

UNIVERSAL

L A S E R S Y S T E M S I N C.

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Versa **LASER**TM










16008 North 81st Street • Scottsdale, Arizona 85260 • 480.483.1214 • www.ulsinc.com

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0000 – ULS Technical Support Department

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Technical Support Department
16008 North 81st Street
Scottsdale, AZ 85260
Phone: 480-609-0297
Fax: 480-609-1203
Hours: M – F 8 am to 5 pm
Web: <http://www.ulsinc.com>
Email: support@ulsinc.com

0010 - *Versa*LASER™ Parts List with Pictures

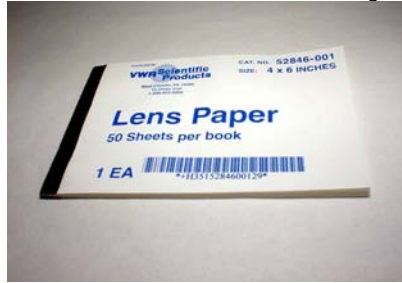
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Consumable Supplies

850-0001-0 Cleaner - Lens



851-0001-0 Tissue - Lens Cleaning



851-0002-0 Applicators - Cotton Tipped



Consumable Parts

143-0007-0 Bearing - X or Y (VLS) Set of 4



143-0008-0 Gear - X Axis VLS



143-0009-0 Idler - X Axis VLS



143-0017-0 Idler - Y Axis VLS



143-0018-0 Gear - Y Axis VLS



591-0003-2 Belt Kit (10.6 ft) (for 16x12 & 18x12 field)



591-0003-4 Belt - Y (4.25 feet) (For 18 inch Y or X axis)



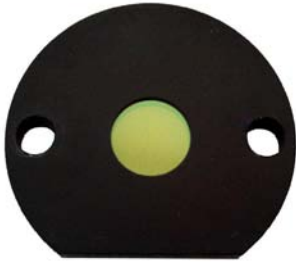
591-0003-7 Belt - Y (3.25 feet) (For 12 inch Y-axis)



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Consumable Optics

145-0027-4 Beam Window – VLS



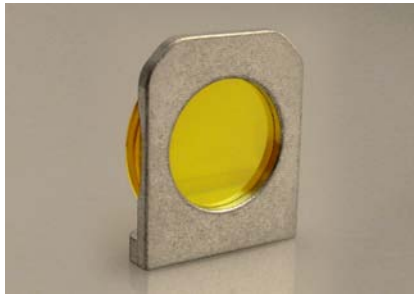
145-0056-0 Mirror Assembly #2 VLS



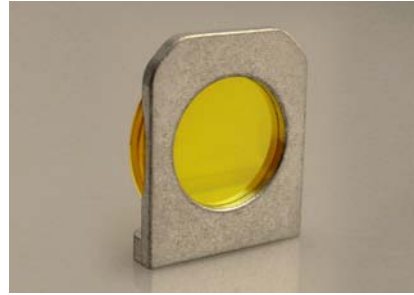
145-0075-0 Mirror Assembly #3 VLS



145-0083-0 Lens Assembly 2.0 VLS



145-0084-0 Lens Assembly 1.5 VLS



Optic Accessories

Focus Tool Assemblies - VLS

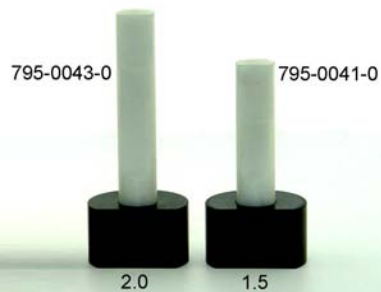


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Electrical and Electronic Parts

100-0017-0 X Axis Motor



100-0018-0 Y Axis Motor



100-0019-0 Z Axis Motor



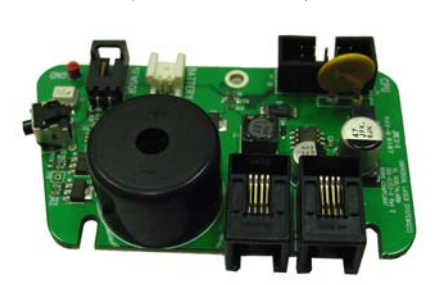
105-0023-0 Power Supply 48V
(VLS2.30/VLS3.50)



133-0161-0 CPU - VLS2.30/VLS3.50



133-0162-0 Thermal Sensor Board
(VLS2.30/VLS3.50)



133-0087-0 X Axis Home Board Assembly



162-0010-0 Power Cord



350-0046-E Fuse - 10A (110V Ceramic)



350-0047-E Fuse - 10A (220V Ceramic)



370-0053-0 Thermal Snap Switch 50 Deg



791-0001-0 Keypad - VLS



Spare Parts List

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270-0065-0 Diffuser - Air Assist



591-0033-0 Belt Pulley - Z Axis

**Maintenance Tools**

800-0002-0 Allen Key Set



0020 – Performing *Versa*LASER™ Service Procedures

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Safety

When performing the procedures in this manual, always be sure to read and understand the entire procedure before beginning to operate the machine. Follow each step carefully. Pay special attention to steps requiring the VLS to be unplugged!

Do not attempt to perform any of the procedures outlined in this manual until you have read and thoroughly understand section [A000 – Safety](#).

Difficulty

The VLS is a very easy machine to maintain and repair. Most service procedures are simple to perform and require minimal time and tools. In order to provide some indication as to the difficulty or involvement of the service procedures in this manual, we have employed the following system:



Procedure requiring very little time and skill



Procedure requiring a moderate amount of time or skill



A more involved procedure requiring a greater amount of time or skill

Tools

Nearly all the procedures described in this manual can be performed with a minimum of simple hand tools:

Hex Key Set, Standard (SAE) including sizes:

9/64, 1/8, 7/64, 3/32, 5/64, 1/16, .050

Screwdrivers, including Phillips #1, #0

Lens Cleaning Solution, Cotton Swabs or Lens Tissue

Needle Nose Pliers

A000 – Safety – PLEASE READ!

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Description of Appropriate Use

This device is designed for laser cutting and engraving of the materials listed in the VLS printer driver. Materials to be processed must fit completely inside the system for proper operation. Use of the equipment in a manner other than that described in this manual may result in injury to yourself and others and may cause severe damage to the equipment and your facility.

General Safety

- **Exposure to the laser beam may cause physical burns and can cause severe eye damage.** Proper use and care of this system are essential to safe operation.



- **Never operate the laser system without constant supervision of the cutting and engraving process.** Exposure to the laser beam may cause ignition of combustible materials and start a fire. A properly maintained fire extinguisher should be kept on hand at all times.

- **Never leave materials in the laser system after laser processing has finished.** Materials may ignite after laser processing has finished. Thoroughly inspect the interior of the laser system and remove any particulate materials before leaving your workstation. A properly maintained fire extinguisher should be kept on hand at all times.



- **A properly configured, installed, maintained, and operating particulate/fume exhaust system is mandatory when operating the laser system.** Fumes and smoke from the engraving process must be extracted from the laser system and either filtered through the Integrated Exhaust Filtration Module (an optional accessory) or exhausted outside through a user supplied exhaust system.



- **Some materials, during and after laser processing, may produce toxic fumes.** We suggest that you obtain the Material Safety Data Sheet (MSDS) from the materials manufacturer. The MSDS discloses all of the hazards when handling or processing that material. Some materials continue emitting fumes for several minutes after laser processing and may pose a health hazard. Avoid using this device in small, enclosed, or non-ventilated areas.

- **Some materials, during and after laser processing, may produce corrosive fumes.** **DISCONTINUE** processing any material that produces signs of chemical deterioration in the laser system such as rust, metal etching or pitting, peeling paint, etc. Damage to the laser system from corrosive materials is **NOT** covered under warranty.





- **Care should be taken when moving or lifting this device.** Obtain assistance from 1 or 2 additional people when lifting or carrying (secure motion system and access door). Severe bodily injury may occur if improper lifting techniques are applied or the system is dropped.

- **Dangerous voltages are present within the electronics and laser enclosures of this system.** Although access to these areas is not necessary during normal use, if it becomes necessary to open one of these enclosures for service reasons, please remember to disconnect the power cord from your electrical supply.



- **The power supply cord is the mains disconnect device; the equipment should be located close to an easily accessible wall socket outlet.** To disconnect the equipment from the supply mains, the power cord shall be unplugged from the wall outlet or main power inlet (appliance coupler) of the unit.
- **This device is specifically designed to comply with CDRH performance requirements under 21 CFR 1040.10 and 1040.11.** CDRH is the Center for the Devices of Radiological Health division of the Food and Drug Administration (FDA) in the USA. It also complies with CE (European Community) safety regulations. No guarantees of suitability or safety are provided for any use other than those specified by Universal Laser Systems, Inc.

Laser Safety

The device contains a sealed carbon dioxide (CO₂) laser in a Class I enclosure that produces intense invisible and visible laser radiation at a wavelength of 10.6 microns in the infrared spectrum. For your protection, this enclosure is designed to completely contain the CO₂ laser beam.

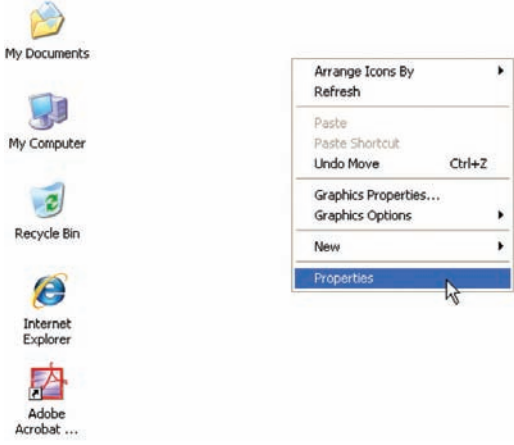
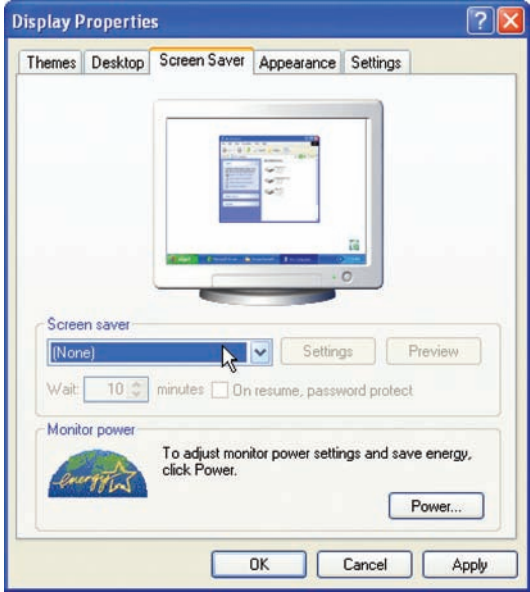
CAUTION – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

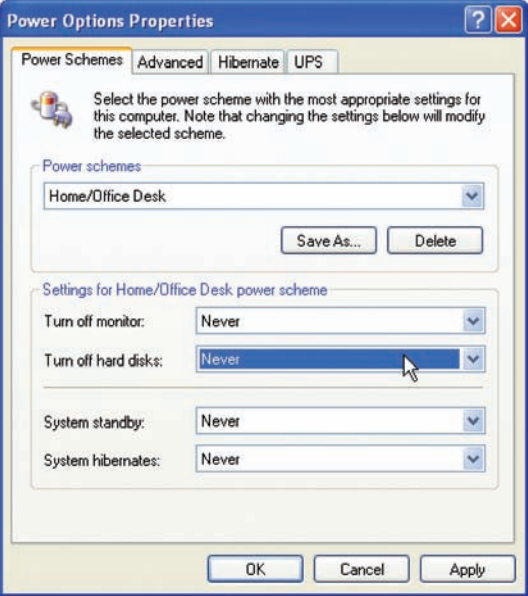
- The intense light that appears during the engraving or cutting process is the product of material combustion or vaporization. **DO NOT STARE AT THIS LIGHT FOR EXTENDED PERIODS OR ATTEMPT TO VIEW IT WITH OPTICAL INSTRUMENTS.**
- This device contains a visible Red Dot Pointer (Class IIIa, 5mw maximum output, 630-680 nm). **DO NOT STARE AT THIS RED LIGHT FOR EXTENDED PERIODS OR ATTEMPT TO VIEW IT WITH OPTICAL INSTRUMENTS.**
- The user access door of this device is safety interlocked and will disable the CO₂ laser beam when the access door is opened. The Red Dot Pointer is **NOT** safety interlocked and is activated when the user access door is open.
- **DO NOT OPERATE THE LASER SYSTEM IF ITS SAFETY FEATURES HAVE BEEN MODIFIED, DISABLED OR REMOVED.** This may lead to exposure to invisible and visible CO₂ laser radiation which may cause permanent blindness and/or severe burns to the skin.

A005 - Computer Power Management Configuration

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Power management is an option on computers and monitors to reduce energy consumption when they are not in active use. However, your computer is a critical component in the operation of the VLS. Active Power Management can cause interruption of communication between the PC and the VLS, resulting in failure of operation.

 <ol style="list-style-type: none">1. With your computer fully booted into Windows XP, right-click on your desktop.2. From the list of options, select "Properties". The "Display Properties" box will open.	 <ol style="list-style-type: none">3. In Display Properties, select the Screen Saver tab. Set the Screen saver to "(None)".4. Then in the box "Monitor power", Click the button "Power..."
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The screenshot shows the 'Power Options Properties' dialog box with the 'Power Schemes' tab selected. The 'Home/Office Desk' power scheme is chosen. The settings for this scheme are: Turn off monitor: Never, Turn off hard disks: Never, System standby: Never, and System hibernates: Never. The 'Apply' button is highlighted.

5. Select the tab “Power Schemes”.
6. For the “Settings for Home/Office Desk power scheme” box, select “Never” for all the setting options: Turn off monitor, Turn off hard disks, System standby, and System hibernates.
7. Click “Apply”, then “OK” on both open windows.
8. The configuration is complete.

A010 – Laser Power Upgrading

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The VLS2.30 is capable of upgrading to a maximum of 30 watts. The VLS3.50 is capable of upgrading to a maximum of 50 watts.

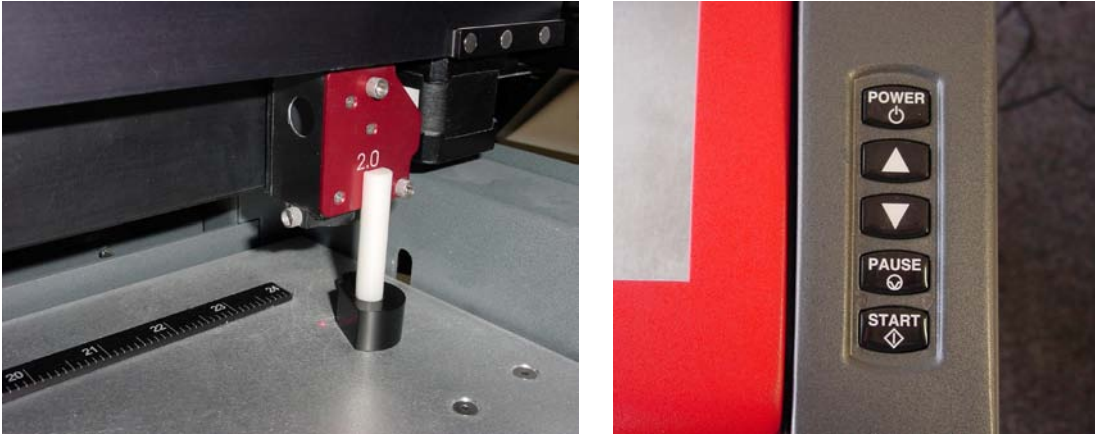
If you are upgrading either system, the VLS's internal software (firmware) will automatically reflect the change. Nothing has to be done to the laser system to have it function properly.

A020 - CPU Initialization / Auto-Z and Rotary Calibration

NOTE: This procedure must be performed with the solid aluminum Engraving Table installed. Do not use the honeycomb Cutting Table for this procedure.

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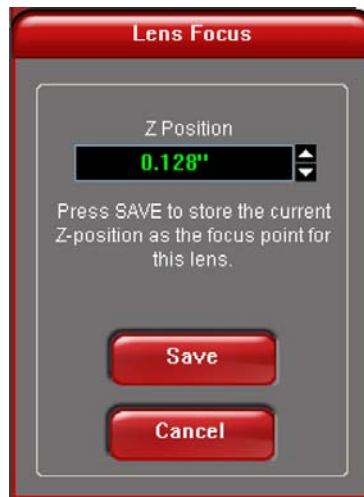
1. Power up your computer and the VLS. Home the Z-axis by clicking the HOME Z button in the VIEWER tab of the VCP.



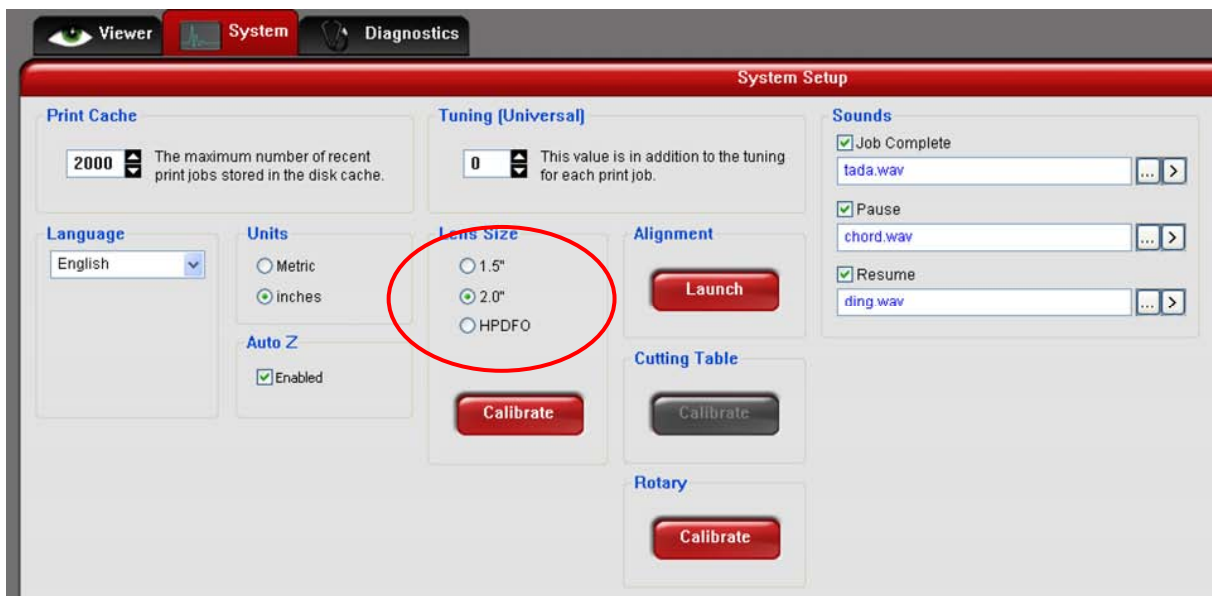
2. Using the UP and DOWN arrow buttons, either on the machine or in the UCP, bring the Z-axis table up. Using the appropriate Focus Tool for the lens installed (the standard is 2.0, other Focus Lens Kits are optional), focus directly on the surface of the table.



3. In the UCP, click the SYSTEM tab and choose 2.0 from the Lens Size list.



- Click on the Calibrate button within the Lens Size box of the System Tab. The following window appears. Click on Save to accept the new Z Position. Your 2.0 Lens has now been calibrated.



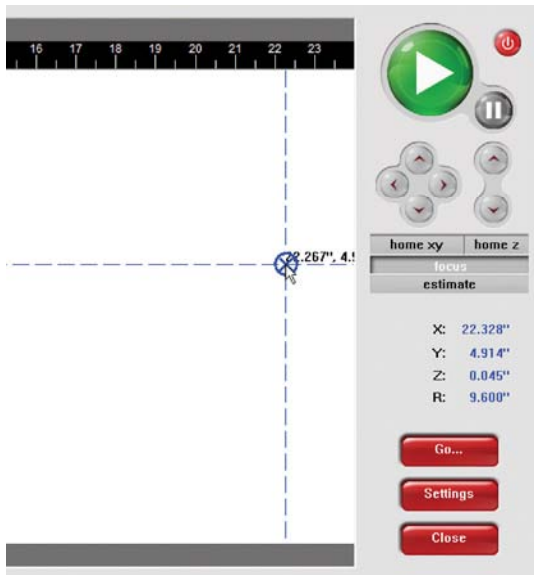
- If you have purchased the 1.5 or HPDFO optional lens kits, calibrate the lens kit according to steps 1 through 4. Be sure you select the proper lens size from the list before calibrating.
- You must now set the Y-axis Rotary Position even if you have not purchased the optional Rotary Fixture.



