

Vision 16 Series and 24 Series Engraver User Manual

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1 Introduction

About This Manual

This manual is designed to provide you with information about your Vision Engraver or Router. Beginning with machine descriptions and continuing through installation and maintenance, this manual does not attempt to teach the user how to become an expert in engraving, computer usage, or engraving software usage. Some previous knowledge of engraving terms and the engraving process is certainly beneficial. **For information about operation and usage, refer to the Series 4 Controller User Manual. For information on the Vision Engraving Software, see the Vision Engraving Software manual.** For more information on your individual computer system, see your computer's user manual or contact your computer distributor.

1.1 Disclaimer and Warranty Information

Limits of Liability / Disclaimer of Warranty

The information contained within this manual has been carefully checked and is believed to be accurate, however, Vision makes no representations or warranties for this manual, and assumes no responsibility for inaccuracies, errors, or omissions that may be contained within this manual. In no event shall Vision be liable for any loss of profit including (but not limited to) direct, indirect, special, incidental, consequential, or other damages resulting from any defect or omission in this manual, even if previously advised of the possibility of such damages.

In the interest of continued product development, Vision reserves the right to make improvements to this manual and the products it describes at any time, without notice or obligation.

Limited Warranty:

Vision Computerized Engraving and Routing Systems (and Retrofit Tables)

Vision Computerized Engraving and Routing Systems (Vision) warrants that for a period of two (2) years from the date of shipment to the original purchaser of either a Series 4 Controller, Phoenix, Vision or Table Retrofit (the System), that the System will be free from defects in material and workmanship under normal use and service. Upon written notification, we will transfer the remaining warranty to a new customer. *This warranty shall cover all elements except for items covered by separate manufacturer's warranties and consumable items.* "Consumable" items include, but shall not be limited to, belts, brushes, lubricants, and cutters furnished with the System, for which no warranty is provided.

In the event a defect is discovered during the warranty period, within thirty days of discovery, but no later than the last day of the warranty period as described above, the user shall contact Vision for instructions regarding disposition of the problem. Vision shall, at its option, either (1) repair the affected product with new or refurbished parts, or (2) provide a replacement. Any incidental costs, including the cost of shipment from the user's location to the point of repair and return, and any installation performed by the user, shall be at the expense of the user.

This warranty covers normal use only and shall be void in the event that the System is altered or modified without authorization by Vision, or is subject to abuse, neglect, or other misuse by the user.

The warranties for Third-Party Hardware and Third-Party Software shall run directly from the manufacturers of such hardware and software to the user. Vision makes no warranties, expressed or implied, with regard to Third-Party Hardware or Third-Party Software.

Vision does not warrant any product, component, or part not manufactured by Vision that was not supplied by Vision. (Third-party items, including but not limited to software, are subject to their own manufacturer's warranties.) Vision does not warrant defects caused by a failure to provide a suitable environment for the system, by unauthorized attachments, by modifications or repairs other than by Vision, by use of the System for other than its original intention, or by other misuse or abuse of the System.

Extended Warranty

An Extended Warranty may be purchased which extends the terms of the original equipment Warranty in 1 year increments for a period of up to 30 days after the original equipment Warranty expires. An Extended Warranty may also be purchased for a period of up to 30 days after an existing Extended Warranty expires. Extended Warranties cannot be purchased on any equipment that is 7 or more years old, or if there is a Lapse of Warranty. Age of equipment is determined from the date of shipment to the original buyer.

Lapse of Warranty

If an Extended Warranty is not purchased within 30 days of the expiration of the original equipment Warranty, or within 30 days of the expiration of an existing Extended Warranty, the equipment will be in Lapse of Warranty. An Extended Warranty can never again be purchased for any equipment that is in Lapse of Warranty. It is the responsibility of the purchaser of the equipment to maintain accurate records and to know the expiration date of any Warranty.

The above and foregoing is the only warranty of any kind, either expressed or implied, by statute or otherwise, regarding the System, its fitness, quality, merchantability, or otherwise. Any warranties implied by law are hereby expressly disclaimed. No oral or written information or advice given by Vision, its Dealers, Distributors, Agents, or Employees shall create a warranty or in any way increase the scope of this warranty. Neither Vision, nor anyone else who has been involved in the creation, production, or delivery of the System shall be liable for any direct, indirect, consequential, or incidental damages (including damages for loss of business profits, business interruption, loss of business information, and the like) arising out of the use of, or inability to use, the product.

Any software supplied by Vision in conjunction with the purchase of the System for use therewith shall be governed by its own separate software license and warranty agreement.

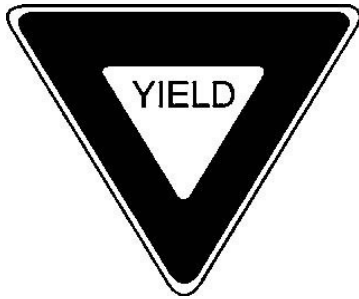
Terms and Conditions are subject to change

For Warranty Service Call: (602) 439-0700

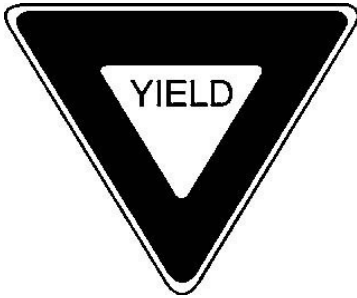
Please have your machine serial number ready before calling.

Vision Engraving & Routing Systems is owned and operated by Western Engraver's Supply, Inc.
Phoenix, Arizona, USA

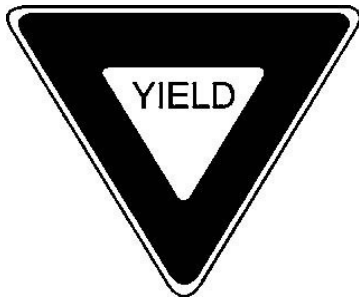
1.2 Safety



- ***WARNING: Do not attempt to operate this equipment until you have read thoroughly and understood completely the instructions contained in this User's Guide! Failure to comply may result in damage to the equipment and/or inflict serious personal injury!***
- Only trained personnel should operate the Vision Engraver or Router. All individuals operating this system should have read and understand this complete User's Guide.
- Use of this equipment by unauthorized or untrained personnel may result in damage to the equipment and/or inflict serious personal injuries.
- Never use this machine in a hazardous environment. Do not store or use this machine outdoors. Do not run this machine in an extremely hot environment.
- Place the equipment in a location with low humidity and a minimum of dust. Avoid placing the equipment in direct sunlight or in locations with excessive heat.
- Do not expose the equipment to rain or use it near water. You can clean the controller with a damp cloth, but be sure to unplug the unit first.
- Follow the maintenance instructions for proper cleaning of the controller air filter.
- There are no user serviceable parts inside the controller. Please contact qualified service personnel for service issues.
- Openings are provided in the controller box for ventilation. Do not cover the openings or place the controller in an environment where the openings may become blocked.
- Never insert anything into the ventilation openings. Doing so may create a danger of electric shock.
- Always stop the machine before making any adjustments.
- Keep hands clear of the bottom of the spindle during operation.
- Do not operate the equipment with the covers removed.
- Use extreme caution when inserting or removing cutters.
- Before any servicing, disconnect the power cord.



- To avoid electric shock or equipment damage, connect the power to this machine according to the suggestions in this guide and in compliance with all applicable regulations. Make sure the machine is properly grounded.
- Never operate the equipment with damaged or frayed power cords, loose connections, or exposed extension cords where the cord could create a tripping hazard.
- Be sure to hold the plug, not the cord, when disconnecting the equipment from an electrical socket or power source.
- Keep work area clean. Remove adjustment tools from the machine prior to start-up. Keep workbench clean. Cluttered work areas can increase the potential for an accident.
- Safety Glasses should be worn at all times while machine is running. While machine is running, chips or other debris may become airborne.
- Avoid loose clothing, neckties, gloves, rings, bracelets, or jewelry which may get caught in moving parts.
- If your equipment does not operate properly; in particular, if there are any unusual sounds or smells coming from it, immediately unplug it and contact a service technician or your local distributor.
- Unplug the machine when it is going to be left unused for an extended period of time.
- Operators should inspect the machine daily for damage. Under no circumstances should the machine be operated if there is any doubt about the machine's condition. If there are any questions call the Vision Engraving Systems technical support team at 602-439-0600.
- Keep a safe distance away from machine while its running.
- Keep children away from work area at all times. Visitors should be at least 3 feet or more away from working area.
- Do not operate this or any machine while under the influence of drugs or alcohol.
- Keep hands away from the spindle at all times when spindle is rotating and/or machine is moving. Always wait for spindle to stop rotating completely before attempting to insert or change a tool. Do not try to stop the spindle manually with your hands or other devices. Failure to comply with these instructions may result in serious personal injury!
- Never leave the machine running unattended.



