process
11. **SPACING MARKINGS** - Displays the markings that the Spacing Needle will need to be aligned with during the cutting process
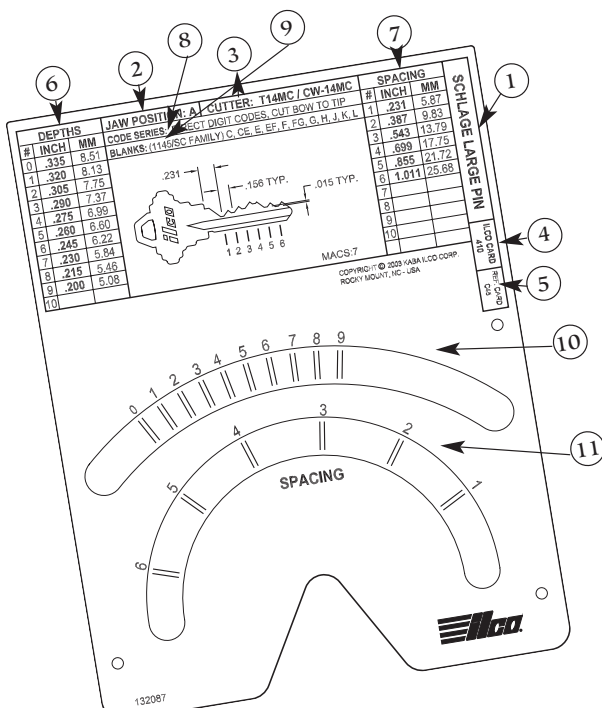
CODE CARDS

Some Code Cards feature additional information on their reverse side. This information would typically include the following:
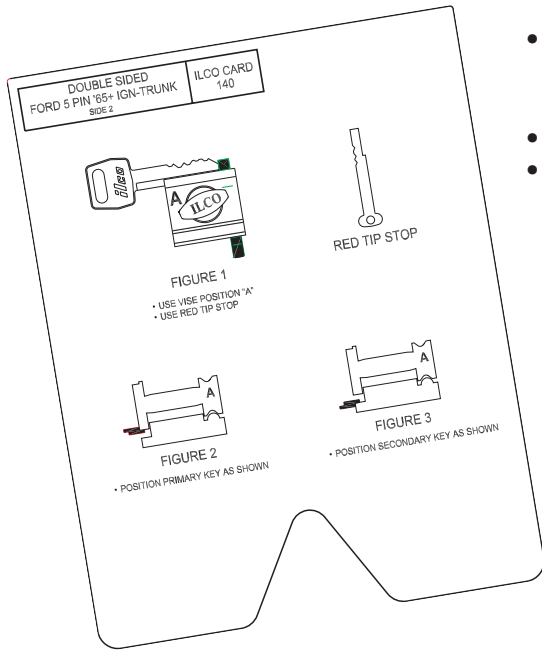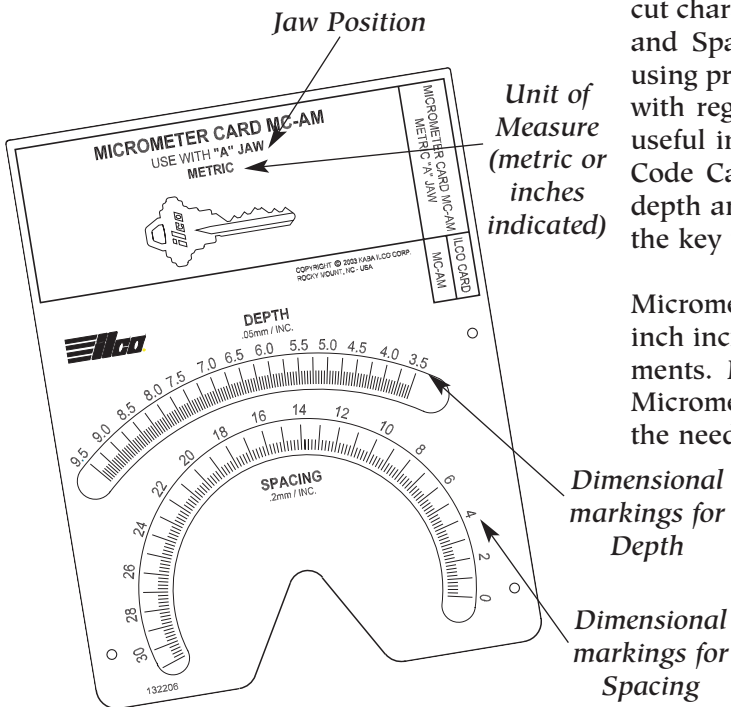

- Graphics illustrating which vise position to use, and VERY IMPORTANT, how to position the key blank in the jaw in order to properly clamp it in a secure fashion.
- A drawing of the proper TIP STOP to use to gauge the key (if applicable)
- Instructions relative to the use and placement of the Straight Shim accessory (if applicable)

Micrometer Cards

Included in the selection of Code Cards received with your machine is a special type known as a MICROMETER CARD. Unlike other Code Cards, Micrometer Cards are not designed for specific lock manufacturers or lock products. Instead of Spacing and Depth Markings, they feature a graduated dimensional scale. This allows the user, with an in-depth knowledge of the physical cut characteristics of a given key, to position the machine's Depth and Spacing Needles based on actual dimensions rather than using pre-established Depth and Spacing numbers, as is the case with regular Code Cards. Therefore, Micrometer Cards are very useful in instances where you do not have the correct dedicated Code Card for a particular application. If you know the actual depth and spacing dimensions for a given key, you can originate the key using the appropriate Micrometer Card.

Micrometer Cards are categorized by unit of measure, (metric or inch increments), as well as by vise jaw and key gauging requirements. Many users will never have to originate a key from a Micrometer Card, but they do provide a simple alternative should the need arise.

Jaw Position

Unit of Measure (metric or inches indicated)

