GCC
LaserPro

S290LS

User Manual

Dear Sir / Madam,

Thank you for choosing GCC and the LaserPro S290LS. You can be assured that this machine meets the highest safety standards while using technological innovations shared by no other laser engraver. The LaserPro S290LS is backed by GCC, a truly international company that is dedicated to help your business grow.

We at GCC are proud to introduce the LaserPro S290LS, our most technologically advanced laser engraver to date. This easy to operate machine has been designed with quality, productivity, and safety in mind. With innovations like the QSM^{TM}, stellar quality under high speed, SmartFILE file management, and the new Linear Low Maintenance Motion System, the S290LS is clearly on the cutting edge of all laser systems.

GCC understands that a creative technical background is the key to successful growth in the ever-changing information economy. We have a strong team of R&D experts who propel our company to new heights. From product development to manufacturing, our engineers are dedicated to innovation and quality.

Guiding our solid technical base is a world-class management team. At GCC, our leaders bring together marketing, technical support, research development and distribution experts to create an international network to meet your demands. Over the years, this network has been able to span throughout the globe. Our technical support staff is committed to provide you with impeccable service, and when your business is ready to grow, our team will be there!

Sincerely,

Leonard Shih
President of G.C.C.

Table of Contents

1

Safety

Principles of a DPSS & Fiber Laser

Safety Ratings

The Safety Interlock System

Safety Labels

Safety Measures

Operating Environment

1.1 Principles of a Fiber Laser

LASER is the acronym for Light Amplification by Stimulated Emission of Radiation. A fiber laser is a laser in which the active gain medium is an optical fiber doped with rare-earth elements such as erbium, ytterbium, neodymium, dysprosium, praseodymium, and thulium. They are related to doped fiber amplifiers, which provide light amplification without lasing. GCC fiber laser utilizes a MOPA technique used to achieve a pulsing laser, it can generate pulse width in the nanosecond range. A short pulse width generates an extremely high peak power. Such high peak power is very potent and effective in marking of metallic objects or other hard processed material. The advantages of fiber laser source is compact, high quality optical beam, energy efficient and no consumables. The laser beam delivery in terms of beam size and laser power are very consistent due to the good reflective nature and efficient cooling capacity of the fiber laser.

1.2 Safety Ratings

The LaserPro S290LS is equipped with a DPSS laser that emits intense and invisible laser radiation with a wavelength of 1 micron in the infrared spectrum. The laser system is designated as a Class I laser device, meaning that the system is equipped with key safety features and an enclosed laser head to completely contain the laser under normal use. One of the key safety features found on the LaserPro S290LS is a Class 3R red dot safety guidance pointer (similar to a laser-pointer presentation pen) allowing the operator to see the exact location where the laser beam will fire. Even though the LaserPro S290LS is equipped with the most powerful laser to date, through proper usage and taking necessary hardware safeguards, will make it an extremely safe machine. When the front door and back door are open, machine becomes a Class 4 equipment and users must wear goggles to operate the machine.

1.3 The Safety Interlock System

The laser system is equipped with a safety interlock system utilizing magnetic sensors on the top and side access doors, laser-activation and door LED lights on the control panel. The magnetic sensors will deactivate the laser when either door is opened. At this time, the "door" LED light found on the control panel will illuminate, indicating an open or improperly closed door. When the laser is in operation, the "laser" LED will illuminate to inform the operator that the laser is activated. If at any time, any of the access doors are open and the "laser" LED is illuminated, IMMEDIATELY unplug the laser system and contact GCC service team for technical support and maintenance instructions.

⚠ WARNING
·DO NOT operate the laser system if any component of the safety system is malfunctioning.   ·DO NOT attempt to remove or modify any component of the safety interlock system.

1.4 Safety Labels

According to CDRH standards, all fixed or removable covers that allow access to a laser beam must have appropriate laser warning labels attached to them. These warning labels must be clearly visible to the operator prior to removing the cover. Additional labels must be applied to the interior of the machine and be visible in the event when the covers are removed. A label clearly displaying the manufacturer's name,

date of manufacture, description of product, model number, serial number, and compliance statement must be attached to the outer surface of the machine.

In compliance with CDRH standards, the required warning labels are affixed at the time of manufacture to the LaserPro S290LS, attached on appropriate locations. These labels are not to be modified in any way or removed for any reason. Please familiarize yourself with the specific labels and their locations on the machine. Below is a list of all the safety labels and their locations on the machine.

Product Label

This label is located at the right-back side of machine. All the product information such as Serial Number, Model Numbers, Laser Power and Electric power can be found here. Before requiring any further tech support, always provide the service person with the information on this label.

GCC *LaserPro*

Serial Number
I50357

Manufacturer	Great Computer Corporation
Product	Laser Engraver
Model	S290LS
Model Number	S290LS - 20RMZ
Wavelength	1064 nm
Power	20W
Input	100-240VAC, 50-60Hz, Max 8A
Manufactured	May 2012

Class I Laser Product Complies with EN60825-1:2007
Class IIIR Laser Product Complies with CDRH
Made in Taiwan
4F-1., No.236, Fude 2nd Rd., Xizhi Dist., New Taipei City 22151, Taiwan

GCC *LaserPro*

Serial Number
I50357

Manufacturer	Great Computer Corporation
Product	Laser Engraver
Model	S290LS
Model Number	S290LS - 20SHS
Wavelength	1064 nm
Power	20W
Input	100-240VAC, 50-60Hz, Max 8A
Manufactured	May 2012

Class I Laser Product Complies with EN60825-1:2007
Class IIIR Laser Product Complies with CDRH
Made in Taiwan
4F-1., No.236, Fude 2nd Rd., Xizhi Dist., New Taipei City 22151, Taiwan

GCC LaserPro

Serial Number
I50357

Manufacturer	Great Computer Corporation
Product	Laser Engraver
Model	S290LS
Model Number	S290LS - 20JFL
Wavelength	1064 nm
Power	20W
Input	100-240VAC, 50-60Hz, Max 8A
Manufactured	May 2012

Class I Laser Product Complies with EN60825-1:2017, EN ISO 13849-1:2021
Class II Laser Product Complies with CDRH
Made in Taiwan
4F-1., No.236, Fude 2nd Rd., Xizhi Dist., New Taipei City 22151, Taiwan
CE (Pb)

GCC LaserPro

Serial Number
I50357

Manufacturer	Great Computer Corporation
Product	Laser Engraver
Model	S290LS
Model Number	S290LS - 30RMZ
Wavelength	1064 nm
Power	30W
Input	100-240VAC, 50-60Hz, Max 8A
Manufactured	May 2012

Class I Laser Product Complies with EN60825-1:2007
Class IIIR Laser Product Complies with CDRH
Made in Taiwan
4F-1., No.236, Fude 2nd Rd., Xizhi Dist., New Taipei City 22151, Taiwan
(Pb) CE

GCC LaserPro

Serial Number
I50357

Manufacturer	Great Computer Corporation
Product	Laser Engraver
Model	S290LS
Model Number	S290LS - 30JFL
Wavelength	1064 nm
Power	30W
Input	100-240VAC, 50-60Hz, Max 8A
Manufactured	May 2012

Class I Laser Product Complies with EN60825-1:2017, EN ISO 13849-1:2021
Class II Laser Product Complies with CDRH
Made in Taiwan
4F-1., No.236, Fude 2nd Rd., Xizhi Dist., New Taipei City 22151, Taiwan
CE (Pb)

GCC *LaserPro*

Serial Number
I50357

Manufacturer	Great Computer Corporation
Product	Laser Engraver
Model	S290LS
Model Number	S290LS - 40HHS
Wavelength	1064 nm
Power	40W
Input	100-240VAC, 50-60Hz, Max 8A
Manufactured	May 2012

Class I Laser Product Complies with EN60825-1:2007
Class IIIR Laser Product Complies with CDRH
Made in Taiwan
4F-1., No.236, Fude 2nd Rd., Xizhi Dist., New Taipei City 22151, Taiwan

---

GCC *LaserPro*

Serial Number
I50357

Manufacturer	Great Computer Corporation
Product	Laser Engraver
Model	S290LS
Model Number	S290LS - 50RMZ
Wavelength	1064 nm
Power	50W
Input	100-240VAC, 50-60Hz, Max 8A
Manufactured	May 2012

Class I Laser Product Complies with EN60825-1:2007
Class IIIR Laser Product Complies with CDRH
Made in Taiwan
4F-1., No.236, Fude 2nd Rd., Xizhi Dist., New Taipei City 22151, Taiwan

---

GCC *LaserPro*

Serial Number
I50357

Manufacturer	Great Computer Corporation
Product	Laser Engraver
Model	S290LS
Model Number	S290LS - 60JFL
Wavelength	1064 nm
Power	60W
Input	100-240VAC, 50-60Hz, Max 8A
Manufactured	May 2012

Class I Laser Product Complies with EN60825-1:2017, EN ISO 13849-1:2021
Class II Laser Product Complies with CDRH
Made in Taiwan
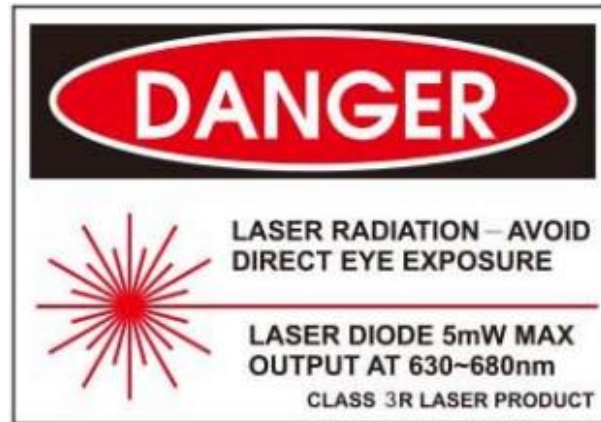4F-1., No.236, Fude 2nd Rd., Xizhi Dist., New Taipei City 22151, Taiwan

CDRH Label

This label indicates the class level of CDRH.

DANGER

LASER RADIATION – AVOID DIRECT EYE EXPOSURE

LASER DIODE 5mW MAX OUTPUT AT 630~680nm

CLASS 3R LASER PRODUCT

CE Label

This label indicates the class level of CE

LASER RADIATION –
AVOID DIRECT EYE EXPOSURE
CLASS 3R LASER PRODUCT
LASER DIODE 5mW MAX
OUTPUT AT 630~680nm
Classified by EN 60825-1:1994+A1.2002+A2:2001   LASER APERTURE

Laser Path Warning Label

LaserPro machines are very safe under normal functioning conditions. However, as a precaution, Laser Path Warning Label are affixed on possible laser paths and operators should be aware of the possibility of injury while machine is operating.

CAUTION
AVOID PLACING YOUR EYES IN THE RED BEAM PATH

Laser Path Danger label

This label indicates the laser path. Normally you can find this label inside of machine. Please take extra caution of this area when you conduct maintenance.

DANGER
INVISIBLE LASER RADIATION WHEN OPEN.
AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION.
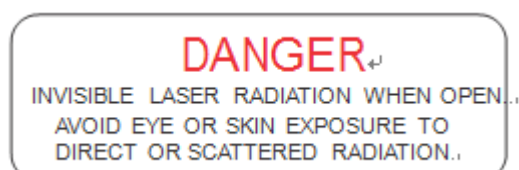
Warning Label

Warning Label is written with all the necessary information to be aware of in every operation.

WARNING

⚠️	Invisible laser radiation when door open and interlock failed. Avoid eye or skin exposure direct to laser radiation.
🚷	Do not leave the machine unattended during operation.
🔥	Resulting debris and scraps from laser processing may cause fire hazard. Do not leave debris and scraps inside laser machine after job finished.
	Please clean the bearings and motion system tracks everyday.
☢️	Do not use reflective metals, heat sensitive surfaces or materials that may produce toxic substances or corrosion problems, such as PVC and Teflon.
👓	Please wear goggle to operate while door open.
😷	Dust mask required.
📖	Read and understand operator's manual before using this machine.

Emergency Stop Label

This label indicates the emergency stop button. You can find this label on the right upper side of the machine.

Aperture warning stickers (mirror):

This label indicates the laser path. Normally you can find this label inside of machine or laser exit. Please take extra caution of this area when you conduct maintenance or operate machine.

AVOID EXPOSURE -
VISIBLE AND INVISIBLE
LASER RADIATION IS
EMITTED FROM THIS
APERTURE
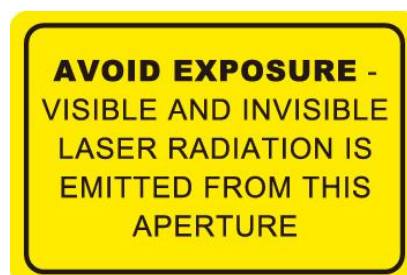
Door open warning labels

CAUTION

CLASS 4 VISIBLE AND INVISIBLE
LASER RADIATION WHEN OPEN
AVOID EYE OR SKIN EXPOSURE
TO DIRECT OR SCATTERED
RADIATION

Protection Window Label

This label indicates the protection wavelength. You can find this label in the lower middle of window.
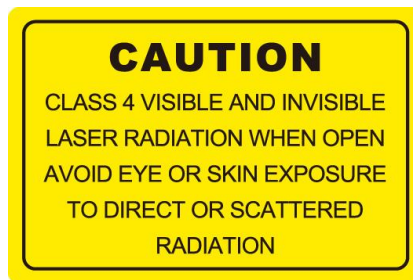
OD6+ @ 1064 nm Protection Window

1.5 Safety Measures

• **LASER RADIATION WARNING:** Exposure to laser radiation may result in physical burns and severe eye damage. Proper use and regular maintenance of this machine is important to the safety of all people in the immediate area.

• Prior to operation, carefully read and familiarize yourself with the warning labels located on both your laser system and in this manual.

• Never leave the machine unattended during the laser cutting and engraving process. The laser may ignite combustible materials. A well-maintained fire extinguisher and operational smoke or fire detector should be kept in the vicinity of the machine.

• Resulting debris from laser cutting are very dangerous and may cause fire hazard.

• DO NOT leave debris and scraps inside laser machine after job finished. Must keep machine clean after job finished.

• Caution—Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

NOTE

SmartGUARD™ is an optional fire detection alarm system developed by GCC. Contact your local GCC authorized distributor for more details to have this safety option installed onto your system.

• Enable the SmartAIR™ nozzle when engraving or cutting materials that may easily ignite, such as acrylic, wood, or paper.

• Always wear safety goggles that will filter out 1064nm laser when the laser system is in operation. Reflective materials such as mirrors, enameled brass and anodized aluminum may partially-reflect some of the invisible laser radiation. Severe eye damage may occur if proper safety goggles are not worn.

NOTE

Each LaserPro S290LS machine is shipped with a single pair of safety goggles. If additional safety goggles are required, please contact GCC directly or an authorized GCC distributor. If you wish to purchase one on your own, please make sure the safety goggles meet these requirements:

190 - 534 nm OD5+
910-1070 nm OD6+
Visible Light Transmission: 23.5%

- Connect the machine to a properly grounded power outlet. Ensure the voltage of the power source is identical to the voltage of the machine.
- Do not open the laser access panel when the machine is plugged in.

- Do not attempt to modify or disassemble the laser module.
- Do not attempt to remove or modify any component of the machine's laser interlock safety system.
- Ensure the immediate work area of the machine is well-ventilated. Odors, vapors, and dust are by products generated during the laser engraving and cutting process. An exhaust system, vacuum cutting box, and honeycomb table are recommended. Please contact GCC or your local GCC distributor for more information.
- Do not laser heat-sensitive surfaces or materials that may generate toxic fumes, such as PVC and Teflon.

Regularly clean and maintain your machine according to our cleaning and maintenance instructions. Doing so will ensure your machine will operate effectively and safely over a long period of time.

1.6 Operating Environment

- Please follow the guidelines when considering a suitable location to set the LaserPro S290LS. Improper work environments may lead to operational malfunction and/or unsafe working conditions. The LaserPro S290LS should be placed and operated in a standard office-type environment.
- Avoid environments where the machine is exposed to high levels of dust, temperature (temperatures exceeding 30°C or 86°F) or humidity (humidity exceeding 70% or where the ambient temperature is near the dew point).
- Avoid placing the machine in small enclosed areas with poor ventilation.
- Avoid areas with high levels of electrical noise.
- Select a location that is large enough to accommodate the LaserPro S290LS, an exhaust system, a computer and a work or storage table.
- Select a location in which the ambient temperature remains between 15°C and 30°C (60°F to 86°F).
- Select a location in which the relative humidity remains between 30% - 40%.
- Select a location in which there is a short, direct path to the fume exhaust system.
- Set the LaserPro S290LS on a floor surface that is completely even.
- Make sure your smoke/ fire detection system and fire extinguisher in the immediate area are well functioning.
- Set up the machine so that the back of the machine is at least 60 cm (2 feet) away from the wall in order to assure proper ventilation.
- Resulting debris from laser cutting are very dangerous and may cause fire hazard.

1.7 EC-Declaration of Conformity

EC DECLARATION OF CONFORMITY

Applicant	:	Great Computer Corp.
Address of Applicant	:	4F-1., No.236, Fude 2nd Rd., Xizhi Dist., New Taipei City 22151, Taiwan
Product Name	:	GCC LaserPro Spirit Series Laser Engraver
Model No.	:	S290LS ##-XXXXXX (# = none character, blank, II, III, IV … X, or A-Z; XXXXXX & YYYYYY = laser supplier tube model or blank)
Directive	:	2006/42/EC Machinery Directive 2014/35/EU Low Voltage Directive 2014/30/EU Electromagnetic Compatibility Directive

For the most specific risks of this machine, safety and compliance with the essential requirements of the Directive has been based on elements of:

● EN ISO 12100:2010 / Safety of machinery — General principles for design — Risk assessment and risk reduction
● EN ISO 11553-1:2008 / Safety of machinery - Laser processing machines - Part 1: General safety requirements
● EN 60825-1:2014 / Safety of laser products -- Part 1: Equipment classification and requirements
● EN 60204-1:2006+A1:2009+AC: 2010 / Safety of machinery - Electrical equipment of machines- Part 1 : General requirements- Industrial electrical device
● EN 61000-6-2:2005 / Electromagnetic compatibility (EMC) -- Part 6-2: Generic standards - Immunity for industrial environments
● EN 61000-6-4:2007/A1:2011 / Electromagnetic compatibility (EMC) -- Part 6-4: Generic standards - Emission standard for industrial environment

$C\!\epsilon$

232001410G(12)

2

Chapter 2

Unpacking& Contents

Unloading / Unpacking / Repacking

Contents and Accessories Checklist

2.1 Unloading/Unpacking / Repacking

The LaserPro S290LS is shipped in one crate that contains the machine, the software, and all of the necessary accessories. The following section shows detailed step-by-step instructions for unpacking and assembly of the machine.

> ⚠ **WARNING**
>
> More than one person may be needed when loading and unloading the shipping crate in order to avoid body injury or damage to the machine.

> **NOTE**
> Please store the original shipping crate as it may be needed for transportation in the future

GCC has used eco-friendly metal crates for GCC LaserPro laser engravers including Sprit, Spirit LS, Spirit GLS and S290LS. Other models will change to metal packing crate in the near future.
For years, GCC LaserPro has been dedicated to reducing carbon footprint and becoming a greener company in the industry.

Unpacking and Unloading

The LaserPro S290LS is shipped in one crate that contains the machine, the software and other accessories. The following section has a detailed list of the steps required for unpacking and packaging of the machine.

To prevent damage to the machine or personal injury, please get assistance when loading and unloading the shipping crate. Please keep and store the original shipping crate in case it is needed for future transport or product servicing.

Move the shipping crate close to the desired working location of the machine. Unpack following the steps below.

Step 1: Remove the 6 metal clips that secures the top panel to the crate by using a flathead screw driver
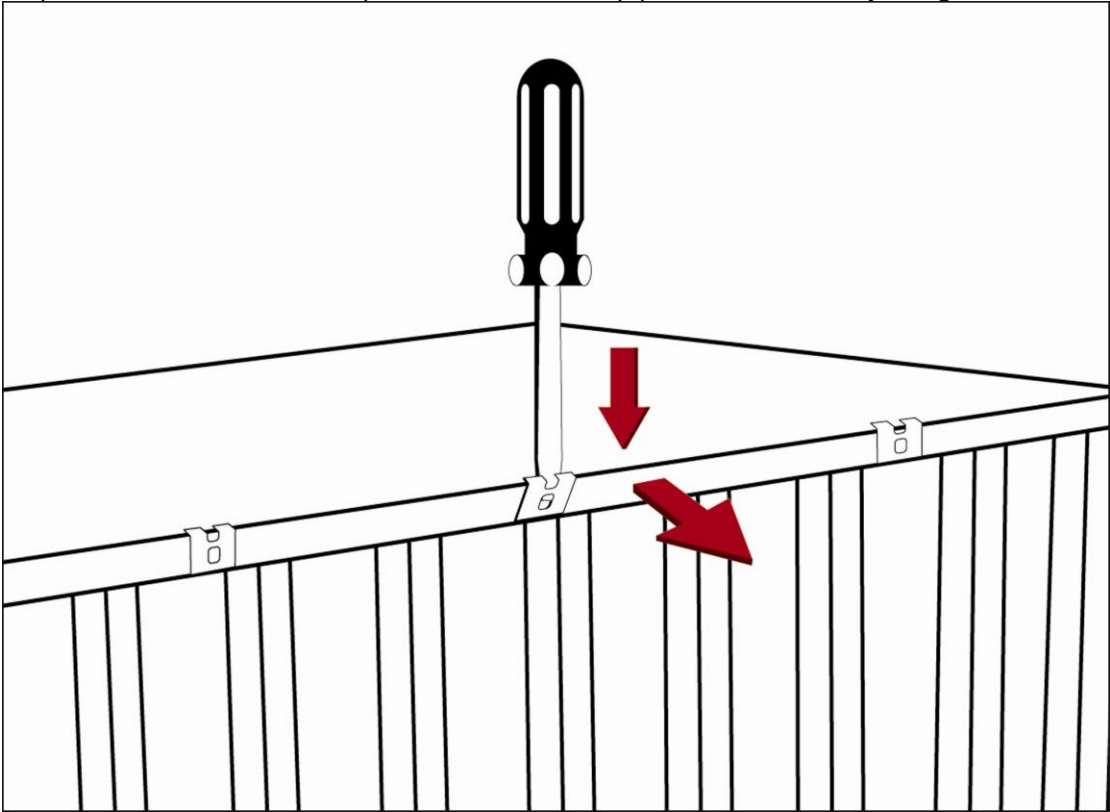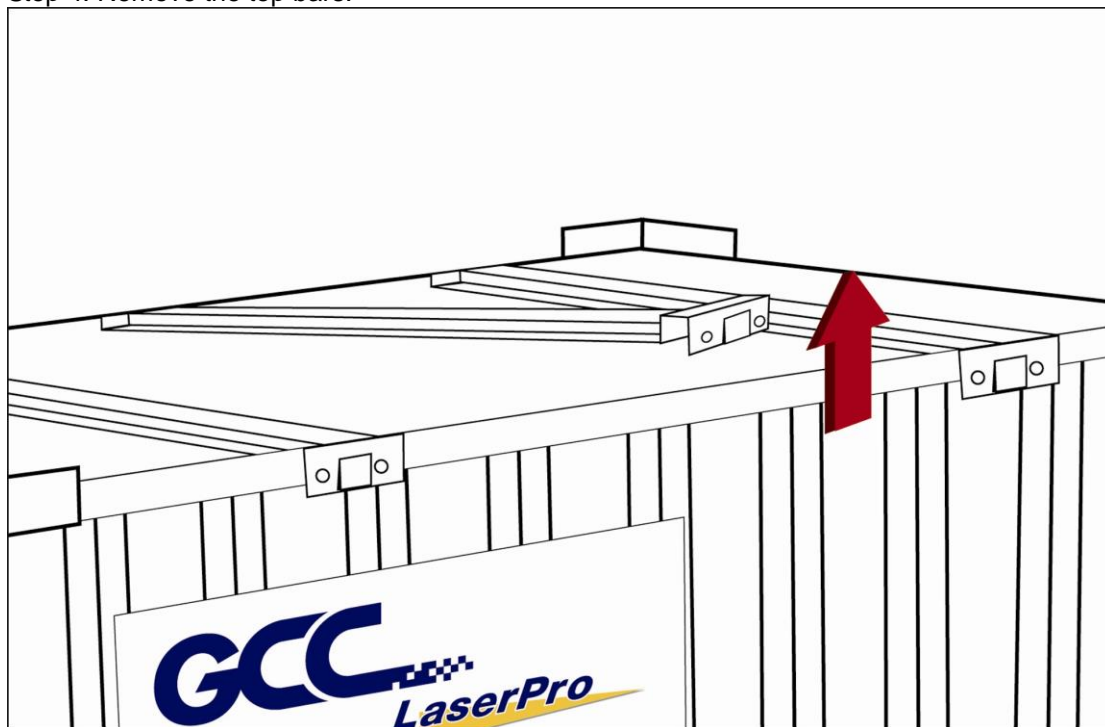
Step 2: Lift the top panel and remove

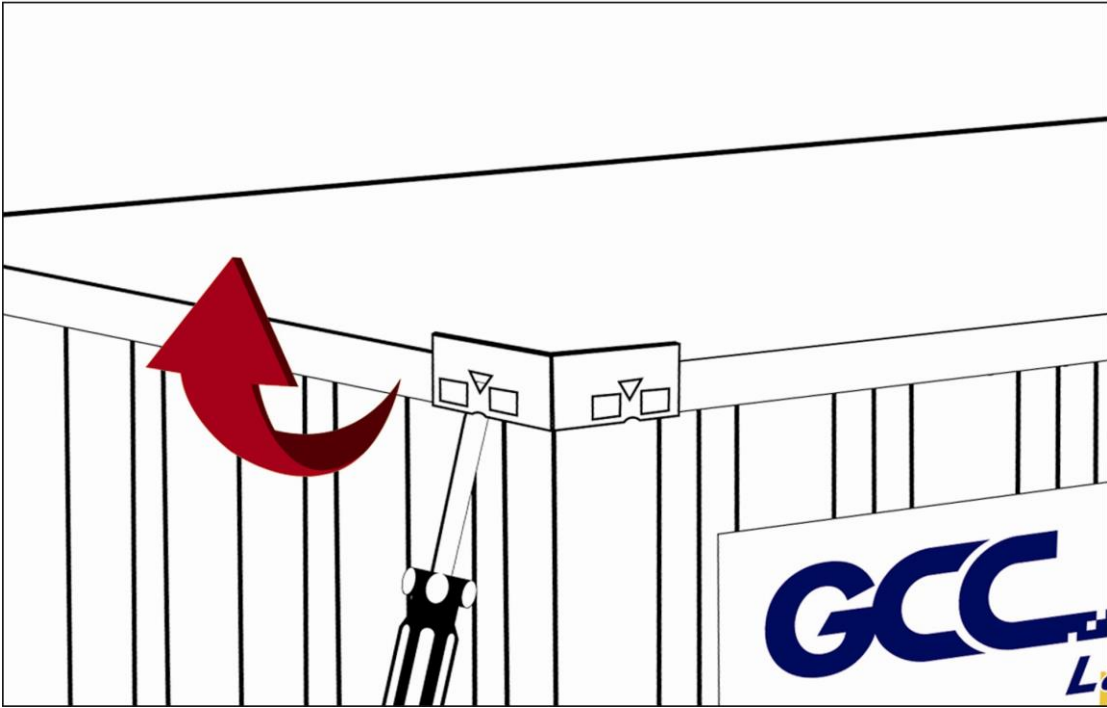Step 3: Use a flathead screwdriver to remove the brackets that secures the bars in place.

Step 4: Remove the top bars.

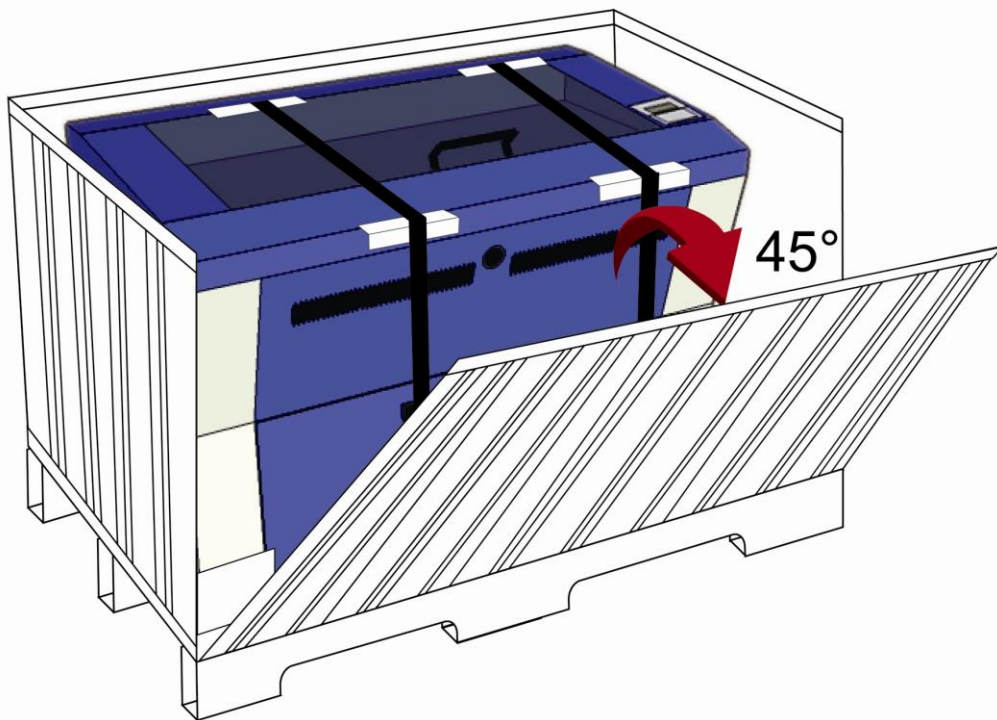Step 5: Use a flathead screwdriver to pry loose the side brackets and remove them.

Step 6: Pull the front panel and lower it to an angle of about 45 degrees and then pull it away from the crate. Do the same for the rear panel.

Step 7: Remove the left and right panels in the same way after the front and rear panels have been removed

45°
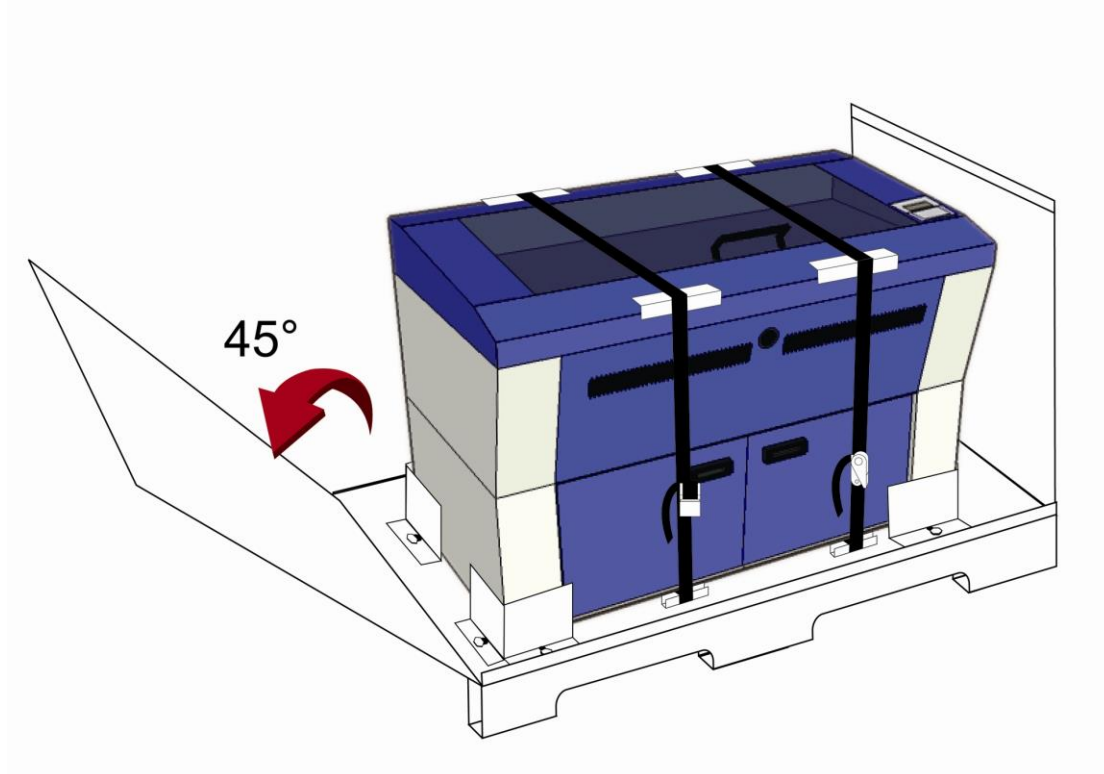
Step 8: Unbuckle and remove the belts that holds the machine in place.

232001410G(12)
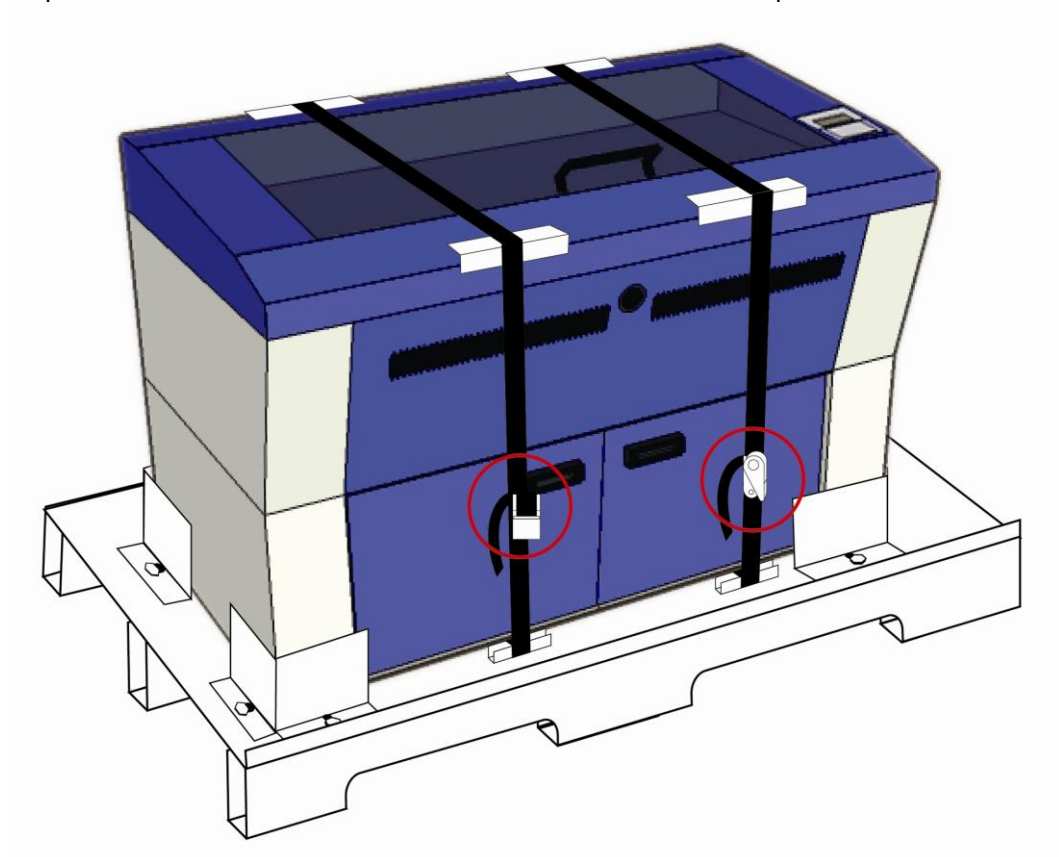
Step 9: Use a Philips screwdriver to remove the brackets that holds the machine in place
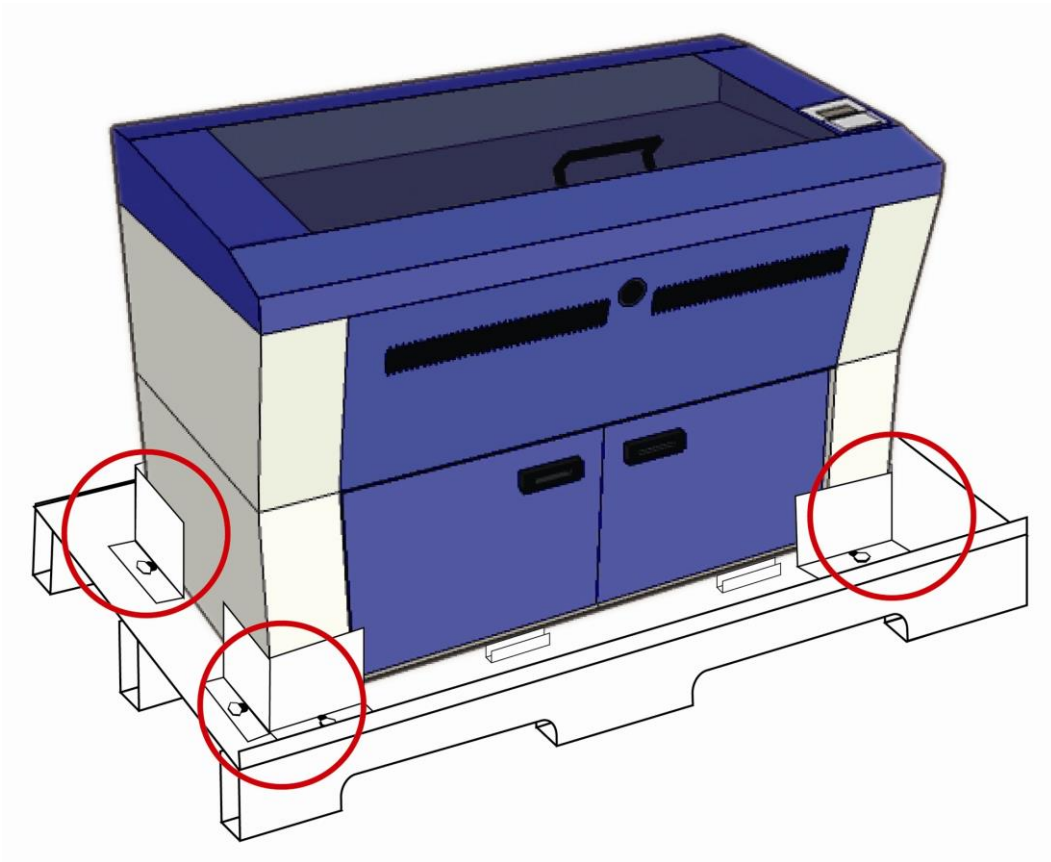
Step 10: Position the ramps as shown below and the machine can now be pushed off the base board via the ramps. (The ramps are found in a box within the crate)
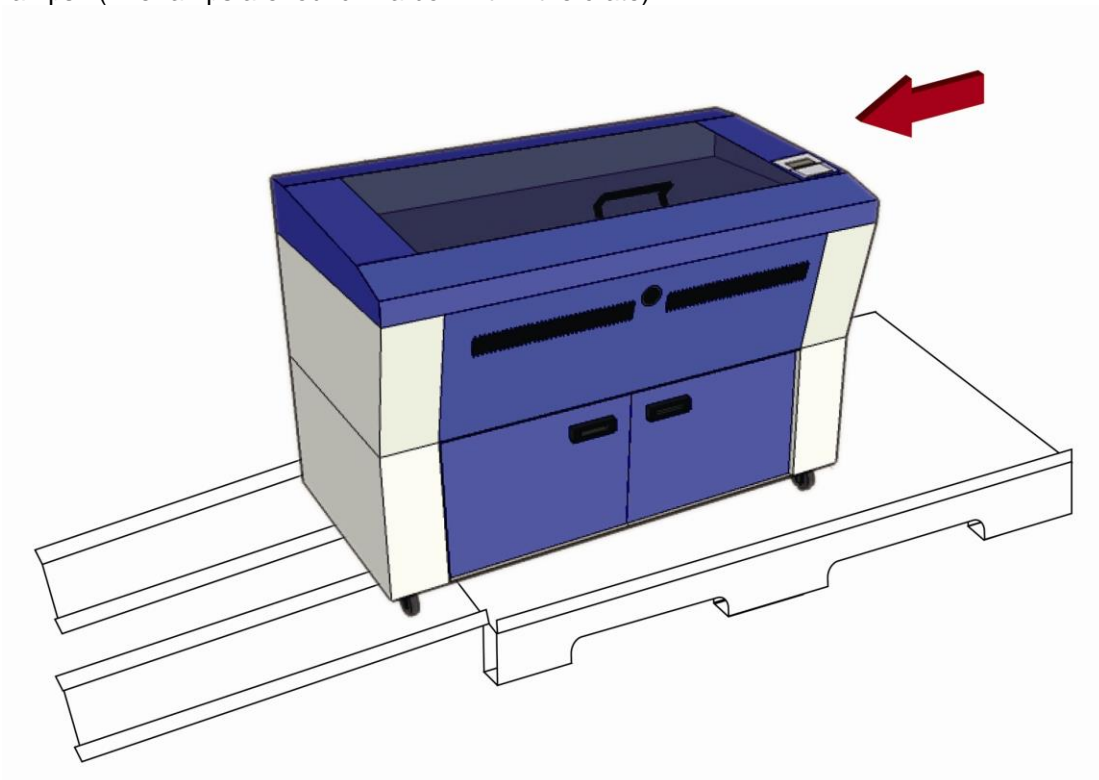
Pack via the following steps:

Step 1: Set up the ramp with the base board and carefully push the machine onto the iron pallet.
NOTE: More than one person may be needed when loading and unloading the shipping crate in order to avoid body injury or damage to the machine.
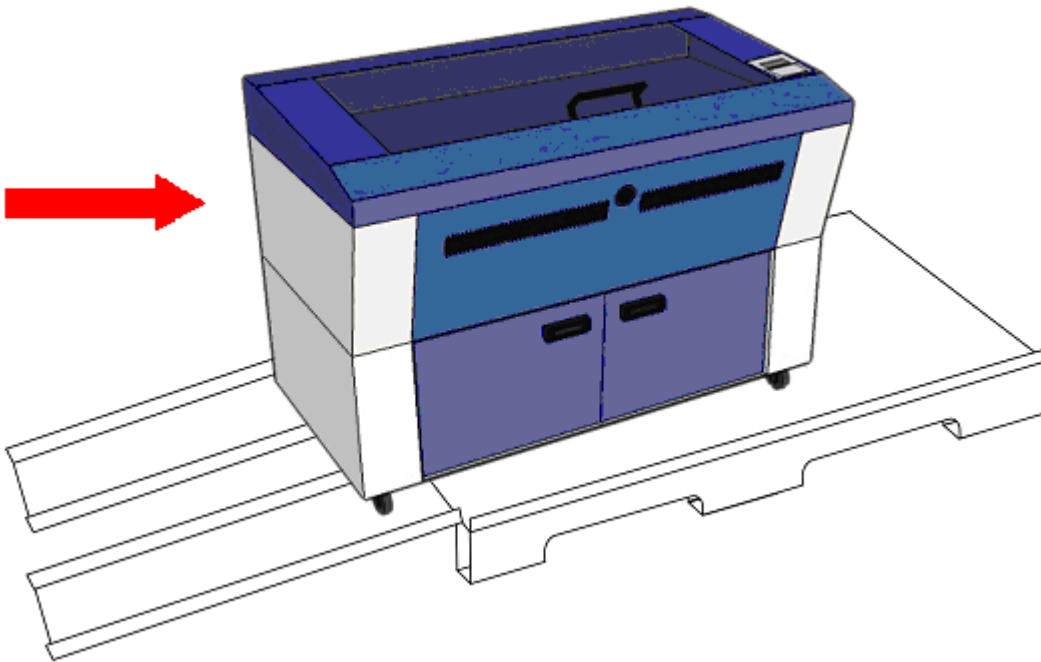
Step 2: Fasten the belts accordingly and make sure the machine is affixed on the iron plate.
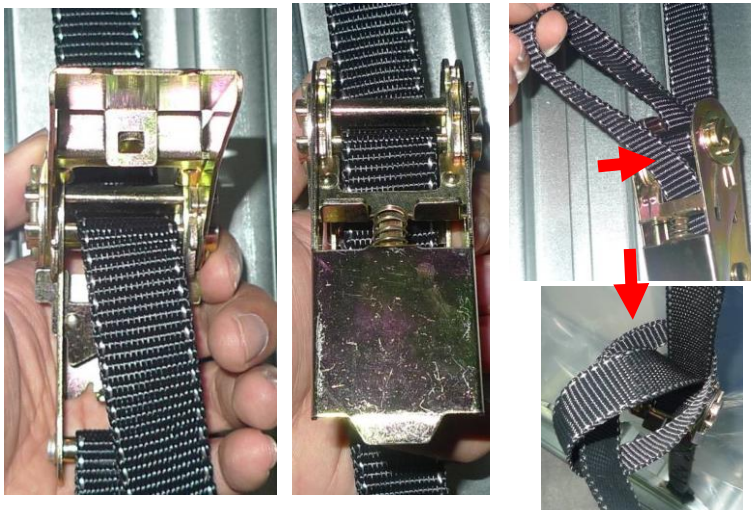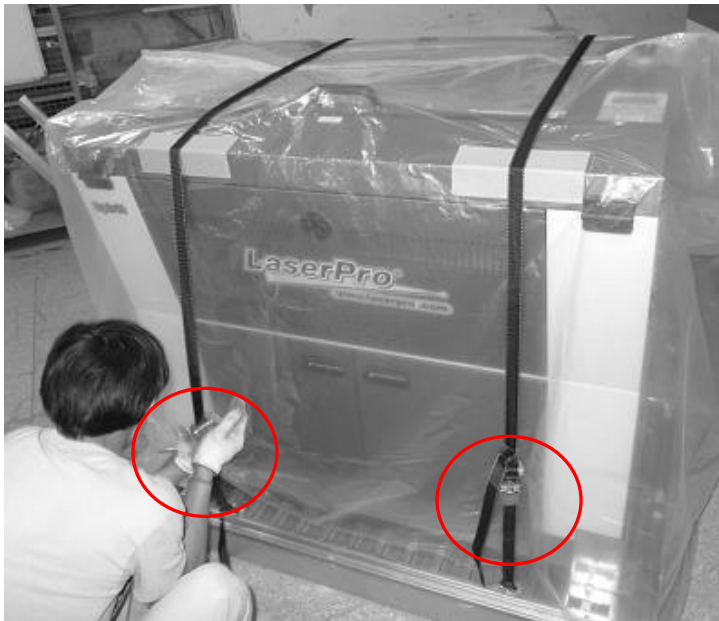
Step 3: Insert four side boards on the slot of bottom plate.

