Piolas 400

User Manual

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Release Note

Version	Release date	Remark
1.0	2024/6/17	First version

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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 material. 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 material.

1.2 Safety Ratings

The LaserPro Piolas 400 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 Piolas 400 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.

The LaserPro Piolas 400 Hybrid dual lasers configuration is equipped with dual CO2 and Fiber laser tubes that emits intense and invisible laser radiation with a wavelength of 10.6 microns for CO2 and 1 micron for fiber laser in the infrared spectrum. The laser system is designed 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 machine is a Class 3R (US: Class IIIR) red dot safety guidance pointer (similar to a laser-pointer presentation pen) allowing the operator to see the exact location where the laser beam will fire.

Even though the LaserPro Piolas 400 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 Touch Screen 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 Product Label and Safety Label

According to CDRH standards, all fixed or removable covers that allow access to a laser beam must have an appropriate laser warning label 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 Piolas 400, 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 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).

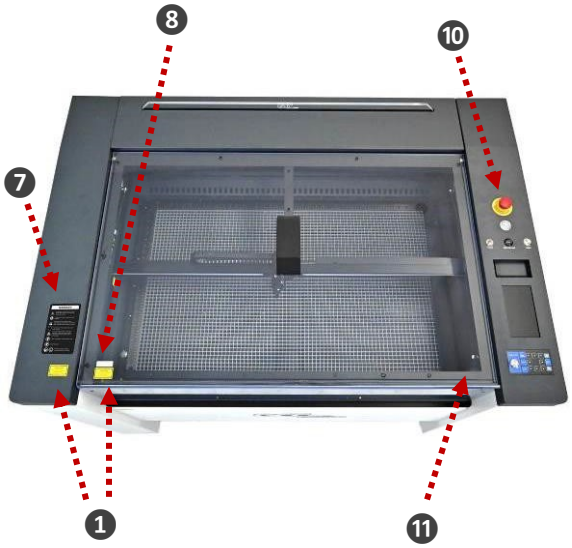
Please refer to the following table to view all available models and related information.

Piolas 400			
Model Number	Wavelength	Power	Input
Piolas 400-80GT	10.57 – 10.63 μm	CO2 80W	200-240VAC, 50-60Hz, Max 13A
Piolas 400-100GT	10.57 – 10.63 μm	CO2 100W	200-240VAC, 50-60Hz, Max 13A
Piolas 400-120GT	10.57 – 10.63 μm	CO2 120W	200-240VAC, 50-60Hz, Max 13A

Safety Label

This label is located at the right 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.

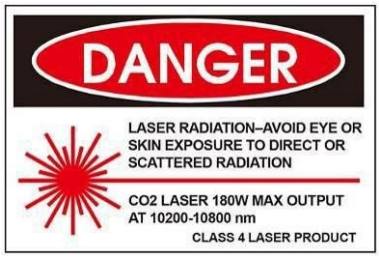
❶ Door Open Warning Label



❷ CDRH Label

This label indicates the class 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)



❸ CE Label

This label indicates the class level of CE.

❹ Pass-through Door Warning Label

❺ Aperture Warning Stickers (mirror)

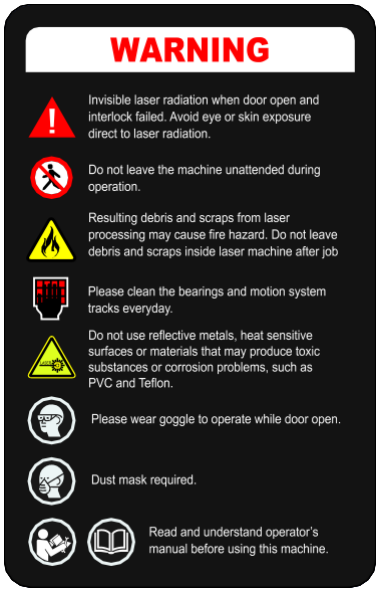
This label indicates the laser path. Normally you can find this label inside of machine or laser exit. Please take extra caution of this area when you conduct maintenance or operate machine.

❻ Noninterlocked Protective Housings Label

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

❼ Warning Label

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



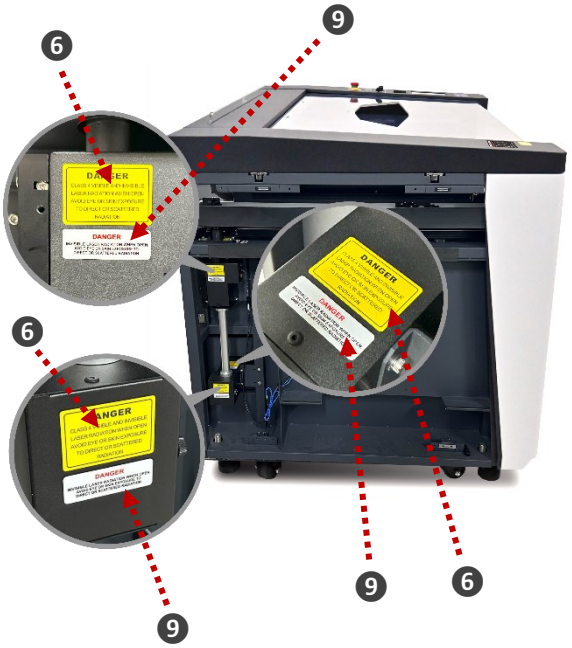
❽ Laser Path Warning Label

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.

CAUTION
AVOID PLACING YOUR EYES
IN THE RED BEAM PATH

❾ Laser Path Danger Label

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



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

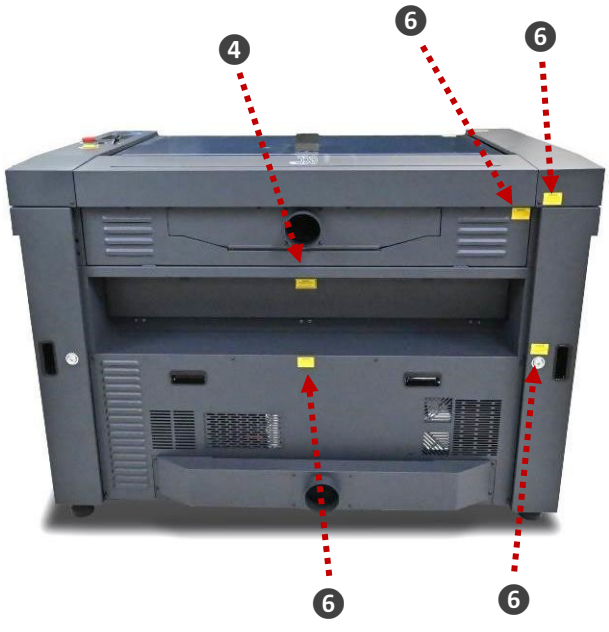
❿ Emergency Stop Label

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

⓫ Protection Window Label

This label indicates the protection wavelength. You can find this label in the lower right comer of window.

OD5+ @ 10600 nm
Protection Window



⓬ Pass-through Door Switch Module Label

Pass-Through Door Switch

WARNING!
Installed this switch, GCC laser system will be converted to Class 4 safety machine.

⓭ Warning Label – Avoid Injury

This label is located on the top lid, to warn & avoid injury when closing the door. When closing the door, please ensure your hands on the top lid until the door is close completely.

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 label 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 material. A well-maintained fire extinguisher and operational smoke or fire detector should be kept in the vicinity of the machine.
- Caution—Use of control 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

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

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.**

- Enable the SmartAIR™ nozzle when engraving or cutting materia that may easily ignite, such as acrylic, wood, or paper.
- Always wear safety goggles when the laser system is in operation. Reflective materia 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 materia 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 (US: Class IV) 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 (US: Class IV) laser beam via direct radiation and indirect stray radiation may cause

damage to both skin and eyes. Exposure to the Class 4 (US: Class IV) laser beam may cause ignition of combustible material 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 material by the laser beam. A Class 4 (US: Class IV) 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 (US: Class IV) 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 a o 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 Piolas 400. Improper work environments may lead to operational malfunction and/or unsafe working conditions. The LaserPro Piolas 400 should be placed and operated in a standard office-type environment.

- Avoid environments where the machine is exposed to high level 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 level of noise and electrical noise.
- Select a location that is large enough to accommodate the LaserPro Piolas 400, 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 Piolas 400 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.

- Piolas 400 100W Sound Test Result: 70.2 dB.

Chapter 2
Unpacking and Content

- Unloading and Unpacking
- Contents and Accessories Checklist

2.1 Unloading and Unpacking

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

WARNING!

More than one person may be needed when loading and unloading the shipping crate to avoid body injury or damage to the machine.

NOTE

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

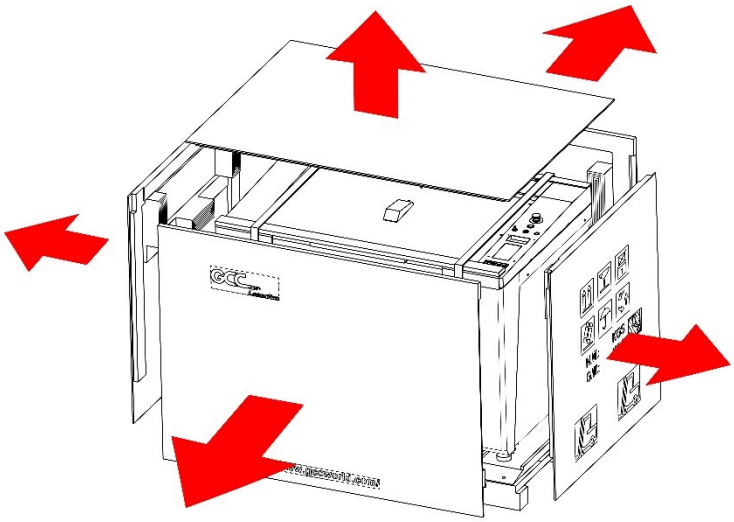
Installation location

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.

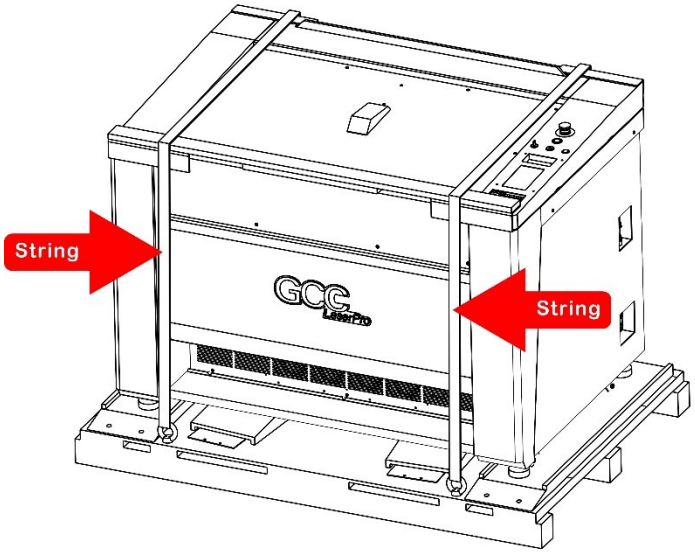
Unpacking and Unloading

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

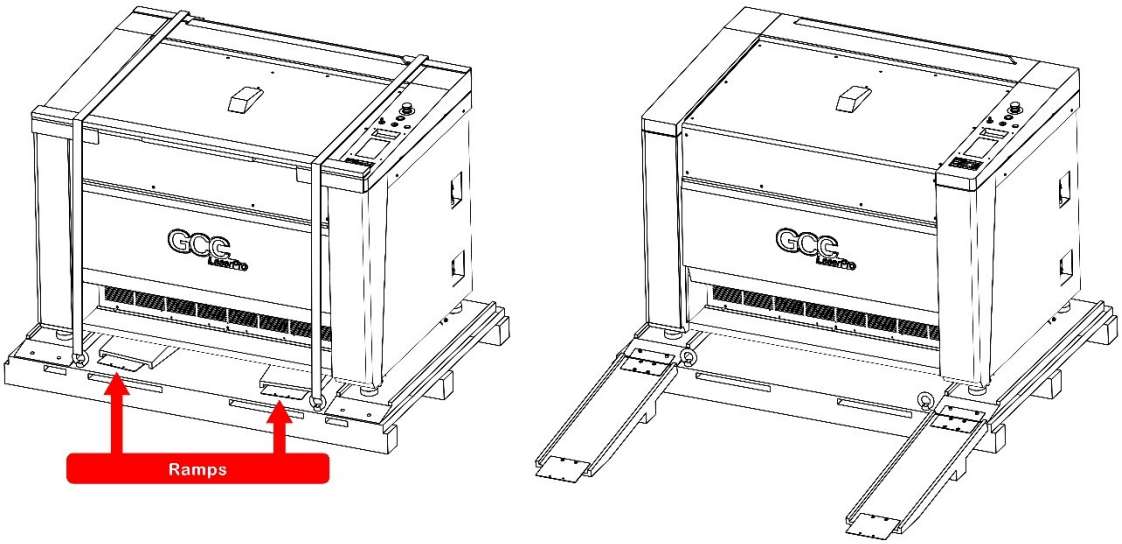
Step 1. Remove the wooden package including top board.



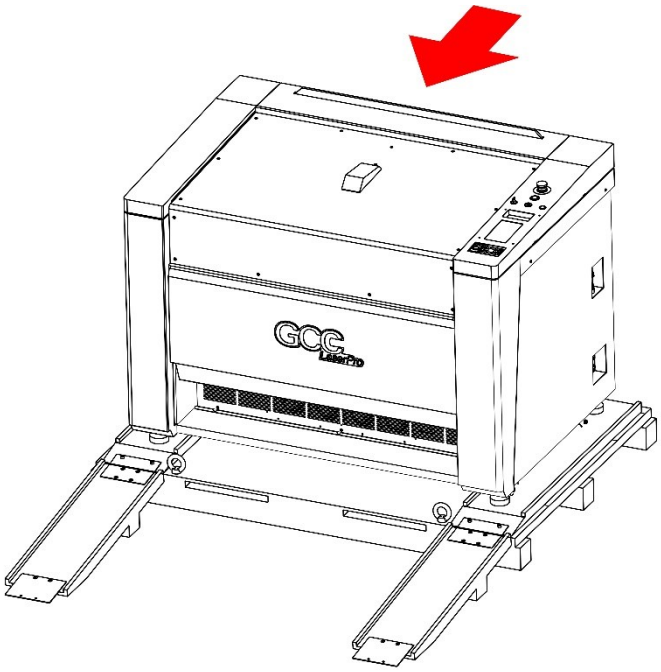
Step 2. Remove the two strings.