- Press any Emergency Stop switch to stop the machine immediately.
- Be familiar with the location of all emergency stop switches. In the case of an emergency you can push the nearest one.
- Make sure workpiece is properly fastened to table before starting job.
- Turn on vacuum table or make sure clamps and other fixtures are tightly fastened. If workpiece moves during operation you can damage the machine, the workpiece, and serious personal injury may occur to the operator.
- Only use the machine and its attachments for the applications they were designed for. Forcing the machine or its attachments to do work it was not intended to do may cause permanent damage to the machine and serious injury may occur to the operator. If there are any questions about the abilities of your machine, please call the Vision Engraving Systems technical support team at 602-439-0600.
- Do not force the machine to work at excessive speeds. The machine will work safely under normal permissible speeds which are material and application dependent. Using excessive speeds may damage tooling, material, the machine, and may cause serious personal injury.
- Avoid powering on the machine when servicing the machine.
- Avoid powering on the machine when installing or replacing parts and/or accessories.
- Turn power to the machine OFF when not in use.
- Perform required maintenance at the recommended intervals.
- Use the general maintenance guidelines to properly maintain your machine.
- A disciplined approach to preventative maintenance can extend the useful life of any Router/ Engraver, improve cut quality, and reduce repair costs. Keep records of what and when you perform maintenance duties.

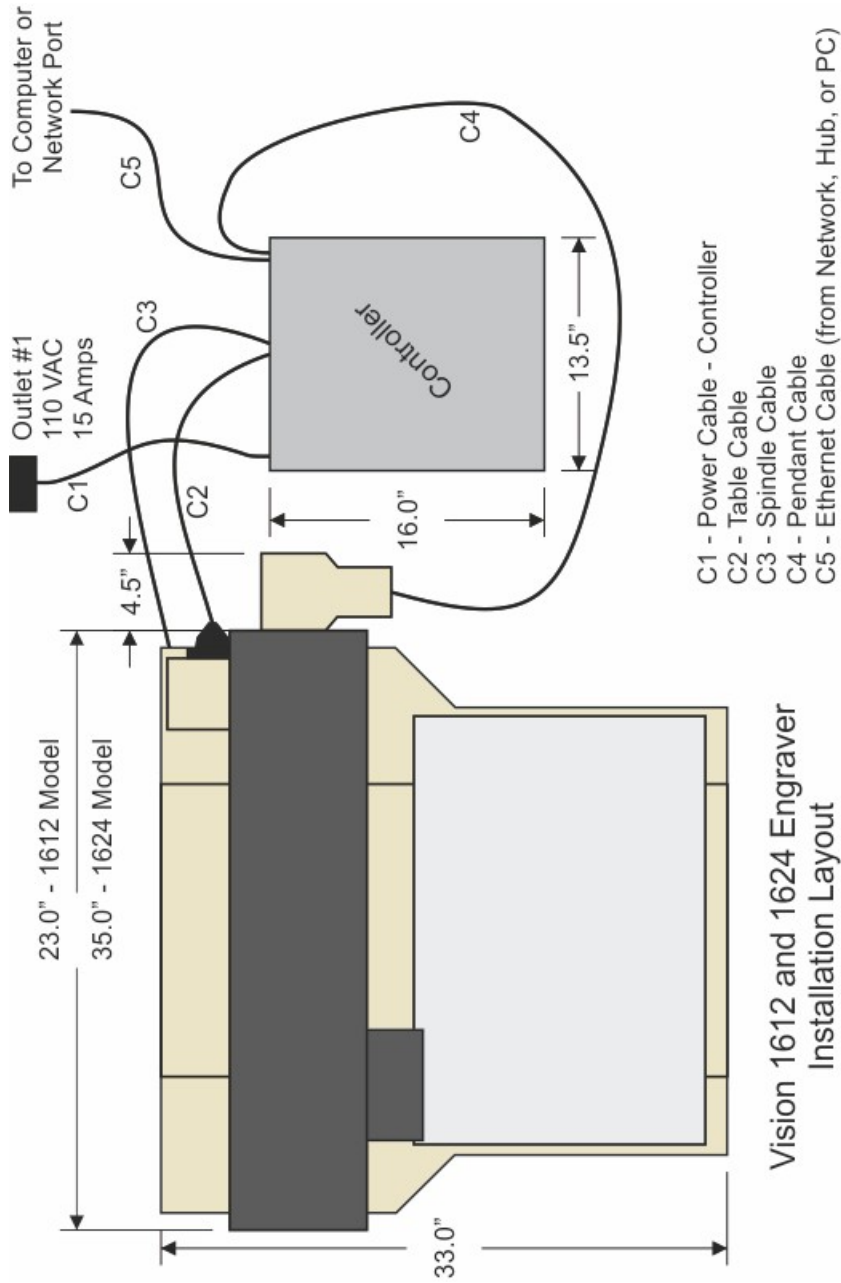
2 Locating the Engraver

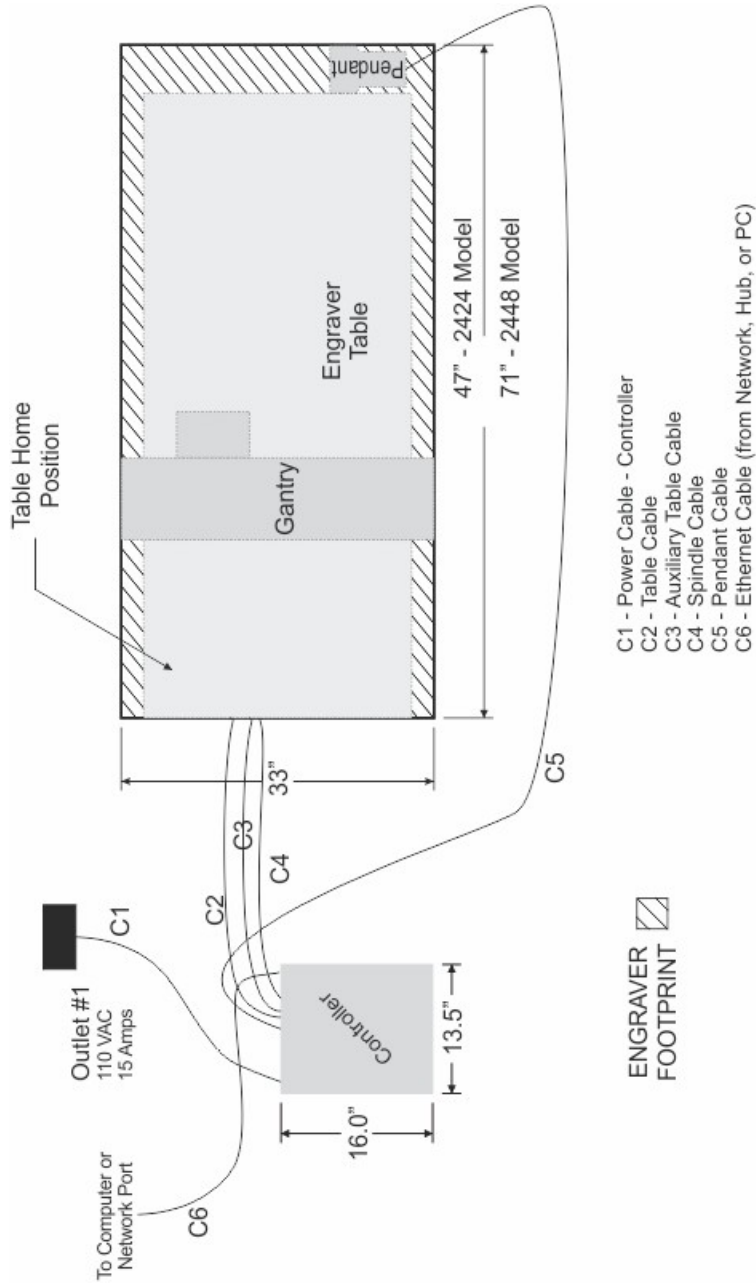
1. Locate all equipment indoors on a flat surface and on a solid foundation.
2. Temperature must remain between 40°F and 85°F.
3. Do not expose machine to direct sunlight, rain, vibration, dampness, or explosive environments.
4. Machine dimensions:
 - 1612 - 33" x 23" x 19", shipping weight = 300 lbs.
 - 1624 - 33" x 35" x 19", shipping weight = 320 lbs.
 - 2424 - 42" x 33" x 20", shipping weight = 371 lbs.
 - 2448 - 66" x 33" x 20", shipping weight = 520 lbs.