Dimensional markings for Depth

Dimensional markings for Spacing

Description	ILCO Card #	Ref. Card #	Cutter	Description	ILCO Card #	Ref. Card #	Cutter
COMMERCIAL APPLICATIONS				British Autos & Cycles	73	CF43	TCW-1011
American Small Pin	494	C30	TCW-1011	Chrysler 8-Cut	745	CX102	TCW-1011
Arrow--New Large Pin	1355	C2	T14MC	Chrysler Double-Sided ('89-'92)	287	CX59	TCW-1011
ASSA Twin 6000	345	CEX1	TCW-32MC	Chrysler Double-Sided ('93+)	537	CX60	TCW-1011
Best/Falcon/Eagle/Arrow (A2)	563	C3	TCW-90MC	Chrysler Pin ('69+)	139	C10	TCW-1011
Chicago Pin	1041	C6	TCW-1011	Chrysler/Renault (Secondary) (B,G,C,DE)	32	CF101	TCW-1011
Chicago/Fort Single Sided-Disc	561	C5	TCW-1011	Chrysler/Renault/Peugeot (Prim.) (B,G,H,J,E) ('82-'85)	28	CF100	TCW-1011
Chicago/Steelcase Small Pin	1042	CX14	TCW-1011	Eagle Premier Ignition ('88+)	290	CF119	TCW-47MC
Corbin (system 70) (X-class/ 27-99) ('77+)	1391	CX5	TCW-90MC	Ford 5 Pin Double-Sided ('65+)	140	C24	T14MC
Corbin Disc	1114	C11	TCW-1011	Ford 8-Cut	612	CX101	TCW-1011
Corbin Small Pin	398	C12	TCW-1011	Ford Aspire (Kia) 10-Cut (B Series)	585	CF303	TCW-1011
Dexter Large Pin ('69+)	401	C16	T14MC	Ford Capri/Fiesta	1345	CF11	TCW-1011
Eagle Large Pin	1072	C21	T14MC	Ford Cargo Truck ('86+~/Sterling)	439	CF48	TCW-1011
Eagle Small Pin Long Space	1046	C20	TCW-20	Ford l0 Cut	194	CX56	TCW-1011
Emhart/Corbin/Russwin (system 70) (Z,D,H) ('93+)	1290	CX6A	TCW-90MC	General Motors Wafer ('36+)	1333	C25	TCW-1011
Emhart/Corbin/Russwin (system 70) High Security Angle Cut	1655	CX1	TCW-1013	Geo Tracker/Suzuki Sidekick/ Isuzu	288	CF89	TCW-1011
Hudson Disc	1069	CX32	TCW-1011	GM ('94+) Modular Ignition Program	567	CF215	TCW-1011
Hudson Small Pin	1039	C26	TCW-1011	GM-Allante ('87+)	222	CF204	TCW-1011
Ilco Small Pin	1049	C27	TCW-1011	GM-Cavalier ('91+~/"N" Body ('92+)	470	CF206	TCW-1011
Ilco/Lockwood Large Std. Pin	404	C28	T14MC	GM-Chevy Nova Primary & Secondary (R,S)	1650	CF86	TCW-1011
Illinois/Timberline Single-Sided Disc	1050	C29	TCW-1011	GM-Chevy Spectrum/Isuzu/ Mitsubishi (A,H)	156	CF85	TCW-1011
Kaba Peaks (140) (6 Pin) (A2)	1653	CPKS1	TCW-90MC	GM-Pontiac Lemans (S) ('88+)	110	CF205	TCW-1011
Kaba Peaks (150) (6 & 7 Pin) (A2)	1654	CPKS2	TCW-90MC	GM-Saturn	636	CF207	TCW-1011
Kwikset Large Pin	403	C31	T14MC	Honda ('82+~/Acura ('86+)	148	CF73	TCW-1011
Kwikset Titan	767	C31X	TCW-1011	Honda ('88+~/Acura ('90+)	262	CF74	TCW-47MC
Lori L10	1502	C115	TCW-90MC	Honda Cycles ('83+)	84	CMC37	TCW-1011
LSDA (Taiwan) Large Pin	687	CX58	T14MC	Hyundai 7-Cut (X, Y Series)/ Kia	1651	CF301	TCW-1011
Master Small Pin (7K)	1350	C34	TCW-1011	Hyundai 8-Cut (S, T Series)	487	CF302	TCW-42MC
Master Standard Large Pin (1K)	526	C35	TCW-1011	Hyundai Sonata	1652	CF211	TCW-1011
Medeco Biaxial	1131	CSP3	TCW-1012	Hyundai-U.S. (X-Series) ('86+)	221	CF201	TCW-1011
Medeco Small Pin (thin head)	859	CX3	TCW-1012	Iveco Truck (P,Z)	131	CF99	TCW-1011
Medeco Standard (.030 inc.)	427	C36	TCW-1012	Jaguar XJ6 (10 Disc) ('88+)	217	CF49	TCW-1011
National Cabinet Single-Sided Disc	1054	C37	TCW-1011	Jaguar/Datsun/Mazda/Triumph	5	CF40	TCW-1011
National Cabinet Small Pin Std.	1043	C39	TCW-1011	Kawasaki Cycles ('79+)	151	CMC50	TCW-1011
National Large Pin	1087	C40	T14MC	Kia Sephia (1998+) (8-cut)	742	CF305	TCW-1011
Russwin (system 70) (K,N) ('77+)	1315	CX7	TCW-90MC	Mazda ('70-'80)	21	CF64	TCW-1011
Russwin Large Pin (not system 70)	408	C41	TCW-90MC	Mazda/Ford 10 Cut	1656	CF68	TCW-1011
Russwin D&H (PRE-SYSTEM 70)	1145	C42	TCW-90MC	Mazda/Ford Truck	20	CF63	TCW-1011
Sargent Large Pin	409	C44	TCW-20FM	Mazda/Ford/Mercury	157	CF65	TCW-1011
Schlage Large Pin	410	C45	T14MC	MERKUR (German Ford)	1337	CF13	TCW-1011
Segal Large Pin	1351	C46	T14MC	Mitsubishi Galant (1999+) (8-cut)	1029	CF306	TCW-1011
Taylor Large Pin	1093	C49	T14MC	Nissan Pathfinder	607	CF304	TCW-1011
Taylor Small Pin	1062	C48	TCW-1011	Nissan/Datsun/Subaru (FM,N,W)	80	CF60	TCW-1011
Weiser-Falcon	411	C50	T14MC	Nissan/Datsun/Subaru/GMC (8 Disc)	145	CF67	TCW-1011
Welch Large Pin	1155	C51	TCW-20FM	Porsche (911 -912)	35	CF36	TCW-1011
Weslock Large Pin	1156	C52	T14MC	Saab ('74+)	52	CF56	TCW-1011
XL Lock Letterbox (X, K Series)	1065	C53	TCW-1011	Suzuki Cycles ('88+)	289	CMC71	TCW-1011
Yale Disc	1335	C55	TCW-1011	Toyota (A,M,N,T,) ('69+~/ Chevy Luv (B)	90	CF81	TCW-1011
Yale Large Pin	412	C57	T14MC				
Yale Small Pin	1555	C56	TCW-1011				
COMMERCIAL APPLICATIONS							
American Motors (D, E, K, L)	144	C1	TCW-1011				
BMW/Mercedes (11 Wafer) ('75+)	184	CF34	TCW-1011				
Briggs & Stratton Disc (Gas Cap)	142	C4	TCW-1011				

CODE CARD LISTING

Description	ILCO Card #	Ref. Card #	Cutter	Description	ILCO Card #	Ref. Card #	Cutter
Toyota (unlettered) ('69+J	91	CF82	TCW-1011	Volvo 240,740 & 760	69	CF52	TCW-1011
Toyota 8 Disc	197	CF87	TCW-1011	Volvo/ MG Primary & Secondary	68	CF51	TCW-1011
Toyota Camry/Corolla Sedan/ Geo Prizm	514	CF208	TCW-1011	VW (plain/shoulder side)	48	CF3	TCW-1011
				VW/Audi/Porsche	1339	CF4	TCW-1011
Toyota Corolla Wagon ('93+)	1346	CF209	TCW-1011	VW/Volvo (Gas Cap)	56	CF8	TCW-1011
Toyota/Geo/Isuzu/Mitsubishi/ Suzuki/Daihatsu	264	CF88	TCW-47MC	Yamaha Cycles ('81+)	98	CMC80	TCW-1011
Toyota/Isuzu/Mitsubishi/Hyundai (D,K,R,S,F,P,C,H,U,Z)	89	CF80	TCW-1011				

