

Model RY45

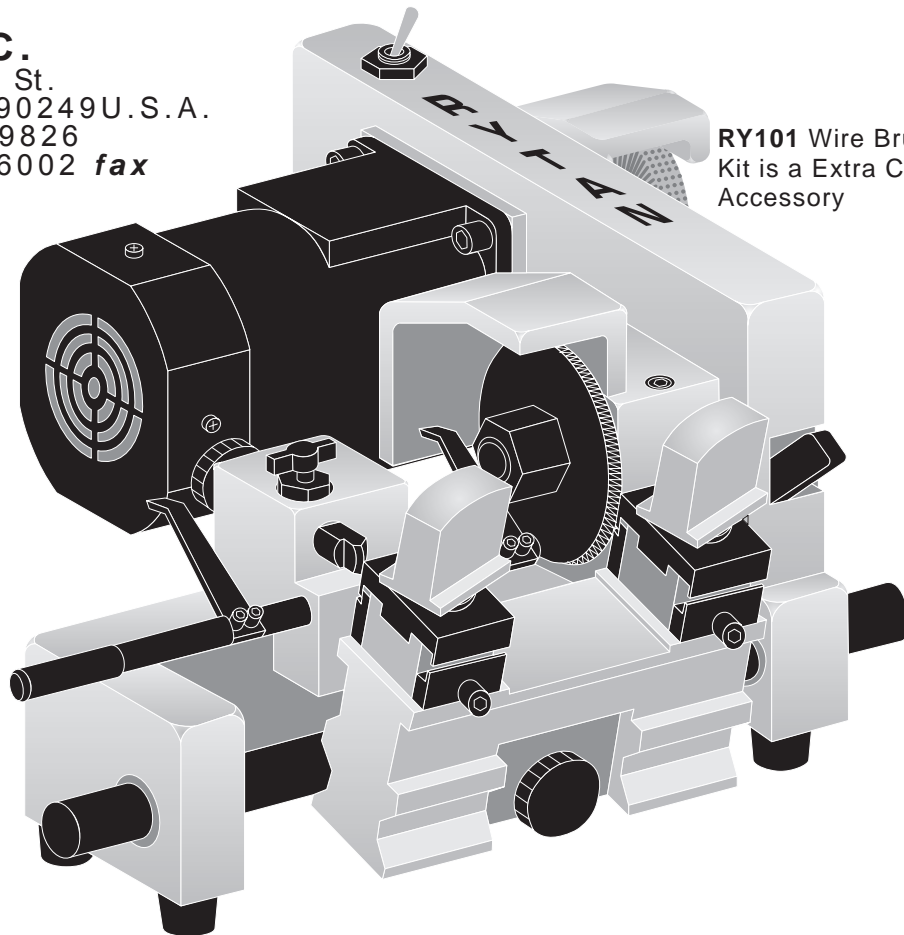
OPERATOR'S MANUAL

Rytan Model RY45 Semi-Automatic Key Duplicating Machine for
Cylinder Keys and Automotive Keys

Rytan Products Are Designed and Manufactured in the U.S.A.

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RY101 Wire Brush
Kit is a Extra Cost
Accessory

**READ AND UNDERSTAND THIS OPERATOR'S MANUAL AND BECOME
FAMILIAR WITH YOUR NEW MACHINE BEFORE YOU START CUTTING KEYS**

RY45 OPERATIONS MANUAL

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1. INTRODUCTION

Thank you for purchasing our American Made, Rytan Inc. Model RY45, universal key duplicating machine. Your new key machine has been designed and built with heavy-duty components designed for the most demanding shop and van use. As you become familiar with your new machine you will find a new ease and confidence in key cutting. Discover the smooth and natural interaction between machine

you will profit greatly from this quality built versatile key machine.

Use your machine to cut standard cylinder keys and U.S. and Foreign automobile keys. Install an optional RY47 Flat Slotter Kit and duplicate Flat Safe Deposit Keys.

2. GETTING STARTED

Please take time now to read and understand this manual thoroughly before you start cutting keys.

machine. Please feel to contact us if you have any questions or go to Rytan.com.

SAFETY FIRST

Do not attempt to operate this machine until you have read thoroughly and understand completely all instructions, rules, etc. contained in this manual. Failure to comply can result in accidents involving fire, electric shock, or serious personal injury.

3. SAFETY RULES

- A. Know your machine. Read the owner's manual carefully. Learn its applications and limitations as well as specific operational hazards peculiar to this machine.
- B. Guard against electrical shock by preventing body contact with grounded surfaces. Examples: Pipes and metal work tops.
- C. Keep guards in place at all times.
- D. Keep your work area clean. Cluttered areas and benches invite accidents.
- E. Avoid dangerous environments. Don't use this machine in damp or wet locations. Keep your work area well lit.
- F. Keep Children away. All visitors should be kept a safe distance from the work area. Do not let visitors contact the machine or power cord.
- G. Do not force the machine. It will do the job better and safer at the rate for which it was designed. Always maintain a sharp cutter wheel on the machine.
- H. Use the machine for what it was designed. Don't use the machine for anything but the key blanks for which it was intended.
- I. Wear proper apparel. For example: No loose clothing or jewelry to get caught in moving parts. Operators without properly restrained long hair **MUST NOT** operate any type of machinery, including key machines. Long hair can get caught in moving (rotating) machinery parts.
- J. Use Safety glasses. Flying chips, improperly secured key blanks and broken cutter wheel teeth can injure the eye if not properly protected.
- K. Don't abuse cord. Never yank cord to disconnect from receptacle. Keep cord from heat, oil and sharp edges. Never remove the ground connection from the plug. If you use a two wire adapter be sure to properly connect the ground wire. **NEVER CUT OFF THE GROUND TERMINAL FROM THE MACHINE'S POWER PLUG!**
- L. Secure keys properly in vises. Don't hold key head for support when cutting. If it doesn't clamp properly, don't try to cut it!
- M. Maintain a sharp cutter wheel. A dull cutter wheel is not only inefficient but dangerous. A dull cutter wheel can produce excessive cutting force on a key blank and exceed the machine's vise jaws clamping force to a point where the key blank could be ripped out of the machine.
- N. Disconnect machine. When not in use, during servicing, or when changing cutter wheel and accessory brush always disconnect the machine from its electrical power source.
- O. Remove servicing wrenches. Remove all service tools from the machine before turning it on.
- P. Always turn off machine. After cutting a key, turn off the machine before removing a cut key and clamping another fresh blank.
- Q. Always lock carriage back. After cutting a key, turn off the machine and lock the carriage back to prevent accident or injury.
- R. Outdoor use. When machine is used outdoors, use only extension cords suitable for outdoors and that have a built-in third wire and ground terminal. **NEVER CUT OFF THE GROUND TERMINAL FROM THE MACHINE'S POWER PLUG!**
- S. Keep hands away from cutter and key blank. Keep hands away from rotating cutter. Do not reach underneath or around cutter or key blank when cutter is rotating.
- T. Never use machine in an explosive atmosphere. For example, if your machine is in a service van with a fuel leak or spill, switching on the machine could ignite the fumes.

NOTE: A FLAMMABLE SOLVENT SPILL IN YOUR SHOP OR VAN IS EQUALLY DANGEROUS!

- U. Inspect machine cord periodically. If damaged, repair at once.
- V. Keep hands, dry, clean and free from oil and grease.
- W. Stay alert. Watch what you are doing and use common sense. Do not operate machine when you are tired.
- X. Do not use machine if switch does not turn the machine ON or OFF.
- Y. Drugs, Alcohol, Medication. Do not operate machine while under the influence of drugs, alcohol, or medication.
- Z. The operation of any key machine can result in foreign objects being thrown into the eyes, which can result in severe eye damage. Always wear safety glasses or eye shields before commencing key machine operation. We recommend wide vision safety mask for use over spectacles or standard safety glasses.

4. **MOUNTING THE MACHINE**

Mounting the machine. Drill two oversized 1/2" holes in your bench top to mount your machine. Use 1/2"-13 bolts from your local hardware store. Carefully turn the machine up-side-down and measure the spacing of the two tapped holes on the bottom of your machine (be careful not to set the machine on the power switch). Turn the machine right-side-up and place the machine where you want it on your work bench. Mark the bench and drill your holes.