If you use our freight company, the equipment will be placed on the ground and a pallet jack or other device is necessary to move the crate into your facility.

5. The sides of the crate unscrew, but it will take four people to remove the engraver from the shipping crate.
6. A distance of at least 36" is recommended around all sides of the machine to ensure easy operating, material handling, cleaning, maintenance and safety.
7. Typically, the engraver is oriented as shown in the layout diagrams.
8. Cutters and sample materials must be available before the scheduled installation/machine orientation date.
9. If a chip extraction unit has not been purchased from Vision, it is highly recommended that one is available for the installation/machine orientation.
10. If you ordered the NSK High Frequency Spindle, a clean air source is required. The air requirement is 1 CFM @ 40 psi.

3 Installation Layout Diagrams





Vision 2424 and 2448 Engraver Installation Layout

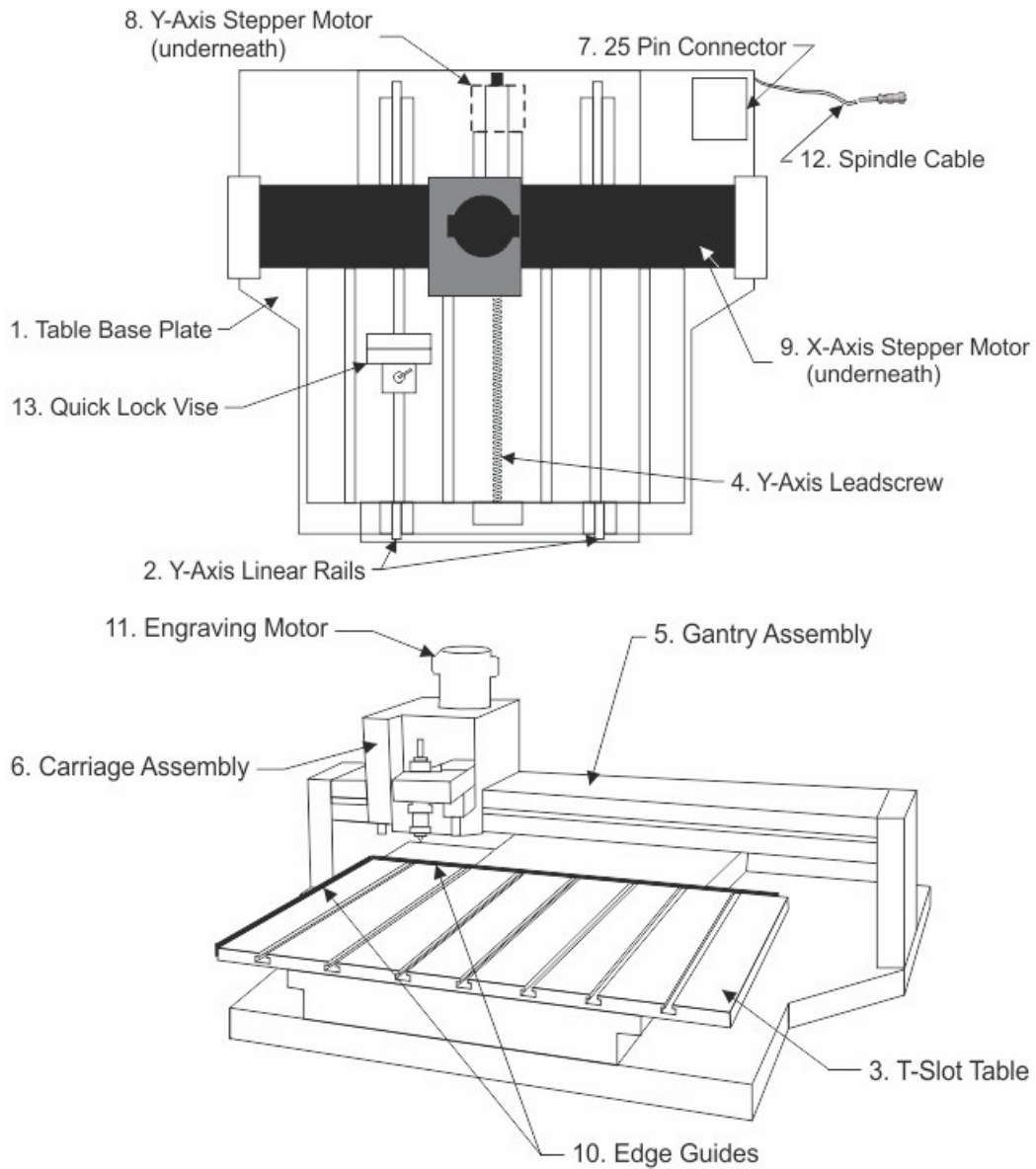
4 Table Descriptions

16 Series Engraver Descriptions

(Refer to the diagrams on the following page)

- 1. Table Base Plate.** This is the large flat plate upon which everything else is mounted. All mechanical alignments are referenced to this plate, so the space upon which you place the engraving table must be a reasonably level surface.
- 2. Y-Axis Linear Rails.** Mounted on the table base plate are stainless steel rails with sealed bearings, which allow the motion of the T-slot table in the Y-axis direction.
- 3. T-Slot Table.** Also referred to as the work surface, this aluminum bed supported by the linear rails allows placement of the engraving material or special clamps and fixtures. The slots in this table are shaped with an upside-down T, with the bottom of the T being a single-line slot across the top of the table. The slots are used to hold various accessory holders, clamps, and jigs. All t-slot accessories are available on at www.visionengravers.com
- 4. Y-Axis Lead Screw.** This is a threaded rod located underneath the T-slot table. Combined with the stepper motor, the lead screw is rotated and causes the T-slot table to move along the rails in the Y-axis direction. There is also a second lead screw called the X-axis lead screw. The X-axis lead screw is contained within the gantry, and can be accessed by removing the black sheet metal gantry cover. The X-axis lead screw is responsible for X-axis motion of the carriage assembly, moving it left and right across the gantry.
- 5. Gantry Assembly.** The gantry or “bridge” is a large, rectangular bar suspended across the width of the table in the X-axis. The carriage assembly is supported and rides on the gantry in the X-axis.
- 6. Carriage Assembly.** The carriage assembly houses the engraving spindle, Z-Axis mechanism and engraving motor. The carriage moves along the gantry assembly on a set of sealed bearing. The carriage assembly holds the engraving spindle; it raises and lowers the spindle during the engraving process using a lead screw and stepper motor.
- 7. 25 Pin Connector.** This connection port is used to connect the table to the system controller. The connector is located near the rear of the table and on top of the base plate.
- 8. Y-Axis Stepper Motor.** Drives the T-Slot table in the Y-Axis.
- 9. X-Axis Stepper Motor.** Drives the carriage in the X-Axis. Located under the protective cover.
- 10. Edge Guides.** Used as a back and side stop for locating material and clamps during set-up.
- 11. Engraving Motor.** The engraving motor or “spindle motor”, is the large black motor on the top of the carriage assembly. The engraving motor drives a belt and pulley system, which turns the engraving cutter during the engraving process.
- 12. Spindle Cable.** Connects to the system controller and provides power to the engraving motor.
- 13. Quick Lock Vise.** A “cam” type locking device that allows quick change of parts for engraving.