Micrometer Data Cards

Description	ILCO Card #	Ref. Card #
FOR "A" JAW (INCH)	MC-A	CMMI
FOR "A" JAW (RED TIP STOP)	MC-ART	CMRT
FOR "A" JAW (U-SHAPED TIP STOP)	MC-AUT	CMHT
FOR "A" JAW (METRIC)	MC-AM	CMMM
FOR "A" JAW (RED TIP STOP-METRIC)	MC-ARTM	CMRM
FOR "A" JAW (U-SHAPED TIP STOP-METRIC)	MC-AUTM	CMHM
FOR "B" JAW (INCH)	MC-B	CMBI
FOR "B" JAW (METRIC)	MC-BM	CMBM

CUTTERS

The Universal II is supplied with two cutter wheels, each having a different profile. You can identify each type by the product number displayed on their left side. Ilco's family of cutters for the "U2" is constructed of high quality M2 tool steel, and coated with very hard Titanium Nitride for maximum service life. Both cutters supplied with your machine are designed for cutting specific key types and should only be used for suitable applications, as indicated on the code cards supplied with the machine. The T-14MC is used for most standard "full size" cylinder keys, and is the one installed on your machine when you received it. Also supplied is a TCW-1011 cutter which is used for padlocks, cabinet locks, and most automotive applications (Reminder: exceptions exist… ALWAYS REFER TO CODE CARDS FOR THE CUTTER NUMBER SPECIFIED FOR A SPECIFIC LOCK APPLICATION). Certain code cards require the use of optional cutters not included with the machine; these may be obtained from your favorite Ilco Distributor.

A convenient feature of your Universal II is that no adjustment is required when you change cutters for cutting various keys. The manufacturing tolerances are very rigorously controlled… Use only Ilco cutters or their HPC equivalent! When a cutter begins to dull (characterized by heavy burring of key blanks or louder than normal noise), when cutting you should replace it rather than have it re-sharpened. VERY IMPORTANT: Re-sharpening a cutter reduces its diameter, and hence it will no longer "match" your machine's other cutters and cut to its intended depth. Re-adjusting your machine to "accommodate" a re-sharpened cutter, then "re-setting" it back to its original setting for other applications is not a practical solution… Its best to replace the worn cutter with a new one!

Supplied Cutters:

Cutter No.	Description
T14MC	100° angle; standard "full size" cylinder cutter
TCW-1011	90° angle; common "small" cylinder cutter

Optional Cutters:

Cutter No.	Description
TCW-47MC	87° angle; required for some Toyota, Honda, and other automotive applications
TCW-90MC	90° angle; for Best, Falcon, Arrow, Eagle, Kaba, and keys for similar IC core
TCW-20FM	76° angle; flat tooth profile for Sargent keys
TCW-1012	86° angle; designed for cutting Medeco high security keys (Avail. late 2003)
TCW-1013	90° angle; designed for cutting Emhart high security keys (Avail. late 2003)
TCW-1014	100° angle; designed with .080" flat for one step cutting of Weiser, Kwikset, and Weslock keys when using OEM pins (Avail. late 2003)
TCW-32MC	90° angle; designed for ASSA keys with .032" flat (Avail. late 2003)

HOW TO CHANGE CUTTERS

Always follow appropriate safety practices when changing the cutter on ANY key machine. Maximum safety is assured by UNPLUGGING the machine prior to performing this procedure!

1. Assure that the machine's power switch is in the "OFF" position.

2. Engage the right end of the cutter shaft with a 1/2" open end wrench (part # MCM-WR1 supplied).

3. Remove the cutter nut with a 3/4" box end wrench by turning it clockwise (it has a left hand thread).

4. Remove the cutter.

5. Place the replacement cutter onto the shaft. VERY IMPORTANT. Be certain that the cutter is correctly installed for clockwise rotation! (cutter number should be visible on the left side of the cutter beside the cutter nut).

6. Hold the cutter shaft using the 1/2" wrench and re-install the cutter nut.

7. Tighten the cutter nut using the 3/4" box end wrench. DO NOT OVERTIGHTEN; moderate pressure is sufficient!

Reminder: The cutter nut has a left hand thread and is removed by turning clockwise.

HOW TO GAUGE AND CLAMP KEYS

Clamping Keys

Your Universal II uses a TWO-POSITION vise jaw (featuring "A" and "B" sides) for most applications. Optional vise jaws are required for special applications… their use is specified on Code Cards for applications that require them.

HOW TO GAUGE AND CLAMP KEYS

As previously discussed, the individual Code Cards supplied with your machine indicate the correct jaw position to be used for clamping specific keys. Where appropriate, certain code cards feature graphics on their reverse side to provide additional detail and special instructions for gripping specified key blanks. **VERY IMPORTANT: Pay close attention to the illustrations to assure that you select the proper vise position, correctly position the key blank, and follow all instructions given relative to gauging a key!**

To Change the Vise Jaw Position:

1. Loosen and remove the vise wing nut assembly and thrust bearings
2. Lift up on the Upper Vise to remove it from the machine
3. Flip the Upper Vise over to its alternate position
4. Reinstall the thrust bearings and wing nut assembly.

Option: Remove the upper vise and flip it over to use alternate position.

The Clamping Process:

Due to the huge variety of key profiles (groove patterns) used in today's locking systems, there isn't one correct way to properly clamp all keys! Most keys however, including some double-sided types, should be inserted into the "A" vise so that the bottom of the key blade rests against the inner ledge of the vise (this is the same technique one normally uses to position single-sided keys on most duplicating machines). Code Cards intended for keys requiring a different clamping technique than that just described, display the necessary instructions on their reverse side relative to proper clamping. On such cards, you will find information regarding the correct jaw position to use, how to position the key within the jaw for proper clamping, and if applicable, positioning of the straight shim (Part No. SH1) with your machine.

Points to remember:
• Most keys are clamped using the "A" vise jaw position
• Code cards indicate when an alternate clamping process is required
• Some keys require the use of a straight shim to assure level clamping
• Code Cards supply specific information relative to the clamping of non-standard keys

Very Important:
Once a key blank has been properly gauged and positioned within the vise jaw, use **moderate pressure** when tightening the vise wing nut. **Use care not to OVERTIGHTEN the wing nut during the clamping process! Moderate pressure is sufficient; excessive tightening force may lead to damage, or pre-mature failure of the wing nut or other carriage components!**
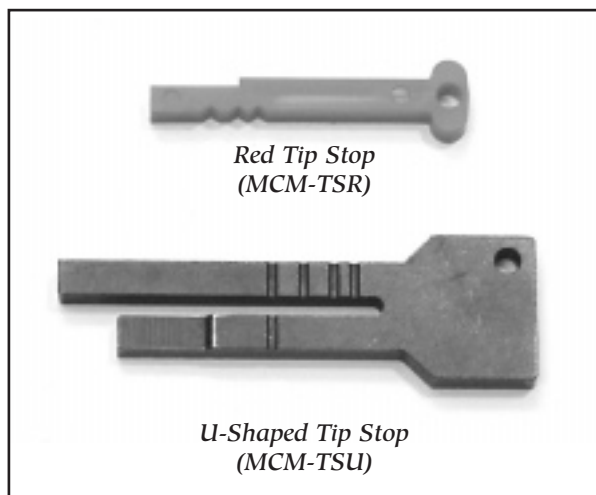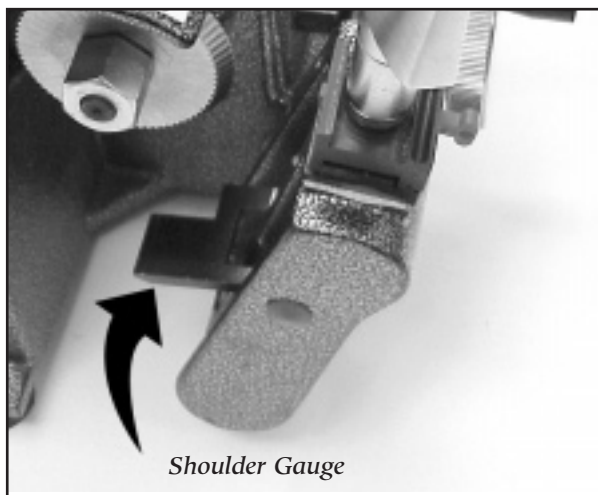
Gauging Keys

