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*(Original Instructions)*

# Operations Guide

**Cobalt® XL**

Manual 3.2 • Jul-23



Laser Marking Technologies provides dependable, innovative ideas and solutions with unequalled product satisfaction. In this document you will find complete instructions.

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# 1 Introduction

This guide is intended for use by Plant Managers, Machine Operators and Maintenance Personnel

## 1.1 System Overview

System:	Details
Manufactured by	Laser Marking Technologies, LLC.
Model	Cobalt XL
Type	Pulsed Fiber
General Description	Laser marking machine equipped with an automated Z Axis, optional automated X axis and/or A Axis and 163 or 254fl lens on a digital galvo head
Functions	Permanent marking of laser friendly products including metals/ plastics

## 1.2 Authorized Use



This machines primary function and only authorized use is to safely mark products. This machine is not to be used as an experimental machine. This machine is not for use on combustible materials.

## 1.3 Points of Contact

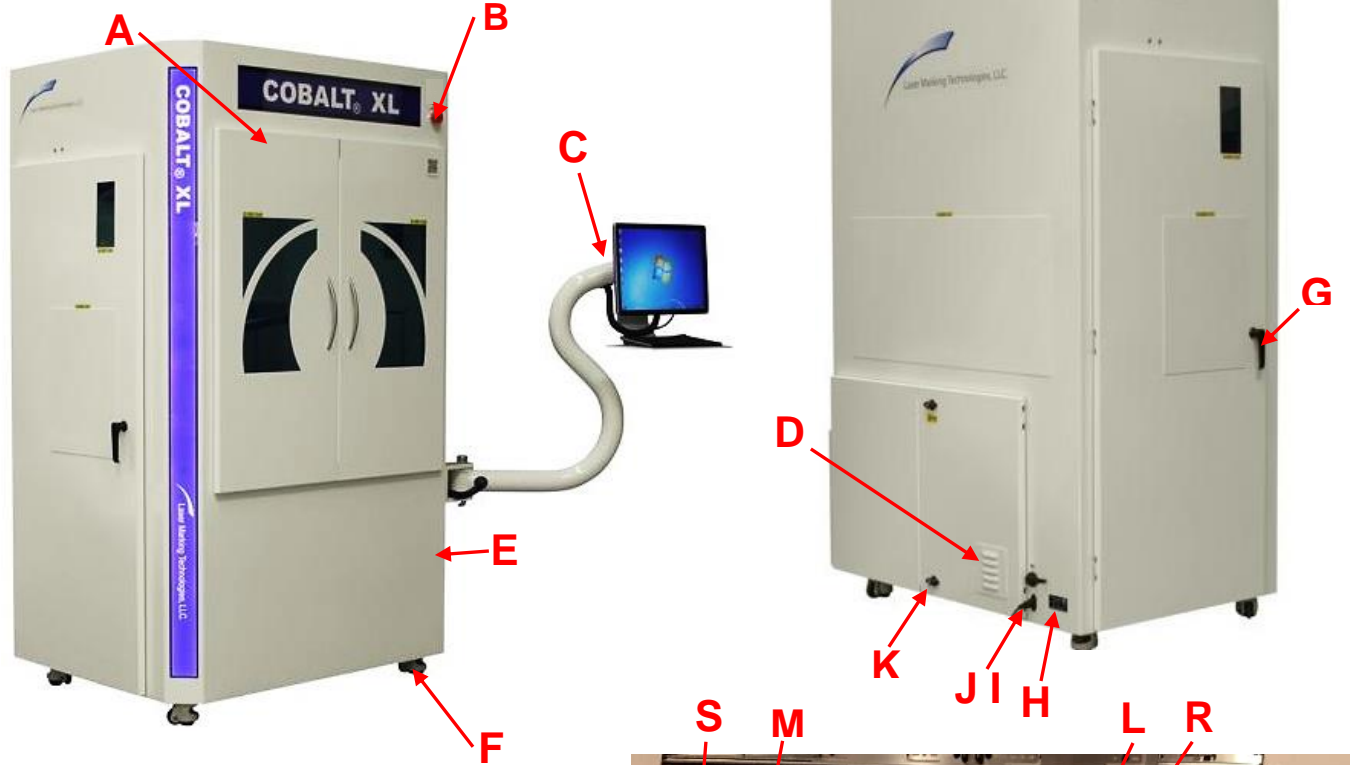
The following is a list of points of contact (POCs) that may be needed by the user for informational and troubleshooting purposes

Type	Email	Telephone
General information	<a href="mailto:info@lmtgrp.com">info@lmtgrp.com</a>	+1(866).799.0199
Sales	<a href="mailto:sales@lmtgrp.com">sales@lmtgrp.com</a>	+1(866).799.0199
Engineering	<a href="mailto:engineering@lmtgrp.com">engineering@lmtgrp.com</a>	+1(866).799.0199
Technical Support	<a href="mailto:techsupport@lmtgrp.com">techsupport@lmtgrp.com</a>	+1(866).799.0199
Service/ Parts	<a href="mailto:service@lmtgrp.com">service@lmtgrp.com</a>	+1(866).799.0199
EU General information	<a href="mailto:info@gsetechnology.com">info@gsetechnology.com</a>	+31(0)493 35 21 21
EU Sales	<a href="mailto:leo@gsetechnology.com">leo@gsetechnology.com</a>	+31(0)493 35 21 21

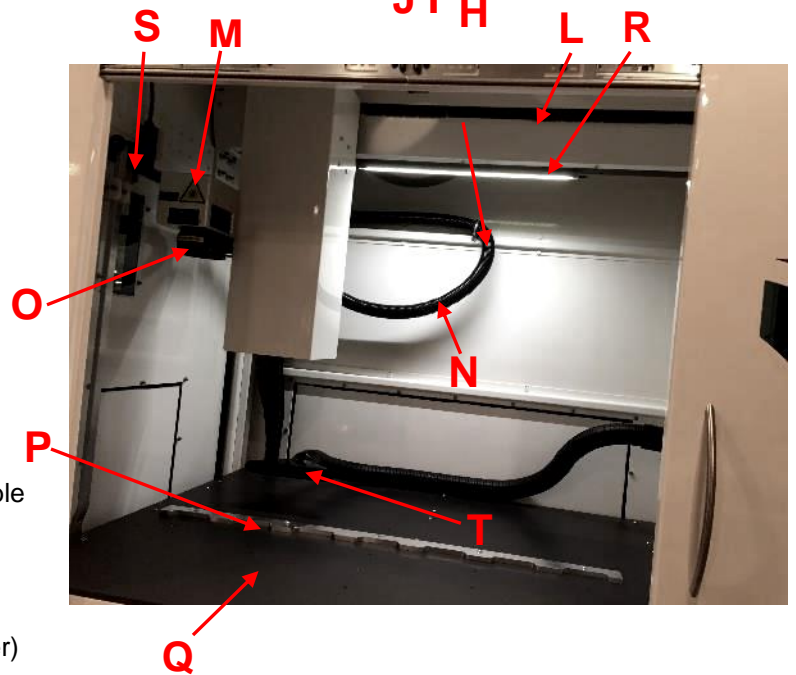
## 2 System Overview

### 2.1 Description of Machine (View A)

The following is an introduction to the Cobalt® Dominator



- A. Front horizontal sliding doors
- B. E-Stop
- C. Monitor including additional USB ports
- D. Filtered vents for CPU/electrical area
- E. CPU Access door
- F. Castors with leveling pads
- G. Side access door
- H. Data Plate
- I. Foot Pedal inlet
- J. Power inlet
- K. Doors for Electrical/CPU area
- L. Optional Automated X axis assembly
- M. Scan Head
- N. Loom including Laser Source Fiber Cable
- O. Lens w/ Cap
- P. Docking Station
- Q. Base Plate (adjustable height work surface-Factory set for Z axis values)
- R. LED Work Light (on with machine power)
- S. Door Safety interlocks (3 total)
- T. Fume Extraction port



## 2.2 Un-packaging instructions



This equipment is only authorized to be used in a facility with suitable lighting available.



This equipment is only authorized to be used in a facility where there is no slip or trip hazards present.



This equipment is only authorized to be used in a facility where proper training in ergonomics has been completed.



This equipment is only authorized to be used in a facility where proper forklift training has been completed.



Do not place liquids on any part of the machine or machine components.



Suitable Safety equipment to be worn while un-packaging



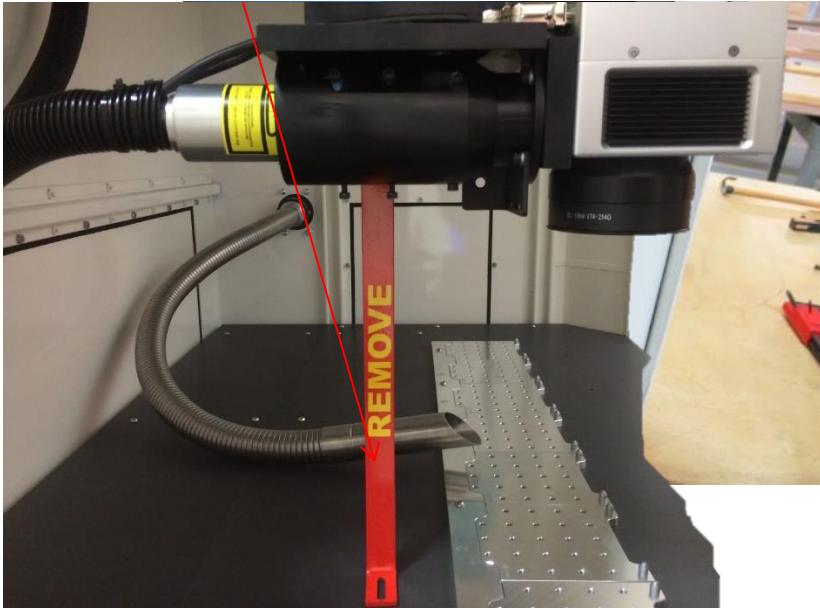
1. To unload from truck, insert forklift forks into forklift pockets on the crate.
2. Remove Banding
3. Remove crate top, then sides
4. Remove stretch film from machine. Do not use a knife of any type
5. Machine may be bolt to crate bottom. Remove lag bolt from inside the machine
6. Remove all components in cardboard packaging located within crate
7. Locate Computer in cardboard packaging
8. Turn on computer to read the manuals provided on the desktop or on the master cd
9. Read Safety Manual before continuing in the setup process



Suitable securing and bracing of the table surface using minimum of 300lb capacity holding units must take place before placing the machine atop to avoid the machine from causing harm. Suitable tested and certified lifting equipment must be used at all times.

