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Preface

This machine was thoroughly checked out and run at the factory. Before uncrating it, check thoroughly to insure that it has not been damaged in shipping. If the crate has been broken in any way, do not uncrate the machine, but call the trucking company and report the damage.

Although this machine was adjusted perfectly and very carefully crated before shipping, there is the remote possibility that some items may have been shaken out of adjustment during its trip to you. We therefore suggest that you check certain items before carving with it.

The following pictures of K-Star Carvers with the parts numbered and named have been included in this brochure to assist you in following checkout and operating instructions. We suggest that you keep this manual with the machine for future reference when ordering replacement parts, doing maintenance work, or making adjustments.
Section I
Machine Installation and Checkout

UNIT 1  Uncrating

After examining the crate for shipping damages and assuring yourself that none is evident, uncrate the machine.

UNIT 2  Spindle Arm Accuracy Check and Adjustment for K-Star Models

Step 1:  Place 1/4" diameter set up pins in all spindle chucks loosely and a 1/4" diameter stylus in the stylus holder.

Step 2:  Move the cutter carriage so the set up pins and stylus are directly over the top of the front beam with each pin centered over its front center turning spindle.

Step 3:  Adjust and tighten all set up pins and the stylus so that each touches the top of the front beam.

Step 4:  Swing the cutter and stylus arms 5" to the left and check to see if all the set up pins and the stylus still touch the top of the front beam. If they are all no farther than .006" (two thicknesses of notebook paper), that should be okay. If any pin or the stylus is more than .006" from the top of the beam, its arm needs adjustment per Step 5, because it is not swinging in a perfectly horizontal plane.

NOTE: If only one pin or the stylus touches the beam and all of the others are approximately an equal distance away, the one that is touching is off and should be adjusted per step 5.

Step 5:  If all the set up pins and the stylus are not within a minimum of .006" from the top of the beam when 5" to the left and to the right, loosen all of the movable pivot bearing plates (See Figure 3), (One plate for each arm) and then hold the set up pins and stylus tightly against the top of the front beam while swinging it again from 5" right to 5" left. Be sure that the pins and stylus are in contact with the top of the beam at all times while you are wringing them from right to left. Often this procedure will shift the loose pivot bearing plates into proper position and they can be tightened.

(Figure 3) Adjustable Pivot Bearing Plate
Step 6: If Step 5 doesn’t work, loosen the movable pivot bearing plate that is on the end that swings high and tap it towards the low end. Move the bearing plate and keep checking until the set up pins all stay close enough to the beams throughout a full left to right swing. Then tighten all pivot bearing plates.

UNIT 3 Lining the cutter carriage assembly up with the front beam

The cables wrapped around the carriage wheels on all K-Star Carvers are there to keep the cutter carriage assembly parallel to the front beam at any position of the carriage. If either of these two cables should get loose or out of adjustment, the cutter carriage would get out of line with the front beam. This lining up procedure is the same for all carving machines that have cables. Make sure all set screws in wheels are tight before starting this procedure.

Step 1: Insert 1/4" set up pins in all spindles and a 1/4" stylus in the stylus holder.

Step 2: With decks off the machine, pull the cutter carriage assembly forwards toward the front beam until at least one pin or the stylus touches the back inside edge of the front beam. If all the pins and the stylus are touching or within 1/32" from touching, the alignment is okay. If the stylus or any pin is farther than 1/32" away, proceed to step 3.

Step 3: Loosen the rear cable adjustment bolt on the side of the machine where the set up pin(s) are too far from the beam.

Step 4: Tighten the front cable adjustment bolt on the same side of the machine until the set up pin(s) touch the front beam.

Step 5: Retighten the rear cable adjustment bolt so that cable is tight and check to see if the set up pins are still up against the front beam. If they are, lock the cable adjustment bolts. If not, re-adjust the cable per steps 3, 4 and 5.

UNIT 4 Checking and Adjusting Pivot Points

K-Star Carvers have four pivot point bolts and nuts on the carriage arm. Two are screwed into the carriage tube bracket pivot bearings and the other two are screwed into the cutter bar pivot bearings. (See Figure 3 and Figure 4).

![Figure 4](Figure 4) K-Star pivot arm with pivot adjusting points
If any pivot points come loose, proceed as follows:

**Step 1:** Check to see if any of the pivot bolt lock nuts are loose.

**Step 2:** If loose lock nuts are found, tighten their pivot bolts until the looseness disappears and lock the nut. Do not touch the pivot bolts whose lock nuts are tight.

**Step 3:** If an opposed pair of pivot bolts (one directly above the other on the same arm) have loose lock nuts, tighten each pivot equally until the looseness disappears and then lock the nuts. Also if an opposed pair of pivot bolts have tight lock nuts but the points are loose, loosen both lock nuts and adjust each pivot bolt an equal amount until the looseness disappears then tighten the lock nuts.
UNIT 5  Wiring and Motor Rotation Check

Step 1:  Power Supply and Wiring

Be sure you have the proper 120 volt 60 cycle electrical supply for your K-Star machine. A cord with a grounded plug is supplied with a machine and the RECEPTACLE MUST BE GROUNDED.