Step 3. Place the ramps as shown below and the machine can now be pushed off the wooden base board via the ramps. (The ramps are found in a box within the crate)



Step 4. The machine can now be pushed off the base board.



Step 5. Unpacking process is completed.

2.2 Contents and Accessories Checklist

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

GCC LaserPro

Accessory Check List

Model: ☐ Piolas 400

Wattage : CO_2: ☐ 80W ☐ 100W ☐ 120W

Power Cord

Item	Quantity	Item	Quantity
☐ Main Power Cord	1 Piece		

Data Transmission Cable

☐ USB Cable	1 Piece		

Cleaning Tools

☐ Mirror Cleaner	1 Bottle	☐ Cotton Swab	1 Pack
☐ Cleaning Tissue	1 Pack		

Others

☐ 4" Hose Connector Set	1 Set	☐ Thin Wrench	1 Piece
☐ CO2 Goggles	1 Piece	☐ SmartPIN Auto Focus	1 Piece
☐ Laser Firing Control Key	2 Piece	☐ Manual Focusing Tool	1 Piece
☐ V30 RJ-45 Laser Signal Cable 2100 mm	1 Piece	☐ Magnet	3 Piece
☐ Label of Customer Service	1 Piece	☐ Oil Grease	1 Set
☐ 5" Hose Connector Set	1 Pack	☐ Gradienter	1 Piece
☐ SmartEYES Calibration board	1 Pack	☐ Hex Wrench	1 Piece
☐ Star Hex Wrench	1 Piece	☐ 4 mm Air Nozzle	1 Piece

Optional Items

☐ Air Compressor 220V	1 Piece	☐ CCD Module	1 Set
☐ Air Compressor 110V	1 Piece	☐ External Signal Indicator	1 Piece
☐ Rotary Attachment	1 Piece	☐ Down Vacuum Engraving Table	1 Piece
☐ SmartGUARD Fire Alarm	1 Piece		

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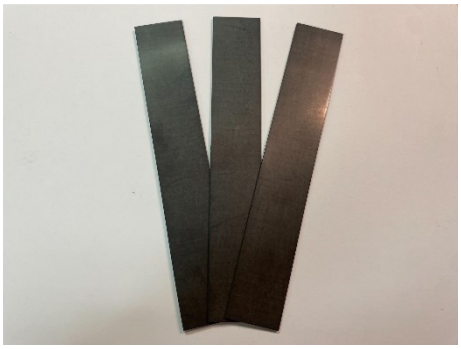
US & Canada Only Toll Free 1-888-284-5211

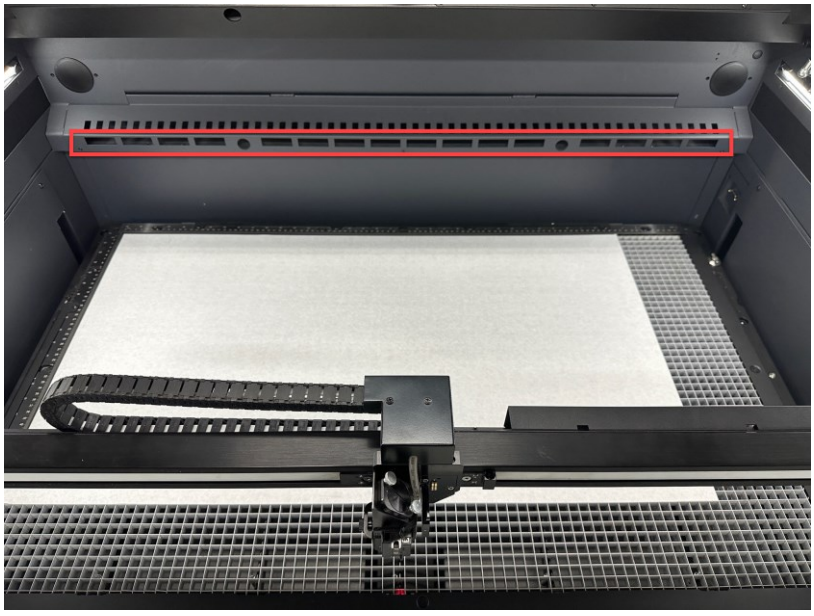
Next, we will introduce the usage of some tools from the accessory box. We hope these tools will bring you convenience when using GCC laser machines.

2.2.1 Magnetic Air Suction Adjuster

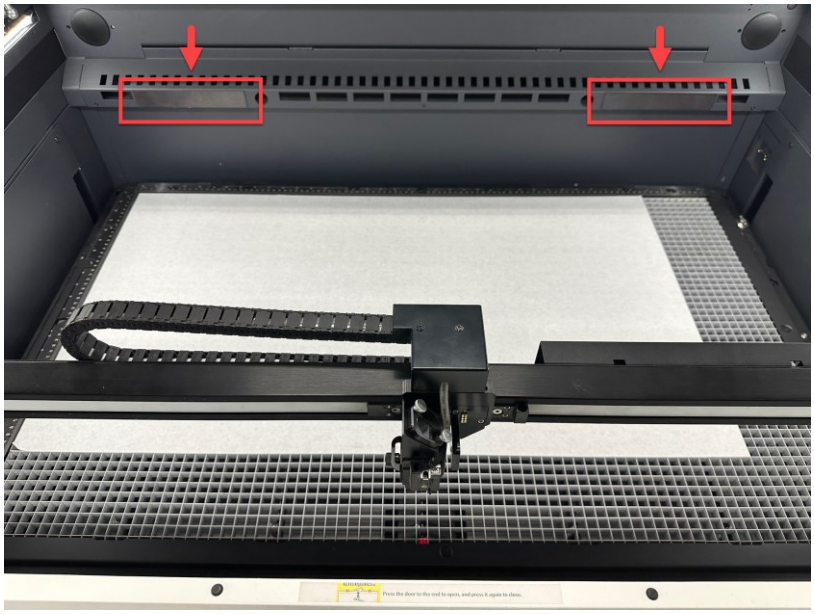
These three magnetic air suction adjusters can help you manually adjust the suction volume and direction.

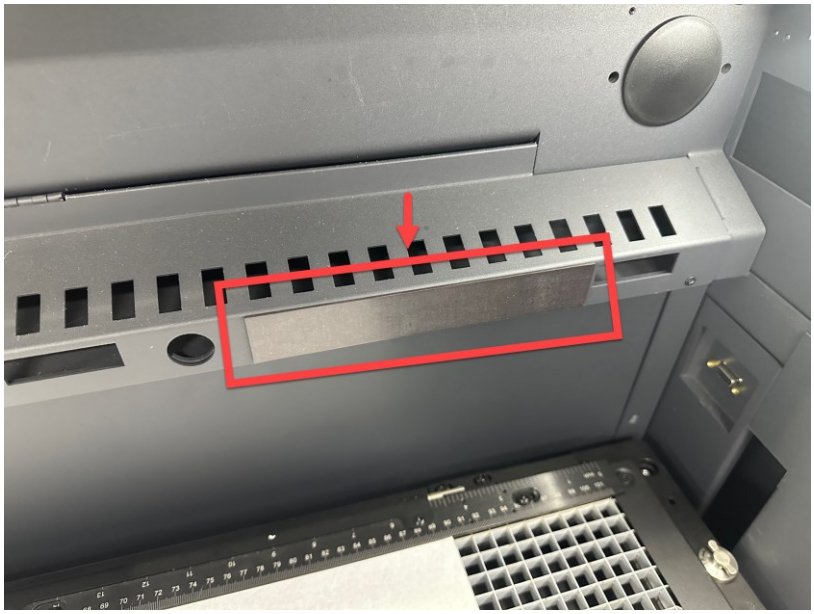


Step 1. Here are the exhaust holes, located at the top of the working area.



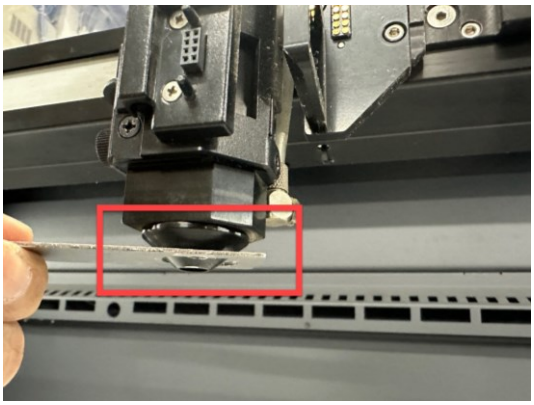
Step 2. Using the magnet to block the holes to adjust the vacuum direction and volume.



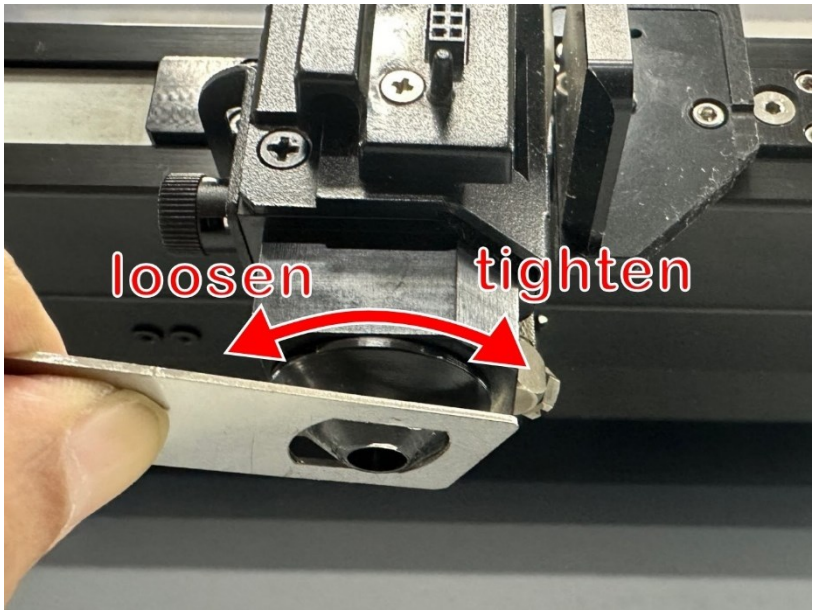


2.2.2 Thin wrench

The thin wrench is to help you remove the standard nozzle from the carriage with ease. You can find it from the accessory box.



From the following picture, you can use the thin wrench to remove nozzle from carriage easier.

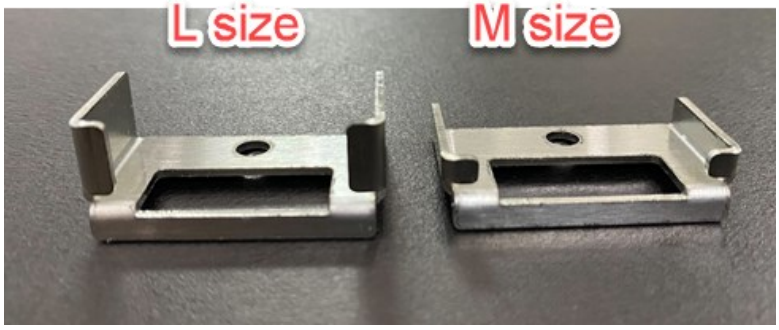


NOTE

The tip is to ensure the thin wrench fits securely within the groove of the nozzle.

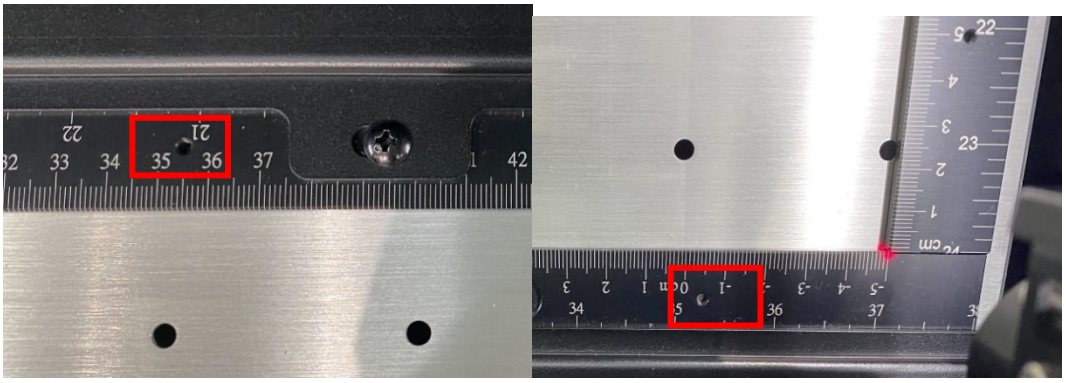
2.2.3 Limit-baffle Set

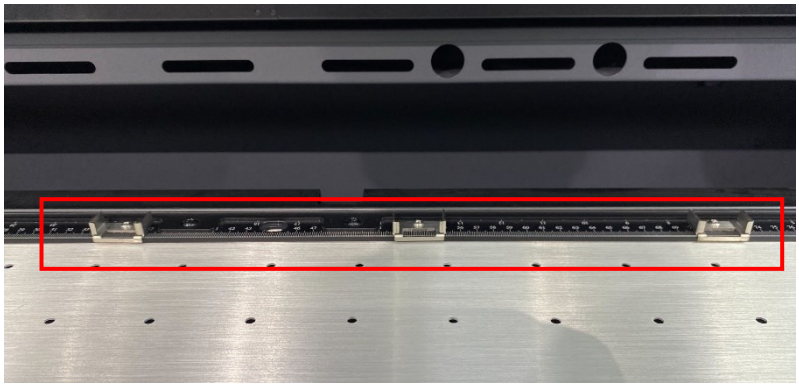
The limit-baffle set can help you achieve alignment by extending the ruler's height when using the raising tool to lift the engraving/cutting materials. We have L-size and M-size included within the accessory box that can extend the height of the ruler by 10mm/5mm.



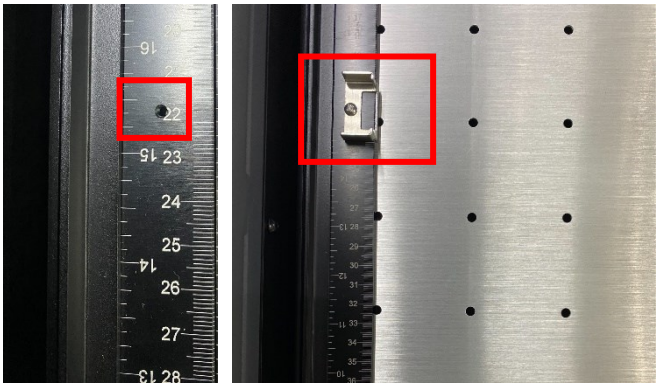
There are six holes on the X-axis and four holes on the Y-axis to fix the limit-baffles. You can fix the limit-baffle set according to your needs using the screws that come with the limit-baffle sets.