5. **CUTTING STANDARD KEYS**

- A) Most key clamping requirements use the standard top jaw configuration. The top jaw can be shimmed with .040" drill rod (included)—to make deeper cuts in small keys. Narrow groove style top and bottom vise jaws are possible by reversing the entire carriage.
- B) Keys are always gauged with the full-function flip-up key gauges. We do not recommend bottom shoulder gauging because key blank manufacturers do not always maintain a reliable correlation between bottom and top shoulder positions on the key blanks they make.
- C) Always remember to flip away your key gauges before cutting a key.
- D) Always cut keys from **Bow to Tip**. NEVER MAKE YOUR FIRST CUT FROM TIP-TO-BOW.
The RY45 is specifically designed to cut most cylinder keys and U.S. and Foreign automotive keys. The key will be cut properly starting at the Bow and ending at the Tip of the key. It is O.K. to make a "clean-up" cut back to the bow of the key ONLY after the key has already been cut.

NOTE: If an excessive amount of key blank material is removed on the clean-up cut (second cut) your cutter may need replacing or sharpening.

6. **CUTTING DEEP CUTS IN SMALL KEYS**

- A) Most key clamping requirements use the standard top jaw configuration. If you are making deep cuts in small keys you may have to use .040" drill rod shims in the vises. You must use them in both left and right vise jaws.

Make sure you only open the vise jaws just enough to slide the key in—opening too wide may allow the key to sit on top of the shim. See illustration figure 1.

WISE JAW WITH .040" SHIM
TO ENABLE DEEP CUTS TO
BE MADE IN KEY

STANDARD JAW WILL
CLAMP MAXIMUM
AMOUNT OF KEY

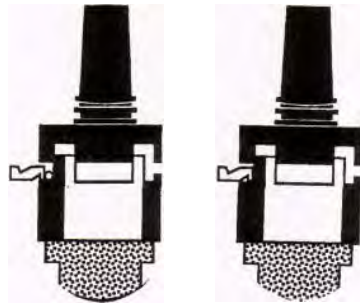


Figure 1

CUTTING KEYS

- 1) Keys are always top shoulder gauged with the full-function key gauges. Never attempt to bottom shoulder gauge a key against the vise jaws.
- 2) Always remember to flip back your key gauges before cutting a key. Switch ON your machine and gently raise the carriage and position it so the stylus is right over the key. Continue to ease up on the carriage and manipulate the carriage to make a smooth gentle cut down the left edge of the "V" cut in the key and then gently continue across the rest of the key to the tip cutting all cuts on the key.
- 3) You may want to reverse the carriage and make a "clean-up" cut back to the bow of the key.
- 4) Turn OFF your machine.

CUTTING STEEL KEYS IS NOT RECOMMENDED

Cutting steel keys will accelerate cutter wear. Some steel keys will ruin your cutter wheel with just one pass.

NOTE: *Some automotive presentation keys are made of Hardened Steel and can ruin the cutter wheel instantly! Don't befooled by the decorative Gold, Brass or Silver-plating on these keys.*

Suggestion: Keep a small magnet near your key machine to identify steel keys. Before cutting a steel key try filing a small groove where one of the deeper cuts will be—if the key won't file easily it won't cut any better in your key machine and will mostly likely ruin your cutter!

7. WISE JAWS

Choosing the correct vise jaws. For most key cutting work the vise jaws can remain in the standard configuration. In the standard configuration the entire "throat" of the bottom and top jaws is used. Measuring from the front faces of the top and bottom vise jaws and into the throat of the jaws—you will measure .142". This throat dimension of .142" is how much of the key is consumed by the vise jaws when the key is clamped. Most keys are rarely cut deeper than .142" from the back edge of the key blade.

Some padlock keys and some General Motors keys have cuts deeper than .142" from the back edge of the key blade. For these keys you have to shim the vise jaws to clamp the keys properly.

Use the pair of round-drill rod shims that came with your machine. Place a shim in each vise jaw against the back edge and lay the key in front of the shim—effectively pushing the key out of the vise jaws and clamping on the remaining .102" of the key. See figure 2 below.

By opening the vise jaws enough to slide the key in you will be making the key lay right in front of the drill rod shim in the vise jaw—effectively pushing the key out of the vise jaws and clamping on the remaining .102" of the key.

WISE JAW WITH .040" SHIM
TO ENABLE DEEP CUT TO
BE MADE IN KEY. KEY IS
CLAMPED ON .102" OF ITS
BLADE.

STANDARD JAW WILL
CLAMP MAXIMUM
AMOUNT OF KEY. KEY
IS CLAMPED ON .142"
OF ITS BLADE.

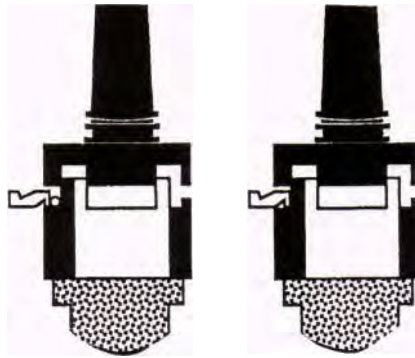


FIGURE 2

TOP VISE JAW REPLACEMENT

Either top vise jaw may be replaced at any time—you do not have to buy top vise jaws in pairs. Inspect your top vise jaws for uneven clamping and referencing surfaces. Replace when worn. Accelerated wear occurs when you clamp double-sided steel keys such as Volks Wagon. Clamping pre 1984-1/2 Ford double-sided keys too far to the right into the vise jaws causes wear to the left edges of both the top and bottom vise jaws. The damage is due to the "wedged" shaped milling of these keys as you approach the bow of the key.

Unscrew the painted key clamp knob and remove the knob and its threaded shaft and the three piece radial thrust bearing. Reinstall a new vise jaw assembly. NOTE: The top vise jaw and plunger are preassembled at the factory and are sold as an assembly. See figure 3

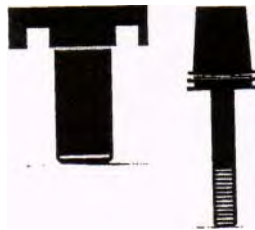


Figure 3

BOTTOM VISE JAW REPLACEMENT

Two bottom vise jaws are bolted to the carriage. One jaw is designed for standard configuration key clamping with .142" throat (key clamping) and the other is a narrow style for clamping keys in their groovings (1/16" grip).

Bottom vise jaws can be replaced one at a time—there is no need to replace them as matched sets. Use your 9/64" Alien Hex Wrench to remove the #8-32 Socket Head Cap Screw securing the bottom vise jaw to the carriage. See figure 4.

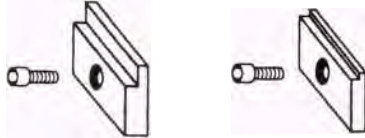


Figure 4

REVERSING THE CARRIAGE

The carriage is reversed on your RY45 key machine to switch from standard vise jaw configuration to narrow groove key clamping configuration. To reverse the carriage unscrew the red knurled knob and screw assembly located near the bottom front of the carriage. Inspect the carriage shaft and carriage and wipe off any key cuttings that might affect clamping the carriage back onto the carriage shaft. Reinstall the Red Knurled Knob and screw assembly back onto the carriage and carriage shaft. See figure 5.

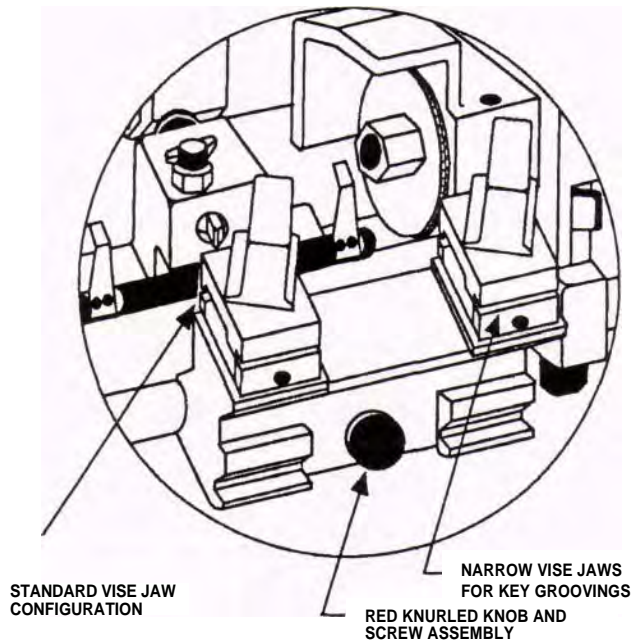


Figure 5

8. TOP SHOULDER GAUGING

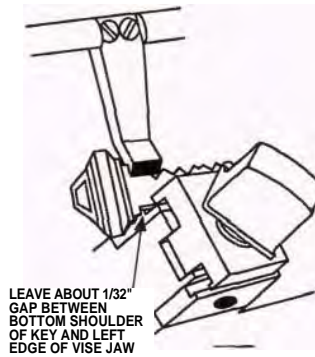


Figure 6

Standard cylinder keys should always be Top Shoulder Gauged. Use the machine's full-function flip-down key gauges. We do not recommend bottom shoulder gauging because key blank manufacturers do not always maintain a reliable correlation between bottom and top shoulder positions on the key blanks they make.