CAUTION: Make certain that the power switch is OFF before attempting to gauge keys!
One of the first steps involved with originating a key is to first, properly position the required key blank into the machine's vise jaw. Gauging (aligning the blank) refers to the process that assures the key blank is correctly positioned laterally (left-to-right) relative to the cutter on the machine before beginning to cut it. The Universal II provides three separate ways to achieve this. The most common method used, for keys with a shoulder features along their blade, is "shoulder gauging".

There are also two methods of "tip gauging" for keys without a shoulder feature. Where applicable, Code Cards specify the tip gauging method required for a given application. **You must use the method indicated on the card to achieve the desired result**. A description of each method follows:

Shoulder Gauge

Red Tip Stop
(MCM-TSR)

U-Shaped Tip Stop
(MCM-TSU)

Shoulder Gauging Keys

The majority of Commercial and Residential keys should be gauged using the flapper style shoulder key gauge on the machine. The unique design of the shoulder gauge allows for greater contact along the blade of the key blank than competitive products, and helps assure that the blank is positioned level within the vise jaw. Some Automotive key types are similarly gauged, but those for many newer applications require the use of one of the two Tip Gauging methods described later in this section. When **Tip Gauging** is necessary, you will find a special notation indicating such, on the Code Cards used for those applications.

To Position a Key Using the Universal II Shoulder Gauge:

1. Rotate the SPACING and DEPTH CRANKS counter-clockwise to provide maximum clearance and easy accessibility for inserting the key blank.

2. Insert the required key blank into the vise jaw with the shoulder gauge in the up or load position.

3. Slide the key blank within the jaw so that it's shoulder is in contact with the edge of the key gauge; do not use undue pressure as doing so may cause the shoulder gauge to stick in the load position.

4. At this point, tighten the vise jaw wing nut to secure the key blank in position. **As noted above, it does not require extreme clamping pressure to secure the blank in the vise jaw!**

5. Once the key blank is secured, make certain that the shoulder gauge is returned to its normal down or rest position. Failure to do so may result in damage to the shoulder gauge and/or cutter!

Shoulder of key is in contact with edge of gauge.

Note: To prevent possible interference with the key blank, make certain that the red tip stop is pulled back from the vise jaw into its first detent position whenever the shoulder gauge is used. This assures that the tip stop does not protrude into the vise jaw's clamping area.

HOW TO GAUGE AND CLAMP KEYS

Tip Gauging Keys

As mentioned previously, some keys must be gauged using their tip as the reference point. Most are readily identified by virtue of the fact that they lack a shoulder feature on the blade, and therefore can't be gauged using the method described in the previous section. To address these keys, the Universal II is supplied with two types of Tip Stops. In use, the tip of a key blank is made to contact the edge of the Tip Stop, thus establishing the proper positioning of the key blank within the vise jaw. A Red (plastic) Tip Stop is used with some keys, and a U-Shaped (metal) Tip Stop is required for others. Code Cards designed for cutting Tip Gauged keys specify which of the two styles of Tip Stops should be used for specific applications, and provide additional details regarding their use. Also, both types of Tip Stops incorporate detent positions that may be specifically referenced by a Code Card, the use of which is a requirement for certain applications.

NOTE: When not in use, it's a good practice to position an installed Tip Stop into its first detent position (by pulling towards you) so that it does not intrude into the clamping area of the jaw. With the Tip Stop left too far in, a mis-cut key could be produced if you tried to originate a key requiring shoulder gauge alignment.

To Position a Key Using the Red Tip Stop (plastic)

1. Rotate the SPACING and DEPTH CRANKS counter-clockwise to provide maximum clearance and easy accessibility for inserting the key blank.

2. Insert the Red Tip Stop into the slot on the vise jaw and push in until it reaches the appropriate detent position. **Note: Code Cards used with applications requiring the Red Tip Stop may indicate a detent position that must be used.**

3. For many Automotive applications, the Red Tip Stop is pushed inward into the machine's vise jaw until its **third** detent position is engaged.

4. Some Non-Automotive applications require use of the **second** detent position. In this setting, the tip stop does not protrude as far into the clamping area at the front of the vise jaw.

Tip of key is in contact with edge of tip stop.

5. Insert the appropriate key blank into the vise jaw, following the directions printed on the Code Card. For most tip gauged keys (including all automotive), the tip of the key should butt against the edge of the tip stop.

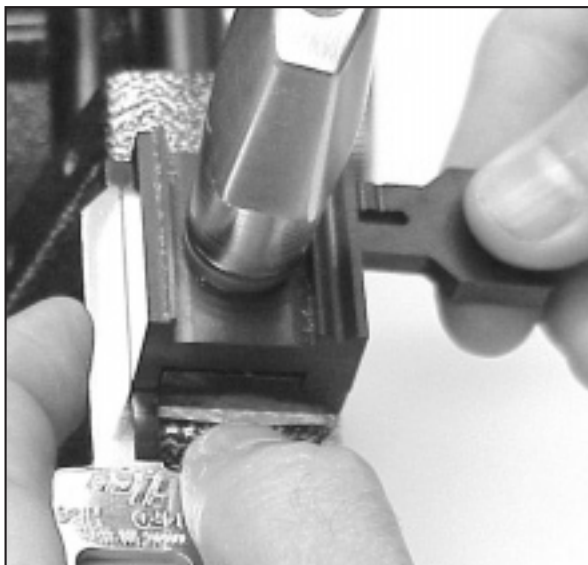6. Tighten the wing nut to secure the key blank in place.
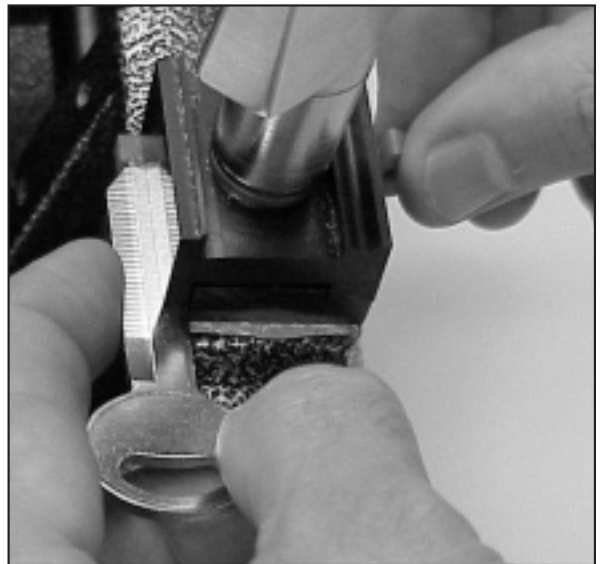
   Note: Once a key is gauged and the wing nut tightened to secure it, you should pull the Tip Stop back towards you to eliminate the potential for damage (due to cutter contact) before proceeding to cut the key.

