Installation & Set-up Guide

VLS3.60, VLS4.60, VLS6.60

www.ulsinc.com

UNIVERSAL®
LASER SYSTEMS

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Thank you for choosing Universal Laser Systems®. We appreciate innovative customers like you who have made Universal Laser Systems an integral part of their business.

Universal Laser Systems is committed to providing the highest level of customer satisfaction and support. To ensure your satisfaction, we urge you to read the comprehensive User Guide contained on the included CD.

Since 1988, Universal Laser Systems has been committed to continually improving our technology and customer-driven laser solutions. Your satisfaction is very important to us and we welcome your feedback. Tell us about your experience with Universal Laser Systems and our systems at moreinfo@ulsinc.com.

Should you have any questions during your installation, please contact your local representative or Universal Laser Systems' Customer Service Team at 480-609-0297 (USA), +43 1 402 22 50 (Austria), +81 (45) 224-2270 (Japan) or e-mail us at support@ulsinc.com.

Again, thank you for choosing Universal Laser Systems.

Your Universal Laser Systems Team

This guide provides step-by-step instructions for site preparation, computer/software setup and laser system assembly and connection. Follow the instructions in the order shown.

1. Site Preparation
2. Operating System Requirements and Software Installation
3. Assembling and Connecting Your Laser System

NOTE: Make sure to complete step 2 (software installation) prior to plugging the laser system into a USB port on your PC.

CAUTION: ***Damage to the laser system due to inadequate or improper installation or operation is not covered under the Universal Laser Systems (ULS) Warranty. See the ULS Warranty for additional information. A ULS Warranty document is supplied with your laser system. Should you require a copy of the Warranty, please contact our Customer Service Team at 480-609-0297 (USA), +43 1 402 22 50 (Austria), +81 (45) 224-2270 (Japan) or e-mail us at support@ulsinc.com.***

Please refer to the Safety Manual before operating your laser system.

Step 1: Site Preparation

Operating Environment (User Supplied)

1. The laser system must be installed in an office, laboratory, workshop or light duty manufacturing environment.
2. Dusty or dirty environments can damage the laser system. Keep the laser system isolated from any processes that produce airborne particles such as sandblasting, sanding, machining, etc. Also, keep the laser system isolated from any equipment requiring mists of oil or water for lubrication. Airborne dust and liquids can coat and damage optics and motion system components.
3. Avoid small, enclosed, non-ventilated areas. Some materials, after laser engraving or cutting, continue emitting fumes for several minutes after processing. Having these materials present in a confined, unventilated room can create a health hazard.
4. For best results, since the laser cartridges are air-cooled, we recommend operating the laser system between the ambient temperatures of 70°F (21°C) and 78°F (25°C).
5. Avoid storing the laser system outside the temperatures of 50°F (10°C) and 95°F (35°C) as excessively cold or hot temperatures can damage the laser cartridge or reduce its lifetime.
6. Ambient humidity levels must be non-condensing to protect optics.
7. The laser system should be at least 1 foot (300 mm) away from any wall or obstruction to allow for access and proper ventilation.

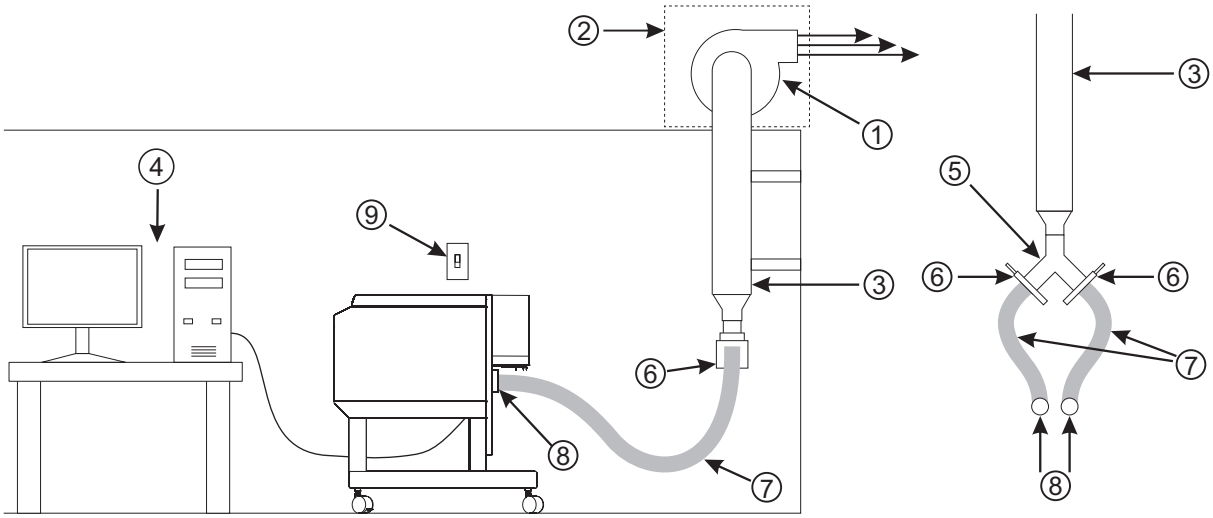
Electrical Power Source (User Supplied)

1. For your system's electrical requirements, please refer to the "INPUT POWER" label near the power inlet.
2. ***CAUTION:*** Never remove the ground lead to the electrical cord and plug the laser system into a non-grounded outlet. A laser system that is not properly grounded is hazardous and has the potential to cause severe or fatal electrical shock. Without proper grounding, the laser system may exhibit sporadic or unpredictable behavior. Always plug the system into a properly grounded (earthed) outlet.
3. Noisy or unstable electricity and voltage spikes may cause interference and possible damage to the electronics of the laser system. If electrical power fluctuations, brown outs or constant power outages are a problem in your area, please contact your local Electrician to supply a power isolation and regulation module. Electrically noisy equipment, such as equipment with large motors, can also cause interference if plugged into the same outlet. It may be necessary to attach the laser system to a dedicated electrical line to resolve the problem.
4. The laser system is designed as a Class I, Group A, pluggable device. It is also designed for connection to IT Power systems which provide the most flexibility to the user.