10. Place the Machine onto a secure surface with 1 meter clearance surrounding

11. Remove the shipping bracket from the inside of the cabinet—bolted between the collimator tube and the Base Plate



## 2.3 Machine requirements

1. Voltage and Amperage is machine specific, and requirements can be found at the rear of the machine on the Serial Tag at the rear of the machine near the power inlet
2. Customer must supply an electrical receptacle with 220 vac (or 110 vac dependent upon the specified requirement) with a ground and 15 amp service

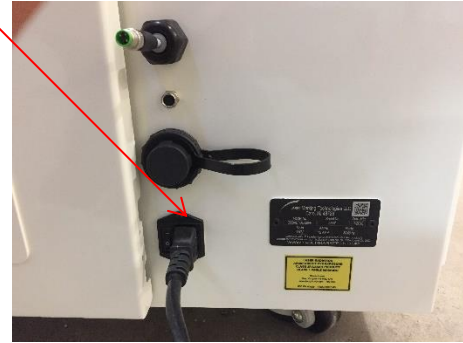


## 2.4 Initial set-up instructions



Be aware of risk of electrical shock while performing the following actions, must take proper precautions.

1. Plug main control electrical cabinet power cord into a customer supplied receptacle with a ground



2. Remove the lens cap



3. In the event of removal of either of these panels (labeled “Class 4 if open”), a risk assessment must be provided by the end user to eliminate the possibility of injury from class 4 invisible laser radiation. Additional guarding may have to be provided to ensure safety from the class 4 radiation



4. Install fume extractor system's hose to the inlet of the machine, and open the gate valve by sliding it upward.
5. Place the fume extraction nozzles as near to the process area as possible without obstructing the beam



**Fume Extraction Requirements: Minimum recommended airflow/static pressure - 223cfm/96mbar at machine.**

**If evidence of a lack of routine maintenance is shown to have had a part in a disruption of machine operation, such as inadequate fume extraction during operation, the machine's warranty will be voided. Please ensure a maintenance schedule is created and applied immediately after receiving training on the machine**

6. Plug in PC and install all USB cables between CPU and Machine (port location is not relevant) as well as the monitor cable. Install the foot pedal cable, fume extractor cable if applicable and Ethernet cable if necessary to connect to your facility's network.

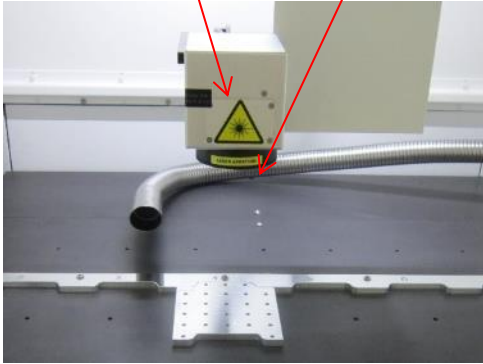


7. Ensure all warning labels and Data Plate are in position and readable as described below



**LASER APERTURE**

**CAUTION**  
CLASS 3R VISIBLE LASER RADIATION  
WHEN OPEN  
AVOID EXPOSURE TO BEAM  
Wavelength 630-670nm  
OUTPUT < 5mW CW  
IEC/EN 60825-1:2007



**CAUTION**  
CLASS 4 INVISIBLE LASER RADIATION WHEN  
OPEN AVOID EYE OR SKIN EXPOSURE TO  
DIRECT OR SCATTERED RADIATION  
Wavelength 1040-1200nm  
OUTPUT < 60W  
IEC/EN 60825-1:2007



**DANGER**  
110 VOLTS



## 2.5 Machine start-up instructions

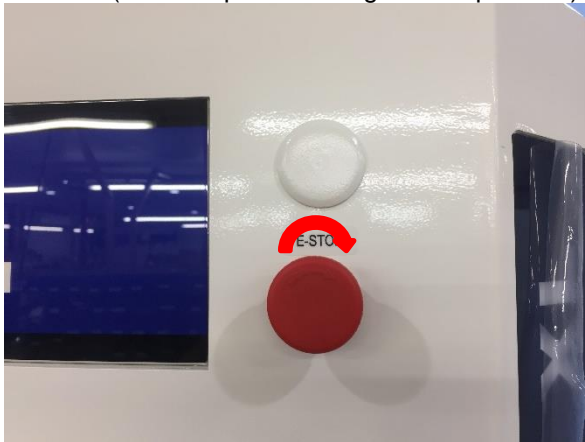


- Depression of the E-stop at any time will disconnect the power supply to the laser and control components, ceasing operation and removing the possibility of harm caused by the laser.

1. Turn the “Main Switch” to the “on” position. It will automatically start the PC. Note: If you turn the “Main Switch” to “off”, it will turn AC power off to the PC.



2. Energize electrical control by rotating the red handle of the E-Stop located on front of cabinet clockwise (the e-stop will no longer be depressed).



3. **\*NOTE\*** If this machine is located outside of the US. Please go to <https://www.dell.com/support/Assets-Online/us/en/04/registration#/identifyservicetag> to register the Dell PC. The PC's service tag will be in the Laser Back-up parameters on the Master USB and the desktop.

## 2.6 Operating Instructions



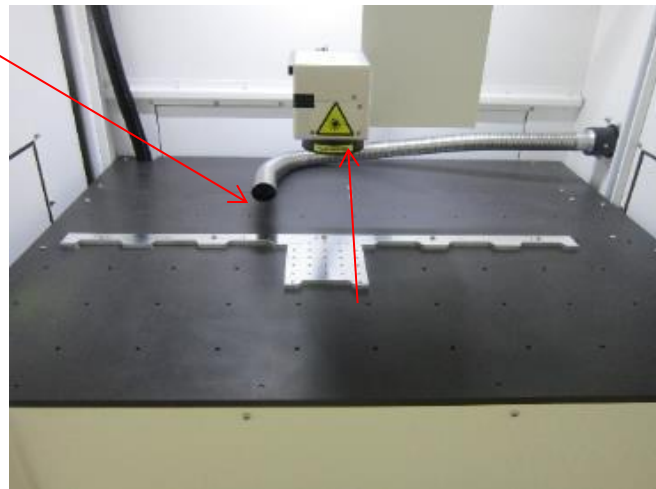
- This machine is not intended for use other than described.
- This machine can mark material such as steel, aluminum, ceramic, carbide, rubber, titanium, brass, copper and laser friendly plastics.
- Do not operate this equipment until you are properly trained to use the equipment.
- This machine is below 70dba and does not require any hearing protection.

1. Ensure the machine is on and all USB cables are properly seated
2. Place the part to be marked inside of the marking area (110mm square beneath the scan head is standard). A sample part and program has been provided with the corresponding serial # of the machine for an example marking.

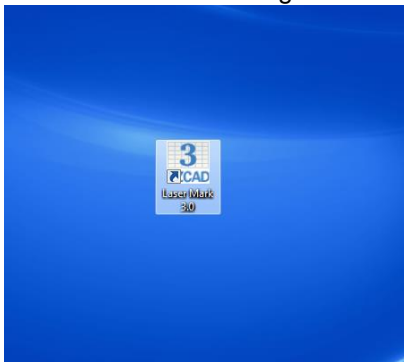
Ensure the path of all Axis's are clear before performing any action causing motion



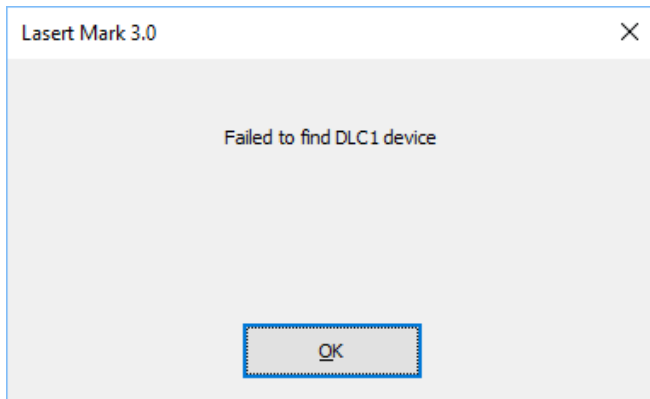
Ensure no obstructions for motion!



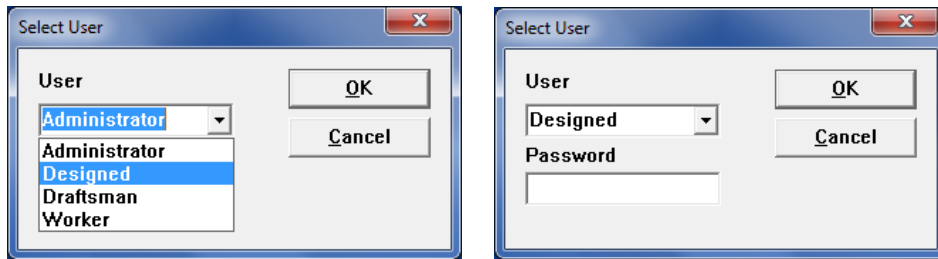
3. On the desktop of the computer, double click the “LaserMark” software icon. Note: machine must be powered on before starting the software.