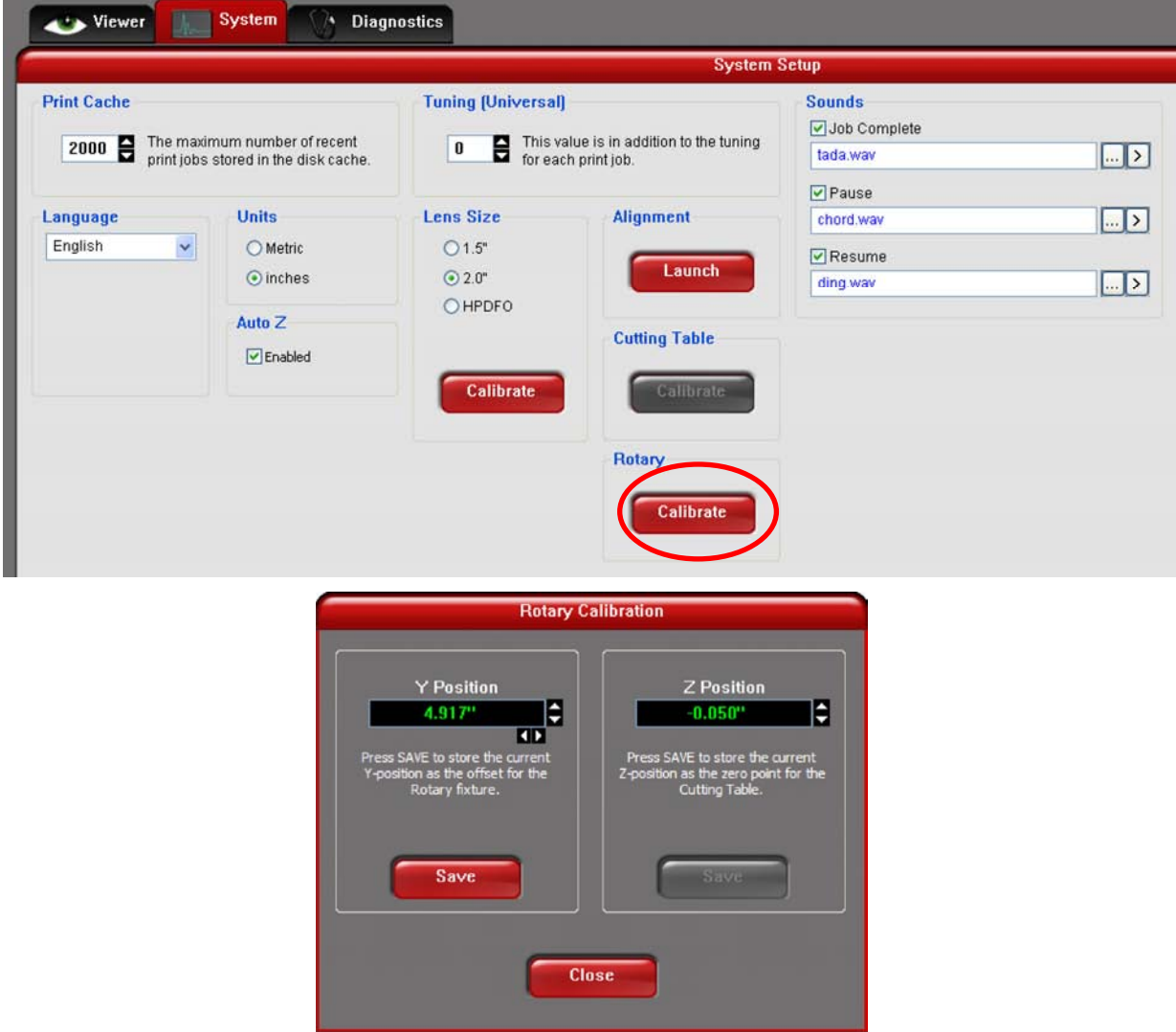
7. Lower the Z-axis table, halfway down. Loosen the two thumbscrews on the Engraving table and remove.



8. Locate the Rotary Fixture Alignment Pin. Then raise the Z-axis platform as high as it will go.



9. Using the focus feature in the VIEWER tab of the VCP, position the red dot directly in the center of the Rotary Fixture Alignment Pin. Try to get it as close to the center of the pin as possible. You can also use your keyboard's arrow keys to move the focus carriage to an exact location.



The image shows two screenshots from a software interface. The top screenshot is the 'System Setup' window, which has tabs for 'Viewer', 'System', and 'Diagnostics'. The 'System' tab is active, showing various settings panels: 'Print Cache' (set to 2000), 'Tuning [Universal]' (set to 0), 'Sounds' (with 'Job Complete', 'Pause', and 'Resume' checked), 'Language' (set to English), 'Units' (set to Inches), 'Lens Size' (set to 2.0"), 'Alignment' (with a 'Launch' button), 'Cutting Table' (with a 'Calibrate' button), and 'Rotary' (with a 'Calibrate' button circled in red). The bottom screenshot is the 'Rotary Calibration' dialog box, which has two sections: 'Y Position' (set to 4.917") and 'Z Position' (set to -0.050"). Each section has a 'Save' button, and there is a 'Close' button at the bottom.

10. DO NOT exit the focus feature. While still on the focus feature click on the SYSTEM Tab and click on the Rotary Calibrate button. The Rotary Calibrate window appears. Click on the Save button for the Y Position. Accept the new position.

11. CPU Initialization is now complete.

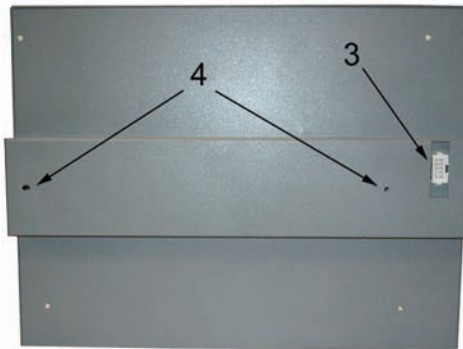
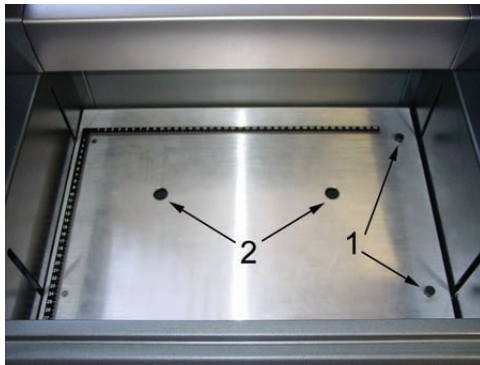
CPU calibration is necessary for two reasons: You must have a "0.00" reference point so that the machine properly adjusts the Z-axis to focus the laser beam accurately when selecting the different lenses. Also, it needs to know where the centerline of the Rotary Fixture is so that the x-axis arm will move out to the correct position (highest point of the cylinder) to engrave cylindrical objects.

A030 - Cutting Table Calibration

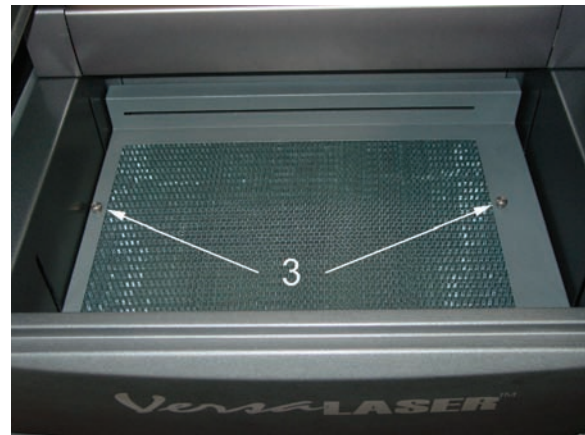
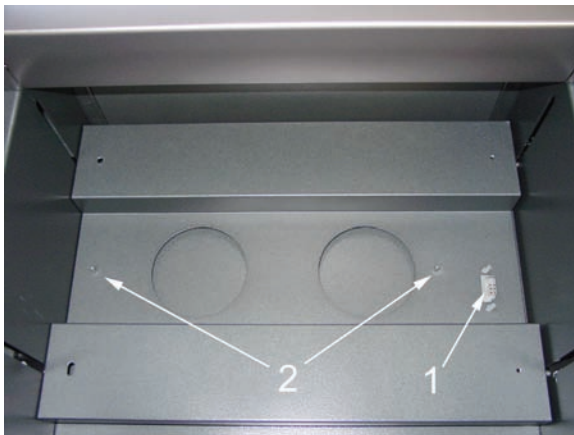
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Installation

1. Turn on your VLS machine by clicking on the red POWER button on your Universal Control Panel.
2. Lower the table all the way down to the bottom of its travel or down far enough so that you can remove the table and install the VCA without interfering with the moving parts of the VersaLASER.



3. Remove the table by loosening the two captive thumbscrews (1). Insert your fingers into the two holes (2) and slowly lift the table out of the VersaLASER being careful not to bump it around. On the underside of the VCA find the self-aligning electrical connector (3) and two alignment holes (4).



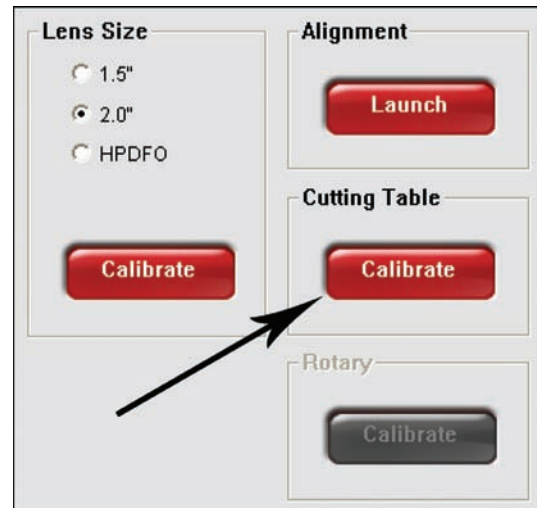
4. Inside the VersaLASER you will find the large recessed slot with a self-aligning electrical connector to the right side (1) and the two alignment pins (2).
5. By using the thumbscrews as handles (3), insert the VCA into the slot (it is OK to do with the power on because it is hot swappable) and move it around until the connector engages and the fixture sits flat. DO NOT raise the table at this point.

Focus Lens Calibration



To properly use the VCA for the first time you **NEED** to calibrate your focus lens to the top of the VCA surface. If you do not calibrate the focus lens the focus carriage may cause damage to your VCA and focus carriage.

6. After you have installed the VCA into your VersaLASER, manually focus to the VCA surface by using your appropriate focus tool.
7. Once that is complete, go directly to your System Tab and you will notice that the red CALIBRATE button for the Cutting Table box will be activated. Click on the CALIBRATE button. A window will appear. To accept the new Z-height click on SAVE.
8. You are now done calibrating the new Z-height for engraving or cutting on the VCA.

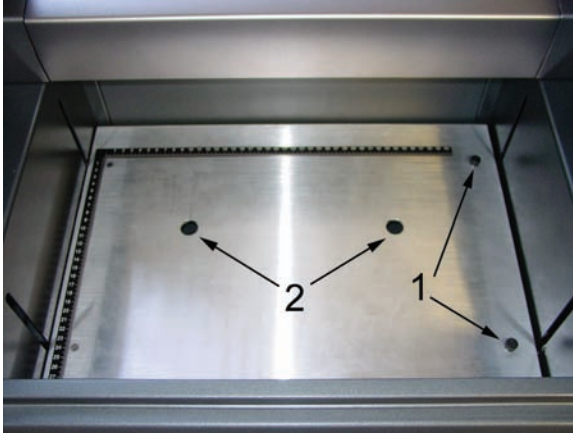


A040 - Rotary Calibration

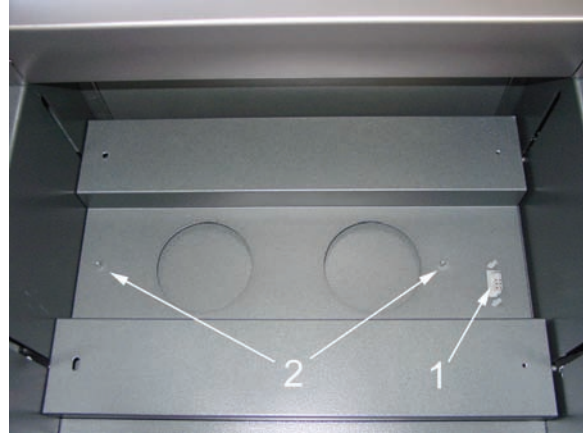
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Calibration and Installation

1. Turn on the UCP and VLS.
2. Open the top door.
3. Lower the table all the way **DOWN** to the bottom of its travel so that you can remove the table.

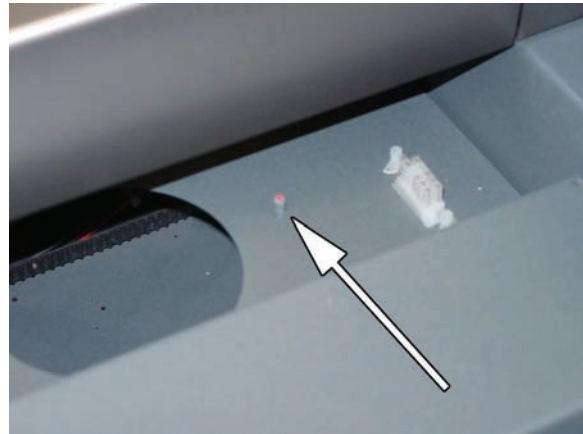
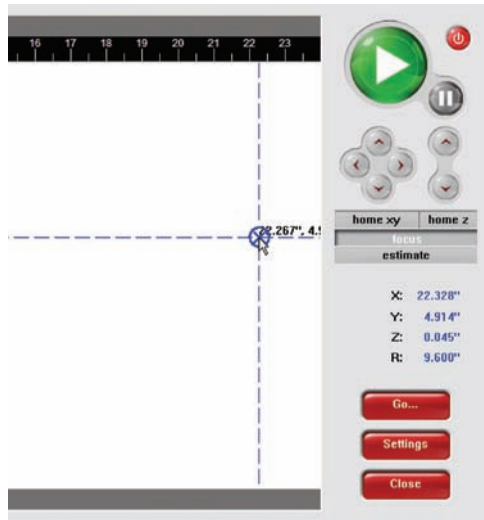


4. Remove the table by loosening the two captive thumbscrews (1). Insert your fingers into the two holes (2) and slowly lift the table out of the VersaLASER being careful not to bump it around

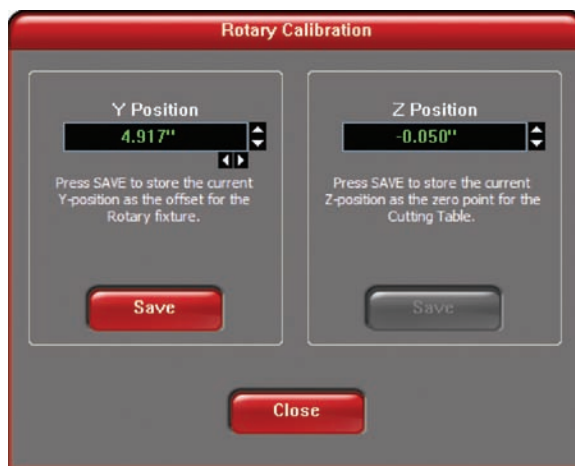


5. Inside the VersaLASER you will find the large recessed slot with a self-aligning electrical connector to the right side (1) and the two alignment pins (2)

6. Now raise the Z-axis platform as high as it will go by using the VLS keypad or UCP.

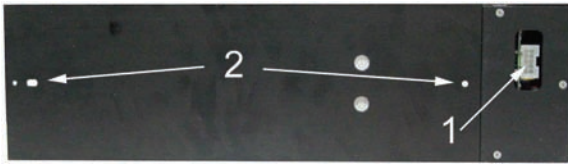


- Proceed to the UCP and activate the focus feature on the right hand side of the Viewer Tab. Click within the focus feature and have the focus carriage move over the alignment pin as shown. Use the red LED to position the focus carriage over the pin properly. You can also use your computers keyboard to control the movement of the focus carriage when you are using the focus feature. **DO NOT** exit the focus feature yet.

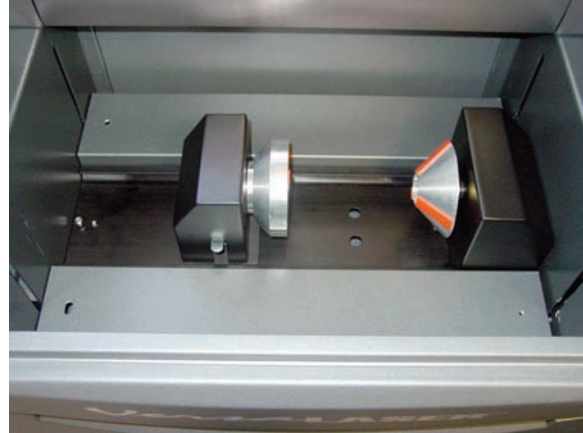


- Next, proceed to the System Tab and click on the Rotary CALIBRATE button. The Rotary Calibration window appears. Click on the Y Position SAVE button. If it asks you to override the current position accept the new number. Once the Rotary Calibration window is closed the focus carriage will re-home.

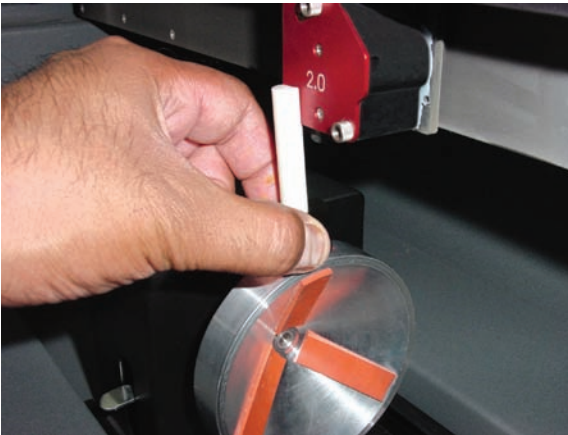
- Go back to the Viewer Tab and exit the focus feature.
- Lower the table all the way **DOWN** to the bottom of its travel.



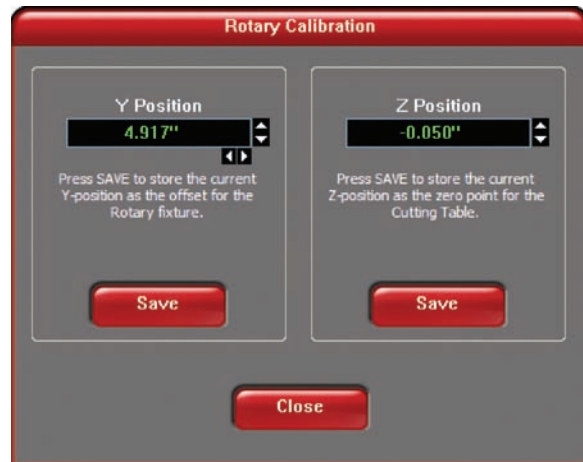
11. On the underside of the Rotary notice the self-aligning electrical connector (1) and two alignment holes (2).



12. Insert the Rotary into the slot (OK to do with the power on because it is hot swappable) and move it around until the connector engages, the pins protrude through the alignment holes, and the fixture sits flat. It will indicate that it is installed properly by automatically rotating its cone slightly.



13. Using the same procedure in step 7 use the focus feature and move the focus carriage's red LED over the flat part of the metal concave fixture. Now use the focus tool and manually focus on top of the flat part of the metal concave fixture. **DO NOT** focus on top of the black metal cover normally located on the left hand side of the rotary.



14. Once you have manually focused proceed to the System Tab and click on the Rotary CALIBRATE button. The Rotary Calibration window appears. Click the SAVE button for the Z Position **ONLY**. If it asks you to override the current position accept the new number.

15. Rotary calibration is now done. Rotary calibration does not need to be done again unless the VLS's CPU is changed or calibration settings are changed.

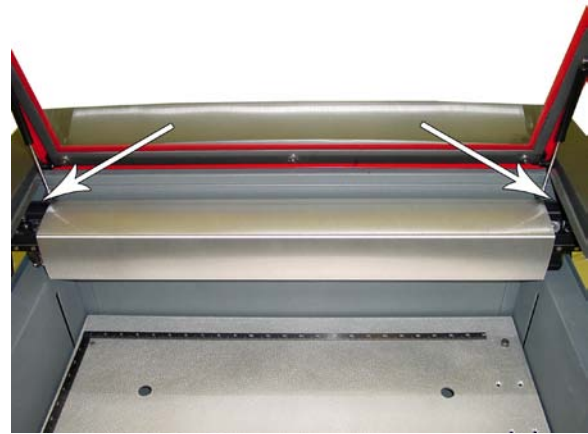
A050 - X-axis Arm Alignment Check and Adjust (Squaring)

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1. Make sure the VLS is powered OFF and unplugged.

