

*Solo SE  
EVO*

*Kent Lasers  
Operating Manual*



*Desktop Laser Cutting & Engraving System  
Service and Operation Manual*



[www.kentlasers.com](http://www.kentlasers.com)

## 1) WARNINGS:

Congratulations on the purchase of your **Solo SE Evo** laser cutting and engraving system. Kent Lasers has undertaken extensive research and development to bring you the best laser cutting technologies at an affordable price. We believe you will not find better value for money, performance or reliability with any other manufacturer.

This document has been written to help you set up, operate and maintain your new equipment safely. The information contained in this document is not intended to replace safe working practises as laid out in relevant health and safety legislation.

Please ensure that ALL users of this equipment, or persons supervising the use of this equipment, have undertaken adequate health and safety training, including a valid risk assessment in addition to recognition of the materials suitable for laser processing.

Please contact Kent Lasers (or an **authorised** representative) for availability of training. Our website is available at: [www.kentlasers.com](http://www.kentlasers.com).

**Please observe the following safety precautions which MUST be followed at all times:**

**This machinery contains an industrial class IV laser contained within an interlocked class I enclosure. This type of laser emits a high-intensity beam of INVISIBLE laser radiation in the near-infrared spectrum, operating at 10.6uM.**

**THE LASER BEAM PRODUCED BY THIS EQUIPMENT IS CAPABLE OF CAUSING BURNS TO THE SKIN AND SEVERE DAMAGE TO THE EYES. NEVER ATTEMPT TO OPERATE THIS EQUIPMENT WITH INTERLOCKS DISABLED, OR WITH DAMAGE SUSTAINED TO ANY PART OF THE MACHINE.**

**ALL SERVICING MUST BE UNDERTAKEN BY A QUALIFIED ENGINEER. THIS EQUIPMENT CONTAINS HIGH VOLTAGES AT AND ABOVE MAINS POTENTIAL. EQUIPMENT MUST BE INSPECTED REGULARLY AND KEPT IN GOOD CONDITION.**

**EQUIPMENT MUST NOT BE OPERATED WITH ANY MODIFICATIONS, OR WITH ANY SAFETY FEATURES, SUCH AS INTERLOCKS DISABLED.**

**THERE ARE NO USER SERVICEABLE SPARE PARTS WITHIN THIS SYSTEM.**

**THIS EQUIPMENT MUST BE SUPERVISED AT ALL TIMES DURING OPERATION.**

### WARNING CAUTION:



INVISIBLE CO2 10600 nm CLASS 4 LASER WHEN OPEN AND INTERLOCKS DEFEATED : AVOID EXPOSURE TO DIRECT OR SCATTERED RADIATION.

**MACHINERY MUST BE ATTENDED AT ALL TIMES**

### WARNING CAUTION:



HIGH VOLTAGE - NO USER-SERVICEABLE PARTS INSIDE. REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL.

## 2) USE OF THIS EQUIPMENT:

Solo SE Evo is a direct current (DC) driven CO2 laser cutting and engraving system designed for processing objects with a maximum height of 40mm in addition to the cutting of flat craft materials up to 6mm thickness. *(Please see common materials below).*

This equipment has a maximum materials processing envelope of 600X310mm for cutting and 580X310mm for engraving. The machine design allows for slightly larger material sheets to be loaded at the users discretion, without the need for openings in the machines cabinet. (Often referred to as "pass through"). Solo SE-Evo is also available with an optional motorized working table (Z axis). The servicing and usage data contained in the manual are the same for BOTH models.

It is important for the continued safety and reliability of this system that it is used in accordance with safe working practises and in an appropriate manner. This includes, but is not limited to:

- Ensure adequate training has been provided for all users.
- Never use this device outside of the recommendations listed in this manual.
- Equipment is **NEVER** to be left unattended, regardless of job duration, cutting or engraving.
- This device is only to be used in an indoor environment, which is clean, dry and dust-free, with non-condensing humidity. A temperature range of 10-30 degrees C is recommended.
- Only use this equipment with adequate fume extraction in accordance with Local Exhaust Ventilation (LEV) requirements.
- **NEVER** use your laser to cut materials containing PVC or certain plastics cured with isocyanates.
- Equipment must be used with original spares and accessories **ONLY**.
- **Equipment is to be serviced on a regular basis and kept in a good clean condition by qualified personnel.**

## 3) PRINCIPLE OF OPERATION:

Laser cutting is a "subtractive" manufacturing process whereby flat materials are cut using a focused beam of coherent light. This vaporises the material at point of contact leaving a clean burr-free edge. This vaporised material is then removed via a fume extraction system and either vented to the outside air (vent-to-air) or passed through a series of filters to remove contaminants and odours (filtered extraction system).

The Solo SE Evo laser cutting and engraving system is rated at 40W maximum output power. This is capable of cutting materials up to 6mm in thickness, consistently. Thicker materials can be cut (up to 10mm thickness) however the machine will require slowing in order to facilitate this, which can distort materials, increase production times and wear on the laser; this is generally not recommended.

Solo SE Evo also features an "air assistance" system which blows a jet of compressed air onto the material being cut. This increases the quality of the cut edge, reduces volatilised material and helps to protect the focusing lens from damage.

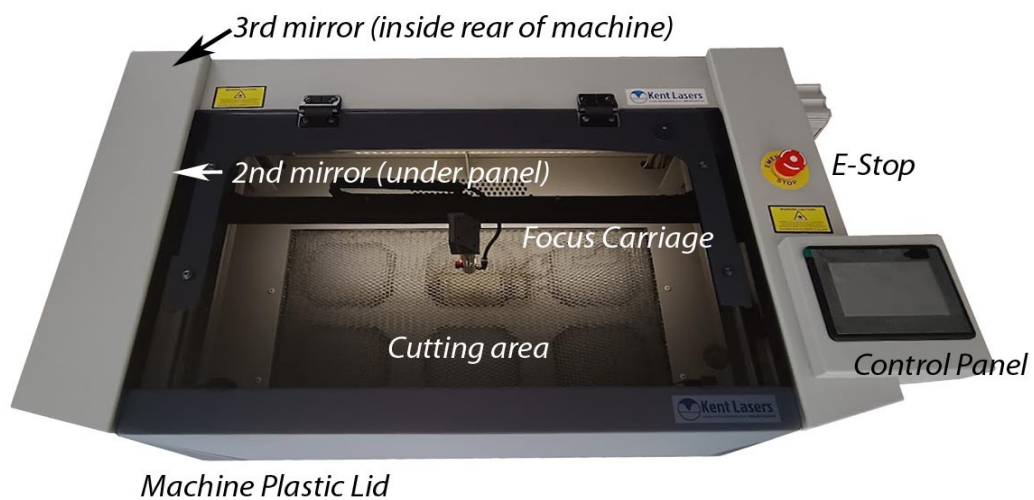
Materials being cut should be as flat as possible. Small variations in material thickness are acceptable, however heavily warped materials, or items that are not flat should be avoided.