Always remember to flip UP your key gauges before cutting a key. See figure 6.

9. CLAMPING KEYS

Open the vise jaws only wide enough to slide the key in. With the key in all the way into the "throat" of the vise jaws—put your index finger against the key blade as shown in figure 7 below and with moderate force against the key into the vise jaw gently slide the key left and right a few times (about 1/8" will do) to "seat" the key into the vise jaws. With the bottom shoulder of the standard cylinder key about 1/32" away from the left edge of the vise jaws CLAMP the key with the key clamp now-still pressing against the blade of the key with your finger as you tighten the key clamp knob.

We recommend that you clamp the blank in the right vise jaw first, see figure 7—then flip up the full-function key gauges and clamp the customer (original) key in the left vise jaw (see figure 8) using your finger—following the same procedure outlined directly above.

CLAMPING KEYS IN RIGHT VISE JAW

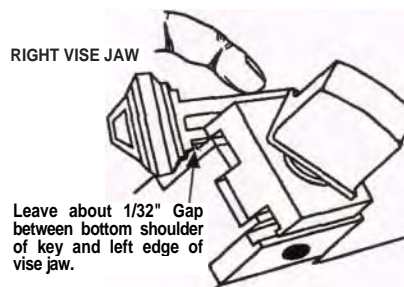


Figure 7

CLAMPING KEYS IN LEFT VISE JAW

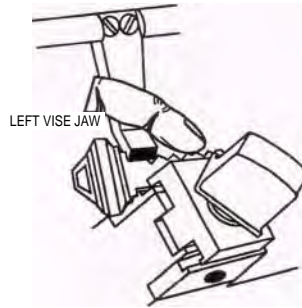


Figure 8

When both keys have been properly gauged and clamped in the vise jaws REMEMBER to flip UP the full-function key gauges before attempting to cut the key.

CLAMPING (Ford double-sided keys)

Keys such as Ford double-sided ignition and door do not have a top shoulder to gauge from.

Open the vise jaws ONLY enough to slide in the thinnest part of the key. Slide in the key blank and allow the full thickness "ridge" of the key to contact the face of the vise jaw.

Clamp the key into the vise jaws so that its cuts are approximately centered in the vise jaws.

Ignition key "ridge" will contact the face of the TOP vise jaw. See figure 10. Door and truck

key "ridge" will contact the face of the BOTTOM vise jaw. See figure 9. See figure 9 for proper

insertion of keys into vise jaws.

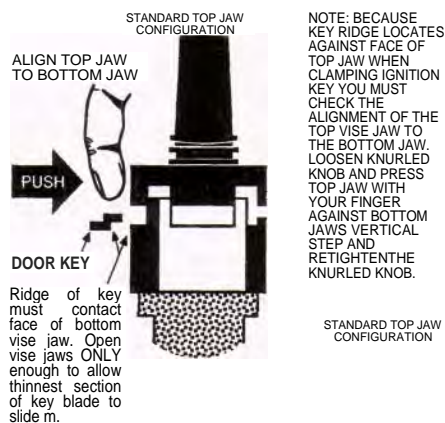


Figure 9

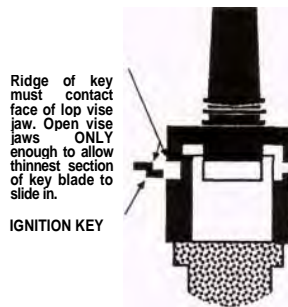


Figure 10

10. TIP GAUGING (Ford double-sided keys)

Operate the full-function key gauges by rotating the key gauge shaft toward you—then push to the right on the key gauge shaft while continuing to rotate the key gauge until the key gauge aligns itself with the tip of the key. See figure 11.

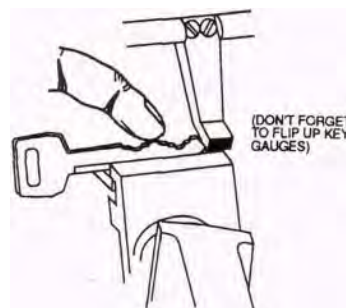


Figure 11

BEST and FALCON (behind the tip) KEY GAUGING

These keys must be gauged from a "tip" location that is behind the actual tip of the key (see figure 12). Position the key in the vise so that the "tip" edge of the key is about 1/32" (or less) from the right edge of the vise jaws. Operate the full-function key gauges by rotating the key gauge shaft toward you—then push to the right on the key gauge shaft while continuing to rotate the key gauge shaft until the key gauge slides past the actual tip of the key. Slowly release the key gauge shaft and allow the key gauge to rest on the "tip" location that is behind the actual tip of the key (see figure 12)

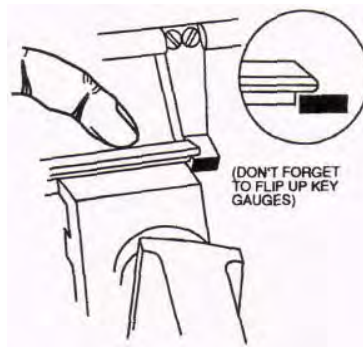


Figure 12

SWITCH "ON" YOUR MACHINE

The power switch is located at the top, right rear of the machine—near the motor. See figure 13.

To switch ON push the switch to the rear.

To switch OFF pull the switch forward.

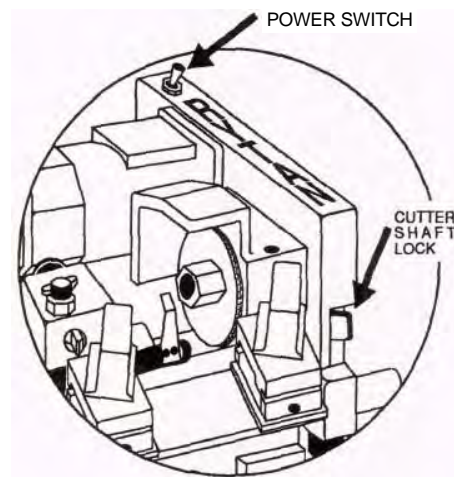


Figure 13

11. **CUTTER SHAFT LOCK**

To remove the cutter you must lock the cutter and cutter shaft in position before using a wrench to remove the cutter. See figure 13.

Press DOWN firmly on the cutter shaft lock. See figure 13. While holding the lever down—rotate the cutter by hand until the cutter shaft lock "clicks" into position. When turning the cutter by hand there is only ONE locking position to be found. Once the cutter shaft lock is fully depressed—Hold it There. You may now proceed with removing the cutter shaft lock nut and the cutter.

PLEASE...DON'T FORGET to pull UP on the cutter shaft lock when you are finished reinstalling the cutter wheel. Pulling UP on the cutter shaft lock releases the cutter and cutter shaft from the locked position. Failure to unlock the cutter when attempting to cut a key may result in no rotation of the cutter.

Please note however—the motor may be powerful enough to slip the belt and permanently damage it by wearing a flat spot on the belt.

12. **REMOVING THE CUTTER**

The cutter wheel is secured to the cutter shaft with a **LEFT-HAND NUT**. See figure 14. You must turn the nut to the **RIGHT** (facing the cutter wheel) to remove it.

Remember to **LOCK** the cutter shaft before removing the cutter wheel (see figure 13).

Use a 1" open-end or hex wrench to remove the Left-Hand Nut.



Figure 14

REPLACING THE CUTTER

Before you replace the cutter—clean off any cuttings from the cutter shaft with a clean rag. Apply a small amount of white grease to the cutter shaft face, shank and threads before installing the cutter wheel and Left-Hand Nut.