Exhaust System (User Supplied)

1. We recommend you consult with a licensed contractor to meet local safety and building code requirements.
2. The exhaust system must be capable of supplying a minimum of:
   - VLS3.60 and VLS4.60 - **250 CFM (cubic feet per minute)** of airflow while under a load of 6 inches of static pressure (425m3/hr at 1.5kPa)
   - VLS6.60 - **500 CFM (cubic feet per minute)** of airflow while under a load of 6 inches of static pressure (850m3/hr at 1.5kPa)
3. Do not install forward incline, backward incline, in-line or ventilator fans because these types of air handlers are inadequate and inappropriate for this type of installation. A high-pressure blower must be used to meet minimum airflow requirements.
4. For personal safety and noise control, we recommend that the exhaust blower be mounted outside the building.
5. Rigid tubing should be used for the majority of the connection between the blower and the laser system. The tubing should be smooth-walled and have as few 90-degree bends as possible.
6. Install an exhaust gate to adjust airflow and to close off the exhaust when the laser is not in use. Place this gate near the laser system within 5 to 10 feet (1.50 to 3.00 meters).
7. Use a short piece of industrial grade, wire-reinforced rubber tubing to connect each laser system exhaust port to an exhaust gate and secure with a hose clamp. This will isolate exhaust blower vibrations from your laser system.
8. Wire the exhaust blower electrically to a wall switch in the same room for easy ON/OFF control.

Note: The following diagram shows a typical exhaust system layout. Use this as a guideline for proper exhaust system installation. Although this diagram serves as an example, we recommend you consult with a licensed contractor to meet local safety, environmental and building code requirements and to also calculate the correct size blower required for your particular installation. Length of exhaust pipe, exhaust pipe diameter, number of 90-degree angles and other restrictions must be calculated when determining the correct exhaust blower unit. Installing an undersized or oversized blower is not only unsafe, but can also lead to excessive wear and tear to the laser system and premature failure.



VLS6 Exhaust

1. Exhaust blower mounted outside* (User Supplied)
2. Weatherproof shield (User Supplied)
3. Rigid ducting matching the diameter of the blower inlet (User Supplied)
4. Computer (User Supplied)
5. Y-Pipe VLS6 only (User Supplied)
6. Shut-off or air-flow gate 4inch (User Supplied)
7. Flexible, wire-reinforced, industrial grade rubber hose (User Supplied)
8. Hose connection to laser system
9. Exhaust On/Off swtich (User Supplied)

*Exhaust blower illustration may differ by region.

Step 2: Computer Requirements and Software Installation.

Your computer is a critical component in the operation of your laser system. In fact, you cannot operate the laser system if your computer is not connected, powered on, running Windows and running the Universal Control Panel (UCP) software.

You can only run one laser system per computer. You will need to purchase a separate computer for each laser system you own. You must operate the laser system using the computer that is directly attached to it via the provided 6 ft (2 meters) USB cable. USB cables longer than 6 feet (2 meters) may cause the laser system to malfunction

Computer and Operating System Requirements.

Minimum Computer Requirements (User Supplied)

- 2.0 GHz processor (minimum)
- 32 bit or 64 bit version of Windows XP, Windows Vista or Windows 7
- 2 GB of RAM (minimum)
- 40 GB hard drive (15 GB free space) (minimum)
- VGA monitor (minimum 1024 x 768 resolution)
- CD-ROM Drive
- Mouse and keyboard
- Available USB 2.0 Hi-Speed compliant port only
- Computer speakers (optional)
- Internet connection and e-mail address (optional)

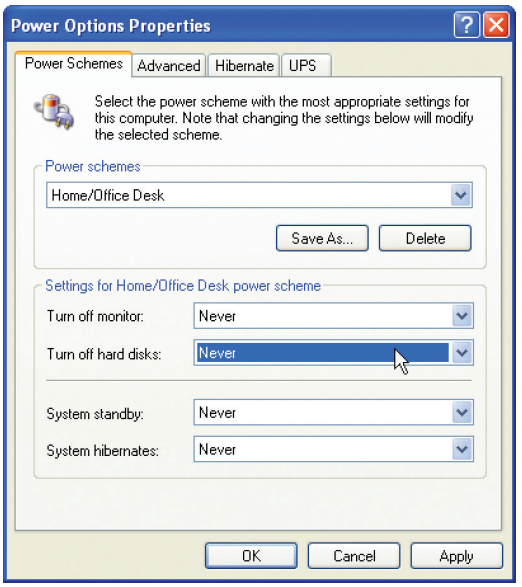
Note: Some computer manufacturers' USB ports do not comply with USB 2.0 Hi-Speed standards. This may cause the laser system to exhibit erratic behavior. Confirm that your computer is USB 2.0 Hi-Speed compliant by checking your computer manual. For more information on USB 2.0 Hi-Speed compatibility, please visit www.usb.org.

Other USB peripheral devices that demand a large amount of computer processing power may slow down the operation and productivity of the laser system. If you experience problems with operation of the laser system while using another USB device, we recommend you discontinue use of that device while the laser system is in use. Do not connect or disconnect USB devices while the laser system is running a job.

Computer Power Management

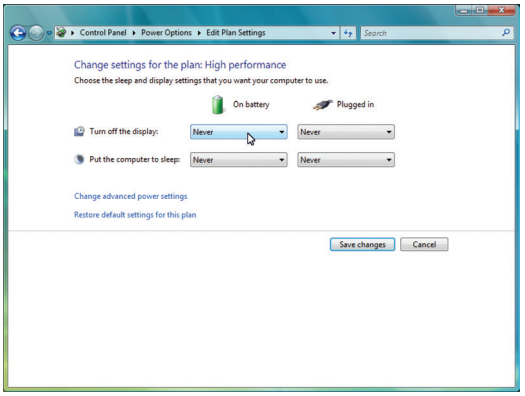
Power management settings on your computer can interfere with proper operation of the laser system by putting the PC in standby or sleep mode while the laser system is processing material. The settings can be controlled through the power options in the Windows control panel on your PC. The illustrations below show you how to disable power management.

XP



For the Power Scheme in use, select "Never" for **all** the options: Turn off monitor, turn off hard disks, system standby and system hibernates.

Vista and 7



For the Power Scheme in use, select "Never" for **all** the options: Turn off display and Put the computer to sleep.