A list of general materials which are suitable for laser processing can be seen below:

- Plywood (Birch and Poplar)
- Medium Density Fibreboard (MDF) Including veneered MDF panels.
- Solid wood, including Ash, Oak & Elder
- Paper & card
- PE Foam
- Leather (*Including faux leather – ensure PVC free*)
- Fabrics, including Cotton, Linen, Lycra & synthetics.
- Acrylic – both extruded and cast grades.
- Anodized aluminium (*engraving only*)
- Stainless steel (*engraving only and with a developer spray such as Cermark*)
- Engraving laminates

*Please ensure compatibility of materials by choosing "laser graded" suppliers. Material Safety Data Sheets (MSDS) information is available from most reputable sheet material suppliers which contain information as to the composition and suitability of materials.*

### Front machine layout:



**Rear machine layout, including I/O:**



**DO NOT OBSTRUCT REAR VENTS – LEAVE AT LEAST 100MM CLEARANCE**

**Side machine layout including I/O:**



**4) SAFETY FEATURES & PPE:**

During normal operation, including basic servicing procedures listed in this manual the user is not required to wear any specific personal protective equipment (PPE). More advanced servicing tasks, such as replacement of the laser, or electronic module repair should be performed by a qualified engineer only. Solo SE Evo has been designed so that basic servicing tasks are able to be performed from the front of the machine, without moving equipment or requiring any special tools /access.

The equipment has a single opening (lid) which is able to block harmful levels of direct or indirect (scattered/reflected) laser radiation. The cabinet and lid of this equipment therefore forms an interlocked enclosure which is designed to protect persons from hazards associated with exposure to the laser beam. During normal operation, if the lid is opened, a stop command is sent instantly to the laser source and its associated power supply. A secondary "feed hold" command is also sent to the machines main controller; this ensures that cutting motion is paused and jobs are not lost if the lid is opened during materials processing. The interlocking devices should therefore never be removed, modified or serviced by any unqualified persons.

Solo SE Evo contains an integrated visible red laser for alignment of materials. This device is enclosed in the laser compartment at the rear of the machine and is coincident with the main cutting beam. This red laser is a class **3R** device with a maximum optical output not exceeding 5mW. This device should **NEVER** be viewed directly or viewed with optical instruments.

Solo SE Evo also features advanced fume extraction which greatly reduces the risk of airborne contaminants, prolongs the life of the laser and reduces the complexity of extraction system(s). In order for the machine to work effectively it is important to clean the machines bed (honeycomb insert) and general cutting area on a regular basis as to avoid harmful build up of cutting residues. *Please consult Kent Lasers or an authorised representative to ensure a suitable fume extraction system is being used in conjunction with this equipment.*

## 5) GENERAL MAINTENANCE:

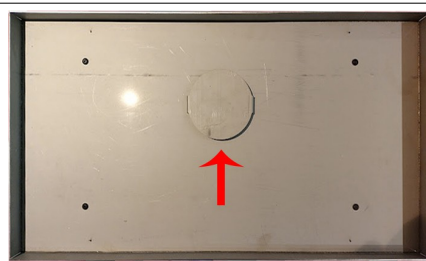
Laser maintenance and care is comprised of regular cleaning of the machines cutting area, visual inspection of safety features, inspection/cleaning of optical elements (mirrors, lenses etc) and checking the optical alignment of the mirrors. Ensuring linear motion/drive components are all in acceptable condition is also recommended. Maintaining your laser system can be divided into specific checks which can be performed on a weekly basis, in addition to general inspection and maintenance as and when required. Many maintenance tasks will depend upon how much use the system receives and should therefore be performed on a case by case basis. *Window cleaning solution and cloth can be used to clean internal surfaces.*

### Weekly (minimum):

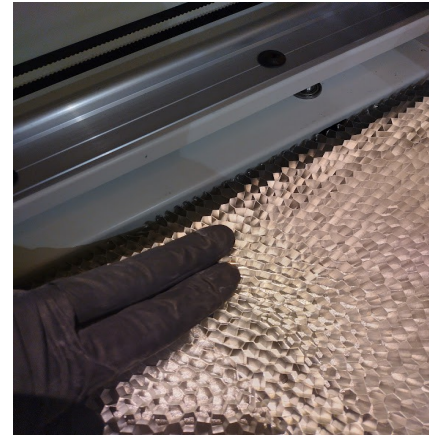
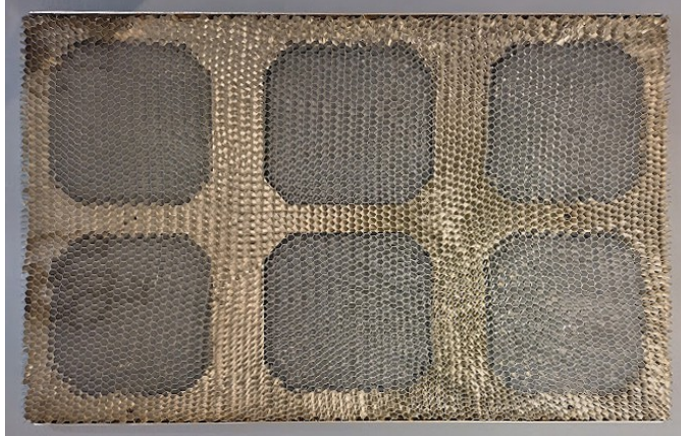
1. Cleaning of the cutting area, including extraction vent.
2. Removal of honeycomb insert and cleaning/vacuuming of the bed tray/vent.
3. Visual inspection of the mirrors and lens.
4. Check filters and air inlets on extraction equipment.



(1) Extraction vent and general cutting area.

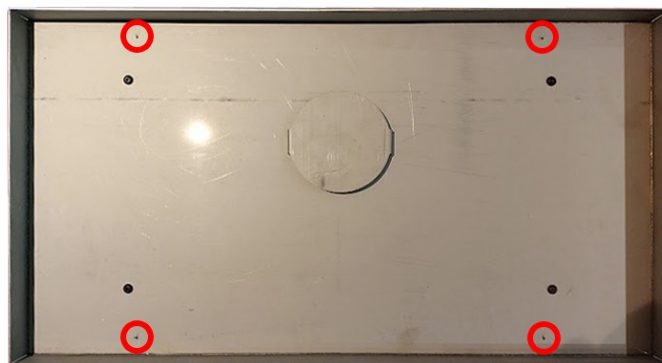


(2) Bed tray and vent (underneath honeycomb)

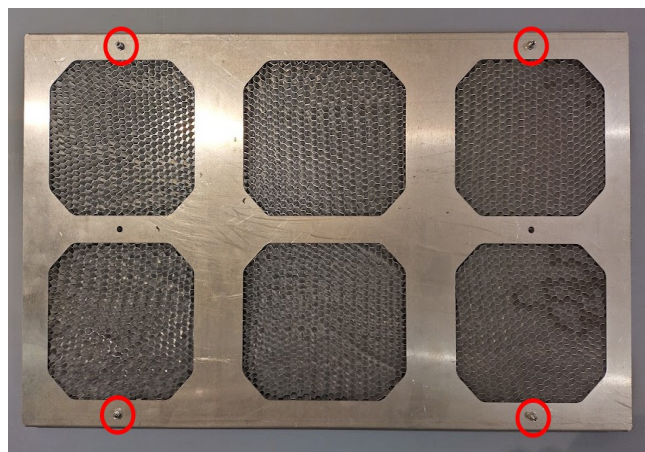


The honeycomb insert is a consumable item and will become contaminated with cutting debris and vapours over time. Frequency of replacements will depend on the material(s) being cut and the length of time the current unit has been fitted. To remove the insert, gentle pressure can be applied in a downwards motion on either the left, or right hand side of the insert. This will cause the opposing side to upend facilitating removal: It is necessary for the honeycomb insert to be removed in order to clean the bed tray as pictured above.