X axis



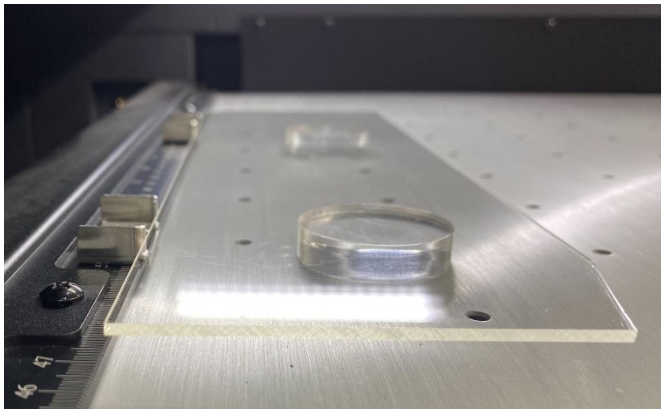


Y axis

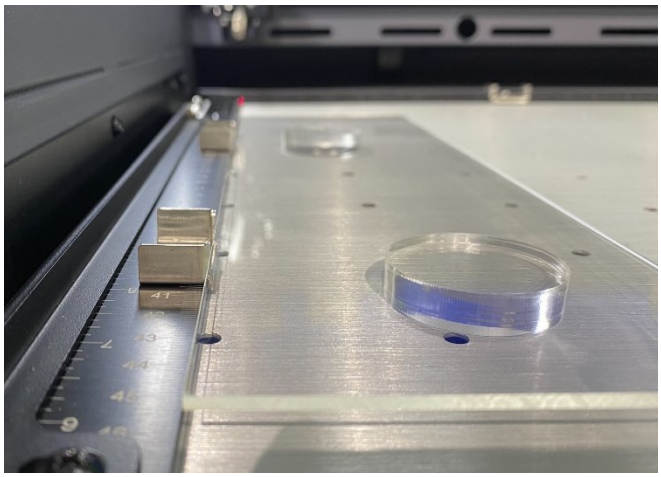


From the following pictures, you can clearly see that the materials can still be aligned with the ruler even when lifted by the raising tool.

X axis



Y axis



2.2.4 Spirit Level

A spirit level can help you adjust the horizontal of the entire machine once you finish installing it.

Step 1. Please move the gantry to the middle of the working area, then place the spirit level in the middle of the gantry.

Step 2. If the spirit level displays an imbalance, please adjust the level of the machine until the spirit level displays horizontal.

Step 3. Level adjustment is completed.

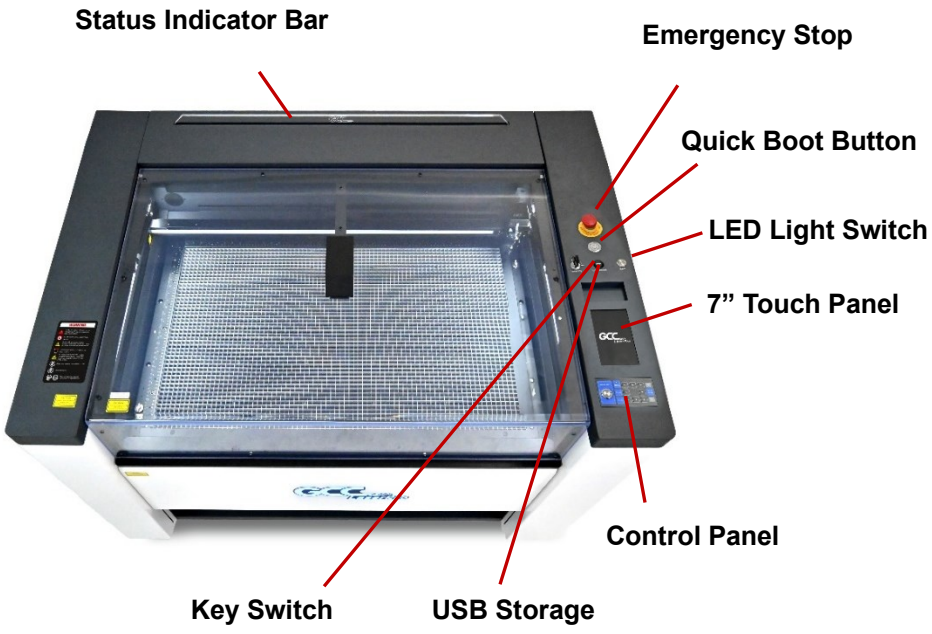
Chapter 3
Mechanical Overview

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

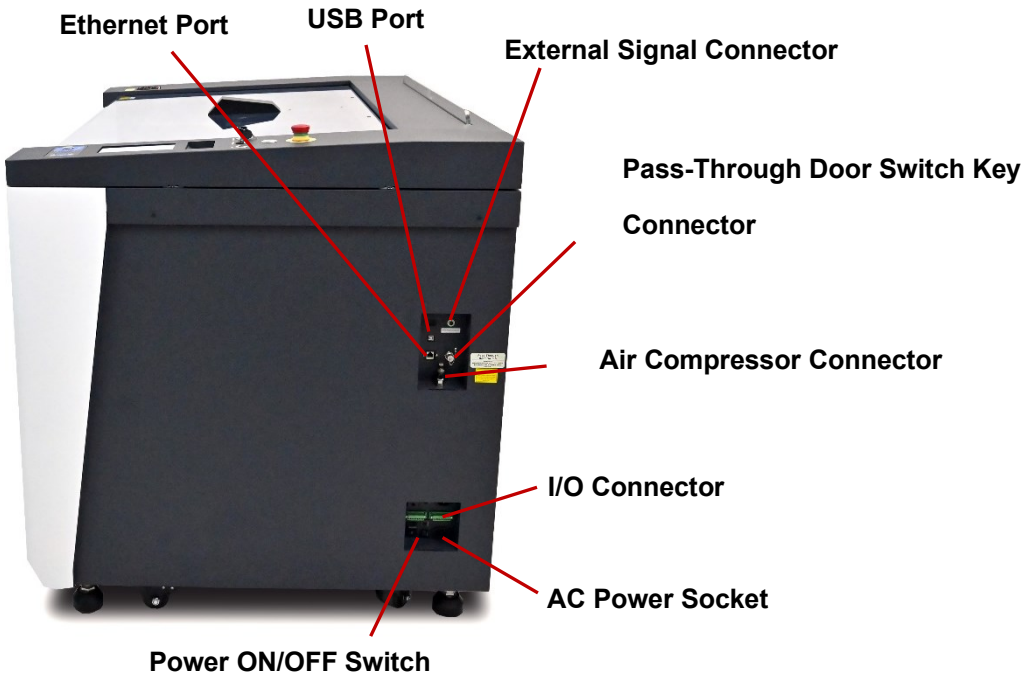
Please take some time to familiarize yourself with this section regarding the mechanical overview of the LaserPro Piolas 400. References will be made back to the different parts of the LaserPro Piolas 400 in later sections.

3.1 Front View

3.2 Top View

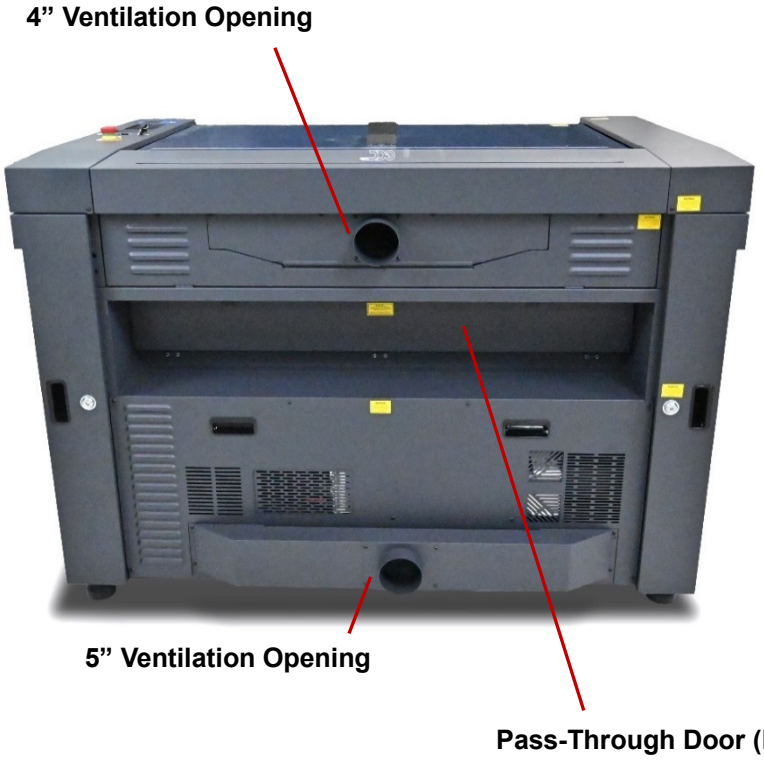


3.3 Right View



3.4 Left View

3.5 Rear View


4” Ventilation Opening
5” Ventilation Opening
Pass-Through Door (Rear)

Chapter 4
Setup and Installation

- Machine Setup

4.1 Machine Setup

4.1.1 Powering Up the Machine

CAUTION!

Make sure both the LaserPro Piolas 400 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 Piolas 400 has been designed to automatically switch from 100-240 VAC
- Make sure to supply 220 VAC of electricity to the LaserPro Piolas 400 with laser 80 Watt and above.

4.1.2 Connecting the Computer

The LaserPro Piolas 400 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 Piolas 400 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 Piolas 400, 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 Piolas 400.

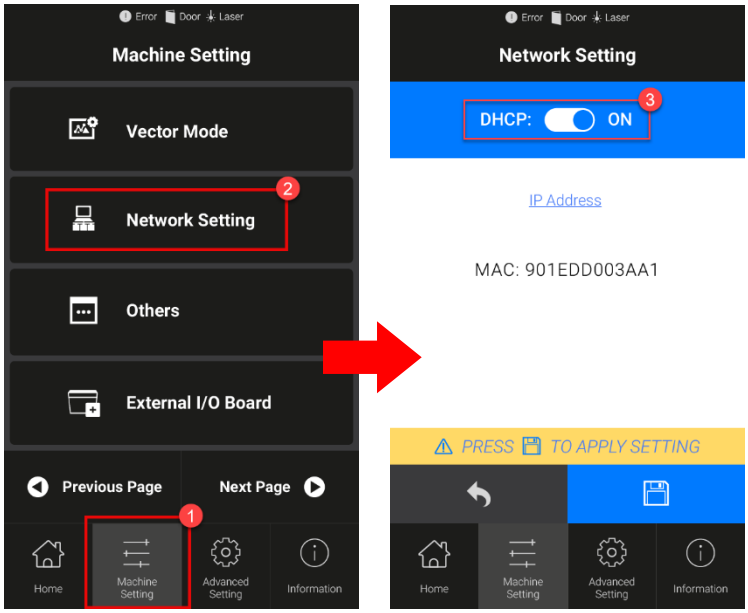
4.1.2.1 Networking Connectivity Setup

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.

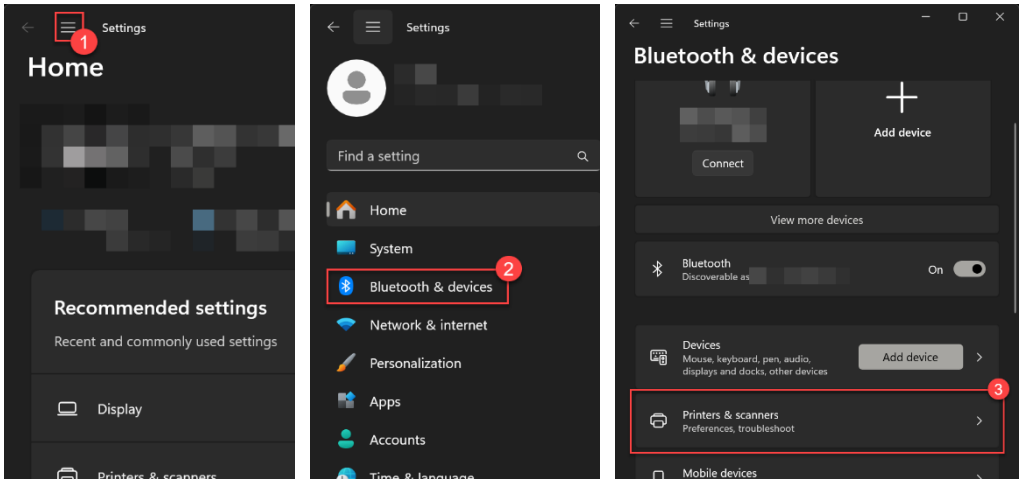
DHCP ON instruction:

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

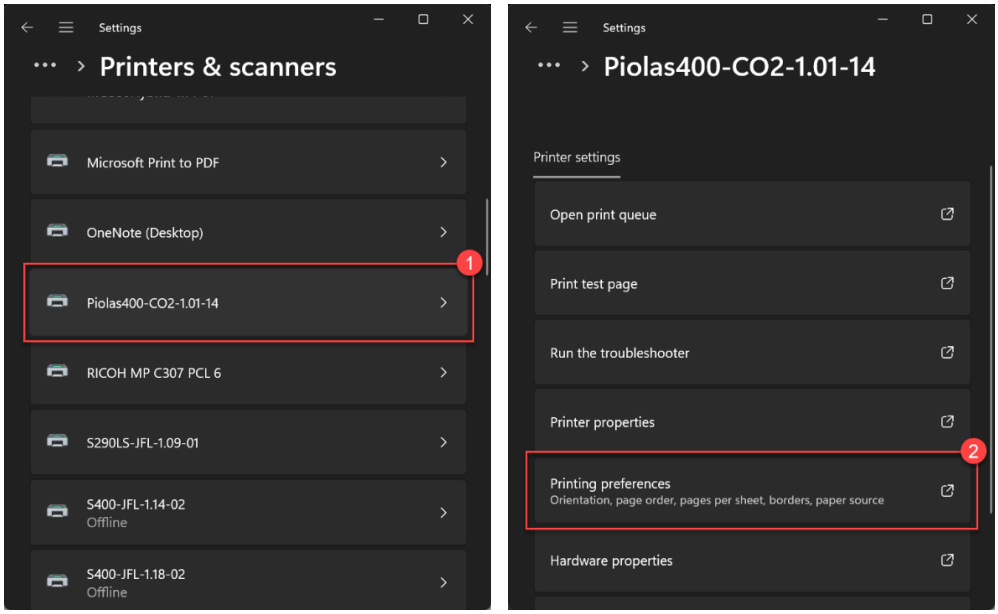
Step 2. Navigate the Touch Screen through <Machine Setting> → <Network Setting>, and turn on the “DHCP”, then click the Save button to save the setting. The machine will reboot automatically.