DON'T OVER TIGHTEN the cutter wheel nut-The Left-Hand Nut is self locking as you use it. Over tightening the cutter wheel nut may make it harder to remove later and may result in damaging the cutter shaft lock or cutter shaft pulley.

PLEASE...DON'T FORGET to pull UP on the cutter shaft lock when you are finished reinstalling the cutter wheel. Pulling UP on the cutter shaft lock releases the cutter and cutter shaft from the locked position. Failure to unlock the cutter when attempting to cut a key will result in no rotation of the cutter. Please note however—the motor may be powerful enough to slip the belt and permanently damage it by wearing a flat spot on the belt.

13. **DEPTH ADJUSTMENT**

Depth is adjusted at the back side of the stylus. To adjust the depth you will need:

- Piece of Writing Paper cut approximately 1" X 4"
- Two identical key blanks-measure blades width with micrometer or dial calipers and select two that match.

Before you begin please make sure that both top vise jaws are in the standard configuration.

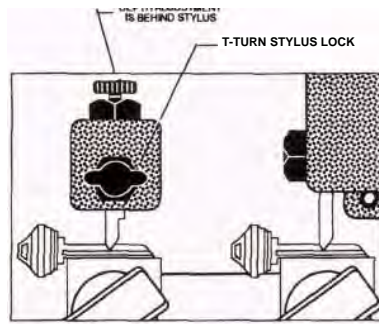


Figure 15

Depth is adjusted by moving the stylus forward or backward by means of a knurled adjustment knob located at the back of the stylus. The adjustment is secured by the "T-turn" knob located on the top of the stylus holder.

To begin the adjustment you must loosen the "T-turn" knob. Use your hand to turn the knurled thumb—turn the adjustment knob about 1 full turn—viewed from the front of the machine turn the knob to your LEFT. See figure 15.

NOTE: The stylus is spring loaded and you must push against the tip of the stylus to compress the spring.

Secure the two matched key blanks—one in each vise jaw. See figure 15. **PLEASE NOTE:** Clamp the keys into the vise jaws with about 1/32" gap between the bottom shoulder of the key and the left-side edge of the vise jaws. **DO NOT** bottom shoulder the keys into the vises—there may be a small radius in the corner of the key blank's blade and bottom of the shoulder area.

Clamping in this area may ANGLE the key blank in the vise and throw off your adjustment.

With the keys clamped in the vises and with the stylus adjusted forward about 1 turn—carefully bring up the carriage and position it so the key in the left vise jaw *LIGHTLY contacts* the stylus about in the middle of the key blank's blade. Now push more firmly against the carriage and allow the left hand key to compress the stylus all the way back. Hold the carriage in this position during the adjustment process.

Observe that the cutter wheel misses the key blank in the right vise by carefully turning the cutter **BACKWARDS** by hand—the cutter teeth should miss the blade. The reason for turning the cutter backwards is to prevent any cutter teeth from removing material off the key blank's blade before you make your adjustments. Turning the cutter backwards will bump the key blank without cutting it—if the stylus was not adjusted forward enough to miss the key blank.

Upon verifying that the cutter wheel misses the key blank—you may switch ON your key machine.

Take the 1" x 4" piece of writing paper you made earlier and hold one end of it between the spinning cutter Wheel and the blade of the key blank.

Use your hand to slowly and carefully back off on the knurled adjustment knob—at the same time we recommend that you slowly move the 1" x 4" piece of paper from side to side along the blade of the key blank to assist you in detecting when the cutter wheel's teeth first contact the paper. When the cutter wheel first contacts the paper the paper will be shaved almost without any sound—you must back off the stylus very slowly for this to work.

Once you have the cutter wheel touching the paper you may slow down the procedure to very small increments. Stop when the piece of paper is cut through to the last few fibers. You have accurately adjusted the depth of cut on your key machine.

14. SPACING ADJUSTMENT

Never adjust the spacing without first adjusting DEPTH. If the depth adjustment is not right—spacing will not be right.

Spacing is adjusted by moving the cutter wheel and its cutter shaft assembly left or right. The cutter shaft assembly is secured to the machine's main housing by one #10-32 Alien Socket Head Cap Screw. See figure 16. To adjust spacing you will need:

- 5/32" Alien Hex Wrench
- Two identical Key Blanks
- Small Plastic Mallet

Before you begin please make sure that both top vise jaws are in the standard configuration.

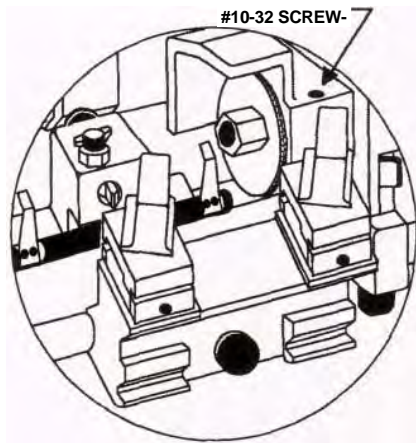


Figure 16

Stack the two identical key blanks one on top of the other and clamp them in the right hand vise jaw. Be sure to top shoulder gauge them with the machine's full-function key gauges—leave the 1/32" gap between the bottom shoulder of the keys and the left-side edge of the vise jaws. **DO NOT** bottom shoulder the keys into the vise—there may be a small radius in the corner of the key blank's blade and bottom shoulder area. Clamping in this area may **ANGLE** the key blank in the vise and throw off your adjustment.

There should be **NO** key blank in the left vise jaw for this part of the procedure.

DO NOT FORGET to flip up your key gauges.

Switch **ON** the key machine and carefully release the carriage and position it so the cutter wheel will make a cut in about the middle of the blade of the key blanks. Hold the machine's carriage steady and carefully make a straight "V" cut into the two-piece key blank stack about 1/8" deep—it is important to do this operation without moving the carriage sideways by the slightest amount.

Pull the carriage back straight and switch **OFF** the key machine.

Remove the two key blanks from the right vise jaw—Do Not Mix Them Up.

Reinstall the **TOP** key blank in the right vise jaw with about 1/32" gap between the bottom shoulder of the key and the left-edge of the vise jaw.

Install the BOTTOM key blank in the left vise jaw—flip down the machines full-function key gauges and carefully top shoulder gauge the left key to the key in the right-hand vise jaw.

Carefully release the carriage and align the left-hand key blanks "V" cut with the machines stylus—the "V" cut in the key blank in the right-hand vise jaw should "fall" into place around the "V" profile of the cutter wheel.

Use your hand to carefully turn the cutter wheel BACKWARDS to verify that the cutter wheels teeth do not touch the "V" cut in the key blank.

Verify that the stylus is completely seated in the "V" cut in the left-hand key blank. If it is and the cutter wheel will not turn Backwards by hand or the cutter wheel teeth "tick" the "V" cut in the right-hand key blank—then spacing needs to be adjusted. See figure 17.

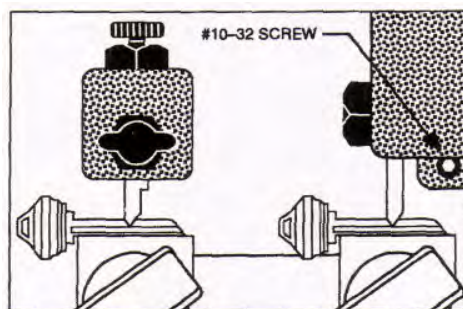


Figure 17

Loosen the #10-32 screw securing the cutter shaft assembly in place using your 5/32" Alien hex wrench—retighten the screw with LIGHT pressure. You want just enough retightening pressure on the screw to keep the cutter shaft assembly in place so you can't move it with your hand—but you can move it with gentle to moderate tapping with your small plastic mallet. See figure 18.

Turn the cutter BACKWARDS with your hand to observe which way you must move the cutter. Use your small plastic mallet to "nudge" the cutter shaft assembly in the direction you want to go. It is a good idea to verify the cutter position in the "V" cut in the key after every "tap" of the small plastic mallet. Verify your results by turning the cutter Backwards with your hand. Also verify that the stylus is properly seated in the "V" cut in the left-hand key. Adjust the position of the carriage as required to keep the stylus seated in the "V" cut in the key.

Continue with this procedure until you are satisfied with the position of the cutter. Once you are satisfied you may wish to turn ON your key machine and observe the spinning cutter wheel in the "V" cut in the key. This test must only be done AFTER you have turned the cutter Backwards by hand and verify that no cutter wheel teeth will contact either side of the "V" cut. With the machine running you may want to lightly "nudge" the spinning cutter a little more before retightening the #10-32 screw.