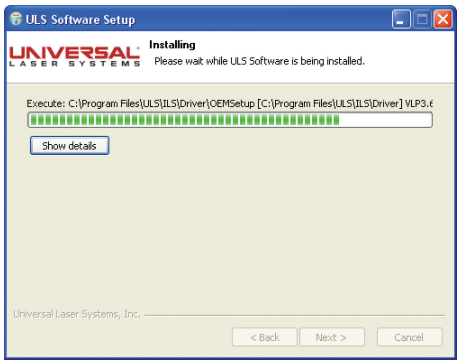
Software Installation

At this point you need to install the Universal Control Panel (UCP) and printer driver. In order to install the software, you need to have administrative privileges on the computer before starting installation. Use the Software Installation CD-ROM included with your laser system.

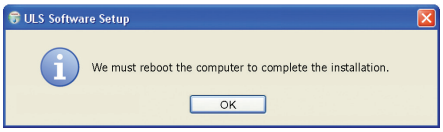
1. Insert the Software Installation CD-ROM into your PC's CD/DVD drive. It should automatically launch the "Universal Control Panel Installation" window. Select the laser system for which you you are installing software.

   Note: If the setup window does not automatically launch, you can launch it manually. Locate your CD or DVD drive using Windows Explorer and click on the Setup.exe application to start installation.

2. The installation process will proceed as indicated by a progress bar.



3. When the installation process is finished, the "Completing the ULS Software Setup Wizard" window will prompt you to reboot the PC to complete the installation. If you have any other applications running in Windows, make sure you save your work prior to rebooting. After the PC finishes rebooting, the software installation is complete and you are ready to connect your laser system to the PC.



Step 3: Assembling and Connecting Your Laser System

Familiarize yourself with the instructions before getting started.

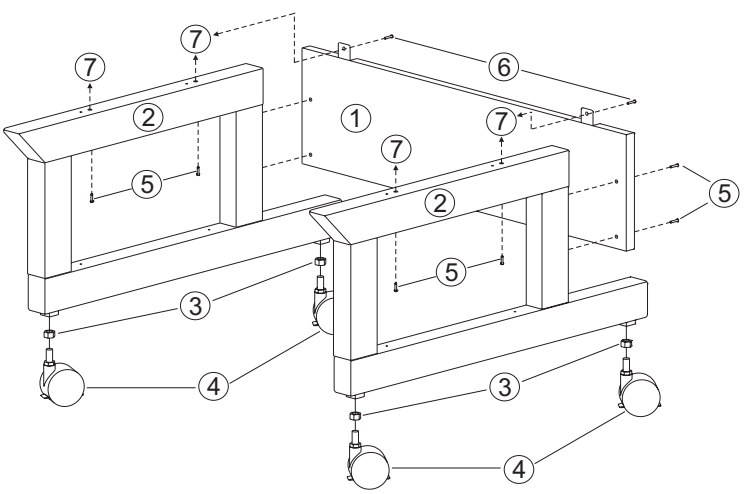
The final step in installation is to assemble your laser system, install the laser cartridge, level the laser system, make final connections and perform a beam alignment check. Do not power up your laser system until the final step, "Checking Beam Alignment."

CAUTION: ***Do not attempt to move or lift this laser system alone. Obtain assistance from additional people when lifting or carrying the laser system and make sure to secure the motion system and doors before lifting. Injury may occur if improper lifting techniques are used or the system is dropped.***

System Assembly - VLS3.60 and VLS4.60 Systems

Cart Assembly

1. Unpack the laser system from its packaging.
2. Remove the unassembled cart from the top of the laser system.
3. Assemble the cart as it appears in the diagram below, but leave all of the screws slightly loose, except for the casters which should be tightened as far as possible into each cart leg.



1. Back panel
2. Legs (both are identical)
3. Nuts (4)
4. Locking casters (4 are identical)
5. 1/4-20 x ½, socket head screws w/lock & flat washers (8)
6. 10-32 x 3/8 socket head screws w/lock & flat washers (2)
7. Connect to main enclosure

4. With the assistance of another person, place the system on top of the cart and loosely install the provided screws that attach the machine to the cart. These screws go up through the cart legs into the bottom of the machine.

5. Open the front door all the way to ensure that it does not rub on or interfere with the cart legs. If the door should come in contact with the cart legs, gently pull the cart legs apart to ensure there is no contact between the door and the cart legs.

6. Securely tighten all the screws at this point.

7. Place the laser system in the desired location for operation.

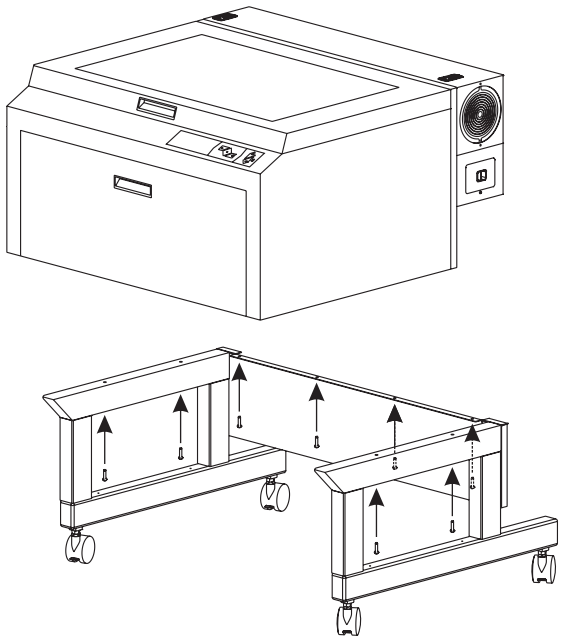
8. Attach your exhaust system's wire-reinforced rubber hose to the exhaust port at the rear of the laser system and secure it with a hose clamp.

System Assembly - VLS6

1. Unpack the laser system.
2. Place the laser system in the desired location for operation.
   a. If a doorway is not wide enough for the laser system to pass through, the system can be detached from the cart stand and carried through the door on its side.
   b. If you do not need to detach the laser system from the cart to move it to the desired location for operation, you can proceed to "Laser Cartridge Installation"

Detaching laser system from cart to fit through small doors (Optional)

1. Remove any packing materials or accessories inside the laser system.
2. Using strong shipping tape or rope, tape the top and front door closed so that they do not open up when tilted.
3. Remove the eight screws that attach the cart stand to the laser system (See below.)



4. Lift the laser system straight up.
5. Place the laser system front door down on a dolly and roll it through the doorway. Lift and rotate the cart to move it through the doorway.
6. Carefully line up the laser system and place it back on top of the cart stand.