Step 4: Fix the four side boards by four corner brackets.

Step 5: Place the top cover on the top of the machine and fix it with the fixers.

The machine is now repacked and ready for shipping.
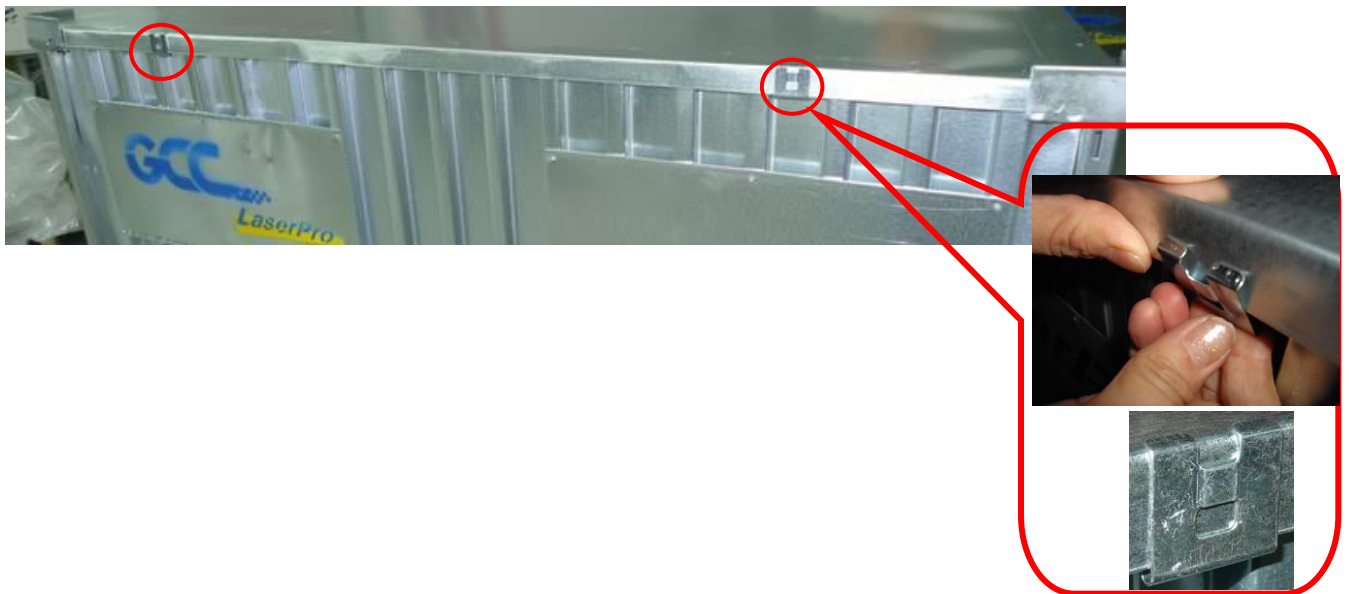
2.2 Contents and Accessories Checklist

Please check to make sure that all of the following items are included within the shipping crate. If any of the following items are missing, immediately contact your local GCC distributor.

ITEM		QUANTITY
Cleaning Kit	Cotton	1
	Lens Cleaner Solution	1
	Lens Tissue	1
Power Cord (US/EU/AU)		2/ each
USB Cable		1
LAN Cable		1
Focusing Tool		1
Safety Goggles (1064nm wavelength)		1
Hose Connector		1
Installation CD (including user manual, driver, and firmware)		1
Lubrication Grease		1
Warranty Card		1

232001410G(12)

3

Chapter 3

Mechanical Overview

Front View

Top View

Right (Profile) View

Left (Profile) View

Rear View

Please take some time to familiarize yourself with this section regarding the mechanical overview of the LaserPro S290LS. References will be made back to the different parts of the LaserPro S290LS in later sections.

3.1 Front View

SmartEXT^{TM} Pass-Through Front Door

Lower Front Door

3.2 Top View

Key Switch

Emergency Stop Button

SmartLIGHT™ Switch

Control Panel

3.3 Right (Profile) View

Power On/ Off Switch

LAN Port

USB Port

Power Cable Inlet

3.4 Left (Profile) View

Access Panel Mirror #1

232001410G(12)

3.5 Rear View

SmartLID™ Operation Handles

Exhaust Port

Laser Access Panel

SmartEXT™ Pass-through Rear Door
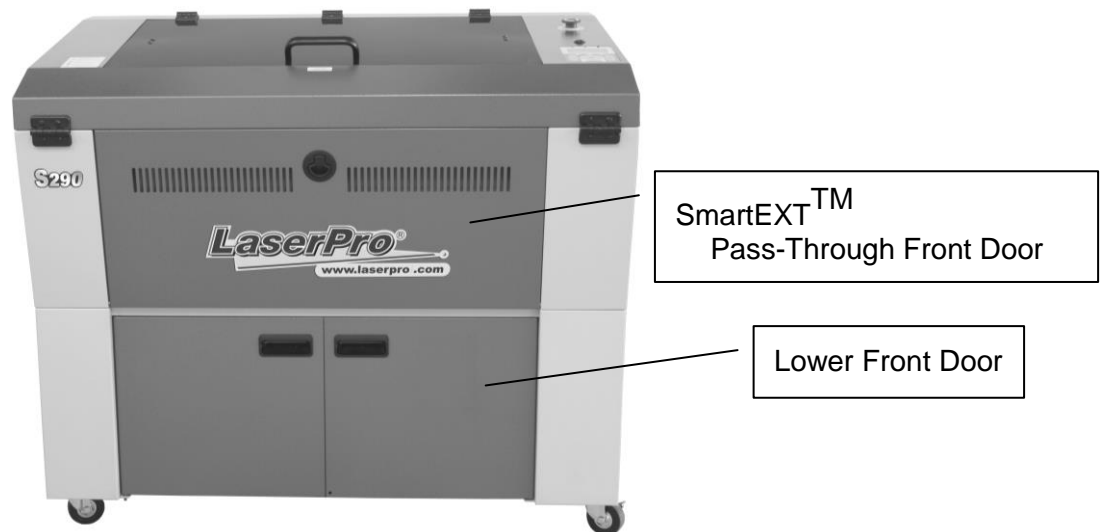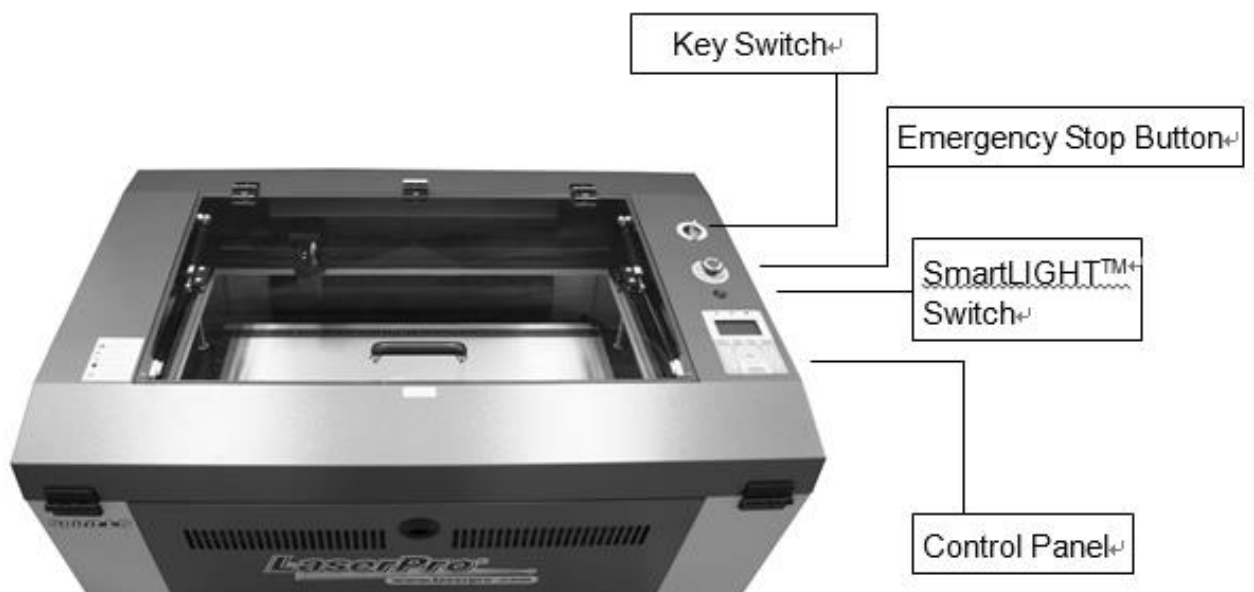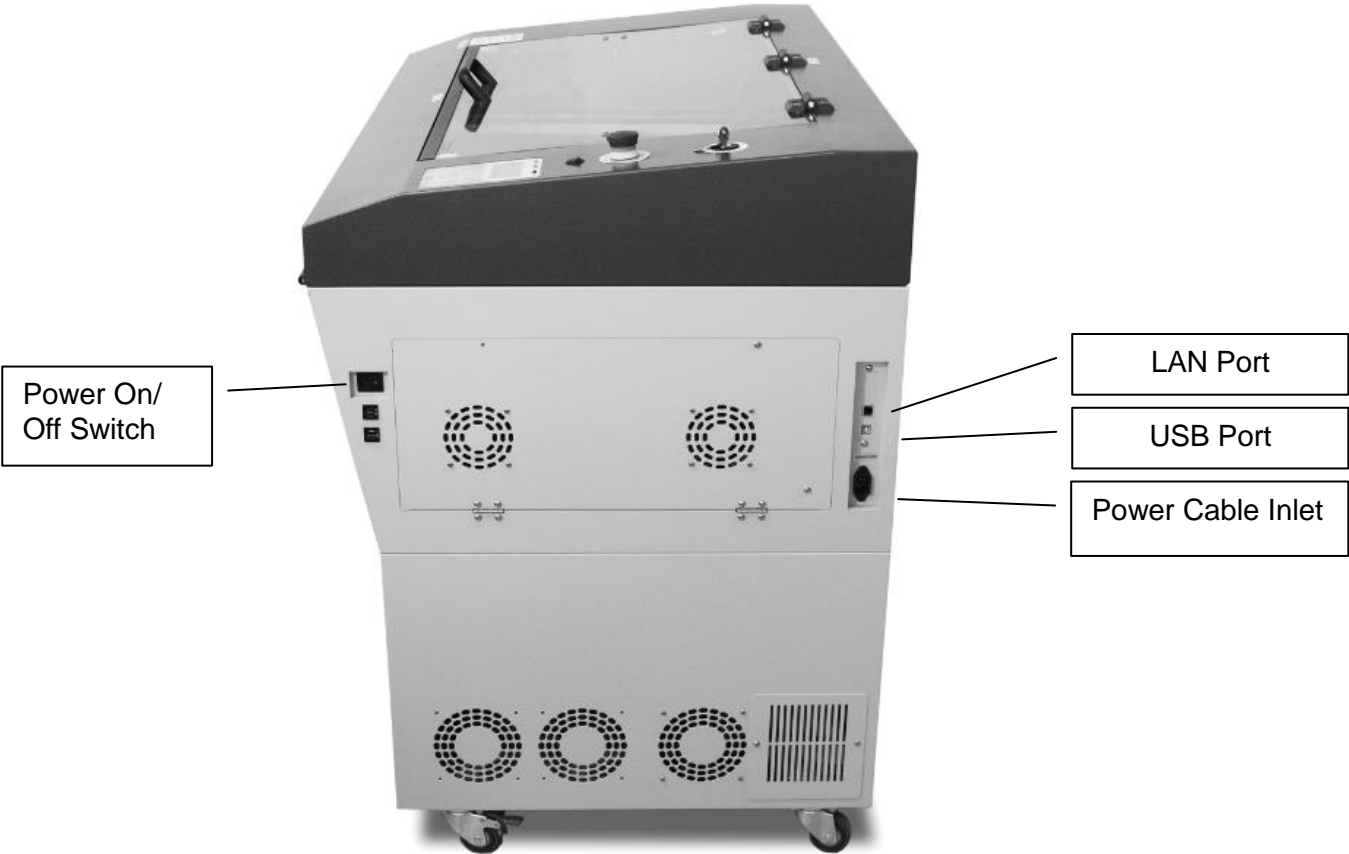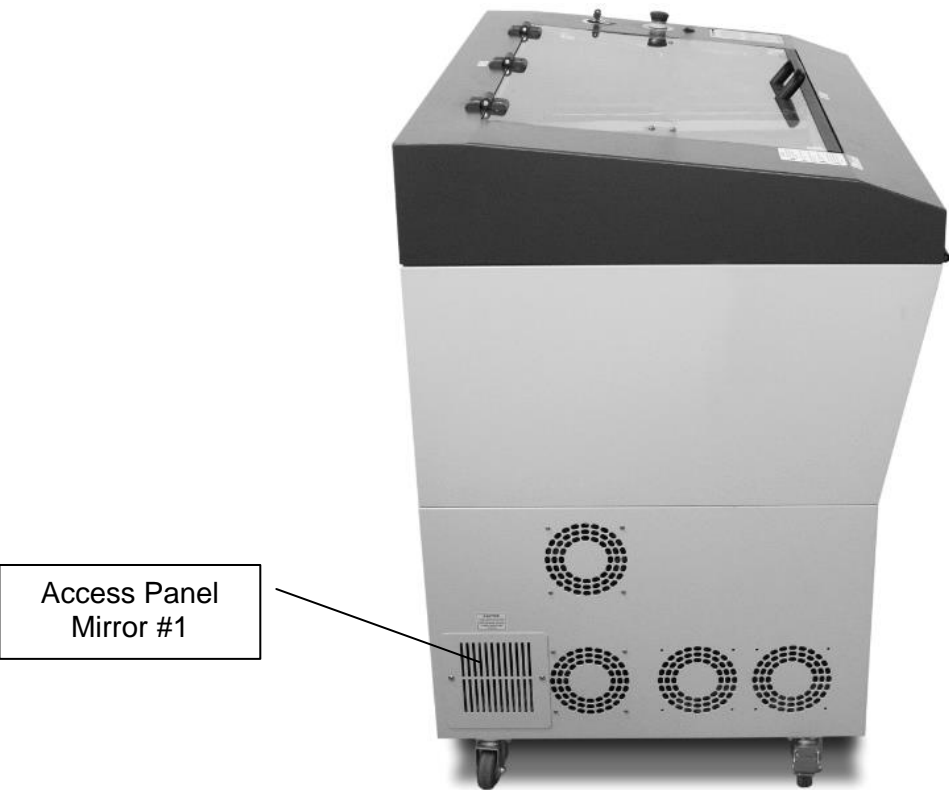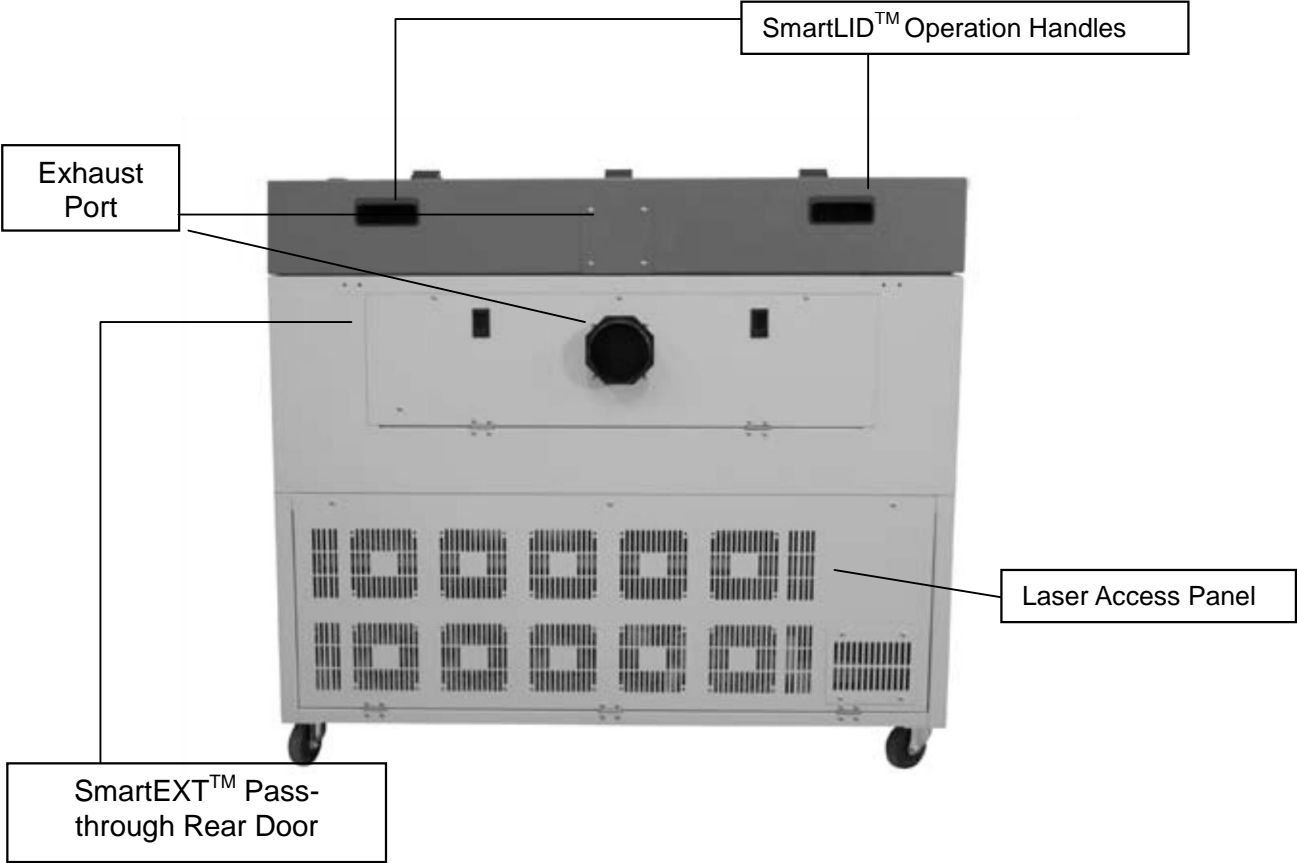
4

Chapter 4

Setup and Installation

Machine Setup

- Powering Up the Machine

- Connecting the Computer

Graphics Software Setup

- Recommended Computer Configuration

- Installation of the LaserPro USB Driver

- Installation of the LaserPro Print Driver

4.1 Machine Setup

4.1.1 Powering Up the Machine

<table>
<tr><td>⚠ CAUTION</td></tr>
<tr><td>Make sure both the LaserPro S290LS and the computer are turned off before connecting either to a power source.</td></tr>
</table>

1) Connect the male end of the power cord to a quality surge protector and then connect the surge protector to a properly grounded outlet.

2) Do the same for the computer system.

3) Connect the female end of the power cord to the machine's power cable inlet located on the right side of machine.

> **NOTE**
>
> The LaserPro S290LS has been designed to automatically switch from 100-240 VAC.

> *TIP*
>
> **Please adjust the LCD Display Screen's Contrast** before plugging in the electrical cord of your laser. LCD adjustment wheel is located underneath the control panel

4.1.2 Connecting the Computer

The LaserPro S290LS Series can communicate with a computer through a USB Port or LAN Port connection interface. Regardless of the connection method chosen, you will need to connect the respective connection cable from the LaserPro S290LS Series to your computer.

USB Connectivity: Connect the included USB Port Cable to the USB Port on the right-hand side of the LaserPro S290LS.

Ethernet Connectivity: Connect the LAN Cable in accessory to the LAN port on the right-hand side of the laser system. Follow below instruction for ethernet connectivity setup..

> NOTE
> 1. Never leave laser system unattended during laser cutting, engraving, and marking process, even with Ethernet or Wi-Fi connection setup, this requirement cannot be avoided. Exposure to the laser beam may cause ignition flame to combustible materials.
>
> 2. DO NOT connect USB cable when using Ethernet function for data transmission.
>
> 3. If you have purchased additional Optional Accessories for the LaserPro S290LS, please refer to chapter VII for instructions on how to properly setup your optional accessories. These should be setup prior to working with your LaserPro S290LS.

4.1.2.1 Networking Connectivity Setup

GCC laser engraver is built-in with LAN port to enable multiple laser engravers to be operated by one PC and multiple PCs to share a single unit of laser engraver. Follow below setup instructions using Spirit GLS model as illustration.

Step 1. Connect LAN cable to the LAN port of GCC laser engravers and turn on machine
Step 2. Navigate the control panel through <F4> Function→ <Machine Setting>→ <LAN Setup Wizard>→ IP Address.
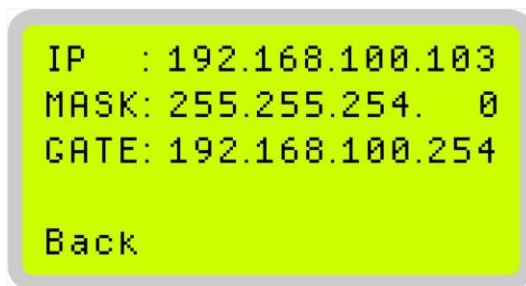
Step 3. Go to Windows <Control Panel>→ <Hardware and Sound>→ <Printer>, and right click on Spirit series printer to check printer properties.
Step 4. Go to <Ports> tab of printer properties, and select <Add Port>, and follow the instruction to enter the TCP/IP information received from laser machine control panel in step 2.

Printer Ports

Available port types:

Adobe PDF Port Monitor
Local Port
Standard TCP/IP Port
UCP

New Port Type...   New Port...   Cancel

Add Standard TCP/IP Printer Port Wizard

Welcome to the Add Standard TCP/IP Printer Port Wizard

This wizard helps you add a port for a network printer.

Before continuing be sure that:
1. The device is turned on.
2. The network is connected and configured.

To continue, click Next.

< Ba   Next >   Cancel

Add Standard TCP/IP Printer Port Wizard

Add port
For which device do you want to add a port?

Enter the Printer Name or IP address, and a port name for the desired device.

Printer Name or IP Address: 192.168.100.103

Port Name: 192.168.100.103

< Back   Next >   Cancel

Add Standard TCP/IP Printer Port Wizard

Additional port information required
The device could not be identified.

The device is not found on the network. Be sure that:

1. The device is turned on.
2. The network is connected.
3. The device is properly configured.
4. The address on the previous page is correct.

If you think the address is not correct, click Back to return to the previous page. Then correct the address and perform another search on the network. If you are sure the address is correct, select the device type below.

Device Type

- ◉ Standard   Generic Network Card
- ○ Custom   Settings...

[< Back] [Next >] [Cancel]

Add Standard TCP/IP Printer Port Wizard

Completing the Add Standard TCP/IP Printer Port Wizard

You have selected a port with the following characteristics.

SNMP:	No
Protocol:	RAW, Port 9100
Device:	192.168.100.103
Port Name:	192.168.100.103
Adapter Type:	Generic Network Card

To complete this wizard, click Finish.

[< Back] [Finish] [Cancel]

SpiritGLS-3.05-04 Properties

General | Sharing | Ports | Advanced | Color Management | Security | Option | Pen | Advance | Paper | Language

SpiritGLS-3.05-04

Print to the following port(s). Documents will print to the first free checked port.

Port	Description	Printer
☑ 192.168.100.103	Standard TCP/IP Port	
☐ PORTPROMPT:	Local Port	
☐ nul:	Local Port	
☐ XPS	Local Port	
☐ C:\ProgramData...	Local Port	Snagit 12
☐ Desktop*.pdf	Adobe PDF	

[Add Port...] [Delete Port] [Configure Port...]

☐ Enable bidirectional support
☐ Enable printer pooling

[Close] [Cancel] [Apply]

2001410G(12)

4.1.2.1 Ethernet Connectivity Setup

GCC laser engraver is built-in with LAN port to transmit data from PC to laser engraver with ease and higher speed instead of USB port option.
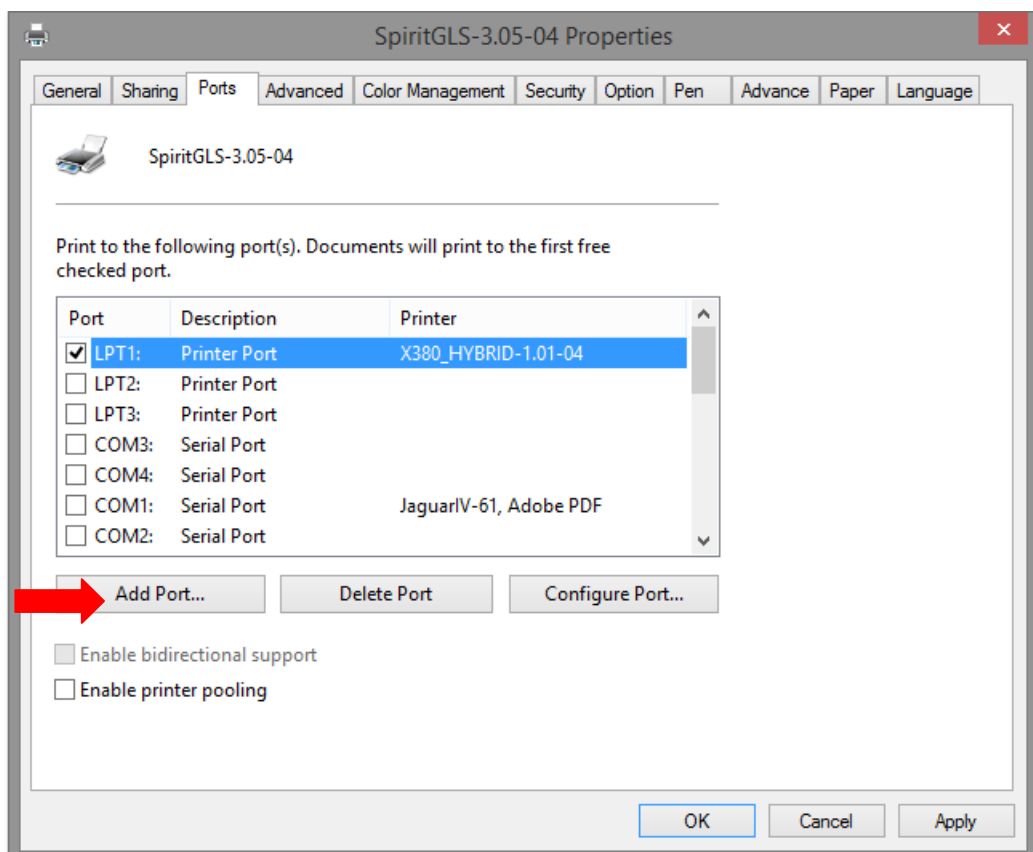
Step 1. Connect LAN cable to the LAN port of GCC laser engravers and turn on machine
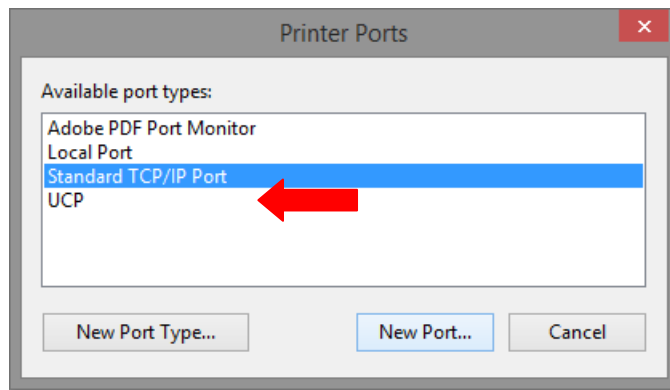Step 2. Navigate the control panel through <F4> Function→ <Machine Setting>→ <LAN Setup Wizard>→ DHCP: OFF.
Step 3. Navigate the control panel through <F4> Function→ <Machine Setting>→ <LAN Setup Wizard>→ IP Address.
Step 4. Enter 192,168,3.X (X refers to 1~255 value which can't be the same value with IP address setting in PC or Notebook) for IP, and 255.255.255.0 for MASK with UP/ DOWN keys.
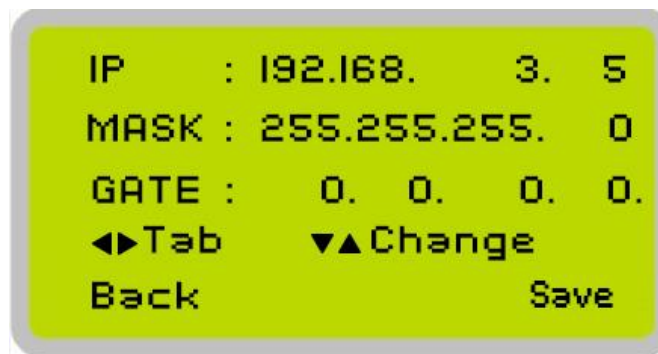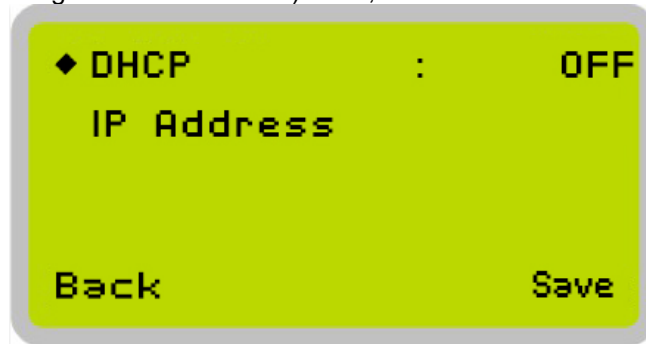
Step 5. Go to <Control Panel→Network and Internet→Network Connections> of computer, right click mouse on the connected internet device, and choose <Properties>
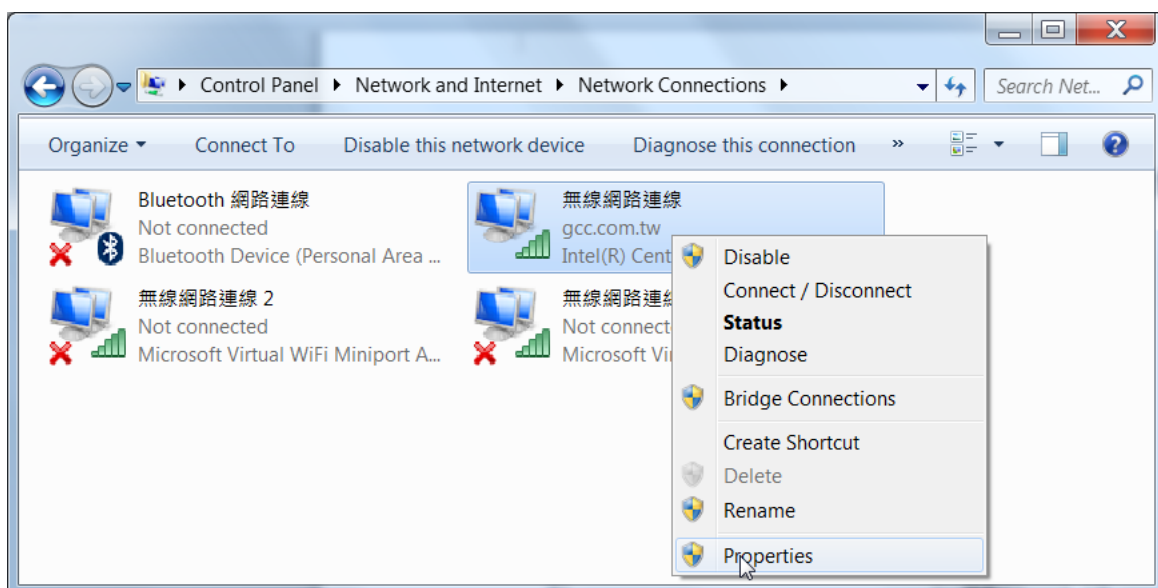
Step 6. Choose the <Internet Protocol Version 4(TCP/IPv4)> and click <Properties> to open up the setting window.
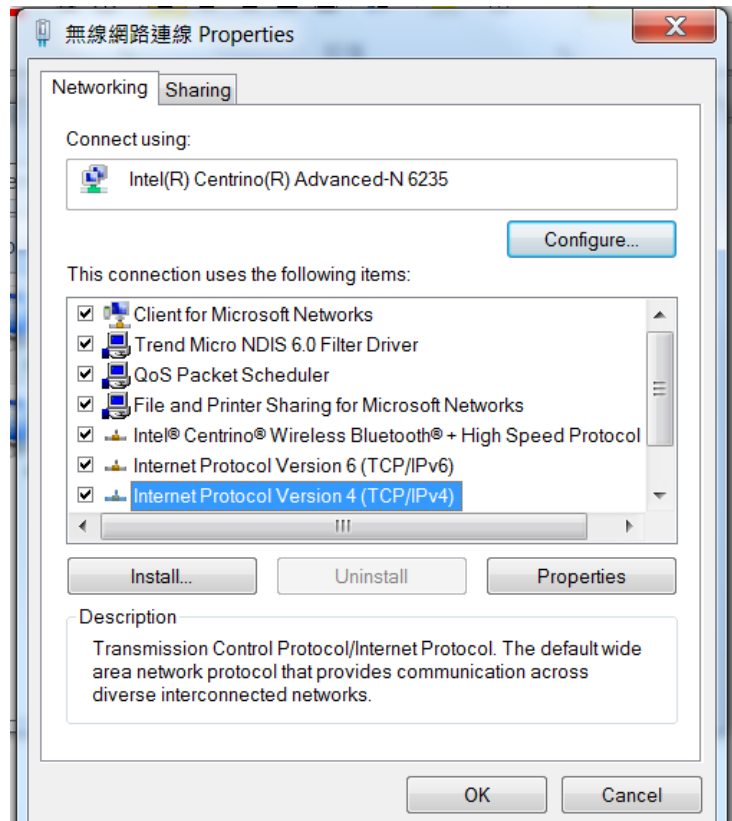
Step 7. Enter the IP address and Subnet mask setting values, and choose <OK>
Note the IP address 192.168.3.X (X value can be 1~255, while can't be the same number as machine control panel setting in step 4)

232001410G(12)
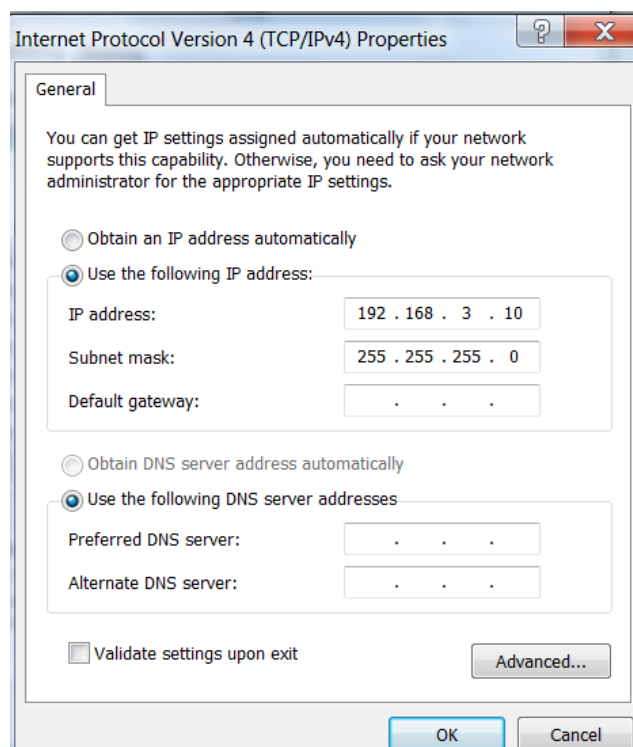
Step 8. Go to <Control Panel> → <Device and Printers> of computer and right click on the laser machine printer, choose <Printer Properties>.
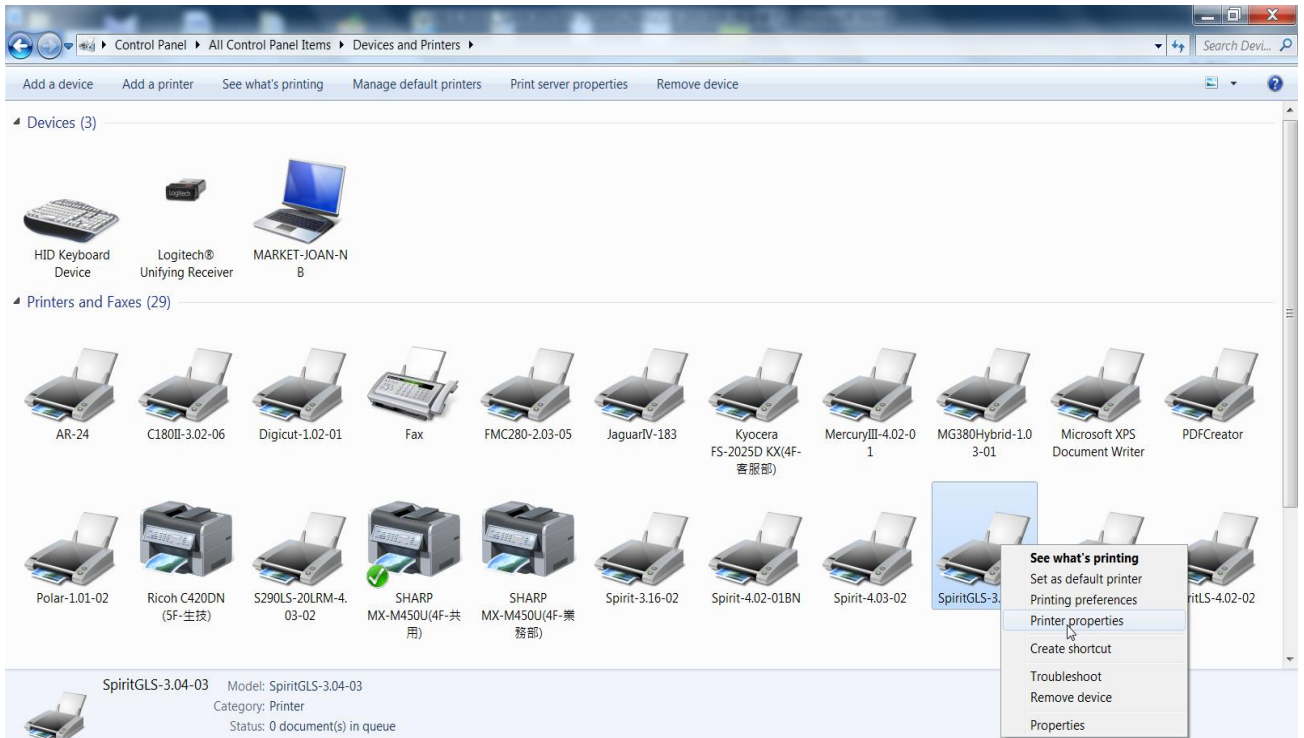
Step 9. Select <Add Pot> under Ports tab, and follow the instruction to enter the TCP/IP information in laser machine's control panel in step 4.

Printer Ports

Available port types:

Adobe PDF Port Monitor
Local Port
Standard TCP/IP Port
UCP

New Port Type...   New Port...   Cancel

Add Standard TCP/IP Printer Port Wizard

Welcome to the Add Standard TCP/IP Printer Port Wizard

This wizard helps you add a port for a network printer.

Before continuing be sure that:
1. The device is turned on.
2. The network is connected and configured.

To continue, click Next.

< Back   Next >   Cancel

Add Standard TCP/IP Printer Port Wizard

Add port
For which device do you want to add a port?

Enter the Printer Name or IP address, and a port name for the desired device.

Printer Name or IP Address: 192.168.3.10

Port Name: 192.168.3.10

< Back   Next >   Cancel

Add Standard TCP/IP Printer Port Wizard

Additional port information required
The device could not be identified.

The device is not found on the network. Be sure that:

1. The device is turned on.
2. The network is connected.
3. The device is properly configured.
4. The address on the previous page is correct.

If you think the address is not correct, click Back to return to the previous page. Then correct the address and perform another search on the network. If you are sure the address is correct, select the device type below.

Device Type

(•) Standard   Generic Network Card ▼

(○) Custom   Settings...

< Back   Next >   Cancel

Add Standard TCP/IP Printer Port Wizard

Completing the Add Standard TCP/IP Printer Port Wizard

You have selected a port with the following characteristics.

SNMP: No

Protocol: RAW, Port 9100

Device: 192.168.3.10

Port Name: 192.168.3.10

Adapter Type: Generic Network Card

To complete this wizard, click Finish.

< Back   Finish   Cancel

SpiritGLS-3.04-03 Properties

General | Sharing | Ports | Advanced | Color Management | Security | Option | Pen | Advance | Paper | Language

SpiritGLS-3.04-03

Print to the following port(s). Documents will print to the first free checked port.

Port	Description	Printer
☐ 192.168.100.234	Standard TCP/IP Port	Ricoh C420DN (
☐ 192.168.100.246	Standard TCP/IP Port	Kyocera FS-2025
☑ 192.168.3.10	Standard TCP/IP Port	
☐ PDFCreator:	PDFCreator Redirect...	PDFCreator
☐ XPSPort:	Local Port	Microsoft XPS D
☐ nul:	Local Port	傳送至 OneNote

Add Port...   Delete Port   Configure Port...

☐ Enable bidirectional support
☐ Enable printer pooling

Close   Cancel   Apply

2001410G(12)

Troubleshooting

While users configure the Ethernet setting precisely with DHCP = OFF (assign the machine a static IP) referring to the manual, sometimes the communication might still not be able to work, at this time you can refer to below actions to have a basic troubleshooting with IT technician.

1. **Verify the IP addresses you are using to see if they are valid.**
   i. Open command line mode in your windows system (Press Windows key + R, the "Run" window will appear, type "CMD" in the blank bar then press "OK" to open command line mode)
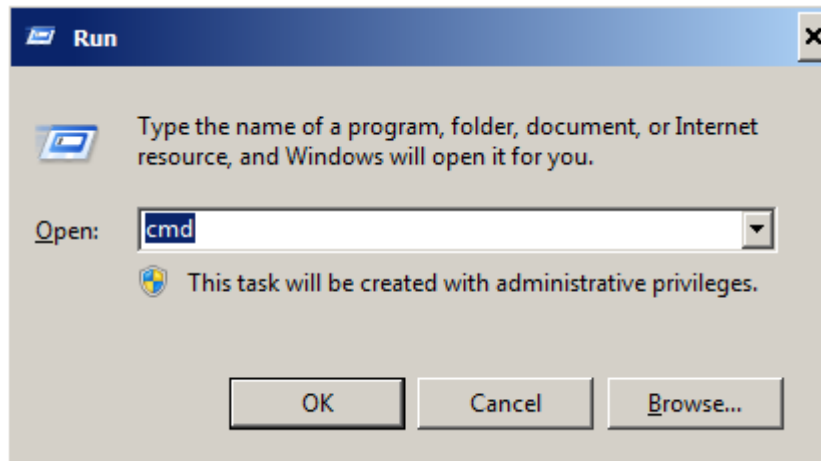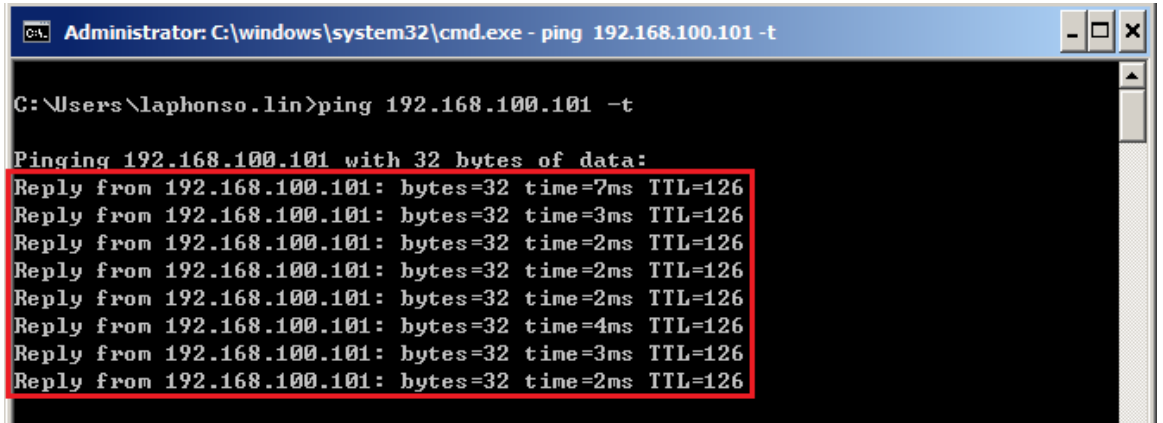
Command line mode window
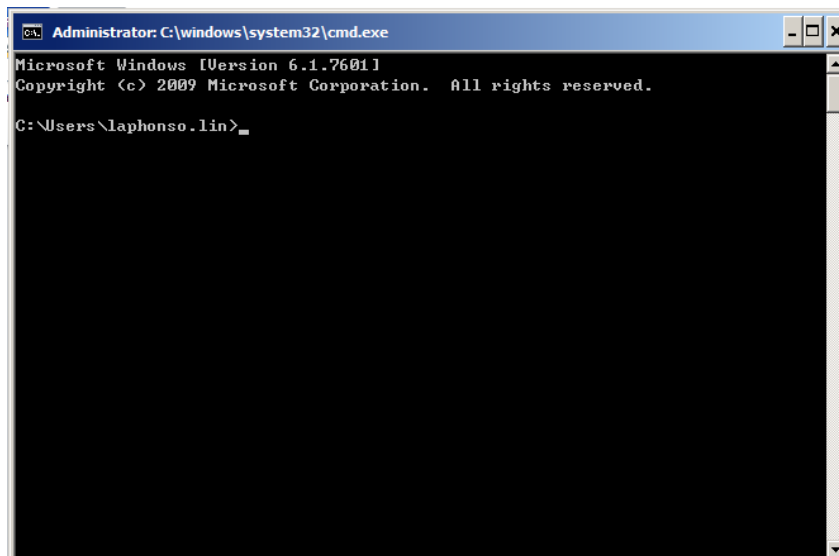
ii. Type "ping x.x.x.x –t" after the prompt symbol, (x.x.x.x is the IP address you set on the laser machine, ie: 192.168.100.101)., press "Enter" to run the "Ping" tool.
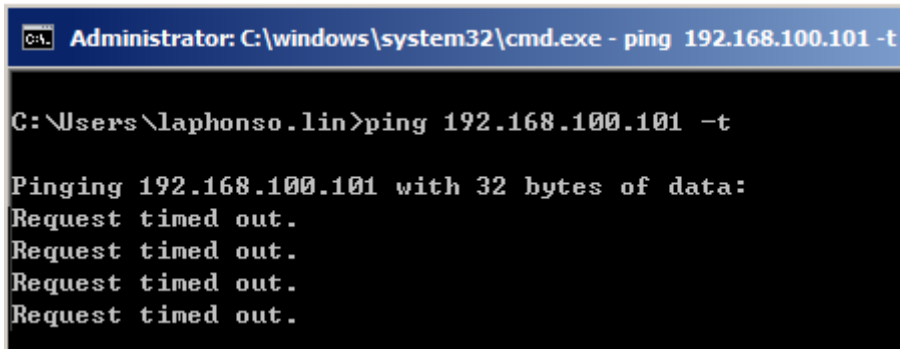
If the communication is OK between your PC and Laser machine, you will see reply from the destination IP.

