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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 and operator, resulting from careful design and placement of the operating controls. We are confident 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. Maintain this owner's manual and review it often, and make it available to others who will use this 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 ½” holes in your bench top to mount your machine. Use ½”-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

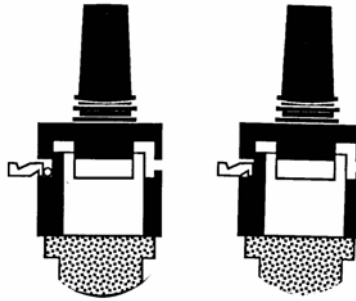


Figure 1

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.
- 3) 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.
- 4) You may want to reverse the carriage and make a "clean-up" cut back to the bow of the key.
- 5) 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 be fooled 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. VISE 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.

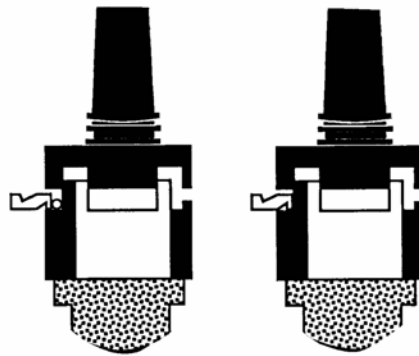


FIGURE 2

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

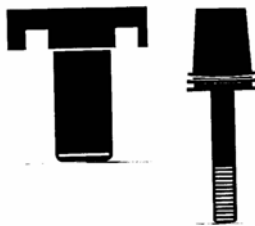


Figure 3

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" Allen Hex Wrench to remove the #8-32 Socket Head Cap Screw securing the bottom vise jaw to the carriage. See figure 4.

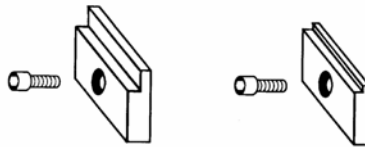


Figure 4

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.

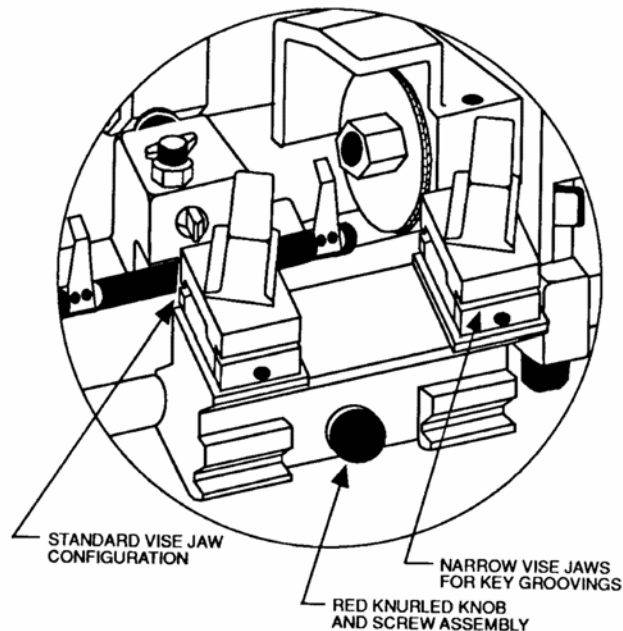


Figure 5

8. TOP SHOULDER GAUGING

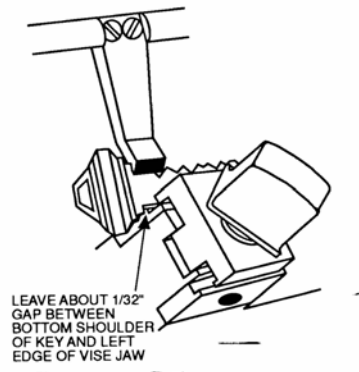


Figure 6

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

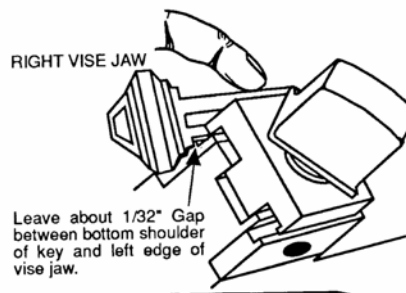


Figure 7

CLAMPING KEYS IN LEFT VISE JAW

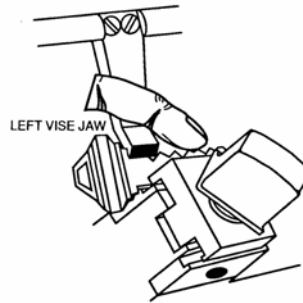


Figure 8

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.

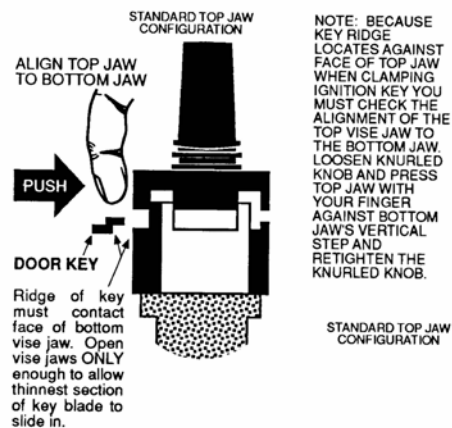


Figure 9

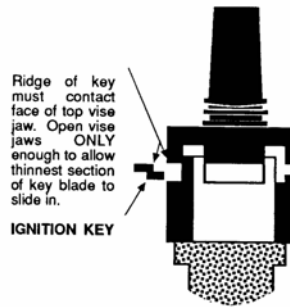


Figure 10

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.

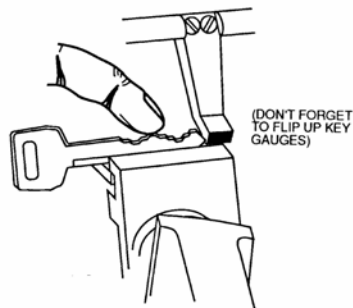


Figure 11

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.

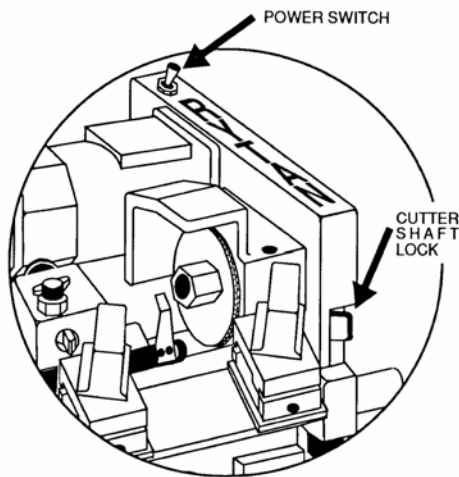


Figure 13

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.

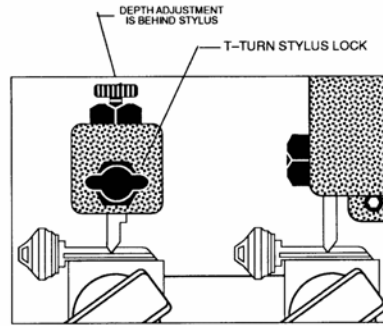


Figure 15

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 bade 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 Allen Socket Head Cap Screws. See figure 16. To adjust spacing you will need:

- 5/32" Allen 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.

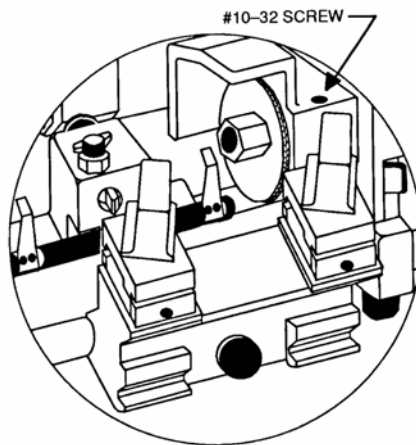


Figure 16

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.

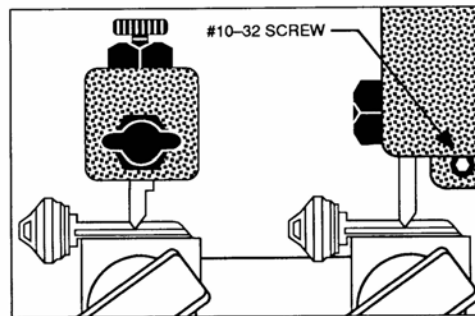


Figure 17

Loosen the #10-32 screw securing the cutter shaft assembly in place using your 5/32” Allen 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.

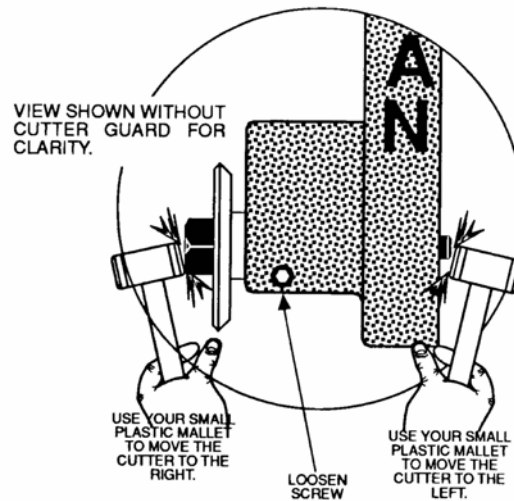


Figure 18

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 $\frac{1}{4}$ " 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.

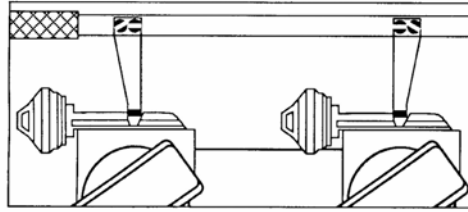


Figure 19

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 1/4 turn.

The thread pitch is 20 which is approximately 12 thousandths of an inch per 1/4 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.

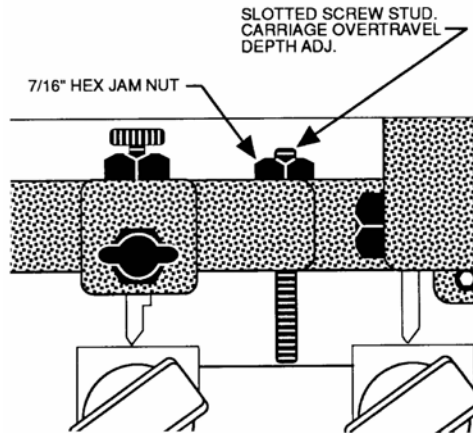


Figure 20

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 machine 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" Allen 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.

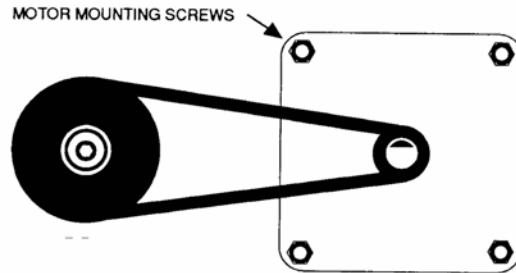


Figure 21

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 from 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 resharpen 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. You're 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 to much you will narrow the width of the pin seat somewhere in the middle—if the stylus is sharp it will scrape the key to much, if the stylus is blunted to 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 it's 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. Resharpener 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” Allen 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 ½” 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 pounded 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

9:00am-4:00 pm

Monday – Friday

**(800) 447-9826 (National)
(310) 212-6002 (Fax)**

**Ship to:
Rytan, Inc.
455 Maple Ave.
Torrance, CA 90503**

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)

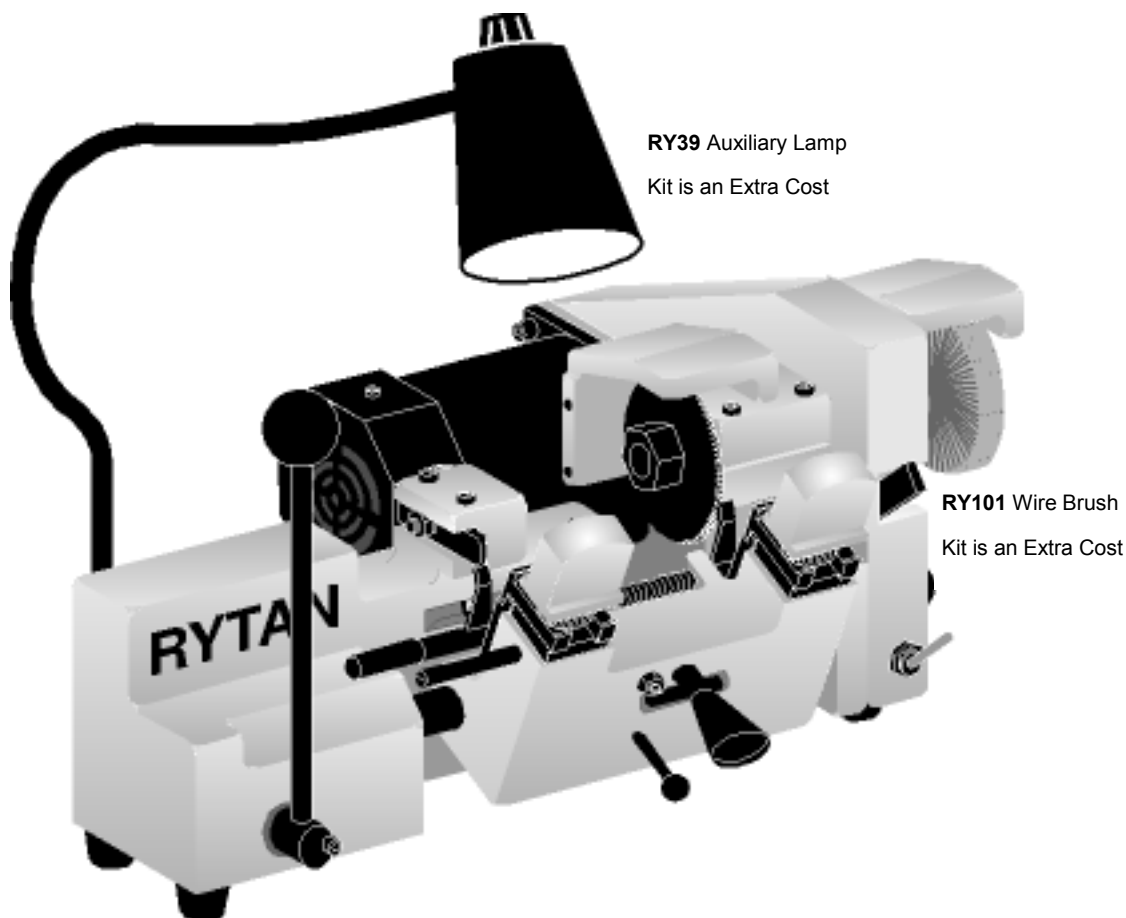
MACHINES SENT TO RYTAN, INC. FACTORY FOR SERVICE OUT OF WARRANTY MUST BE ACCOMPANIED BY PROOF OF PURCHASE OR OWNERSHIP. PAYMENT OF ALL SHIPPING AND HANDLING COSTS ARE THE CUSTOMERS RESPONSIBILITY.

Model RY100

OPERATOR'S MANUAL

Rytan Model RY100 Semi-Automatic Key Duplicating Machine for

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



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

RYTAN, INC. RESERVES THE RIGHT TO MAKE CHANGES WITHOUT NOTICE. PRICES MAY VARY FROM YOUR DISTRIBUTOR

455 MAPLE AVENUE—TORRANCE, CA 90503 U.S.A. (800) 447-9826 FAX (310) 212-6002

We Thank You . . .

Thank you for your continued interest in Rytan quality products. We appreciate and respect the confidence you have shown in us. From your early support through purchasing our first products back in 1983 we have created many innovative products which you use on a daily basis in your business. Many of our innovative product ideas came from friends and associates in the Locksmith and Locksmith Distribution business who sincerely wanted us to be here and to serve their industry.

The successful ergonomic handled lock picks and all of the standard, unique, and miniature pick blades were created from a desire to make the best possible lock picking instruments in the industry. The curved ergonomic handle was inspired by the world famous Buck Knife. The Rytan Riffle Pick, Diamond-Hook, Hi-Lo Modified Full Rake and Miniature pick tips are, and always be, uniquely ours. Did you know that once you become accustomed to the comfort and "feel" of the Rytan curved pick handle it is hard to go back to the straight handle again.

The inspiration for the famous Rytan RY57 Plug Spinner came from our knowledge of the old "knuckle buster" plug spinner that used a wind-up spring. We designed our RY57 Plug Spinner with a push button to release a torsion spring that could not turn much more than a half turn in either direction. It saved your knuckles from being bashed and gave us a great reputation which carries your endorsement by the very fact that we've sold over 40,000 of them.

In late 1984 there was a problem with 1984-1/2 Ford double-sided ignition locks with a sidebar. The only practical way to get through the lock was to drill the sidebar or use try-out keys. Existing drill tools at the time were cheaply made and try-out key codes were selling for the rip-off price of \$100 or more. We responded by designing and building the first heavy-duty "real tool" to drill out the side bar and gave away the try-out codes for free with the purchase of the RY25 Ford Drill Tool.

It was the profits earned from you, by purchasing our tools, that we reinvested into the design of our now famous RY100 heavy-duty high-speed key duplicating key machine.

The "work-horse" of the industry, the RY100 high speed heavy-duty key duplicator was designed to massive proportions because it had to feel strong, and be strong, and rigid, and fast, and accurate to the person who used it. Upon its introduction at the Los Angeles ALOA Convention the machine took the show by storm and sold more machines on introduction than any other key machine in history. Locksmiths discovered at the show that they could buy two Rytan RY100 key machines for the cost of only one imported premium key machine.

The idea for our most successful feature on the RY100 — the full-function key gauges came from our understanding that you don't want a key machine that uses separate key gauges that can become misplaced or lost. Our full-function key gauges allow you to gauge the keys on the top shoulder, gauge from the tip of the key as for Ford double sided, and gauge from behind the tip as for Best and Falcon. All with the same built-in full-function key gauge; with no other key gauges to misplace or lose. The Rytan RY100 standard key duplicator and the RY256 Medeco and standard key duplicator both use our famous key vises. At trade shows the impressive power of our vise jaws was demonstrated by clamping an over cut Volkswagen key in the vise of the RY100; and then lifting the machine completely off the table with a large key ring looped through the over cut Volkswagen key. Of course the reason why we could do this demonstration successfully is because, like a machinists milling vise, the RY100 key vise is precision made, stays square and parallel, and crunches with brute force.

We like what we're doing. We're good at it. And, like our story, we keep on going . . .

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1. **INTRODUCTION**

Thank you for purchasing our American Made, Rytan, Inc., Model RY100, universal key duplicating machine. Your new key machine has been designed and built with heavy-duty components designed for the most demanding shop and service vehicle 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 and operator, resulting from careful design and placement of the operating controls. We are confident you will profit greatly from this quality built versatile key machine.

Your new RY100 key duplicating machine is made similar to the RY256 RAMM semi-automatic key machine, but with one exception: Stylus and Cutter Head cannot be rotated to cut Medeco Level-1 high security keys.

Use your machine to cut standard cylinder keys and U.S. and Foreign automobile keys. Install an optional RY111 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. Maintain this owner's manual and review it often, and make it available to others who will use this machine.

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 environment. 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 work area. Do not let visitors contact 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. Cutting steel keys is not recommended.
- 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. Do not attempt to remove key blank or key blank material while cutter is rotating.
- T. Never use machine in an explosive atmosphere. For example, if your machine is in a service vehicle 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** and **OFF**.
- Y. Drugs, Alcohol, Medication. Do not operate machine while under the influence of drugs, alcohol, or any 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.

AA. Save these instructions.

4. **MOUNTING THE MACHINE**

Drill two oversized 1/2" holes in your bench top to mount the 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. Top jaw can be flipped over for “step” jaw requirements - to make deeper cuts in small keys.
- 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 down your key gauges before cutting a key. Failure to do so may damage the key gauge and key gauge shaft with the cutter wheel.
- D. Always cut keys from **Bow-to-Tip**. NEVER MAKE YOUR FIRST CUT FROM TIP-TO-BOW.

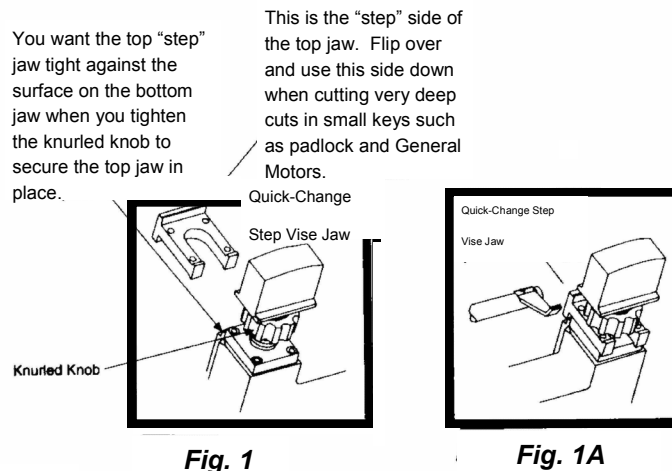
The RY100 is specifically designed to cut most cylinder keys and U.S. and Foreign automotive keys by operating the machine’s “stick-shift” lever SMOOTHLY from **Right-to-Left**. The key will be cut properly starting at the Bow and ending at the tip of the key. It is O.K. to make a “cleanup” cut back 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 cleanup cut (second cut) your cutter may need replacing or re-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 the “step” top configuration. You must flip over both left and right top vise jaws and clamp them in place with the large knurled knobs located below the painted key clamping knobs.

Make sure your vise jaws are clean (no chips in the way) and as you secure the top vise jaw in the “step” jaw configuration -be sure to push the back edge of the step top jaw firmly, flat, and parallel against the stepped face of the bottom vise jaw when tightening the large knurled knob located below the painted key clamp knob. See figure 1 & 1A.



When clamping keys in the “step” jaws be sure to open the jaws ONLY enough to slide the key in place so it will be clamped against the top vise jaw’s “step”. Opening the vise jaw too wide will allow the key to pass under the step part of the top jaw and the key will be clamped improperly.

Please see below for more Vise Jaw information.

- A. Keys are always gauged with the full-function flip-up key gauges.
- B. Always remember to Flip Down your key gauges before cutting a key. Failure to do so may damage the key gauge and key gauge shaft with the cutter wheel.
- C. Switch ON your machine and gently release the carriage and operate the “stick-shift” lever until the stylus is right over the left edge of the first cut closest to the bow of the key. Ease up on the carriage and manipulate the carriage controls to make a smooth *gentle* cut down the left edge of the “V” cut in the key to the tip cutting all cuts on the key.
- D. You may want to reverse the carriage and make a “clean-up” cut back to the bow of the key.
- E. Lock back your carriage. Turn OFF the machine.

NOTE: 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 be fooled 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 made – if the key won't file easily it won't cut any better in your key machine and will most likely ruin your cutter!

7. **WISE JAWS**

Choosing the correct upper vise jaw. For most key cutting work the upper jaw 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 two choices to clamp the keys.

- A. **The old-fashion way.** Use a pair of round wire shims made from Music Wire about .037” diameter and 1-1/2 long. Place a wire 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 .105” of the key.
- B. **The modern “step” jaw way.** Loosen the knurled knob securing the top vise jaw in place and flip the top jaw over to the step jaw side. Retighten the knurled knob securing the top vise jaw. You must do both vise jaws for this to work. See figure 2 & 2A.

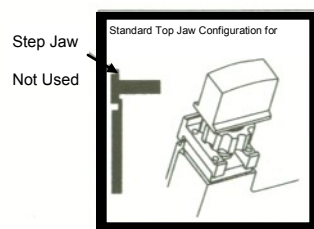


Fig. 2

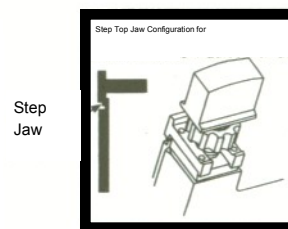


Fig. 2A

By opening the vise jaws just enough to slide the key in you will be making the key lay right in front of the step portion of the top vise jaw - effectively pushing the key out of the vise jaws and clamping on the remaining .105" of the key.

CHANGING THE TOP VISE JAW

To change the top vise jaw unscrew the painted key clamping knob a few turns. Unscrew the large knurled knob located below the painted key clamping knob a few turns. Slide out the top vise jaw. Look for key cutting chips and brush them away before reinstalling the top vise jaw. Reinstall the top vise jaw in the reverse order.

NOTE: When reinstalling the top vise jaw you should push on the face of the top vise jaw and hold it firmly against the vertical step on the bottom vise jaw. By doing this you will insure that the top vise jaw is installed perfectly parallel to the bottom vise jaw. This is especially important when using the face of the top vise jaw as reference surface when cutting keys like Ford double-sided and when using the step jaw - especially when cutting Medeco keys on a Rydan RY256 RAMM key duplicating machine for standard and Medeco keys.

Always change both vise jaws to standard or the step jaw configuration. If you change only one – your depth of cut will be off either plus .037" or minus .037".

Check the knurled knobs securing the top vise jaws for tightness often and recheck the parallelism of the top vise jaws - especially when using the step vise jaw configuration and when cutting key such as Ford double-sided.

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 or sets. Inspect your top vise jaws for uneven clamping and referencing surfaces. Replace when jaws appear worn. Accelerated wear occurs when you clamp double-sided steel keys such as Volkswagen. Clamping pre 1984- ½ Ford double-sided keys too far to the right into the vise jaws causes wear to the left edges of both 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. See figure 3.

BOTTOM VISE JAW REPLACEMENT

Remove the top vise jaws. The bottom vise jaws are secured by two #10-32 x ½ long socket head cap screws. Use a 5/32" Allen hex wrench to remove the screws. If you have difficulty accessing the bottom screw you may remove the top plate. #6 – 32 x ¼" long socket head cap screws.

To remove the top plate you must first remove the key clamping knob assembly with the 3-piece radial thrust bearing and the knurled knob. Use a 7/64" Allen hex wrench to remove four #6 – 32 x ¼" long socket head cap screws. See figure 4.

Remove bottom vise jaw from 1" diameter plunger. Wipe plunger and carriage surfaces clean with a lint-free rag or paper towel. Bolt a new bottom vise jaw onto the plunger, loosely - do not tighten the two screws at this time. Use Sta-Lube Super White Multi-Purpose Grease (available in Auto Parts Stores). This is a Lithium grease, Grade 2, 350 °F water resistant lubricant.

Coat all steel sliding surfaces (back side of bottom vise jaw and plunger and all aluminum mating surfaces on the carriage). Also apply this grease to the 3/8" threaded hole in the plunger.

Gently slide the bottom vise jaw and plunger assembly into the carriage from the top. Snug up the two screws securing the bottom vise jaw and check that the assembly slides up and down in the carriage – do not tighten the two screws at this time.

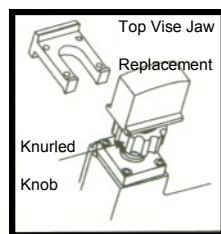


Fig. 3

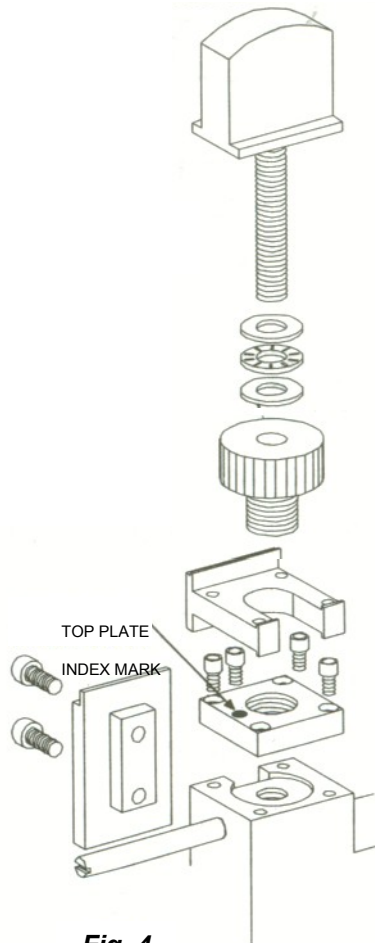


Fig. 4

Reinstall the top plate with the (4) #6 – 32 x 1/2" screws flush with the top of the top plate - but do not tighten the four screws at this time. Remember to reinstall the top plate with its INDEX MARK in the same location as illustrated here.

With your hand hold the top vise jaw on top of the top plate and at the same time raise up the bottom vise jaw so the two vise jaw parts engage each other as if they were clamping a key. With your other hand grab the edges of the top plate and pull it back until it contacts the short tabs on the open "horseshoe" end of the top vise jaw - you want to take up as much of the slack between the top and bottom vise jaws as you can. **NOW** tighten the four #6 – 32 screws with your 7/64" Allen hex wrench – readjust if necessary to get a good fit.

You may now reinstall the knurled knob, 3-piece radial thrust bearing (please clean it first) and key clamp knob assembly - you may secure the top vise jaw in place with the knurled knob at this time.

You will secure the bottom vise jaw now. Before tightening the two #10 – 32 screws - use the key clamp knob to close the vise jaws together with moderate force without a key. **NOW** tighten the two #10 – 32 screws with your 5/32" Allen hex wrench. Loosen the key clamp knob a few turns and push down on it to open the vise jaws. You have created a matched pair of vises on your key machine that are about as good as they were when the machine was new.

8. **TOP SHOULDER KEY GAUGING**

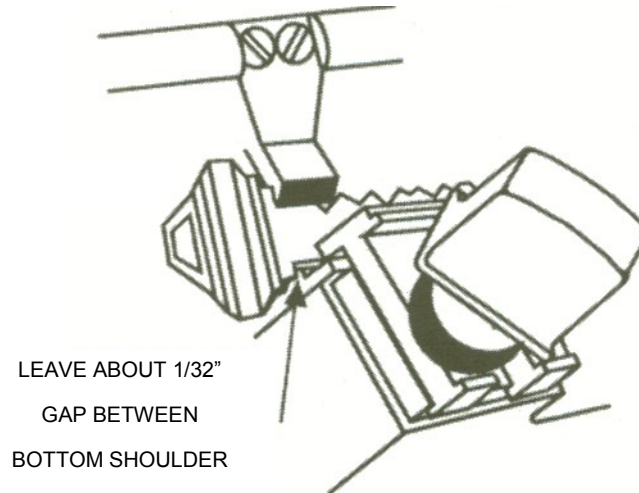


Fig. 5

Standard cylinder keys should always be top shoulder gauged. Use the machine's 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. See figure 5.

Always remember to flip DOWN your key gauges before cutting a key. Failure to do so may damage the key gauge and the key gauge shaft with the cutter wheel.

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 below and with moderate force against the key in to 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 a standard cylinder key about 1/32" away from the edge of the vise jaws CLAMP the key with the key clamp knob – still pressing against the blade of the key with your finger as you tighten the key clamp knob. See figure 6.

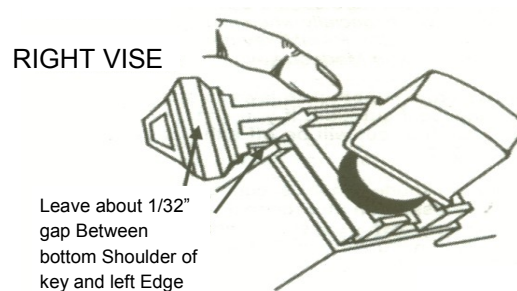


Fig. 6

When both keys have been properly gauged and clamped in the vise jaws REMEMBER to flip down the full-function key gauges before attempting to cut the key. Failure to flip down the key gauges may damage the key gauge and key gauge shaft with the cutter wheel. See figure 7.

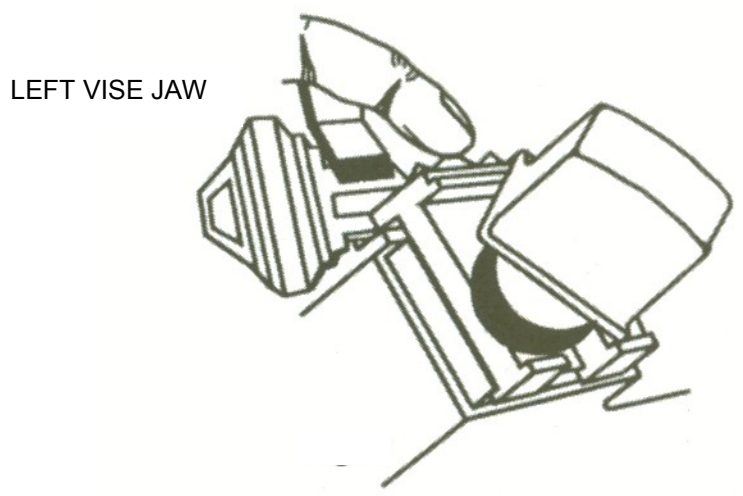


Fig. 7

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 8.

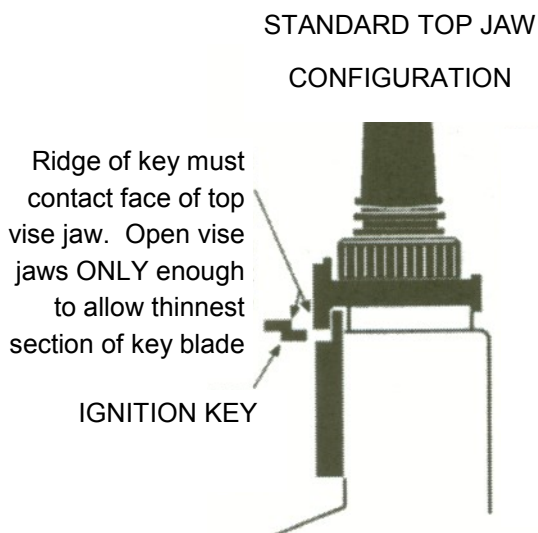


Fig. 8

Door and trunk key "ridge" will contact the face of the BOTTOM vise jaw. See figure 9.