Refitting the honeycomb insert is achieved by placing it back into the bed tray. Please note there are 4 threaded "spiked" screws in each outer corner of the honeycomb insert, these are designed for locating into the 4 holes in the bed tray as pictured below:



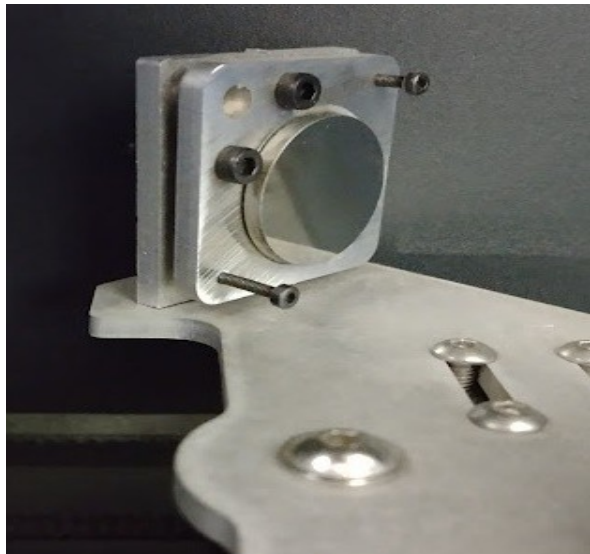
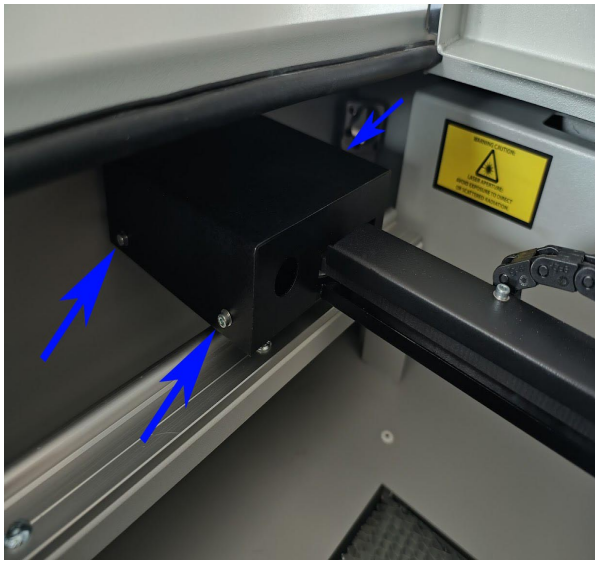
Spiked fixings shown on the underside of the honeycomb insert:



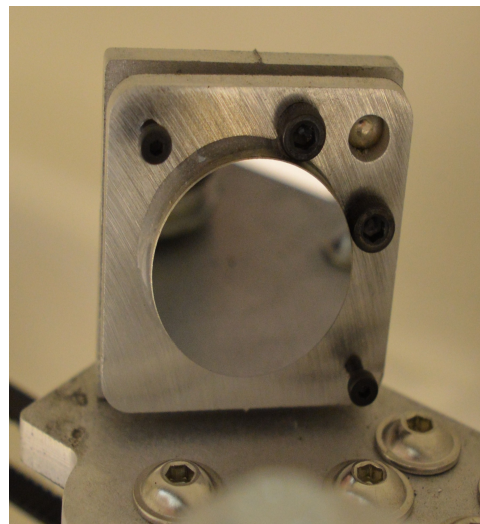
Cleaning of the mirrors will also be necessary from time-to-time. Maintenance of the mirrors and optics is one of the more crucial service tasks, which can create a large impact on cutting efficiency and quality. Contamination on the optical surfaces can cause a loss of laser beam reflectance turning crucial laser energy into wasted heat. If contamination is left to build up to excess, the optical elements can sustain permanent damage.

*It is not recommended to clean optical surfaces on a scheduled basis and only perform cleaning if optics are dirty.*

The images below show the mirror cover, which is located on the left-hand-side of the machine inside the cutting area. This cover can be removed by unscrewing the 3 retaining bolts (arrowed) to access the mirror optical element. The opposite shows the mirror surface ready for cleaning.



To facilitate cleaning, a fresh microfibre cloth is used to gently wipe off any dust or residue. For heavily contaminated optics, lens cleaning solution can be utilised or any light solvent such as naphtha or isopropanol. Strong solvents such as acetone must **NOT** be used.





The focusing lens will also require periodic cleaning and inspection. The focusing lens is located inside the focus carriage above the nozzle. Exploded view of the focus carriage assembly:



In order to access the lens the focus adjustment knob must be rotated counter clockwise in order to loosen the nozzle and lens tube assembly. The lens is held inside this tube and secured with a retaining ring. Once the nozzle is free, the airline can be removed from its fitting by pushing down on the blue ring and pulling away the silicone airline tubing.

The nozzle can then be unscrewed counter clockwise from this tube. The lens will now be visible inside. If the lens requires cleaning it can be removed from the tube by loosening the retaining ring with a small flat head screwdriver, taking care not to scratch the lens surface.

The lenses utilised in this device, made from Zinc Selenide, are not considered toxic, however, care should be taken when handling; washing hands after refitting is recommended. Broken lenses which have cracked or chipped should be wrapped in tissue and disposed of carefully.

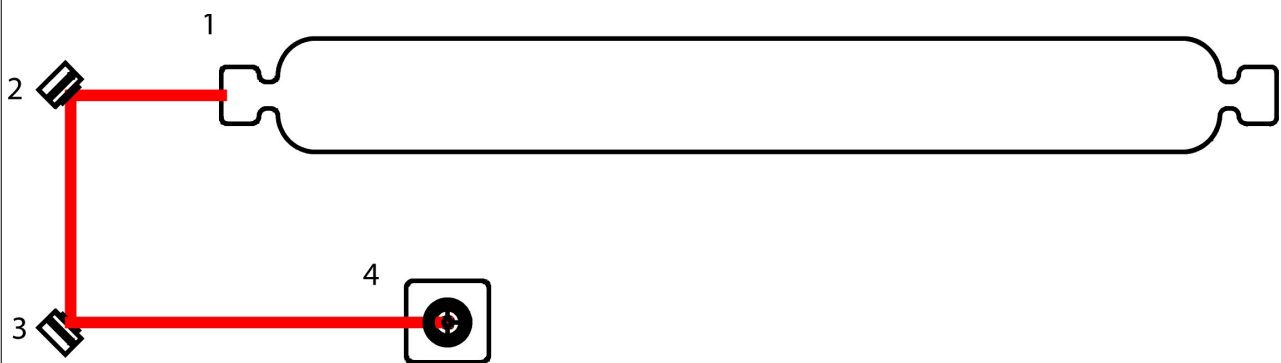
For your reference, a data sheet is provided at the end of this document which details handling and disposal requirements.

## 6) ADVANCED MAINTENANCE:

Undertaking more advanced maintenance procedures will sometimes be necessary in order to ensure equipment is working efficiently. This consists of the following procedures which are performed only when required; usually if cutting has become inconsistent:

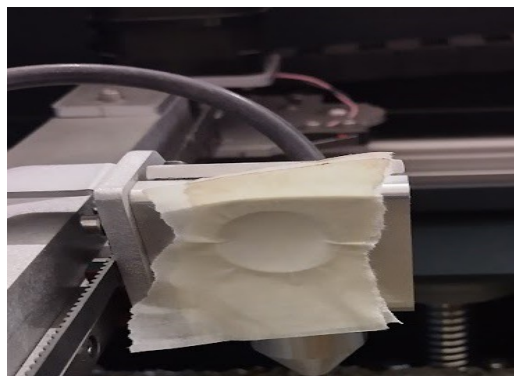
- Optical alignment and re-alignment if required.
- Bed levelling.
- Cleaning and lubrication of X axis linear guide.