Typical 16 Series Engraver Diagrams

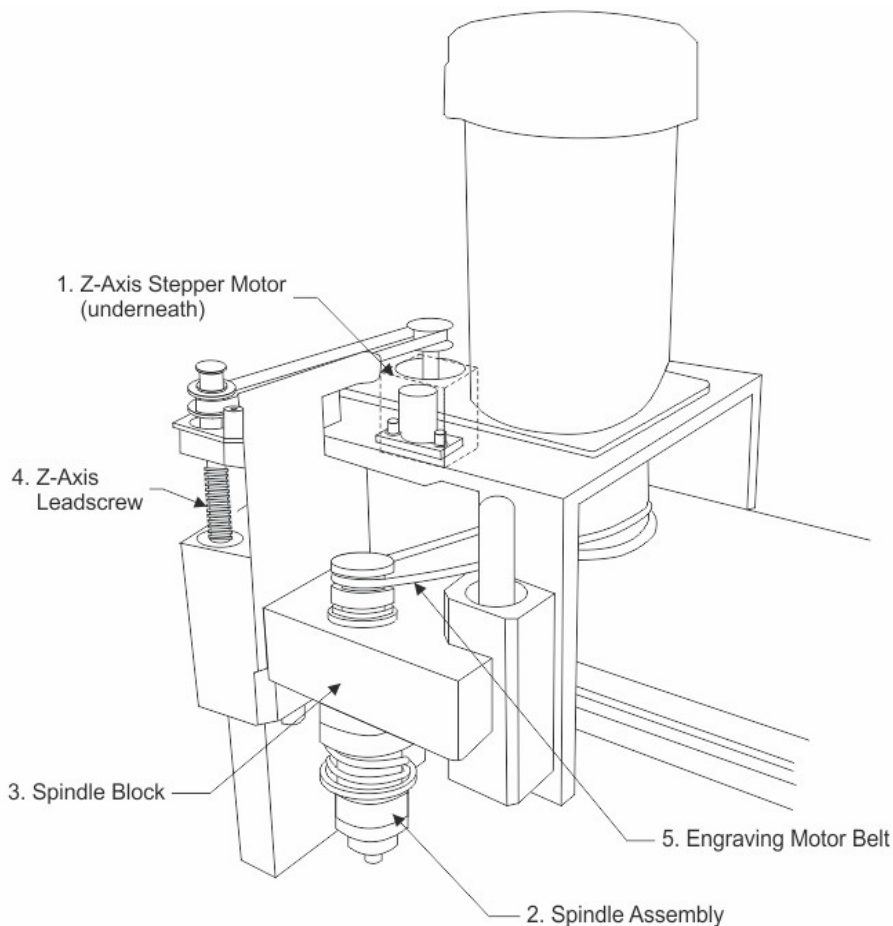


16 and 24 Series Engravers Carriage Descriptions

(Refer to the diagram below)

- 1. Z-Axis Stepper Motor.** The small motor under the carriage cover that provides the spindle up and down motion of the spindle during the engraving process.
- 2. Spindle Assembly.** The spindle mounted in its block; includes a pulley, housing, micrometer, retainer ring, nose cone and associated hardware. The spindle assembly moves up and down along a linear bearing, which attaches to the face of the carriage assembly.
- 3. Spindle Block.** Houses the spindle assembly.
- 4. Z-Axis Leadscrew.** The threaded screw which raises and lowers the spindle during the engraving process.
- 5. Engraving Motor Belt.** Drive belt connecting the engraving motor to the spindle pulley.

Typical 16 and 24 Series Carriage Diagram

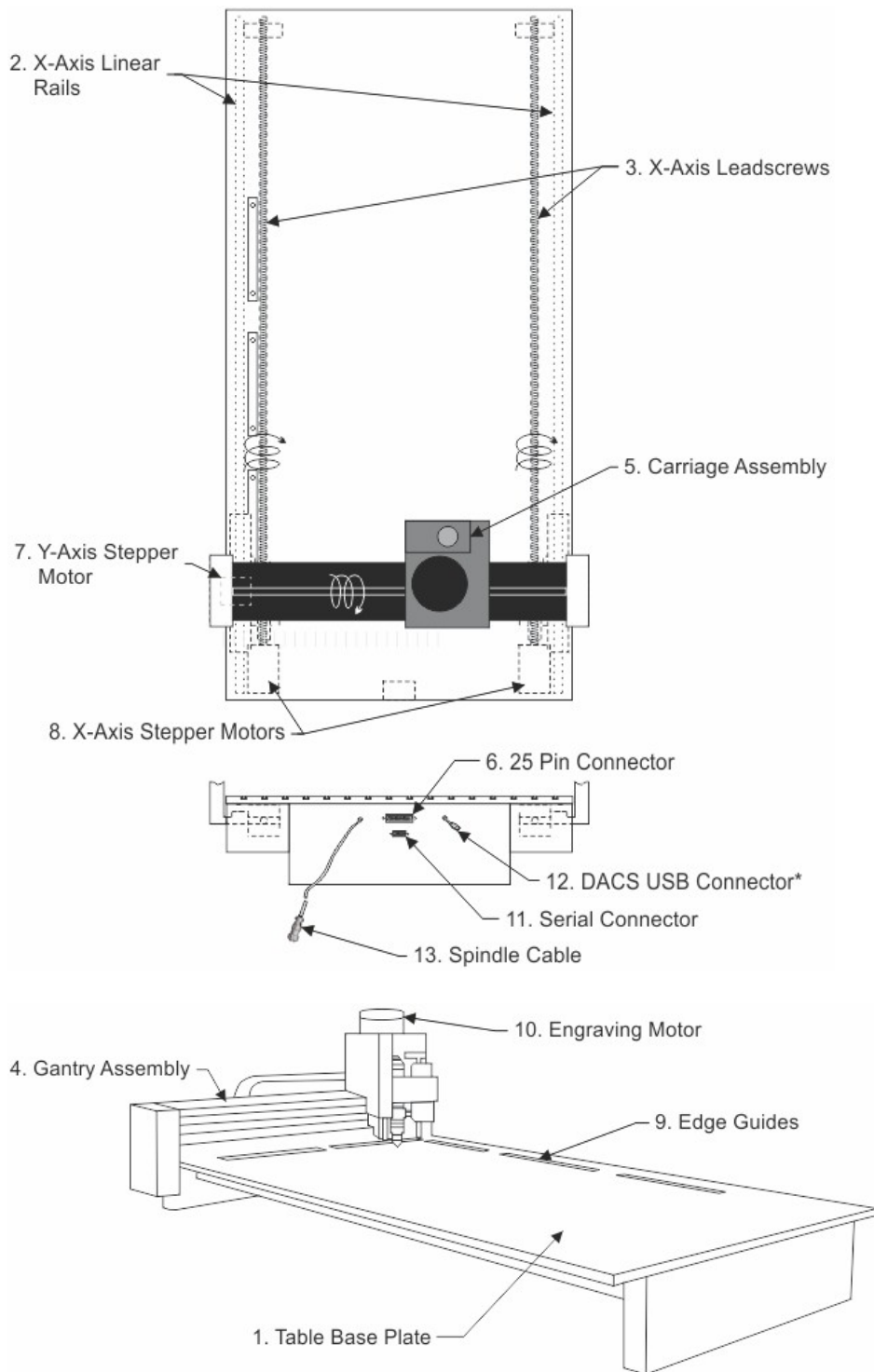


24 Series Engraver Descriptions

(Refer to the Diagrams on the following page)

- 1. Table Base Plate.** This is the large flat plate upon which everything else is mounted. All mechanical alignments are referenced to this plate, so the space upon which you place the engraving table must be a reasonably level surface.
Always carry the table by the base plate only. An optional t-slot table may be installed on the table base plate.
- 2. X-Axis Linear Rails.** Mounted under the table base plate are steel rails with sealed bearings, which allow the motion of the gantry in the X-axis direction.
- 3. X-Axis Leadscrews.** These are the threaded rods located underneath the table baseplate. Combined with the stepper motors, the leadscrews are rotated and cause the gantry to move along the rails in the X-axis direction. There is also a second leadscrew in the Y-axis of the machine. The Y-axis leadscrew is contained within the gantry and can be accessed by removing the black sheet metal gantry cover. The Y-axis leadscrew is responsible for motion of the carriage assembly, moving it back and forth across the gantry.
- 4. Gantry Assembly.** The gantry or “bridge” is a large, rectangular bar suspended across the width of the table. It travels down the table along the X-axis.
- 5. Carriage Assembly.** The carriage assembly houses the engraving spindle, the Z-axis mechanism and the engraving motor. The carriage moves along the gantry assembly on a set of sealed bearings in the Y-axis. The carriage assembly raises and lowers the engraving spindle during the engraving process using the Z-Axis leadscrew and stepper motor.
- 6. 25 Pin Connector.** This connector port is used to connect the table to the system controller.
- 7. Y-Axis Stepper Motor.** Drives the carriage in the Y-Axis.
- 8. X-Axis Stepper Motors.** Drives the gantry in the X-Axis.
- 9. Edge Guides.** Used as a back and side stop for accurately locating material and clamps during set-up.
- 10. Engraving Motor.** Drives the spindle for rotary engraving.
- 11. Serial Connector.** This connector port is used to connect the table to the controller.
- 12. DACS USB Connector.** This optional connector is used to connect the DACS Camera System to your computer.
- 13. Spindle Cable.** This cable connects to the system controller and provides power to the engraving motor.

