Spirit Pro Series

User Manual

www.GCCworld.com

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Release Note

Version	Release date	Remark
01	July, 2024	First version
02	September, 2024	Minor details revised, Add GLS Hybrid PRO model
03	December, 2024	Minor details revised, Add basic requirement for GCC LaserPro printer driver Add software setup instructions

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1.1 Principles of a CO2 Laser

LASER is the acronym for Light Amplification by Stimulated Emission of Radiation. A CO2 laser works by electrically stimulating the molecules within a carbon dioxide gas mixture. When focused through a lens, this highly intense and invisible beam will vaporize many materials. Depending on the speed and intensity of the projected beam, a CO_2 laser may be used to engrave or cut through a wide variety of materials.

1.2 Safety Ratings

The LaserPro Spirit PRO series are equipped with a sealed carbon-dioxide laser that emits intense and invisible laser radiation with a wavelength of 10.6 microns in the infrared spectrum. The laser system is designated as a Class 1 (US: 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 Spirit PRO series is a Class 2 (US: Class II) red beam 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 Spirit PRO Series 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 (US: Class IV) 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 open. 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 an 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 Spirit PRO Series, 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.

Product label example

NOTE

If the pass-through door switch module is standard, the product label will indicate the laser safety level of CDRH as Class 4 (US: Class IV).

Please refer to the following table to view all available models and related information.

Spirit LS PRO CO2 Model			
Model Number	Wavelength	Power	Input
SLS PRO-30V	10.57 – 10.63 μm	CO2 30W	100-240VAC, 50-60Hz, Max 10A
SLS PRO-30GT	10.57 – 10.63 μm	CO2 30W	100-240VAC, 50-60Hz, Max 12A
SLS PRO-30GTE	10.57 – 10.63 μm	CO2 30W	100-240VAC, 50-60Hz, Max 12A
SLS PRO-40Vi	10.57 – 10.63 μm	CO2 40W	100-240VAC, 50-60Hz, Max 12A
SLS PRO-40GT	10.57 – 10.63 μm	CO2 40W	100-240VAC, 50-60Hz, Max 12A
SLS PRO-60GT	10.57 – 10.63 μm	CO2 60W	100-240VAC, 50-60Hz, Max 15A
SLS PRO-60GTE	10.57 – 10.63 μm	CO2 60W	100-240VAC, 50-60Hz, Max 15A
SLS PRO-60Ti	10.57 – 10.63 μm	CO2 60W	100-240VAC, 50-60Hz, Max 15A
SLS PRO-60Ti93	9.23 – 9.31 μm	CO2 60W	100-240VAC, 50-60Hz, Max 15A
SLS PRO-80Ti	10.57 – 10.63 μm	CO2 80W	220-240VAC, 50-60Hz, Max 15A
SLS PRO-80GT	10.57 – 10.63 μm	CO2 80W	220-240VAC, 50-60Hz, Max 15A
SLS PRO-100TiF	10.57 – 10.63 μm	CO2 100W	220-240VAC, 50-60Hz, Max 20A
SLS PRO-100GT	10.57 – 10.63 μm	CO2 100W	220-240VAC, 50-60Hz, Max 20A
Spirit LS PRO Fiber Model			
Model Number	Wavelength	Power	Input

SLS PRO-30JFL	1064 nm	Fiber 30W	100-240VAC, 50-60Hz, Max 8A
SLS PRO-50JFL	1064 nm	Fiber 50W	100-240VAC, 50-60Hz, Max 8A

Spirit GLS Hybrid PRO CO2 Model			
Model Number	Wavelength	Power	Input
GLS Hybrid PRO-20V93	9.23 – 9.31 µm	CO2 20W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-30V	10.57 – 10.63 µm	CO2 30W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-30GT	10.57 – 10.63 µm	CO2 30W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-30GTE	10.57 – 10.63 µm	CO2 30W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-40Vi	10.57 – 10.63 µm	CO2 40W	100-240VAC, 50-60Hz, Max 12A
GLS Hybrid PRO-40GT	10.57 – 10.63 µm	CO2 40W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-60Ti	10.57 – 10.63 µm	CO2 60W	100-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-60GT	10.57 – 10.63 µm	CO2 60W	100-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-60Ti93	9.23 – 9.31 µm	CO2 60W	100-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-80Ti	10.57 – 10.63 µm	CO2 80W	220-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-80GT	10.57 – 10.63 µm	CO2 80W	220-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-100TiF	10.57 – 10.63 µm	CO2 100W	220-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-100GT	10.57 – 10.63 µm	CO2 100W	220-240VAC, 50-60Hz, Max 15A
Spirit GLS Hybrid PRO Fiber Model			
Model Number	Wavelength	Power	Input
GLS Hybrid PRO-30JFL	1064 nm	Fiber 30W	100-240VAC, 50-60Hz, Max 8A
GLS Hybrid PRO-50JFL	1064 nm	Fiber 50W	100-240VAC, 50-60Hz, Max 8A
Spirit GLS Hybrid PRO Dual Model			
Model Number	Wavelength	Power	Input
GLS Hybrid PRO-30V/30JFL	10.57 – 10.63 µm	CO2 30W/Fiber 30W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-30V/50JFL	10.57 – 10.63 µm	CO2 30W/Fiber 50W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-30GT/30JFL	10.57 – 10.63 µm	CO2 30W/Fiber 30W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-30GT/50JFL	10.57 – 10.63 µm	CO2 30W/Fiber 50W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-30GTE/30JFL	10.57 – 10.63 µm	CO2 30W/Fiber 30W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-30GTE/50JFL	10.57 – 10.63 µm	CO2 30W/Fiber 50W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-40Vi/30JFL	10.57 – 10.63 µm	CO2 40W/Fiber 30W	100-240VAC, 50-60Hz, Max 12A

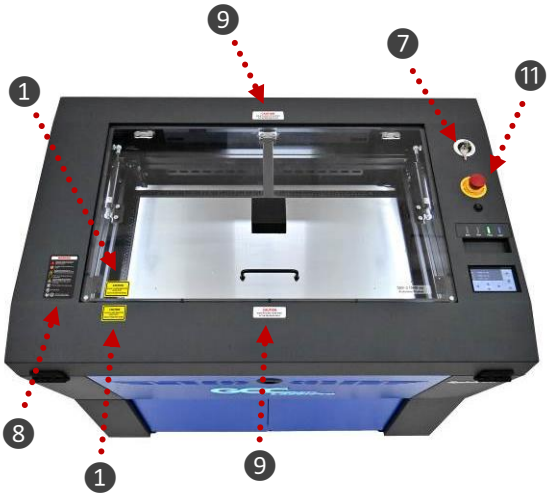
GLS Hybrid PRO-40Vi/50JFL	10.57 – 10.63 µm	CO2 40W/Fiber 50W	100-240VAC, 50-60Hz, Max 12A
GLS Hybrid PRO-40GT/30JFL	10.57 – 10.63 µm	CO2 40W/Fiber 30W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-40GT/50JFL	10.57 – 10.63 µm	CO2 40W/Fiber 50W	100-240VAC, 50-60Hz, Max 10A
GLS Hybrid PRO-60Ti/30JFL	10.57 – 10.63 µm	CO2 60W/Fiber 30W	100-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-60Ti/50JFL	10.57 – 10.63 µm	CO2 60W/Fiber 50W	100-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-60GT/30JFL	10.57 – 10.63 µm	CO2 60W/Fiber 30W	100-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-60GT/50JFL	10.57 – 10.63 µm	CO2 60W/Fiber 50W	100-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-60Ti93/30JFL	9.23 – 9.31 µm	CO2 60W/Fiber 30W	100-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-60Ti93/50JFL	9.23 – 9.31 µm	CO2 60W/Fiber 50W	100-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-80Ti/30JFL	10.57 – 10.63 µm	CO2 80W/Fiber 30W	220-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-80Ti/50JFL	10.57 – 10.63 µm	CO2 80W/Fiber 50W	220-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-80GT/30JFL	10.57 – 10.63 µm	CO2 80W/Fiber 30W	220-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-80GT/50JFL	10.57 – 10.63 µm	CO2 80W/Fiber 50W	220-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-100TiF/30JFL	10.57 – 10.63 µm	CO2 100W/Fiber 30W	220-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-100TiF/50JFL	10.57 – 10.63 µm	CO2 100W/Fiber 50W	220-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-100GT/30JFL	10.57 – 10.63 µm	CO2 100W/Fiber 30W	220-240VAC, 50-60Hz, Max 15A
GLS Hybrid PRO-100GT/50JFL	10.57 – 10.63 µm	CO2 100W/Fiber 50W	220-240VAC, 50-60Hz, Max 15A

Safety label

CDRH and CE regulations require that all laser manufacturers add warning labels in specific locations throughout the equipment. The following warning labels are placed on the laser system for your safety. Do not remove these labels for any reason. If the labels become damaged or have been removed for any reason, do not operate the laser system, and immediately contact Great Computer Cooperation or e-mail us for a replacement.

Please refer to the following content to review all safety labels.

❶ Door Open Warning Label

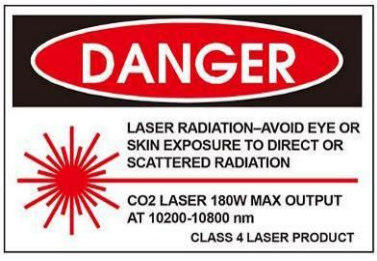


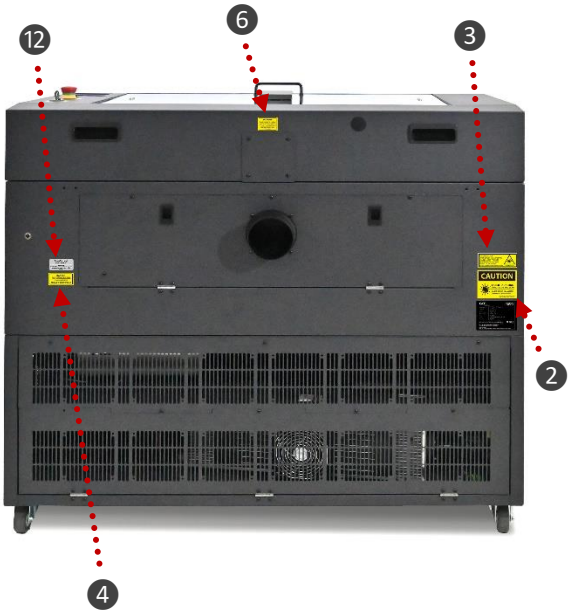
❷ CDRH Label

This label indicates the class level of CDRH.

If the pass-through door switch module is standard, the product label will indicate the laser safety level of CDRH as Class 4 (US: Class IV)

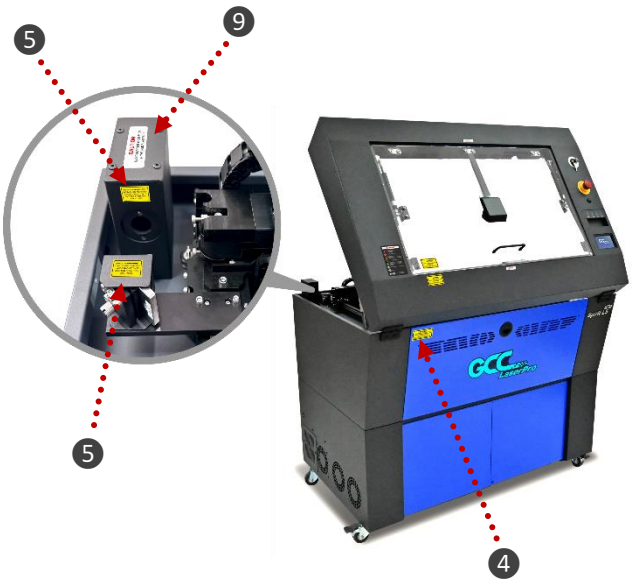
For CO2 models: Spirit LS PRO CO2 / Spirit GLS Hybrid PRO CO2





For Fiber models: Spirit LS PRO Fiber / Spirit GLS Hybrid PRO Fiber

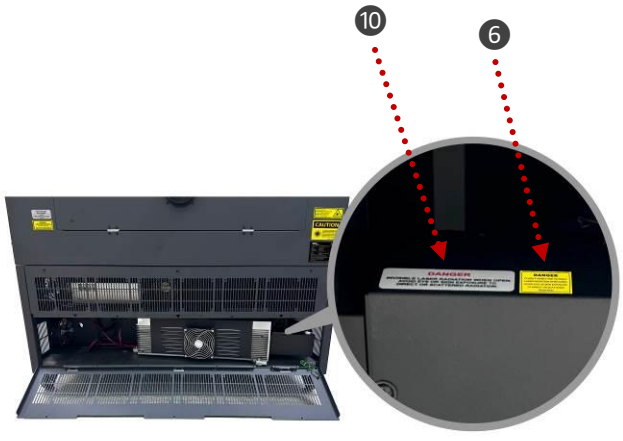
For Dual models: Spirit GLS Hybrid PRO Dual



3 CE Label

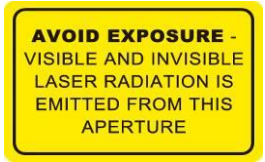
This label indicates the class level of CE.

4 Pass-through Door Warning label



5 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.



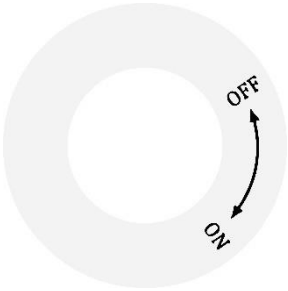
6 Noninterlocked Protective Housings Label

This label indicates that the laser path will be exposed when the user removes/opens the cover.

▲ Spirit LS PRO

7 Laser Key Switch

This label indicates the laser key switch. You can find this label on the right upper side of the machine.



▲ Spirit GLS Hybrid PRO

8 Warning label

Warning label is written with all the necessary information to be aware of during operation.

❾ Laser path warning label

LaserPro machines are very safe under normal use. Furthermore, Laser Path Warning Label are displayed at the proximities of possible laser paths as a reminder. Operators should exercise caution when working close to the laser paths to avoid possible injury while machine is turned on.

❿ 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.

⓫ Emergency stop label

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

⓬ Pass-through Door Switch Module Label

1.5 Safety Measures

1.5.1 General Safety

- 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.
- Caution—Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- 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. Always keep machine clean after job finished.

NOTE

For Spirit PRO CO2 model, the 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:

9000-11000nm OD5+

Visible Light Transmission: 92.9%

NOTE

For Spirit PRO fiber and dual model, the 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%

WARNING!

- Resulting debris from laser processing 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.
- Always remove the vector grid to clean any small pieces that have fallen through the grid.

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 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.
- 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 in Chapter 8. Doing so will ensure your machine will operate effectively and safely over a long period of time.

1.5.2 Safety Notice for Class 4 (US: Class IV) Machine

When the optional Pass-Through door module is installed, the laser system becomes a Class 4 machine with front and rear doors open, machine operators must wear goggles and follow the safety instructions to operate the machine.

Exposure to a Class 4 laser beam via direct radiation and indirect stray radiation may cause damage to both skin and eyes. Exposure to the Class 4 laser beam may cause ignition of combustible materials which can lead to a fire. A proper and well-maintained fire extinguisher should keep on hand next to the laser machine all the times.

The machine operator is responsible to take all necessary protective measures to prevent he possible ignition or explosion of materials by the laser beam. A Class 4 laser system should be operated according to the following precautionary measures among others:

- The operator is obliged to appoint **a trained Laser Protection Officer** responsible for compliance with the relevant regulations.
- **Identify the danger zone** by installing **warning lights** and **warning signs** outside the area.
- **The danger zone must be secured against unauthorized access.**
- The operator of a Class 4 laser system should always **wear laser protection goggles** suitable for the laser wavelength in use and with optical density at least OD5+ within the danger zone.
- An additional warning light should also be installed in a visible location to warn the machine operator of any emerging laser radiation.

1.6 Operating Environment

Please follow the guidelines when considering a suitable location to set the LaserPro Spirit PRO Series. Improper work environments may lead to operational malfunction and/or unsafe working conditions. The LaserPro Spirit PRO Series should be placed and operated in a standard office-type environment.

- Avoid environments where the machine is exposed to high levels of dust, temperature (temperature exceeding 30°C or 85°F) or humidity (humidity exceeding 70% or where the ambient temperature is near the dew point).
- Avoid small, enclosed areas with poor ventilation.
- Avoid areas with high levels of noise and electrical noise.
- Select a location that is large enough to accommodate the LaserPro Spirit PRO Series, 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 85°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 Spirit PRO Series on a floor surface that is completely even.

- Make sure your smoke or fire detection system in the immediate area is functioning.
- Setup the machine to be apart from the wall for at least 60 cm (2 feet).

1.7 Noise Test

Test Conditions: measured at a distance of 1 meter from the surface of the machinery and a height of 1.6 meters from the floor or access platform.

The following table shows the noise levels based on different machine statuses.

Model	Idle	Standby	Engraving
Spirit LS PRO	59~60 dB	48~49 dB	68~69 dB
Spirit GLS Hybrid PRO	63~64 dB	49~50 dB	68~69 dB

1.8 EC-Declaration of Conformity

Certificate – Сертификат – 證明書 – Certificat – 증명서 – شهادة

CERTIFICATE

No. 3X231120.GCSD88

Test Report / Technical Construction File no. GCC-2023001-A1

Certificate's Holder: Great Computer Corp.
4F-1., No.236, Fude 2nd Rd., Xizhi Dist., New Taipei City 22151, Taiwan

Certification ECM Mark: Type Approved

Product: GCC LaserPro Spirit Series Laser Engrave

Model(s): *(see the following annex)*

Verification to: Standard:
EN ISO 12100:2010, EN ISO 11553-1:2020+A11:2020,
EN ISO 13849-1:2023,
EN 60825-1:2014/A11:2021/AC:2022,
EN 60204-1:2018, EN IEC 61000-6-2:2019,
EN IEC 61000-6-4:2019

related to CE Directive(s):
2006/42/EC (Machinery)
2014/35/EU (Low Voltage)
2014/30/EU (Electromagnetic Compatibility)

Remark:
The manufacturer has voluntarily decided to submit its documents concerning the above-mentioned product for verification. Ente Certificazione Macchine confirms that the documentation made available and immediately returned to it, as containing sensitive data, meets the essential requirements of the above-mentioned directive/standard. The verification activity carried out exclusively concerned the technical documentation and no verification was carried out on the product. This document cannot replace the EC Declaration of Conformity. This document was issued in accordance with regulation RGVOL01 published on the website of www.entecerma.it and concerning voluntary certifications with a non-notified procedure.

Issuance date: 20 November 2023

Expiry date: 19 November 2028

For online check:

Approver
Ente Certificazione Macchine
Legal Representative
Luca Bedonni

Ente Certificazione Macchine Srl
Via Ca' Bella, 243 – Loc. Castello di Serravalle – 40053 Valsamoggia (BO) - ITALY
☎ +39 051 6705141 +39 051 6705156 info@entecerma.it www.entecerma.it

Certificate – Сертификат – 證明書 – Certificat – 증명서 – شهادة

Annex I

No. 3X231120.GCSD88

Test Report / Technical Construction File no. GCC-2023001-A1

Model(s):

GLS Hybrid-30V/20RMZ, SI ##-XXXXXX, SLS ##-XXXXXX, GLS ##-XXXXXX,
SI ### Hybrid-XXXXXX/YYYYYY, SLS ### Hybrid-XXXXXX/YYYYYY,
GLS ### Hybrid-XXXXXX/YYYYYY, S400 ### Hybrid-XXXXXX/YYYYYY,
S290 ##-XXXXXX, S400 ###-XXXXXX/YYYYYY, GLS Hybrid ####-100TiF/30JFL,
SLS ####-100TiF, SI ####-100TiF, GLS Hybrid#####-XXXXXX/YYYYYY,
SLS#####-XXXXXX, SI#####-XXXXXX

(# = none character, blank, II, III, IV … X, A-Z or a-z; XXXXXX & YYYYYY = laser supplier tube model or blank)

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Chapter 2
Unpacking and Content

- Unloading and Unpacking
- Contents and Accessories Checklist

2.1 Unloading and Unpacking

The LaserPro Spirit PRO Series 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

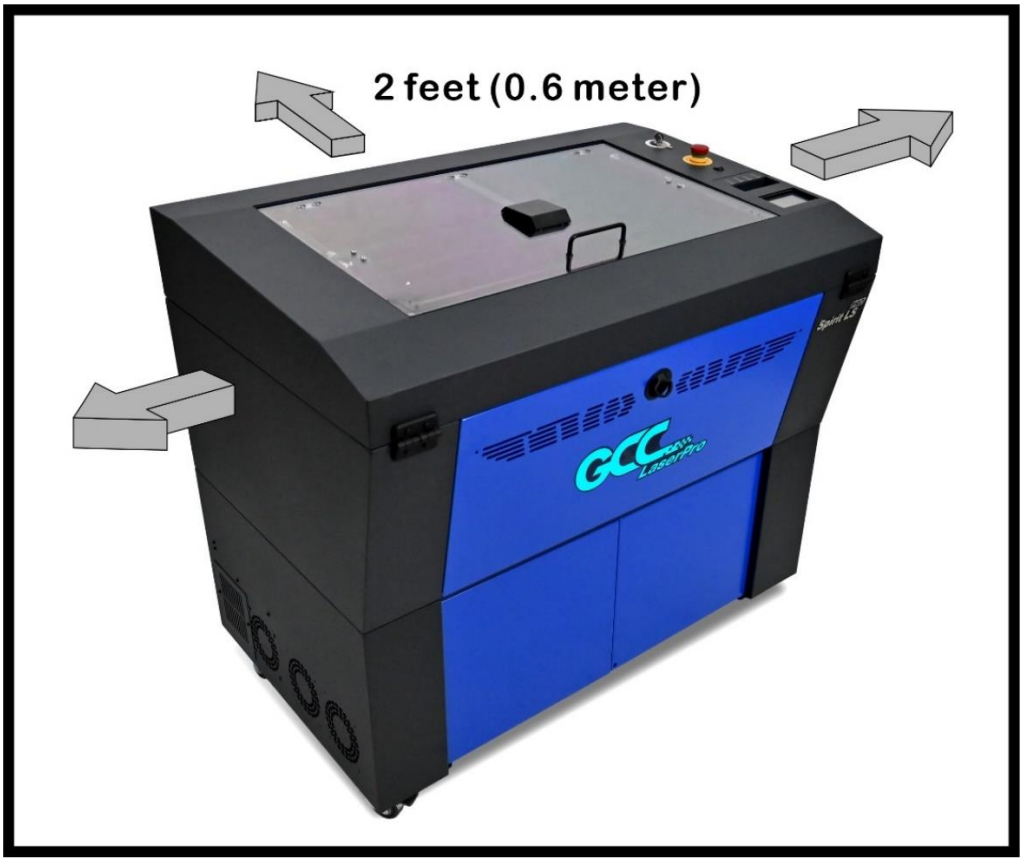
NOTE

Please store original crate as it may be needed for transportation in the future your system

GCC has used eco-friendly metal crates for GCC LaserPro laser engravers including Spirit PRO Series. For years, GCC LaserPro has been dedicated to reducing carbon footprint and becoming a greener company in the industry.

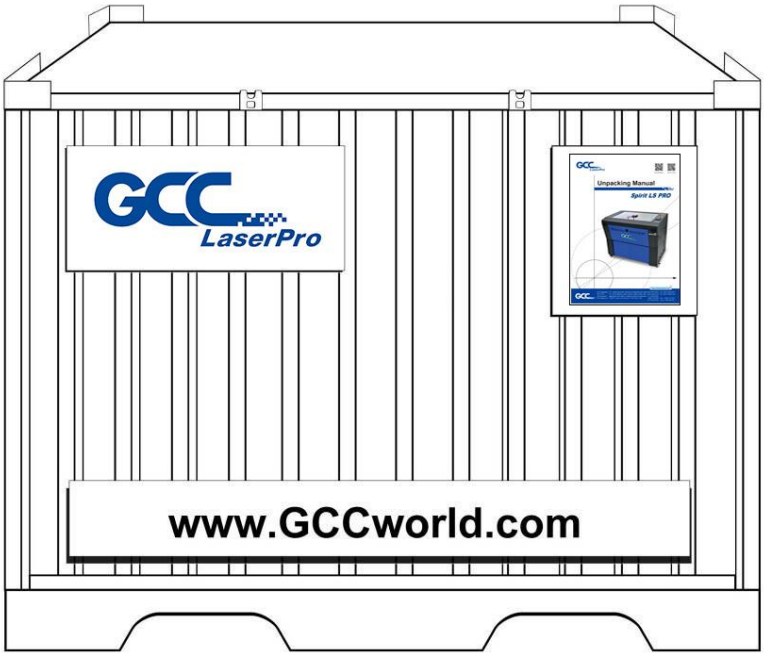
Installation location

Before unpacking the laser system, make sure the location in which you intend to install the laser system will provide at least **2 feet (0.6meter)** of clearance on all sides of the machine.

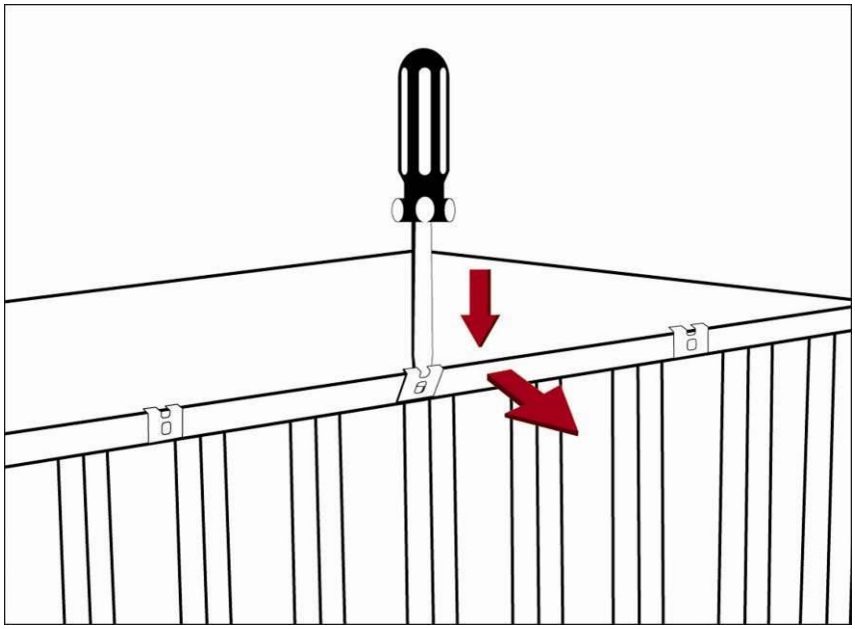


Unpacking and Unloading

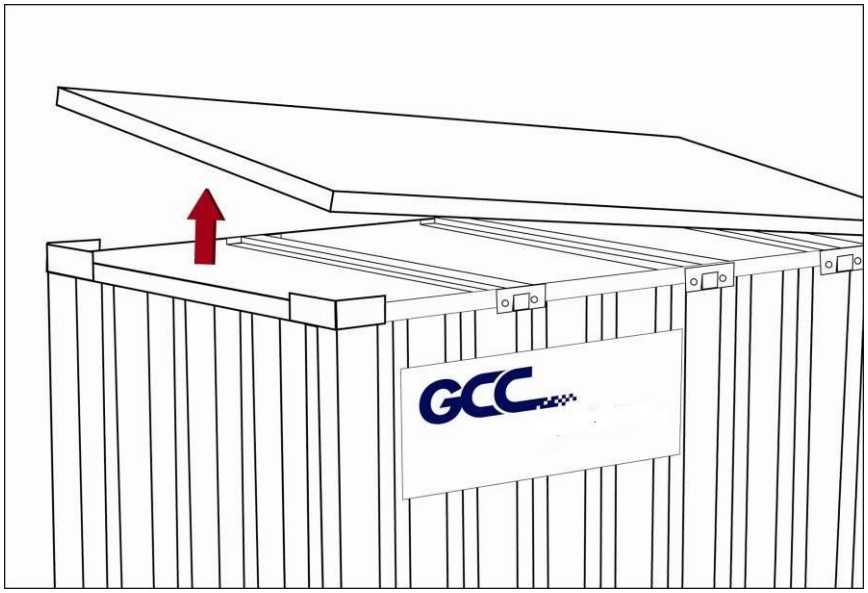
Move the shipping crate close to the desired working location of the machine. Unpack following the steps below.



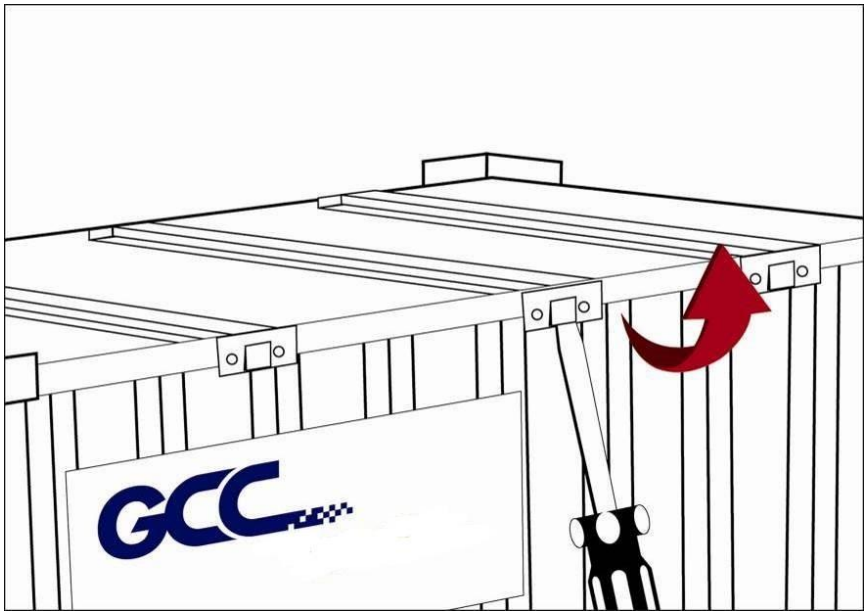
Step 1. Remove the 6 metal clips that secures the top panel to the crate by using a flathead screwdriver



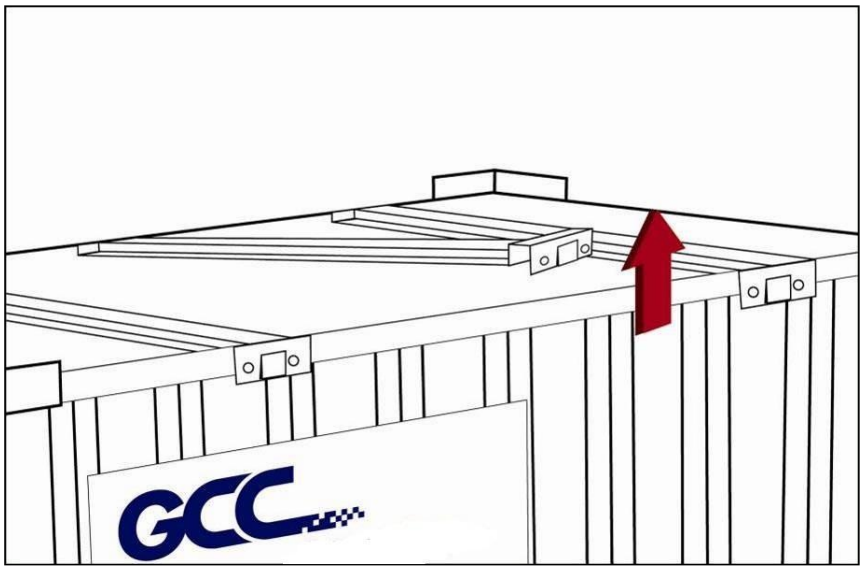
Step 2. Lift the top panel and remove



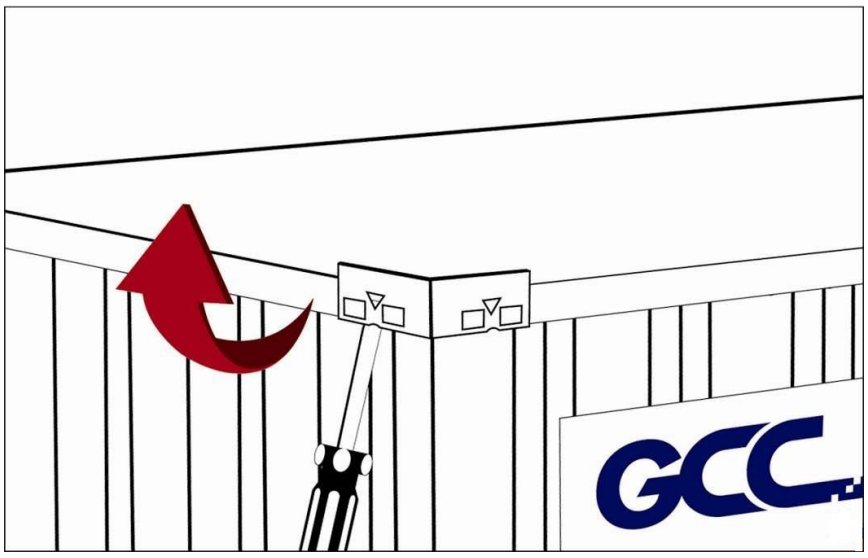
Step 3. Use a flathead screwdriver to remove the brackets that secures the bars in place.



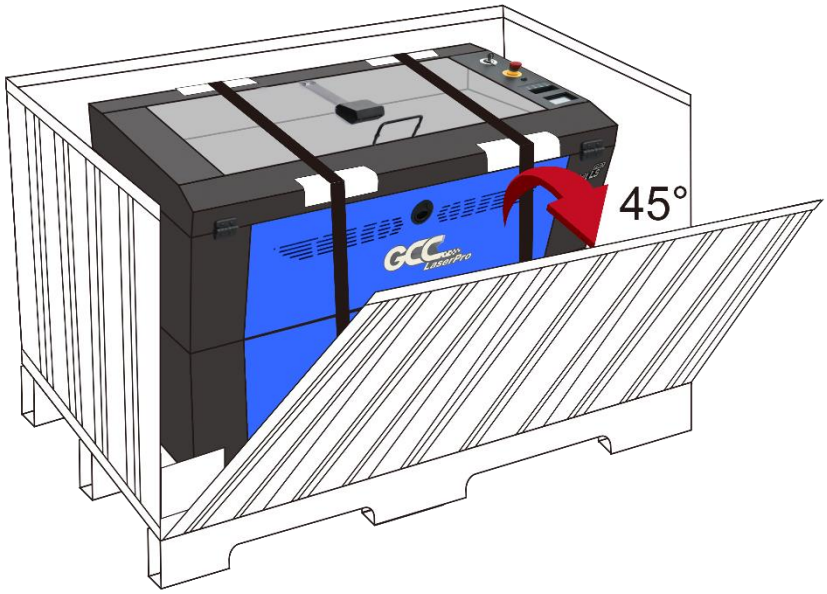
Step 4. Remove the top bars.



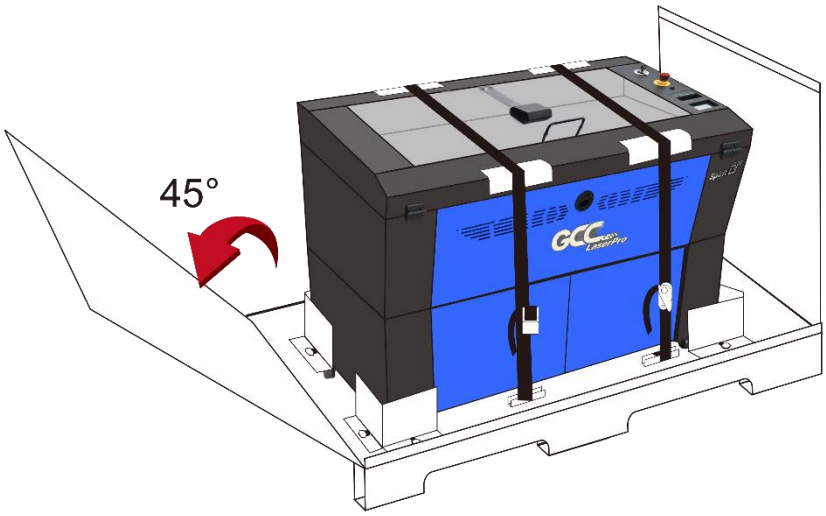
Step 5. Use a flathead screwdriver to pry loose the side brackets and remove them.



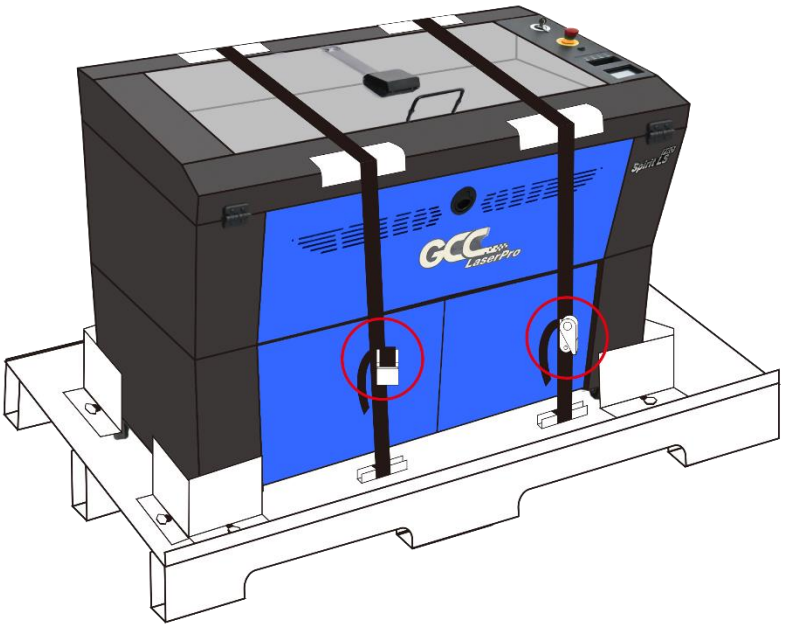
Step 6. Pull the front panel and lower it to an angle of about 45 degrees and then pull it away from the crate. Do the same for the rear panel.



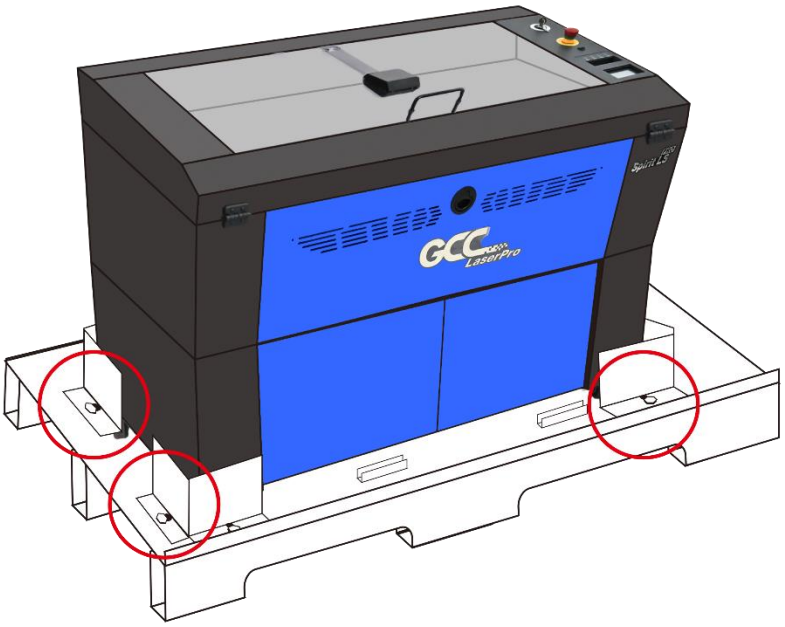
Step 7. Remove the left and right panels in the same way after the front and rear panels have been removed.



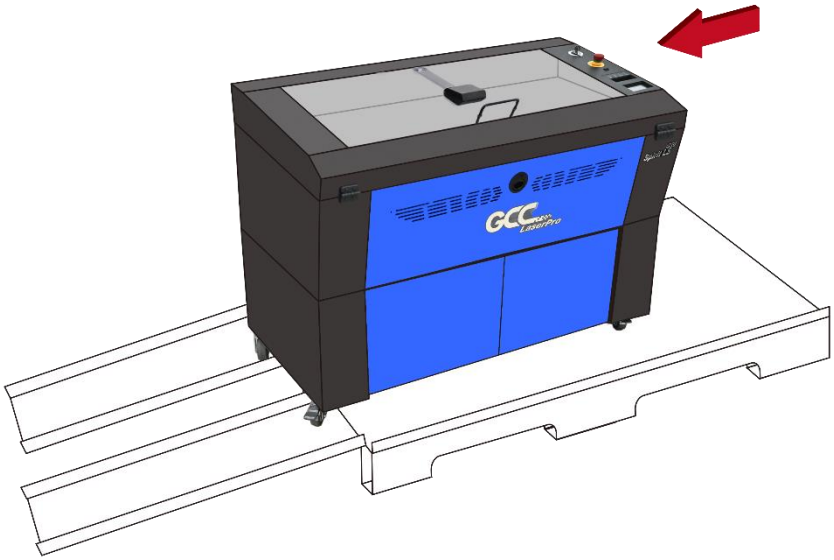
Step 8. Unbuckle and remove the belts that holds the machine in place.



Step 9. Use a Philips screwdriver to remove the brackets that holds the machine in place.

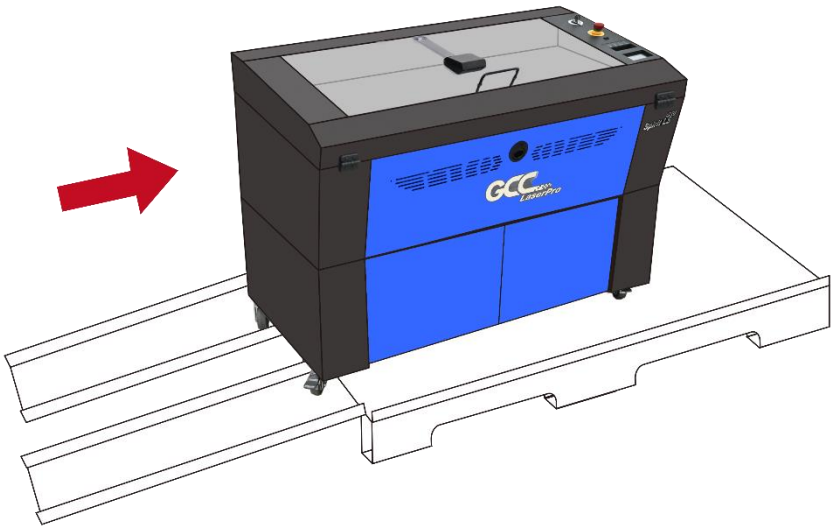


Step 10. Position the ramps as shown below and the machine can now be pushed off the base board via the ramps. (The ramps are found in a box within the crate)



2.2 How to Re-pack the Machine

Step 1. Set up the ramp with the base board and carefully push the machine onto the iron pallet.

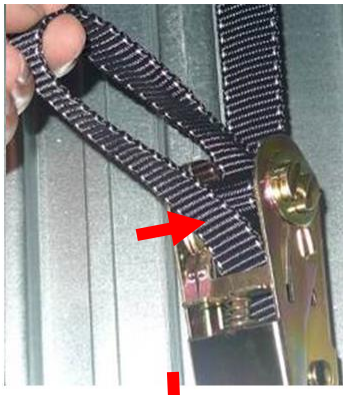


NOTE

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.



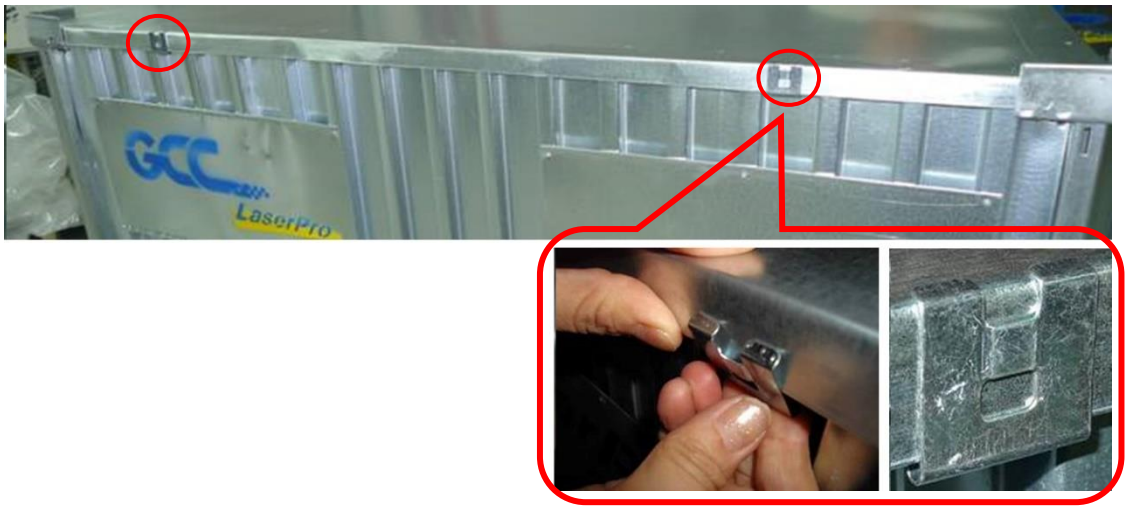


Step 3. Insert four side boards on the slot of bottom plate.

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.



2.3 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.