HOW TO GAUGE AND CLAMP KEYS

To Position a Key Using the U-Shaped Tip Stop (metal):

1. Rotate the SPACING and DEPTH CRANKS counter-clockwise to provide maximum clearance and easy accessibility for inserting the key blank.

2. Insert the U-Shaped Tip Stop into the slot on the vise jaw and push in until it reaches the appropriate detent position. **Note: Code Cards used with applications requiring the U-Shaped Tip Stop typically indicate the correct detent position that should be used.** As in the case with the red tip stop, automotive keys should butt against the tip stop edge.

3. For many Automotive applications, the Red Tip Stop is pushed inward into the machine's vise jaw until its **third** detent position is engaged.

4. Some Non-Automotive applications require use of the **second** detent position. In this setting, the tip stop does not protrude as far into the clamping area at the front of the vise jaw.

Tip of key is in contact with edge of tip stop.

5. Insert the appropriate key blank into the vise jaw, following the directions printed on the Code Card.

6. Tighten the wing nut to secure the key blank in place.

   Note: Once a key is gauged and the wing nut tightened to secure it, you should pull the Tip Stop back towards you to eliminate the potential for damage (due to cutter contact) before proceeding to cut the key.

7. Remove the U-Shaped Tip Stop from the machine when not in use.

SPACING AND DEPTH CONTROLS

The actual process of cutting a key on the Universal II is performed through the movement of two controls, the SPACING CRANK and DEPTH CRANK. As these controls are rotated, the machine's Spacing and Depth Needles move across the depth and spacing windows on the CODE Card lens in relation to movement of the machine's carriage. When a Code Card is inserted in the machine, it provides a visual indication of where to position the needles to create specific cuts on the key. Because of this, it is imperative that the proper Code Card be selected for the key application desired.
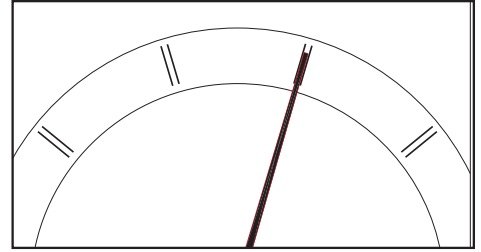
Spacing Crank

Rotating the "SPACING CRANK", located on the right side of the machine, controls the lateral location of cuts (SPACING), along the blade of a key. Counter-clockwise rotation of this crank moves a key blank towards the left, positioning it so that cuts would be produced closer to its tip. The SPACING CRANK is used to position the Spacing Needle directly over spacing markings on a Code Card, to assure proper lateral placement of cuts along the blade of a key.
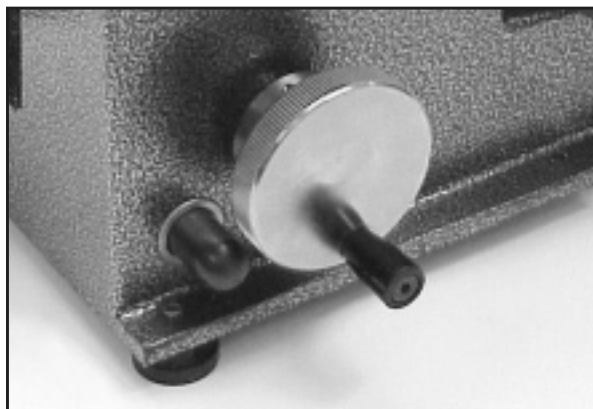
Spacing Crank

SPACING AND DEPTH CONTROLS

- The SPACING CRANK control is used to align the SPAC-ING Needle directly over spacing markings on Code Cards to create a cut at a desired location along the blade of a key.

- Most spacing positions are marked with a "double line" configuration. The Spacing Needle is correctly positioned when it is centered between these lines.

- As a general rule, the Spacing Needle should be positioned over the #1 spacing mark prior to making the first cut on a key blank.

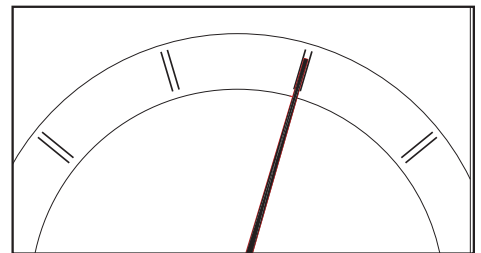*Spacing needle is correctly positioned when "centered" between double line markings.*

Depth Crank

Rotating the DEPTH CRANK, located on the front of the machine, controls the DEPTH of cut. Clockwise rotation will move a key blank closer to the cutter, and thus INCREASES the depth of cut made. Counter-clockwise rotation moves the key blank away from the cutter (decreasing the depth of cut). The DEPTH CRANK is used to position the Depth Needle directly over depth markings on a Code Card, and thus create corresponding cuts on the key blank.

Depth Crank

- The DEPTH CRANK control is used to align the Depth Needle directly over a depth marking on Code Cards to create a desired cut depth on a key.

- Most Depth positions are marked with a "double line" configuration. The Depth Needle is correctly positioned when it is centered between these lines.

- After turning the DEPTH CRANK to create a cut, you should rotate it counter-clockwise until the Depth Needle is to the left of the depth markings on the Code Card being used. At this point, it is safe to rotate the SPACING CRANK to position the Spacing Needle for the next cut to be made on the key.


Spacing needle is correctly positioned when "centered" between double line markings.

A step-by-step explanation of the key cutting process is contained in the following section of this manual.

The instructions that follow, guide you through the process of originating a key on your new machine. **If you have not done so, please read the section concerning Safety located on page 3 of this manual before operating the machine; safety glasses or another approved form of eye protection is STRONGLY RECOMMENDED!** Never Insert, remove or gauge keys with the cutter turning.

1. Select the appropriate Code Card for your intended application and slide it beneath the lens as shown.
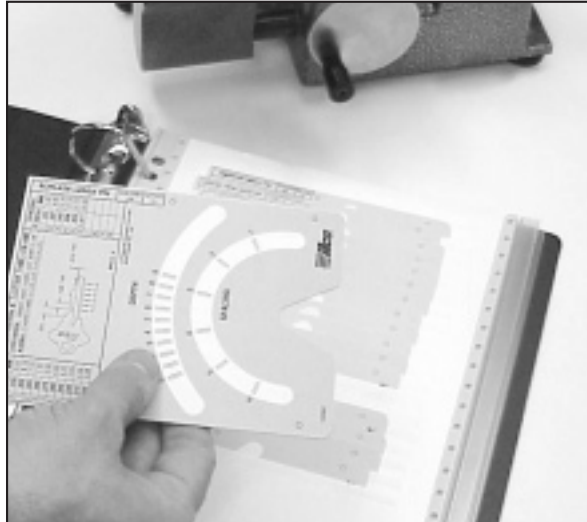
Select the appropriate Code Card   *Slide the Code Card beneath lens as shown.*

2. Verify that the cutter and jaw specified on the Code Card are on the machine; if necessary install the required component.

3. Rotate the SPACING and DEPTH CRANKS counter-clockwise to provide maximum clearance and easy access for inserting the key blank.