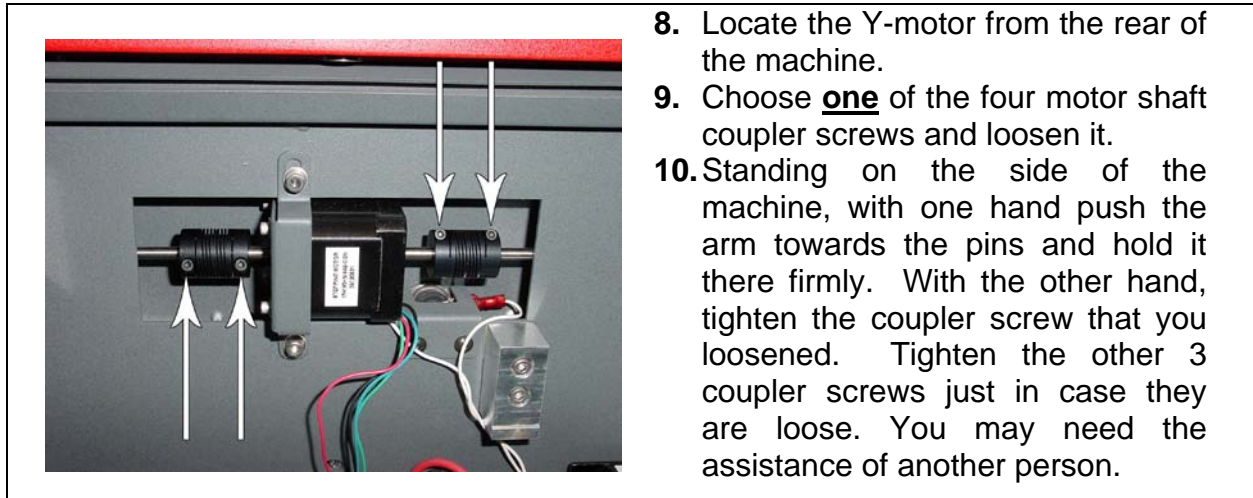


2. Open the Top Door.
3. Locate the pins that are pressed into the Y-axis Rails. There are two pins, one on each rail, in the rear corners of the main enclosure.



4. Gently push the X-axis Arm all the way to the back. Observe if both sides of the arm touch the two respective pins, at the same time. You may need a flashlight to see the pins. If you cannot, make a judgment by the gap between the arm and the rear wall.
5. If one side touches one pin, and the other side doesn't, the arm is not square and you will need to proceed to step 6. If the arm touches both pins you are done with this process.

6. Remove the [Rear Cover](#).
7. Remove the [Laser Tube](#).



11. Reassemble the system.

12. If the X-axis arm continues to come out of square, then either the **Y-axis Belt** is loose or worn excessively or the **Y-axis Drive Gear** is slipping. Proceed to those sections and then perform this procedure again.

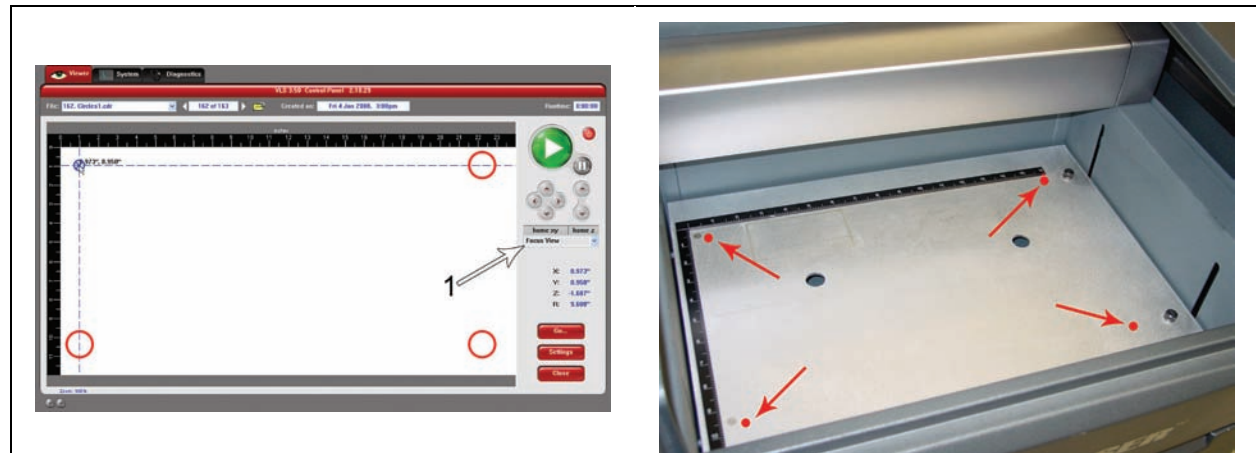
A060 - Laser Beam Check and Alignment

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Make sure the table is clear of any objects that could obstruct the movement of the motion system. **The red diode is ONLY a guide.** The red diode may be slightly off center compared to the burn mark you will make in the following steps so we recommend you make a burn mark for best results.

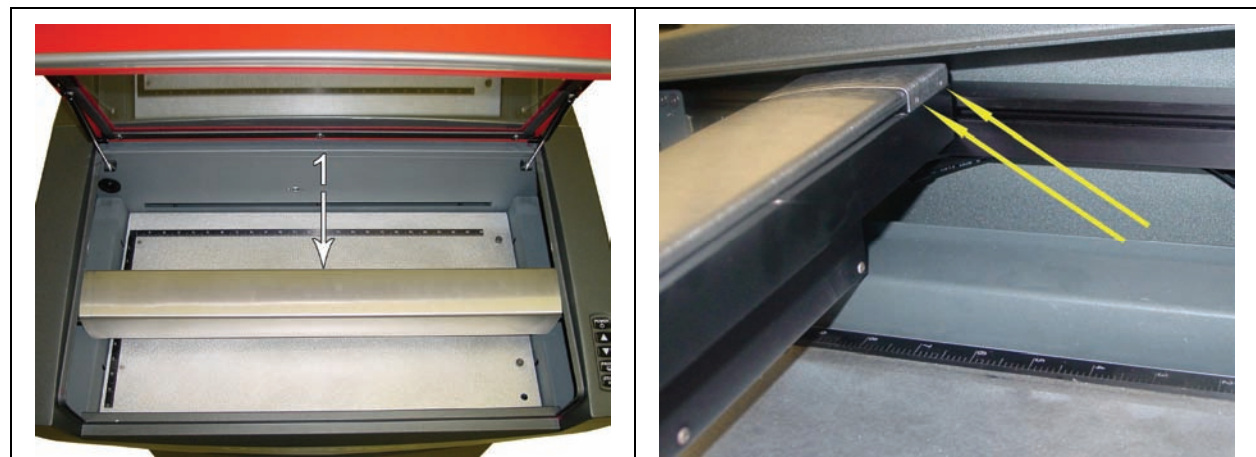
<ol style="list-style-type: none"> 1. Power the VLS ON and let it home, or re-home it by clicking the Home XY button in the Viewer Tab of the UCP. 	<ol style="list-style-type: none"> 2. Remove the optics from the Focus Lens Carriage and place in a safe, clean place.
	<ol style="list-style-type: none"> 3. Place a strip of masking tape over the hole on the left side of the Focus Carriage. 4. The red diode beam should appear on the tape. The red diode beam should be fairly centered over the hole.



The screenshot on the left shows the 'Viewer Tab' in the UCP software. A red circle labeled '1' points to the 'Focus View' button. The interface displays a grid and various control buttons. The photograph on the right shows the interior of the laser table with four red dots indicating the positions of the red diode beams in the corners, each with a red arrow pointing to a hole in the focus carriage.

5. Using the Focus Feature (1) of the Viewer Tab in the UCP, verify the position of the red diode beam relative to the hole in the focus carriage in all four corners of the table.

6. The red diode should be **fairly centered** on the hole in all four corners of the table. If this is the case, you can remove the masking tape from the hole in the focus carriage and reinstall the optics. The laser beam is aligned.
7. If the red diode beam is **not centered** on the hole in all four corners of the table, the beam will need to be aligned. Do not remove the masking tape or reinstall the optics.
8. Power off the VLS and unplug the unit.

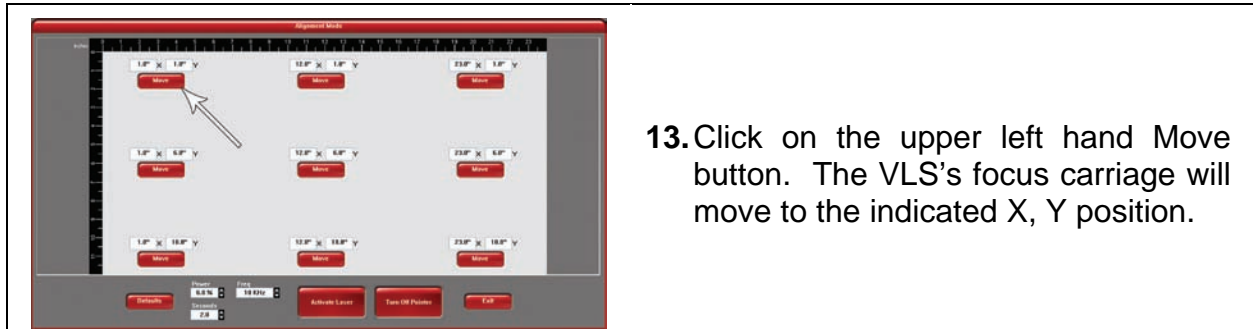


The photograph on the left shows the X-axis arm (1) being moved forward, indicated by a white arrow. The photograph on the right shows a close-up of the left-hand side of the X-axis arm, with two yellow arrows pointing to the screws that secure the cover.

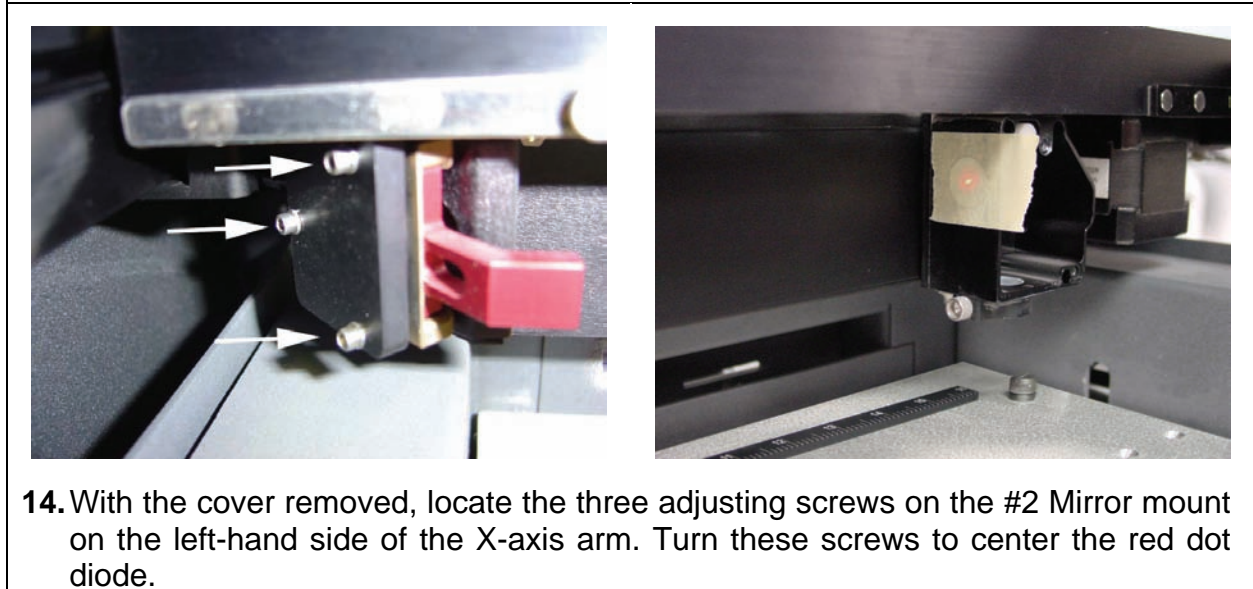
9. Slowly move the X-axis arm (1) forward.

10. Locate and carefully remove the two screws securing the cover on the left-hand side of the X-axis arm. Remove this cover.

11. Plug in the VLS and turn the power on with the top door open.
12. Once it finishes homing proceed to the System Tab then click on the Alignment Launch button. The Alignment Mode window will appear.

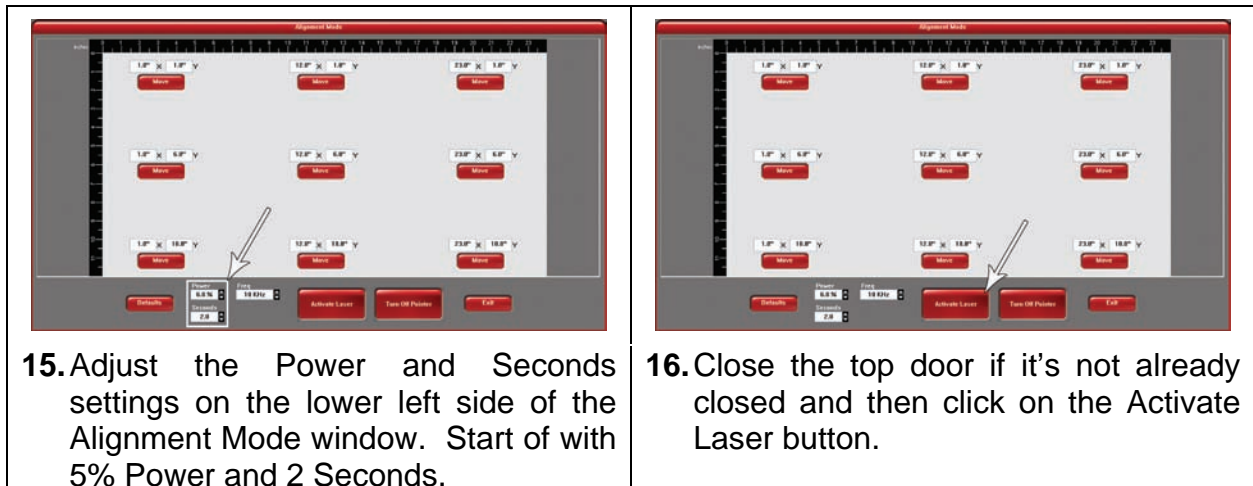


13. Click on the upper left hand Move button. The VLS's focus carriage will move to the indicated X, Y position.



14. With the cover removed, locate the three adjusting screws on the #2 Mirror mount on the left-hand side of the X-axis arm. Turn these screws to center the red dot diode.

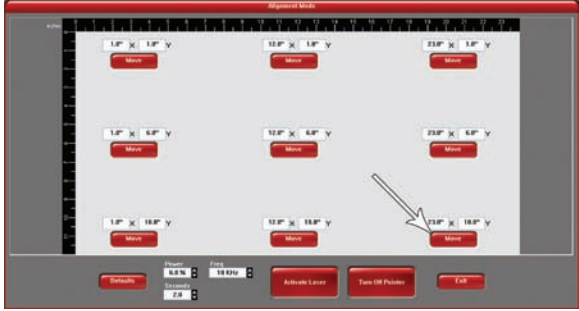
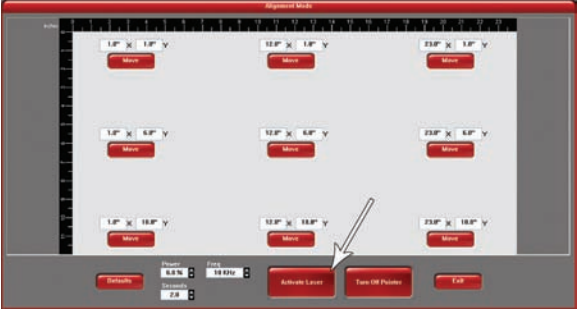
Note: To create a small burn mark on the tape in the next step you will need to adjust your Power and Seconds settings in the Alignment Mode screen (lower left side). Lower power laser tubes require higher power settings and higher power laser tubes require lower power settings to make the burn mark on the tape.



15. Adjust the Power and Seconds settings on the lower left side of the Alignment Mode window. Start off with 5% Power and 2 Seconds.

16. Close the top door if it's not already closed and then click on the Activate Laser button.

17. If the burn mark is not centered adjust the corresponding screw on the #2 Mirror mount.
18. If the burn mark is centered continue to step 20.
19. Continue making a burn mark on a new piece of tape until the burn mark is fairly centered on the upper left hand corner.
20. Once the burn mark is centered keep the piece of tape on the focus carriage.

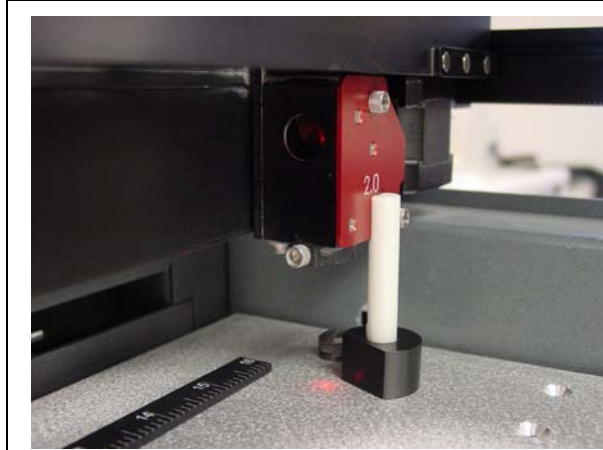
	
<p>21. Now click on the lower right side Move button.</p>	<p>22. Close the top door if it's not already closed and then click on the Activate Laser button. Take note of the burn mark.</p>

23. Both burn marks should be over lapping each other near the center. If they are not continue to adjust the #2 Mirror for the lower right hand corner.
24. Once aligned Exit the Alignment Mode Window and remove the masking tape from the Focus Lens Carriage and reinstall the optics.
25. Power off and unplug the VLS.
26. Reinstall the cover and two screws over the #2 mirror mount from step 10.

A070 - Z-axis Leveling

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1. Power ON the VLS.



2. Using the Focus tool manually set the focus height to the engraving table.

3. Power OFF and unplug the laser system.

4. Remove the [Rear Cover](#).

5. Remove the [Rear Side Covers](#).

6. Remove the [Side Covers](#).



7. Locate the four pulleys, one at the bottom of each lead screw. Two pulleys with lead screws are on each side of the machine.

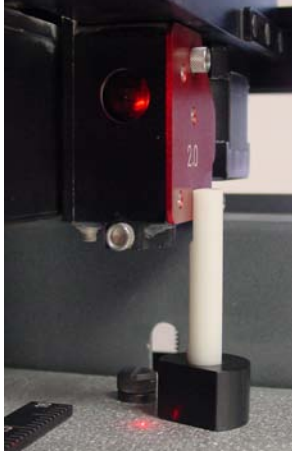


Table to low

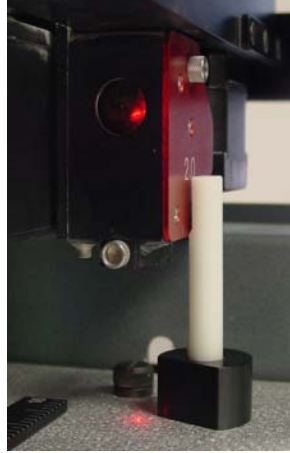
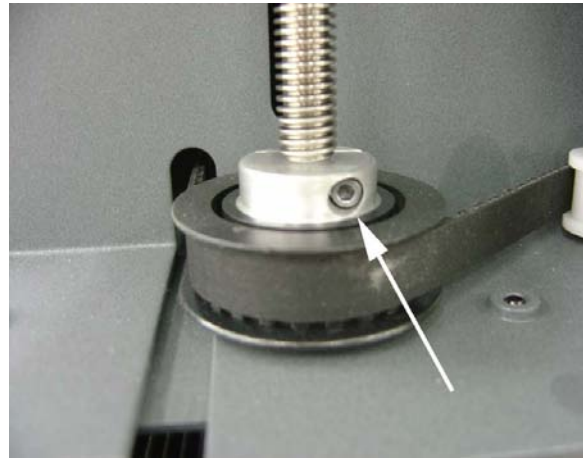


Table to high

8. Move the focus carriage to each of the four corners of the table by hand. At each corner, use the Focus tool to check the height of the table to the Focus carriage.
9. Locate the corner (or corners) of the table that are "off", i.e. either too close or too far from the Focus carriage.



10. One at a time, locate the pulley of the lead screws that are "off".
11. If necessary, rotate the pulley to find the screw at the base shown above.
12. Loosen the pulley screw.
13. After the screw is loose, you can adjust that corner of the table independently from the rest of the table by turning that lead screw by hand.
14. Use the focus tool to measure the changing height of the corner you are adjusting until it is exactly correct.