If the communication is not ok, you will see "Request timed out" message from destination IP.
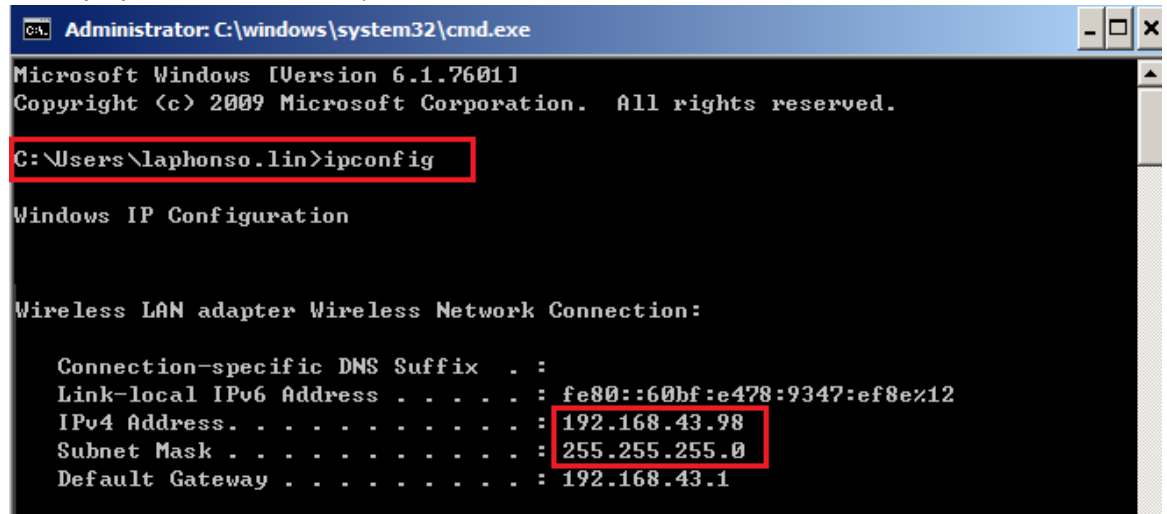
2. **Diagnostics**
   a. For cases the communication is not ok (can't get response, just have "Request timed out" from destination IP), you can look for two PC/Laptops which are original set in the LAN environment and work ok (they can get normal response from each other by the command "PING"), note down the TCP/IP configurations by running "ipconfig" on both PC/Laptops (press "Windows key + R" to call the "Run" windows, type "CMD" in the blank bar, press enter to start command line mode,
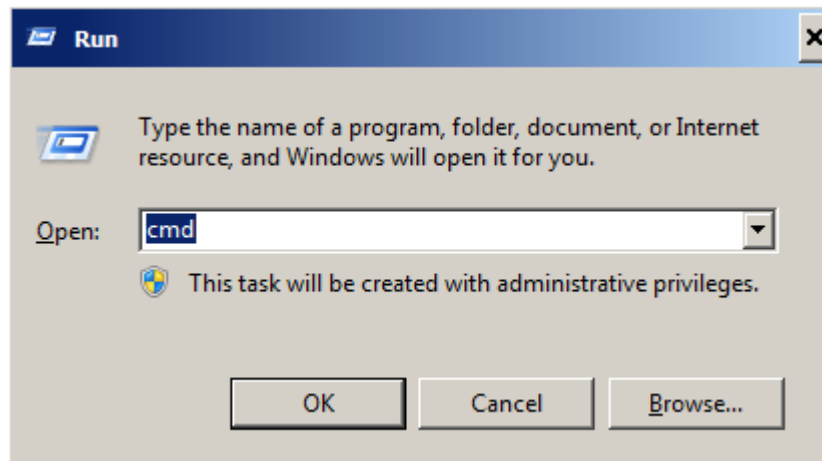
type "ipconfig" after the prompt symbol then press enter, the TCP/IP configurations of this PC/Laptop will show as below)

Set those two IP addresses to the laser machine and the PC/Laptop which you want to communicate with laser.

Test Ping again to see if you can get normal response from destination IP, if the communication is normal now (can get reply from destination IP), we can be sure the IP addresses we set originally are invalid, ask the LAN administrator to provide us a proper one.

b. Directly connect the Laser machine and PC/Laptop using the RJ45 cable without any router/switch..etc. in between, test PING and send files, if the files can be sent and the result of PING is normal (can get response from destination IP), the Ethernet function of GCC laser is normal, it should be something wrong in the LAN environment , ask the administrator of the LAN to solve the problem.

4.2 Graphics Software Setup

The LaserPro S290LS is compatible with graphics software that can output HPGL commands, such as
CorelDRAW, Adobe Photoshop, AutoCAD, Illustrator etc.

Supported Graphic Software

- Photoshop

- CorelDRAW

- Illustrator

- AutoCAD

Other software such as EngraveLab and PhotoGrav may work with the LaserPro S290LS, but these are not officially supported. Any software that can output to the LaserPro Print Driver should work.

NOTE
Support will not be offered, if you experience output problems with non-supported graphics software.

4.2.1 Recommended Computer Configuration

The LaserPro S290LS operates under Windows operating systems and is designed to work on a computer that meets the following minimum requirements.

Computer

- CPU – Pentium 90 (or equivalent) or greater
- RAM – 32 MB or higher
- HDD – 1.2 GB Hard Drive or greater
- SVGA – 15" Super VGA Monitor
- On Board Parallel Mode (Enabled from motherboard's BIOS)
- SPP – Preferred Mode
- ECP – Cable (Less than 1.8 meters)

Software

- The LaserPro S290LS drivers are designed for Windows 2000, Window7 or other operating systems developed subsequently.

4.2.2 Installation of the LaserPro Print Driver

1) Insert the LaserPro CD.

2) From the auto run menu, select **S290LS → LaserPro Driver** to begin the LaserPro Print Driver installation.

3) When the Add Printer Wizard menu comes up, click **Next** to continue.

4) At the Local or Network Printer page, select <**Local printer attached to this computer**>, then click **Next** to continue.

5) At the Select a Printer Port page, select <**Use the following port**> and select the port that the LaserPro S290LS will be attached to, then click **Next** to continue.

6) The next screen will prompt you with a list to select the manufacturer and model of your printer. From this menu, click **Have Disk**. Another menu will now pop up for you to indicate the location of the print driver. With the LaserPro CD still in your drive, click **Browse,** select the LaserPro S290LS driver folder and locate the GLXXX.inf file. Click **OPEN** to have S290LS displayed as a valid printer.

7) Now select S290LS from the list of printers (S290LS should be the only printer displayed on the list) and click **Next** to continue.

8) If a screen comes up informing you of the detection of a previous driver and asks to keep the existing driver or use the new one, select <**Replace Existing Driver**> and click **Next** to continue.

9) This screen will prompt you to provide a printer name. Simply type in <**S290LS**> and select **Yes** or **No** if you want to use this printer as the default printer and click **Next** to continue.

> **NOTE**
> When working with the LaserPro S290LS Print Driver within your graphics software, you will need to have the S290LS set as the default printer to get proper output. If you select to not have the S290LS be the default printer, please remember to manually change this on your own from within the graphic software printer selection area or from the Windows → Control Panel → Printers and Faxes section.

10) At the Printer Sharing screen, select <**Do not share this printer**> and click **Next** to continue.

11) Select <**No**> when asked if you want to print a test page and click **Next** to continue.

12) Now simply click **Finish** to complete the Add Printer Wizard.

13) Now the installation will proceed, if you get a Hardware Warning about the software you are installing for this hardware has not passed Windows Logo testing, simply click **Continue Anyway** to ignore this warning.

14) Congratulations, your printer driver has been successfully installed!

4.2.3 Using Parallels Desktops for MAC OS

MAC users can use GCC LaserPro machines by purchasing the Parallels Desktop software which allows you to install Windows OS in MAC computers and run Windows based software under MAC computer and output with GCC print driver.

1) Purchase Parallels Desktops on its official website.

2) Install Parallels Desktops under Mac OS environment.
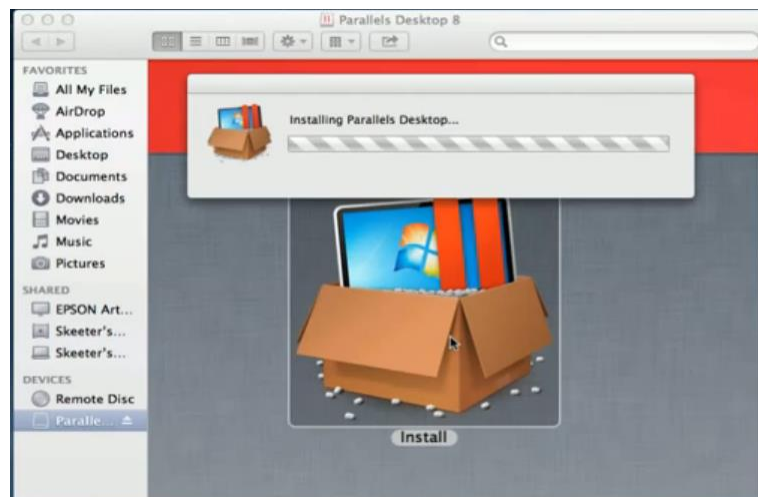
3) Read Software License Agreement and press "Accept" to continue installation
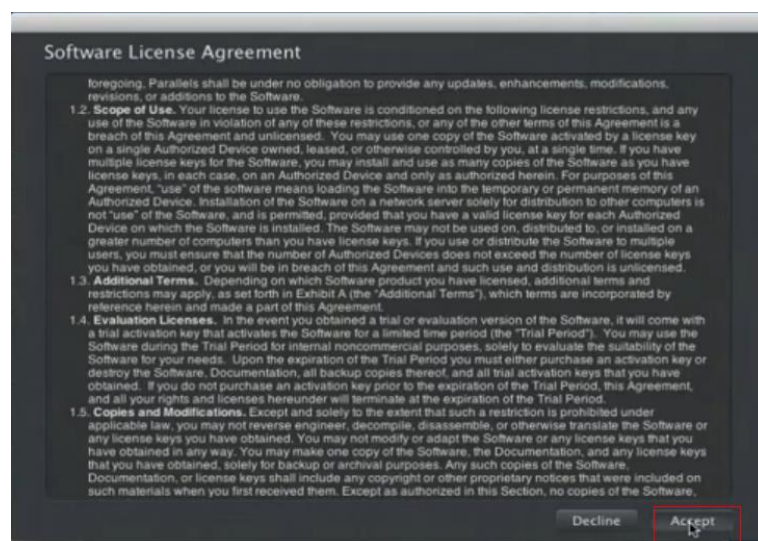
4) Enter your Mac OS X User Name and Password then press "OK"
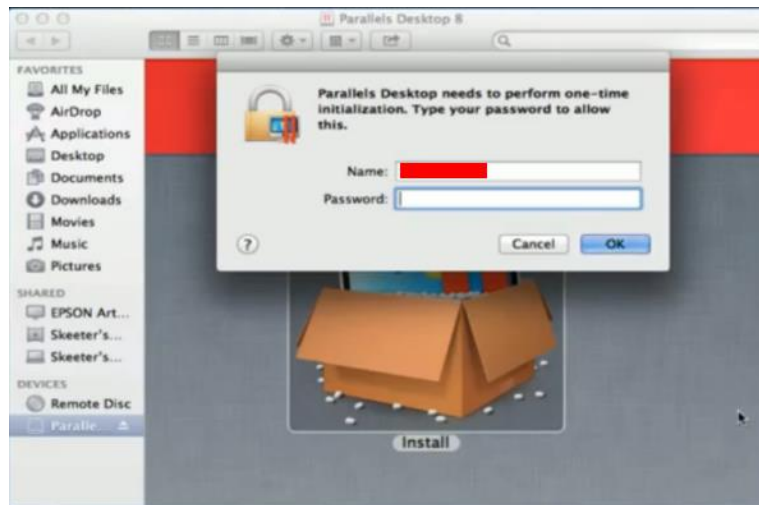
5) Press "Active"
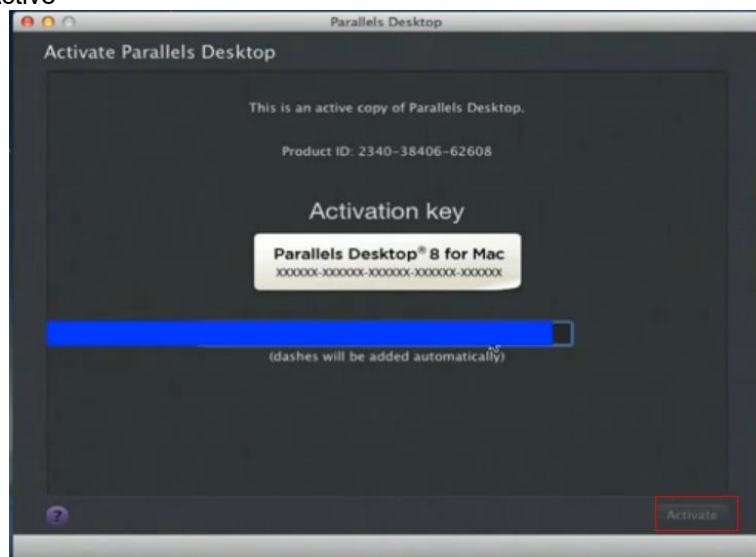
6) Press "OK" when activation is complete.
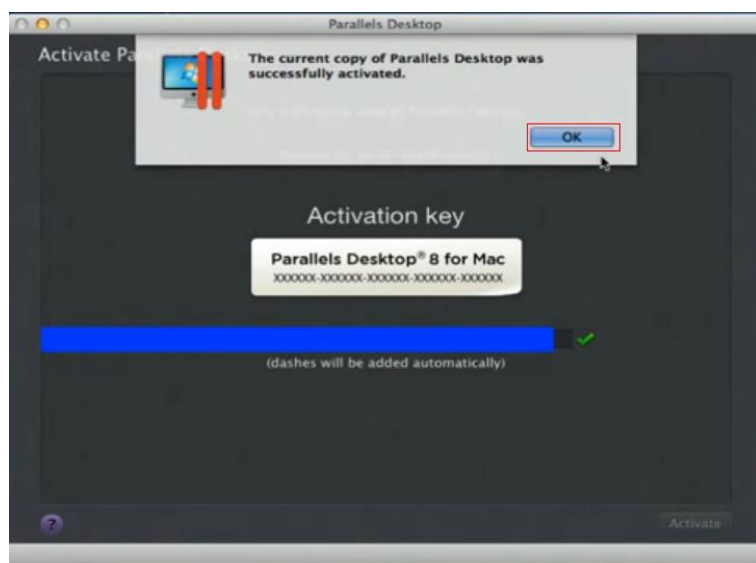
7) Register Parallels Desktop

8) Press "Register" and "OK" to complete the installation of Parallels Desktop.

9) Open **Parallels Desktop** (in the **Applications** folder) then choose **File → New**
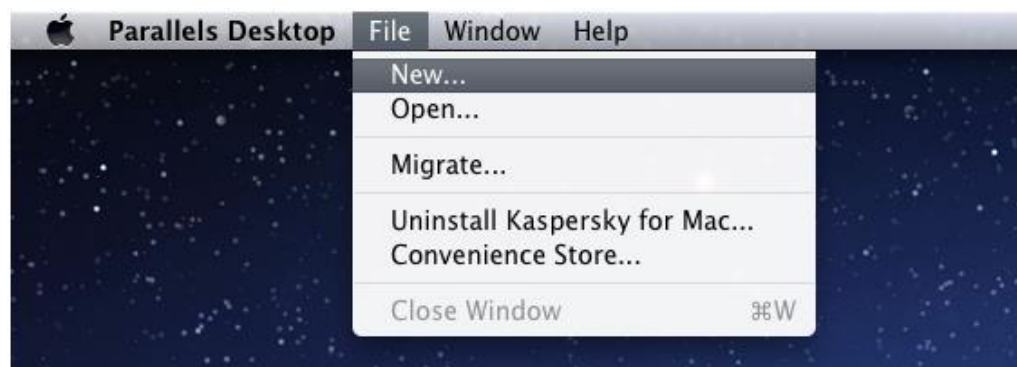
10) Press "Install Windows from DVD or image file" then press "continue" to install windows OS

11) Select CD-ROM drive with the Windows installation CD

12) Enter the Windows OS product key
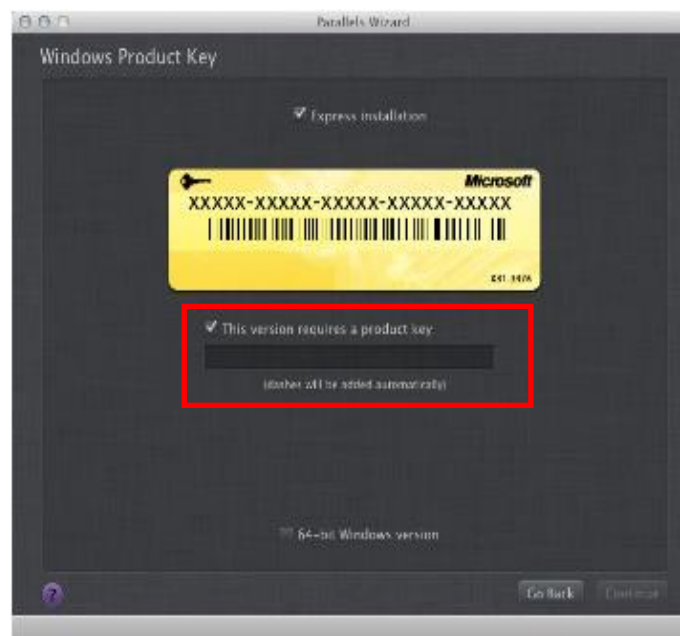
13) Select how you would like to run your Windows program.

14) After the prior setting is complete the windows OS installation procedure will start automatically.
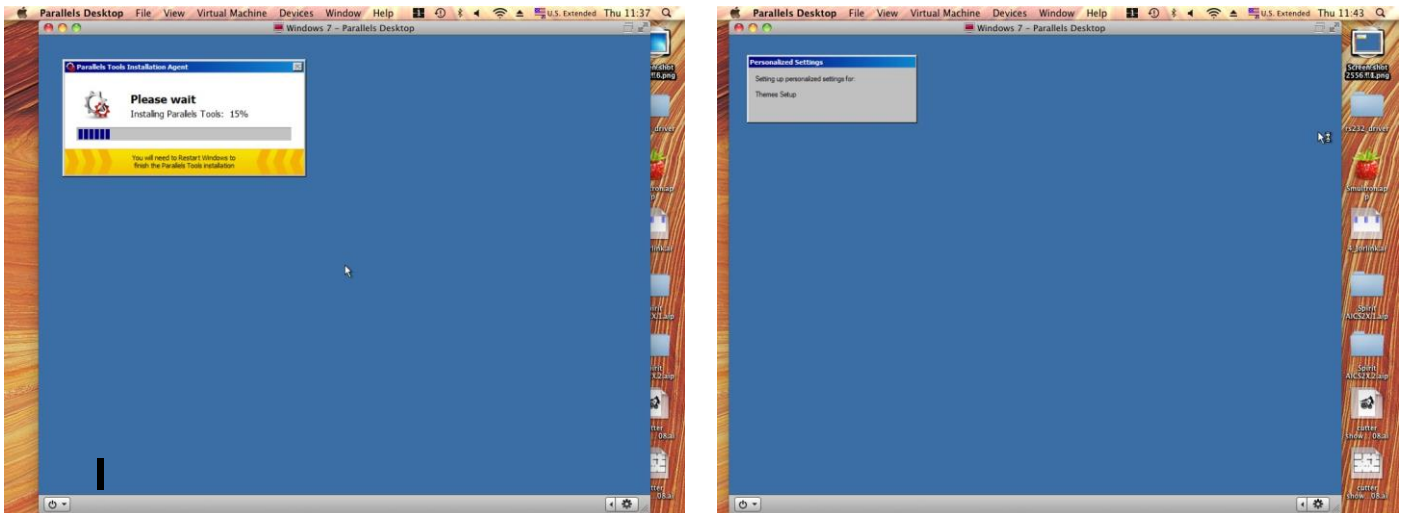
15) Windows OS installation is complete then you can refer to "4.2.5 Installation of the LaserPro Print Driver" to install GCC LaserPro Print Driver.
16) Install the AP that you want to use after the above installation is complete.
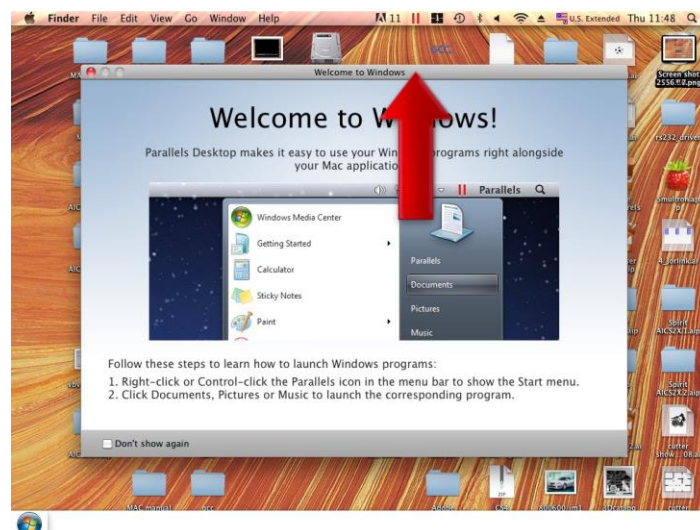
4.2.4 Using Adobe's AP with GCC LaserPro machine

The Adobe's AP (e.g. Illustrator, Photoshop or Acrobat reader) processes files via its Advanced Printing Features; users should firstly deselect Enable Advance Printing Features; otherwise the machine is unable to recognize or read general files when uploaded.

● Deselect "Enable Advance Printing Features"

1) Click to select → Control Panel → Devices and Printers

Administrative Tools	AutoPlay	Backup and Restore (Windows 7)
Color Management	Credential Manager	Date and Time
Device Manager	Devices and Printers	Display
File Explorer Options	File History	Flash Player (32-bit)
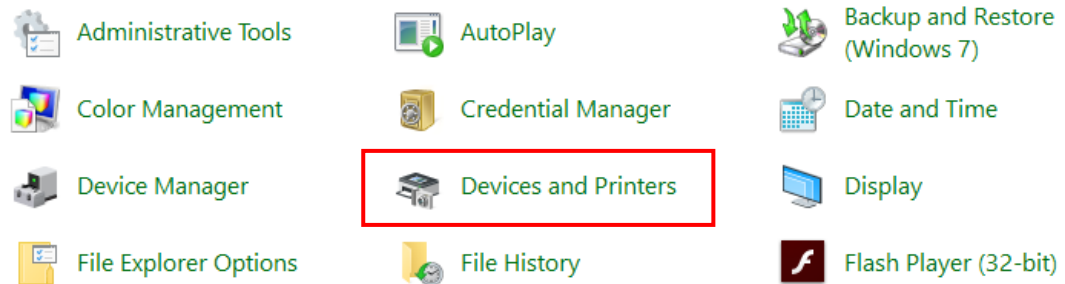
2) Select your printer (for example, Spirit), right-click your mouse and choose Properties to enter Spirit Properties setup

FMC280-3.01-02   FUJI XEROX DocuPrint CP215w   GLS-Hybrid-1.01-03   GLS-Hybrid-1.02-02   GLS-Hybrid-RMZ-1.01-02   MercuryIII-4.05-01   Microsoft Print to PDF

Microsoft XPS Document Writer   S290LS-RMZ-1.01-03   Send To OneNote 2016   SmartC...

See what's printing
Set as default printer
Printing preferences
Printer properties
Create shortcut
Remove device
Troubleshoot
Properties

...04-03   SpiritCCD-1.01-01

SpiritGLS-4.05-01   T500-1.03-03   T500-1.04-02   VenusII-4...   ...03-03   X380RX-4.03-02

3) The click the Advanced tab, then deselect Enable Advanced Printing Features, now all files can be recognized and uploaded.
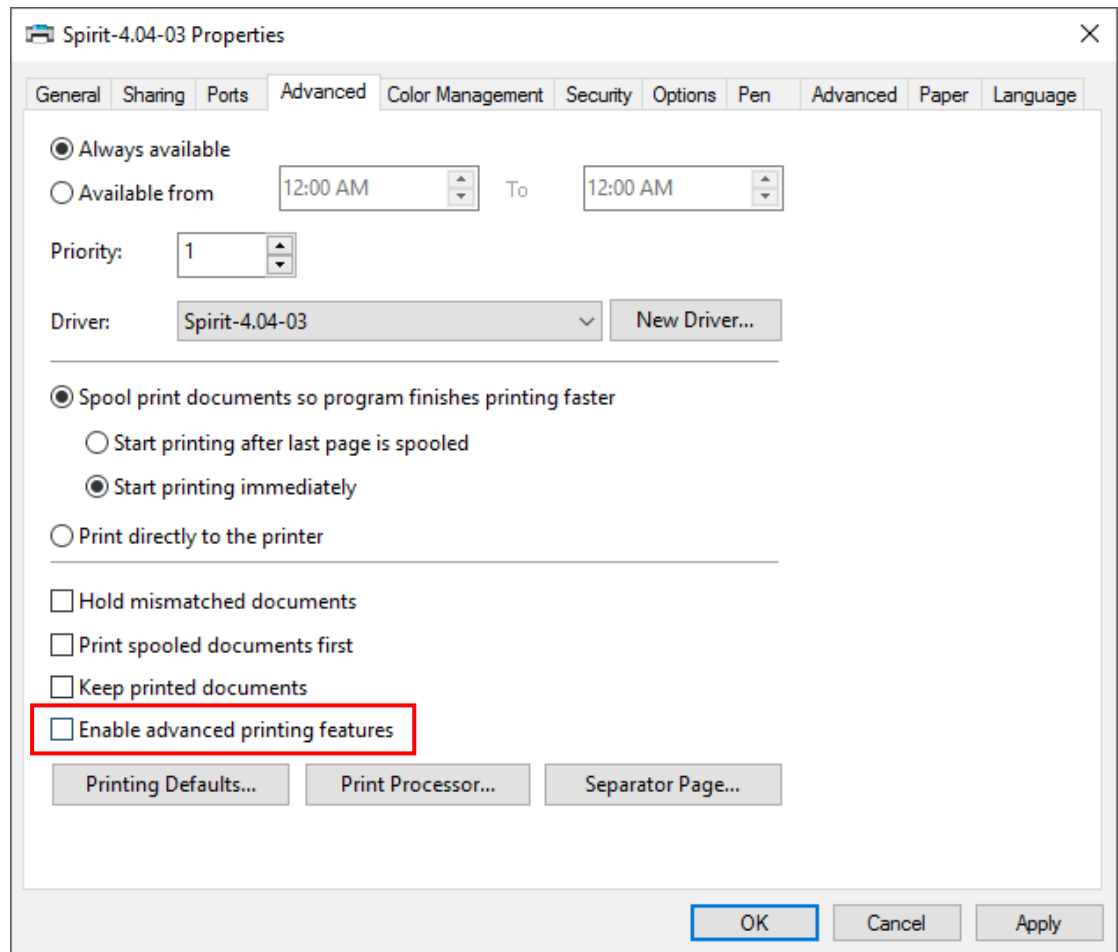
- **File Transfer**
  1) Select your working object, and then at the upper toolbar please choose File → Print.
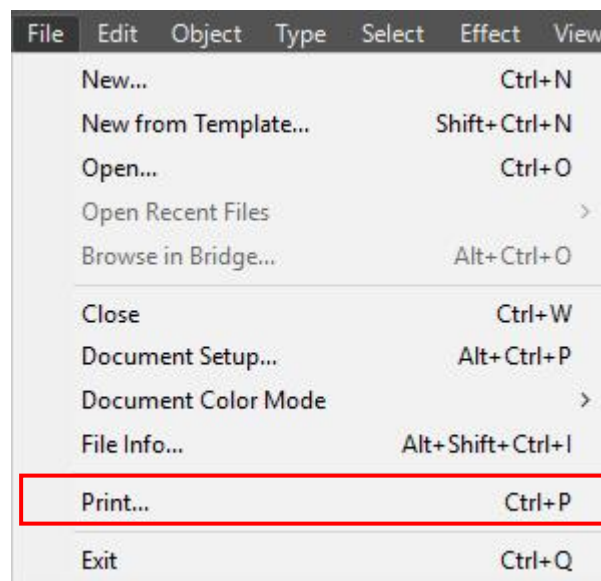
2) At the print setup screen, at Print Preset please select Custom, and choose your printer (e.g. Spirit)
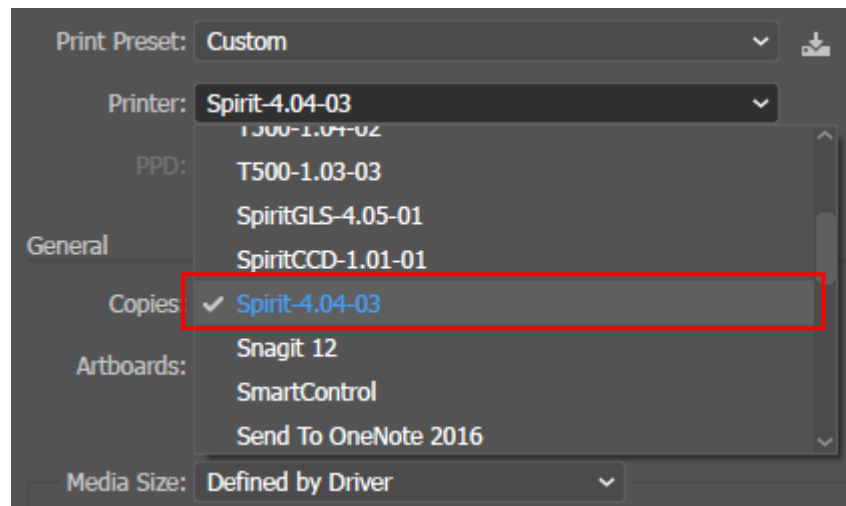
3) Then click on the lower left tab of Setup to enter Preferences settings.
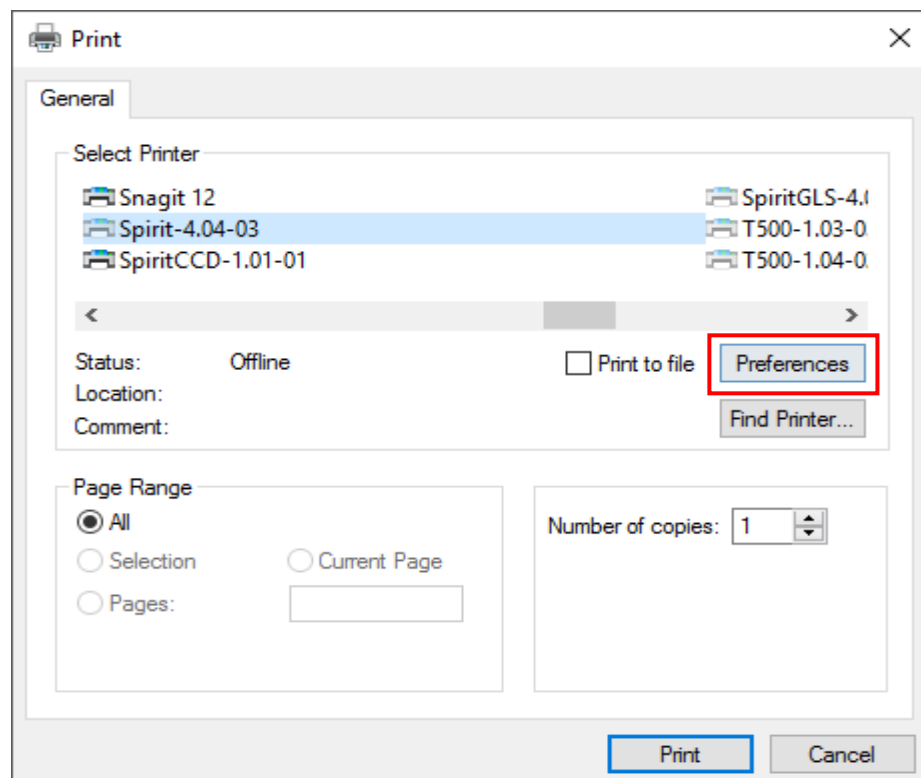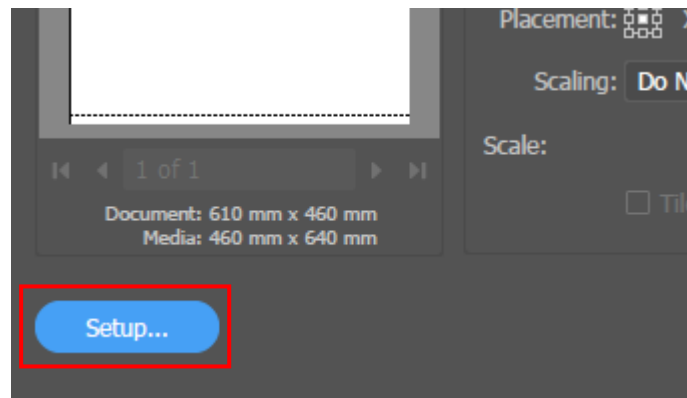
4) After all preferences are set, click Print to send file to the machine for print out.

4.2.5 Using AutoCAD Inventor with GCC LaserPro machine

1. Start drawing.
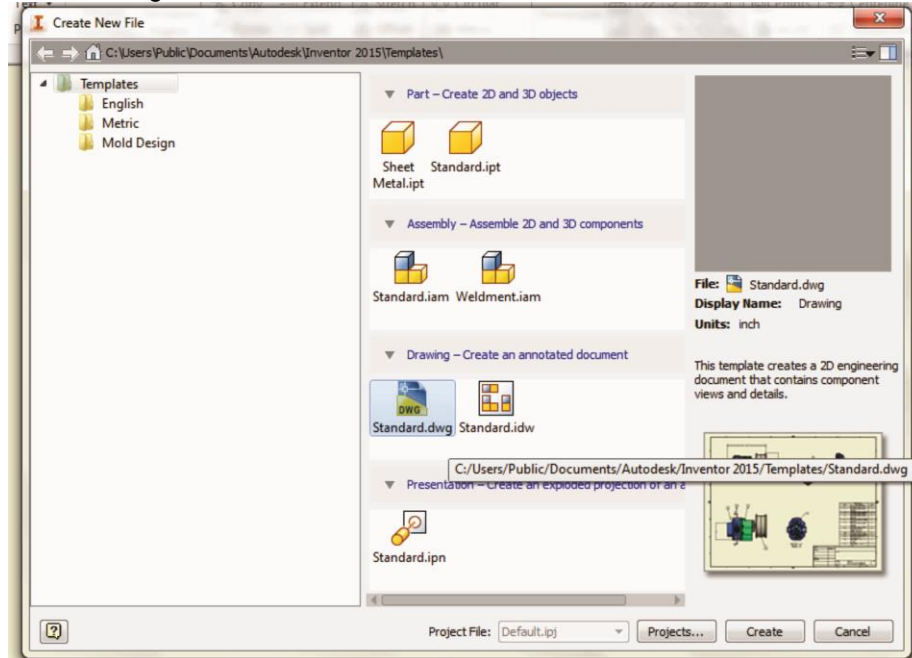
2. Delete border and title block by right clicking on sheet1 and selecting delete.
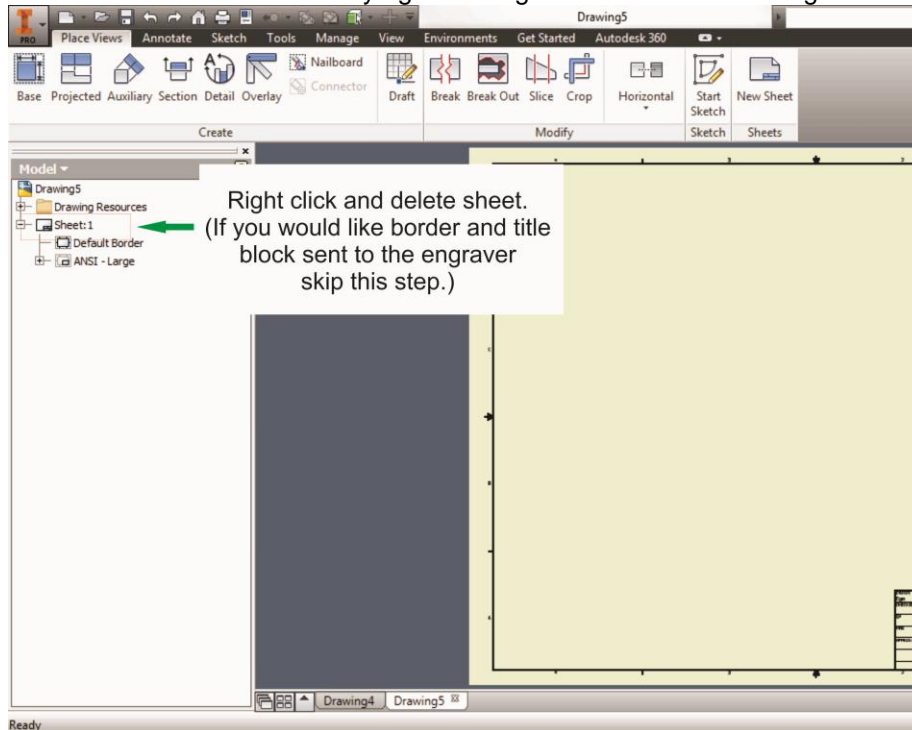
3. Set sheet size to match working area of engraver. Engraver working area can be found on the paper tab of the windows driver.
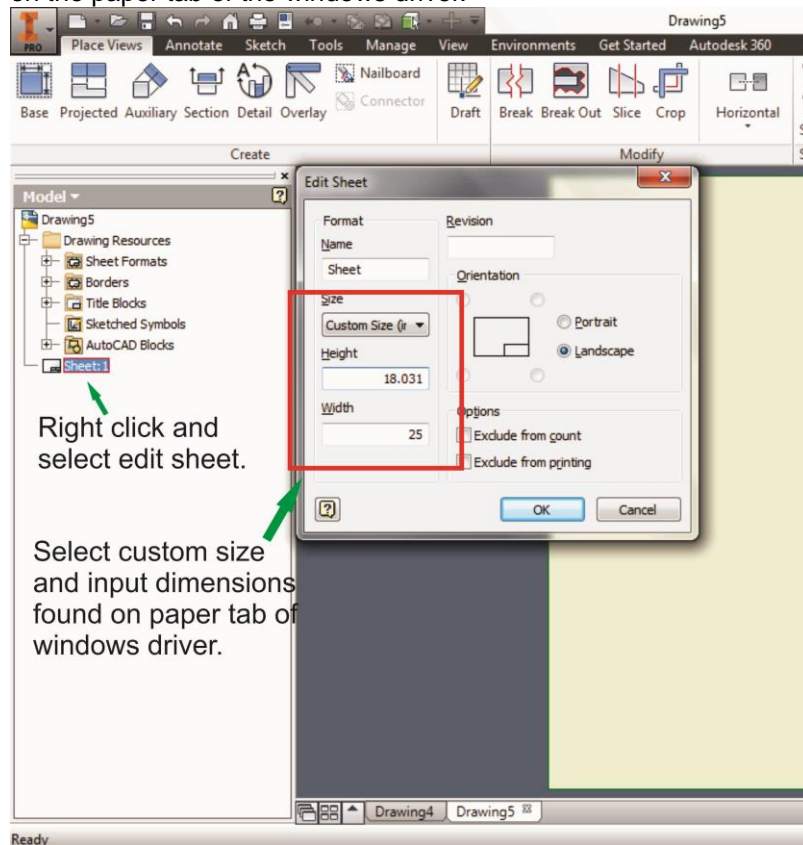
4. Start sketch.
5. Engraving
   a. Finish sketch.
   b. Right click on sketch and select properties.
   c. Line Type: By Layer
   d. Line Weight: By Layer
   e. Set color to match one of the 16 colors available in the pen tab of the windows driver.
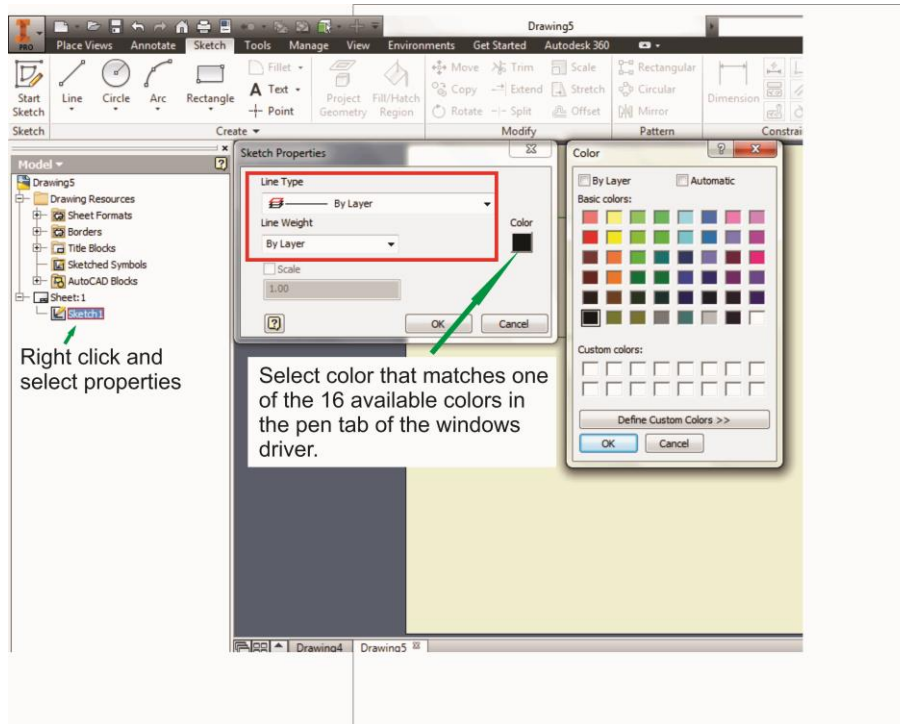
Right click and select properties

Select color that matches one of the 16 available colors in the pen tab of the windows driver.

6. Cutting
    a. Finish sketch.
    b. Right click on sketch and select properties.
    c. Line Type: Continuous
    d. Line Weight: .001 in.
    e. Set color to match one of the 16 colors available in the pen tab of the windows driver.

Right click and select properties

Change line type to continuous. Set line weight to .001.

Select color that matches one of the 16 available colors in the pen tab of the windows driver.
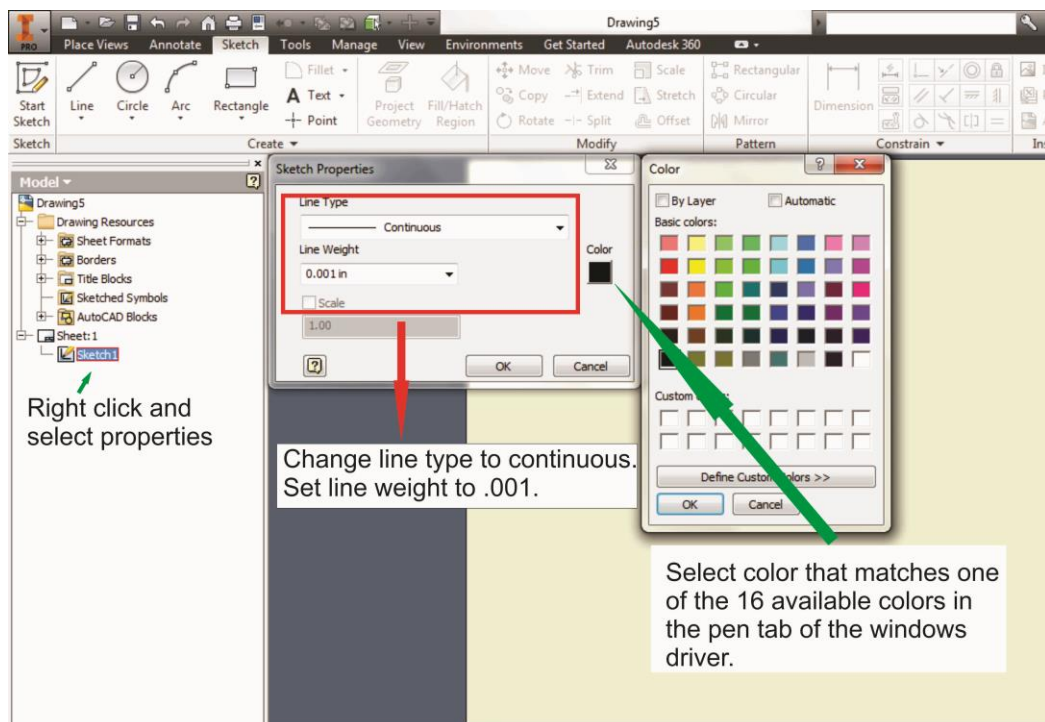
NOTE: All objects created in one particular sketch will have the same properties meaning all will engrave or all will cut. If you would like to engrave and cut in the same job you will need at least two sketches, one with all the engravings and another with all the cuts, to do so properly.