The optical pathway used to deliver the laser beam onto the workpiece is referred to as a “flying optics” beam delivery system. The raw laser beam is reflected from a series of moving mirrors through a lens and onto the workpiece. Principle of operation is shown below:



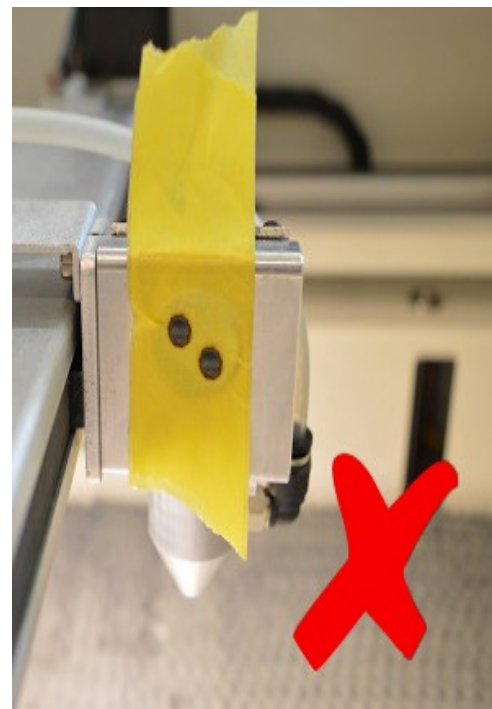
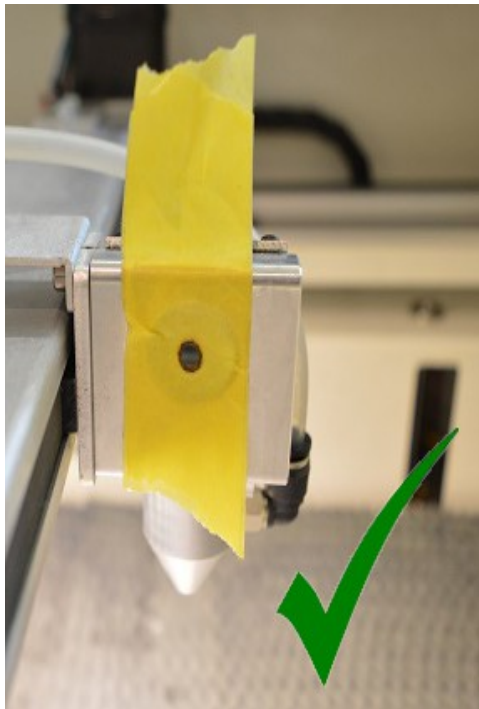
1. The laser tube, which resides in the rear of the machine.
2. First reflection mirror: steers the beam in the Y axis.
3. Second reflection mirror: steers the beam in the X axis.
4. Third mirror steering the beam downwards, through a focussing lens.

In order for cutting to remain consistent, it is critical that the above components are kept in perfect alignment with only a very small degree of variance. In order to undertake an initial test on the laser systems alignment, a small piece of doubled-up masking tape should be affixed to the input aperture on the focus carriage as detailed below:



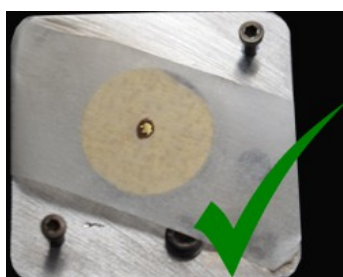
Applying gentle pressure to this tape will make an indentation which matches the outer diameter of this aperture (allowing the user to gauge relative beam location). The beam should hit the exact same position in each corner of the bed within a very small margin of error ( $\pm 0.5\text{mm}$ ) and should be centrally located.

A momentary test pulse can be sent to the laser tube by accessing the menu on the touchscreen controller until the "laser" icon is displayed. Pressing this key will send a test pulse to the laser source, creating a small burn mark allowing visual inspection of beam location. This should be first performed in each corner of the machines cutting space. The resulting burn marks should all be within the central portion of the aperture, as in the green image below:



If the beam deviates by a considerable margin as detailed in the red image, a re-alignment may be required; the masking-tape method, as discussed previously will be used again in order to visualise beam location starting with the second mirror. **It is crucial to note that a change in beam location onto the surface of any mirror is achieved by adjustments to the previous mirror.**

The first mirror, located behind the left-hand-side panel, is factory preset and does not require testing with masking tape. This mirror will however be used in order to change the location of the beam onto the second mirrors surface.



The images above demonstrate how relative beam location is checked; a small piece of doubled-up masking tape is affixed to the mirror to be tested and a momentary test pulse is sent to the laser tube with all lids and access panels closed. A short test pulse is achieved by pressing the "laser" key within the machines menu.

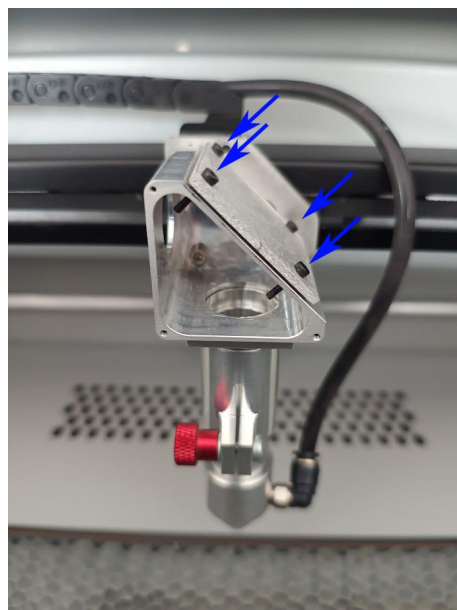
The beam should be located in the central portion of the mirror being tested and retain this position at both extents of axis travel; for instance the second mirror can be moved all the way to the **REAR** of the machine, a test pulse is then burnt onto the masking tape, moving this mirror to the **FRONT** of the machine should yield a burn mark in the exact same position on the masking tape. This procedure is repeated front-to-back (mirror 2) and then left-to-right (mirror 3)

Adjustments can be made to beam location by rotating the small set-screws in the mirror plate of the previous mirror:



*A 1.5mm Allen key can be used for mirror adjustment.*

After alignment of mirror 1 & 2 has been completed, the third mirror, which is affixed to the cutting head (focus carriage) can be inspected, ensuring that the mirror surface is clean and smear-free. The alignment of this mirror is factory set and cannot be adjusted. It can be removed for inspection, or replacement by removing the 4 mirror-plate retaining bolts.