15. Repeat this process with all other corners that are out of level.

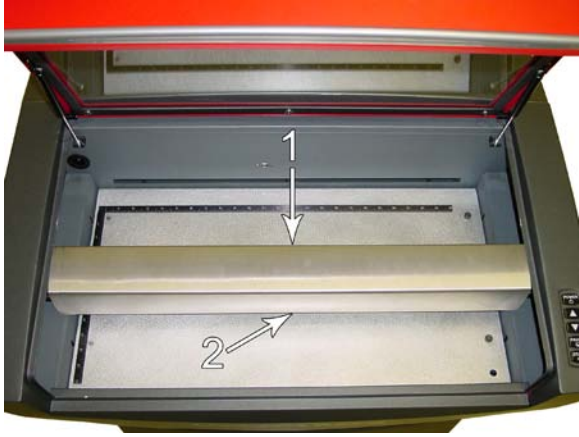

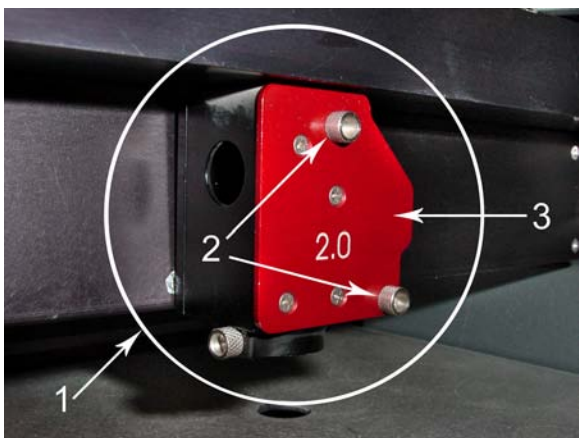
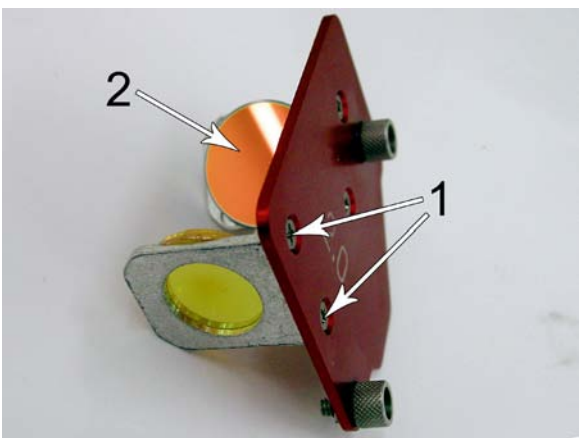
16. Check to make absolutely certain that each of the pulley screws is firmly tightened.

17. Replace all of the covers.

R000 – Focusing Lens

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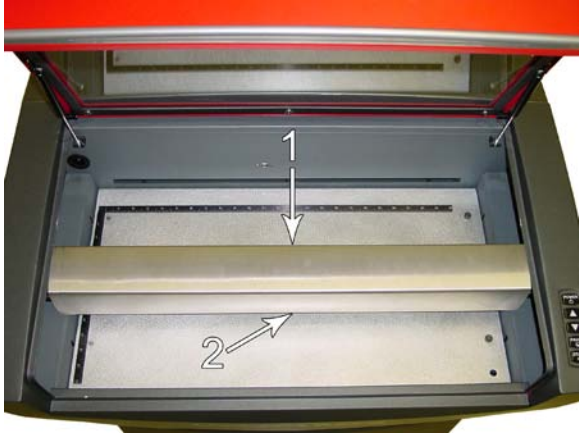

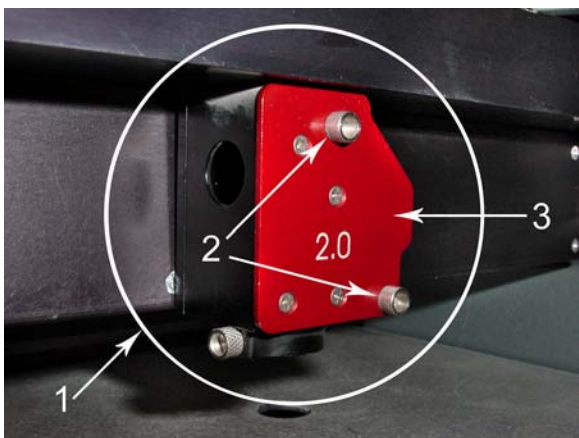
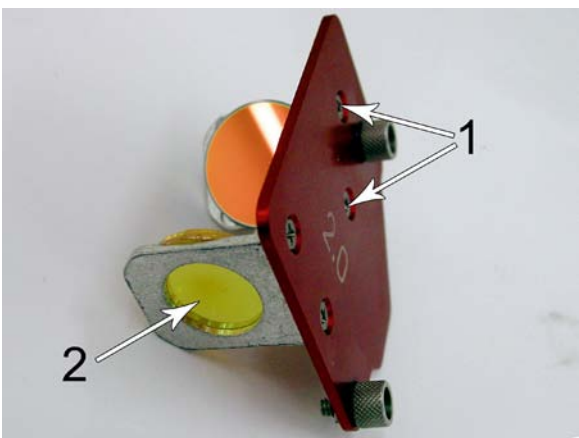
1. Make sure the VLS is powered OFF and unplugged.

 <p>2. Slowly slide the X-axis Arm (1) forward.</p> <p>3. Grasp the bottom lip (2) of the cover.</p>	 <p>4. Rotate the cover (1) up and over the top of the X-axis Arm. The cover is held down by magnets and will “stick” slightly when you first begin to pull it upward.</p>
 <p>5. Locate the Focus Carriage (1).</p> <p>6. Loosen the two thumbscrews completely (2). They are held captive by retaining clips so they will not come out all the way.</p> <p>7. Grasp the Front Cover Plate (3). Gently slide it forward and out of the Focus Carriage to remove the optics.</p>	 <p>8. Place the optics on a soft, non-abrasive cloth.</p> <p>9. Remove the two Phillips head screws (1) that attach the Focusing Lens to the Front Cover Plate and remove the optic.</p> <p>10. Attach the new Focus Lens to the Front Cover Plate.</p> <p>11. Clean the #3 Mirror (2) if necessary.</p> <p>12. Reinstall the optics in the Focus Carriage.</p>

R010 - Mirror 3

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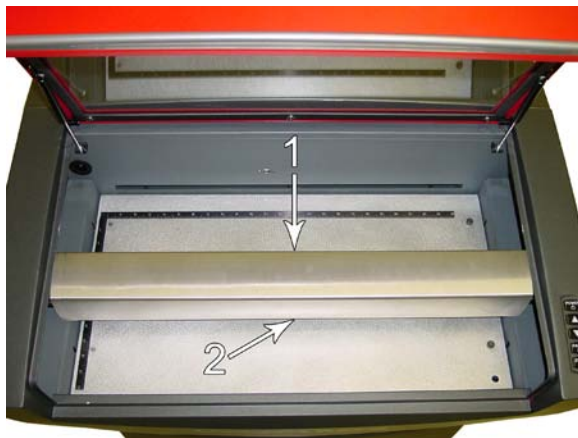
1. Make sure the VLS is powered OFF and unplugged.

 <p>2. Slowly slide the X-axis Arm (1) forward.</p> <p>3. Grasp the bottom lip (2) of the cover.</p>	 <p>4. Rotate the cover (1) up and over the top of the X-axis Arm. The cover is held down by magnets and will “stick” slightly when you first begin to pull it upward.</p>
 <p>5. Locate the Focus Carriage (1).</p> <p>6. Loosen the two thumbscrews completely (2). They are held captive by retaining clips so they will not come out all the way.</p> <p>7. Grasp the Front Cover Plate (3). Gently slide it forward and out of the Focus Carriage to remove the optics.</p>	 <p>8. Place the optics on a soft, non-abrasive cloth.</p> <p>9. Remove the two Phillips head screws (1) that attach Mirror 3 to the Front Cover Plate and remove the optic.</p> <p>10. Attach the new Mirror 3 to the Front Cover Plate.</p> <p>11. Clean the Focus Lens (2) if necessary.</p> <p>12. Re-attach to the Focus Carriage.</p>

R020 - Mirror 2

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1. Make sure the VLS is powered OFF and unplugged.



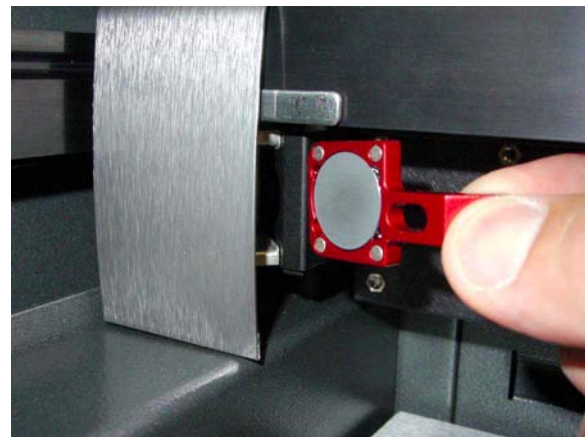
2. Slowly slide the X-axis Arm (1) forward.
3. Grasp the bottom lip (2) of the cover.



4. Rotate the cover (1) up and over the top of the X-axis Arm. The cover is held down by magnets and will “stick” slightly when you first begin to pull it upward.



5. Locate Mirror 2 on the left side of the X-axis arm.
6. Grasp its protruding handle with your thumb and forefinger and slide it out. It is held in place by magnets so you may feel a slight resistance when you begin to slide it out. The next photo shows the backside of the mirror.



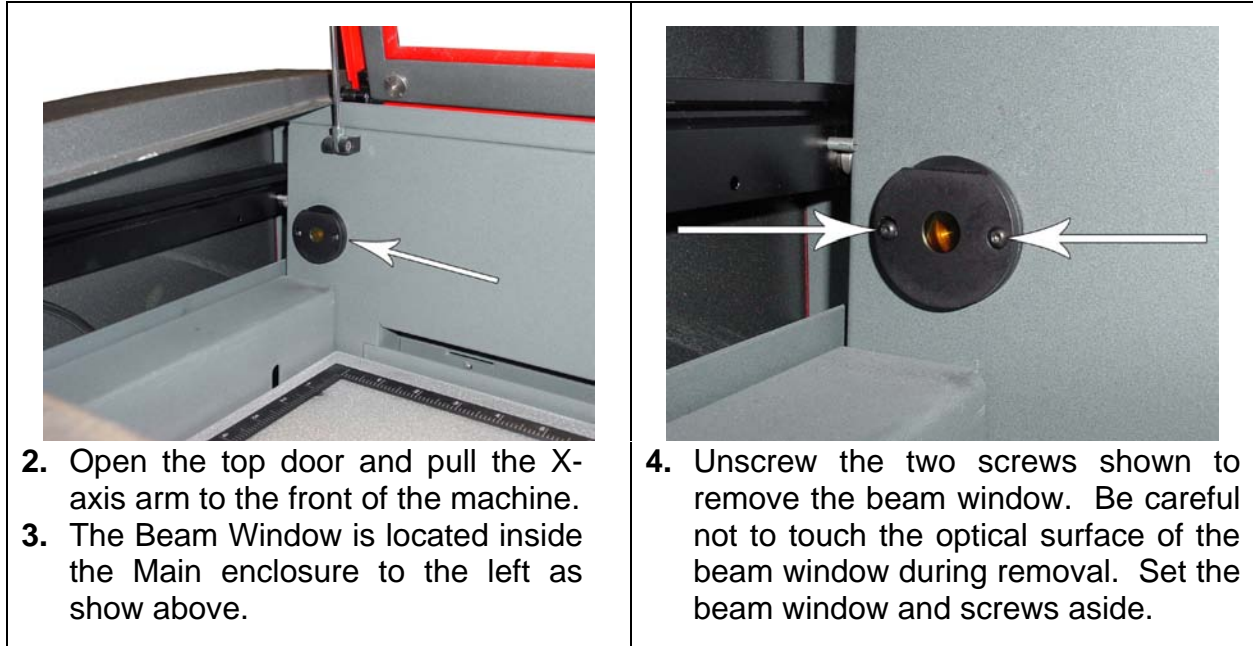
7. Install the new Mirror 2 by sliding it into the mounting slot until it stops.
NOTE: Installing the mirror backwards will cause the handle to protrude in such a way that the X-axis Arm cover will not close properly and will destroy the mirror once the laser beam penetrates the backside of the mirror, so be sure that you re-install the mirror correctly.

R030 - Beam Window

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NOTE: Be very careful not to touch the optical surface of the beam window during installation or removal.

1. Power OFF and unplug the VLS.

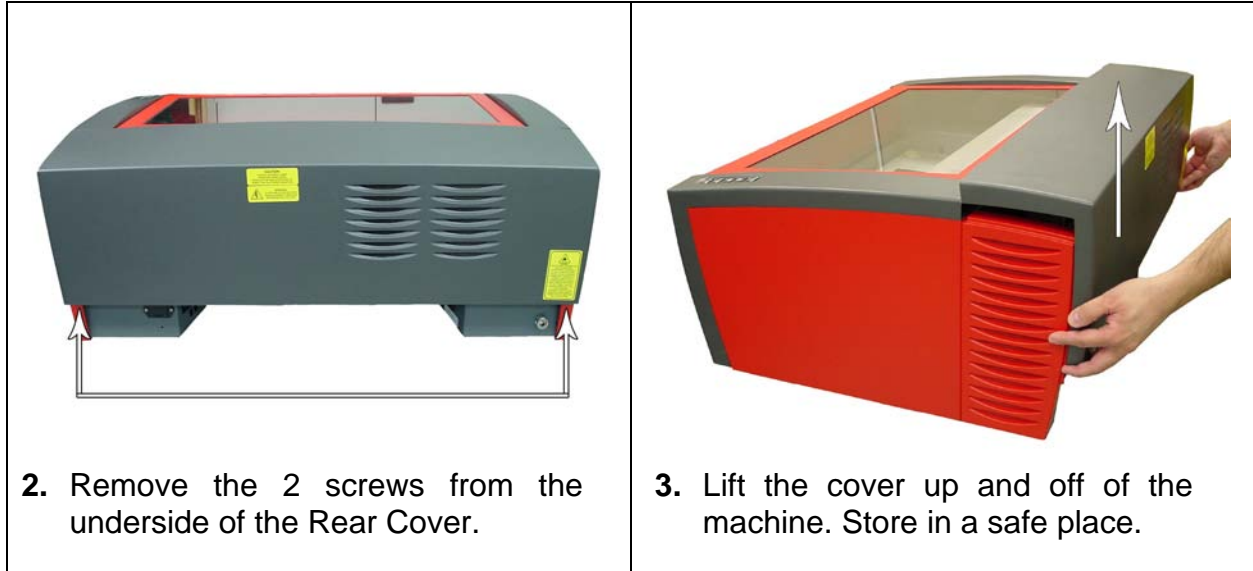


5. Installation is opposite of removal.

R100 - Rear Cover

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1. Make sure the VLS is powered OFF and unplugged.

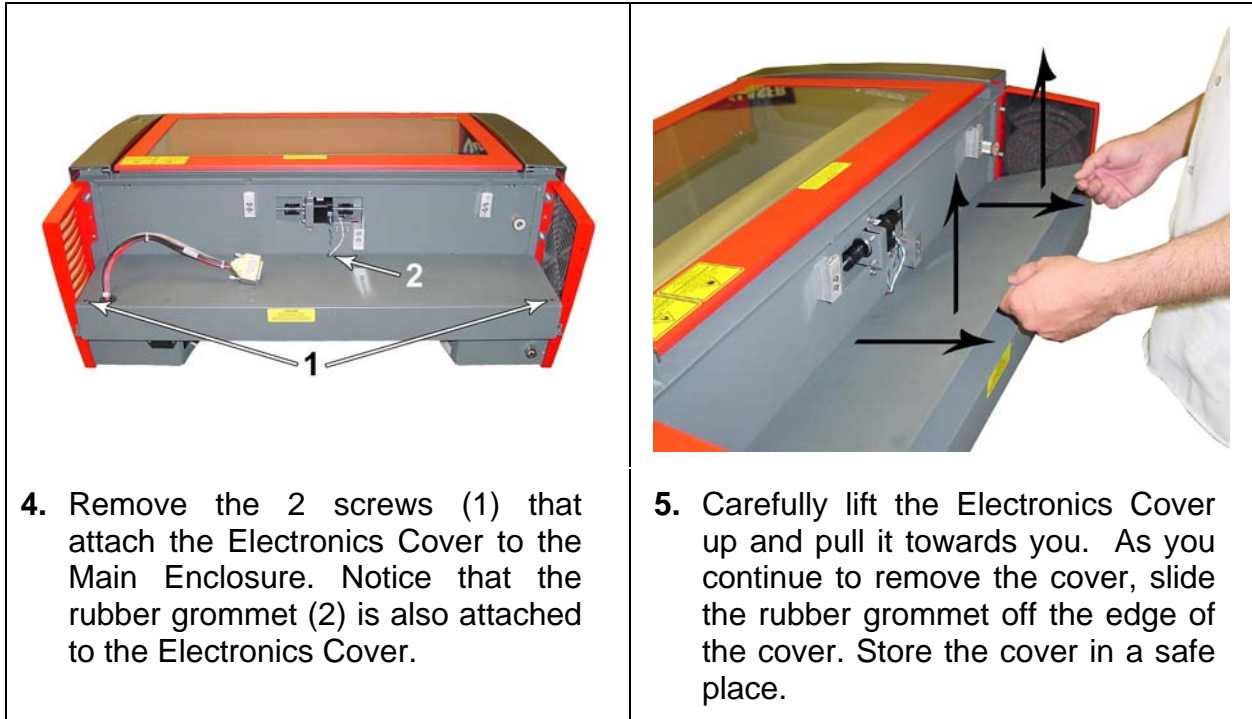


4. Installation is opposite of removal.

R110 - Electronics Cover

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1. Make sure the VLS is powered OFF and unplugged.
2. Remove the [Rear Cover](#).
3. Remove the [Laser](#).
 - a. Verify that you remove the bracket as stated in [Laser](#) before removing the laser tube.

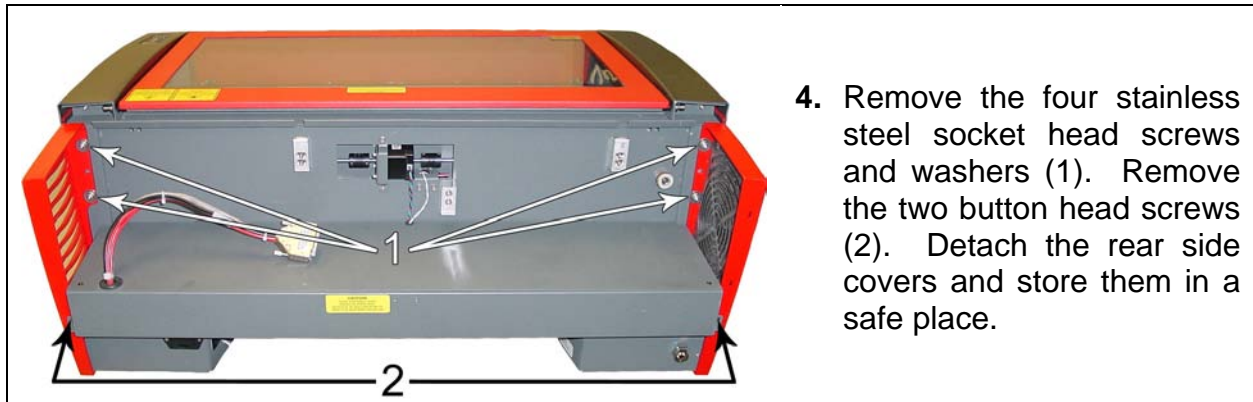


6. Installation is opposite of removal.

R120 – Rear Side Covers

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1. Make sure the VLS is powered OFF and unplugged.
2. Remove the [Rear Cover](#).
3. Remove the [Laser](#).