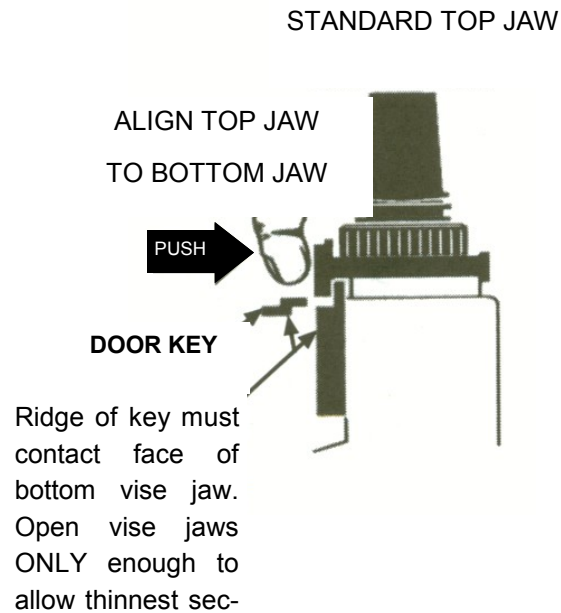


Fig. 9

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 10.

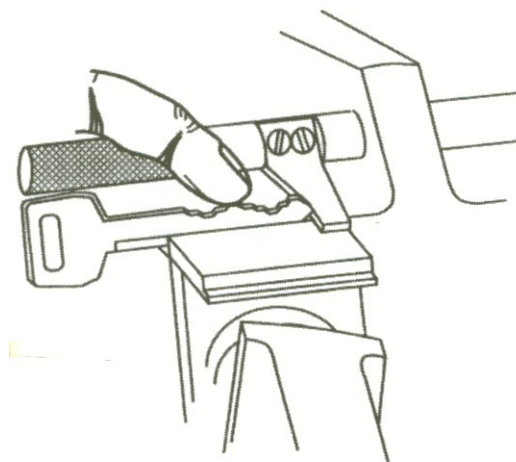


Fig. 10

Always remember to flip DOWN your key gauges before cutting a key. Failure to do so may damage the key gauge and key gauge shaft with the cutter wheel.

10. **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. 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 illustration in circle). See figure 11 and figure 12.

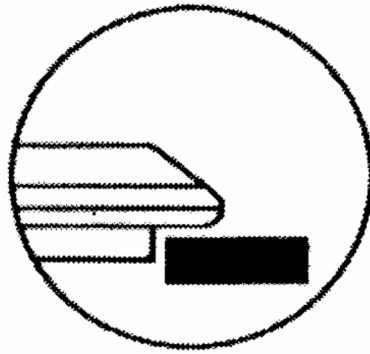


Fig. 11

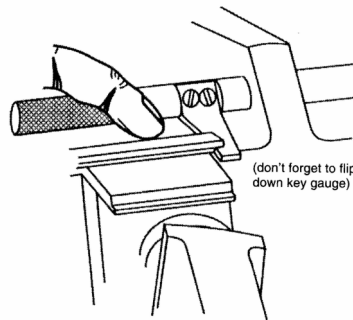


Fig. 12

Always remember to flip **DOWN** your key gauges before cutting a key. Failure to do so may damage the key gauge and key gauge shaft with the cutter wheel.

11. **RELEASING THE CARRIAGE**

For safety reasons - releasing the carriage requires two actions. With your right hand, push down gently on the carriage's large “teardrop” knob just enough to move the carriage down a small distance. While holding the carriage down reach around with your thumb and index finger and grasp the small round black knob and pull it out and hold it there. When the small round black knob is pulled out - gently lift up on the carriage a small distance and **THEN** let go of the small round black knob and continue positioning the carriage where you want it to be (you will want to move the carriage to the beginning of the first cut nearest the bow of the key).

NOTE: You will not be able to pull the small black knob by itself to release the carriage. You are required to push down on the carriage first – then pull out the small black knob to release the carriage. See figure 13.

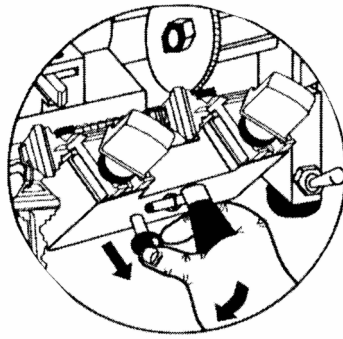


Fig. 13

ALWAYS REMEMBER to flip down your key gauges before cutting a key. Failure to do so may damage the key gauge and key gauge shaft with the cutter wheel.

PLEASE. . . DON'T FORGET to turn off your key machine before removing a cut key and reloading another key blank.

LOCK THE CARRIAGE BACK (after cutting a key)

Push DOWN on the carriage's large "teardrop" knob until the carriage "clicks" into the locked position.

SWITCH "ON" YOUR MACHINE

The power switch is located at the lower right, front of the machine. See figure 14.

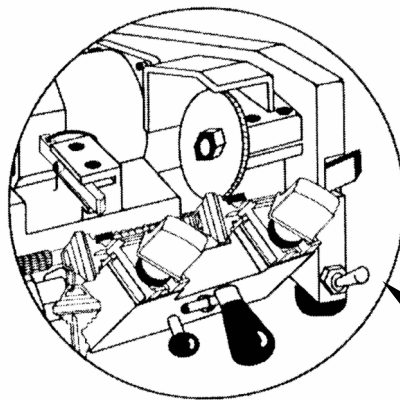


Fig.14

Power Switch

To switch ON push the switch DOWN.

To switch OFF pull the switch UP.

10. **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.

Press DOWN firmly on the cutter shaft lock. While holding the lever down - rotate the cutter by hand until the cutter shaft lock “clicks” in to 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 the 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** - the motor may be powerful enough to slip the belt and permanently damage it by wearing a flat spot on the belt.

13. REMOVING/REPLACING THE CUTTER

REMOVING THE CUTTER

The cutter wheel is secured to the cutter shaft with a **LEFT-HAND NUT**. You must turn the nut to the **RIGHT** (facing the cutter wheel) to remove it. See figure 15.

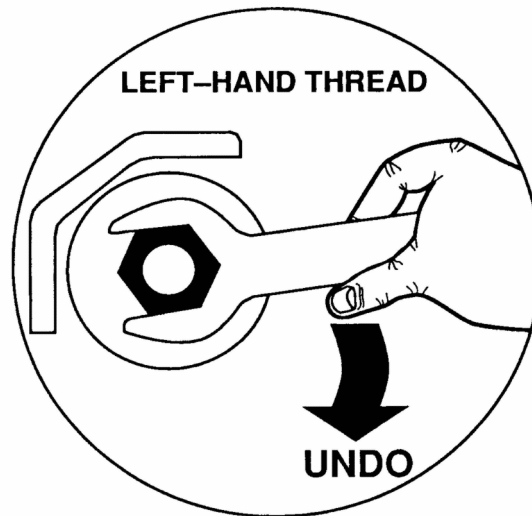


Fig. 15

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

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.

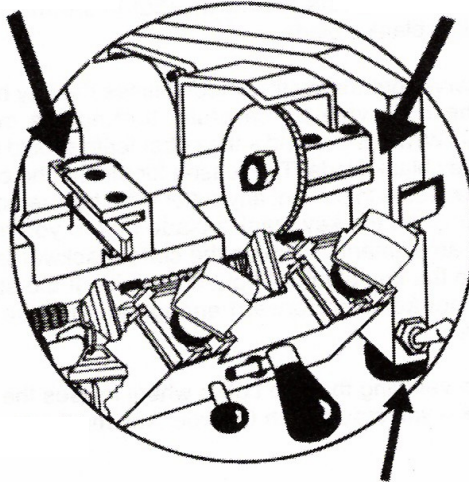
DON'T OVERTIGHTEN the cutter wheel nut - The Left-Hand Nut is self tightening as you use it. Over tightening the cutter wheel nut may make it harder to remove later and may result in damaging the cutter shaft lock or cutter pulley later when you remove the cutter at a later date.

14. DEPTH ADJUSTMENT

Depth is adjusted at the back end of the stylus. See figure 16.

Depth Adjust-

Cutter Shaft Lock



Power Switch

Fig. 16

To adjust the depth you will need:

- 5/32" Allen Hex Wrench
- Piece of writing paper cut to approximately 1" x 4"
- Two identical key blanks-measure blade width with micrometer or calipers and select two that match.

To begin the adjustment you must loosen the two #10-32 Screws. Use your 5/32" Allen Hex Wrench to loosen the two screws about 1 turn each.

Before you begin please make sure that both top vise jaws are in the standard configuration. See figure 17 below.

**TOP JAW STANDARD
CONFIGURATION**

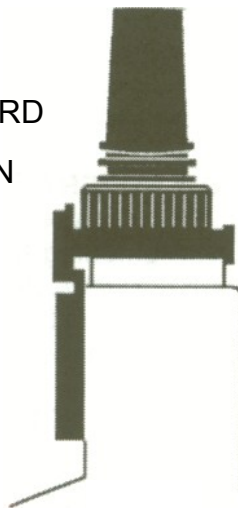


Fig.17

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 two #10-32 Allen Socket Head Cap Screws located on the top of the stylus holder.

To begin the adjustment you must loosen the two #10-32 Screws. Use your 5/32" Allen Hex Nut Wrench to loosen the two screws about 1 turn each.

Use your hand to turn the knurled thumb-turn adjustment knob about 1 full turn - viewed from the front of the machine you will turn the knob to your LEFT.

Secure the two matched key blanks - one in each vise jaw. 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 the bottom 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 release 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.

Observe that the cutter wheel missed the key blank in the right vise by carefully turning the cutter **BACKWARDS** by hand - the cutter teeth should miss the key blank 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.

NOTE: Use the knurled knob as a "clock" to measure how much you are moving the stylus. One full turn of the knurled knob is about .035" (35 thousandths). There are about 80 knurls around the edge of the knob. 1 knurl is less than 1/4 thousandth of an inch. 10 knurls is a little over 4 thousandths (.004").

Backing off the stylus in 1/8 turn increments will speed up the process considerably, 10 knurls at a time – sliding the piece of paper across the front of the cutter wheel after each 1/8 turn will establish a simple routing and make the job less tedious to perform.

Once you have the cutter wheel touching the paper you may slow down the procedure to very small increments, 1 knurl at a time - each time moving the piece of paper from side to side in front of the spinning cutter wheel. Stop when the piece of paper is cut through to the last few fibers. You have now accurately adjusted the depth of cut on your key machine.

Tighten the two #10-32 Screws with your 5/32" Allen Hex Wrench – moderate tightness should be enough. See figure 18.

Verify that tightening the two screws did not alter the adjustment by switching ON the machine and verifying that the cutter wheel just "ticks" the blade of the key blank. We recommend moving the machine's "stick-shift" lever very slightly to the right – and at the same time listening to the cutter wheel for the very faint "ticking" sound of the cutter wheel teeth barely grazing the key blank. DO NOT go back and forth over the same spot! If you use the same spot more than once your stylus will burnish a spot on the key blank that is ever so slightly lower than the rest of the key blank.

Switch OFF the key machine.

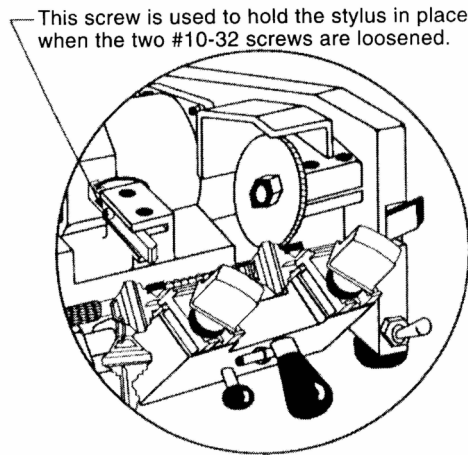


Fig. 18

15. **SPACE ADJUSTMENT**

Never adjust the spacing without first adjusting DEPTH. If the depth adjustment is not right - then spacing will not be right. See #14 above for depth adjustment.

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 two #10 – 32 Allen Socket Head Cap Screws. See figure 19.

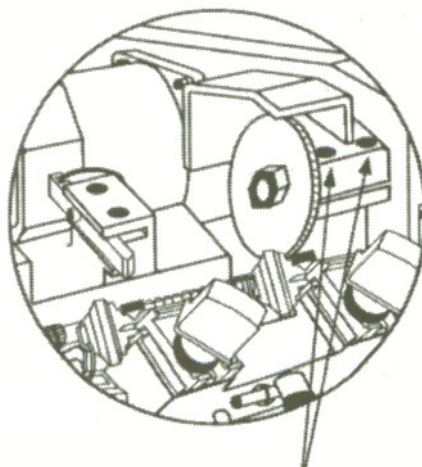


Fig. 19

Two #10-32 Screws

To adjust the spacing you will need:

- ❖ 5/32" Allen 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. See figure 20.

STANDARD TOP JAW
CONFIGURATION



Fig. 20

Stack the two identical key blanks one on top of each other and clamp them in the right hand vise jaw. Be sure to top shoulder gauge them with the machine's flip-up full-function key gauges – leave about 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 jaw 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 down your key gauges. Failure to do so may result in damage to the key gauge and key gauge shaft by the cutter wheel.

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 "stick-shift" lever 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. See figure 21.

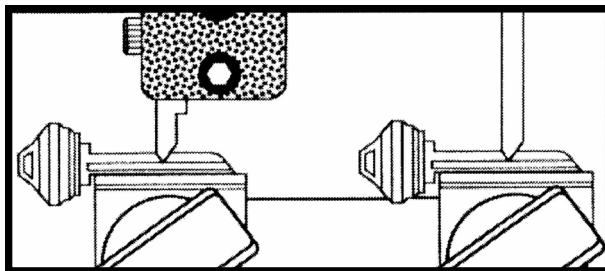


Fig. 21

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 up the machine's full-function key gauges and carefully top shoulder guard the left key to the key in the right-hand vise jaw.

Carefully release the carriage and align the left-hand blank's "V" cut with the machine's 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 hands to carefully turn the cutter wheel **BACKWARDS** to verify that the cutter wheel's teeth do not touch the "V" cut in the key blank.

Loosen the two #10 –32 Screws securing the cutter shaft assembly in place using your 5/32" Allen Hex Wrench – Retighten the two screws with LIGHT pressure. You want just enough retightening pressure on the two screws 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 22.

VIEW SHOWN WITHOUT CUT-
TER GUARD FOR CLARITY.
YOU DO NOT HAVE TO RE-
MOVE THE CUTTER GUARD TO
ADJUST SPACING.

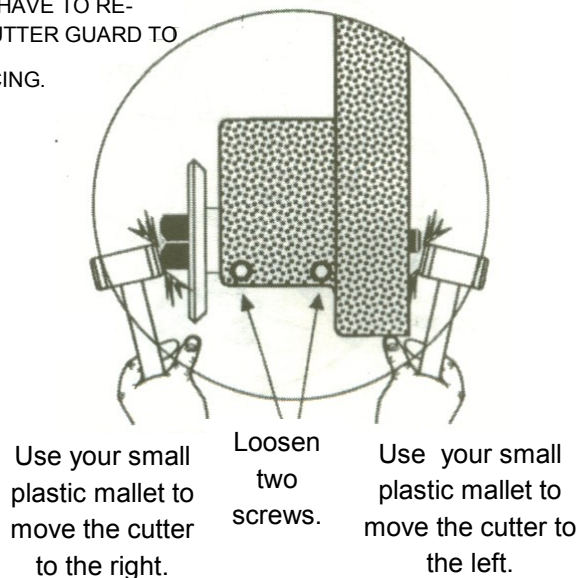


Fig. 22

Turn the cutter **BACKWARDS** with your hand and observe which way you must move the cutter. Use your small plastic mallet to "nudge" the cutter shaft assembly in the direction you want it 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 using the machine's "stick-shift" lever 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 wheel backwards by hand and verify that no cutter wheel teeth will contact either side of the "V" cut in the key. With the machine running you may want to slightly "nudge" the spinning cutter a little more before retightening the two #10 –32 screws.

Switch OFF the key machine.

Tighten the two screws using the 5/32" Allen Hex Wrench

IMPORTANT – Verify that your depth adjustment is correct and readjust if necessary. Refer back to page 15 regarding Depth Adjustment if necessary.

16. **KEY GAUGE ADJUSTMENT**

Stack two identical key blanks one on top of the other and clamp in the right-hand vise jaw. Be sure to **BOTTOM SHOULDER GAUGE** them. **DO NOT** use the machine's flip-up 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 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 "stick-shift" lever 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 "stick-shift" lever to the **LEFT** making a wide cut slightly more than 1/4" wide.

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 flip-up full-function key gauges.

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

NOW flip up 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 when you are finished. See figure 23

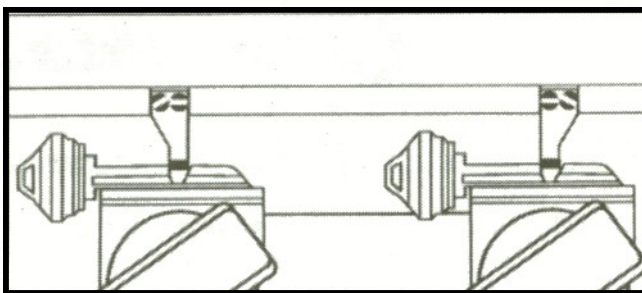


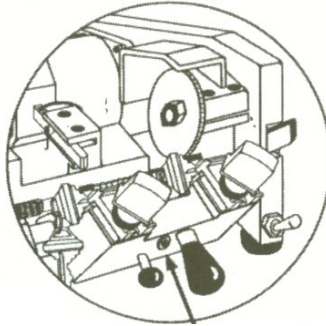
Fig. 23

The key gauges now match the spacing of the vise jaws.

You **MUST** verify and readjust, if necessary, the machine's spacing and adjustment. Please refer to page 18 for **SPACING ADJUSTMENT** information.

17. CARRIAGE OVER TRAVEL DEPTH ADJUSTMENT

Your key machine is equipped with a depth over travel device. Its adjustment is important. The over travel device prevents the cutter wheel from cutting into the vise jaws when there are no keys clamped in the machine. Setting the depth over travel device too high will prevent deep cuts from being made - they will not get cut all the way down into the key blank. See figure 24.



CARRIAGE OVERTRAVEL
ADJUSTMENT

Fig. 24

To adjust the depth over travel 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. Release the carriage and position it so the stylus and cutter wheel are in about the middle of the vise jaws.

Loosen the 7/16" Hex Jam Nut on the front of the carriage.

Loosen the 1/4" – 20 slotted screw stud with your screwdriver. About 1 turn should be enough. Observe that the stylus is touching the face of the closed vise jaw.

Gently turn the slotted screw stud with your screwdriver in the clockwise direction and stop when you feel the stud contact the key machine's main housing. There is a 3" long hardened roll pin in the machine's main housing that the slotted screw stud will contact.

Turn the slotted screw stud an additional 1/4 turn – after contacting the roll pin the machine's main housing. The thread pitch is 20 which is approximately 12 thousands of an inch per 1/4 turn. Tighten the 7/16" Hex Jam Nut on the slotted screw stud - use moderate tightness.

After tightening the 7/16" not - check the gap between the stylus and the face of the closed vise jaws. Use three pieces of 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 over travel will work only when readjusted properly. The following things can happen if the adjustment is not done properly.

- a) If adjusted to low your cutter wheel may cut into the right-hand vise jaw.
- b) If adjusted to high your cutter wheel may not cut deep enough when cutting deep cuts in keys.
- c) Carriage over travel will not prevent cutting the right-hand top vise jaw if the top vise jaw has come loose and has moved forward into the cutter. PLEASE check the tightness of the knurled knobs OFTEN.

18. **MAINTENANCE**

UNPLUG YOUR MACHINE PRIOR TO MAINTENANCE

Your machine is time proven with good design, engineering and modern manufacturing practices. You can service virtually 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

UNPLUG YOUR MACHINE PRIOR TO 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 black oxide processed 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. Turn the machine over and lubricate the linkages that drive the carriage shaft left and right. **WARNING:** Do not turn the machine over and set it on the Power Switch.

SUGGESTION: When lubricating the "stick-shift" drive linkages under the machine you might want to use spray-on bicycle chain lubricant – the kind that foams and penetrates. **DO NOT** use this on the rest of the machine.

Lubricate the vise jaw plungers inside the carriage – remove the key clamp knobs and large knurled knobs and top vise jaws. Squirt some number 30 non-detergent motor oil in the large hold and reassemble.

DO NOT LUBRICATE your key machine with LPS-1 or WD-40 in place of number 30 non-detergent motor oil. You may use LPS-1 or WD-40 as a rust preventative in addition to the number 30 non-detergent 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 this 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 an oil-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" Allen Hex Wrench to loosen the four cap screws and hex nuts securing the motor to the motor bracket. Push the motor hard against the belt and tighten the four screws. See figure 25.

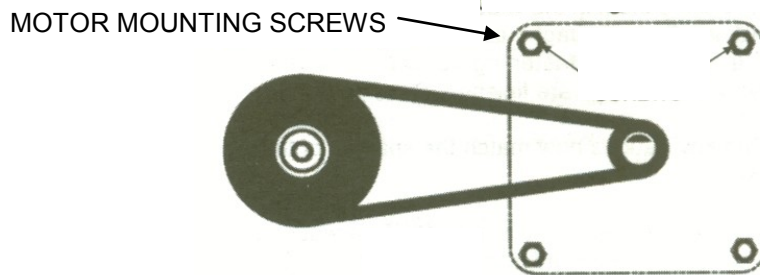


Fig. 25

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 freshly cut key and duplicates another from 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 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 – but 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 questions remain unanswered.

There is only one way to get good results on a consistent bases. 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 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 and accuracy 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 (preferably 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. Measure each cut several times and record their average. Compare the results. There is really no substitute for the procedure if you want to make accurate duplicate keys. Generation cutting will not give you meaningful results like this procedure.

19. **TROUBLESHOOTING**

Machine Always Needs Adjustment

There are several things that can cause your machine to need adjustment.

1. Cutter wheel may be dull. This can cause the key to try to “float” and not cut deep enough in the deepest cuts. Replace or sharpen the cutter.
2. Carriage spring may be weak or adjusted to light. Replace the spring or adjust the spring.
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 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 may be the carriage depth over travel adjustment is set too high. This results in the machine’s inability to cut the deepest cuts on a key – but shallower cuts are fine. This symptom is more common than you think. Fix the problem by readjusting the Carriage Over travel Depth Adjustment. See page 22 for Overtravel Adjustment.
7. Again – one key cuts fine and the next one doesn’t. This time it may be the key gauges. Sometimes key machine operators don’t flip down the full-function key gauges all the way down 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 for how to do it. See page 21 for Key Gauge Adjustment.
8. Keys don’t always work in the lock when gauged off 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 key blanks since they are seldom used by the lock cylinder. 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 half-way 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 service vehicle. You're 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 to much you will narrow the width of the pin seat somewhere in the middle—if the stylus is sharp it will scrape the key to much, if the stylus is blunted to 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 motor. With the machine turned OFF—grab the motor shaft and try to get some movement out of it when trying to move the shaft up and down. If there is up and down movement the motor ball bearings are worn and the motor will need replacement some time in the future. Please ignore any motor shaft play when pushing or pulling the shaft along its length in and out of the motor—this play is in the motor's spring preloaded ball bearings and is not a sign of bearing wear.
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 no 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. Another possibility is the way some of the ball bearing cages are made inside the bearings—these ball cages have an assembly opening created at the bearing factory. These bearings sometimes make a slight "ticking" sound. In this case the sound may not be a problem.
4. The machine's cutter shaft lock is partially depressed and is rubbing against the drive pulley. Pull up on the shaft lock knob and the sound should disappear.

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 and connections.

2. Key cuttings in the motor's capacitor. Unplug the machine, remove the capacitor's rubber cover and blow out the chips. Remember to wear safety glasses.
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. Call us for resharpening details.

My Resharpened Cutter Doesn't Work Well

The cutter resharpening service didn't have it reground – instead you went to a service that used a different means of sharpening such as etching or striking. Simply put... your cutter wheel should always be resharpened by grinding –and you will need a quality service to do it right. Call us for quality resharpening details.

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

Your 115 VAC motor needs a mobile generator to work properly. Power Converters work fine on electric drills, TV's and radios. Many split phase capacitor motors do not work well on some power converters. Buy a Redi-Line or similar motor/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 wired in reverse or you are using a small wire gauge. Reverse the wiring connections and/or use heavier wire such as 14 Gauge or heavier.

I'm Mobile and I Keep Breaking Shoulder Screws in My "Stick-Shift" Linkages

This situation is caused by a combination of the weight of your carriage (about 9 pounds) in the locked back position and aggravated by the bouncing around of the service vehicle driving on the roads. You can fix the situation once and for all by releasing the carriage when it's not in use – put a piece of heavy cardboard, a small piece of wood or even a piece of indoor/outdoor carpet

WHEN DO I REPLACE. . .

- a) 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. **NOTE:** Rytan's key machine cutter can be resharpened. Call us for details.
- b) Resharpen your cutters in sets. Store your old cutters until you've accumulated at least three cutters – then call us about resharpening them to all 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.
- c) 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.
- d) Replace **vise jaws** when the edges become rounded, flared, mushroomed or when you've cut into them too many times.
- e) Replace the **key gauge shaft** and/or **carriage** when the key gauge shaft wobbles in the carriage excessively.
- f) Replace the **carriage shaft** and **bronze Oilite® bearings** when you can wobble them beyond "just noticeable".
- g) Replace the **drive belt** yearly if you use the machine a lot. Every 3-5 years if you have a low volume shop.
- h) 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.
- i) Replace the **power switch** if you accidentally bump it, or hit it, or drop something on it.
- j) 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 consider replacing it just in case for safety reasons.

HOW DO I REPLACE. . .

UNPLUG MACHINE BEFORE REPLACING PARTS

The Stylus

Remove the 1/4-20 cap screw going through the stylus. Use a 3/16" Allen hex wrench and a 7/16" socket wrench. Loosen the two #10-32 socket head cap screws on top of the stylus holder with a

5/32" Allen hex wrench. Pull out the stylus and reinstall a new one. Be sure to place the groove near the back end of the stylus on to the flange of the knurled knob. Reinstall the 1/4-20 socket head cap screw and 7/16" hex nut – do not tighten it so tight that you cannot move the stylus in and out by turning the knurled adjustment knob. Also do not tighten the screw so loose that you can wobble the stylus from side-to-side with your hand. Refer to Depth Adjustment on page 9.

The Cutter Shaft

Remove the left-hand nut and cutter wheel. Remove the access plate and wire brush if installed on your RY100 and loosen the four motor mounting screws to loosen the drive belt. Loosen the two #10-32 socket head cap screws located on the top front edge of the cutter head – use your 3/16" Allen hex wrench. Loosen them about 1 full turn each.

Pull out the entire cutter shaft assembly and replace with a new one. Reassemble in the reverse order from above.

The Carriage Spring

Turn the machine over on a piece of thick carpet (you don't want to damage the power switch located on the front of the machine). Use your 3/16" Allen hex wrench and remove the 1/4-20 x 3/4" long socket head cap screw that secures the linkage to the "stick-shift" lever's drive shaft. Drop the linkage assembly and pull out the "stick-shift" lever and drive shaft assembly. Leave the two piece linkage assembly attached to the carriage shaft.

If your carriage spring is still attached – grasp the linkages with your left hand and use the linkages as a lever to hold the carriage shaft from turning when you release the carriage. With your right hand release the carriage in the same way you would do if you were going to cut a key. This will require a bit of muscle in your left hand because you're trying to hold onto the linkages while trying to release the carriage against the carriage spring at the same time.

When you've released the carriage you will notice that everything got easy all of a sudden and the carriage spring will probably fall out by itself. At the bottom of the carriage there is a 1/4" wide slot with a pin in it – use a small hammer and drive the pin to nearly flush with the bottom of the carriage.

From the front of the carriage install a new carriage spring and retaining pin - the retaining pin will lay in a milled groove on the face of the carriage. Hold the spring and its pin in place and manipulate the other end of the carriage spring onto the 1/4" diameter grooved pin going through the carriage shaft. If the spring won't reach to the pin you have your carriage in the locked back position - release the carriage and manipulate the carriage and carriage shaft (hold onto the

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 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.

Reassemble in the reverse order and refer to section in this manual titled HOW DO I REPLACE. . The Carriage Spring and complete your assembly.

You should recheck the depth, depth over travel and space adjustments on your machine and readjust as necessary.

WHY DID WE DO IT THAT WAY . . .

Key Gauges

We are often asked why we didn't make our key gauges flip down automatically when the carriage is released. It's a good question and deserves answering. We chose full-function key gauges instead. We're committed to incorporate unique and useful features into our products wherever we can. We felt that if we could incorporate a built-in key gauging system that worked for almost all the key gauging requirements you would benefit more from this than having ordinary top shoulder key gauges that automatically blip-away when the carriage is released. Think about it – three key gauging possibilities that don't flip away automatically verses only one key gauging possibility that does flip away.

Why Such a Big Cutter

The bigger the cutter the less noticeable the radius is in the pin seat area of the duplicated key.

Why Such an Unusual Vise Jaw Design

Simple – we built these vise jaws in a way that resembles a machine shop milling machine vise. No milling machine vises uses a pivoting action jaw - parts would be flying out all the time! With a pivoting action jaw you only have one theoretical size thickness that will clamp properly.

Why Make the Bottom Jaw Move Instead of the Top Jaw Like all the Other Machines

We wanted the movable vise jaw attached to a very large diameter, very long piston to keep movable jaw from tipping. We wanted a vise jaw design that would clamp straight all the time . . . period. The only place with enough room to do it was below the vise jaws and in the carriage.

Why Didn't We Use Gears to Drive the Carriage Left and Right

Gears are pumps – on a key machine they pump dirt and key cuttings. Gears get crunchy - our linkages do not!

Why Aren't the Vise Jaws Hardened

Simple - miss-adjust your key machine and waste the cutter. Our vise jaws are made from machine able steel so you won't ruin your cutter if you make a mistake. The vise jaws last a long time anyway and when you replace them you are not required to replace them in sets - buy only what you need at the time.

Why Not Use a Less Expensive Motor and Save Money

Our "stick-shift" machine is the fastest machine you can own - you need a lot of power to keep that big cutter going when you "wail" through a key. Low cost motors either won't have the power you will need or they won't work efficiently on a Redi-Line® power generator in your service truck or van. Your machine is equipped with the most powerful motor you can get and it works well on a Redi-Line® generator.

Why is the Machine As Big As It Is, You Could Make is Smaller

The machine is built big, and strong, and rigid – It Is Built To Last.

20. CUSTOMER INFORMATION

Rytan, Inc. provides the following information on warranty and service for the RY100 key duplicating machine:

Warranty Registration

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 and Handling Charges

Payment of all shipping and handling charges 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.

**YOU MAY CALL US TOLL FREE
(800) 447-9826
9:00 a.m. – 4:30 p.m. Pacific Time
Monday through Friday**

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 will be charged an evaluation fee which will be applied to parts and labor costs you have authorized, PLUS you will be charged for shipping and handling costs. If your machine is serviced out of warranty the evaluation fee will be applied to parts and labor costs you have authorized, PLUS you will be charged for shipping and handling costs. If we receive a machine that requires no service you will be charged the 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 by the customer. We must have your authorization before we will begin evaluating your key machine and you must be aware of the costs involved before we proceed.

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

21. **WARRANTY**

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

RYTAN, INC. MODEL RY100 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 THE RYTAN, INC. FACTORY FOR ALL WARRANTY WORK. THIS WARRANTY IS NOT APPLICABLE TO THE CUTTER WHEEL OR TO 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.