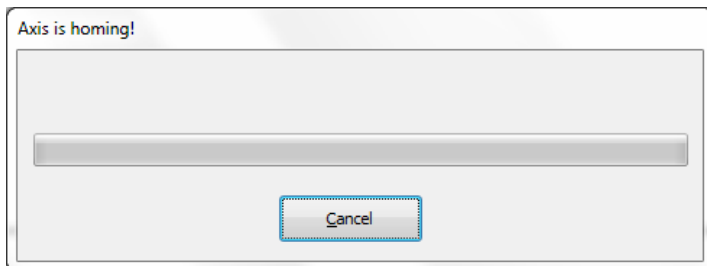
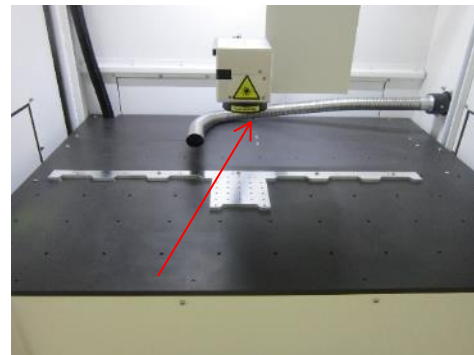
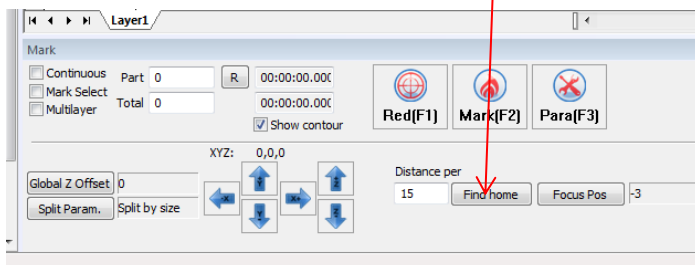
4. If an error appears, the machine is most likely turned off, or the usb is unplugged



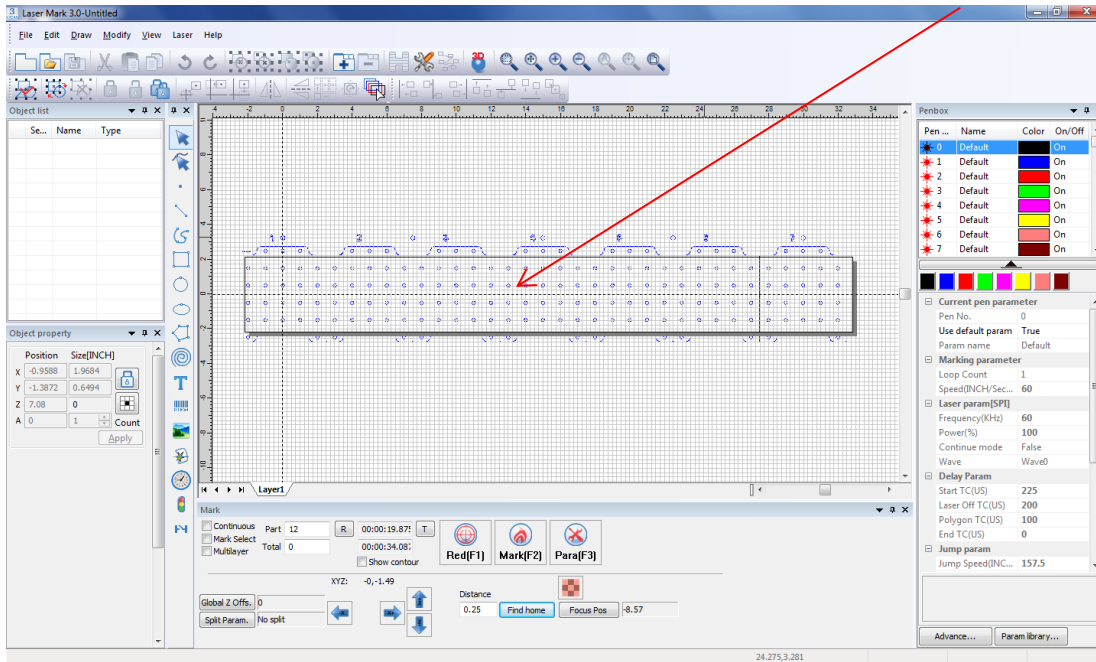
5. Enter the program in the "Designed" level of access (this currently requires no password), click "ok"



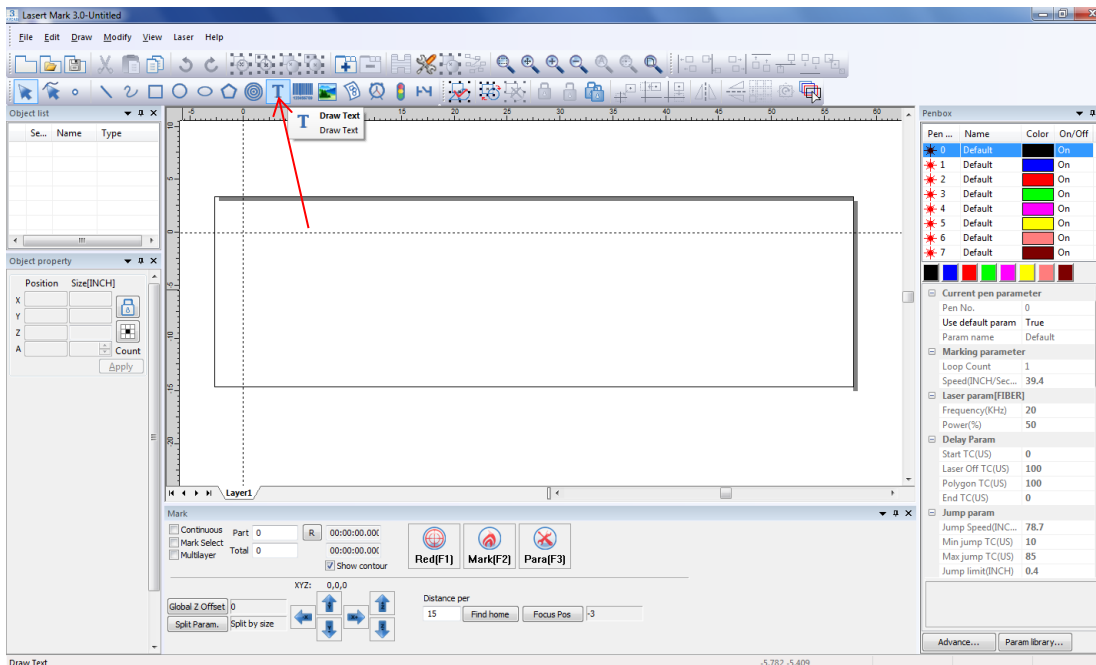
6. Home the Axis's by clicking "Find home" (homing must be produced once after every startup, or marking will not be allowed)



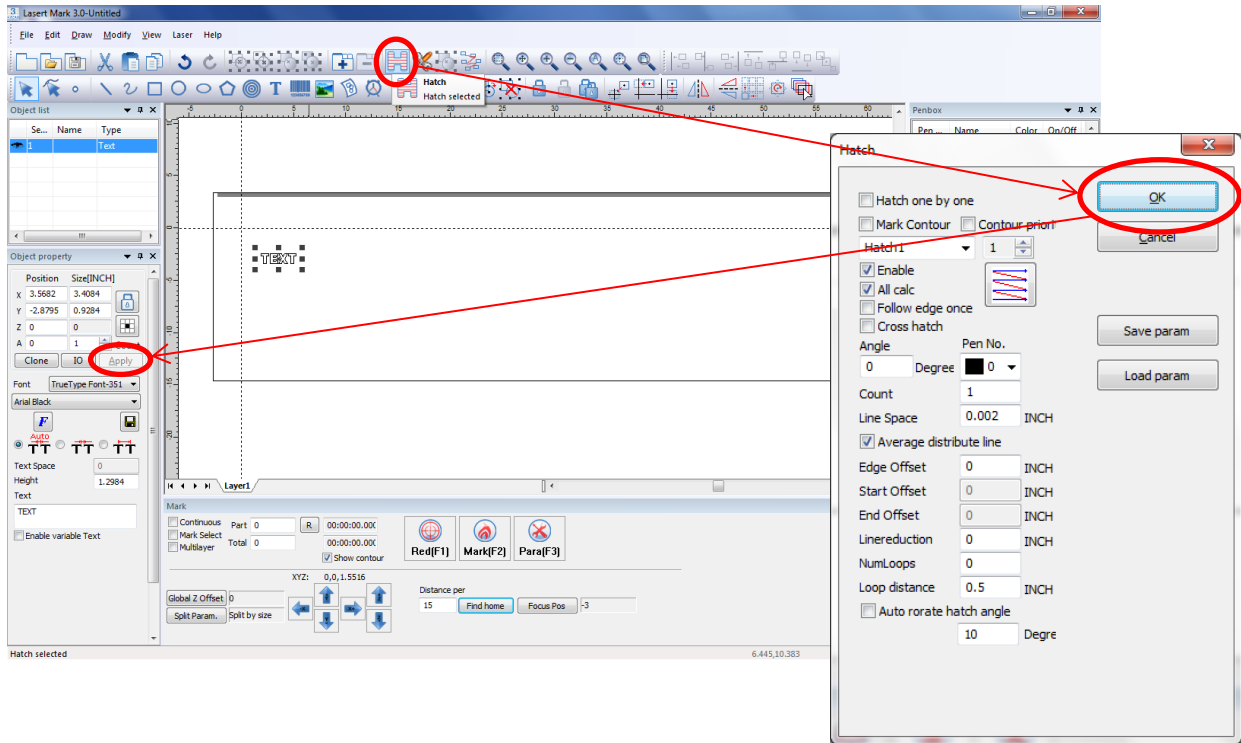
7. Marking Area is the black box. The blue graphic is for visual graphic positioning.