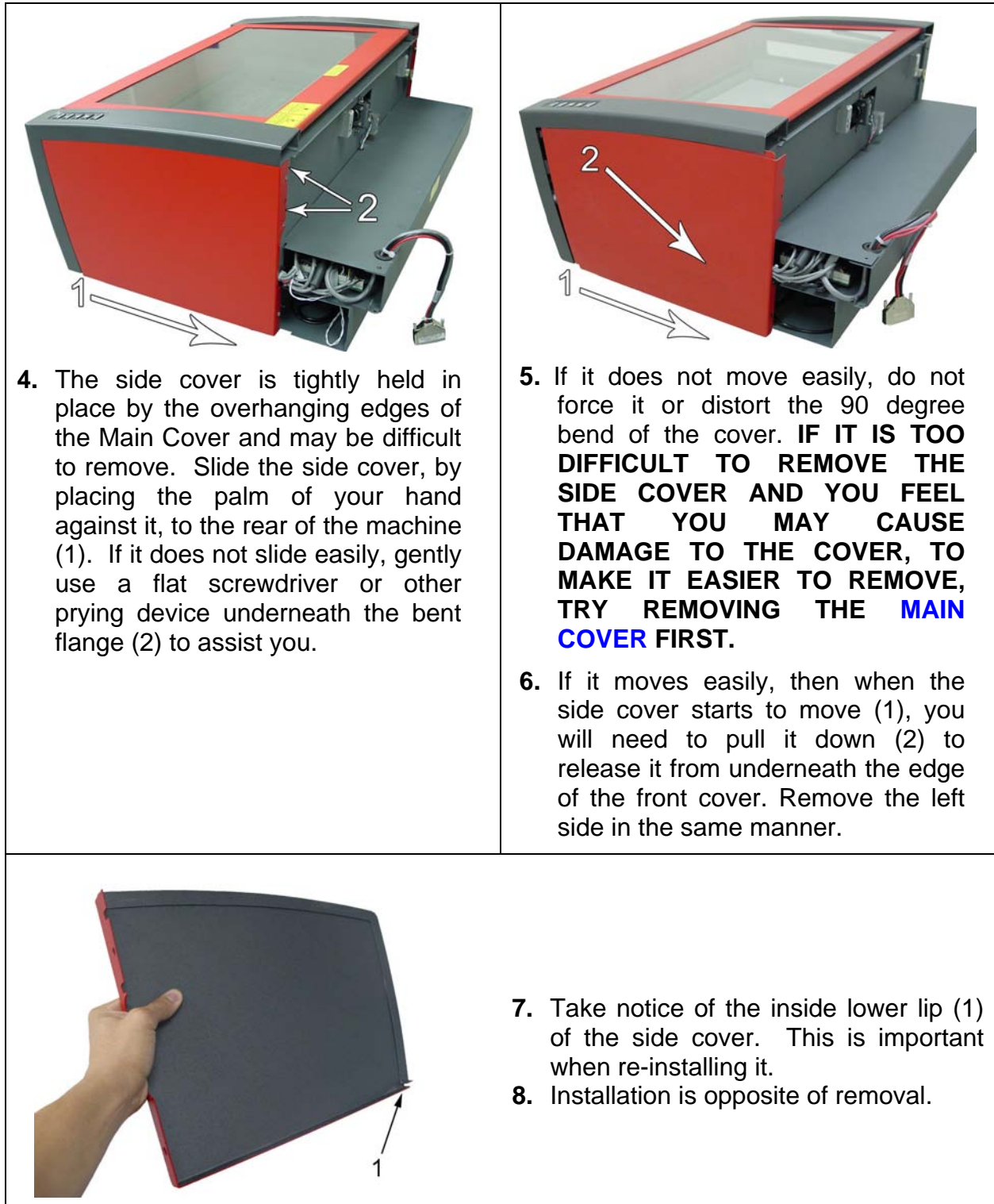
4. Remove the four stainless steel socket head screws and washers (1). Remove the two button head screws (2). Detach the rear side covers and store them in a safe place.

5. Installation is opposite of removal.

R130 – Side Covers

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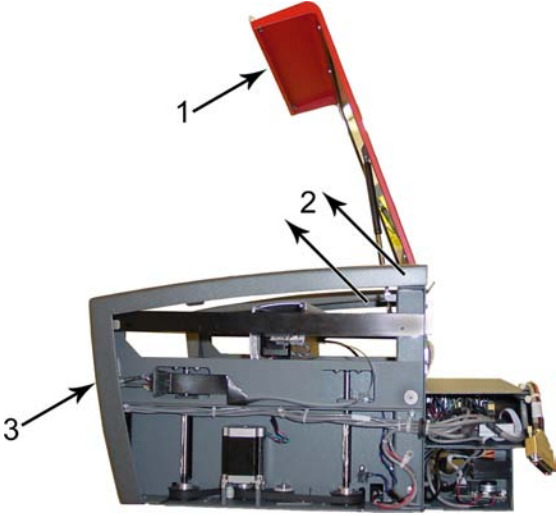
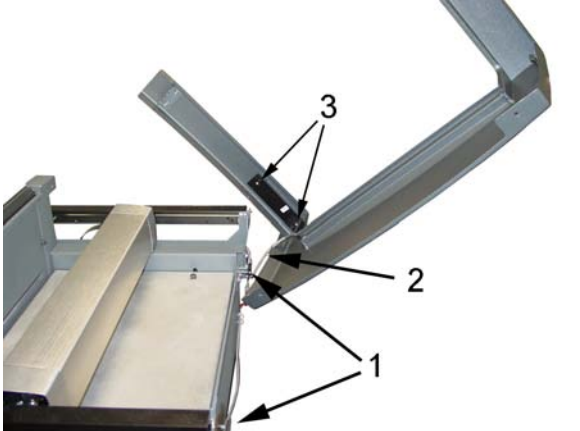
1. Remove the [Rear Cover](#).
2. Remove the [Laser](#).
3. Remove the [Rear Side Covers](#).



R140 – Main Cover and/or Keypad

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1. Make sure the VLS is powered OFF and unplugged.
2. Remove The [Rear Cover](#), [Laser](#), and [Rear Side Covers](#).
3. Remove the [Side Covers](#). If you are having difficulty removing the side covers, proceed to the next step anyway.

 <p>4. Locate and remove the two button head screws at the bottom front of the VLS.</p>	 <p>5. Remove the four screws at the top rear corners of the VLS.</p>
 <p>6. Open the Top Door (1). 7. Gently lift up on both arms (2). There may be some binding along the front side of the Main Cover as the cover passes over the two Top Door Interlock Sensors (3).</p>	 <p>8. Remove the Main Cover slowly. Take notice of the Top Door Interlock Sensors (1) and the Keypad wiring harness (2). 9. Unplug the Keypad wiring harness from the keyboard. 10. If you are removing the Keypad, take off the two screws (3) and detach it from the enclosure.</p>

11. Installation is opposite of removal.

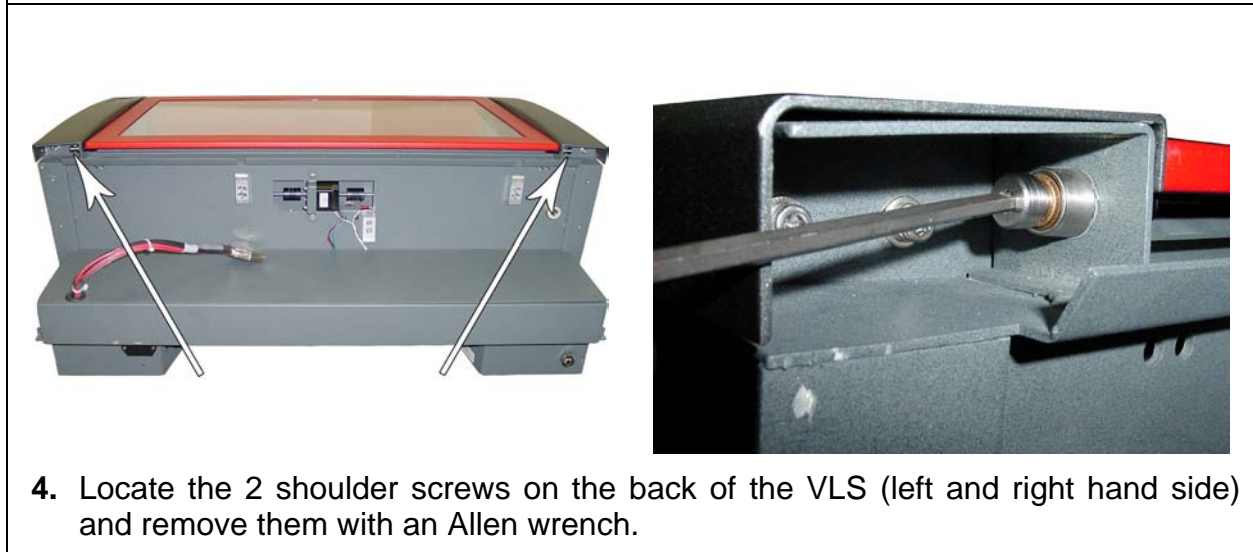
R150 - Top Door Window

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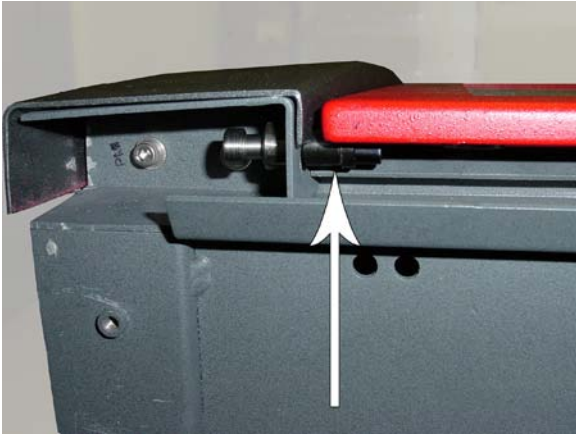
1. Make sure the VLS is powered OFF and unplugged.
2. Remove the [Rear Cover](#).



3. Open the top door and locate the 2 hydraulic cylinders and remove the 2 shoulder screws as shown. Hold the top door with one hand while taking the screws off so the top door won't drop down. Close the top door.

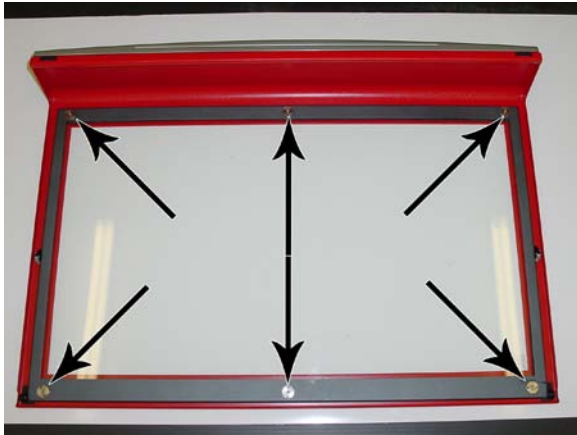


4. Locate the 2 shoulder screws on the back of the VLS (left and right hand side) and remove them with an Allen wrench.



5. While the shoulder screw is being removed 2 spacers between the main cover and the top door will drop. Set the spacers and shoulder screws aside.

6. Remove the top door from the VLS and place it on a flat surface like a table.



7. Locate the 6 window nuts and remove them with needle nose pliers like shown. Set the window nuts aside.



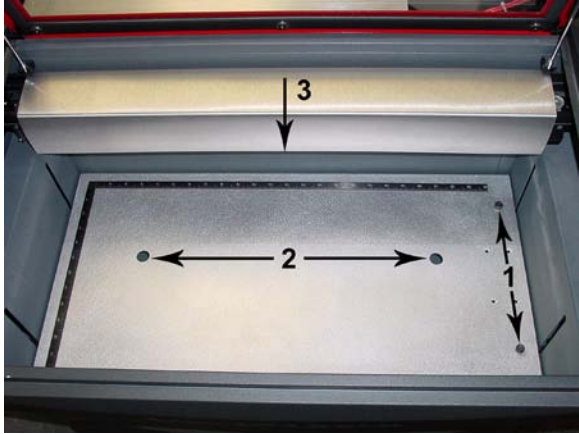


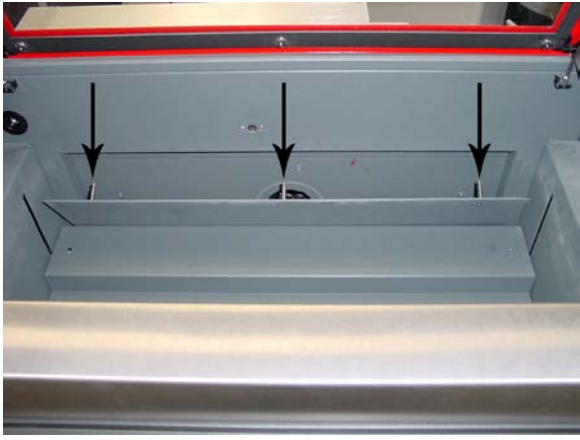
8. **Carefully** turn the top door over and remove the window frame from the top door. Using your fingers remove the glass window from the frame. The glass window is help in place by sticky foam tape. **DO NOT** remove the sticky tape from the frame.

9. Install the new glass window onto the window frame.
10. Installation is opposite of removal. Verify that you place the spacers back into place where they were removed from step 5.
11. Plug in and power ON the VLS. Open and close the door. Check to see if the Red Diode turns on and off when you open and close the door, respectively.
12. Installation is complete.

R160 – Exhaust Plenum

Table of Contents

1. Power ON the PC and VLS.
2. Home the Z-Axis or use the down arrow button in the UCP or Keypad to lower the engraving table to the bottom of its travel.
3. Power OFF and unplug the VLS.

	
<p>4. Remove the table by loosening the two captive thumbscrews (1). Insert your fingers into the two holes (2) and slowly lift the table out of the VLS being careful not to bump it around. Move the X-Arm (3) forward.</p>	<p>5. Once the table is removed, carefully insert your fingers in the slot as shown and gently pull forward. Next, pull up on the panel to remove it.</p>
	
<p>6. Now is a good time to clean the plenum and exhaust port if required.</p>	<p>7. When reinserting the panel, verify that the 3 pins are inserted correctly into the holes and that the panel sits flush against the wall of the VLS.</p>

8. Installation is opposite of removal.

R170 – Rulers

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1. To replace the rulers you need a hard plastic scraper and some double-sided adhesive tape.
2. Use the scraper to gently pry up one of the corners of the ruler and slowly move down the ruler prying up each section.
3. Once the rulers are removed, use some solvent cleaner to remove any of the tape residue left over from the removed rulers.
4. Place masking tape on the table over the approximate location of the ruler positions extending the full length of the table in box axes.
5. Using your graphic software, create a red line box that outlines the page size perfectly.
6. Run that cut file to see the exact location of where the edges of your rulers should be.
7. After the cut file has been run, peel the outside masking layer off leaving the inside portion to set your rulers to.
8. Put the double-sided tape on your new rulers and stick them down to the outside of the leftover masking tape.
9. Once the rulers are in the correct place, press down firmly on them to ensure they hold their position.
10. Remove the masking tape from the inside.

R200 - X-axis Bearings

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1. Power OFF and unplug the VLS.



2. Pull the X-axis arm forward and lift the arm cover. The cover is held down by magnets and will “stick” slightly when you first begin to pull it upward.



3. Carefully move by hand the Focus Carriage towards the center of the X-axis arm. Looking down on the arm with the cover open, you will see 4 bearings in a square pattern guiding the Focus Carriage Assembly along the X-rails.

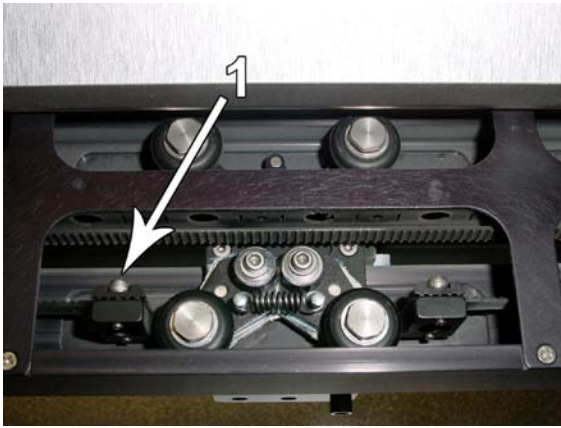


4. Bearing replacement is easiest if the Main X-Arm cover is removed first. Using a ball-end Allen wrench, remove the 2 screws shown above. Be careful not to lose the screws or washers.

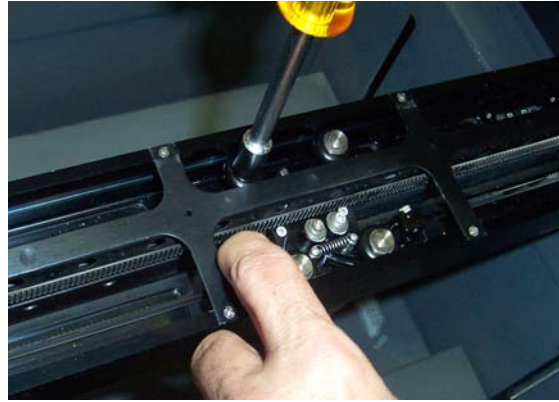


Order of removal

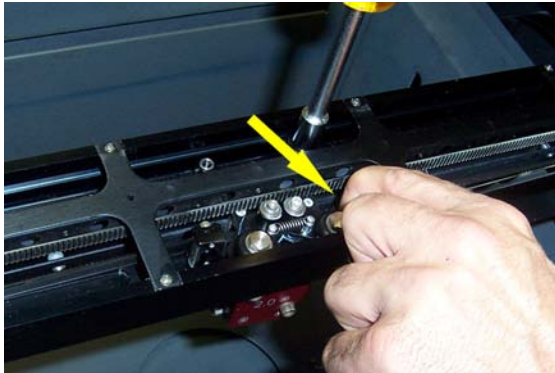
5. To remove the bearings, first remove the two rear bearings (1 and 2). With these two removed, the front bearings (3 and 4) can then be easily removed. It is recommended to use a 5/16” Nut Driver.



6. Push on the bracket as shown above to shift the bearing (1) out of the track. The entire bearing carriage will tilt and the bearing will tilt away from the track.



7. With pressure still applied, use the nut driver to remove the bearing axle in the center of the bearing.



8. Remove the second rear bearing in the same way by pushing on the adjacent bracket and removing the axle and bearing.



9. With the two rear bearings out, you can now remove the remaining two bearings.



10. Take notice of the Bearing Assembly. There is a small wave washer between the head of the axle and the bearing. Be careful not to lose or damage this washer. The bearing itself has no orientation and can be installed with either surface against the carriage.



11. Reinstall the two front bearings first. These were the last two bearings that were removed.

- 12.** Reinstall the top bearings one at a time in the same way they were removed. Push the bracket back, insert the bearing, and tighten.
- 13.** Finally, reinstall the final top bearing. Push the bracket back, insert the bearing, and tighten.
- 14.** Replace the X-axis arm cover.
- 15.** This completes the X-axis Bearing replacement procedure.

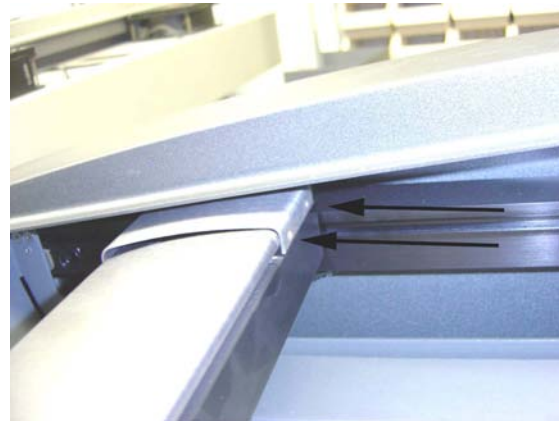
R210 - X-axis Belt

Table of Contents

1. Power OFF and unplug the VLS.



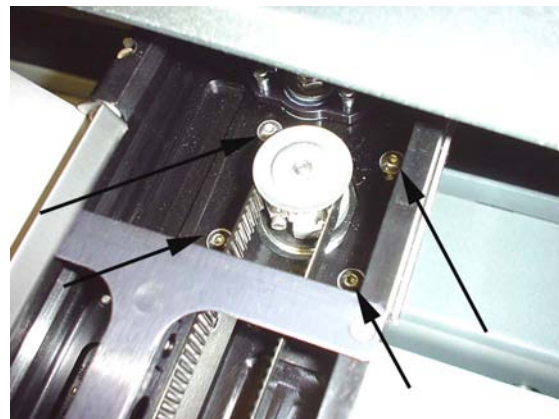
2. Pull the X-axis arm towards the front of the machine.
3. Locate the two small metal covers at each end of the X-arm.



4. Remove the screws shown above (the screws are located on the back of the X-axis arm on both ends).
5. Remove the small end covers on both sides and lift up the X-axis arm cover.



6. First taking note of the tension of the belt, loosen (but do not remove) the screws on the belt clamps shown above.
7. Remove the belt once it has been separated from the clamps.



8. Loosen the four screws shown above. These mount the X-axis motor to the arm and also adjust the belt tension.
9. Move the motor module as far to the left of the arm as possible.
10. Feed the new belt through the arm, making sure it is properly positioned around the drive gear and idler pulley.
11. Place each end of the belt inside the belt clamps and tighten.

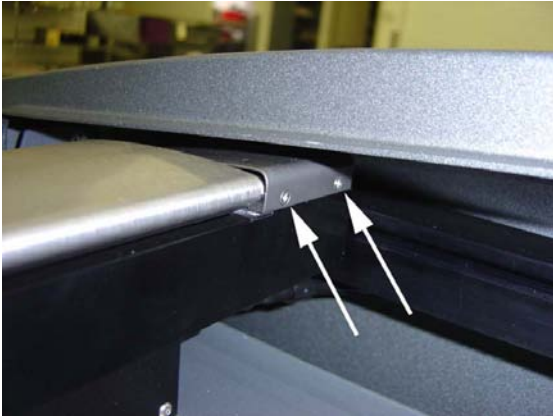


- 12.** Pick up the slack in the belt and set the tension by moving the motor module to the right and tightening all four screws down once the proper tension has been reached.
- 13.** Replace the two end covers and screws.