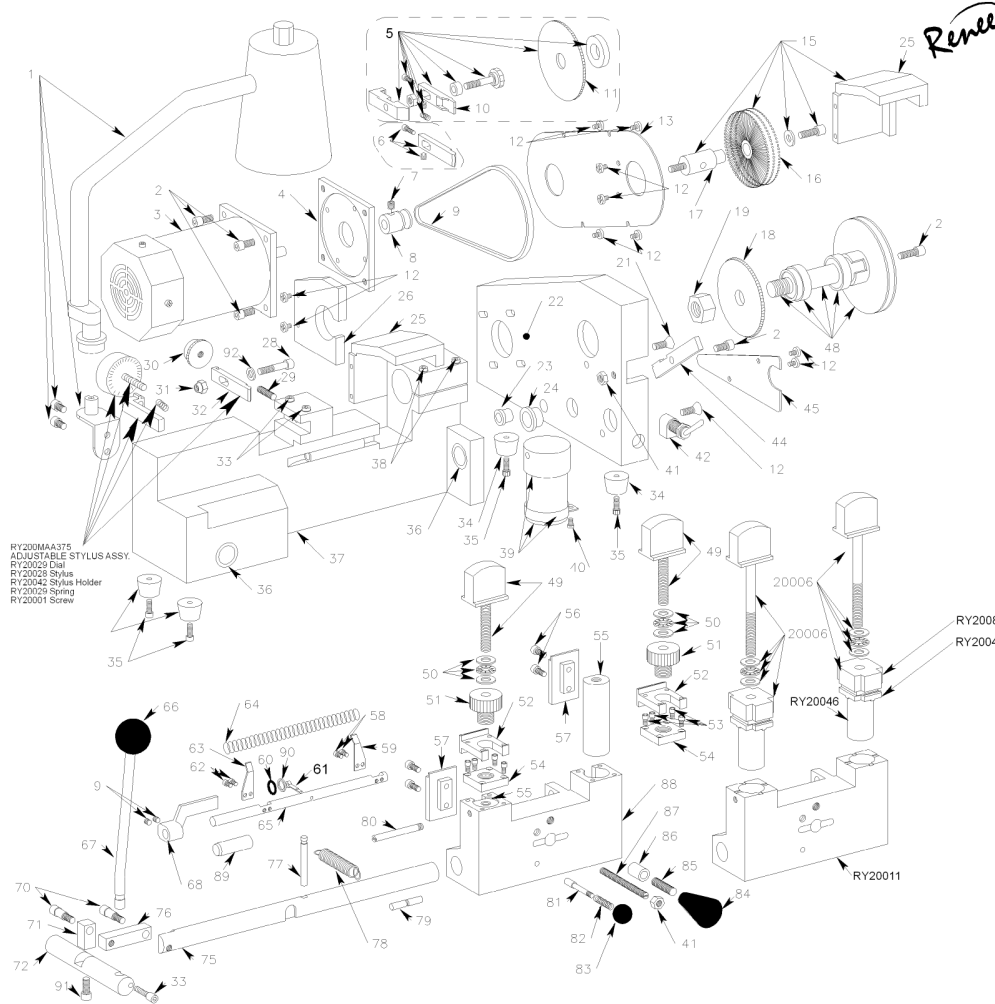
SERVICE (APPLICABLE IN THE CONTINENTAL U.S.A. ONLY)

MACHINES SENT TO THE 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 CUSTOMER'S RESPONSIBILITY.

RY100 & RY200 Key Machine

Rytan
INCORPORATED

455 Maple Avenue
Torrance, CA 90503
tel (800) 447-9826
fax (310) 212-6002
WWW.RYTAN.COM



RY100 & RY200 PARTS LIST

- | | |
|--|---|
| 1- RY39 Lamp Kit | 40-RY9065 Cap Screw |
| 2- RY9069 Cap Screw | 41-RY9055 Hex Jam Nut |
| 3- RY10038 A.C. Motor | 42-RY9041 Switch |
| 4- RY10033 Motor Mounting Plate | 44-RY10035 Cutter Shaft Lock |
| 5- RY111 or RY222 Slotter Kit (optional) | 45-RY10017 Access Plate |
| 6- RY118 or RY218 Standard QC Stylus | 48-RY84 Ball Bearing Spindle Assembly |
| 7- RY9048 Set Screw | 49-RY80 Key Vise Knob & Stud |
| 8- RY10037 Motor Pulley | 50-RY82 3-Piece Thrust Bearing Assy. |
| 9- RY9039 Drive Belt | 51-RY10041 Top Jaw Clamp Knob |
| 10-RY118 or RY218 Slotter Stylus | 52-RY89 or RY20089 Top Vise Jaw |
| 11-RY115 Slotter Cutter | 53-RY9063 Cap Screw |
| 12- RY9046 Phillips Screw | 54-RY10045 Top Plate |
| 13-RY10016 Belt Guard | 55-RY10046 Vise Plunger |
| 15- RY101 Wire Brush Kit (optional) | 56-RY9062 Cap Screw |
| 16- RY9074 Replacement Wire Brush | 57-RY10047 or 20047 Bottom Vise Jaw |
| 17- RY10101 Arbor | 58-RY9107 Slot Head Screw |
| 18- RY10030 or RY20030 Cutter | 59-RY10048 Key Gauge R.H. |
| 19- RY10036 Cutter Hex Nut (Left Hand) | 60-RY9108 O-Ring |
| 20- RY9037 Ball Bearing Assembly | 61-RY9279 Cotter Pin |
| 21-RY9054 Flat Head Screw | 62-RY9061 Cap Screw |
| 22-RY10012 Motor Bracket | 63-RY10050 Key Gauge L.H. |
| 23- RY9053 Strain Relief | 64-RY10061 Key Gauge Spring |
| 24-RY9052 Bushing | 65-RY10049 Key Gauge Shaft |
| 25-RY10013 Guard | 66-RY9027 Lever Knob |
| 26-RY107 Cutter Shield (optional) | 67-RY10018 Lever Shaft |
| 28-RY9042 Cap Screw | 68-RY114 Key Gauge Protector (optional) |
| 29-RY9029 Set Screw | 69-RY9003 Set Screw |
| 30-RY10029 Stylus Adjustment Knob | 70-RY9059 Shoulder Screw |
| 31-RY9056 Nylon Lock Nut | 71-RY10020 Drive Link |
| 32-RY10028 or RY20028 Stylus | 72-RY10019 Drive Shaft |
| 33-RY9057 Cap Screw | 75-RY10022 Carriage Shaft |
| 34-RY9145 Rubber Foot | 76-RY10021 Shaft Link |
| 35-RY9058 Cap Screw | 77-RY10026 Carriage Shaft Spring Pin |
| 36-RY9024 Bronze Oilite™ Bearing | 78-RY10025 Carriage Extension Spring |
| 37-RY10010 Machine Base | 79-RY9200 Retaining Pin |
| 38-RY9044 Cap Screw | 80-RY10056 Key Ring Stud |
| 39-RY92 Capacitor Assembly | 81-RY10023 Carriage Release Stud |

Part Drawing may be different
than actual part-Rytan reserves
the right to make changes

- | |
|-----------------------------------|
| 82-RY9025 Carriage Release Spring |
| 83-RY9038 Carriage Release Knob |
| 84-RY9028 Carriage Knob |
| 85-RY10086 Threaded Stud |
| 86-RY10060 Knob Spacer |
| 87-RY10087 Carriage Over-Travel |
| 88-RY10011 or RY20011 Carriage |
| 89-RY9278 Vinyl Cap |
| 90-RY10067 Flat Washer |
| 91-RY9047 Cap Screw |
| 92-RY9273 Plastic Small Washer |

Convert your RY100 to 4-way jaws

Order part numbers:

- RY20005- Carriage assembly
RY101-Wire Brush Kit
RY114- Key Gauge Protector (optional)

Call us!

PARTS NOT ILLUSTRATED

- RY9040 Power Cord
RY9051 Wire Nut
RY88 12 Volt D.C. Motor
RY99 12 Volt Wiring Kit
RY100104 Instruction Manual

OPTIONAL ACCESSORIES/PARTS

- RY39 Lamp Kit
RY81 Key Gauge Assembly
RY82 Key Vise Thrust Bearing
RY83 Carriage Drive Linkage
RY84 Ball Bearing Spindle Assy.
RY85 Carriage Release Assy.
RY101 Wire Brush Kit
RY107 Cutter Shield
RY111 Slotter Kit
RY114 Key Gauge Protector
RY120 Quick Change Kit

RY200 Parts

- RY218 Quick Change Standard Stylus
RY220 Standard Cutter & Q.C. Stylus
RY222 RY200 Slotter Kit
RY20011 Carriage
RY20005 Carriage Assy. with 4 Way Jaws
RY20006 Knob assb. w/ bearings
RY20028 Stylus
RY20030 Cutter for RY200
RY20046 Vise Plunger
RY20047 Bottom Jaw
RY20089 Top Jaw
RY200375 MicroAdjust

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE***SEE TERMS AND CONDITIONS

Rytan
INCORPORATED

Model RY200

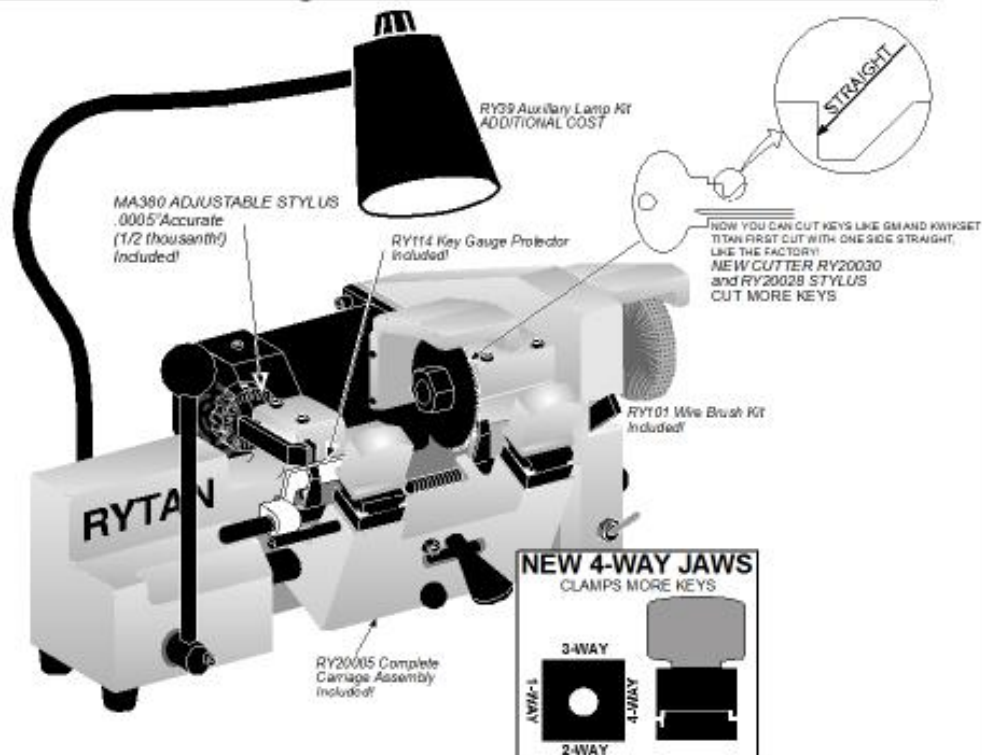
OPERATOR'S MANUAL

Rytan Model RY200 Semi-Automatic Key Duplicating Machine with 4-Way Jaws
for Cylinder Keys and Automotive Keys

CLAMPS MORE KEYS

NEW CUTTER AND STYLUS CUTS GM AND KWIKSET TITAN KEYS
BUILT IN MICRO-ADJUST STYLUS

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



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

RYTAN, INC. - 455 MAPLE AVE. - TORRANCE, CA. 90503 (800) 447-9826 - (310) 212-6002 fax

RYTAN, INC. RESERVES THE RIGHT TO MAKE CHANGES WITHOUT NOTICE. PRICES MAY VARY FROM YOUR DISTRIBUTOR.

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1. INTRODUCTION

Thank you for purchasing our American Made, Rytan, Inc., Model RY200, universal key duplicating machine. Your new key machine has been designed and built with heavy-duty components designed for the most demanding shop and service vehicle 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 and operator, resulting from careful design and placement of the operating controls. We are confident you will profit greatly from this quality built versatile key machine.

Your new RY200 key duplicating machine is made similar to the RY256 RAMM semi-automatic key machine, but with one exception: Stylus and Cutter Head cannot be rotated to cut Medeco Level-1 high security keys. The Stylus on the RY200 key machine is 100% adjustable to better than 1/2-thousandths of an inch (0.0005"), and can be re-set to "0" at any time.

Use your machine to cut standard cylinder keys and U.S. and Foreign automobile keys.

2. GETTING STARTED

Please take time now to read and understand this manual thoroughly before you start cutting keys. Maintain this owner's manual and review it often, and make it available to others who will use this machine.

Do not attempt to operate this machine until you have read it 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 environment. 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 work area. Do not let visitors contact 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. Cutting steel keys is not recommended.
- 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. Do not attempt to remove key blank or key blank material while cutter is rotating.
- T. Never use machine in an explosive atmosphere. For example, if your machine is in a service vehicle 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** and **OFF**.
- Y. Drugs, Alcohol, Medication. Do not operate machine while under the influence of drugs, alcohol, or any 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.
- AA. Save these instructions.

4. **MOUNTING THE MACHINE**

Drill two oversized ½" holes in your bench top to mount the machine. Use ½" – 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 jaw “A” configuration. Jaw requirements - to make deeper cuts in small keys or to clamp other types of keys simply loosen the key clamp knob a few extra turns and lift-and-turn the jaw assemblies from A” to “B” to “C” to “D”.
- 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 down your key gauges before cutting a key. Failure to do so will prevent the key from being cut by the cutter wheel.
- D. Always cut keys from **Bow-to-Tip**. NEVER MAKE YOUR FIRST CUT FROM TIP-TO-BOW.

The RY200 is specifically designed to cut most cylinder keys and U.S. and Foreign automotive keys by operating the machine’s “stick-shift” lever SMOOTHLY from **Right-to-Left**. 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 “cleanup” cut back to the bow of the key ONLY after the key has already been cut from Bow to tip.

NOTE: If an excessive amount of key blank material is removed on the cleanup cut (second cut) your cutter may need replacing or re-sharpening. Rytan can sharpen your dull cutter.

6. CUTTING DEEP CUTS IN SMALL KEYS

- A. Most key clamping requirements use the standard jaws “A” configuration. If you are making deep cuts you may have to rotate to the “B” jaw configuration. You must loosen the painted key clamping knobs a few turns, turn the vise and retighten.

Make sure your vise jaws are clean (with no chips in the way) and as you secure the vise jaw on to your key - be sure to push the key into the jaw firmly and make sure they remain flat, and parallel into the vise jaws when tightening the large painted key clamp knob

When clamping keys in the jaws be sure to open the jaws ONLY enough to slide the key in place.

Please see below for more Vise Jaw information.

- B. Keys are always gauged with the full-function flip-up key gauges.
- C. Always remember to Flip Down your key gauges before cutting a key. Failure to do so will not cut the key.
- D. Switch ON your machine and operate the “stick-shift” lever until the stylus is right over the left edge of the first cut closest to the bow of the key, gently press down on the carriage with the black tear-drop hand, then reach down and pull out the carriage release (small round black knob) and release the carriage. You may ease up on the carriage and manipulate the carriage controls to make a smooth *gentle* cut down the left edge of the first “V” cut in the key to the last cut on the tip of the key - cutting all cuts on the key.
- E. You may want to reverse the direction of the carriage and make a “clean-up” cut back to the bow of the key.
- F. Push down and lock back your carriage. Turn OFF the machine.

NOTE: 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.

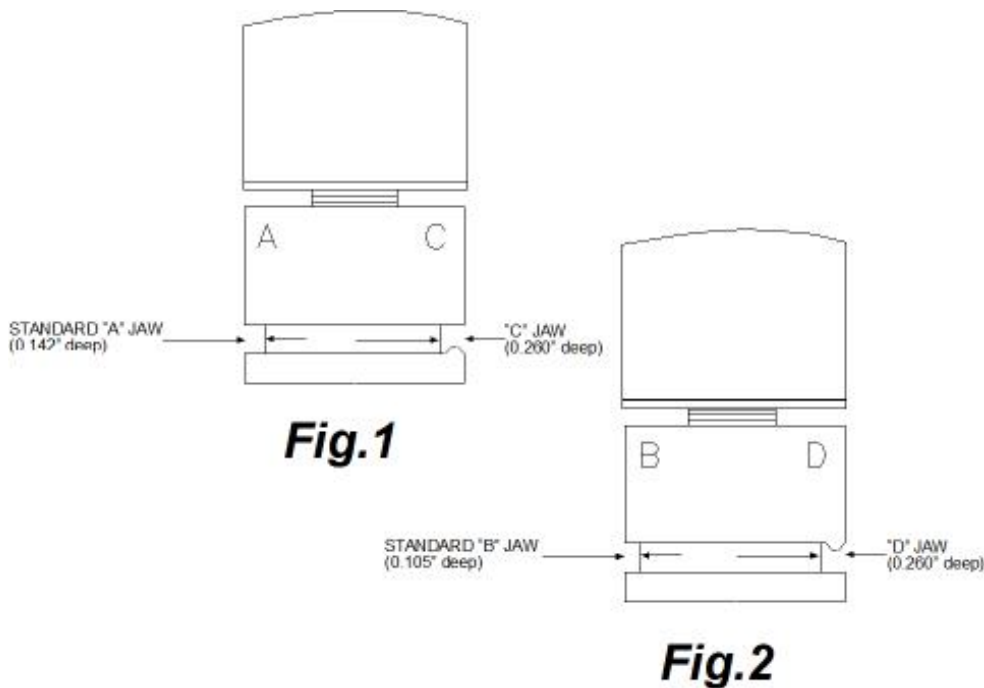
NOTE: Some automotive presentation keys are made of Hardened Steel and can ruin the cutter wheel instantly! Don’t be fooled by the decorative Gold, Brass, or Silver plating on these keys.

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 made – if the key won't file easily it won't cut any better in your key machine and will most likely ruin your cutter!

7. VICE JAWS

Choosing the correct vise jaw. For most key cutting work the jaws can remain in the standard "A" configuration. In the standard configuration the entire "throat" of the jaws is used. Measuring from the front faces of the "A" vise jaw 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 can flip your vise jaws to "B". Loosen the vise jaw a few turns, flip the vise jaws to "B" and retighten the large painted knob. You must do both vise jaws for this to work. Your "B" key machine vise jaws now have a "throat" of .105" to clamp the key.



CHANGING THE VISE JAW

Your new jaws can be rotated from the "A" jaws to "B", "C", or "D" vise jaws by just turning them.

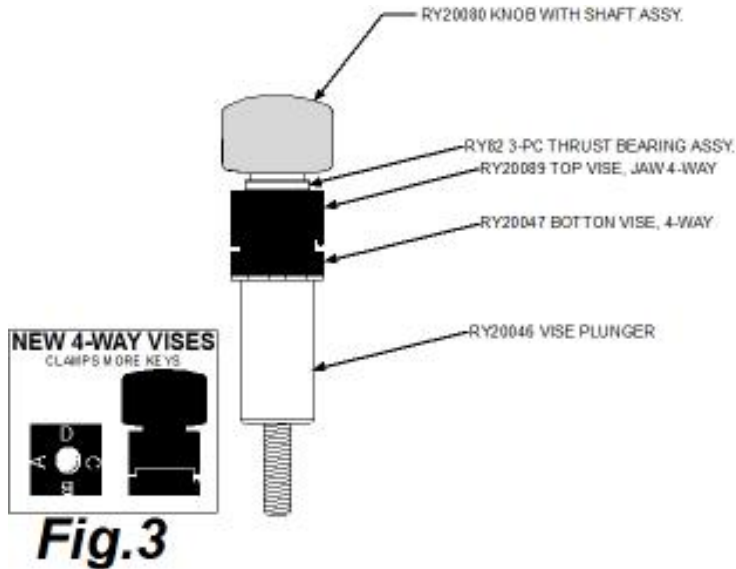
VICE JAW REPLACEMENT

Either vise jaw assembly may be replaced at any time. Inspect your vise jaws for uneven clamping and referencing surfaces. Replace when jaws appear worn. Accelerated wear occurs when you clamp double-sided steel keys such as Volkswagen. Clamping pre 1984- 1/2 Ford double-sided keys too far to the right into the vise jaws may cause wear to the left edges of both 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. This can be observed if you open the vises only enough to insert the key.

WISE JAW REPLACEMENT

Vise jaws (cartridges) are replaced in pairs as an assembly, a matched set consisting of (one top jaw and one bottom jaw); you will need two sets for your key machine. You will disassemble and re-install the old plungers, springs, and screws. Or you can buy a complete set with the plunger, top jaw, bottom jaw, screws and springs. Simply drop the (cartridges) in place, you will need two cartridges. You will reuse your RY2008 Knob with Shaft assy., and the RY82 thrust bearings.

Coat all steel sliding surfaces with a light coating of grease when installing the vises.



8. TOP SHOULDER KEY GAUGING

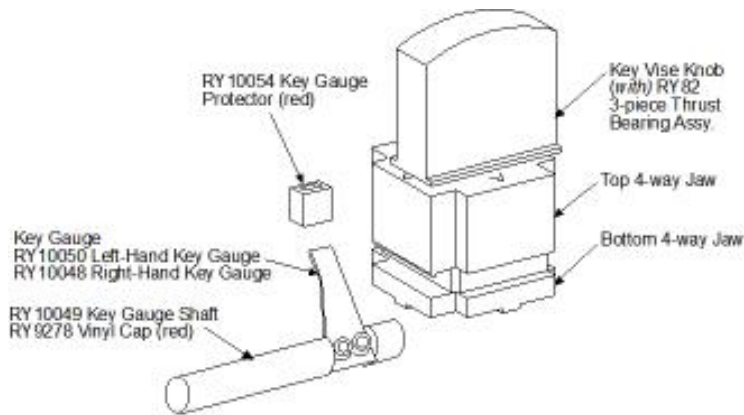


Fig. 4

Standard cylinder keys should always be top shoulder gauged. Use the machine's 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.

Always remember to flip DOWN your key gauges before cutting a key. Failure to do will prevent your key machine from cutting the key.

1. CLAMPING KEYS

Open the vise jaws only wide enough to slide the key in. With the key all the way into the “throat” of the vise jaws - put your index finger against the key blade and with moderate force against the key in to 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 a standard cylinder key is about 1/32” away from the edge of the vise jaws CLAMP the key with the key clamp knob –continue pressing against the blade of the key with your finger as you tighten the key clamp knob.

When both keys have been properly gauged and clamped in the vise jaws REMEMBER to flip down the full-function key gauges before attempting to cut the key. Failure to flip down the key gauges will prevent you key machine from cutting the key.

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 “A” vises ONLY enough to slide in the thinnest part of the key. (See Fig. 5 & 6) 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.

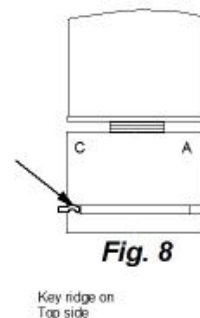
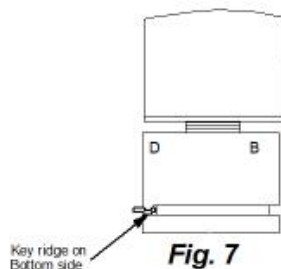
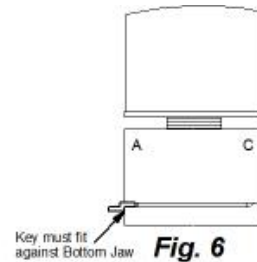
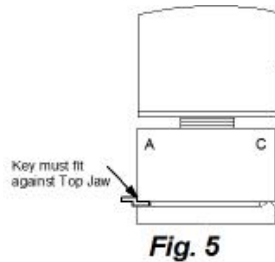
Door and trunk key “ridge” will contact the face of the BOTTOM vise jaw. See Fig. 5 & 6 below..

Keys such as Chicago double sided and others should use vises “D” and “C” to clamp into the groove near the center of the blank. (See Fig. 7 & 8)

For Medeco Use “B” side jaws.

TIP OR BEHIND THE TIP KEY GAUGING.

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. Or behind the TIP as in Best keys.



Always remember to flip DOWN your key gauges before cutting a key. Failure to do so will prevent the key from being cut.

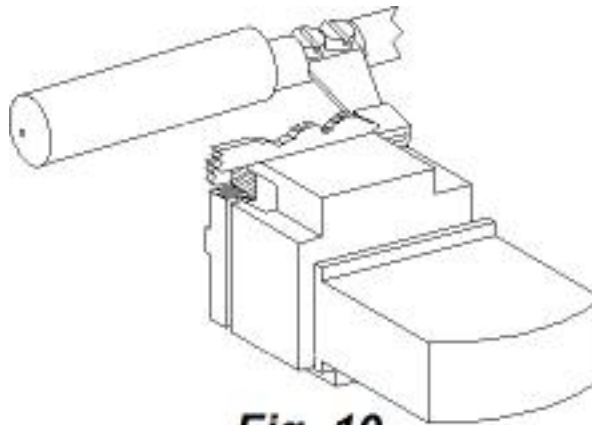


Fig. 10

10. **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. 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 11 and figure 12.

Always remember to flip DOWN your key gauges before cutting a key. Failure to do so will prevent the key from being cut.

11. **RELEASING THE CARRIAGE**

For safety reasons - releasing the carriage requires two actions. With your right hand, push down gently on the carriage’s large “teardrop” knob just enough to push the carriage down a small distance. While holding the carriage down reach around with your thumb and index finger and grasp the small round black knob and pull it out and hold it there. When the small round black knob is pulled out - gently lift up on the carriage a small distance and **THEN** let go of the small round black knob and continue positioning the carriage where you want it to be (you will want to move the carriage to the beginning of the first cut nearest the bow of the key).

NOTE: You will not be able to pull the small black knob by itself to release the carriage. You must push down on the carriage first – then pull out the small black knob to release the carriage. See figure 11.

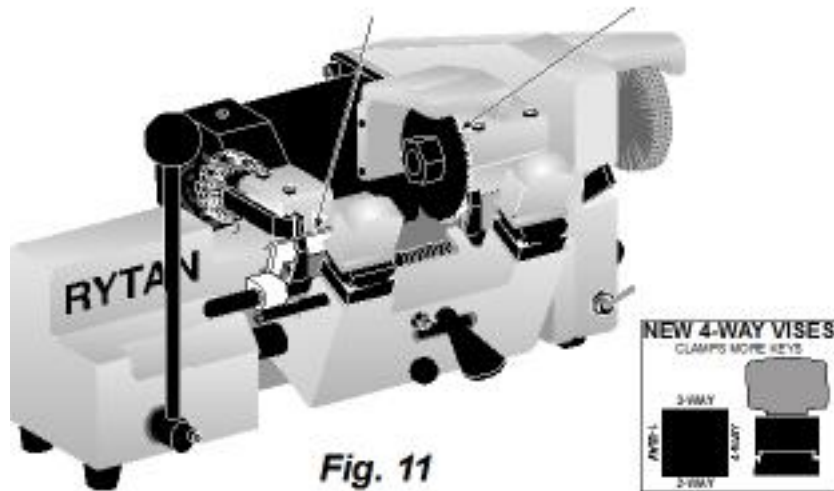
ALWAYS REMEMBER to flip down your key gauges before cutting a key. Failure to do so will prevent the key from being cut.

PLEASE. . . DON’T FORGET to turn off your key machine before removing a cut key and reloading another key blank.

LOCK THE CARRIAGE BACK (after cutting a key). Push DOWN on the carriage’s large “teardrop” knob until the carriage “clicks” into the locked position.

SWITCH “ON” YOUR MACHINE

The power switch is located at the lower right, front of the machine. See figure 12.

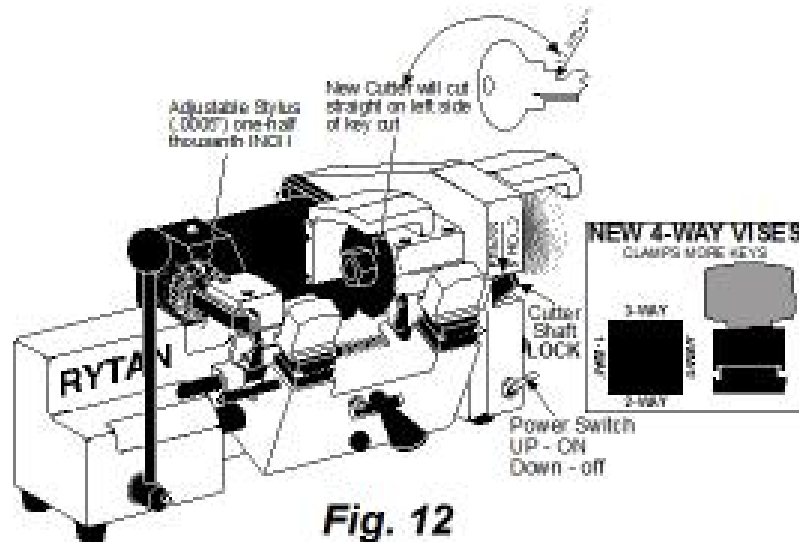


To switch ON pull the power switch up.

To switch OFF push the power switch DOWN.

12. CUTTER SHAFT LOCK

To remove the cutter you must lock the cutter and cutter shaft in position before using a 1" wrench to remove the cutter.



Press DOWN firmly on the cutter shaft lock. While holding the lever down - rotate the cutter by hand until the cutter shaft lock “clicks” in to 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 the 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** - the motor may be powerful enough to slip the belt and permanently damage it by wearing a flat spot on the belt.

13. **REMOVING/REPLACING THE CUTTER**

REMOVING THE CUTTER

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

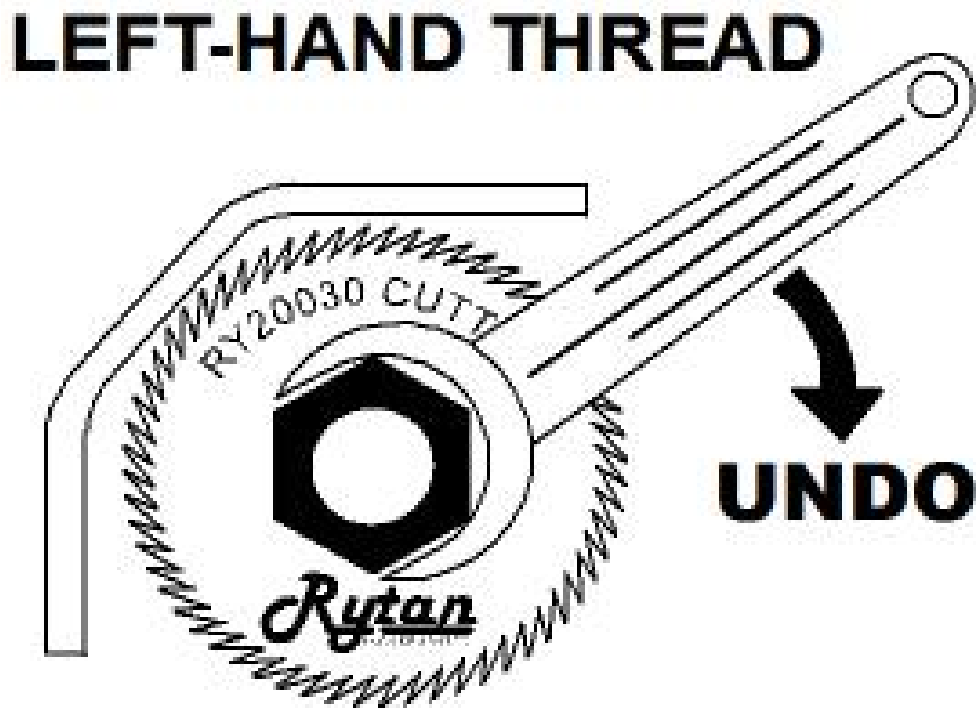


FIG. 13

Remember to LOCK the cutter before removing the cutter wheel.

Use a 1" open-end or hex wrench to remove the Left-Hand Nut. See Fig. 13.

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 grease to the cutter shaft face, shank, and threads before installing the cutter wheel and Left-Hand Nut.

DON'T OVERTIGHTEN the cutter wheel nut - The Left-Hand Nut is self tightening 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 pulley later when you remove the cutter at a later date.

14. DEPTH ADJUSTMENT

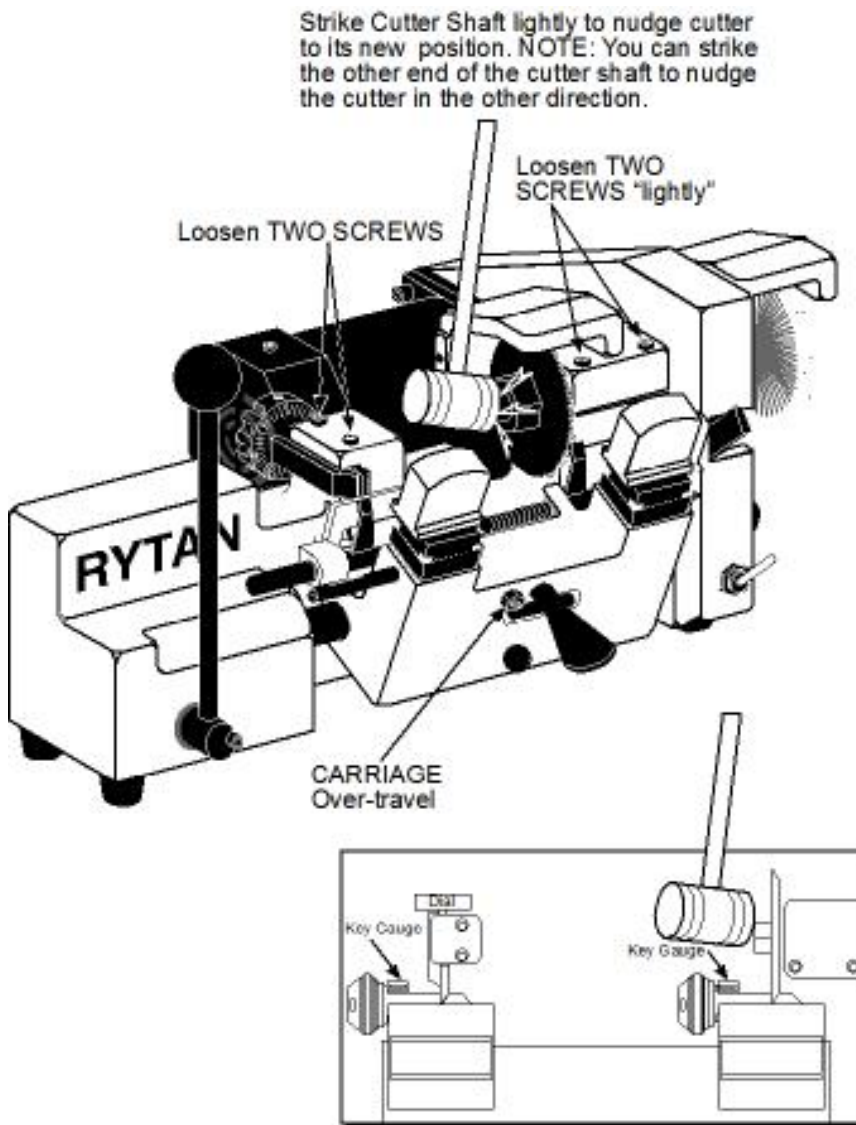
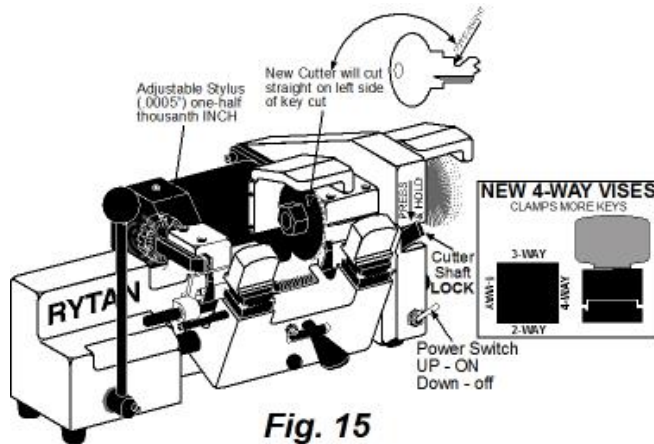


Fig. 14

Depth is adjusted at the back end of the stylus.