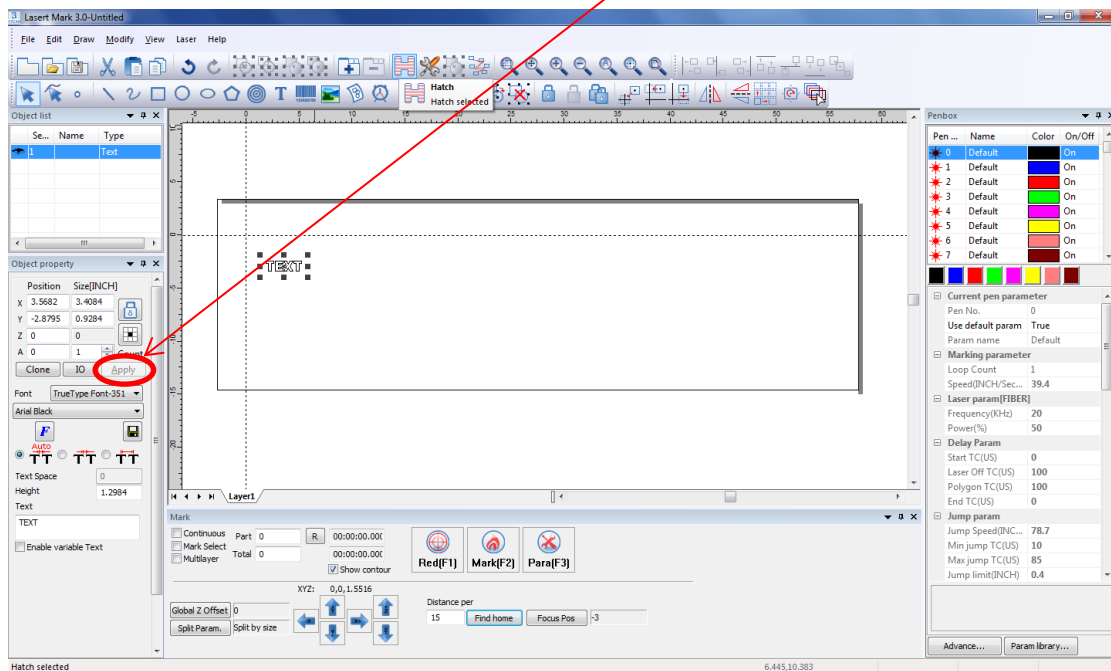
8. To create a new text, click “draw”, then text, then place the cursor anywhere in the marking area and left click the mouse



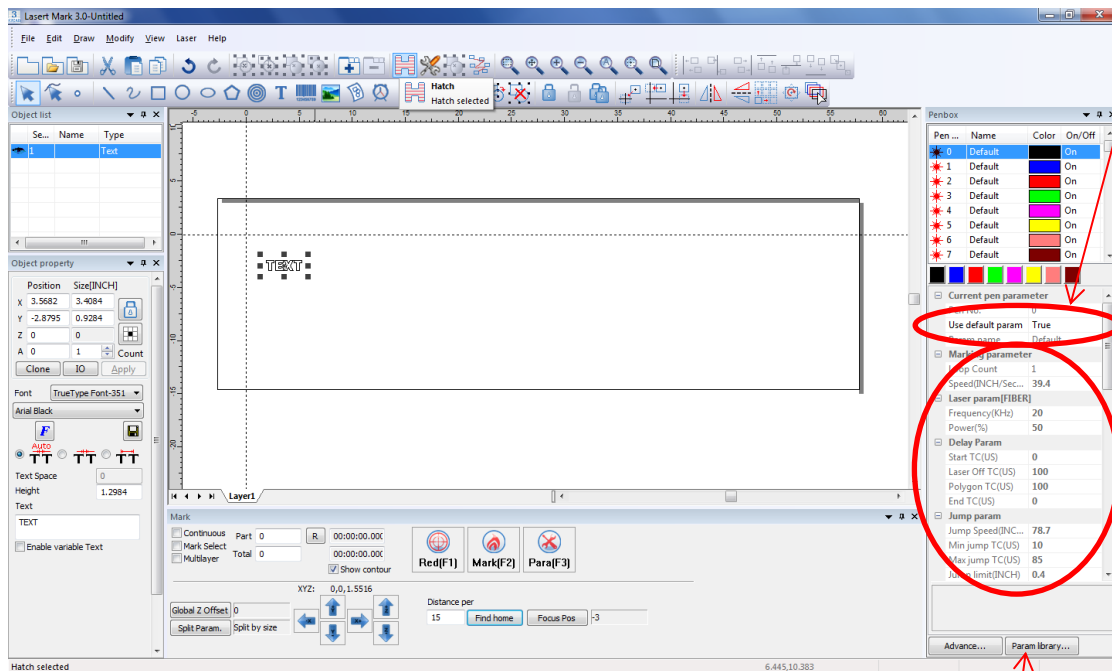
9. To “hatch” or create a fill in a text or any vector image- select the image, then click the “H” button to bring up the menu, once settings are complete, click ok to apply the change (click apply after making any change to the object’s attributes



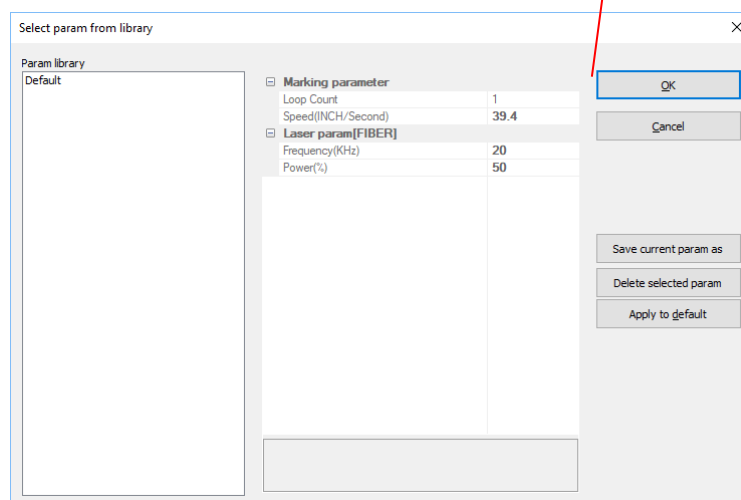
10. To modify text's content- change the content within the “Text” box, also apply the desired font style and sizing within this area. Click “Apply” when finished



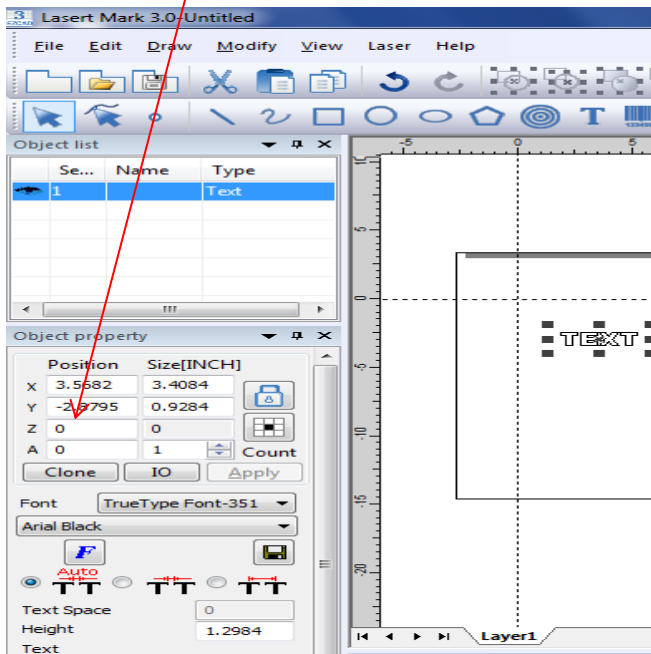
11. To change the marking parameters, modify the values on the right hand side of the marking software. The horizontal color selection bar can apply a different set of parameters to a marking object by changing the color of it on the screen (so you can visually reference a different parameter setting by looking at the screen, pen assignments have a # and a color—0 through 7 are represented on this bar). Simply click the object, then click the color on the horizontal bar to change it's pen assignment