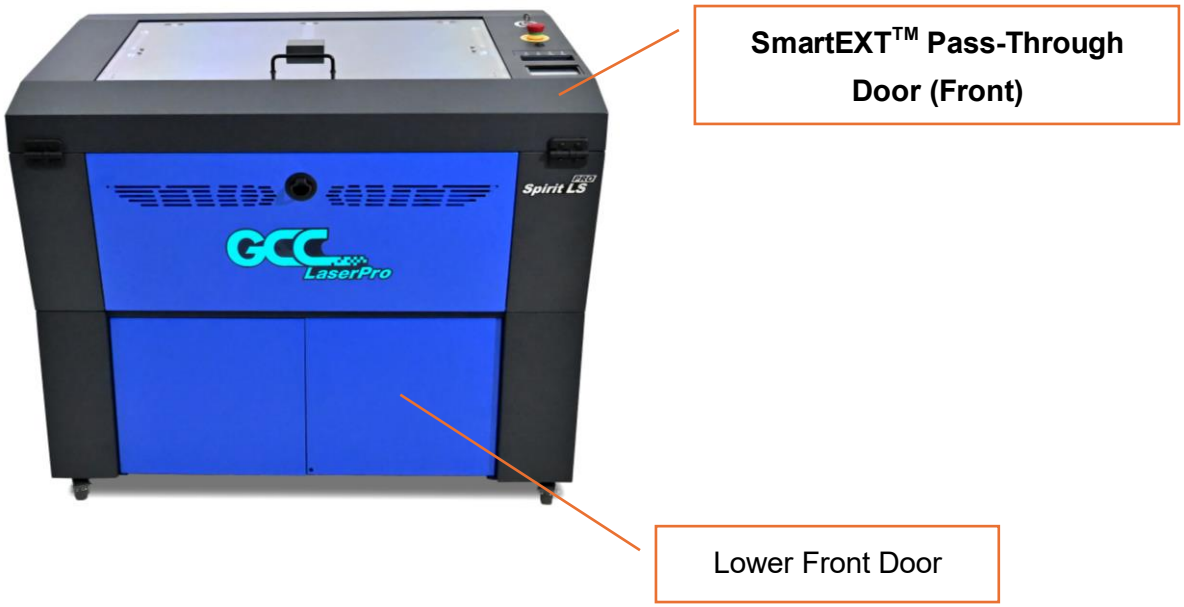
ITEM		QUANTITY (pc/ set)
Cleaning Kit	Cotton swab	1
	Lens Cleaner Solution	1
	Lens Tissue	1
Main Power Cord		1
USB Cable		1
LAN Cable		1
Focusing Tool		1
Goggles		1
Exhaust Port Connector		1
Magnetic Bar for Ventilation Cover		2
Installation CD (user manual, driver)		1
Grease Syringe (for Spirit LS PRO and Spirit GLS Hybrid PRO models)		1
Lubrication Grease		1
Quality Promise Card		1
Laser Firing Control Key		1
SmartEYES CCD calibration materials		1

Chapter 3
Mechanical Overview

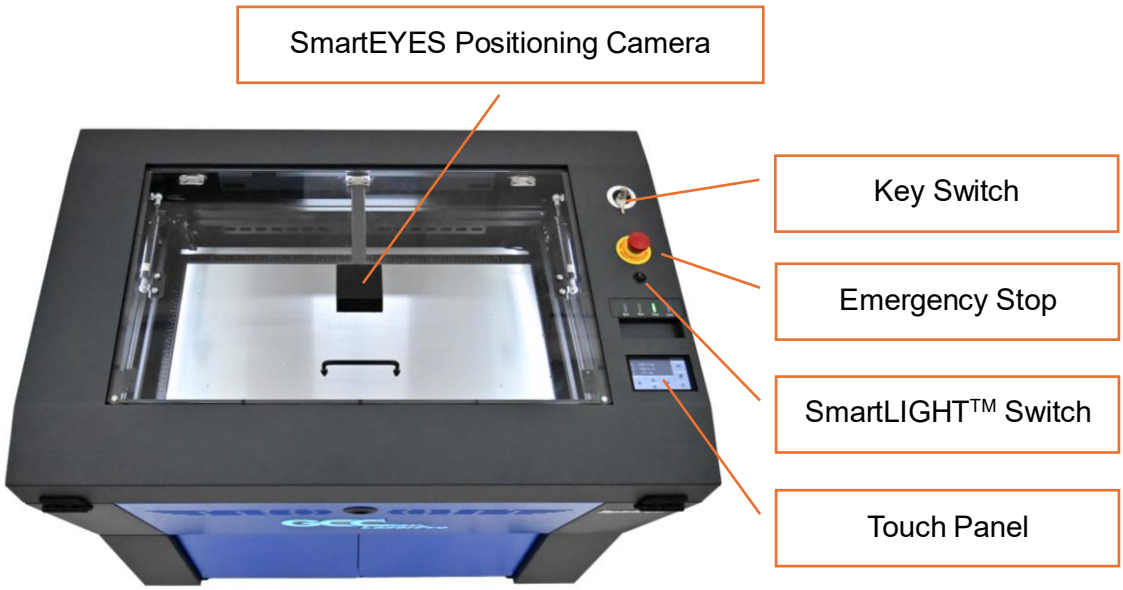
- Front View
- Top View
- Right View
- Left View
- Rear View

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

3.1 Front View



3.2 Top View



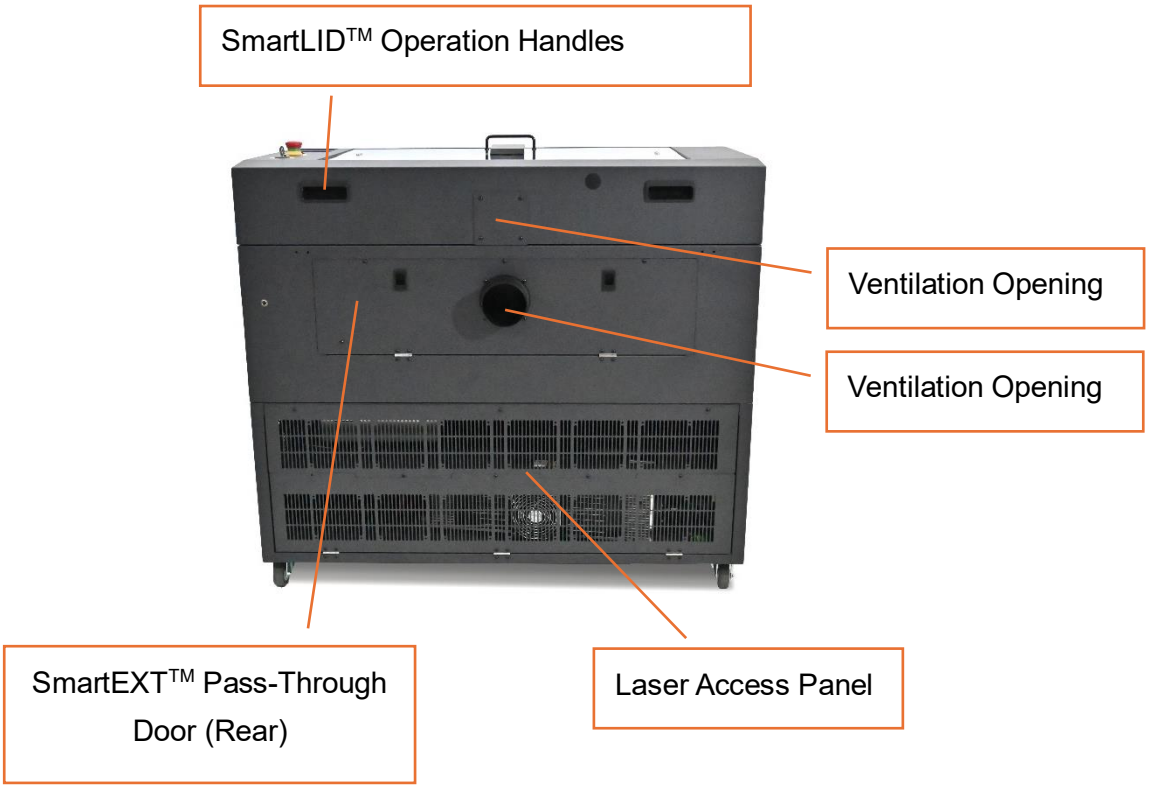
3.3 Right (Profile) View

3.4 Left (Profile) View

Spirit GLS Hybrid PRO

Spirit LS PRO

3.5 Rear (Profile) View



Chapter 4
Setup and Installation

- Machine Setup
  - Powering Up the Machine
  - Connecting the Computer
  - USB Storage Setup
  - Ruler Setup
- Graphics Software Setup
  - Recommended Computer Configuration
  - Installation of the GCC LaserPro Print Driver
  - SmartPRINT for MAC Users
  - Using Adobe's AP with GCC LaserPro Machine
  - Using Autodesk Inventor with GCC LaserPro Machine
  - Using the GCC SmartTOOL Plug-in with GCC Lasers

4.1 Machine Setup

4.1.1 Powering Up the Machine

CAUTION!

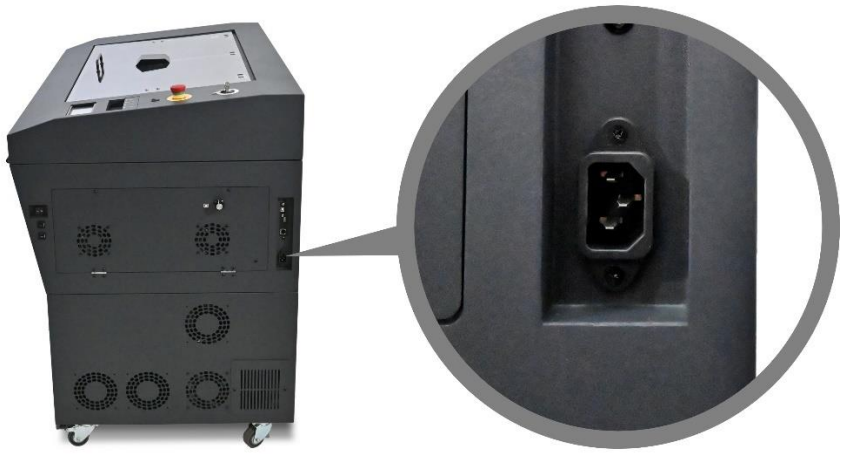
Make sure both the LaserPro machine and the computer are turned off before connecting either to a power source.

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 air compressor and external air extraction system to the laser machine before powering up. The connection and setup of air compressor and air extraction system refer to Chapter 7 for detail.

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



NOTE

- The LaserPro Spirit PRO series has been designed to automatically switch from 100-240 VAC
- Make sure to supply 220 VAC of electricity to the LaserPro Spirit PRO series with laser 80 Watt and above.

4.1.2 Connecting the Computer

The LaserPro Spirit PRO 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 Spirit PRO series to your computer.

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

Ethernet Connectivity: Connect the Ethernet Cable in accessory to the Ethernet 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 material.
2. DO NOT connect USB cable when using Ethernet function for data transmission.
3. If you have purchased additional Optional Accessories for the LaserPro Spirit PRO series, 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 Spirit PRO series

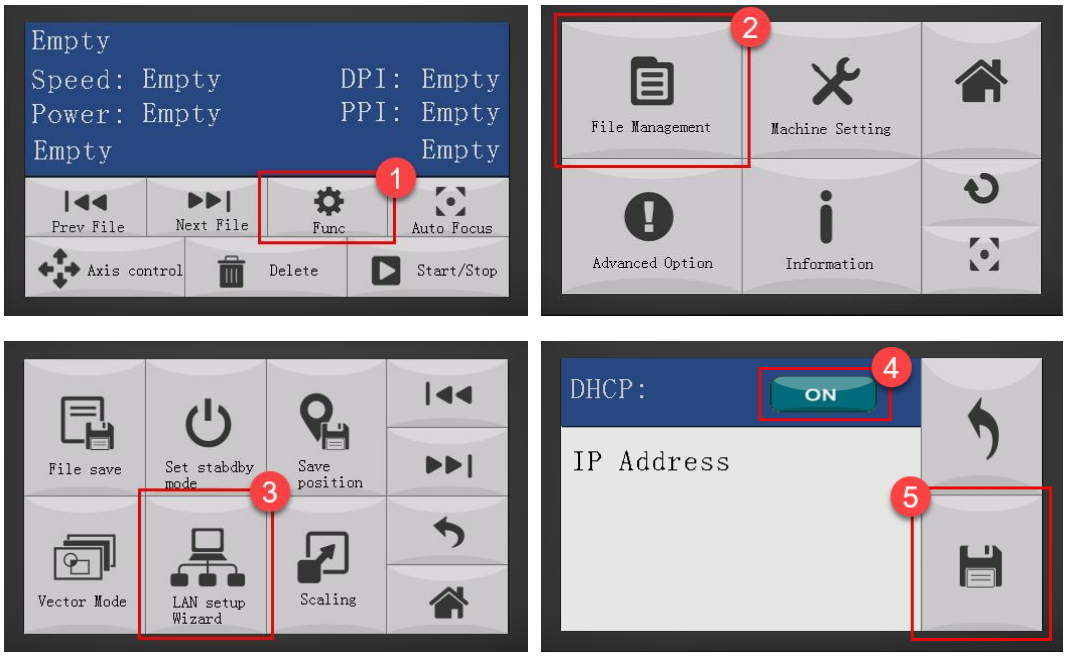
4.1.2.1 Networking Connectivity Setup

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 the setup instructions below.

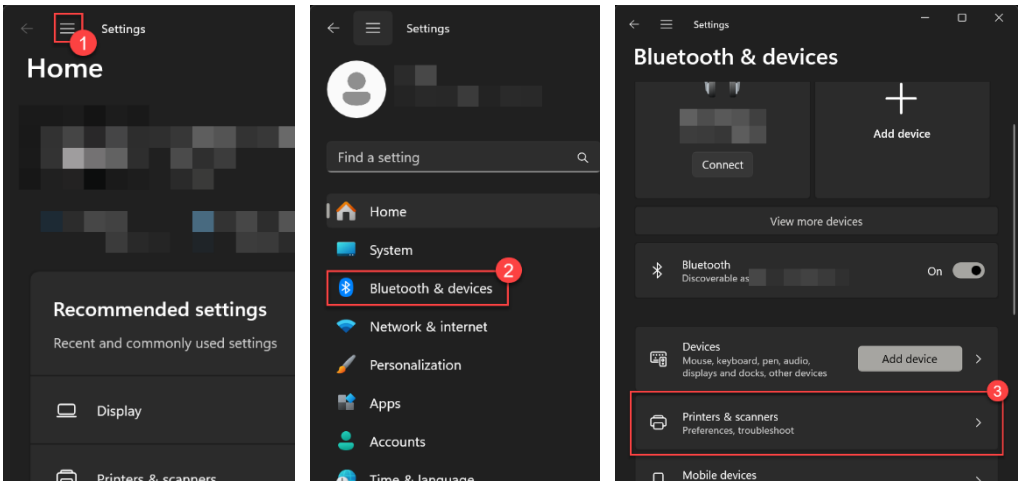
DHCP ON instruction:

Step 1. Connect LAN cable to the LAN port of GCC laser engravers and turn on machine.

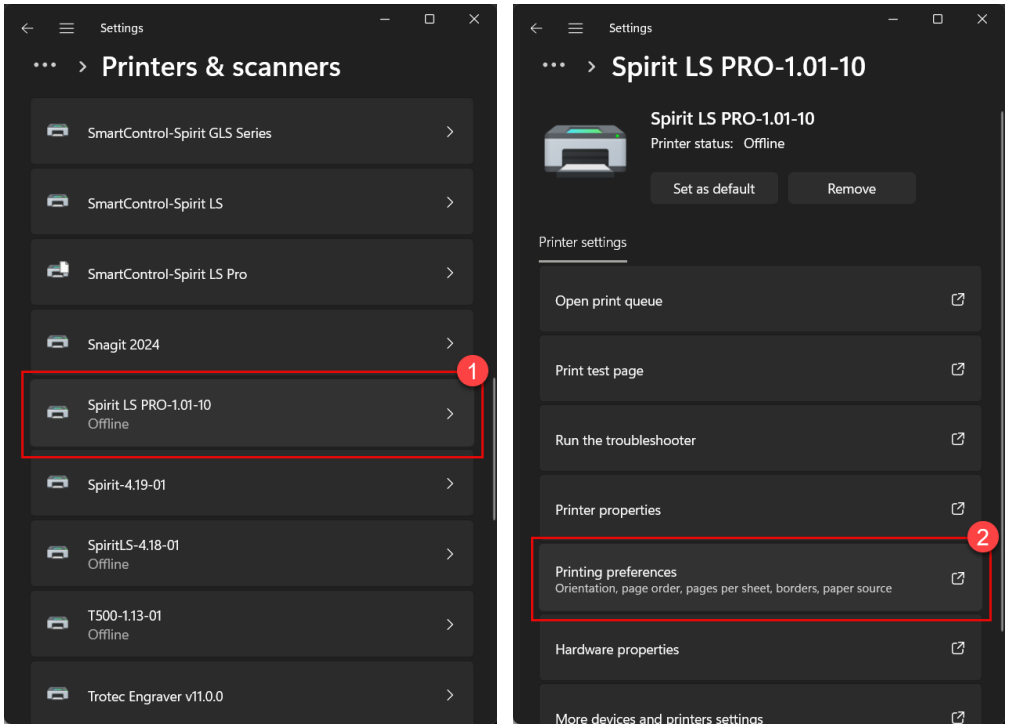
Step 2. Navigate the Touch Screen through <Func> → <Machine Setting> → <LAN Setup Wizard>, and turn on the “DHCP”, then click the Save button to save the setting. The machine will reboot automatically.



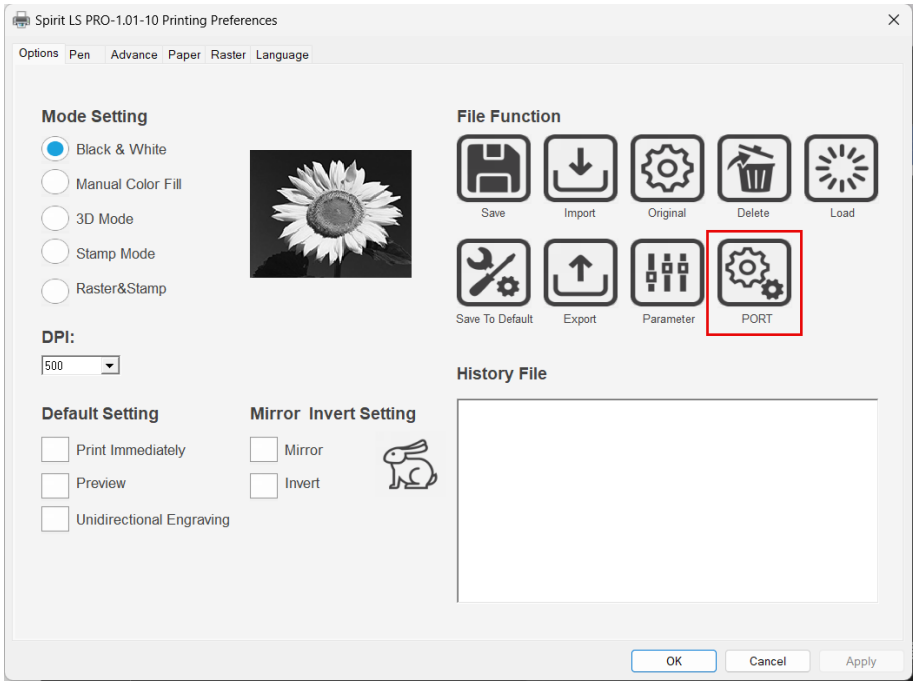
Step 3. Press Windows + I to open the settings app. Click “Navigation” icon to open the menu, then click “Bluetooth & devices” > “Printers and scanners”.



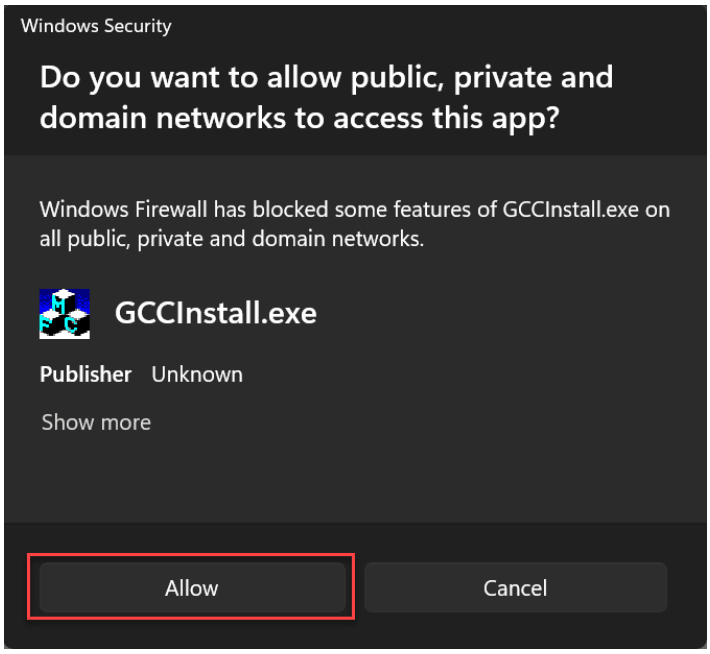
Step 4. Select Spirit LS PRO, then select “Printing preference”. The printer driver window will appear at the top.



Step 5. Click the “Port” button to open the “Port Configure” window.

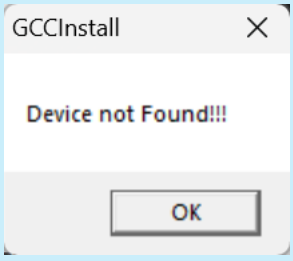


Step 6. Select “LAN” and click “OK” button. The operating system will display a Windows Security window. Please click the “Allow” button to continue.

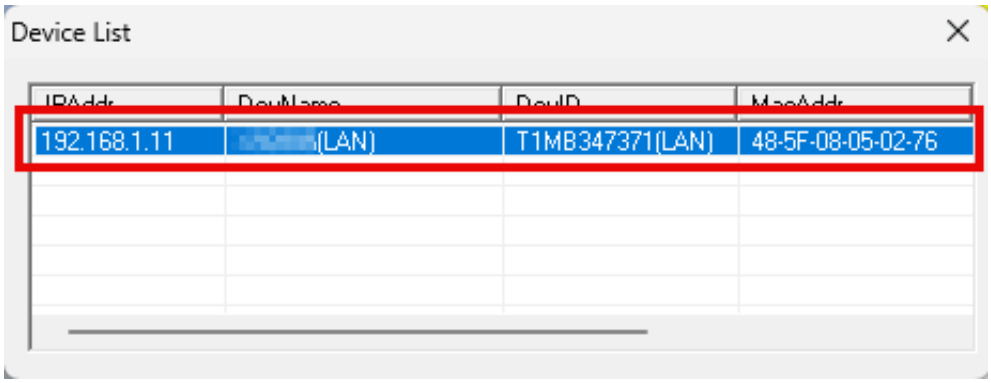


NOTE

If the system displays the following message, please check that your Ethernet cable is connected properly and without any issues.



Step 7. The “Device List” window will open, double-click your machine and the system will run some settings automatically.



Step 8. Connection setting is completed.

4.1.3 USB Storage Setup

GCC laser engraver is built-in with USB storage port allow you to transmit data from USB flash drive. You can format and use a USB flash drive as an USB storage of GCC laser engraver.

USB flash drive minimum requirements

- Windows FAT16/FAT32 file system format
- A maximum of 32G of storage capacity

Following are our certified brands for GCC LaserPro USB storage

Brand	Size	Format
HP	16G	FAT32
SanDisk	16G	
PNY	8G	
Kingston	8G / 16G	
Transcend	4G / 16G	
ADATA	8G / 32G	

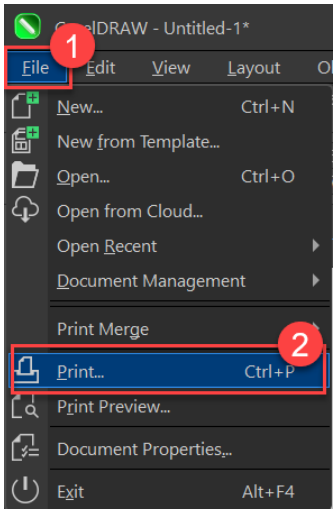
NOTE

- USB storage port of GCC laser engraver is compatible with USB 2.0.
- Please use above certified brands for GCC LaserPro USB storage.
- Using USB 3.0 or other brands which are not in the list may cause an exception.

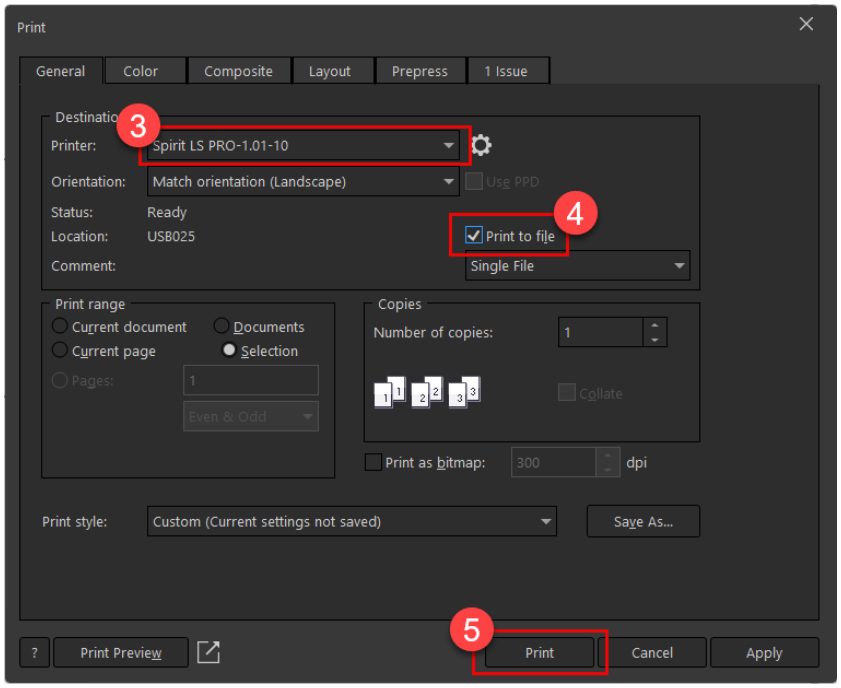
Please refer to the following instructions to convert the file to PRN format.

Step 1. Make sure the page setup and orientation match GCC LaserPro Spirit PRO Series. Please refer to chapter 5.3.1 for page setup and orientation.

Step 2. Open the file in graphics software and click File → Print from menu bar, and the Print window will appear.

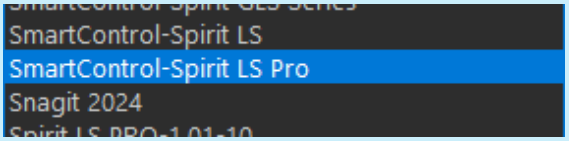


Step 3. Choose Spirit LS PRO printer driver form the drop-down menu of the printr in the print window. Then check the “Print to file” function and click the print button to continue.



NOTE

This operation is only for USB storage use. If the file will be used for SmartVISION Elite CCD, please choose “SmartCONTROL-Spirit LS PRO” to convert to PRN format.



Step 4. Ensure the file format is set to *.prn

Step 5. Select the save folder and define file name, then click “Save” to convert the file to PRN format.

To ensure that the file name can be displayed on the touch panel without any issues, please follow the rule below when naming the PRN file.

- File names should only include English letters and numbers.

O	ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz 0 1 2 3 4 5 6 7 8 9
X	! @ # $ % ^ & * ( ) _ + . { } | ” : ? > <

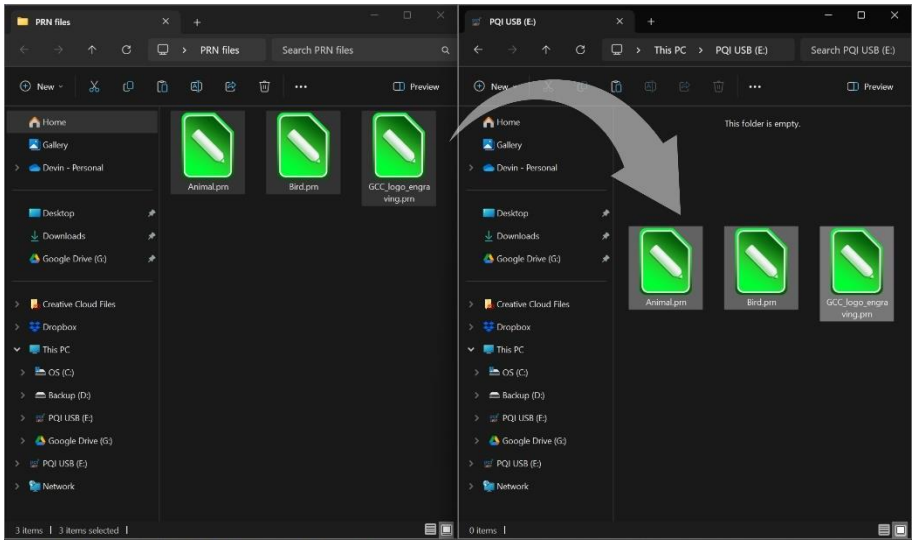
- Only 8 characters of the file name can be displayed on the touch screen; longer file names will be automatically truncated.

File Name	Displayed on Touch Panel
GCC_LOGO_Engraving.PRN	GCC_LO-1.PRN

- File names should not contain spaces.

O	GCC_LOGO_Engraving.PRN
X	GCC LOGO Engraving.PRN

Step 6. Copy/move files to the USB flash drive.

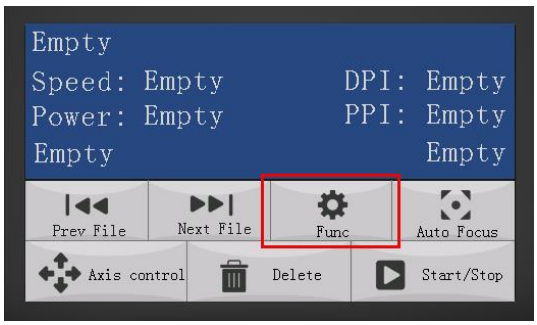


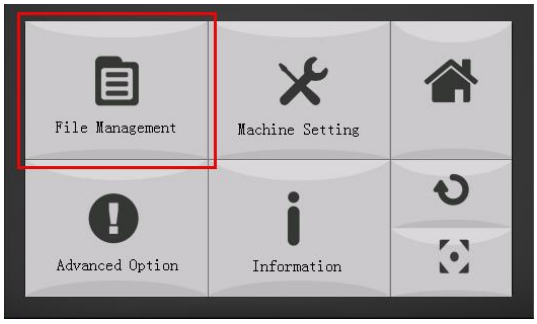
Step 7. Insert USB flash drive to the USB Storage port of GCC laser engravers.

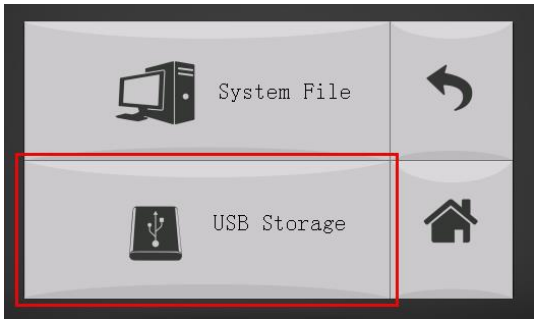
NOTE

USB storage function only supported for the PRN format.

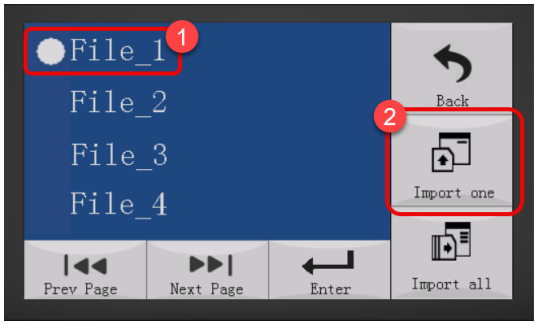
Step 8. Navigate the Touch Panel through <Func> → <File Management> → <USB Storage> to open the file list







Step 9. Select a file and click “Import one” to import the file to the machine.



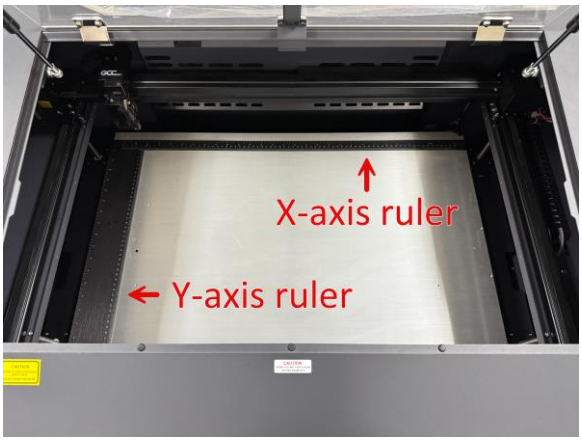
Tip

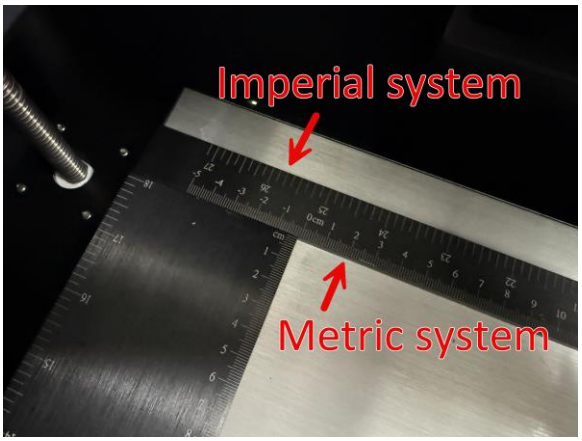
The "Import all" button lets you import all PRN files from a folder at once. For example, if you have 5 PRN files in the "20240801" folder, after the file list is read from the USB storage, navigate to the "20240801" folder and click the "Import all" button. The system will then import all 5 PRN files simultaneously, making the process simple and convenient.

Step 10. After transmission, the file will be shown on the touch panel. Click the Start/Stop button on the control panel to begin laser jobs.

4.1.4 Ruler Setup

The Spirit PRO series is equipped with a magnetic ruler on the working table. You will find the ruler on the left side (X-axis) and the top side (Y-axis) of the working table. Each ruler has units engraved on both sides, allowing you to easily switch between the Metric and Imperial systems by following these steps.

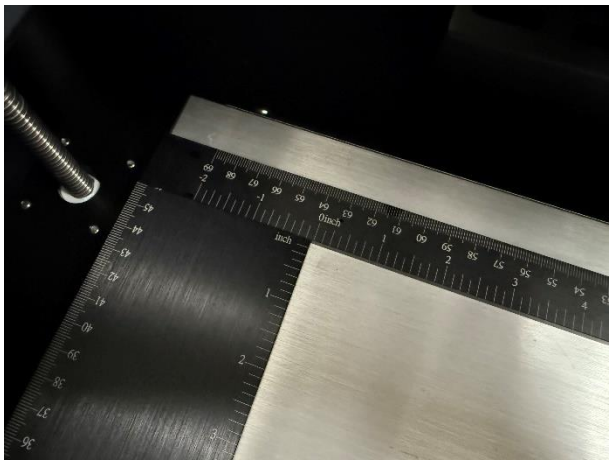




Step 1. Remove the Y-axis ruler. (For example, switching from the Metric system to the Imperial system.)

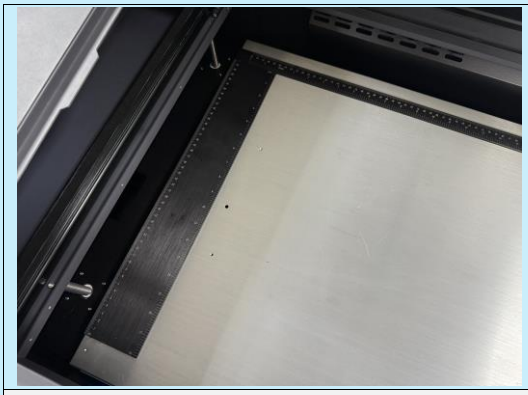
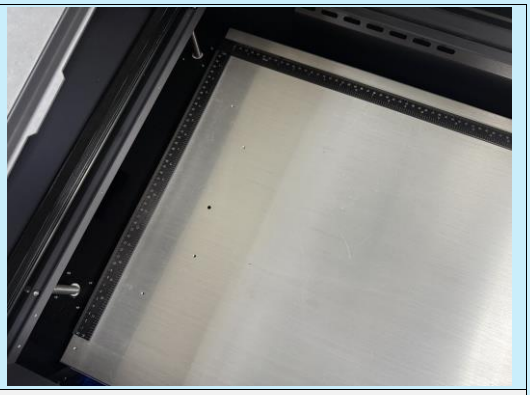
Step 2. Rotate the ruler 180 degrees to switch to the Imperial system.

Step 3. Place the ruler back on the working table. The magnetic feature will ensure it is fixed in the correct position.



NOTE

If you are using the extended mode, make sure to use the correct Y-axis ruler, which can be found inside the machine. Please refer to the picture below for more details.

	
Normal mode	Extend mode

4.2 Graphics Software Setup

The LaserPro Spirit PRO Series 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 be compatible with the LaserPro Spirit PRO Series. However, LaserPro does not guarantee full compatibility and will not provide technical support for these programs.

NOTE

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

4.2.1 Recommended Computer Configuration

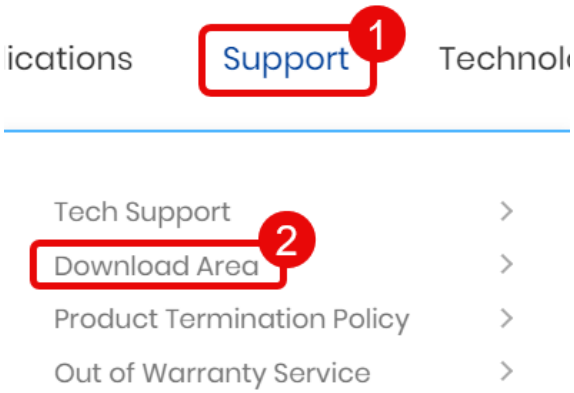
The LaserPro Spirit PRO Series operates under Windows operating systems and is designed to work on a computer that meets the following minimum requirements.

Operating System	Windows 11 or Windows 10 (version 21H2 or later), 64-bit, with the latest updates and service packs.
Processor	Multicore Intel processor (with 64-bit support) with SSE 4.2 or later or AMD Athlon 64 processor with SSE 4.2 or later.
RAM	8 GB (16 GB recommended)
Hard Disk	1 GB of available hard-disk space for installation (SSD recommended)
Monitor Resolution	1024 x 768 display (1920 x 1080 recommended)

4.2.2 Installation of the GCC LaserPRO Print Driver

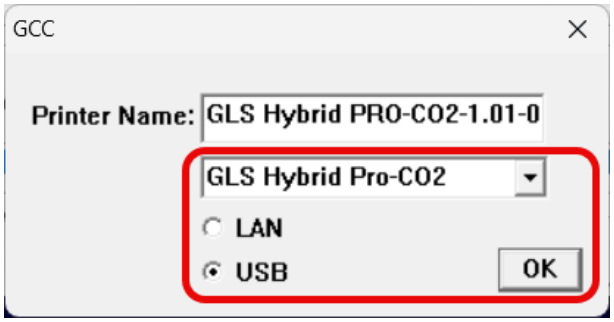
Please refer to the following steps to install the GCC LaserPro print driver on your computer.

Step 1. Visit www.GCCWorld.com, navigate to Support → Download Area → Laser Engraver, and download Spirit LS PRO or GLS Hybrid PRO print driver.

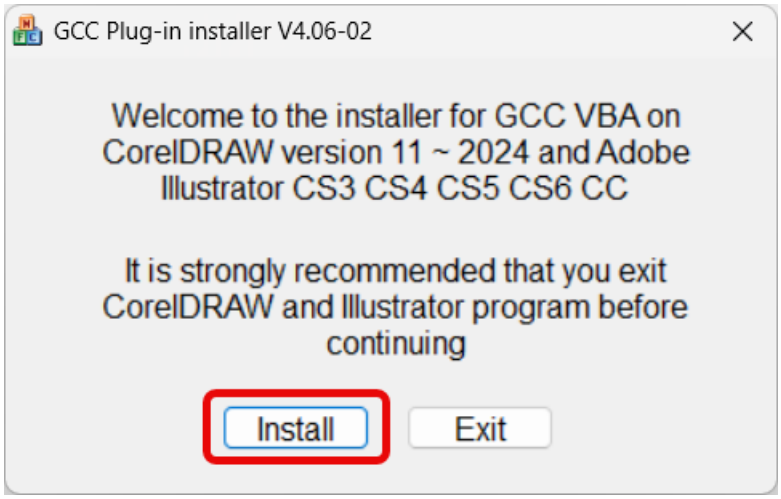


Step 2. Double-click the downloaded file to install the print driver.

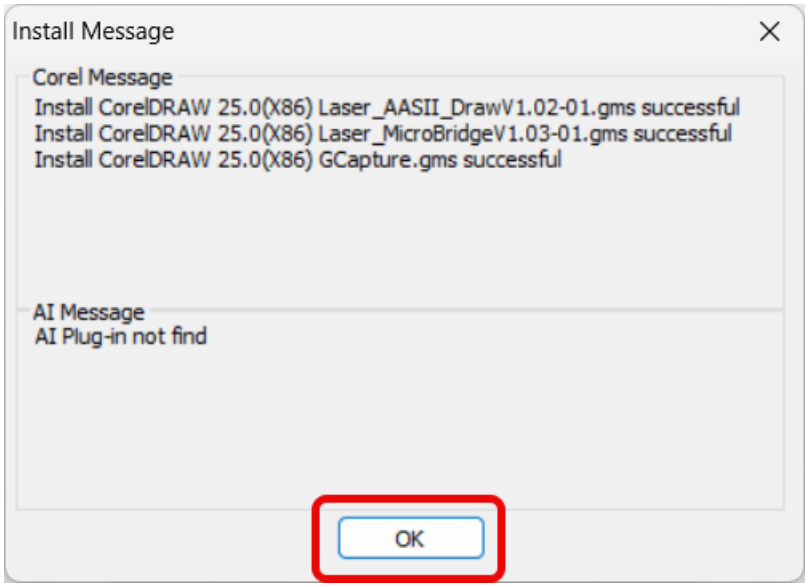
Step 3. During installation, the model selection window will appear. Select your model and connection method, then click the “OK” button to proceed.



Step 4. The GCC plug-in installation will then start. Click the “Install” button to continue.

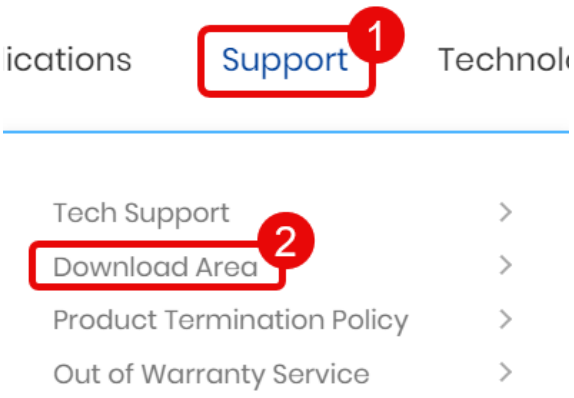


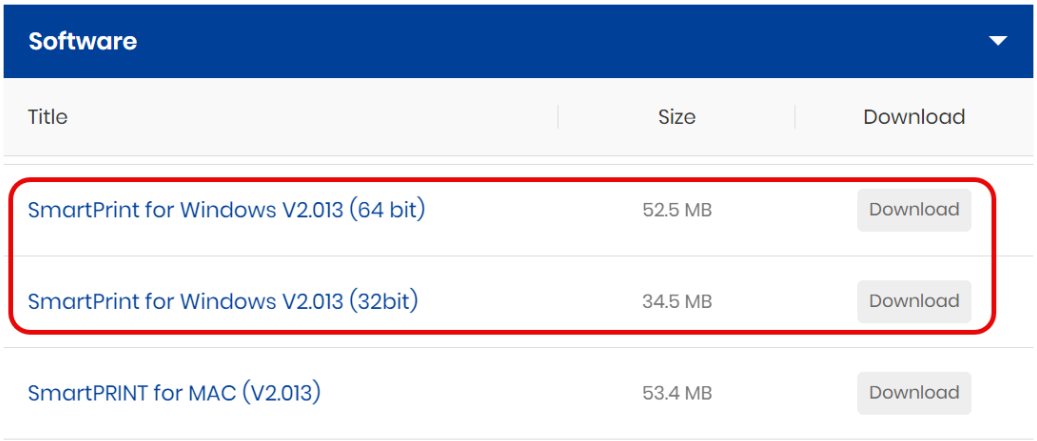
Step 5. The installer will automatically detect the versions of CorelDRAW and Illustrator on your computer and install the appropriate GCC plug-in. Click “OK” to complete the installation.



4.2.3 SmartPRINT for MAC Users

Mac users can operate GCC LaserPro machines by purchasing the GCC SmartPRINT software, which provides full functionality. GCC offers a 15-day trial version of SmartPRINT. To download and try it before purchase, visit www.GCCWorld.com, navigate to Support → Download Area → Laser Engraver.





For more information, please refer to the following link:

Introduction Video:

https://youtu.be/FBaYXzOGbV0?si=34-P5mz2X4IKm5_L

User Manual

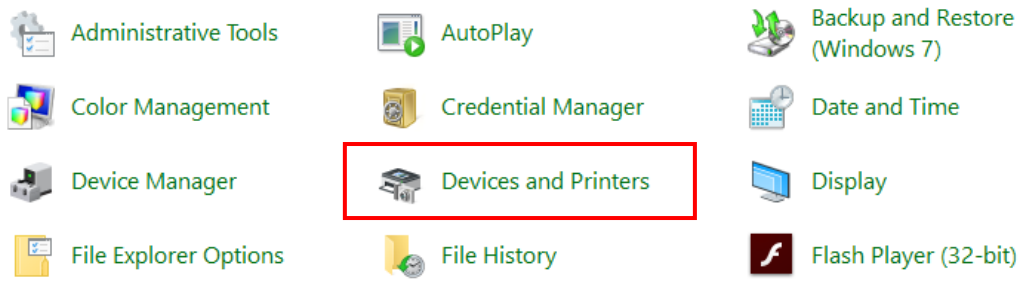
https://www.gccworld.com/data/download/file/SmartPRINT-user%20manual.pdf

4.2.4 Using Adobe's AP with GCC LaserPro Machine

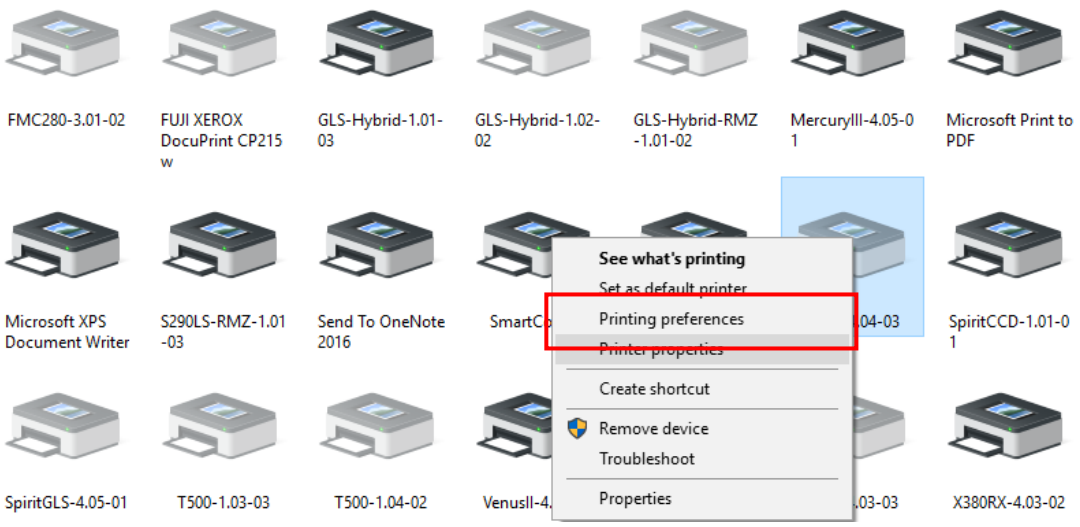
The Adobe's AP (e.g. Illustrator, Photoshop or Acrobat reader) processes files via its Advanced Printing Features; users should firstly deselect Enable Advance Printing Features; otherwise the machine is unable to recognize or read general files when uploaded.