Typical 24 Series Engraver Diagrams

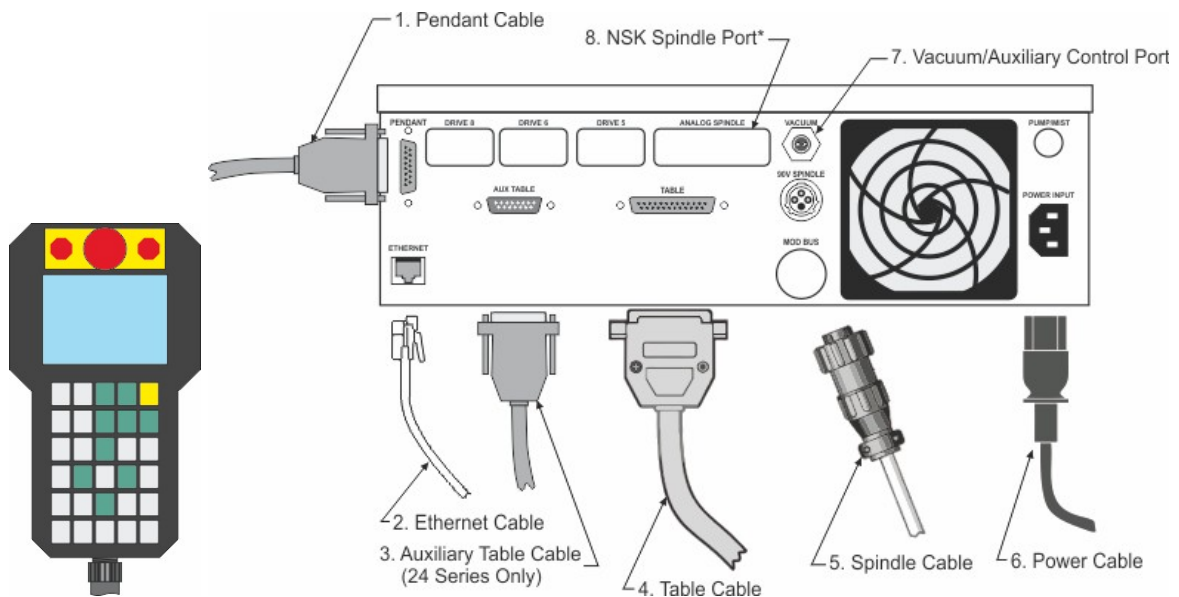


5 Table Connections

16 and 24 Series Engraver/Series 4 Controller Connections

1. The engraver's Pendant is connected to the Pendant cable port.
2. The Ethernet Cable from your computer, hub or network is connected to the Ethernet port.
3. The Auxiliary Table Cable is used on the 24 Series engraver ONLY.
4. The Table Cable connects from 25 pin connector on the engraver to the Table port.
5. The Spindle Cable connects to the Spindle port.
6. The Power Cable connects a 110 - 220 VAC electrical source to the controller and powers the controller, table and spindle.
7. If your machine is equipped with the optional Vacuum Chip Removal System, a remote On/Off cable is connected to the controller to automatically turn the vacuum pump on and off when the job is being run.
8. *If your machine is equipped with the optional NSK High Frequency Spindle, a second 25 pin connector will be included with your controller. The NSK Spindle is controlled by the NSK Spindle Cable connected to this port. NOTE - the Spindle Cable to the standard engraving motor will not be used in this configuration.

Series 4 Pendant and Controller



6 Zeroing the Cutter

Zeroing Cutters

(Refer to the diagram on the following page)

Zeroing Cutters for Top-Loaded Spindles

1. Turn the micrometer to zero. This provides a starting point and reference for setting the depth accurately. It's important to note that the micrometer should be threaded onto the spindle housing sufficiently to prevent excessive play in the micrometer and nosecone. If there are too few threads holding the micrometer in place it will move during the engraving process. The best starting position is 3 or 4 complete revolutions from the top.
2. With the appropriate cutter installed in the spindle, loosen the setscrew in the brass cutter knob with a spline wrench (commonly referred to as the cutter wrench). CAUTION: When you loosen the setscrew in this step, the cutter may easily fall out of the spindle and can cause cutter tip damage. Use one hand to hold the cutter before loosening.
3. Gently place a piece of metal against the bottom of the nosecone so as to push the cutter even with the bottom of the nosecone. Now the cutter should be flush with the nosecone.
4. Tighten the cutter knob setscrew. Your cutter is now "zero'ed". Rotating the micrometer to the right will increase the depth of the cut. Each click of the micrometer = .001". A full revolution is .025".

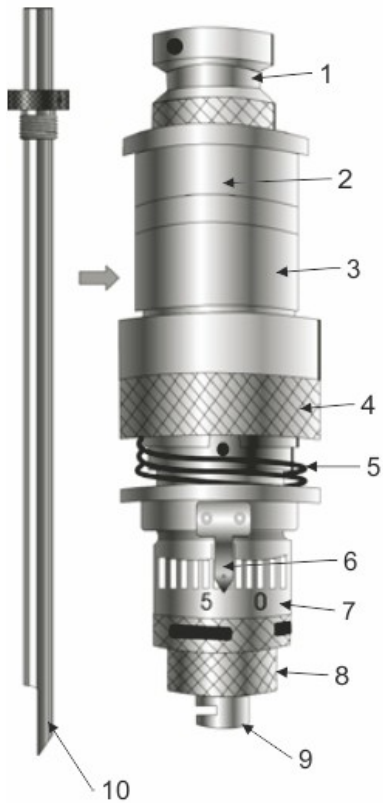
Zeroing Cutters for Top and Bottom Loaded Collet Spindles

The collet spindle can be used with either top loaded or bottom loaded cutters.

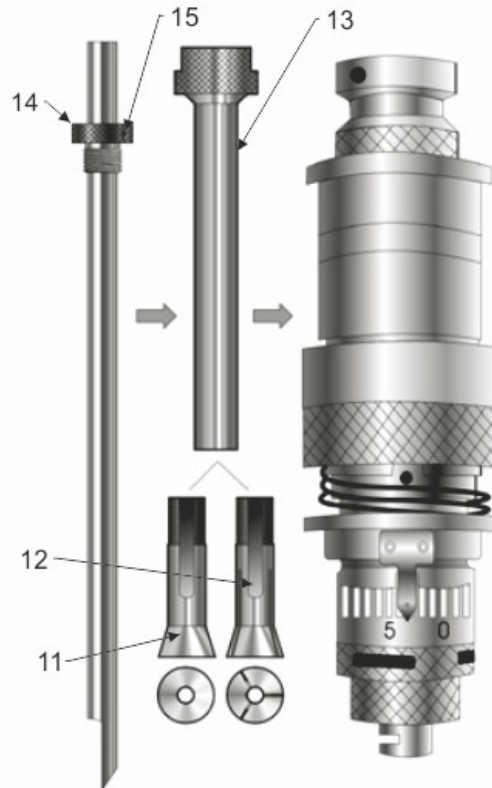
1. To install a top loaded cutter in the collet spindle, first set the micrometer to zero.
2. Loosen the knurled draw bar on the top of the spindle slightly.
3. Remove the cutter knob from the cutter, and slide the cutter into the spindle.
4. Place a piece of flat material against the bottom of the nosecone and lower the cutter until it rests against the material.
5. Tighten the draw bar around the cutter. Make sure it is tight. The draw bar must be tightened before the cutter knob is installed, as the cutter will slightly rise in the spindle assembly when the draw bar is tightened.
6. Re-attach the cutter knob to the top of the cutter and screw it in counterclockwise until secure. Be careful when turning the cutter knob into the draw bar. Counterclockwise is the direction to loosen the draw bar. Hand tighten the cutter knob only - do not use pliers or wrenches! Tighten the cutter knob setscrew. The cutter depth can be increased by turning the micrometer to the right. *Note: If using 2" short cutters, install them from the bottom. Use the draw bar on the top of the spindle to tightly secure the cutter.*

A solid collet, if purchased, can be installed in place of the split collet for burnishing. Install the collet in the bottom of the spindle and tighten the draw bar firmly. The spindle now acts as a normal top loaded spindle for ease of operation. The split collet can be reinstalled when required.