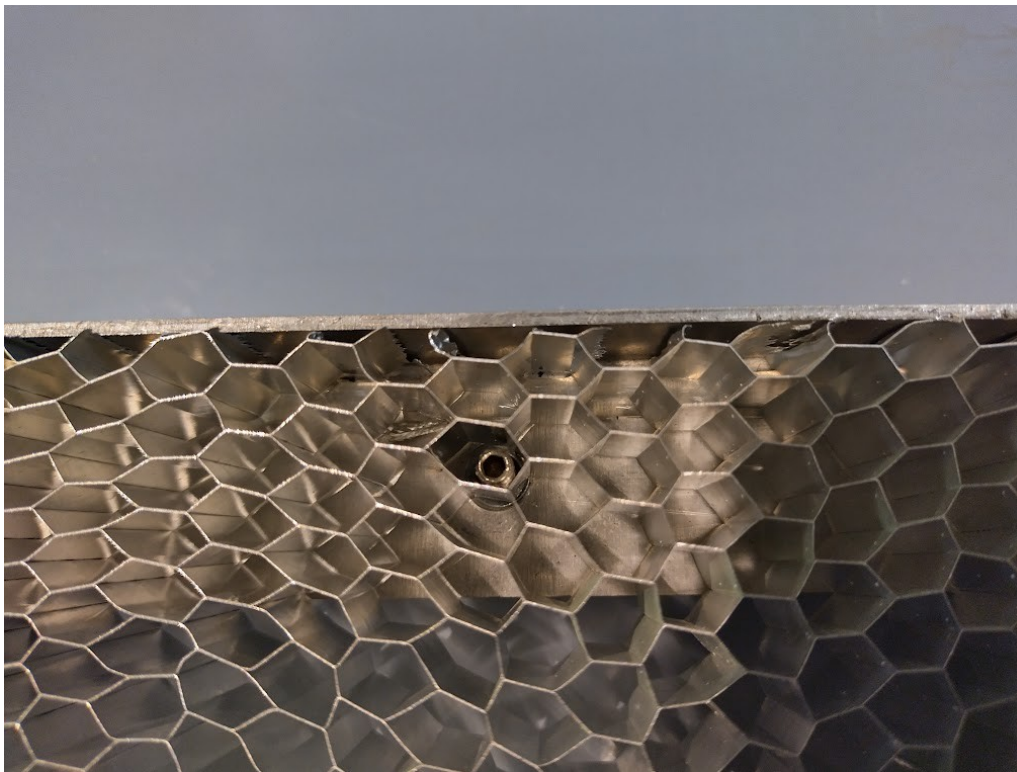


After careful checking that the entire optical pathway is calibrated (Beam aim is travelling level from the rear-to-front, and also from left-to-right) the re-alignment procedure is now complete.

The re-alignment process is now complete.

### **Calibrating the honeycomb insert:**

In order to ensure efficient cutting, it is important that the honeycomb insert (which supports your materials) is level. This consists of ensuring the honeycomb is the same distance away from the lens in all 4 corners of the machine. The bed can be levelled by rotating the adjustment screws located in each corner of the honeycomb insert. Tightening the screws will force them downwards and therefore lift the bed in the respective corner. The adjustment screws are shown below:



A 2.0mm Allen key can be used for bed adjustments.

The X axis linear guide should be kept clean and well lubricated during continued use. This is to ensure a "fluid film" of lubricant is protecting the carriage assembly and guideway. The metal guideway should be wiped down prior to applying lubricant taking note to remove any dirt or residue from the recess cut into each face of the guide. A microfibre cloth or tissue roll is recommended for this task.

The Solo SE Evo utilises a linear covering system to protect the motion systems guide rail from contamination and ingress of dirt. It is generally not required to clean or lubricate this area of the machine, however if engraving quality becomes inconsistent a light mist of light oil, or lubricating fluid, such as WD40 can be utilised by spraying the underside of the belt.



Lubricant should never be allowed to make contact with any other components ESPECIALLY the optical reflecting elements and focussing lens.

## 7) SOFTWARE:

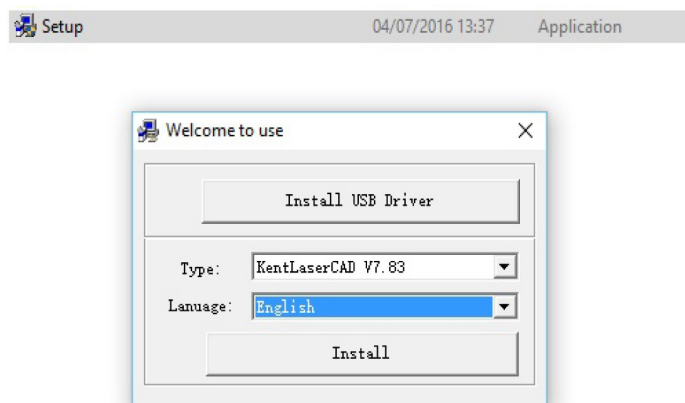
The Solo SE Evo is supplied with an industry standard motion controller with touch-screen display. The controller is compatible with its proprietary software (LaserCAD) as well as software produced by third parties, such as Light Burn ([www.lightburnsoftware.com](http://www.lightburnsoftware.com)).

These two packages offer advanced features and job setup, as well as the ability to utilise many different file formats. We recommend the DXF file format for vector cutting and marking, in addition to JPEG or Bitmap formats for raster photo engraving. Other file formats are supported; for details of this and other image processing features please refer to the LaserCAD manual which is supplied with your machine or available for download from [www.kentlasers.com](http://www.kentlasers.com).

The installation and basic setup for LaserCAD is detailed below:

LaserCAD requires minimal PC specification with a recommended dual-core processor, 2GB RAM and 100MB free hard-disk space in addition to USB-2 connectivity. Software installation should be performed **BEFORE** connecting the USB cable from the machine to your PC and can be performed as follows:

Start the LaserCAD installer by clicking on the setup icon. The following screen will be displayed:

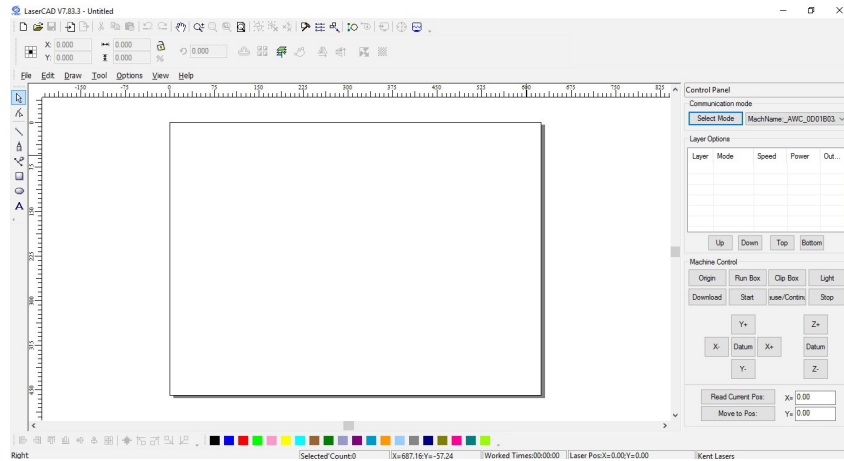


Select "LaserCAD" from the first pull down menu and English from the second language pull down options menu. The USB driver should be installed **FIRST** and on screen instructions followed. Now proceed to install LaserCAD by pressing the lower "install" option dialogue box.

After installation, a shortcut icon will be placed within the start menu on most Windows® operating systems. The software can be launched from this icon. The main program application icon can also be found in the following directory:

[Main drive path, for instance C:/] <C:/laserCAD/AWCprograms/laserCAD>.