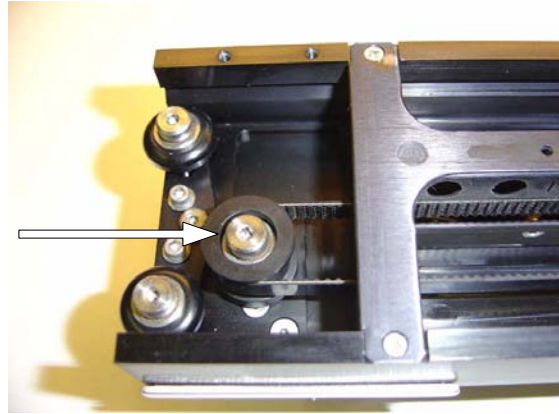
R220 - X-axis Idler Pulley

Table of Contents

1. Power OFF and unplug the VLS.



2. Pull the X-Axis arm forward so you can reach the back side.
3. Remove the two screws on the left side of the arm (located on the back side of the arm shown above).
4. Remove the small cover.



5. Lift the main X-axis arm cover and locate the idler pulley on the left side of the X-Axis arm.
6. Remove the screw on top of the idler pulley.
7. Remove the pulley and replace it with the new one.

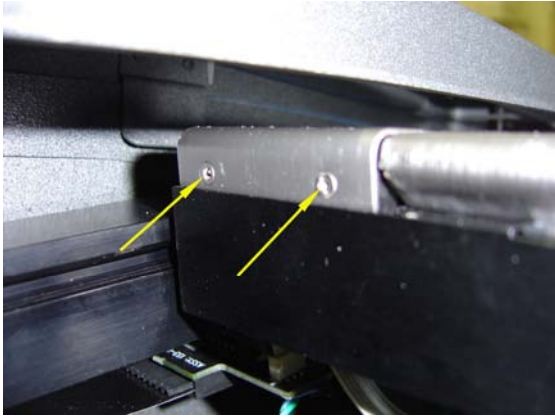
Note: You may need to loosen the X-motor on the right side of the arm to relieve some tension on the belt, and to re-set the belt tension once the new Idler pulley is re-installed. (See [X-axis Belt](#))

8. Replace the cover and screws.

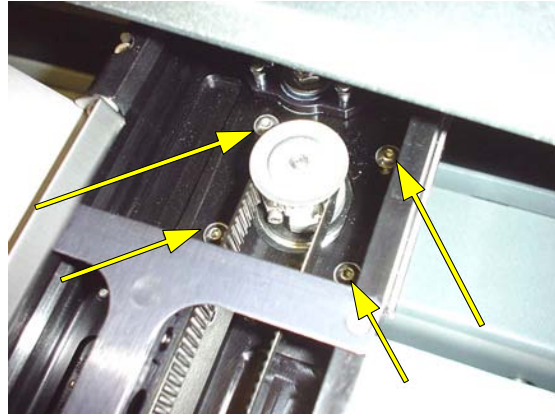
R230 - X-axis Motor and Drive Gear

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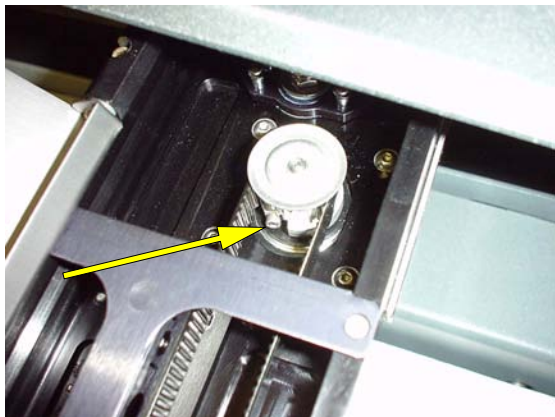
1. Power Off and unplug the VLS.



2. Remove the small cover located on the right side of the X-axis arm by removing the two screws in the rear of the arm.



3. Loosen the four screws shown above to reduce the belt tension. If you are removing the motor, remove these four screws completely.



4. Loosen the screw on the Drive Gear shown above. (If you have problems getting to it, you may have to remove the main cover)
5. Slide the Drive Gear off of the motor shaft.

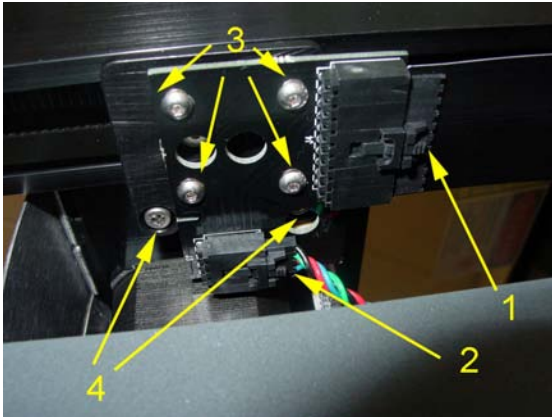


6. Tighten the new gear on the motor shaft.
7. Slide the motor to the right and tighten down the mounting screws once the desired tension is reached.
8. Replace the cover and two screws.

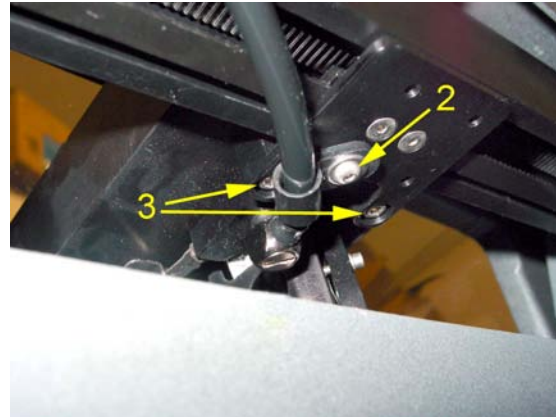
R240 - X-axis Arm

Table of Contents



1. Power OFF and unplug the VLS.
2. Remove the [Rear Cover](#), [Rear Side Covers](#), and [Side Covers](#).



3. Underneath the right side of the machine, remove the Upper Flex Cable board by unplugging the Flex Cable (1), unplugging the motor (2), and removing the 4 screws (3) that attach the board to the arm. Remove the screws one at a time and be careful not to lose the spacers (white) that are on top of the board.
4. Once the board is removed, remove the two screws that attach the Y-belt bracket to the X-axis Arm (4).



5. Underneath the left side of the machine, remove the screw that holds the clamp down but do **not** detach the clamp from the hose (2).
6. Remove the two mounting screws that attach the Y-axis belt clamp to the X-axis Arm (3).
7. Leave the hose attached to the X-axis arm but use **extreme caution** when proceeding to step 8!

	
<p>8. Grasp the arm with both hands. Gently push one side towards the rear of the machine and pull the other side towards the front of the machine. The arm will detach from the rails but do not pull on X-axis arm because this will damage your VLS.</p>	<p>9. With the X-axis arm detached from the rail, unscrew the air assist hose using a flathead screwdriver.</p>

10. If you are exchanging arms, transfer the covers and optics from the old arm to the new one.

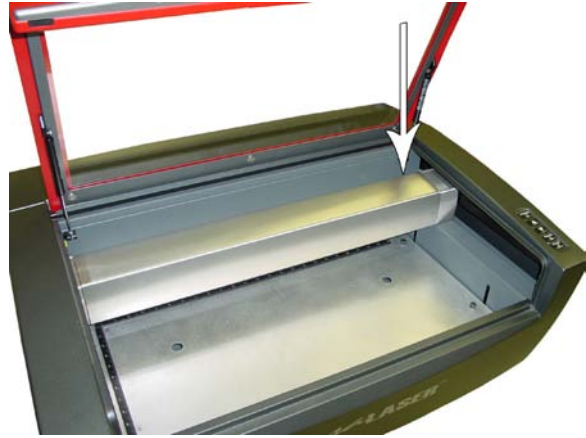
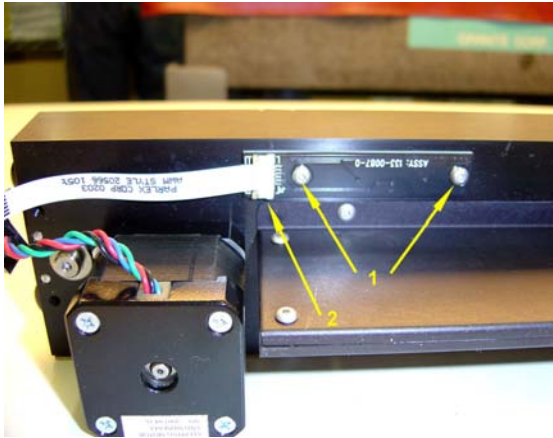
11. Installation is opposite of removal.

12. Once installed, perform [X-axis Arm Alignment Check and Adjust \(Squaring\)](#), and [Laser Beam Alignment](#).

R250 - X-axis Home Sensor Board and Flex Cable

Table of Contents

1. Power OFF and unplug the VLS.


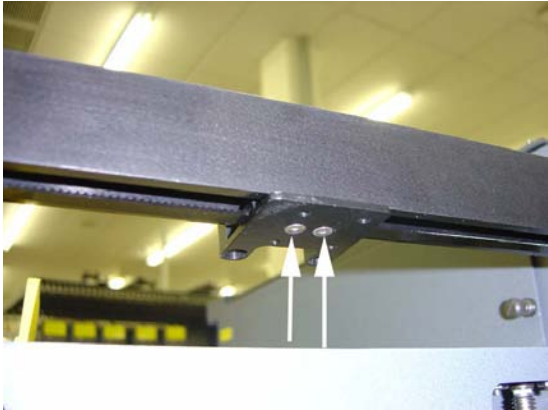
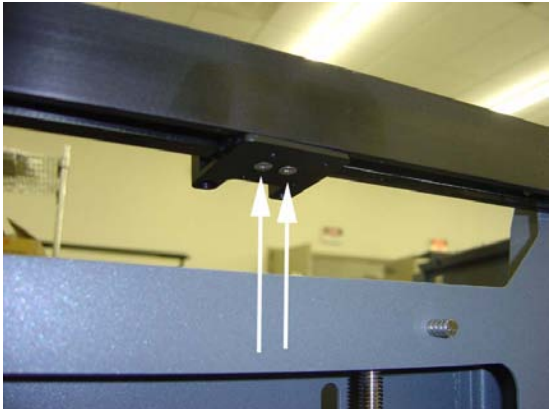
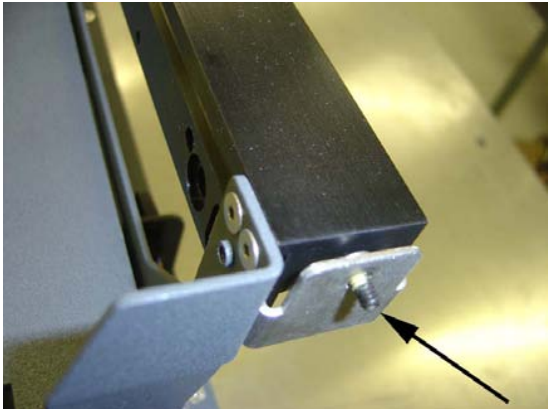
	
<ol style="list-style-type: none">2. Locate the X-axis Home Sensor board on the underside back-right portion of the X-axis arm, just to the left of the X-motor.3. Pull the arm forward to access the Homing Sensor board. Reach behind the arm with a 1/16" Hex wrench to remove the two screws (you do not have to remove the arm to complete the replacement).	<ol style="list-style-type: none">4. Remove the two screws (1) on either side of the board shown above.5. Remove the small flex cable (2) from the board by pulling on the connector release tab.

6. Installation is opposite of removal.

R300 - Y-axis Belts

Table of Contents

1. Power OFF and unplug the VLS.
2. Remove the [Rear Cover](#), [Rear Side Covers](#), and [Side Covers](#).
3. Remove the main cover. (See [Main Cover and/or Keypad](#)).
4. Remove the [X-Axis Arm](#).


 <p>5. Locate the Y belt clamps on the underside of both the Y rails.</p>	 <p>6. Remove the screws shown above to free the Y belt.</p> <p>7. Take the clamp off, but do not remove the belt at this time!</p>
 <p>8. Remove the screws on the other side as well.</p> <p>9. Staple one end of the new Y belt to the old one and pull it through, replacing the old one.</p> <p>10. Remove the stapled end.</p> <p>11. Place the new belt tightly in the clamp and put the clamp screws back into place.</p>	 <p>12. Once both belts have been clamped, use the setscrew shown above to set the tension. There is one adjustment setscrew for each belt.</p> <p>13. Reassemble the machine.</p>

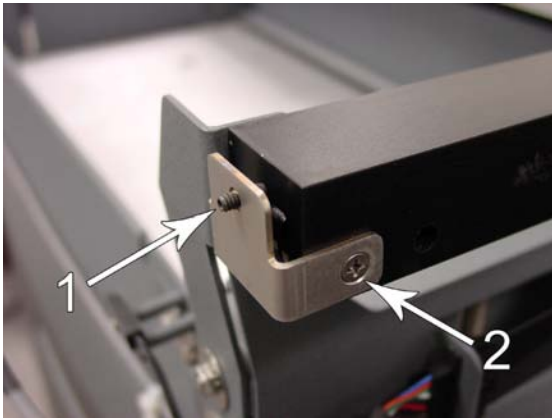
R310 - Y-axis Idler Pulleys

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SOME OF THESE PICTURES WERE MADE WITH THE Y-RAILS REMOVED FROM THE MACHINE. THIS IS FOR VISUAL PURPOSES ONLY. THE RAILS MUST REMAIN ATTACHED TO THE REAR OF THE MACHINE WHILE YOU SERVICE IT!

1. Power OFF and unplug the VLS.

 <ol style="list-style-type: none">2. Remove the main cover (See Main Cover and/or Keypad).	 <ol style="list-style-type: none">3. Locate the two screws on the inside of the Y rail.4. Remove the frame screws to release the front of the rail from the frame. DO NOT REMOVE THE ENTIRE RAIL, ONLY THE FRONT TWO MOUNTING SCREWS AS SHOWN.
--	--



5. Loosen the setscrew (1) in front of the Y rail to relieve the Y belt tension.
6. Remove the Phillip head screw (2) from the Y rail as shown above.



7. Remove the short spacer from inside the idler. (You may need to use a screwdriver to push out the spacers)



8. Remove the long spacer from the inside of the idler.



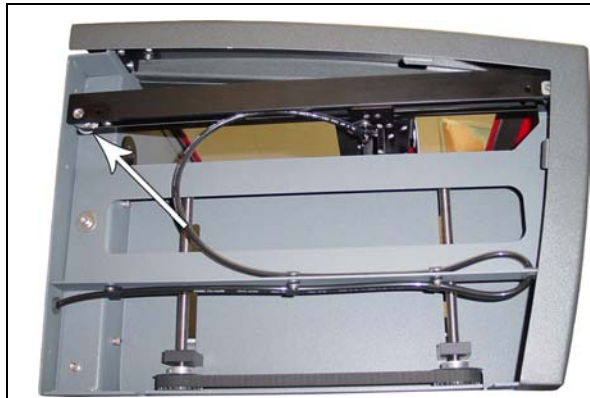
9. Remove the idler and replace it with the new one.

10. Replacement is the opposite of removal.

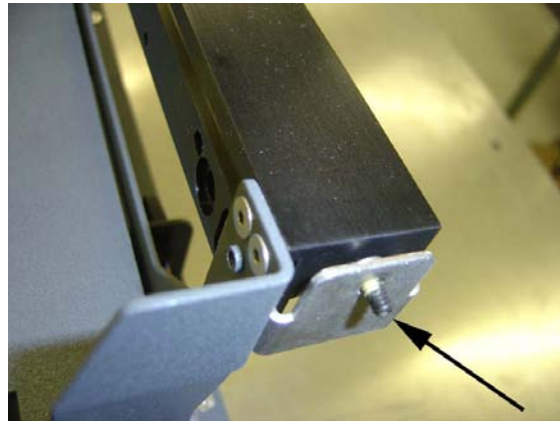
R320 - Y-axis Drive Gear

Table of Contents

1. Power up the PC and the VLS. Using the UP/ DOWN arrow buttons, either on the machine or in the UCP, lower the Z-axis table to the bottom of the enclosure.
2. Power OFF and unplug the VLS.
3. Remove the [Rear Cover](#).
4. Remove the [Laser](#).
5. Remove the [Rear Side Covers](#).
6. Remove the [Side Covers](#).



7. Locate the two Y-axis drive gears, one on each side of the system.
8. Remove the [Main Cover](#).



9. Remove the [Y-axis Motor](#).
10. Loosen the Y-axis Belt tension by loosening the setscrew as shown.



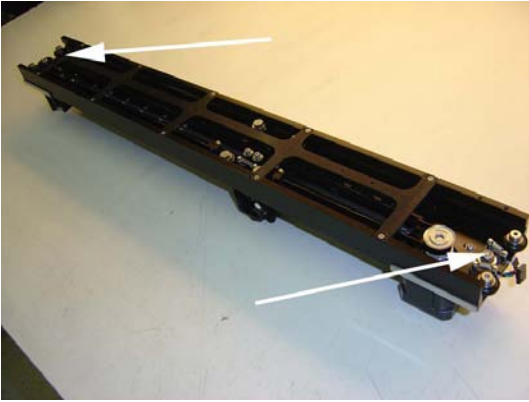
11. Loosen the Y-axis Drive Gear clamping screw shown.
12. Slide the Y-axis Drive Shafts inwards towards the center of the machine. The gears should fall out.

13. Install the new Y-axis Drive gears. Tighten the clamp screws securely.
14. Reinstall the [Y-axis Motor](#).
15. Set the Y-axis Belt tension using the setscrew as shown in Step 11.
16. Replace the [Main Cover](#).
17. Replace the [Side Covers](#), and [Rear Side Covers](#).
18. Replace the [Laser](#).
19. Replace the [Rear Cover](#).
20. Perform the procedure [X-axis Arm Alignment Check and Adjust \(Squaring\)](#).
21. Check [Laser Alignment](#).

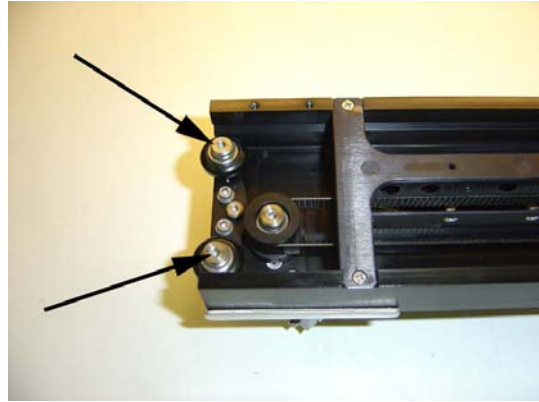
R330 - Y-axis Bearings

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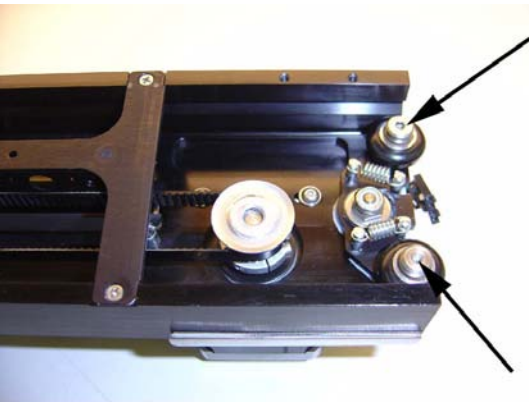
1. Power OFF and unplug the VLS.



2. Remove the [Main Cover](#).
3. Remove the X-axis Arm Cover and remove the arm itself. See the procedure [X-axis Arm](#).
4. Locate the Y bearings on either side of the X Axis arm shown above.



5. Remove the nuts in the center of the Y bearings on the left of the X-axis arm as shown above.
6. Take off the Y bearings and replace them with the new ones. Be careful not to lose the small wave washers.



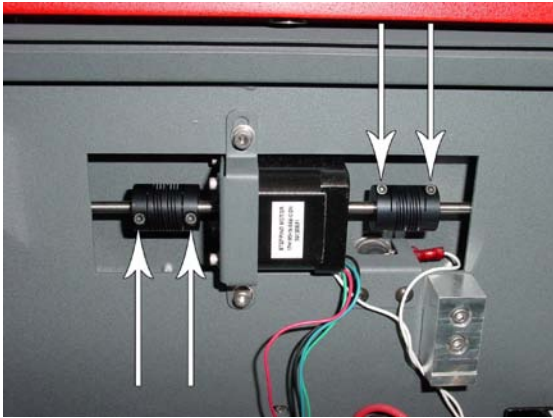
7. Remove the nuts in the center of the Y bearings on the right of the X-axis arm as shown to the left.
8. Remove the Y bearings and replace them with the new ones. Be careful not to lose the small wave washers.