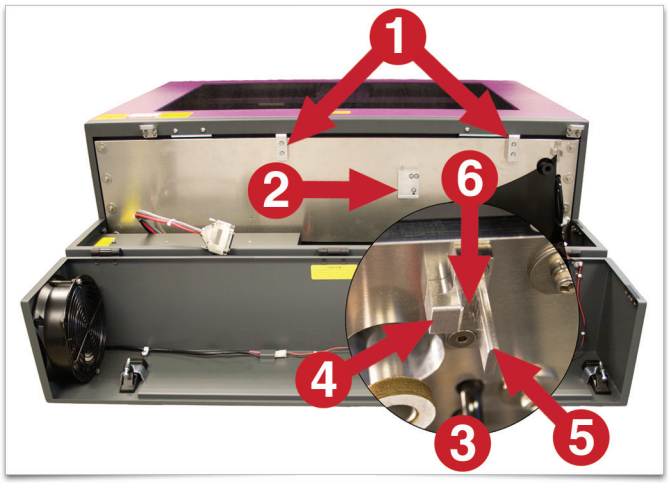
   Reassemble the laser system.

Laser Cartridge Installation

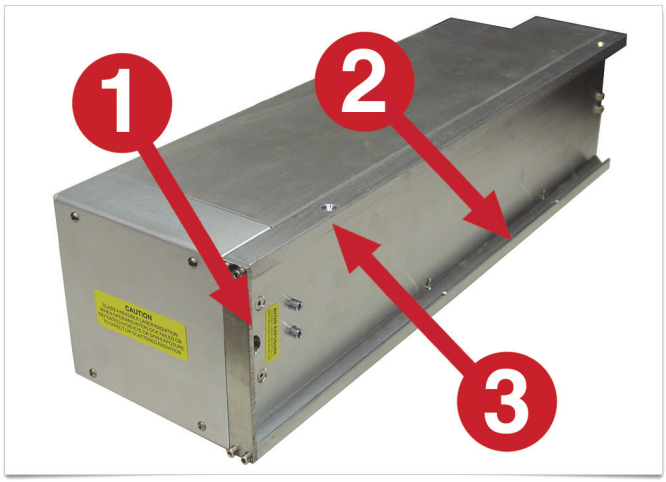
1. Make sure that your laser system power cord is not plugged in at this time. Open the rear laser cover using the latches on top of the laser cover. Some laser systems are shipped with keyed locks so make sure the latches are unlocked.

   Note: Access latches for the laser cover are lockable. If you lose your keys, please contact our Customer Service Team at 480-609-0297 (USA), +43 1 402 22 50 (Austria), +81 (45) 224-2270 (Japan) or e-mail us at support@ulsinc.com for new keys.

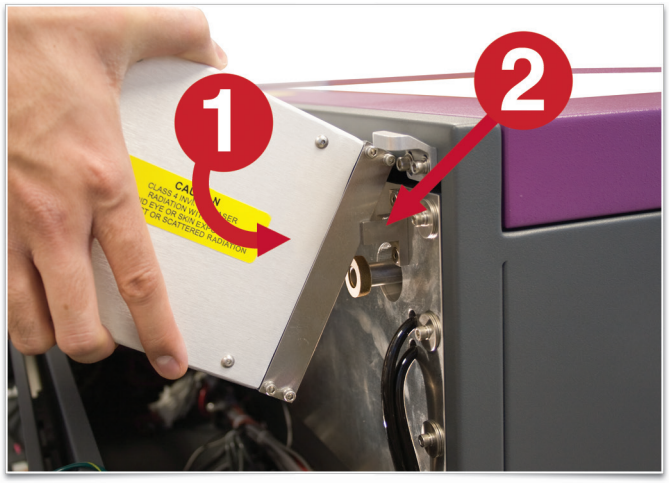
2. Locate the mounting blocks (1), the laser latches (2) and alignment forks (3). Notice that the alignment fork has a groove (6) located between two blocks, one short (4) and one tall (5).



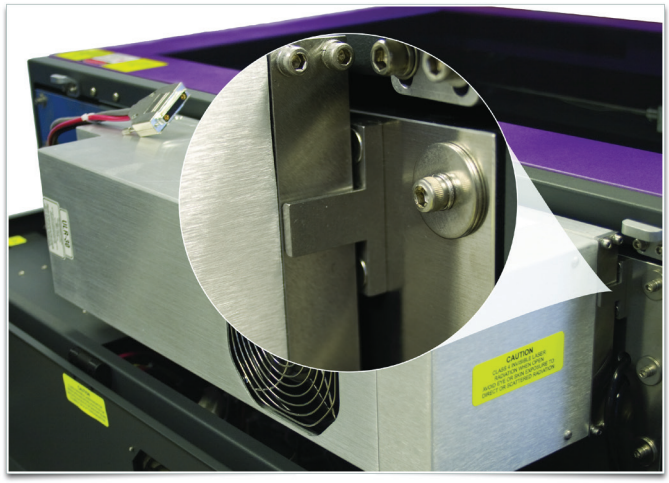
3. Locate the "V" groove along the upper (3) and lower (2) part of the laser cartridge base plate and the alignment plate (1) at the end of the base plate.



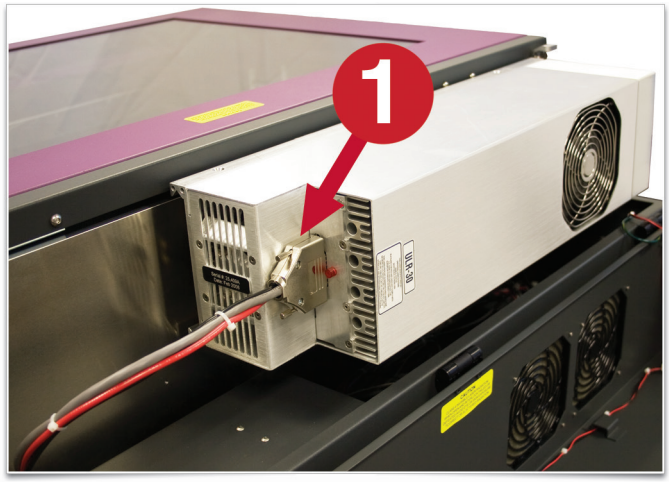
4. Pick up the laser cartridge by the ends and tilt it at a 30° angle as shown (1). Mount the cartridge onto the mounting blocks shown in step 2 by placing the upper "V" groove on top of the mounting blocks. Slide the cartridge to the right until the outer edge (2) of the alignment plate contacts the inside edge of the tall block of the alignment fork.