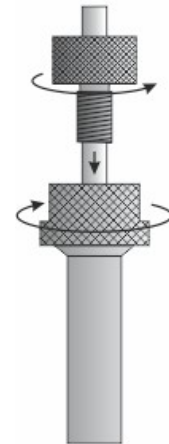
Top Loading Spindle Assembly



Top and Bottom Loading Collet Spindle Assembly



Tightening the Cutter Knob into the Draw Bar of a Collet Spindle



1. Pulley
2. Inner Spindle Housing (under sleeve)
3. Outer Spindle Sleeve
4. Pressure Spring Adjuster
5. Pressure Spring
6. Micrometer Pointer (Arrow)
7. Micrometer
8. Retainer Ring

9. Nose Cone
10. Cutter
11. Solid Collet
12. Split Collet
13. Draw Bar
14. Cutter Knob
15. Cutter Knob Setscrew

7 Proximity Sensor

Advantage of this Feature

The advantage of this device is that it eliminates the need to perform a surface setting procedure. It is used when utilizing a nose cone or diamond drag cutter. It cannot be used without a nose cone, such as when burnishing or setting multiple pass depths in the software.

Procedure

1. Make sure that the proximity switch is in the “On” position on the controller's Pendant, or turned on within the Vision software. Ensure that some travel is allowed to “float” the spindle on the pressure spring. The pressure spring adjuster must be backed off.
2. Zero the cutter in the spindle and dial in the desired depth on the nose cone micrometer.
3. Send the job to the controller via the computer.
4. Press the “Start” button on the Pendant to begin engraving.

Usage

“Nose-riding” - WITH proximity sensor

Engraving with the proximity sensor can only be performed with a nose cone attached, or when diamond drag engraving.

“Non-nose-riding” - WITHOUT proximity sensor

When setting a depth in the Vision software, the proximity sensor should be turned off via the Pendant, or in the Cut Toolbox (in the Vision software program before sending the job to the machine). Also, make sure that there is no “float” on the spindle by locking the pressure spring adjuster all the way down. Locking the spindle is especially important when engraving into hard surfaces or materials like brass and stainless steel.

Diamond Drag Engraving

To install a diamond drag adapter, remove the retainer ring and nose cone from the bottom of the spindle and replace with the diamond drag adapter. For diamond drag engraving, the engraving motor is turned off and the cutter “drags” across the material. Down pressure against the material can be reduced or increased as necessary by adjusting the spring pressure adjuster as shown below.



8 Maintenance

Vision strives for the highest quality in their manufacturing process to provide you with the most cost effective, reliable engraving machine in use today. Please remember that proper maintenance and care is necessary to achieve maximum product life expectancy.

The engraving environment generates small plastic and metal chips as well as other particles during operation. As with any machinery, your engraving system should be kept as clean as possible to minimize wear and tear and to improve final quality of the engraved product.

Removing Chips

A portable vacuum is suggested for chip removal, but applying direct suction to the spindle area is not recommended. Note that this cleaning can be minimized and greatly simplified through the use of the optional vacuum chip removal system. The vacuum chip removal system removes chips and dust created by engraving. This system can also extend the life of other components in the system, as prompt removal of chips reduces contamination and overheating in the spindle area. The vacuum chip removal system also keeps the nose cone from skipping over letters due to chips that would otherwise remain on the engraving surface.

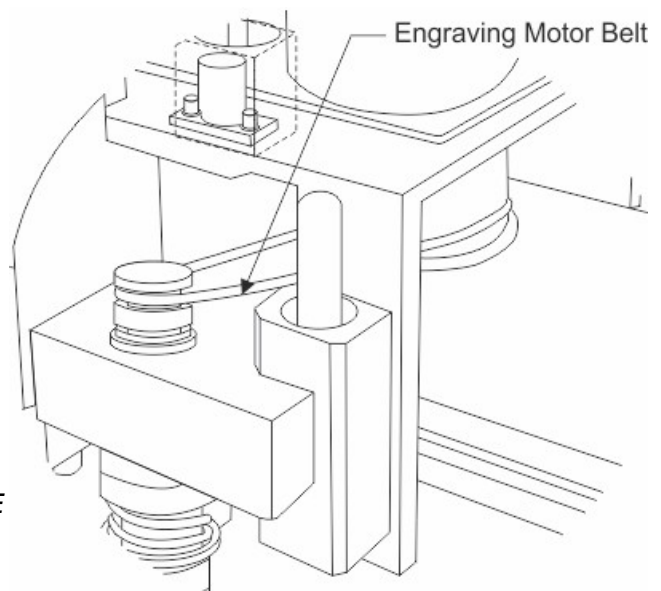
The Vacuum Chip Removal System

The optional vacuum chip removal system is designed to simplify the engraving process and minimize wear and tear on the engraver. The vacuum chip removal system uses a vacuum nose cone to remove chips created during the engraving process before they have the chance to create problems. The quiet pump, coupled with the micro-fine layered filters, assures that your unwanted chips are whisked away effortlessly. The vacuum pump canister uses reusable filters to assure maximum efficiency and cost-effectiveness.

Engraving Motor Belt Replacement

A belt is used to drive the engraver's spindle. It runs between the motor drive pulley and the spindle pulley. If it needs replacement, remove the old belt by rolling it to the top of the spindle pulley, then slightly stretching the belt to snap it over the top of the spindle pulley. Once loose, it can easily be removed from the machine. To install the new belt, position the new belt around the drive pulley, then lightly stretch it to snap over the top of the spindle pulley.

NOTE: Be sure to purchase the specified replacement belt from Vision Engraving Systems. Having the correct belt size is extremely important to the functionality of the motor. **NEVER EXCESSIVELY STRETCH THE BELT!**

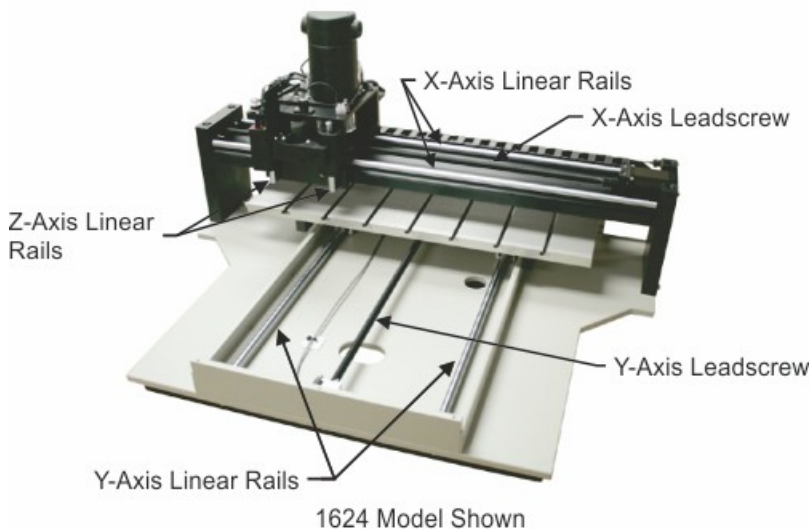
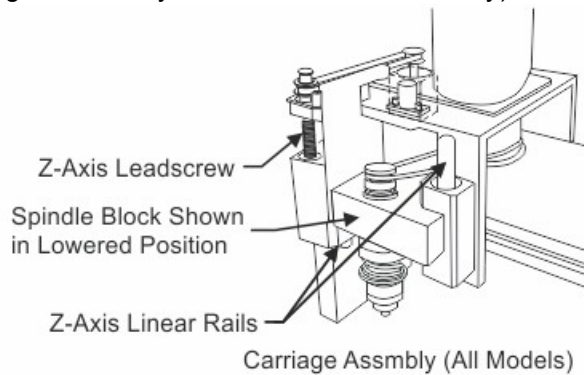


Lubricating the X-Axis, Y-Axis and Z-Axis Leadscrews and Linear Rails (ALL MODELS)

A light lubrication of the X, Y and Z-Axis leadscrews should be performed after every month of usage. Use Teflon-Free Silicone lubricant spray only. Spray a light coating along the entire leadscrew. Note: A nozzle extender attached to the aerosol spray can help facilitate this procedure and may eliminate the need to remove the metal covers. DO NOT use any lubricant other than Teflon-Free Silicone, as it may become sticky and cause a buildup that will cause mechanical failure.