Step 2:  Spindle Rotation

Do not install cutters in the chucks before the run in check. Plug cord into receptacle and then start and stop the motor to observe spindle rotation. As you face the carver, the left hand spindle should rotate counter clockwise (left hand) and the right hand spindle should rotate clockwise (right hand). Motor rotation is checked at the factory so there should be no problem. If the wrong rotation is found, a simple motor wiring change is required to reverse the rotation. Contact your dealer or have an experienced electrician change the rotation.

UNIT 6  Run In Testing and Adjustments

Step 1:  Motor Run In

After proper motor rotation has been proven, turn on the motor and let it run for about 10 minutes. If the motor and spindles run quietly and there is no noise from the belt slapping or rubbing on the cover, proceed to Unit 7.

Step 2:  Belt Adjustments

If the belt is noisy, remove the four screws that hold the belt cover on and remove the belt cover. With the cover off, turn on the motor and observe whether the belt is vibrating while running or is not tracking on the pulleys. (The belt should not overhang any of the pulleys or rub on the bottom of the housing.) If the belt is loose, adjust the idler pulley (KS-82) (Unit 20) to tighten the belt and then run the motor again to see if the belt runs without vibrating. If the belt still vibrates, re-adjusting as above until belt runs smoothly.

If the belt does not track properly on the pulleys, stop the motor, loosen the upper strap that holds the motor (KS-75) (Unit 20) and tilt the motor slightly one way or the other and run the motor again to observe belt tracking. Continue adjusting as above until belt tracks properly. Replace belt cover and proceed to Step 3.

Step 3:  Tilt Adjustment

Normally, the motor and spindle assembly tilting feature should be set tight so that the unit will not tilt until loosened. To loosen the tilting motion, loosen the front hex head screws (PN 00-1363) (Unit 23) on the two bearing housings (KS-6A). Tilt unit to desired position and tighten the two screws.
Section II
Safety

Before anyone starts to carve with a carving machine, he must be fully prepared and equipped to operate the carving machine and accessories in a manner that will prevent any injury to himself or any helper or any onlookers. These precautions are an absolute must (mandatory) if one want to eliminate any possibility of injury to himself or others. Strict rules for safety are as follow:

UNIT 7  Check Out Your Carving Machine

1. Be sure that it is level and cannot wobble or move around.

2. Be sure there are no loose joints, bearings, belts, bolts or screws.

3. Be sure that all electrical wiring and switches are properly grounded and insulated and comply with applicable electrical codes.

4. Be sure that all pivot bearings are suitably lubricated and that there are no puddles of grease on the floor or on the machine.

5. Be sure that no loose boards, wrenches, or clamps are laying on the machine or on the floor near it.

6. Be sure that the machine’s spindle nuts are not all chewed up or cracked so that they cannot be properly tightened.

7. Be sure that the machine’s motors are clean and tightly fastened to their mounts (bases).

8. Be sure that all gear guards and belt guards are on the machine in their proper places and that they are tightly fastened.

9. Be sure cutter guard is in place.

UNIT 8  Check Cutter and Stylus Installation

1. Be sure all cutters are tightly fastened into their chucks.

2. Be sure that the stylus is tight and cannot slip upwards in its chuck so that the cutters dig in and possibly break in addition to possibly ruining the work.

3. Check that the cutter spindles cannot wobble from side to side.

4. Be sure that left hand cutters are installed in each left hand spindle and right hand cutters are installed in each right hand spindle.

5. Be sure that cutters are not cracked or dull.
Unit 9  Noise Protection and Prevention

Carving machines are inherently noisy because of their high spindle speeds. Even when running empty, each cutter spindle will produce a relatively high-pitched hum. Therefore, the more spindles a carving machine has, the noisier it will be. Usually, the noise a carving machine makes when running empty or cutting lightly with sharp cutters will be well within limits that are considered safe for the machine operator’s ear drums. On the other hand, dangerously high noise levels are often generated when making heavy cuts or when the cutters are dull. This noise can be minimized several different ways:

1. First of all, when carving, do not hog too much of the wood, as this will cause more noise and will be hard on the machine.

2. Keeping the cutters sharp will also minimize the noise a carving machine will make. When the cutters are dull or have been poorly sharpened, the noise they make will be louder and very often higher pitched.

3. THE CARVING MACHINE OPERATOR MUST WEAR EAR PROTECTORS AT ALL TIMES WHILE OPERATING ANY CARVING MACHINE!

4. Owners of older carving machines should provide ear protection for the machine operator(s). (TERRCO Carver Division sells ear protectors or they may be obtained elsewhere.) (Figure 5).