4. With the power switch "**OFF**", insert the appropriate key blank into the Universal II's vise jaw and **gauge it using the method indicated on the Code Card**. Once assured that the key is positioned "level" in the jaw, tighten the wing nut to secure it.

   CAUTION - Do NOT remove or insert keys while the cutter is turning!

   Note: A few applications require the use of the steel *Stabilizer Shim* (part no. SH-1) accessory included with your machine, when clamping the key blank. This shim provides additional support for key blanks that might otherwise "tilt" in the vise jaw, due to their particular groove pattern. **Its use is CRITICAL in applications where it is specified on a Code Card!**

Align key using shoulder gauge or correct tip stop as required

ORIGINATING A KEY

5. After securing the key blank in the vise jaw, assure that the Shoulder Gauge is in the down position before continuing.

6. Turn the Power Switch to the "ON" position.

7. Rotate the SPACING CRANK clockwise until the Spacing Needle is centered over the #1 spacing mark in the spacing window. (see picture below)

Rotating Spacing Crank to center Spacing Needle over desired cut position

8. Rotate the DEPTH CRANK slowly until the Depth Needle is centered over the depth mark you wish to cut.

USE CARE NOT TO PASS THIS MARK

Doing so will make the resulting cut deeper than desired!

9. **IMPORTANT:** Rotate the DEPTH CRANK counter-clockwise so that the key blank is clear of the spinning cutter.

10. Rotate the SPACING CRANK to the #2 spacing mark.

11. Slowly rotate the DEPTH CRANK until the Depth Needle is centered over the depth you wish to create in this space position.

12. Follow the same procedure until all required cuts are created from the head of the key to its tip.

13. After completing the final cut, **turn the power switch to the "OFF" position!** Rotate the SPACING and DEPTH CRANKS counter-clockwise to provide maximum clearance and access; remove the finished key.

    CAUTION - DO NOT remove or insert keys while the cutter is turning!

14. Turn the power switch back "ON" to de-burr the key.
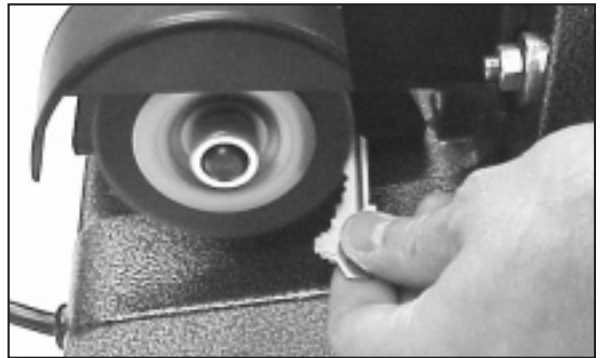
Lightly brush key against rotating brush to deburr

Special Instructions for Double-Sided Keys

Double-sided keys sometimes present a **special** challenge when being cut. For most applications, the Universal II requires that a flat (mostly uncut) surface be positioned against the inner ledge of the vise jaw to establish the reference point for depth of cut. With single-sided keys, no problem exists due to the fact that they are cut only on one side, and thus the flat "referencing surface" remains on the reverse side of the key. Some double-sided keys however, may present a problem, depending upon their specific design, and the amount of uncut material remaining after the first side has been cut.

With some keys and cut patterns, not enough material remains after cutting the first side to assure that the key rests level within the vise jaw, once it is flipped over to create the cuts on the second side. In most cases, an experienced operator can compensate for this by visually "tilting" the key so that its groove pattern is again parallel with the face of the vise jaw as it is being clamped. This usually provides for a properly functioning key, but the accuracy obtained is dependent upon the "judgment of the operator".

For this reason, most Code Cards intended for double-sided keys warn that "**it may be necessary to cut one side of the key by code, and then duplicate the result onto a second key blank**" to create a functioning key. Through experience, most operators will quickly determine which process works best for them when cutting keys for specific applications.

Special Instructions for Code Cards Featuring "Widen Spacing" Marks

A few Code Cards feature special Spacing Markings that allow for **widening** cuts in each spacing location (cards for Weiser and Kwikset are examples). The reason for the special markings is to enable the T14MC cutter (supplied with your machine) to create the wider than normal cut widths necessary for these keys to be used in locks containing **original equipment** pins. For locks containing "standard" aftermarket pins, the middle mark at each spacing position can be used, with no widening process required.

To widen a cut, start at the first widening mark encountered at its spacing position, and while holding the DEPTH CRANK, turn the SPACING CRANK counter-clockwise from the first widening mark until the Spacing Needle is centered over the second widening mark found in that spacing position.

FOR MAXIMUM ACCURACY **DO NOT TURN THE SPACING CRANK CLOCKWISE** DURING THE CUT WIDENING PROCESS!

A simpler solution is to purchase a TCW-1014 cutter (sold separately) for cutting keys requiring wide cuts. When using this cutter, you may center the Spacing Needle over the middle marks at each spacing position and the cut created will automatically be wide enough to accommodate original equipment pins.
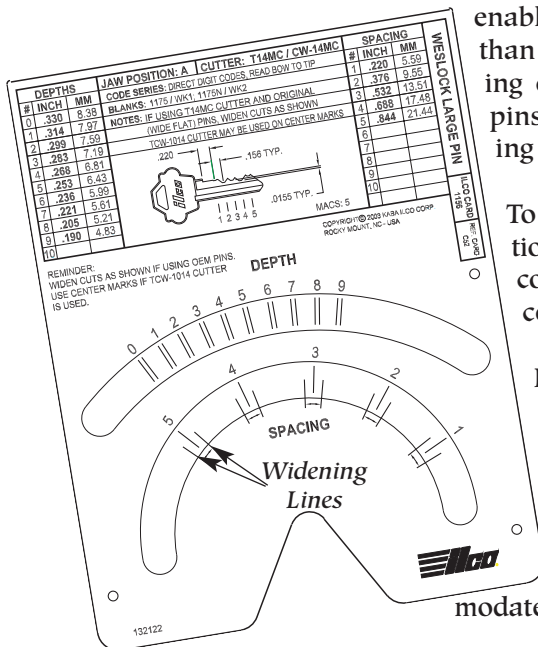
Widening Lines - Some cards display a special type of spacing marking that includes "Widening Lines". The factory keys furnished with the locks for which these special cards apply have wider than normal cut flats. If cutting a key for a lock that has been repinned with traditional round tip pins use the center line as the correct spacing position. if the lock still contains OEM "blunt tip" pins, use the Spacing Crank to widen the cuts by moving the Spacing Needle between the two outer lines at each spacing position. Using a special cutter, TCW-1014 (see page 10) dispense with the need to use widening lines with these applications.
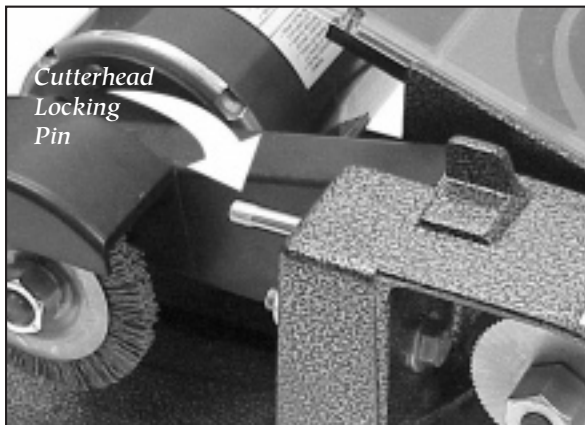
Originating Angled Cut Keys