14. **DEPTH ADJUSTMENT**

To adjust the depth you will need.

- ❖ Piece of writing paper cut to approximately 1" x 4".
- ❖ Two identical key blanks – measure blade width with micrometer or dial calipers and select two that match.

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

Depth is adjusted by moving the stylus forward or backward by means of an adjustment dial located at the back of the stylus.

Secure the two matched key blanks - one in each vise jaw. 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 the bottom shoulder area. Clamping in this area may **ANGLE** the key blank in the vise and throw off your adjustment by cutting to shallow near the key head.

With the keys clamped in the vises and with the stylus adjusted forward about 1 turn - carefully release 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.

Observe that the cutter wheel missed the key blank in the right vise by carefully turning the cutter **BACKWARDS** by hand - the cutter teeth should miss the key blank 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 turn the Dial – 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, 1 number at a time - each time moving the piece of paper from side to side in front of the spinning cutter wheel. Stop when the piece of paper is cut through to the last few fibers. You have now accurately adjusted the depth of cut on your key machine.

Verify by switching ON the machine and verifying that the cutter wheel just “ticks” the blade of the key blank. We recommend moving the machine’s “stick-shift” lever very slightly to the right – and at the same time listening to the cutter wheel for the very faint “ticking” sound of the cutter wheel teeth barely grazing the key blank. **DO NOT** go back and forth over the same spot! If you use the same spot more than once your stylus will burnish a spot on the key blank that is ever so slightly lower than the rest of the key blank.

Switch OFF the key machine.

1. SPACE ADJUSTMENT

Never adjust the spacing without first adjusting DEPTH. If the depth adjustment is not right - then 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 two #10 – 32 Allen Socket Head Cap Screws.

To adjust the spacing you will need:

- ❖ 5/32” Allen Hex Wrench
- ❖ Two identical Key Blanks
- ❖ Small Plastic Mallet

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

Stack the two identical key blanks one on top of each other and clamp them in the right hand vise jaw. Be sure to top shoulder gauge them with the machine’s flip-up full-function key gauges – leave about 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 jaw and throw off your adjustment. There should be **NO** key blanks in the left vise jaw for this part of the procedure.

DO NOT FORGET to flip down your key gauges. Failure to do so will result in not cutting the key.

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 “stick-shift” lever 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 back the carriage to the locked position 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 up the machine’s full-function key gauges and carefully top shoulder guard the left key to the key in the right-hand vise jaw.

Without turning ON the motor, carefully release the carriage and align the left-hand blank’s “V” cut with the machine’s 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 hands to carefully turn the cutter wheel **BACKWARDS** to verify that the cutter wheel’s teeth do not touch the “V” cut in the right-hand key blank.

Loosen the two #10 –32 Screws securing the cutter shaft assembly in place using your 5/32” Allen Hex Wrench – Retighten the two screws with MODERATE pressure. You want just enough retightening pressure on the two

screws 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.

Turn the cutter **BACKWARDS** with your hand and observe which way you must move the cutter. Use your small plastic mallet to “nudge” the cutter shaft assembly in the direction you want it 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 using the machine's “stick-shift” lever 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 wheel backwards by hand and verify that no cutter wheel teeth will contact either side of the “V” cut in the key. With the machine running you may want to slightly “nudge” the spinning cutter a little more before retightening the two #10 –32 screws **MODERATELY**.

Switch OFF the key machine.

Tighten the two screws using the 5/32” Allen Hex Wrench.

IMPORTANT – Verify that your depth adjustment is correct and readjust if necessary.

16. **KEY GAUGE ADJUSTMENT**

Stack two identical key blanks one on top of the other and clamp in the right-hand vise jaw. Be sure to **BOTTOM SHOULDER GAUGE** them. **DO NOT** use the machine's flip-up 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 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 “stick-shift” lever 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 “stick-shift” lever to the **LEFT** making a wide cut slightly more than ¼” wide.

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 flip-up full-function key gauges.

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

NOW flip up 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 when you are finished.

The key gauges now match the spacing of the vise jaws.

You **MUST** verify and readjust, if necessary, the machine's spacing and adjustment.

17. CARRIAGE OVER TRAVEL DEPTH ADJUSTMENT

Your key machine is equipped with a depth over travel device. Its adjustment is important. The over travel device prevents the cutter wheel from cutting into the vise jaws when there are no keys clamped in the machine. Setting the depth over travel 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 over travel 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. Release the carriage and position it so the stylus and cutter wheel are in about the middle of the vise jaws.

Loosen the 7/16" Hex Jam Nut on the front of the carriage.

Loosen the ¼" – 20 slotted screw stud with your screwdriver. About 1 turn should be enough. Observe that the stylus is touching the face of the closed vise jaw.

Gently turn the slotted screw stud with your screwdriver in the clockwise direction and stop when you feel the stud contact the key machine's main housing. There is a 3" long hardened roll pin in the machine's main housing that the slotted screw stud will contact.

Turn the slotted screw stud an additional ¼ turn – after contacting the roll pin the machine's main housing. The thread pitch is 20 which is approximately 12 thousands of an inch per ¼ 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 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 over travel will work only when adjusted properly. The following things can happen if the adjustment is not done properly.

- a) If adjusted to low your cutter wheel may cut into the right-hand vise jaw.
- b) If adjusted to high your cutter wheel may not cut deep enough when cutting deep cuts in keys.
- c) Carriage over travel will not prevent cutting the right-hand top vise jaw if the top vise jaw has come loose and has moved forward into the cutter. PLEASE check the tightness of the knurled knobs OFTEN.

18. MAINTENANCE

UNPLUG YOUR MACHINE PRIOR TO 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.

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 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 – but 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 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 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 and accuracy 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 (preferably 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. Measure each cut several times and record their average. Compare the results. There is really no substitute for the procedure if you want to make accurate duplicate keys. Generation cutting will not give you meaningful results like this procedure.

19. TROUBLESHOOTING

Machine Always Needs Adjustment

There are several things that can cause your machine to need adjustment.

1. Cutter wheel may be dull. This can cause the key to try to “float” and not cut deep enough in the deepest cuts. Replace or sharpen the cutter.
2. Carriage spring may be weak or adjusted to light. Replace the spring or adjust the spring.
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 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 may be the carriage depth over travel adjustment is set too high. This results in the machine’s inability to cut the deepest cuts on a key – but shallower cuts are fine. This symptom is more common than you think. Fix the problem by readjusting the Carriage Over travel Depth Adjustment.
7. Again – one key cuts fine and the next one doesn’t. This time it may be the key gauges. Sometimes key machine operators don’t flip down the full-function key gauges all the way down 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 for how to do it.

Keys don’t always work in the lock when gauged off 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 key blanks since they are seldom used by the lock cylinder.

1. 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 service vehicle. You're 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 to much you will narrow the width of the pin seat somewhere in the middle—if the stylus is sharp it will scrape the key to much, if the stylus is blunted to 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 stylus wears—until finally you have to buy a new cutter or get the old cutter resharpened or replace the stylus. When you put on the new or resharpened cutter or stylus you're back to ridges again.

Machine Makes Whirring Sound

There are four possible causes.

1. The sound is coming from the motor. With the machine turned OFF-grab the motor shaft and try to get some movement out of it when trying to move the shaft up and down. If there is up and down movement the motor ball bearings are worn and the motor will need replacement some time in the future. Please ignore any motor shaft play when pushing or pulling the shaft along its length in and out of the motor—this play is in the motor's spring preloaded ball bearings and is not a sign of bearing wear.
2. Your drive belt is coming apart or is frayed. Replace it.

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

3. There's movement in the bearings you need to replace the cutter shaft assembly. If there is no 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. Another possibility is the way some of the ball bearing cages are made inside the bearings—these ball cages have an assembly opening created at the bearing factory. These bearings sometimes make a slight “ticking” sound. In this case the sound may not be a problem.

4. The machine's cutter shaft lock is partially depressed and is rubbing against the drive pulley. Pull up on the shaft lock knob and the sound should disappear.

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 and connections.
2. Key cuttings in the motor's capacitor. Unplug the machine, remove the capacitor's rubber cover and blow out the chips. Remember to wear safety glasses.
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 it's not brass or Nickel-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. Call us for resharpening details.

My Resharpened Cutter Doesn’t Work Well

The cutter resharpening service didn’t have it reground – instead you went to a service that used a different means of sharpening such as etching or striking. Simply put... your cutter wheel should always be resharpened by grinding –and you will need a quality service to do it right. Call us for quality resharpening details.

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

Your 115 VAC motor needs a mobile generator to work properly. Power Converters work fine on electric drills, TV’s and radios. Many split phase capacitor motors do not work well on some power converters. Buy a Redi-Line or similar motor/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 wired in reverse or you are using a small wire gauge. Reverse the wiring connections and/or use heavier wire such as 14 Gauge or heavier.

I’m Mobile and I Keep Breaking Shoulder Screws in My “Stick-Shift” Linkages

This situation is caused by a combination of the weight of your carriage (about 9 pounds) in the locked back position and aggravated by the bouncing around of the service vehicle driving on the roads. You can fix the situation once and for all by releasing the carriage when it’s not in use – put a piece of heavy cardboard, a small piece of wood or even a piece of indoor/outdoor carpet

WHEN DO I REPLACE. . .

- a) 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. **NOTE:** Rytan’s key machine cutter can be resharpened. Call us for details.
- b) Resharpen your cutters in sets. Store your old cutters until you’ve accumulated at least three cutters – then call us about resharpening them to all 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.
- c) 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.
- d) Replace **vise jaws** when the edges become rounded, flaired, mushroomed or when you’ve cut into them too many times.
- e) Replace the **key gauge shaft** and/or **carriage** when the key gauge shaft wobbles in the carriage excessively.
- f) Replace the **carriage shaft** and **bronze Oilite® bearings** when you can wobble them beyond “just noticeable”.
- g) Replace the **drive belt** yearly if you use the machine a lot. Every 3-5 years if you have a low volume shop.
- h) 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.
- i) Replace the **power switch** if you accidentally bump it, or hit it, or drop something on it.
- j) 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 consider replacing it just in case for safety reasons.

HOW DO I REPLACE. . . UNPLUG MACHINE BEFORE REPLACING PARTS

The Stylus

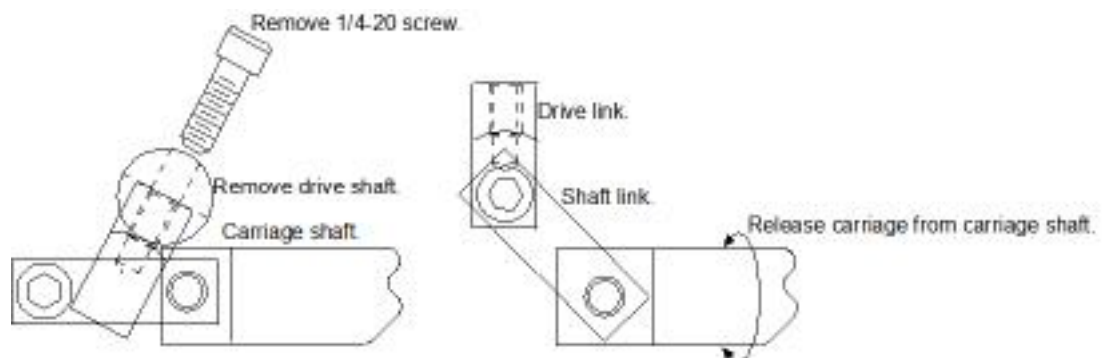
Loosen the two #10-32 socket head cap screws on top of the stylus holder with a 5/32" Allen hex wrench. Pull out the stylus and reinstall a new one. Be sure to place the groove near the back end of the stylus on to the right side of the machine. Make sure you cannot wobble the stylus from side-to-side with your hand.

The Cutter Shaft

Remove the left-hand nut and cutter wheel. Remove the access plate and wire brush if installed on your RY200 and loosen the four motor mounting screws to loosen the drive belt. Loosen the two #10-32 socket head cap screws located on the top front edge of the cutter head – use your 3/16" Allen hex wrench. Loosen them about 1 full turn each.

Pull out the entire cutter shaft assembly and replace with a new one. Reassemble in the reverse order from above.

The Carriage Spring



Turn the machine over on a piece of thick carpet (you don't want to damage the power switch located on the front of the machine). Use your 3/16" Allen hex wrench and remove the 1/4-20 x 3/4" long socket head cap screw that secures the linkage to the "stick-shift" lever's drive shaft. Drop the linkage assembly and pull out the "stick-shift" lever and drive shaft assembly. Leave the two piece linkage assembly attached to the carriage shaft.

If your carriage spring is still attached – firmly grasp the linkages with your left hand and use the linkages as a lever to hold the carriage shaft from turning when you release the carriage. With your right hand release the carriage in the same way you would do if you were going to cut a key. This will require a bit of muscle in your left hand because you're trying to hold onto the linkages while trying to release the carriage against the carriage spring at the same time.

When you've released the carriage you will notice that everything got easy all of a sudden and the carriage spring will probably fall out by itself. At the bottom of the carriage there is a 1/4" wide slot with a pin in it – use a small hammer and drive the pin to nearly flush with the bottom of the carriage.

From the front of the carriage install a new carriage spring and reinstall the retaining pin - the retaining pin will lay in a milled groove on the face of the carriage. Hold the spring and its pin in place and manipulate the other end of the carriage spring onto the 1/4" diameter grooved pin going through the carriage shaft. If the spring won't reach to the pin you have your carriage in the locked back position - release the carriage and manipulate the carriage and carriage shaft (hold onto the linkages like you did before when you released the carriage) until the end of the carriage spring can be fitted over the 1/4" diameter grooved pin.

Now holding the linkages attached to the carriage shaft with your left hand at the same time holding the carriage spring and retaining pin in place with your right hand – cock the carriage back to its locked back position. Once again you will need some muscle power to hold onto the linkages attached to the carriage shaft to keep the shaft from turning. Once the carriage is in the locked back position everything gets easy again

Reinstall the “stick-shift” and drive shaft assembly and reattach the two piece drive shaft linkage and you’re almost done.

Turn the machine back onto its feet and observe the carriage spring attached to the ¼” diameter grooved pin driven into the carriage shaft. Take your small hammer and a steel rod or drift and drive the pin back into the carriage shaft. Stop when the bottom edge of the carriage spring almost touches the carriage shaft.

Test the operation of the carriage and the “feel” of the carriage spring. If the carriage spring seems a bit too strong – drive the grooved spring pin retaining pin in a little bit further. If the carriage seems a bit too weak - drive the grooved spring retaining pin up (from the bottom of the machine) a little bit further. Test the carriage again.

The Carriage Shaft and Bronze Oilite® Bearings

Refer to the first part of The Carriage Spring to disconnect the linkages and remove the “stick-shift” lever assembly and the carriage spring. Remove the linkages from the carriage shaft using a 1/8” Allen Hex Wrench to remove the shoulder bolt.

Drive the ¼” diameter carriage shaft pin used to retain the carriage and the carriage pin.

Look down onto the carriage shaft from the top of the carriage and lightly file the ¼” diameter hole where the grooved pin was - the knurled section of the pin probably raised up small burrs on the edge of the hole which might damage the carriage when the shaft is pulled out of the carriage. Also turn the carriage shaft and expose the milled notch in the carriage shaft where the carriage release mechanism locked the carriage back. The constant locking back and unlocking of the carriage probably raised up a burr on the shaft at the edge of the milled notch – remove any burr you may find in this area with your file before trying to remove the carriage shaft.

Pull 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 ¾” diameter about ½” long - to fit onto the new bronze Oilite® bearing.

From the right side of the machine push the 1” hardwood dowel through the 1” diameter bearing hole – go almost all the way through 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 onto the 1” diameter hole. Notice the dowel pin going through the first hole 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 bronze Oilite® bearing into its hole. Remove the dowel and insert the new carriage shaft – leave the end of the carriage shaft extended about ½” out of the right-side bearing hole and place your second bearing onto this shaft. Notice that the carriage shaft now acts as an alignment guide for the second bearing. Use your 6” piece of 1” diameter hardwood dowel and your hammer to pound in this 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 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.

Reassemble in the reverse order and refer to section in this manual titled HOW DO I REPLACE. . The Carriage Spring and complete your assembly.

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

WHY DID WE DO IT THAT WAY . . .

Key Gauges

We are often asked why we didn't make our key gauges flip down automatically when the carriage is released. It's a good question and deserves answering. We chose full-function key gauges instead. We're committed to incorporate unique and useful features into our products wherever we can. We felt that if we could incorporate a built-in key gauging system that worked for almost all the key gauging requirements you would benefit more from this than having ordinary top shoulder key gauges that automatically flip-away when the carriage is released. Think about it – three key gauging possibilities that don't flip away automatically verses only one key gauging possibility that does flip away.

Why Such a Big Cutter

The bigger the cutter the less noticeable the radius is in the pin seat area of the duplicated key.

Why Did We Change to an Unusual 4-way Vise Jaw Design

We built these vise jaws in a way that resembles a machine shop milling machine vise. And we did it with Cartridges instead of individual pieces. No milling machine vises uses a pivoting action jaw - parts would be flying out all the time! With a pivoting action jaw you only have one theoretical size thickness that will clamp properly.

We wanted the movable vise jaw attached to a very large diameter, very long piston to keep the jaws from tipping. We wanted a vise jaw design that would clamp straight all the time . . . period. The only place with enough room to do it was below the vise jaws and in the carriage.

Why Didn't We Use Gears to Drive the Carriage Left and Right

Gears are pumps – on a key machine they pump dirt and key cuttings. Gears get crunchy - our linkages do not!

Why Aren't the Vise Jaws Hardened

Simple - miss-adjust your key machine and waste the cutter. Our vise jaws are made from machineable steel so you won't ruin your cutter if you make a mistake. The vise jaws last a long time.

Why Not Use a Less Expensive Motor and Save Money

Our "stick-shift" machine is the fastest machine you can own - you need a lot of power to keep that big cutter going when you "wail" through a key. Low cost motors either won't have the power you will need or they won't work efficiently on a Redi-Line® power generator in your service truck or van. Your machine is equipped with the most powerful motor you can get and it works well on a Redi-Line® generator.

Why is the Machine As Big As It Is, You Could Make is Smaller

The machine is built big, and strong, and rigid. It is built to support the size of the Human Body – It Is Built To Last.

20. CUSTOMER INFORMATION

Rytan, Inc. provides the following information on warranty and service for the RY200 key duplicating machine:

Warranty Registration

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 and Handling Charges

Payment of all shipping and handling charges 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.

**YOU MAY CALL US TOLL FREE
(800) 447-9826
9:00 a.m. – 4:30 p.m. Pacific Time
Monday through Friday**

We Thank You...

We thank you for your continued interest in Rytan quality made products. We appreciate and respect the confidence you have shown in us. From your early support through purchasing our first products made back in 1983 we have created many innovative products, which you use on a daily basis in your business. Many of our innovative products have come from friends and associates in the Locksmith and Locksmith Distribution businesses who sincerely want us to be here to serve their industry.

The successful ergonomic handled lock picks and all of the standard, unique and miniature lock pick blades were created from a desire to make the best possible lock picking instruments in the industry. The curved ergonomic handle was inspired by the famous Buck Knife. The Rytan Riffle Pick, Diamond-Hook, Hi-Lo Modified Full Rake and all the Miniature pick blades are, and always be, uniquely ours. Did you know that once you become accustomed to the comfort and “feel” of the Rytan curved pick handle it is hard to go back to the straight handle again!

The inspiration for the famous Rytan RY57 push button Plug Spinner came from our knowledge of the old “knuckle buster” plug spinner that used a wind-up spring. We designed our RY57 Plug Spinner with a push button to release a torsion spring that could not turn more than a half turn in either direction. It saved your knuckles from being bashed and gave us a reputation that carries your endorsement by the very fact that we have sold many tens of thousands of these fine tools. In fact this original all metal RY57 has encouraged us to develop the NEW RY5798 low cost plug spinner developed in 1998!

In late 1984 there was a problem with the 1984-1/2 Ford double-sided ignition locks with a side-bar. The only practical way to get through the lock was to drill the side-bar or use try-out keys. Existing drill tools at the time were cheaply made and try-out key codes were selling for a rip-off price of \$100 or more! We responded by designing and building the first heavy-duty “real” drill tool to drill out the side-bar and we gave away the try-out key codes for free with the price of the RY25 Ford Drill Tool.

It was the profits earned by our Locksmith tool sales that we reinvested into the famous RY100 heavy-duty key-duplicating machine:

The RY256 & ry456 key machine that also does Medeco® key duplication.

The RY45 & ry65 manual key duplicator.

The NEW

Portable RY2000 “DUAL” punch machine that can be set up for Schlage, Kwikset, I-Core and others.

AND THIS NEW RY200 KEY DUPLICATOR WITH ITS UNIQUE 4-WAY VISE JAWS!

Upon its introduction many years ago at the Los Angeles ALOA Convention our original RY100 key machine took the show by storm and sold more machines at its introduction than any other key machine in history.

Your new RY200 key machine is built on the original foundation of our famous RY100 Key Machine that was introduced in 1983, with a new cutter wheel and stylus that can cut keys like GM and Kwikset Titan keys with an almost straight first cut, without affecting the cutting of the rest of the key. The new RY200 comes with all-new 4-way Vise Jaws that can be replaced as simple drop-in cartridges when required. And it is equipped with our new Micro-Adjust stylus that can adjust your stylus to better than 1-2 thousandths of an inch (.0005”) at any time – and your machine can be returned to its original position just as fast!

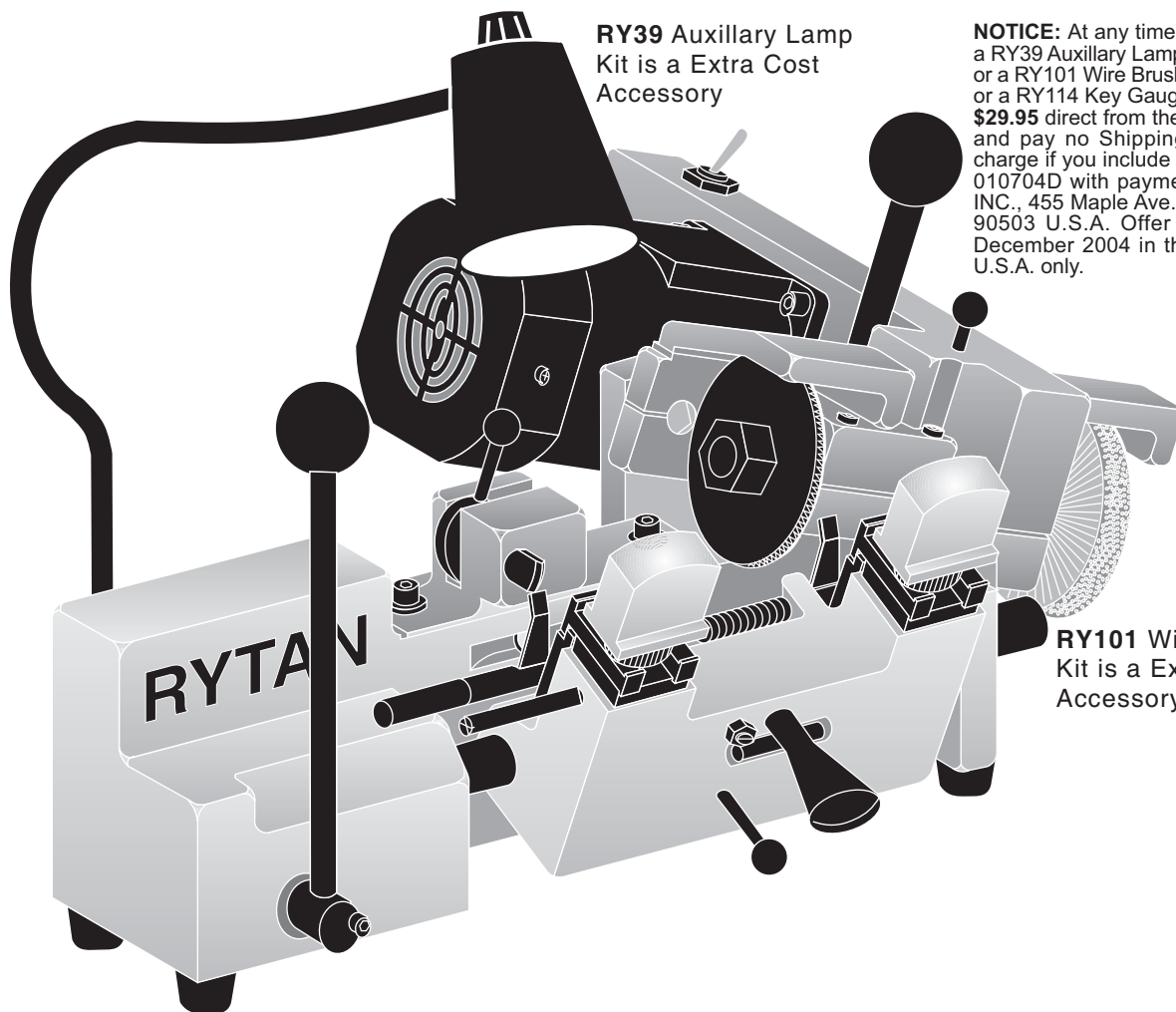
We like what we are doing. We have proven we are good at what we do. And we keep on going...

Model RY256

OPERATOR'S MANUAL

Rytan Model RY256 Semi-Automatic Key Duplicating Machine for
Medeco® Keys, Cylinder Keys and Automotive Keys

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



RY39 Auxillary Lamp
Kit is a Extra Cost
Accessory

NOTICE: At any time you can order a RY39 Auxillary Lamp Kit for **\$53.50** or a RY101 Wire Brush Kit for **\$42.75** or a RY114 Key Gauge Protector for **\$29.95** direct from the Rytan factory and pay no Shipping or Handling charge if you include Promotion No. 010704D with payment to RYTAN, INC., 455 Maple Ave., Torrance, CA 90503 U.S.A. Offer valid through December 2004 in the Continental U.S.A. only.

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**

RYTAN, INC. RESERVES THE RIGHT TO MAKE CHANGES WITHOUT NOTICE. PRICES MAY VARY FROM YOUR DISTRIBUTOR.

We Thank You . . .



Thank you for your continued interest in Rytan quality products. We appreciate and respect the confidence you have shown in us. From your early support through purchasing our first products back in 1983 we have created many innovative products which you use on a daily basis in your business. Many of our innovative product ideas came from friends and associates in the Locksmith and Locksmith Distribution business who sincerely wanted us to be here and to serve their industry.

The successful ergonomic handled lock picks and all of the standard, unique, and miniature pick blades were created from a desire to make the best possible lock picking instruments in the industry. The curved ergonomic handle was inspired by the world famous Buck Knife. The Rytan Riffle Pick, Diamond-Hook, Hi-Lo Modified Full Rake and Miniature pick tips are, and always be, uniquely ours. Did you know that once you become accustomed to the comfort and "feel" of the Rytan curved pick handle it is hard to go back to the straight handle again.

The inspiration for the famous Rytan RY57 Plug Spinner came from our knowledge of the old "knuckle buster" plug spinner that used a wind-up spring. We designed our RY57 Plug Spinner with a push button to release a torsion spring that could not turn much more than a half turn in either direction. It saved your knuckles from being bashed and gave us a great reputation which carries your endorsement by the very fact that we've sold over 40,000 of them.

In late 1984 there was a problem with 1984-1/2 Ford double sided ignition locks with a side-bar. The only practical way to get through the lock was to drill the side-bar or use try-out keys. Existing drill tools at the time were cheaply made and try-out key codes were selling for the rip-off price of \$100 or more. We responded by designing and building the first heavy-duty "real tool" to drill out the side bar and gave away the try-out codes for free with the purchase of the RY25 Ford Drill Tool.

It was the profits earned from you, by purchasing our tools, that we reinvested into the design of our now famous RY100 heavy-duty high speed key duplicating key machine.

The "work-horse" of the industry, the RY100 high speed heavy-duty key duplicator was designed to massive proportions because it had to feel strong, and be strong, and rigid, and fast, and accurate to the person who used it. Upon its introduction at the Los Angeles ALOA Convention the machine took the show by storm and sold more machines on introduction than any other key machine in history. Locksmiths discovered at the show that they could buy two Rytan RY100 key machines for the cost of only one imported premium key machine.

The idea for our most successful feature on the RY100 — the full-function key gauges came from our understanding that you don't want a key machine that uses separate key gauges that can become misplaced or lost. Our full-function key gauges allow you to gauge the keys on the top shoulder, gauge from the tip of the key as for Ford double sided, and gauge from behind the tip as for Best and Falcon. All with the same built-in full-function key gauge; with no other key gauges to misplace or lose. The Rytan RY100 standard key duplicator and the RY256 Medeco and standard key duplicator both use our famous key vises. At trade shows the impressive power of our vise jaws was demonstrated by clamping an overcut Volkswagen key in the vise of the RY100; and then lifting the machine completely off the table with a large key ring looped through the overcut Volkswagen key. Of course the reason why we could do this demonstration successfully is because, like a machinists milling vise, the RY100 key vise is precision made, stays square and parallel, and crunches with brute force.

We like what we're doing. We're good at it. And, like our story, we keep on going . . .

455 MAPLE AVENUE • TORRANCE, CA 90503 U.S.A. • (800) • 447 • 9826 • fax (310) • 212 • 6002

1) GETTING STARTED

Please take time now to read and understand this manual thoroughly before you start cutting keys. Maintain this owner's manual and review it often, and make it available to others who will use this machine.

2) 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.

SAFETY RULES

- A) Know your machine. Read 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 environment. 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 safe distance from work area. Do not let visitors contact 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. Long hair. 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 also 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 disconnects 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) Outdoors 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!**
- R) Keep hands away from the cutter and key blank. Keep hands away from rotating cutter. Do not reach underneath or around cutter or key blank when cutter is rotating. Do not attempt to remove key blank or key blank material while cutter is rotating.
- S) 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!

- T) Inspect machine cord periodically. If damaged, repair at once.
- U) Keep hands dry, clean and free from oil and grease.
- V) Stay alert. Watch what you are doing and use common sense. **Do not** operate machine when you are tired.
- W) Do not use machine if switch does not turn the machine **ON** and **OFF**.
- X) **Drugs, Alcohol, Medication.** Do not operate machine while under the influence of drugs, alcohol, or any medication
- Y) 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.
- Z) Save these instructions.

3. Mounting the Machine

Mounting the machine. Drill two oversized ½” holes in your bench top to mount your machine. Use ½”-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 workbench. Mark the bench and drill your holes.

4. Cutting Standard Keys

- A) Stylus is rotated to the vertical (Center) position. Cutter head is rotated and locked in the vertical (center) position.
- B) Most key clamping requirements use the standard top jaw configuration. Top jaw can be flipped over for “step” jaw requirements –to make deeper cuts in small keys.
- C) Keys are always gauged with the full—function flip-up key gauges. We do not recommend bottom shoulder gauging because key blank manufactures do not always maintain a reliable correlation between bottom and top shoulder positions on the key blanks they make.
- D) Always remember to flip down your key gauges before cutting a key. Failure to do so may damage the key gauge and key gauge shaft with the cutter wheel.
- E) Always cut keys from **Bow-to-Tip**. **NEVER MAKE YOUR FIRST CUT FROM TIP-TO-BOW**.

The RY256 is specially designed to cut most cylinder keys and U.S. and **Foreign** automotive keys by operating the machine’s “stick-shift” lever **SMOOTHLY** from **RIGHT-to-LEFT**. 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.

5. Cutting Medeco Lever-1 Keys

When cutting Medeco Level-1 keys the machine’s stylus is rotated and the cutter head is **rotated and Locked** in position (Left or Right or Center) in accordance with the specific cut being made on the key.

NEVER duplicate across the entire Medeco key in one pass in any cutter position-Left or Right or Center.

Each cut must be “profiled” or traced individually-one cut at a time.

- A) Stylus is rotated to the vertical (Center) position. Cutter head is rotated and locked in the vertical (Center) position. Cutter head is rotated and locked in the vertical (center) position.
- B) Most keys clamping requirements use the standard top jaw configuration. If your Medeco key has a deep cut you will have to flip over the “step” jaw and clamp it in place before clamping the key. You

must flip over both left and right top vise jaws and clamp them in place with the large knurled knobs located below the painted key clamping knobs.