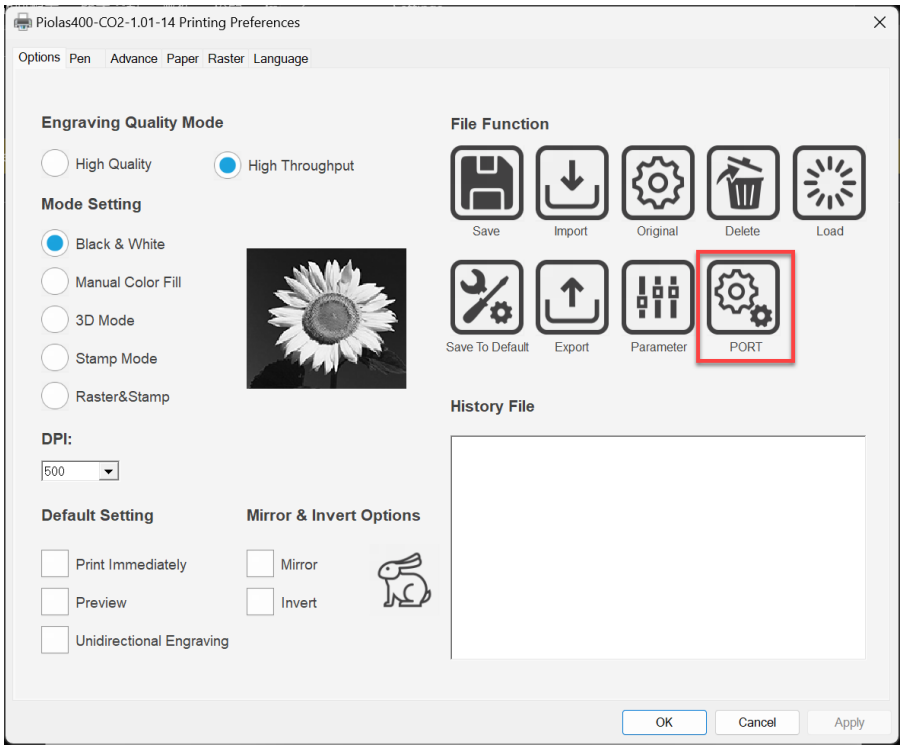
Step 3. Press Windows + I to open the settings app. Click “Navigation” icon to open the menu, then click “Bluetooth & devices” > “Printers and scanners”.



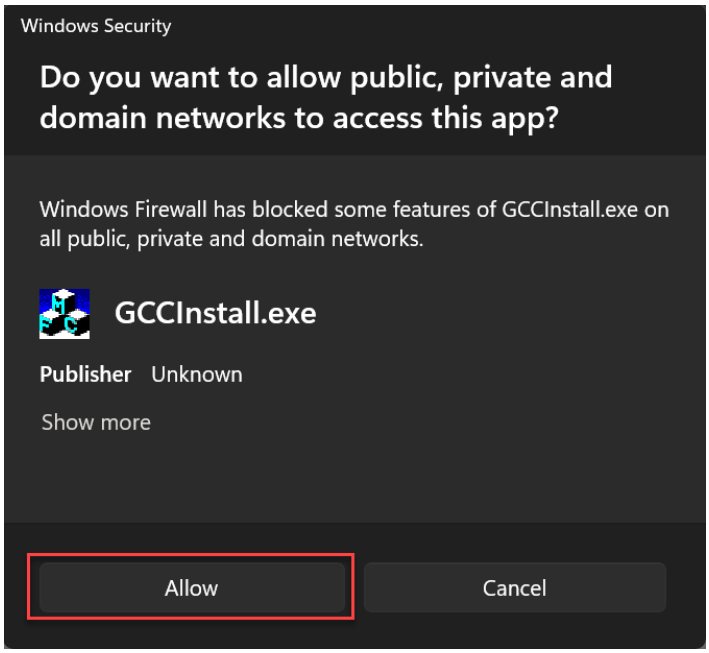
Step 4. Select Piolas 400, then select “Printing preference”. The printer driver window will appear at the top.



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

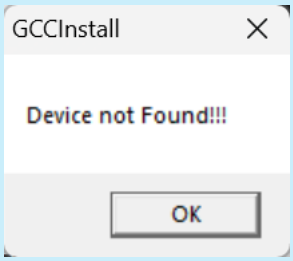


Step 6. Select “LAN” and click “OK” button. The operating system will display a Windows Security window. Please click the “Allow” button to continue.

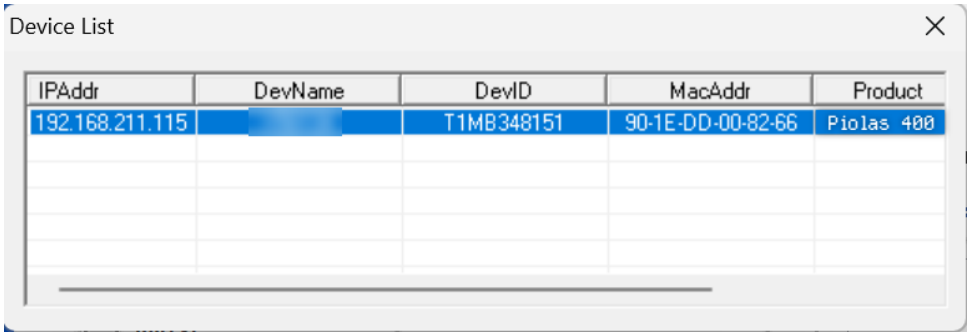


NOTE

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 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	

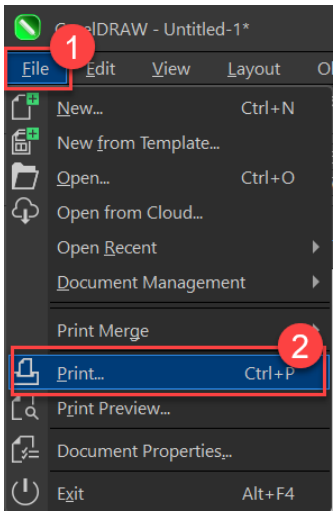
NOTE

- 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.

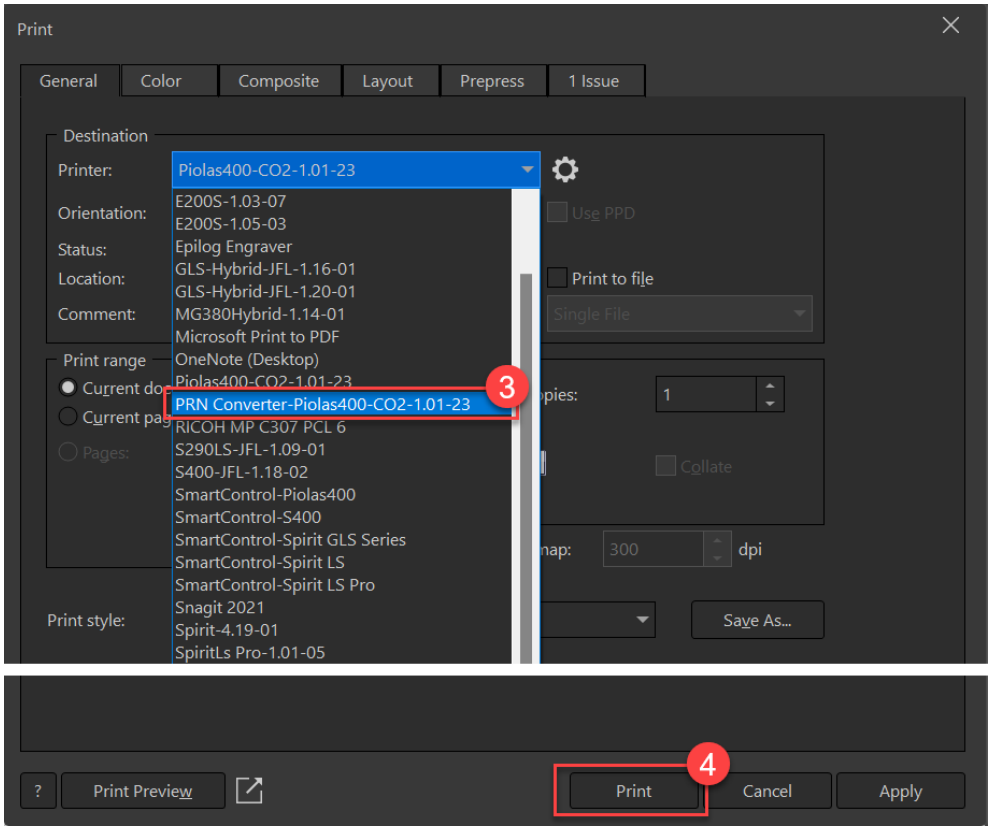
Please refer to the following instruction to convert the file to PRN format.

Step 1. Make sure the page setup and orientation are match GCC LaserPro Piolas 400. 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.

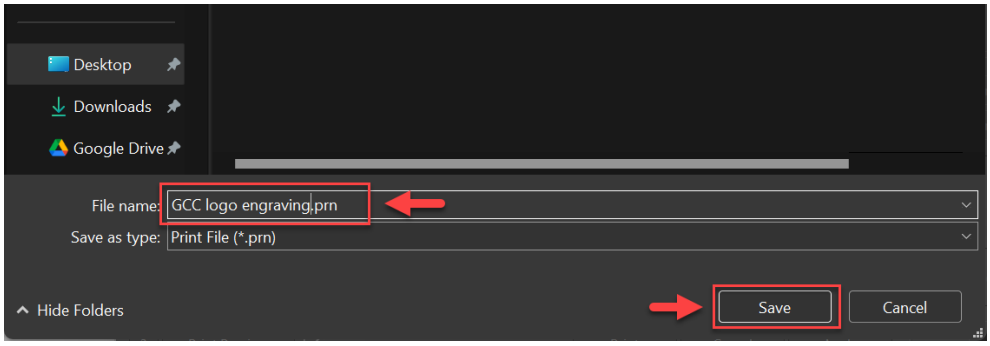


Step 3. Choose PRN Converter Piolas 400 printer driver form the drop-down menu of the printr in the print window. Then click the print button to continue.



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	! @ # $ % ^ & * ( ) _ + . { } | ” : ? > <

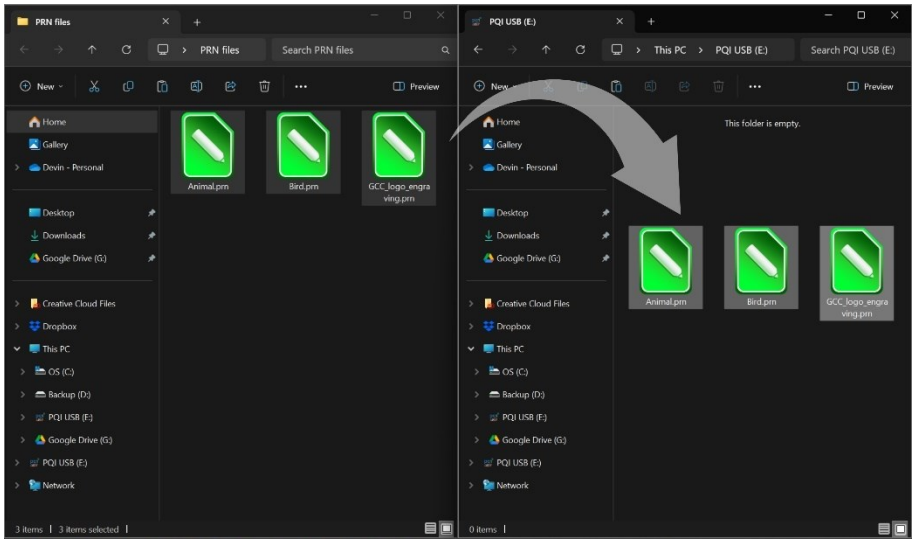
- Only 8 characters of the file name can be displayed on the touch screen; longer file names will be automatically truncated.

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

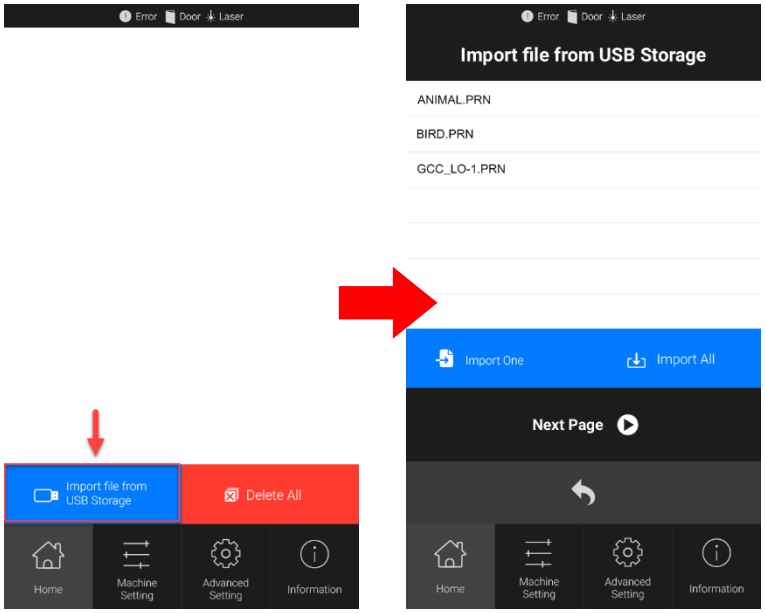


Step 7. Insert USB flash drive to the USB Storage port of GCC laser engravers.

NOTE

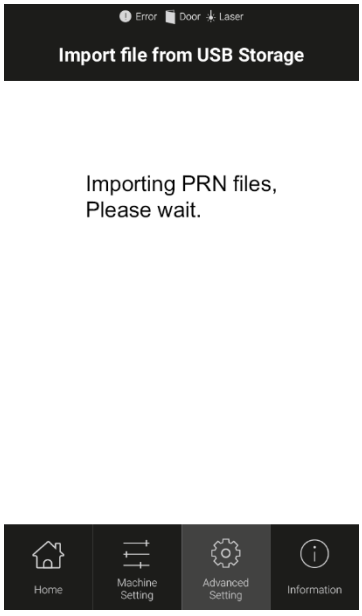
USB storage function only supported for the PRN format.

Step 8. Click the "Import file from USB Storage" button on the Home page of the touch panel. The machine will read the USB and display the file list.