4.2.6 Using eCut Plug-in with GCC LaserPro machine

eCut is an inexpensive and powerful plugin work under CorelDRAW or Illustrator software with GCC laser systems. It increases the functions Corel Draw or Illustrators doesn't have or simplifies the operations workflow. eCut details and operation videos can be found on http://eng.e-cut.ru/

eCut unique feature list:
- Nesting
- Puzzles
- Material usage calculation
- AutoText to import files including image, text, QR code, and barcode etc. to the linked variable columns.
- Slice/ Tile function
- CAD editing function
- Sign box and packaging box aided design
- 2D barcode
- QR code

5

Chapter 5
Operating the LaserPro S290LS

Using the Hardware

- Adjusting the LCD Display Screen's Contrast Setting

- Graphic Control Panel Overview (Description)

- Graphic Control Panel Navigation Chart

- Graphic Control Panel Function Pages

The LaserPro S290LS Print Driver

- Page Setup and Orientation

- Color Management

- Using the LaserPro S290LS Print Driver

    - LaserPro S290LS Print Driver >> Options Page

    - LaserPro S290LS Print Driver >> Pen Page

    - LaserPro S290LS Print Driver >> Advanced Page

    - LaserPro S290LS Print Driver >> Paper Page

    - LaserPro S290LS Print Driver >> Language Page

    - LaserPro S290LS Print Driver >> Raster Page

Once you have installed the LaserPro USB Driver (for use with USB connection), LaserPro Print Driver, and have connected the LaserPro S290LS to your computer, you will need to familiarize yourself with the LaserPro S290LS control panel and LaserPro Print Driver. The print driver will be where specific laser parameters for your jobs are configured, while the control panel will allow you to set repeat times, manipulate file order, perform auto / manual focusing, and more.

5.1 Using the Hardware

5.1.1 Laser Key Switch

Turn the key-switch to the "ON" position BEFORE powering on the machine. If the key-switch is turned to the "OFF" position, the laser will be disabled meaning that the laser will not fire although the XY motion system will still move.

5.1.2 Adjusting the LCD Display Screen's Contrast Setting

Depending on the lighting of your immediate work area, you may need to adjust the contrast of the LCD display screen. You may increase or decrease the display screen's contrast via the contrast adjustment wheel found on the inside of the front cover on the bottom, right-hand side. You can access this area by opening the top window and looking inside to the rear, right side of the work area (as shown in the picture below).

LCD Display Screen
Contrast Adjustment
Wheel

* This picture was taken with the SmartLID opened to clearly show the location of the contrast adjustment wheel.

5.1.3 Graphic Control Panel Overview

The Control Panel

The control panel on the LaserPro S290LS provides an easy access to all the manual controls needed for cutting and engraving. The liquid crystal display (LCD), functional, directional and selection buttons make navigating through the machine's manual controls easy to do.

	LED Indicator Light
	LCD Display Screen
	Functional Buttons
	Directional and Hot-key Buttons
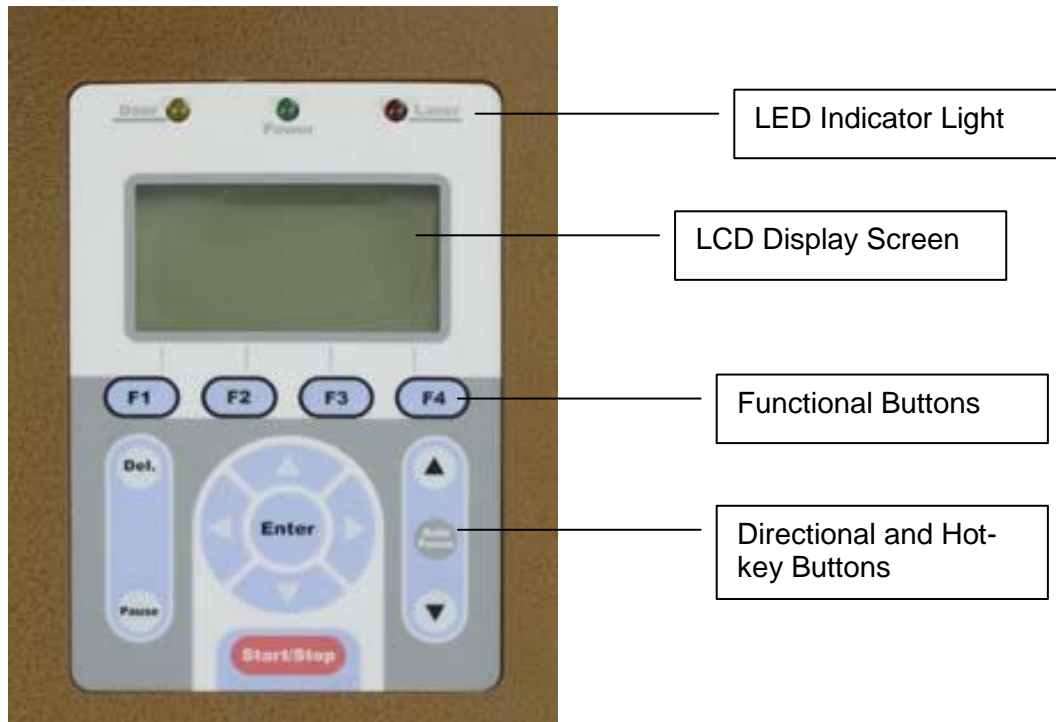
LED Indicator Lights

Three indicator lights on the LaserPro S290LS control panel are part of the system's safety interlock system.

- **Door -** The door light will illuminate when either the top lid or external pass through doors on the LaserPro S290LS are open or improperly closed.
- **Power -** The power light will illuminate when the LaserPro S290LS is powered on.
- **Laser -** The laser light will illuminate when the laser is active and in operation.

⚠ WARNING

- DO NOT attempt to remove or modify any component of the safety interlock system.
- If at any time, any of the access doors are open and the "laser" LED is illuminated, unplug the laser system IMMEDIATELY and contact GCC technical support for service instructions.
- DO NOT operate the laser system if any component of the safety system is malfunctioning.

Directional and Selection Buttons

Function (F1 / F2 / F3 / F4) – Four function buttons allow you to select various functions which will change depending on what section of the menu you are in. Each function button's corresponding task will be displayed right above its respective button on the LCD display screen. Please note that in certain menus, not every function button will always be mapped to a corresponding action. In these situations, that particular button will not have a function.

Directional ($\triangle$ / $\triangledown$ / $\triangleleft$ / $\triangleright$) – Four directional buttons allow you to navigate the selection cursor through the control panel menu and adjust the value of specific settings. In general, the $\triangle$ / $\triangledown$ directional buttons cycle through the various selections, while the $\triangleleft$ / $\triangleright$ directional buttons adjust the value of that particular selection.

Enter – Confirms the current selection.

Start / Stop – Allows you to start or stop engraving jobs, once those jobs have been successfully loaded onto the system.

Delete – Provides quick access to delete the current job.

Pause – Pauses the current engraving process. Press again to resume the current process.

Auto Focus – After you have positioned your material and moved the laser carriage head to the area you want to engrave, press this button and the system will automatically adjust the optimal vertical focal distance for the laser.

Manual Focus (▲ / ▼) – To manually adjust the vertical focal distance between the laser head and the material, you can use the ▲ / ▼ buttons to do so. Doing so will adjust the vertical height (z-axis) of the worktable.

5.1.4 Graphic Control Panel Navigation Chart

```
┌──────────────────┐     ┌──────────────────┐     ┌──────────────────────┐
│ SmartCENTER Page │─────│  Main Work Page  │─────│  Carriage / Work Table│
└──────────────────┘     └──────────────────┘     │    Adjustment Page    │
                                  │                └──────────────────────┘
                         ┌──────────────────┐
                         │  Functions Page  │
                         └──────────────────┘
```

File Management Page	Machine Settings Page	Machine Information Page

- File Management Page
  - Link / DLink Page
  - File Information Page
  - File Management Edit Page

- Machine Settings Page
  - Select Lens Page
  - Tune Auto Focus Page
  - Table Down Page
  - Red Beam Page
  - Carriage Free Page
  - Command Mode Page
  - Save Position Page
  - File Save Mode
  - Vector Mode Page
  - Standby Page
  - Image Offset Tuning Page
  - Laser Options Page
  - LAN Setup Wizard Page
  - Scaling Page
  - Other
  - Reset

5.1.5 Graphic Control Panel Function Pages

When the LaserPro S290LS is powered on, the machine will perform a series of safety checks and initialization routines. The LCD display screen will display the GCC copyright, LaserPro logo, and machine initialization pages before going to the main work page.

Main Work Page

```
—|Empty File
Speed:——.—%DPI:——
Power:——.—%PPI:——
——:——:——        ——/——
Prev Next SP  Func
```
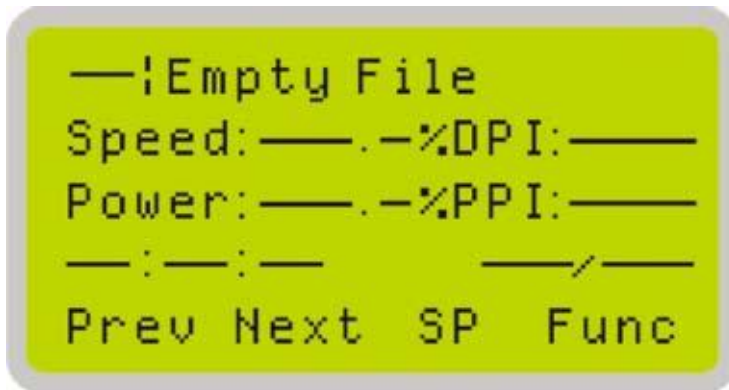
The main work page is the page that the LaserPro S290LS will default to upon startup and will be the "home base" for when navigating through the various functions of the control panel. This will be the page that is displayed when you are processing your jobs. This page contains specific job information such as the current job's name, Speed, Power, Freq., DPI, processing / remaining times, and jobs loaded.

Main Work Page	
Relevant Buttons	**Function**
F1 (Prev)	Scroll through previous jobs
F2 (Next)	Scroll through next jobs
F3 (SP)	Go to Store Position Page for SmartCENTER
F4 (Func)	Go to Functions Page
△/ ▽/◁ / ▷ Directional	Go to Carriage / Work Table Adjustment Page
Start / Stop	Start / Stop the current job
Delete	Delete the current selected job
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Carriage / Work Table Adjustment Page

ⓘ Navigating to this page:

```
Carriage moving
◄►X:   0.10mm-49.90mm
▲▼Y:   0.07mm    0.07mm
        Z:       11.0mm
Back         Down   Up
```

Main Work Page

↓ press,△ ,▽ ,◁ ▷ or **F3**
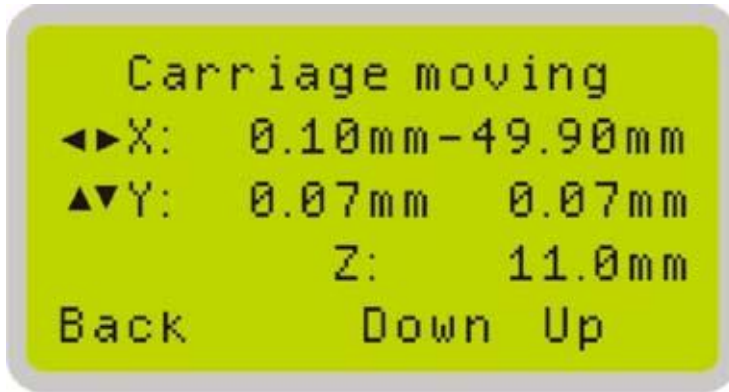
Carriage / Work Table Adjustment Page
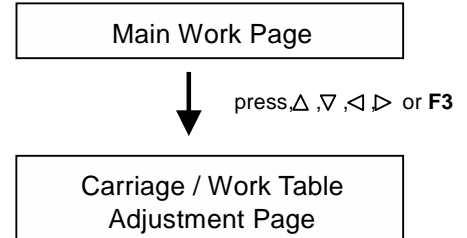
The Carriage / Work Table Adjustment Page allow you to manually increase and decrease the height of the work table (Z-axis). In addition, you can manually adjust the Y-axis and X-axis of the laser carriage.

Carriage / Work Table Adjustment Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F3 (Down)	Manually decrease the height of the work table (Z-axis)
F4 (Up)	Manually increase the height of the work table (Z-axis)
△/ ▽Directional	Manually adjust the Y-axis position of the laser carriage
◁ / ▷ Directional	Manually adjust the X-axis position of the laser carriage
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲/ ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)
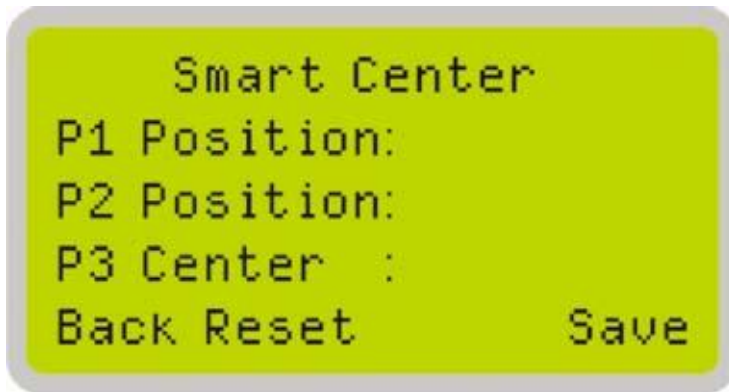
SmartCENTER Page
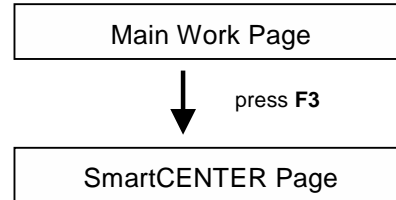
Under SmartCENTER mode the job will begin after the system positions the carriage to the center position between two or four points indicated by the user. The SmartCENTER mode has to be enabled through the driver.

Enter SmartCENTER page by pressing the F3 button. You will be prompted to indicate and store the position points. The positions can be indicated by moving the carriage by hand and pressing enter to save the positions indicated by the red pointer. After all points are set, the carriage will move to the center of the two entered points and the job will begin.

SmartCENTER Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F2 (Reset)	Reset all saved positions
F4 (Save)	Save current lens carriage position
△/ ▽ Directional	Manually adjust the Y-axis position of the laser carriage
◁ / ▷ Directional	Manually adjust the X-axis position of the laser carriage
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲/ ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Functions Page

```
♦▤ File management
🛠 Machine setting
§§ Advance Option
 ? Information
Back      Help Recall
```
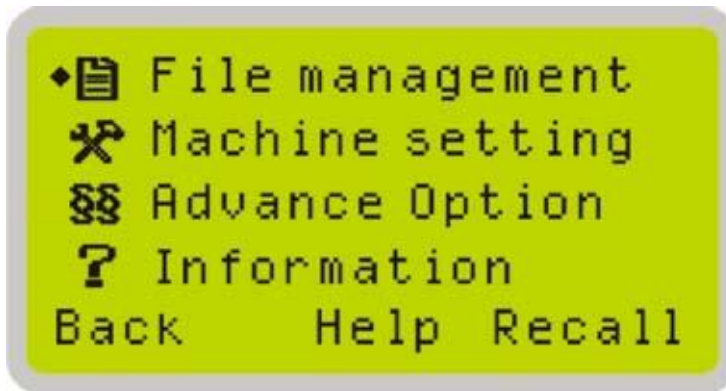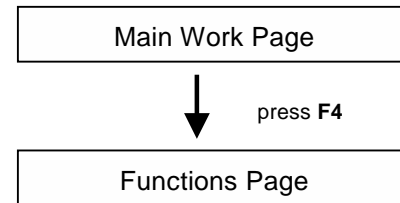
The Functions Page allows you to edit file management and machine settings. From this page, you will be able to access the File Management, Machine Setting, and Machine Information pages.

- **File Management Page** – this page allows you to manage the files that you have loaded onto the laser engraver.
- **Machine Setting Page** – this page allows you to access and modify various machine settings, including: Set Lens, Tune Auto Focus, Set Table Down, Set Red Beam, Carriage Lock, Set Command Mode, Save Position, Flash Memory, Set File Save Mode, Set Vector Mode, Tune Image Power, Set Laser Wattage, Set Fine Mode, Other, Reset.
- **Machine Information Page** – this page allows you to view information regarding the system such as the GCC logo, machine name, firmware version, and other information.

Functions Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F3 (Help)	Display help
F4 (Recall)	Back to previous page
△/ ▽Directional	Scroll through the menu selections
Enter	Perform the selection
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲/ ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

File Management Page
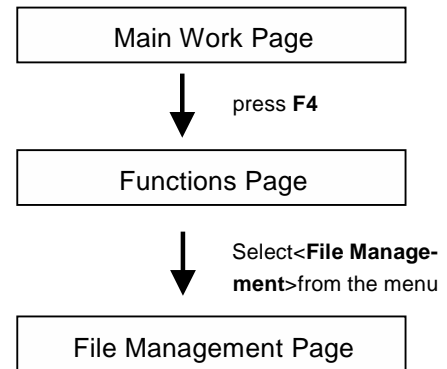
The File Management Page allows you to manage the files that you have loaded onto the LaserPro S290LS. You can scroll through your jobs, delete a selected job, delete all jobs, and go to the Link / DLink Page to set and arrange multiple loaded jobs into a single job queue for processing.

File Management Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F2 (Link)	Go to the Link/DLink Page
F3 (D-All)	Delete all loaded jobs
F4 (Del)	Delete the selected job
△/ ▽Directional	Scroll through the menu selections
Enter	Go to the File Information Page for the selected job
Start / Stop	Go to the Main Work Page for the selected job
Auto Focus	Initiate the auto focus function
▲/ ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Link / DLink Page

```
01:Marble.cdr:03:02
♦02:Marble.cdr:01*—
03:Marble.cdr:—:01


Back  Link      DLink
```
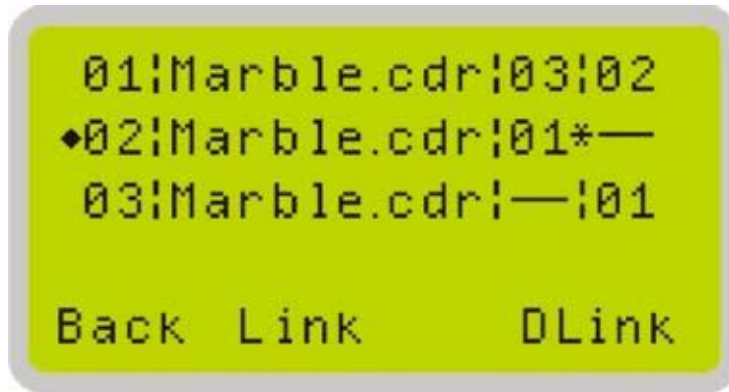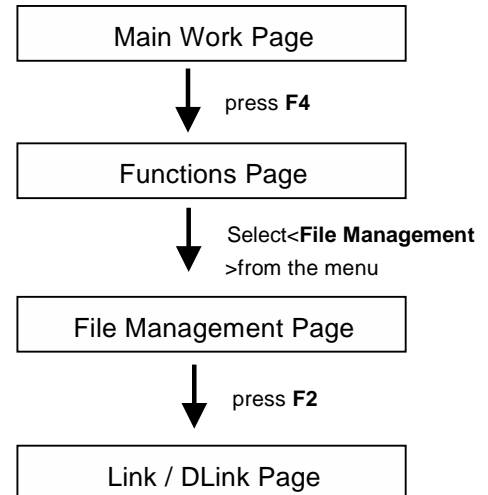
The Link / DLink Page allows you to set, arrange, and remove loaded jobs to and from a job queue for processing. Use the directional keys to cycle through your loaded jobs, then simply press the <F2 (Link)> key to add a file to the job queue. The job queue will be set in a sequential order based on the order you link the files. To remove a job from your job queue, press the <F4 (DLink)> key.

The first column field (before the file name) displays the job number. The sequence for your job queue is displayed in the two columns to the right of your file names. The first column to the right of your job file name displays the job number of the previous file in the job queue sequence. The second column after the file name displays that job's next file in the job queue sequence. First and last jobs in the job sequence you set will have a (---) in the first and second columns respectively. So according to the image above, the job queue sequence has been set to be processed in this order: 03:Marble.cdr→01:Marble.cdr→02:Marble.cdr.

Link / DLink Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F2 (Link)	Add the currently-selected job to the job queue
F4 (DLink)	Remove the currently-selected job from the job queue
△/ ▽Directional	Scroll through the menu selections
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲/ ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

File Information Page

```
01:Marble.cdr    *02
Speed: 80.0%DPI: 500
Power: 30.0%PPI: 400
──:──:──     000/001
Back           Edit
```
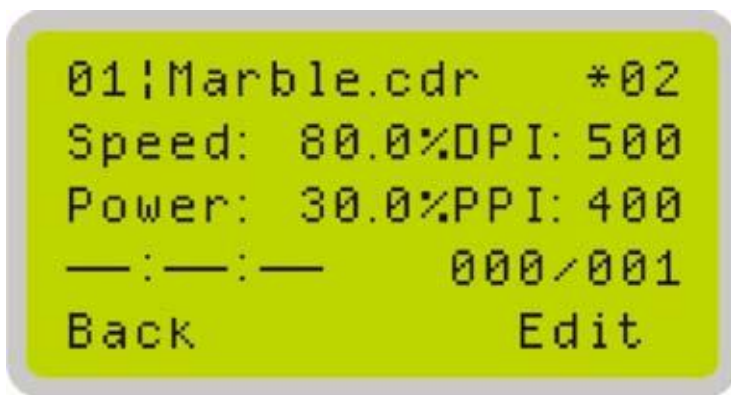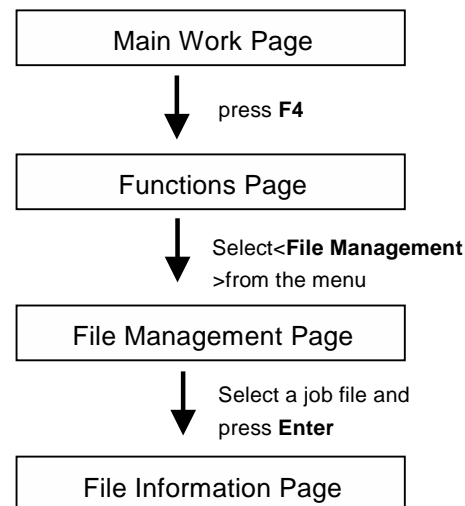
The File Information Page allows you to view the speed, power, DPI, and Freq. settings of the selected job. In addition, you will be able to go to the File Management Edit Page from this menu to change raster / vector speed and power settings for the selected job.

File Information Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (edit)	Go to the File Management Edit Page for the selected job
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲/ ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

File Management Edit Page

```
♦Raster Setting
 Vector Setting
 Repeat Num    :    1


Back
```

Main Work Page

↓ press **F4**

Functions Page

↓ Select<**File Manage-ment**>from the menu

File Management Page

↓ Select a job file and press **Enter**

File Information Page

↓ press **F4**

File Management Edit Page

The File Management Edit Page allows you the choice to modify your raster or vector settings for the selected job, as well as setting the number of times to repeat the process of the selected job (Repeat Num).

File Management Edit Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△/ ▽ Directional	Scroll through the menu selections
◁ / ▷ Directional	Cycle through the available selections
Enter	Perform the selection
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲/ ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

File Management Edit Page

```
◆Raster Power:  30.0%
 Raster Speed:  80.0%
 SmartACT  :     NO


Back
```

Main Work Page

↓ press F4

Functions Page

↓ Select<**File Management**>from the menu

File Management Page

↓ Select a job file and press **Enter**

File Information Page

↓ press F4

File Management Edit Page

↓ Select < **Raster Setting**> from the menu

File Edit Raster Page

The File Edit Raster Page allows you to edit the raster power and speed settings, as well as enable or disable SmartACT for the selected job. These settings correspond to the same settings found on the LaserPro S290LS print driver. This page allows you to easily adjust these values to make immediate adjustments while processing your loaded jobs, even when you have disconnected your computer from the LaserPro S290LS.

- Raster Power: 0.0% - 100%
- Raster Speed: 0.0% - 100%
- SmartACT: YES / NO

| File Edit Raster Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△/ ▽ Directional	Scroll through the menu selections
◁ / ▷ Directional	Adjust the value for that selection
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲/ ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

File Management Edit Page

```
◆Vector Pen   :    1
 Vector Power: 50.0%
 Vector Speed: 50.0%
 Vector Freq :  30khz
Back            Save
```

| Main Work Page |
| press F4 |
| Functions Page |
| Select<**File Management**>from the menu |
| File Management Page |
| Select a job file and press **Enter** |
| File Information Page |
| press F4 |
| File Management Edit |
| Select < **Vector Setting** > from the menu |
| File Edit Vector Page |

The File Edit Vector Page allows you to edit the vector pen, vector power, vector speed, and vector freq. for the selected job. These settings correspond to the same settings found on the LaserPro S290LS print driver. This page allows you to easily adjust these values to make immediate adjustments while processing your loaded jobs, even when you have disconnected your computer from the LaserPro S290LS.

- • Vector Pen: 1 - 16
- • Vector Power: 0.0% - 100%
- • Vector Speed: 0.0% - 100%
- • Vector freq.: 0% - 100%

File Edit Vector Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
△/ ▽Directional	Scroll through the menu selections
◁ / ▷ Directional	Adjust the value for that selection
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲/ ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Machine Setting Page

```
♦Select Lens
 Tune auto-focus
 Table Down
 Red Beam
 Back          Next  Prev
```

Main Work Page

↓ press F4

Functions Page

↓ Select<**File Management**>from the menu

Machine Setting Page

The Machine Setting Page allows you to access and modify various machine settings, including: Set Lens, Tune Auto Focus, Set Table Down, Set Red Beam, Carriage Lock, Set Command Mode, Save Position, Flash Memory, Set File Save Mode, Set Vector Mode, Tune Image Power, Set Laser Wattage, Set Fine Mode, Other, and Reset.

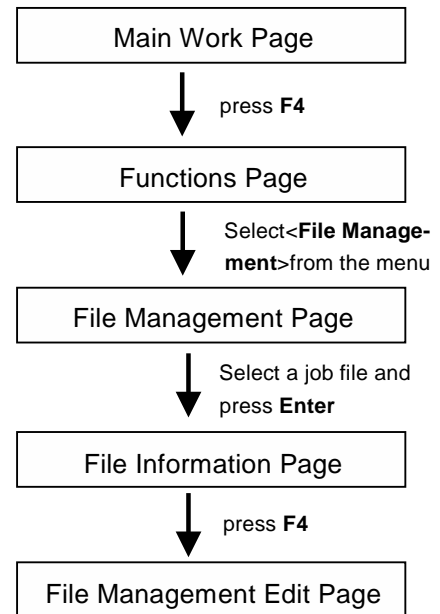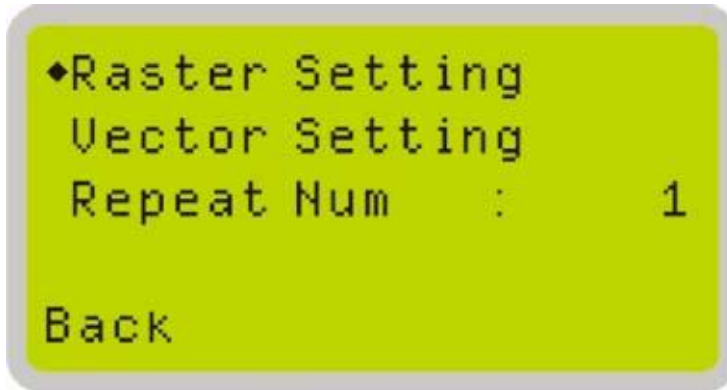| Machine Setting Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△/ ▽Directional	Scroll through the menu selections
Enter	Perform the selection
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Select Lens Page>> Machine Setting Page

```
◄►:Select Af lens
Lens:              2.0"


Back              Save
```

Main Work Page

↓ press F4

Functions Page

↓ Select<**Machine Setting**>from the menu

Machine Setting Page

↓ Select<**Select Lens**> from the menu

Select Lens Page

The Set Lens Page allows you to modify the lens settings after you have changed to a different focus lens. Remember to save your settings after you have made the proper changes. Now by pressing the Auto Focus button, the LaserPro S290LS will conduct auto focus accordingly using the new lens. The default setting is <4.0">

- Lens: 2.0" / 4.0"

Lens	2.0"	4.0"
Spot Size	0.0005" (0.0129mm)	0.001" (0.0258mm)

Go to Chapter 7.3 for more focus lens information.

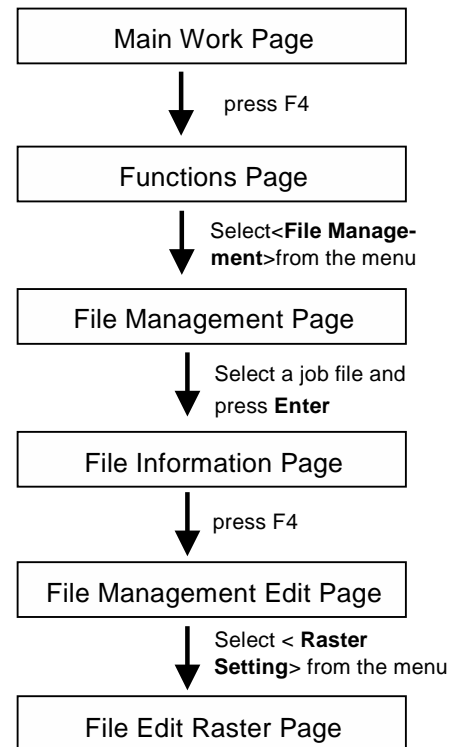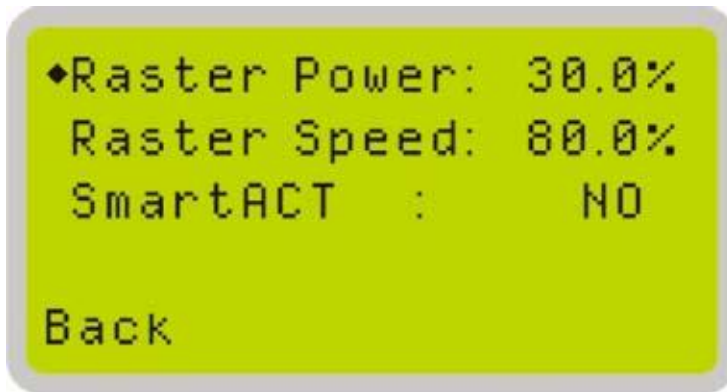| Set Lens Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
△/ ▽Directional	Cycle through selections
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Tune Auto Focus Page>> Machine Setting Page

```
▲▼:Moving table

Lens:          2.0"
   Z:       11.0mm
Back            Save
```

Main Work Page

↓ press F4

Functions Page

↓ Select<**Machine Setting**>from the menu

Machine Setting Page

↓ Select<**Tune Auto Focus**>from the menu

Tune Auto Focus Page

The Tune Auto Focus Page allows you to manually set the default auto focus distance / vertical height of the worktable (Z-axis) when the Auto Focus button is pushed.

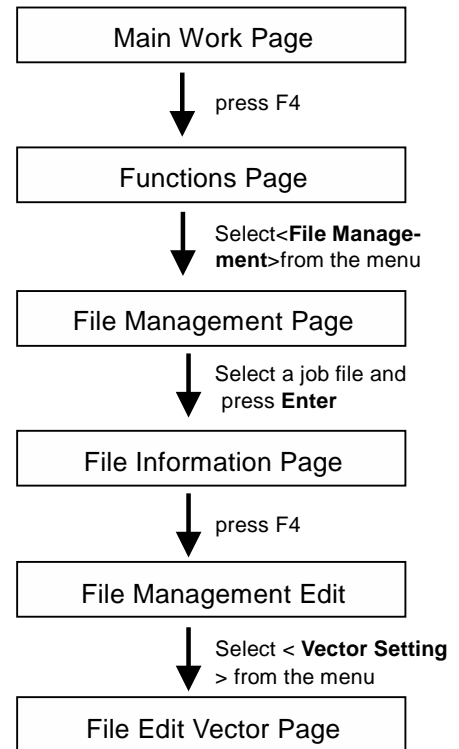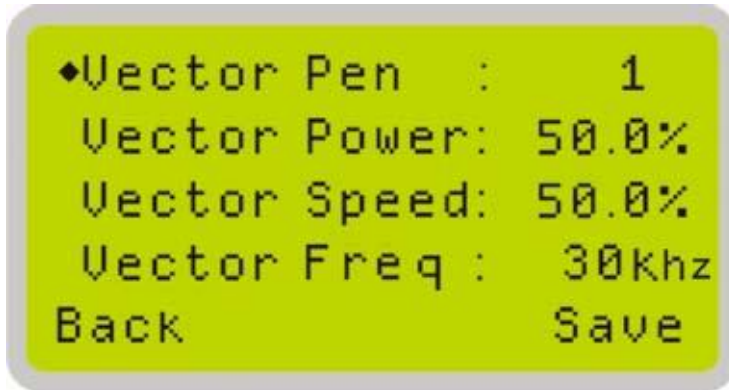| Tune Auto Focus Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
△/ ▽Directional	Manually adjust the height of the work table (Z-axis)
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Table Down Page>> Machine Setting Page

```
◆Table Down:      YES
 Distance:    11   mm



Back              Save
```

Main Work Page	
↓ press F4	
Functions Page	
↓ Select<**Machine Setting**>from the menu	
Machine Setting Page	
↓ Select<**Set Table Down**>from the menu	
Set Table Down Page	

The Set Table Down Page allows you to select whether or not the LaserPro S290LS displays a warning prompt at startup. If the Table Down selection is set to <YES>, the LaserPro S290LS will display a warning prompt: at startup, stating: "Table will move down and remove objects on table". Pressing the Enter key at this point will confirm the prompt to move the work table to its lowest position. If the Table Down is set to <NO>, then the LaserPro S290LS will not display this warning prompt at system startup.

- Table Down: YES / NO
- Distance: 0 - 165 mm

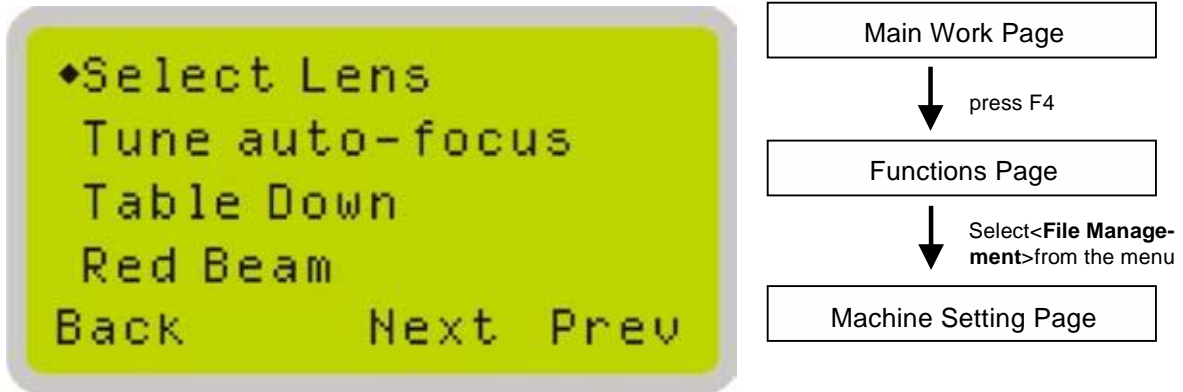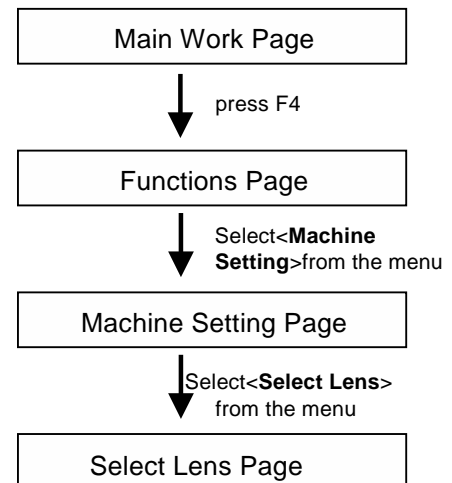| Set Table Down Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
△/ ▽Directional	Scroll through the menu selections
◁ / (Directional	Adjust the value for that selection
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Red Beam Page>> Machine Setting Page

```
Red beam:          YES




Back               Save
```

Main Work Page

↓ press F4

Functions Page

↓ Select<**Machine Setting**>from the menu

Machine Setting Page

↓ Select<**Red Beam**>from the menu

Set Red Beam Page

The Set Red Beam Page allows you to turn on or off the red dot laser pointer on the laser carriage. Enabling this function will indicate the exact area the engraving laser will fire upon.

• Red Beam YES / NO

Set Red Beam Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle Red Beam between YES / NO
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Carriage Free Page>> Machine Setting Page

```
Carriage Free:    YES




Back              Save
```

Main Work Page

↓ press F4

Functions Page

↓ Select<**Machine Setting**>from the menu

Machine Setting Page

↓ Select<**Carriage Free**>from the menu

Carriage Lock Page

The Carriage Lock Page allows you to set whether the laser carriage is to be locked or free. If the Carriage Free setting is set to <YES>, then you will be able to manually move the laser carriage along the X and Y axis by hand with the top door open. Whereas setting the Carriage Free to <NO> will lock the laser carriage and movement or positioning can only be done by the control panel.

- Carriage Free YES / NO

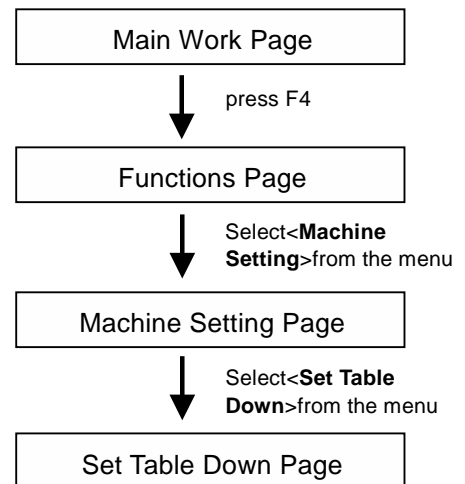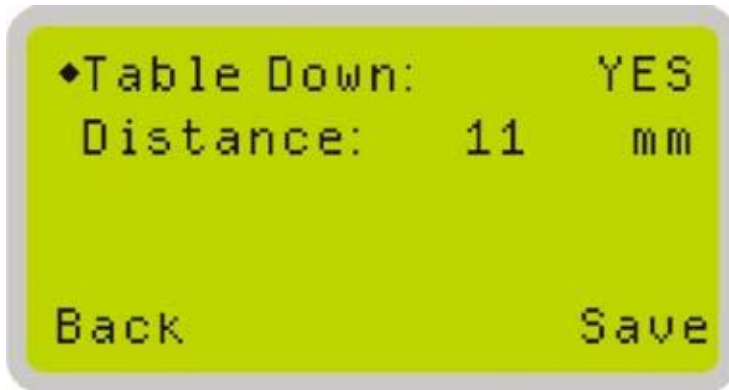| Carriage Free Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle Carriage Free between YES / NO
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Set Command Mode Page>> Machine Setting Page

```
◆Mode:        Default
 Vector Pen:        1
 Vector Power:  50.0%
 Vector Speed:  50.0%
Back            Save
```

Main Work Page	
↓ press F4	
Functions Page	
↓ Select<**Machine Setting**>from the menu	
Machine Setting Page	
↓ Select<**Set Command Mode**>from the menu	
Set Command Mode Page	

The Command Mode Page allows you to configure vector settings when outputting in Default or HPGL mode. Default mode is the standard Windows print driver and also recognized by the most popular graphic software programs such as CorelDRAW, Photoshop, Illustrator, and more. Whereas, HPGL mode is a less common output format generated from some RIP applications (signage industry). Regardless of which format you will be working with, both output formats are supported.

- Mode: Default / HPGL
- Vector Pen: 1 - 16
- Vector Speed: 0.0% - 100%
- Vector PPI: 0.0% - 100%
- Power Ramp: YES / NO

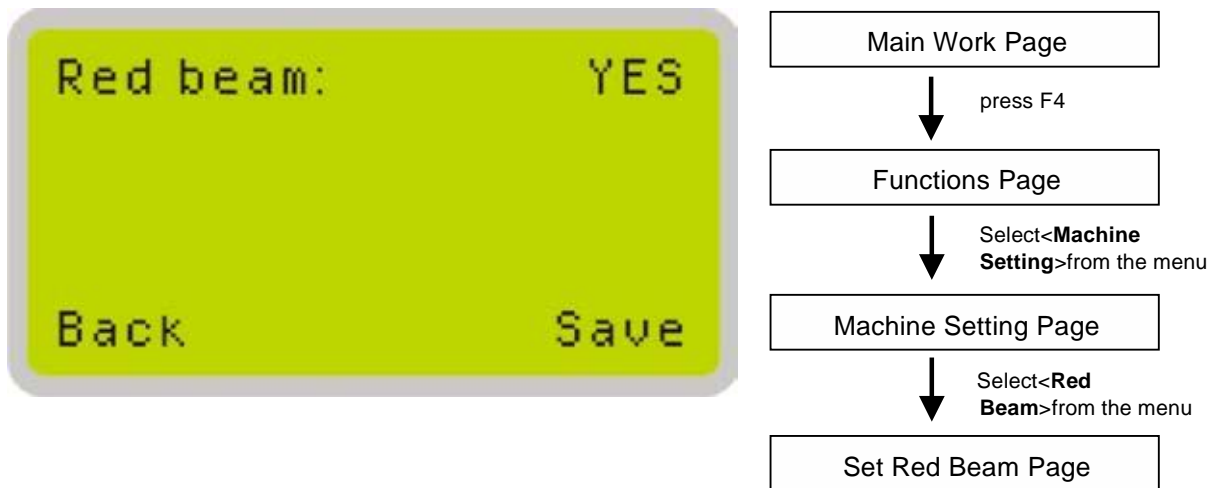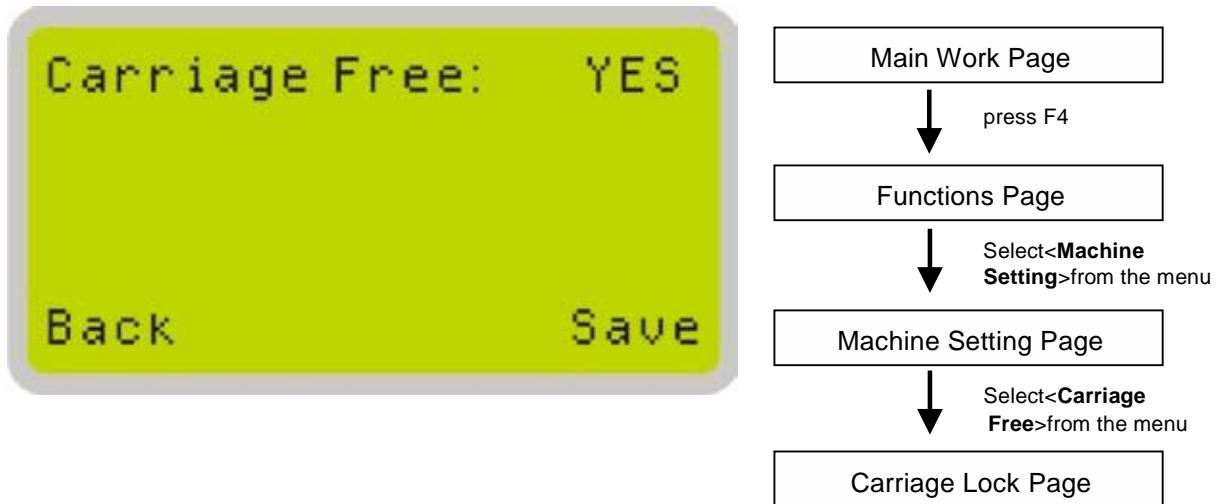| Set Command Mode Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
△/ ▽Directional	Scroll through the menu selections
◁ / ▷ Directional	Adjust the value for that selection
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Save Position Page>> Machine Setting Page

Save Position Function

```
♦Save Position
 SmartGUARD
 Vector Mode


 Back
```

Main Work Page

↓ press F4

Functions Page

↓ Select<**Advanced Options**>from the menu

Advanced Options

↓

Select <**SavePosition**> from the menu

The Save Position Function allows you to save the current X-axis and Y-axis positions of the laser carriage and sets this position to be the origin for subsequent jobs.

Tip

This is an excellent function to use when you are processing identical items or engraving relatively smaller objects positioned away from the default start position (top left) of the work table.

Recall Position

```
♦🗎 File management
 ✂ Machine setting
 §§ Advance Option
 ? Information
 Back    Help  Recall
```

ⓘ Navigating to this page:

Main Work Page

↓ press F4

Functions Page

↓

Select<**Recall**> by pressing F4
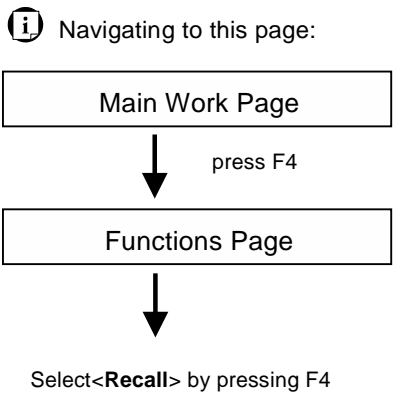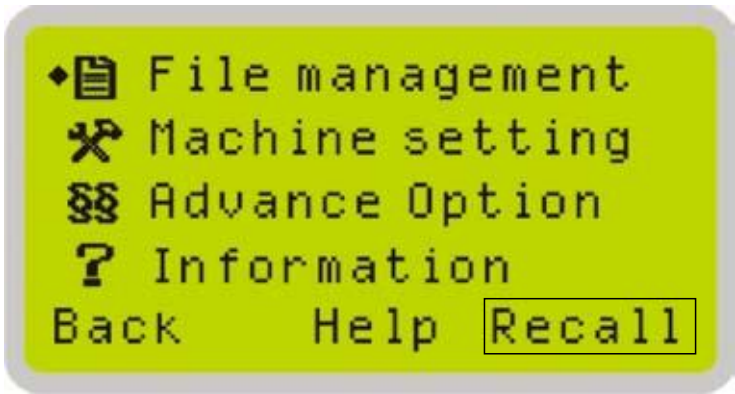
To recall the saved position, simply go to Functions page and press F4 again to recall the saved position. The laser carriage will be moved to the saved position.