Make sure your vise jaws are clean (no chips) and as you secure the top vise jaw in the “step” jaw configuration-be sure to push the back edge of the step top jaw firmly and flat against the stepped face of the bottom vise jaw when tightening the large knurled located below the painted key clamp knob. See figure 1 below.

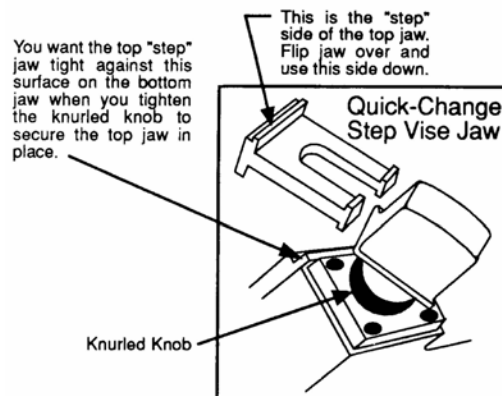


Figure 1

When clamping keys in the “step” jaw be sure to open the jaws **ONLY** enough to slide the key in place so it will be clamped against the top vise jaw’s “step”. Opening the vise jaw too wide will allow the key to pass under the step part of the top jaw and the key will be clamped improperly.

Please see below for more vise jaw information

- C) Keys are always gauged with the full-function flip-up key gauges. Never attempt to bottom shoulder gauge a Medeco key against the vise jaws.
- D) Always remember to flip down your key gauges before cutting a key. Failure to do so may damage the Key gauge and key gauge shaft with the cutter wheel.
- E) Your stylus and cutter head should be in the **Center** cut position. Look down onto the key to be duplicated and note which cuts are straight or angled cuts. Switch **ON your** machine and gently release the carriage and operate the “stick-shift” lever until the stylus is right over the left edge of the first center cut. Ease up on the carriage and manipulate the carriage controls to make a smooth gentle cut down the left edge of the “**V**” cut in the key and then gently up the right side of the “**V**” cut in the key. Cut the entire single “**V**” cut but do not cut over the top of either edge of the “**V**” cut you are duplicating. You may reverse the cut to “clean” it up.
Pull gently back on the carriage when the single cut is completed. Note if there is another center cut on the key and duplicate it also. Duplicate all center cuts one-at-a-time and cut **ONLY** those Center cuts at this time. Remember-do not cut over the top of the “**V**” and into another adjacent cut. Duplicate only one cut at a time.
- F) Lock back your carriage. Turn **OFF** your machine. Rotate the stylus and rotate the cutter head and lock it in place for left cuts.

- G) Repeat step 5 for the left cuts. Remember to duplicate only one cut a time and do not cut over the top of the “V” and into another adjacent cut. When you have duplicated all the left cuts lock back your carriage and turn **OFF** your machine.
- H) Rotate the stylus and rotate the cutter head and lock it in place for Right cuts.
- I) Repeat step 5 for Right cuts. Remember to duplicate only one cut at a time and do not cut over the top of the “V” and into another adjacent cut. When you have duplicated all the Right cuts lock back your carriage and turn **OFF** your machine.

Cutting Medeco Hi-security keys is simple and easy to do with the Rytan RY256 Key Duplicating machine. Keeping your machine clean and paying attention to detail and following the simple steps outlined above will insure quality Medeco keys cut at maximum profit for you.

NOTE: 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 instantly! Don't be fooled 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 most likely ruin your cutter!

6. Vise Jaws

Choosing the correct upper vise jaws. For most key cutting work the upper jaw can remain in the standard configuration. In the standard configuration the entire “throat” of the bottom and top jaws is used. Measuring from 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 and Medeco Hi-Security keys have cuts deeper than .142” from the back edge of the key blade. For these keys you have two choices to clamp the keys.

- A) **The old-fashion way.** Use a pair of round wire shims made from Music Wire about .037” diameter and about 1- 1/2” long. Place a wire 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 .105” of the key.
- B) **The “step” jaw way.** Loosen the knurled knob securing the top vise jaw in place and flip the top jaw over the step jaw side. Retighten the knurled knob securing the top vise jaw. You must do both vise jaws for this to work.

By opening the vise jaws just enough to slide the key in you will be making the key lay right in front of the step portion of the top vise jaw effectively pushing the key out of the vise jaws and clamping on the remaining .105” of the key. See Figure 2 below.

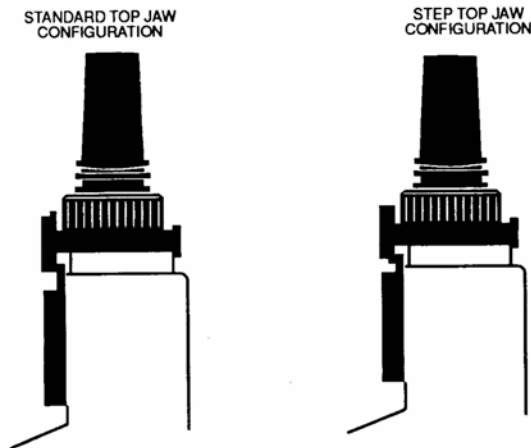


Figure 2

CHANGING THE TOP VISE JAWS

To change the top vise jaw unscrew the painted key-clamping knob a few turns. Unscrew the large knurled knob located below the painted key-clamping knob a few turns. Slide out the top vise jaw. Look for key cutting chips and brush them away before reinstalling the top vise jaw. Reinstall the top vise jaw in the reverse order.

NOTE: When reinstalling the top vise jaw you should push on the face of the top vise jaw and hold it against the vertical step on the bottom vise jaw. By doing this you will insure that the top vise jaw is installed perfectly parallel to the bottom vise jaw. This is especially important when using the face of the top vise jaw as a reference surface when cutting keys like Ford double-sided and when using the step jaw. Especially when cutting Medeco keys.

Always change both vise jaws to standard or step jaw configuration. If you change only one your depth will be off either plus .037" or minus .037". See figure 3 below

Check the knurled knobs securing the top vise jaws for tightness often and recheck the parallelism of the top vise jaws- especially when using the step vise jaw configuration and when cutting keys such as Ford double-sided.

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 Volkswagen. Clamping pre 1984- ½ Ford doubled sided keys too far to the right into the vise jaw 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.

BOTTOM VISE JAW REPLACEMENT

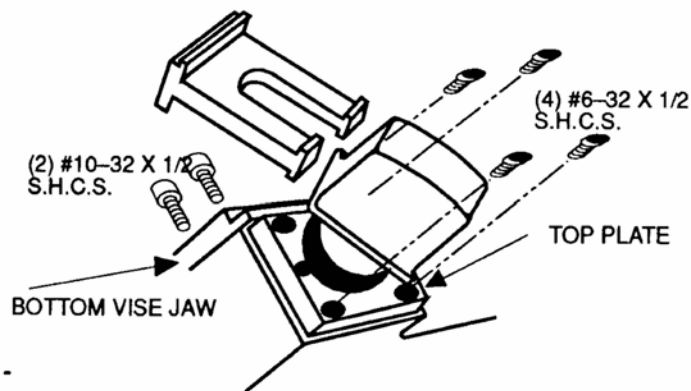


FIGURE 3

Remove the top vise jaws. The bottom vise jaws are secured by two #10-32 x 1/2" long socket head cap screws. Use a 5/32" Allen hex wrench to remove the screws. If you have difficulty accessing the bottom screw you may remove the top plate. See figure 4 below.

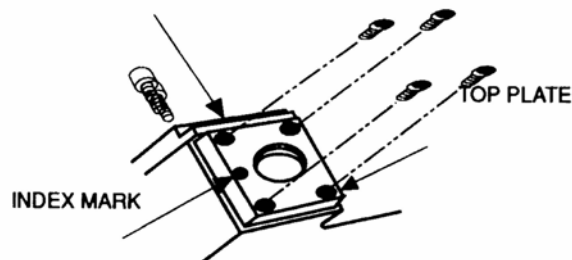


FIGURE 4

To remove the top plate you must first remove the key clamping knob assembly with the 3 piece radial thrust bearing and the knurled knob. Use a 7/64" Allen hex wrench to remove 4 #6-32 x 1/2" long socket head cap screws.

Remove bottom vise jaw from 1" diameter plunger. Wipe plunger and carriage surfaces clean with a lint-free rag or paper towel. Bolt a new bottom vise jaw onto the plunger; loosely do not tighten the two screws at this time. Use Sta-Lube Super White Multi-Purpose Grease (available in Auto Parts Stores). This is a Lithium grease, Grade 2, 350° F min., and water resistant lubricant.

Coat all steel sliding surfaces (back side of bottom vise jaw and plunger and all aluminum mating surfaces on the carriage). Also apply this grease to the 3/8" threaded hole in the plunger.

Gently slide the assembly into the carriage from the top. Snug up the two screws securing the bottom vise jaw and check that the assembly slides up and down in the carriage- do not tighten the two screws at this time.

Reinstall the top plate with the (4) #6-32 x ½ screws flush with the top of the top plate- but do not tighten the four screws at this time. Remember to reinstall the top plate with its INDEX MARK in the same location it was before. See figure 4 above for reference.

With your hand hold the top vise jaw on top of the top plate and at the same time raise up the bottom vise jaw so the two vise jaw parts engage each other as if they were clamping a key. With your other hand grab the edges of the top plate and pull it back until it contacts the short tabs on the open “horseshoe” end of the top vise jaw. You want to take up as much of the slack between the top and bottom vise jaws as you can.

Now tighten the four #6-32 screws with your 7/64” Allen hex wrench readjust if necessary to get a good fit.

You may now reinstall the knurled knob, 3-piece radial thrust bearing (please clean it first) and key clamp knob assembly – you may secure the top vise jaw in place with the knurled knob at this time.

You will secure the bottom vise jaw now. Before tightening the two #10-32 screws- use the key clamp knob to close vise jaws together with moderate force without a key. **Now** tighten the two #10-32 screws with your 5/32” Allen hex wrench. Loosen the key clamp knob a few turns and push down on it to open the vise jaws. You have created a matched pair of vises on your key machine that are about as good as they were when the machine was new.

7. Top Shoulder Key Gauging

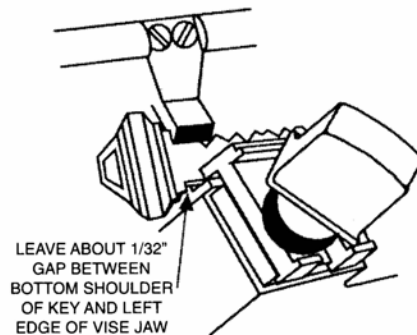


FIGURE 5

Standard cylinder keys should always be Top Shoulder Gauged. Use the machine’s 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. See figure 5 above.

Always remember to flip DOWN your key gauges before cutting a key. Failure to do so may damage the key gauge and key gauge shaft with your cutter wheel.

8. 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 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 a standard cylinder key about 1/32” away from the left edge of the vise jaws CLAMP the key with the key clamp knob- still pressing against the blade of the key with your finger as you tighten the key clamp knob. See figure 6.

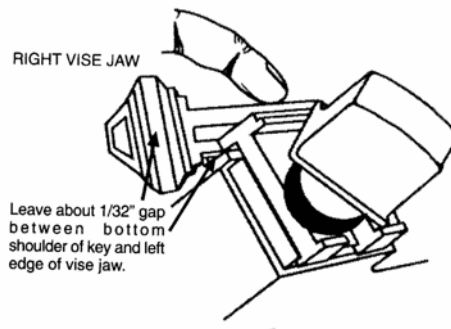


FIGURE 6

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

When both keys have been properly gauged and clamped in the vise jaws REMEMBER to flip down the full-function key gauges before attempting to cut the key. Failure to flip down the key gauges may damage the key gauge and key gauge shaft with the cutter wheel.

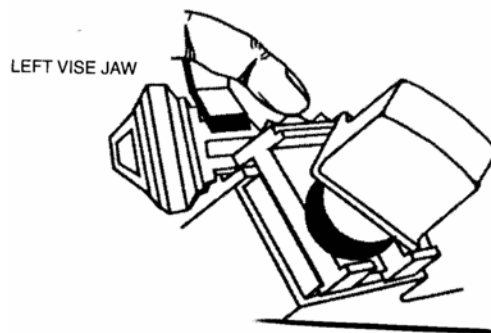


FIGURE 7

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 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 8 below.

Door and trunk key “ridge” will contact the face of the BOTTOM vise jaw. See figure 8 below.

See figure 8 below for proper insertion of keys into vise jaws.

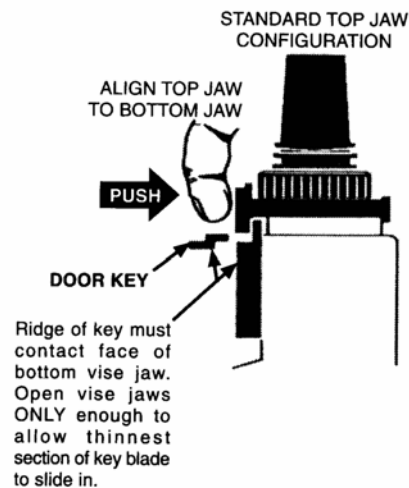
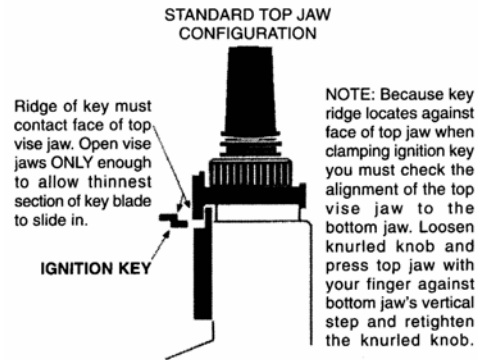


FIGURE 8

9. Tip Gauging (Ford double-sided)

Operate the full-function key gauges by rotating the key gauge shaft towards 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 9.

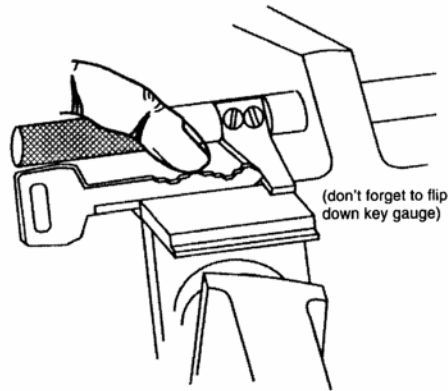


FIGURE 9

Always remember to flip DOWN your key gauges before cutting a key. Failure to do so may damage the key gauge and key gauge shaft with the cutter wheel.

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 10. 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 towards 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 11.

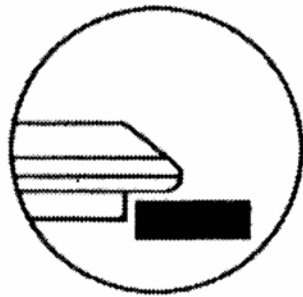


Figure 10



Figure 11

10. Releasing The Carriage

For safety purposes- releasing the carriage requires two actions. With your right hand, push down gently on the carriage's large "tear-drop" knob just enough to move the carriage down reach around with your thumb and index finger and grasp the small round black knob and pull it out – gently lift up on the carriage a small distance and **THEN** let go of the small round black knob and continue positioning the carriage where you want it to be (you will want to move the carriage to the beginning of the first cut nearest the bow of the key). See figure 12 below.

Note: You will not be able to pull on the small black knob by itself to release the carriage. You are required to push down on the carriage first-then pull out the small black knob to release the carriage.

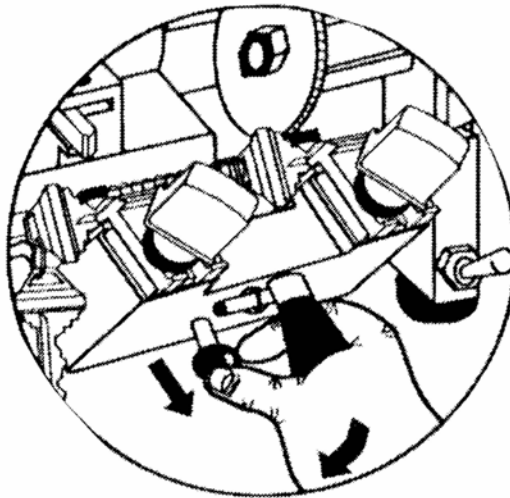


Figure 12

ALWAYS REMEMBER to flip down your key gauges before cutting a key. Failure to do so may damage the key gauge and key gauge shaft with the cutter wheel.

PLEASE ... DON'T FORGET to turn off your key machine before removing a cut key and reloading another blank.

LOCKING THE CARRIAGE BACK (After cutting a key)

Push DOWN on the carriage's large "tear-drop" knob until the carriage "clicks" into the locked position.

11. ROTATING THE STYLUS (Medeco duplication)

The RY256's stylus can be rotated from the "center" (straight up) position- to the left or to the right. Rotating the stylus is accomplished by moving the small black knob attached to the stylus either to the left or to the right of "center" position. There is no locking action required to "lock" the stylus in position- instead we provide an efficient ball and spring "detent" device that you can "feel" when moving the stylus from position to position. See figure 13 below

CENTER CUT POSITION- Straight UP

LEFT CUT POSITION- Move the small black knob to the right.

RIGHT CUT POSITION- Move the small black knob to the LEFT.

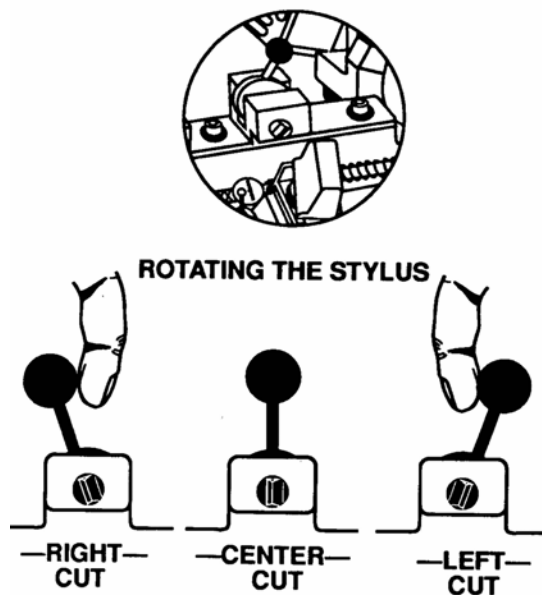


FIGURE 13

12. CUTTING STANDARD KEYS

Leave stylus in the CENTER position-straight UP

CUTTING MEDECO KEYS

- A) Cut all CENTER cuts first.
- B) Cut all Left cuts second.
- C) Cut all RIGHT cuts third.

13.ROTATING THE CUTTER HEAD (Medeco duplication)

The cutter head must always be rotated in the same direction as the stylus. To rotate the cutter head-Turn the large black round knob and shaft assembly until you “feel” the shaft “detent” (or loosen) into position. It does not matter if you turn the large black knob and shaft in the left direction or in the right direction. You cannot undo the shaft from the machine buy turning it.

Once you have turned the large black knob and shaft assembly to the “detent” (loose position) you may rotate the cutter head to the angled position of your choice-Left, Right or Center. Grasping the shaft just below the large black knob and rotating the entire cutter head assembly with your wrist can accomplish rotating the cutter head. When you are in position you will “feel” the cutter head assembly “fall” into position. Once the cutter head assembly is in position you may turn the large black knob about 1/ 2 turn to lock it in place before cutting. It does not matter if you turn the large black knob and shaft 1/ 2- turn in the left direction or in the right direction. See figure 14.

CENTER CUT POSITION—Straight UP

LEFT CUT POSITION—Rotate the cutter head assembly to the RIGHT.

RIGHT CUT POSITION —Rotate the cutter head assembly to the LEFT.

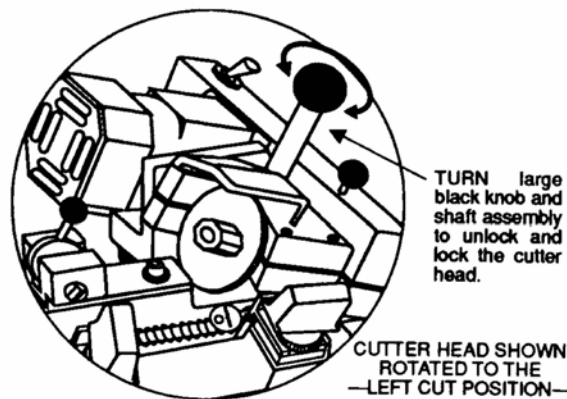


FIGURE 14

CUTTER HEAD LABEL

The label in figure 15 is affixed to your motor-near the large black knob and shaft assembly.

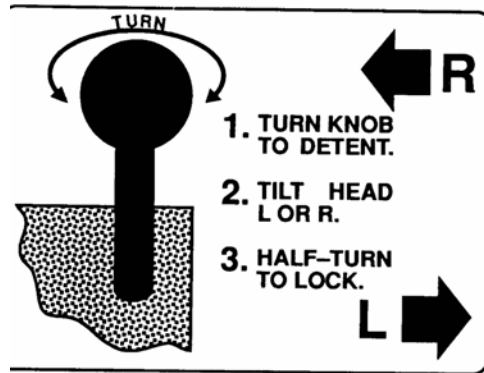


FIGURE 15

14. LOCK THE CUTTER HEAD.

The cutter head must be **LOCKED** in position when cutting keys –Center, Left, or center Right.

PLEASE ... DON'T SLAM the cutter head to the Left or Right positions. We've provided solid stops in addition to the ball and spring "detent" mechanism for two reasons: To prevent over rotation of the cutter head assembly and to provide you an easy way to learn where the left and Right positions are when you first get your machine.

ALWAYS TURN OFF your key machine before rotating the cutter head from position to position when cutting keys.

SWITCH "ON" YOUR MACHINE

The power switch is located at the top, right rear of the machine-near the motor. See figure 16.

To switch ON push the switch to the rear.

To switch OFF pull the switch forward.

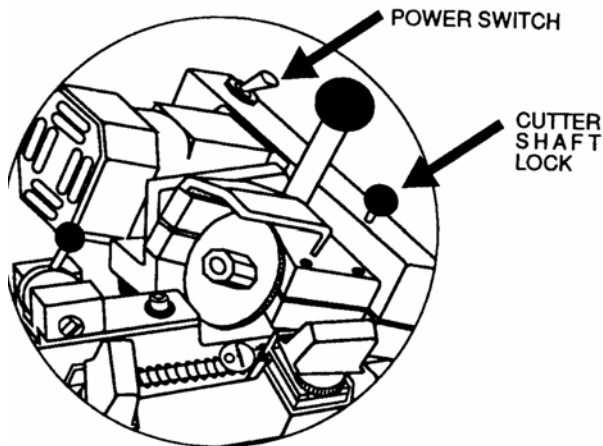


FIGURE 16

15. 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.

Press **DOWN** firmly on the cutter shaft lock (small round black knob). While holding the knob 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. 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 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.

16. Removing/Replacing the Cutter

REMOVING THE CUTTER

The cutter wheel is secured to the cutter shaft with a **LEFT-HAND NUT**. You must turn the nut to the **RIGHT** (facing the cutter wheel) to remove it. See figure 17 below

Remember to **LOCK** the cutter before removing the cutter wheel.

Use a 1” open-end or hex wrench to remove the Left-Hand Nut. See figure 17.



Figure 17

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 OVERTIGHTEN the cutter wheel nut - The Left-Hand Nut is self-locking as you use it. Overtightening 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.

17. Depth Adjustment

Depth is adjusted at the backside of the stylus.
To adjust the depth you will need.

- ❖ 1/8" Allen Hex Wrench
- ❖ 7/16" Wrench
- ❖ Piece of writing paper cut to approximately 1" x 4".
- ❖ Two identical key blanks – measure blade 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. See figure 18 below.

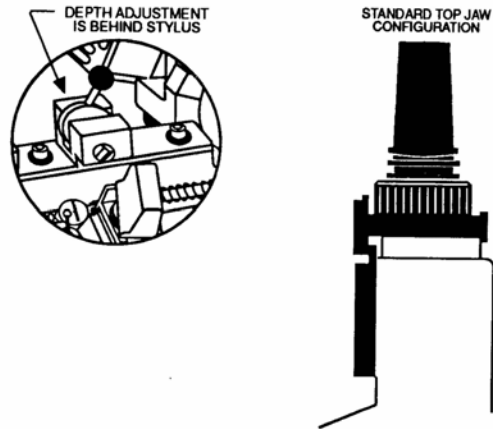


FIGURE 18

Depth is adjusted by moving the stylus forward or backward by means of a hardened, fine threaded Allen set screw. The adjustment is secured by 7/16" Hex Jam Nut. See figure 19 below.

To begin the adjustment you must loosen the 7/16" Hex Jam Nut-do not remove it. With your 1/8" Allen Hex Wrench-turn the set screw into the housing to make the stylus move forward toward the front of the machine. About 1 turn should be enough.

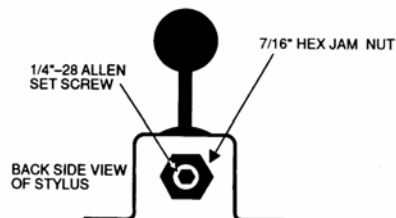


FIGURE 19

Secure the two matched key blanks - one in each vise jaw. 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 the bottom 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 release 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.

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 the 1/8” Allen wrench to slowly and carefully back off on the set screw adjustment- 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.

NOTE: Use the Allen wrench as a “clock” to measure how much you are moving the stylus.

The pitch of the setscrew is 28 threads per inch, which translated to about 0.035” (35 thousandths).

1/4 turn equals about .009” and half of that (1/8 turn) equals about 3- 1/2 thousandths which is about the thickness of the piece of paper you are using.

If you back off the stylus with Allen wrench you can easily observe 1/8 turn. Backing off the stylus in 1/8 turn increments will speed up the process considerably- sliding the piece of paper across the front of the cutter wheel after each 1/8 turn will establish a simple routine and make the job less tedious to perform.

Once you have the cutter wheel touching the paper you may slow down the procedure to very small increments- each time moving the piece of paper from side to side in front of the spinning cutter wheel. Stop when the piece of paper is cut through to the last few fibers. You have now very accurately adjusted the depth of cut on your key machine.

Switch OFF the key machine.

CAREFULLY hold the Allen wrench in place and use your 7/16” wrench to tighten the Hex Jam Nut moderate tightness should be enough.

Verify that the tightening of the 7/16” Hex Jam Nut did not alter the adjustment by switching ON the machine and verifying that the cutter wheel just “ticks” the blade of the key blank. We recommend moving the machine’s “stick-shift” lever very slightly to the right- and at the same time listening to the cutter wheel for the very faint “ticking” sound of the cutter wheel teeth barely grazing the key blank. **DO NOT** go back and forth over the same spot! If you use the same spot more than once your stylus will burnish a spot on the key blank that is lower than the rest of the blank.

Switch OFF the key machine

Further verification of depth adjustment is recommended. With the machine switched OFF and the carriage pulled back away from the stylus from side to side while pushing against it in an attempt to drive it further back. Now carefully release the carriage and position it so the key in the left vise jaw *LIGHTLY* contacts the stylus just to the side of where the adjustment was made. Switch ON the key machine and verify that the cutter wheel just “ticks” the blade of the key blank by moving the machine’s “stick-shift” lever very slightly to the right- and at the same time listening to the cutter wheel for the very faint “ticking” sound of cutter wheel teeth barely grazing the key blank. **DO NOT** Go back and forth over the same spot! If you see the same spot more than once your stylus will burnish a spot on the key blank that is lower than the rest of the blank.

18. 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 stylus holder left or right. The stylus holder is secured to the machine's main housing by two 1/4-20 Socket Head Cap Screws and washers. See figure 20. To adjust the spacing you will need:

- 3/16" Allen 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.

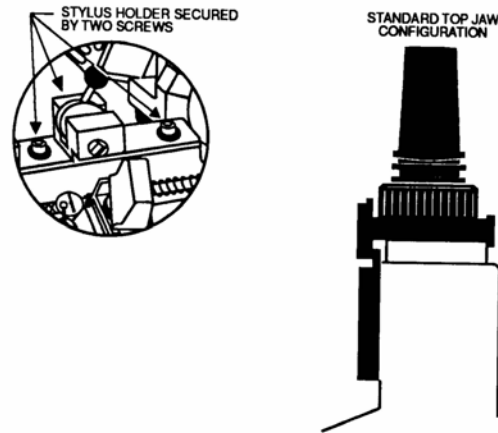


FIGURE 20

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 flip full-function key gauges leave about 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 down your key gauges. Failure to do so may result in damage to the key gauge and key gauge shaft by the cutter wheel.

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 "stick-shift" lever 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 up the machine's 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 blank's "V" cut in the machine's 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. See figure 21.

Use your hands to carefully turn the cutter wheel **BACKWARDS** to verify that the cutter wheel's teeth do not touch the "V" cut in the left-hand key blank. If it is and the cutter wheel 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.

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.

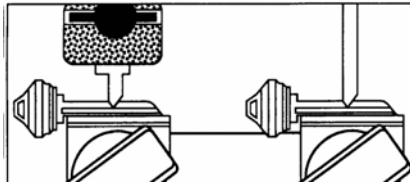


Figure 21

Loosen the two 1/4"-20 Screws securing the stylus holder in place using your 3/16" Allen Hex Wrench-Retighten the two screws with LIGHT pressure on the two screws to keep the stylus holder in place so you can't move it with gentle to moderate tapping with your small plastic mallet. See figure 22 below.

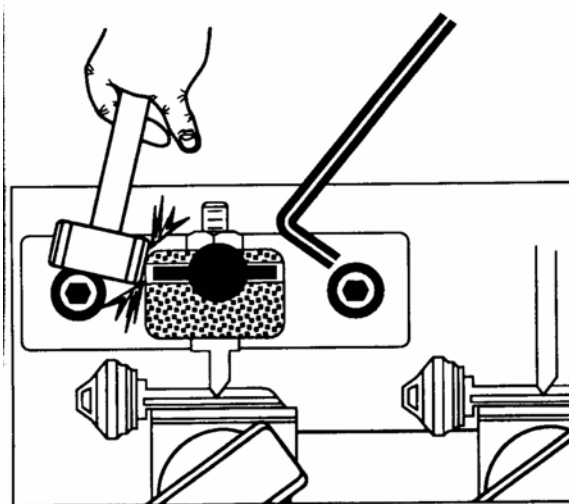


Figure 22

Turn the cutter **BACKWARDS** with your hand and observe which way you must move the stylus holder. Use your small plastic mallet to “nudge” the stylus holder in the direction you want it 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 using the machine’s “stick-shift” lever 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 stylus holder. 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 tuned the cutter Backwards by hand and verify that no cutter wheel teeth will contact either side of the “V” cut in the key. With the machine running you may want to slightly “nudge” the stylus holder a little more before retightening the stylus holder.

SWITCH OFF THE KEY MACHINE

Tighten the two screws using the 3/16” Allen Hex Wrench.

IMPORTANT- Verify that your depth adjustment is correct and readjust if necessary. Refer back to Depth Adjustment if necessary.

Spacing adjustment is now complete.

19. 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 flip up 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 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 “stick-shift” lever 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 “stick-shift” lever to the LEFT making a wide cut slightly more than ¼” wide. See figure 23 below.

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

Remove the two 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 flip up full-function key gauges.

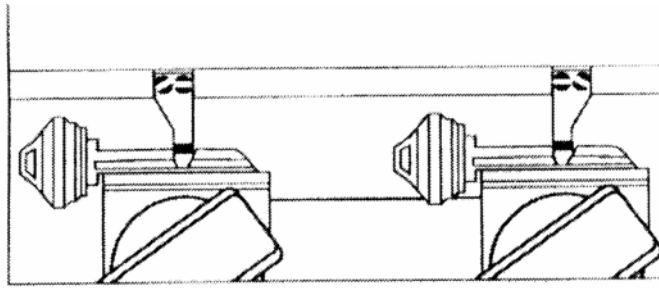


FIGURE 23

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

NOW flip up 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 gauges's fastening screws. Retighten the screws when you are finished. See figure 21.

The key gauges now match the spacing of the vise jaws.

You **MUST** verify and readjust, if necessary, the machine's spacing adjustment. Please refer to **SPACING ADJUSTMENT** information.

20. Cutter Wheel Central Adjustment

This is not required adjustment and should not be necessary during the life of the machine however; if you replace the machine's cutter shaft assembly this adjustment will have to be made.

Cutter wheel central position is required when duplicating Medeco high-security keys. If this adjustment is off you will not be able to cut Medeco keys that work.

Please contact the Factory if this adjustment is necessary.

INSTRUCTIONS:

Precise depth adjustment is required before attempting to adjust the cutter wheel central position. Use two identical key blanks that you have measured and verified that they both have the same blade height.

Both vise jaws must be in the standard configuration. Top shoulder gauge both keys, one in each vise jaw. Remember to leave about 1/32" gap between the key's bottom shoulder and the left-edge of the vise jaws.

REMEMBER to flip down the machine's built-in full-function key gauges before switching the machine ON.

Leave the key machine OFF.

Verify that both the stylus and cutter head are in the **CENTER- straight UP** positions. Cutter head should be locked.

Release the carriage and GENTLY bring the keys into contact with the stylus and cutter wheel. Position the keys so the stylus and cutter wheel are nearer to the shoulder of the keys than the center of the blade.

Switch ON the key machine.

With the cutter spinning use your right hand to apply (momentarily) a gentle to moderate amount of pressure to the carriage creating a very small cutter wheel mark in the right hand key blank. It is important that the carriage DOES NOT move left or right by even the smallest amount.

Switch OFF the key machine and pull back and lock the carriage.