A shortcut can also be made for the above file location by right clicking within the windows desktop and selecting "create shortcut" using the correct file path. Opening LaserCAD will present the following default program window:



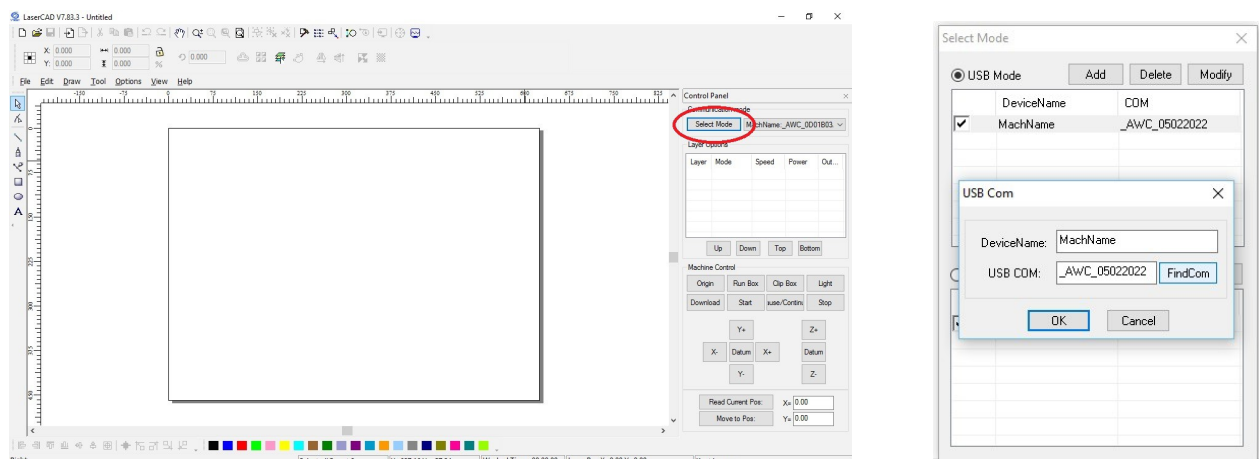
In order to ensure the machine is ready for use, the software has to be configured as detailed below:

### **Setting Communication mode:**

The correct communication mode within LaserCAD is required in order to initialise the laser cutting systems controller for communication with the PC. There are two modes of connectivity between the cutting system and your PC; USB and LAN (Local Area Network).

LAN is used in industrial environments where long cable runs are required between the laser cutter and PC. Information for setting up LAN based connections is dependant upon your network infrastructure and is beyond the scope of this manual. Please consult your IT administrator for connection of the machine to your local area network.

In order to set up the communication mode within LaserCAD, click on the following dialogue box highlighted in red. The adjacent menu will then be displayed:



### **Setting up USB interface:**

The above options menu will have various generic machines listed under "device name". Please ensure "USB Mode" is enabled and the USB cable is plugged into both the machine and PC. Highlight one of the listed machines and select "Modify". This will bring up a second menu.



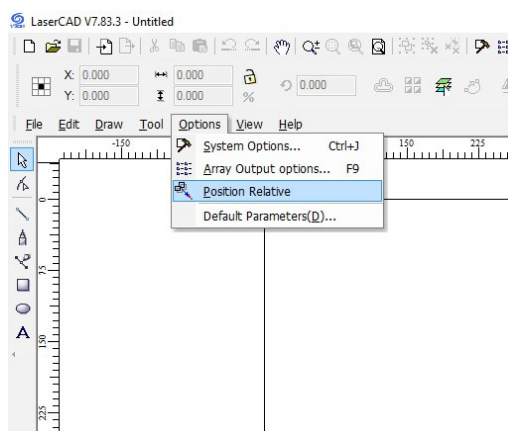
Clicking the "FindCom" icon will now initialise the laser system controller and establish connection to the PC. To exit setup click "OK".

*Each machine controller is pre-programmed with a serial number, this should now be displayed in the list. The machine name can also be changed by selecting "modify" and entering a new machine name in the table.*

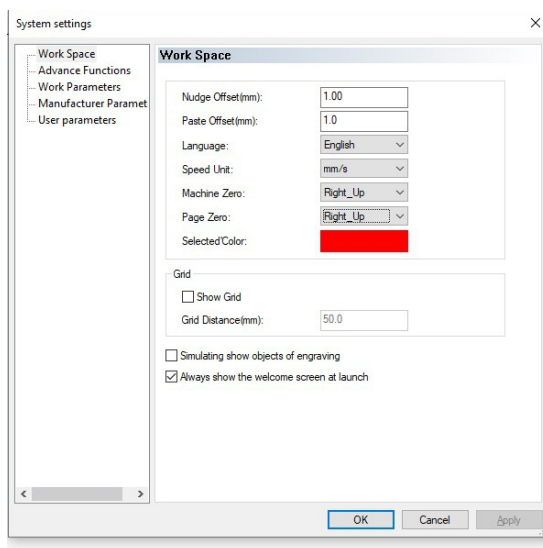
### **Page Modes and offsets:**

The software now requires configuration of the page and machine origin positions. These are locations within the workspace and machine, which are used to locate graphics and start jobs. The default machine layout for all new Kent Lasers equipment is **Rear Right**. This specific set up can be implemented using the following settings within LaserCAD:

From the Options menu, select "Position Relative" and ensure **Right\_Up** is selected:

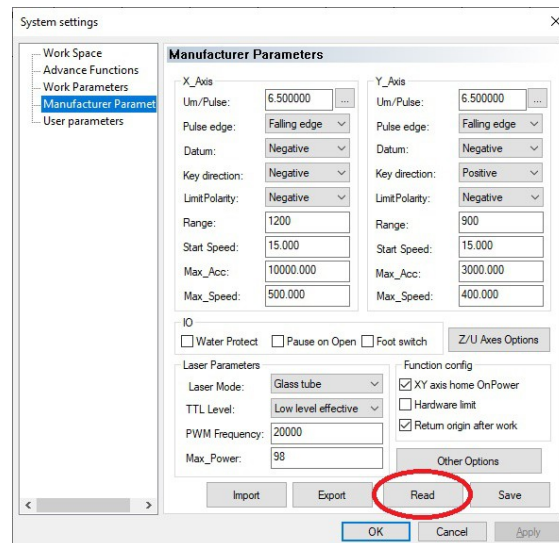


To finalise software settings, please ensure the following options which can be accessed by selecting "system options" under the options toolbar (or by using shortcut Ctrl+J) are as listed below:



To confirm: Speed unit is set to **mm/sec** Machine Zero and Page Zero are both set to **Right\_Up**.

System configuration will require one final procedure in order to offer maximum compatibility. Under the "options" toolbar menu, select "system settings" (Shortcut Ctrl+J) then enter "Manufacturer Parameters". In this menu click "Read". This will ensure the page size and system configuration stored in the controllers firmware is correctly displayed in all LaserCAD windows.



Click "OK" to apply settings and exit this menu. *It is important not to attempt to change any other settings in this menu, as undesired operation may result; these settings are protected via a unique LaserCAD administrator password.*

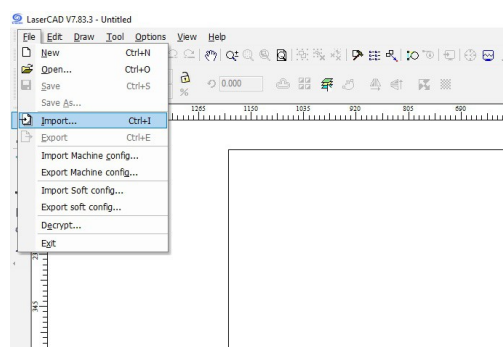
The software is now ready to use.