File Save Mode Page>> Machine Setting Page

File Save: YES

Back   Save
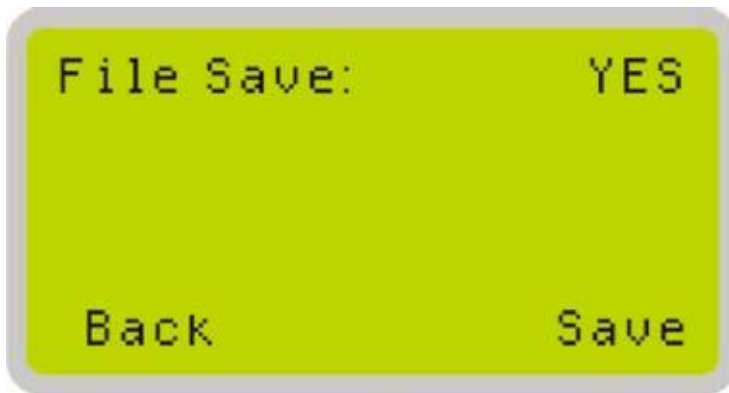
```
┌─────────────────────────────┐
│      Main Work Page         │
└─────────────────────────────┘
              │ press F4
              ▼
┌─────────────────────────────┐
│      Functions Page         │
└─────────────────────────────┘
              │ Select<Machine
              ▼ Setting>from the menu
┌─────────────────────────────┐
│    Machine Setting Page     │
└─────────────────────────────┘
              │ Select<File Save
              ▼ Mode>from the menu
┌─────────────────────────────┐
│   Set File Save Mode Page   │
└─────────────────────────────┘
```
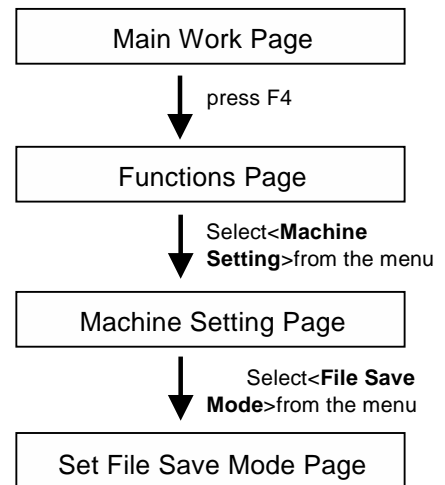
The Set File Save Mode Page allows you to set whether or not the LaserPro S290LS automatically deletes each job file after processing. Setting File Save to <NO> will automatically and immediately delete each job file from the LaserPro S290LS after the engraving or cutting process. Setting File Save to <YES> will retain all job files on the LaserPro S290LS.

- File Save: YES / NO

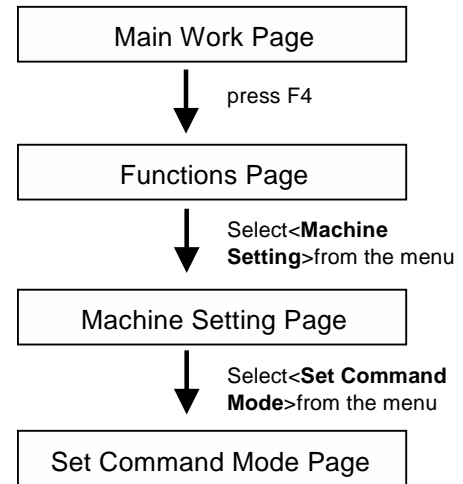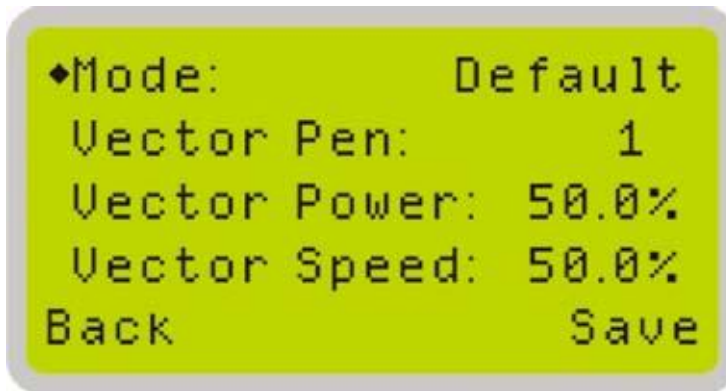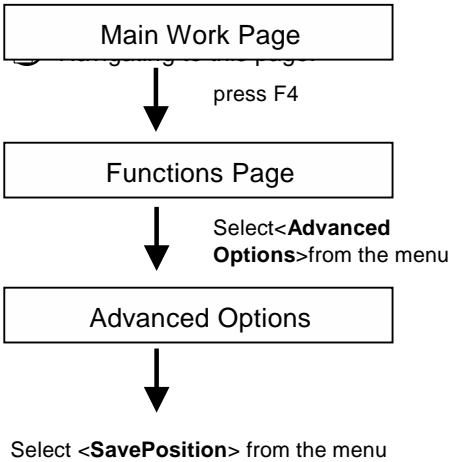| Set File Save Mode Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle File Save between YES / NO
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Vector Mode Page>> Machine Setting Page

```
Mode:Quality Vector




Back              Save
```
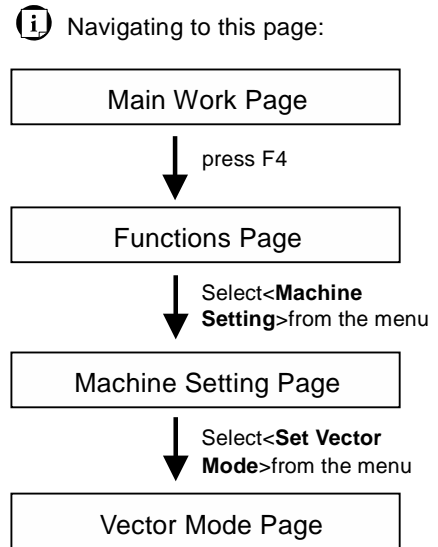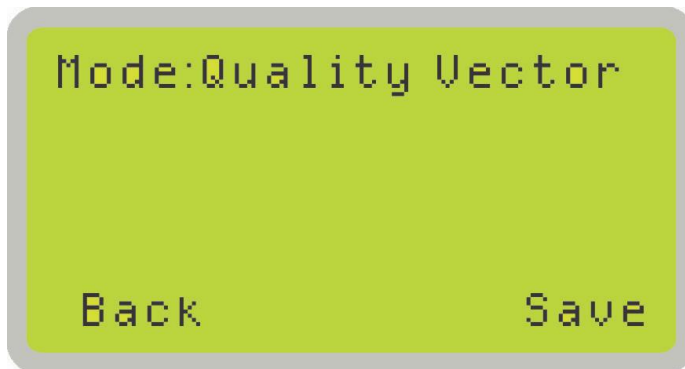
The Vector Mode Page allows you to adjust and balance vector mode's quality and speed settings based on your specific job. Speedy Vector Mode offers the highest output speed, sacrificing quality. Whereas Quality Vector Mode offers the highest quality, sacrificing output speed. Keep in mind that speed and quality are usually at a tradeoff. The system's default is Production Vector mode.

- Modes: Quality, Production, Speedy
  [Slower speeds / higher quality -------------------- Faster speeds / lower quality]

The machine will reboot automatically after clicking <Save> button for the change.

Vector Mode Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
△/ ▽Directional	Cycle through Vector Mode Settings
◁ / ▷ Directional	Cycle between options and YES / NO
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Set Standby Mode Page>> Machine Setting Page
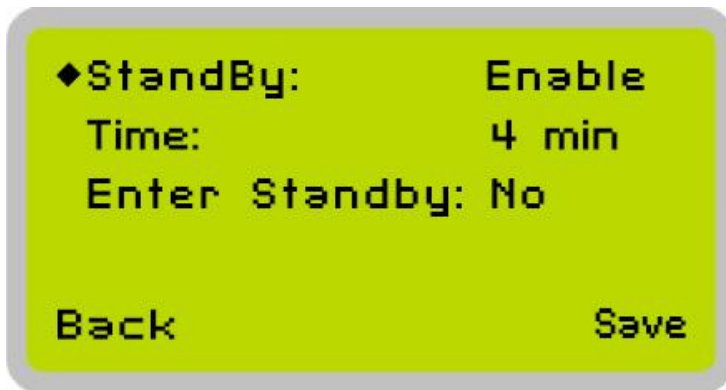
```
◆StandBy:        Enable
 Time:           4 min
 Enter Standby: No


 Back                Save
```
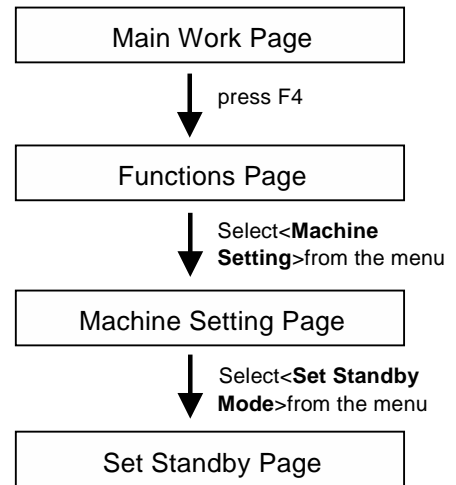
The Set Standby Mode page allows you to configure the laser machine automatically enter into power saving if machine is idle for a specified time.

When entering into the Set Standby Mode function, you can use Left or Right arrow keys to scroll between <Enable> or <Disable> the function. The Time function is to determine after how long the laser machine is idle, it will enter in power saving automatically. The default time is 4 minutes. The Enter Standby function will turn the machine into power saving immediately after selected.

- Standby: Enable/ Disable
- Time: 4-30 mins. (Default 4 mins.)
- Enter Standby: YES/ NO

Standby Mode Page	
Relevant Buttons	Function
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle standby mode between YES / NO
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
△ / ▽ Directional	Scroll between menu options
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Image Offset Tuning Page>> Machine Setting Page

Adjust image offset

Right:0.0 mm

Back   Save
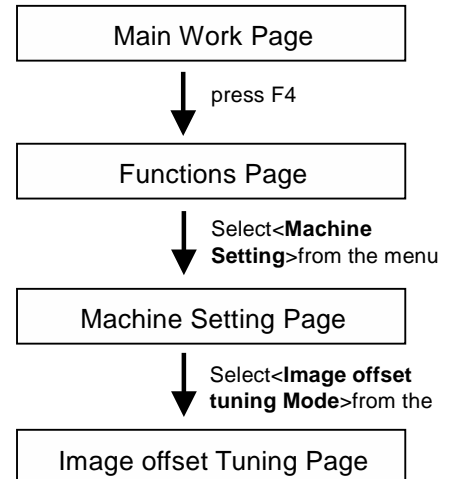
The Adjust image offset function allows you to align the position of raster object against vector outputs.

- Adjust Image Offset: 0.0 mm

| Image Offset Tuning Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle Auto Standby between YES / NO
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Laser Options Page>> Machine Setting Page

```
Laser State Feedback
. Press ENTER to
confirm, then read
states

Back
```

```
Power Setting:      0
Freq.  Setting:    30
Laser Temp    :  24.9
Overtemp      :    NO

Back            More ▼
```
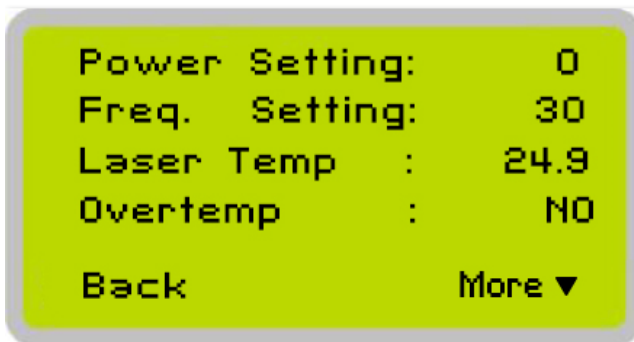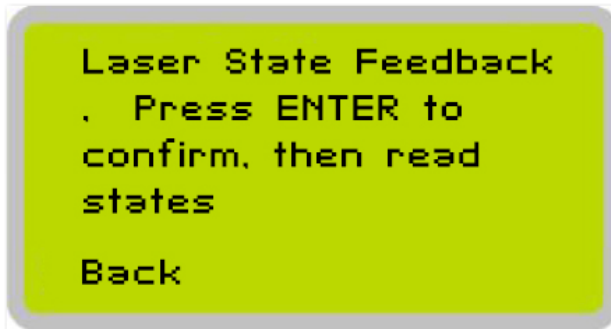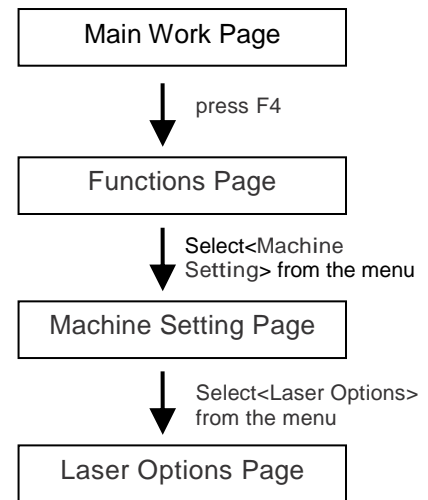
Laser Options Page is for GCC service engineer diagnosis purpose for Spirit GLS Hybrid machine with fiber laser tube only.

Laser Options Page	
Relevant Buttons	Function
F1 (Back)	Back to previous page
F4 (More)	To display information on next page
△ / ▽ Directional	Scroll the display page
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

LAN Setup Wizard Page>> Machine Setting Page

```
◆ DHCP          :      OFF
   IP Address



Back                   Save
```

```
◆ DHCP          :       ON
   IP Address



Back                   Save
```

```
IP   :   0.   0.   0.   0
MASK:    0.   0.   0.   0
GATE:    0.   0.   0.   0
◀▶Tab   ▲▼ Change

Back                   Save
```

(i) Navigating to this page:

Main Work Page

↓ press F4

Functions Page

↓ Select<**Machine Setting**>from the menu

Machine Setting Page

↓ Select<**LAN Setup Wizard**>from the menu

Image offset Tuning Page

The LAN Setup Wizard Page allows you to connect the laser machine with ethernet to transmit files from computer to laser machine for processing jobs. When selecting the DHCP to <ON>, the network is set tup to dynamic IP address, the IP address will automatically retrieve from network; while DHCP <OFF> is to apply static IP address, and you need to further enter the IP address, MASK, and GATE information. Using Left or Right directional keys under dynamic IP setting page to scroll between different columns to enter the address, and use Up or Down keys to change the numbers.

• DHCP: ON/ OFF

Please refer to Chapter 4.1.2 for ethernet connectivity setup in Windows driver.

LAN Setup Wizard Page	
Relevant Buttons	Function
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Cycle DHCP between NO/ OFF, or move between tabs on IP address settings
△ / ▽ Directional	Scroll between menu options, or change the numbers of IP address settings.
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Scaling Page>> Machine Setting Page

```
Manual Scaling
◀▶X:    1.0000
▲▼Y:    1.0000


Back                Save
```

ⓘ Navigating to this page:

Main Work Page

↓ press F4

Functions Page

↓ Select<Machine Setting>from the menu

Machine Setting Page

↓ Select<Scaling> from the menu
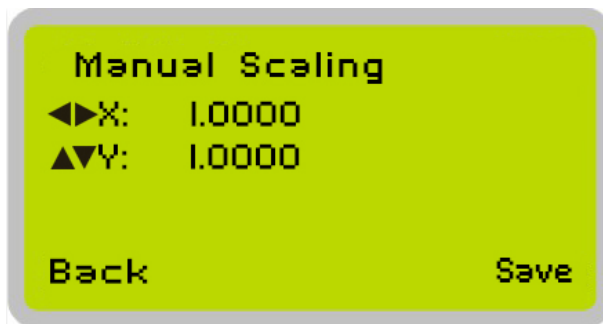
Scaling Page

The Scaling Page allows you to fine tune the laser machine output scale to precisely fit the original graphic file design scale when precision output is requried to your application.

Please reboot the machine after clicking <Save> button for the change.

Scaling Page	
Relevant Buttons	Function
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◁ / ▷ Directional	Adjust the X axis scaling numbers
△ / ▽ Directional	Adjust the Y axis scaling numbers
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Other Page>> Machine Setting Page
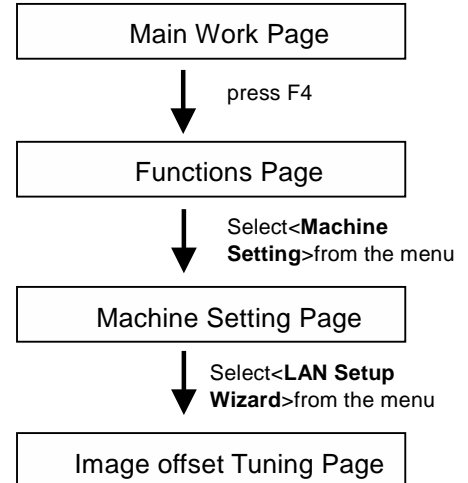

(i) Navigating to this page:

Main Work Page

↓ press F4

Functions Page

↓ Select<**Machine Setting**>from the menu

Machine Setting Page

↓ Select<**Other**>from the menu
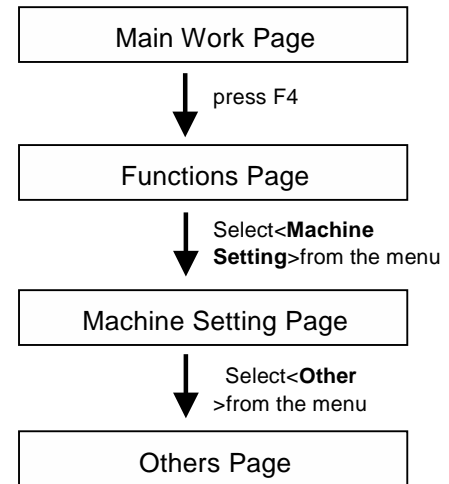
Others Page

The Others Page allows you to change various settings that correspond to the control panel. The Language setting will allow users to change available languages displayed on the control panel. The Unit setting will allow you to change whether the units displayed by the control panel is in the metric or imperial system. The EOF (end of file) Alarm setting will enable or disable an audible notification when jobs are complete. The Air Delay setting allows you to specify the delay in seconds of the SmartAIR air-assist after the point of laser firing.

- Language: ENGLISH (others dependent on Firmware)
- Unit: METRIC / ENGLISH
- EOF Alarm: YES / NO
- Air Delay: 1-100 seconds

☺ **Tip**

Depending on the material you are engraving with, your laser settings, and the desired results, please experiment with the air delay to achieve your desired results.

Other Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
△/ ▽Directional	Scroll through the menu selections
◁ / ▷ Directional	Adjust the value for that selection
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Reset Page>> Machine Setting Page

◆Factory Default

Back

ⓘ Navigating to this page:

```
┌─────────────────────────┐
│     Main Work Page      │
└─────────────────────────┘
            │ press F4
            ▼
┌─────────────────────────┐
│     Functions Page      │
└─────────────────────────┘
            │ Select<Machine
            │ Setting>from the menu
            ▼
┌─────────────────────────┐
│  Machine Setting Page   │
└─────────────────────────┘
            │ Select<Reset>from the
            │ menu
            ▼
┌─────────────────────────┐
│       Reset Page        │
└─────────────────────────┘
```
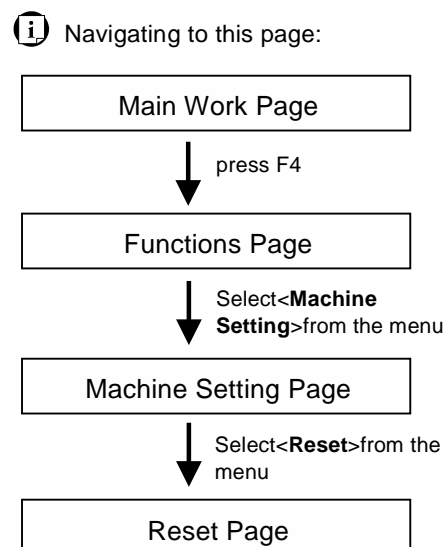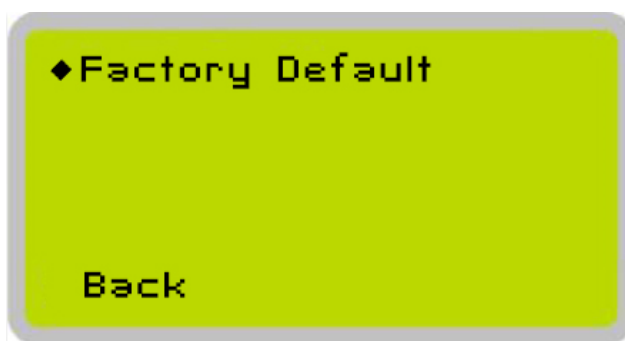
The Reset Page will restore machine settings back to factory default. Press ENTER to confirm the change, and restart the machine.

Reset Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△/ ▽Directional	Scroll through the menu selections
Enter	Perform the selection
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

Machine Information Page

```
GCC LaserPro
S290
Copyright 2007
                More▼

Back
```

Main Work Page

↓ press F4

Functions Page

↓ Select<**Machine Information**>from the menu

Machine Information Page

```
Firmware: 01.18
FPGA    : H0.4




Back
```

The Machine Information Page allows you to view information regarding the system such as the GCC logo, machine name, firmware version, and other information.

Machine Information Page	
Relevant Buttons	**Function**
F1 (Back)	Back to previous page
△/ ▽Directional	Scroll through pages
Start / Stop	Back to Main Work Page
Auto Focus	Initiate the auto focus function
▲ / ▼ Manual Focus Buttons	Manually adjust the height of the work table (Z-axis)

5.2 The LaserPro S290LS Print Driver

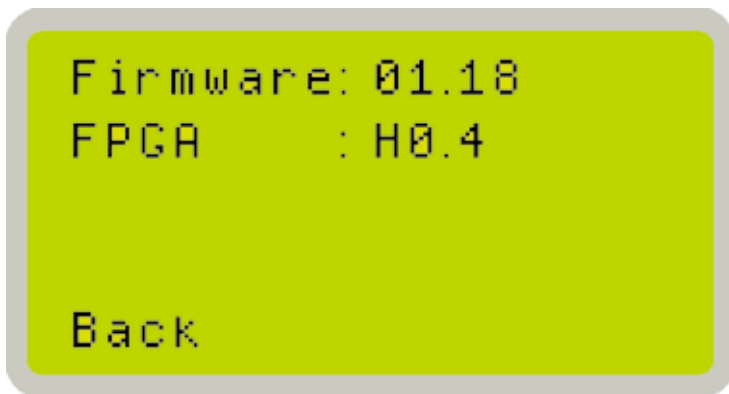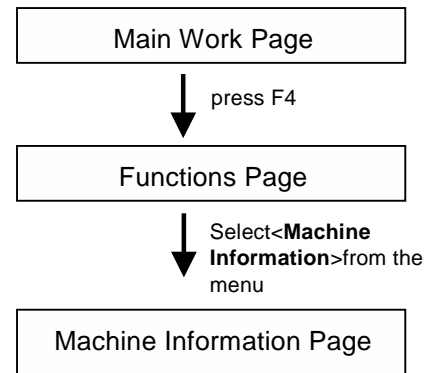With the LaserPro S290LS print driver successfully installed, you will need to adjust the printer and page size default settings before you can begin editing and completing jobs. By doing so, you will be setting the work area in your graphics software to match the LaserPro S290LS work table area.

> **NOTE**
> Please make sure the LaserPro S290LS is set to the default printer before proceeding to the page and layout setup.

Ensure that the LaserPro S290LS has been selected as the DEFAULT PRINTER. You can do so by going into your Windows Control Panel → Printers and Faxes.

If the LaserPro S290LS is not selected as DEFAULT PRINTER, you may set it up through the graphics software as well. The following example takes CorelDRAW to demonstrate how to set up LaserPro S290LS as the Printer.

    1)   From the primary menu, click FILE → PRINT SETUP.

    2)   From the navigation bar Name, click S290LS → OK
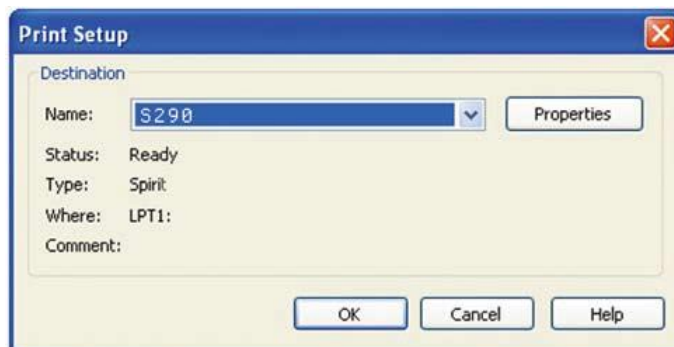
5.2.1 Page Setup and Orientation

The first thing you must do before working with the LaserPro S290LS Print Driver will be to make sure the page and layout settings are properly configured within your graphics software. You will need to access and edit the Page Setup or Layout page of your graphics software to set your graphics software's page layout to match the work table's dimensions and orientation.

From your graphic software's Page Setup page:

- Set the page orientation in the graphics software to Landscape mode.

- Set page size horizontal length to 640 mm (25 inches) or 740 mm (29 inches) and vertical height to 460 mm (18 inches).

CorelDRAW Example (Page Setup and Orientation)

The following is an example of how to set the Page Setup and Orientation in the graphics software. CorelDRAW is the designated graphics software used for this example. For other graphics software, you will need to access the corresponding Page Setup page.

3) From the primary menu, click LAYOUT → PAGE SETUP.

4) From the navigation bar on the left, click DOCUMENT → PAGE → SIZE.

5) Ensure that NORMAL PAPER and LANDSCAPE are selected.

6) Ensure the Paper Width and Height dimensions match the work table dimensions of 640 mm (25.197 inches) and 460 mm (18.110 inches) or 740 mm (29.134 inches) x 460 mm (18.110 inches).

7) Click OK to end the paper size adjustment.

Tip

Instead of manually selecting the Landscape and setting the Paper Width and Height, you can simply click the Set From Printer function and CorelDraw will automatically set the proper orientation and dimensions based on the work table. (You MUST have the LaserPro S290LS set as the default printer prior to doing this.)
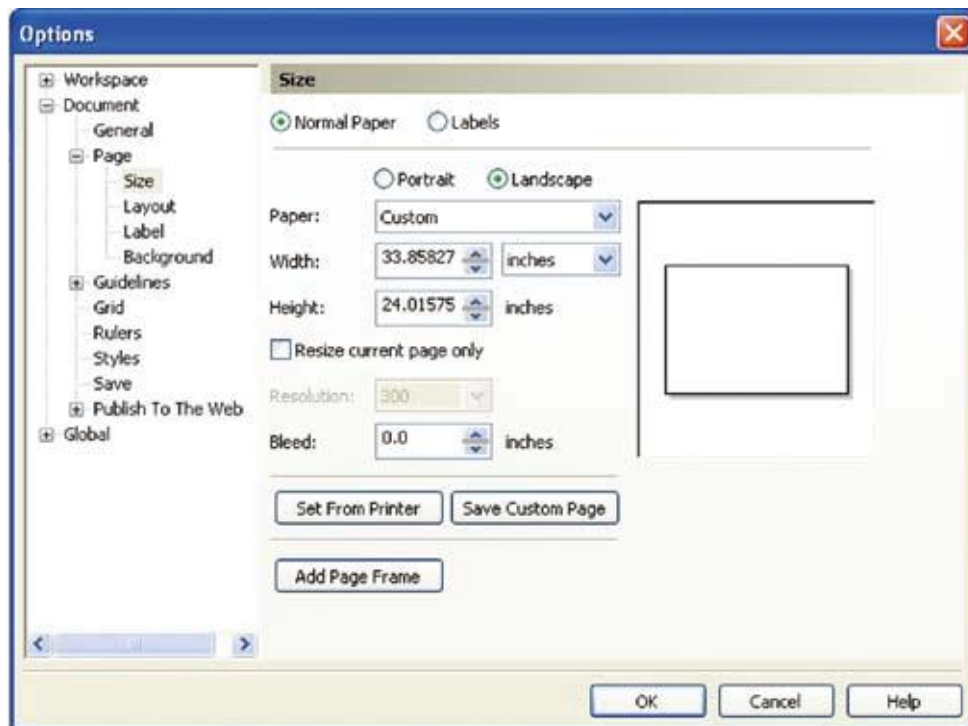
5.2.2 Color Management

The LaserPro driver uses pen color settings to control laser engraver's engraving and cutting parameters. In addition to having your Page Setup and Orientation properly set in your graphics software, you will also need to make sure Color Management is DISABLED prior to working with the LaserPro S290LS Print Driver.

From your graphic software's Color Management page:

 • Disable Color Management or set Color Management to Off.

CorelDRAW Example (Color Management)

The following is an example of how to properly disable Color Management in the graphics software. CorelDRAW is the designated graphics software used for this example. For other graphics software, you will need to access the corresponding Color Management page.

1) From the primary menu, click TOOLS → COLOR MANAGEMENT and CorelDRAW's Color Management will appear.

2) Under the Style pull down menu, select COLOR MANAGEMENT OFF.

3) Click OK to complete the color management adjustments.
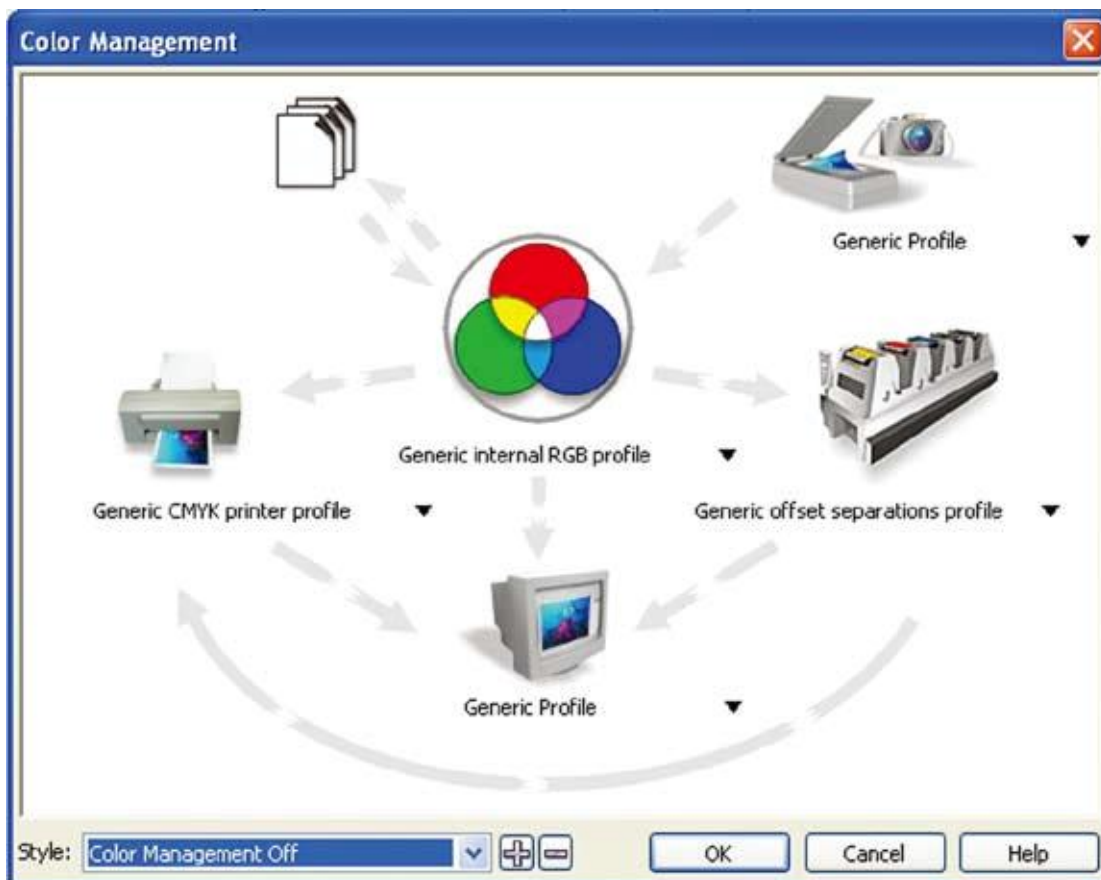
5.2.3 Using the LaserPro S290LS Print Driver

Now after you have properly set the Page and Layout and Color Management of your graphics software, you are ready to configure the details of your actual job through the LaserPro S290LS Print Driver. The print driver allows you to adjust your engraving / cutting options. After you have setup your image, design, or text to be engraved in your software application, you can access the LaserPro S290LS print driver by going to FILE → PRINT → PROPERTIES.
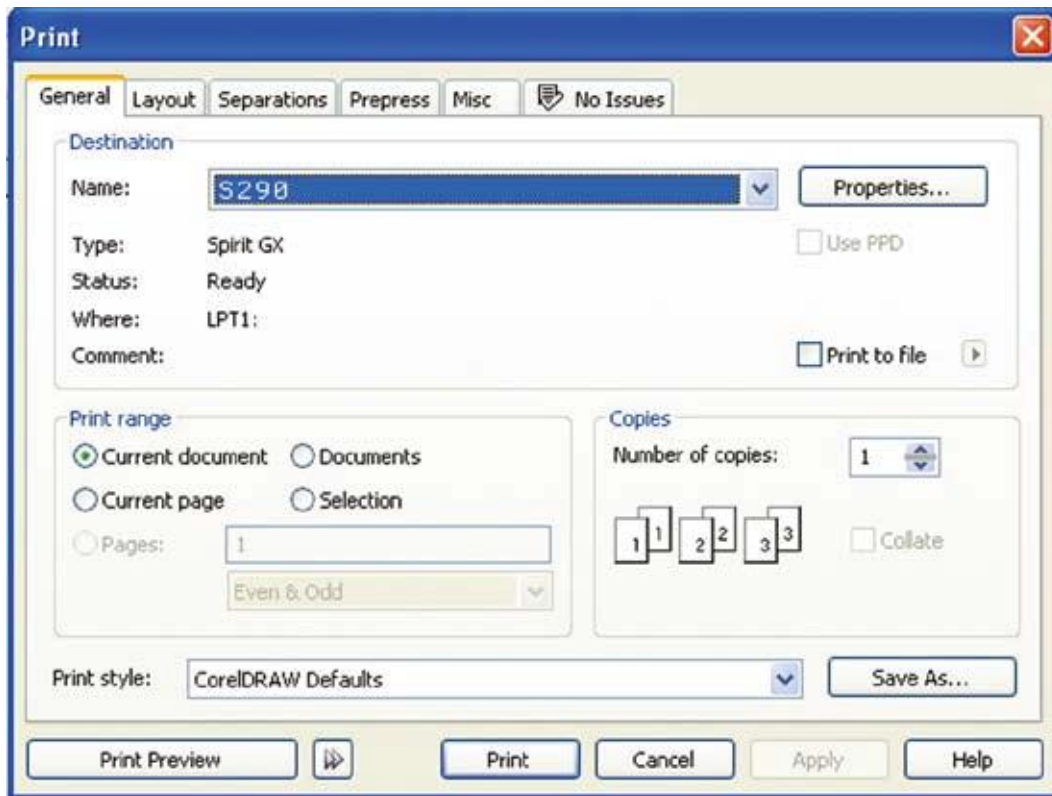
NOTE
For this screenshot example, CorelDRAW was used as the software application.

The LaserPro S290LS Print Driver consists of seven primary sections (pages) in which you will be able to choose various engraving / cutting options and settings:

- Options Page
- Pen Page
- Advanced Page
- Paper Page
- Language Page
- Raster Page (appears only in Black & White Mode)

5.2.3.1 LaserPro S290LS Print Driver >> Options Page
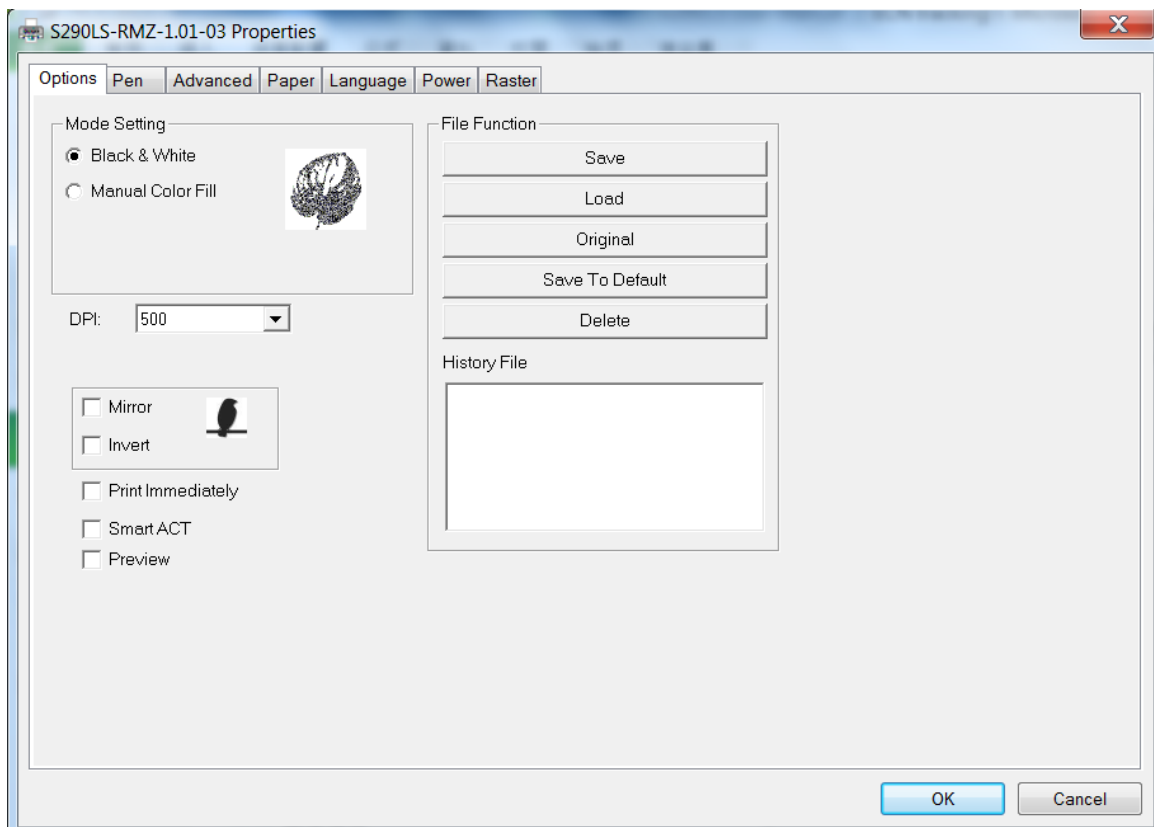
Mode Setting (OPTIONS PAGE) [DEFAULT SETTING: Black & White]

You can select from four primary mode settings, depending on your application or results you would
like to achieve.

Black & White:

Select this mode when using clipart images or drawings with several colors, shades of gray, or
many outlines. This mode outputs in a method similar to that of a black and white laser printer.

The GCC LaserPro print driver will interpret colored and shaded areas as 256-level shades of gray
by producing a halftone effect while engraving. Instead of engraving only solid lines, gray or
halftone areas will be a collection of dots with varying density.

The entire selected image will be engraved using a single set of power and speed settings (the
black pen from the PEN menu. Please refer to the next section of the details regarding the PEN
functions). The resolution and depth of these halftone areas can be adjusted with the DPI setting
found on the Options page. Please note that selecting the Black & White mode will add a new

Raster page to the menu. The Black & White mode dithering settings can be changed from the Raster page. (Please refer to the Raster section below for details). Experiment with different dithering settings to attain the desired results.

☺ **Tip** ◇◇
> The Black & White mode interprets the processed image by the varying colors and shades. For the best results, we suggest you convert the image to a grayscale image with your graphics software prior to engraving in the Black & White mode.

◇◇

> ### NOTE
> Selecting the Black & White mode will enable the Raster page on the LaserPro S290LS Print Driver

Manual Color Fill

Specify laser type to different color pens. The GCC LaserPro print driver allows a maximum of 16 pen parameters to be set. It will help user to set different parameters easily in one file.

Pen No.	Color	Speed	Power	PPI	Raster	Vector	Air	AF	Defocus	Bridge	Repeat
1		50.0	50	400	YES	YES	NO	NO	0.0	5	1
2		50.0	50	400	YES	YES	NO	NO	0.0	0	1
3		50.0	50	400	YES	YES	NO	NO	0.0	0	1
4		50.0	50	400	YES	YES	NO	NO	0.0	0	1
5		50.0	50	400	YES	YES	NO	NO	0.0	0	1
6		50.0	50	400	YES	YES	NO	NO	0.0	0	1
7		50.0	50	400	YES	YES	NO	NO	0.0	0	1
8		50.0	50	400	YES	YES	NO	NO	0.0	0	1
1*		50.0	50	400	YES	YES	NO	NO	0.0	1	1
10		50.0	50	400	YES	YES	NO	NO	0.0	0	1
11		50.0	50	400	YES	YES	NO	NO	0.0	0	1
12		50.0	50	400	YES	YES	NO	NO	0.0	0	1

Speed: < ▬ > 50.0   ☑ Raster
Power: < ▬ > 50   ☑ Vector
PPI: < ▬ > 400   ☐ Air
Defocus < > 0.0 mm   ☐ Auto Focus
Bridge: < > 0 mm   ☐ Defocus
                         ☐ Bridge Cutting
                         Repeat: 1

DPI (Options Page) [DEFAULT SETTING: 500]

DPI (dots-per-inch) represents the number of times the laser will fire over a one-inch path. This setting determines the image resolution and quality when performing raster engraving functions. Higher DPI settings result in cleaner and deeper engravings, but require more time to complete. Lower DPI settings result in coarser and shallower engravings, but require less time to complete. The LaserPro S290LS offers 8 DPI options: 125, 250, 300, 380, 500, 600, 760, 1000,1500, and 3000. Experiment with different settings to get your desired effect.

Below is a chart for your convenience detailing the Set DPI (your input setting) vs. Actual DPI (your output results).

Set DPI	125	250	300*	380	500	600*	760	1000	1500	3000
Actual DPI	127	254	381	381	508	762	762	1016	1524	3048

3D Mode:

3D Mode allows the naked eyes to visualize the curvatures of the 3D effect by applying 200 grayscale power level technology to create different depth of engraving.
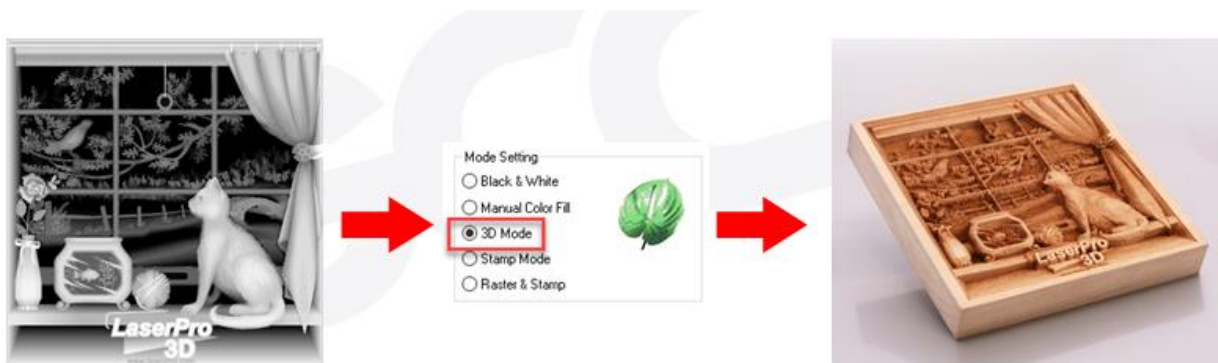
Stamp Mode:

The stamp mode is one of the more dynamic functions of the LaserPro laser engravers by applying 200 power leve to create different steps.

NOTE

Selecting the Stamp mode will enable the Stamp page on the Spirit Series Print Driver, allowing you to adjust advanced stamp-related settings.

Mirror (Options Page) [DEFAULT SETTING: Unselected]

Checking this box will automatically engrave your image with a mirrored effect. This setting will flip the image along the Y-axis from left to right and vice-versa.

Mirror Effect
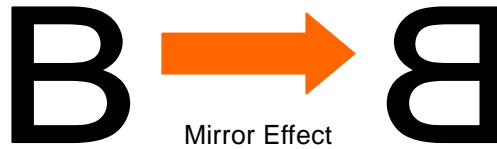
Invert (Options Page) [DEFAULT SETTING: Unselected]

Checking this box automatically inverts / reverses the color of your image (the white areas become black and vice versa). The Invert option is not available if disabled while Manual Color File mode selected.

Invert Effect
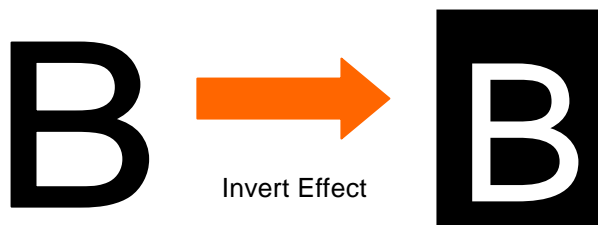
Print Immediately (Options Page) [DEFAULT SETTING: Unselected]

Checking this will instruct the LaserPro S290LS to immediately begin the laser engraving process, when you select Print from your graphic software program. If Print Immediately is not checked, then selecting Print will transfer the job file to the machine and will need to be initialized from the LaserPro S290LS control panel.

SmartACT (Options Page) [DEFAULT SETTING: Unselected]

By eliminating unnecessary travel of the lens carriage at the expense of some quality, SmartACT reduces the acceleration area to save of time to process a job~!
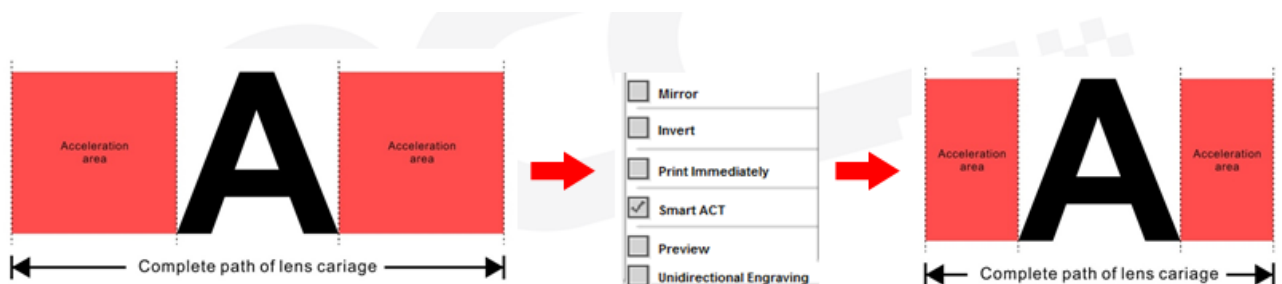
☺ **Tip** ⚬⚬⚬

There is a greater performance gain when enabling SmartACT for designs that are vertically longer than they are horizontally wide, as the SmartACT optimization modifies the movement of the X-axis of the laser carriage.

Preview (Options Page) [DEFAULT SETTING: Unselected]

Users can use the Preview function to check a simulated output of the job. An estimated working time will also be shown. Please make sure to set the file printing option to "print to file" in order to activate the Preview function. Here we use GCC Spirit LS machine driver as illustration.