Remove the keys from the vises and reinstall the key with the very small cutter wheel mark in the left-hand vise- be sure to leave about 1/32" gap between the bottom shoulder of the key blank and the left-edge of the vise jaw.

Install the uncut key blank in the right-hand vise jaw-be sure to leave about 1/32" gap between the bottom shoulder of the key blank and the left edge of the vise jaw. You do **not** use the machine's built-in full function key gauges for this procedure.

Carefully release the machine's carriage and position the left-hand key with its cutter mark directly on the machine's stylus be sure the tip of the stylus is "seated" in the cutter mark of the key blank. You now have a situation where the cutter wheel will make a similar mark on the uncut key blank by itself when you switch ON the key machine.

Remove your hands from the key machine-do not touch any of the machine's controls. Switch ON the key machine and then switch OFF the key machine-wait until the cutter wheel has completely stopped before proceeding.

With the cutter wheel stopped after making a CENTER cut carefully release the cutter head lock and rotate the cutter head to make a RIGHT cut. Relock the cutter head. Remove your hands from the key machine-do not touch any of the machine's controls. Switch ON the key machine and then switch OFF the key machine- wait until the cutter wheel has completely stopped before proceeding.

With the cutter wheel stopped after making a RIGHT cut carefully release the cutter headlock and rotate the cutter head to make a LEFT cut. Relock the cutter head. Remove your hands from the key machine-do not touch any of the machine's controls. Switch ON the key machine and then switch OFF the key machine – wait until the cutter wheel has completely stopped before proceeding.

You have made three very small cutter wheel marks-CENTER, RIGHT and LEFT.

Pull back the carriage and remove the right-hand key that has the three small cutter wheel marks.

Inspect the three small cutter wheel marks with a large magnifier under a strong light source. The cuts should be symmetrical. See figure 24 below. If the "pie" or "V" sections are not symmetrical (the same size) then you will have to change the cutter wheel position and redo the procedure again until your results match the illustration.

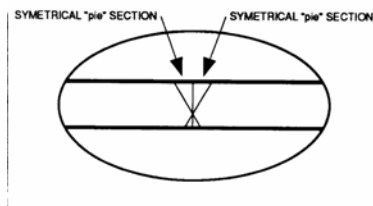


Figure 24

21. Changing The Cutter Wheel Position

Remove the cutter guard and observe the pivot stud behind the cutter wheel-notice that it is pointed. The pointed stud is provided on all RY256 key machines as a visual reference point for adjusting the alignment of the cutter wheel in the field. You may have to clean the cutting chips away from the point to see it better. See figure 25.

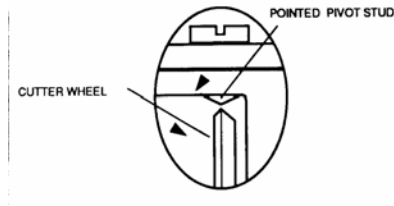


Figure 25

Careful alignment must be made between the point of the pivot stud and the point of the cutter wheel. If your cutter wheel is dull you will have difficulty observing the symmetrical “pie” sections cut on your test key.

To move the cutter wheel position you must use 3/16” Allen hex wrench to loosen the two cap screws on the cutter head to free up the cutter shaft assembly attached to the cutter wheel. See figure 26 below.

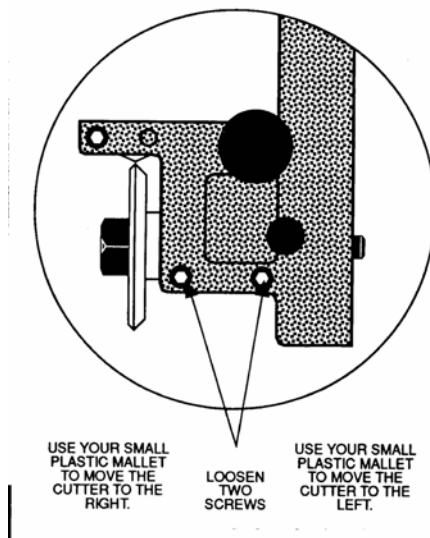


Figure 26

Look down from the top of the machine onto the cutter wheel and pointed pivot stud and GENTLY tap the cutter shaft assembly in the direction you want to move the cutter in relation to the pivot stud's point.

IMPORTANT: When you are close to matching the point on the pivot stud with point on the cutter- make all further adjustments in very small amounts. Test the cutter's position often by making the three cuts on

the key as described. Continue to adjust in very small amounts and make a test key until you are satisfied with the results.

When the adjustment is complete retighten the two cutter head screws with your 3/16" Allen Hex Wrench- do not over-tighten these screws. Moderate pressure will be sufficient. NOTE: over-tightening of these two screws may accelerate the rate at which the cutter shaft's ball bearings wear out.

Reinstall the cutter guard.

22. 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 onto 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. Release the carriage and position it so the stylus and cutter wheel are in about the middle of the vise jaws.

Loosen the 7/16" Hex Jam Nut on the front of the carriage. See figure 27.

Loosen the 1/4"-20 slotted screw stud with your screwdriver. About 1 turn should be enough. Observe that the stylus is touching the face of the closed vise jaw.

Gently turn the slotted screw stud with your screwdriver in the clockwise direction and stop when you feel the stud contact the key machine's main housing. There is a 3" long hardened roll pin in the machine's main housing that the slotted screw stud will contact.

Turn the slotted screw stud an additional 1/4 turn after contacting the roll pin the machine's main housing. The thread pitch is 20 which is approximately 12 thousandth of an inch per 1/4 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 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.

- a) If adjusted to low your cutter wheel may cut into the right-hand vise jaw.
- b) If adjusted to high your cutter wheel may not cut deep enough when cutting deep cuts in keys.
- c) Carriage overtravel will not prevent cutting the right-hand top vise jaw if the top vise jaw has come loose and has moved forward into the cutter. PLEASE... check the tightness of the knurled knobs located right below the key clamping knobs OFTEN.

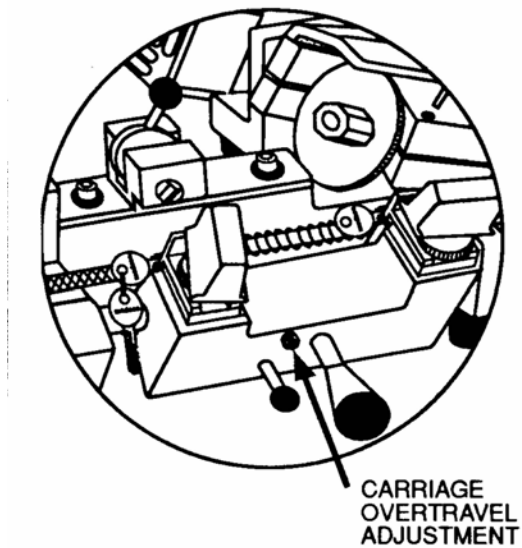


FIGURE 27

23. 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 machine's.

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 black oxide processed 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. Turn the machine over and lubricate the linkages that drive the carriage shaft left and right. **WARNING:** Do not turn the machine over and set it on the Power Switch.

SUGGESTION: When lubricating the “stick-shift” drive linkages under the machine you might want to use spray-on bicycle chain lubricant – the kind that foams and penetrates. **DO NOT** use this on the rest of the machine.

Lubricate the vise jaw plungers inside the carriage – remove the key clamp knobs and large knurled knobs and top vise jaws. Squirt some number 30 non-detergent motor oil in the large hold and reassemble.

DO NOT LUBRICATE your key machine with LPS-1 or WD-40 in place of number 30 non-detergent motor oil. You may use LPS-1 or WD-40 as a rust preventative in addition to the number 30 non-detergent 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 this 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 an oil-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

Keep your machine's drive belt tight. Your machine's belt tension is maintained by means of a ball bearing idler assembly. To adjust the belt tension- use your 3/16" Allen Hex Wrench and loosen the cap screw in the center of the idler bearing assembly. Push the bearing hard against the belt and retighten the cap screw. See figure 28.

This machine is design for a tight belt. The motor and cutter shaft are all quality ball bearing constructed and a tight belt does not affect them. See illustration showing correct position for the idler.

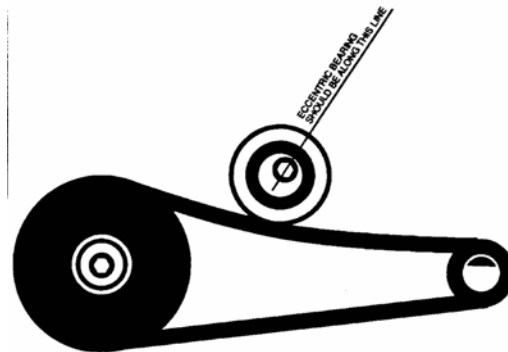


FIGURE 28

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 freshly cut key and duplicates another from 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 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 – but 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 questions remain unanswered.

There is only one way to get good results on consistent bases. 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 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 and accuracy 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 (preferably 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. 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 the procedure if you want to make accurate duplicate keys. Generation cutting will not give you meaningful results like this procedure.

24. 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. Replace or resharpen the cutter.
2. Carriage spring may be weak or adjusted to light. Replace the spring or resharpen the cutter.
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 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 may be the carriage depth overtravel adjustment is set too high. This results in the machine's inability to cut the deepest cuts on a key – but shallower cuts are fine. This symptom is more common than you think. Fix the problem by readjusting the Carriage Overtravel Depth Adjustment.

Again – one key cuts fine and the next one doesn't. This time it may be the key gauges. Sometimes key machine operators don't flip down the full-function key gauges all the way down 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.

7. Keys don't always work in the lock when gauged off 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 blanks since they are seldom used by the lock cylinder. 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 service vehicle. You're 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 to much you will narrow the width of the pin seat somewhere in the middle—if the stylus is sharp it will scrape the key to much, if the stylus is blunted to 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 backside of the drive belt—the backside 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're probably O.K. for a while.
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 and connections.
2. Key cuttings in the motor's capacitor. Unplug the machine, remove the capacitor's rubber cover and blow out the chips. Remember to wear safety glasses.
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.

Can't Make Depth Adjustment

The problem is you've run out of room in the stylus assembly to make the adjustment because You have one stop vise jaw in the standard configuration and other top vise jaw in the step configuration.

1. Make sure both are install in the standard configuration and should be O.K.
2. You've had your cutter resharpened to many times and the diameter is too small to work on your machine.

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.

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.

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!

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

A key cutting on the face of the cutter shaft preventing the cutter wheel from seating properly may cause this situation. 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. Call us for resharpening details.

My Resharpened Cutter Doesn't Work Well

The cutter resharpening service didn't have it reground – instead you went to a service that used a different means of sharpening such as etching or striking. Simply put... your cutter wheel should always be resharpened by grinding –and you will need a quality service to do it right. Call us for quality resharpening details.

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

Your 115 VAC motor needs a mobile generator to work properly. Power Converters work fine on electric grill, TV's and radios. Many split phase capacitor motors do not work well on some power converters. Buy a Redi-Line or similar motor/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 the wiring connections and/or use heavier wire such as 14 Gauge or heavier.

I'm Mobile and I Keep Breaking Shoulder Screws in My "Stick-Shift" Linkages

This situation is caused by a combination of the weight of your carriage (about 9 pounds) in the locked back position and aggravated by the bouncing around of the service vehicle driving on the roads. You can fix the situation once and for all by releasing the carriage when it's not in use – put a piece of heavy cardboard, a small piece of wood or even a piece of indoor/outdoor carpet between for added protection.

WHEN DO I REPLACE. . .

- a) 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. **NOTE:** Rytan key machine cutter can be resharpened. Call us for details.
- b) Resharpen your cutters in sets. Store your old cutters until you’ve accumulated at least three cutters – then call us about resharpening them to all 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.
- c) 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.
- d) Replace **vise jaws** when the edges become rounded, flared, mushroomed or when you’ve cut into them too many times.
- e) Replace the **key gauge shaft** when the key gauge shaft wobbles in the carriage excessively.
- f) Replace the **carriage shaft** and **bronze Oilite® bearings** when you can wobble them beyond “just noticeable”.
- g) Replace the **drive belt** yearly if you use the machine a lot. Every 3-5 years if you have a low volume shop.
- h) 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.
- i) Replace the **power switch** if you accidentally bump it, or hit it, or drop something on it.
- j) 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 consider replacing it just in case for safety reasons.

The Stylus

Unscrew the stylus lever. With the lever removed look inside the hole- there is a #10-32 Allen set /32” Allen Hex Wrench to loosen the screw about 1 full turn the “disk” will snap back to the back edge of the slot. Gently pull out the stylus and reinstall a new one. With a pair of small screwdrivers gently push the “disk” forward to about halfway in the slot. Push hard on the tip of the new stylus to make sure it didn’t come forward when you worked the disk forward. Tighten the disk onto the stylus-be absolutely certain that the setscrew in the disk is locating directly on the flat on the stylus. Refer to depth Adjustment section in this manual.

The Cutter Shaft

Remove the left-hand nut and cutter wheel. Remove the access plate and wire brush if installed on your RY256. Loosen the drive belt tension idler and remove the drive belt. Loosen the two cap screws located on the top front edge of the cutter head – use your 3/16” Allen Hex wrench. Loosen them about 1 full turn each.

Pull out the entire cutter shaft assembly and replace with a new one. Reassemble in the reverse order from above. Refer to cutter Wheel Central Adj. Section in this manual.

The Carriage Spring

Turn the machine over on a piece of thick carpet (you don't want to damage the power switch located on the front of the machine). Use your 3/16" Allen hex wrench and remove the 1/4-20 x 3/4" long socket head cap screw that secures the linkage to the "stick-shift" lever's drive shaft. Drop the linkage assembly and pull out the "stick-shift" lever and drive shaft assembly. Leave the two piece linkage assembly attached to the carriage shaft.

If your carriage spring is still attached – grasp the linkages with your left hand and use the linkages as a lever to hold the carriage shaft from turning when you release the carriage. With your right hand release the carriage in the same way you would do if you were going to cut a key. This will require a bit of muscle in your left hand because you're trying to hold onto the linkages while trying to release the carriage against the carriage spring at the same time.

When you've released the carriage you will notice that everything got easy all of a sudden and the carriage spring will probably fall out by itself. At the bottom of the carriage there is a 1/4" wide slot with a pin in it – use a small hammer and drive the pin to nearly flush with the bottom of the carriage.

From the front of the carriage install a new carriage spring and retaining pin - the retaining pin will lay in a milled groove on the face of the carriage. Hold the spring and its pin in place and manipulate the other end of the carriage spring onto the 1/4" diameter grooved pin going through the carriage shaft. If the spring won't reach to the pin you have your carriage in the locked back position - release the carriage and manipulate the carriage and carriage shaft (hold onto the linkages like you did before when you released the carriage) until the end of the carriage spring can be fitted over the 1/4" diameter grooved pin.

Now holding the linkages attached to the carriage shaft with your left hand at the same time holding the carriage spring and retaining pin in place with your right hand – lock the carriage back to its locked back position. Once again you will need some muscle power to hold onto the linkages attached to the carriage shaft to keep the shaft from turning. Once the carriage is in the locked back position everything gets easy again.

Reinstall the "stick-shift" and drive shaft assembly and reattach the two-piece drive shaft linkage and you're almost done.

Turn the machine back onto its feet and observe the carriage spring attached to the 1/4" diameter grooved pin driven into the carriage shaft. Take your small hammer and a steel rod or drift and drive the pin back into the carriage shaft. Stop when the bottom edge of the carriage spring almost touches the carriage shaft.

Test the operation of the carriage and the "feel" of the carriage spring. If the carriage spring seems a bit too strong – drive the grooved spring pin-retaining pin in a little bit further. If the carriage seems a bit too weak - drive the grooved spring retaining pin up (from the bottom of the machine) a little bit further. Test the carriage again.

The Carriage Shaft and Bronze Oilite® Bearings

Refer to the first part of The Carriage Spring to disconnect the linkages and remove the "stick-shift" lever assembly and the carriage spring. Remove the linkages from the carriage shaft using a 1/8" Allen Hex Wrench to remove the shoulder bolt.

Drive the 1/4" diameter carriage shaft pin used to retain the carriage and the carriage pin.

Look down onto the carriage shaft from the top of the carriage and lightly file the 1/4" diameter hole where the grooved pin was - the knurled section of the pin probably raised up small burrs on the edge of the hole which might damage the carriage when the shaft is pulled out of the carriage. Also turn the carriage shaft and expose the milled notch in the carriage shaft where the carriage release mechanism locked the carriage back. The constant locking back and unlocking of the carriage probably raised up a

burr on the shaft at the edge of the milled notch – remove any burr you may find in this area with your file before trying to remove the carriage shaft.

Pull 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” hardwood dowel through the 1” diameter-bearing hole – go almost all the way through 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 onto the 1” diameter hole. Notice the dowel pin going through the first hole 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 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 that the carriage shaft now acts as an alignment guide for the second bearing. Use your 6” piece of 1” diameter hardwood dowel and your hammer to pound in this 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 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.

Reassemble in the reverse order and refer to section in this manual titled HOW DO I REPLACE. . The Carriage Spring and complete your assembly.

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

WHY DID WE DO IT THAT WAY . . .

Key Gauges

We are often asked why we didn’t make our key gauges flip down automatically when the carriage is released. It’s a good question and deserves answering. We choose full-function key gauges instead. We’re committed to incorporate unique and useful features into our products wherever we can. We felt that if we could incorporate a built-in key gauging system that worked for almost all the key gauging requirements you would benefit more from this than having ordinary top shoulder key gauges that automatically flip-away when the carriage is released. Think about it – three key gauging possibilities that don’t flip away automatically verses only one key gauging possibility that does flip away.

Why Such a Big Cutter

The bigger the cutter the less noticeable the radius is in the pin seat area of the duplicated key.

Why Such an Unusual Vise Jaw Design

Simple – we built these vise jaws in a way that resembles a machine shop milling machine vise. No milling machine vises uses a pivoting action jaw - parts would be flying out all the time! With a pivoting action jaw you only have one theoretical size thickness that will clamp properly.

Why Make the Bottom Jaw Move Instead of the Top Jaw Like all the Other Machines

We wanted the movable vise jaw attached to a very large diameter, very long piston to keep movable jaw from tipping. We wanted a vise jaw design that would clamp straight all the time . . . period. The only place with enough room to do it was below the vise jaws and in the carriage.

Why Didn't We Use Gears to Drive the Carriage Left and Right

Gears are pumps – on a key machine they pump dirt and key cuttings. Gears get crunchy - our linkages do not!

Why Aren't the Vise Jaws Hardened

Simple - miss-adjust your key machine and waste the cutter. Our vise jaws are made from machine-able steel so you won't ruin your cutter if you make a mistake. The vise jaws last a long time anyway and when you replace them you are not required to replace them in sets - buy only what you need at the time.

Why Not Use a Less Expensive Motor and Save Money

Our "stick-shift" machine is the fastest machine you can own - you need a lot of power to keep that big cutter going when you "wail" through a key. Low cost motors either won't have the power you will need or they won't work efficiently on a Redi-Line® power generator in your service truck or van. Your machine is equipped with the most powerful motor you can get and it works well on a Redi-Line® generator.

Why is the Machine As Big As It Is, You Could Make it Smaller

The machine is built big, and strong, and rigid – It Is Built To Last. Also it's built for people to use-we can't change people's size. The machine fits people just right.

Why Does the Machine Use a Duplicating Cutter for Medeco?

Simple-you don't have to change cutters to duplicate Medeco at any time, even in the middle of a rekeying job.

CUSTOMER INFORMATION

Rytan, Inc. provides the following information on warranty and service for the RY100 key-duplicating machine:

Warranty Registration

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 and Handling Charges

Payment of all shipping and handling charges 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.

**YOU MAY CALL US TOLL FREE
(800) 447-9826
8:00 a.m. – 4:30 p.m. Pacific Time
Monday through Friday**

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 will be charged an evaluation fee which will be applied to parts and labor costs you have authorized, PLUS you will be charged for shipping and handling costs. If your machine is serviced out of warranty the evaluation fee will be applied to parts and labor costs you have authorized, PLUS you will be charged for shipping and handling costs. If we receive a machine that requires no service you will be charged the evaluation fee PLUS all shipping and handling costs.

Machines Received Without Authorization

The factory will NOT work on any machine where the customer has not authorized the work. We must have your authorization before we will begin evaluating your key machine and you must be aware of the costs involved before we proceed.

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

WARRANTY

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

RYTAN, INC. MODEL RY100 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 THE RYTAN, INC. FACTORY FOR ALL WARRANTY WORK. THIS WARRANTY IS NOT APPLICABLE TO THE CUTTER WHEEL OR TO MACHINES WHICH HAVE BEEN ALTERED OR REPAIRED BY UNAUTHORIZED SOURCES, OR HAVE BEEN SUBJECT TO NEGLECT, 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 THE 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 CUSTOMER'S RESPONSIBILITY.

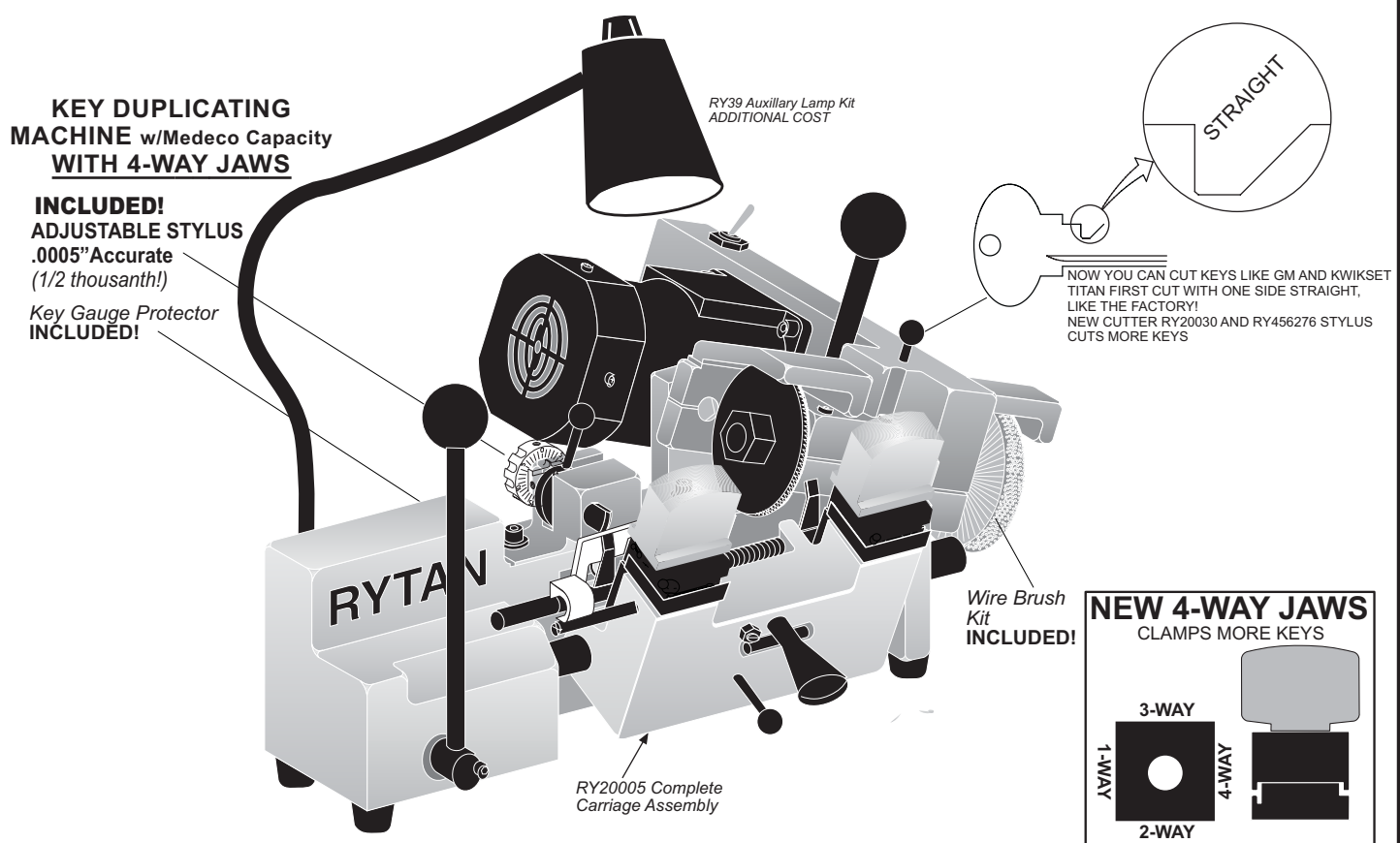
Rytan
INCORPORATED

Model RY456

OPERATOR'S MANUAL

Rytan Model RY456 Semi-Automatic Key Duplicating Machine with 4-Way Jaws
for Cylinder Keys and Automotive Keys and Medeco
CLAMPS MORE KEYS
NEW CUTTER AND STYLUS CUTS GM AND KWIKSET TITAN KEYS
BUILT IN MICRO-ADJUST STYLUS

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



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

RYTAN, INC. - 455 MAPLE AVE. - TORRANCE, CA. 90503 (800) 447-9826 - (310) 212-6002

RYTAN, INC. RESERVES THE RIGHT TO MAKE CHANGES WITHOUT NOTICE. PRICES MAY VARY FROM YOUR DISTRIBUTOR.

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1. **INTRODUCTION**

Thank you for purchasing our American Made, Rytan, Inc., Model RY456, universal key duplicating machine. Your new key machine has been designed and built with heavy-duty components designed for the most demanding shop and service vehicle 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 and operator, resulting from careful design and placement of the operating controls. We are confident you will profit greatly from this quality built versatile key machine.

Your new RY456 key duplicating machine is made similar to the RY256 RAMM semi-automatic key machine. The Stylus on the RY456 key machine is 100% adjustable to better than ½-thousandths of an inch (0.0005”), and can be re-set to “0” at any time.

Use your machine to cut standard cylinder keys and U.S. Foreign automobile keys and Medeco.

2. **GETTING STARTED**

Please take time now to read and understand this manual thoroughly before you start cutting keys. Maintain this owner’s manual and review it often, and make it available to others who will use this machine.

Do not attempt to operate this machine until you have read it 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 environment. 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 work area. Do not let visitors contact 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. Cutting steel keys is not recommended.

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 wore 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. Do not attempt to remove key blank or key blank material while cutter is rotating.

T. Never use machine in an explosive atmosphere. For example, if your machine is in a service vehicle 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** and **OFF**.

Y. Drugs, Alcohol, Medication. Do not operate machine while under the influence of drugs, alcohol, or any 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.

AA. Save these instructions.

4. **MOUNTING THE MACHINE**

Drill two oversized ½" holes in your bench top to mount the machine. Use ½" – 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 jaw “A” configuration. Jaw requirements - to make deeper cuts in small keys, or to clamp other types of keys simply loosen the key clamp knob a few extra turns and lift-and-turn the jaw assemblies from A” to “B” to “C” to “D”.

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 down your key gauges before cutting a key. Failure to do so will prevent the key from being cut by the cutter wheel.

D. Always cut keys from **Bow-to-Tip**. NEVER MAKE YOUR FIRST CUT FROM TIP-TO-BOW.

The RY456 is specifically designed to cut most cylinder keys, U.S. and Foreign automotive keys and Medeco by operating the machine’s “stick-shift” lever SMOOTHLY from **Right-to-Left**. 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 “cleanup” cut back to the bow of the key ONLY after the key has already been cut from Bow to tip.

NOTE: If an excessive amount of key blank material is removed on the cleanup cut (second cut) your cutter may need replacing or re-sharpening. Rytan can sharpen your dull cutter.

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

A. Most key clamping requirements use the standard jaws “A” configuration. If you are making deep cuts you may have to rotate to the “B” jaw configuration. You must loosen the painted key clamping knobs a few turns, turn the vise and retighten.

Make sure your vise jaws are clean (with no chips in the way) and as you secure the vise jaw on to your key - be sure to push the key into the jaw firmly and make sure they remain flat, and parallel into the vise jaws when tightening the large painted key clamp knob.

When clamping keys in the jaws be sure to open the jaws ONLY enough to slide the key in place.

Please see below for more Vise Jaw information.

B. Keys are always gauged with the full-function flip-up key gauges.

C. Always remember to Flip Down your key gauges before cutting a key. Failure to do so will not cut the key.

D. Switch ON your machine and operate the “stick-shift” lever until the stylus is right over the left edge of the first cut closest to the bow of the key, gently press down on the carriage with the black tear-drop hand, then reach down and pull out the carriage release (small round black knob) and release the carriage. You may ease up on the carriage and manipulate the carriage controls to make a smooth *gentle* cut down the left edge of the first “V” cut in the key to the last cut on the tip of the key - cutting all cuts on the key.

E. You may want to reverse the direction of the carriage and make a “clean-up” cut back to the bow of the key.

F. Push down and lock back your carriage. Turn OFF the machine.

NOTE: 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.

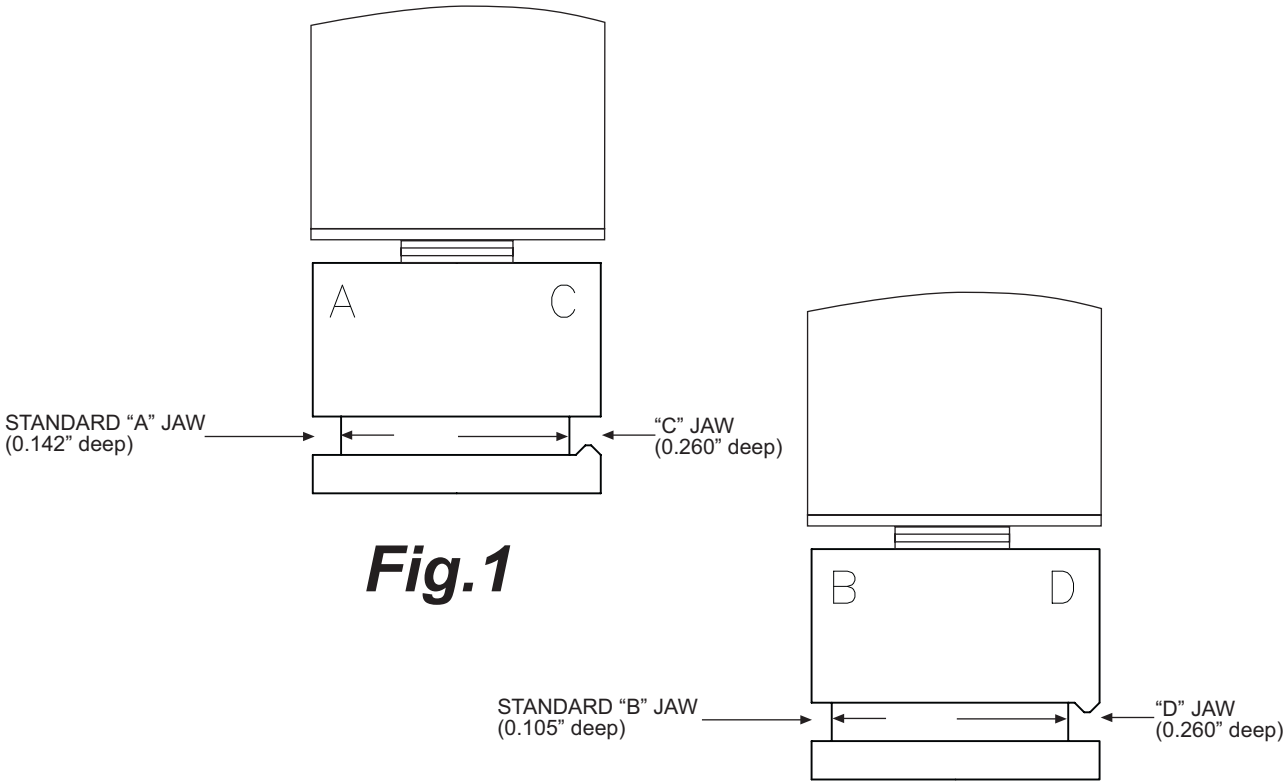
NOTE: Some automotive presentation keys are made of Hardened Steel and can ruin the cutter wheel instantly! Don’t be fooled by the decorative Gold, Brass, or Silver plating on these keys.

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 made – if the key won’t file easily it won’t cut any better in your key machine and will most likely ruin your cutter!

7. **WISE JAWS**

Choosing the correct vise jaw. For most key cutting work the jaws can remain in the standard “A” configuration. In the standard configuration the entire “throat” of the jaws is used. Measuring from the front faces of the “A” vise jaw 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 can flip your vise jaws to “B”. Loosen the vise jaw a few turns, flip the vise jaws to “B” and retighten the large painted knob. You must do both vise jaws for this to work. Your “B” key machine vise jaws now have a “throat” of .105” to clamp the key.



 CHANGING THE VISE JAW

Your new jaws can be rotated from the “A” jaws to “B”, “C”, or “D” vise jaws by just turning them.

 WISE JAW REPLACEMENT

Either vise jaw assembly may be replaced at any time. Inspect your vise jaws for uneven clamping and referencing surfaces. Replace when jaws appear worn. Accelerated wear occurs when you clamp double-sided steel keys such as Volkswagen. Clamping pre 1984- ½ Ford double-sided keys too far to the right into the vise jaws may cause wear to the left edges of both 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. This can be observed if you open the vises only enough to insert the key.

WISE JAW REPLACEMENT

Vise jaws (cartridges) are replaced in pairs as an assembly, a matched set consisting of (one top jaw and one bottom jaw), you will need two sets for your key machine. You will disassemble and re-install the old plungers, springs, and screws. Or you can buy a complete set with the plunger, top jaw, bottom jaw, screws and springs. Simply drop the (cartridges) in place, you will need two cartridges.