5. Slowly rotate the laser cartridge down into place, making sure that the alignment plate is centered in the groove in the alignment fork. The laser should click onto the spring loaded laser catch shown in step 2 to lock it in place. **Never force the laser onto the laser latch**. If the laser does not install smoothly, check for obstructions such as pinched wires or hoses or a binding laser latch. Once installed, verify that the alignment plate is centered within the alignment fork.



6. Plug in each power connector (1) to the corresponding laser cartridge.

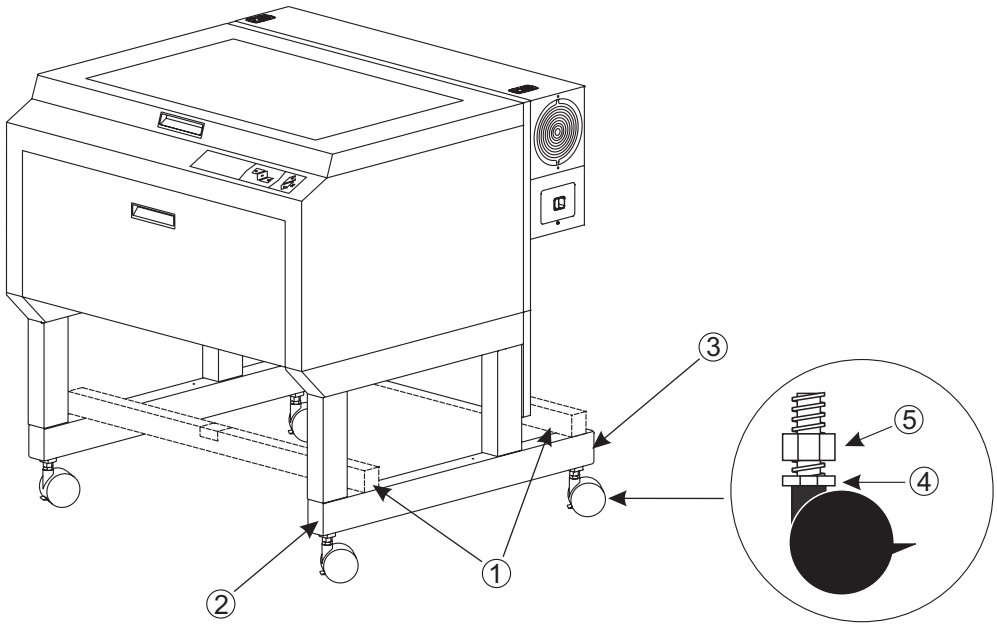


7. Gently close the rear cover, making sure not to pinch any wires or hoses.
8. Once the laser cartridge has been installed, proceed to "Laser System Leveling."

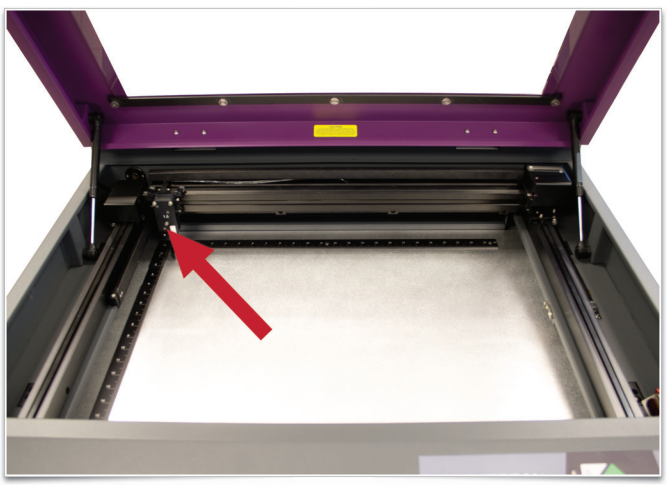
Laser System Leveling

Once the laser system is in place, you should lock the casters and level the laser system using the leveling nuts provided on the laser system casters. This will ensure the laser system is not twisted due to unlevel floors which can affect laser beam alignment and Z axis binding.

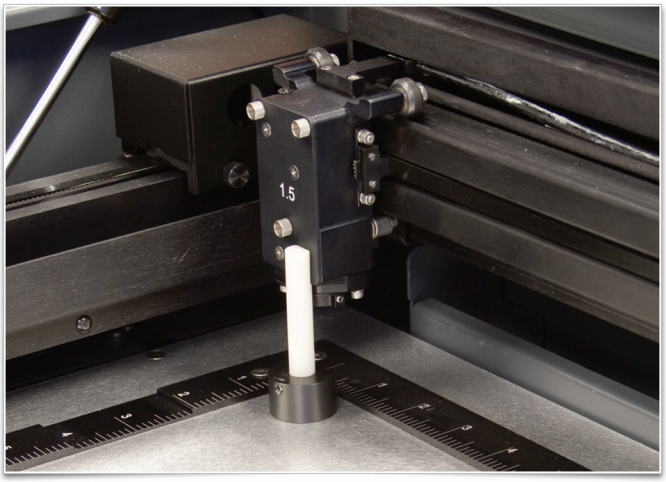
1. Place a bubble level (1) across the front (2) and rear cart legs (3). Adjust the caster height using the adjustment nut (4) until both the rear and front of the cart are level with respect to each other. Once the system is level, secure all casters by tightening the locknut (5) up against the cart leg.
2. Remove any remaining packing materials and accessories from inside the machine, including items such as elastic bands that may have secured the motion system in place for shipping.

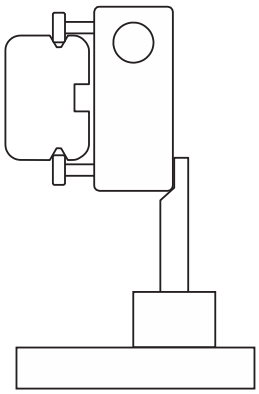


3. To check the level of the machine, move the Focus Carriage by hand to the upper left corner.



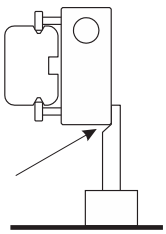
4. Place the focus tool* against the black lens plate (focus carriage) so that the flat edge of the focus tool rests against the front side of the focus carriage as illustrated. Take note of the fit of the focus tool (it should look like the diagram to the right) in the upper left corner of the system. This corner will be your reference point.