Your Universal II Code Machine can be configured to create "angled cuts" such as those found on Medeco® and Emhart® high security keys. To utilize this capability the following optional items will be needed:

> For Classic Medeco Keys: Requires vise jaw # MCM-JAW C and cutter TCW-1012 (both available late 2003) or their HPC equivalent
>
> For Biaxial Medeco Keys: Requires cutter TCW-1012 (optional vise jaw is not required)
>
> For Emhart High Security Keys: Requires cutter TCW-1013 (available late 2003), (optional vise jaw not required)

The Universal II features a cutter head that can be swiveled. By pulling out on the spring loaded locking pin, located at the back of the cutter head, it can be swiveled left or right to correspond to the angled cuts found on the above family of high security keys. Be sure that the locking pin fully engages its detent locations before operating the machine (the cutter head should lock in place and

The Universal II's cutter head is designed to rotate for cutting angled cut keys.
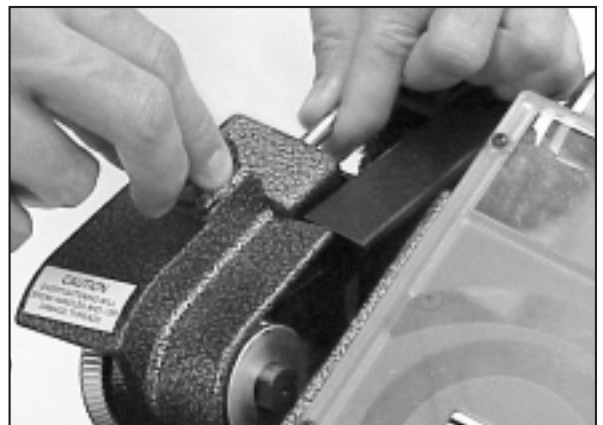
To rotate, pull back on locking pin and tilt cutter head to desired position

not rotate when properly positioned).

Pay careful attention to the information printed on Code Cards intended for angled cut keys! The information supplied regarding vise jaw position, correct cutter, and proper clamping of the key blank must be followed to obtain satisfactory results. The basic procedures involved in cutting these keys are the same as for other single-sided key types, except for re-positioning of the cutter head to change cut angle.

MACHINE MAINTENANCE AND ADJUSTMENT PROCEDURES

Your Universal II Code Machine has been designed to require minimal maintenance. The machine utilizes permanently lubricated bearings for both the cutter spindle and drive motor, which do not require periodic lubrication or adjustment. The following maintenance tips apply to the remainder of the machine:

- Allow the machine time to do its work. Cutting keys is not a race… excessive speed results in reduced accuracy, and is detrimental to both machine and cutters.

- Use a soft-bristle brush to assure that brass chips generated during the cutting process do not build up on the machine surfaces. This is **especially important** on the vise jaw surfaces, as this may effect the accuracy of the keys produced by the machine.

- **Do not use compressed air to dust off the machine!** Doing so may result in debris being forced into critical areas, creating a potential source of problems.

- The clear Code Card Lens may be cleaned with a soft damp cloth. Do not use solvents or abrasive cleansers on any portion of the machine.

- Cutters and accessories should be stored in a secure place to prevent loss and potential damage. It is very important that cutters be stored so that they do not bump against other metal items as this can easily degrade their useful service life.

- The Universal II is equipped with a circuit breaker. In the unlikely event it activates, pressing in on its white button will reset it. A tripped breaker situation should not occur on a regular basis; if it does the machine should be examined for a defective breaker or other abnormal electrical condition by an Ilco Service Technician or other experienced electrician.

Cutter Replacement

Under normal usage, the cutters supplied with the Universal II should provide excellent service life and value. Cutting keys made of steel or other hard materials, contact with the vise jaw, or use for cutting non-key items will definitely degrade a cutter and diminish available service life.

Even with proper use there comes a time however when a cutter is no longer fit for service. Signs that a cutter has reached the end of its service life include the following: a distinct burr or ridge of material remains after cutting a key that is difficult to remove with the deburring brush, the noise level the cutter generates while cutting markedly increases, or it starts requiring noticeably more rotation force on the Depth Crank to cut a key.

When its time to replace the cutter, **it is strongly suggested that a new cutter be installed rather than re-sharpening the original**. The machine and the Code Cards are designed so that cutters can be freely changed on the machine as required without re-adjustment when cutting various types of keys; this dictates that the cutters must all be of the same, correct diameter… which will not be the case if one is re-sharpened! When changing or replacing a cutter, remember that the cutter nut has a left hand (reverse) thread, and should be turned clockwise to remove.

MACHINE MAINTENANCE AND ADJUSTMENT PROCEDURES

How and When To Adjust Depth of Cut

VERY IMPORTANT! You **WILL NOT** need to re-adjust the Universal II for depth of cut each time you use a different Code Card. The Depth Markings on all Universal II Code Cards are imprinted so that when your machine is correctly adjusted for one card, it is adjusted for all, **provided you use Ilco or equivalent HPC cutter wheels!**

Depth adjustment on the Universal II is rarely needed, and the procedure should be performed only after more common reasons for mis-cut keys are considered and eliminated.

Common Reasons for Mis-Cut Keys:

- Incorrect Key Blank- This cause is the easiest to identify, as usually an incorrect key blank will not enter the intended lock. This type of mistake is also encountered when duplicating keys; the mis-cut situations that follow are unique to code cutting.
- Incorrect Code Number for Intended Lock System- Many lock manufacturers use key code series numbers that correspond to ones used by other manufacturers. While the code numbers may be the same, their associated bitting numbers, along with the required spacing and depth dimensions, may be vastly different.
- Incorrect Code Card Selected- As an example, a key for a Yale door lock will not be properly cut using a Code Card for a Yale desk drawer or cabinet lock. You must select the proper Code Card for the task at hand.
- Typographical Errors Sometimes Occur- Occasionally, you will find that a code book, or computerized code program, is in error regarding a particular key code. Also, it is not uncommon for an Automotive Manufacturer's documentation to be incorrect in that the locks actually installed on a particular vehicle do not match the code number recorded for that vehicle by the manufacturer.

If you cut a lot of keys, at some point you will encounter all of the above! Its important however not to reach for wrenches just because you've cut a bad key… eliminate other factors first, as usually something other than machine adjustment is the culprit!

Depth Adjustment Procedure

If you feel that the machine does not cut keys to the proper cut depth, **first** verify that one of the situations mentioned in the above section is not the underlying issue. If the problem still appears to be due to machine adjustment, proceed with the depth adjustment procedures outlined below:

1. Cut a key by code, and measure its cut depths using a key micrometer or dial caliper.
2. Compare the measured depths against the corresponding depth data shown on the front of the Code Card used to cut the key.
3. If the measured cuts match the Code Card data, machine re-adjustment is not indicated. If the measurements do not match within 1 thousandths of an inch (.001") proceed to step four.
4. Turn the Depth Crank counter-clockwise to its stop position.
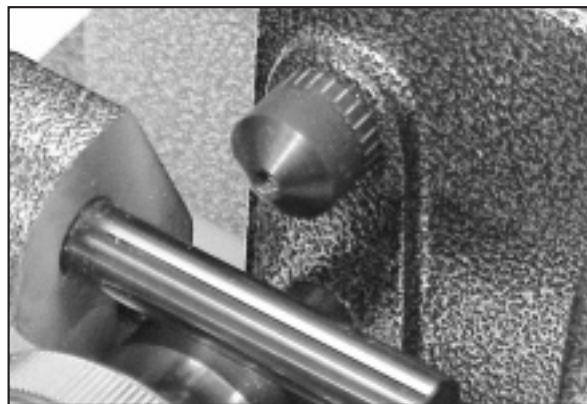
The Universal II utilizes a graduated Depth Adjustment Dial for precise, simple to perform, adjustment for depth of cut.