9. Reinstall the [X-axis Arm](#).
10. Reinstall the [Main Cover](#).
11. Reinstall the X-axis Arm Cover.
12. Perform [X-axis Arm Alignment Check and Adjust \(Squaring\)](#), and [Laser Beam Alignment](#).

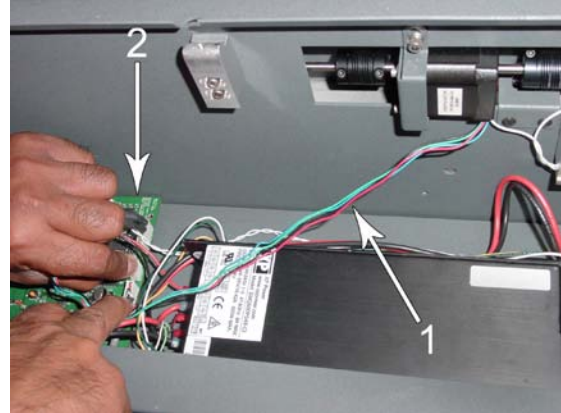
R340 - Y-axis Motor

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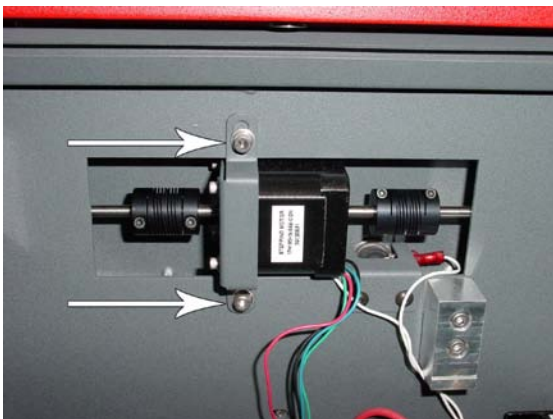
1. Power OFF and unplug the VLS.
2. Remove the [Rear Cover](#) and the [Laser tube](#).
3. Remove the [Electronics Cover](#).



4. Loosen the coupler screws that attach the motor to the Y-shafts. Slide the couplers outwards, away from the motor.



5. Unplug the motor cable (1) from the CPU board (2).



6. Remove the 2 screws that hold the motor bracket to the frame, and remove the motor and motor bracket.

7. Remove the 4 screws that mount the motor to the bracket and transfer the new motor to the bracket.
8. Install the new motor and perform the procedures [X-axis Arm Alignment Check and Adjust \(Squaring\)](#), and [Laser Beam Alignment](#).

R350 - Y-Axis Home Assembly Adjustment and Replacement

Table of Contents

Adjustment

1. Turn off and unplug your VersaLASER.
2. Do an [X-axis Arm Alignment Check and Adjust \(Squaring\)](#). Once squaring is complete proceed to the next step.

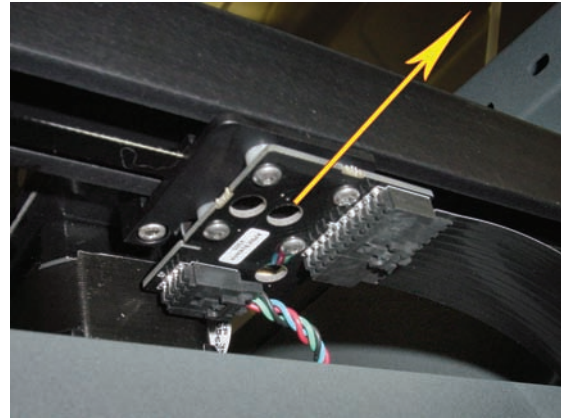


3. Verify that the magnet is in the proper location. There is a magnet on the right Y-Axis rail located inside the VersaLASER. If the magnet is missing replace the magnet. The magnet should not stick out from the Y-Axis rails and should sit flush against the rail.

4. Next adjust the Y-Axis Home Assembly board by following the next steps.
5. Remove the [Rear Cover](#).
6. Remove the [Laser Tube](#).
7. Remove the **right Rear Side Cover**.
8. Remove the **right Side Cover**.
9. Locate the Y-Axis Home Assembly.
 - a. The Y-Axis Home Assembly is located underneath the y-axis rail on the right hand side.



10. Loosen the 4 screws but do not remove.



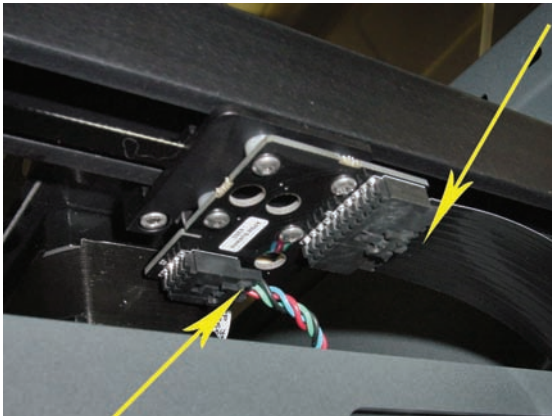
11. Gently slide the Y-Axis Home Assembly towards yourself.
a. The Y-Axis Home Assembly can only be moved about ¼ inches.

12. Tighten the 4 screws.

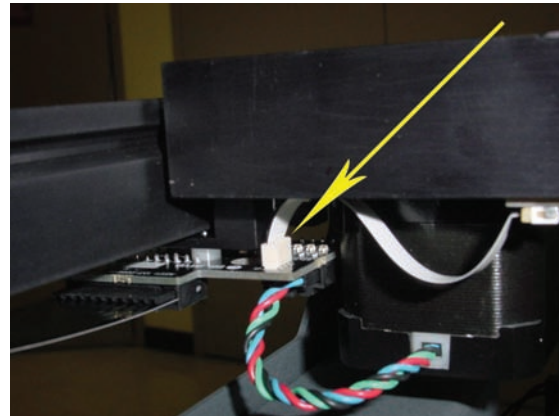
13. Attempt to re-home the VersaLASER.

14. If this process does not resolve the problem you will need to proceed to the next step and replace the Y-axis Home Assembly.

Replacement



a.



b.

1. To remove the Y-Axis Home Assembly you will need to gently unplug the 10-pin, 4-pin, and white connector.

a. The 10-pin and 4-pin connectors are located underneath the PCB board.

b. The white connector is located on top of the PCB board towards the inside of the VersaLASER.




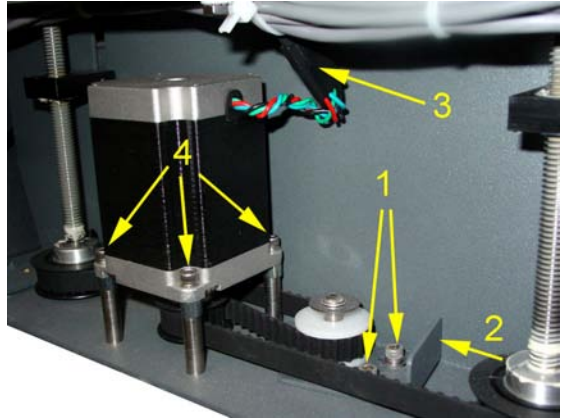
2. Remove the Y-Axis Assembly by unscrewing the screws and set the Y-Axis Assembly and screws aside in a clean safe place.

3. Installation of the Y-Axis Home Assembly is opposite of removal.
4. Once the new Y-Axis Home Assembly is installed, re-home the VersaLASER to ensure the installation was done properly.
 - a. Make sure all connections and screws are properly installed.
 - b. You may want to repeat steps 9 through 12 from the above section if re-homing was not successful.

R400 - Z-axis Motor

Table of Contents

1. Power OFF and unplug the VLS.

 <ol style="list-style-type: none"> 2. Remove the Rear Cover, Right Rear Side Cover and Right Side Cover. The Z-axis motor is located on the right side of the VLS as shown above. It is not necessary to remove the left side covers. 3. When performing this procedure, make sure that you do not accidentally turn the Z-axis Lead Screws that drive the table up and down; otherwise you will need to re-level the table later on! 	 <ol style="list-style-type: none"> 4. Loosen the two screws (1) to release the belt tensioner. 5. Slide the tensioner to the left, releasing the tension (2). 6. Disconnect the electrical connector (3). 7. Carefully remove the 4 screws that mount the motor (4) (one is not visible in the photo) and remove the motor.
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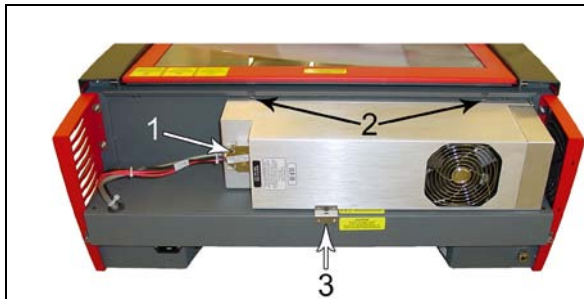
8. Transfer the pulley from the old Z-axis Motor to the new one.
9. Install the new Z-axis motor and tighten the 4 mounting screws. Make sure that the pulley does not contact the base of the machine and can turn freely.
10. Pull the tensioner to the right to re-apply tension to the belt while tightening the tensioner screws.
11. Reattach the electrical connector.
12. Replace the covers in reverse order of removal.

R500 - Laser

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Note: Handle the laser with *care!* Do not bump or jar it.

1. Make sure the VLS is powered OFF and unplugged.
2. Remove the [Rear Cover](#).



3. Unplug the electrical connector (1) from the Laser by manually undoing the two thumb screws and gently pulling it to the left. Remove the two screws (2) that attach the Laser to the frame. Finally remove the bracket (3) by unscrewing the 2 screws that hold the bracket in place.



4. Rotate the laser, a few degrees, from the bottom and lift it up and off the mounts. Store the laser in a safe place.

5. Installation is opposite of removal.

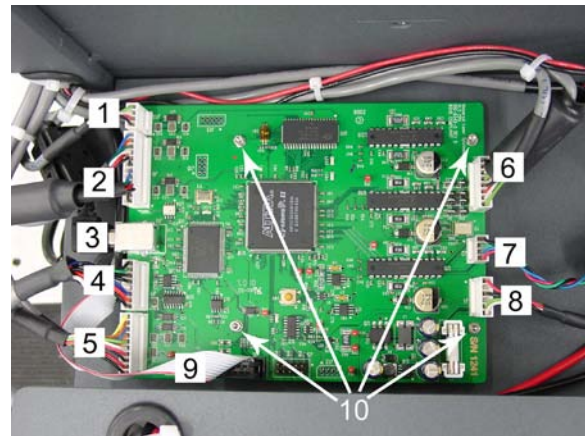
R510 - CPU

Table of Contents

1. Make sure the VLS is powered OFF and unplugged.
2. Remove the [Rear Cover](#).
3. Remove the [Laser](#).
4. Remove the [Electronics Cover](#).



5. Locate the CPU. Note the arrangement of connectors and the four mounting screws.



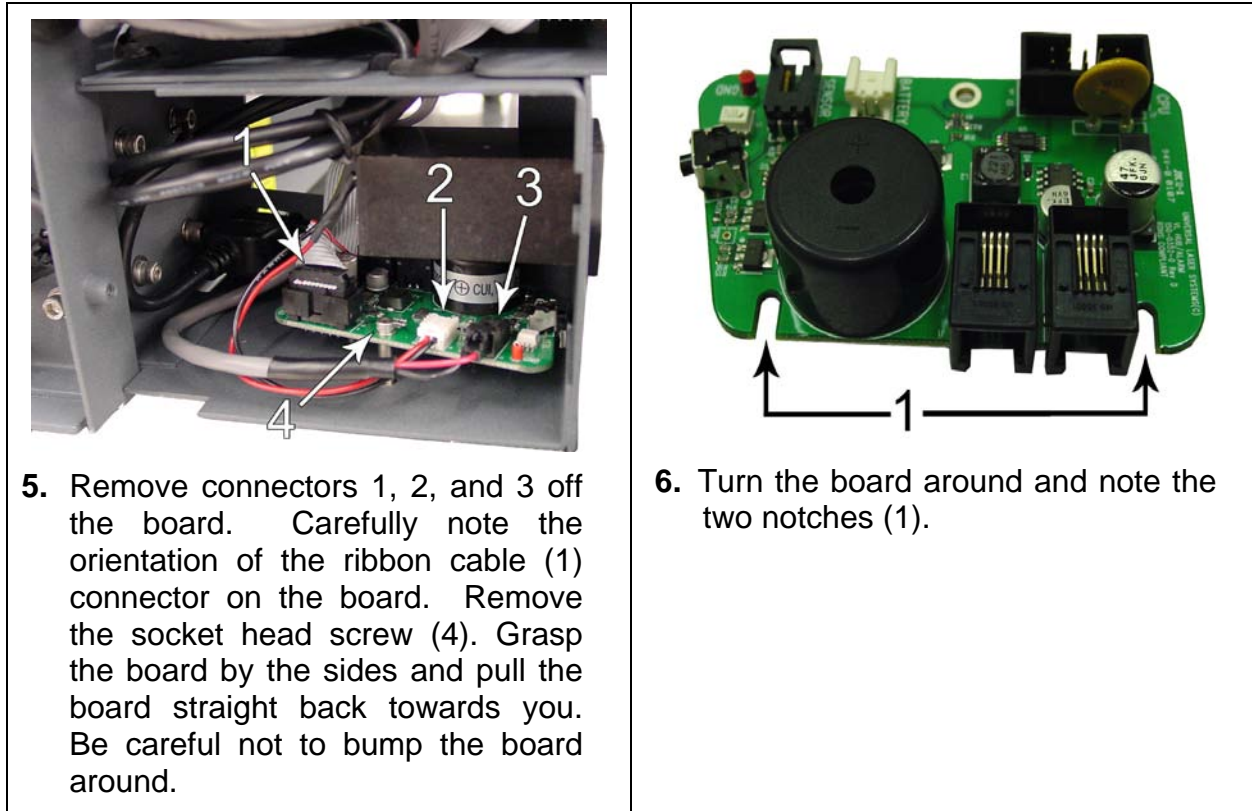
6. As a precaution, using masking tape, label each connector, as in the photo. Remove the connectors by pulling them straight up. Connection labeled number 3 needs to be pulled out to the left. Also remove the gray colored flat ribbon cable (9) by pulling the connector straight up. **Carefully** note the orientation of the ribbon cable connector on the CPU! Remove the four mounting screws (10). To prevent static damage, grasp the CPU board by the edges, remove the CPU from the system and store in a safe place.

7. Installation is opposite of removal.
8. Perform the procedure [CPU Initialization / Auto-Z and Rotary Calibration](#).

R520 – Thermal Sensor Board

Table of Contents

1. Make sure the VLS is powered OFF and unplugged.
2. Remove the [Rear Cover](#).
3. Remove the [Laser](#).
4. Remove the right side, [Rear Side Cover](#). This is the right side when facing the front of the VLS.



7. When installing the new board, make sure the notches align with the alignment pegs mounted in the main enclosure. Re-attach the socket head screw and the electrical connectors to finish the installation.

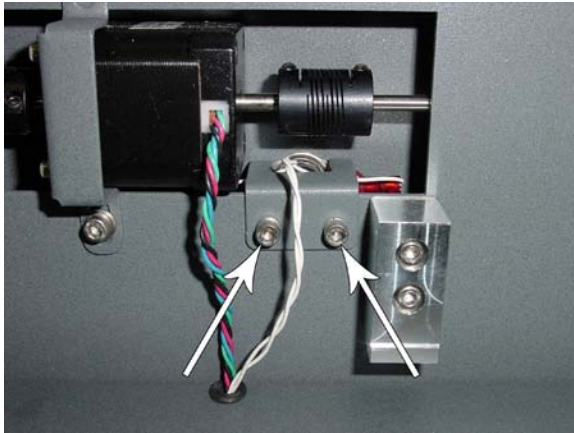
R530 – Thermal Snap Switch

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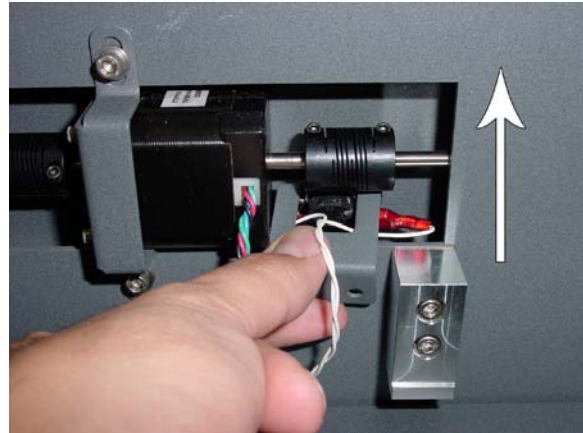
1. Make sure the VLS is powered OFF and unplugged.
2. Remove the [Rear Cover](#).
3. Remove the [Laser](#).



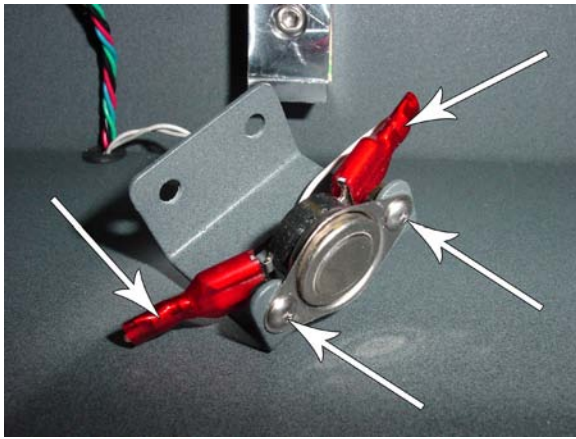
4. Remove the Thermal Sensor Board's battery holder by inserting a flat head screw driver into the slot of the battery holder. **Gently** push up then pull the screw driver towards you to remove the battery holder and set it aside.



5. Located behind the laser tube, undue the 2 screws shown and set aside.



6. Grab a hold of the bracket and **gently** pull up and out. You may have to rotate the bracket and slide it out sideways. Be careful not to pull on the bracket as it is still attached.



7. First, unplug the wire connectors by gently pulling the connector out. Once that is done, unscrew the 2 screws that hold the switch to the bracket and set those aside.

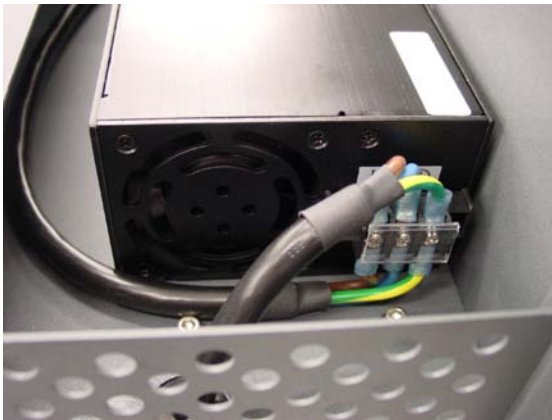
8. Installation is opposite of removal. Verify that the battery is reinstalled into the VLS in order for the engraver to function properly.

R540 - Power Supply(s)

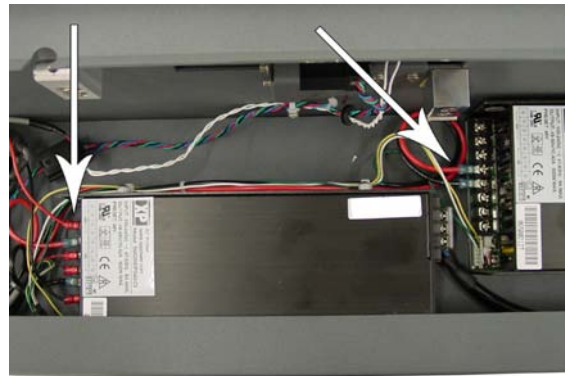
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Note: The VLS3.50 and VLS2.30 is shown in the following photos. The VLS2.30 only has one power supply and the VLS3.50 has two power supplies.

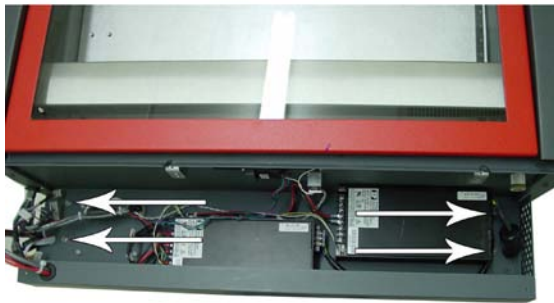
1. Power OFF and unplug the VLS.
2. Remove the [Rear Cover](#).
3. Remove the [Laser](#).
4. Remove the [Rear Side Covers](#).
5. Remove the [Electronics Cover](#).
6. Remove the [CPU](#) and set it aside.