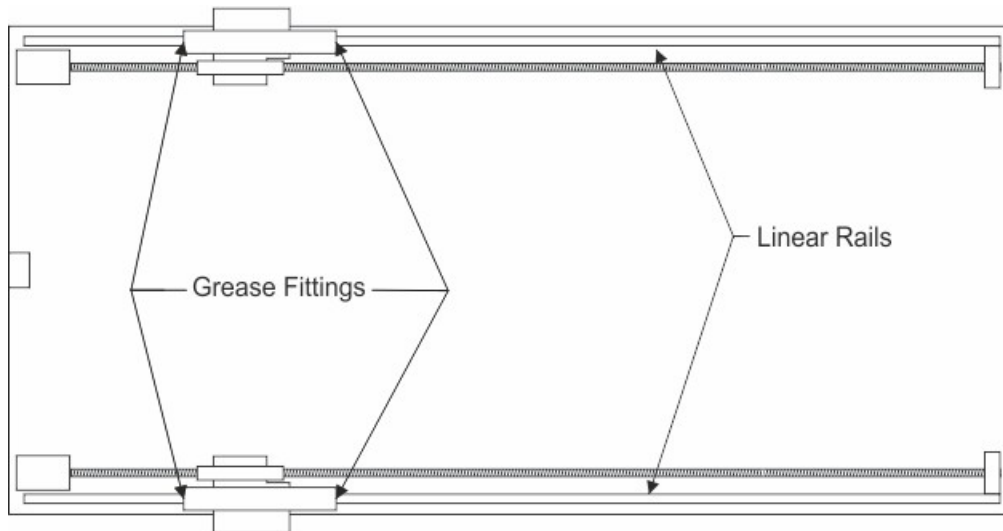
The X and Z-Axis linear rails should be wiped down with a clean, dry cloth each week and a few drops of machine oil (such as 3-in-1 Oil) should be applied to the rail surfaces. Spread the oil over the rails using a cotton swap or your finger. Lubrication frequency will depend on usage and the types of materials being engraved.

(Carriage and Gantry Covers Removed for Clarity)



The Y-Axis linear rails on the 16 Series machines are under a cover below the engraving table. These linear rails should be wiped down with a clean, dry cloth every year and a few drops of machine oil (such as 3-in-1 Oil) should be applied to the rail surfaces as per above..

The Y-Axis linear rails on the 25 Series machines have grease fittings (shown below). Greasing of these fittings should only be performed every year. Only 1/2 - 1 pump of grease is required. **DO NOT** apply grease until grease comes out of the bearing seals. This will deform the seals and allow debris into the bearings.

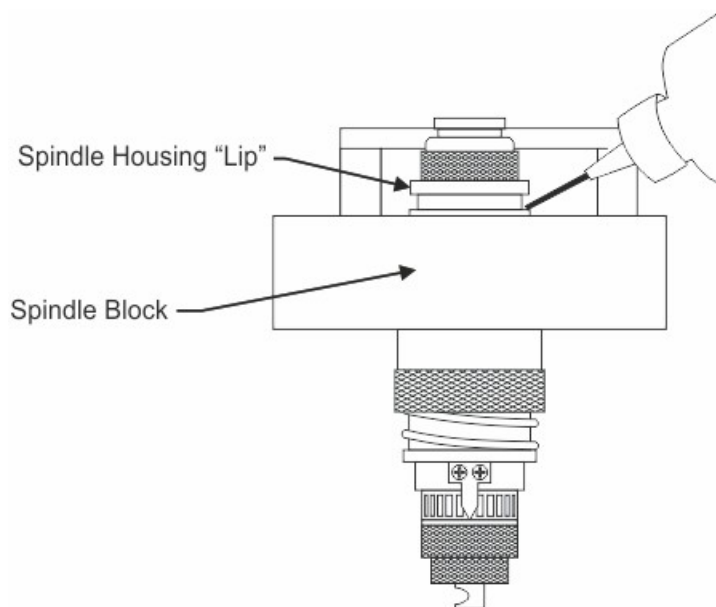


Bottom View of Table
25 Series Machines Only

Spindle Housing Lubrication

The spindle assembly requires a monthly lubrication of the housing. Simply push the spindle up until there is a 1/3" gap between the spindle block and the "lip" of the housing. Lubricate with 2 to 3 drops of 3 in 1 oil.

DO NOT OVER LUBRICATE! Never lubricate the spindle bearings! This will cause the spindle to stick.



What not to Lubricate

Many of the bearings and assemblies in your engraving machine are sealed and/or coated using special low-friction methods and should not be lubricated. Do not attempt to lubricate the spindle bearings. If you suspect lubrication problems, call Vision for instructions, as further lubrication may harm the machine. Do not lubricate the X or Y stepper motors.

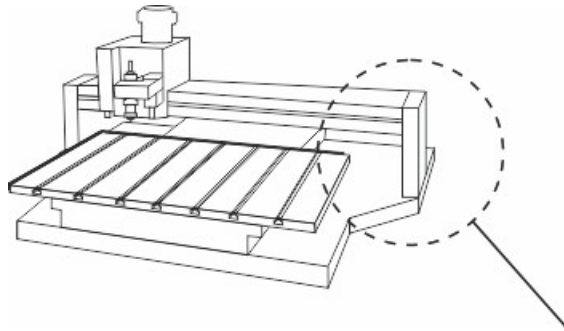
Maintenance Schedule

The following is a suggested maintenance schedule. Remember that in conditions of prolonged use, unusual environments, or unusual applications, maintenance items may need to be performed more frequently than suggested in this schedule.

Frequency	Maintenance Items
As Needed	<ul style="list-style-type: none"> • Vacuum and/or brush debris • Clean Vacuum Canister Filters (if equipped with Vacuum Chip Removal System)
Every Day	<ul style="list-style-type: none"> • Remove chips from the spindle area
Every Week	<ul style="list-style-type: none"> • Clean and Lubricate X and Z-Axis Linear Rails
Every Month	<ul style="list-style-type: none"> • Lubricate X, Y and Z-Axis Leadscrews • Lubricate the Spindle Housing
Every Year	<ul style="list-style-type: none"> • Lubricate Y-Axis Linear Rails

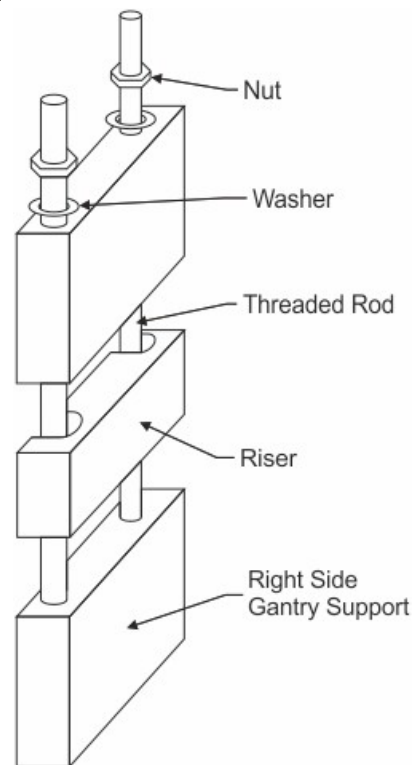
9 Riser Block Extensions

The optional riser block kit allows you to raise the entire gantry assembly quickly and simply. Each end of the gantry assembly is supported by two tower blocks stacked on top of each other. Riser blocks are installed between the two tower blocks and add height to the gantry.



Installation

Determine the extra height required, and select riser blocks of appropriate height. One end of the gantry has long threaded rods topped by washers and nuts. Loosen the nuts on the threaded rods. On the other end of the gantry, loosen the bolts. Raise the gantry for clearance, and slide a riser in between the two tower blocks on each end of the gantry. For higher extensions use the longer bolts and additional riser extensions as needed. Always add the same height to each end of the gantry. When finished installing the riser blocks, be sure to tighten all bolts and threaded rods.