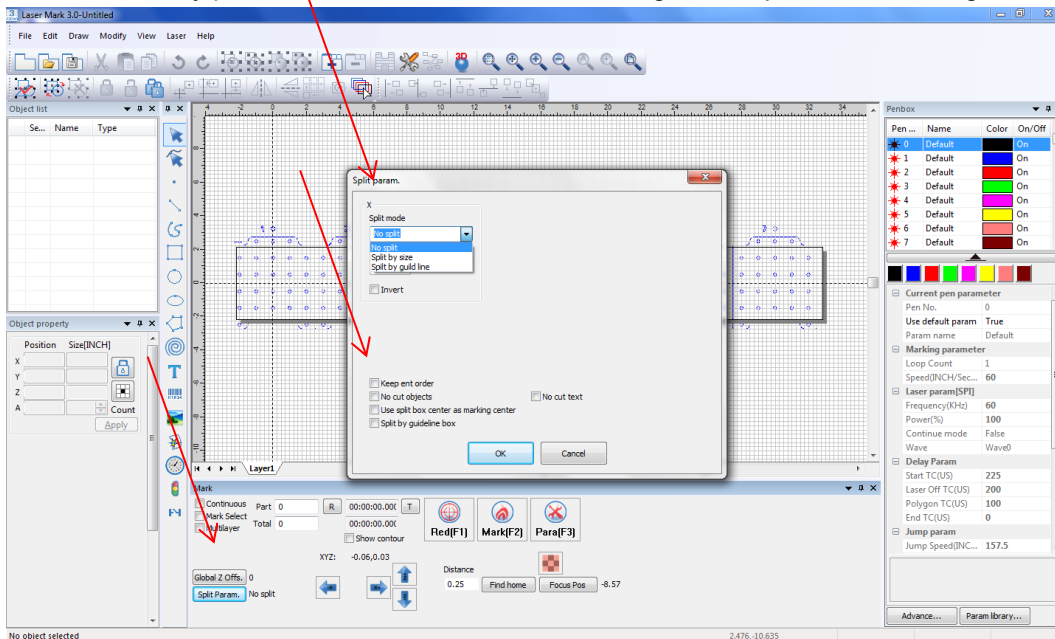
12. General Starting Parameters have been created for this marking system and can be accessed by clicking the “Select Param from Library” Button and selecting the desired material (these are “starting point” parameters, and may need the values modified for specific process specifications). Select the desired material, then click “ok”. Parameters can also be saved for later use in this menu



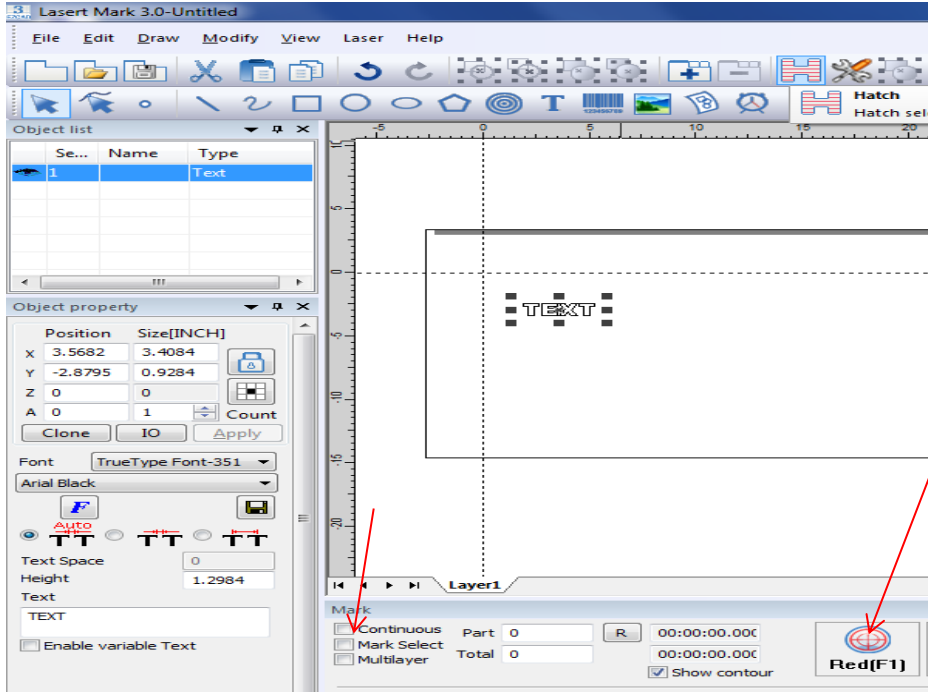
13. Set “part height” for each object in the object list by place it in the “Z position” and click apply after each value.



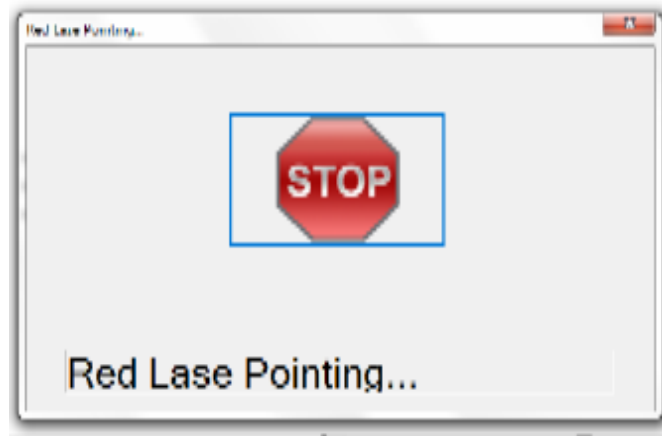
14. Set desired “Split Mark” setting if needed. Split Mark size is how much it will mark before it moves to next split mark section. Note that split size cannot be any larger than the lens specifications. Software will automatically position the X and Z axis’s when using the red pointer or marking function.



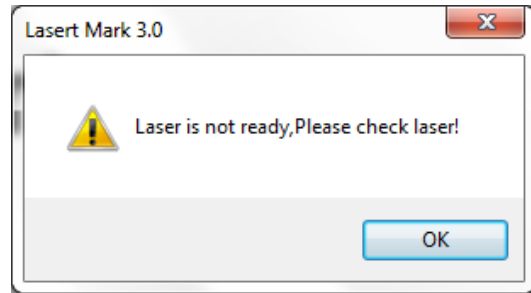
15. Preview your graphic. Click “Mark Select” as this will preview just this graphic. Then click the “Red” button or hit “F1” on the keyboard to preview the mark using the red beam (this will move the axis’s into position)



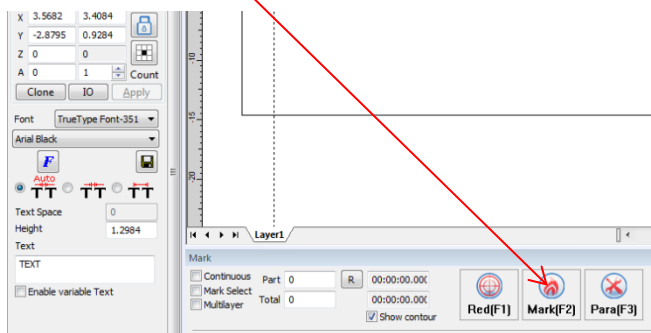
16. The screen will display that you are “lighting”, move the part, or adjust the position of the file using the arrow key to achieve proper placement of the marking. Hit the “esc” key or click “Stop” when finished



17. Close all doors (front 2) completely before marking. An error will be produced if the door is opened at any time the mark is being commanded. (Must be cycled open to closed upon starting up)

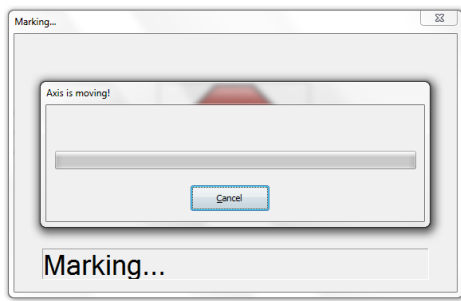


18. Click "Mark" or hit the "F2" key on the key board to start the marking (also the foot pedal can produce same signal)

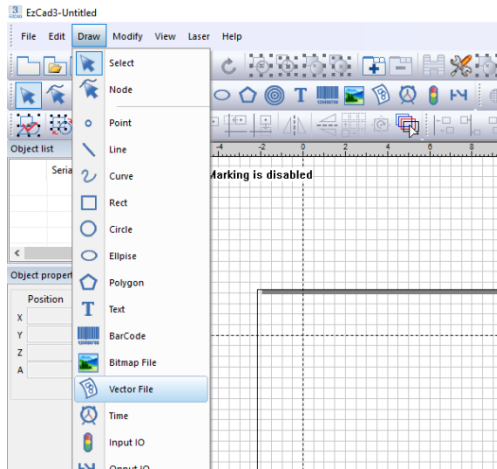


19. The marking can be viewed through the safety glass, and the text "Marking" will be displayed through the duration of the mark. When complete, the "marking" prompt will be gone, and the door can be opened for inspection of the part.

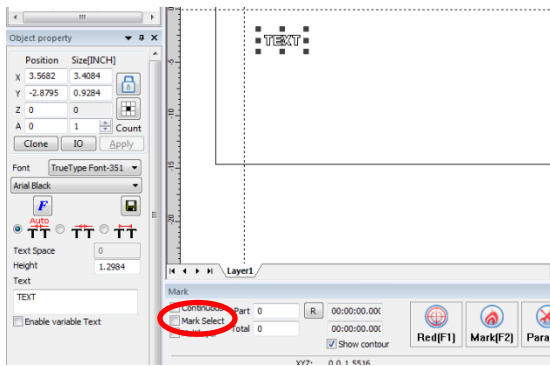
Dependent upon the material and duration of the marking, the marking surface or part may be hot—use caution in handling the processed parts.