SWITCH OFF THE KEY MACHINE. Retighten the #10-32 Screw.

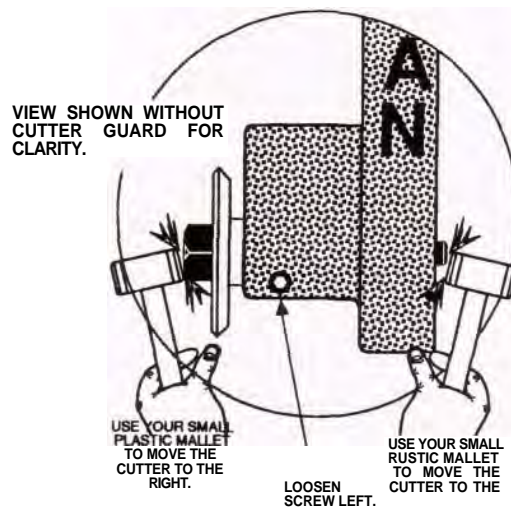


Figure 18

15. KEY GAUGE ADJUSTMENT

Stack two identical key blanks one on top of the other and clamp them in the right-hand vise jaw. Be sure to **BOTTOM SHOULDER GAUGE** them. **DO NOT** use the machine's full-function key gauges.

There should be **NO** key blank in the left vise jaw for this part of the procedure.

Switch **ON** the key machine and carefully position the carriage so the cutter wheel will make a cut in about the middle of the blade of the key blanks. Hold the machine's carriage steady and carefully make a straight "V" cut into the two-piece key blank stack—go all the way to the carriage's built-in over-travel stop and move the machine's carriage to the **LEFT** making a wide cut slightly more than V_i " wide. See figure 19.

Pull the carriage back and switch **OFF** the key machine.

Remove the two key blanks from the right-hand vise jaw.

Reinstall one key blank in the Right vise jaw—use **BOTTOM SHOULDER GAUGING**. **DO NOT** use the machine's full-function key gauges.

Install the other blank in the Left vise jaw—use **BOTTOM SHOULDER GAUGING**. **DO NOT** use the machine's full-function key gauges.

NOW flip down the machine's full-function key gauges and place them in the wide grooves cut in the keys. Adjust the key gauges as necessary by loosening the key gauge's fastening screws—retighten the screws. The key gauges now match the spacing of the vise jaws.

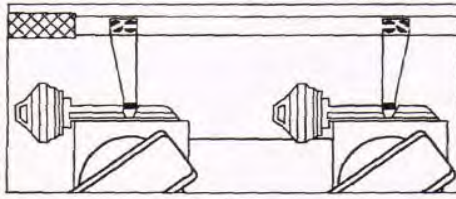


Figure 19

16. CARRIAGE OVERTRAVEL DEPTH ADJUSTMENT

Your key machine is equipped with a depth overtravel device. Its adjustment is important. The overtravel device prevents the cutter wheel from cutting into the vise jaws when there are no keys clamped in the machine. Setting the depth overtravel device too high will prevent deep cuts from being made—they will not get cut all the way down into the key blank. To adjust the depth overtravel you will need:

- Slot head screwdriver
- 7/16" Wrench
- Three pieces of writing paper—cut to approximately 1" x 4" each.

Close both vise jaws without keys in them. Position the carriage so the stylus and cutter wheel are in about the middle of the vise jaws—hold the carriage up against the machine during the following procedure.

Loosen the 7/16" Hex Jam Nut located at the back of the machine's main housing. See figure 20.

Turn back the 1/4"-20 slotted screw stud with your screwdriver. About 1 turn to the right as viewed from the front of the machine. Observe that the stylus is touching the face of the closed vise jaw.

Gently turn the slotted screw stud with your screwdriver to the left as viewed from the front of the machine and stop when you feel the stud contact the key machine's carriage—remember to be holding the carriage up during this procedure. With the carriage overtravel just touching the carriage—and with the carriage's vise jaws contacting the stylus continue turning the slotted screw stud an additional 1/2 turn.

The thread pitch is 20 which is approximately 12 thousandths of an inch per 1/2 turn. Tighten the 7/16" Hex Jam Nut on the slotted screw stud—use moderate tightness.

After tightening the 7/16" nut-check the gap between the stylus and the face of the closed vise jaws. Use three pieces of the 1" x 4" writing paper you made earlier. They equal a combined thickness of about 9 thousandths of an inch. Readjust if necessary.

IMPORTANT: Carriage overtravel works only when adjusted properly. The following things can happen if the adjustment is not done properly:

- If adjusted to low your cutter wheel may cut into the right-hand vise jaw.
- If adjusted to high your cutter wheel may not cut deep enough when cutting deep cuts in keys. See figure 20.

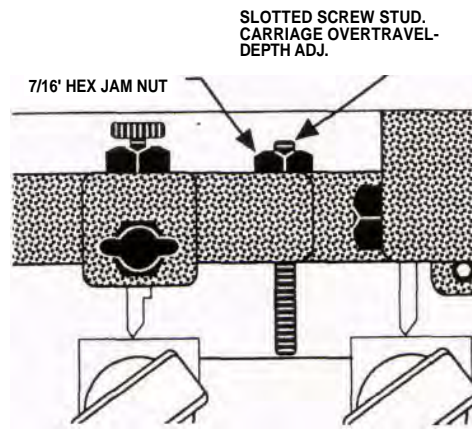


Figure 20

17. MAINTENANCE

Your machine is time proven with good design engineering and modern manufacturing practices. You can service virtually anything on your machine yourself. There are no special tools, fixtures or alignment jigs required to install the parts used in this key machine. Because Rytan manufactures the machines in-house you are assured a supply of new replacement parts and updates for as long as YOU want us to make the machines.

Keep your machine clean and lubricated and it will remain a productive asset to your business for a very long time.

Lubrication

You do not need to lubricate the motor or the cutter shaft bearings - these ball bearing assemblies are sealed and lubricated for their lifetime.

Lubricate your machine as often as you like. Use number 30 non-detergent motor oil. Apply oil with a brush to all the black oxide process steel surfaces. After applying the oil let it stand overnight and wipe the oiled parts dry the next day with a clean rag or soft paper towel. **WARNING:** Do not turn the machi~~p~~e over and set it on the Power Switch.

Lubricate the vise jaw plungers inside the carriage—remove the key clamp knobs and top vise jaws. Squirt some number 30 motor oil in the large hole and reassemble.

DO NOT LUBRICATE YOUR MACHINE WITH LPS-1 or WD-40 in place of number 30 motor oil. You may use LPS-1 or WD-40 as a rust preventative in addition to the number 30 motor oil. If you only use LPS-1 or WD-40 as your machine's lubricant you will eventually damage the machine. These "lubricants" act more like solvents than lubricants—they work partially as a solvent that extracts already existing oils from bearings and other parts and redistributes the existing oil along the surfaces that need oil. Eventually you will exhaust all oil reserves in the machine's parts and the machine will be operating as a dry machine.

DO NOT allow any oil or grease to get on the machine's drive belt or pulleys. When handling these parts be sure your hands are clean and free of any lubricants.

DRIVE BELT

Your machine's belt tension is maintained by means of moving the motor. To adjust the belt tension-use your 7/16" wrench and your 3/16" Alien Hex Wrench to loosen the 4 cap screws and hex nuts on the motor. Push the motor hard against the belt and retighten the 4 screws. See figure 21.

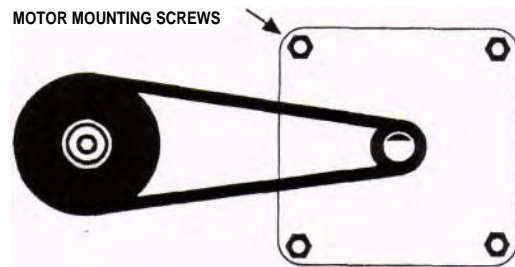


Figure 21

KEY MACHINE ACCURACY

Generation Cutting

Generation cutting is a process where the key machine operator takes a fresh cut key and duplicates another key off of it, then takes that key and duplicates another form it, and so on. The idea is to cut as many "generations" as possible and still have a working key. This is interpreted as a "test" of the quality of the key machine.