## 8) JOB SETUP:

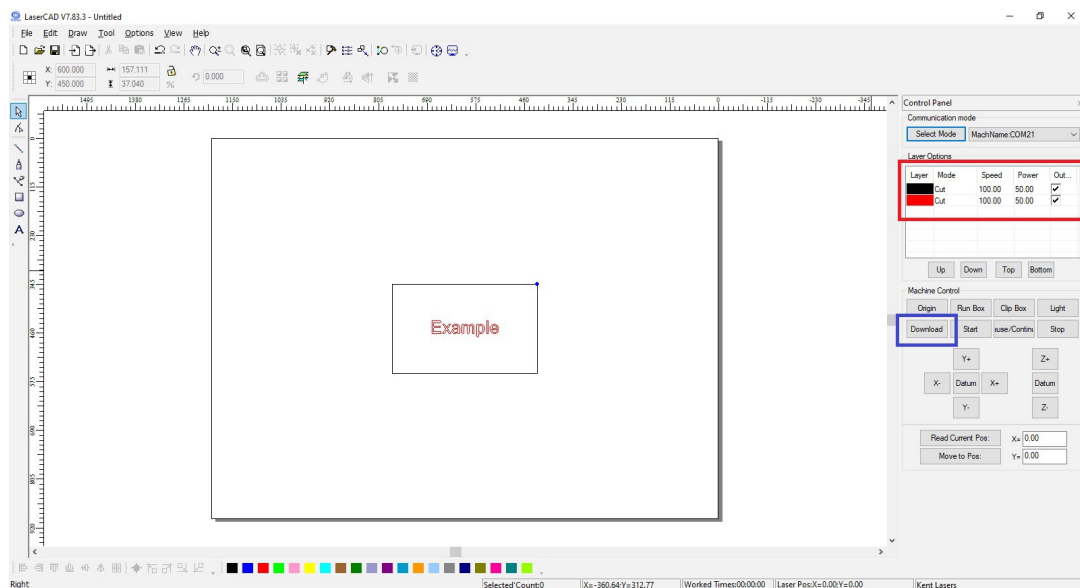
Setting up of jobs within the Solo SE Evo cutting and engraving system is comprised of:

- Preparing design files and sending to machine.
- Loading materials and setting lens focal height.
- Setting the starting point (Origin).
- Ensuring fume extraction is turned on.

Design files can be imported from the "File" menu within LaserCAD. The shortcut keys Ctrl+I can also be used to open the import dialogue menu:



Once the correct design file has been selected (*formats supported are numerous, however we recommend the dxf file format*) the preview window will display the design within the main LaserCAD window. The speed and power settings can now be selected within the LaserCAD control panel which is located on the right-hand-side of the screen.



LaserCAD has picked up that this design has been formatted using two separate drawing colours. The line colours in the drawing are used to differentiate the processing modes of the machine. There are 3 basic processing modes:

### Vector Cutting:

The machine will process the lines set to cut at a slower speed and high laser intensity. This facilitates a through-cut of the loaded material.

### Vector Marking (Scribing):

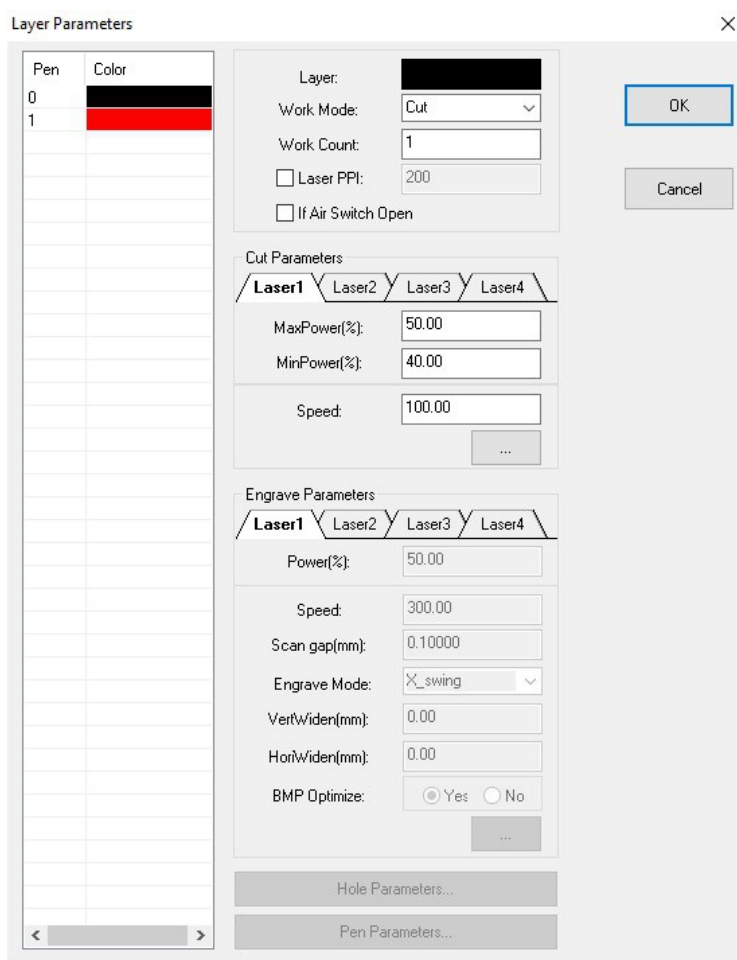
The machine will process the lines set to cut at a lower power and slightly faster speed. This causes the top layer of material to be burnt away leaving a fine marking of detail with no through-cutting.

### Engraving (Raster):

The machine will fill in sections of the drawing by sweeping the focus carriage left-to-right and firing the laser within selected vectors. Raster engraving can also be used for bitmap image photo engraving.

Setting the job processing modes can be achieved by clicking on the colour boxes within the LaserCAD control panel window (shown below). A dialogue box will then open where speed and power values can be input. Finally the job (and all associated settings) are sent to the machine by pressing the "download" icon (*highlighted in blue in the above image*). The machines motion controller will then emit an audible beep to confirm the job has been received.

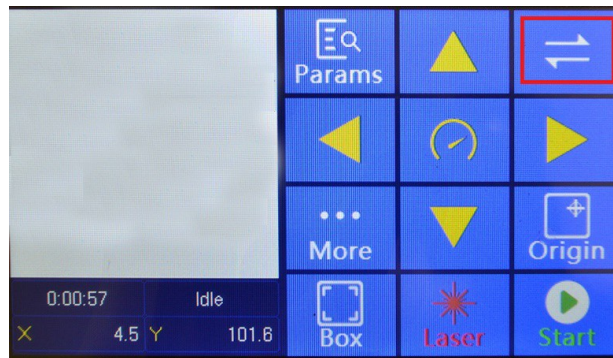
Layer Parameters window within LaserCAD, accessed via the control panel colour bars:



Functions:

Colour:	The colour of the line within the drawing.
Layer:	Referencing the line colour within the drawing.
Work Mode:	Cut or Engrave for vector/raster processing of the associated line colour.
Work Count:	The amount of times the machine will process this layer.
Laser PPI:	Turns the laser from continuous mode, to pulsed; this can be useful for delicate materials where very low power setting is required; recommended values from 600 to 3200.
MaxPower:	The main cutting power of the laser.
MinPower	The minimum cutting power of the laser. Setting a slightly lower minimum power can sometimes be useful when cutting delicate materials, or when corners of cut shapes have become damaged/distorted.
Speed:	The cutting speed of the selected layer in mm per second.
Engrave Parameters:	Settings as above, applied to engraving processing mode.