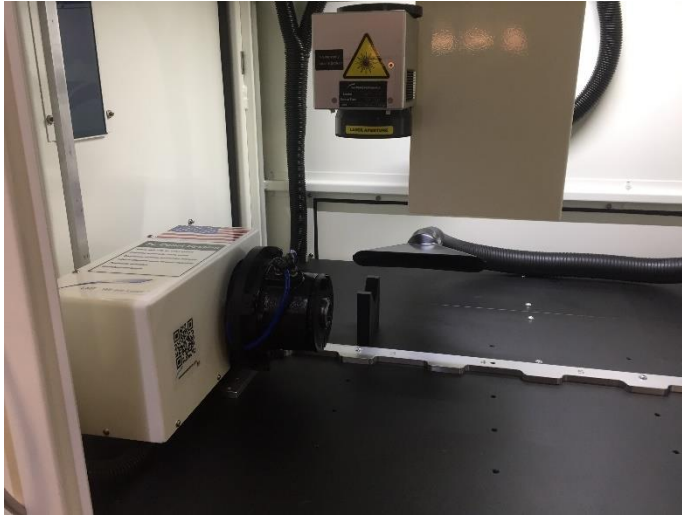
20. To import a vector file for marking - click “File”, then click “Import vector file”, and choose the desired file of the available Vector file types



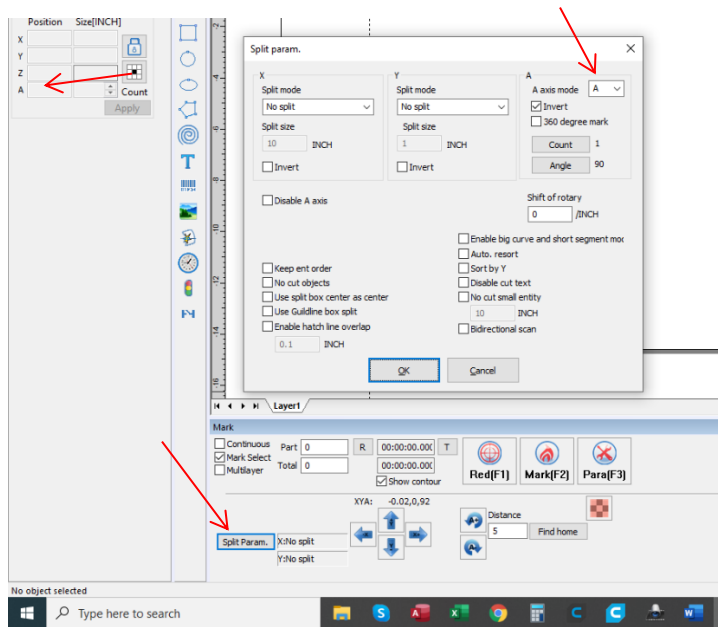
21. To only mark or preview a selected portion of the marking file, place a checkmark in the “Mark select” box near the Mark Button and select the desired portion of the file, then click F1 or F2 to preview or mark that selection



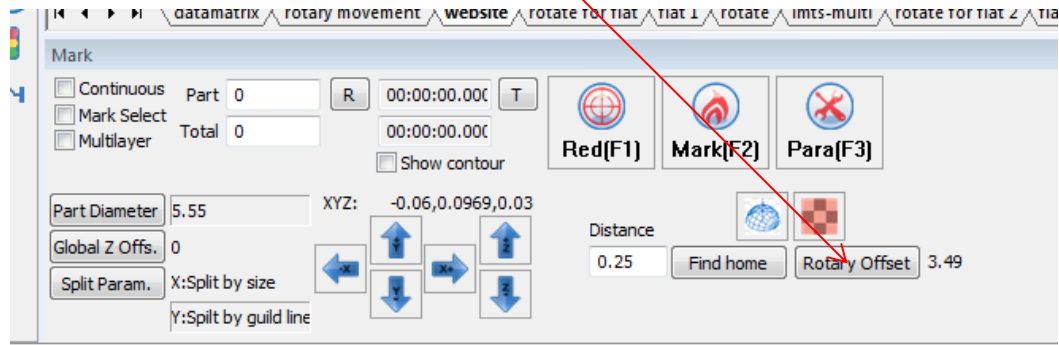
## 2.7 Rotary Marking Option



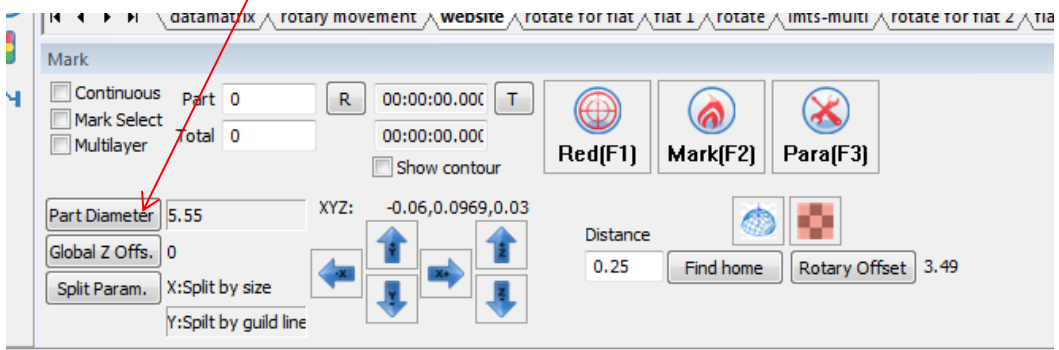
1. Perform steps 1-12 from Section 2.6 “Operation Instructions”.
2. Set desired “Rotary Mode”. You can change it from X mode, Y mode or A mode. X or Y mode will split mark around the diameter based on split size. A mode is a set desired angular move. This is set by entering in the “degree” value in the “A Position” tab on the main screen for each desired object.



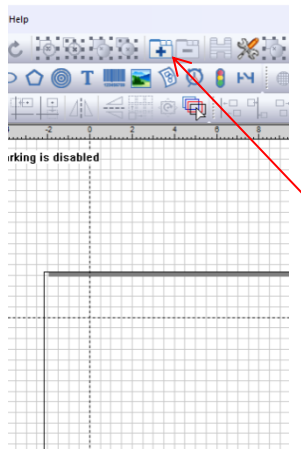
3. If Rotary mode is X or Y. Then Apply the “Rotary Offset”. This is the distance from the centerline of the rotary chuck to the top of the 5x5 docking fixture.



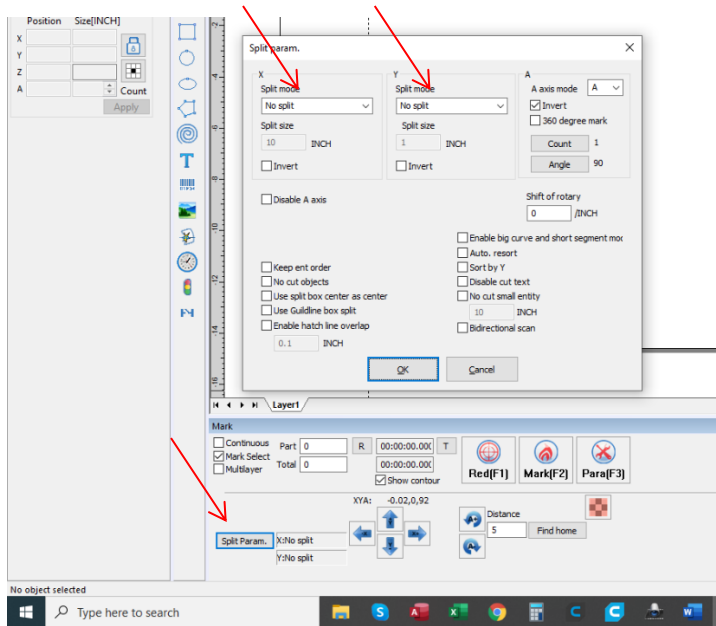
4. Then set the part diameter. Note: if you want to park multi diameters in one program. You will need to create another layer. Then set rotary offset and part diameter to each layer.



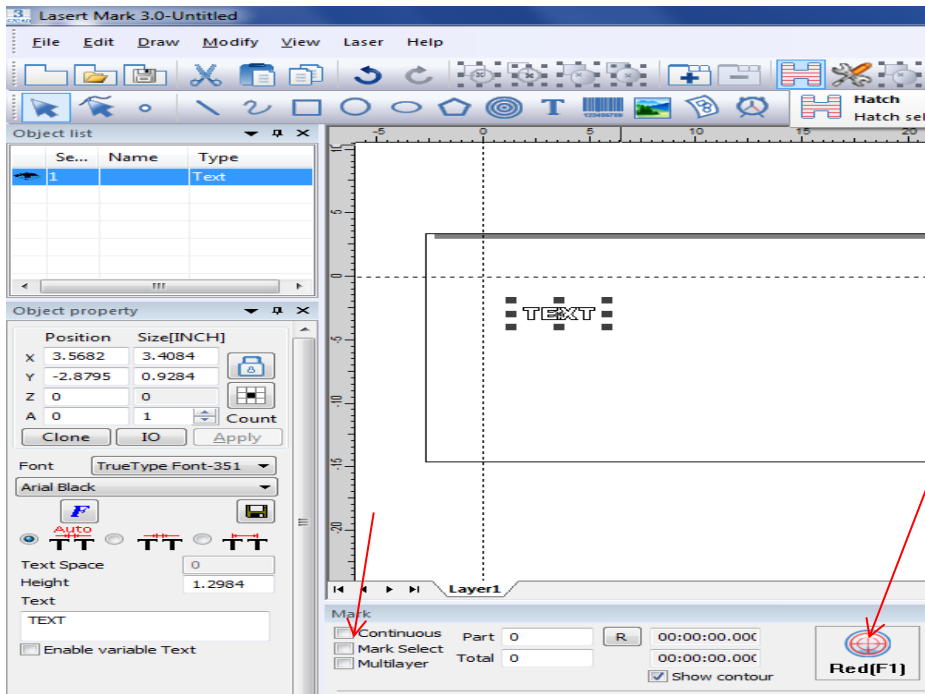
5. To add another layer, click the plus symbol. Then set rotary offset and part diameter to each layer. Then create desired text for this diameter.