Coat all steel sliding surfaces with a light coating of grease when installing the vises.

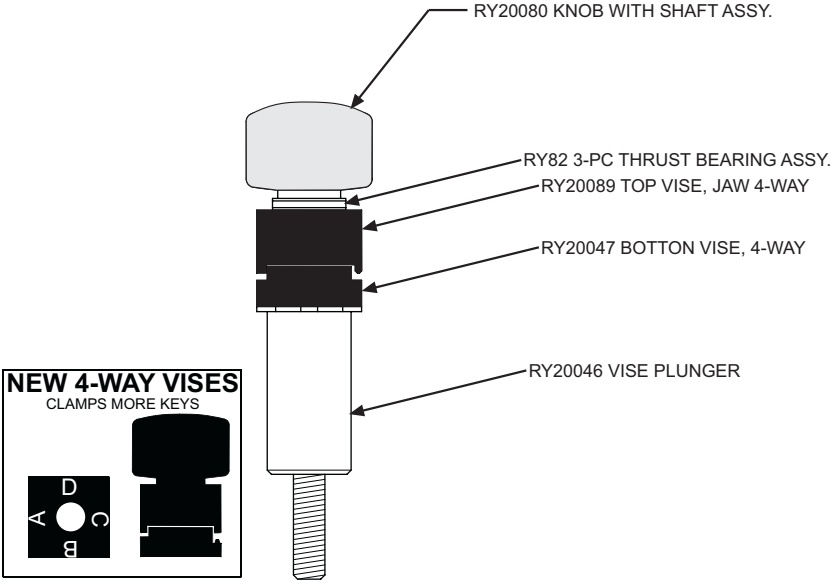


Fig.3

8. **TOP SHOULDER KEY GAUGING**

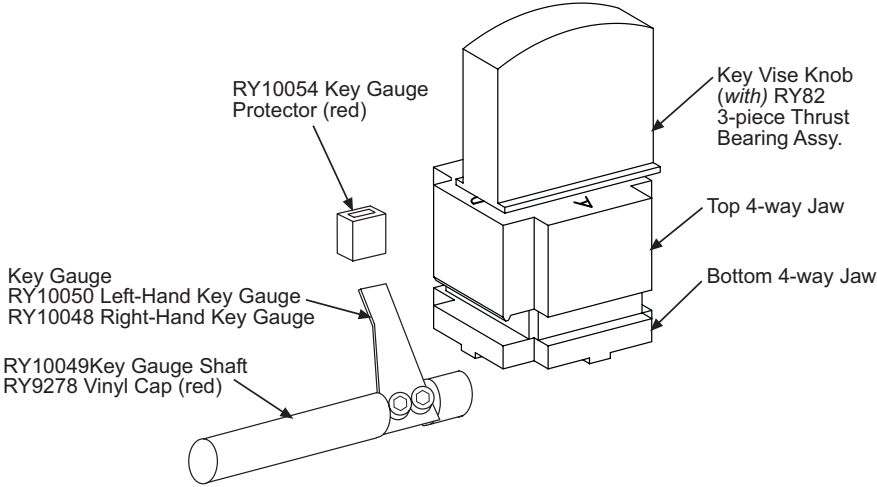


Fig. 4

Standard cylinder keys should always be top shoulder gauged. Use the machine’s 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.

Always remember to flip DOWN your key gauges before cutting a key. Failure to do will prevent your key machine from cutting the key.

1. CLAMPING KEYS

Open the vise jaws only wide enough to slide the key in. With the key all the way into the “throat” of the vise jaws - put your index finger against the key blade and with moderate force against the key in to 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 a standard cylinder key is about 1/32” away from the edge of the vise jaws CLAMP the key with the key clamp knob –continue pressing against the blade of the key with your finger as you tighten the key clamp knob.

When both keys have been properly gauged and clamped in the vise jaws REMEMBER to flip down the full-function key gauges before attempting to cut the key. Failure to flip down the key gauges will prevent you key machine from cutting the key.

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 “A” vises ONLY enough to slide in the thinnest part of the key. (See Fig. 5 & 6) 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.

Door and trunk key “ridge” will contact the face of the BOTTOM vise jaw. See Fig. 5 & 6 below..

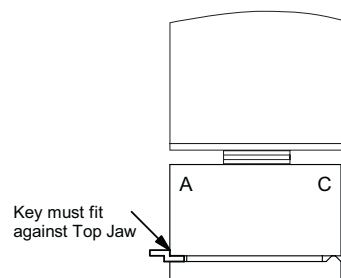


Fig. 5

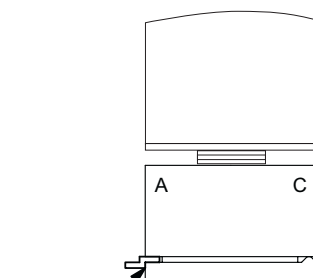


Fig. 6

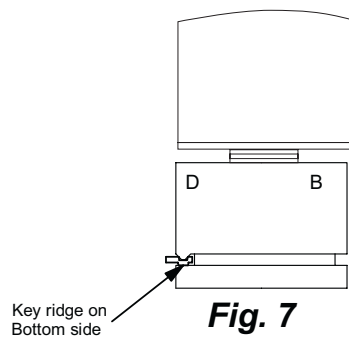


Fig. 7

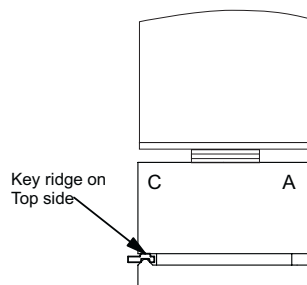


Fig. 8

Use “B” vise jaw to cut Medeco.

Keys such as Chicago double sided and others should use vises “D” and “C” to clamp into the groove near the center of the blank. (See Fig. 7 & 8)

TIP OR BEHIND THE TIP KEY GAUGING.

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. Or behind the TIP as in Best keys.

Always remember to flip DOWN your key gauges before cutting a key. Failure to do so will prevent the key from being cut.

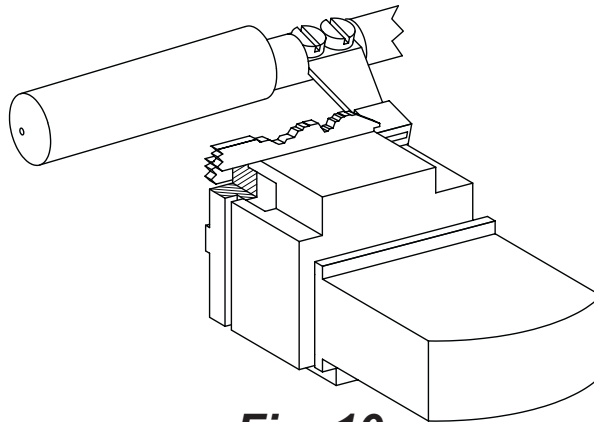


Fig. 10

10. **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. 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 11 and figure 12.

Always remember to flip DOWN your key gauges before cutting a key. Failure to do so will prevent the key from being cut.

11. **RELEASING THE CARRIAGE**

For safety reasons - releasing the carriage requires two actions. With your right hand, push down gently on the carriage’s large “teardrop” knob just enough to push the carriage down a small distance. While holding the carriage down reach around with your thumb and index finger and grasp the small round black knob and pull it out and hold it there. When the small round black knob is pulled out - gently lift up on the carriage a small distance and **THEN** let go of the small round black knob and continue positioning the carriage where you want it to be (you will want to move the carriage to the beginning of the first cut nearest the bow of the key).

NOTE: You will not be able to pull the small black knob by itself to release the carriage. You must push down on the carriage first – then pull out the small black knob to release the carriage. Se

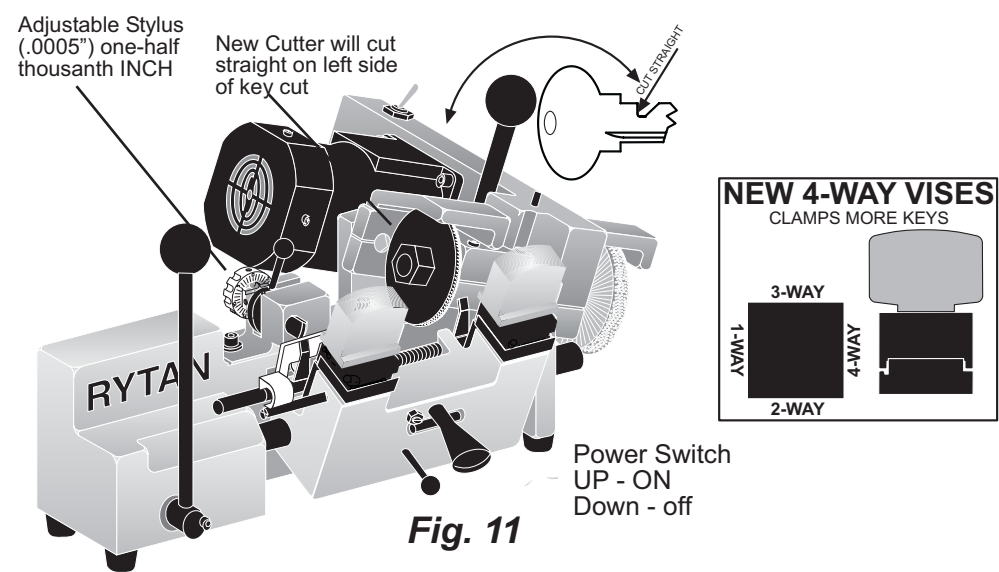
ALWAYS REMEMBER to flip down your key gauges before cutting a key. Failure to do so will prevent the key from being cut.

PLEASE... DON’T FORGET to turn off your key machine before removing a cut key and reloading another key blank.

LOCK THE CARRIAGE BACK (after cutting a key). Push DOWN on the carriage’s large “teardrop” knob until the carriage “clicks” into the locked position.

SWITCH “ON” YOUR MACHINE

The power switch is located at the lower right, front of the machine. See figure 12.

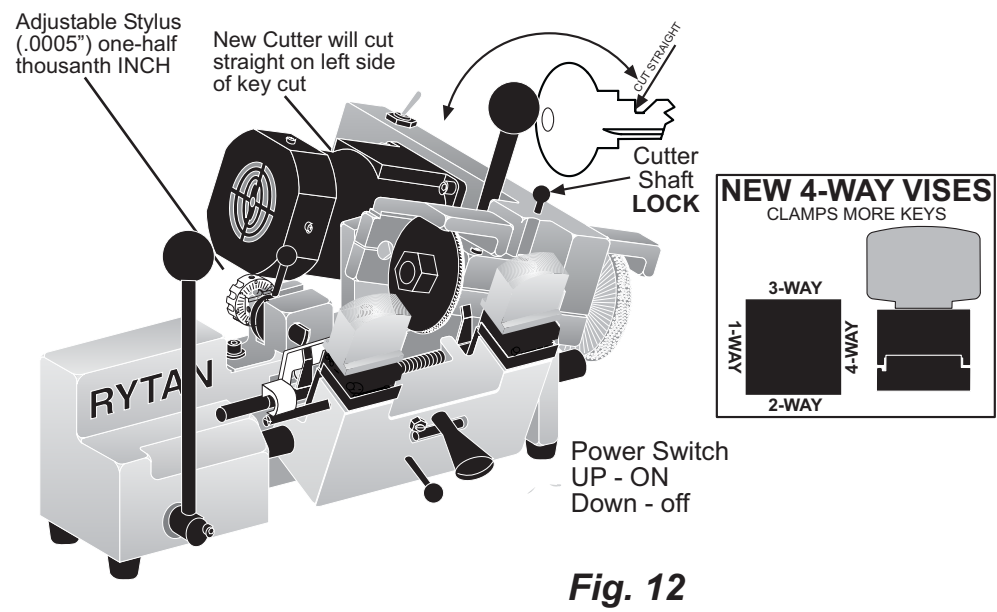


To switch ON pull the power switch up.

To switch OFF push the power switch DOWN.

12. CUTTER SHAFT LOCK

To remove the cutter you must lock the cutter and cutter shaft in position before using a 1” wrench to remove the cutter.



Press DOWN firmly on the cutter shaft lock. While holding the lever down - rotate the cutter by hand until the cutter shaft lock “clicks” in to 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 the 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** - the motor may be powerful enough to slip the belt and permanently damage it by wearing a flat spot on the belt.

13. **REMOVING/REPLACING THE CUTTER**

REMOVING THE CUTTER

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

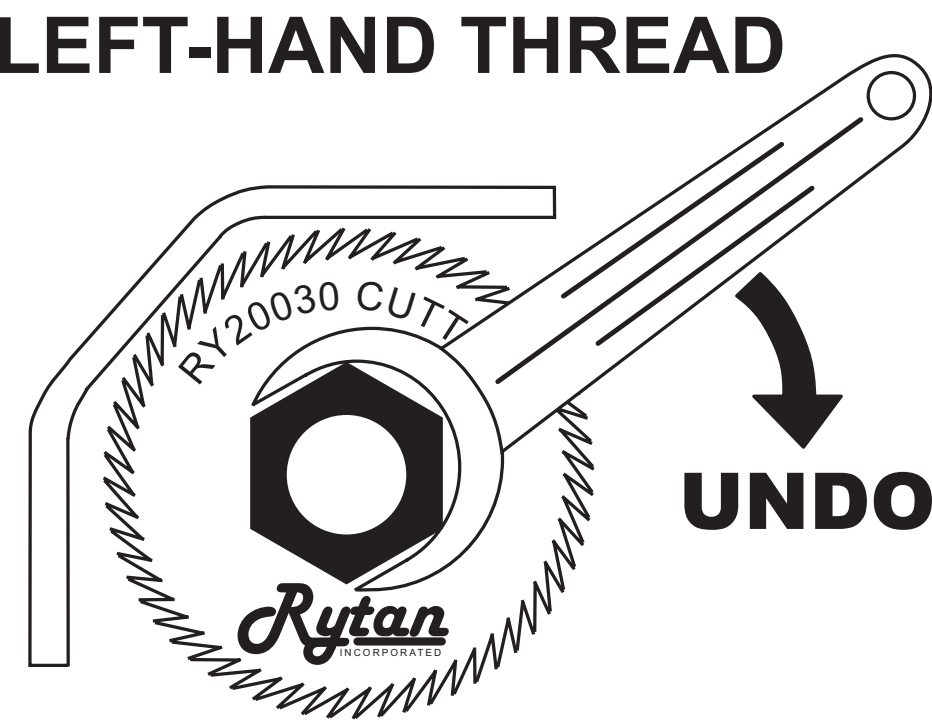


FIG. 13

Remember to LOCK the cutter before removing the cutter wheel.

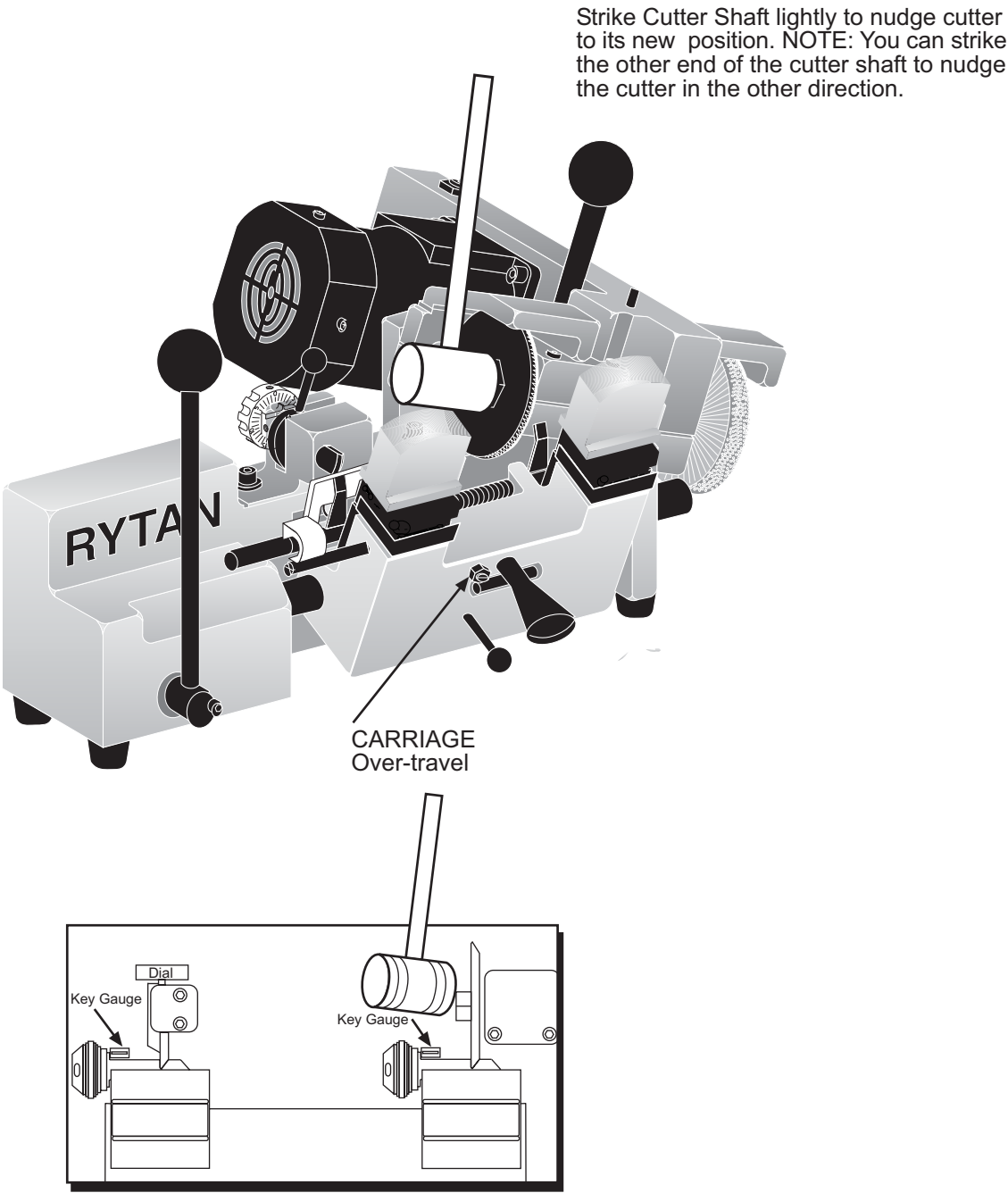
Use a 1” open-end or hex wrench to remove the Left-Hand Nut. See Fig. 13.

REPLACING THE CUTTER

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

DON'T OVERTIGHTEN the cutter wheel nut - The Left-Hand Nut is self tightening as you use it. Overtightening the cutter wheel nut may make it harder to remove later and may result in damaging the cutter shaft lock or cutter pulley later when you remove the cutter at a later date.

14. **DEPTH ADJUSTMENT**



Depth is adjusted at the back end of the stylus.

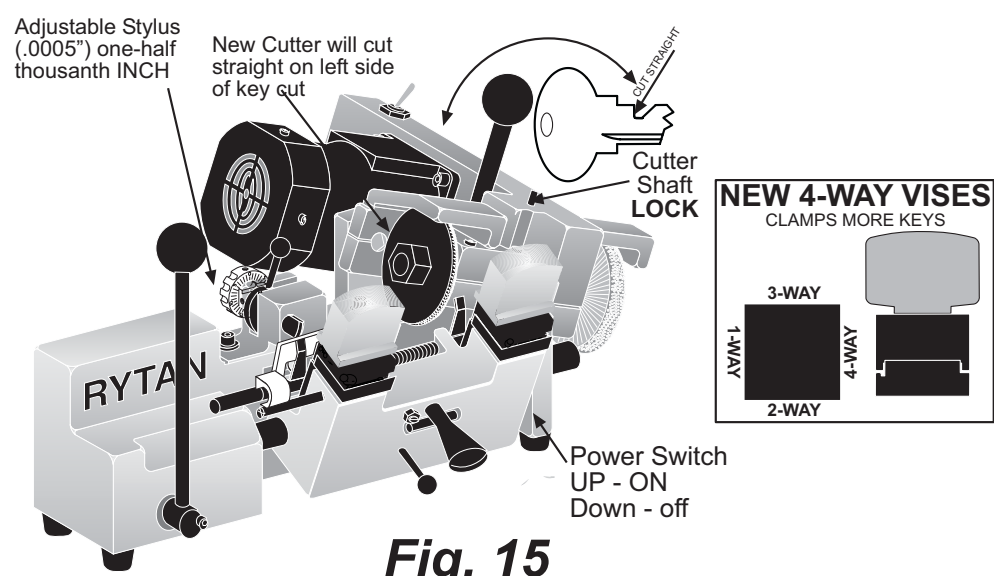


Fig. 15

14. DEPTH ADJUSTMENT

To adjust the depth you will need.

- ❖ Piece of writing paper cut to approximately 1” x 4”.
- ❖ Two identical key blanks – measure blade width with micrometer or dial calipers and select two that match.

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

Depth is adjusted by moving the stylus forward or backward by means of an adjustment dial located at the back of the stylus.

Secure the two matched key blanks - one in each vise jaw. 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 the bottom shoulder area. Clamping in this area may **ANGLE** the key blank in the vise and throw off your adjustment by cutting to shallow near the key head.

With the keys clamped in the vises and with the stylus adjusted forward about 1 turn - carefully release 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.

Observe that the cutter wheel missed the key blank in the right vise by carefully turning the cutter **BACKWARDS** by hand - the cutter teeth should miss the key blank 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 turn the Dial – 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, 1 number at a time - each time moving the piece of paper from side to side in front of the spinning cutter wheel. Stop when the piece of paper is cut through to the last few fibers. You have now accurately adjusted the depth of cut on your key machine.

Verify by switching ON the machine and verifying that the cutter wheel just “ticks” the blade of the key blank. We recommend moving the machine’s “stick-shift” lever very slightly to the right – and at the same time listening to the cutter wheel for the very faint “ticking” sound of the cutter wheel teeth barely grazing the key blank. DO NOT go back and forth over the same spot! If you use the same spot more than once your stylus will burnish a spot on the key blank that is ever so slightly lower than the rest of the key blank.

Switch OFF the key machine.

1. SPACE ADJUSTMENT

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

Spacing is adjusted by moving the stylus holder left or right. The stylus holder is secured to the machine’s main housing by two 1/4-20 Socket Head Cap Screws and washers.

To adjust the spacing you will need:

- ❖ 3/16” Allen Hex Wrench
- ❖ Two identical Key Blanks
- ❖ Small Plastic Mallet

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

Stack the two identical key blanks one on top of each other and clamp them in the right hand vise jaw. Be sure to top shoulder gauge them with the machine’s flip-up full-function key gauges – leave about 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 jaw and throw off your adjustment. There should be NO key blanks in the left vise jaw for this part of the procedure.

DO NOT FORGET to flip down your key gauges. Failure to do so may result in damage to the key gauge and key gauge shaft by the cutter wheel.

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 “stick-shift” lever 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 back the carriage to the locked position 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 up the machine’s full-function key gauges and carefully top shoulder guard the left key to the key in the right-hand vise jaw.

Without turning ON the motor, carefully release the carriage and align the left-hand blank’s “V” cut with the machine’s 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 hands to carefully turn the cutter wheel **BACKWARDS** to verify that the cutter wheel’s teeth do not touch the “V” cut in the right-hand 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 “tick” and “V” cut in the right-hand key blank-----then spacing needs to be adjusted.

Loosen the two 1/4-20 screws securing the stylus holder in place using your 3/16” Allen Hex Wrench---retighten the two screws with LIGHT pressure. You want just enough retightening pressure on the two screws to keep the stylus holder 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.

Turn the cutter BACKWARDS with your hand and observe which way you must move the stylus holder. Use your small plastic mallet to “nudge” the stylus holder in the direction you want it 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 using the machine’s “stick-shift” lever 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 stylus holder. 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 teeth will contact either side of the “V” cut in the key. With the machine running you may want to slightly “nudge” the stylus holder a little more before retightening the stylus holder.

Switch off the key machine. Tighten the two screws using the 3/16” Allen Hex Wrench.

IMPORTANT--Verify that your depth adjustment is correct and readjust if necessary. Refer back to Depth Adjustment if necessary.

Spacing Adjustment is now complete.

IMPORTANT – Verify that your depth adjustment is correct and readjust if necessary.

16. **KEY GAUGE ADJUSTMENT**

Stack two identical key blanks one on top of the other and clamp in the right-hand vise jaw. Be sure to BOTTOM SHOULDER GAUGE them. DO NOT use the machine’s flip-up 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 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 “stick-shift” lever 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 “stick-shift” lever to the LEFT making a wide cut slightly more than 1/4” wide.

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 flip-up full-function key gauges.

Install the other key blank in the Left vise jaw - use BOTTOM SHOULDER GAUGING. DO NOT use the machine’s flip-up full function key gauges.

NOW flip up 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 when you are finished.

The key gauges now match the spacing of the vise jaws.

You **MUST** verify and readjust, if necessary, the machine’s spacing and adjustment.

17. **CARRIAGE OVER TRAVEL DEPTH ADJUSTMENT**

Your key machine is equipped with a depth over travel device. Its adjustment is important. The over travel device prevents the cutter wheel from cutting into the vise jaws when there are no keys clamped in the machine. Setting the depth over travel 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 over travel 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. Release the carriage and position it so the stylus and cutter wheel are in about the middle of the vise jaws.

Loosen the 7/16” Hex Jam Nut on the front of the carriage.

Loosen the ¼” – 20 slotted screw stud with your screwdriver. About 1 turn should be enough. Observe that the stylus is touching the face of the closed vise jaw.

Gently turn the slotted screw stud with your screwdriver in the clockwise direction and stop when you feel the stud contact the key machine’s main housing. There is a 3” long hardened roll pin in the machine’s main housing that the slotted screw stud will contact.

Turn the slotted screw stud an additional ¼ turn – after contacting the roll pin the machine’s main housing. The thread pitch is 20 which is approximately 12 thousands of an inch per ¼ turn. Tighten the 7/16” Hex Jam Nut on the slotted screw stud - use moderate tightness.

After tightening the 7/16” not - check the gap between the stylus and the face of the closed vise jaws. Use three pieces of 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 over travel will work only when adjusted properly. The following things can happen if the adjustment is not done properly.

- a) If adjusted to low your cutter wheel may cut into the right-hand vise jaw.
- b) If adjusted to high your cutter wheel may not cut deep enough when cutting deep cuts in keys.
- c) Carriage over travel will not prevent cutting the right-hand top vise jaw if the top vise jaw has come loose and has moved forward into the cutter. PLEASE check the tightness of the knurled knobs OFTEN.

18. **MAINTENANCE**

UNPLUG YOUR MACHINE PRIOR TO 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

UNPLUG YOUR MACHINE PROIR TO 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 black oxide processed 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. Turn the machine over and lubricate the linkages that drive the carriage shaft left and right. **WARNING:** Do not turn the machine over and set it on the Power Switch.

SUGGESTION: When lubricating the “stick-shift” drive linkages under the machine you might want to use spray-on bicycle chain lubricant – the kind that foams and penetrates. **DO NOT** use this on the rest of the machine.

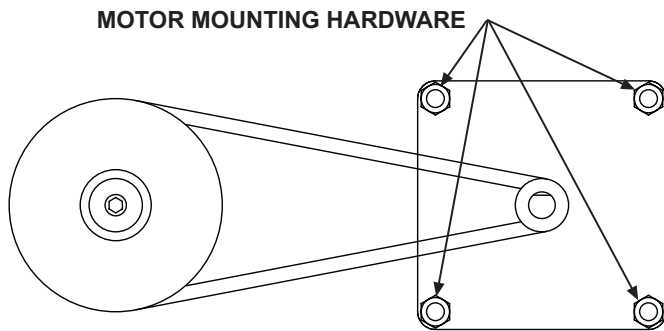
Lubricate the vise jaw plungers inside the carriage – remove the key clamp knobs and large knurled knobs and top vise jaws. Squirt some number 30 non-detergent motor oil in the large hold and reassemble.

DO NOT LUBRICATE your key machine with LPS-1 or WD-40 in place of number 30 non-detergent motor oil. You may use LPS-1 or WD-40 as a rust preventative in addition to the number 30 non-detergent motor oil. If you only use LPS-1 or WD-40 as your machine’s only 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 this 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 an oil-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” Allen Hex Wrench to loosen the four cap screws and hex nuts securing the motor to the motor bracket. Push the motor hard against the belt and tighten the four screws.



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 freshly cut key and duplicates another from 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 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 – but 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 questions remain unanswered.

There is only one way to get good results on a consistent bases. 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 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 and accuracy 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 (preferably 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. Measure each cut several times and record their average. Compare the results. There is really no substitute for the procedure if you want to make accurate duplicate keys. Generation cutting will not give you meaningful results like this procedure.

19. **TROUBLESHOOTING**

Machine Always Needs Adjustment

There are several things that can cause your machine to need adjustment.

1. Cutter wheel may be dull. This can cause the key to try to “float” and not cut deep enough in the deepest cuts. Replace or sharpen the cutter.
2. Carriage spring may be weak or adjusted to light. Replace the spring or adjust the spring.
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 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 may be the carriage depth over travel adjustment is set too high. This results in the machine’s inability to cut the deepest cuts on a key – but shallower cuts are fine. This symptom is more common than you think. Fix the problem by readjusting the Carriage Over travel Depth Adjustment.
7. Again – one key cuts fine and the next one doesn’t. This time it may be the key gauges. Sometimes key machine operators don’t flip down the full-function key gauges all the way down 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 for how to do it.

Keys don’t always work in the lock when gauged off 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 key blanks since they are seldom used by the lock cylinder.

1. 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 service vehicle. You’re 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 to much you will narrow the width of the pin seat somewhere in the middle—if the stylus is sharp it will scrape the key to much, if the stylus is blunted to 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 stylus wears—until finally you have to buy a new cutter or get the old cutter resharpened or replace the stylus. When you put on the new or resharpened cutter or stylus you’re back to ridges again.

Machine Makes Whirring Sound

There are four possible causes.

1. The sound is coming from the motor. With the machine turned OFF-grab the motor shaft and try to get some movement out of it when trying to move the shaft up and down. If there is up and down movement the motor ball bearings are worn and the motor will need replacement some time in the future. Please ignore any motor shaft play when pushing or pulling the shaft along its length in and out of the motor—this play is in the motor’s spring preloaded ball bearings and is not a sign of bearing wear.
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 no 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. Another possibility is the way some of the ball bearing cages are made inside the bearings—these ball cages have an assembly opening created at the bearing factory. These bearings sometimes make a slight “ticking” sound. In this case the sound may not be a problem.

4. The machine’s cutter shaft lock is partially depressed and is rubbing against the drive pulley. Pull up on the shaft lock knob and the sound should disappear.

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 and connections.
2. Key cuttings in the motor’s capacitor. Unplug the machine, remove the capacitor’s rubber cover and blow out the chips. Remember to wear safety glasses.
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 Nickel-Silver...period.

Cutter Wobbles

This situation may be caused by a key cutting on the face of the cuter 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. Call us for resharpening details.

My Resharpened Cutter Doesn’t Work Well

The cutter resharpening service didn’t have it reground – instead you went to a service that used a different means of sharpening such as etching or striking. Simply put... your cutter wheel should always be resharpened by grinding –and you will need a quality service to do it right. Call us for quality resharpening details.

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

Your 115 VAC motor needs a mobile generator to work properly. Power Converters work fine on electric drills, TV’s and radios. Many split phase capacitor motors do not work well on some power converters. Buy a Redi-Line or similar motor/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 wired in reverse or you are using a small wire gauge. Reverse the wiring connections and/or use heavier wire such as 14 Gauge or heavier.

I’m Mobile and I Keep Breaking Shoulder Screws in My “Stick-Shift” Linkages

This situation is caused by a combination of the weight of your carriage (about 9 pounds) in the locked back position and aggravated by the bouncing around of the service vehicle driving on the roads. You can fix the situation once and for all by releasing the carriage when it’s not in use – put a piece of heavy cardboard, a small piece of wood or even a piece of indoor/outdoor carpet

WHEN DO I REPLACE. . .

- a) 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. **NOTE:** Rytan’s key machine cutter can be resharpened. Call us for details.
- b) Resharpen your cutters in sets. Store your old cutters until you’ve accumulated at least three cutters – then call us about resharpening them to all 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.
- c) 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.
- d) Replace **vise jaws** when the edges become rounded, flaired, mushroomed or when you’ve cut into them too many times.
- e) Replace the **key gauge shaft** and/or **carriage** when the key gauge shaft wobbles in the carriage excessively.
- f) Replace the **carriage shaft** and **bronze Oilite® bearings** when you can wobble them beyond “just noticeable”.
- g) Replace the **drive belt** yearly if you use the machine a lot. Every 3-5 years if you have a low volume shop.
- h) Replace the **cutter shaft** assembly when you hear a whirling, 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.
- i) Replace the **power switch** if you accidentally bump it, or hit it, or drop something on it.
- j) 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 consider replacing it just in case for safety reasons.