MACHINE MAINTENANCE AND ADJUSTMENT PROCEDURES

5. Insert a 3/32" allen wrench into the front end of the Depth Adjustment Dial to engage the Depth Locking Screw, and loosen it by turning the wrench counter-clockwise by about 1/2 of a turn.

6. With the screw loosened, the Depth Adjustment Dial can now be rotated by hand. Each graduated mark on the dial changes the depth of cut by approximately 1½ thousandths of an inch (.0015"). Rotate the Dial the required number of marks to compensate for the depth error previously measured. Clockwise rotation INCREASES cut depth; counter-clockwise rotation DECREASES cut depth.

7. Once you have adjusted the dial as described above, re-tighten the Depth Locking Screw. DO NOT OVERTIGHTEN... this screw secures the Depth Adjustment Dial by expanding an internal friction lock. Snugging the screw is adequate!

8. At this point you should cut another key and measure it to verify that the proper amount of depth adjustment has been achieved.

9. Note that the goal when adjusting your machine is to enable it to cut to within .001 (or better) of the depth data shown on the Code Card.

To change depth of cut, loosen the locking screw in the front of the Depth Adjustment Dial by turning it counter-clockwise about 1/2 of a turn.


With the locking screw loosened, rotate the dial clockwise to increase cut depth or counter-clockwise to decrease as desired. (each mark is equivalent to 1½ thousandths of an inch change in cut depth).

REPLACEMENT PARTS

	Part Number	Description		Part Number	Description
1X	MCM-1X	Carriage Assembly	70	MCM-70	Rubber Feet
2	MCM-2	Carriage Stud	75	MCM-75	Motor (110 V-AC)
3	MCM-3	Upper Vise Jaw	300	MCM-300	Card Lens
4	MCM-4	Vise Jaw Spring	301	MCM-301	Belt Guard
6X	MCM-6X	Thrust Bearing Set	302	MCM-302	Spacing Crank Complete
8	MCM-8	Wing Nut Assembly	303	MCM-303	Depth Crank Complete
36	MCM-36	Cutter Nut	304	MCM-304	Power Cord
38		Cutter (specify type)*	305X	MCM-305X	Cutter Head Assembly
41	MCM-41	Cutter Shaft Pulley	306	MCM-306	Motor Bracket
43	MCM-43	Nylon Brush	350	MCM-TSR	Red Tip Stop
47	MCM-47	Motor Pulley	351	MCM-TSU	U-Shaped Tip Stop
48	MCM-48	V-Belt	352	MCM-SH1	Flat Shim
56	MCM-56	Key Gauge	353	MCM-WR1	Wrench (open end)
61	MCM-61	Circuit Breaker	354	MCM-WR2	Wrench (box end)
62A	025-62A	Power Switch			

* Cutters T14MC and TCW-1011 are both supplied with Universal II (full system); specify version desired.

![ilco logo]
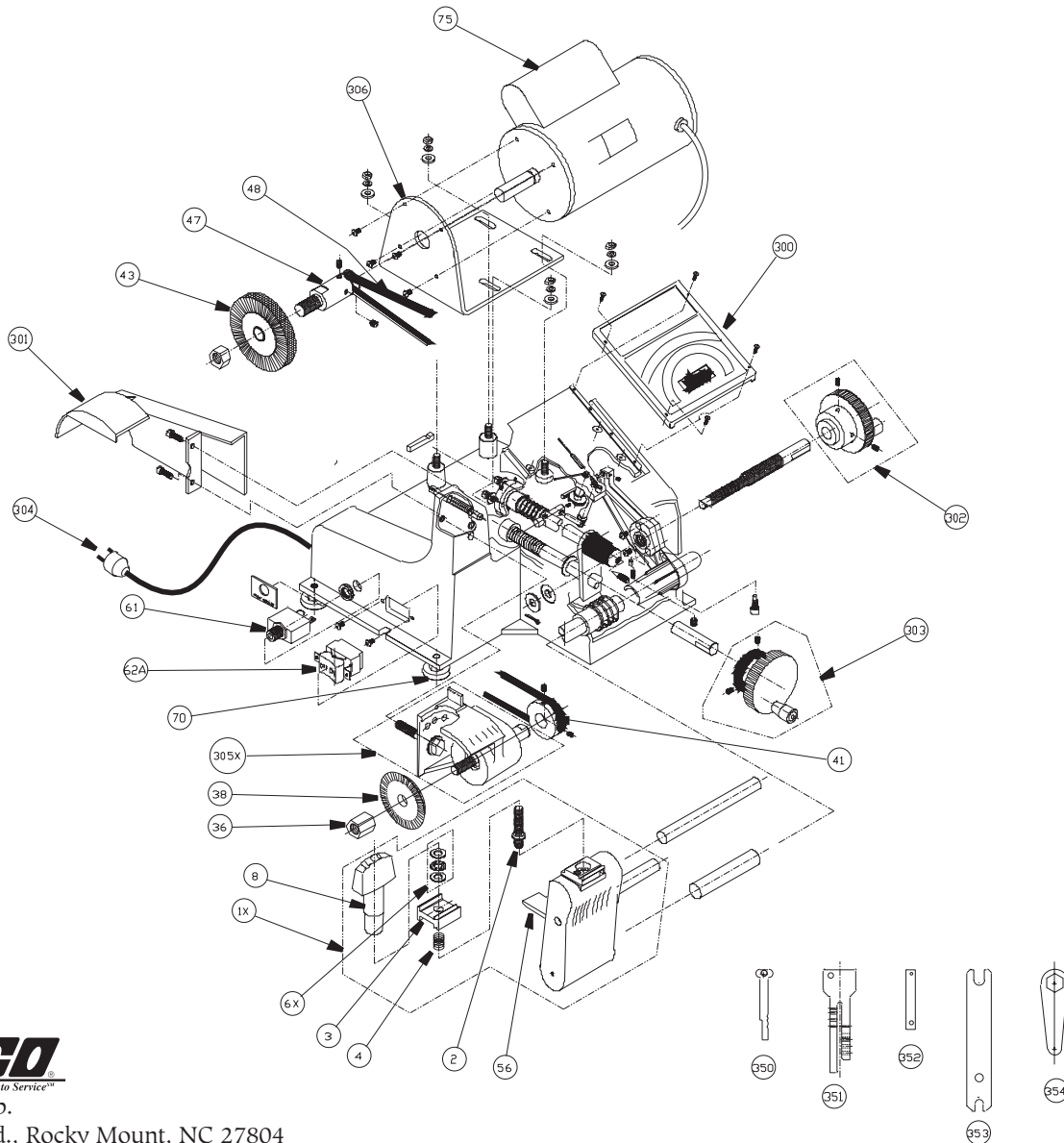
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