What key machine operators often forget is if the depth adjustment is off by as little as 1-1/2 thousandths of an inch (.0015) they will accumulate up to 15 thousandths of an inch (.015) in only 10 generations. In as little as five generations the key probably won't work in the lock.

In reality, generation cutting is a representation of the entire key cutting process (key machine, operator, and adjustments) and the results you get are either good or bad keys—you don't learn the reason why you are getting good or bad results. Your results do not indicate the quality of the key machine, the quality of the operator, or the quality of the adjustments made to the machine. All the questions remain unanswered.

There is only one way to get good results on a consistent basis. Buy a quality-built heavy-duty key machine; don't abuse it, and keep it well maintained and adjusted at all times. Keep an eye on cutter sharpness, the integrity of the stylus, the fit of the carriage shaft to its bearings, the fit of the vise jaws, the fit of the key gauge shaft to the carriage, and the fit of the cutter shaft to the bearings. Any situations in these areas will decrease the performance of the machine. When parts start to wear—replace them.

In addition to a quality machine and its maintenance you need an accurate measuring tool such as a dial caliper or key micrometer (preferable mechanical digital).

Measuring True Key Machine Accuracy

The proper way to measure key machine accuracy is to take the key you are going to duplicate from and measure it. Measure each cut from the back edge of the blade of the key blank. Measure each cut several times and record their average. After documenting the key, make a duplicate of it and measure each cut several times and record their average. Compare the results. There is really no substitute for this procedure if you want to make accurate duplicate keys. Generation cutting will not give you meaningful results like this procedure does.

18. TROUBLESHOOTING

Machine Always Needs Adjustment

There are several things that can cause this situation.

1. Cutter wheel may be dull. This can cause the key to try to "float" and not cut deep enough in the deepest cuts if you don't push hard enough against the carriage. Replace or sharpen the cutter (see replacing the cutter above).
2. Pushing harder and harder on the carriage to cut keys also puts more pressure on the stylus as it passes across the key being duplicated. This heavy "scraping" action will remove more and more material off the original key being duplicated. Heavy cutting pressure also will wear out the stylus faster.
3. Stylus may be worn. Check it carefully, if there is a groove worn in the stylus you may get deep and shallow cuts on different brands of keys. For example when cutting Ford double sided keys the ignition key will be cut high on the stylus and the door key will be cut low on the stylus—Schlage C keys are cut more in the middle of the stylus. This may seem like an extreme case—but it happens every day. Replace the stylus.
4. Carriage shaft and bearings are worn. Check for excess "wobble". Replace the carriage shaft and bronze oilite bearings.
5. Cutter shaft bearings are worn. Check for any "wobble" or in-out play. Replace the cutter shaft assembly.
6. One key cuts fine and the next doesn't. You adjust and readjust all the time. The problem is the carriage depth overtravel is set to high. This results in the machine's inability to cut the deepest cuts on a key. This symptom is more common than you think. Fix the problem by readjusting the Carriage Overtravel Depth Adjustment (see carriage overtravel adjustment above).
7. **Again.** One key cuts fine and the next doesn't. This time it may be the key gauges. Sometimes key machine operators don't flip back the full-function key gauges all the way and the left-hand key gauge CRASHES into the stylus holder and knocks the key gauges out of position. The key they're cutting is O.K. but the next key they duplicate won't work in the lock. If you ever CRASH the left-hand key gauge into the stylus holder—fix the key gauges right away. See Key Gauge Adjustment above.
8. Keys don't always work in the lock when gauged off of the bottom shoulder stop. This is a common problem caused by the key blank manufacturers. In recent years many of the key blank manufacturers have stopped paying attention to the bottom shoulder stop on most keys since they are seldom used for anything anymore. We've seen Schlage C key blanks with variations of up to 15 thousandths of an inch (.015") between top and bottom shoulder positions—between keys taken from the same box. It happens more often than you think. The solution? **DON'T bottom shoulder gauge your keys anymore.**

Cutter Stalls Out

There are six possible causes for this problem.

1. You are cutting keys from Tip-to-Bow. This one can fool you if you're not careful. Cutting keys from tip to bow will work when you cut only shallow keys—sometimes a shop can cut keys all day long and never hit upon a key with a deep cut. You think everything is O.K. when all of a sudden your cutter stops dead halfway along the key. The problem? The deep cut put the cutter into the key past the cutter tooth area on the left side of the cutter—you just reinvented the disk brake! **SOLUTION—ALWAYS CUT FROM BOW-TO-TIP.**
2. Oil on the belt and pulleys. Clean the pulleys with safety solvent and install a new drive belt.
3. Left-hand nut securing the cutter wheel isn't tight.
4. Belt tension needs to be increase and/or replaced the drive belt.

5. You're in your van. Your Redi-Line generator needs repair, or your wiring needs replacing (usually from the battery to the Redi-Line), or your battery is weak. Another possibility is that you've been using a power converter and it is marginal.
6. Your cutter wheel is really dull.

Stylus Shaves Material Off Key

The situation is caused by the fact that the cutter wheel is made to a sharp point and therefore to cut keys accurately the stylus must also be made with a sharp edge. A key blank dragged across a sharp edged stylus has no choice but to scrape material from the key blank. The solution is to lightly "blunt" the sharp edge of the stylus. This has to be done carefully because if the edge of the stylus is blunted too much you will narrow the width of the pin seat somewhere in the middle—if the stylus is sharp it will scrape the key too much, if the stylus is blunted too much it will produce a duplicate key with a slightly narrower pin seat area.

If you're going to cut more than 5 or 10 duplicates off one key we recommend that you make "first" generation keys and then make additional duplicates off of them. For example if you had to make 50 duplicates off the same key you should make 5 or 10 "first" duplicates and make 5 or 10 duplicates off of each of them. This is a classic example of why your key machine should always be maintained in perfect depth and space adjustment.

Cutter Leaves Ridges on Cut Key

This situation is related to the example above. The cutter wheel is made with a dead-sharp edge or point. You will always get ridges on the cut surface when the cutter has sharp pointed teeth. The ridges will get smoother as the cutter wears—until finally you have to buy a new cutter or get the old cutter resharpened. When you put on the new or resharpened cutter you're back to ridges again.

Machine Makes Whirring Sound

There are four possible causes.

1. The sound is coming from the ball bearing belt tension idler. This idler pushes against the back side of the drive belt—the back side of the drive belt is ridged and some belts used have large ridges than others. The sound comes from the idler rolling against these ridges on the drive belt. It's O.K.
2. Your drive belt is coming apart or is frayed. Replace it.
3. Your ball bearing cutter wheel shaft assembly is wearing out. With the machine turned OFF—grab the cutter wheel's left-hand nut and try to get some movement out of it. There should be absolutely no movement—if there's movement in the bearings you need to replace the cutter shaft assembly. If there is not movement it may be the other bearing next to the drive pulley—you will have to remove the drive belt to be able to check it out. If all seems well then you are probably O.K. for awhile.
4. The machine's cutter shaft lock is partially depressed and is rubbing against the drive pulley. Pull up on the shaft lock knob.

Machine Won't Start

There are several things that can cause this besides the obvious—plug in the machine and check the power line.

1. If you are running 12 Volt D.C.—check the fuse and ALL the wiring.
2. Key cuttings in the motor's capacitor. Unplug the machine, remove the capacitor's rubber cover and blow out the chips.
3. Remove the machine's access plate—check the wiring connections and switch. Repair or replace as necessary.
4. Cutter shaft lock is in the locked position.

Cutter Wheel Didn't Seem to Last Long

Several things can cause this to happen.

1. The cutter will last the longest if it only duplicates brass keys.
2. Premium quality Nickel-Silver key blanks are abrasive to the cutter wheel and will dull the cutter more rapidly than brass keys. Here's what you can do to get the maximum life out of your cutter wheel on these premium blanks
 - a). Duplicate them a little slower. Racing through the job, especially in large rekeying jobs will put more wear on the cutter wheel than going a little slower. The machine's high-speed "stick-shift" feature, extremely powerful motor and extra large diameter cutter are a real temptation to push the machine faster and faster.
 - b). You should charge a little bit more money for cutting premium key blanks and put that difference aside for the purchase of a new cutter.
3. You really cut more keys than you thought you did. Often we calculate how many months the cutter lasted instead of how many keys you cut. If you really want to know how long your cutter lasted—keep an accurate inventory of your key blanks—or put a simple mechanical counter on your key machine and you'll be surprised with results.
4. You cut steel keys. You can cut them, but we don't recommend it. No question about it—steel keys are hard on cutters....period!
5. You cut a beautiful brand new Automotive "Presentation" key that the customer brought in. **You cut the key and "toasted" the cutter.** What you cut was a Gold plated hardened steel key. They're out there—they were made by mistake sometime ago and they continue to surface from time to time. Best thing to do is:
 - a). Never cut a key that's brought in by your customer. Cut only what you know and make sure it always comes from YOUR inventory.
 - b). Place a small magnet near your key machine. Test any key that's suspicious—if it's magnetic its not brass or Nickely-Silver..period.