- Deselect "Enable Advance Printing Features"

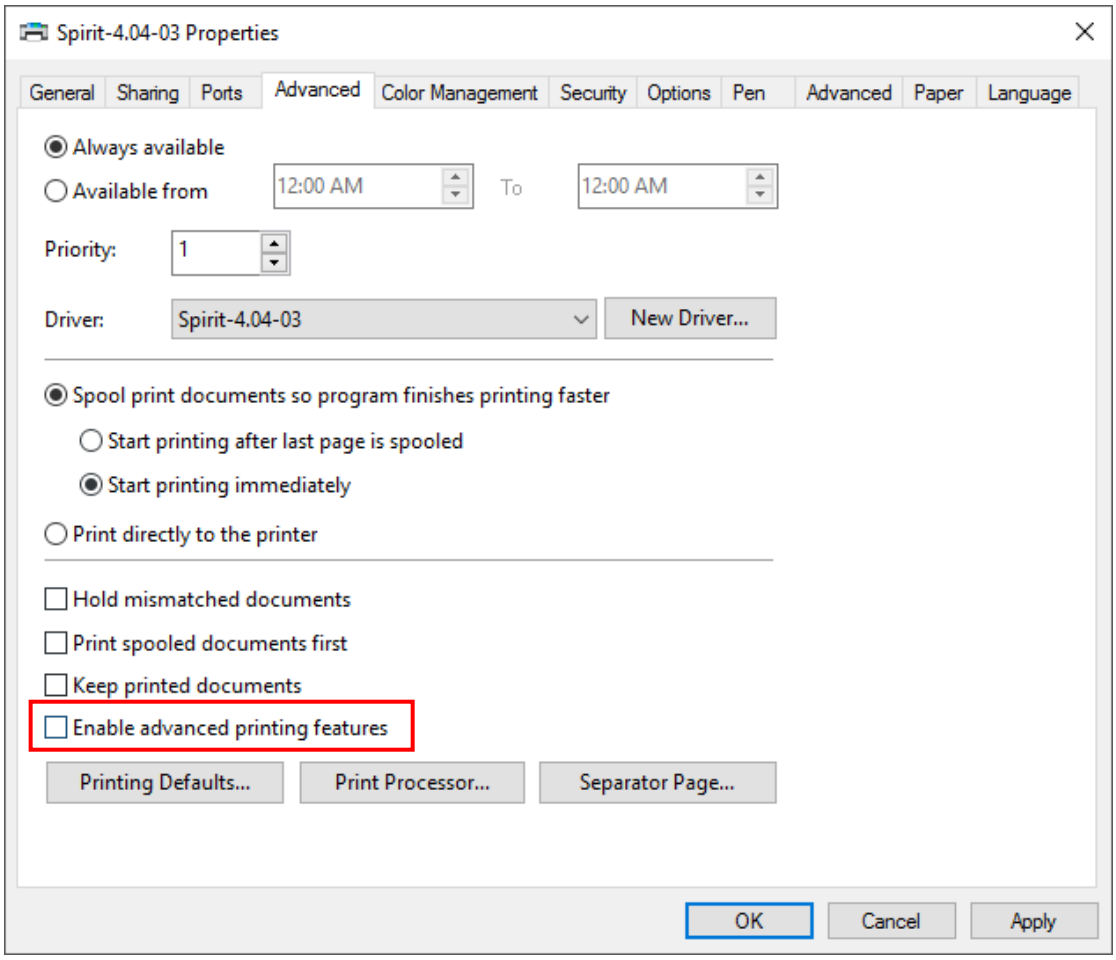
1) Click to select → Control Panel → Devices and Printers



2) Select your printer (for example, Spirit), right-click your mouse and choose Properties to enter Spirit Properties setup

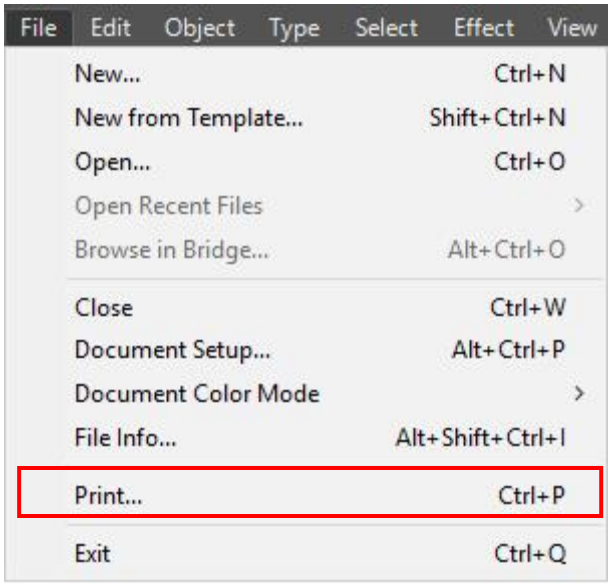


3) Then click the Advanced tab, then deselect Enable Advanced Printing Features, now all files can be recognized and uploaded.

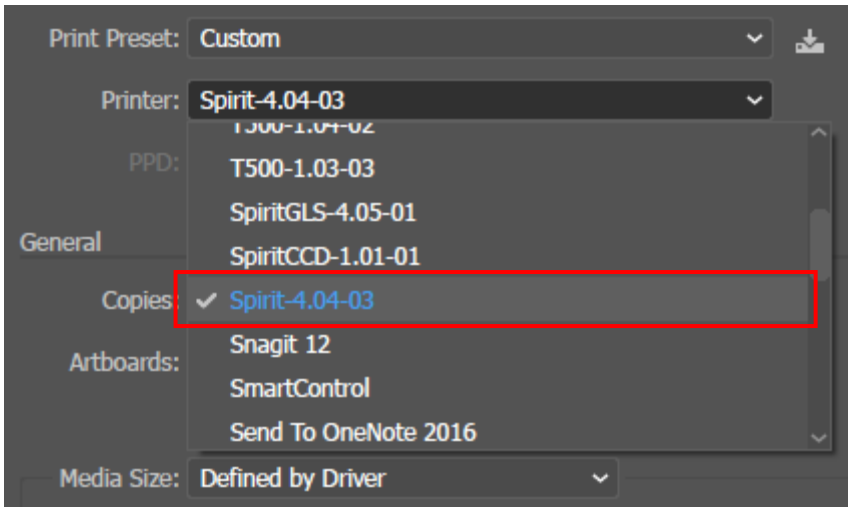


- File Transfer

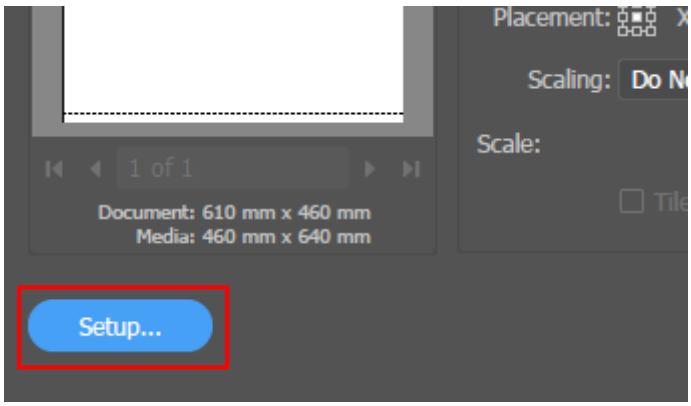
1) Select your working object, and then at the upper toolbar please choose File → Print.

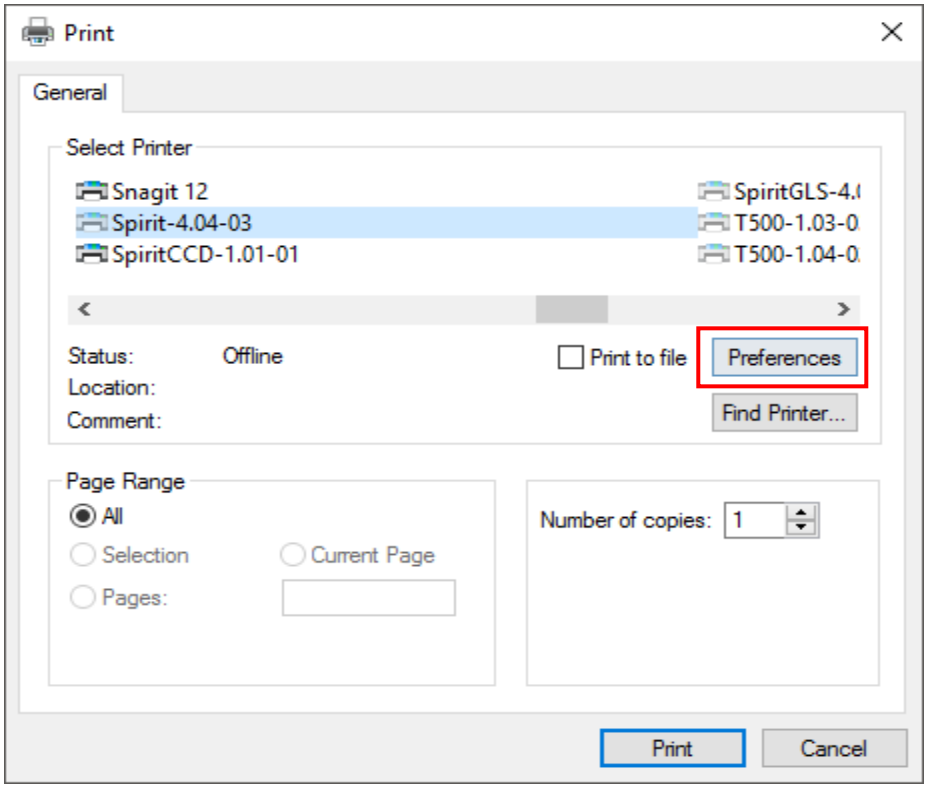


2) At the print setup screen, at Print Preset please select Custom, and choose your printer (e.g. Spirit)

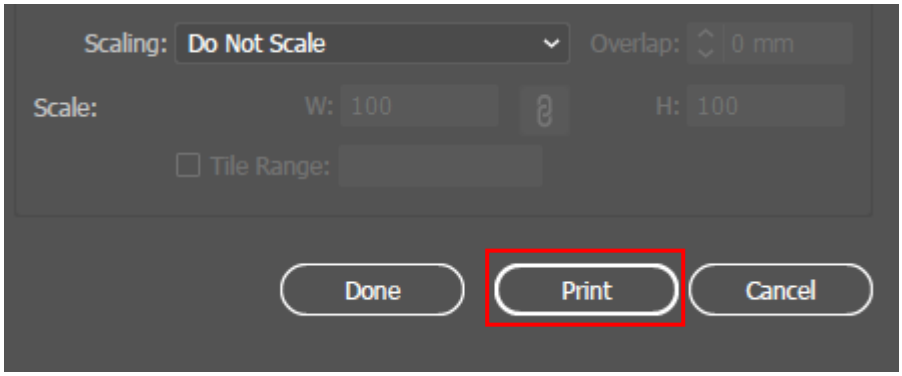


3) Then click on the lower left tab of Setup to enter Preferences settings.



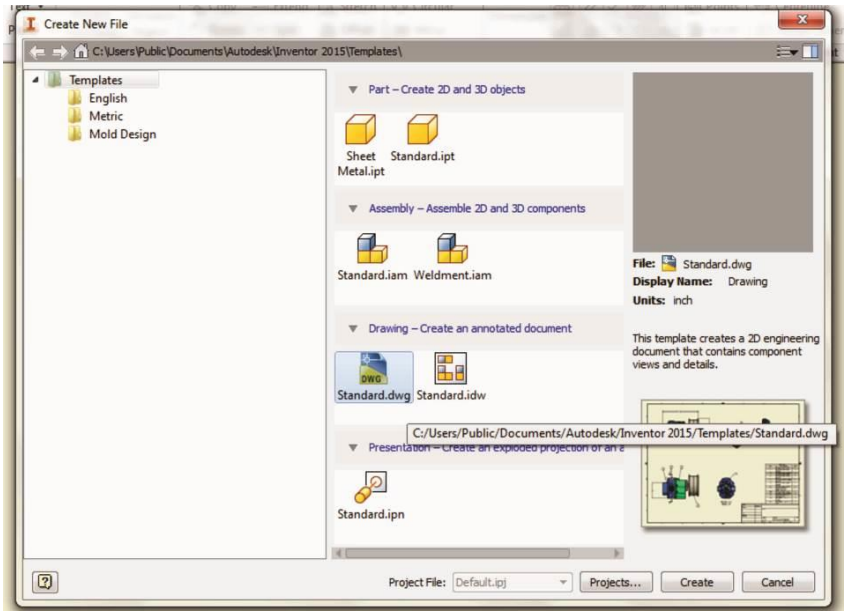


4) After all preferences are set, click Print to send file to the machine for print out.

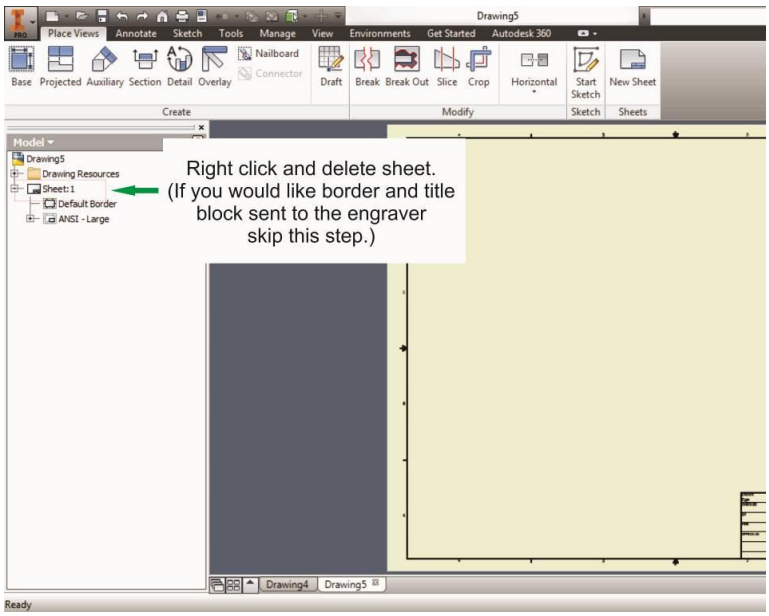


4.2.5 Using Autodesk Inventor with GCC LaserPro Machine

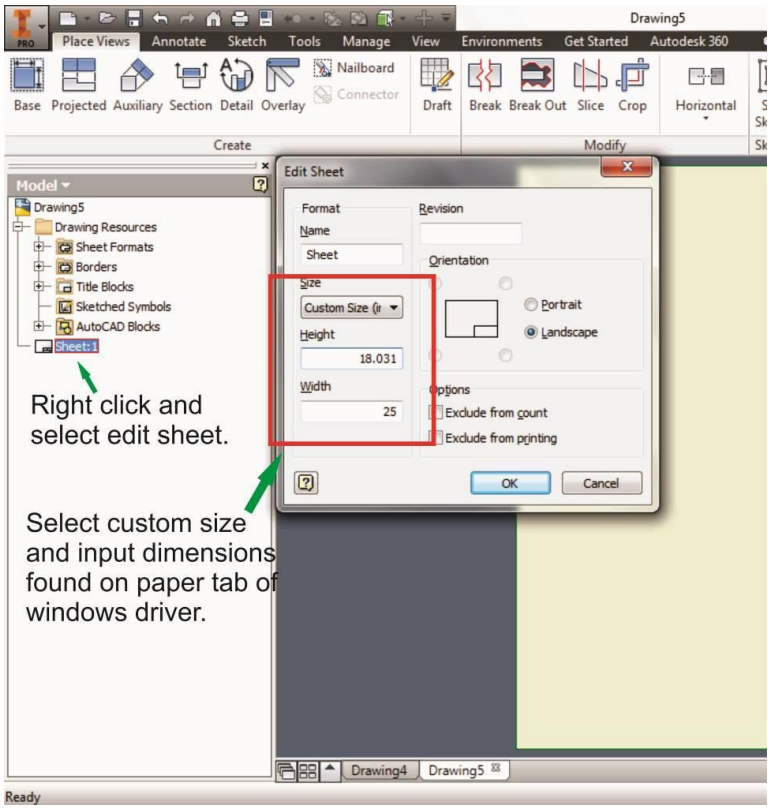
1. Start drawing.



2. Delete border and title block by right clicking on sheet1 and selecting delete.

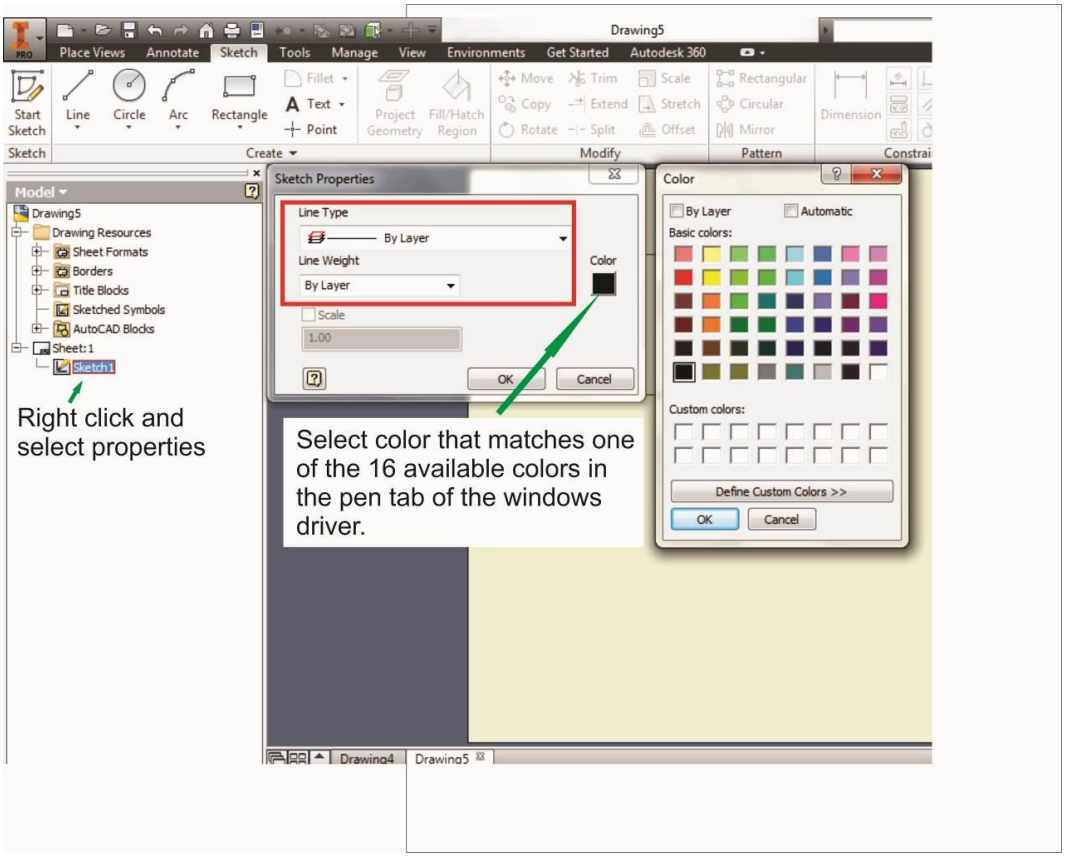


3. Set sheet size to match working area of engraver. Engraver working area can be found on the paper tab of the windows driver.

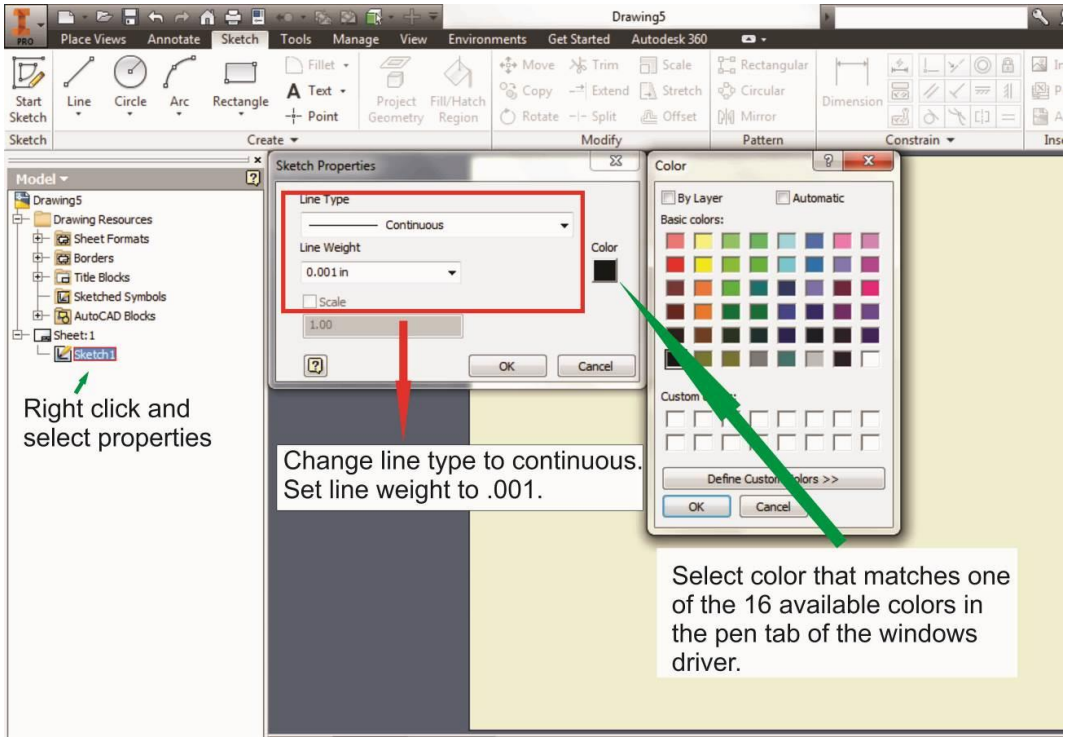


4. Start sketch.

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.



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.



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 the GCC SmartTOOL Plug-in with GCC LaserPro Machine

The GCC SmartTOOL™ is a unique software extension for Corel Draw that can drastically reduce your process times. This makes standard processes like a child's play and saves an infinite amount of valuable time.

GCC SmartTOOL unique feature list:

- Quick setup of laser machine layout
- One-click creation of CCD registration marks
- Generate label templates
- Smart copy functionality
- Import Excel data
- Automatic object sorting
- Image optimization for laser output
- Stamp tool
- Rhinestone tool

For more information, please refer to the following link:
Introduction Video:
https://youtu.be/lgs6QHRgyPQ?si=twZrx4uOAccAmsHk

User Manual
gccworld.com/data/download/file/SmartTOOL-User-Manual.pdf

Chapter 5
Operating LaserPro Spirit PRO Series

- Using Hardware
- Using the Touch Panel
- The LaserPro Print Driver

Once you have installed the LaserPro USB Driver (for use with USB connection), LaserPro Print Driver,and have connected the LaserPro Spirit PRO Series to your computer, you will need to familiarize yourself with the LaserPro Spirit PRO Series 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. The laser firing will need 8-10 seconds to warm up if turning to off, and turn on later, therefore, please wait 10 seconds before pressing STRART button for laser work.

5.1.2 Emergency Stop

Press the button to stop the laser in an emergency. To reset this button, rotate it to the direction of an arrow.

5.1.3 LED Light Switch

Quickly turn ON/OFF the LED light.

5.1.4 Machine Status Indicator Light

The four indicator lights on the LaserPro Spirit PRO Series Touch Screen are part of the system's safety interlock system.

Light Color	Status	
	Error	The power light will illuminate when machine finds any error.
	Door	The door light will illuminate when either the top lid or external pass-through doors on the LaserPro Spirit PRO series are open or improperly closed.
	Power	The power light will illuminate when the LaserPro Spirit PRO series is powered on.
	Laser	The laser light will illuminate when the laser is active and in operation.

5.1.5 Touch Panel

The 4” touch panel enables the user to manage files, adjust machine settings, and more.

5.1.6 USB Storage

The USB storage port allows you to transmit data from a USB flash drive. Please refer to Chapter 4.1.3 for more details on operations.

5.1.7 SmartEYES CCD

SmartEYES™ CCD on the top lid enables capturing the entire working area of the machine, making positioning easy. Please refer to the following instructions for operation.

NOTE

Before using SmartEYES CCD, please ensure that print driver and SmartCONTROL program have been installed on your computer/laptop.

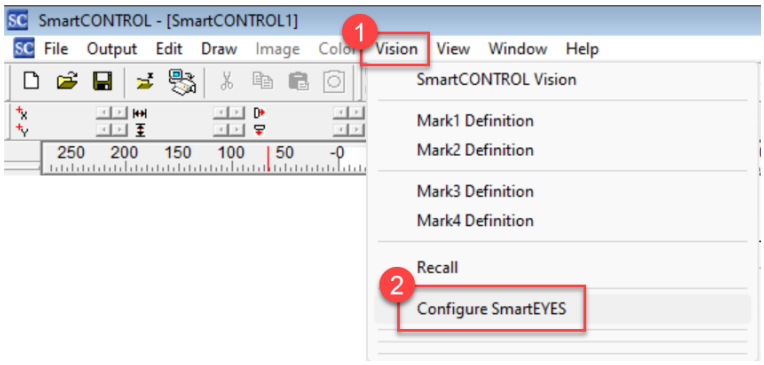
Import the calibration file of SmartEYES into your computer/laptop

1) Please visit the following link on GCCworld to download the latest version of SmartCONTROL and install it on your computer/laptop.

   GCCworld Down Area

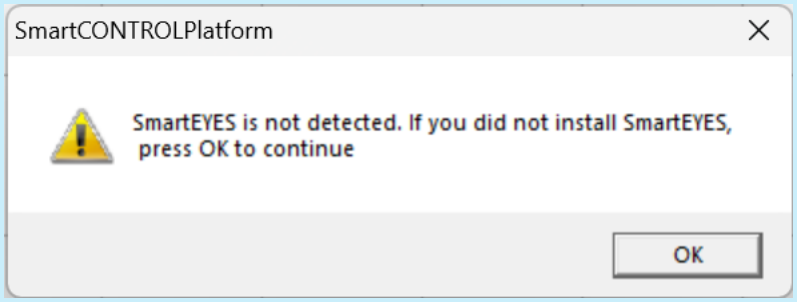
2) Connect the computer/laptop to the machine.

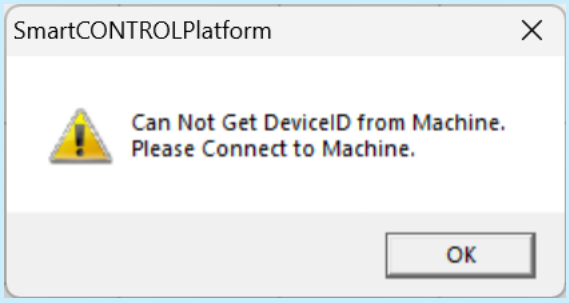
3) Open SmartCONTROL program, and go to <Vision> → <Configure SmartEYES>, then the SmartEYES setting window will appear.



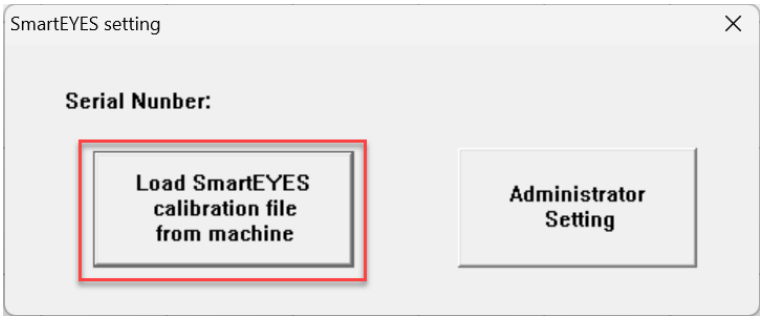
NOTE

If you found following messages, please verify the connection.

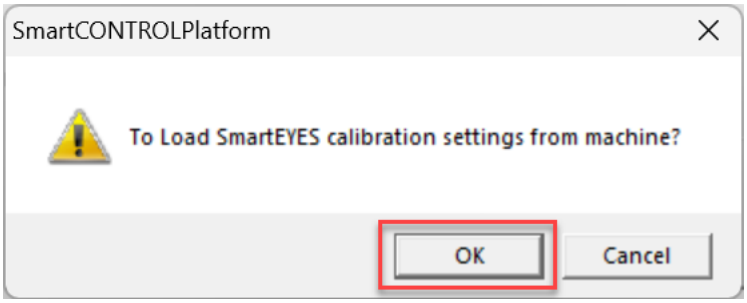




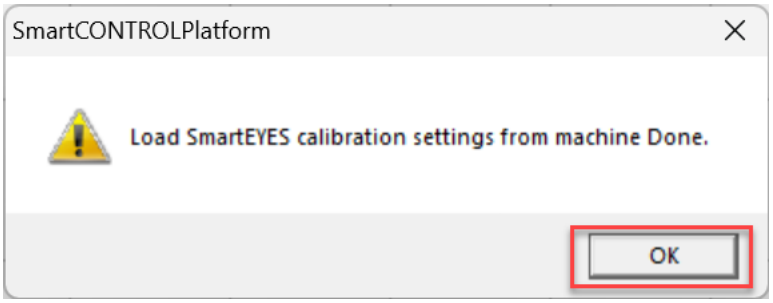
4) Click “Load SmartEYES calibration file from machine” to import the calibration file into your computer/laptop.



5) The SmartCONTROL will display a message to remind you that the calibration file will load to your computer/laptop. Please click OK to continue.

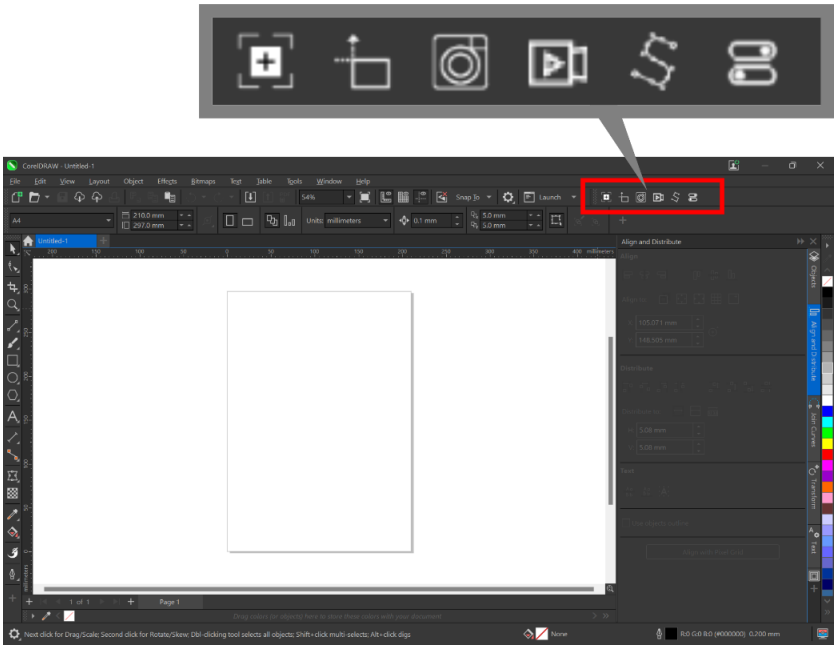


6) After loading the calibration file, SmartCONTROL will display a load calibration complete message. Click OK to close the window and now you can close SmartCONTROL.

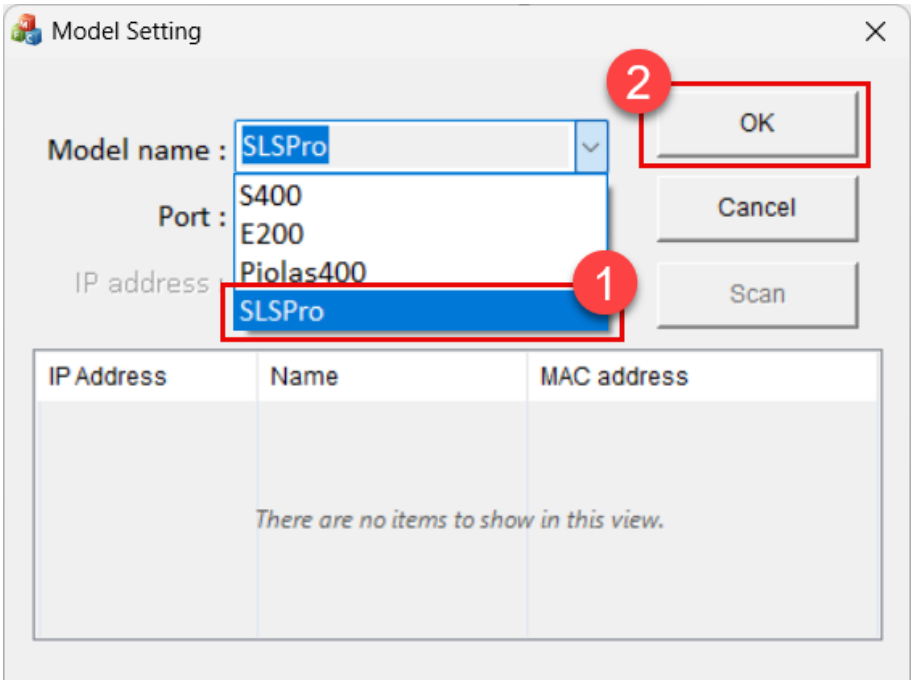


CorelDRAW Setting

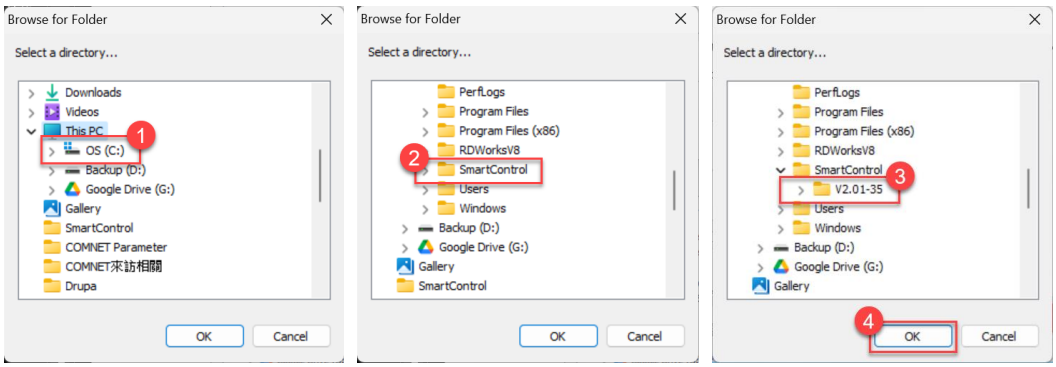
1) Run CorelDRAW and find the GCC plug-in from toolbars. It's located in the up-right corner of CorelDRAW.



2) Click  (Camera Model) button, and the Model Setting window will appear. Select "Spirit LS PRO" or "GLSH PRO" from the drop-down menu of model names and click "OK" to complete the setting.

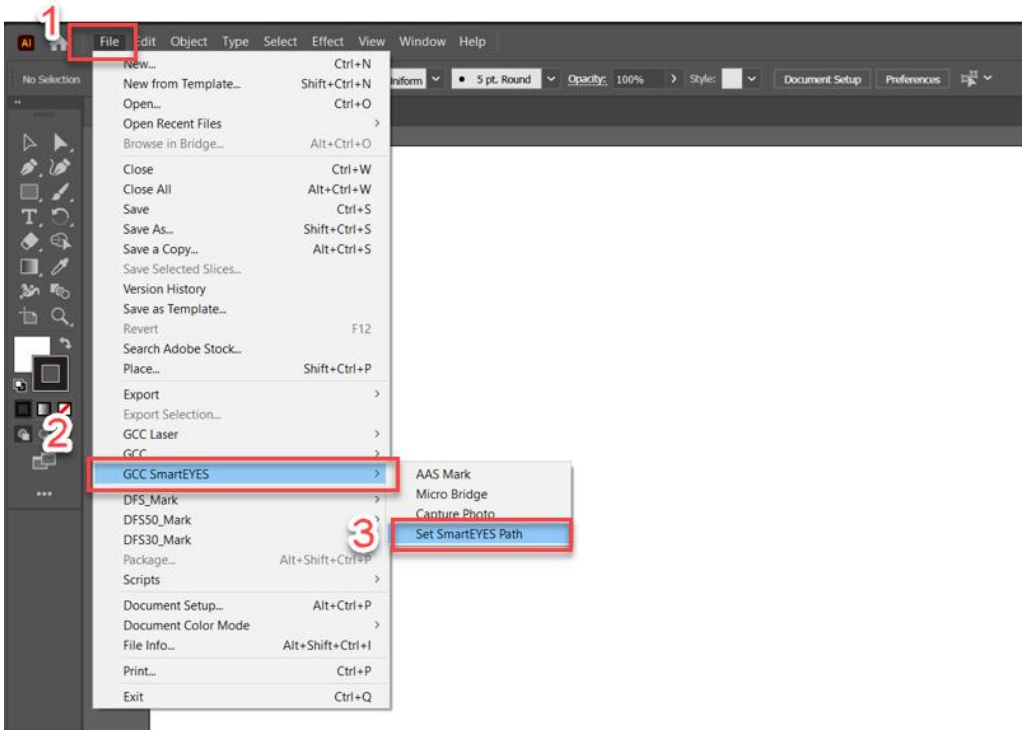


3) Click  (Set SmartEYES Path) button and assign the calibration file located at C:\SmartCONTROL\V2.01-35 (the path may vary depending on the installed version). Then click "OK" to finish the setting.

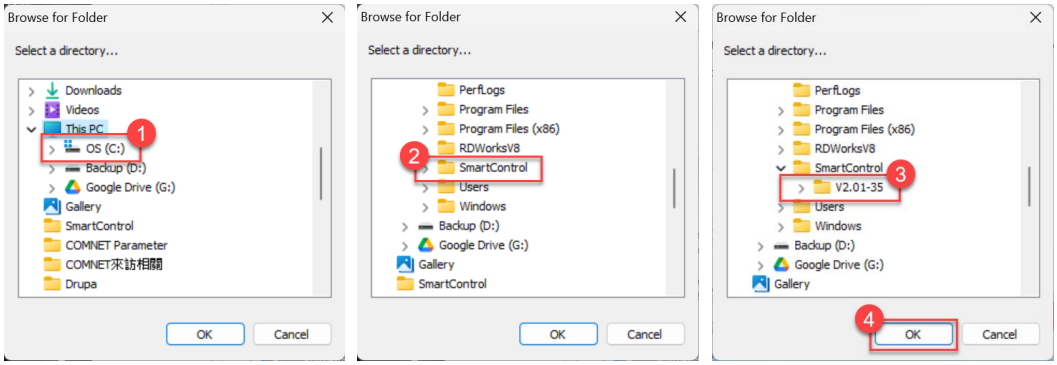


Adobe Setting

1) Run Adobe Illustrator and go to <File> → <GCC SmartEYES> → <Set SmartEYES Path> from the menu bar.

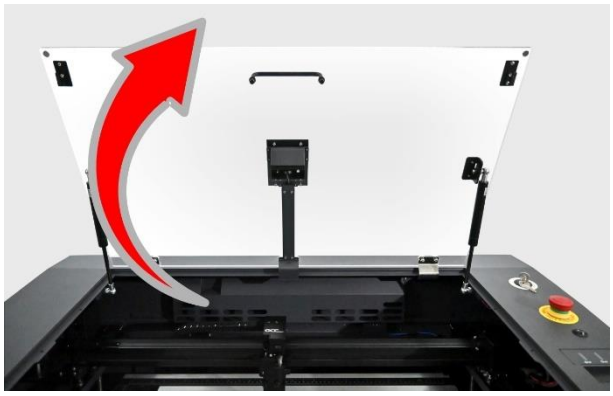


2) Assign the calibration file located at C:\SmartCONTROL\V2.01-35 (the path may vary depending on the installed version). Then click "OK" to finish the setting.

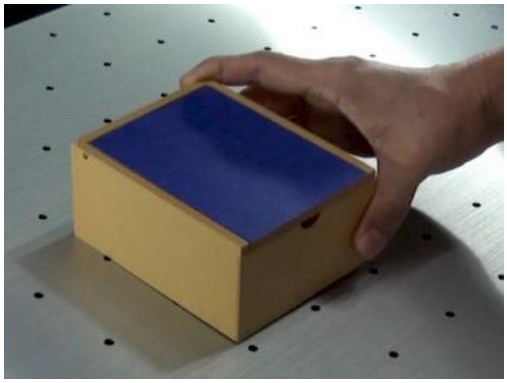


Operation (Using CorelDRAW as an Example)

1) Open the top lid of the Piolas 400.

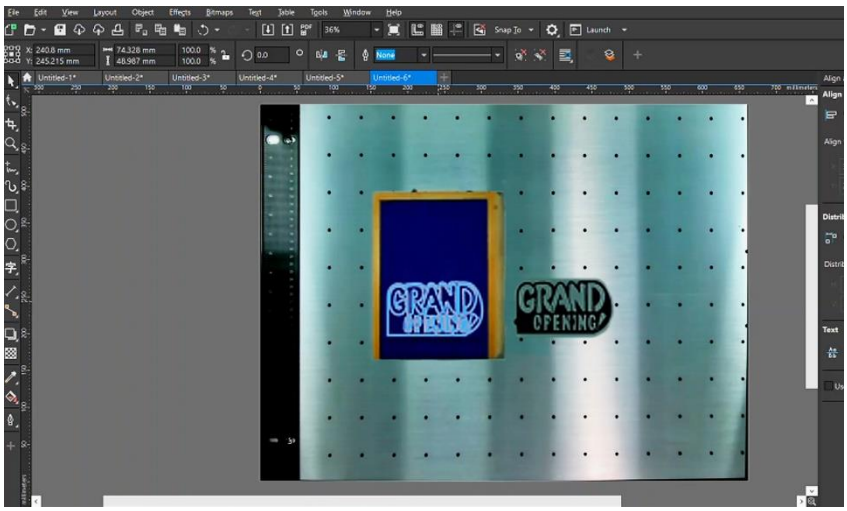


2) Place an object on the working table of the machine.



3) Click  (Capture photo) button to capture table.

4) Move artwork to a position that you want to process.



5) Engraving job is finished.

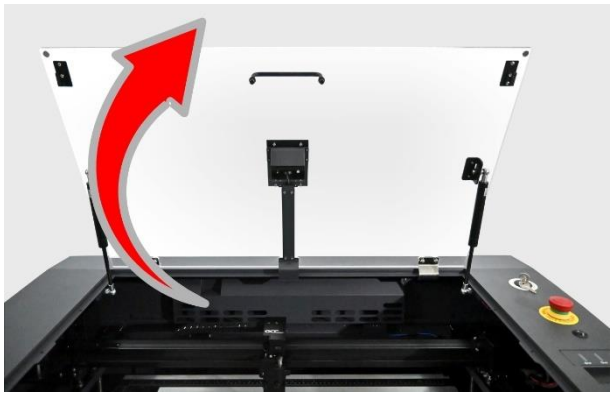
5.1.8 Live-View Camera

The Live-View Camera enables you to monitor the machine status during laser processing. It also helps teachers easily instruct students on how to use the laser in the classroom.

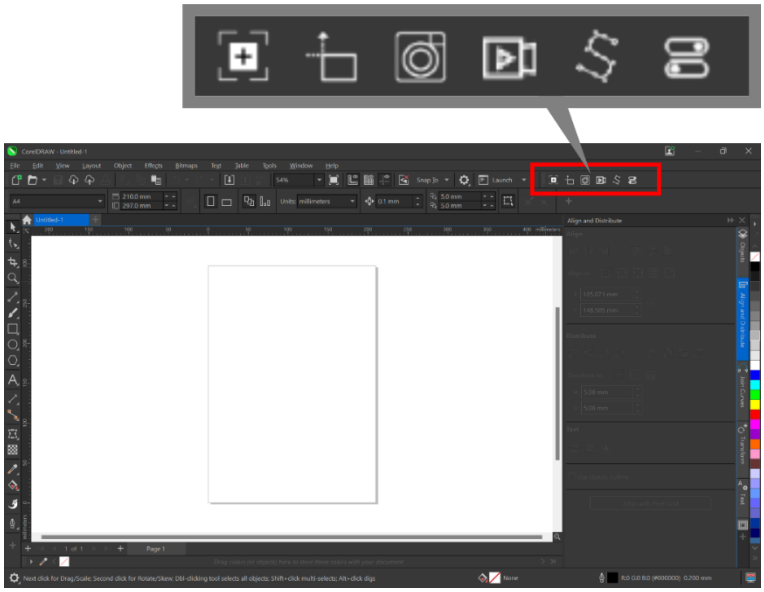
Operation (Using CorelDRAW as an example):

1) Please refer to chapter 5.1.7 to complete the setting for **Import the calibration file of SmartEYES into your computer/laptop** and **CorelDRAW/Adobe Illustrator Setting.**

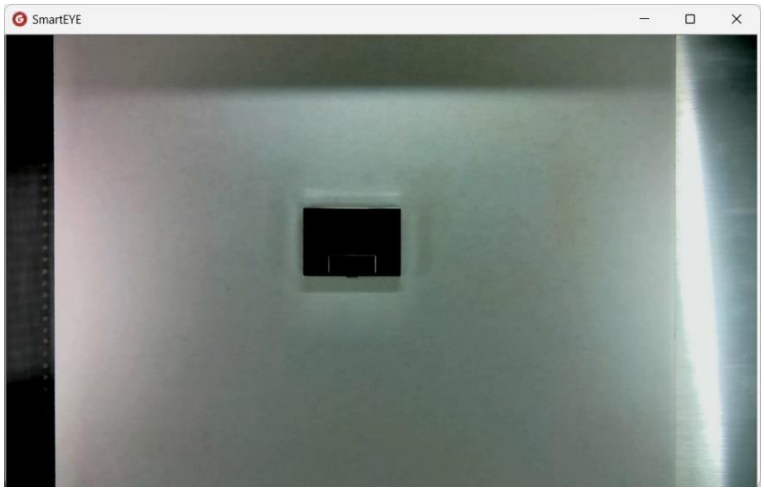
2) Open the top window of the Spirit PRO Series.



3) Run CorelDRAW and find the GCC plug-in from toolbars. It's located in the upper-right corner of CorelDRAW.