A filename will be prompted.
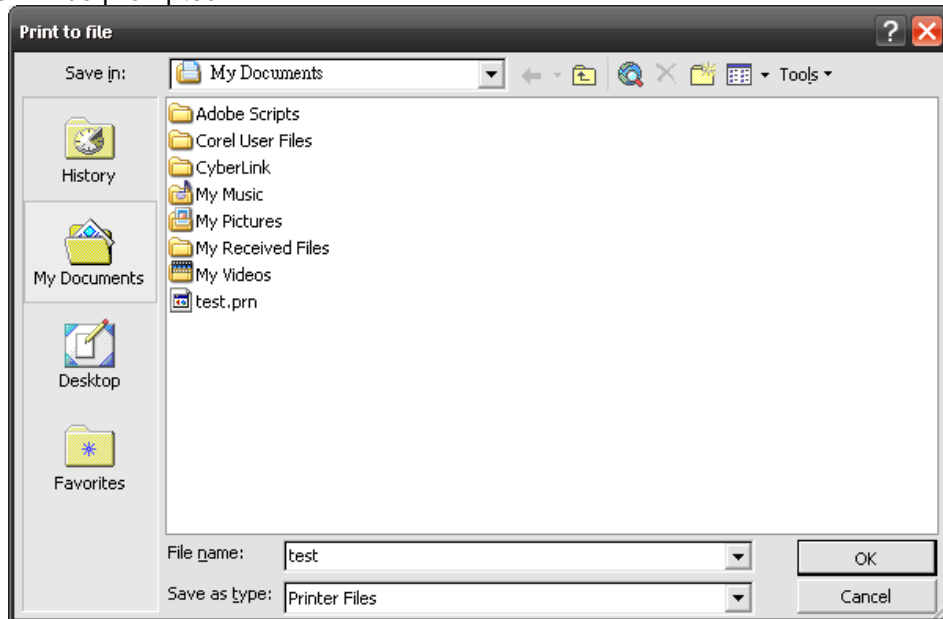
After entering the filename and pressing <ok>, the Preview screen will be shown.
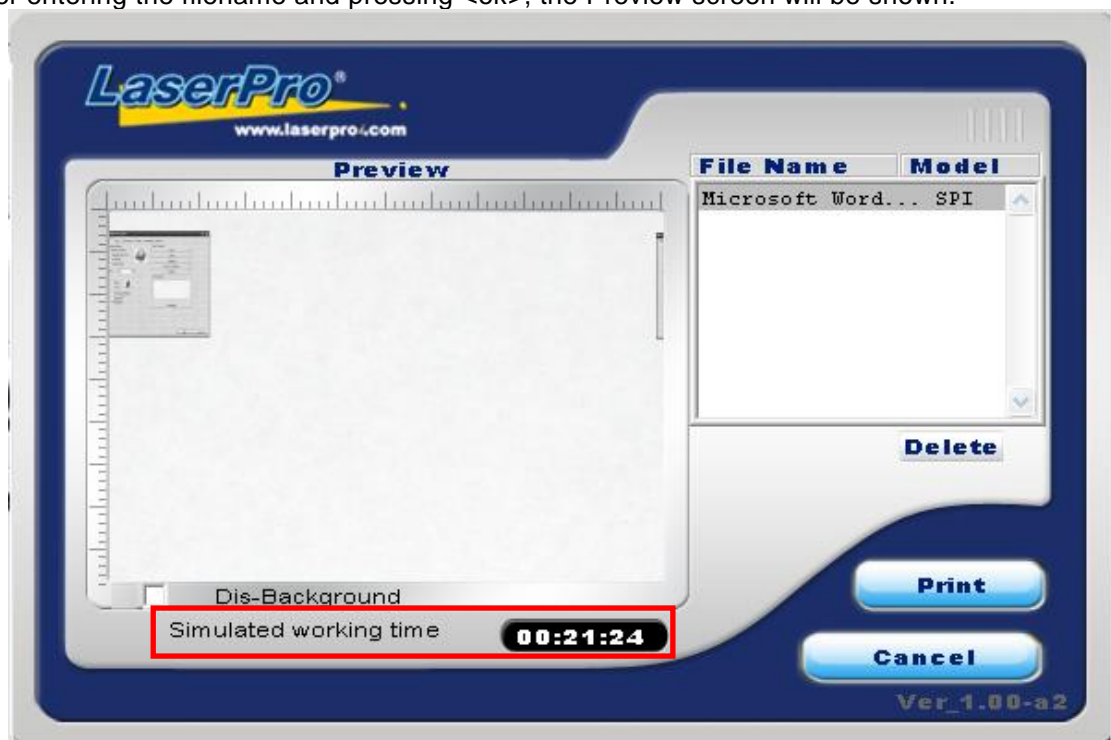
The output file can be previewed and an estimated working time of the job is also displayed.

File Function (Options Page):

The file function section allows you to manage various laser parameters. This section is useful when performing duplicate jobs on a variety of objects, allowing you to save your frequently used laser parameters and load them in the future.

- **History File:** This section contains a list of the recent files you have recently created and worked with.

- **SAVE:** This function will save the current print driver parameter settings to a file and location on your computer of your selection. (Saved parameter setting files will be tagged with the .H2O extension)

- **LOAD:** This function allows you load previously saved print driver parameters or LaserPro parameter database.

- **ORIGINAL:** This function will load the print driver's original factory parameter settings.

- **SAVE TO DEFAULT:** This function allows you to save your current print driver parameters as the default startup settings.

- **DELETE:** This function will delete the file you select from the History File section. Please note the Delete function only removes the file from the history file section, it does not remove the Spi file from your hard drive, if you wish to completely remove the file from your hard disk, then you will have to manually delete the file from your operating system.)

NOTE

If you are using Windows 2000/XP/Win7 as your operating system, make sure you log in with an administrator or administrator-rights account in order to properly save laser parameter settings.

Tip

LaserPro material database settings allow you easy to load the several parameters. If you are loading LaserPro parameter database as your operating parameter, please direct load from several build-in parameter folders.
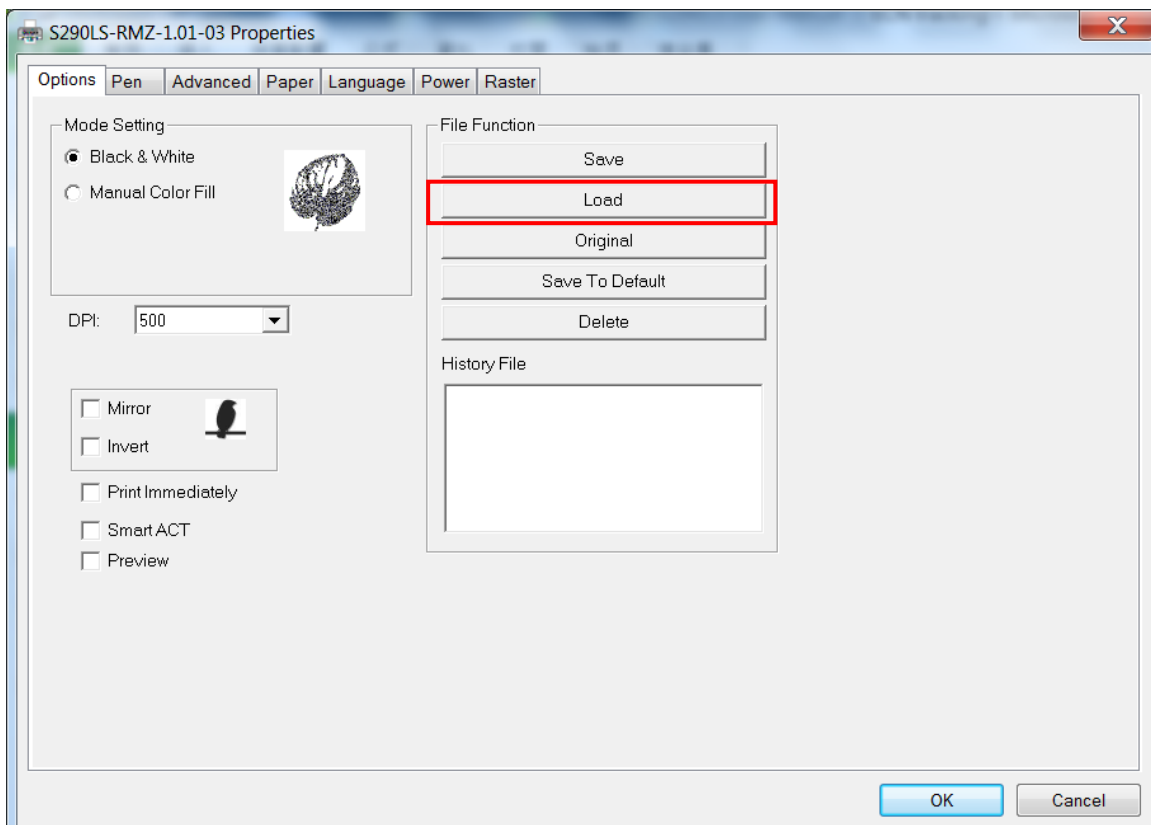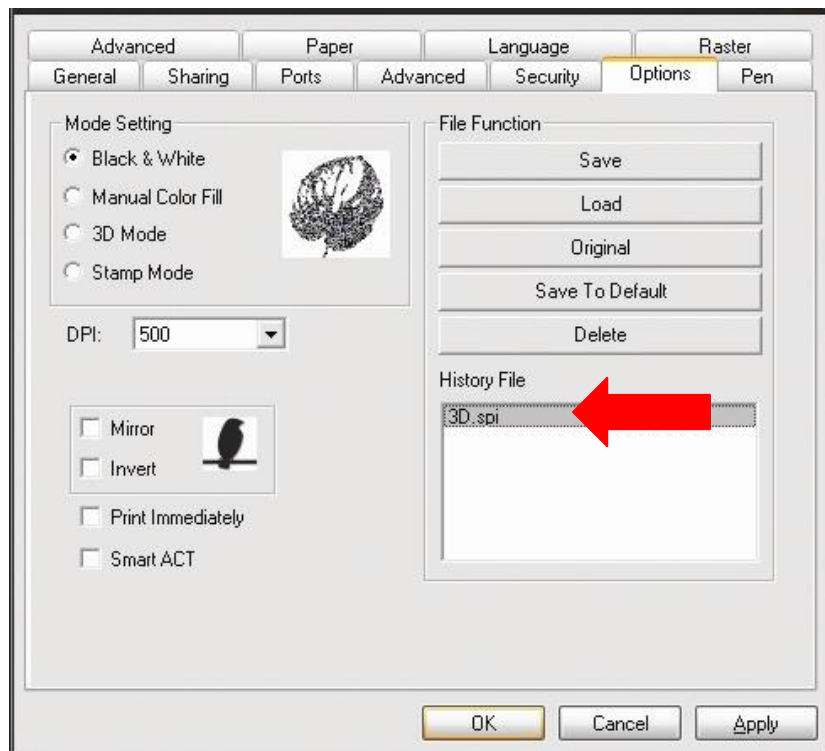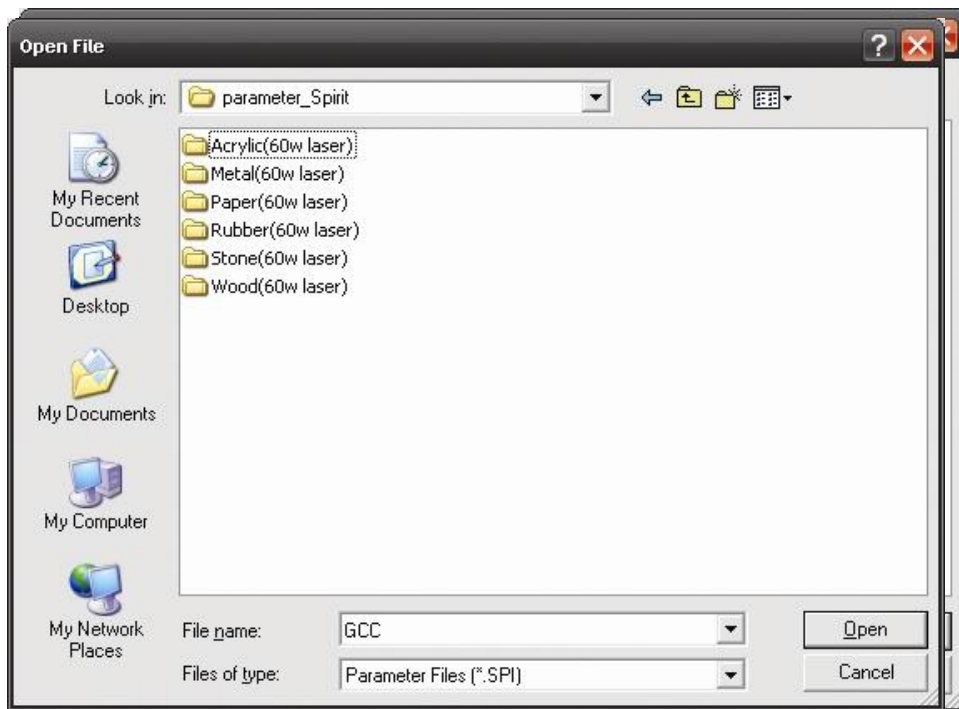
5.2.3.2 S290LS Print Driver >> Pen Page

The LaserPro S290LS incorporates the use of 16 different colors to represent 16 different laser power and speed settings when cutting and engraving. These colors are referred to as "Pens". Think of each pen as a designated laser setting, rather than as a color. As an example, a black and white image will use only one power and speed laser setting (Black). An image that is made

up of black, red and blue colors will be processed using the laser settings designated for each particular color. In order to utilize up to 16 different pens (laser parameter settings), make sure your graphics software can recognize and utilize the 16 pen colors designated by the LaserPro S290LS print driver.
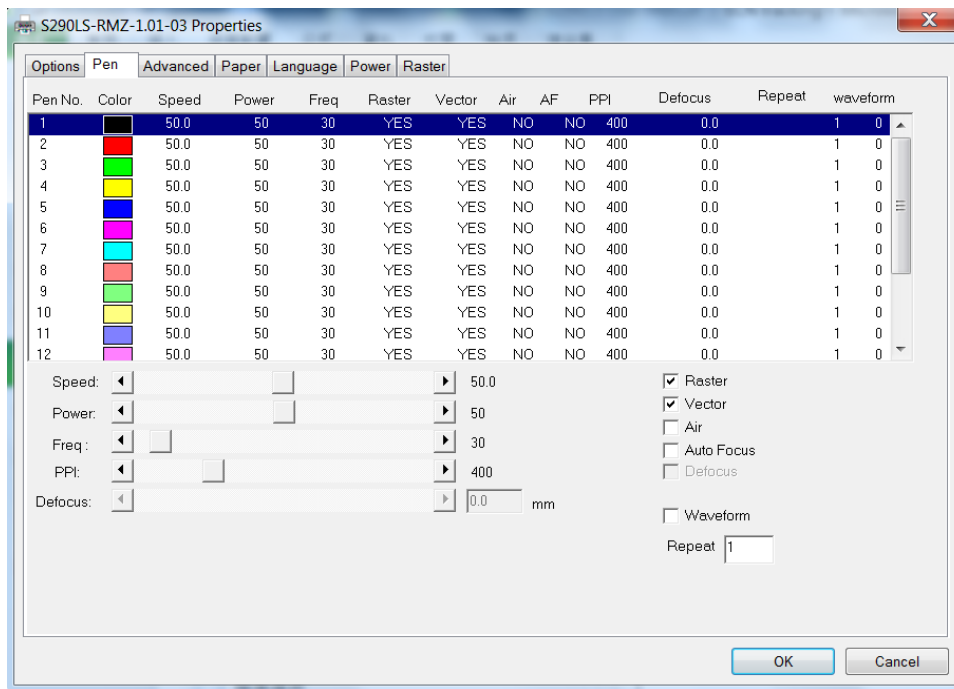
If you would like to specify your own colors to designate to a particular laser setting, then all you have to do is to double-click on that particular pen color from the pen menu and a color manager window will open where you can select "define custom colors" to define your own color (shown in the picture below). This is useful when your image is composed of colors that are not part of the pen menu's default color selection, and instead of modifying your image, you simply assign the laser settings based on the existing colors depicted from your current image.
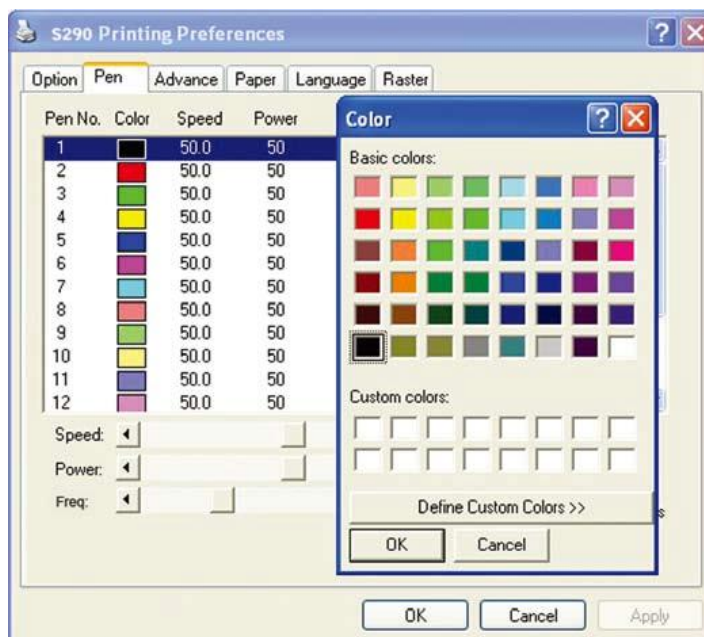
> **NOTE**
> The LaserPro S290LS print driver cannot store more than 16 pen colors or different laser parameter

Speed (Pen Page) [DEFAULT SETTING: 50]

The speed slider controls the laser's speed during operation (engraving speed) with settings ranging from 0.1 – 100%. The maximum laser processing speed of the S290LS is 80 inches per second, therefore a setting of 100% speed is equivalent to 80 inches per second and a 10% speed setting would be equivalent to 8 inches per second. Keep in mind, this is the speed the laser moves at when cutting or engraving straight lines. The machine will automatically slow down when processing curves.

Power (Pen Page) [DEFAULT SETTING: 50]

The power slider controls the laser's power during operation (engraving power) with a range setting from 1 – 100%. The percentage setting represents the power for each laser pulse fired.

Tip

Cutting / engraving depth and quality are determined by a combination of power and speed. Slower speeds at higher power will produce deeper cuts and engravings, whereas higher speeds at lower power will produce more shallow cuts and engravings.

Freq (Pen Page)[DEFAULT SETTING: 30]

Freq (frequency) determines the peak power of the laser which affects the color variation and depth of the laser marking. A lower frequency will produce a deeper marking. You can drag the Freq. slider to the experiment the output.

Raster / Vector (Pen Page) [DEFAULT SETTING: Selected]

Checking the Raster checkbox will process only the raster functions for the areas of your design that correspond to that particular "pen" color.

Checking the Vector checkbox will process the vector functions for the areas of your design that correspond to that particular "pen" color.

As an example: a particular "pen" color may be assigned to areas in your design containing color fills (raster engraving) and very thin lines (vector cutting). By checking / unchecking the Raster and Vector will force the driver to process / ignore the color fills / thin lines.

	Vector Checked	Vector Unchecked
Raster Checked	Processes both Vector and Raster functions for that particular color	Processes only the Raster functions for that particular color (Vector functions ignored)
Raster Unchecked	Processes only the Vector functions for that particular color (Raster functions ignored)	Does not process Vector or Raster functions for that particular color

Air (Pen Page) [DEFAULT SETTING: Unselected]

This checkbox controls the SmartAIR air-assist function (if you have the optional air compressor installed). By selecting a pen color and checking this box will enable the SmartAIR air-assist function for that particular pen color. As an example, if you are performing a combination of both surface raster engraving job and deep vector cutting on a material such as acrylic, you may want to enable the SmartAIR air-assist for the vector cutting sections to get the cleanest cuts. To do this, you would simply need to select the pen color that you have assigned to the sections to be cut and select the Air checkbox for those particular pen colors.

Auto Focus (Pen Page) [DEFAULT SETTING: Unselected]

This checkbox sets the Auto Focus for that pen setting. With the Auto Focus button checked, the LaserPro S290LS will automatically initialize the auto focus procedure before starting the job. This will ensure the focal distance is properly set based on the particular material you are working with and the focal lens you have installed.

Defocus (Pen Page) [DEFAULT SETTING: Unselected]

This checkbox sets the Defocus function for that pen setting. With the Defocus button checked, the LaserPro S290LS will automatically initialize the auto-focusing procedure before starting the job. The focal distance will be set based on distance entered by the user. A positive value sets the focus distance above the working piece and a negative value sets the focal point to below the working piece.

PPI (Pen Page) [DEFAULT SETTING: 400]

PPI (pulses-per-inch) represents the number of times the laser pulses (fires) per linear inch, exclusive for vector cutting. Higher PPI settings will generate deeper, overlapping laser pulses, resulting in cleaner cuts. Lower PPI settings (lower than 150) will result in the individual laser pulses being spread apart, resulting in a perforated effect.

If dragging the PPI slider to the furthest right (maximum), the value will change to X. This completely disables the PPI control and continuously fires the laser non-stop, without pulsing. Think of setting PPI to X as being equivalent to turning a water facet on with the water continuously flowing out. This also disables the power ramp functionality, which automatically controls the PPI depending on the speed of the laser carriage (such as vector cutting around the corner of a square).

☺ Tip ∞∞

Cutting / engraving depth and quality are determined by a combination of power and speed. Slower speeds at higher power will produce deeper cuts and engravings, whereas higher speeds at lower power will produce shallower cuts and engravings.

∞∞

Waveform (Pen Page)

GCC Fiber Laser is equipped an unique Waveform function to give users greater control over laser pulse parameters that can lead to more efficient and effective processing. An example would be the use of low repetition rate, high-energy pulses to rough out and remove the bulk of the material while a higher frequency shorter pulse with less energy can subsequently be used in a polishing pass yielding a better surface finish.

Please refer to Chapter 6.4 for more waveform information and application notes.

CW Mode/ Pulse Mode (Pen Page) [For S290LS- 20SHS, S290LS-40HHS models only]

S290LS-20SHS-4.03-03 Properties

| Options | Pen | Advanced | Paper | Language | Power | Raster |

Pen No.	Color	Speed	Power	Freq	Raster	Vector	Air	AF	Pulse	C/W	Defocus	Waveform	Repeat	PPI
1	0	50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
2	0	50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
3	0	50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
4	0	50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
5	0	50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
6	0	50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
7	0	50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
8	0	50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
9	0	50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
10	0	50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
11	0	50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
12	0	50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400

Speed: ◄ □ ► 50.0 ☑ Raster
Power: ◄ □ ► 50 ☑ Vector
Freq : ◄ □ ► 30 ☐ Air
Defocus: ◄ ► 0.0 mm ☐ Auto Focus
Waveform: ◄ ▨ ► 0 ☐ Defocus
PPI: ◄ □ ► 400 ☑ Pulse Mode
☐ C/W Mode
Repeat 1

OK   Cancel

S290LS-40HHS-4.01-02 Properties

| Options | Pen | Advanced | Paper | Language | Power | Raster |

Pen No.	Color	Speed	Power	Freq	Raster	Vector	Air	AF	Pulse	C/W	Defocus	Waveform	Repeat	PPI
1		50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
2		50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
3		50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
4		50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
5		50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
6		50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
7		50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
8		50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
9		50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
10		50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
11		50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400
12		50.0	50	30	YES	YES	NO	NO	YES	NO	0.0	0	1	400

Speed: ◄ □ ► 50.0 ☑ Raster
Power: ◄ □ ► 50 ☑ Vector
Freq : ◄ □ ► 30 ☐ Air
Defocus: ◄ ► 0.0 mm ☐ Auto Focus
Waveform: ◄ □ ► 0 ☐ Defocus
PPI: ◄ □ ► 400 ☑ Pulse Mode
☐ C/W Mode
Repeat 1

OK   Cancel

Two additional controls are available for the S290LS 20SHS and 40HHS models which allow to choose if we want to operate the laser under Pulse mode or C/W mode.

Pulse mode: In general, higher power can be achieved with Pulse mode since higher peak power can be achieved.

C/W mode: C/W mode is great for cutting thermal sensitive material such as ITO film when a steady source of laser power is required.

5.2.3.3 LaserPro S290LS Print Driver >> Advanced Page

Scaling (Advanced Page) [DEFAULT SETTING: 0]

In some cases you may find a slight output inaccuracy in the actual output compared to what you have set in the computer. This margin of error or offset is extremely small (approximately 1/300). What this means is that there may be a 1-unit offset for every 300 unit increments. As an example, if you engrave a 300mm straight line, it may end up measuring only 299 mm or 301 mm in the final output. In this case, you will want to set the scaling setting to +1/1000 or -1/1000 respectively to compensate. A general rule of thumb is for every 300 unit increment, you will want to adjust the slider by +1 if the final output is 1 unit increment shorter or -1 if the final output is 1 unit increment longer than your graphic design setting.
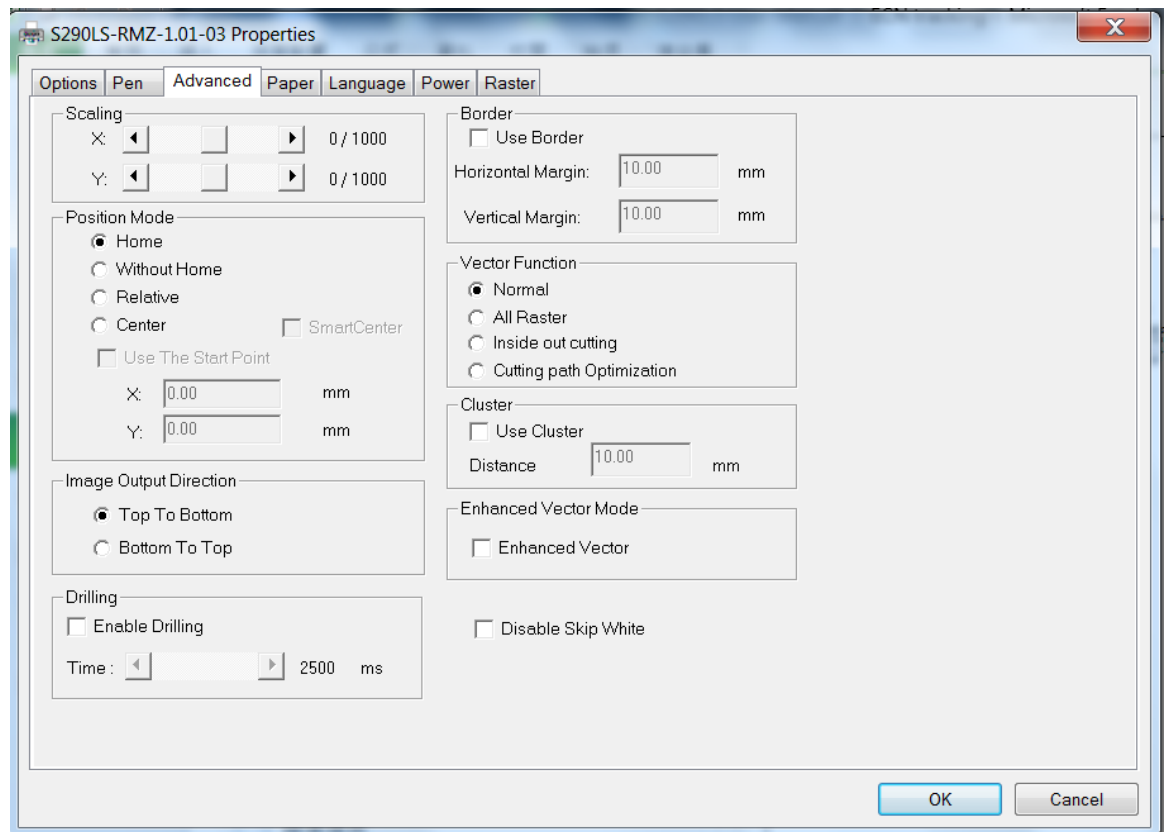
Position Modes (Advanced Page) [DEFAULT SETTING: Home]

These selections allow you to control the positioning of the laser head after each job completion and before the next subsequent job.

- **Home:** Resets the positioning of the laser head to the 'home position' (upper-right) before
   and after each job.

- **Without Home:** The laser head will start the next job based on the position from its graphic application software setting, from the last position of the previous job. Upon completion of the current job, the laser head will remain at the last position of the previous job.

- **Relative:** This mode sets the current laser head position to correspond to the origin (top left) position of the graphic software. Therefore, the laser head will process the job from its current position relative to its setting in the graphics software.

- **Center:** Sets the current position of the laser head as the center point for your subsequent job. As an example, if the subsequent job is to vector cut a circle and you have the Position Mode set to Center, then the LaserPro S290LS will vector cut a circle around the initial position of the laser head.

- **SmartCENTER**: The SmartCENTER function is a quick and easy way to precisely locate the center point between two points or four points.
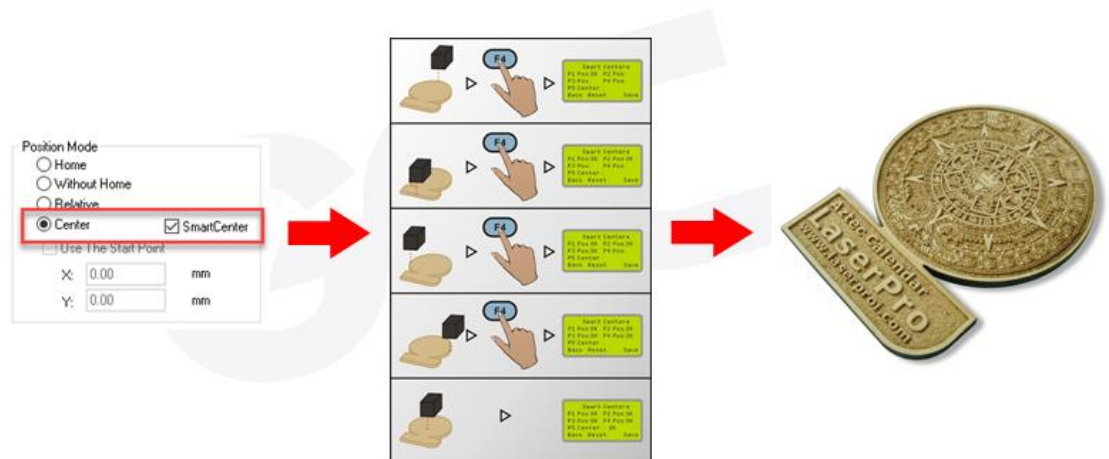
Tip

The SmartCENTER function is a quick and easy way to precisely locate the center point between two points. The SmartCENTER function is a great tool for users whose jobs often require engraving on specific locations.

Tip

It is highly recommended you enable the red dot laser pointer when setting / adjusting the Position Modes, as this will ease your job positioning with enhanced accuracy.
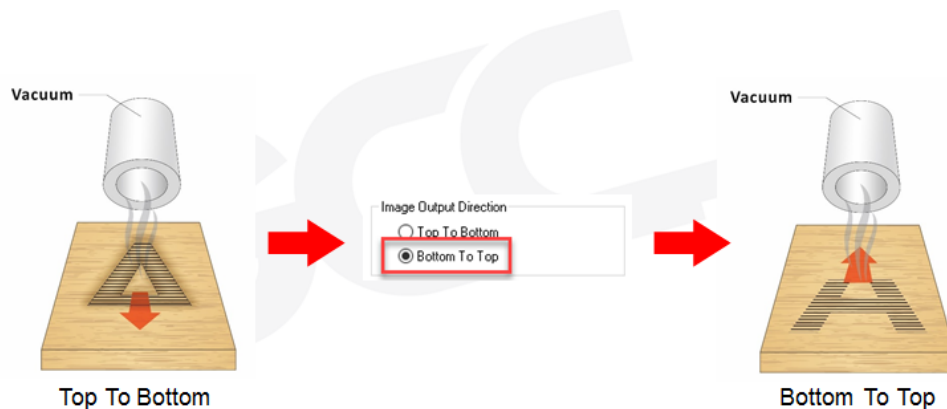
Image Output Direction (Advanced Page) [DEFAULT SETTING: Top to Bottom]

These selections allow you to control the direction in which the system processes an engraved image.

Top To Bottom

Bottom To Top

- **Top To Bottom:** Selecting this will force the system to process the current task by moving the laser carriage from the top to the bottom of the image (rear end to front end of the work table).

- **Bottom To Top:** Selecting this will force the system to process the current task by moving the laser carriage from the bottom to the top of the image (front end to rear end of the work table)

Normally, the LaserPro S290LS engraves from left to right, top to bottom. Selecting Bottom Up will force the machine to start from the bottom and work its way to the rear of the working table.

☺⚡ **Tip**

In situations where the material you will be working with may produce a lot of dust byproducts and you are utilizing the optional Fume Extraction system, it is recommended that you select the Bottom To Top image output direction option. This will minimize

the amount of dust byproducts lodged in the engraved sections as the Fume Extraction system is vented from the rear of the machine, the same direction as the image is processed.

## Border (Advanced Page) [DEFAULT SETTING: Unselected]

In cases where you are working with a negative image (negative outline areas of your image are engraved, rather than the positive areas), you may wish to include a border around your image. To properly add a border, you will first need to Invert your design from the Options Page, then check Use Border and specify a value for the thickness of the border you would like to add to your design.

> **NOTE**
> If you wish to use the Border and Cluster function simultaneously, then the Border Thickness value must be less than the Distance value specified in the Cluster setting.

Vector Function (Advanced Page) [DEFAULT SETTING: Normal]

- **Normal:** This selection will not apply any special advanced vector function to your job. This is the default Vector Function setting.

- **All Raster Output:** This selection will instruct the print driver to process your entire image as a raster engraving. Any vector lines within the image will be treated as raster data and outputted as a raster engraving, similar to a dot-matrix printer.

Vector Processing   Raster Processing
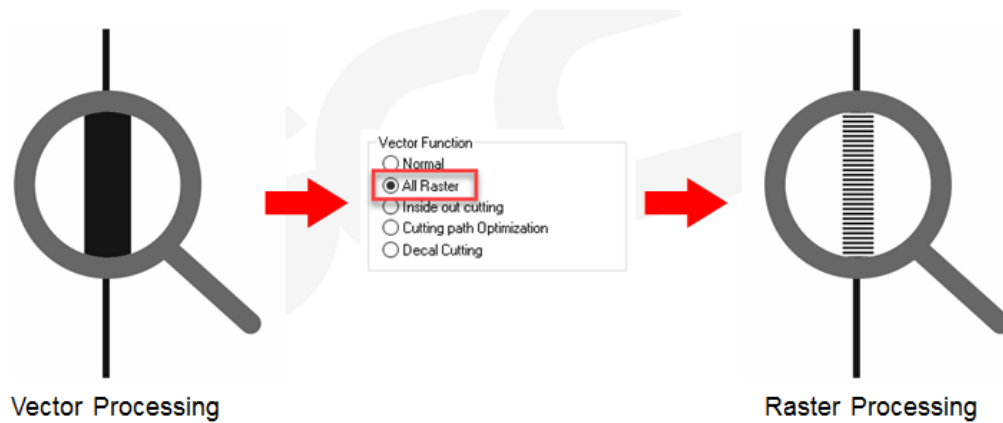
- **Inside out Cutting:** This setting will always automatically direct the laser to cut from the inner most vector shape and move outwards.

- **Cutting Path Optimization:** This is a setting that will minimize your process time. When selected, the print driver will analyze your image and automatically determine the most efficient processing path to process your image.

Use Cluster (Advanced Page) [DEFAULT SETTING: Unselected]

This setting allows you to change how LaserPro S290LS interprets and processes individual / independent areas of an image in order to minimize job-processing times. The Cluster function is only applicable when multiple areas of an image are broken down and isolated from each other (areas not touching each other, blank space in-between). Another condition that must be met for the Cluster function is that these individual areas of your design must have some X-axis overlap, meaning that they should be to some extent side-by-side with empty spaces between them. The distance value can be set by the user and represents the limit or cutoff point in which side-by-side objects will be processed in Cluster mode or not. If the distance between side-by-side objects is greater than the
set distance value, then the individual areas will be processed in Cluster mode. Conversely, if the distance between side-by-side objects is lesser than the set distance value, then the individual areas will be processed normally (not via Cluster mode).

An example of an image that would benefit from the Cluster function would be: 2 squares to be engraved, side-by-side on the X-axis with a 20 cm gap in between them. In this scenario, you would want to enable the Cluster setting and set the distance to a value less than 20. By doing
so, the laser will completely process one square and "leap-frog" to the second square, rather than processing both squares simultaneously. The result: you shorten the processing time by minimizing the unnecessary travel distance the laser head needs to make across the X-axis in between squares, if they were to be processed simultaneously.

NOTE
If you wish to use the Border and Cluster function simultaneously, then the Border Thickness value must be **less than** the Distance value specified in the Cluster setting.

Enhanced Vector Mode (Advanced Page) [DEFAULT SETTING: Unselected]

This setting allows you to improve the cutting quality at the expense of speed. Your engraving speed will be dropped by 50%, to maximize the cutting power. We recommend that you enable this function when cutting thicker materials.

5.2.3.4 LaserPro S290LS Print Driver >> Paper Page
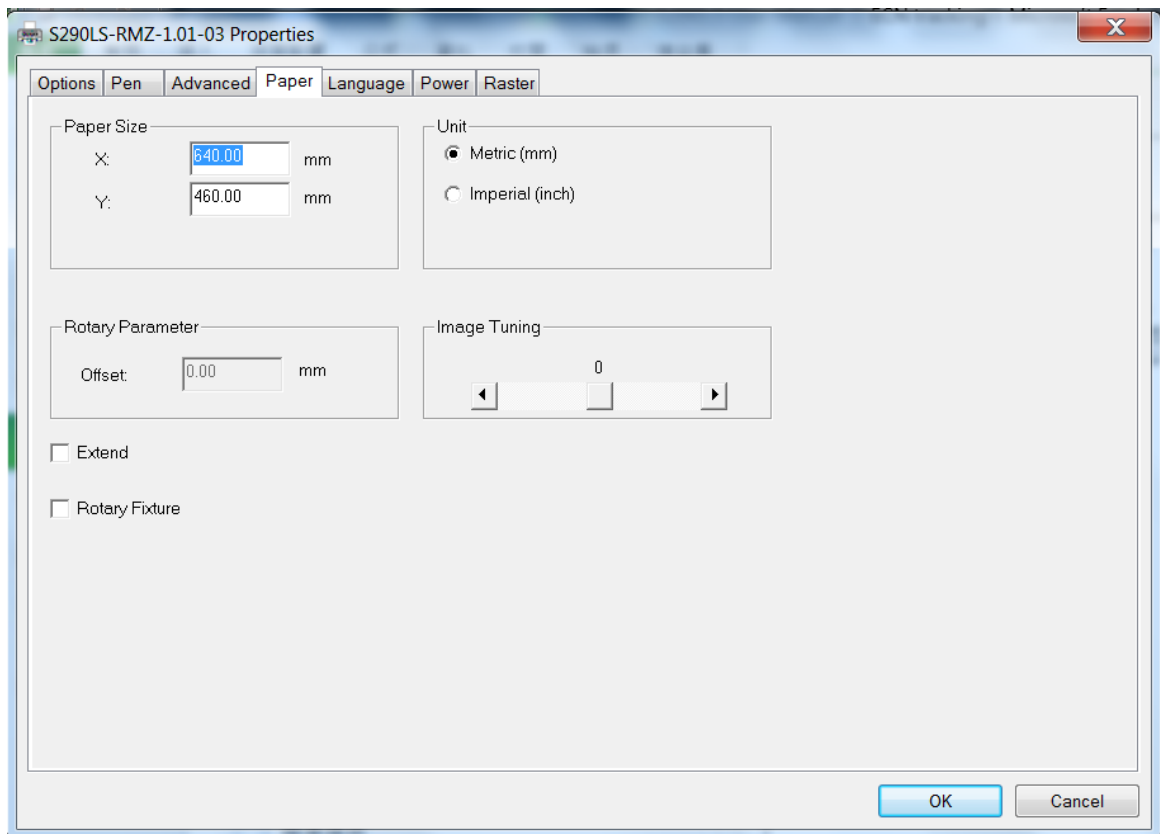
Paper Size (Paper Page)

The paper size represents your total work area. Ensure that the paper size is never set greater than the S290LS work table area of 25" x 18" (640 mm x 460 mm) or 29" x 18" (740 mm x 460 mm) with the Extend option checked. The X value represents the length and the Y value represents the width.

Unit (Paper Page) [DEFAULT SETTING: Metric (mm)]

Here you can set your preferred measurement standard in which you would like to use with the LaserPro S290LS print driver. You can choose between metric or imperial standards.

Image Tuning (Paper Page) [DEFAULT SETTING: 0]

In the event that you are processing extremely fine and detailed designs requiring near- microscopic edge-to-edge precision, you will need to adjust the image tuning setting. To adjust this setting, we recommend that you engrave a small black square design as a sample and use a magnifying glass to view the engraved results.

When you look at your engraved test square under a magnifying glass, you may notice the edges of your square may be slightly offset, with every consecutive engraved even or odd line protruding past the square's ideal edge. This occurrence may occur on the left or right side of the square and can be compensated for by the image tuning setting. In the diagram below, the arrows refer to the direction the laser head is moving to generate that engraved line. If the first and every other line protrude to the **left** of the square's ideal edge, you will want to set the image tuning to a **negative value**. If the first and every other consecutive line protrude to the **right** of the square's ideal edge, you will want to set the image tuning to a **positive value**. The further the protruding lines are from the square's ideal edge, the larger you will need to set the Image Tuning value to compensate.

Square's Left Edge	Square's Right Edge (Ideal)
Set Image Tuning to NEGATIVE	Set Image Tuning to POSITIVE
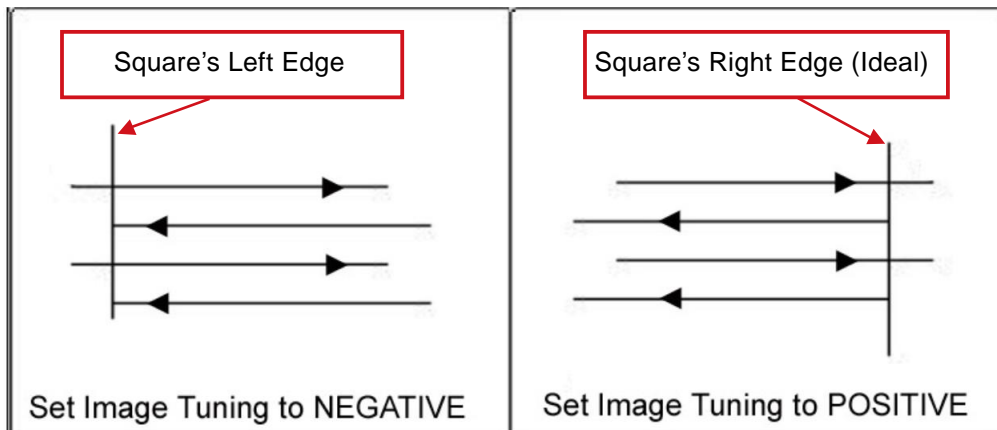
The following is an example that has the proper image tuning, and demonstrates this significance when engraving fine, small, intricate text. The following two pictures show engraved text magnified with no image tuning (left picture) and image tuning enabled (right picture).

Extend (Paper Page) [DEFAULT SETTING: Unselected]

If you are processing a very large area requiring the maximum work table area, you will want to enable this mode. Enabling this mode will extend the machine's maximum work area to 29" x 18" (740 mm x 460 mm), from the default 25" x 18" (640 mm x 460 mm). This function is enabled at the expense of some quality loss, usually on the left and right edges of your full-size engraving. Usually the quality loss is minimal and may not be apparent, depending on your design.

> **NOTE**
> With the Extend function enabled, the following functions are disabled: SmartACT (Options Page), Disable Skip White (Advanced), and Auto Focus (Pen Page).

5.2.3.5 LaserPro S290LS Print Driver >> Language Page

This page allows you to specify the language displayed by the LaserPro S290LS Print Driver. Current language options allow for: English, Spanish, French, Chinese (Simplified, Traditional), Japanese, and German. Remember to select "Save to Default" on Options Page to save the

specified language.
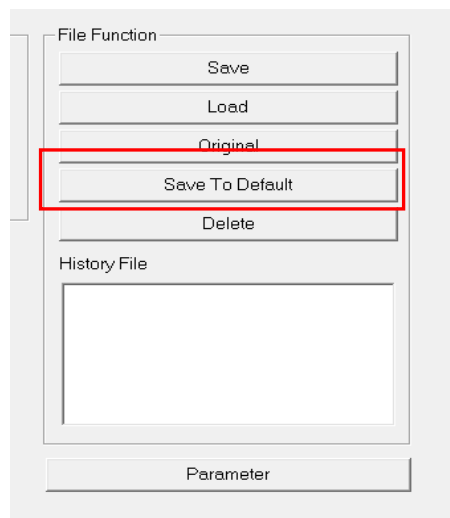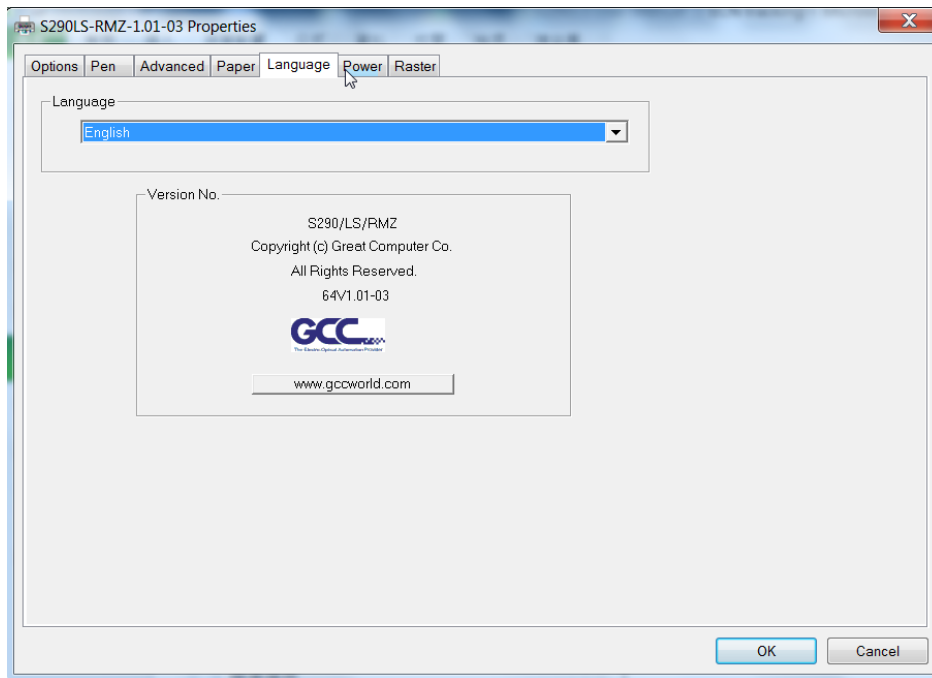
5.2.3.6 LaserPro S290LS Print Driver >> Raster Page

> **NOTE**
> The Raster Page is only available when Black & White Mode Setting is selected from the
> Options Page, this page offers a number of advanced Raster Engraving output
> options.