10 Collets and Diamond Drag Adapter

Spindle Options

Increase your profits and engraving quality with the split collet spindle. Designed to be extremely accurate and durable, the collet spindle is simple to use. This collet retracts around the cutter gripping it at the bottom, while firmly holding on the top. By holding the cutter in two places the cutter is virtually vibration-free and nearly eliminates play and runout. The split collet spindle can engrave with excellent clarity and resolution while averaging a longer product life than any other spindle.

The collet spindle accepts both top loaded and bottom loaded cutters, including 2" short shank cutters such as drill bits, router bits, dremel tools etc. Should you ever want your split collet spindle to act like a standard spindle, simply install our solid collet in the spindle (available separately).

Diamond Drag Adapters

Using your plastic cutters to engrave metal can seriously damage them. There is a better option; Vision offers high-quality diamond drag adapters. Don't burn out your bearings on a job that can be done just as easily as cutting plastic. The diamond drag adapter engraves virtually all-metallic surfaces, at high resolution and high speed. The results achieved with a diamond drag adapter can be even more amazing when used with double and triple-line fonts.



11 Troubleshooting

ENGRAVING PROBLEMS

Problem: Engraving on the plate is “slanted”.

Possible solutions:

1. Check material for squareness. Is the material cut square?
2. Check to see if the material on the table is square to the home position and the edge guides.
Hint: Always inspect your job before removing your plate from the system. You may be able to salvage it by re-engraving the job, or at a minimum, you may be able to analyze the problem and prevent repeating it. Perhaps the plate moved during engraving. Removing it without inspection would prevent you from detecting this problem.

Problem: You are using a nosecone, but your engraving is “shallow” across the top or left margin of your plate. It engraves properly when the spindle is away from the edge.

Possible solutions:

1. Your nosecone is riding on the edge guides. Lower the edge guides so that they are even with or below the level of your material surface.
2. Check to see if your material is on top of the edge guides.

Problem: You are using a nosecone and your engraving is uneven.

Possible solutions:

1. Your spindle is not “zeroed” to your material.
2. You are not using enough spring pressure to keep the nosecone in contact with the material.
3. You may be engraving too fast for the type of material you are cutting. Check the manufacturer’s recommendation. The cutter may be bouncing on the surface. Some hard materials may exhibit this problem.
4. You may have a defective or broken cutter.
5. Your material may be defective.
6. Your vacuum chip removal system is plugged and engraving chips are getting caught between the nosecone and the material.
7. The nosecone or vacuum nosecone is loose.

Problem: “Shadowing” occurs while engraving certain materials.

Possible solutions:

1. Leave the protective film on the engraving material during engraving.
2. Use a plastic nosecone instead of a standard metal nosecone.
3. The nosecone may be damaged. Inspect for burrs or roughness. Try using an Emory cloth to polish the nose.
4. Back off on the spring pressure. Excessive down pressure will leave a rub mark on almost any plastic material.

Problem: You are not using a nosecone and you have uneven engraving.

Possible solutions:

1. Switch to a nose-riding method.
2. Use a different method of holding the material. If you use double sided tape, it may be thick enough to change your surface flatness by a few thousandths.
3. Parcel the job if possible so that you can have more direct control over the depth of each specific area. This may be effective if you have uneven material or a large engraving bed.

4. Table tolerances may not be able to maintain the accuracy level you want.
5. Table may not be on a level surface.

Hint: While it's true that you can do non-nose riding engraving, it's not easy to hold any controlled accuracy on the depth. This takes flat material, a very flat bed and some degree of skill and confidence. It also takes an application where some amount of uneven engraving may be tolerated.

Problem: I'm getting "tails" or "swirls" in the corners of my engraving.

Possible solutions:

1. Your cutter speed is too fast relative to your x-y speed. Slow your spindle speed down or increase your table speed.
2. Your cutter is worn or damaged.
3. Turn down the dwell speed.

Problem: I'm getting "fuzz", "fur" or can see lines in the bottom of my cut showing each cutter path. I can even see steps in the bottom of my cut.

Possible solutions:

1. This problem is tough. Sometimes caused by dull cutters, the wrong cutter, or not enough overlap for each cut. Try changing cutter size slightly. You may get better clean up.
2. Try taking a second pass cut at .001-.002 deeper. This may clean up the roughness.
3. Resharpen the cutter. There are various cutter angles that can cause these kinds of problems. There is a relief angle that if too great can cause noticeable ridges in the bottom of the cut.
4. Ensure that the spindle is square in the mount or block. An unsquare spindle means an unsquare cutter to the material surface.
5. Turn spindle speed up.

Problem: Poor letter quality.

Possible solutions:

1. You may be engraving too fast. Engraving quality improves with the right engraving and spindle speeds.
2. If you are diamond drag engraving, you have too much down pressure or you are engraving too deep. Also, check the grain of the material; it should be left to right.
3. You may have a worn or dull cutter.
4. Your material is not securely fastened to the table.

Problem: Ragged Type.

Possible solutions:

1. If the quality of cut is ragged or exhibits steps, you may have play in the cutter. This could be in the gap between the cutter and the spindle shaft. Maybe the shaft is worn or the spindle bearings need to be replaced. Once a shaft starts to wear and a cutter is loose, the problem can worsen quickly.
2. The spindle is loose in the housing or block.
3. The carriage is loose or has excessive play, check the z-axis bearings or slide.
4. Lubricate lead screws with recommended lubricant.

Problem: My baseline is off.

Possible solutions:

1. You're not at the mechanical or software home. Maybe the table or carriage was bumped during set-up. Maybe the previous job was cut short and the system did not return back to its mechanical home or limit switches. Move the table, bridge or carriage physically to home or send it home via the software.
2. Check your software layout for keystroke errors.

Problem: While burnishing aluminum I have voids or non-engraved areas.

Possible solutions:

1. Try re-engraving the same plate again. Some of the anodized aluminum plates have very hard surfaces and two passes are required.
2. Switch to a diamond burnisher. The more common carbide tools may have difficulty getting through the tough surface and are more easily worn down, thus sometimes skipping across the surface.
3. Increase the pressure of the z-axis or burnishing adapter.
4. Try other materials. Same reasons as above. Some materials, from some vendors, are just plain tough.

Hints:

Always try to solve the problems yourself before seeking help. A little patience goes a long way. Never work on any problem that gets you so frustrated that you become irritated at the machine, the service technician, or the salesman. It's only a machine, don't let it get the best of you. Contact your dealer.

MECHANICAL PROBLEMS**Problem: No X, Y or Z-Axis movement.**

Possible solutions:

1. Check that the controller power is on.
2. Check that the drives are turned on.
3. Check the table cable for a solid connection. It may be helpful to remove the cable, reconnect and tighten the hold down screws to ensure a good connection.
4. Ensure that the job has been transferred to the controller.
5. Ensure that the emergency STOP button is not depressed.

Problem: System has no movement in any one axis.

Possible solutions:

1. Try to jog the problem axis using the X/Y/Z jog keys on the control unit. If OK, retry the job.
2. Check the table cable for a solid connection.
3. Call service technician for further instructions.

Problem: Unusually loud noises during the engraving process.

Possible solutions:

1. Isolate the cause of the unusual noise by:
 - a. Remove the cutter.
 - b. Turn the engraving motor to OFF.
 - c. Run the engraving job, or X/Y jog the system.

If the noise persists, it may be confined to the X, Y or Z-axis. Check for proper lubrication of leadscrews.

If the noise goes away and to further isolate the cause, do the following:

- a. Remove the motor belt.
- b. Run the engraving motor without starting a job. Loose motor belts may cause some noises, so removal will narrow down the problem. If the noise is present with the spindle motor on, check the motor brushes.

If there is no unusual noise when running the spindle motor with no belt attached, do the following:

- a. Attach the motor belt.
- b. Run the spindle motor and vary the RPM with the Pendant control.

Noise levels may vary. If the noise persists, check the spindle for overheating. Excessive overheating of the outside housing of the spindle is a sign of defective bearings. The noise may be caused by the bearings.

Problem: Spindle is hot.

Possible solutions:

1. Ensure that the nose cone area is free of debris. Check the vacuum system (if used) for clogging.
2. Inspect the spindle for other obstructions that may prevent proper rotation.
3. Bearings may need to be replaced.

Problem: Spindle motor will not turn on.

Possible solutions:

1. Check the auto/on/off switch to ensure the proper operational mode.
2. Check motor brushes.

Problem: Motor belt will not stay on pulley.

Possible solutions:

1. Motor belt is probably worn and needs to be replaced.