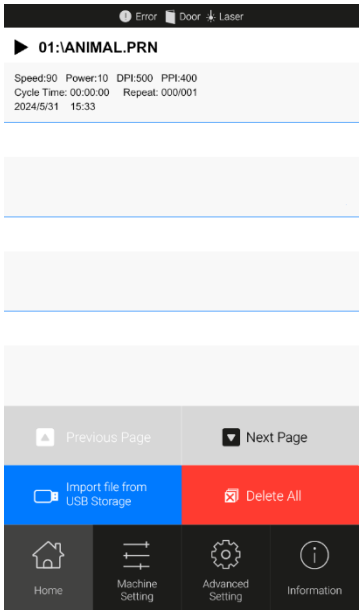


Step 9. Choose a file and press the "Import One" button on the touch panel to transmit the file to the laser engraver. Alternatively, you can press the "Import All" button to transmit all PRN files from the existing folder.

Step 10. The machine will show a message during files transmit.



Step 11. After transmission, the file will be shown on the touch panel.



Step 12. Press START button on control panel to begin laser jobs.

Chapter 5
Setup and Installation

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

Once you have installed the LaserPro USB Driver (for use with USB connection), LaserPro Printer Driver, and have connected the LaserPro Piolas 400 to your computer, you will need to familiarize yourself with the LaserPro Piolas 400 Touch Screen and LaserPro Print Driver. The print driver will be where specific laser parameters for your jobs are configured, while the Touch Screen will allow you to set repeat times, manipulate file order, perform auto / manual focusing, and more.

5.1 Using the Hardware

5.1.1 Emergency Stop

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

5.1.2 Quick Boot Button

The button makes the user to turn ON/OFF machine with ease.

5.1.3 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.

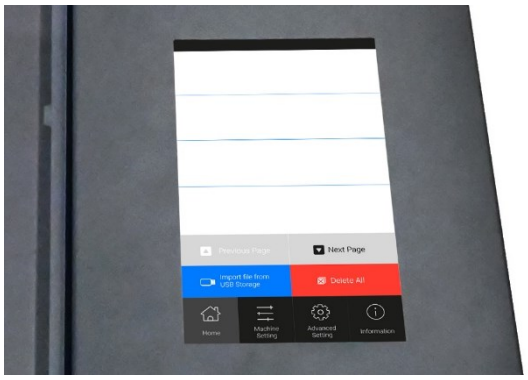
5.1.4 USB Storage

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.

5.1.5 LED Light Switch

Quickly turn ON/OFF the LED light.

5.1.6 Touch Panel



The 7” touch panel enables the user to manage files, adjust machine settings, and more.

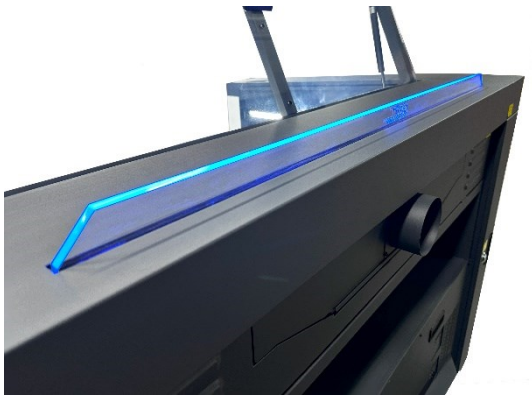
5.1.7 Control Panel

The new control panel provides physical button which allows the user to control the machine with a good tactile feedback and operational accuracy.

The control panel can operate the machine as following functions:

- ✓ START/STOP button – Start or stop the job process.
- ✓ PAUSE/RESUME button – Pause or resume the job process.
- ✓ Recall – Make the lens carriage go back to home or specific position with ease.
- ✓ Standby – Quickly enter the standby mode.
- ✓ Arrow keys – Move the lens carriage easily.
- ✓ Z-axis UP and DOWN – Adjust the Z-axis up and down.
- ✓ Auto Focus – One button to set the correct focus distance.

5.1.8 Status Indicator Light



The status indicator light helps the user to identify the status of the machine.

Please refer to the following chart to know all the status:

Light Color	Status	Light Behavior
	Initializing	The white light is fading in and out
	Laser processing	The green light stays on
	Idle	The blue light stays on
	Door Open	The orange light stays on
	Error	The red light flickers

5.1.9 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.

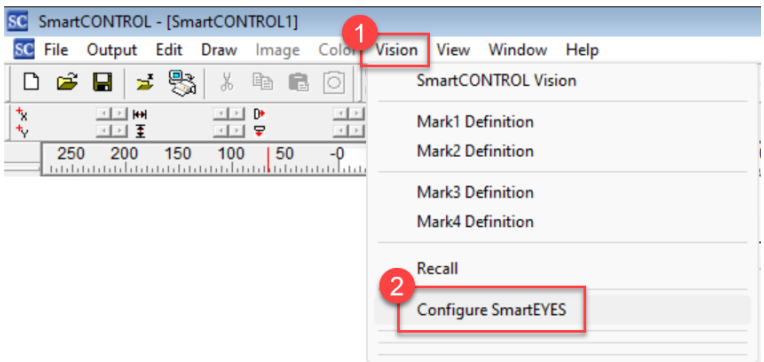
NOTE

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

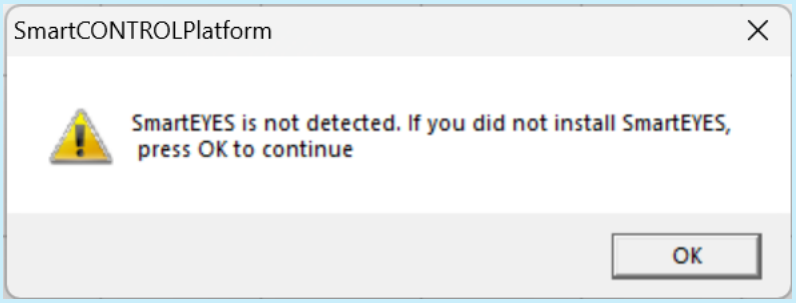
1) Connect the computer/laptop to the machine.

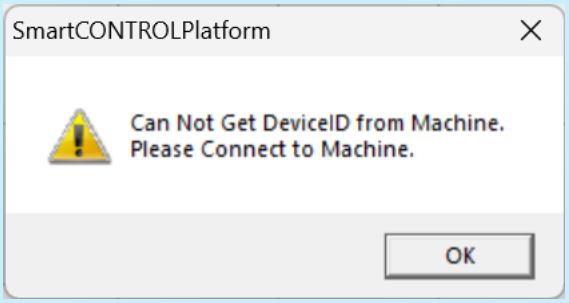
2) Open SmartCONTROL program, and go to <Vision> → <Configure SmartEYES>, then the SmartEYES setting window will appear.



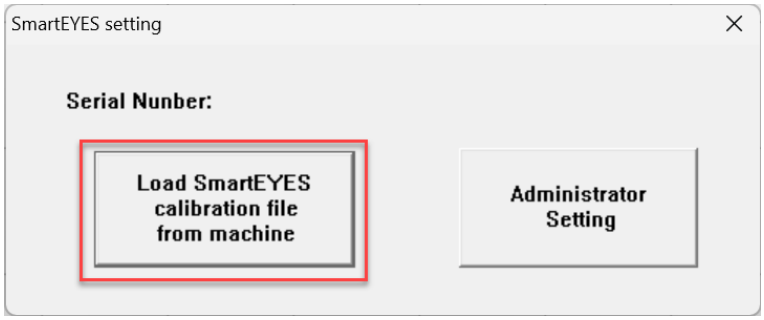
NOTE

If you found following messages, please verify the connection.

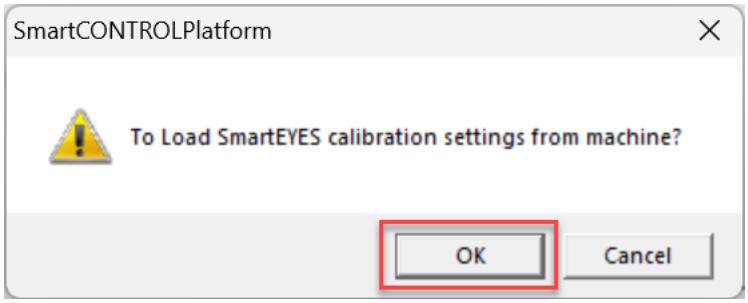




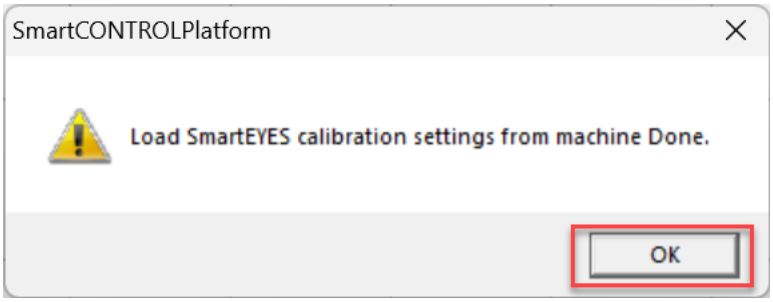
3) Click “Load SmartEYES calibration file from machine” to import the calibration file into your computer/laptop.



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

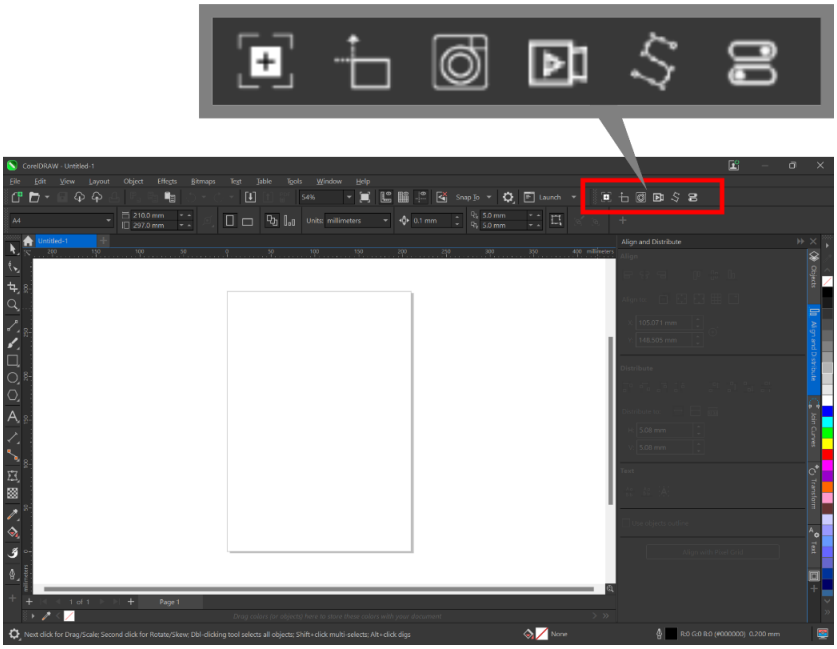


5) After loading the calibration file, SmartCONTROL will display a load calibration complete message. Click OK to close the window and now you can close SmartCONTROL.

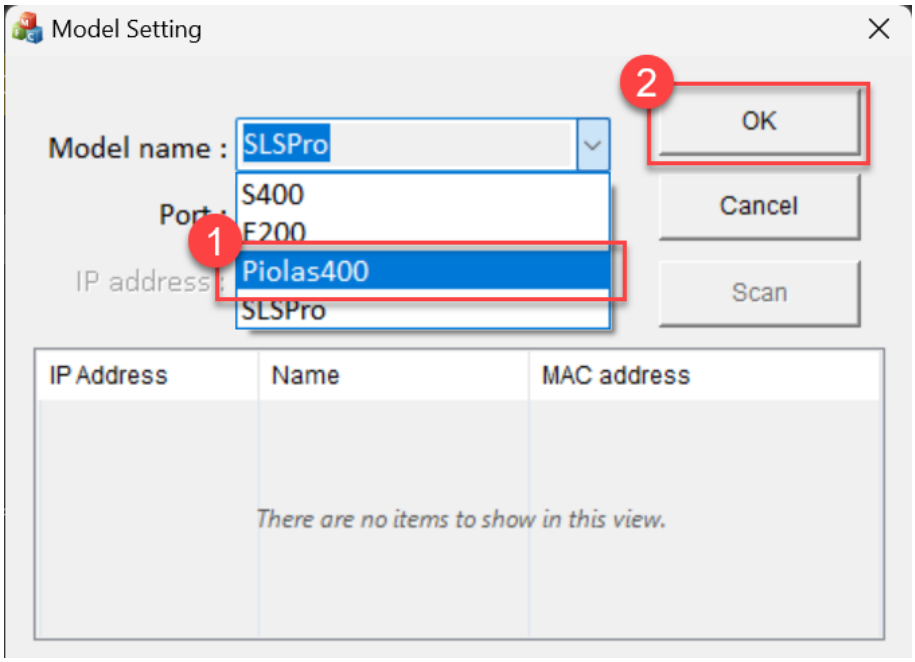


CorelDRAW Setting

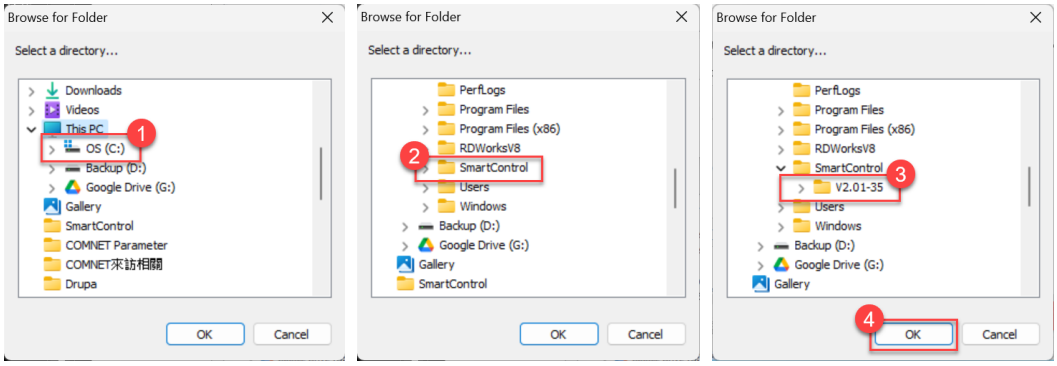
1) Run CorelDRAW and find the GCC plug-in from toolbars. It's located in the up-right corner of CorelDRAW.



2) Click  (Camera Model) button, and the Model Setting window will appear. Select "Piolas 400" from the drop-down menu of model names and click "OK" to complete the setting.