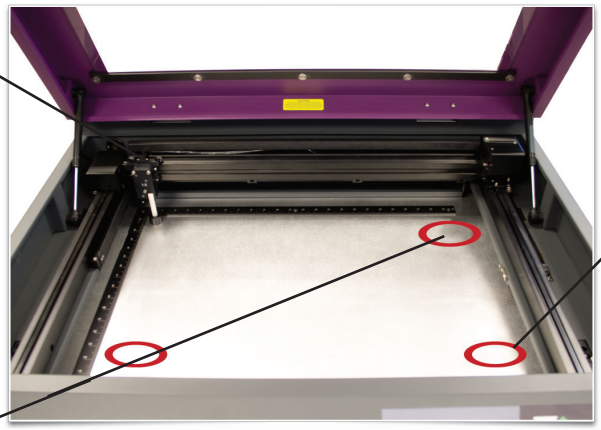


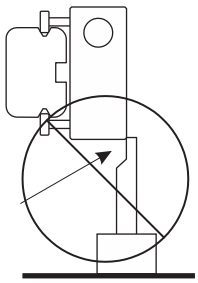
*Alternate leveling method available. See the end of this section.

5. Using the upper left corner as a reference point, move the focus carriage by hand to each corner and take note of any differences between the fit of the focus tool in the upper left corner of the field and the fit of the focus tool in each of the other corners.

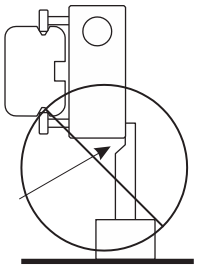


Perfect Fit



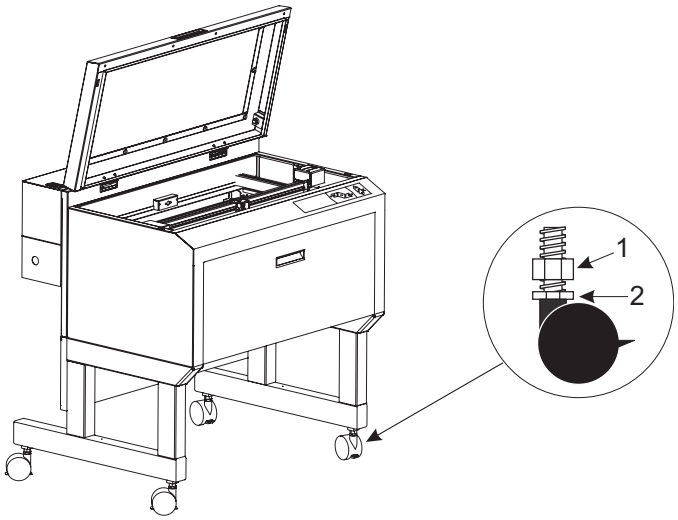


Gap too big



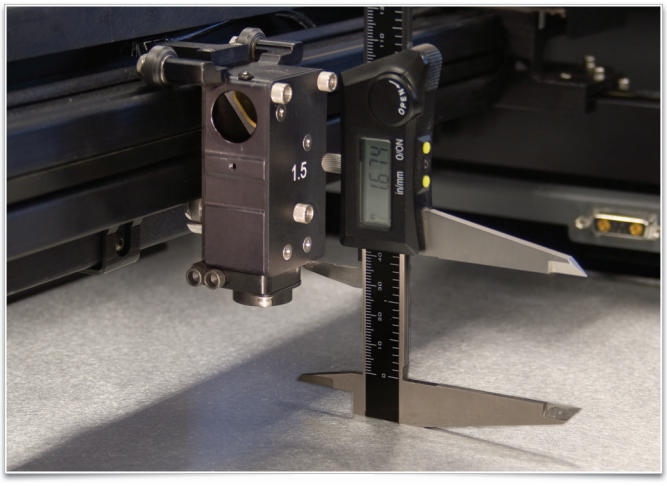
Gap too big

6. If one or more of the other corners does not match the upper left corner, loosen the lock nut and adjust the caster directly underneath that corner up or down until the focus tool fit at that corner matches the fit at the upper left corner. First loosen the lock nut (1), then turn the adjusting screw (2) in 1/8 turns. Once the foot is at the correct height, tighten the lock nut (1). When you are done, the focus tool fit at all four corners should be the same.



*Alternate leveling method

For the best leveling results, use a digital caliper and adjust the caster directly under each corner that does not match the height of the upper left corner until that corner matches the upper left corner's height. Verify that you zero out the caliper before taking any measurements. The height at each corner should be within 0.010" (0.254 mm) of the height at the upper left corner.



Finalizing the Connections

Make the following connections in the order described, otherwise static electricity can potentially damage the computer and/or the laser system electronics.

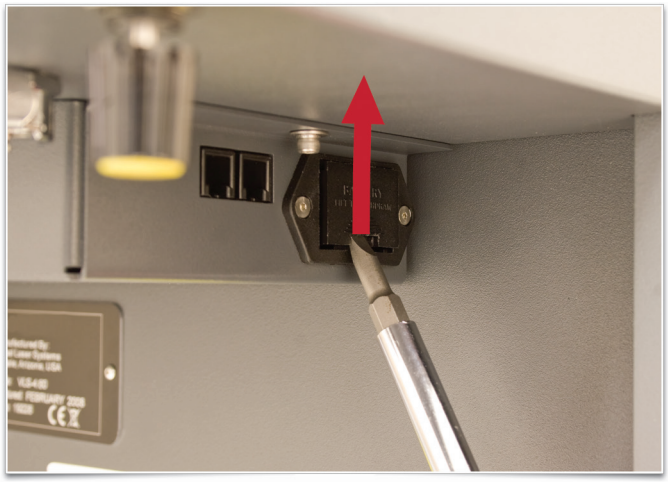
1. Connect the 4-inch (101.6 mm) flexible rubber exhaust system to the rear of the laser system.
2. Connect the laser system's power cord and your computer's power cord to a grounded electrical outlet.