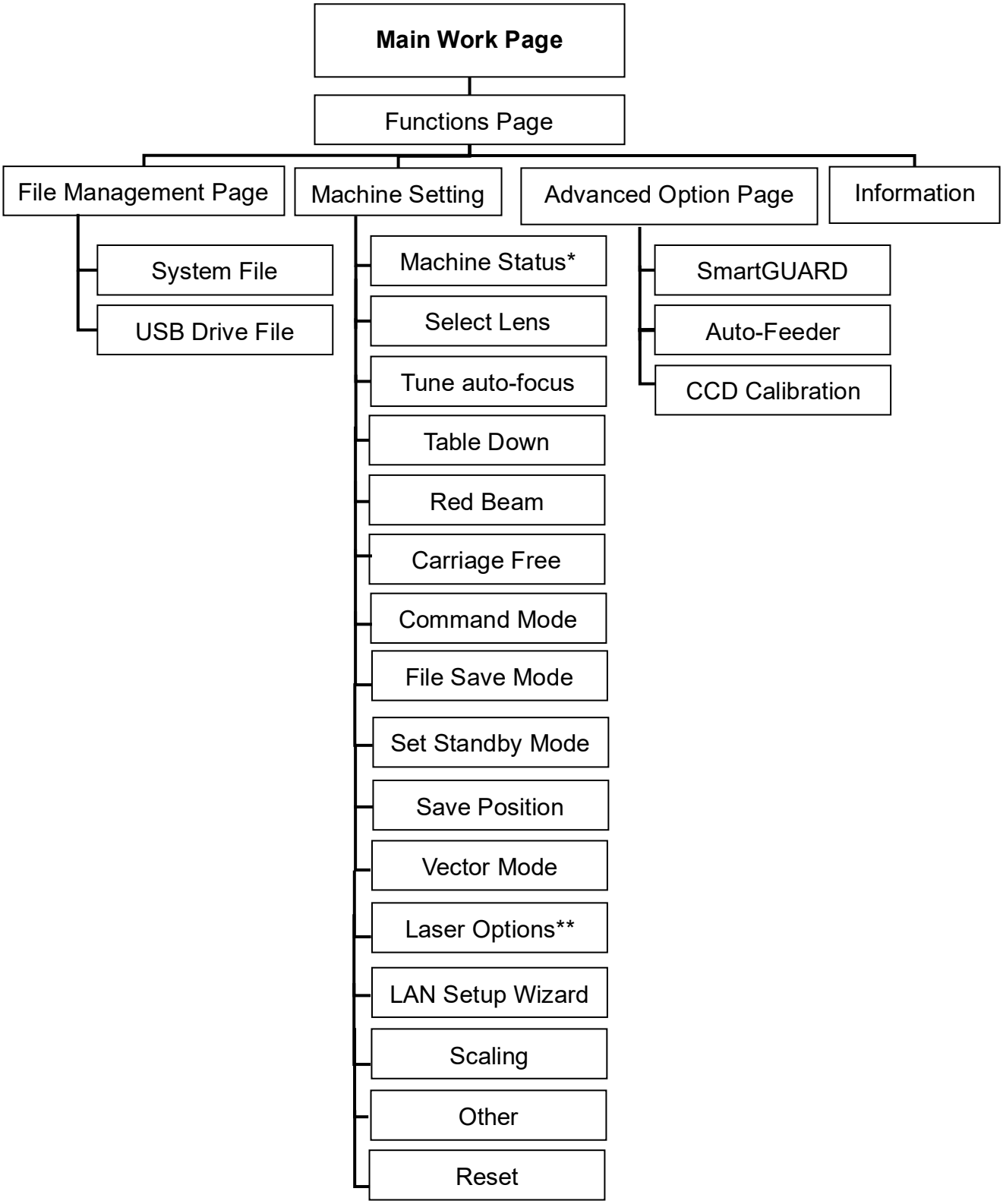
4) Click  (Real Time Video) button, and a new window for SmartEYS will appear.



5) You can now see the real time video of the working table on your computer/laptop.

5.2 Using the Touch Panel

5.2.1 Touch Panel Navigation Chart



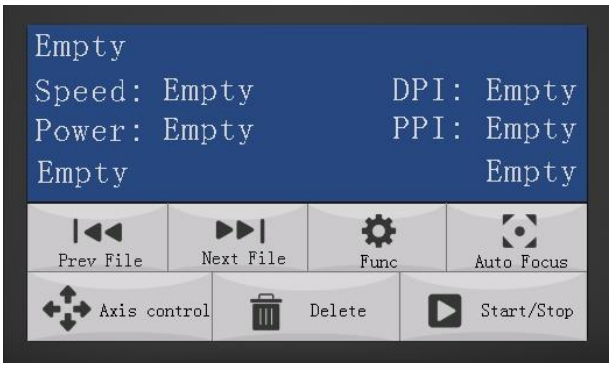
*For Spirit PRO series with GT tube installed

**For Spirit PRO with fiber laser installed

5.2.2 Touch Screen Function Pages

When the LaserPro Spirit PRO series 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



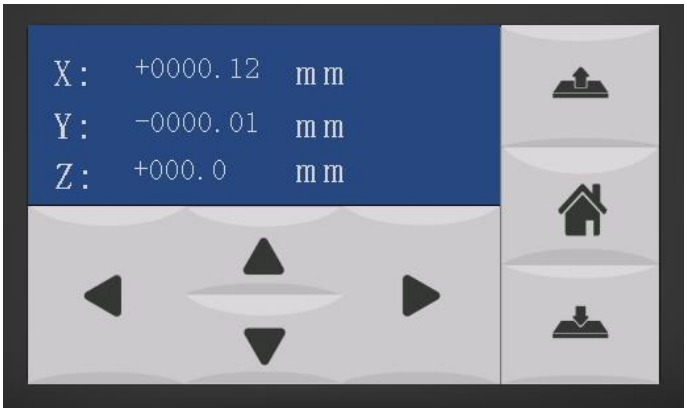
The main work page is the page that the LaserPro Spirit PRO series will default to upon startup and will be the “home base” for when navigating through the various functions of the control panel. This will be the page that is displayed when you are processing your jobs. This page contains specific job information such as the current job’s name, Speed, Power, PPI, DPI, processing / remaining times, and jobs loaded.

Main Work Page	
Relevant Buttons	Function
Prev File	Scroll through previous jobs
Next File	Scroll through next jobs
Func (Function)	Go to Functions Page
Auto Focus	Initiate the auto focus function
Axis control	Manually adjust the X, Y-axis position of the lens carriage and the height of the work table (Z-axis)
Delete	Delete the current selected job
Start/Stop	Start / Stop the current job

NOTE

There is an 8-second warm up period after the door LED is triggered for systems equipped with Synrad laser tubes. i.e. opening the top lid or the external pass-through doors of the machine. Operator must wait for 8 seconds before the laser tube can begin to work.

5.2.2.1 Carriage / Work Table Adjustment Page



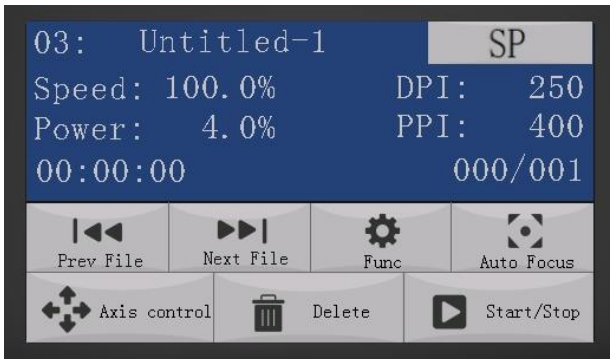
Navigating to this page:

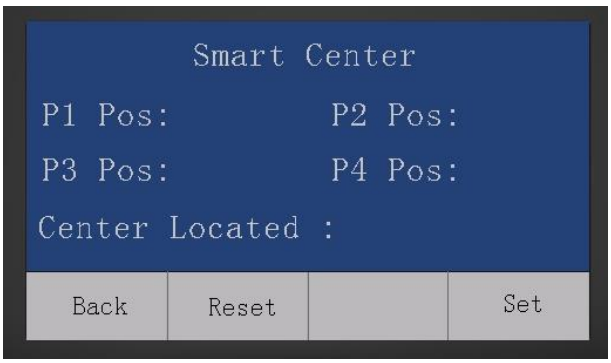
Main Work Page ► Axis Control

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 lens carriage.

Carriage / Work Table Adjustment Page	
Relevant Buttons	Function
Home	Back to Main work page
Up	Manually decrease the height of the work table (Z-axis)
Down	Manually increase the height of the work table (Z-axis)
△ / ▽ Directional	Manually adjust the Y-axis position of the lens carriage
◁ / ▷ Directional	Manually adjust the X-axis position of the lens carriage

5.2.2.2 SmartCENTER Page





Navigating to this page:

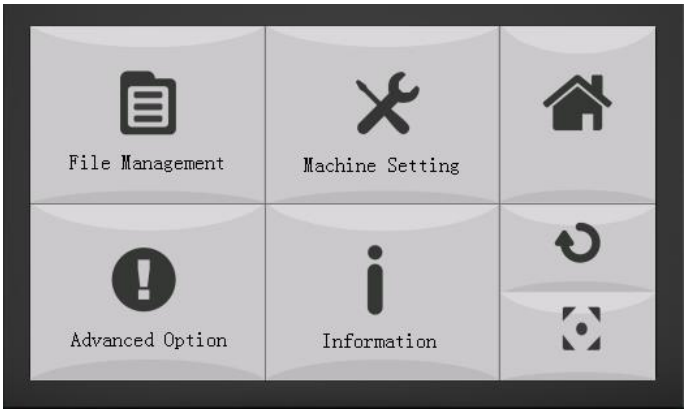
Main Work Page ► SP Button

Under SmartCENTER mode the job will begin after the system positions the carriage to the center position between two points or four points indicated by the user. The SmartCENTER mode has to be enabled through the driver.

SmartCENTER Page	
Relevant Buttons	Function
Back	Back to previous page
Reset	Reset all saved positions
Set	Set Smart Center position

5.2.2.3 Functions Page

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.



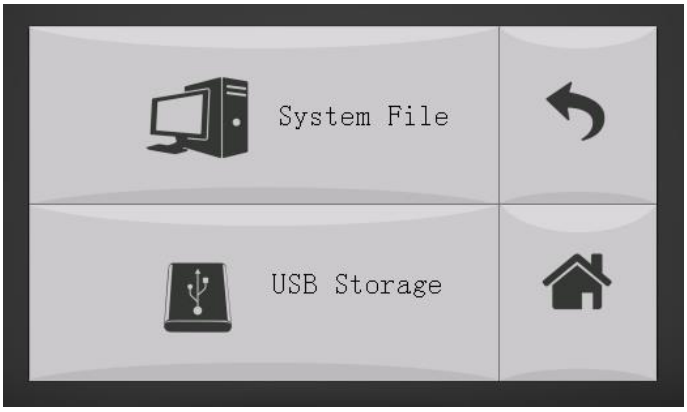
Navigating to this page:
Main Work Page ► Func

- **File Management Page** – this page allows you to manage the files that you have loaded onto the LaserPro Spirit PRO series.
- **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, Set File Save Mode, Set Vector Mode, LAN Setup, Other, Reset.
- **Advanced Option Page –** this page allows you to enable different optional usages for the laser machine, such as roll to roll auto-feeder, CCD calibration for contour cutting, SmartGUARD fire alarm etc.
- **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
Home	Back to main work page
Return	Return to previous page
Auto Focus	Initiate the auto focus function

*refers to Machine Setting Page for save position and recall position functions.

5.2.2.4 File Management Page



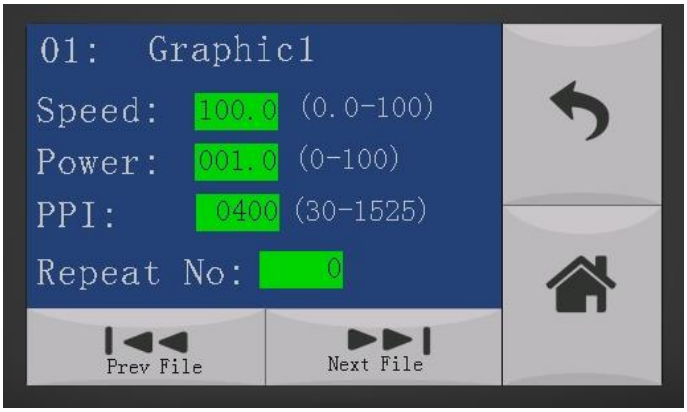
Navigating to this page:

Main Work Page ► File Management

The File Management Page allows you to manage the files from system or USB Storage.

File Management Page	
Relevant Buttons	Function
System File	Manage files from the memory of the machine
USB Storage	Manage files from USB flash disk
Back	Back to previous page
Home	Back to Home Page

5.2.2.5 System File Page



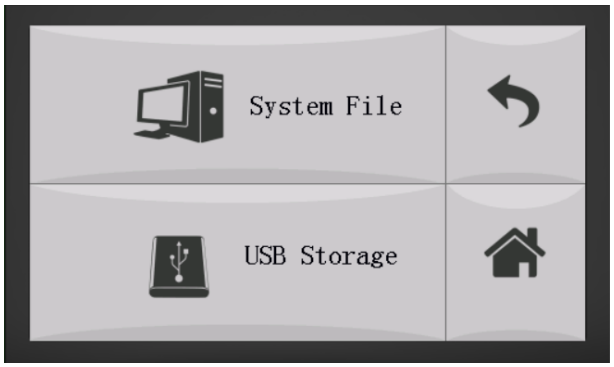
Navigating to this page:

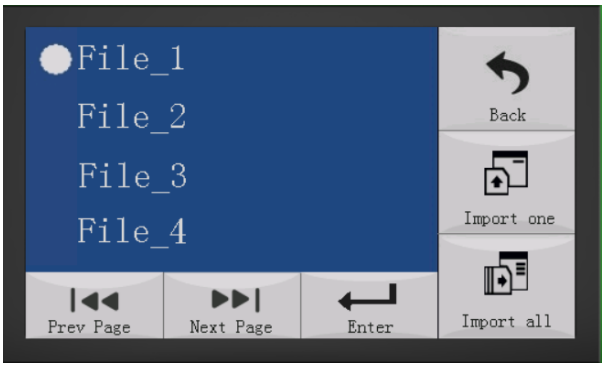
Main Work Page ► Func ► File Management ► System File

The System File Page allows you to manage the files that you have loaded onto the LaserPro S400. 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.

System File Page	
Relevant Buttons	Function
Back	Back to previous page
Home	Back to Main work page
Prev File	Back to Previous File
Next File	Go to Next File

5.2.2.6 USB Storage Page





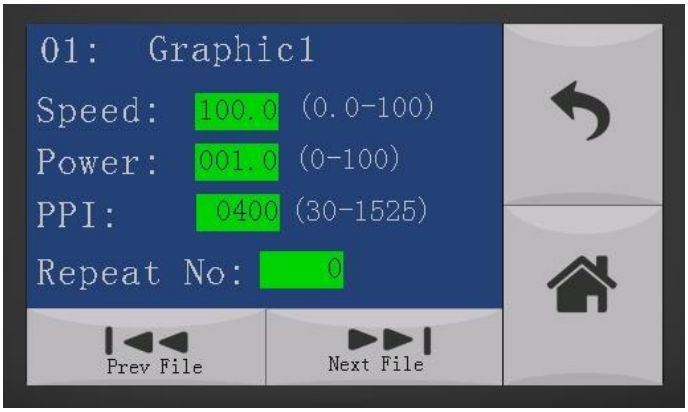
Navigating to this page:

Main Work Page ► Func ► File Management ► USB Storage

The USB Drive File Page allows you to load file from USB storage. You can scroll through your job to processing.

USB Storage Page	
Relevant Buttons	Function
Back	Back to previous page
Home	Go back to Main work page
Prev File	Go back to previous file
Next File	Go to next file

5.2.2.7 File Information Page



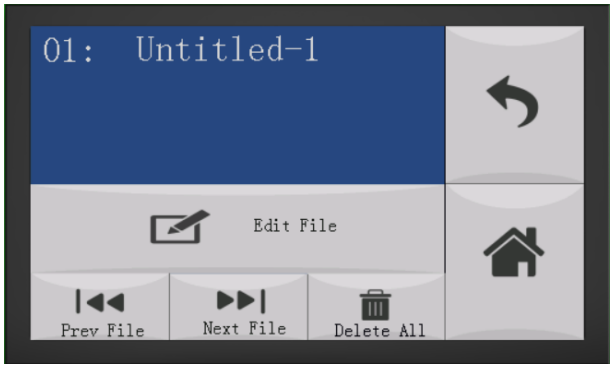
Navigating to this page:

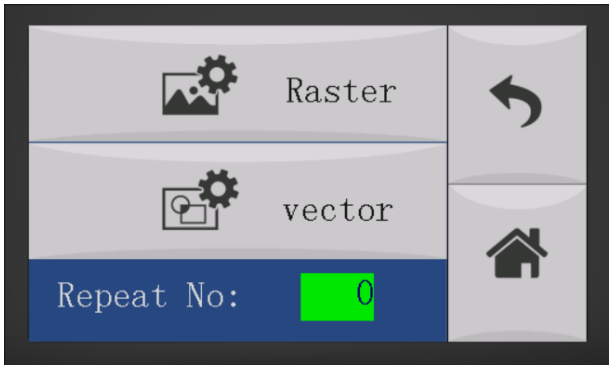
Main Work Page ► Func ► File Management ► USB Storage

The File Information Page allows you to view the speed, power, DPI, and PPI 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
Back	Back to previous page
Edit	Go to the File Management Edit Page for the selected job
Return	Back to Main Work Page
Home	Back to Home Page

5.2.2.8 File Management Edit Page





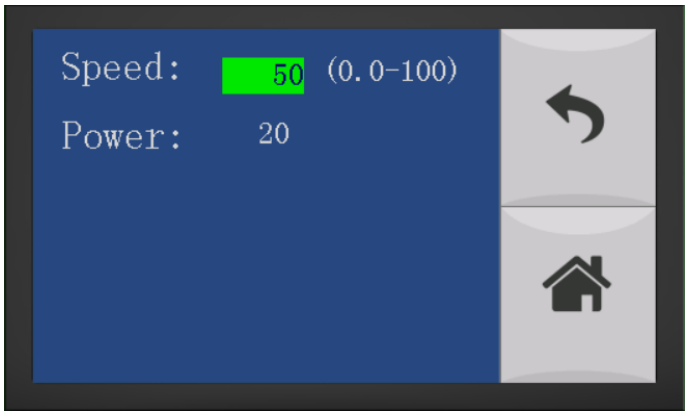
Navigating to this page:

Main Work Page ► Func ► File Management ► System File ► Edit File

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.

File Management Edit Page	
Relevant Buttons	Function
Edit File	Go to edit the parameter of the file
Prev File	Go back to previous file
Next File	Go to next file
Delete All	Delete all files
Back	Back to previous page
Home	Go back to Main work page

5.2.2.9 File Edit Raster Page



Navigating to this page:

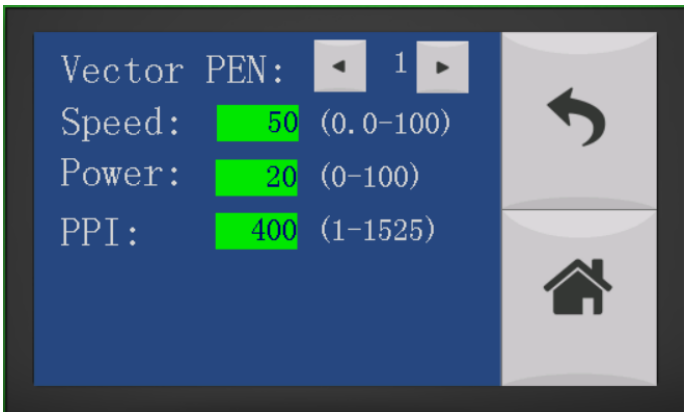
Main Work Page ► Func ► File Management ► System File ► Edit File ► Raster

The File Edit Raster Page allows you to edit the raster power and speed settings for the selected job. These settings correspond to the same settings found on the LaserPro Spirit PRO series 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 Spirit PRO series.

- Raster Power: 0.0% - 100%
- Raster Speed: 0.0% - 100%

File Edit Raster Page	
Relevant Buttons	Function
Back	Back to previous page
Home	Go back to Main work page

5.2.2.10 File Edit Vector Page



Navigating to this page:

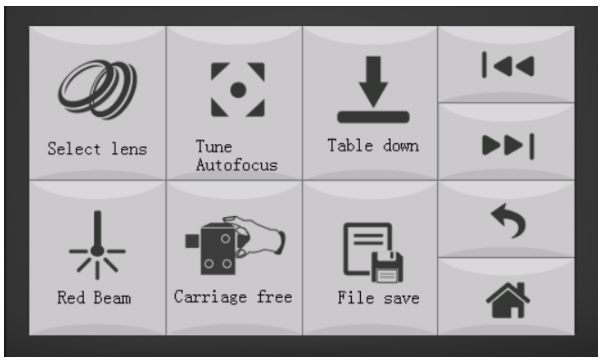
Main Work Page ► Func ► File Management ► System File ► Edit File ► Vector

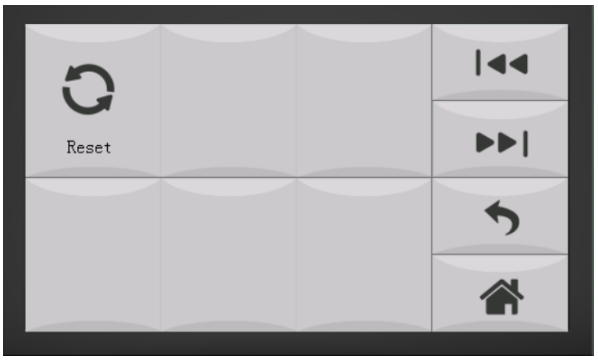
The File Edit Vector Page allows you to edit the vector pen, vector power, vector speed, and vector PPI for the selected job. These settings correspond to the same settings found on the LaserPro Spirit PRO series print driver. This page allows you to easily adjust these values to make immediate adjustments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

- Vector Pen: 1 – 16
- Vector Power: 0.0% - 100%
- Vector Speed: 0.0% - 100%
- Vector PPI: 30 – 1524

File Edit Vector Page	
Relevant Buttons	Function
Back	Back to previous page
Home	Go back to Main work page

5.2.2.11 Machine Setting Page





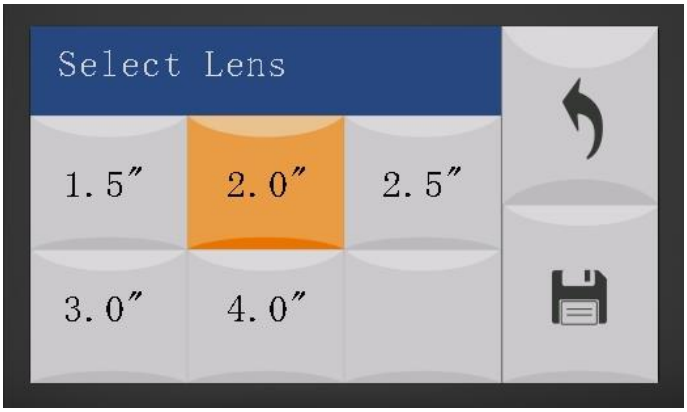
Navigating to this page:

Main Work Page ► Func ► Machine Setting

The Machine Setting Page allows you to access and modify various machine settings, including: Set Lens, Tune Auto Focus, Set Table Down, Red Beam on/ off, Carriage Free, select Command Mode, File Save, Set Stabdby mode, Save position, Select Vector Mode, LAN setup Wizard, Scaling, Other, and Reset etc.

File Management Edit Page	
Relevant Buttons	Function
Back	Back to previous page
Home	Go back to Main work page
Prev File	Go back to previous file
Next File	Go to next file

5.2.2.12 Machine Setting- Select Lens Page



Navigating to this page:

Main Work Page ► Func ► Machine Setting ► Select Lens

The Select Lens Page allows you to modify the lens settings after you have changed to a different focal lens. Remember to save your settings after you have made the proper changes. After that, pressing the Auto Focus button on control panel, the laser machine will conduct auto focus accordingly using the new lens setting.

GCC LaserPro Spirit PRO series include different mode which equipped different laser tubes, make sure the laser tubes installed with your machine before making adjustment.

- CO2 Laser Focal Lens: 1.5"/ 2.0"/ 2.5"/ 4.0" (Default 2.0”)

Lens	1.5"	2.0"	2.5"	4.0"
Spot Size	0.0029" (0.073mm)	0.0039" (0.099mm)	0.0048" (0.121mm)	0.0078" (0.198mm)

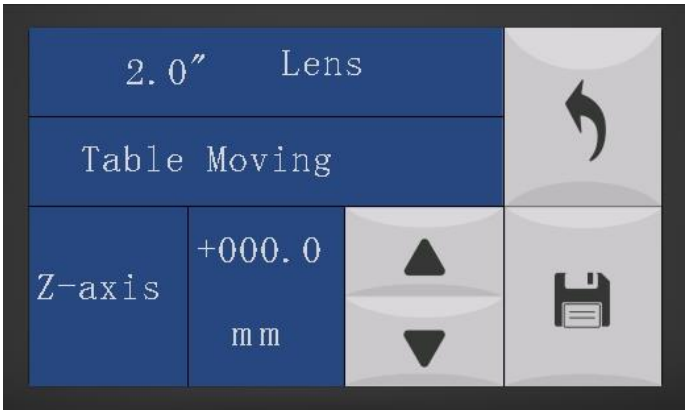
- Fiber Laser Focal Lens: 2.0"/ 4.0" (Default 4.0”)

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

*Go to Chapter 7.3 for different lens detailed information.

Select Lens Page	
Relevant Buttons	Function
Back	Back to previous page
Save	Save your current settings

5.2.2.13 Machine Setting- Tune Auto Focus Page



Navigating to this page:

Main Work Page ► Func ► Machine Setting ► Tune Auto Focus

The Tune Auto Focus Page allows you to manually adjust the auto focus default value, or distance from lens carriage to the worktable (Z-axis) when the Auto Focus button is pressed. GCC LaserPro Spirit PRO series include different mode which equipped different laser tubes, make sure the laser tubes installed with your machine before making adjustment.

Tune Auto Focus Page	
Relevant Buttons	Function
Back	Back to previous page
Save	Save your current settings
△ / ▽ Directional	Manually adjust the height of the work table (Z-axis)

5.2.2.14 Machine Setting- Table Down Page

Navigating to this page:

Main Work Page ► Func ► Machine Setting ► Table Down

The Set Table Down Page allows you to select whether or not the LaserPro Spirit PRO series displays a table moving down warning message at startup. If the Table Down selection is set to <YES>, the LaserPro Spirit PRO series will display a warning message 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>, the LaserPro Spirit PRO series will not display the warning message at system startup.

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

Table Down Page	
Relevant Buttons	Function
Back	Back to previous page
Save	Save your current settings

5.2.2.15 Machine Setting- Red Beam Page

Navigating to this page:

Main Work Page ► Func ► Machine Setting ► Red Beam

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

- Red Beam YES / NO

Red Beam Page	
Relevant Buttons	Function
Back	Back to previous page
Save	Save your current settings

5.2.2.16 Machine Setting- Carriage Free Page

Navigating to this page:

Main Work Page ► Func ► Machine Setting ► Carriage Free

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

- Carriage Free YES / NO

Carriage Free Page	
Relevant Buttons	Function
Back	Back to previous page
Save	Save your current settings

5.2.2.17 Machine Setting- File Save Page

Navigating to this page:

Main Work Page ► Func ► Machine Setting ► File Save

The File Save Mode Page allows you to set whether the LaserPro Spirit PRO series automatically deletes each job file after processing. Setting File Save to <NO> will automatically and immediately delete each job file from the LaserPro Spirit PRO series after the engraving or cutting process. Setting File Save to <YES> will retain the job files on the LaserPro Spirit PRO series.

- File Save: YES / NO

File Save Page	
Relevant Buttons	Function
Back	Back to previous page
Save	Save your current settings

5.2.2.18 Machine Setting- Set Standby Mode Page

Navigating to this page:

Main Work Page ► Func ► Machine Setting ► Set Standby Mode

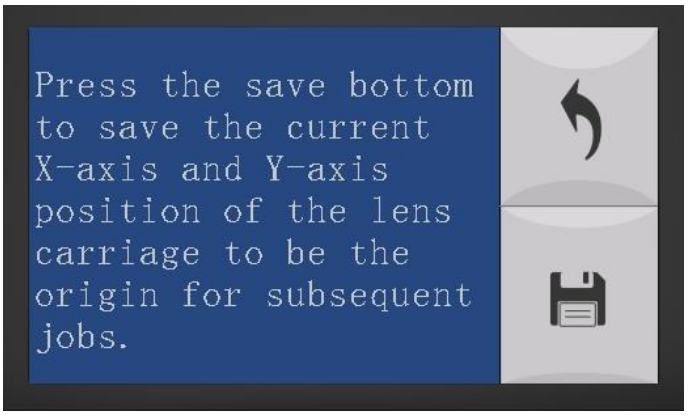
The Set Standby Mode page allows you to configure the laser machine automatically enter into power saving if machine is idle for a specified time.

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

Set Standby Mode Page	
Relevant Buttons	Function
Back	Back to previous page
Save	Save your current settings

5.2.2.19 Machine Setting- Save Position Page



Navigating to this page:

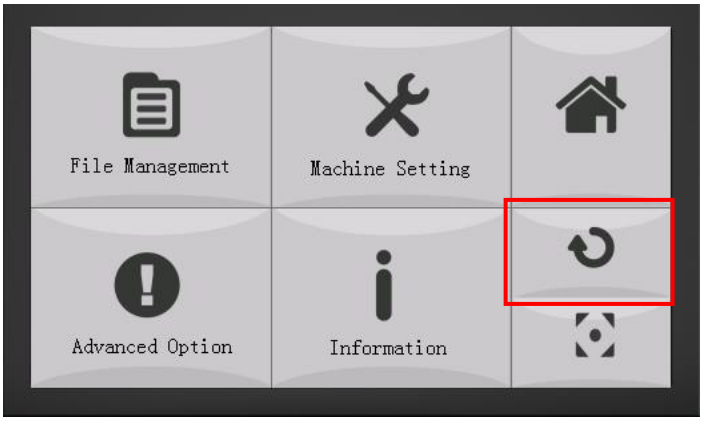
Main Work Page ► Func ► Machine Setting ► Save Position

The Save Position Function allows you to save the current X-axis and Y-axis positions of the lens carriage 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.

5.2.2.20 Recall Position

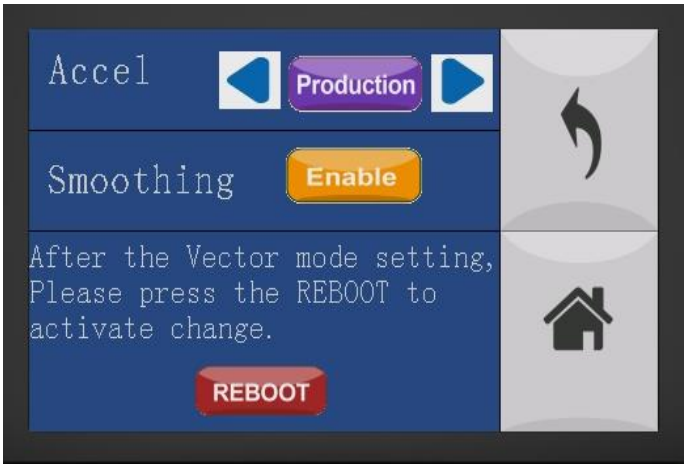


Navigating to this page:

Main Work Page ► Func ► Recall

To recall the saved position, simply go to Func page and press the Recall button to back the saved position. The lens carriage will be moved to the saved position and start subsequent jobs from this origin.

5.2.2.21 Machine Setting- Vector Mode Page



Navigating to this page:

Main Work Page ► Func ► Machine Setting ► Vector Mode

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
Back	Back to previous page
Save	Save your current settings

5.2.2.22 Machine Setting- LAN Setup Wizard Page

Navigating to this page:

Main Work Page ► Func ► Machine Setting ► LAN Setup Wizard

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: NO/ OFF

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

LAN Setup Wizard Page	
Relevant Buttons	Function
Back	Back to previous page
Save	Save your current settings

5.2.2.23 Machine Setting- Others Page

Navigating to this page:

Main Work Page ► Func ► Machine Setting ► Others

The Others Page allows you to change various settings that correspond to the touch panel.

The Unit setting will allow you to change whether the units displayed by the Touch Screen 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.

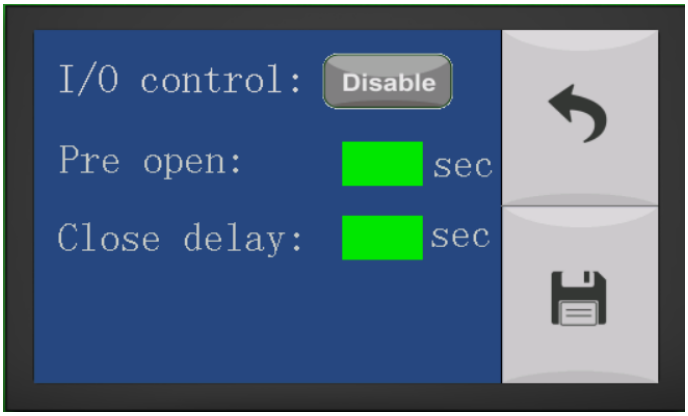
- Unit: METRIC/ INCH
- EOF Alarm: YES/ NO
- Air Delay: 1-100 seconds

Tip

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

Others Page	
Relevant Buttons	Function
Back	Back to previous page
Save	Save your current settings

5.2.2.24 Machine Setting-External I/O Board Page



Navigating to this page:

Main Work Page ► Func ► Machine Setting ► External I/O Board

The External I/O Board allows you set parameters for the external devices.

This operation serves as an example of a fume extraction unit.

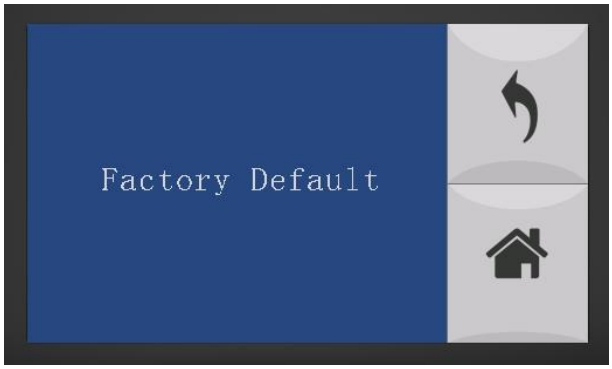
Step 1. Ensure that the fume extraction unit is connected to the I/O port of the machine.

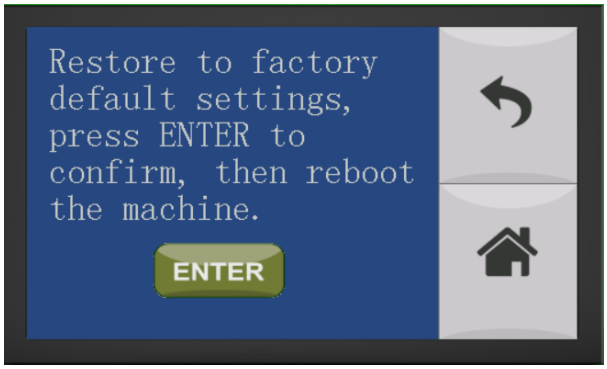
Step 2. Click the input box for "**Pre**" or "**Post**" to set the related parameter for the fume extraction unit.

Step 3. Click the save button to apply the setting.

External I/O Board Page	
Relevant Buttons	Function
Back	Back to previous page
Save	Save your current settings

5.2.2.25 Machine Setting-Reset Page





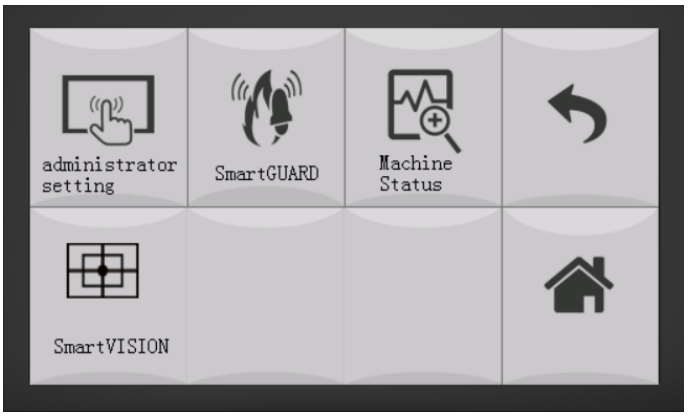
Navigating to this page:

Main Work Page ► Func ► Machine Setting ► Reset

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
Back	Back to previous page
Home	Return to Main Work Page

5.2.2.26 Advanced Option Page



Navigating to this page:

Main Work Page ► Func ► Advanced Option

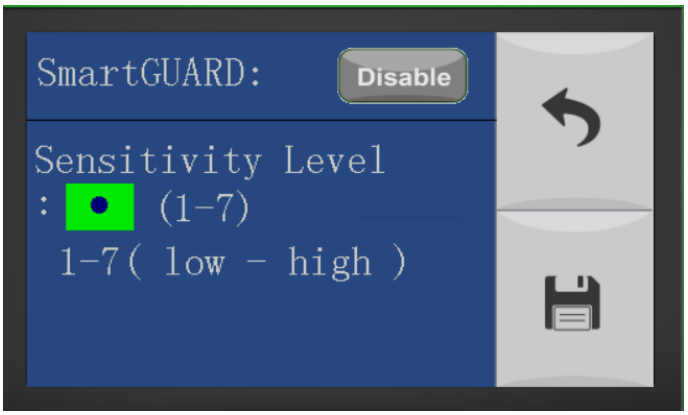
The Advanced Option Page allows you to access multiple setting for laser machine optional peripheral, including Administrator Setting, SmartGUARD, Machine Status, and SmartVISION.

Reset Page	
Relevant Buttons	Function
Back	Back to previous page
Home	Back to Home page

5.2.2.27 Advanced Option- Administrator Setting Page

Only GCC staff, technicians, or your local distributor can access certain special settings.

5.2.2.28 Advanced Option- SmartGUARD Page



Navigating to this page:
Main Work Page ► Func ► Advanced Option ► SmartGUARD

After optional SmartGUARD hardware installation, please enter the function menu on the Touch Screen to enable the SmartGUARD fire alarm.

NOTE

SmartGUARD fire alarm system is not a fire extinguisher, but an fire detecting and alarm system.

SmartGUARD Enable/ Disable:

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

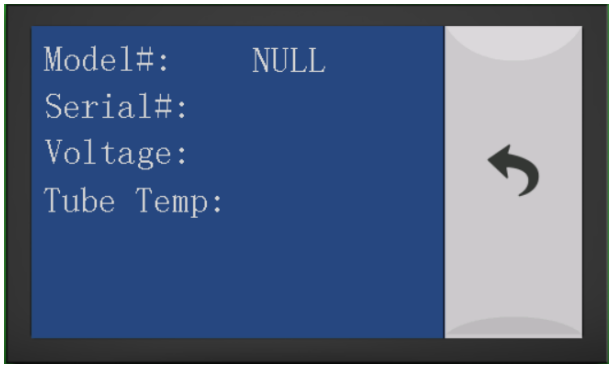
Sensitivity：

Click the green input box to set the sensitivity of SmartGUARD. There are 7 sensitivity levels (1–7) available. 1 is the lowest sensitivity, and 7 is the highest. The highest sensitivity (7) may cause the machine to stop working easily. You can choose a lower sensitivity level if the material is less likely to produce small sparks during the laser process.

SmartGUARD Page	
Relevant Buttons	Function
Back	Back to previous page
Save	Save your current settings

5.2.2.29 Advanced Option- Machine Status Page (only for 40GT/60/80/100GT model)

GT model



Other model

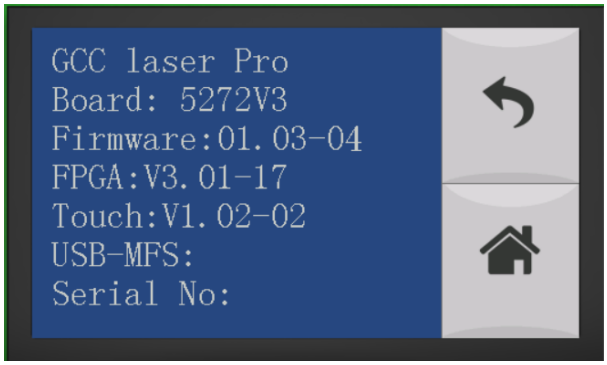
Navigating to this page:

Main Work Page ► Func ► Advanced Option ► Machine Status

Machine Status allows you to check some information of the machine such as machine model, serial number, voltage, and laser tube temperature.

Machine Status Page	
Relevant Buttons	Function
Back	Back to previous page

5.2.2.30 Information Page



Navigating to this page:

Main Work Page ► Func ► Information

The Information Page allows you to view information regarding the system such copyright, laser machine name, firmware version, and other information.

Information Page	
Relevant Buttons	Function
Back	Back to previous page
Home	Back to Home page

5.3 The LaserPro Spirit PRO Series Print Driver

With the LaserPro 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 working table area.

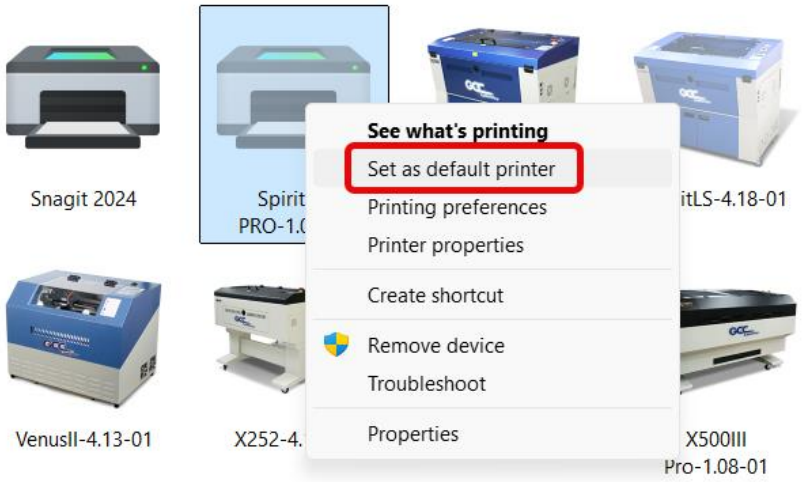
NOTE

Please make sure the LaserPro driver is set to the default printer before proceeding to the page and layout setup.

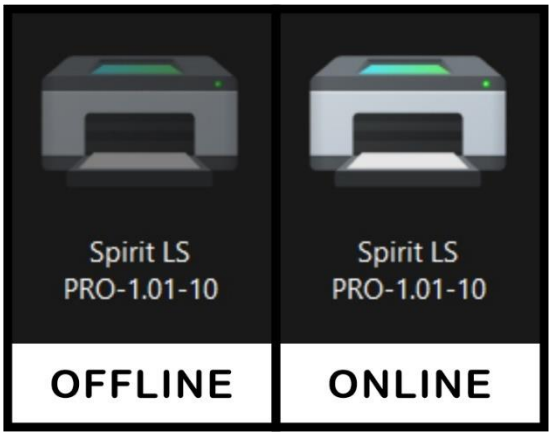
The following take Spirit LS PRO as a demonstration.

Step 1. After installing GCC print drive, please connect the machine with your computer/laptop by USB cable or Ethernet.

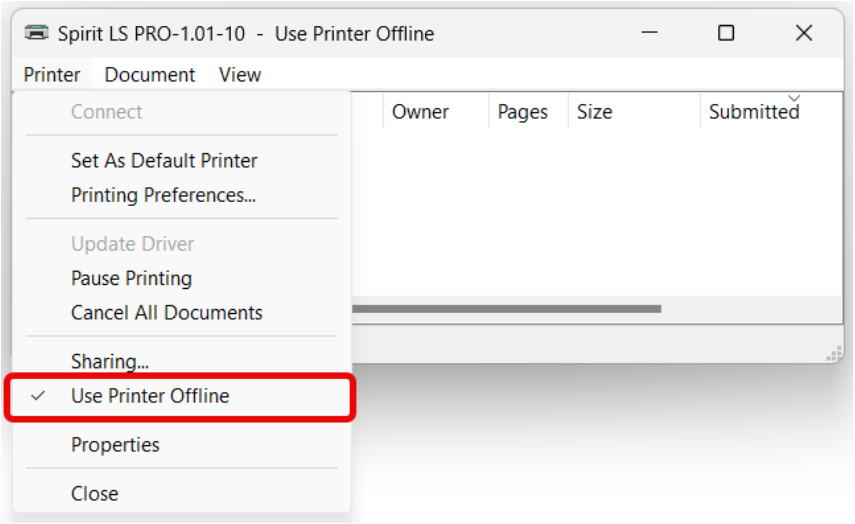
Step 2. Ensure that the LaserPro Spirit LS PRO has been selected as the DEFAULT PRINTER. You can go to Control Panel → Devices and Printers, then set Spirit LS PRO printer machine as default printer.



Step 3. After setting Spirit LS PRO laser as default print driver, please make sure the printer is online, not offline.



Step 4. If you find that the default machine, Spirit LS PRO, is offline, double-click the device and select Printer → Use Printer Offline to switch the machine online.



5.3.1 Page Setup and Orientation

The first thing you must do before working with the LaserPro 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 LaserPro Spirit PRO series work table's dimensions and orientation.

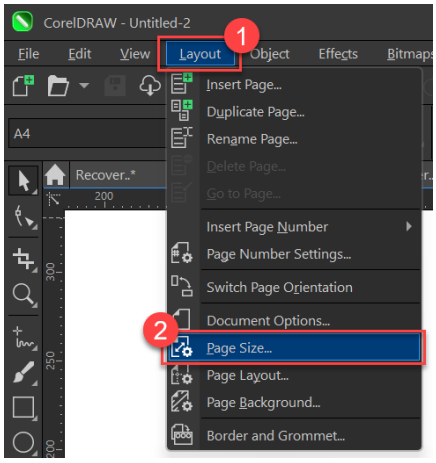
From your graphic software's Page Setup page:

- Set the page orientation in the graphics software to Landscape mode.
- Set page size to match laser machine work area size.
  Spirit LS PRO: 640 x 460 mm (25" x 18")
  Spirit GLS Hybrid PRO: 860 x 610 mm (34" x 24")

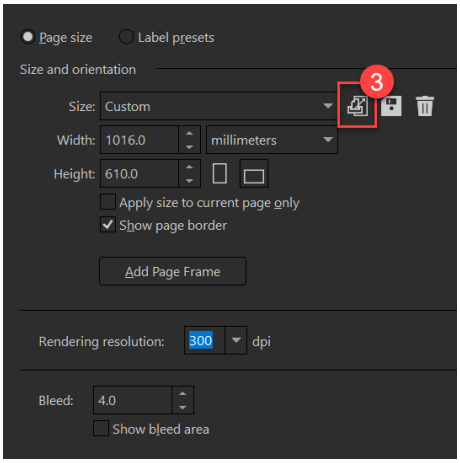
CorelDRAW Example (Page Setup and Orientation)

The following is an example of how to set the Page Setup and Orientation in the graphics software. CorelDRAW 2024 version is the designated graphics software used for this example. For other graphics software, you will need to access the corresponding Page Setup page.

1) From the primary menu, click Layout → Page Size. The options window will appear.



2) Click “Get page size from printer” button to set a correct page size. If you cannot get a correct page size, please make sure that the Spirit LS PRO print driver has been set to the default printer.



5.3.2 Color Management

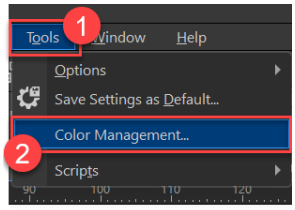
The LaserPro driver uses pen color settings to control laser engraver's engraving and cutting parameters. In addition to having your Page Setup and Orientation properly set in your graphics software, you will need to make sure Color Management is DISABLED prior to working with the GCC Print Driver.
From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

- Disable Color Management or set Color Management to Off.