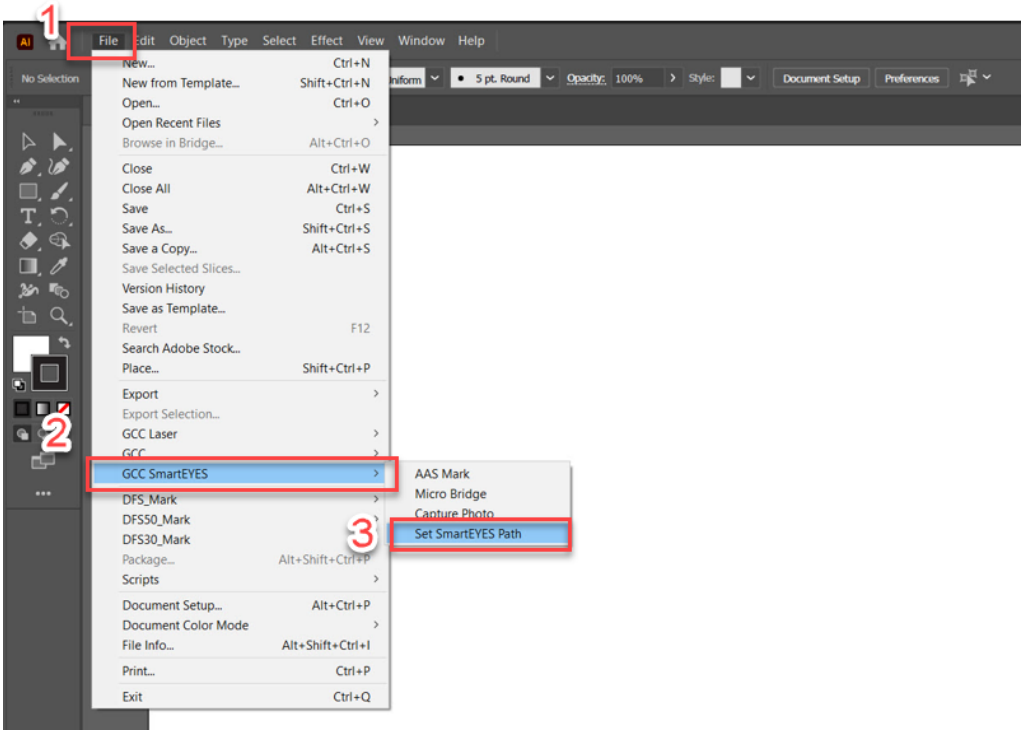


3) Click  (Set SmartEYES Path) button and assign the calibration file located at C:\SmartCONTROL\V2.01-35 (the path may vary depending on the installed version). Then click "OK" to finish the setting.

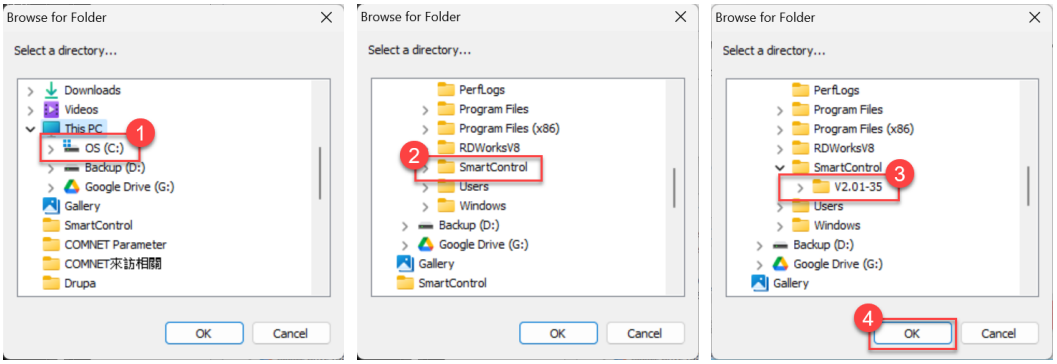


Adobe Setting

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



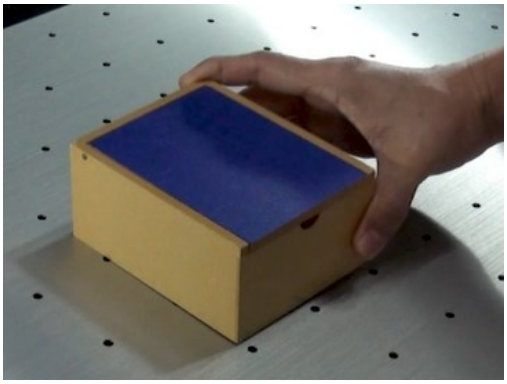
2) Assign the calibration file located at C:\SmartCONTROL\V2.01-35 (the path may vary depending on the installed version). Then click "OK" to finish the setting.



Operation (Using CorelDRAW as an Example)

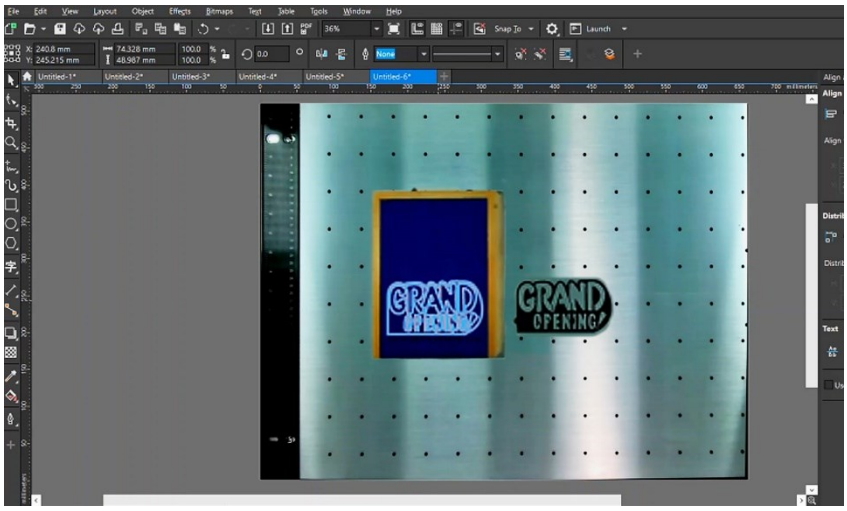
1) Open the top lid of the Piolas 400.

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.

5.1.10 Live-View Camera

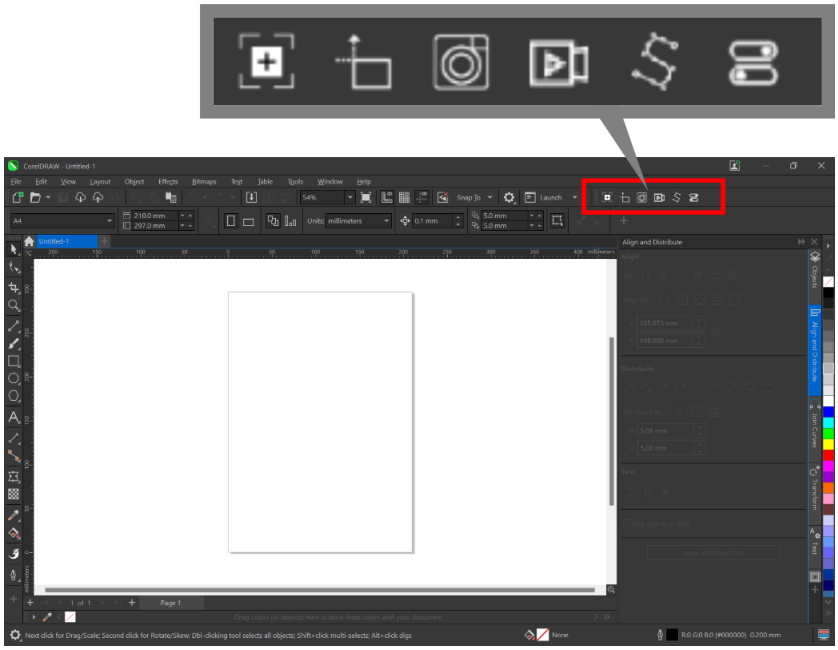
The Live-View Camera enables you to monitor the machine status during laser processing. It also helps teachers easily instruct students on how to use the laser in the classroom.

Operation (Using CorelDRAW as an example):

1) Please refer to chapter 5.1.9 to complete the setting for **Import the calibration file of SmartEYES into your computer/laptop** and **CorelDRAW/Adobe Illustrator Setting.**

2) Close the top lid when you have finished all the setup.

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 in your system.

5.1.11 SmartAIR Fine Nozzle

The Piolas 400 equipped with two SmartAIR nozzle. The standard nozzle has been installed on the lens carriage and you can find the Fine nozzle in the accessory box.

The main difference between Standard nozzle and Fine nozzle is below chart:

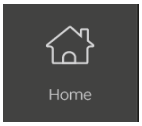
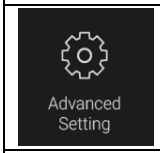
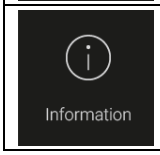
Nozzle Type	Application
Standard	General application
Fine	The air will be more focused, especially for processing materials such as paper and fabric.

Please refer to Chapter 2.2.2 to check how to change the SmartAIR nozzle.

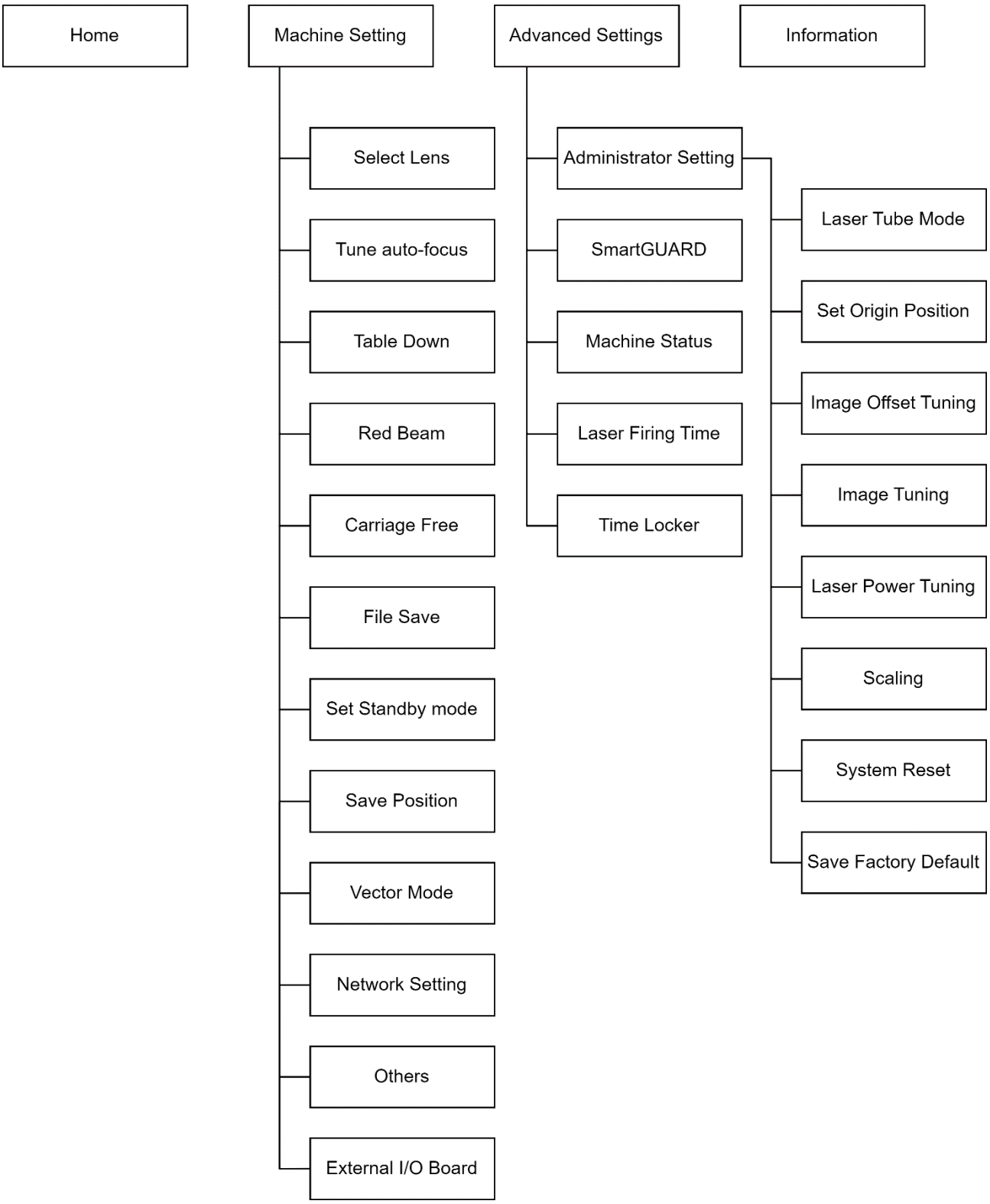
5.2 Using the Touch Panel

The touch panel on the LaserPro Piolas 400 provides easy access to all the manual controls needed for cutting and engraving. The 7-inch touch panel makes setting up the machine simple.

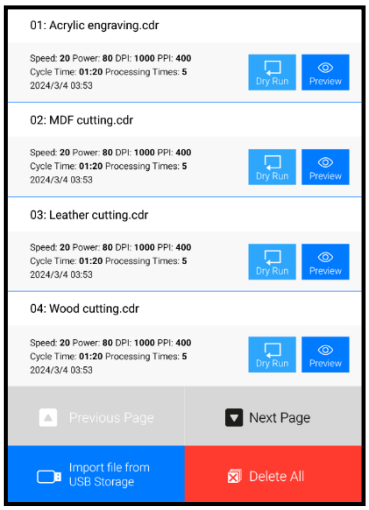
The bottom of the touch panel always includes four buttons: Home, Machine Settings, Advanced Settings, and Information. Please refer to the following chart for more details.

	Home – Manage files, load file from the USB flash, etc.
	Machine Settings – Set various machine functions.
	Advanced Settings – Set extra functions.
	Information – Check the machine information, including two barcodes for the user to go to GCC website or read user's manual quickly.

5.2.1 Touch Panel Navigation Chart

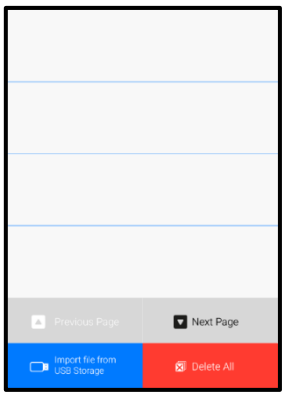


5.2.2 Home Page

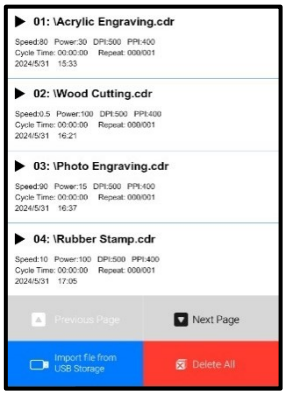


The Home Page allows you to manage files and import files from a USB flash drive.