CAUTION: ***International users - if using an adapter or replacement power cord for local outlets, make sure that you attach the adapter correctly to the power cord and that you are using a properly grounded (earthed) adapter and power.***

3. Do not power on the laser system at this time
4. Locate the Thermal Sensor battery holder drawer on the side of the laser system. Install the provided 9-volt Thermal Sensor battery using a flat head screw driver to open the drawer.

   Note: A properly installed 9-volt battery is necessary to operate the laser system. The laser system will not function without a charged battery installed. Keep a spare 9-volt battery on hand at all times.

   a. Gently push up on the Thermal Sensor battery holder drawer as indicated. Pull the battery holder drawer out.
   b. Insert the 9-volt battery provided into the battery holder drawer.



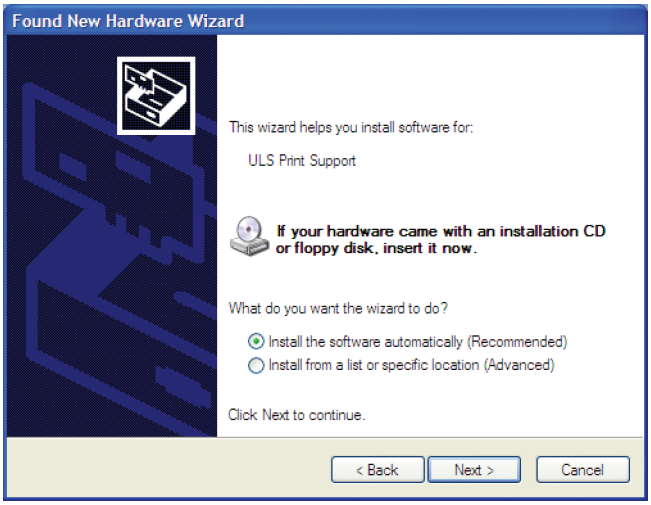
   c. Reinsert the battery holder drawer into the cavity until it latches in place.

5. Connect the USB cable provided with the laser system between the USB port of the computer and the USB port on the back of the laser system.

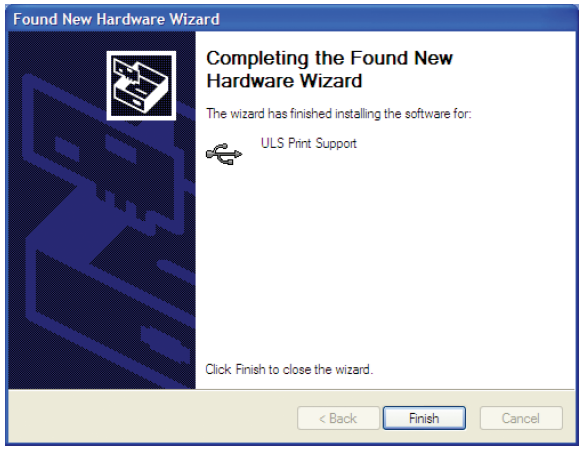
   CAUTION: ***The laser system is USB 2.0 Hi-Speed (only). The laser system comes equipped with a high quality, 6-ft (2.0 meter) USB 2.0 certified cable. We recommend you use this provided cable. Do not use any adapters, extension cables, USB cables longer than 6 ft (2.0 meters) or other devices between the computer's USB port and the port on the laser system; sporadic or unpredictable behavior may result***.

6. After connecting the USB cord, the "Found New Hardware Wizard" will open to install the drivers for the USB connection. If the wizard offers to connect to "Windows Update" to search for software, select "No, not at this time." Then select "Next" to continue.

   a. Select "Install the software automatically." Then select "Next" to continue. You do not need to insert the Software Installation CD-ROM.



b. Select "Finish" to close the wizard.

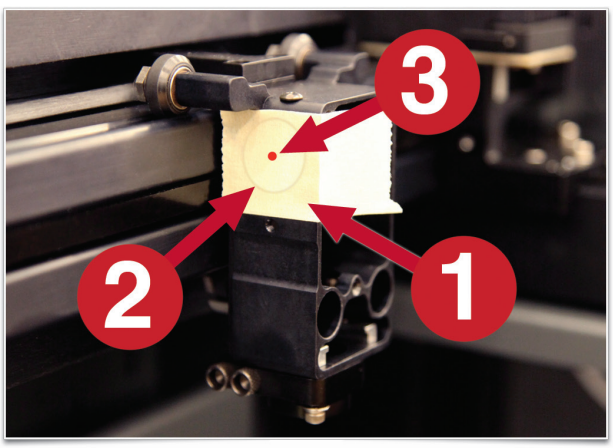


Note: A properly installed 9-volt battery is necessary to operate the laser system. The laser system will not function without a charged battery installed. Keep a spare 9-volt battery on hand at all times.

Checking Beam Alignment

Note: You will not engrave anything at this time.

1. Open the top door.
2. Place a small piece of masking tape across the 3/4" (19 mm) hole in the focus carriage (1). Gently rub the tape around the edge of the hole so that you can see the outline of the hole through the tape (2).
3. Power on your computer and verify that the Universal Control Panel (UCP) icon is present on the taskbar. If it's not, activate it by selecting the "Universal Control Panel" icon on your desktop.
4. Power on the laser system by pressing the Power Button on the VLS system keypad.
5. With the top door open, a red dot will appear on the masking tape (3). The red dot should appear centered, within 1/8 inch (3.18 mm). If not, turn off the laser system, remove and re-install the laser cartridge and try again. If the red dot still does not appear centered, please contact our Customer Service Department at 480-609-0297 (USA), +43 1 402 22 50 (Austria), +81 (45) 224-2270 (Japan) or e-mail us at support@ulsinc.com.
6. Once you have completed laser beam alignment verification, remove the masking tape.