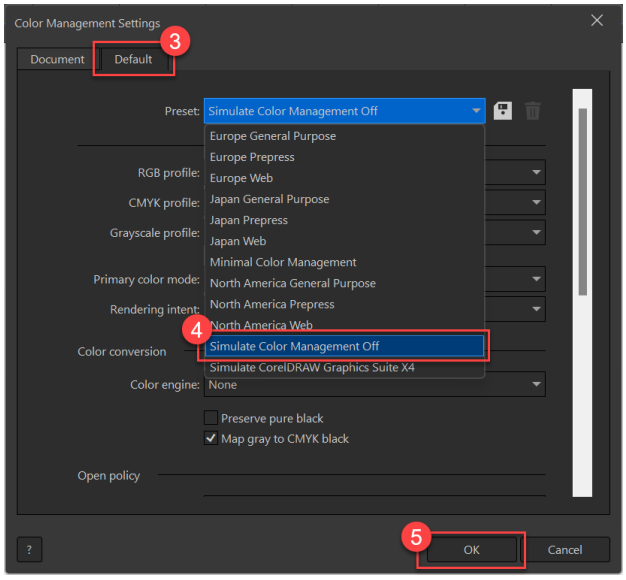
CorelDRAW Example (Color Management)

The following is an example of how to properly disable Color Management in the graphics software. CorelDRAW 2024 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 Settings window will appear.



2) Click Default tab, select "Simulate Color Management Off" from the Present drop-down menu, then click OK to save the setting.



5.3.3 Using the LaserPro 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 detail of your actual job through the LaserPro print driver. The LaserPro 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 GCC print driver by going to <FILE> → <PRINT> → <PROPERTIES>.

NOTE

CorelDRAW was used as the software application for this screenshot example.

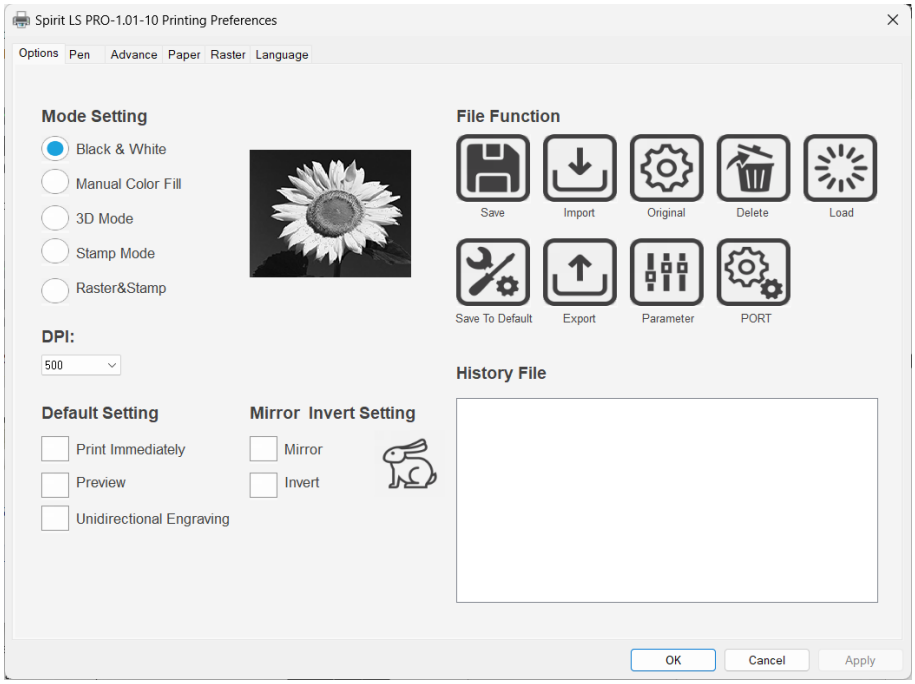
The GCC Print Driver consists of seven primary sections (pages) in which you will be able to choose various engraving / cutting options and settings:

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

Tip

The following sections describe the specific functions for each of the settings found in the LaserPro Spirit PRO series Print Driver. If you are new to laser engraving, it is recommended that you first familiarize yourself with the general principles of the laser process in Section 6, especially the Vector Cutting and Raster Engraving concepts. This will make it easier to understand the various descriptions and terminologies used in this

5.3.3.1 Piolad 400 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 detail 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 detail). 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 GCC LaserPro Print Driver, allowing you to adjust advanced stamp-related settings.

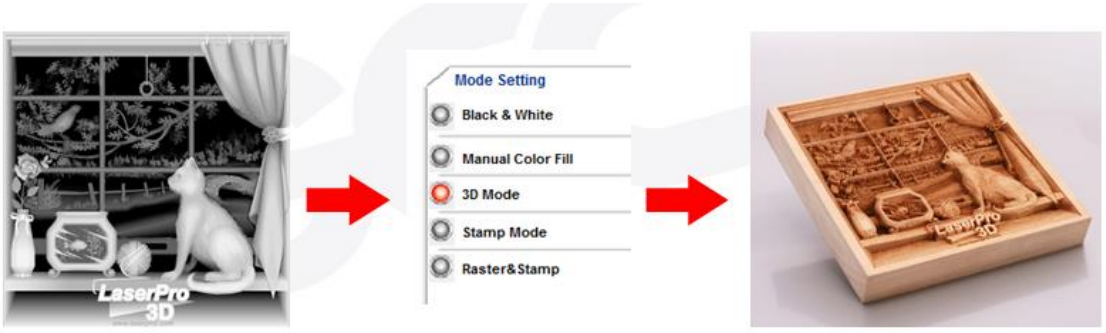
Manual Color Fill:

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	Raster	Vector	PPI	CO2Freq	Air	Bridge	AF	Defocus	Laser
1		50.0	50	YES	YES	400	None	YES	0	NO	0.0	CO2
2		50.0	50	YES	YES	400	None	YES	0	NO	0.0	CO2
3		50.0	50	YES	YES	400	None	YES	0	NO	0.0	CO2
4		50.0	50	YES	YES	400	None	YES	0	NO	0.0	CO2
5		50.0	50	YES	YES	400	None	YES	0	NO	0.0	CO2
6		50.0	50	YES	YES	400	None	YES	0	NO	0.0	CO2
7		50.0	50	YES	YES	400	None	YES	0	NO	0.0	CO2

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 level to create different steps.

NOTE

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

Raster & Stamp Mode:

Select this mode when you would like to engrave image on stamps. The Raster & Stamp mode combines the 256 level gray scale image processing technology and 200 power level stamp steps production requirement to create slopes.

Noted Raster & Stamp mode is only suitable for CO2 laser system, not suitable for dual model

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 Spirit PRO series offers 8 DPI options: 125, 250, 300, 380, 500, 600, 760, 1000, and 1500 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
Actual DPI	127	254	381	381	508	762	762	1016	1524

NOTE

Outputting a full-table (25.1" x 18.1") job using 300 or 600 DPI will result in a truncation error; this is due to the large differences in set DPI vs. actual DPI output for those two particular DPI settings. Therefore, when processing a 25.1" x 18.1" job using 300 DPI, we recommend you move to the next higher DPI setting of 380. Similarly, for a 25.1" x 18.1" job using 600 DPI, we recommend you use 760 DPI.

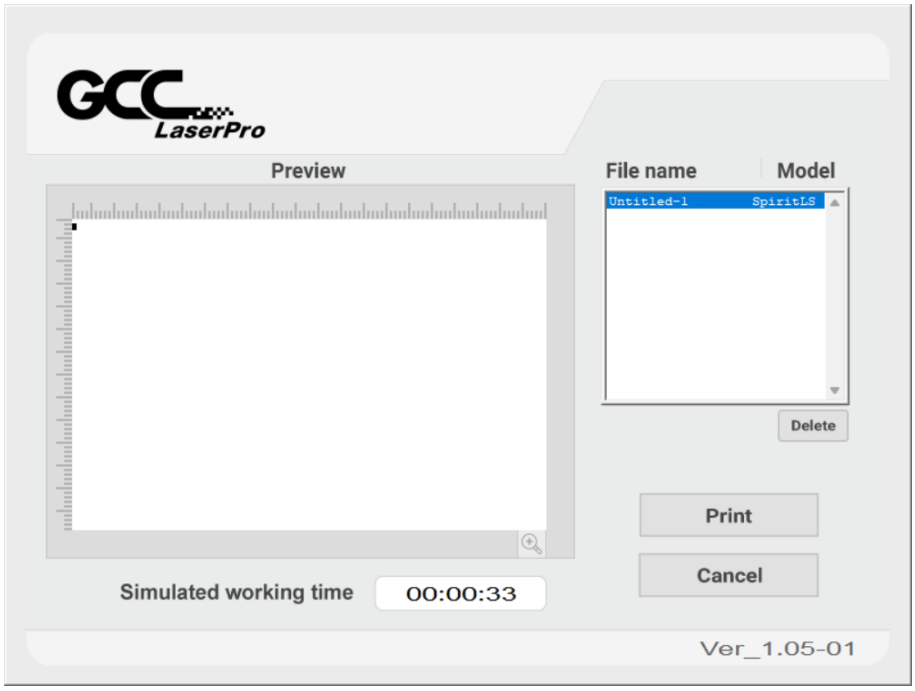
Please note that when using Illustrator for output, the vector function supports a DPI range of 380 - 1500.

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

Checking this will instruct the laser machine 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 laser machine and will need to press the START/STOP button on touch panel to run the job.

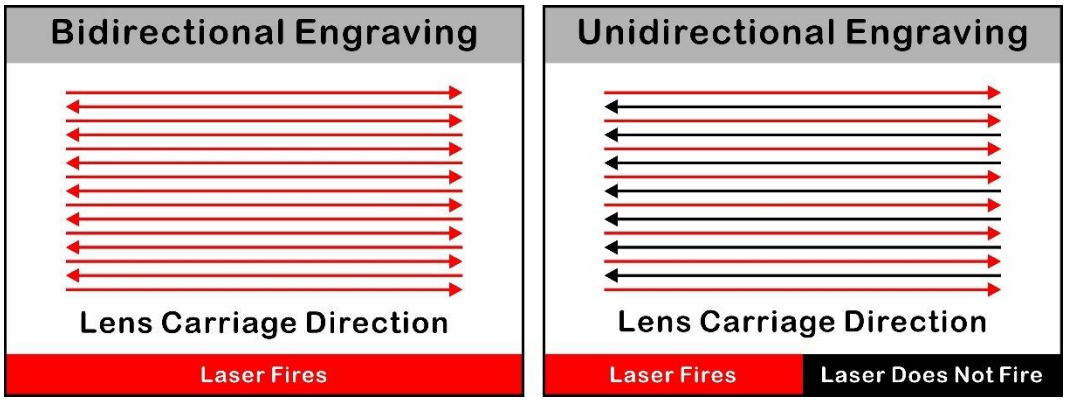
Preview (Options Page) [DEFAULT SETTING: Unselected]

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.



Unidirectional Engraving (Options Page) [DEFAULT SETTING: Unselected]

Checking this box will make the laser fire in only one direction, instead of firing in both directions as it usually does.



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.

Tip

When engraving a stamp, via the stamp mode, the stamp image needs to be engraved in reverse (mirrored) for the final stamp to be correctly laid out.

Invert (Options Page) [DEFAULT SETTING: Unselected]

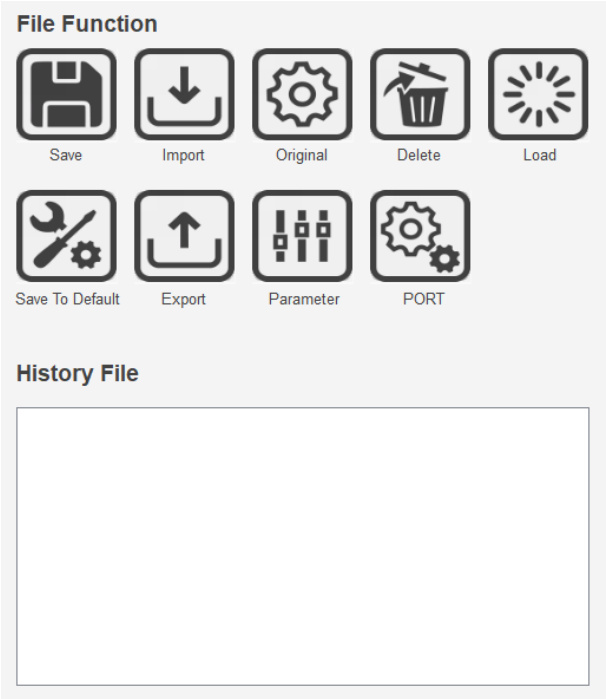
Checking this box automatically inverts / reverses the color of your image (the white areas become black and vice versa). The Invert option is not available if disabled while Manual Color File mode is selected.

Tip

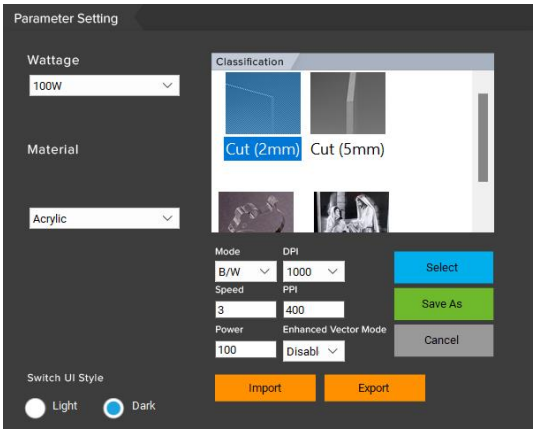
Invert mode is useful when creating a stamp in Stamp Mode, as inverting your normal image will set the negative space to be engraved out, with the remaining positive space (your stamp design) protruding out.

File Function (Options Page):

The file function section allows you to manage various laser parameters. It can save all your perfect parameters to be used for next time.



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 .SLS Pro extension)
Import	Import a saved parameter setting file.
Original	This function will load the print driver's original factory parameter 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.)
Load	This function allows you to load those previously saved print driver parameters.
Save to Default	This function allows you to save your current print driver parameters as the default startup settings.
Export	Export a saved parameter setting file.
Parameter	The material database consists of pre-built-in parameter settings to work with a wide variety of material including wood, acrylic, glass, 2py-laminated plastic, marble, tiles, rubber, coated metal, and more. With this convenient function, users can easily set up their tool by selecting the appropriate job type (engraving or cutting) and material categories for the corresponding parameters to be applied.

	
PORT	Set up the connection for the machine using either USB or Ethernet
History File	This section contains a list of the recent files you have recently created and worked with.

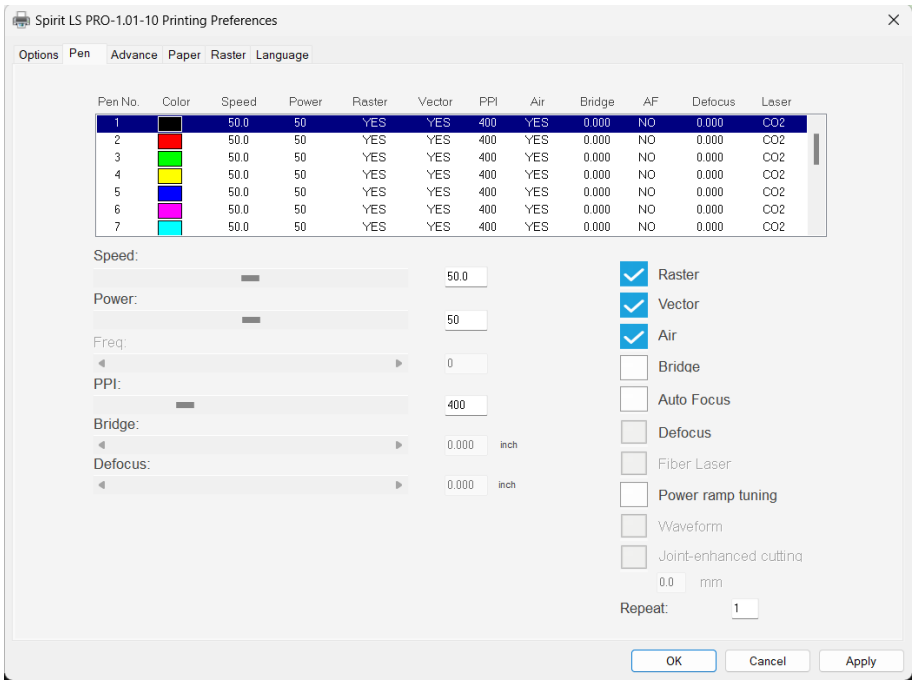
Tip

LaserPro material database settings allow you easy to load the several parameters.

If you are loading LaserPro parameter database as your operating parameter, please click <Parameter> under OPTIONS page, and direct load from several build-in parameter folders.

5.3.3.2 Print Driver – Pen Page

The GCC laser machine 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 GCC 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 GCC print driver cannot store more than 16 pen colors or different laser parameter settings per file.

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%. Keep in mind, the speed setting refers to the lens carriage moves at when cutting or engraving straight lines. The machine will automatically slow down when processing curves.

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.

Power (Pen Page) [DEFAULT SETTING: 50]

The power slider controls the laser's power during operation (engraving power) with a range setting from 0 – 100%. The percentage setting represents the power for each laser pulse fired.

The power slider controls the laser's power during operation (engraving /cutting power) with a range setting from 0 100% (PWM signal provided by the mainboard). The percentage setting represents the power for each laser pulse fired.

Freq (Pen Page) [DEFAULT SETTING: 30] (only for fiber or dual models)

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.

Notice to select "Fiber Laser" for the corresponding pen No. first before adjusting fiber laser related parameters like Freq. and Waveform.

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 (similar to the perforation in the paper between mailing stamps).

If you drag 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 faucet on with the water continuously flowing out. This an disables the power ramp functionality, which automatically control the PPI depending on the speed of the lens 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.

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]

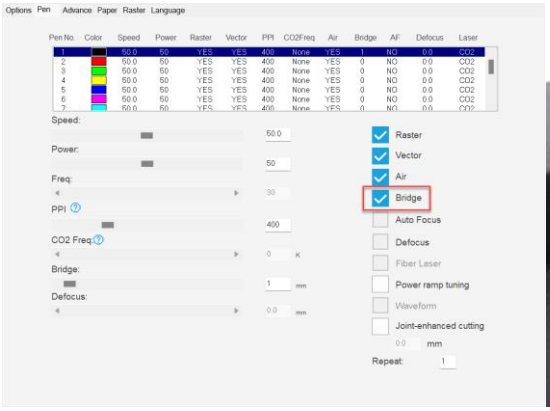
This checkbox control the SmartAIR air-assist function (if you have the optional air compressor installed). By selecting a pen color and checking this box will enable the SmartAIR air-assist function for that particular pen color. As an example, if you are performing a combination of both surface raster 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.

NOTE

In order to use the Air Delay function under the firmware or the Air assist function in the driver, make sure that the optional air compressor is connected to the power outlet located in the lower machine cabinet. There are two power outlets located in the right hand side of the lower machine cabinet, make sure that the air compressor is connected to the "For Air Compressor" power outlet.

Bridge Cutting (Pen Page) [DEFAULT SETTING: Unselected / 0.0 mm]

Checking the Bridge Cutting checkbox will allow users to easily create perforation lines (dash-line). Once seethe line color along with another corresponding pen can be used in tandem to indicate the length of the gap and the uncut part of a perforation line. (If Pen 1 is selected for bridge cutting, Pen 9 will be reserved to the length of the connected lines of the perforation. If Pen 2 is selected, Pen 10 will be reserved and so on…)

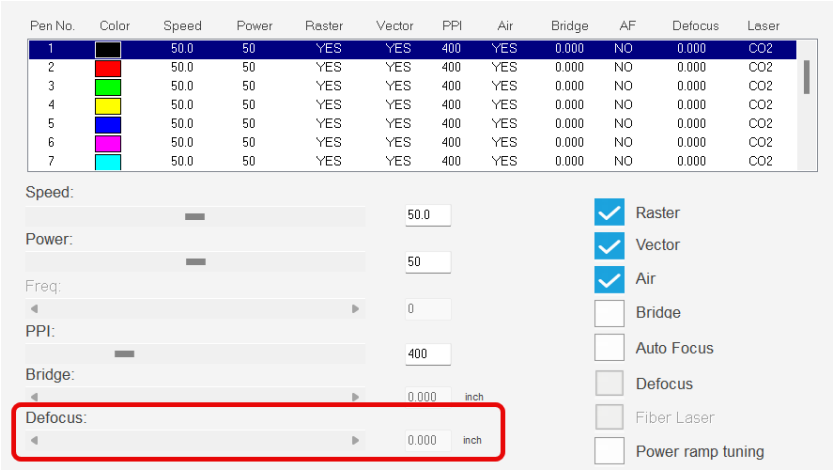


Auto Focus (Pen Page) [DEFAULT SETTING: Unselected]

This checkbox sets the Auto Focus for that particular job. With the Auto Focus button checked, the laser machine 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]

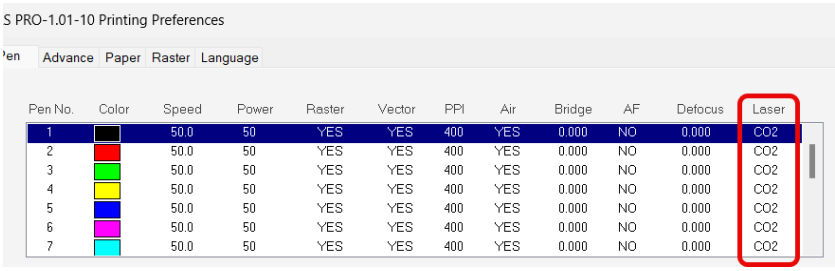
This function allow users to set the defocus or out of focus distance for a particular job. One of application is polishing, the acrylic can be polished after engraving.



Fiber Laser (Pen Page) [DEFAULT SETTING: Unselected] (only for fiber or dual models)

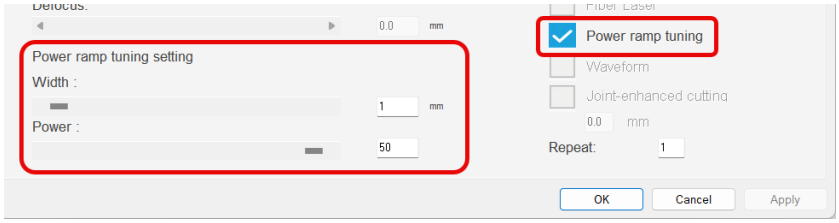
You can assign Pen to apply different laser tube for the laser machine, CO2 laser as the default, by selecting “Fiber Laser” option to switch the corresponding Pen No. to apply fiber laser.

Only when assign the specified Pen to Fiber Laser, the related fiber laser settings, ie. Freq. and Waveform can be adjusted for that Pen.



Power Ramp Tuning (Pen Page) [DEFAULT SETTING: Unselected]

If the material is very sensitive to the laser, it may cause poor cutting results at the start point. Power Ramp Tuning allows the user to adjust the power parameter for the beginning of each job, which can help improve this issue to some extent.



The following is the function explanation:

Width (1~5): It enables the user to set how many points would be applied the power setting.

Power: Set the power parameter for power ramp tuning.

> **NOTE**
>
> The power parameter for power ramp tuning cannot exceed the power parameter. For example, if the power is set to 75%, then the maximum power parameter for power ramp tuning is also 75%.

Waveform (Pen Page) [DEFAULT SETTING: Unselected]

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 pules 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. Remember to select “Fiber Laser” first for the desired Pen No. before enable Waveform function. The Waveform value will turn into “1” when the option is enabled

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 pulse 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 parameter table for different fiber laser model:

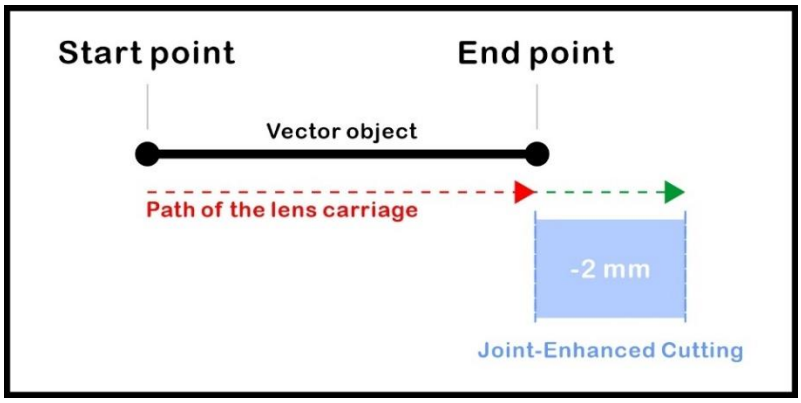
Waveform Number	20RMZ			30RMZ			50RMZ		
	Pulse Duration (ns)	Pulse Frequenct (kHz)	Pulse Energy (mJ)	Pulse Duration (ns)	Pulse Frequenct (kHz)	Pulse Energy (mJ)	Pulse Duration (ns)	Pulse Frequenct (kHz)	Pulse Energy (mJ)
0	260/40	20	1	260/40	30	>1	260/40	50	>1
1	40/26	90	0.2	40/26	140	>0.2	40/26	250	>0.2

Joint-Enhanced Cutting (Pen Page) [DEFAULT SETTING: Unselected]

Some materials exhibit poor absorption rates for laser beams, leading to incomplete cutting. To address this issue, the **Joint-Enhanced Cutting** function allows users to set an additional cutting distance. If the cutting result is incomplete on some materials, please enable this function and set the appropriate distance. The lens carriage will backward or extend a specific distance according to the object's shape when the lens carriage reaches the end point.

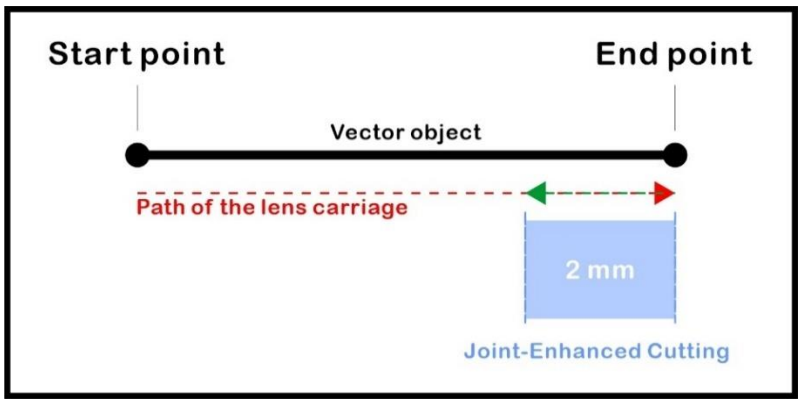
Please refer to the following examples for more information.

If Joint-Enhanced Cutting value is -2 mm



The lens carriage will move extend specific distance according to the object’s shape when the lens carriage reaches the end point.

If Joint-Enhanced Cutting value is 2 mm

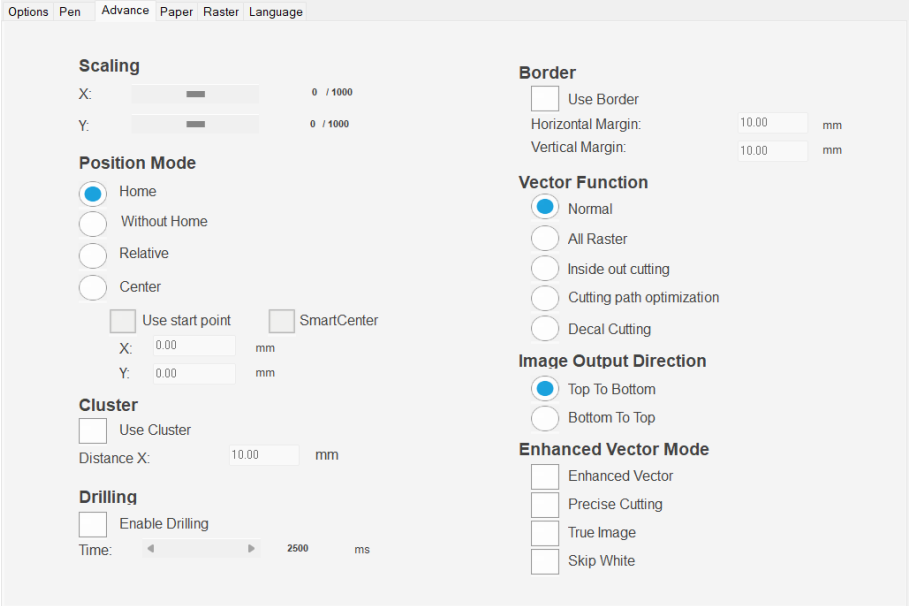


The lens carriage will move backward specific distance according to the object’s shape when the lens carriage reaches the end point.

Repeat (Pen Page) [DEFAULT SETTING: 1]

It allows the user to set a number for job repetition. Double-click the input box for repeat and enter a number (range: 1-99). The job will then repeat accordingly.

5.3.3.3 Print Driver – Advanced Page



Scaling (Advanced Page) [DEFAULT SETTING: 0]

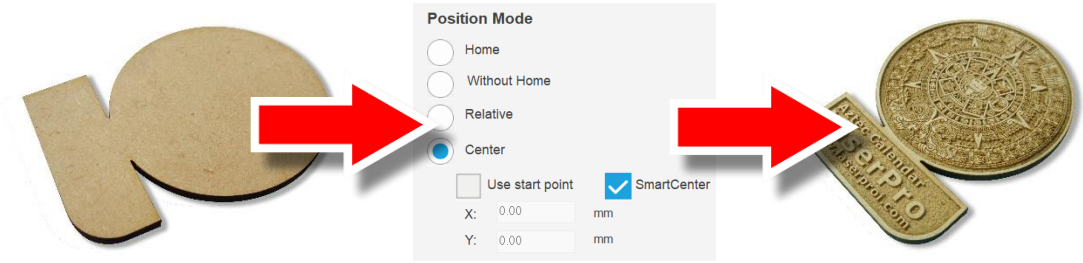
In some cases you may find a slight output inaccuracy in the actual output compared to what you have set in the computer. This margin of error or offset is extremely small (approximately 1/300). What this means is that there may be a 1-unit offset for every 300 unit increments. As an example, if you 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 laser machine 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 or four points. It is a great tool for users whose jobs often require engraving on specific locations such as on award signs and plaques.
- 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.

Cluster (Advanced Page) [DEFAULT SETTING: Unselected]

This setting allows you to change how the laser machine 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 resulting processing time is minimized by eliminating 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

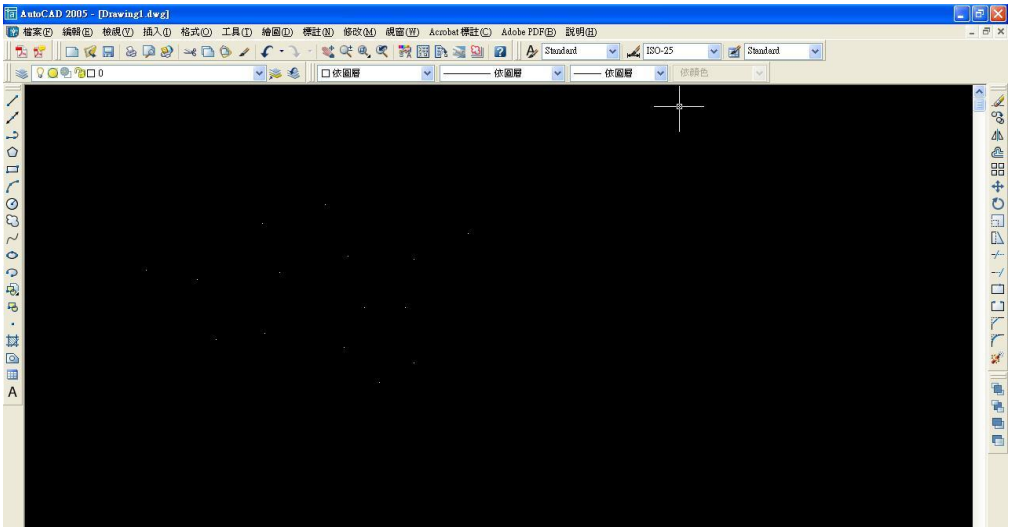
If you wish to use the Border and Cluster function simultaneously, then the Border Thickness value must be less than the Distance value specified in the Cluster setting.

Drilling (Advanced Page) [DEFAULT SETTING: Unselected]

The drilling function is available only for use with AutoCad. Users can insert dots from AutoCad's tool bar and use the drilling function to set the drilling time required to create holes.

Use the default "dot" tool ( ) from the tool bar to create dots which will be interpreted as drilling locations.

Use the adjusting bar on under the "Drilling" function to set the drilling time (spot delay) required. The size of the drilled hole can be adjusted by deploying a longer or shorter drilling time.



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.

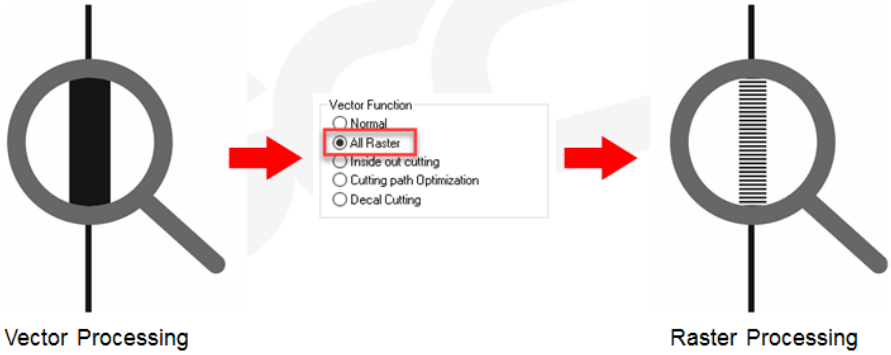
To properly add a border, you will first need to Invert your design from the Options Page, then check Use Border and specify a value for the thickness of the border you would like to add to your design. This mode is useful for engraving rubber stamps, as it allows you to create the outline around your stamp image.

NOTE

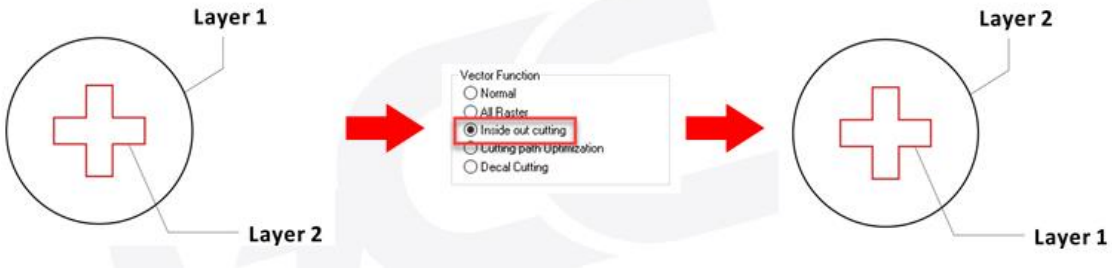
If you wish to use the Border and Cluster function simultaneously, the Border Thickness value must be less than the Distance value specified in the Cluster setting.

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.

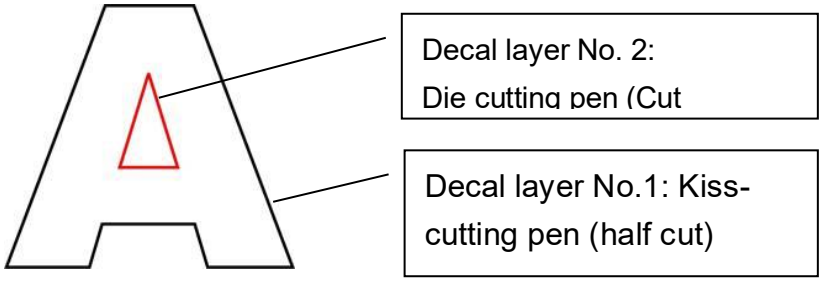


- Inside out Cutting: This setting will always automatically direct the laser to cut from the inner most vector shape and move outwards.



- Optimization Sorting: 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.

- Decal Cutting: this function is developing to reduce material weeding job after laser cutting for multiple layers adhesive material , such as lettering vinyl, heat transfer film, and twill film. This function allows allocating different parameters for corresponding decal layer numbers to do die cut (cut through media) for the unwanted parts, and kiss-cut (half cut) for the kept material parts, after the laser cutting, users can just peel off the material to get rid of waste parts.



You are welcome to visit below link for easy understanding:

https://youtu.be/YgGTMHqtWqE?si=3qfBAxMjBtKbBv13

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: Selecting this will force the system to process the current task by moving the lens 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 lens carriage from the bottom to the top of the image (front end to rear end of the work table)

Normally, the laser machine engraves from left to right, top to bottom. Selecting Bottom Up will alter the engraving sequence and the engraving will 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 air 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 air extraction system is vented from the rear of the machine, the same direction as the image is processed.

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 material.

Precise Cutting (Advance Page) [DEFAULT SETTING: Unselected]

Precise cutting ensures accurate results for VECTOR objects. The machine's firmware integrates a scale value specifically for VECTOR objects. If you desire the most precise cutting results, we recommend enabling this function.

NOTE

Precise Cutting does not support RASTER objects. If your job includes both VECTOR and RASTER objects, DO NOT enable this function.

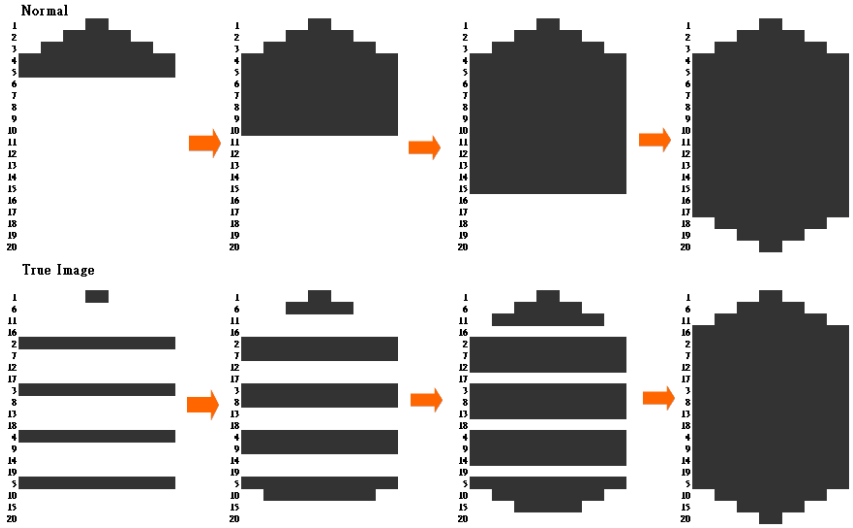
True Image Mode (Advance Page) [DEFAULT SETTING: Unselected]

This setting allows you to improve the engraving quality by reordering the line by line output sequence and by doing so masking the banding problems. This feature is only suitable for engraving large sized graphics.

NOTE

The overall working time will be increased.

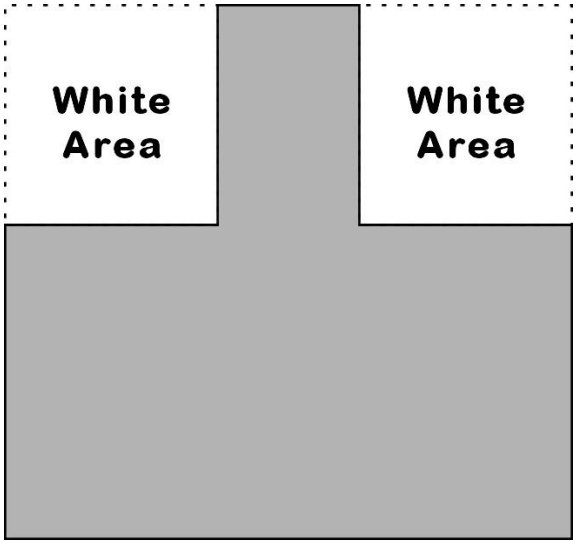
True Image is a function that will shuffle the normal engraving sequence to produces a nicer engraving output by reducing possible banding occurrences.



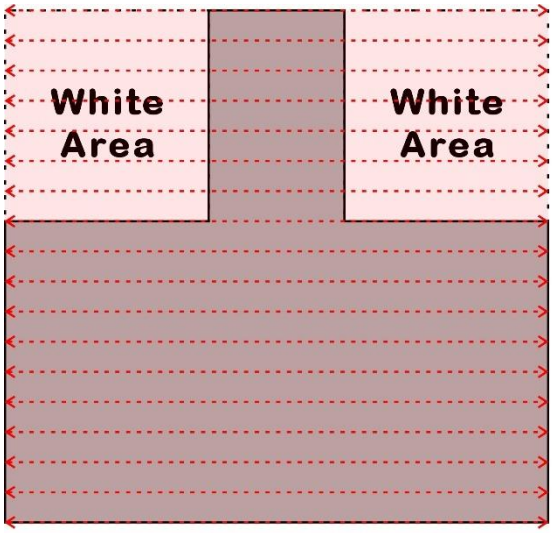
Skip White (Advance Page) [DEFAULT SETTING: Unselected]

The **Skip White** function allows users to bypass white (empty) areas during laser engraving, increasing throughput slightly.

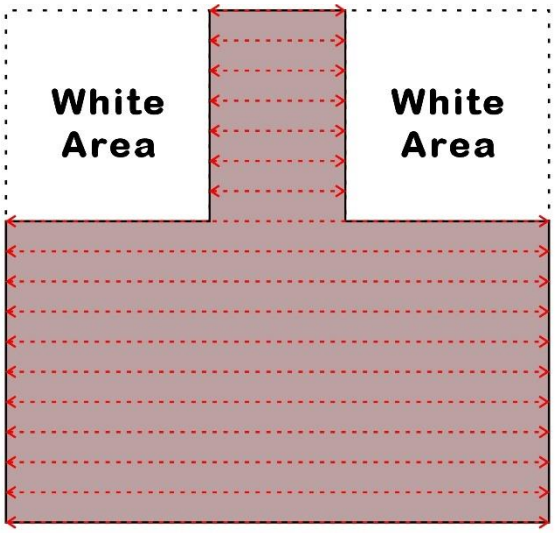
For example, when the machine processes the following object, you can see two white (empty) areas in the top-left and top-right corners. This means the laser will not engrave in those areas.



In the regular processing method, the lens carriage runs the job based on the maximum width of the entire shape. If the user enables the "Skip White" function in the print driver, the lens carriage will run the job based on the actual width of the shape, skipping the white areas.



Regular Processing Method

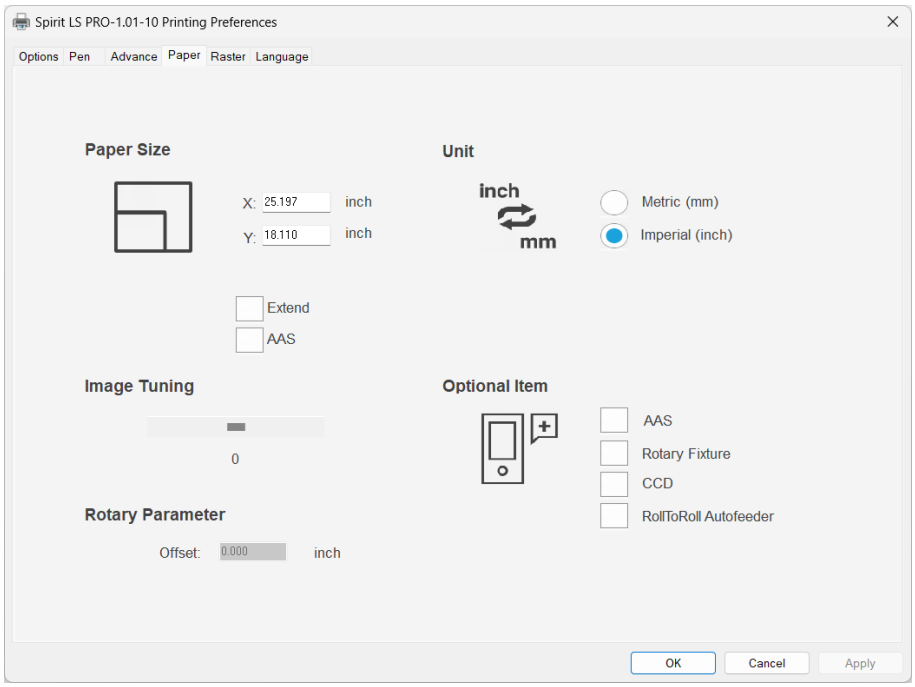


Skip White Processing Method

NOTE

There may be some minor quality loss when the "Skip White" function is enabled in the print driver. Please consider whether quality or throughput is more important for your application.

5.3.3.4 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 working area. The X value represents the length and the Y value represents the width.

> **NOTE**
>
> When using the optional rotary attachment system and with the Rotary Fixture option checked, the X value represents the length of your working piece. The Y value will be changed to Diameter, which represents the diameter of your working piece (at the position you wish to engrave).

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

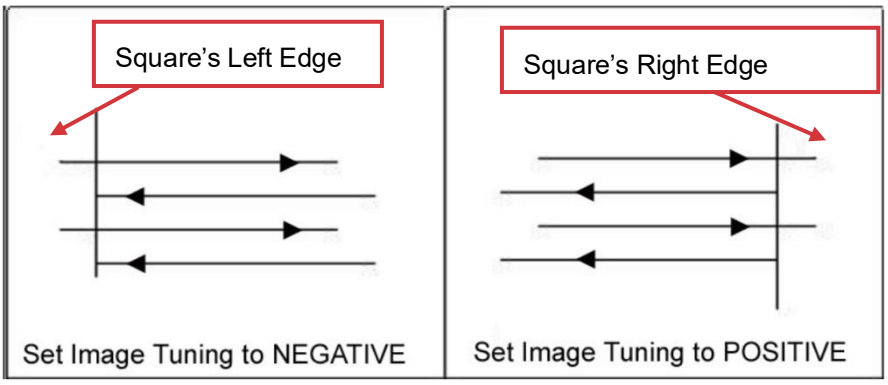
Here you can set your preferred measurement standard in which you would like to use with the GCC print driver. You can choose between metric or imperial standards.

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.



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 work area as follows, depending on your model.

Model	Regular work area	Extend work area
Spirit LS PRO	610 x 460 mm (24” x 18”)	740 x 460 mm (29” x 18”)
Spirit GLS Hybrid PRO	860 x 640 mm (34” x 24”)	960 x 610 mm (38” x 24”)

This function is enabled at the expense of some quality loss, typically along the left and right edges of the full-size engraving. However, the quality loss is usually minimal and may not be noticeable, depending on your design.

NOTE

With the Extend function enabled, the following functions are disabled: 3D mode (Options Page), Stamp Mode (Options Page), SmartACT (Options Page), Disable Skip White (Advanced), Auto Focus (Pen Page), and Rotary Fixture (Paper Page).

Rotary Fixture (Paper Page) [DEFAULT SETTING: Unselected]

NOTE

This option is only to be used with the Rotary Attachment optional accessory properly set up. For instructions on how to set up the Rotary Attachment, please refer to Chapter VII of this manual.

You will need to select this option when processing a job with the optional rotary attachment system to engrave on round or cylindrical objects. When you have your material and rotary attachment properly set up:

1) Check the Rotary Fixture function and notice the change in the Paper Size fields under Paper Size, the X value represents the length of your work piece. Enter the length of your work piece in this field.

2) 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, at the point of engraving on your work piece.