UNIT 10 Dust Protection and Prevention

Figure 6

Wear a dust mask when the wood being carved causes dust!

Many types of wood give off quantities of dust when they are machine carved. Inhalation of this dust over a long period of time could cause health problems for carving machine operators. (Figure 6).

UNIT 11 Eye Protection

Figure 7

WEAR SAFETY GLASSES AND/OR A FACE SHIELD WHEN OPERATING ANY CARVING MACHINE!

Eye protection is needed when using any carving machine. Dust and chips may fly from the machine; therefore, the operator and anyone nearby should have eye protection. (Figure 7).
Unit 12  Lighting

The carving machine area should have plenty of light so the operator can easily see any defects when he is checking the machine for safe operation and he can easily observe the progress of his work.

The carving machine operator usually watches the carving station closest to his tracing station, so that carving station should be especially well-lighted. Also it is a good idea to provide the operator with a small paint brush to use for brushing off the carving at that station rather than have the operator use his hand to brush it off and possibly get his hand too close to the rotating cutter.

Unit 13  Operating Safety Rules

1. Be sure all work blanks and the pattern are securely fastened on the decks or securely mounted between the centers. (If a work blank comes loose while it is being carved, it could fly out of the machine and possibly hit someone.)

2. Before starting the machine, put on your safety goggles, ear protection and dust mask.

3. After starting the machine, NEVER PUT YOUR HAND NEAR THE ROTATING CUTTERS AND NEVER ALLOW ANY OTHER PERSON TO BE NEAR THEM.
UNIT 14 GENERAL INFORMATION

Proper and regular maintenance is necessary if carving machines are to be kept in their best working condition. First of all, carving machines produce a great deal of chips and dust, and although most of the machines' parts are covered, it is possible for dust to get inside the machine. In order to avoid any trouble with the dust, it is best to have some form of dust and chip removal. Removal of dust and chips will not only help to keep the machine in working order, but will also prevent any work hazard that may be caused by having dust and chips on the floor.

The best equipment for removing dust and chips is some type of vacuum cleaner or vacuum system. Conventional dry type shop vacuum cleaners are suitable for periodically cleaning the K-Star carvers.

TERRCO carving machines are designed and built for long life with a minimum of maintenance and repair. Sealed bearings are used whenever practical and all structural parts are designed for a lifetime of use. We know of numerous carving machines that are still in daily use after 60 or more years. On the other hand, these machines would not have lasted to long if they had not received the minimum amount of daily care and maintenance that they require. (Carriage wheels and rails are damaged because dirt and dust were left on the rails over a long period of time. Pivot bearings are ruined because they were not greased at least once every three months or they were never cleaned.)

Because we know that maintenance costs money and humans forget, we have applied improvements in materials and components into the design and construction of the TERRCO carvers now being built. All these improvements are built into TERRCO carvers to increase their life, improve performance and reduce maintenance. Sealed bearings are used throughout the machines and all gears, worms, and shafts are designed and protected so that only a three (3) month cleaning and greasing is required. Also, TERRCO ultra-modern machining facilities have allowed them to machine beams and cutter bars to accuracies that eliminate the need for movable spindle housings that frequently get out of adjustment. The total misalignment tolerance between the cutter bar spindle centers and the front and rear center turning centers is held to plus or minus .005" (the thickness of two human hairs), and this accuracy is built in so no adjustments need to be made during the life of the machine.

Unit 15 Regular Maintenance Instructions

1. Cleaning

Clean your carving machine daily, preferable with a suitable vacuum pick up system. Be especially careful to clean the tops of the carriage rails.

2. Lubrication

The K-Star requires lubrication of the pivot bearings once very three (3) months.
Unit 16  Sharp Cutters

The one most important item affecting carving machine maintenance is sharp cutters. Dull cutters cause sluggish operation, machine vibration and wear, and unnecessary extra effort by the machine operator. One should never install dull cutters in his carving machine and he should not continue running it after the cutters become dull.

Unit 17  Checks While Running

1. Listen

When carving with your K-Star Carver, always listen for any unusual noises that might indicate a dull or loose cutter, loose work blank, etc.

2. Look

You should also look to see that no cutters are smoking (dull cutter or right hand in left hand spindle) and to observe that the cutters are doing equal amounts of work on each work blank, etc.

3. Feel

While operating your carving machine, always feel for any unusually jerky, bumpy or unusually difficult operation. Dirty carriage rails or lack of grease can cause such operating problems.

Unit 18  Back Beam Adjustment

The back beam on K-Star carvers are clamped to the side frames of the machine. To change the position of the back beams in relation to the front beams, just loosen the back beam clamps and slide the beam forward or backward as desired. Before tightening the clamps, be sure that the back beam is parallel to the front beam and then tighten the clamps. With the back beam cup centers fully retracted, the back beam should be set approximately 1” farther from the front spur head than the maximum length of the work blanks you plan to use.