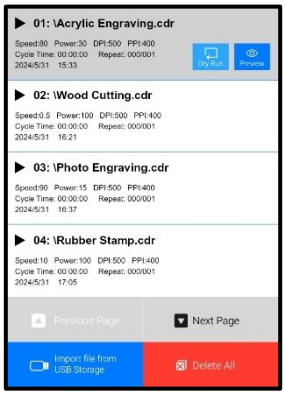
There are three statuses displayed on the Home Page



No file in the machine.



Files have been sent to the machine. Each page can display up to 4 files. Click the "Previous Page" or "Next Page" button to switch between pages in the list.



When the user selected a file. The background of the file will be highlight to dark gray. The Dry Run and Preview icon will appear.

Operation:

1) After sending file to the machine, please click a file on touch panel. The background of the file will be highlighted to dark gray, and the 

and 

icon will appear.

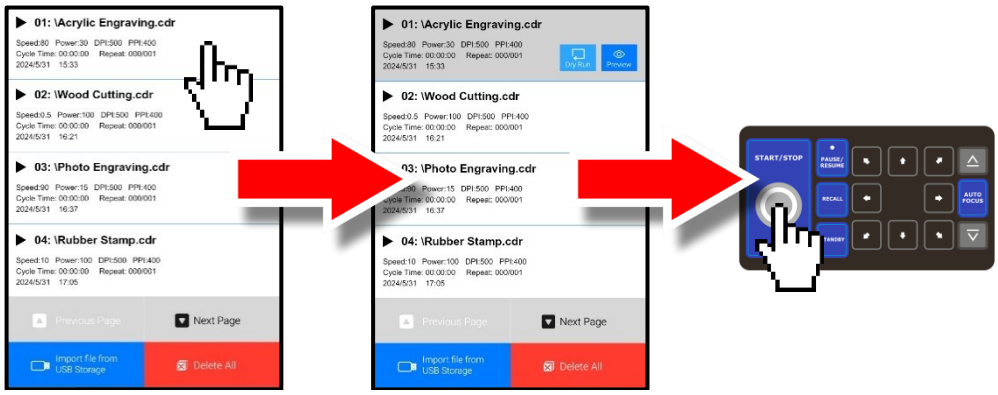
2) Clicking the 

(Dry Run) button will cause the carriage to run a rectangle, allowing the user to visualize the size and position required for the job. This function can help the user to prepare a correct material size before job processing.

3) Click the 

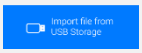
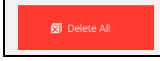
(Preview) button will enter the Preview Page, please refer to chapter 5.2.2.2 for more information.

4) After selecting a file, please press the “START/STOP” button on the control panel to process the job.

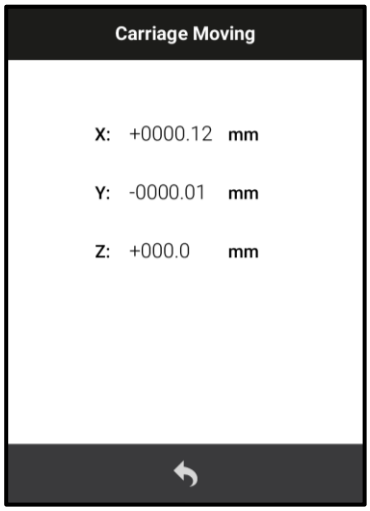


5) If you want to import files from USB storage, please refer to chapter 4.1.3 for more information.

Page configuration:

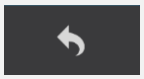
	Previous Page and Next Page – Switch the page of the file list
	Import File from USB Storage – Clicking this will take you to the “USB Storage” page. Please refer to Chapter 4.1.3 for more information.
	This button deletes all files from the machine.

5.2.2.1 Carriage Movement Page



Press any arrow key on the control panel in the Home page to enter the Carriage Movement page. The coordinates of X, Y, and Z will be shown on this page. The coordinates will be updated in real time as you move the carriage or Z table.

Page configuration:

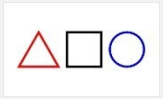
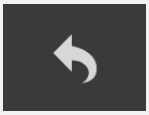

Go back to the previous page

5.2.2.2 Preview Page

Select a file on the touch panel and click the 

button to enter the preview page. This page allows you to check more details of the file, such as the file name, output graphic preview, parameters, etc.

Page configuration:

	Output graphic preview
	Run the job or stop the job.
	Clicking this button will cause the machine to run a rectangle to show the position and size of the job.
	If you have set SmartCENTER for the file, it will appear in the preview page, please refer to chapter 5.2.3 for more details.
	Allow you to modify the parameter of laser processing. Please refer to chapter 5.2.2.3 for more information.
	Delete this file.
	Back to previous page

NOTE

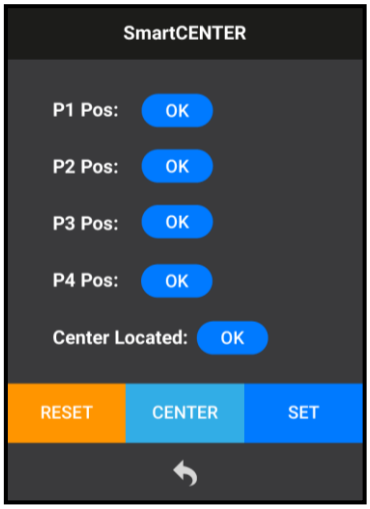
There are certain conditions under which the output graphic preview may not display correctly on the touch panel. Please refer to the following content for more details.

▲ File sent via SmartCONTROL

▲ File sent via USB Storage

▲ File sent via Print Immediately function of the print driver.

5.2.2.3 SmartCENTER Page



If you have set SmartCENTER for the file, you will see a "SmartCENTER" icon on the preview page. In SmartCENTER mode, the job will begin after the system positions the carriage at the center point between two points or four points indicated by the user. The SmartCENTER mode must be enabled through the driver.

Operation:

Step 1. Move the lens carriage to desired positions and click SET button. The OK button will then appear on P1 POS ~ P4 POS. (Set at least set two positions)

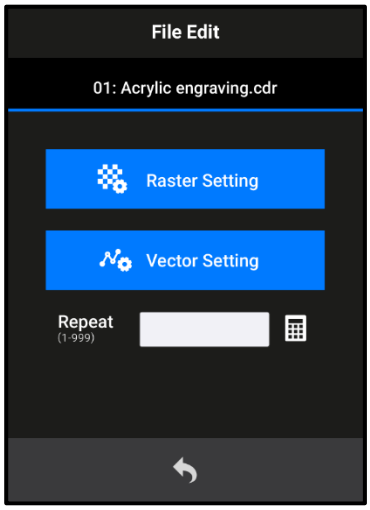
Step 2. After setting the positions, click CENTER button. The OK button will appear on Center Located, and the lens carriage will automatically move to the center.

Step 3. Click RESET button if you want to reset the positions.

Page configuration.

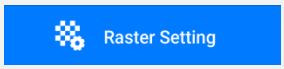
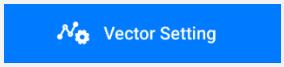
RESET	Reset all positions
CENTER	Click it make the lens carriage to the center position between two points or four points indicated by the user.
SET	If you have set SmartCENTER for the file, it will appear in the preview page, please refer to chapter 5.2.3 for more details.
	Back to the previous page

5.2.2.4 Edit Page



When you click on  *button in the preview page, it will enter the File Edit page to help you to adjust the parameters such as raster setting, vector setting, and repeat etc.*

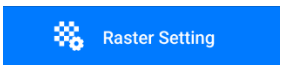
Function Definition:

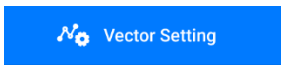
	The Raster Setting allows you to edit the speed and power parameters for the existing file.
	The Vector Setting allows you to edit the speed and power parameters for the existing file.
	The repeat function enables you to specify the number of times the job will be repeated.

NOTE

Before editing the parameters, please ensure the job method as Raster (engraving) or Vector (cutting) and select the correct option accordingly. For instance, if the job method as Vector (cutting) but you edit parameters intended for Raster (engraving), the changes will not take effect.

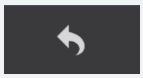
File Edit Operation:

1) Click the 

or 

button based on your job method to proceed to the next page.
2) Click the input box for **Speed** or **Power** to edit the parameters. You also can edit **PPI** value in Vector Setting. The numeric keypad will pop up, allowing you to enter the number.
3) After entering the parameters, click the XXX button to confirm the edits.
4) You can now use the new parameters to process the job.
5) To set a specific number of repetitions for the job, click on the input box for **Repeat** and enter a number (value: 1~99)

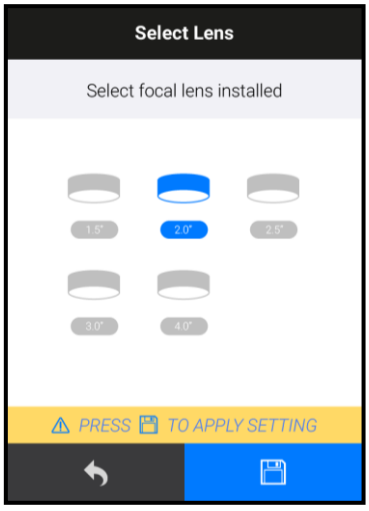
Page configuration:

	
Go back to the previous page	Apply the setting

5.2.3 Machine Settings

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 Standby mode, Save position, Select Vector Mode, LAN setup Wizard, Scaling, Other, and Reset etc.

5.2.3.1 Select Lens



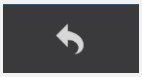
The Select Lens Page allows you to modify the lens settings after you have changed to a different focal lens. Remember to save your settings after you have made the proper changes. After that, pressing the Auto Focus button on control panel, the laser machine will conduct auto focus accordingly using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

Operation:

Step 1. Click a lens that you installed on your machine.

Step 2. Click  button to apply the setting.

Page configuration:

	
Go back to the previous page	Apply the setting

GCC LaserPro Piolas 400 machine include different mode which equipped different laser tubes, make sure the laser tubes installed with your machine before making adjustment. Please go chapter 7.3 for different lens detailed information.

5.2.3.2 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 Piolas 400 machine include different mode which equipped different laser tubes, make sure the laser tubes installed with your machine before making adjustment.

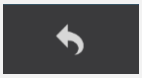
Operation:

Step 1. Select the lens from the Lens drop-down menu on touch panel.

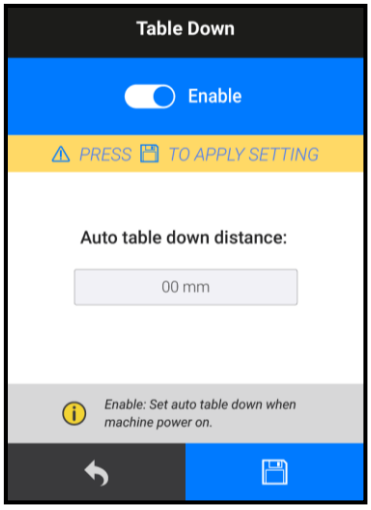
Step 2. Press  and  buttons on control panel to adjust the height of the z-axis table until you find a precise focal distance.

Step 3. After tuning the distance, click  button and the machine will run a auto focus to save the setting.

Page configuration:

	
Go back to the previous page	Apply the setting

5.2.3.3 Table Down



The Set Table Down Page allows you to select whether or not the LaserPro Piolas 400 table moving down at system startup.

Function Definition:

Enable	The machine will down the table automatically to the specific distance at the system startup.
Disable	The machine will not move the table at system startup.

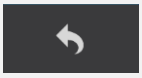
Operation:

Step 1. Set the table down to “Enable” if you want the table down automatically at system startup.

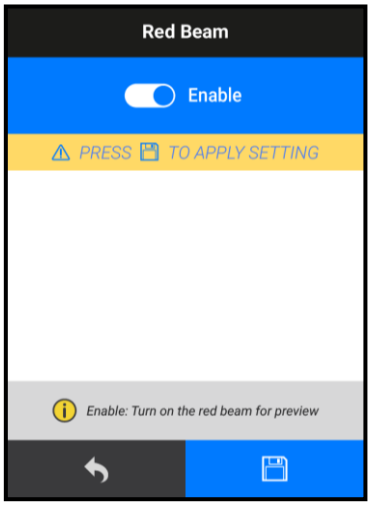
Step 2. Click the input box of “Auto table down distance, then the keypad will appear and key in a value that you want and click “Enter” to confirm. (The value can be set to 1~279)

Step 3. Click the  button to apply the setting.

Page configuration:

	
Go back to the previous page	Apply the setting

5.2.3.4 Red Beam



The Red Beam Page allows you to turn on or off the red dot laser pointer on the lens carriage.

Function Definition:

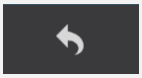
Enable	The red pointer will be turned on.
Disable	The red pointer will be turned off.

Operation:

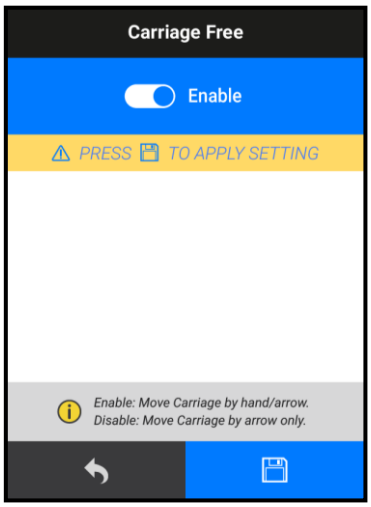
Step 1. Set the Red Beam to “Enable” or “Disable”

Step 2. Click the  button to apply the setting.

Page configuration:

	
Go back to the previous page	Apply the setting

5.2.3.5 Carriage Free



The Carriage Free Page allows you to decide whether the lens carriage should be locked or free for hand movement.

Function Definition:

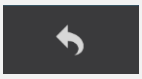
Enable	The lens carriage can be manually moved by hand with the top door open.
Disable	The lens carriage will be locked and can only be moved using the control panel arrow keys.

Operation:

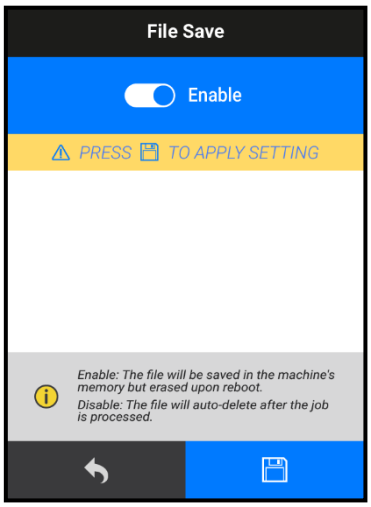
1) Set the Carriage Free to “Enable” or “Disable”.