Contrast (Raster Page) [DEFAULT SETTING: 0]

This provides a quick and easy way to immediately adjust the contrast of an engraved image.
Moving the slider to the Dark setting will increase the contrast levels of the engraved output,
whereas moving the slider to the Light setting will decrease the contrast levels of the engraved
output.

Tip

There are other ways to adjust an engraved image's contrast such as: adjust the power / speed settings or simply adjust the contrast of the image in software with the graphic software application.
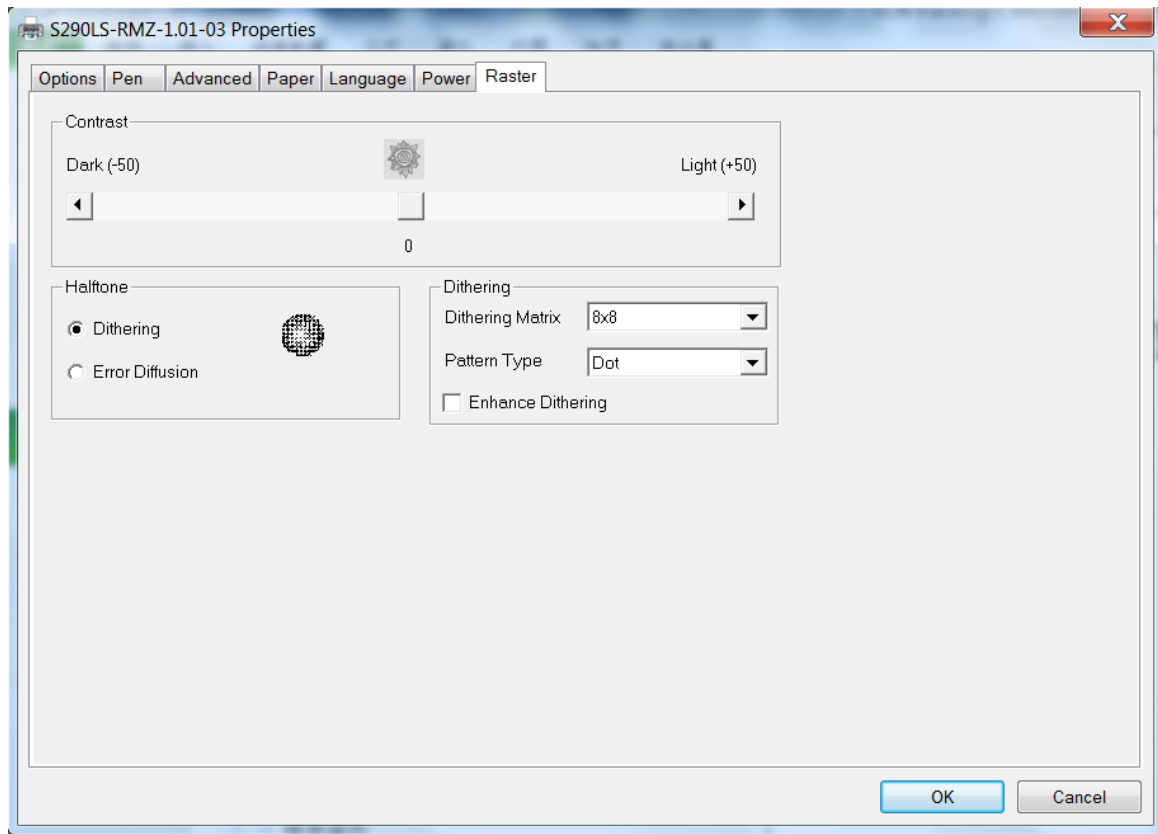
Halftone (Raster Page) [DEFAULT SETTING: Dithering]

This option controls the way a raster-engraved image is processed. The "digital image to engraved output" process can be processed via two methods: Dithering or Error Diffusion. Each offer additional output options yielding different output effects, style, and quality.

- **Dithering:** Interprets and outputs the raster engraving via the dithering method. This mode will allow you to select the Pattern Type and Dithering Matrix, and Enhanced Dithering.

    o **Pattern Type: Dot, Bayer, Corner, 45 Degree [DEFAULT SETTING: Dot]**
      Each pattern type uses a different shape and arrangement of dots to compose the shading effect of a raster image.

      The following diagram is an example of the raster effects when using the different pattern types.
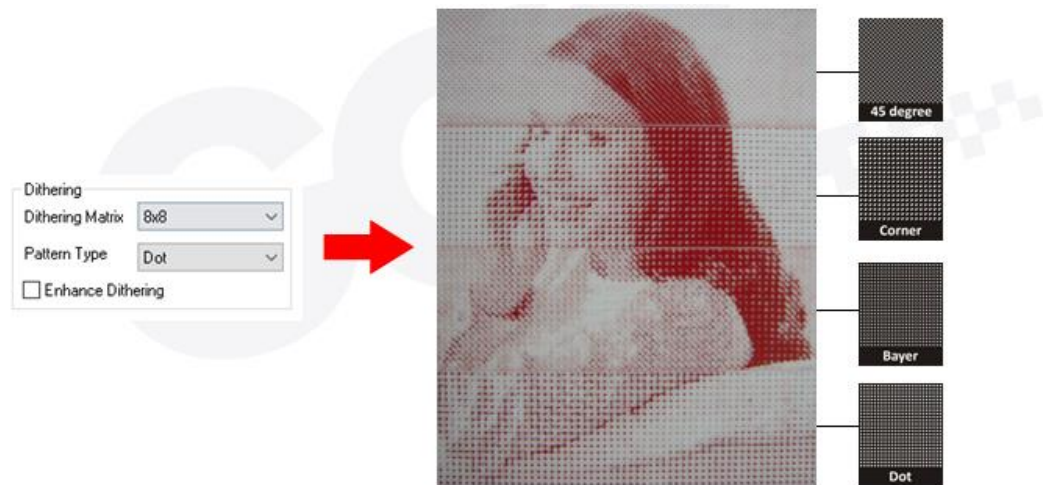
o **Dithering Matrix: Variable depending on the Pattern Type selected.**
   [DEFAULT SETTING: 8x8]

This controls the resolution (dot size) and the number of dots the image is broken down into for the dithering process. As an example, selecting 2 x 2 will shade with a 5-grade halftone, where as an 8 x 8 Dithering Matrix will dither with a 65-grade halftone.
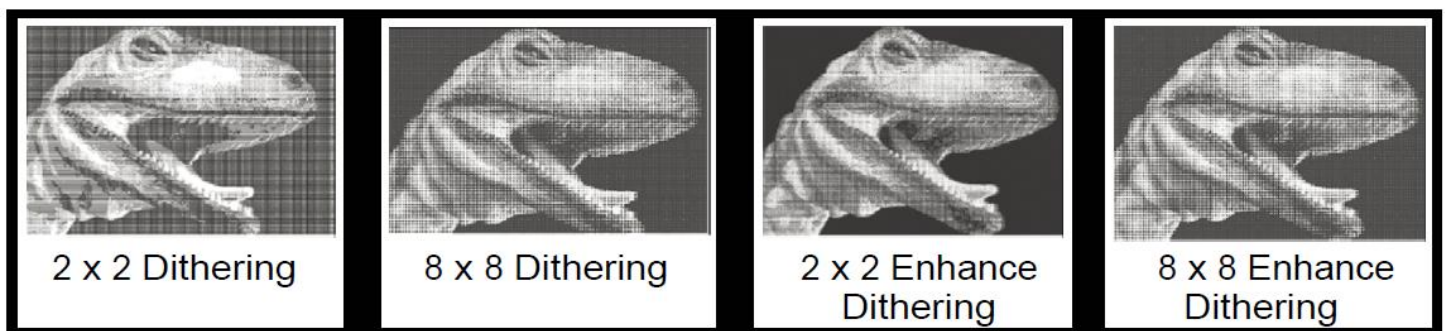The following diagram is an example of the raster effects when using the different dithering matrices.

o **Enhance Dithering [DEFAULT SETTING: Unselected]**

Selecting this will produce a finer dithering output.

o **Error Diffusion (Raster Page):**
   Interprets and outputs the raster engraving via the error diffusion method. This mode will allow you to select from three diffusion types: Floyd, Stucki, and Jarvis.

o **Diffusion Type: Floyd, Stucki, Jarvis [DEFAULT SETTING: Floyd]**

Each diffusion type presents the shade of image as different spread halftones instead of dots to compose a raster image.

The following diagram is an example of the raster effects when using the different diffusion types.

Floyd   Stucki   Jarvis
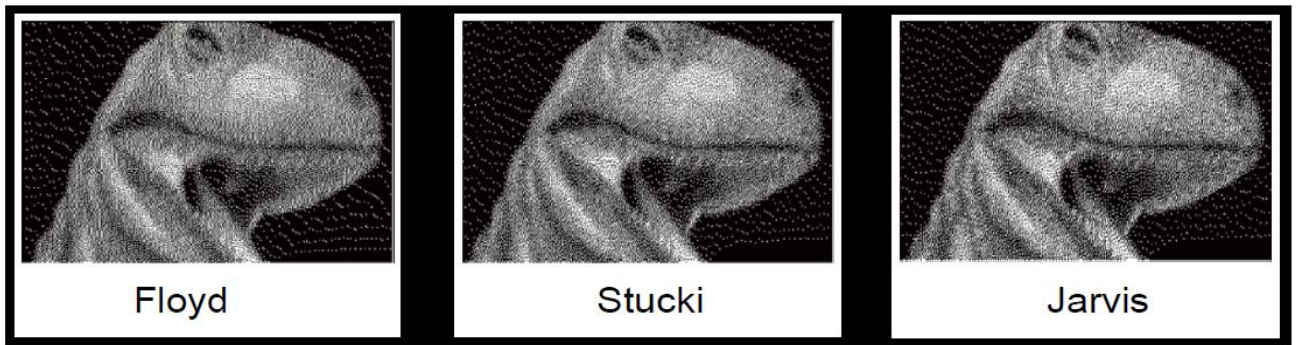
Tip

There is no "correct" or "best" setting when using the Raster options. The most appropriate settings will be based on a variety of factors: your design, the material you are engraving on, and the results you wish to achieve, etc. Please take some time to experiment with the multitude of raster options to get the one you feel is the best for your piece. This is where much of the fun in engraving is….experimentation!

6

Chapter 6
Engraving and Cutting Techniques

Raster Engraving

Vector Cutting

To modified image settings of a picture for better engraving quality

6.1 Raster Engraving

A laser engraver can process text, scanned image, digital picture, or design by "laser firing" grids / dots of individual pixels into a raster image. Think of this as simply "printing" your job onto any particular material. An example of a raster engraved piece is text engraving as shown in the picture below.

6.2 Vector Cutting

A laser engraver can process text, design, and images composed of lines through continuous-firing of the laser to cut out various shapes. When performing vector cutting operations, imagine the laser head as a pair of scissors cutting out the lines specified in your design. An example of a vector cut piece is copper cutting as shown below.


The LaserPro S290LS Print Driver determines which sections should be raster engraved or vector cut based on the outline width of that particular area or section of the design. In order to prep a particular section for vector cutting, you will need to set that object's fill color to white and set its outline thickness between 0.001" (0.025 mm) to 0.004" (0.1 mm) via the graphics software.

Below is an example of how to prep an area (in this case, we will use a section of text) for vector cutting. CorelDRAW will be used as the selected graphics software.

1) With the text function, create a string of characters and select those characters by clicking on the text.

2) Change the text fill color of the selected characters to white by left clicking on the white color from the CorelDRAW Color Palette (located on the right hand side of the screen)

3) Change the outline color of the selected characters outline by right clicking on the desired color from the CorelDRAW Color Palette.

4) Change the selected characters outline thickness to the thinnest width by right clicking on the selected text select <Properties> → Click on the <Outline> tab and change the Width to its thinnest dimension. Click on "OK" to apply the changes.

5) Now your string of characters has been properly designated as an area to be vector cut. Simply "print" your job (output the file to the LaserPro S290LS) and watch as your string of characters is vector cut.

6.3 Modify Image Settings of a Picture for Better Engraving Quality

1. Connect your digital camera to the computer by USB cable.
2. Download the picture from the digital camera to the computer
3. Select the picture that you want to engrave.
4. Import the image from the folder where the picture is located by selecting File/Import
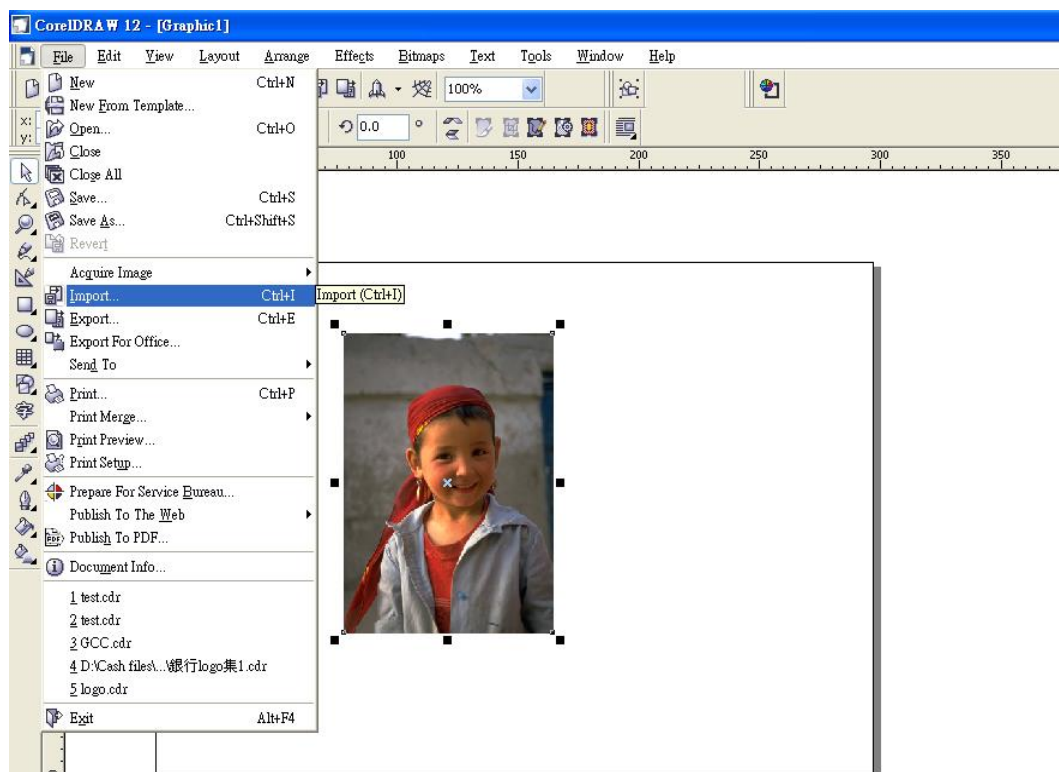
5. Convert the image to Bitmap by selecting the image and click on Bitmaps/Convert to Bitmap
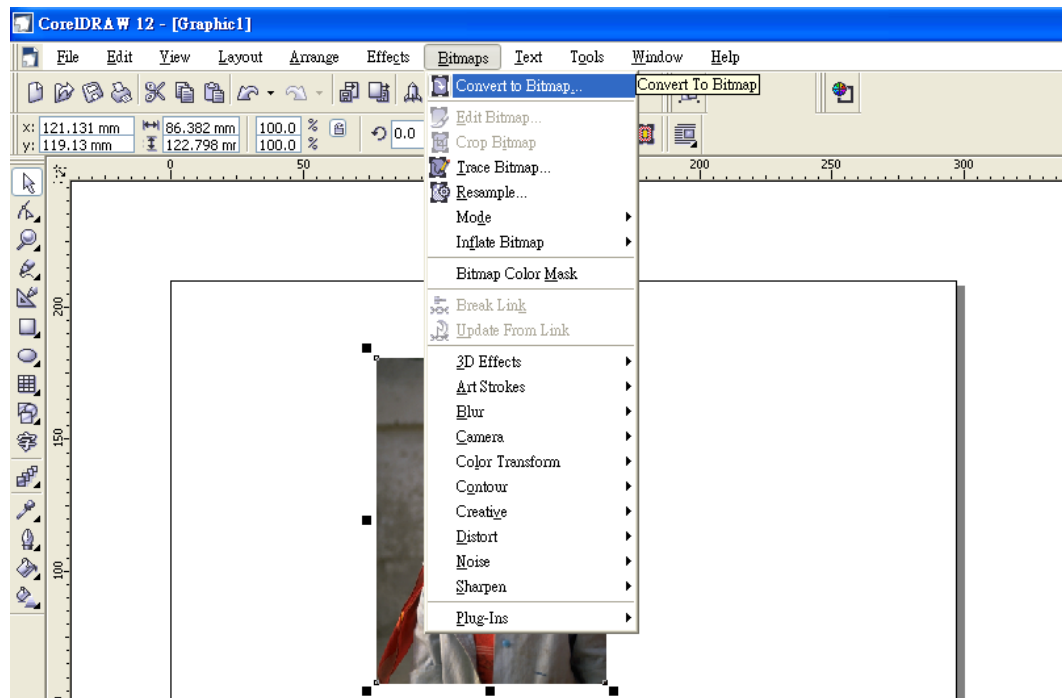
6. Change the Bitmap settings by setting "Color" to Grayscale (8-bit) and "Resolution" to 300 dpi and click OK.
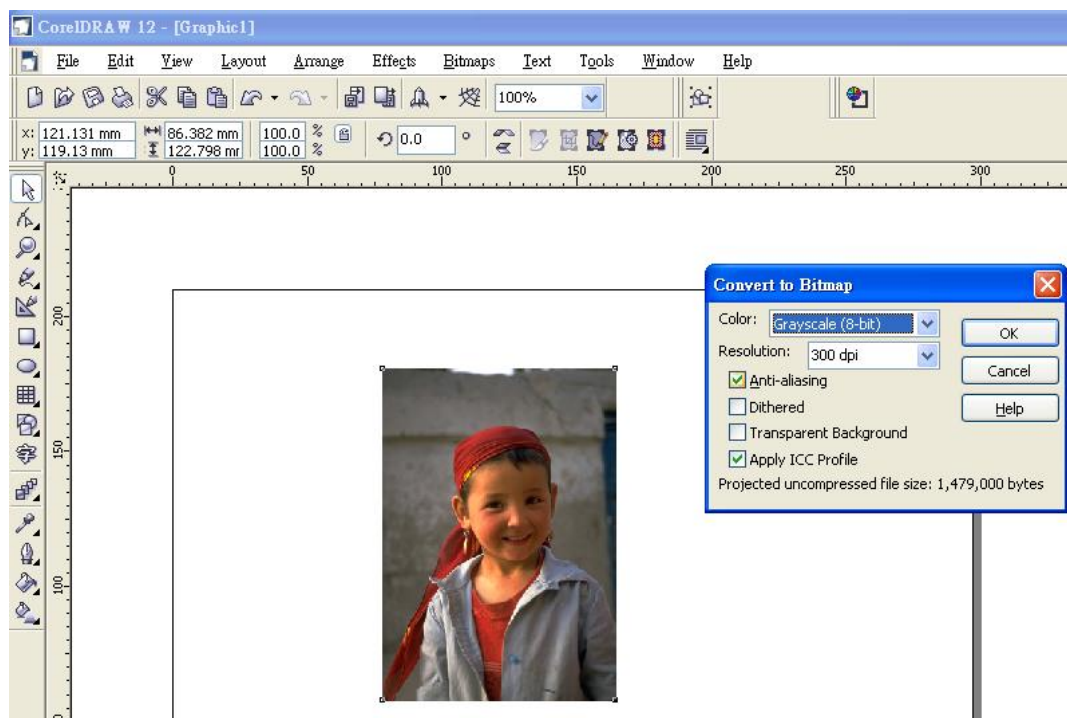
7. Finally, Invert the image by selecting Effects/Transform/Invert
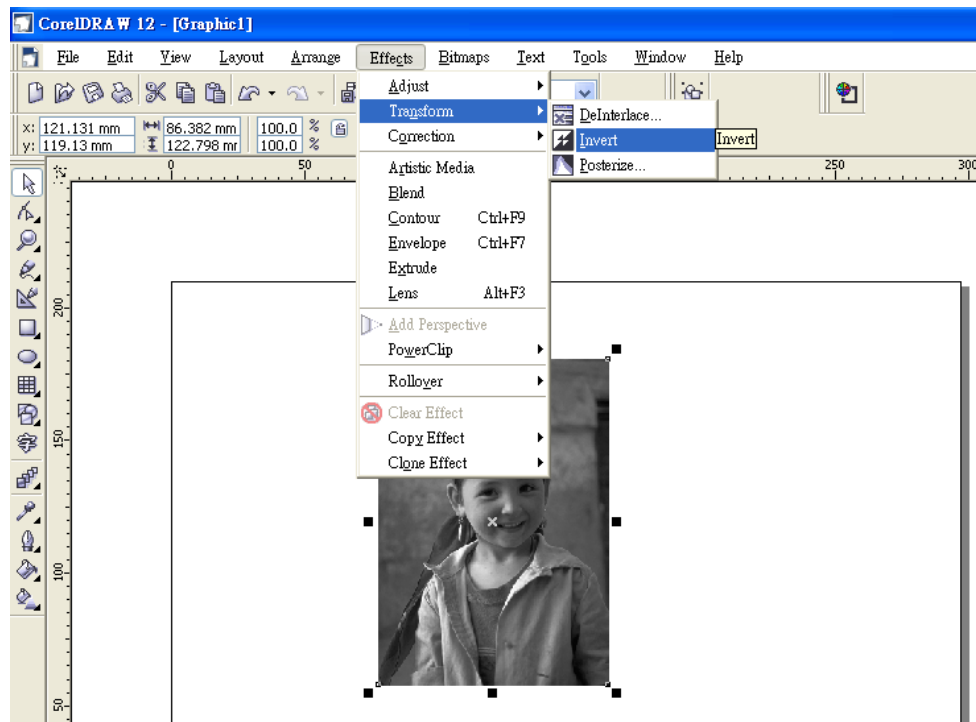
8. Now you are ready to output the modified image by clicking File/Print

232001410G(12)
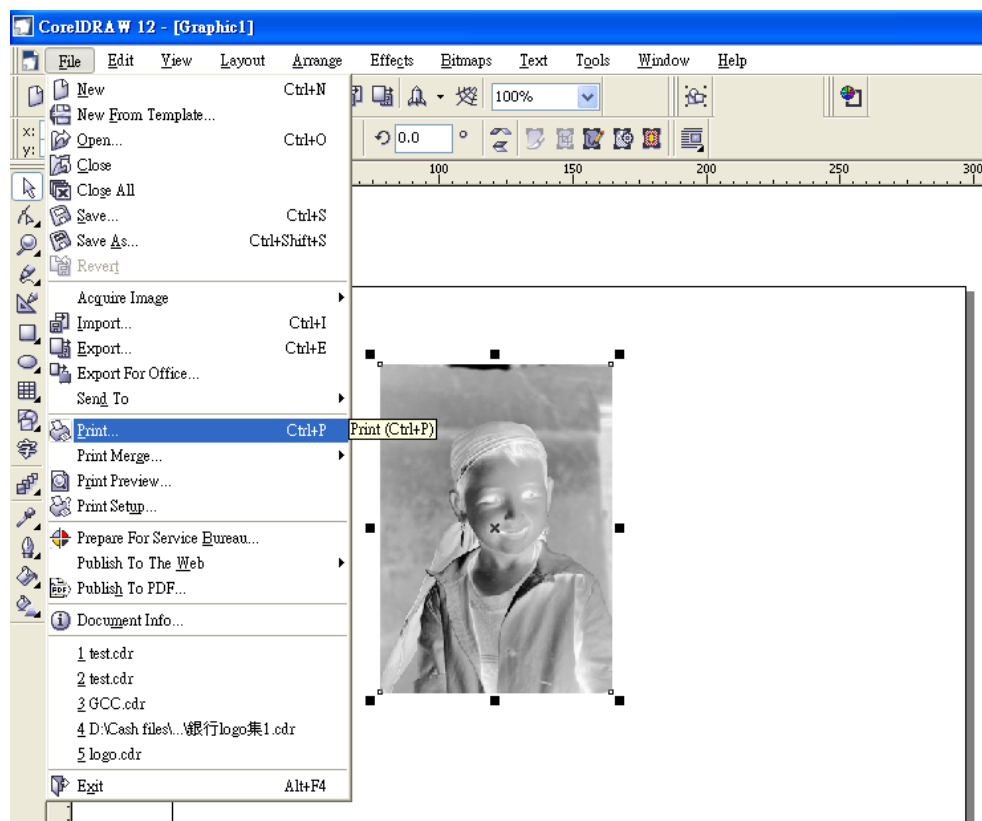
6.4 Waveform Knowledge Base

A waveform is a pulse with a specific shape, pulse energy and duration. The benefits of this are that it allows the user to adjust the pulse conditions to optimize marking, micromachining and applications. GCC Fiber Laser is equipped unique Waveform function to give users greater control over laser pulse parameters that can lead to more efficient and effective processing. An example would be the use of low repetition rate, high-energy pulses to rough out and remove the bulk of the material while a higher frequency shorter pulse with less energy can subsequently be used in a polishing pass yielding a better surface finish.

Waveform allows users flexible control over pulse duration and peak power through the use of predefined waveforms. Each waveform is optimized for pulse energy and peak power at a given pulse duration and frequency. These waveforms can be used at any power demand and frequency giving users great scope for pulse characteristic optimization for specific applications.

To achieve a high quality finish, Waveforms are used to maintain control of the engraving process. When engraving starts, a less aggressive pulse is initially used in order to avoid a perimeter ridge around the engraved area. Then the Waveforms can be switched to a long high energy pulse with its higher material removal rate. Throughout this process, a short pulsed Waveforms is regularly used to clean the engraved area which helps to remove dross and debris. After the engraving process has finished, the surrounding area is Laser cleaned using a short Waveforms to remove any surface deposits. Note that there is a trade-off between material removal rate and engraving quality.

Below is the waveform table for different S290LS wattage:

Waveform Number	20 / 30 / 50RMZ			20SHS			40HHS		
	Pulse Duration (ns)	Pulse Frequenct (kHz)	Pulse Energy (mJ)	Pulse Duration (ns)	Pulse Frequenct (kHz)	Pulse Energy (mJ)	Pulse Duration (ns)	Pulse Frequenct (kHz)	Pulse Energy (mJ)
0	260	20	1	220	35	0.57	250	30	1.33
1	40	90	0.2	120	55	0.36	130	47	0.85
2				55	90	0.22	60	76	0.53
3				25	170	0.12	30	145	0.28
4				18	270	0.074	20	230	0.17
5 - 10				15	290	0.068	9	250	0.16
11				220	35	0.57	250	30	1.33
12				205	37	0.54	230	32	1.25
13				200	39	0.51	220	34	1.18
14				190	44	0.45	200	38	1.05
15				160	48	0.42	170	41	0.98
16				140	51	0.39	150	43.5	0.92
17				120	55	0.36	130	47	0.85
18				100	60	0.33	110	51	0.78
19				95	63	0.32	100	54	0.74
20				85	68	0.29	90	58	0.69
21				75	72	0.28	80	62	0.65
22				65	80	0.25	70	69	0.58
23				55	90	0.22	60	76	0.53
24				45	105	0.19	50	89	0.45
25				35	125	0.16	40	108	0.37
26				25	170	0.12	30	145	0.28
27				18	270	0.074	20	230	0.17
28				15	290	0.068	9	250	0.16
29 - 63				Duplicate of waveform 28					

10G(12)

Color Engraving With Waveform

One of the benefits of waveforms is to do color marking on metal materials. The illustration utilizes a S290LS 40HHS model to process matt 304 stainless steel.
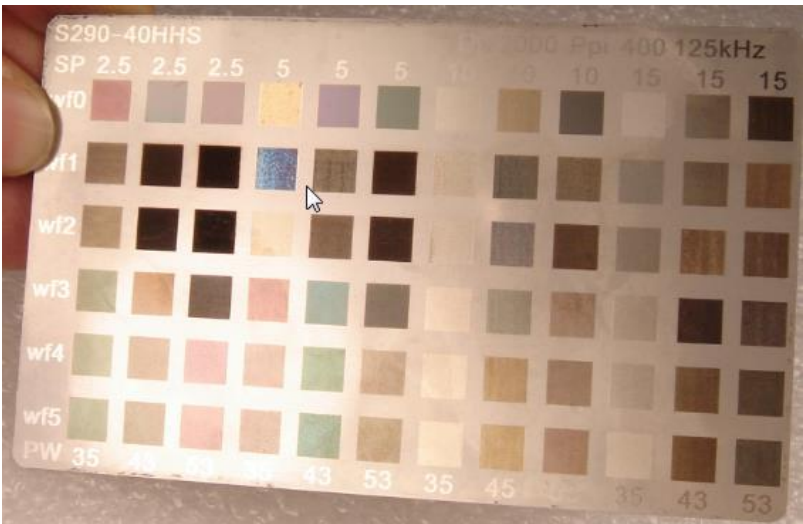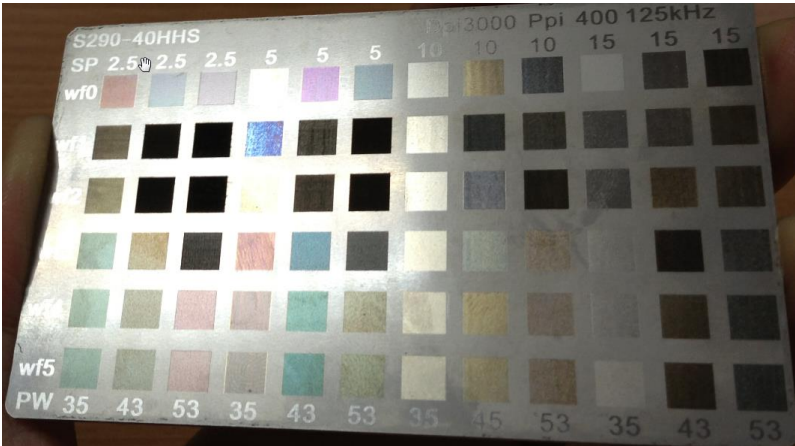
Firstly design a matrix with fixed speed/ power range, and frequency, change multiple waveforms as the key parameter, different colors can be marked by laser.

Recommended parameter settings for 40HHS model is low speed range under 15%, moderate power range 28~55%, and fixed 3000 DPI with waveforms selection 0, 1, 2, 3, 4, 5.

Pick up the preferred color, and repeat the corresponding parameters to color your design graphic. The process will greatly save your time than going through complicated parameter experiment.

	Speed											
	2.5%	2.5%	2.5%	5%	5%	5%	10%	10%	10%	15%	15%	15%
WF0												
WF1												
WF2												
WF3												
WF4												
WF5												
	35%	43%	53%	35%	43%	53%	35%	43%	53%	35%	43%	53%
	Power											
	3000 DPI, 125kHz Frequency											

TIPS:
1. Place the media over the whole work table may get varied color contrast due to slightly changed spot size (power density) on different location of work table. Place the media to same position will help the color reproduction.
2. High frequency setting will darken the marking, and reduce the color variation effect; while low frequency setting will destroy the metal surface only. 125kHz is recommended for frequency.
3. Low DPI setting (below 1500 DPI) will mark the material with different gray levels only, not colorful contrast, high DPI is recommended.

NOTE:
1. Color marking is very sensitive to material surface treatment or texture (matt, glossy, brushed, or mirror), spot size (power density), and material composition. Even same parameters applied on same materials, the color can't be guaranteed to repeat correctly.
2. The color of marking may vary to different colors when viewing in different angle with reflecting ambient light.

7

Chapter 7

Optional Items

Fume Extraction System
Air Compressor
Focus Lens
SmartBOX
Rotary Chuck
SmartGUARD Fire Alarm

When purchasing the LaserPro S290LS from your local authorized GCC distributor, you will be provided with a chance to purchase optional items to enhance your experience with the acquired system. If anytime after the purchase of your LaserPro S290LS, should you ever consider to purchase any optional item, please contact your local authorized GCC distributor.

7.1 Fume Extraction System Option

To properly remove dust, vaporized materials and chemical smoke from the working area and machine, it is necessary to install a suitable Fume Extraction system. The Fume Extraction system and other components are readily available from your local authorized GCC distributor or you can elect to purchase and install one yourself with components found at your local industrial supply store.

LaserPro's Fume Extraction Systems are specifically designed to prevent personnel from inhaling hazardous fumes and dust generated by the laser process. Available for all LaserPro engravers, the LaserPro Fume Extraction System represents the latest in fume extraction and odor reduction technology for all types of applications. Quiet operation, high vacuum capacity, compact design and long life expectancy are but a few outstanding features. Each LaserPro Fume Extraction System is powered by a maintenance-free, continuous-running turbine. In order to ensure personnel safety and legal compliance, the LaserPro Fume Extraction System is CE-compliant for Europe and ETL-certified for the United States and Canada. To purchase a LaserPro Fume Extraction System, contact your local authorized GCC distributor.

INSTALLATION (Self-Assembled Unit):

1) Purchase an exhaust system at your local industrial supply store, we suggest that you have a contractor install the exhaust system. We highly recommend you to install the exhaust system outside of the building for both noise considerations and if it does not possess filtering capabilities.

2) Mount the exhaust system in an obvious and accessible location, not too far from the LaserPro S290LS, so it can be routinely switched on prior to laser engraving. The maximal distance you should mount the exhaust system away from the LaserPro S290LS depends on the blower's vacuum capacity. We recommend that you consult with the vendor regarding the unit's vacuum force, maximal distances, based on the available models.

3) Connect rigid and smooth walled tubing such as PVC or sheet metal with a 4" diameter to the ventilation opening located on the rear side of the LaserPro S290LS. (As shown in the picture below). Try to keep this tubing as straight as possible as bends reduce the exhaust efficiency. Use the appropriate sized tube clamps and sealants to ensure a tight and secure attachment.

4) There are two exhaust openings on the rear side of GCC LaserPro machines, you can connect the top or bottom one, or both for application requirements. The top ductwork is suitable for dust, smoke generated on material surface when doing laser engraving, which will reduce residue left on material surface; while the bottom ductwork is recommended for laser cutting jobs. Optimum down vacuum is critical for clear cutting edge when laser cutting materials.
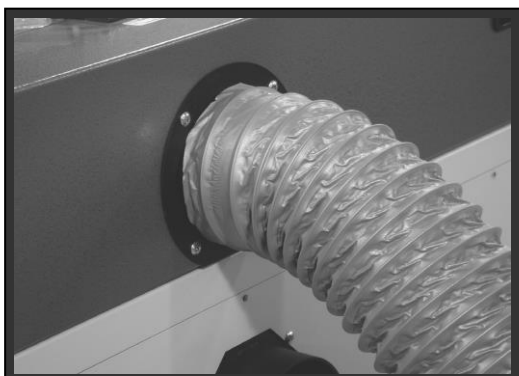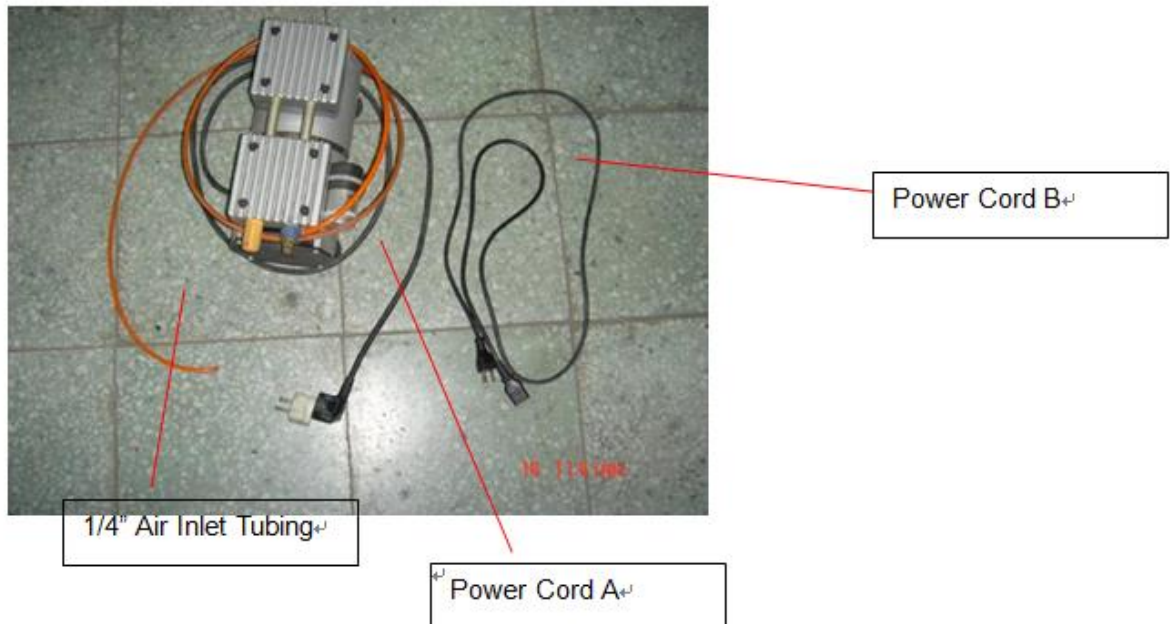
7.2 Air Compressor

Specifically designed for laser engravers, the air compressor utilizes an oil-free diaphragm. The air compressor helps to eliminate harmful and potentially damaging moisture from the laser optics, maximizing life of the laser optics. In addition, the air compressor provides an optimal air flow to the SmartAIR nozzles to minimize flaming, suppress working temperatures, and blow away dust and particle by products generated from the laser process.

Power Cord B

1/4" Air Inlet Tubing

Power Cord A

NOTE

It is important that the 1/4" air tubing has clean, straight cuts on each end. Jagged or slanted cuts will not produce adequate sealing capabilities.

INSTALLATION:

1) Remove the plugs on the air compressor to expose the air inlets.

2) Fasten the included air tube fastener valve to the outgoing air inlet (indicated by 2a) and the air filter into the ingoing air inlet (indicated by 2b).

2b

2a

Plugs
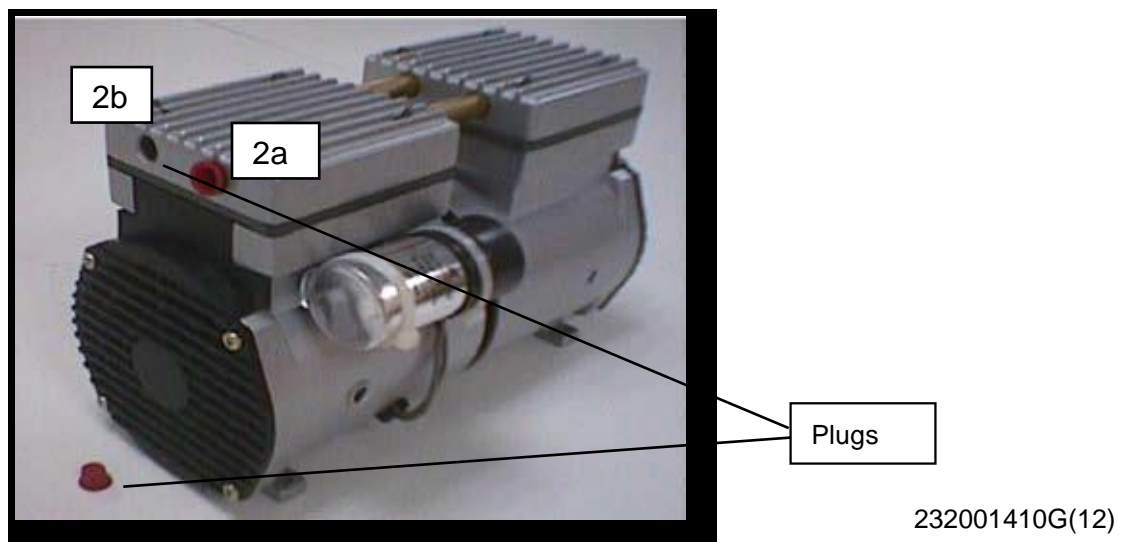
3) Connect a 1/4" tubing to the air tube fastener valve on the air compressor.

4) Open the bottom doors found on the front side of the S290LS to locate both the Air-Assist Valve and Internal Power Sockets. As indicated below:

Air Assist Value

AC Internal Power Sockets
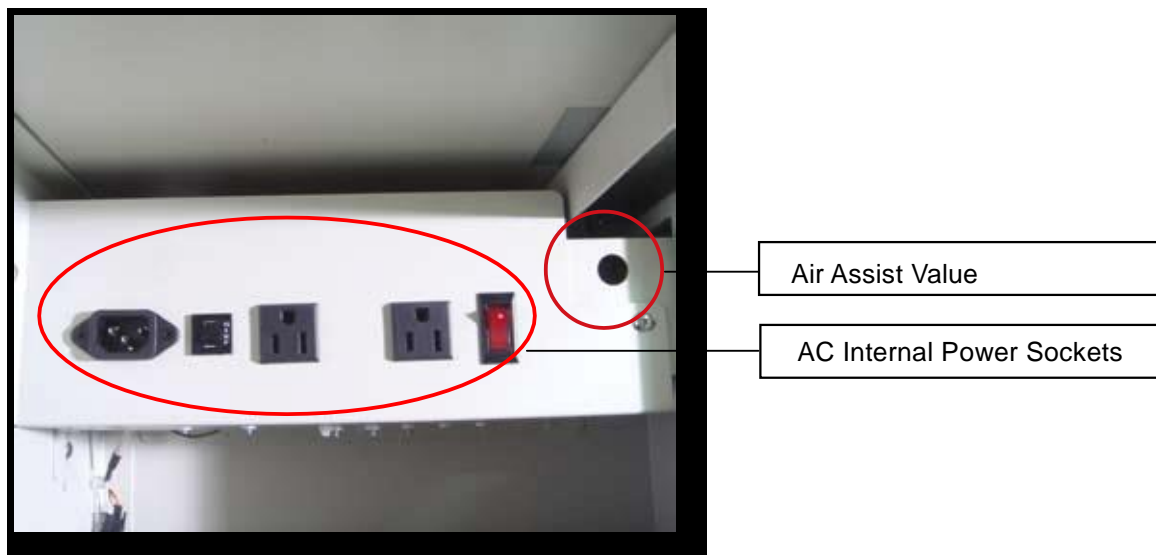
5) Plug the air compressor's power cord A into the AC internal power socket.

6) Plug the female end of power cord B to the AC internal power socket and the male end to an external power outlet.

Power Cord B Socket

Power Cord A Socket
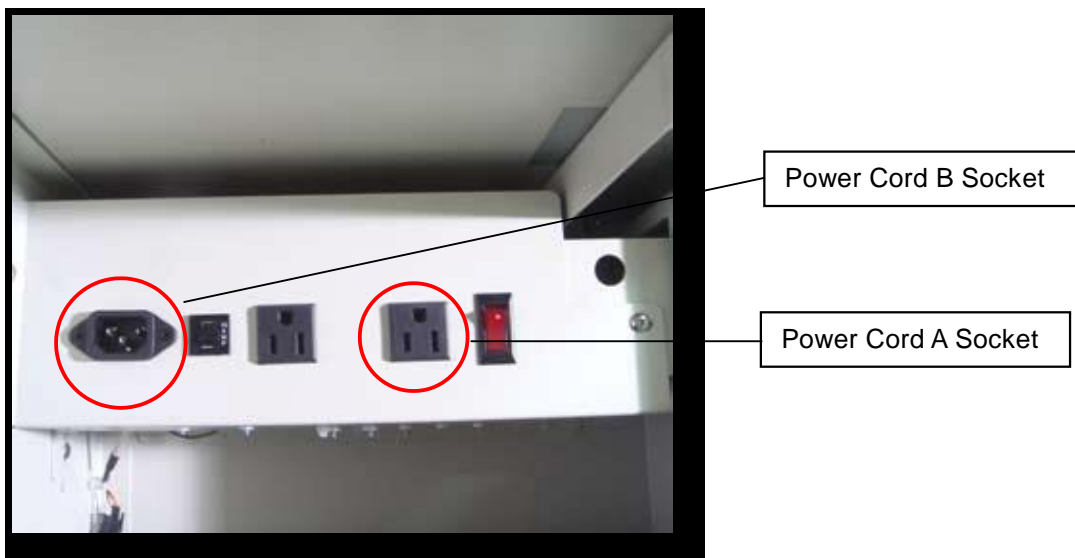
7) Take the unattached end of the 1/4" air tubing (other end already connected to air compressor) and connect it to the air tube connector on the air assist valve. Make sure you press down on the air tube fastener when inserting the 1/4" air tubing, to form a tight, secure attachment as indicated in the diagram below.

Air Flow Regulator:

| Turn Clockwise to increase airflow |
| Turn Counter-Clockwise to decrease |

Ait Tube Fastener

Air Tube Connector
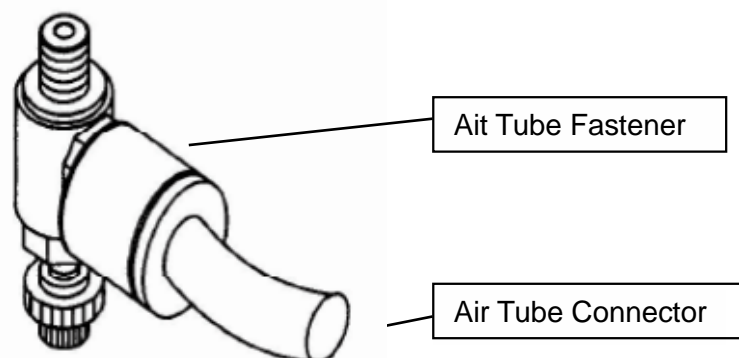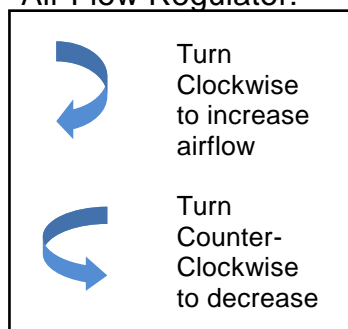
8) Congratulations, you have finished setting up the air compressor. Make sure you have the proper SmartAIR nozzle installed (depending on your application), before you turn on and utilize the air compressor.