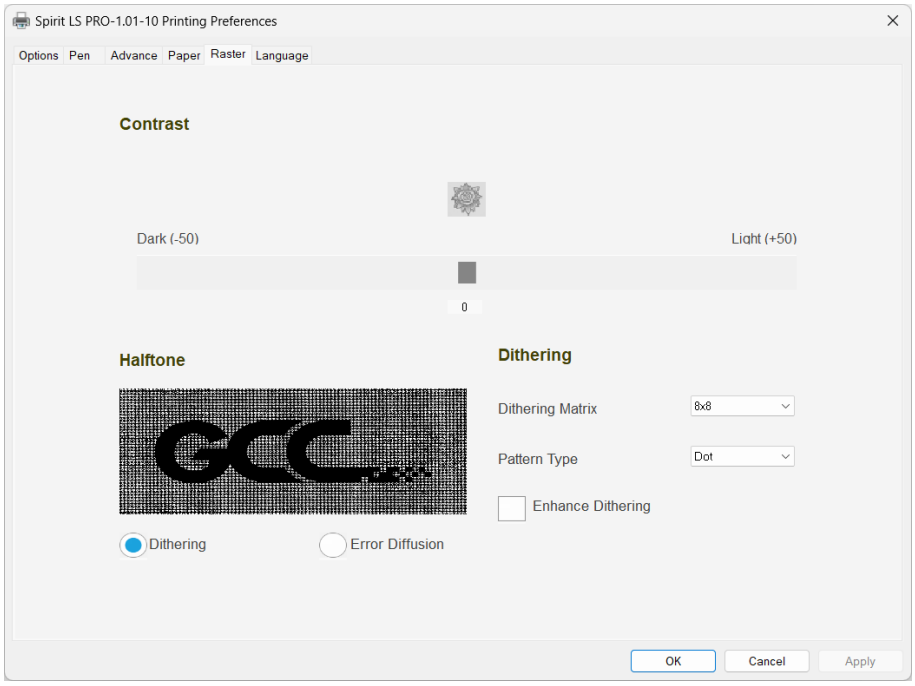
3) Under Rotary Parameter, the Offset value represents distance from the open end of your work piece to the base of the padded rubber wheel. This value will be displayed on the LCD panel. Enter the proper offset value in this field.

CCD* (Paper Page) [DEFAULT SETTING: Unselected]

This option is only to be used with the CCD optional accessory properly set up. The CCD optional module allow you to laser contour cut the printed image, the CCD module will find the registration marks printed around the image, and position the laser contour cutting line automatically. For instructions on how to operate the CCD, please refer to its manual along with package.

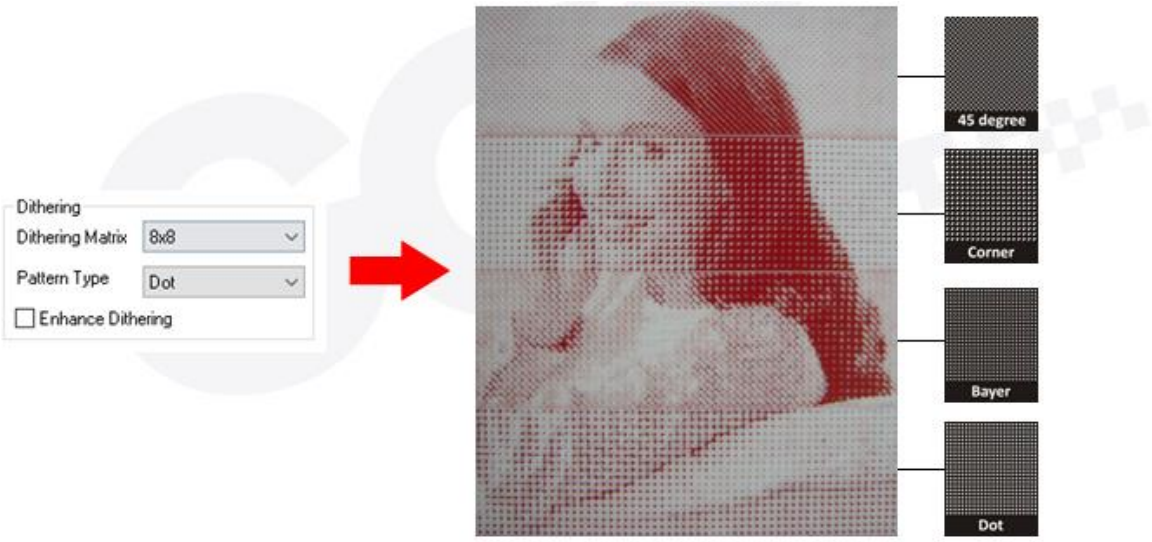
> **NOTE**
> This option is only to be used with the CCD optional accessory properly set up.

5.2.3.6 Print Driver – Raster Page



Dithering [DEFAULT SETTING: 0]

This option control the way a raster-engraved image is processed. Each pattern type uses a different shape and arrangement of dots to compose the shading effect of a raster image.



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 level of the engraved output, whereas moving the slider to the Light setting will decrease the contrast level 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]

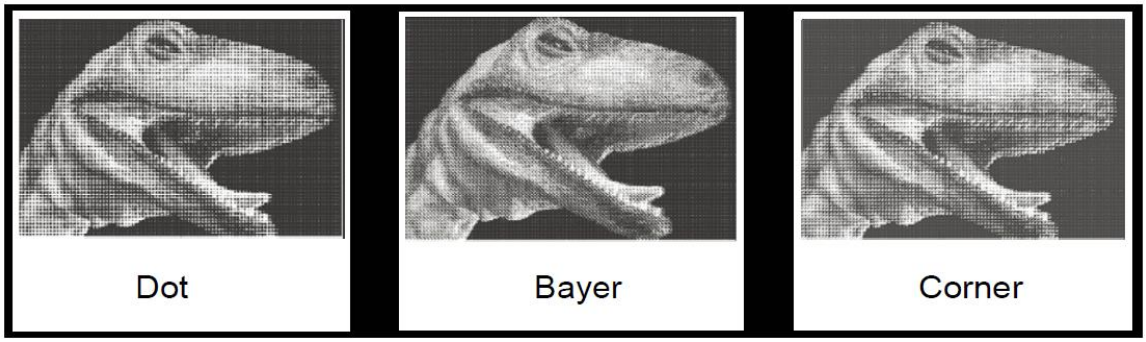
This option control the way a raster-engraved image is processed. The "digital image to engraved output" process can be processed via two methods: Dithering or Error Diffusion. Each offer additional output options yielding different output effects, style, and quality.

- 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.

- 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.

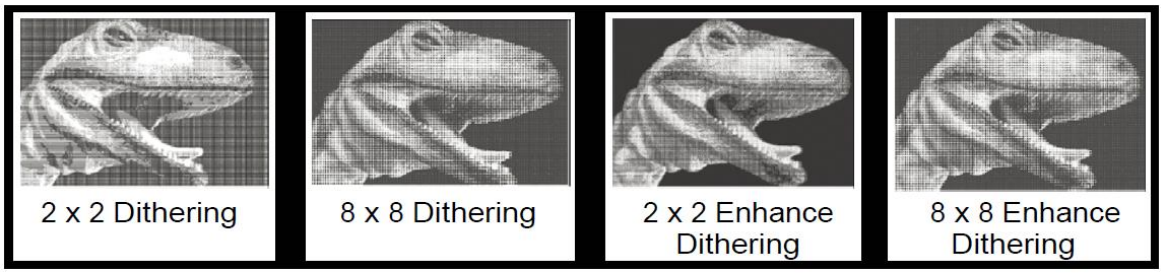
  The following diagram is an example of the raster effects when using the different pattern



- Dithering Matrix: Variable depending on the Pattern Type selected. [DEFAULT SETTING: 8x8]

  This control 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.



- Enhance Dithering [DEFAULT SETTING: Unselected]

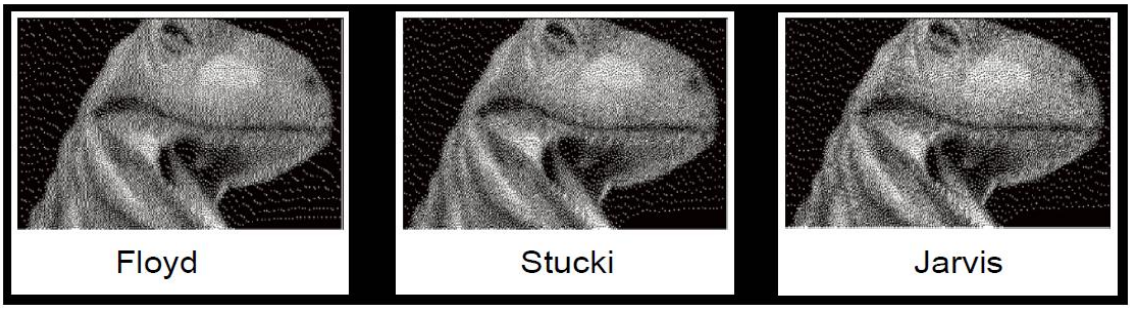
  Selecting this will produce a finer dithering output.

- 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.

- 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.

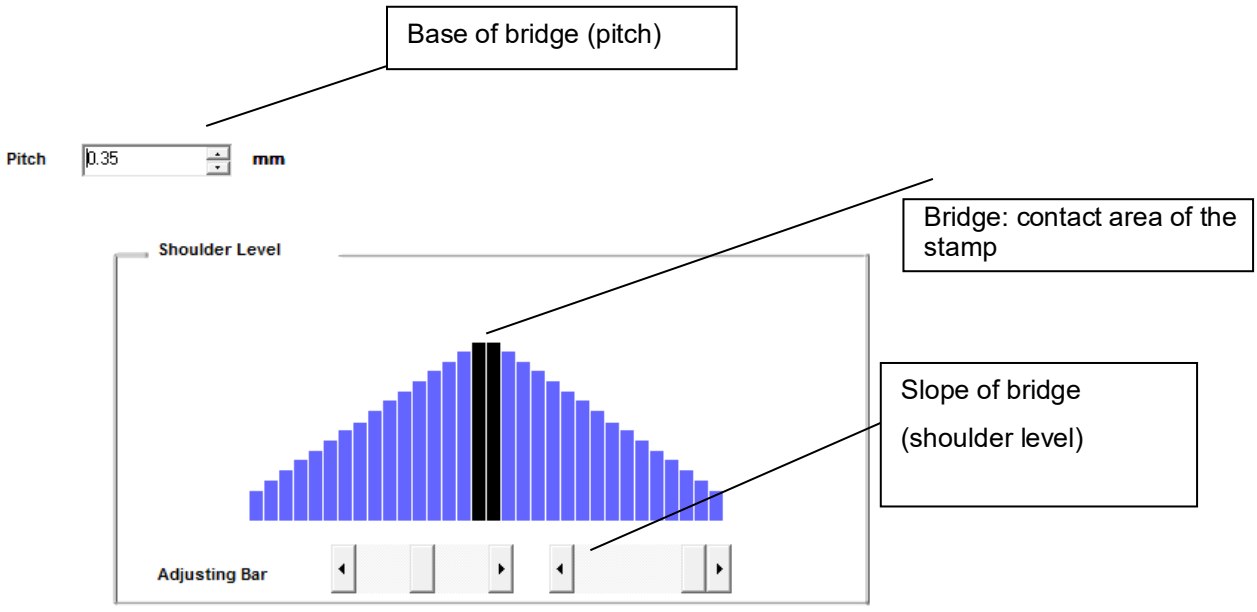


Tip

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!

5.2.3.7 Print Driver – Stamp Page

Producing stamps require different operational steps than your standard engraving or cutting jobs. The Stamp page offers dynamic options allowing you to customize your stamp production process.



NOTE

The Stamp page will only appear and be accessible when you have selected the Stamp Mode from the Options Page.

Tip

Functions located on the other pages that are useful when making a stamp: Set Shoulder, Pitch, Border, Invert, and Mirror.

Pitch (Stamp Page)

Your stamp will be a reversed image composed of engraved depressions and ridges. Think of these ridges as the “contact sections” of the stamp. If the ridges of these contact sections are too thin, they may break. The Pitch setting allows you to increase the width of the ridge base, hence creating more stable “contact sections” and longer lasting stamp. The pitch value setting allows you to adjust the base width of the ridge. Broad pitch gives the maximum amount of support for each ridge. Experiment with different pitch value settings in order to produce the stamp that is best suited for your application.

Adjustment Bar/ Power Level (Stamp Page)

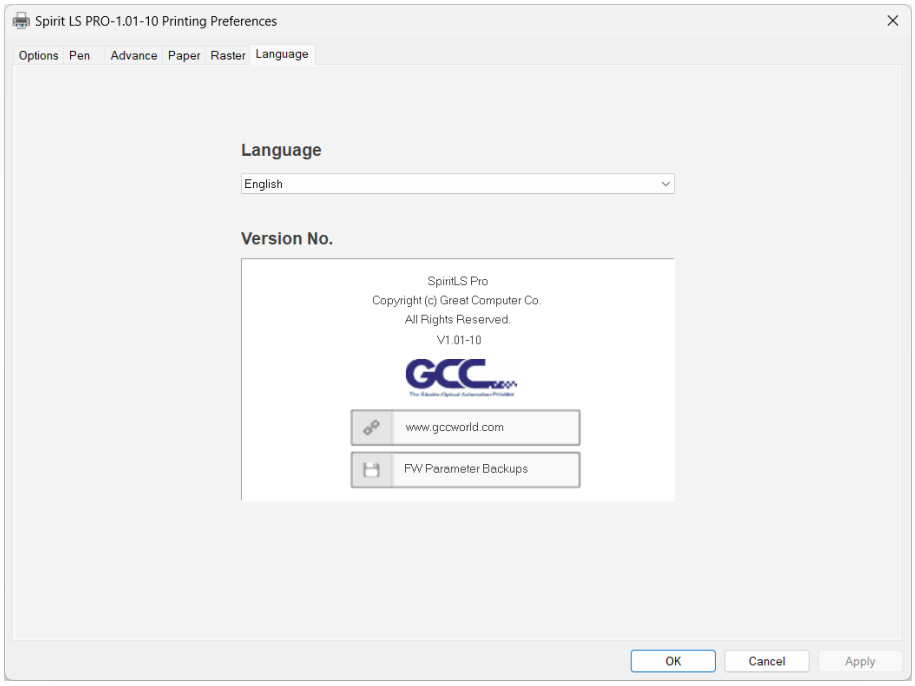
Another important aspect of creating a stamp is setting the slope level of the shoulder. The shoulder is the section from the “contact section” of the stamp to its base. This function allows you to adjust the slope for the shoulder sections of your stamp. By sliding the sliders or directly input of power level, you will be able to change the slope of the shoulder.

NOTE

The visual representations of the Pitch and Shoulder Level in the GCC print driver are an exaggerated representation to allow for easy visual guidance and precise input. Remember we are working with distances less than 1 mm here.

5.2.3.5 Print Driver – Language Page

This page allows you to specify the language displayed by the GCC 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.



Chapter 6
Engraving and Cutting Techniques

- Raster Engraving
- Vector Cutting
- Vector and Raster
- 3D Tips
- Modify Image Settings of Picture for Better Engraving Quality

6.1 Raster Engraving

A CO2 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 would be a photo engraving on tile, as shown in the picture below.

6.2 Vector Cutting

A CO2 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 would be a customized dining mat, as shown in the picture below.

The GCC 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 laser machine) and watch as your string of characters is vector cut.

6.3 Vector and Raster

In some cases, you will want to process both raster engraving and vector cutting tasks within a single project. For example, if you wanted to engrave a design onto a particular material and then cut a particular shape around that engraving. The picture below is an example of engraving on a piece of leather which has then been cut out: The picture below is an example of an engraving on a piece of cork, which has then been cut out with a square shape:

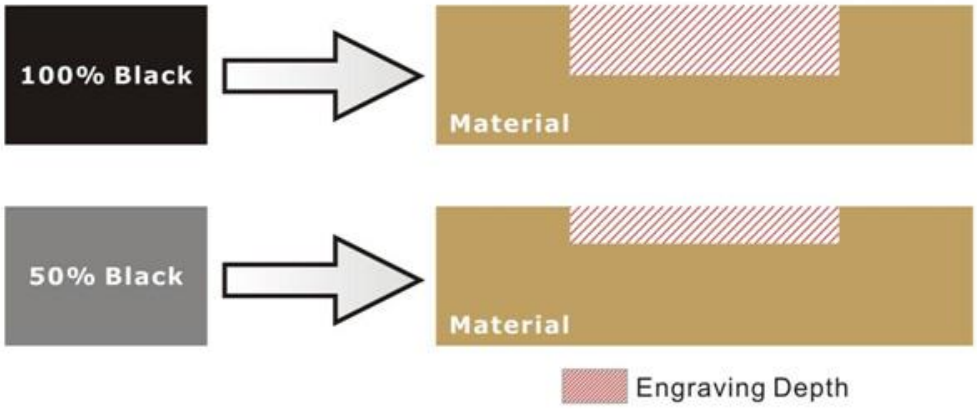
In these situations when there are raster engraving and vector cutting operations on a single project, the GCC driver will interpret between raster sections and vector sections by the types of lines and line widths of your design. Areas of your design with line widths set between 0.001" (0.025 mm), 0.004" (0.1 mm) will be designated for vector cutting, and the other areas will be designated for raster engraving.

6.4 3D Tips

3D Mode is one of the functions of GCC CO2 laser engraver. Instead of traditional two-dimensional graphic processing, 3D Mode allows the naked eyes to visualize the curvatures of the 3D effect by applying 200 power levels technology to create different depth of engraving. Although it is easy to produce 3D samples with LaserPro Engraver, production of the 3D graphic can be a hassle for our users.

Principle for 3D production by laser

3D processing uses degrees of the gray level to adjust the output energy of the laser. Take the figures below as an example. When the color of a certain block is set as 100% black, the laser output energy for processing will be at 100%. The processing depth will be fairly deep. When the gray level is set as 50% black, the laser output energy will be adjusted to a smaller value accordingly so that the processing depth is not as deep.
By specifying the degrees of the gray level in this way, various energy output is achieved and the 3D effects are produced.



By specifying different levels of black in design software, the corresponding laser power energy will generate different depths of engraving result.

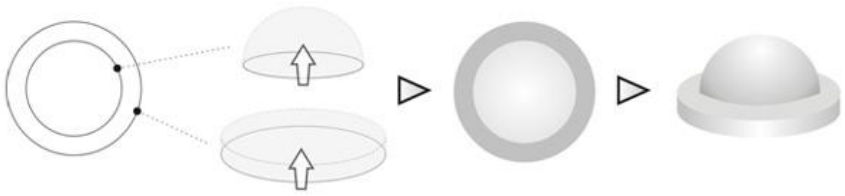
Introduction to software for 3D graphic production

Many ways to produce 3D graphics are available. If you are familiar with or frequently use one of the 3D software in the market like Laser Type, EngraveLab, 3D Studio etc., you may use it for the production of 3D graphics. After completion, save the 3D images as one of the formats that is compatible with the Laser Engraver (such as JPG or BMP) and let the machine begin the engraving. If you are not familiar with any 3D software, some editing software specific for laser in the market an o have 3D mode functionality, which could be a handy tool for you to produce 3D objects. Of course, you may also use Photoshop or CorelDRAW, which you might be using on daily basis, for the production of 3D objects. Ways to produce 3D graphics with this software are not the same. In the following section, we will give you simple illustrations with respect to how this software works.

Laser Professional AP

Currently, quite few laser professional application softwares like Laser Type, 3D studio, EngraveLab are available in the market. You can not only create all kinds of vector images with these AP but a o convert these vector images into 3D module, which is a great way to produce 3D graphics.

As illustrated in the figure below, all you need to do is to choose the direction of the vector and then set the length and shape of the convex or concave surface. The software will automatically generate the 3D graphic for you.

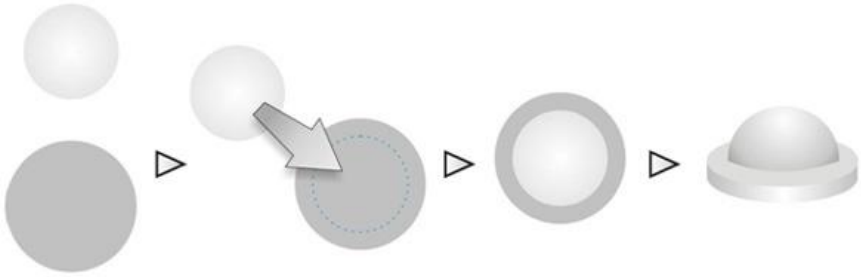


Concept illustration of 3D graphic production with Laser Professional AP

After the graphic is completed, you can output the 3D graphic directly to the laser machine through GCC LaserPro driver, which is very handy. Or you can export the 3D graphics as JPG or BMP format and edit with frequently used CorelDRAW or Illustrator software, then output the graphic to GCC laser system.

Photoshop & CorelDRAW

The way to produce 3D graphics with Photoshop and CorelDRAW is very similar. Fill in the desired gray level colors to each of the drawn figures, and proceed with further arrangement and combination. Then you may output the 3D graphic to the laser for the production of the 3D object. Take the figure below as an example. After producing two graphs in gray level, proceed with the arrangement and combination. Then you may let the laser proceed with 3D mode.



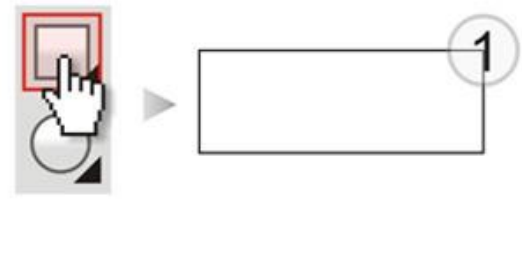
Both Photoshop and CorelDRAW may produce 3D graphics in the manner of combinatio

A way to produce 3D graphics

For the production of 3D graphics, in addition to the requirement of having great familiarity with the software, a significant amount of time is required to design and arrange the layout. Thus, we use a relatively simple graphic for illustration so that you would understand how to produce 3D graphics better.

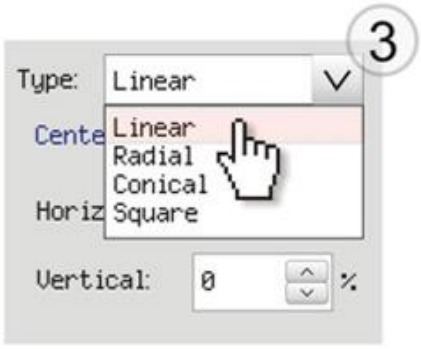
Take the graphic above as a production example. CorelDRAW is used for the production of the 3D graphic.

Step 1. Produce the gray level background

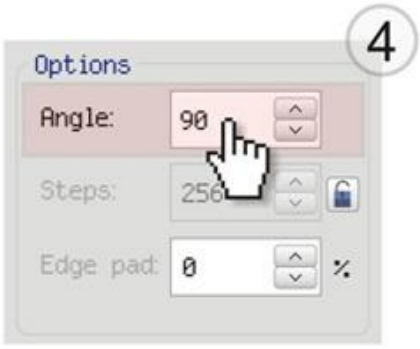


▲Draw a rectangular box with the drawing tool

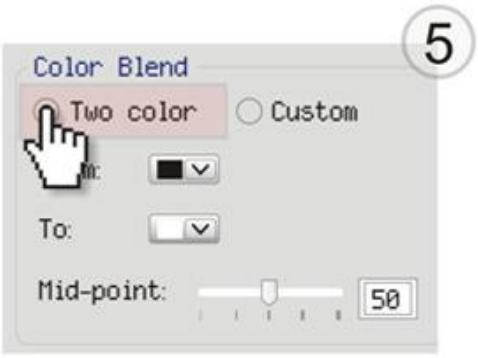
▲Select Fountain Fill to fill in the gray level



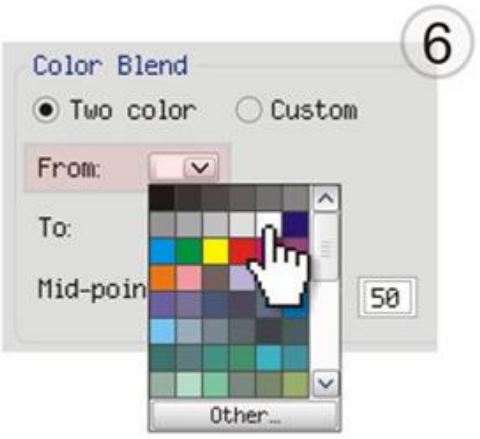
▲Select Linear as the type of the gray level



▲Set the gray level angle as 90 degrees

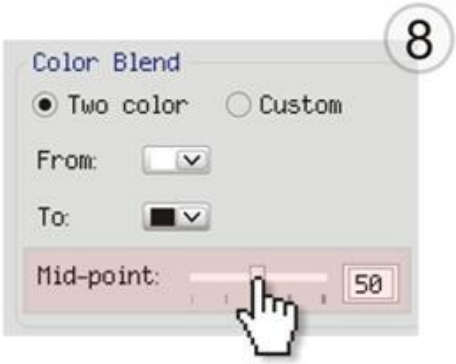


▲Select Two color as the type of the gray level



▲Set the From color as 0% Black

▲Set the To color as 100% Black



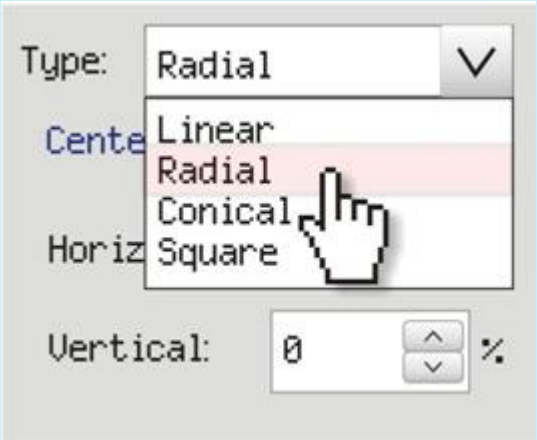
▲Set the Mid-point as 30

▲Click OK to complete the editing

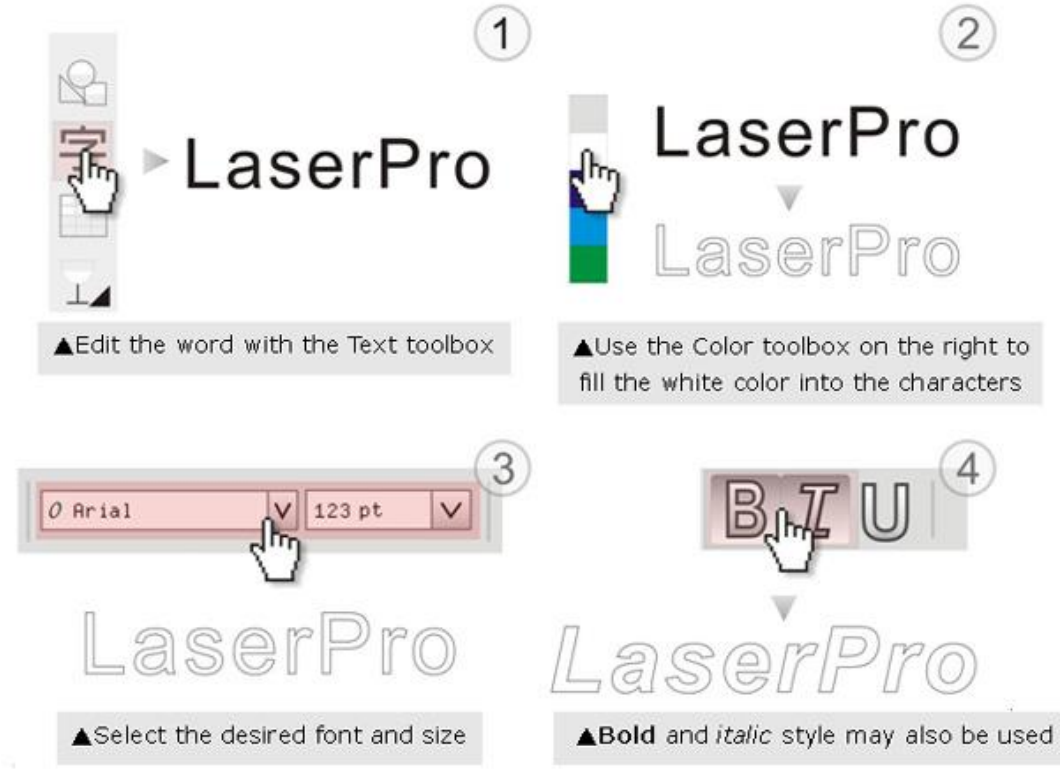
▲A gray level graphic is finished

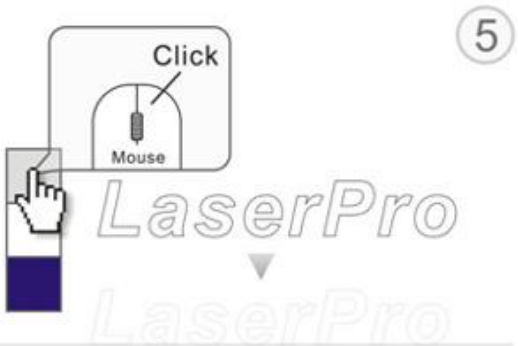
NOTE

If you need to produce circular 3D graphics, you only need to select Radial as the gray level type in the pull-down menu of Type. Then, a circular 3D graphic may be produced.

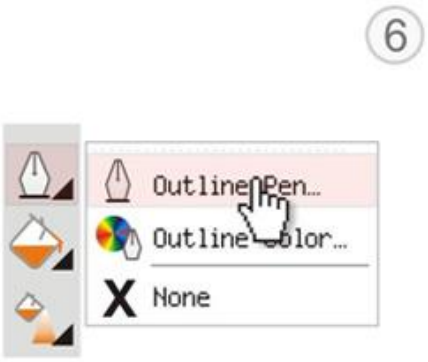


Step 2. Produce three-dimensional characters





▲On the palette, set the exterior frame as 10% gray level (Right click the mouse to set the color of the line for the exterior frame quickly)



▲Click on the Outline Pen tool

▲Set the width of the line for the exterior frame

▲Check the Behind Fill option

▲Click OK to complete the text editing

▲Three-dimensional characters are completed

Step 3. Edit the characters for the website

▲Edit the word with the Text toolbox

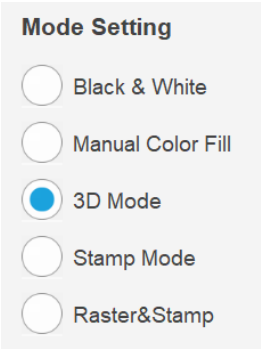
▲Select the desired font and size

Step 4. Combine the 3D images

After finishing the production for each of the objects, you may proceed with the combination of the objects. The combined graphic may be output with the laser engraver.

Output the 3D graphic

After selecting the graphic to be output, set the Mode as 3D Mode in the driver. After setting the engraving parameters, output the 3D graphic.



Tips for engraving 3D graphics

LaserPro Application Lab provides a few reminders that may require your attention during the 3D engraving in order to improve the result of the engraving.

Turn on the Air Assist function

When the engraving is done along with Air Assist, the depth of the engraving would be deeper. Set Air assist inside the driver by checking the box.

Polish

Dust will accumulate during the engraving when acrylic is engraved. The acrylic can be polished after the engraving. After the processing, don't remove the engraved object. Use the Touch Screen to lower the platform (for about 7~8 mm) and then engrave once again to achieve the better finish.

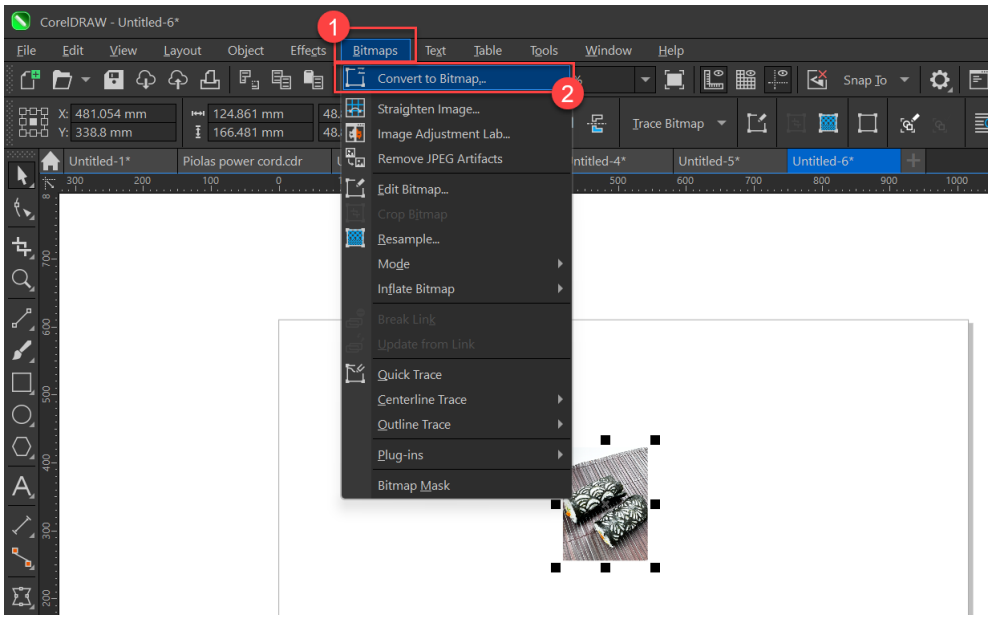
After engraving the wooden objects, please use a toothbrush with some clean water to remove the dust on top of the object.

▲ Before cleaning

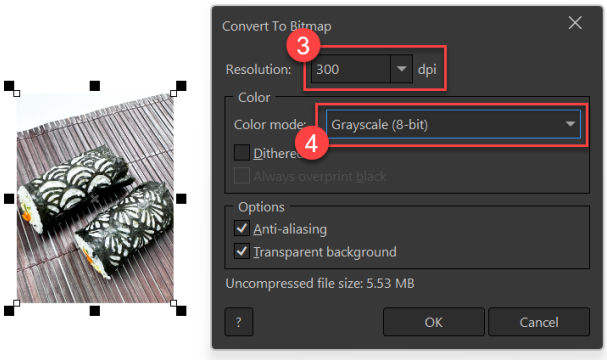
▲ After cleaning

6.5 Modify Image Settings of Picture for Better Engraving Quality

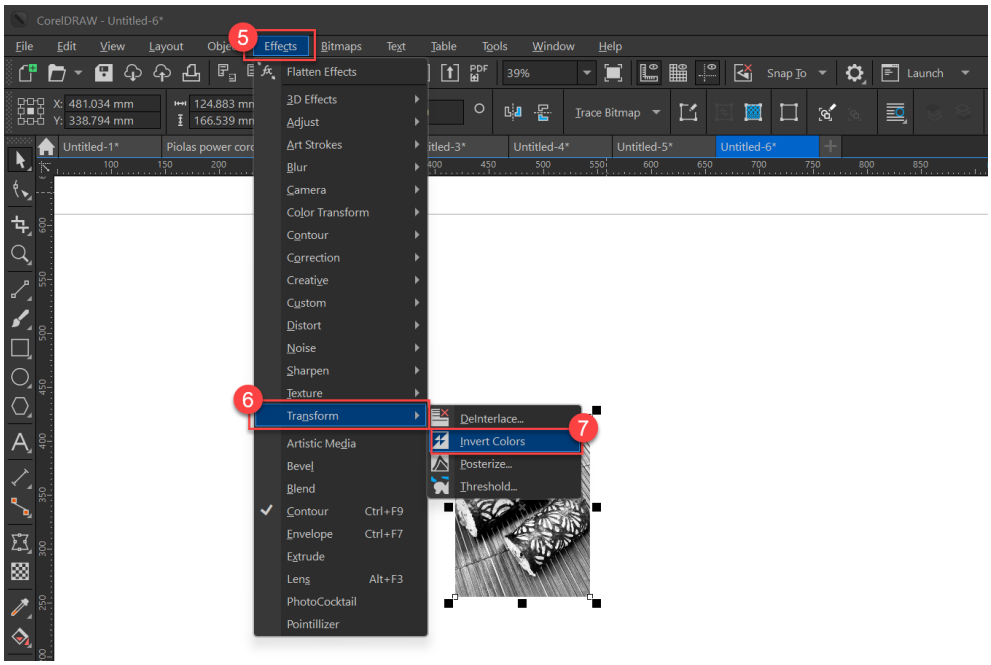
1. Import a picture into CorelDRAW.
2. Convert the image to Bitmap by selecting the image and click on Bitmaps/Convert to Bitmap



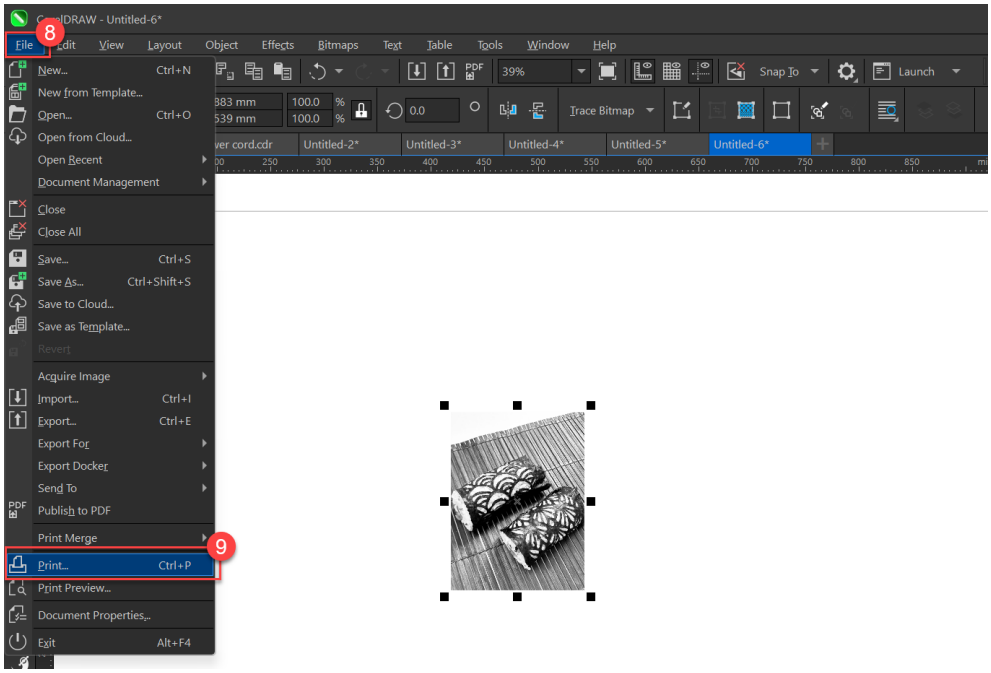
3. Change the Bitmap settings by setting “Color” to Grayscale (8-bit) and “Resolution” to 300 dpi and click OK.



4. Finally, Invert the image by selecting Effects/Transform/Invert



5. Now you are ready to output the modified image by clicking File/Print



NOTE

This instruction is a simple example for general use. There are many tips and tricks to achieve a good engraving quality. It takes a lot of practice and experience to achieve a good engraving quality. Different picture may need different modifications and different material may need different parameters.

Chapter 7
Optional Items

- Fume Extraction Unit
- Air Compressor
- Focus Lens Options
- Pass-Through Door Options
- SmartBOX Cutting Accessory
- SmartVISION Elite CCD
- Rotary Attachment & Rotary Chuck
- SmartGUARD Fire Alarm Option
- SmartAIR Fine / Ultra Nozzles Option

Several optional items are available to enhance your experience with the GCC LaserPro Spirit PRO series system. If, at any time after purchasing your laser machine, you consider purchasing any optional items, please contact your local authorized GCC distributor.

7.1 Fume Extraction Unit

To properly remove dust, vaporized material and chemical smoke from the working area and machine, it is necessary to install a suitable air extraction system. The air 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 Units 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 Unit represents the latest in exhaust 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 Unit is powered by a maintenance-free, continuous-running turbine. In order to ensure personnel safety and legal compliance, the LaserPro Fume Extraction Unit is CE-compliant for Europe. To purchase a LaserPro Fume Extraction Unit, contact your local authorized GCC distributor.

INSTALLATION (Self-Assembled Unit):

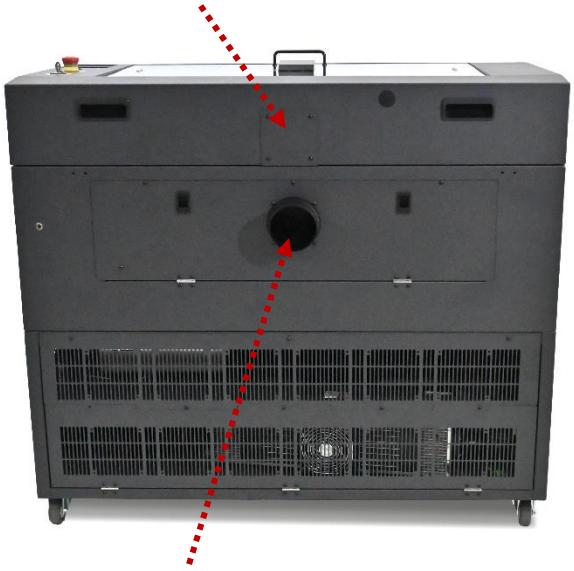
1) If you purchase an exhaust system at your local industrial supply store, we suggest that you have a contractor install the exhaust system. We highly recommend you install the exhaust system outside of the building for both noise considerations and if it does not possess filtering capabilities.

2) Mount the fume ventilation system in an obvious and accessible location, not too far from the GCC LaserPro machines, so it can be routinely switched on prior to laser engraving. The maximal distance you should mount the exhaust system away from the laser machine 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 mode.

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 GCC LaserPro machines. (As shown in the picture below). Try to keep this tubing as straight as possible as bends reduce the exhaust efficiency. Use the appropriately 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 material.

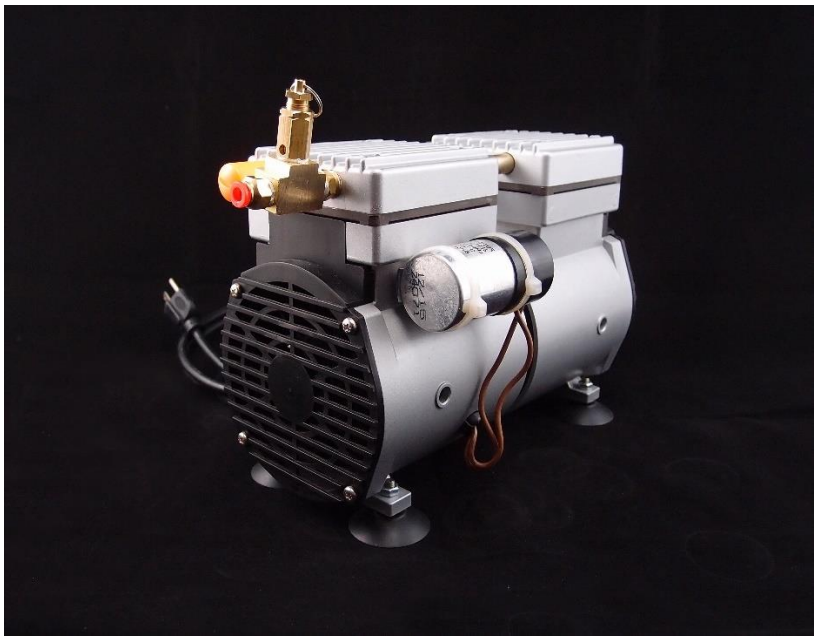
4” Ventilation Opening (top)



4” Ventilation Opening (bottom)

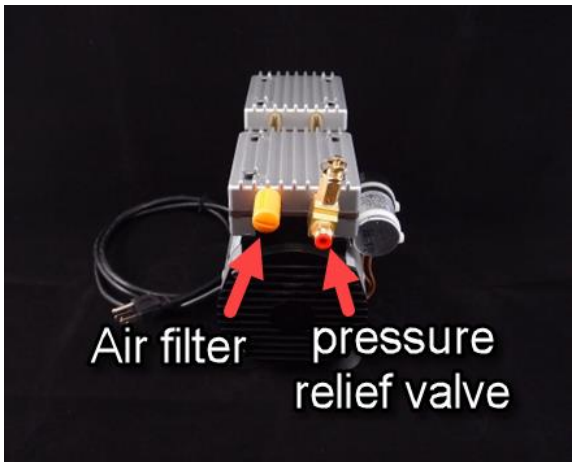
7.2 Air Compressor

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 airflow to the SmartAIR nozzles to minimize flaming, suppress working temperatures, and blow away dust and particle by products generated from the laser process. GCC LaserPro Spirit PRO series provides an air control by pen color function in Windows driver to enable or disable air assist automatically per different pen jobs. Refer to Chapter 5.3.3.2 about driver operation in pen page.



INSTALLATION:

1) Install the air filter to the air inlet of the compressor and install the pressure relief valve to the air outlet of the compressor.



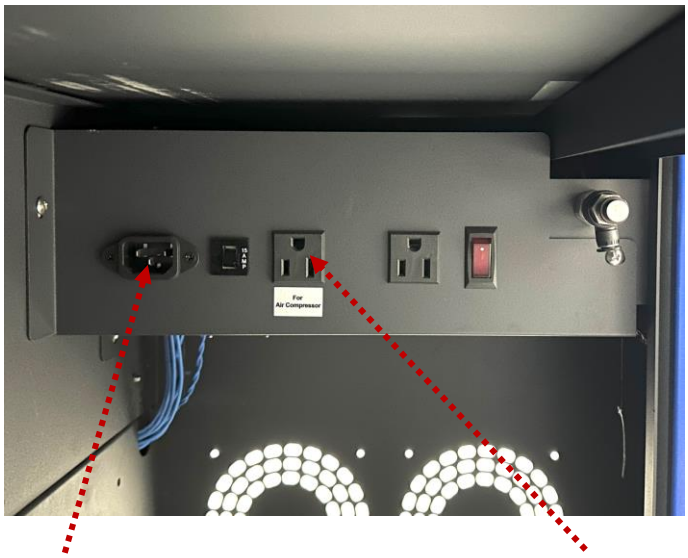
2) Connect a 1/4" tubing to the pressure relief valve of the compressor.

> **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.

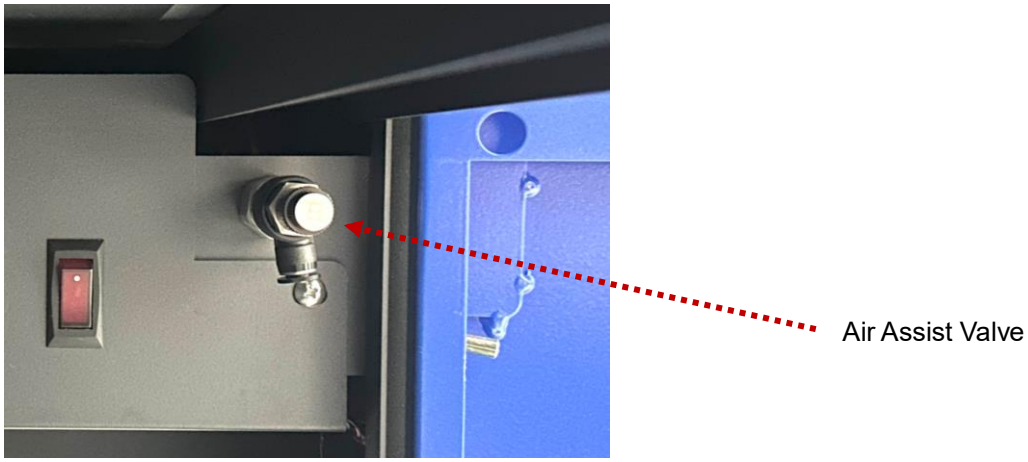
3) Open the bottom front doors of the Spirit PRO series laser engraver to locate both the Air-Assist Valve and Internal Power Sockets. As indicated below:

4) Plug the air compressor’s power cord into the “For Air Compressor” power socket.