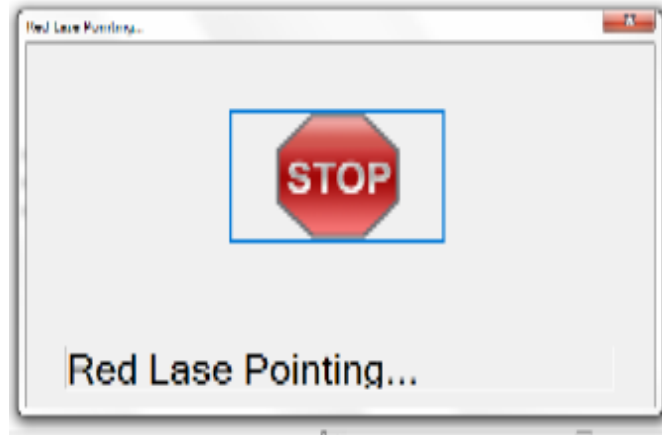
- Set desired “Split Mark” setting if needed, split size is the amount it marks before it rotates to the next section. Software will automatically position the X,Z,A axis’s when using the red pointer or marking function.



- Preview your graphic. Click “Mark Select” as this will preview just this graphic. Then click the “Red” button or hit “F1” on the keyboard to preview the mark using the red beam (this will move the axis’s into position)



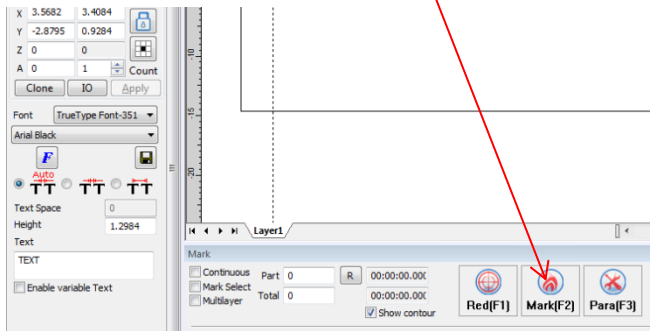
8. The screen will display that you are “lighting”, move the part, or adjust the position of the file using the arrow key to achieve proper placement of the marking. Hit the “esc” key or click “Stop” when finished



9. Close all doors (front 2) completely before marking. An error will be produced if the door is opened at any time the mark is being commanded. (must be cycled open to closed upon starting up)

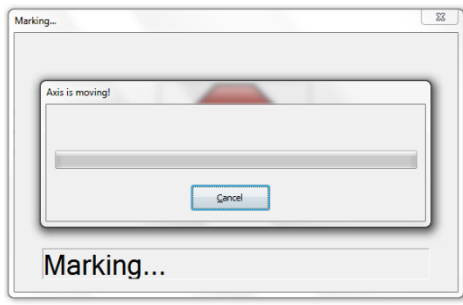


10. Click “Mark” or hit the “F2” key on the key board to start the marking (also the foot pedal can produce same signal)



11. The marking can be viewed through the safety glass, and the text “Marking” will be displayed through the duration of the mark. When complete, the “marking” prompt will be gone, and the door can be opened for inspection of the part.

Dependent upon the material and duration of the marking, the marking surface or part may be hot—use caution in handling the processed parts.

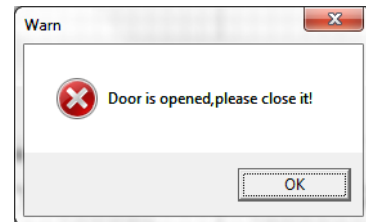
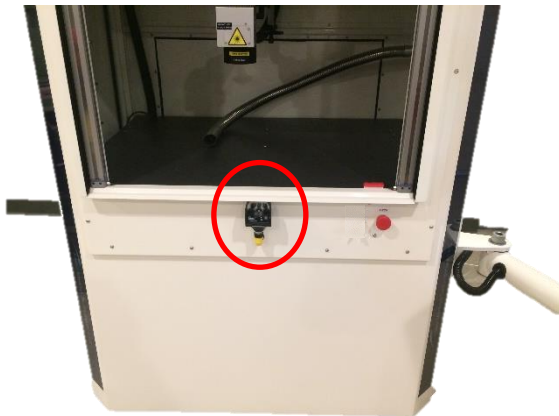


## 2.8 Auto Door Option

1. Close the front door by pressing the Opti-touch button on the front of the marking enclosure—the pneumatic door will come completely down, and the mark will automatically be commanded once the safety interlock is engaged. At the end of the mark cycle the door will automatically open. An error will be produced if the door is opened at any time the mark is being commanded.



Keep clear of the moving door. Ensure no obstruction is in the path of the closing/opening door before and during initiation!



2. If for any reason you need to manually open the door simply cycle power to the machine or press the safety bump strip on bottom of the door.



Note: If the door is already in a closed state and you open a program expect the machine to start marking.

## 2.9 Turn Table Option

When the machine is equipped with a Turn Table Option it allows the operator to index between stations and automatically start the mark when the touch buttons located on the sides of the machine are simultaneously pressed during the movement to fully index to the next marking station.

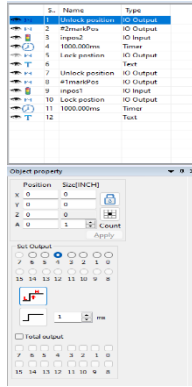


1. Ensure proper air is supplied and on to the machine.

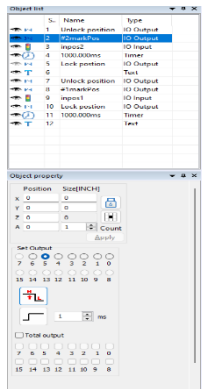


2. Creating laser mark program to perform the motion between marking.

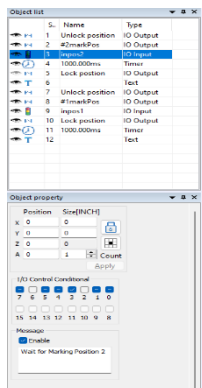
2.1. Create the “Unlock Position 2”. Draw output. Refer photo below for object property settings.



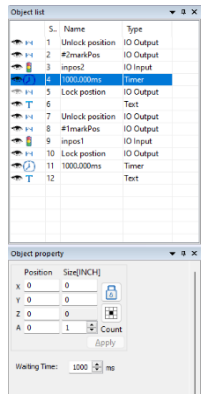
2.2. Create the “#2 Mark Position”. Draw output. Refer photo below for object property settings.



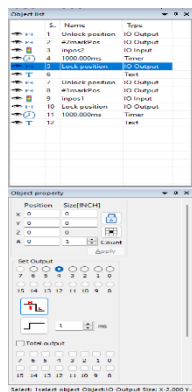
2.3. Create the “In Position 2”. Draw input. Refer photo below for object property settings.



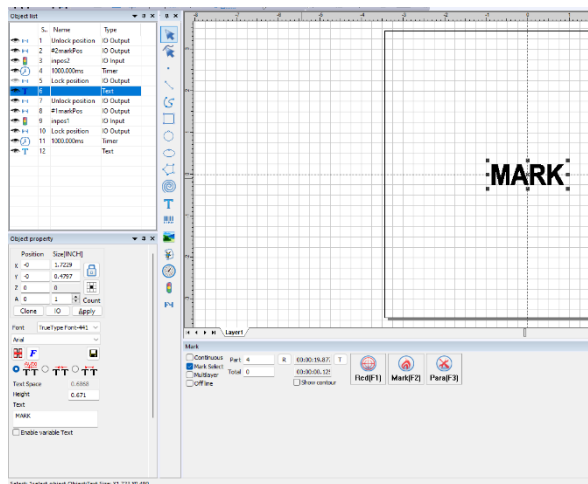
2.4. Create the “1000ms timer”. Draw Timer. Refer photo below for object property settings.



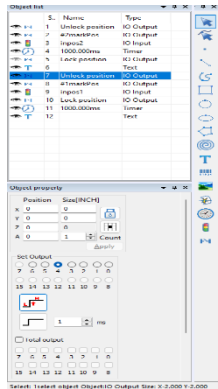
2.5. Create the “Lock Position”. Draw output. Refer photo below for object property settings.



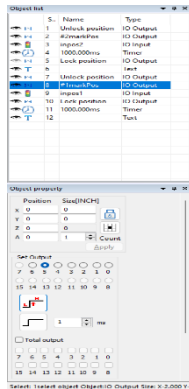
2.6. Create you desired object(s) to be marked.



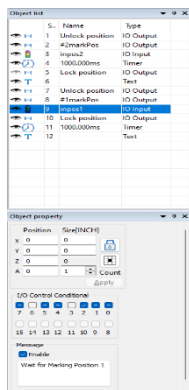
2.7. Create the “unlock position 1”. Draw output. Refer photo below for object property settings.



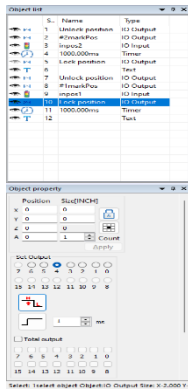
2.8. Create the “#1 Mark Position”. Draw output. Refer photo below for object property settings.



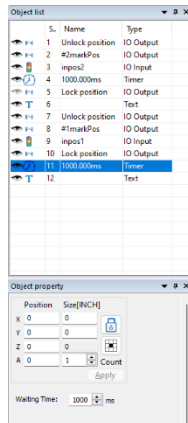
2.9. Create the “In Position 1”. Draw input. Refer photo below for object property settings.