Focus Carriage Beam Alignment

Accesories

Your laser system includes various accessories such as a cutting table for cutting applications and a ULS Computer Controlled Compressed Air Unit, along with a cone and backsweep for air assisted material processing. The accessories section of the manual details how to install and use these accessories

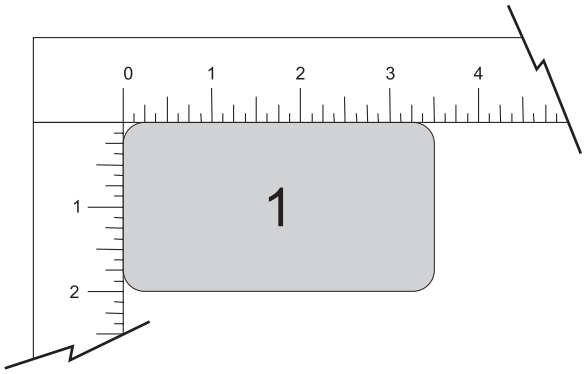
Running Your First Job

This example will walk through the process of engraving an image on a 2 x 3.5 inch (50.8 x 89 mm), 0.0195 inch (0.49 mm) thick anodized aluminum test card supplied with your laser system. For additional test cards, please contact Universal Laser Systems' Customer Service Team at 480-609-0297 (USA), +43 1 402 22 50 (Austria), +81 (45) 224-2270 (Japan) or e-mail us at support@ulsinc.com.

Note: For this example we will be using CorelDRAW and the CorelDRAW sample file provided on the installation CD. The file is also provided in .eps or .dxf for use in other applications if CorelDRAW is not available.

Step 1 – Loading and Positioning the Material

Position the piece of anodized aluminum (1) in the upper left corner of the table, against the rulers.



Step 2 – Creating the Graphic

Using CorelDRAW, open the sample graphic file found on the software installation CD. The file is named ULSTest.cdr. The Software Installation CD contains test files in .cdr, .eps, and .dxf.

Step 3 – Printing to your VLS System (Materials Database Tab)

You are using the Materials Database Tab in the printer driver.

1. Verify that the UCP 

is running in the taskbar by looking for the square red icon.
2. When you are ready to print the job, select PRINT from the CorelDRAW FILE menu. Make sure that your laser system printer driver appears in the DESTINATION NAME dropdown list, and then click PROPERTIES (Figure 4) to display your laser system printer driver settings (Figure 5).
3. Choose your material category (metal, in this case) and then select the desired material: Aluminum Anodized (Figure 5).
4. Set the Fixture Type to NONE.

   Note: If you were using an optional accessory or custom fixture, you would choose it from the fixture list.

5. Measure the thickness of the material (a digital caliper is recommended for this task) and enter it into the material thickness field. In this example, the provided test card is 0.019" (0.483 mm) thick.
6. Click OK when done.
7. Now Select PRINT in the Print dialog window (Figure 4).
8. Launch the UCP by selecting the square red UCP icon on the taskbar and the current print job will appear in the Viewer Tab of the Universal Control Panel (Figure 6).
9. Now select the System Tab and verify that the Auto Z box is checked.
10. Return to the Viewer Tab and proceed to the next step.

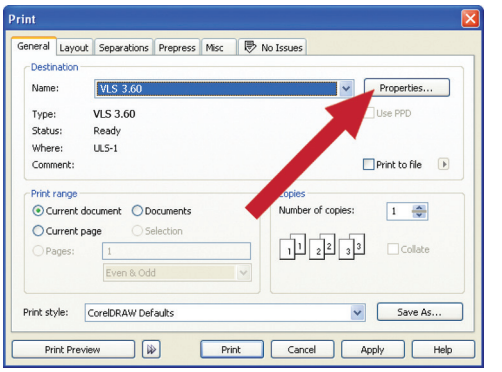


Figure 4

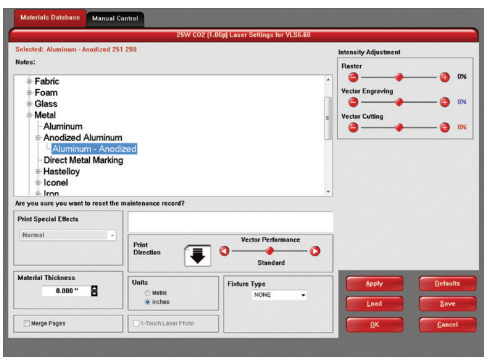


Figure 5

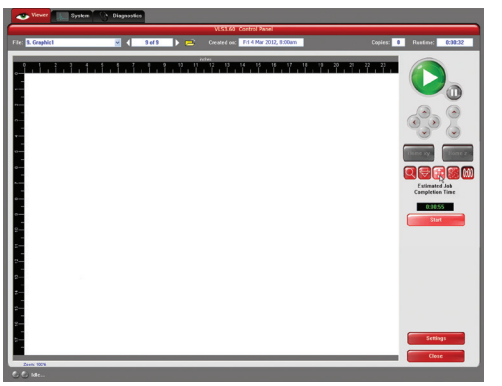


Figure 6

Step 4 – Starting the Process

1. Turn on the exhaust and laser system if not already on.

   Note: Laser system cooling fans are variable speed and may speed up and slow down during operation as needed to cool the lasers.

2. Make sure the material is positioned correctly within the engraving area.
3. Close the top door.
4. Click the green START button on the UCP to begin laser processing (Figure 6 on previous page).

CAUTION: ***Observe the laser system to ensure it is functioning properly. If everything is working properly, an image should appear on the test card as the laser system runs the job. If no image appears, check focus manually as described in the User Guide and adjust if necessary. If you cannot resolve the issue, please contact your distributor or the ULS Customer Service Department. Never leave the laser system unattended while laser processing.***

Step 5 – Material Removal and Reloading

Once the laser system has completed processing the material, the focus carriage will move to the home position in the upper right hand corner of the processing field.

Before opening the top door, wait a few seconds to allow any remaining fumes that are left from laser processing to evacuate through the exhaust system.

Congratulations! You have just completed your first laser processing job. Below is an image of the sample test card as it should look after laser processing. If your results are not satisfactory, please contact the Customer Service Department at 480-609-0297 (USA), +43 1 402 22 50 (Austria), +81 (45) 224-2270 (Japan) or e-mail us at *support@ulsinc.com*.

Universal's laser systems are protected under one or more of U.S. Patents: 5,661,746; 5,754,575; 5,867,517; 5,881,087; 5,894,493; 5,901,167; 5,982,803; 6,181,719; 6,313,433; 6,342,687; 6,423,925; 6,424,670; 6,983,001; 7,060,934; 7,415,051; 7,469,000; 7,715,454; 7,723,638; 7,947,919; 8,101,883. Other U.S. and international patents pending.

The VLS Desktop system has been awarded U.S. Design Patent No. D517,474 for the unique design of its external cabinet, which also functions as a Class 1 laser safety enclosure.

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