5) Plug the female end of power cord to the power cord B socket.

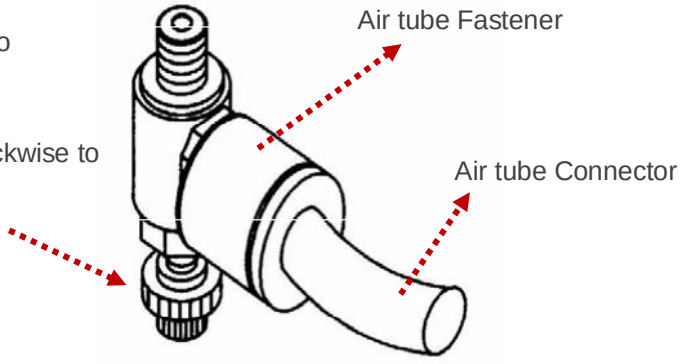


6) Take the unattached end of the 1/4" air tubing (other end already connected to air compressor) and connect it to the air tube connector on the air assist valve. Make sure you press down on the air tube fastener when inserting the 1/4" air tubing, to form a tight, secure attachment as indicated in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



Air Flow Regulator:

- Turn clockwise to increase airflow
- Turn counterclockwise to decrease airflow



7) 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:

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, counterclockwise to decrease the airflow). The air nozzle under the laser head should emit a steady flow of air.

With the SmartAIR nozzle and air compressor properly installed and operating, all configurations and settings relating to air-assist functions are controlled through the LaserPro Spirit PRO series print driver and hardware control panel. Please refer to chapter 5.3.3.2 Pen page on print driver section of this manual for detail on how to enable and configure air-assist functionally.

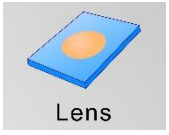
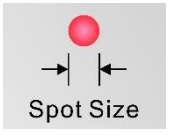
7.3 Focus Lens Options

7.3.1 CO2 Laser Focus Lens

GCC offers five different focal lenses namely the 1.5”, 2.0”, 2.5”, 3.0”, and 4.0” for different applications. The number description, 1.5”, 2.0”, 2.5”, 3.0” 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.

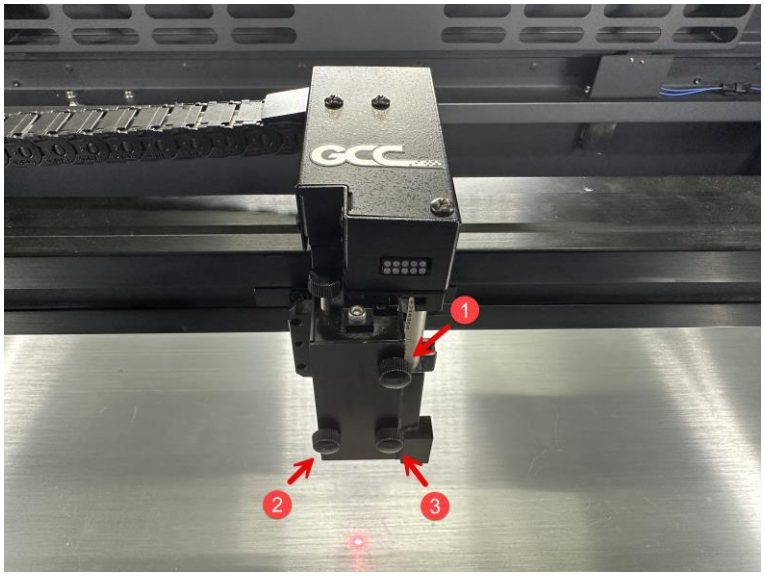
The resulting spot size from the different focus lens are a o different and the following chart shows the different spot sizes achieved from the different lenses.

- 1.5” Lens: The 1.5” lens is best when used for engraving of very fine detail
- 2.0” & 2.5“ Lens: The 2.0” & 2.5“ lenses are good for normal engraving and cutting of up to 10mm thick acrylic.
- 4.0” Lens: The 4.0” lenses are good for 10mm and above acrylic cutting.

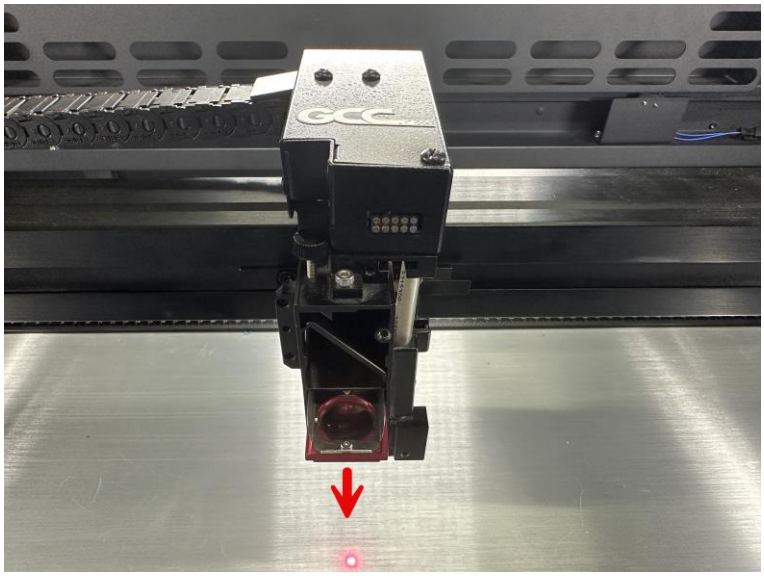
	1.5”	2.0”	2.5”	4.0”
	0.073 mm (0.0029”)	0.099 mm (0.0039”)	0.121 mm (0.0048”)	0.198 mm (0.0078”)

Change a different focal lens

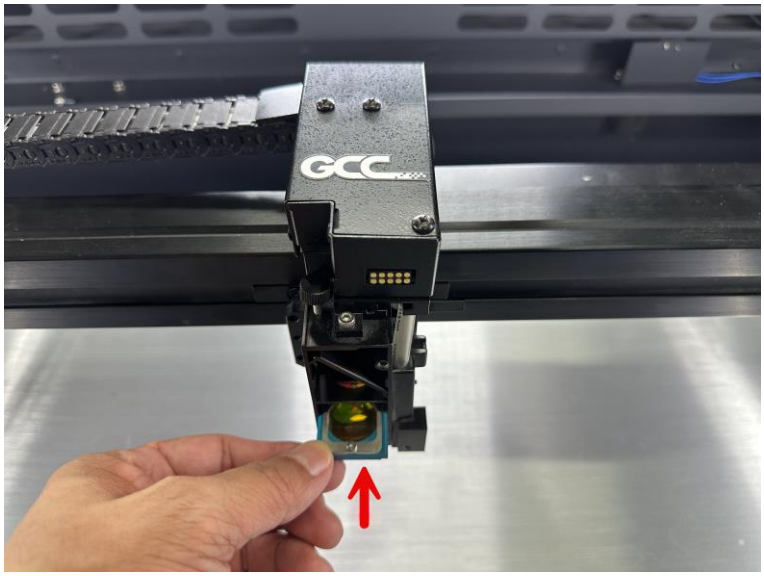
1) Unscrew three thumbscrews to remove the lens cover from the carriage.



2) Remove the focal lens.

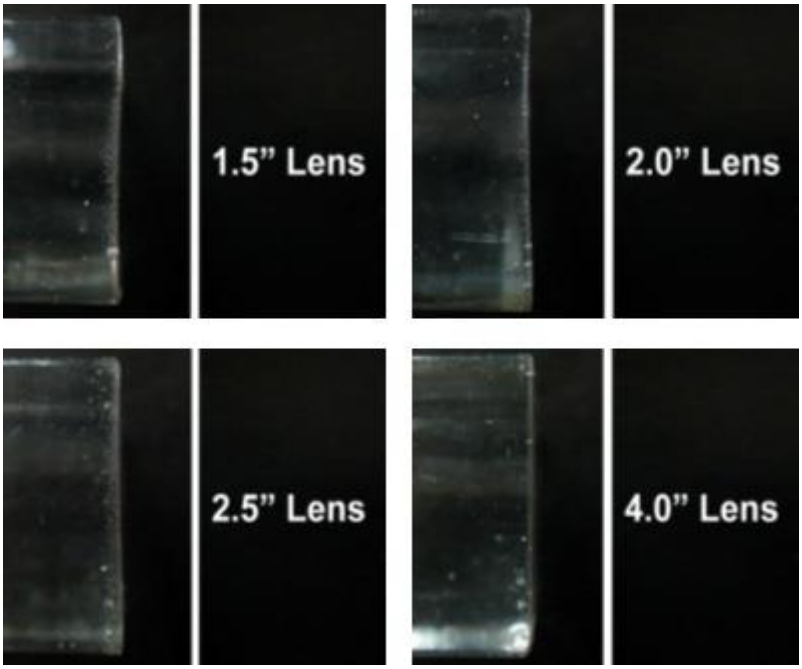


3) Insert the new focal lens and reattach the cover.



Engraving effects achieved with the different lenses

Cutting edges achieved with the different lenses



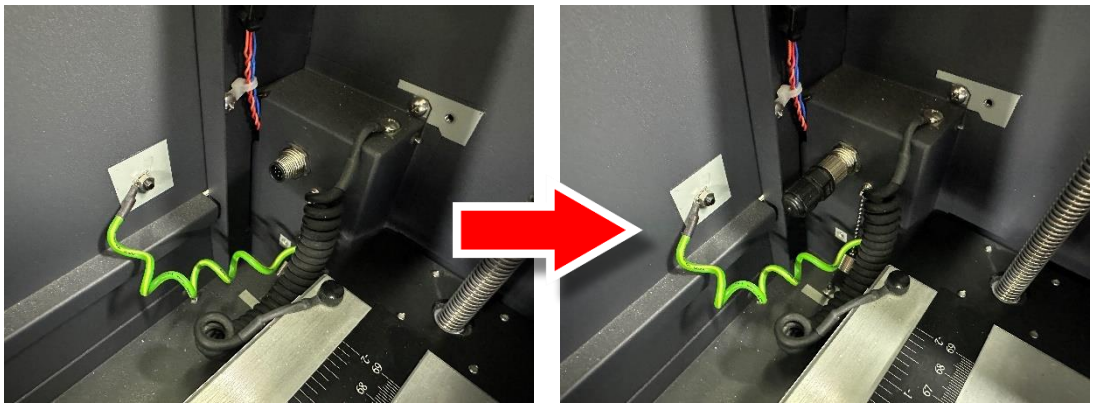
7.4 Pass-Through Door Options

GCC LaserPro Spirit PRO series laser systems are designed to be Class 2 (US: Class II) safety requirement, the laser would stop firing if any door open during operation to protect operator safety. For users installed optional Pass-Through Door switch module, GCC laser system will be converted to Class 4 (US: Class IV) safety machine, operators must follow the safety notice stated in Chapter 1.5 of this manual.

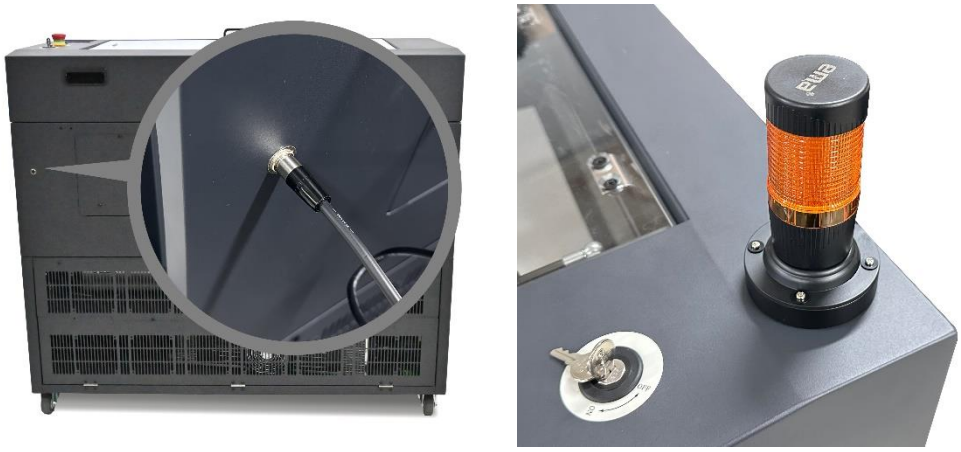
7.4.1 How to Install Pass-Through Door Switch Option

1) Open the top window of laser machine then lower down the working table of laser system to the bottom.
2) Locate the Pass-Through Door switch key connector on the right side corner of the machine chassis.

3) Unscrew the port cover and plug the Pass-Through Door switch key into the female connector.



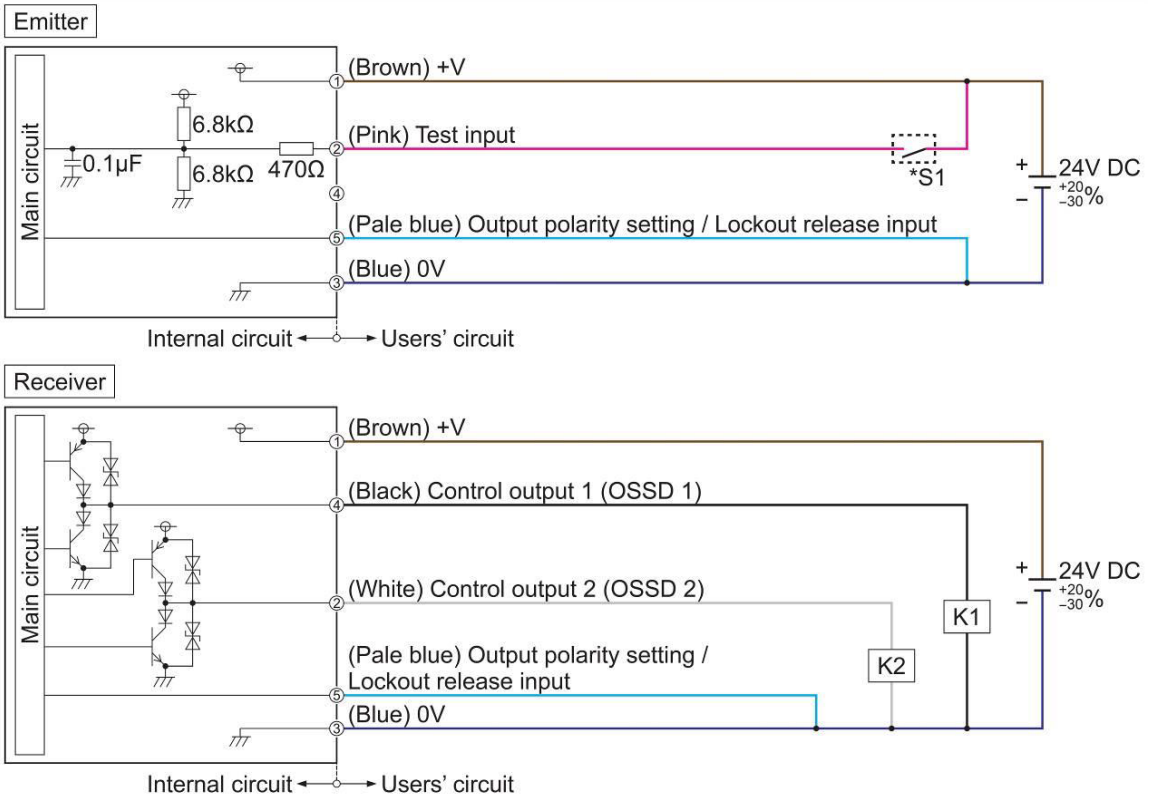
4) Locate the external signal connector on the right side of laser system and plug the warning light to this port. Put the warning light on top of laser machine with high visibility as class 4 (US: class IV) safety requirement.



5) The installation is completed.

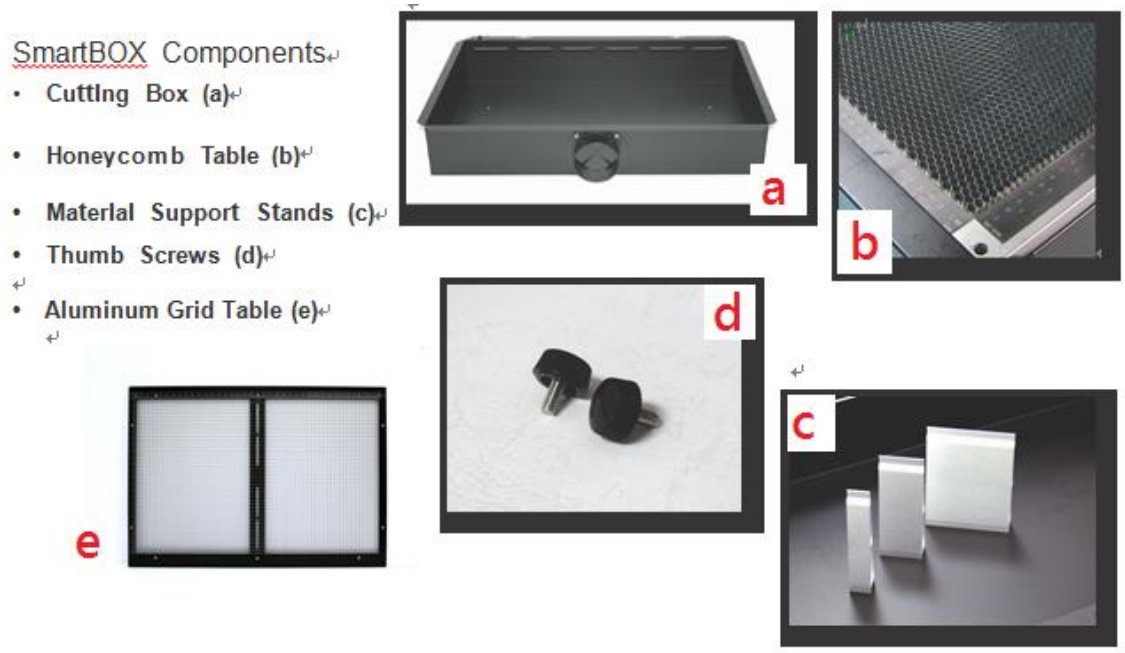
7.4.2 Connect with an External Remote Interlock

If you wish to connect an external remote interlock, please consult the following diagram to complete the setup.



7.5 SmartBOX Cutting Accessory

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.



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

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

Action	Suggestion setups
Engraving	NO Smart Box
Light cutting	honeycomb table
Thick cutting	Cutting box + Support
Thin textile/fabric module	smart box

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/ Aluminum Grid Cutting Table):

1) Open the front pass-through door and lower the work table to the lowest possible position through the touch panel.
2) Insert the cutting box and attached honeycomb table through the open front pass-through door onto the work table, with the air extraction opening facing towards the back end of the Spirit PRO Series. 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 air extraction system option installed, then you will need to attach the air extraction system's pipe connector to the SmartBOX's air extraction opening from the Spirit PRO Series rear side. (For detailed instructions to setup the air extraction system, please see the AIR 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 Spirit PRO Series, 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 working table to the lowest possible position through the Spirit PRO Series control panel.
4) Insert the cutting box through the open front pass-through door and place it onto the work table, with the air extraction opening facing towards the back end of the Spirit PRO Series. Ensure the rear and lefthand 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 Spirit PRO Series 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.

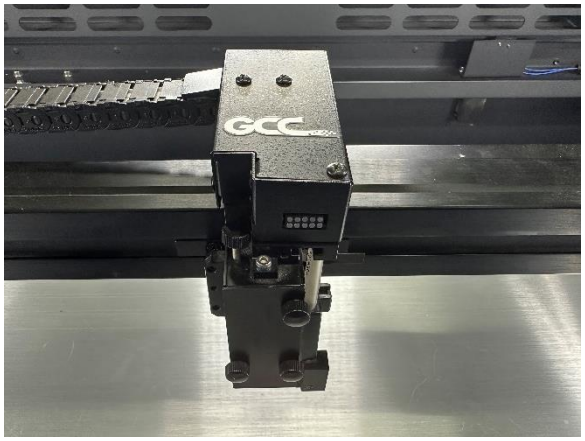
7.6 SmartVISION Elite CCD

The SmartVISION Elite CCD enables you to read registration marks and achieve precise cutting, making it ideal for print-and-cut applications.

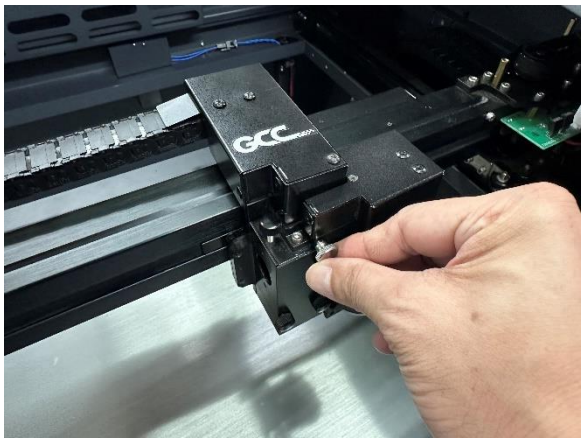
> **NOTE**
> The SmartVISION Elite CCD is only available for the CO2 model.

Installation:

1) Turn off the power of the machine.
2) Take out the SmartVISION Elite CCD from the package.
3) Slide the SmartVISION Elite CCD to the right side of the lens carriage.




4) Tight 2 thumbscrews to fix it.



5) Connect the USB cable and CCD cable between laser machine and computer/laptop.

6) The installation is completed.

Convert file to the **PRN** format:

Please refer to chapter 4.1.3 to get more information about convert file to the PRN format.

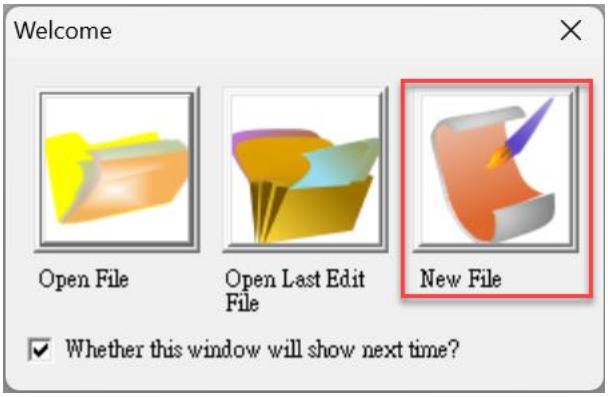
Operation:

1) Please go to the **Down Area** from the www.GCCworld.com to download the GCC SmartCONTROL software.

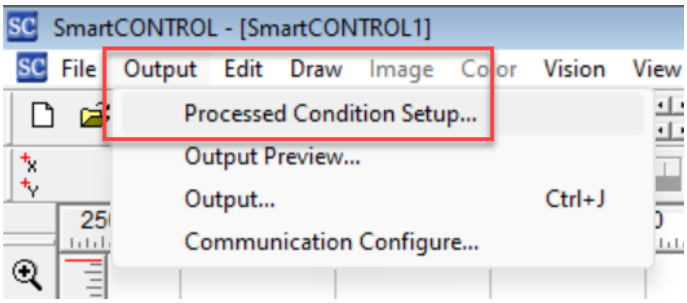
2) Install it to your computer/laptop and run it.

3) The below message serves as a reminder: if you send files simultaneously via SmartCONTROL and different drawing software (such as CorelDRAW or Illustrator), it can lead to unexpected issues. Please remember to close SmartCONTROL before sending files from other drawing software. Click OK button to close the window.

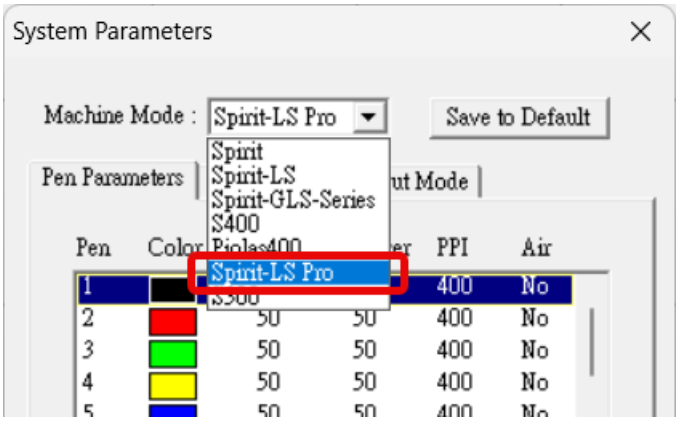
4) The Welcome window will appear, please click “New File” to continue.



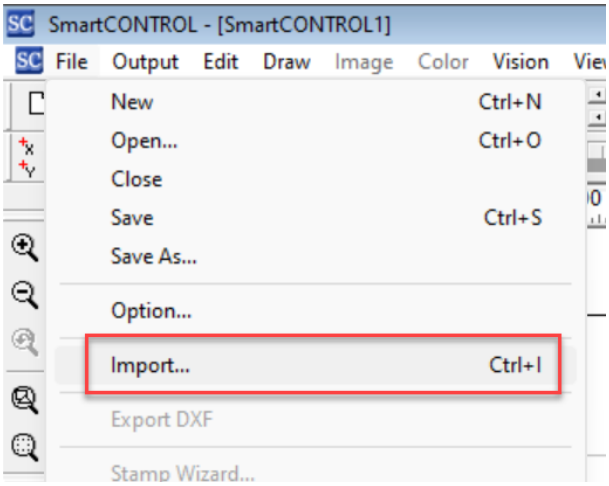
5) Go to Output → Processed Condition Setup… to set a correct model that you use.



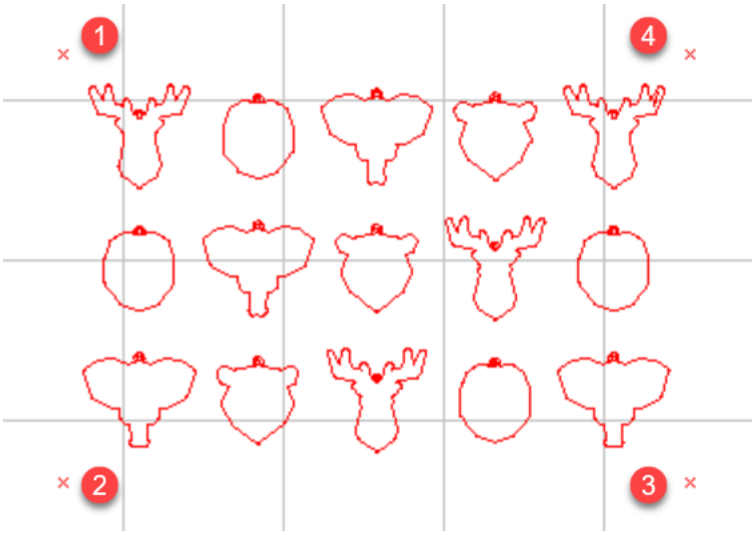
6) Select “Spirit LS PRO” from the drop-down menu of the machine model and click OK,



7) Click File → Import… to import a file to SmartCONTROL.

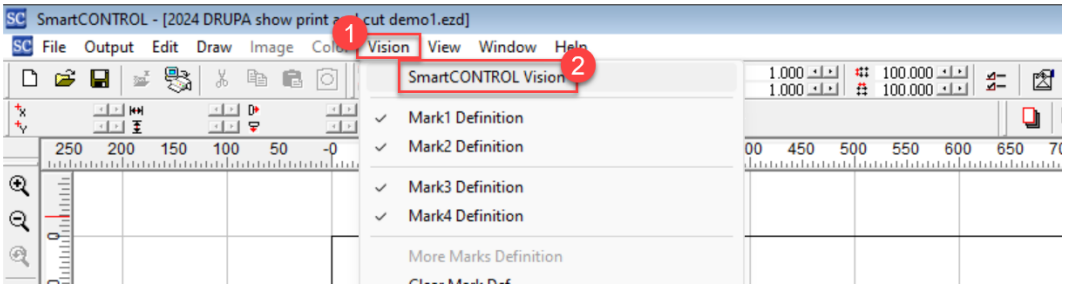


8) After importing the file, you will see some X symbols in SmartCONTROL, which indicate registration marks. If the file lacks these X symbols, it means it doesn't have registration marks and cannot be used with SmartVISION Elite CCD.

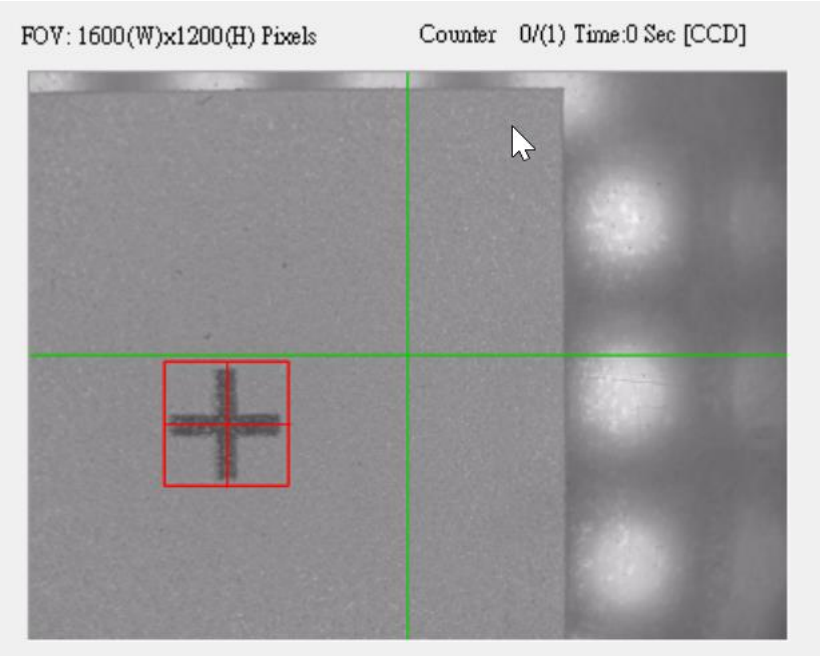


9) Place the printed media on the working table.

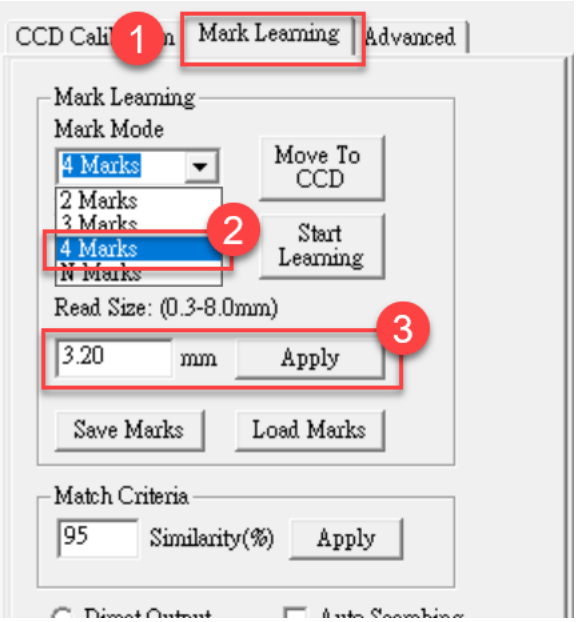
10) Go to <Vision> → <SmartCONTROL Vision> to open the SmartCONTROL window.



11) Move the SmartVISION Elite CCD near the first mark by hand and ensure that the SmartVISION Elite CCD can cover the entire mark in the FOV (Field of View) window. If you cannot see the mark, please use the arrow keys of **ROI Moving** to move the SmartVISION Elite CCD accordingly.



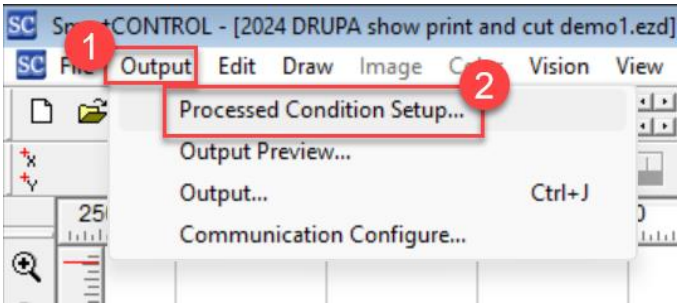
12) Click the <Mark Learning> tab and select a mark mode from the drop-down menu. Then set the read size based on the size of the mark.

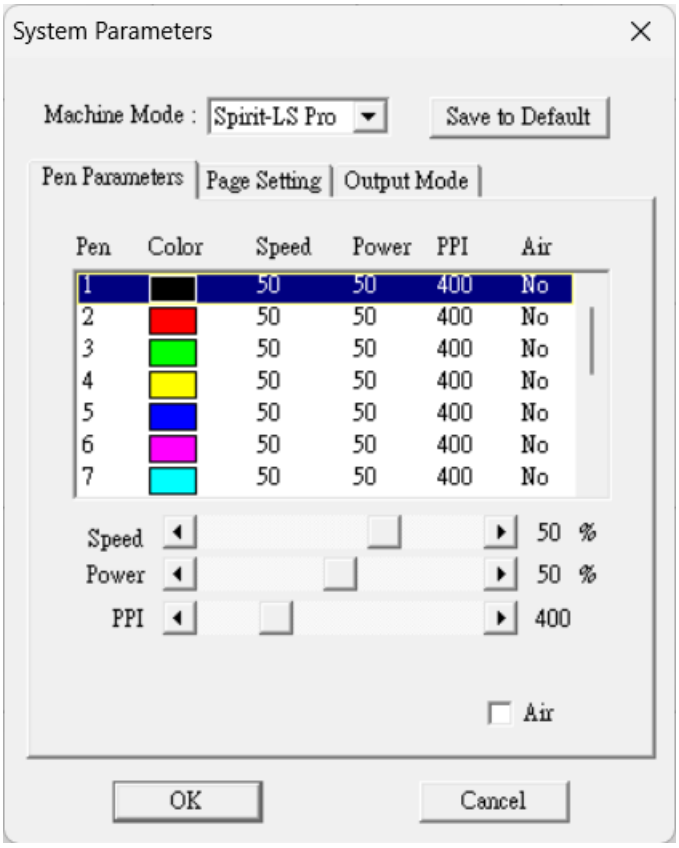


13) Move the Learn ROI (green frame) to the center of the mark and click the **Starting Learning** button to lean the mark.

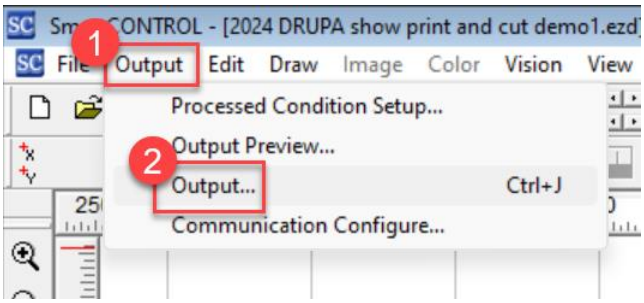
14) After learning the mark, it will appear a message to remind you that all marks have been learned.

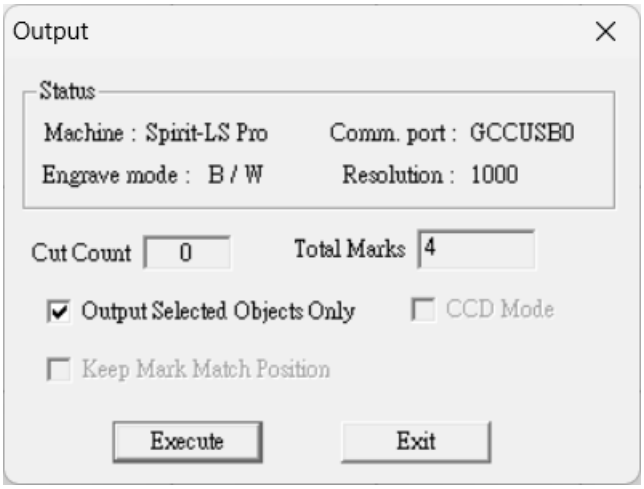
15) Go to <Output> → <Processed Condition Setup…> to set the process parameters.





16) After setting the process parameters, please go to <Output> → <Ouput…> to open the output window.





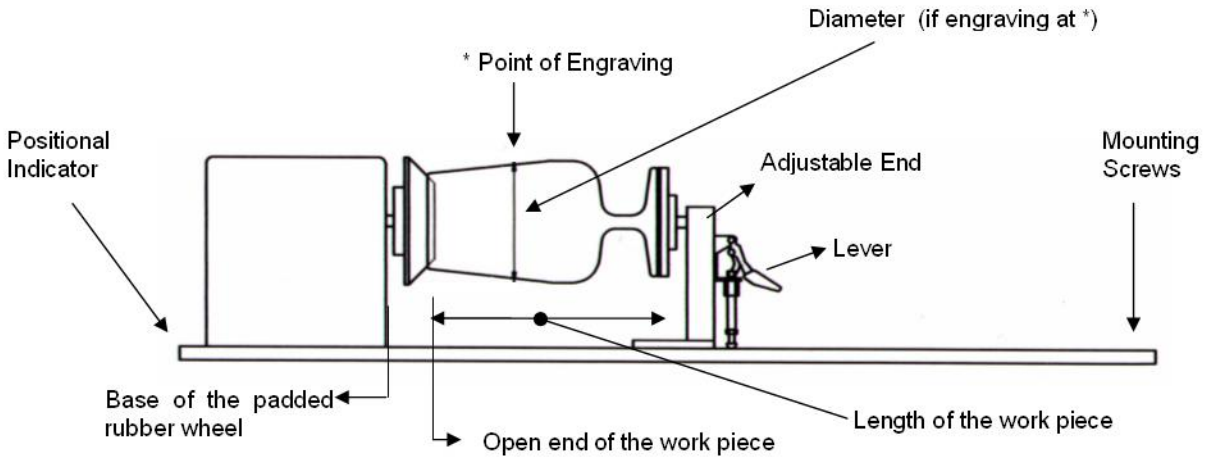
17) Click the **Execute** button to run the job.

18) For more information about SmartCONTROL's special functions or operations, please visit the **<Support>** → **<Downloads>** section at www.GCCworld.com to download the SmartCONTROL user manual.

7.7 Rotary Attachment & Rotary Chuck

The rotary attachment and rotary chuck options provide the Spirit PRO Series with the ability to engrave on cylindrical or spherical objects. In addition to the standard X, Y, Z axis, the rotary attachment and rotary chuck allow for a fourth axis which rotates your object 360° to allow for engraving on cups, wine glasses, and even balls. Users can choose rotary attachment or rotary chuck according to their applications.

Rotary Attachment Specification



Medium Rotary Attachment for Spirit LS PRO models:

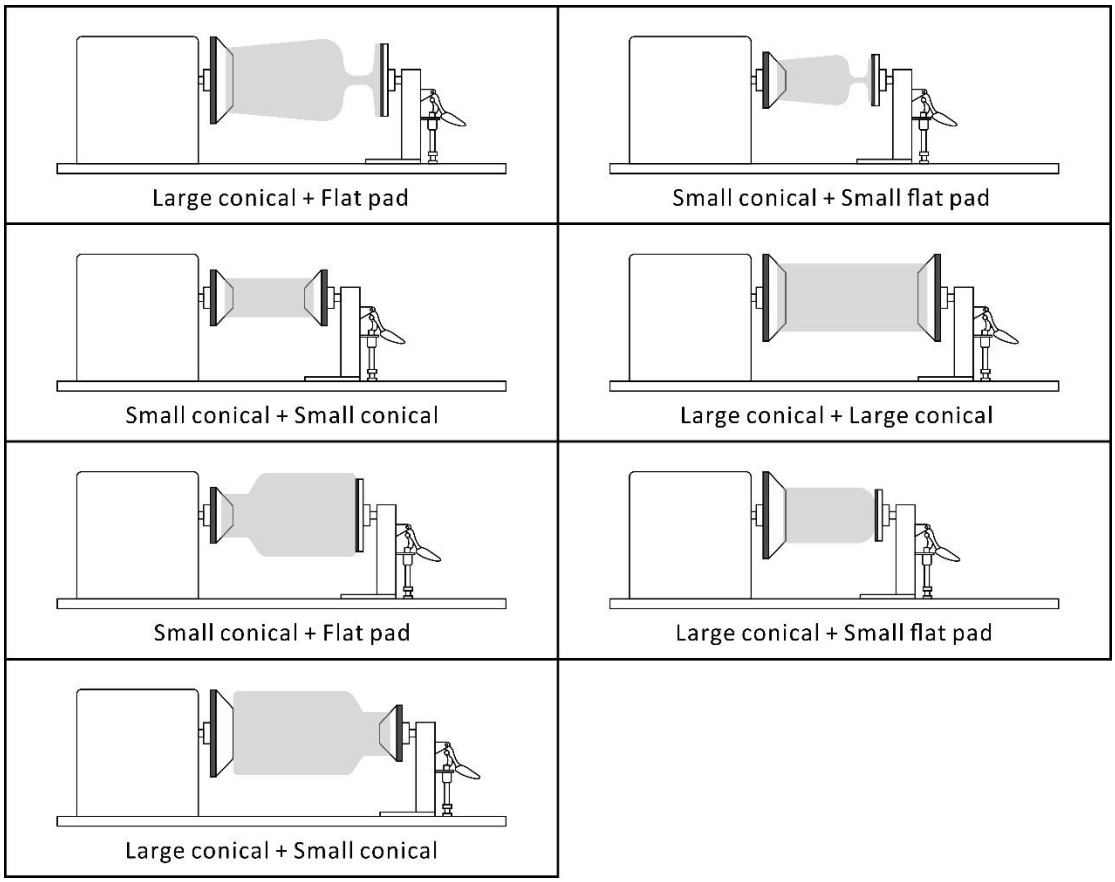
Work Piece Limitations	
Maximum Length	450 mm (17.71 inches)
Maximum Loading Weight	4 kg (8.8 lbs.)
Minimum Inner Diameter (Large conical fixture)	50 mm (1.96 inches)
Maximum Inner Diameter (Large conical fixture)	76 mm (2.99 inches)
Minimum Inner Diameter (Small conical fixture)	12 mm (0.47 inches)
Maximum Inner Diameter (Small conical fixture)	46 mm (1.8 inches)
Maximum Outer Diameter	176 mm (6.9 inches)

Large Rotary Attachment for Spirit GLS Hybrid PRO models:

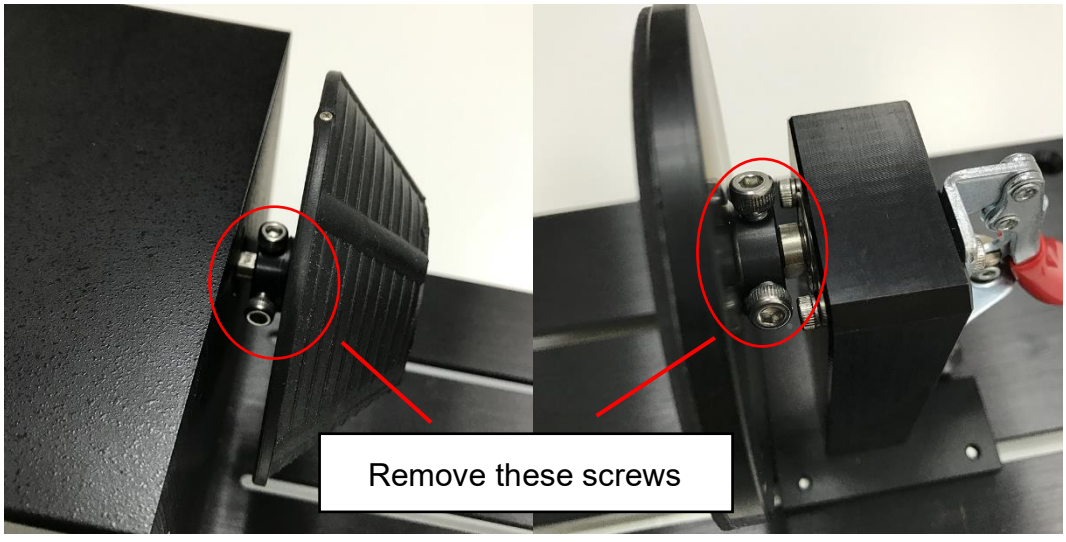
Work Piece Limitations	
Maximum Length	650 mm (25.59 inches)
Maximum Loading Weight	4 kg (8.8 lbs.)
Minimum Inner Diameter (Large conical fixture)	50 mm (1.96 inches)
Maximum Inner Diameter (Large conical fixture)	76 mm (2.99 inches)
Minimum Inner Diameter (Small conical fixture)	12 mm (0.47 inches)
Maximum Inner Diameter (Small conical fixture)	46 mm (1.8 inches)
Maximum Outer Diameter	176 mm (6.9 inches)

Exchange the Conical Fixtures:

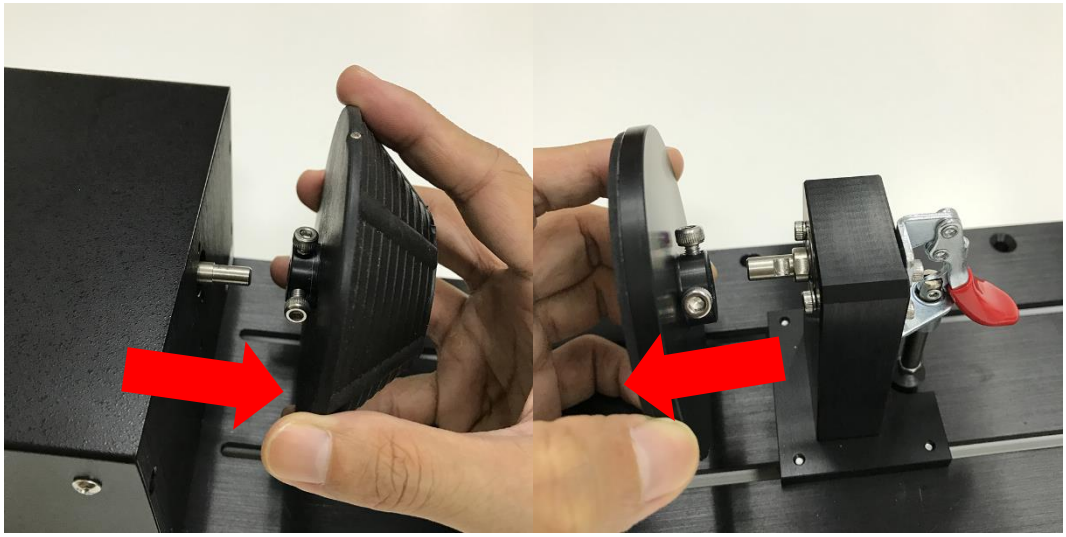
Depending on the shape of work piece, you can exchange different designs of front and back fixtures to fit the materials as below illustration.