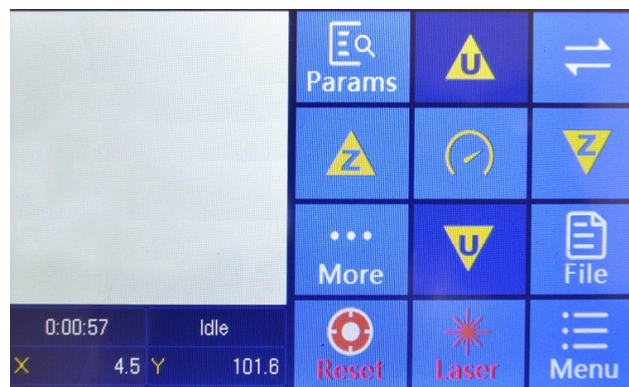
Solo SE Evo features a touch-screen display which allows the user to access various settings and job setup functions:



The machines display offers various features and controls. For a full explanation of these features please refer to the official LaserCAD manual. A basic overview of features is however listed below:

Params:	Allows the user to access various machine/job functions.
Yellow arrow keys:	Used to move the focus carriage in the X (left-to-right) and Y (back-to-front axis).
Yellow timer key:	Used to switch between fast and slow movement modes (jogging). This is a useful feature for achieving fine adjustments of the focus carriage position.
Arrow keys (highlighted):	Used to tab across into additional menus ( <i>please see below</i> ).
Origin:	Sets the starting position of the job.
Box:	The machine will draw a bounding box around the extents of the currently loaded job; used to check material alignment.
Laser:	Fires a test pulse to the laser which can be used for optical alignment.
Start:	Starts the currently loaded design file.

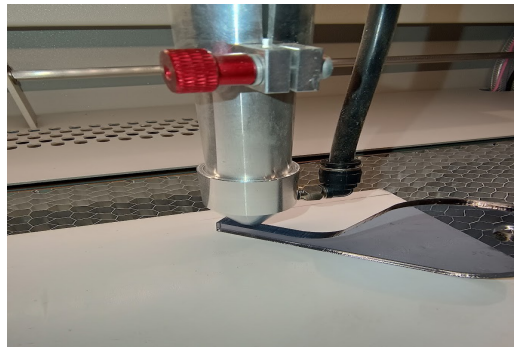
The secondary menu is shown below:



These functions are mainly redundant for the Solo SE Evo and are used to access functions on machines with additional hardware.

When the user has loaded files and set the desired starting position of the job, the materials must then be loaded into the machine and the focal height of the lens set.

Setting of the focus height is an important step in job set up as the lens converges the laser beam into a small spot which is a specific point from the lens centre giving maximum power density. The process for setting focal height is demonstrated below:



The lower portion of the nozzle (as attached to the focus carriage) is used as a reference to set the distance from the bottom of the nozzle, to the top of the material.

The end of this plastic tool is the optimum distance away from the material. The user should aim for a loose "interference" fit between the bottom of the nozzle and the top of the material.

## **9) EMERGENCY STOP & ISOLATION:**

The Solo SE Evo is fitted with a mushroom type emergency stop device which can be used in case of emergency to halt all dangerous machine processes.

This device will shut off the mains power supply to both the laser and main motion-control logic. This device is powered from an isolated 12v auxiliary module inside the machine which will remain energised during operation. The internal LED illumination will remain active when the emergency stop is used.

The location of the emergency stop is at the right-hand-side of the machine, adjacent to the controller touch-screen. This device is pushed to activate and twisted in a clock-wise motion and pulled up in order to reset.



Image of emergency stop device below:

It is recommended that the emergency stop feature only be used in the event of an emergency. This device should **NOT** be used to power-down the machine, especially for long periods of time.

In order to isolate the equipment, the mains lead should be switched off at the mains supply using the power lead and 13A domestic 3-pin socket as supplied.

Please note that when power is applied to the machine, it will undertake a "homing" procedure, whereby the motion system moves towards the rear right-hand side of the cutting area in order to initialise.

Please ensure that after using the equipment, all materials are removed from the cutting area, and the lens tube is stowed in its highest position; this is good practise and will ensure that when the machine is powered-on the homing procedure will not cause remaining materials to be snagged or dragged with the focus carriage and nozzle.

## 10) REFERENCES & DATA:



375 Saxonburg Boulevard • Saxonburg, PA 16056  
Tel: 724-352-1504 • Fax: 724-352-4980 • [www.iiviinfrared.com](http://www.iiviinfrared.com)

### Instructions for Cleaning Up Broken or Burnt ZnSe Optics

#### **Broken ZnSe Optics**

Toxicity studies to determine the risks of handling or ingesting ZnSe have show that this material is not toxic. However, long-term effects of ZnSe dust inhalation are unknown. ZnSe is normally machined or ground using wet slurries to minimize any dust which could result in inhalation. In general, good work practices should be followed, such as washing hands after handling ZnSe to avoid any transfer of ZnSe dust into the mouth from handling food, etc.

If a ZnSe optic is broken, II-VI recommends that large pieces be gathered and placed in an appropriate container for later disposal. Small, dust-size pieces should be wiped up with a wet cloth or paper towel to avoid airborne dust. Broken or scrap ZnSe pieces should be disposed of in a properly licensed industrial disposal facility. ZnSe optics can be returned to II-VI for repair, refurbishment, or reclaiming of the optic.

#### **Burnt ZnSe Optics**

If a ZnSe optic is burnt or melted due to the absorption of the CO<sub>2</sub> laser, the ZnSe will decompose into ZnO and SeO<sub>2</sub>. Cleanup of the decomposed ZnSe should be conducted by wiping the area with a wet cloth or paper towel to avoid airborne dust. The decomposed ZnSe may require abrasion to remove the ZnO and SeO<sub>2</sub> from surrounding lens mounts and beam delivery tubes. This should be cleaned up with a piece of wet sandpaper or other like method. The resulting material should be properly disposed of in a properly licensed industrial waste facility.

#### **Disposal of Used or Broken Optics**

Please contact our corporate offices at 724-352-4455 to reach our Warranty Return group, who will issue a Return Authorization Number for the return of used or broken optics to be disposed.

Clean up instructions.doc

Revised: July 18, 2006  
Supersedes: July 16, 2002  
Supersedes: July 24, 2000



Supply Voltages and I/O Requirements:

This equipment is designed to be powered from a domestic single phase electricity supply at 240V AC 50Hz. This equipment **MUST** be connected to an earthed supply with the mains lead and connection device supplied. Maximum current draw will not exceed 10A.

**A means of isolating the equipment at the mains socket is mandatory.**

For continued EMC compliance use only a quality USB (A-to-B) lead with inductive chokes at both the PC and machine end; illustrated below:



Servicing of this equipment should **ONLY** be performed by a qualified engineer appointed by Kent Lasers. Servicing is generally recommended at 12 month intervals.

**Solo SE Evo is a CLASS I electrical device, meaning it MUST be connected to a earthed mains electricity supply.**

**For advanced repairs and service please contact Kent Lasers or an appointed representative ONLY.**

## 11) CONTACT:

Kent Lasers Ltd

Pear Tree Cottage  
Benover Road  
Yalding  
Maidstone  
Kent

ME18 6AS

[www.kentlasers.com](http://www.kentlasers.com)

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