OPERATION:

(1) Switch on the air compressor unit and make sure that the airflow regulator on the air assist value is opened (turn clockwise to increase the airflow, counter-clockwise to decrease the airflow). The air nozzle under the laser head should emit a steady flow of air.

(2) With the SmartAIR nozzle and air compressor properly installed and operating, all configurations and settings relating to air-assist functions are controlled through the print driver and hardware control panel. Please refer to the LaserPro S290LS PEN page of print driver section of this manual for details on how to enable and configure air-assist functionalities.

7.3 Focus Lens Option

GCC offers two different focal lenses namely the 2.0" and 4.0" for different applications. The number description, 2.0" and 4.0" signifies the distance of where passed through beam will converge. For example, when a laser beam passes through a 2.0" focus lens, the beam will converge at a 2.0" distance resulting in a concentration of energy at that spot.

The resulting spot size from the different focus lens are also different and the following chart shows the different spot sizes achieved from the different lenses.

- 2.0" Lens: The 2.0" fiber laser focus lens with concentrated power within small spot area which is good at cutting thin metal like 0.1mm copper foil.

- 4.0" Lens: The 4.0" lenses are good for marking on metal materials.
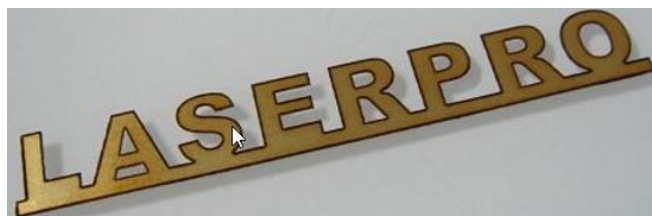
Lens	2.0"	4.0"
Spot Size	0.0005" (0.0129mm)	0.001" (0.0258mm)

7.4 SmartBOX Option

The SmartBOX is an innovative combination of a cutting box, honeycomb table, and material support stands. During the cutting and engraving process, unwanted scrap, dust, and vapor byproducts are left behind. The cutting box collects the larger scrap byproducts while venting out the smaller dust particles, vapors, and smoke to minimize excess buildup on the machine, worktable, and your project. The SmartBOX allows you to maintain a clean worktable and minimizes backside burning of your media, whether you are working with thick and firm materials or thin and flexible materials.

SmartBOX Components

- **Cutting Box (a)**
- **Honeycomb Table (b)**
- **Material Support Stands (c)**
- **Thumb Screws(d)**

a

b

c

d
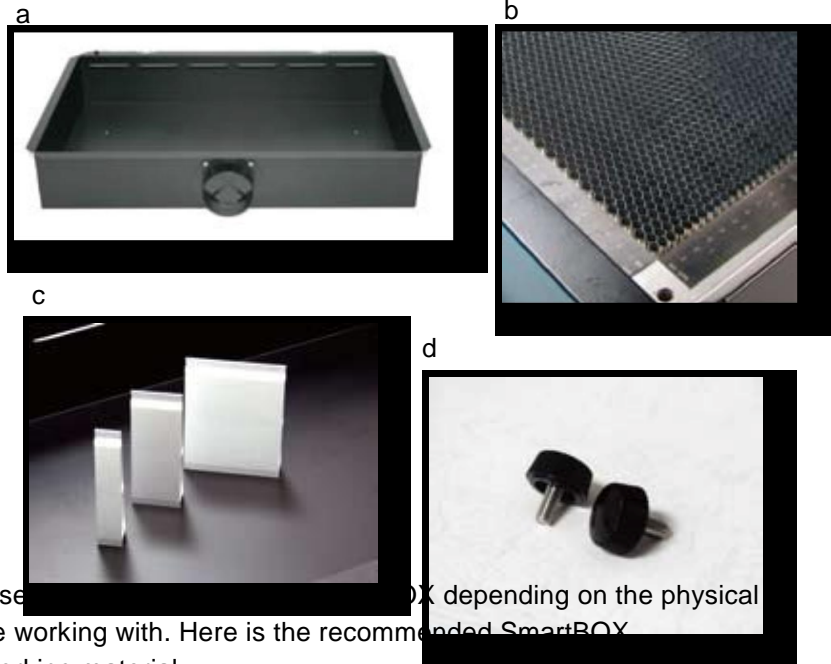
It is highly recommended that you use the appropriate SmartBOX depending on the physical properties of the material you will be working with. Here is the recommended SmartBOX component setups based on your working material.

Component / Application	Cutting Box	Honeycomb Table/ Aluminum Grid Cutting Table	Material Support Stands
Thin, Flexible Materials	Required	Required	Not Required
Thick, Firm Materials	Required	Not Required	Required

> **NOTE**
> Experienced users may choose to try other component setups to suit their particular engraving / cutting techniques or working material. Feel free to explore different ways to setup the various SmartBOX components to generate results you wish to achieve.

INSTALLATION / OPERATION (Cutting Box and Honeycomb Table):

1) Open the front pass-through door and lower the work table to the lowest possible position through the LaserPro S290LS control panel.

2) Insert the cutting box and attached honeycomb table through the open front pass-through door onto the work table, with the Fume Extraction opening facing towards the back end of the LaserPro S290LS. Ensure the rear and left side of the cutting box is aligned to the edges of the left and

   right rulers on the work table.

3) Lift the honeycomb table to find the four screw holes at the bottom of the cutting box. With the included thumbscrews, secure the cutting box to the work table and close the

   honeycomb table.

4) **[OPTIONAL]** If you have an Fume Extraction system option installed, then you will need to attach the Fume Extraction system's pipe connector to the SmartBOX's Fume Extraction opening from the rear side. (For detailed instructions to setup the Fume Extraction system, please see the FUME EXTRACTION UNIT section in section 7.1).

Congratulations, you are now ready to position your thin, flexible materials on top of your honeycomb table / cutting box and commence your tasks.

INSTALLATION / OPERATION (Cutting Box and Material Support Stands):

1) In order to use the cutting box along with the material support stands, you must first remove the honeycomb table from the cutting box. Before you position the cutting box in the LaserPro S290LS, first loosen the screws that attach the hinges of the honeycomb table to the cutting box.

2) Remove the honeycomb table. Please keep in mind the honeycomb table surface is fragile; therefore, it is suggested to keep it in a safe place.

3) Open the front pass-through door and lower the work table to the lowest possible position through the control panel.

4) Insert the cutting box through the open front pass-through door and place it onto the work table, with the Fume Extraction opening facing towards the back end of the LaserPro S290LS. Ensure the rear and left-hand side of the cutting box is aligned to the edges of the left and right rulers on the work table.

5) Find the four screw holes at the bottom of the cutting box. With the included thumbscrews, secure the cutting box to the work table.

6) On the front right hand side of the cutting table, there will be a metal guard, which must be swiveled so that it is perpendicular to the front side of the cutting table (as shown in the picture below). This allows the LaserPro S290LS to properly account for the extra height the cutting table which adds to the cutting table.

| ⚠ **CAUTION** |
| --- |
| Damage may occur to the system if you try to raise the work table without proper setting of the metal guard. |

7) Now position the included material support stands so they support the thick, firm material you will be working with, while avoiding the laser path. In other words, avoid placing the support stands underneath any section of the material that will be lasered, especially during laser cutting.

7.5 Rotary Chuck

The rotary chuck option provides the S290LS with the ability to engrave on cylindrical or spherical objects. In addition to the standard X, Y, Z axis, the rotary attachment allows for a fourth axis which rotates your object 360° to allow for engraving on cups, wine glasses, and other cylindrical or circular objects.
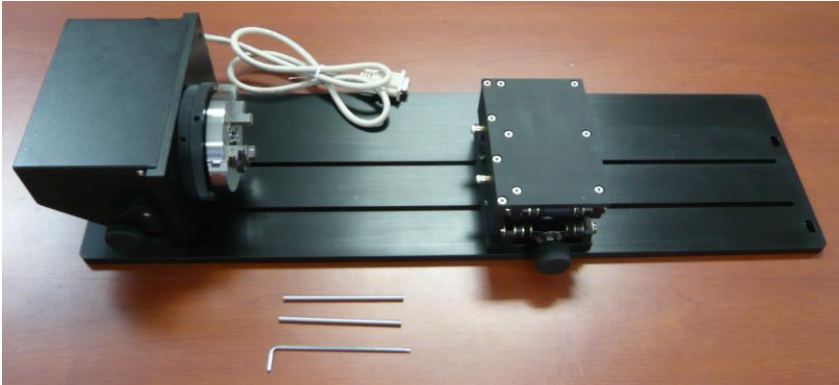
Work Piece Limitations	
Maximum Length	410 mm (16.1 inches)
Maximum Loading Weight	4 kg (8.8 lbs.)
Minimum Diameter	0.5 mm (0.02 inches)
Maximum Diameter	120 mm (4.7 inches)

INSTALLATION:

1) Turn off the power of the engraver.
2) Set the Rotary Chuck onto the working table so that the bottom mounting screws correspond to the positional holes on the working table. In addition, the clamping end of the Rotary Chuck must be leveled against the working table with the rotary's positional indicator (center point of the clamping end of the Rotary Chuck) aligned to the center position on the laser engraver's Y (vertical) axis.
3) With the Rotary Chuck properly positioned, tighten the mounting screws to secure the device.
4) Open the front door panel of the laser machine and connect the Rotary Chuck cable to the connection port located on the machine chassis, and close the front door. (shown in the picture below).
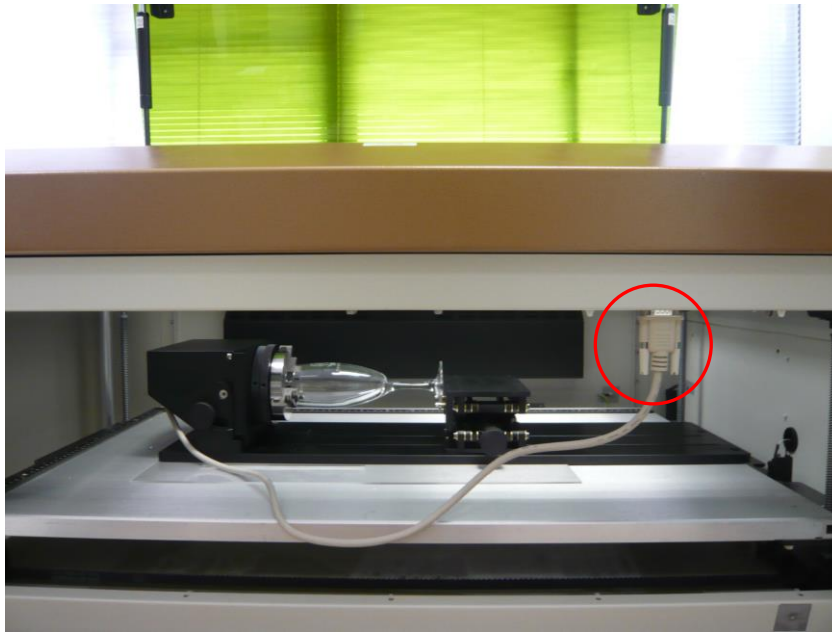
To load the object, you can use the enclose tools to widen or tighten the metallic claws. Simply insert the two metal pins into the holes on the turn-dial and turn it to widen or tighten the claws to hold the engraving object.
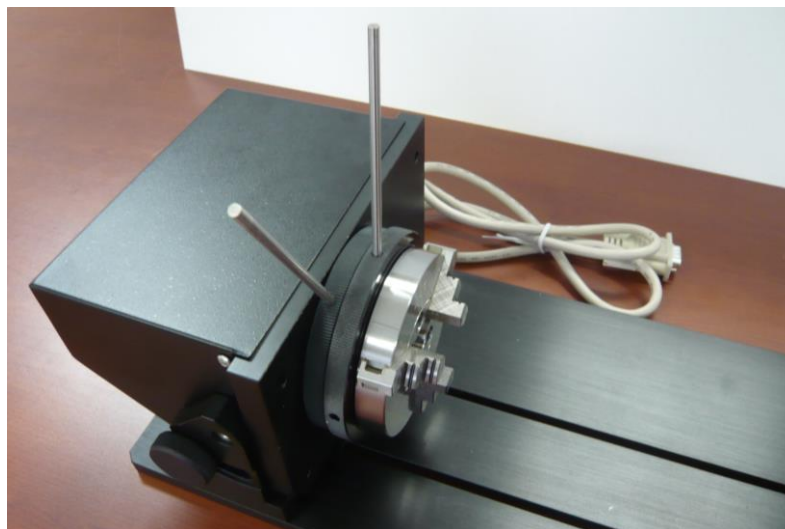
There are two different ways that the rotary attachment can hold an object, by sliding the clamps inwards or outwards to hold the object as shown below.
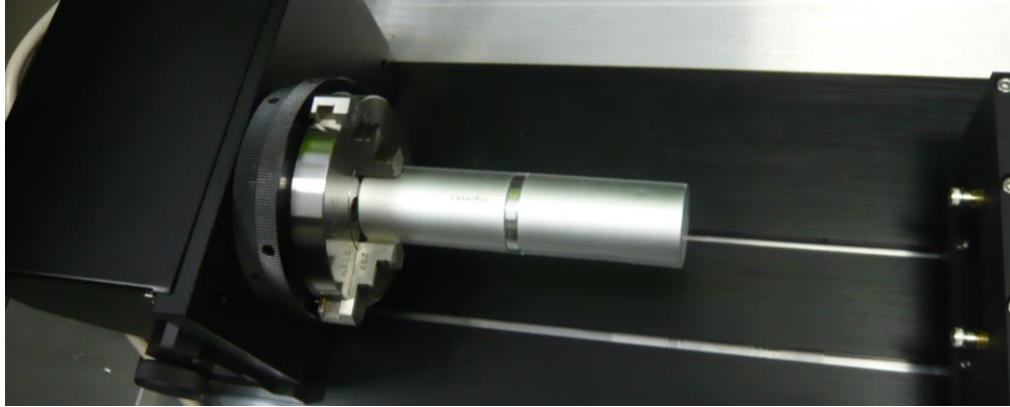
The clamps on the rotary attachment can be detached and reverted for better fitting of objects of different sizes. Note that the clamps should be assembled by lining up the correct numbers.
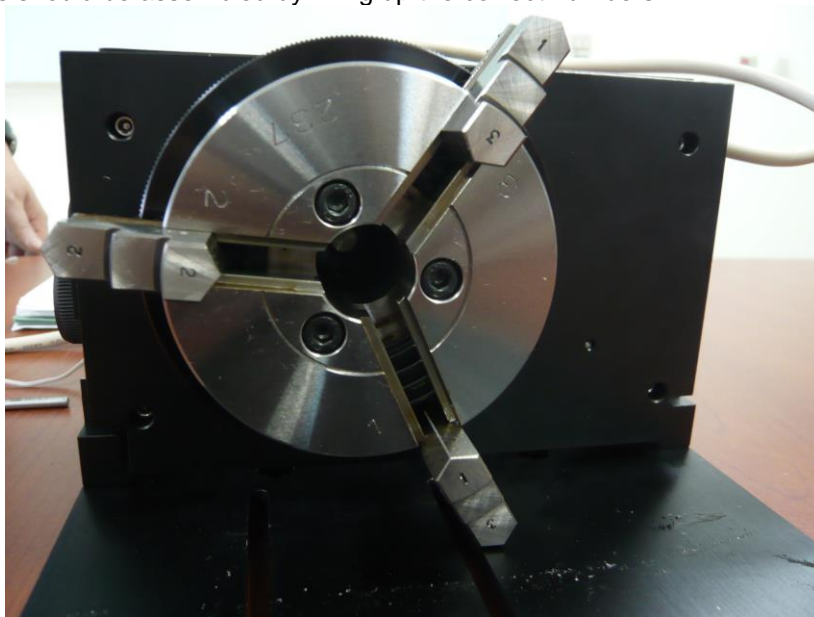
Please remember to lubricate the detachable clamps along the groove with machine oil regularly after each use.

The rear end of the Rotary Chuck also can be locked or unlocked to slide its position by using an Allen key as shown below.

Dial the lever indicated with red arrow below to move up or down the rear end which will adjust its leveling to match clamping end. The red circle marked leveling screws can be removed and reassembled to different height level of openings with Allen key.

⚠ **CAUTION**

Please make sure that the lens carriage will not collide with the Rotary Chuck prior to starting work by lowering down the work table first.

OPERATION:

1) Use a ruler to measure the diameter (at the point on the work piece you will be engraving) and length of the work piece you will be engraving. Make a record of this.

2) Unlock the adjustable rear end of the Rotary Chuck, load the work piece onto the Rotary Chuck by centering the object to the clamping end and adjustable rear end. Adjust the leveling screws on the rear end of Rotary Chuck to make sure the work object is centering to the clamping end, thus work piece is horizontally leveling to the laser carriage in X axis. Slide the adjustable rear end to accommodate the length of the work piece firmly.

3) Manually move the laser carriage to the proper X/ Y location on the work object where you will do laser engraving or cutting. Hit the Auto Focus button on control panel and the laser machine will now properly focus at the location to be laser engraved or cut.

4) Prepare the graphic you would like to work with the Rotary Chuck, print it to GCC laser Print Driver, and go to "Paper" page of the Print Driver.

4) From the Paper Page, the first thing you must do is to check the Rotary Fixture. The Paper Size options and Rotary Parameter will change to allow for proper input based on your rotary attachment.

    a) Under Paper Size, the X value represents the length of your working piece. Enter the length of your work piece in this field.

    b) Under Paper Size, the Diameter value represents the diameter of your working piece (at the position you wish to engrave). Enter the diameter of your work piece in this field. Again remember the proper diameter value would be the diameter location on your work piece you will be engraving.

    c) Under Rotary Parameter, the Offset value represents distance from machine default origin to where you would like to start laser job. The default value is zero.

5) Go back to other pages of GCC Laser Print Driver to set up laser parameters like speed, power, dpi etc. (refer to Chapter V of user manual of laser machine for details) and click "OK" to print your design to laser machine for starting job

> **NOTE**
> The maximum diameter and length of the to-be-engraved object is 120 mm and 410 mm respectively. Its maximum weight should not exceed 4kg.

7.6 SmartGUARD Fire Alarm Option

Laser cutting and engraving operations using the SmartGUARD device protects the operator, machine, produced and the work products from potential fire hazards. During the engraving process, flames may be produced when working with combustible or easily-flammable materials, such as paper or wood. The SmartGUARD is an optional item that can be set to notify the operator through audio warnings and automatically shut down the laser firing as a safety precaution.

INSTALLATION:

If you have purchased your system with SmartGUARD, then no installation is required, as your system will arrive with SmartGUARD pre-installed.

For system owners that did not initially purchase this option, but would now like to add the SmartGUARD, they will need to contact your local authorized GCC distributor to have this great feature installed.

1. Lift the SmartLID using the handles.

SmartLID™ Handles

Y motor PCB
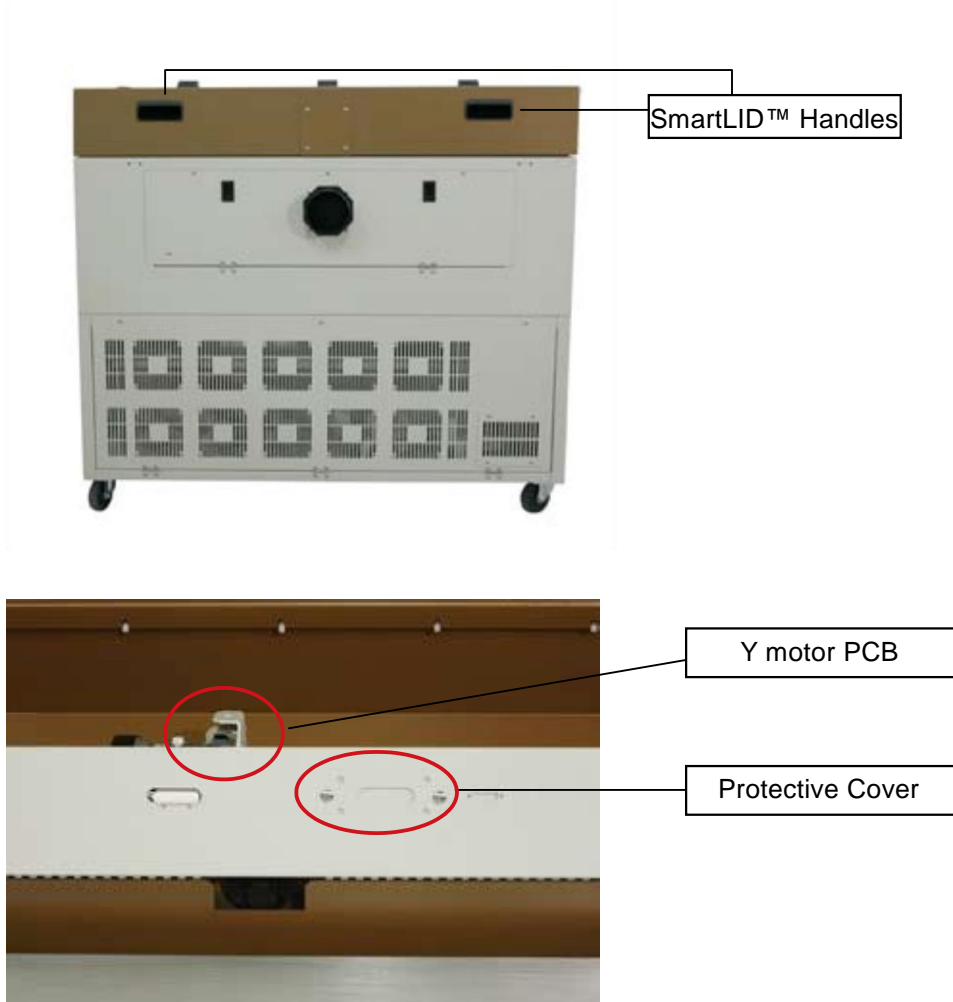
Protective Cover

2. Remove the protective cover

3. Assemble the SmartGUARD at the indicated location as shown below.

Front View

Top View

4. Connect the wire from the SmartGUARD sensor board to the Y motor PCB.

The SmartGUARD 3-pin signal jumper is positioned under the blue connector of the Y motor PCB.

5. Gently close the SmartLID top cover.

OPERATION MENU:

(i) Navigating to this page:
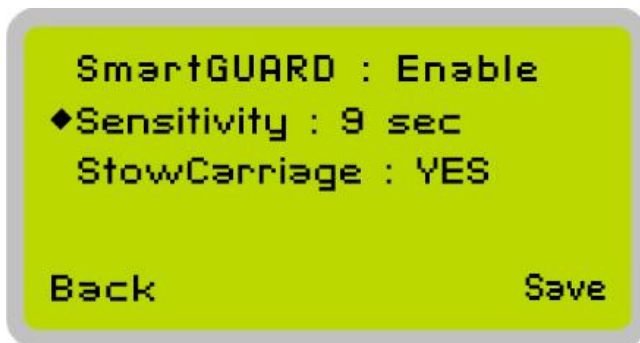
```
Main Work Page
        │ press F4
        ▼
Functions Page
        │ Select<Advanced
        ▼ Options>from the
Advanced Option Page
        │ Select<SmartGUARD>
        ▼ from the menu
SmartGUARD Page
```
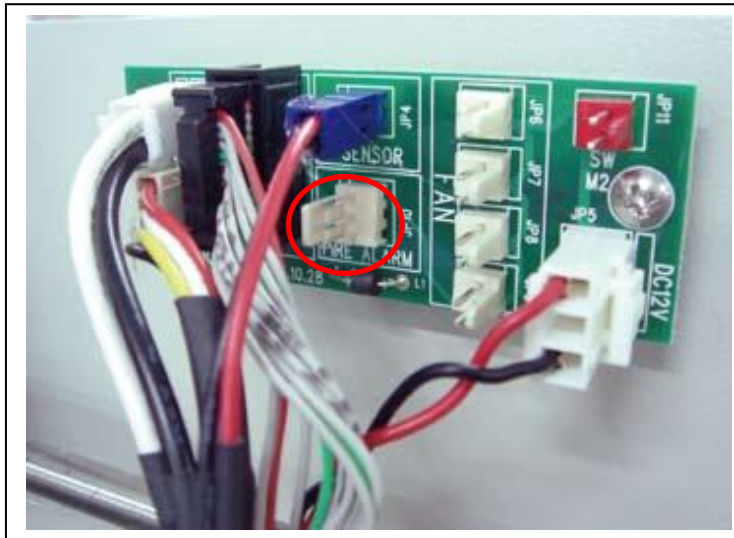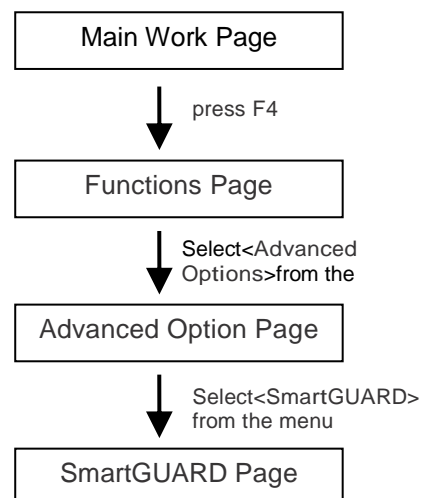
After optional SmartGUARD hardware installation, please enter the function menu on the control panel to enable the SmartGUARD fire alarm. Note SmartGUARD fire alarm system is not a fire extinguisher, but a fire detecting and alarm system.

SmartGUARD Enable/ Disable:

Press directional key (Left or Right) to enable the SmartGUARD device or disable it.

Sensitivity：

Press directional key (left or right) to set the sensitivity of SmartGUARD. There are five sensitivity settings (1, 3, 5, 7, 9 seconds) that can be selected. Sensitivity defines the delay time from when a fire is detected until the fire alarm alerts user, and automatically stop laser firing. For example, if the sensor delay switch is set to the 3-second position, the SmartGUARD will start an alarm and automatically stop laser firing after detecting a fire for 3 seconds.

Stow Carriage：

This function will decide if the lens carriage stay in the last position (set to <NO>) or move to the opposite direction (up or down) when fire alarm is initiated. The default is <YES>, the lens carriage will move to opposite direction when a fire detected.

SmartGUARD Setting Page	
Relevant Butto	**Function**
F1 (Back)	Back to previous page
F4 (Save)	Save your current settings
◂ / ▸ Directional	Adjust the value for that selections
▴ / ▾ Directional	Scroll through the menu selections

8

Chapter 8

Basic Maintenance

Suggested Cleaning and Maintenance Supplies

Maintaining the Work table and Motion System

- Accessing the Work table and Motion System

- Cleaning the Work table and Motion System

- Lubrication of the Y Rails

Cleaning the Optics System

- Removing the Mirrors

- Cleaning the Mirrors

- Removing and Cleaning the Focal Lens

Keeping your laser engraver clean and well maintained will ensure quality output, consistent reliability, and extended product life. Smoke, dust or residue build-up inside the laser system or the mechanical components can cause a reduction in the laser power, irregularities in the motion system, reduced product life cycle, and a host of other avoidable problems. This section will cover how to perform regular maintenance on the work table, motion system, mirrors, and focal lens.

The frequency of the cleaning schedule will depend on number of variables such as the types of material you work with, the immediate work environment, the frequency of use, the quality of the exhaust system, etc.

<table>
<tr><td colspan="1" align="center">WARNING</td></tr>
<tr><td>
• Electrical shock may occur if you do not turn off and unplug the LaserPro S290LS before cleaning.
• Damage may occur to the system if you do not turn off and unplug the LaserPro S290LS before cleaning.
• Always turn off and unplug the LaserPro S290LS before cleaning!
</td></tr>
</table>

8.1 Suggested Cleaning and Maintenance Supplies

Cleaning / Maintenance Tool	Special notes
Soap Solution or All-Purpose Cleaner	
Paper Towels	
Cotton Cloth	
Denatured Alcohol	DO NOT use alcohol on any painted surface, plastic, or the laser system.
Acetone	ONLY to be used on the work table
Vacuum Cleaner with a Flexible Nozzle	Only to be used in and around the work table and motion system
Lubrication syringe	Supplied
Cotton Swabs	Supplied
Lens Cleaner	1pc Supplied; Suggest search locally*
Lint Free Lens Tissue	Supplied
#2 Phillips Screwdriver	
Allen Wrench .050"	

*The recommended lens cleaner is Eclipse Cleaning System Solution from Photographic Solutions or HPLC grade Methanol. Search "Eclipse Cleaning System Solution" on Amazon or eBay to get the solution locally.

http://www.amazon.com/Photographic-Solutions-ECDCS-Cleaning-Solution/dp/B0000AUR1I


Eclipse Cleaning System Solution

8.2 Maintaining the Work table and Motion System

8.2.1 Accessing the Work Table and Motion System

It will be important to gain full access to the work table and motion system to properly clean and maintain these areas. To do so, you will need to gain access by lifting the SmartLID. You can do this via the following steps:

Opening the SmartLID:

1) The top lid of the machine can be lifted open by using the handles from the rear side of the LaserPro S290LS. Lift the lid to the maximum (indicated by a small click) to engage the latch (as shown in the picture below).
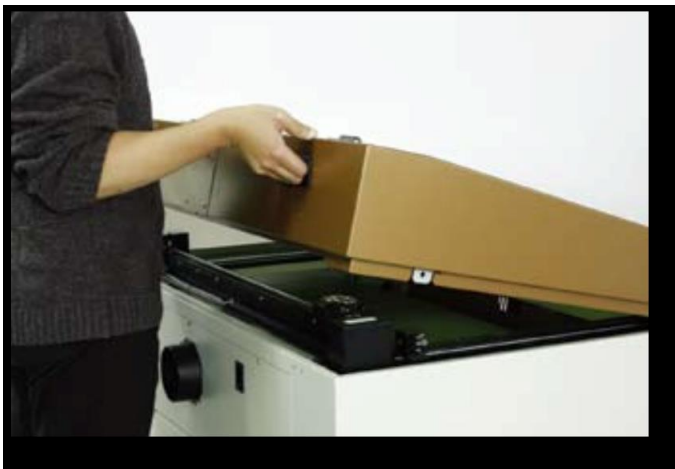
2)   Manually lock the SmartLID via the two sliding locks found on each side of the metal support rails by sliding them to the locked position (as shown in the picture below).

SmartLID Sliding Lock

⚠ WARNING

Anytime you have the SmartLID open, always make sure you have properly engaged the SmartLID manual locks on both sides of the metal support rails. Failure to do so may pose a crush risk if any part of your body is within the vicinity of the work area.

Closing the SmartLID:

To properly close the SmartLID after you have finished accessing the work table or motion system, please follow these steps:

1) Disengage both of the sliding locks found on each side of the metal support rails by sliding them away from you and into the unlock position.

2) Push the SmartLID away from you and move to the maximum position to disengage the latch (indicated by a small click) and gently close the SmartLID.

8.2.2 Cleaning the Work Table and Motion System

Clean the working table and the motion system on a weekly basis through the following steps:

1) Turn the power off and unplug the LaserPro S290LS before cleaning.

2) Use a vacuum cleaner with a flexible nozzle to remove dust and debris from the work table and motion system.

3) Apply small amounts of all-purpose cleaner, alcohol, or acetone to a paper or cotton towel to clean the working table.

4) Apply a soap solution, all-purpose cleaner, or alcohol to a paper or cotton towel to wipe down the rails of the motion system.

5) Wait for all cleaning residue to dry completely before plugging in and operating the LaserPro S290LS.

> *TIP*
> Please clean the AutoFocus pin each time after completing the engraved job to make sure the AutoFocus pin is free to move

---

⚠ **CAUTION**

- Never pour or spray alcohol or acetone directly to the work table.
- Oil, alcohol and acetone can cause fires or smoke build-up if improperly used.


8.2.3 Lubrication of the Y Rails

In order to keep the motion system running smoothly, the Y rails of the motion system will need lubrication on a weekly basis. Use a small amount of light grade machine oil or PS2 grease to a paper or cotton towel and apply to the rails.

You can purchase PS2 grease from NSK dealers worldwide. Please visit **http://www.nsk.com** for additional information.

8.2.4 Lubrication and Cleaning of X Liner Rail

1. Take out the Grease Syringe from accessory box
2. Remove the lubrication slot plate on the X rails
3. Inject 0.1ml of grease to the injection opening inside the linear bearing, and move the lens carriage to smooth the grease and movement
4. Repeat the step 3 till the grease is full out of the linear bearing
5. Repeat the step 3 and 4 to the injection opening in opposite side of the linear bearing
6. Seal the lubrication slot plate back to the X rail
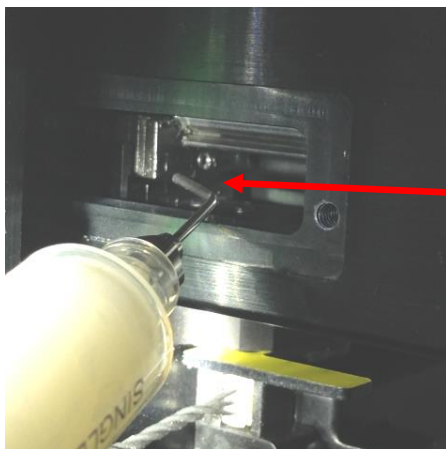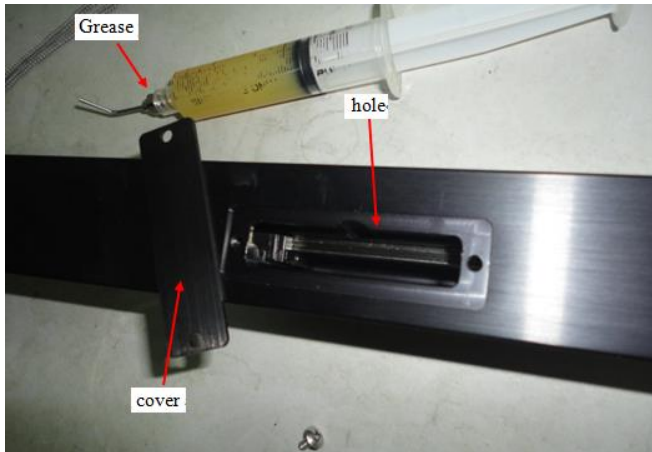
Inject 0.1ml of grease to this injection opening inside the linear bearing

1. Open the belt by hand and use cotton swab to clean the linear guide (make sure to clean top, bottom and surface of linear guide).

2. Use clean oil on cotton swab and then grease on linear guide (including top, bottom and surface of linear guide).

NOTE
- Always clean and lubricate the rails after working with materials that produce lots of debris (such as wood).
- Too much oil or PS2 grease applied to the Y rails will accelerate the build up of debris.

8.3 Cleaning the Optics System

8.3.1 Removing the Mirrors

We recommend that you check the mirrors once or twice a week to see if they require cleaning. If any debris or smoke residue is present, use the following steps to clean them.

> **NOTE**
> • Mirrors should be removed for cleaning **one at a time** to avoid beam misalignment after placing them back to the lens holders
>
> • Refer to section 8.3.2 on how to clean the mirrors.
>
> The following section will illustrate the location of the four mirrors found in the machine for cleaning.

Mirror 1

This mirror is located inside the bottom left access panel of the LaserPro S290LS.

1) Use a #2 Phillips Screwdriver to remove the access panel located on the bottom left side of the LaserPro S290LS.

2) Loosen the thumbscrew and remove the dust cover securing the mirror. (As shown in the picture below).

3) Clean the mirror in the proper manner.
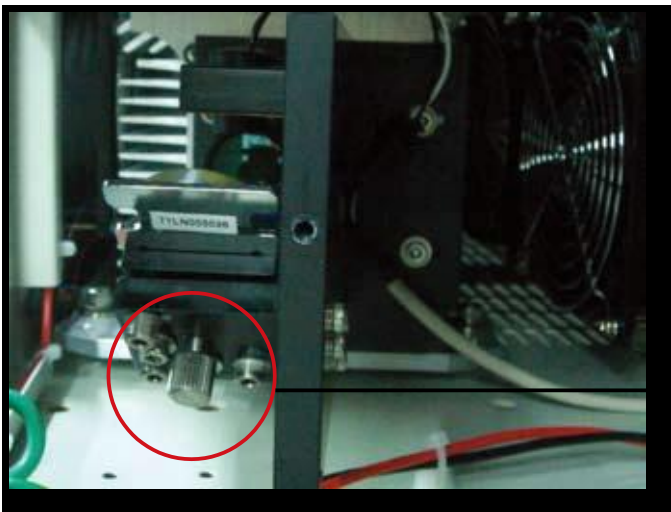
Thumbscrew

4) Place the mirror back to the optics holder after cleaning.

5) Tighten the thumbscrew.

6) Replace and secure the outer access panel.

Mirror 2, 3, 4

These mirrors are located in the work table area of the LaserPro S290LS.
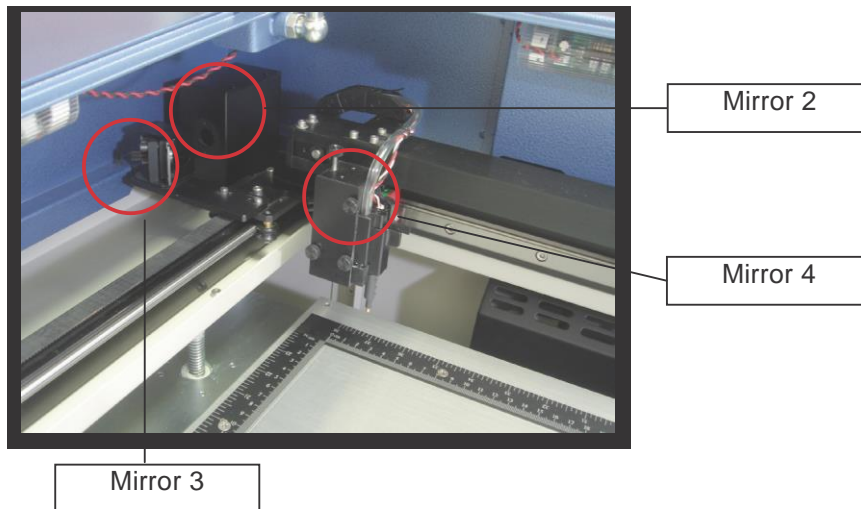
Mirror 2

1) Unscrew and remove the black dust cover covering mirror 2.

2) Loosen the thumbscrew holding mirror 2 in place.

3) Clean the lens in the proper manner.

4) Place the mirror back to the optics holder after cleaning.

5) Tighten the thumbscrew.

6) Replace and secure the black dust cover.

Mirror 3

1) Loosen the thumbscrew holding mirror 3 in place.

2) Clean the lens in the proper manner.

3) Place the mirror back to the optics holder after cleaning.

4) Tighten the thumbscrew.

Mirror 4

1) Loosen the three thumbscrews securing the laser carriage panel and remove the laser carriage panel to reveal mirror 4 and the focal lens.

2) Loosen the top thumbscrew to remove mirror 4 (as shown in the picture below).

Top Thumbscrew

3) Clean the lens in the proper manner.

4) Place the mirror back to the optics holder after cleaning.

5) Tighten the top thumbscrew.

6) Reinstall the laser carriage panel and tighten the three thumbscrews.

8.3.2 Cleaning the Mirrors

After you have removed each mirror, you will want to inspect each mirror for scratches, smoke residue, or debris. If any residue or debris is present, use the following steps to clean the mirrors.

1) Hold the mirror with the reflective side up, without touching the reflective side of the mirror (DO NOT apply any finger pressure or any other cleaning solutions to the mirror surface).

2) Drape a new sheet of lens tissue over the mirror.

3) Apply a few drops of lens cleaner on the tissue covered mirror (apply enough so that the tissue absorbs just enough solution to cover the mirror surface).

4) Pull the tissue across the mirror in only one direction.

5) Repeat the cleaning processes if the mirror is not completely clean after the first attempt.

6) Make sure that the mirror is completely dry before reinstalling it.

<table>
<tr><td colspan="2">⚠ **CAUTION**</td></tr>
<tr><td>

- If the center of the mirror is scratched, contact your GCC LaserPro representatives for replacement.
- DO NOT apply any finger pressure or any other cleaning solutions to the mirror or focal lens surface.
- The optics components are very fragile, handle carefully and follow the cleaning procedure well.

</td></tr>
</table>

8.3.3 Removing and Cleaning the Focal Lens

1) Remove the three thumbscrews (front face of the laser head) securing the laser carriage panel and remove the laser carriage panel to reveal the focal lens.
2) Carefully pull out the focal lens.
3) Clean the focal lens with a cotton swab and lens cleaner solution. Be sure to clean both sides of the focal lens **(DO NOT apply any finger pressure or other cleaning solutions to the lens surface)**.
4) After cleaning, use a cotton swab to gently dry the focal lens and lens cover.

Remove thumbscrew

Pull out the focal lens

9

Chapter 9

Basic Troubleshooting

Quality Problems

- Check focal length setting under F4 function key→ Machine Setting→ Set Focus Lens to see if it matches the type of the lens installed.

- Check if the focal lens is installed correctly or if focal lens is not fixed properly.

- Check if it is caused by the debris or dust builds up in the bearing tracks of X rail.

- Check if it is caused from the damaged or dirty focal lens and mirror 4 in the laser carriage which can not deliver the laser beam effectively.

Non-operational Problems

- **Laser does not fire**

  1. If the red alignment beam is not visible, the laser beam may be misaligned. Adjust the reflection mirrors for exact focus.

  2. If the red alignment beam is visible, please check the driver power. The laser power may be set to too low for detection. Increase the percentage setting of the Laser Power from the software driver or the control panel.

  3. Check if the laser power connector is connected.

  4. For safety purposes, the laser will not fire when the top lid or the front door is open unless the door sensors are defeated by shorting them with magnets.

Other Problems

- **"Graphic Was Clipped…" Message**

  The size or location of graphic image may be bigger or beyond the legal working area. Do not place graphic object, especially vectors, right from (3,0) origin position, or 0 at either x or y rail of working area on application software. Take Corel Draw for instance, even when the vector line's width has been set to the thinnest, it may still go beyond the border and causes the error. If the message appears randomly but frequently even image object is smaller or within the legal border, check or change DRAM module, a bad contact or faulty DRAM could cause such error.

- **Auto Focus Pin is Not Functioning**

  The focus pin could be stocked by greasy residue that gradually forms a coating. Clean the probe with alcohol or acetone. Check the cable of focus pin, there might be a bad contact or breakage.

10

Chapter 10

Appendix

Glossary
LaserPro S290LS Specification Sheet

10.1 Glossary

Color Fill – Term within the awards and engraving industry used to describe the variety of techniques used to add color or contrast to engraving.

DPI – Dots Per Inch or Pixels Per Inch. The resolution of an image is defined by the amount of dots/pixels included in an inch. The DPI setting of 500, will tell the machine to include 500 laser firings within an inch.

Driver – A software program that allows the computer to communicate with its components and peripherals: printers, scanners, monitors, etc.

Error Diffusion (Dithering Method) - This effect uses a series of random black and white pixels to represent shading.

Firmware – Programming permanently set into a computer's ROM chips. This information is burned into the computer chips and can only be changed by replacing the chips, or in the case of EEROM, by special procedure.

Frequency – Adjusting the Frequency determines the peak power of the laser which affects the color variation and depth of the laser marking. A lower frequency will produce a deeper marking.

Raster – The process of rendering a cutting or engraving by multiple horizontal lines. For example: when cutting out or engraving a square, the raster setting will make the laser use numerous horizontal lines to fill in the outlined space.

Raster Image – An image that is defined as a collection of arranged pixels in a rectangular array of lines. A raster image is similar to a "Bitmap" graphics image.

Raster Line – A raster line is the individual horizontal line that makes up the raster image.

Vector – The process of cutting or engraving an image by using single horizontal, vertical and curved lines. For example: when cutting out or engraving the outline of a square, the vector setting will make the laser use a thin single line to follow the outline of the shape.

10.2 LaserPro S290LS Specification Sheet

Specification		S290LS-20SHS	S290LS-20JFL	S290LS-30JFL	S290LS-40HHS	S290LS-60JFL
Laser Source		Fiber 20W	Fiber 20W	Fiber 30W	Fiber 40W	Fiber 60W
Beam Quality (M^2)		1064 nm				
Laser M2		<1.3	<1.3	<1.3	2.5-3.5	<1.8
Laser Peak Power (kW)		>7	>4.5	>5.5	>20	>7.8
Work Area		25 x 18 in. (640 x 460 mm) extendable to 29 x 18 in. (740 x 460 mm)				
Max. Part Size (W x L x H)	All doors closed	31.5 x 22.4 x 6.5 in. (800 x 570 x 165 mm)				
	All doors open	31.5 x ∞ x 6.5 in. (800 x ∞ x 165 mm)				
Table Size		31.1 x 20.9 in. (790 x 530 mm)				
Dimensions		44.3 x 28.3 x 39.6 in. (1125 x 720 x 1005 mm)				
Cooling		Air Cool				
Drive		Closed-loop DC Servo Control				
Maximum Speed*		80 IPS				
Speed Control		Adjustable from 0.1~100% (Up to 16 color-linked speed settings per job)				
Power Control		Adjustable from 0.1~100% (Up to 16 color-linked speed settings per job)				
Engraving Capability		256-level gray scale image processing capability				
Distance Accuracy		0.254 mm or 0.1% of move, whichever is greater				
Z-Axis Movement		Automatic				
Resolution (DPI)		Available 125, 250, 300, 380, 500, 600, 760, 1000, 1500, 3000				
Computer Interface		10 Base-T Ethernet, Full speed 2.0 USB				
Display Panel		4-line LCD panel showing current file name, total working time, laser power, engraving speed, file(s) loaded into memory buffer, setup and diagnostic menus				
Safety		Class I Laser Product Compliant with EN60825 Class 3R Laser Product Compliant with CDRH 2006/42/EC Machine Directive Compliance Class 4 Laser Product Compliant with CDRH with the optional pass-through door module				
Operation Voltage		100V-240VAC, 50/60Hz Auto switching, MAX. 8A				
Fume Extraction System		External exhaust system with minimum flow rate 640m³/h (CFM 377 ft³/h) is required, 2.3kPA negative pressure (Pure-Air PA-1000FS @ 4" exhaust port)				

- Speed is not equal to throughput. See dealer or visit **www.gccworld.com** for more details.
- Caution—Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- Specifications are subject to change without prior notice.