HOW DO I REPLACE. . .
UNPLUG MACHINE BEFORE REPLACING PARTS

The Stylus

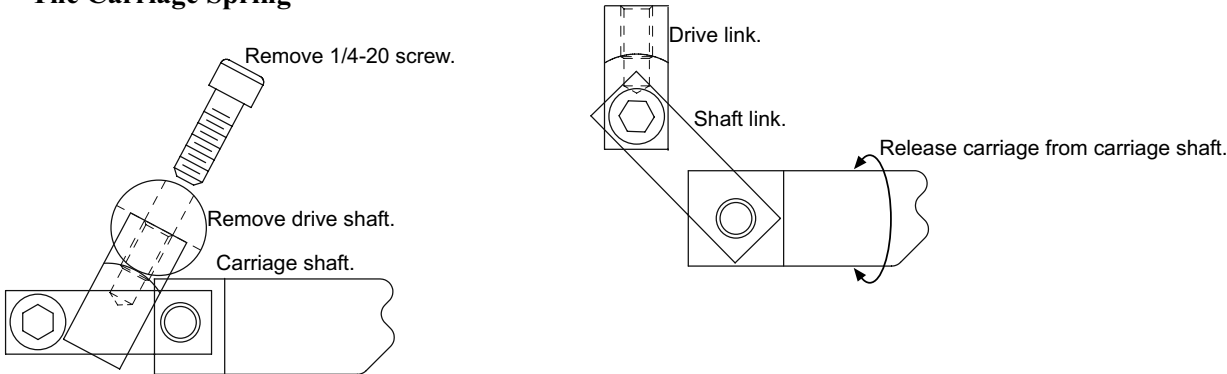
Loosen the two #10-32 socket head cap screws on top of the stylus holder with a 5/32” Allen hex wrench. Pull out the stylus and reinstall a new one. Be sure to place the groove near the back end of the stylus on to the right side of the machine. Make sure you cannot wobble the stylus from side-to-side with your hand.

The Cutter Shaft

To remove the cutter shaft you must lock the cutter and cutter shaft in position before using a wrench to remove the cutter. Press DOWN firmly on the cutter shaft lock (small round black knob on right top side of machine). While holding the knob 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 it will stay in position. You may now proceed with removing the cutter shaft lock nut, cutter and cutter shaft. PLEASE.. DON’T FORGET to pull up on the cutter shaft lock when you are finished reinstalling the cutter shaft or 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 that the motor may be powerful enough to slip the belt and permanently damage it by wearing a flat spot on the belt.

The cutter wheel is secured to the cutter shaft pull out the entire cutter shaft assembly and replace with a new one. Reassemble in the reverse order from above.

The Carriage Spring



Turn the machine over on a piece of thick carpet (you don’t want to damage the power switch located on the front of the machine). Use your 3/16” Allen hex wrench and remove the 1/4-20 x 3/4” long socket head cap screw that secures the linkage to the “stick-shift” lever’s drive shaft. Drop the linkage assembly and pull out the “stick-shift” lever and drive shaft assembly. Leave the two piece linkage assembly attached to the carriage shaft.

If your carriage spring is still attached – firmly grasp the linkages with your left hand and use the linkages as a lever to hold the carriage shaft from turning when you release the carriage. With your right hand release the carriage in the same way you would do if you were going to cut a key. This will require a bit of muscle in your left hand because you’re trying to hold onto the linkages while trying to release the carriage against the carriage spring at the same time.

When you’ve released the carriage you will notice that everything got easy all of a sudden and the carriage spring will probably fall out by itself. At the bottom of the carriage there is a 1/4” wide slot with a pin in it – use a small hammer and drive the pin to nearly flush with the bottom of the carriage.

From the front of the carriage install a new carriage spring and reinstall the retaining pin - the retaining pin will lay in a milled groove on the face of the carriage. Hold the spring and its pin in place and manipulate the other end of the carriage spring onto the 1/4” diameter grooved pin going through the carriage shaft. If the spring won’t reach to the pin you have your carriage in the locked back position - release the carriage and manipulate the carriage and carriage shaft (hold onto the linkages like you did before when you released the carriage) until the end of the carriage spring can be fitted over the 1/4” diameter grooved pin.

Now holding the linkages attached to the carriage shaft with your left hand at the same time holding the carriage spring and retaining pin in place with your right hand – cock the carriage back to its locked back position. Once again you will need some muscle power to hold onto the linkages attached to the carriage shaft to keep the shaft from turning. Once the carriage is in the locked back position everything gets easy again.

Reinstall the “stick-shift” and drive shaft assembly and reattach the two piece drive shaft linkage and you’re almost done.

Turn the machine back onto its feet and observe the carriage spring attached to the ¼” diameter grooved pin driven into the carriage shaft. Take your small hammer and a steel rod or drift and drive the pin back into the carriage shaft. Stop when the bottom edge of the carriage spring almost touches the carriage shaft.

Test the operation of the carriage and the “feel” of the carriage spring. If the carriage spring seems a bit too strong – drive the grooved spring pin retaining pin in a little bit further. If the carriage seems a bit too weak - drive the grooved spring retaining pin up (from the bottom of the machine) a little bit further. Test the carriage again.

The Carriage Shaft and Bronze Oilite® Bearings

Refer to the first part of The Carriage Spring to disconnect the linkages and remove the “stick-shift” lever assembly and the carriage spring. Remove the linkages from the carriage shaft using a 1/8” Allen Hex Wrench to remove the shoulder bolt.

Drive the ¼” diameter carriage shaft pin used to retain the carriage and the carriage pin.

Look down onto the carriage shaft from the top of the carriage and lightly file the ¼” diameter hole where the grooved pin was - the knurled section of the pin probably raised up small burrs on the edge of the hole which might damage the carriage when the shaft is pulled out of the carriage. Also turn the carriage shaft and expose the milled notch in the carriage shaft where the carriage release mechanism locked the carriage back. The constant locking back and unlocking of the carriage probably raised up a burr on the shaft at the edge of the milled notch – remove any burr you may find in this area with your file before trying to remove the carriage shaft.

Pull 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 ¾” diameter about ½” long - to fit onto the new bronze Oilite® bearing.

From the right side of the machine push the 1” hardwood dowel through the 1” diameter bearing hole – go almost all the way through 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 onto the 1” diameter hole. Notice the dowel pin going through the first hole 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 bronze Oilite® bearing into its hole. Remove the dowel and insert the new carriage shaft – leave the end of the carriage shaft extended about ½” out of the right-side bearing hole and place your second bearing onto this shaft. Notice that the carriage shaft now acts as an alignment guide for the second bearing. Use your 6” piece of 1” diameter hardwood dowel and your hammer to pound in this 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 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.

Reassemble in the reverse order and refer to section in this manual titled HOW DO I REPLACE. . The Carriage Spring and complete your assembly.

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

WHY DID WE DO IT THAT WAY . . .

Key Gauges

We are often asked why we didn’t make our key gauges flip down automatically when the carriage is released. It’s a good question and deserves answering. We chose full-function key gauges instead. We’re committed to incorporate unique and useful features into our products wherever we can. We felt that if we could incorporate a built-in key gauging system that worked for almost all the key gauging requirements you would benefit more from this than having ordinary top shoulder key gauges that automatically flip-away when the carriage is released. Think about it – three key gauging possibilities that don’t flip away automatically verses only one key gauging possibility that does flip away.

Why Such a Big Cutter

The bigger the cutter the less noticeable the radius is in the pin seat area of the duplicated key.

Why Did We Change to an Unusual 4-way Vise Jaw Design

We built these vise jaws in a way that resembles a machine shop milling machine vise. And we did it with Cartridges instead of individual pieces. No milling machine vises uses a pivoting action jaw - parts would be flying out all the time! With a pivoting action jaw you only have one theoretical size thickness that will clamp properly.

We wanted the movable vise jaw attached to a very large diameter, very long piston to keep the jaws from tipping. We wanted a vise jaw design that would clamp straight all the time . . . period. The only place with enough room to do it was below the vise jaws and in the carriage.

Why Didn’t We Use Gears to Drive the Carriage Left and Right

Gears are pumps – on a key machine they pump dirt and key cuttings. Gears get crunchy - our linkages do not!

Why Aren’t the Vise Jaws Hardened

Simple - miss-adjust your key machine and waste the cutter. Our vise jaws are made from machineable steel so you won’t ruin your cutter if you make a mistake. The vise jaws last a long time.

Why Not Use a Less Expensive Motor and Save Money

Our “stick-shift” machine is the fastest machine you can own - you need a lot of power to keep that big cutter going when you “wail” through a key. Low cost motors either won’t have the power you will need or they won’t work efficiently on a Redi-Line® power generator in your service truck or van. Your machine is equipped with the most powerful motor you can get and it works well on a Redi-Line® generator.

Why is the Machine As Big As It Is, You Could Make is Smaller

The machine is built big, and strong, and rigid. It is built to support the size of the Human Body – It Is Built To Last.

20. **CUSTOMER INFORMATION**

Rytan, Inc. provides the following information on warranty and service for the RY456 key duplicating machine:

Warranty Registration

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 and Handling Charges

Payment of all shipping and handling charges 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.

**YOU MAY CALL US TOLL FREE
(800) 447-9826
9:00 a.m. – 4:30 p.m. Pacific Time
Monday through Friday**

We Thank You...

We thank you for your continued interest in Rytan quality made products. We appreciate and respect the confidence you have shown in us. From your early support through purchasing our first products made back in 1983 we have created many innovative products, which you use on a daily basis in your business. Many of our innovative products have come from friends and associates in the Locksmith and Locksmith Distribution businesses who sincerely want us to be here to serve their industry.

The successful ergonomic handled lock picks and all of the standard, unique and miniature lock pick blades were created from a desire to make the best possible lock picking instruments in the industry. The curved ergonomic handle was inspired by the famous Buck Knife. The Rytan Riffle Pick, Diamond-Hook, Hi-Lo Modified Full Rake and all the Miniature pick blades are, and always be, uniquely ours. Did you know that once you become accustomed to the comfort and “feel” of the Rytan curved pick handle it is hard to go back to the straight handle again!

The inspiration for the famous Rytan RY57 push button Plug Spinner came from our knowledge of the old “knuckle buster” plug spinner that used a wind-up spring. We designed our RY57 Plug Spinner with a push button to release a torsion spring that could not turn more than a half turn in either direction. It saved your knuckles from being bashed and gave us a reputation that carries your endorsement by the very fact that we have sold many tens of thousands of these fine tools. In fact this original all metal RY57 has encouraged us to develop the NEW RY5798 low cost plug spinner developed in 1998!

In late 1984 there was a problem with the 1984-1/2 Ford double-sided ignition locks with a side-bar. The only practical way to get through the lock was to drill the side-bar or use try-out keys. Existing drill tools at the time were cheaply made and try-out key codes were selling for a rip-off price of \$100 or more! We responded by designing and building the first heavy-duty “real” drill tool to drill out the side-bar and we gave away the try-out key codes for free with the price of the RY25 Ford Drill Tool.

It was the profits earned by our Locksmith tool sales that we reinvested into the famous RY100 heavy-duty key-duplicating machine:

The RY256 key machine that also did Medeco® key duplication.

The RY45 manual key duplicator.

The NEW

Portable RY2000 “DUAL” punch machine that can be set up for Schlage, Kwikset, I-Core and others.

AND THIS NEW RY456 KEY DUPLICATOR WITH ITS UNIQUE 4-WAY VISE JAWS!

Upon its introduction many years ago at the Los Angeles ALOA Convention our original RY100 key machine took the show by storm and sold more machines at its introduction than any other key machine in history.

Your new RY456 key machine is built on the original foundation of our famous RY256 Key Machine that was introduced in 1983, with a new cutter wheel and stylus that can cut keys like GM and Kwikset Titan keys with an almost straight first cut, without affecting the cutting of the rest of the key. The new RY456 comes with all-new 4-way Vise Jaws that can be replaced as simple drop-in cartridges when required. And it is equipped with our new Micro-Adjust stylus that can adjust your stylus to better than 1-2 thousandths of an inch (.0005”) at any time – and your machine can be returned to its original position just as fast!

We like what we are doing. We have proven we are good at what we do. And we keep on going...

CONVERT YOUR OLD RY256 TO A NEW RY456 MACHINE WITH 4-WAY VISE JAWS,
YOU CAN ALSO ADD A NEW CUTTER WHEEL AND
STYLUS KIT (RY456032), KEY GAUGE PROTECTOR
AND A WIRE BRUSH KIT.

Rytan
INCORPORATED
MADE IN U.S.A.

ADD Adjustable Stylus
MA480
\$59.95

ADD RY114 Key Gauge
Protector \$29.95

ADD NEW RY456032 Cutter & Stylus \$135.00

ADD RY101 Wire Brush
Kit for \$42.75

ADD Complete NEW 4-WAY JAWS
with Complete Carriage Assembly
RY20005 \$380.00

IF YOU ARE CONVERTING A VERY OLD (original)
RY256 KEY MACHINE: PLEASE NOTE THAT YOU
WILL LOOSE YOUR CARRIAGE OVERTRAVEL
ADJUSTMENT WHEN YOU UPDATE TO THE NEW
CARRIAGE ASSEMBLY WITH 4-WAY VISE JAWS!

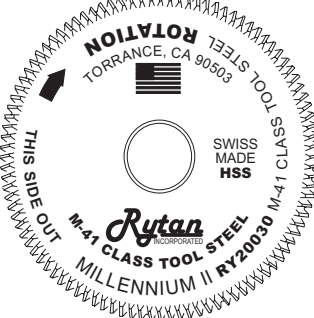
NEW RY456032 Cutter Wheel & FREE STYLUS

NOW YOU CAN CUT KEYS LIKE GM AND KWIKSET TITANS FIRST CUT WITH ONE SIDE
STRAIGHT, LIKE THE FACTORY!

DEALER PRICE \$135.00

NEW RY20030 Cutter cuts
one side straight.

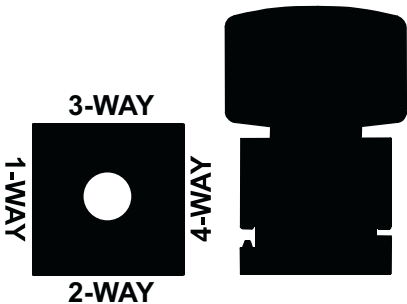
New Cutter & *FREE* Stylus will not affect your
other key cutting work! Get a new cutter and a
FREE stylus and your old RY256 Key Machine
will cut like NEW!



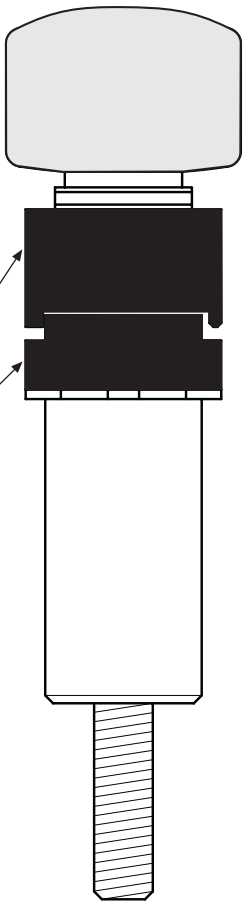
NEW *FREE* RY456276 Stylus traces one side
straight like the factory
on GM and TITAN.

RY20089 Top Jaw ONLY
RY20047 Bottom Jaw ONLY
\$79.95 EACH MATCHED PAIR
2 PAIR REQUIRED

NEW 4-WAY VISES CLAMPS MORE KEYS

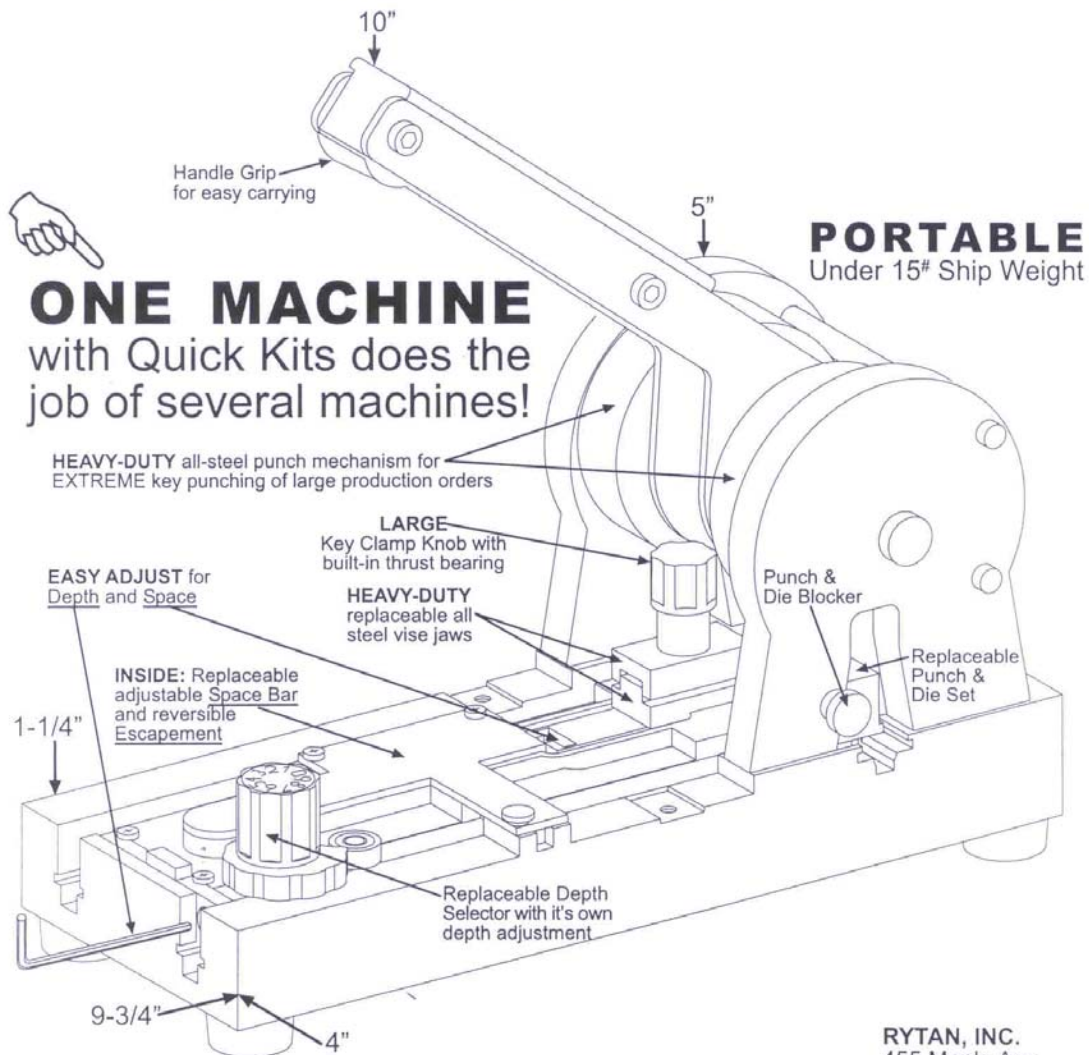


ORDER KIT #:
RY456032



RY2000 EXTREME PUNCH MACHINE *Rytan* INCORPORATED

INSTRUCTION MANUAL *Code Punch Machine*



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RYTAN, INC.
455 Maple Ave
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(800) 447-9826 Tel
www.rytan.com
9:00am - 4:30pm
Pacific Time M-F

RY2000 EXTREME PUNCH MACHINE *Rytan* INCORPORATED

FIRST TIME USE

1. Getting ready to load a key. Push handle down all the way and then let the handle come back up (controlled release). Repeat until the Vise Jaw assembly is back as far as it will go (*toward you*).

2. Loosen the Key Clamp Knob until you can insert your key blank. As you slide in your key blank press (with your finger) the entire length of the blade tight against the vise jaw (1) until the bottom shoulder rests firmly against the vise jaw (2). While holding the key in place tighten the Key Clamp Knob.

3. Push the Key and the Vise Jaw forward until they are pushed all the way into the machine (*you will hear a "ratcheting" sound as you push the Key and Vise Jaw into the machine*).

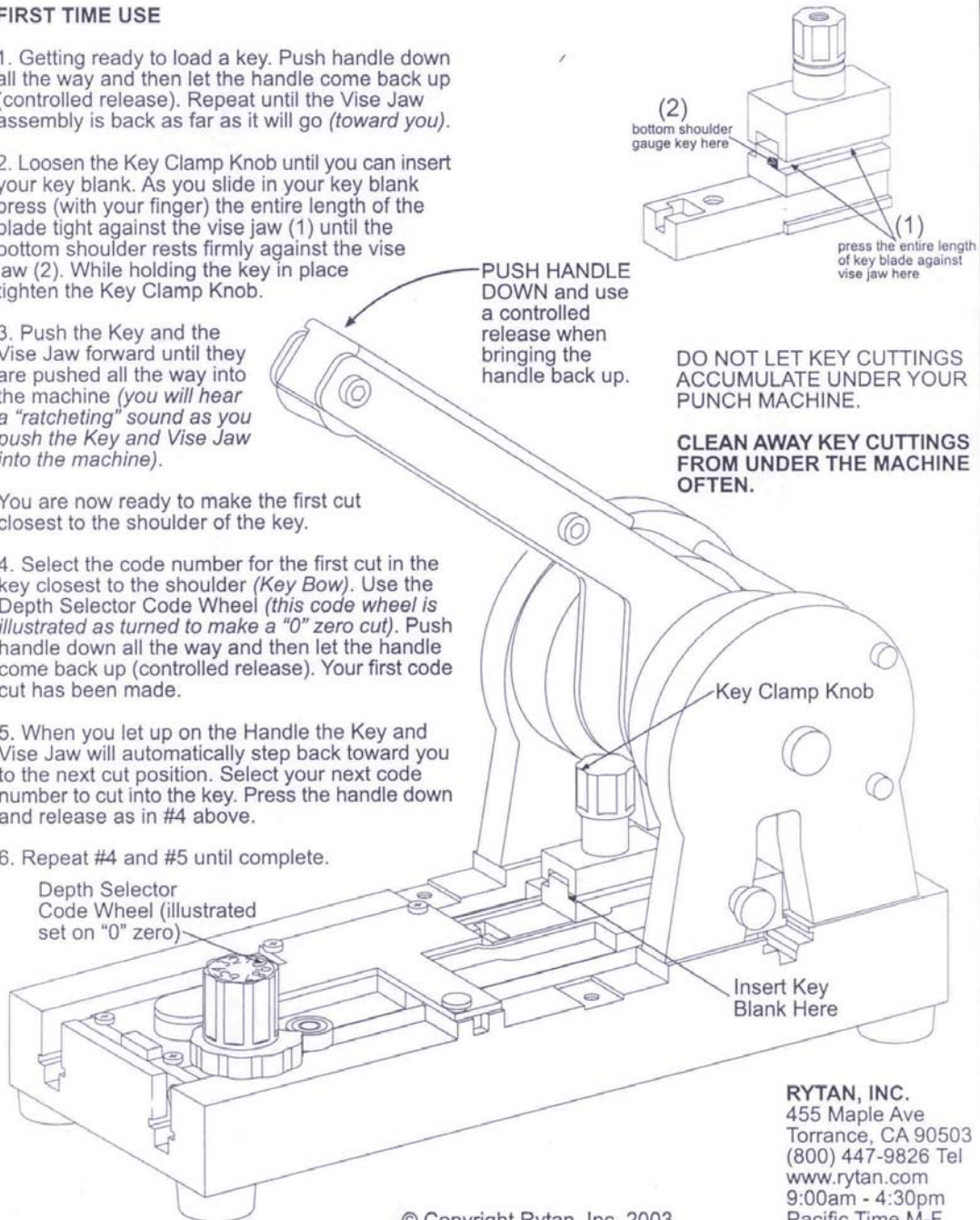
You are now ready to make the first cut closest to the shoulder of the key.

4. Select the code number for the first cut in the key closest to the shoulder (*Key Bow*). Use the Depth Selector Code Wheel (*this code wheel is illustrated as turned to make a "0" zero cut*). Push handle down all the way and then let the handle come back up (controlled release). Your first code cut has been made.

5. When you let up on the Handle the Key and Vise Jaw will automatically step back toward you to the next cut position. Select your next code number to cut into the key. Press the handle down and release as in #4 above.

6. Repeat #4 and #5 until complete.

Depth Selector Code Wheel (illustrated set on "0" zero)



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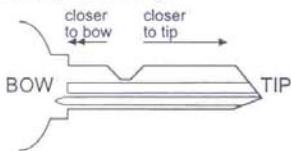
RY2000 EXTREME MACHINES SPACE ADJUSTMENT & DEPTH ADJUSTMENT

Rytan
INCORPORATED

SPACE ADJUSTMENT

Turning the 3/32" Allen Wrench in the Double Arrow direction (see illustration below) will make your key cuts closer to the Bow of the Key.

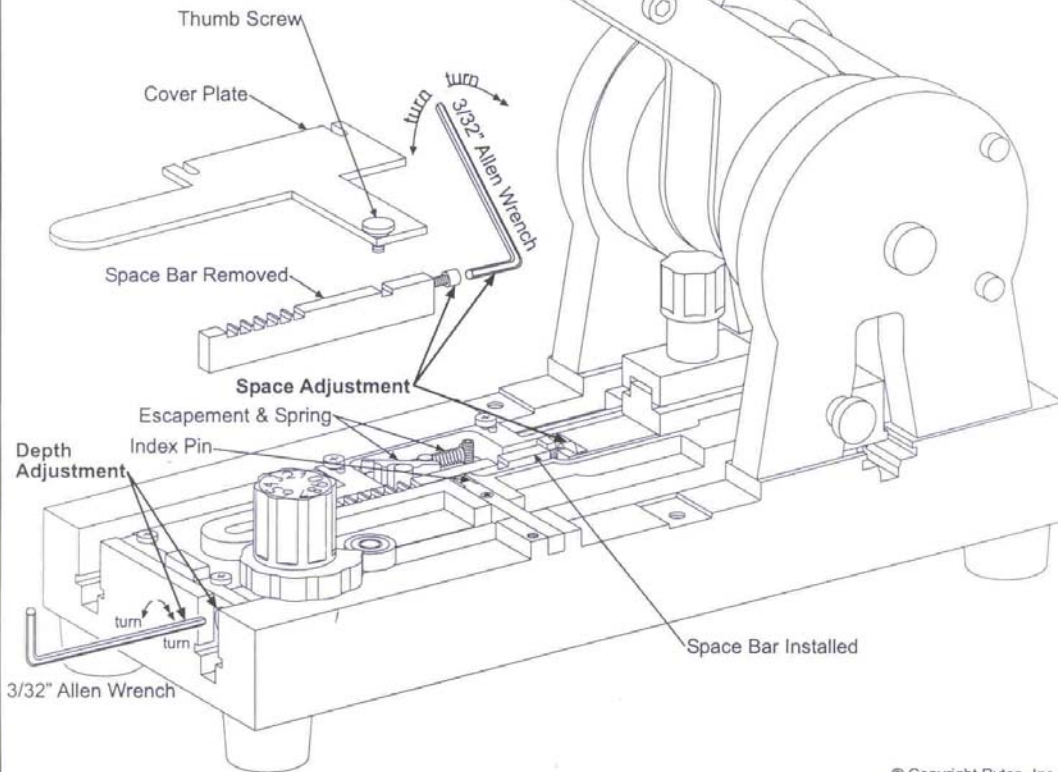
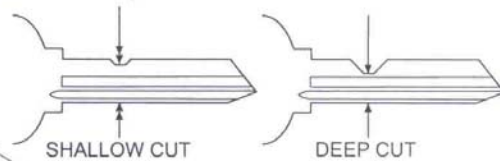
Turning the 3/32" Allen Wrench in the Single Arrow direction (see illustration below) will make your key cuts closer to the Tip of the Key.



DEPTH ADJUSTMENT

Turning the 3/32" Allen Wrench in the Double Arrow direction (see illustration below-left) will make your depth of cuts SHALLOWER.

Turning the 3/32" Allen Wrench in the Single Arrow direction (see illustration below-right) will make your depth of cuts DEEPER.



RY2000 EXTREME CODE PUNCH MACHINE QUICK KIT COMPONENTS



RY2000 Code Punch Machine	Depth Selector Assembly	Space Bar Assembly	Punch & Die Assembly	Depth Driver RH or LH	Tip Stop Assembly	Top Shoulder Stop Assembly
RY2000 ARW Arrow	RY5070DS	RY4070SB	RY6090PD	RY2026LH		RY2075TSS
RY2000 CO70 Corbin	RY5073DS	RY4073SB	RY6078PD	RY2026RH		RY2075TSS
RY2000 DEX Dexter	RY5074DS	RY4074SB	RY6090PD	RY2026LH		
RY2000 A2 I-Core	RY5076DS	RY4078SB	RY6078PD	RY2026LH	RY2015TS	
RY2000 KW Kwikset	RY5079DS	RY4079SB	RY6079PD	RY2026LH		
RY2000 SCH Schlage Classic and Everest	RY5090DS	RY4090SB	RY6090PD	RY2026RH		
RY2000 SCR Schlage Reverse	RY5090DS	RY4090SB	RY6090PD	RY2026LH		
RY2000 WEI Weiser	RY5094DS	RY4094SB	RY6079PD	RY2026LH		RY2075TSS
RY2000 WES Weslock	RY5095DS	RY4095SB	RY6079PD	RY2026LH		RY2075TSS

How to use this chart:

To determine what you need to purchase:

First circle the machine(s) you have and then pick the machine you want to convert to. Pick only the parts you need.

For example:

You own a RY2000 SCH Schlage Classic and Everest machine and you want to convert to RY2000 ARW (Arrow).

RY2000 SCH (Schlage has): RY2000 ARW (Arrow needs):

RY5090DS	RY5070DS
RY4090SB	RY4070SB
RY6090PD	RY6090PD
RY2026RH	RY2026LH
	RY2075TSS

Reviewing the list indicates you need to buy a RY5070DS Depth Selector Assembly, a RY4070SB Space Bar Assembly, a RY2026LH Depth Driver Assembly and a RY2075TSS.

Note that you do not have to purchase another Punch and Die Assembly **RY6090PD**.

Call for Price

Depth Selector Assembly. Dial with dedicated Depth Adjustment and hardware.



Call for Price

Space Bar Assembly with dedicated Space Adjustment and hardware. Quick-Kit Space Bars index from Bow-to-Tip.



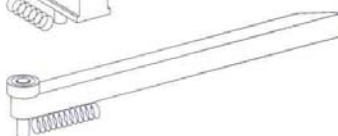
Call for Price

Punch and Die Assembly with hardware.



Call for Price

Depth Driver Assembly RH or LH with hardware.



Call for Price

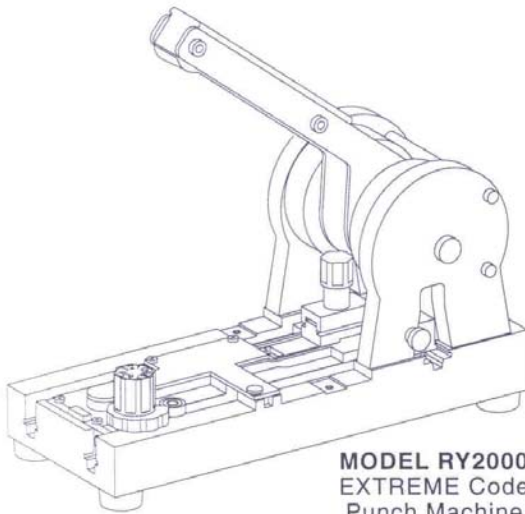
Tip Stop with hardware.



Call for Price

Top Shoulder Stop with hardware.





MODEL RY2000
EXTREME Code
Punch Machine

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

WARRANTIES

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

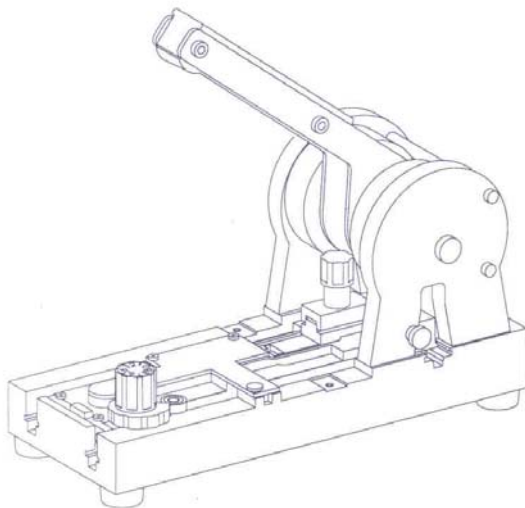
RYTAN, INC. MODEL RY2000 KEY MACHINES ARE WARRANTED TO BE FREE FROM MANUFACTURING DEFECTS FOR ONE YEAR FROM DATE OF PURCHASE. DURING THE FIRST YEAR DEFECTIVE PARTS WILL BE REPLACED WITHOUT CHARGE FOR PARTS OR LABOR. MACHINES MUST BE RETURNED TO THE RYTAN, INC. FACTORY FOR ALL WARRANTY WORK. THIS WARRANTY IS NOT APPLICABLE TO THE CUTTER WHEEL OR TO MACHINES WHICH HAVE BEEN ALTERED OR REPAIRED BY UNAUTHORIZED SOURCES, OR HAVE BEEN SUBJECT TO NEGLECT, 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 THE 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 CUSTOMER'S RESPONSIBILITY.

RY2000 EXTREME PUNCH MACHINE



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

SHIP TO:

Rytan
INCORPORATED

455 Maple Avenue
Torrance, CA 90503

(800) 447-9826 Toll Free

(310) 212-6002 fax

www.rytan.com

E-mail:

customer_service@rytan.com

CUSTOMER INFORMATION

Rytan, Inc. provides the following information on warranty and service for the RY2000 EXTREME Punch Machine:

Warranty Registration

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 and Handling Charges

Payment of all shipping and handling charges 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.

YOU MAY CALL US TOLL FREE

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OR YOU MAY FIND US ON THE WEB AT

www.rytan.com

and E-mail us at

customer_service@rytan.com

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 will 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 is serviced out of warranty the evaluation fee will be applied to parts and labor costs 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 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 by the customer. We must have your authorization before we will begin evaluating your key machine and you must be aware of the costs involved before we proceed.

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

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