7. Disconnect the power supply inlet connectors. Label them if necessary.



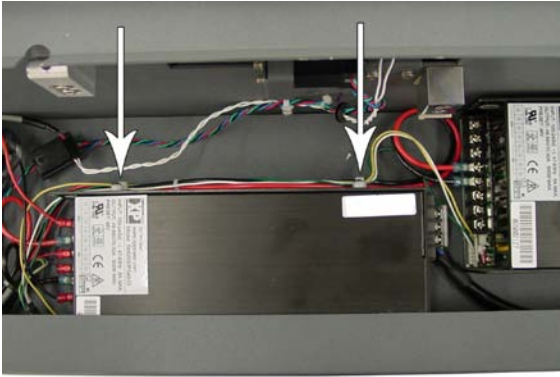
8. Disconnect all of the connections to the power supply(s) and label them if necessary.



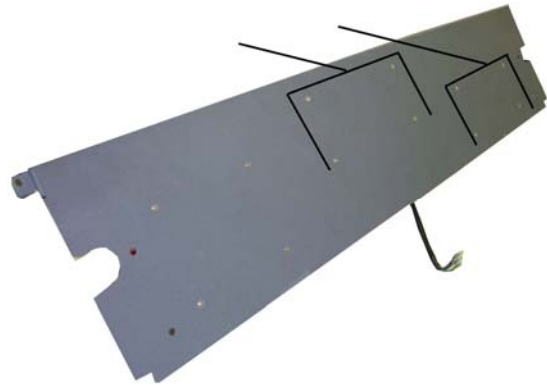
9. Remove the screws on the ends holding the electronics mounting plate to the frame.



10. Remove the electronics mounting plate from the frame.



9. Remove the screws that hold the cables onto the power supply connection behind the first power supply (if you have a VLS3.50).



10. Turn over the electronics mounting plate and remove the screws holding the power supplies.

11. Installation is opposite of removal.

R550 – Air Cleaner Serial Port Board

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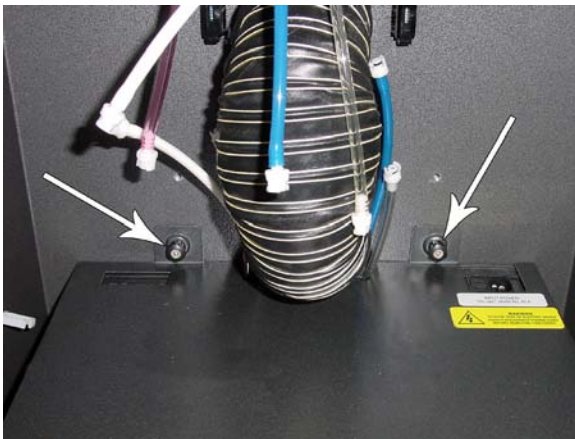
1. Unplug the Air Cleaner Cart.



2. Remove the 4 screws mounting the upper blower cover and remove the cover.



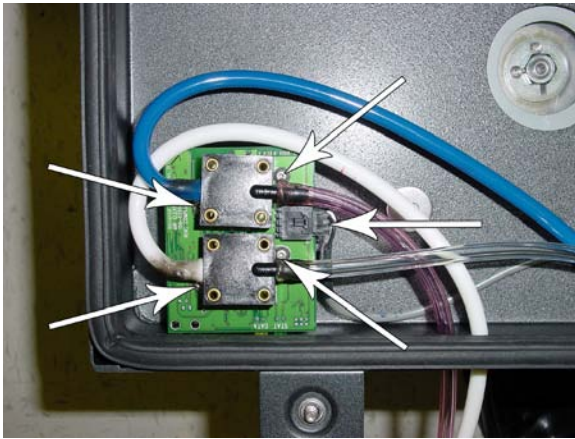
3. Detach the hoses at the quick connect points.



4. Remove the 2 screws shown above and **carefully** tip the motor box over to expose the Serial Port Board.



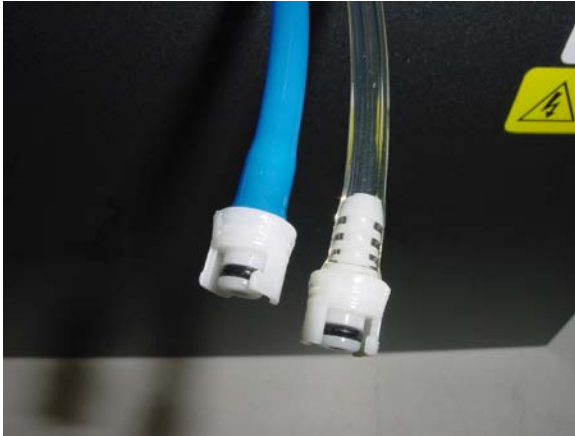
5. Once the inside of the box is exposed cut the hoses where indicated as in the above picture and pull the hoses back through the plate. Pay close attention to the order the hoses are in.



6. Remove the 4 screws holding the Serial Port Board.
7. Remove the wire connector on the right and remove the board.



8. Install the new board and reconnect.



9. Pass the new hoses back through the plate and insert the quick connect fittings into the ends of the new hoses.

10. Installation is opposite of removal.

T010 - Rotary Fixture

Table of Contents

Question	Answer
<p>What kinds of operational checks can I do to ensure that my Rotary Fixture is working right?</p>	<ul style="list-style-type: none"> - Make sure that when you install the rotary in the table socket that the cone briefly rotates. - Verify that you have calibrated the rotary using the “Calibrate” feature in the UCP. - Be sure to have “Rotary” selected in the Fixture Type selection of the printer driver.
<p>What kind of adjustments can I make help optimize my Rotary fixture?</p>	<ul style="list-style-type: none"> - Always check the focus of each object being engraved with the rotary. - Measure the diameter accurately and enter the value in the driver.
<p>What if my system will not detect the Rotary Fixture?</p>	<ul style="list-style-type: none"> - Be sure the rotary has been set into the table socket connector completely. - Be sure that “Rotary” is selected in the Fixture Type selection of the printer driver.
<p>What is the best way to clean and maintain my Rotary Fixture?</p>	<ul style="list-style-type: none"> - Use light industrial cleaner to keep the cone clean and the base free of debris.

T020 - Cutting Table

Table of Contents

Question	Answer
<p>What kind of operational checks can I do to ensure that my Cutting Table is working correctly?</p>	<ul style="list-style-type: none"> - Verify that the Cutting table fixture is in all of the way in the table socket and that it is level. - Be sure to have "None" selected in the Fixture Type selection in the printer driver. - Verify that you have calibrated the cutting table using the "Calibrate" feature in the UCP.
<p>What kind of adjustments can I make to help optimize my Cutting Table?</p>	<ul style="list-style-type: none"> - Keep the honeycomb insert fairly clean and free of debris.
<p>What if my system will not detect the Cutting Table?</p>	<ul style="list-style-type: none"> - Make sure that the table is installed in the table socket connector correctly. - Make sure that you have "None" selected in the Fixture Type selection in the printer driver.
<p>What is the best way to clean and maintain my Cutting Table?</p>	<ul style="list-style-type: none"> - Empty out all of the debris from cutting every four hours of use. - Maintain the exhaust flow. - Clean or replace the honeycomb insert when it becomes restrictive to the exhaust flow.

T030 - Computer Controlled Compressed Air Unit

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Question	Answer
What kind of operational checks can I do to ensure that my Air Assist Compressor Unit is working correctly?	<ul style="list-style-type: none"> - Verify all the connectors are in place. - Check for a green light on the unit showing communication between the devices. - Verify that that the unit switches ON at the start of a file.
What kind of adjustments can I make help optimize my Air Assist Compressor Unit?	<ul style="list-style-type: none"> - Keep all of the air filters on the unit clean. - Make sure that the unit is in a place where air circulates well to keep the core temperature down.
What if my system will not detect the Air Assist Compressor Unit or it will not come on?	<ul style="list-style-type: none"> - Verify that all hoses and connections are in place. - Check the green light communication indicator.
What is the best way to clean and maintain my Air Assist Compressor Unit?	<ul style="list-style-type: none"> - Keep all air filters clean on the unit. - Keep a steady flow of air around the perimeter of your compressor unit.

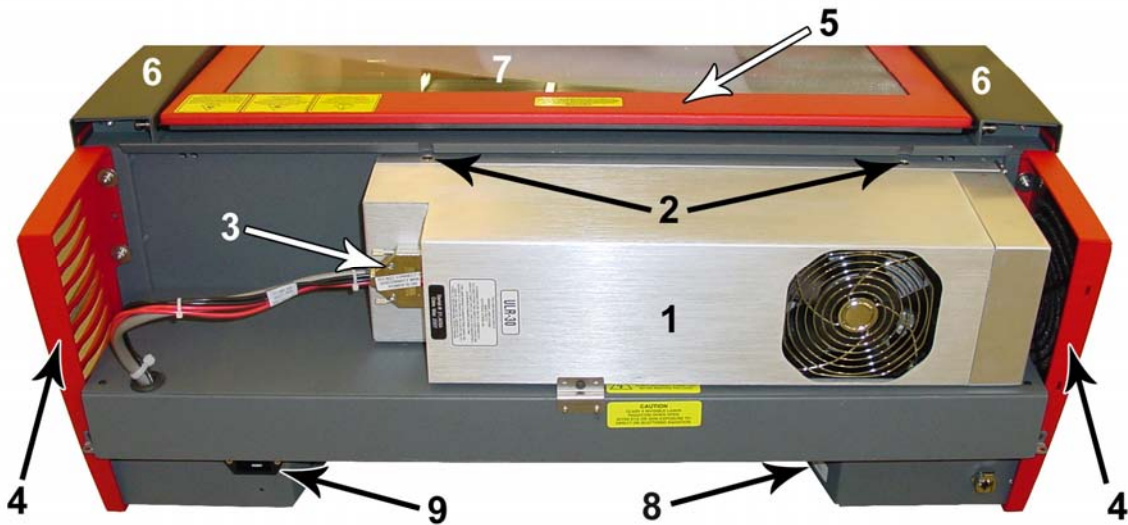
T040 - Computer Controlled Air Cleaner

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Question	Answer
<p>What kind of operational checks can I do to ensure that my Computer Controlled Air Cleaner is working correctly?</p>	<ul style="list-style-type: none"> - Check and maintain the saturation of all filters. - Keep the filter drawers completely closed to avoid any stray particulates. - Keep all laser exhaust ports clean.
<p>What if my system will not detect the Computer Controlled Air Cleaner or it will not come on or there are problems with the suction?</p>	<ul style="list-style-type: none"> - Check the green light communication indicator. - Check all connections for power. - Unplug the Serial connection and shut down the computer attached to the VersaLASER. Once the system shuts down plug the Serial connection back in and restart the computer. - Call tech support for any driver updates. - Make sure all drawers and lids are closed properly to create a proper seal.
<p>What is the best way to clean and maintain my Computer Controlled Air Cleaner?</p>	<ul style="list-style-type: none"> - Keep all air filters clean on the unit. - Keep the exhaust ports well maintained and clean to avoid excess buildup.

P0010 - Front View[Table of Contents](#)**VersaLASER™**

- 1 – FOCUS CARRIAGE
- 2 – #2 MIRROR
- 3 – ENGRAVING TABLE
- 4 – X-ARM
- 5 – X-ARM COVER
- 6 – TOP DOOR/ WINDOW
- 7 – X-MOTOR
- 8 – MAIN COVER
- 9 – REAR COVER

P0020 - Rear View, Laser Tube Installed[Table of Contents](#)**VersaLASER™**

- 1 – LASER TUBE
- 2 – LASER MOUNTING SCREWS (2)
- 3 – LASER ELECTRICAL CONNECTOR
- 4 – REAR SIDE COVERS (2)
- 5 – TOP DOOR ENCLOSER
- 6 – MAIN COVER
- 7 – TOP DOOR WINDOW
- 8 – AC POWER INPUT CONNECTOR
- 9 – THERMAL SENSOR BATTERY

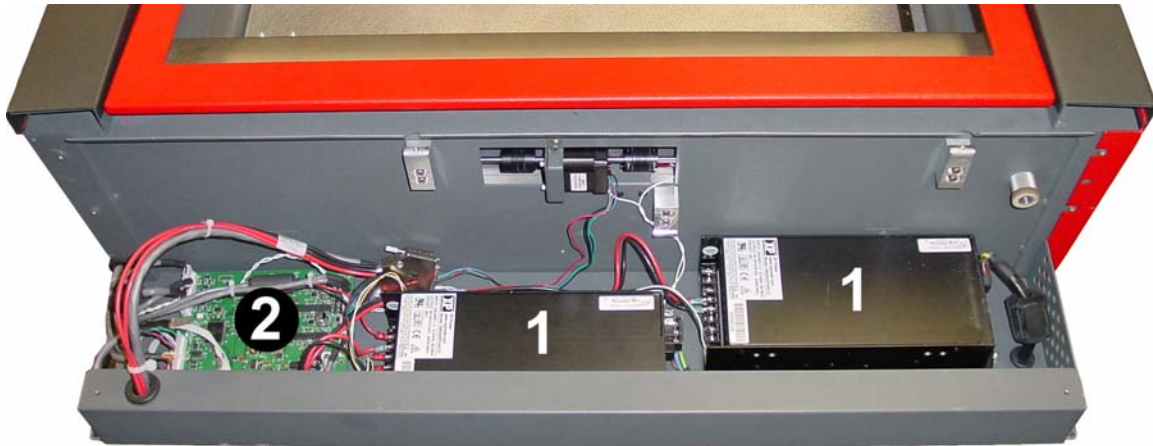
P0030 - Rear View, Laser Tube Removed[Table of Contents](#)**VersaLASER™**

- 1 – ELECTRONICS COVER
- 2 – BEAM TUBE
- 3 – Y-AXIS MOTOR COUPLINGS (2)
- 4 – Y-AXIS MOTOR
- 5 – LASER ELECTRICAL CONNECTOR
- 6 – THERMAL SENSOR

P0040 - Rear View, Electronics Cover Removed

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VersaLASER™



- 1 – 48VDC POWER SUPPLY
(VLS3.50 – TWO SUPPLIES, VLS2.30 – ONE SUPPLY)**
- 2 – CPU**

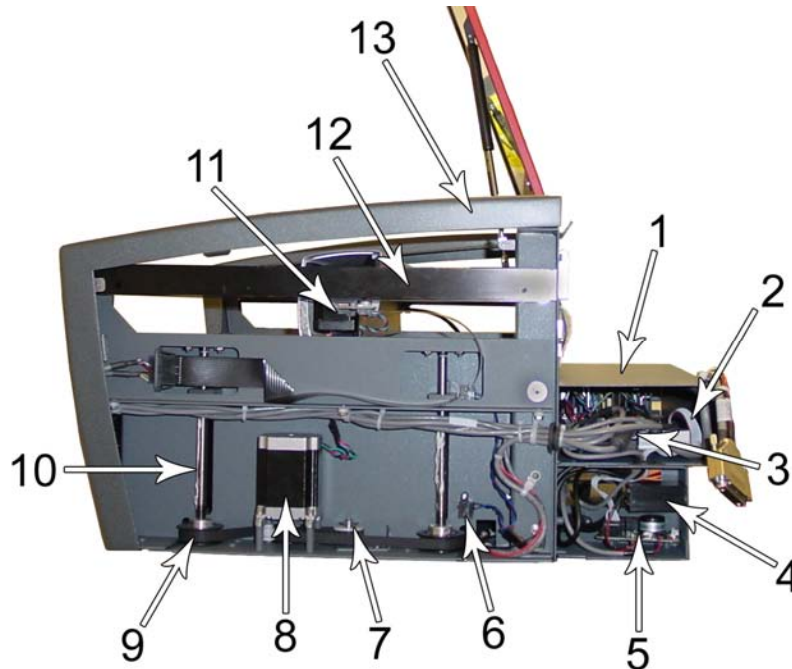
P0050 – Right Side View

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VersaLASER™



- 1 – REAR COVER
- 2 – REAR SIDE COVER
- 3 – SIDE COVER
- 4 – MAIN COVER



- | | |
|----------------------------|-------------------------------------|
| 1 – ELECTRONICS COVER | 8 – Z-AXIS MOTOR |
| 2 – CPU-RIBBON CABLE | 9 – Z-AXIS LEAD SCREW PULLEY (4 EA) |
| 3 – CPU | 10 – Z-AXIS LEAD SCREW (4 EA) |
| 4 - THERMAL SENSOR BATTERY | 11 – X-AXIS MOTOR |
| 5 – THERMAL SENSOR BOARD | 12 – Y-RAIL (2 EA) |
| 6 – Z-AXIS HOME SENSOR | 13 – MAIN COVER |
| 7 – Z-AXIS BELT TENSIONER | |

VersaLASER™ GLOSSARY

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#2 Mirror – A mirror located at the far left side of the X-axis Arm used to direct the horizontal laser beam from the Beam Window into the Focus Carriage.

#3 Mirror – A mirror located in the Focus Carriage used to direct the horizontal laser beam downward onto the work piece.

Air Assist Cone – An accessory for the VersaLaser which attaches to the Focus Carriage to direct compressed air on to the surface of the work piece. On some materials it can be used to reduce the burning effects of the material from laser beam's intense heat. It also can help disperse smoke and gasses created by processing of some materials.

Back Sweep - An accessory for the VLS which attaches to the Focus Carriage to flow compressed air on to the surface of the work piece, either directly or at an angle. On some materials it can be used to reduce the burning effects of the material from laser beam's intense heat. It also can help disperse smoke and gasses created by processing of some materials.

Beam Window – An optic mounted in the left hand rear of the enclosure through which the laser beam enters the enclosure.

CCAC – Computer Controlled Air Cleaner/Cart. An accessory for the VLS that provides a self-contained, computer-controlled exhaust filtration system.

CCAU – Computer Controlled Compressed Air Unit. An accessory for the VersaLaser that provides dry, oil-free compressed air for use with the Air Assist Cone and Back Sweep Accessories.

CPU – A Circuit Board in the VLS that communicates with the PC to drive the motors, monitor interlocks and sensors, etc.

Cutting Table – An accessory for the VersaLaser with a honeycomb insert used to support the work piece when vector cutting. Also can be used as a vacuum base for holding sheet stock flat while cutting.

Diode Beam – The red beam used to indicate the path and position of the cutting/engraving laser.

Engraving Table – The solid, flat metal plate which supports the work piece.

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Focus Carriage – The red aluminum housing which houses the Focus lens and #3 Mirror. The Focus Carriage moves back and forth along the X-axis arm when rastering or vectoring.

Focus Lens – An optic located in the Focus Carriage which concentrates the laser beam into a very small, highly intense spot for cutting and engraving.

Focus Tool – An important tool supplied with the VLS that acts as a gauge to accurately set the distance from the Focus Lens to the work piece.

Graphics Program – The software necessary to create the artwork executed by the VLS. CorelDraw 12 and X3 are two recommended graphics programs.

Interlock – The safety mechanism which prevents the laser beam from being emitted when the top door is opened.

Laser (Cartridge or Tube) – The laser device which generates the beam used to cut and engrave the work piece.

Main Enclosure – The “box” in which the x-y-z motion system moves and the work piece is engraved or cut.

Operating System – The software that runs the computer. The VLS requires Windows XP or Vista as the PC operating System.

Optic – Any optical element such as a window, mirror or lens.

PC – Personal Computer. The VLS requires a PC as an integral part of its operation.

Raster Engraving – A method of engraving whereby the laser beam is scanned back and forth, engraving horizontal lines in the work piece as it steps down the work piece vertically. At each pass a series of laser pulses are applied to create the engraved image. Similar in action to an inkjet or laser printer.


Red Diode Beam – The red beam used to indicate the path and position of the cutting/engraving laser.

Rotary – An accessory for the VLS used to engrave or cut cylindrical objects.

USB – Universal Serial Bus. A standardized communications line used to connect external devices (such as the VLS) to a computer.

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Thermal Sensor Board – A circuit Board on the VLS into which accessories connect using a Serial connection. A ribbon cable connects the USB hub to the CPU.

UCP- Universal Control Panel – The software supplied by Universal Laser Systems used to operate the VLS. This software program allows the user to view, store and execute jobs. Accessed by clicking  Icon in the System Tray.

Vector Cutting / Engraving – A method whereby the laser beam is made to follow a path to cut or engrave a desired outline. Similar in action to a pen plotter.

X-arm or X-Axis – The silver metal-covered rail which moves front to back in the Main Enclosure during rastering or vectoring. The Focus Carriage moves right and left along this rail.

X-Axis Bearings – The four bearings on the X-axis arm which guide the Focus Carriage along the arm.

Y-axis – The front to back direction in the Main Enclosure. Also, the mechanical system used to move the X-axis arm front to back in the enclosure.

Y-axis Bearings – The bearings on the ends of the X-axis arm that guide it along the Y-rails.

Y-rails – The two parallel rails which guide the X-arm front and back inside the Main Enclosure.

Z-Axis – The up and down direction in the Main Enclosure. Also, the mechanical system used to raise and lower the table on which the work piece is placed.