Cutter Wobbles

This situation may be caused by a key cutting on the face of the cutter shaft preventing the cutter wheel from seating properly. Fix it by removing the cutter wheel and cleaning all the surfaces and reinstalling the cutter wheel. If the cutter wheel still wobbles its time to replace the cutter shaft assembly with a new one. REMEMBER: Cutter wheel is secured with a Left-Hand Nut. You must "tighten" to loosen.

Cutter Leaves Big Burrs on Cut Keys

A sharp cutter requires almost no deburring. A dull cutter requires a lot of deburring. A dull cutter seems to make the keys "float" and you're always "force-feeding" the keys into the stylus and cutter wheel. Replace the cutter or get it resharpened.

My Resharpened Cutter Doesn't Work Well

You probably didn't have it reground—instead you went to a service that used a different means such as etching or striking. Simply put.. your cutter wheel should always be sharpened by grinding—and you need a quality service to do it right.

I'm Mobile and My Power Converter Won't Work

Your 115 VAC motor needs a mobile generator to work. Power converters work fine on electric drills, TV's and radios—not split phase capacitor motors. Buy a Redi-Line or similar generator and you'll get the performance you need.

I'm Mobile and My Machine Won't Cut Keys

You have your 12 Volt D.C. motor running in reverse. Reverse your motor wire connections and you'll be O.K.

19. WHEN DO I REPLACE.....

1. Replace the cutter wheel when deburring the key seems to take longer than normal. Replace the cutter wheel when you find yourself "assisting" or "force-feeding" the carriage more often, especially in deep cuts.
2. Resharpen your cutters in sets. Store old cutters until you've accumulated at least 3 cutters— then send them to a quality regrinding shop with a note requesting that they all be sharpened to the same size. When you have them all resharpened to the same size you will have to readjust your key machine only ONCE for all your resharpened cutters.
3. Replace your key machine's stylus when you can see a worn spot such as a slight groove and/or excessive rounding of the otherwise sharp stylus.
4. Replace vise jaws when the edges become rounded, flared, mushroomed or when you've cut into them too many times.
5. Replace the key gauge shaft when it wobbles in the machine housing excessively.
6. Replace the carriage shaft and bronze oilite bearings when you can wobble them beyond "just noticeable".
7. Replace the drive belt yearly if you use the machine a lot. Every 3-5 years if you have a lower volume shop.
8. Replace the cutter shaft assembly when you hear a whirring, grinding or buzzing sound (do not mistake the drive belt sound) or when you can feel any movement in the cutter shaft assembly when you test it.
9. Replace the power switch if you accidentally bump it, or hit it, or drop something on it.
10. Replace the power cord when it begins to show signs of wear or cracking. If your machine is 5 years old or more you should replace it just for safety reasons.

HOW DO I REPLACE....

The Stylus

Loosen the red "T-turn" knob on the top of the stylus holder. Pull out the stylus and replace with a new one. Push hard against the tip of the stylus to compress the stylus spring and retighten the "T-turn" knob. Refer to Depth Adjustment for more details.

The Cutter Shaft

Remove the left-hand nut and cutter wheel. Remove the access plate and wire brush if installed. Loosen the motor and remove the drive belt. Loosen the cap screw located on the top front edge of the cutter head—use your 3/16" Alien Hex Wrench. Loosen about 1 full turn. Pull out the entire cutter shaft assembly and replace with a new one. Reassemble in the reverse order from above.

The Carriage Shaft and Bronze Oilite Bearings

Unscrew the large knurled plastic knob and screw assembly from the lower front of the carriage. Remove the carriage and slip out the carriage shaft.

Use a piece of 1" diameter hard wood dowel purchased from your local hardware store. Cut off a piece about 6" long and use it to pound out the bearings with a hammer.

Cut off a piece of 1" diameter hard wood dowel about 1 foot long and trim one end to 3/4" diameter about 1/2" long—to fit onto the new bronze oilite bearing

From the right side of the machine push the 1" hard wood dowel through the 1" diameter bearing hole—go almost all the way to the left side of the machine where the first bearing will be installed. Slip the new bronze oilite bearing onto the modified end of the dowel and position the bearing into the 1" diameter hole. Notice that the dowel pin going through the first hold and the bearing sitting at the entrance of the 1" diameter hole act on their behalf for their own alignment. Use your hammer to pound on the end of the dowel and drive the new bronze oilite bearing into its hole. Remove the dowel

and insert the new carriage shaft—leave the end of the carriage shaft extended about 1/2” out of the right-side bearing hole and place your second bearing onto this shaft. Notice the carriage shaft now acts as an alignment guide for the second bearing.

Use a 6" piece of 1" diameter hardwood dowel and your hammer to pound in the bronze oilite bearing.

Test to see if the new carriage shaft slides between the two bearings. If you were careful and pound in the bronze oilite bearing.

Test to see if the new carriage shaft slides between the two bearings. If you were careful and pounded them in straight you should be able to continue with the rest of the reassembly right away. If the carriage shaft is just a little stiff you can probably leave it alone and let it work itself in over time. If the carriage shaft seems to be too tight then use a medium size plastic mallet and tap on the shaft in all directions accessible to "settle" in the bearings. Stop when the carriage shaft gets just loose enough to use. Reattach the machine's carriage.

You should recheck the depth, depth overtravel and space adjustment on your machine and readjust as necessary.

WHY DID WE DO IT THAT WAY....

20. CUSTOMER INFORMATION

Rytan, Inc. provides the following information on warranty and service for the RY45 key duplicating machine.

21. WARRANTY

The warranty registration form must be filled out and mailed to Rytan, Inc. within TEN days of date of purchase . Failure to do so will VOID the warranty.

Payment of Shipping

Payment of all shipping charges and handling costs are the customer's responsibility for all warranty work and for all service work.

Factory Authorization

You must contact the factory before sending a machine for warranty work or for service work.

Evaluation Fee

Call the factory to find out if there is an evaluation fee for your key machine. If your machine is found NOT to be defective under warranty you be charged an evaluation fee which will be applied to parts and labor costs you have authorized, PLUS you will be charged for all shipping and handling costs. If your machine serviced out of warranty the evaluation fee will be applied to parts and labor cost you have authorized, PLUS you will be charged for all shipping and handling costs. If we receive a machine that requires no service you will be charged the full evaluation fee plus all shipping and handling costs.

Machines Received Without Authorization

The factory will NOT work on any machine where the work has not been authorized. We must have your authorization before we will begin evaluating your key machine and you must be aware of your evaluation fee if a fee is applicable.

RYTAN, INC. RESERVES THE RIGHT TO MAKE CHANGES AT ANY TIME.

You may call us toll free

Monday – Friday

(800) 447-9826 (National)

(310) 212-6002 (Fax)

Ship to:

Rytan, Inc.

1648 W. 134th St.

Gardena, CA 90249

WARRANTIES

WARRANTIES (APPLICABLE IN THE CONTINENTAL U.S.A. ONLY)

RYTAN, INC. MODEL RY45 KEY MACHINES ARE WARRANTED TO BE FREE FROM MANUFACTURING DEFECTS FOR ONE YEAR FROM DATE OF PURCHASE. DURING THE FIRST YEAR DEFECTIVE PARTS WILL BE REPLACED WITHOUT CHARGE FOR PARTS OR LABOR. MACHINES MUST BE RETURNED TO RYTAN, INC. FACTORY FOR ALL WARRANTY WORK. THIS WARRANTY IS NOT APPLICABLE TO THE CUTTER WHEEL OR THE MACHINES WHICH HAVE BEEN ALTERED OR REPAIRED BY UNAUTHORIZED SOURCES, OR HAVE BEEN SUBJECT TO NEGLIGENCE, ABUSE, MISUSE, OR ACCIDENT (INCLUDING SHIPPING DAMAGES), OR MACHINES WHO'S WARRANTY REGISTRATION FORMS HAVE NOT BEEN MAILED TO RYTAN, INC. WITHIN TEN DAYS OF DATE OF PURCHASE.