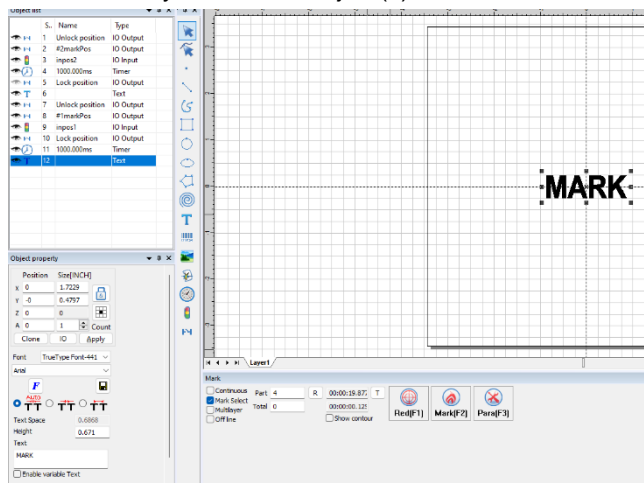
2.10. Create the “Lock Position”. Draw output. Refer photo below for object property settings



2.11. Create the “1000ms timer”. Draw Timer. Refer photo below for object property settings.



2.12. Create you desired object(s) to be marked.



3. Once the program is created. Place parts into the desired fixture.
4. To index the newly loaded parts into the machine and mark them. Simultaneously press the two yellow/black buttons and hold them on until the rotary table is fully indexed into position. Then the operator may let go of the buttons upon and the machine marking the parts.

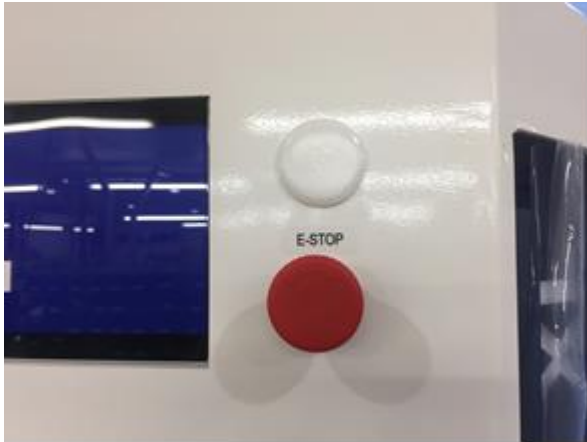


## 2.10 Shut Down Instructions

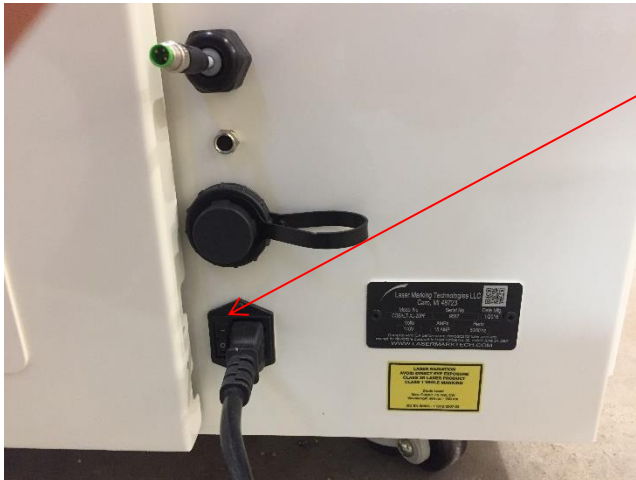


Never leave a machine unattended in the process of marking.

1. Save current work, and close out of the software by clicking the red “x” in the top right-hand corner of the software
2. De-energize electrical control by pressing in the E-Stop located on front of cabinet.



3. Shut down PC though windows screen.
4. Turn the “Main Switch” to the “off” position. Note: If you turn the “Main Switch” to “off”, it will turn AC power off to the PC. Make sure your pc is shutdown prior to this step.



## 3 Preventative Maintenance

Tasks can generally be grouped into daily, weekly and monthly schedules.

Depending on the circumstances, additional tasks may need to be implemented, and some tasks may occur more or less often or not at all.



**All maintenance should be performed using suitable lockout – tag out procedure and equipment**



**Fume Extraction Requirements: Minimum recommended airflow/static pressure - 223cfm/96mbar at machine.**

**If evidence of a lack of routine maintenance is shown to have had a part in a disruption of machine operation, such as inadequate fume extraction during operation, the machine's warranty will be voided. Please ensure a maintenance schedule is created and applied immediately after receiving training on the machine.**

### 3.1 Daily Tasks

Perform these tasks on a daily basis:

1. Inspect lens for any film caused by the process or surrounding environment—clean as necessary (without removing the lens) with >91% Isopropyl alcohol or equivalent and lint-free laser optics cleaning tissues
2. Ensure Fume extraction nozzles are in a suitable position for maximum removal

### 3.2 Weekly Tasks

Perform these tasks on a weekly basis:

1. Remove any dirt or debris on fixture or in area.
2. Check fume extraction system for adequate flow—replace/ clean filters as necessary or recommended by the manufacturer.
3. Inspect lens for any film caused by the process or surrounding environment—clean as necessary (without removing the lens) with >91% Isopropyl alcohol or equivalent and lint-free laser optics cleaning tissues

## 3.3 Monthly Tasks

Perform these tasks on a monthly basis:

1. Remove any dirt or debris on fixture or in area.
2. Check fume extraction system for adequate flow—replace/ clean filters as necessary or recommended by the manufacture.
3. Inspect lens for any film caused by the process or surrounding environment—clean as necessary (without removing the lens) with >91% Isopropyl alcohol or equivalent and lint-free laser optics cleaning tissues
4. Check power cord for damage or wear - replace as necessary
5. Check seating of usb connections - clean connection areas as necessary, replace cord as necessary.
6. Ensure proper motion of the Axis's - clean/grease screw as necessary with lithium grease
7. Inspect Laser fans for dust - Clean with compressed gas duster with power off.
8. Inspect Electrical area for dust - Clean with compressed gas duster with power disconnected.
9. Inspect Work area for dust - Clean with compressed gas duster or a damp cloth with power off.
10. If applicable: Inspect & Check Air filter - Empty canister if it has sediment and replace filter when dirty.
11. If applicable: Inspect & Check Air System for leaks – replace fitting or cylinder as necessary
12. If applicable: Inspect & Check Conveyor Belt tension – adjust tension setscrew.
13. If applicable: Inspect & Check Conveyor Brush seals – if gaps appear, replace brush material
14. If applicable: Inspect & Check Air System for leaks – replace fitting or cylinder as necessary
15. If applicable: Inspect & Check Auto Door Safety Switch alignment and cleanliness
16. If applicable: Inspect & Check Auto Door Safety Edge for correct operation

## 4 FAQ / Troubleshooting



**We've answered some of the most frequently asked questions** we have received. If there's anything else you want to know, or for additional explanation, please [submit a question](#).

Click link below to be connected to our FAQ page. Then type "1111" into the password section.

<http://lasermarktech.com/customer-access-area>

## 5 Transportation Instructions



This equipment is only authorized to be moved by personnel that have been properly trained in forklift use.

### 5.1 Packaging the Machine

1. Bolt on the shipping bracket as initially shipped with the machine—after moving the collimator tube down to just touch the top mounting surface of the bracket with the z axis
2. Place back into the supplied crate, using the supplied packing and similar banding materials  
Place sides back onto crate, install clips along bottom and sides
3. Place computer and monitor into its box, --also box foot pedal, and loose components to place next to the computer box
4. Check to ensure the keys, focal stick, machine power cord, computer, computer power supply and cord, sample tag, foot pedal, and master cd are all included in the crate
5. Place the top on the crate, and replace the clips along the top of the crate.
6. Band the crate in each direction, and place labels for tipping, impact, and do-not-stack

## 6 Spare parts list

This is a list of spare parts recommend to be kept on hand to maintain proper operation of this machine.

<b>Cobalt Standard XL</b>		
<b>QTY</b>	<b>DESCRIPTION</b>	<b>PART #</b>
1	Scan head	LMT-SH
1	Scan Head power supply	included in scan head
1	FL Lens	included in scan head
1	FL Cover Lens	LMT-CL
1	Z-Axis motorized	LMT-RZA
1	Door Safety Glass	LMT-SG-XL
1	Door Safety Key Right Angle	HS9Z-A62
1	6FT Computer Power Cord 16/3 SJTW 110v to iec-320 C-13 connector	2724.072.989
1	LM3 USB Control Board	LMT-LM3-SFTBD
1	Door Safety Switch	HS6B-03B03
1	24VDC power supply	S-320-24
1	12VDC power supply	RS-50-12
1	Quick Start Foot Pedal	7717K14
1	Key switch	HW4K-2BF10
1	USB cable	ECUSBAB-2M
1	E-Stop switch	GCX1131
1	BALL SCREW 16MM X 10MM L EAD 800MM STROKE	BSFU1610-0950-FS
1	X-Axis Servo Motor	620-DST-A6TK1
1	X-Axis Servo Drive	DYN2-T1A6S-00

1	X-Axis Servo Motor Coupling	LMT-XAXIS-COUPLING
1	X-Axis home switch, INDUC PROX 8mm PNP 4mm RNG 3-WIRE DC N.O. M8 Q/D unshielded	AE1-AP-4F
2	XL Door Slides	11435A25
1	CABLE 5m M8 Q/D AXIAL FEMALE 3-POLE	CD08-0C-050-A1
<b>Cobalt XL Auto Door</b>		
<b>QTY</b>	<b>DESCRIPTION</b>	<b>PART #</b>
1	Safety Glass / Front Door	LMT-SG-XL-Auto
1	Banner Opti-Touch Button	OTBVP6QD
1	Door Safety Magnet Switch	70173926
2	24" Rodless Air Cylinder	2738T213
1	Door Solenoid	AVS-513C1-24D
1	Door Safety Glass	LMT-SG-XL



**THANK YOU**  
**FOR CHOOSING LMT AS YOUR**  
**LASER MARKING PARTNER**

**For technical support call**  
**TOLL FREE (866)-799-0199**  
**Ask for technical support.**