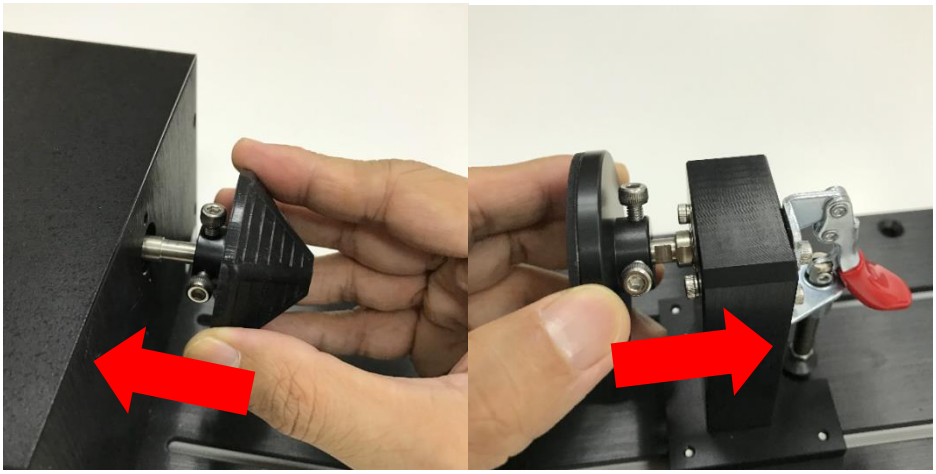
1) Remove the two screws holding the fixtures.



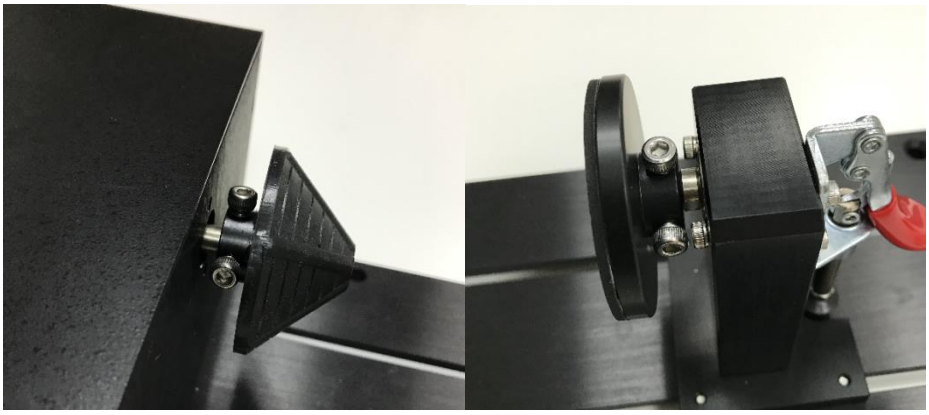
2) Detach the large conical / small conical / flat pads by moving it in the arrow direction as indicated below.



3) Insert the required large conical/ small conical /flat pads onto the rotary attachment as shown below.

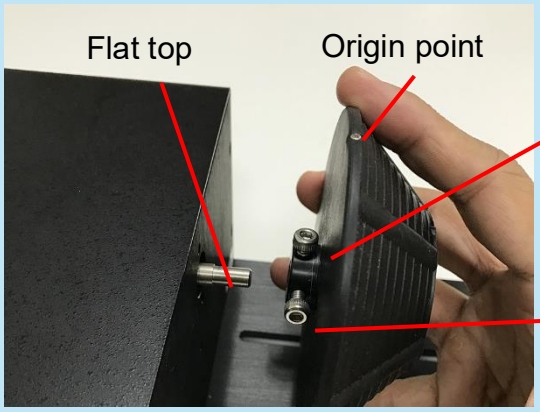


4) Tighten the screws to complete the rotary attachment fixtures setup.



NOTE

Align the origin point to the flat top of shaft then tighten the first screw against it, following to tighten the second screw.

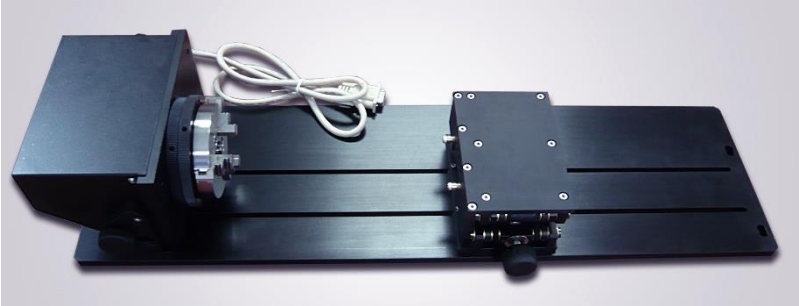


2. Align the origin to flat shaft, then tighten this screw against it.

1. Following to tighten the second screw.

Rotary Chuck Specification:

GCC LaserPro offers different design options to work with cylindrical objects. The Rotary Chuck can hold smaller diameter of working object tightly, tilt with different angles for laser processing.



Work Piece Limitations	
Maximum Length	410 mm (16.14 inches)
Maximum Loading Weight	4 kg (8.8 lbs.)
Minimum Diameter	0.5 mm (0.02 inches)
Maximum Diameter	120 mm (4.7 inches)

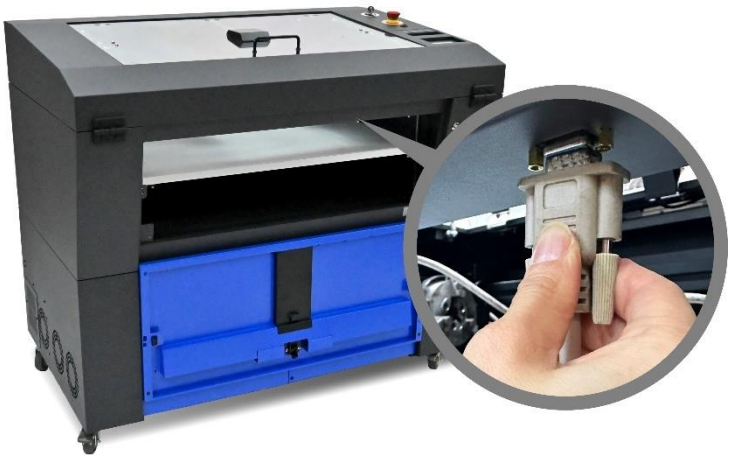
INSTALLATION for Rotary Attachment and Rotary Chuck:

1) Power off the laser engraver before installing the rotary attachment.

2) Place the rotary attachment on the engraving table of laser engraver and ensure the rotary attachment mounting screws in the rear end correspond to the positional holes on the engraving table. In addition, make sure rotary attachment's positional indicator (center point of the top of the rotary) in front end aligned to the center position in Y (vertical) axis of the engraver.

3) With the rotary attachment properly positioned, tighten the mounting screws in the rear end to secure it on engraving table.

4) Open the front door panel of the laser engraver and connect the rotary cable to the rotary port located inside the front door panel.



5) Close the front panel to complete the installation.

6) Power on the laser system, the laser engraver will automatically detect the rotary attachment and automatically move down the engraving table to its lowest position.

> **NOTE**
> Despite the dummy-proof installation design, please ensure that the device is installed correctly before turning on the machine.

OPERATION of Rotary Attachment and Rotary Chuck:

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.

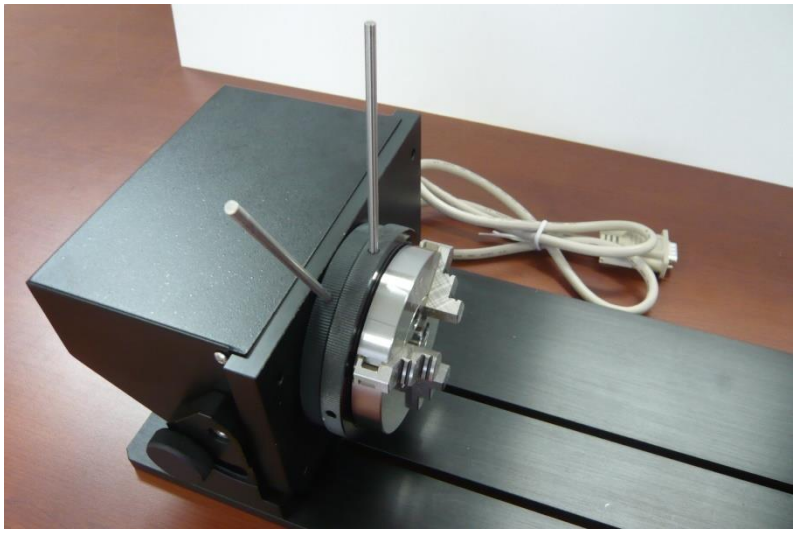
2) Load the work piece onto the rotary attachment
   a) First lift the lever on the rotary attachment, unlock the adjustable end of the rotary attachment.
   b) Slide the adjustable end to accommodate the length of the work piece.
   c) Load the working piece by centering the open end of the work piece against the rubber wheel and slide the adjustable end to fit the bottom of work piece firmly.

   Now simply lower the lever to secure the work piece with the rotary attachment.

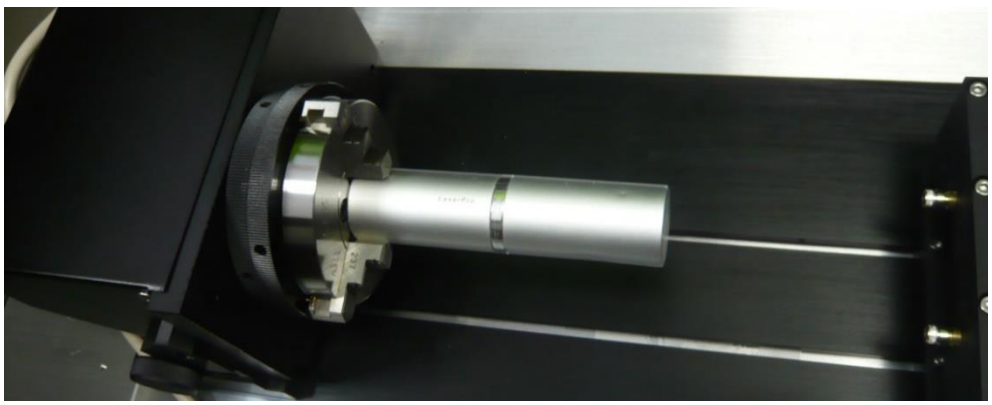
3) Load the work piece onto the rotary chuck
   a) Unlock the adjustable rear end of the Rotary Chuck, load the work piece onto the Rotary Chuck by centering the object to the clamping end and adjustable rear end. Adjust the leveling screws

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.

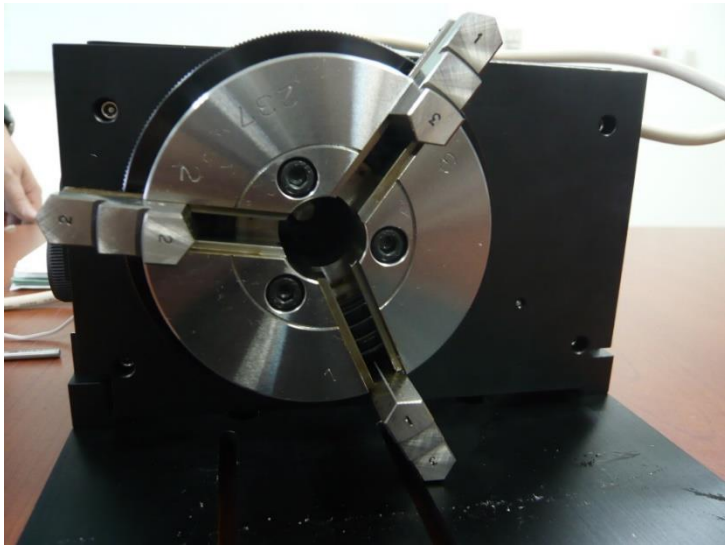
b) To load the object, you can use the enclose tools to widen or tighten the metallic claws. Simply insert the two metal pins into the holes on the turn-dial and turn it to widen or tighten the claws to hold the engraving object.



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.



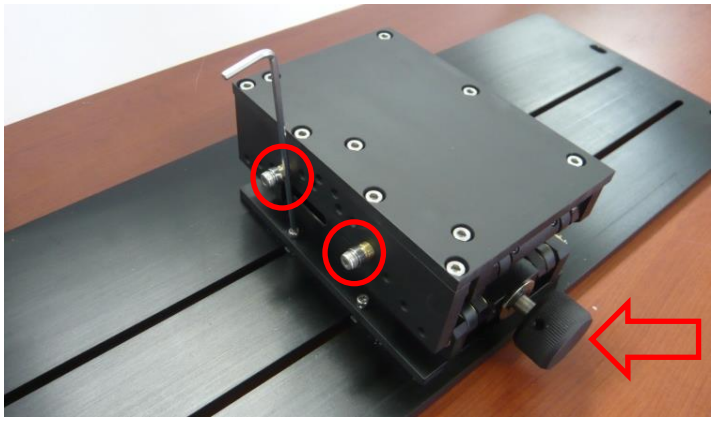
The clamps on the rotary attachment can be detached and reverted for better fitting of objects of different sizes. Note that the clamps should be assembled by lining up the correct numbers.



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.

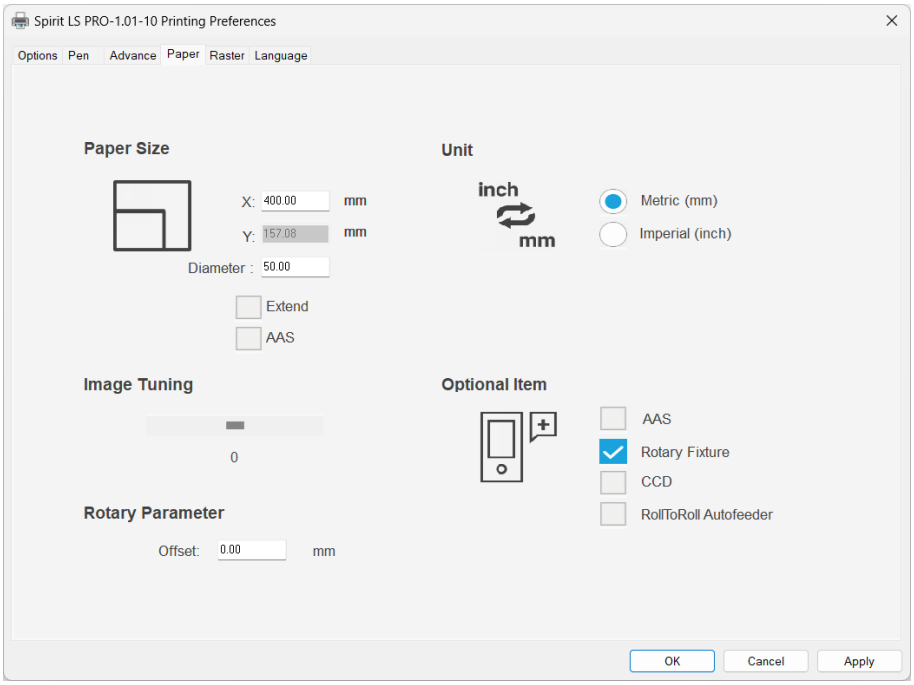


CAUTION!

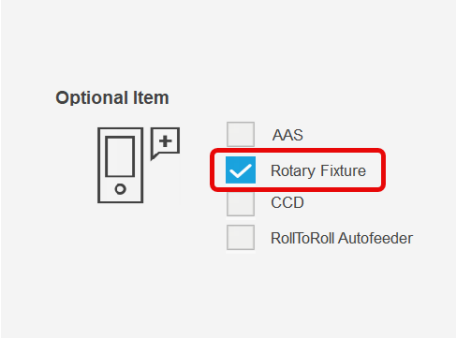
If your work piece is small, please apply 4" focal lens for operation to prevent the lens carriage from colliding with the rotary attachment.

4) 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.

5) 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.



6) From the Paper Page, the first thing you must do is to check the Rotary Fixture. The Paper.



7) 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.

8) 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
9) Despite the dummy-proof installation design, please ensure that the rotary device is installed correctly before turning on the machine

7.8 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.

NOTE

1. The SmartGUARD fire alarm is an fire detecting and alarm system, not a fire extinguisher.
2. If you have purchased your system with SmartGUARD, then no installation is required, as your system will arrive with SmartGUARD pre-installed.
3. 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.

Please enter the function menu on the touch panel to enable the SmartGUARD fire alarm. For more information, please refer to chapter 5.2.2.28: Advanced Option – SmartGUARD Page.

7.9 SmartAIR Fine/ Ultra Nozzles Option

The SmartAIR™ Fine and Ultra Nozzles minimize flaming, suppress working temperatures, and blow away dust and particle byproducts generated from the laser process.

The SmartAIR Fine Nozzle is recommended for engraving or cutting thin material such as textile. The smaller caliber nozzle is positioned closer to the object for a concentrated blast directed over a small area to eliminate burning on the cutting edge. The vertical design of the SmartAIR Fine Nozzle produces a concentrated airflow to blow away dust and unwanted residue, leaving a clean product surface.

The SmartAIR Ultra Nozzle is recommended for cutting thick material such as acrylic. The larger caliber nozzle produces strong airflow over a wider area to prevent flaming when the laser is cutting at slower speeds.

NOTE

1. The SmartAIR Fine and Ultra air nozzles are not compatible with Spirit GLS Hybrid model.
2. The Spirit Series comes standard with the SmartAIR Standard Nozzle, but for specialized jobs on specific materials, we highly recommend the use of the SmartAIR Fine or Ultra Nozzles.

INSTALLATION:

1) Unscrew the thumbscrews securing the front plate of the laser head, and remove the faceplate.
2) Remove the currently installed nozzle by simply sliding it outwards (towards you).
3) With either the SmartAIR Fine or Ultra Nozzle, simply slide into the slot (where you removed the original nozzle), with the pointed end face down.
4) Position the faceplate back onto the laser head and screw the thumbscrews back into place.

OPERATION:

1) With the air compressor unit and applicable SmartAIR Nozzle properly installed. Switch on the air compressor unit and make sure that the airflow regulator on the air assist valve 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 LaserPro Spirit PRO Series print driver and hardware control panel. Please refer to the LaserPro Spirit PRO Series print driver and graphic control panel sections of this manual for details on how to enable and configure air-assist functionalities.

Chapter 8
Basic Maintenance

- Suggested Cleaning and Maintenance Supplies
- Maintaining the Work Table and Motion System
- Cleaning the Optical System

Keeping your LaserPro Spirit PRO Series 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.

WARNING!

- **Electrical shock may occur if you do not turn off and unplug the Spirit Series before cleaning.**
- **Damage may occur to the system if you do not turn off and unplug the Spirit Series before cleaning.**
- **Always turn off and unplug the Spirit Series before cleaning!**

8.1 Suggested Cleaning and Maintenance Supplies

Cleaning / Maintenance Tool	Special notes
Soap Solution or All-Purpose Cleaner	
Paper Towel	
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	Supplied 1pc. Local supply is suggested.*
Lint Free Lens Tissue	Supplied
#2 Phillips Screwdriver	
Allen Wrench .050”	

*The recommended lens cleaner is TIFFEN Lens Cleaner. You can go through the following link to get more information.

Tiffen Lens Cleaner 1.25 oz - EK1767136T – The Tiffen Company

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 lift 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 Spirit PRO Series. 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).

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 serious risk if the SmartLID slams down.

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 frequent basis through the following steps:

1) Turn the power off and unplug the machine 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 Spirit PRO Series.

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.

Tip

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

8.2.3 Lubrication of the X & Y Rails

In order to keep the motion system running smoothly, the X and Y rails of the motion system will need lubrication on weekly base. Apply 0.1ml of lubrication syringe in accessory box to the X liner rail of Spirit LS PRO and Spirit GLS Hybrid PRO models on bi-week base, while apply a small amount of light grade machine oil or PS2 grease to a paper or cotton towel and apply to the X rail of Spirit PRO model, and Y rails of Spirit LS PRO and Spirit GLS Hybrid PRO models weekly. You can purchase PS2 grease from NSK dealers worldwide. Please visit http://www.nsk.com/eng/company/network/index.html for additional information.

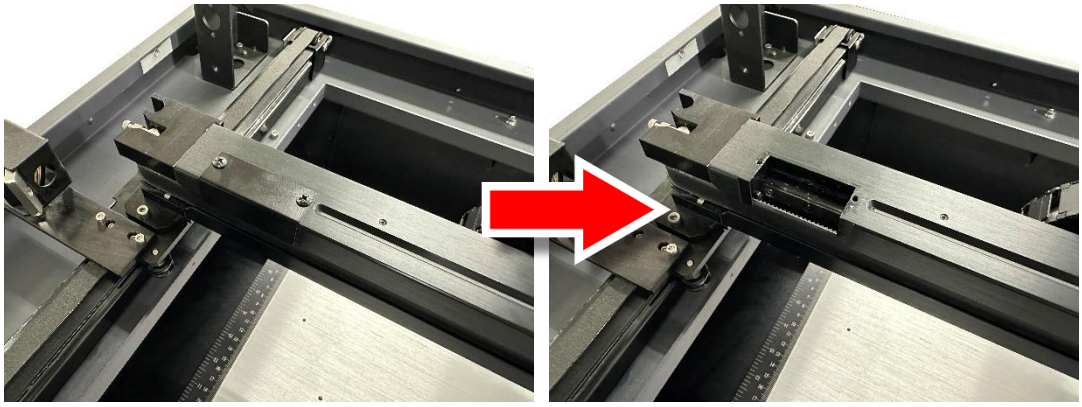
NOTE

- Clean and lubricate the X linear rail of Spirit LS PRO and GLS Hybrid PRO models with 0.1ml grease from syringe every two weeks to properly maintain the motion system.
- The lubrication oil for the X linear rail on Spirit LS PRO and Spirit GLS Hybrid PRO must to be ordered from GCC LaserPro and its authorized dealers. Other unknown grease may damage the rail's life time and performance.
- Always clean and lubricate the X and Y rails of Spirit, and Y rails of Spirit LS PRO & GLS Hybrid PRO models after working with materials that produce lots of debris (such as wood).

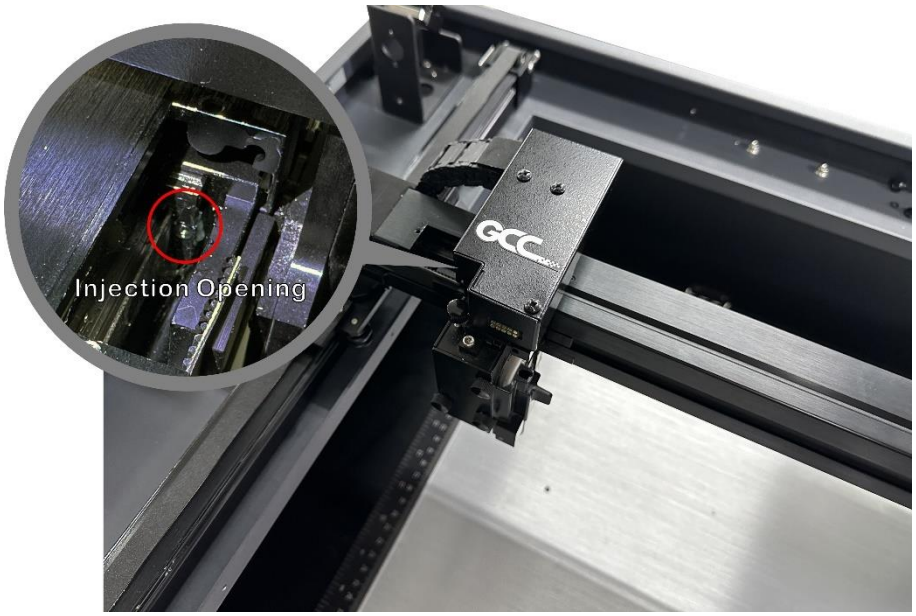
The X rail of Spirit LS PRO and Spirit GLS PRO models has linear bearing design which needs lubrication regularly depending on the job loading, recommend on bi-weekly base. Follow below procedures.

1. Open the SmartLID
2. Take out the Grease Syringe from accessory box.

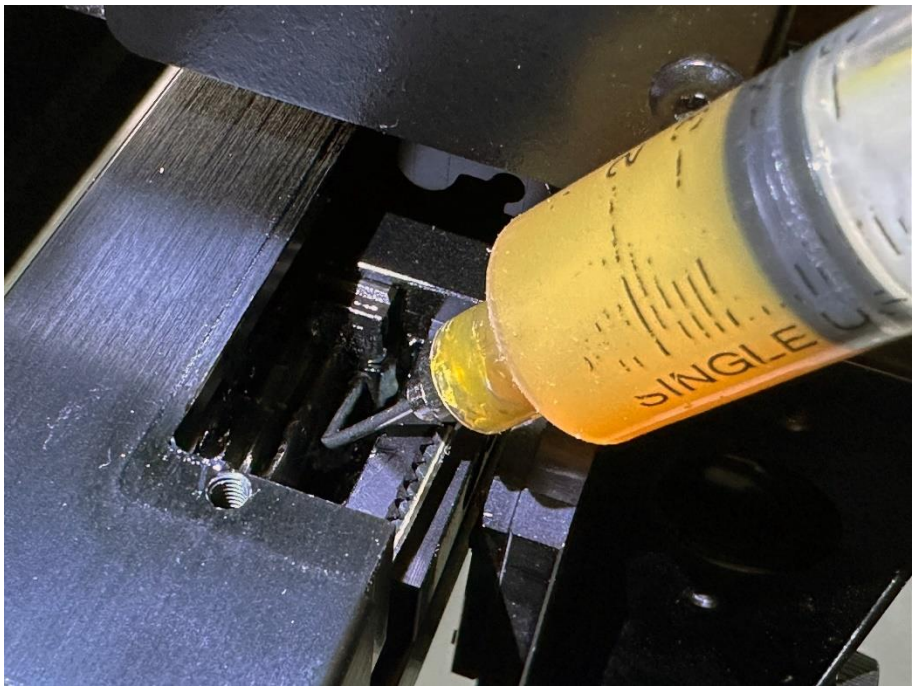
3. Remove the lubrication slot plate on the X rails.



4. Move the lens carriage to the left side and make the injection opening can be shown from the lubrication slot



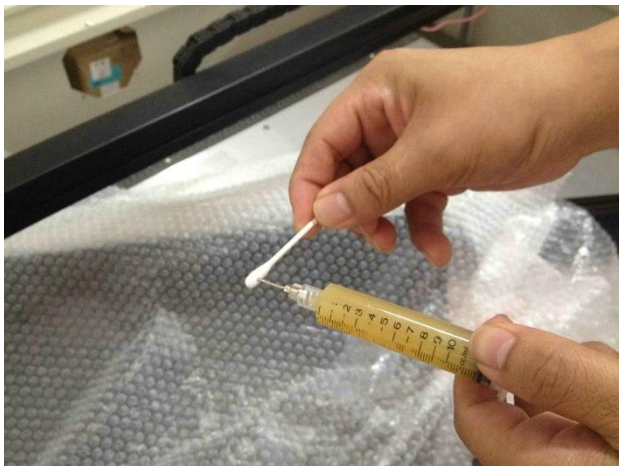
5. Insert the Grease Syringe into the injection opening, then Inject 0.1ml of grease to the injection opening inside the linear bearing, and move the lens carriage to smooth the grease and movement



6. Repeat the step 5 till the grease is full out of the linear bearing
7. Repeat the step 5 and 6 to the injection opening in opposite side of the linear bearing
8. Seal the lubrication slot plate back to the X rail.

9. 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).

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



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

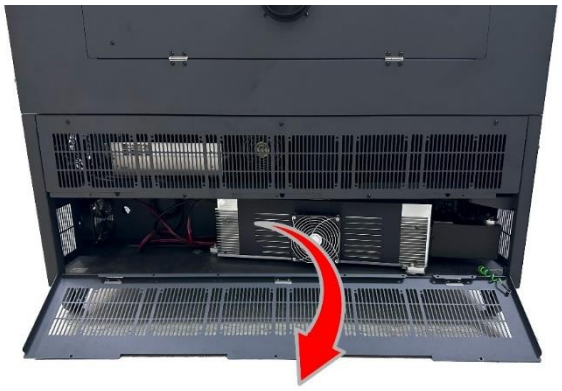
- Mirrors should be removed for cleaning one at a time to avoid beam misalignment after placing them back to the lens holders.
- Refer to section 8.3.2 on how to clean the mirrors.

The following section will illustrate the location of the four mirrors found on the LaserPro Spirit PRO Series for cleaning.

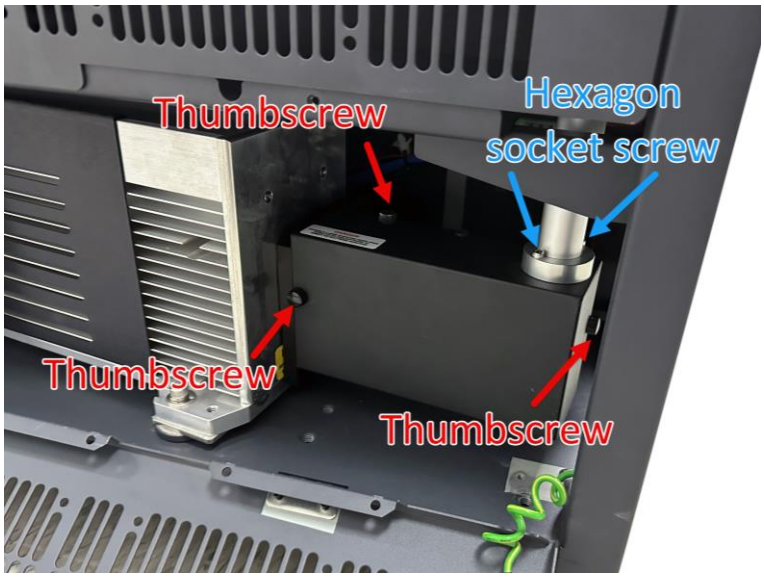
Mirror 1

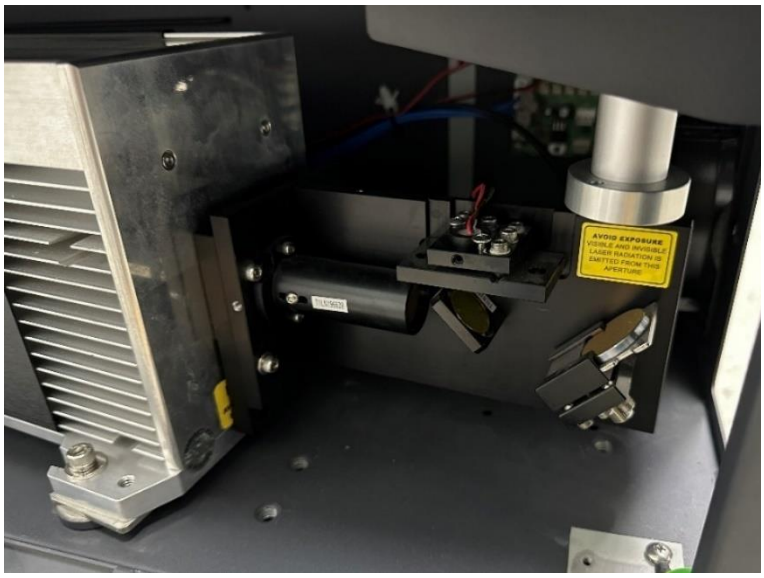
Mirror #1 is located inside the bottom left access door panel of the LaserPro Spirit PRO Series.

1) Use a #2 Phillips screwdriver to open the access panel located on the bottom back and bottom left side of the LaserPro Spirit PRO Series.

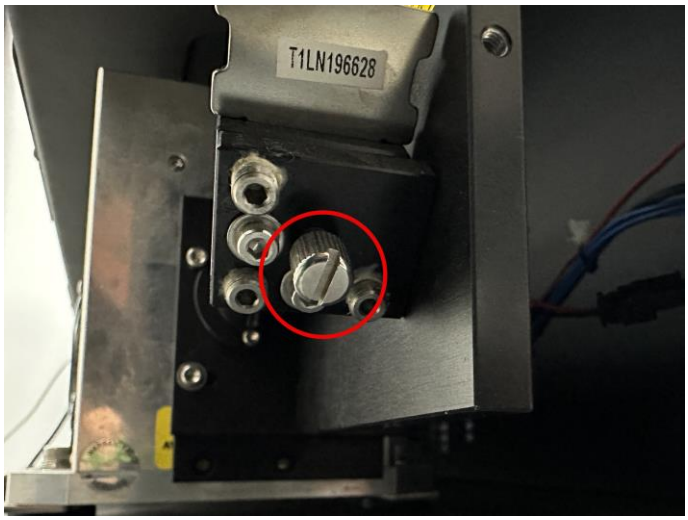


2) Loosen 3 thumbscrews and 2 hexagon socket screws to remove the black dust cover in front of laser tube.





3) Loosen the thumbscrew securing mirror #1.



4) Clean the mirror in the proper manner.

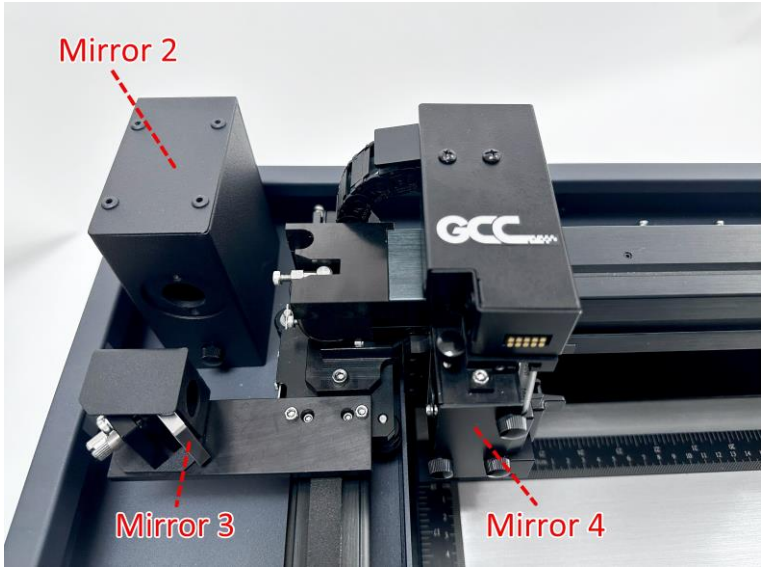
5) Place the mirror back to the optics holder after cleaning.

6) Tighten the thumbscrew.

7) Close and secure all the covers.

Mirror 2, 3, 4

These mirrors are located in the work table area of the LaserPro Spirit PRO Series.



Mirror 2

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

2) Unscrew the thumbscrew holding mirror 2 in place.

3) Clean the lens in the proper manner.

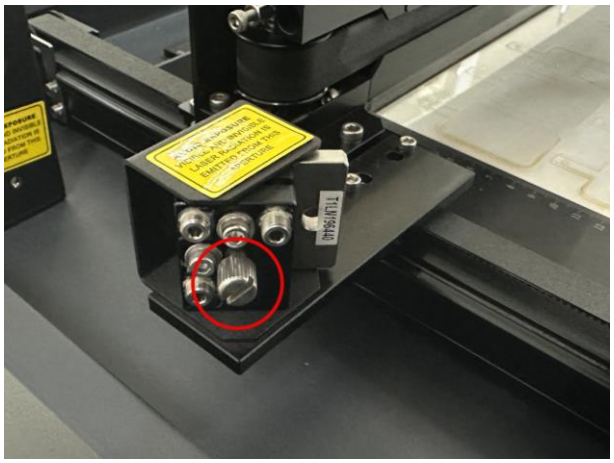
4) Place the mirror back to the optics holder after cleaning.

5) Tighten the thumbscrew.

6) Close and secure the black dust cover.

Mirror 3

1) Unscrew the thumbscrew holding mirror 3 in place.



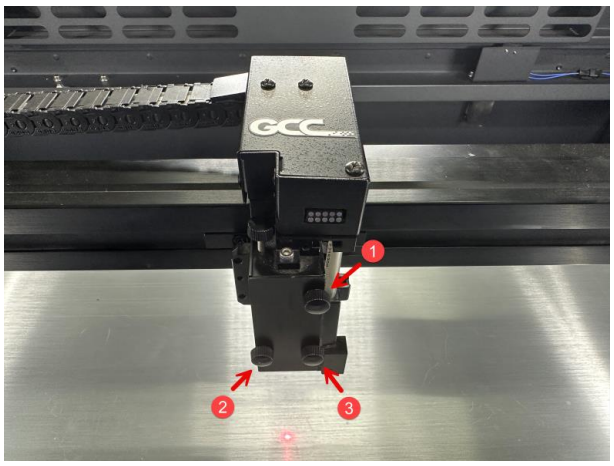
2) Clean the lens in the proper manner.

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

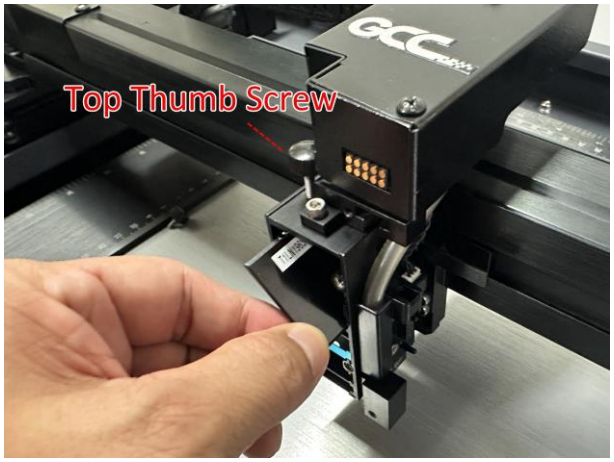
4) Tighten the thumbscrew.

Mirror 4

1) Unscrew the three thumbscrews securing the lens carriage panel and remove the lens 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).



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 lens 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.

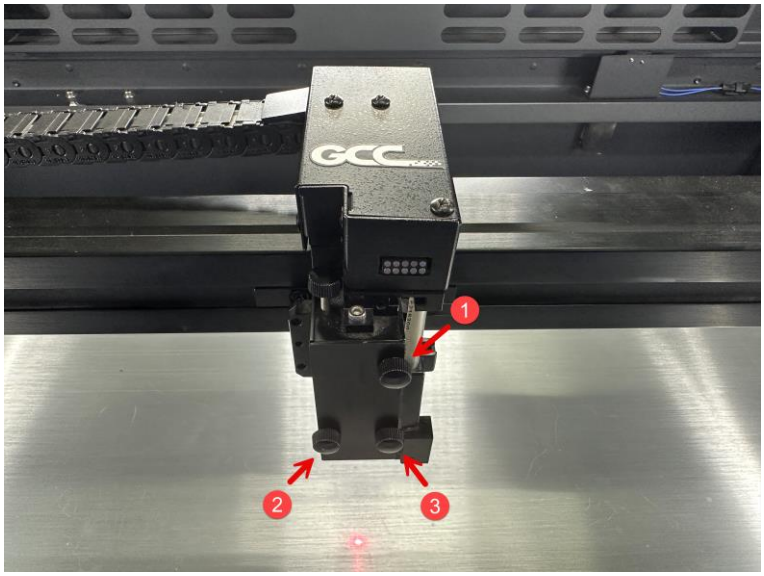
1) Hold the mirror with the reflective side up, without touching the reflective side of the mirror (DO NOT apply any finger pressure or any other cleaning solutions to the mirror surface).
2) Drape a new sheet of lens tissue over the mirror.
3) Apply a few drops of lens cleaner on the tissue covered 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.

CAUTION!

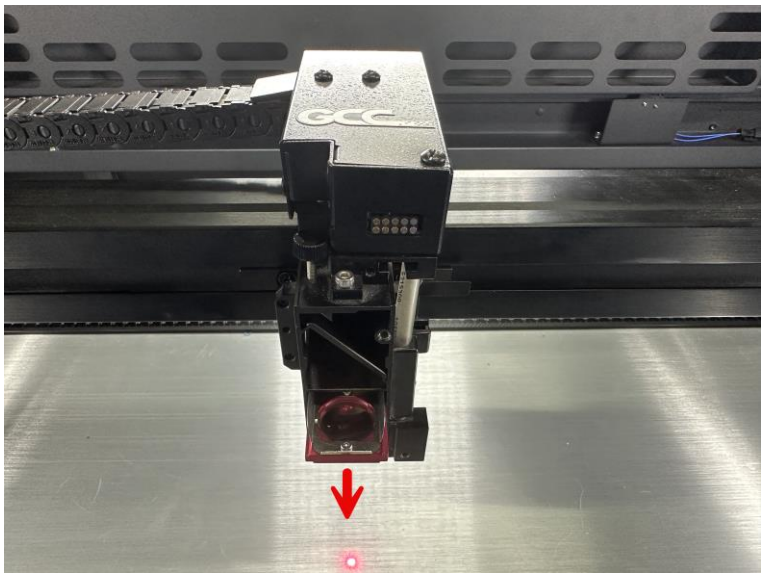
- If the center of the mirror is scratched, contact your GCC LaserPro representatives for replacement.
- DO NOT apply any finger pressure or any other cleaning solutions to the mirror or focal lens surface.
- The optics components are very fragile, handle carefully and follow the cleaning procedure well.

8.3.3 Removing and Cleaning the Focal Lens

1) Unscrew the three thumbscrews securing the lens carriage panel and remove the lens carriage panel to reveal the focal lens.



2) Carefully pull out the focal lens.

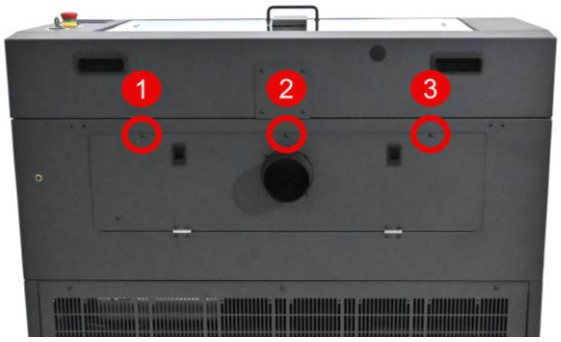


3) Clean the focal lens with a cotton swab and lens cleaner solution. Be sure to clean both sides of the focal lens **(DO NOT apply any finger pressure or other cleaning solutions to the lens surface).**
4) After cleaning, use a cotton swab to gently dry the focal lens and lens cover.
5) Insert the focal lens back to the lens carriage and reattach the cover.

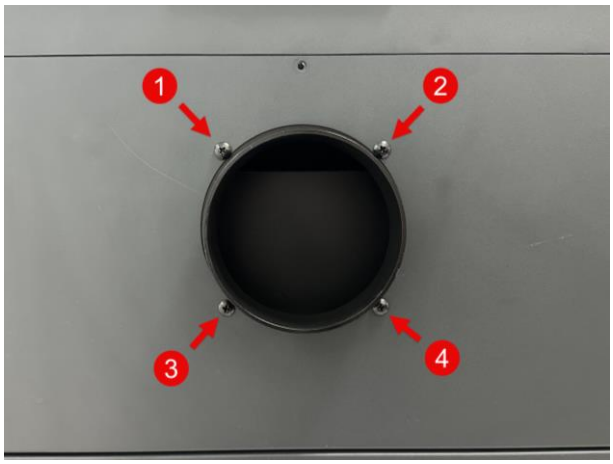
8.4 Cleaning the Exhaust Duct

Efficient exhaust ventilation is crucial to laser cutting quality. We suggest you clean the Exhaust Duct from accumulated dust regularly will help to maintain the ventilation efficiency of your laser engraving system.

1) Remove screws fixing the rear door panel of laser machine.



2) Remove screws securing exhaust duct on rear door panel.



3) Open the rear door and take out the exhaust duct to clean with water.

4) Fix and secure the exhaust duct and rear door panel back to the laser machine.

Chapter 9
Basic Troubleshooting

Quality Problems

- Check focal length setting under F4 function key Machine SettingSet 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 lens carriage which cannot 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.
    5. Check water level or temperature of water cooler if the equipped laser requires water cooling. The laser tube will automatically shut down itself if the laser tube is over-heated.

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.

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.

Chapter 10
Appendix

- Glossary
- LaserPro Spirit PRO Series 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 number 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.
PPI	Pulses Per Inch. PPI determines the gross amount of laser pulses there will be per linear inch. PPI is exclusively used for the vector setting. A PPI setting of 500 results in the laser firing every .002" (500 times per inch). If the standard lens is producing a vector laser focal point of .007", then higher PPI settings will result in deeper, overlapping laser pulses. PPI settings lower than 150 will result in the individual laser pulses being spread far apart, so they will not touch each other. Low PPI settings are a good example of perforate paper.
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 Spirit PRO Series Specification Sheet

Spirit PRO Series Specification Sheet

			Spirit LS PRO	GLS Hybrid PRO
Work Area			640 x 460 mm (25 x 18 in.) Extendable to 740 x 460 mm (29 x 18 in.)	860 x 610 mm (34 x 24 in.) Extendable to 965 x 610 mm (38 x 24 in.)
Max. Part Size (L x W x H)	All doors closed		762 x 482.6 x 165 mm (30 x 19 x 6.5 in.)	990 x 635 x 177 mm (39 x 25 x 7 in.)
	All doors open		762 x ∞ x 165 mm (30 x ∞ x 6.5 in.)	990 x ∞ x 177 mm (39 x ∞ x 7 in.)
Dimensions (W x D x H)			1,125 x 720 x 1,005 mm (44.3 x 28.3 x 39.6 in.)	1,365 x 880 x 1,010 mm (53.7 x 34.6 x 39.7 in.)
Laser Source		CO2	30W to 100W 10.6-µm sealed CO2 Laser	
		Fiber	30W or 50W fiber laser	
		Dual	Not Available	Available
Cooling			Air-cooled, Operating environment temperature 15°- 30°C (59°- 86°F)	
Drive			Closed-loop DC servo control	
Maximum Engraving Speed*		CO2	30W - 40W: 2.54 m/s (100 in/s) / 60W - 100W: 3.04 m/s (120 in/s)	
		Fiber	30W or 50W: 3.04 m/s (120 in/s)	
Speed Control			Adjustable from 0.1~100% (Up to 16 color-linked speed settings per job)	
Power Control			Adjustable from 0~100% (Up to 16 color-linked power settings per job)	
Engraving Capability			256-level gray scale image processing capability	
Z-Axis Movement			Automatic	
Camera	SmartEYES		Standard	
	SmartVISION Elite		Optional	
Focus Lens			Standard 2.0", optional 1.5", 2.5", & 4.0" available	
Resolution (DPI)			Available 125, 250, 300, 380, 500, 600, 760, 1000, 1500	
Interface			10 Base-T Ethernet USB Type-A 2.0 – For USB storage (Max. 32GB capacity, FAT file system) USB Type-B 2.0 – For connecting with the computer	
Compatible Operating Systems			MS Windows	
Display Panel			4" Touch 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 II Laser Product Compliant with CDRH 2006/42/EC Machinery Directive Compliance Class 4 Laser Product Compliant with CDRH with the optional pass-through door module	
Operation Voltage		CO2	30W - 60W: 100-240VAC, 50-60Hz Auto Switching, Max. 15A 80W - 100W: 200-240VAC, 50-60Hz, Max. 20A	
		Fiber	30W or 50W: 100-240VAC, 50-60Hz Auto Switching, Max. 8A	
Fume Extraction System**			External exhaust system with minimum flow rate 640m3/h (CFM 377 ft3/min) is required,2.3kPA negative pressure (Pure-Air PA-1000FS @ 4" exhaust port)	External exhaust system with minimum flow rate 800m3/h (CFM 471 ft3/min) is required,2.3kPA negative pressure (Pure-Air PA-1500FS @ 4" exhaust port)

* Speed is not equal throughput. See dealer or visit http://www.GCCworld.com for more details.

** The flow rate is determined by a default fume extraction system; the flow rate may vary due to a different fume extraction system.

Δ Specifications are subject to change without prior notice.