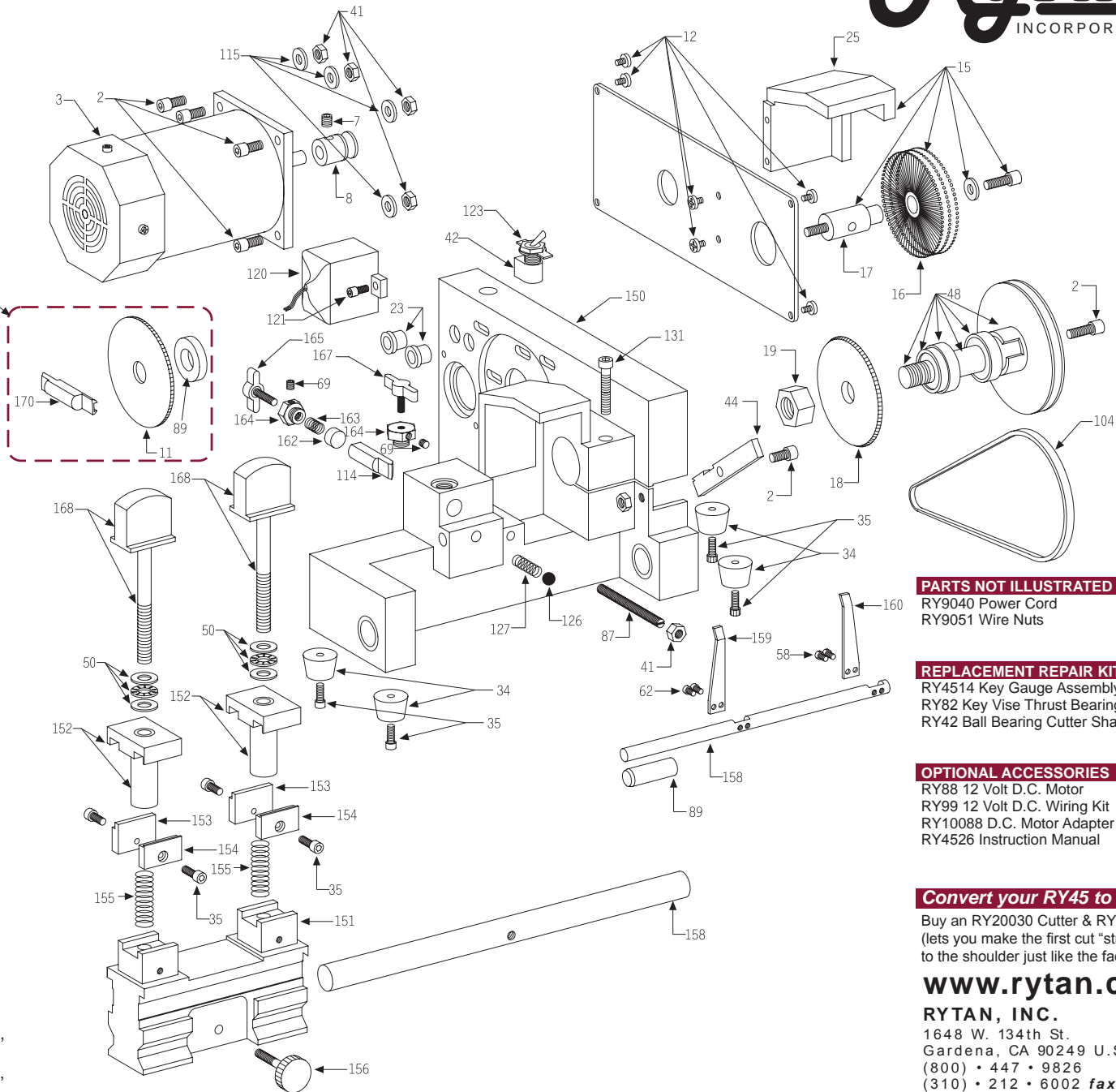
THIS WARRANTY IS EXCLUSIVE AND REPLACES ALL OTHER WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. RYTAN, INC. WILL NOT BE LIABLE FOR ANY OTHER DAMAGES OR LOSS, INCLUDING INCIDENTAL OR CONSEQUENTIAL DAMAGES FROM WHATEVER CAUSE, INCLUDING BREACH OF WARRANTY OR NEGLIGENCE.

SERVICE (APPLICABLE IN THE CONTINENTAL U.S.A. ONLY)

MACHINES SENT TO RYTAN, INC. FACTORY FOR SERVICE OUT OF WARRANTY MUST BE ACCOMPANIED BY PROOF OF PURCHASE OR OWNERSHIP. PAYMENT OF ALL SHIPPING AND HANDLING COSTS ARE THE CUSTOMERS RESPONSIBILITY.

RY45 PARTS LIST

- 2- RY9069 Cap Screw
- 3- RY10038 A.C. Motor
- 7- RY9048 Set Screw
- 8- RY10037 Motor Pulley
- 11- RY115 Slotter Cutter (optional)
- 12- RY9046 Philips Screw
- 15- RY101 Wire Brush Kit (optional)
- 16- RY9074 Replacement Wire Brush
- 17- RY10101 Arbor
- 18- RY10030 or RY20030 Cutter
- 19- RY10036 Cutter Hex Nut (Left Hand)
- 23- RY9053 Strain Relief
- 25- RY10013 Guard
- 34- RY9145 Rubber Foot
- 35- RY9058 Cap Screw
- 36- RY9024 Bronze Oilite™ Bearing
- 41- RY9055 Hex Jam Nut
- 42- RY9041 Switch
- 44- RY10035 Cutter Shaft Lock
- 48- RY42 Ball Bearing Cutter Shaft Assy.
- 50- RY82 3-Piece Thrust Bearing Assy.
- 58- RY9107 Slot Head Screw
- 62- RY9061 Cap Screw
- 69- RY9003 Set Screw
- 89- RY11105 Slotter Cutter Adaptor
- 87- RY10087 Carriage O-Travel Adj.
- 104- RY9085 Drive Belt
- 114- RY256276 or RY456276 Stylus
- 115- RY9073 Steel Flat Washer
- 120- RY10039 Capacitor
- 121- RY10044 Capacitor Bracket
- 126- RY9083 Steel Ball
- 127- RY9089 Compression Spring
- 131- RY9042 Cap Screw
- 150- RY4501 Machine Base
- 151- RY4502 Carriage
- 152- RY49 Top Vise Jaw Assembly
- 153- RY4507 Standard Bottom Vise Jaw
- 154- RY4508 Narrow Bottom Vise Jaw
- 155- RY9035 Compression Spring
- 156- RY4527 Carriage Locking Screw Assy.
- 157- RY4506 Carriage Shaft
- 158- RY4512 Key Gauge Shaft
- 159- RY4515 Key Gauge L.H.
- 160- RY4513 Key Gauge R.H.
- 161- RY4503 Plate
- 162- RY4522 Stylus Plunger
- 163- RY4524 Compression Spring
- 164- RY4523 Locking Stud
- 165- RY4516 Depth Adj. Screw Assy.
- 167- RY4518 Stylus Lock
- 168- RY4517 Vise Jaw Clamp Screw Assy.
- 169- RY47 Slotter Kit (optional)
- 170- RY4521 Dual Stylus. Slotter on one end, RY10030 Stylus on other end. or RY6521 Dual Stylus. Slotter on one end, RY20030 Stylus on other end.



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PARTS NOT ILLUSTRATED

RY9040 Power Cord
RY9051 Wire Nuts

REPLACEMENT REPAIR KITS

RY4514 Key Gauge Assembly
RY82 Key Vise Thrust Bearing Kit
RY42 Ball Bearing Cutter Shaft Assy.

OPTIONAL ACCESSORIES

RY88 12 Volt D.C. Motor
RY99 12 Volt D.C. Wiring Kit
RY10088 D.C. Motor Adapter Plate
RY4526 Instruction Manual

Convert your RY45 to a RY65

Buy an RY20030 Cutter & RY456276 Stylus (lets you make the first cut "straight" next to the shoulder just like the factory)

www.rytan.com

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