2) Click the  button to apply the setting.

Page configuration:

	
Go back to the previous page	Apply the setting

5.2.3.6 File Save



The File Save Mode Page allows you to set whether or not the LaserPro Piolas 400 automatically deletes each job file after processing.

Function Definition:

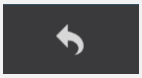
Enable	Files will be kept in the memory of the machine after laser processing. *When the machine reboots, all files will be deleted from the memory.
Disable	The file will be deleted after laser processing.

Operation:

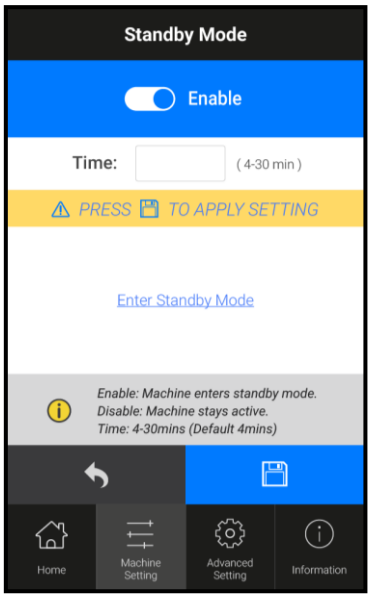
1) Set File Save to “Enable” or “Disable”

2) Click the  button to apply the setting.

Page configuration:

	
Go back to the previous page	Apply the setting

5.2.3.7 Set Standby Mode



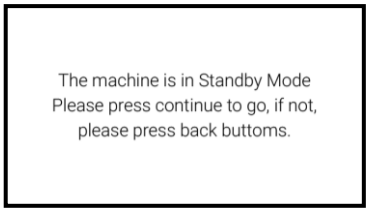
The Set Standby Mode page allows you to configure the laser machine automatically enter into power saving and reduce noises if machine is idle for a specified time.

Function Definition:

Enable	The machine will enter Standby mode when it idles for a specified time.
Disable	The machine will not enter Standby mode.

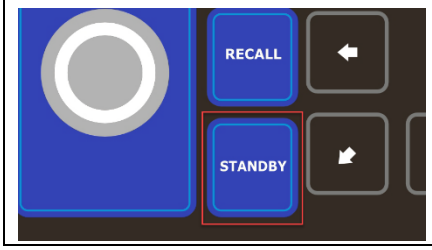
Operation:

1) Set Standby Mode to “Enable” if you want the machine to enter Standby mode when it idles for a specified time.
2) Click input box of the “Time” and key in a value you want. (The value can be set from 4~30 mins)
3) Click the  button to apply the setting.
4) Wen the machine enters Standby mode, the touch panel will display the following message.

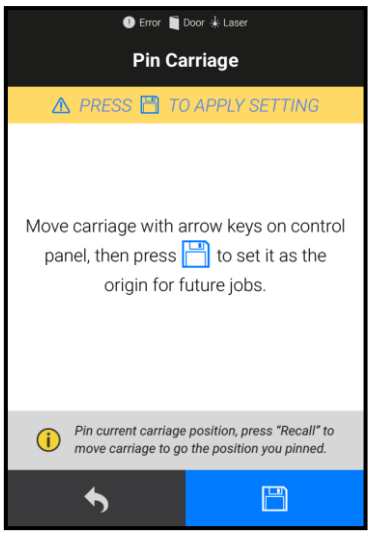


5) Press any key on control panel or click the touch panel to make the machine back to idle.

Page configuration:

Enter Standby Mode		
Make the machine enter Standby mode directly. You may also enter Standby mode by pressing the “Standby” button on control panel. 	Go back to the previous page	Apply the setting

5.2.3.8 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.

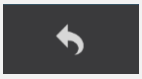
Operation:

Step 1. Move lens carriage to the specific position that you want and click  button to apply the setting.

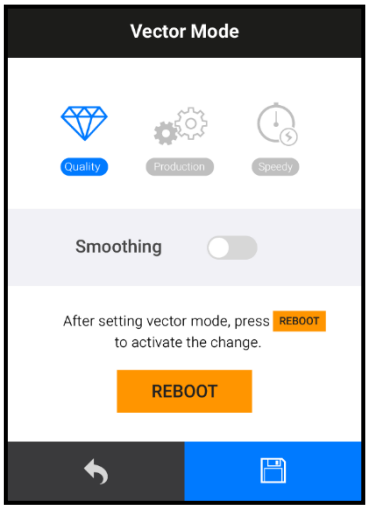
Step 2. Anytime you want to return to the original position, please press the 

button on the control panel to quickly move the lens carriage back to the position.

Page configuration:

	
Go back to the previous page	Apply the setting

5.2.3.9 Vector Mode



The Vector Mode Page allows you to adjust and balance vector mode's quality and speed settings based on your specific job.

Function Definition:

Quality	Slower speeds / Higher quality
Production	Medium speeds / Medium quality
Speedy	Faster speeds / Lower quality

Operation:

Step 1. Select a setting for vector object and click REBOOT button.

Step 2. The machine will reboot automatically to active the function.

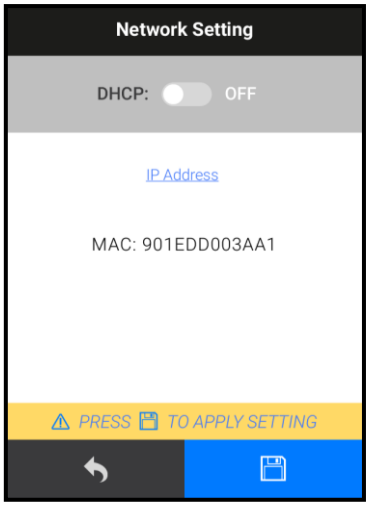
NOTE

Keep in mind that speed and quality are usually at a tradeoff. The system's default is Production Vector mode.

Page configuration:

Go back to the previous page	Apply the setting

5.2.3.10 Network Setting



The Network Setting allows you to connect the laser machine with ethernet to transmit files from computer to laser machine for processing jobs.

Function Definition:

DHCP ON	The network is set tup to dynamic IP address, the IP address will automatically retrieve from network;
DHCP OFF	The network is set to apply static IP address, and you need to further enter the IP address, MASK, and GATE information.
IP Address	Key in the value of the IP Address

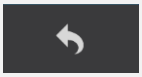
Operation:

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

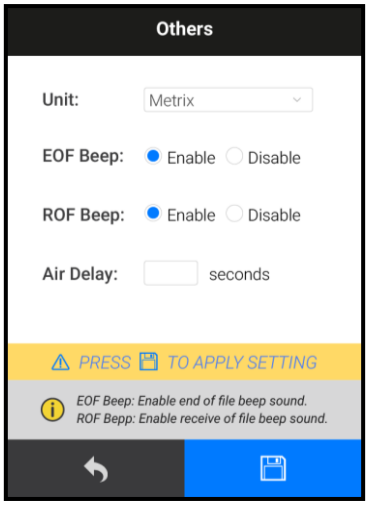
NOTE

Any changes to the network settings will reboot the machine to activate the new settings.

Page configuration:

	
Go back to the previous page	Apply the setting

5.2.3.11 Others

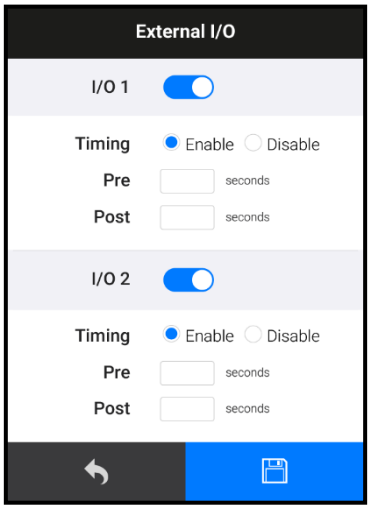


The Others Page allows you to change various settings that correspond to the control panel.

Function Definition:

Unit	Allow you to change whether the units displayed by the touch panel are in the metric or imperial system.
EOF (End of time) Beep Enable/Disable	Enable or disable an audible notification when jobs are completed.
ROF (Received of file) Beep Enable/Disable	Enable or disable an audible notification when jobs are sent.
Air Delay (1~100 seconds)	Allows you to specify the delay in seconds of the SmartAIR air-assist after the point of laser firing.

5.2.3.12 External I/O Board



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

Operation:

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. Enable Input 1 or Input 2 according to your connection.

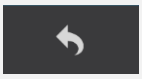
Step 3. Click the input box for "**Pre**" or "**Post**" to set the related parameter for the fume extraction unit.

Step 4. Click the  button to apply the setting.

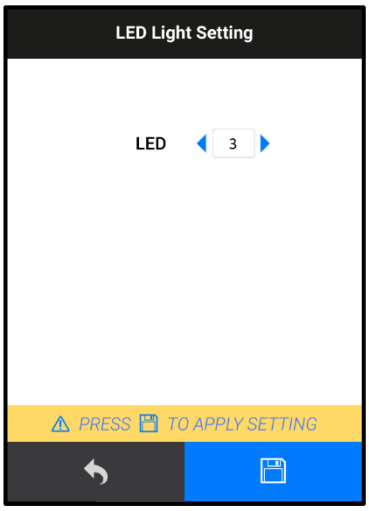
Function definition:

Pre	Set the fume extraction unit to turn ON before job processing.
Post	Set the fume extraction unit to turn OFF after job processing.

Page configuration:

	
Go back to the previous page	Apply the setting

5.2.3.13 LED Light Setting



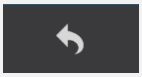
The LED Light Setting allows you to adjust the brightness of the LED light.

Operation:

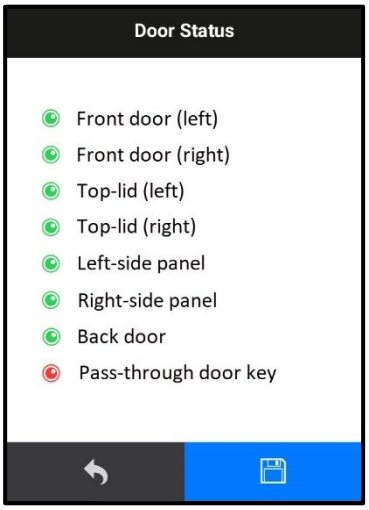
Step 1. Click ◄ or ► to adjust the brightness of the LED lights (Value: 1~5, with 5 being the brightest).

Step 2. Click  to apply the setting.

Page configuration:

	
Go back to the previous page	Apply the setting

5.2.3.14 Door Status



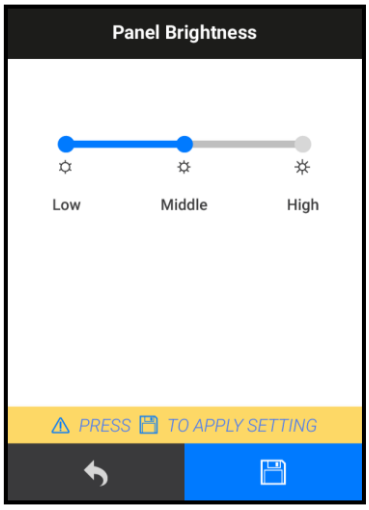
The Door Status allows you to diagnose all door sensors of the machine.

When all doors are closed but the laser still does not work properly, you can use this page to check all door sensors. The locations of all door sensors are shown in the following picture.

▲ The door sensors are installed at the bottom behind the door.

▲ Side panel sensors are installed inside, behind the side panel.

5.2.3.15 Panel Brightness



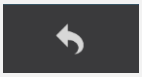
The Panel Brightness allows you to adjust the brightness of the touch panel.

Operation:

Step 1. Click a brightness level you want from Low to High.

Step 2. Click  to apply the setting.

Page configuration:

	
Go back to the previous page	Apply the setting

5.2.4 Advanced Settings

The Advanced Settings allows you to access multiple setting for laser machine optional periphera , including SmartGUARD, Machine Status, Laser Firing Time, Time Locker, etc.

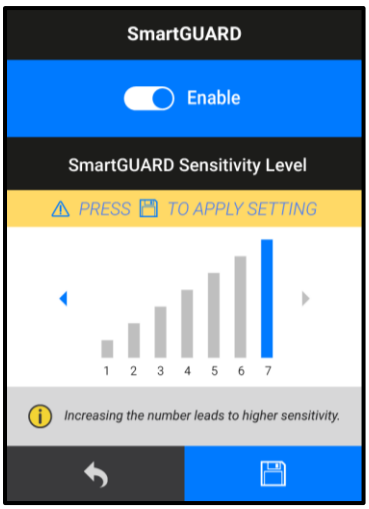
5.2.4.1 Administrator Setting

This function is for use by GCC distributors only.

5.2.4.2 SmartGUARD

WARNING!

The SmartGUARD fire alarm system is designed as a fire detection and alarm system, rather than a fire extinguisher.



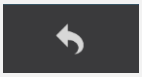
After optional SmartGUARD hardware installation, please go to Advanced Settings → SmartGUARD on touch panel to enable the SmartGUARD fire alarm.

Operation:

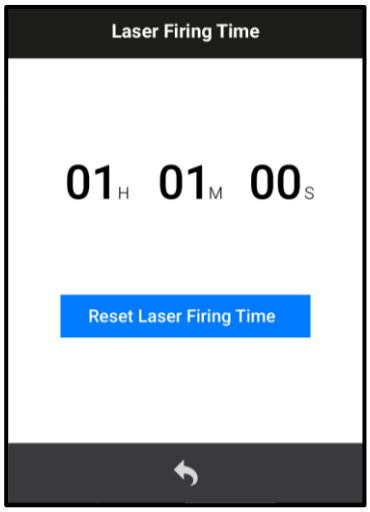
Step 1. Adjust the sensitivity of the SmartGUARD by clicking on the ◄ or ► buttons, with higher numbers indicating greater sensitivity.

Step 2. Click  to apply the setting.

Page configuration:

	
Go back to the previous page	Apply the setting

5.2.4.3 Laser Firing Time



Laser Firing Time helps you check the total duration of laser firing.

NOTE

If you want to run the 'Reset Laser Firing Time' function, please contact your local dealer or distributor.

5.2.5 Information

The Information Page allows you to view information regarding the system such copyright, laser machine name, firmware version, and other information. There are two barcodes which helps you to visit GCC website and download area quickly.

5.3 The LaserPro Print Driver

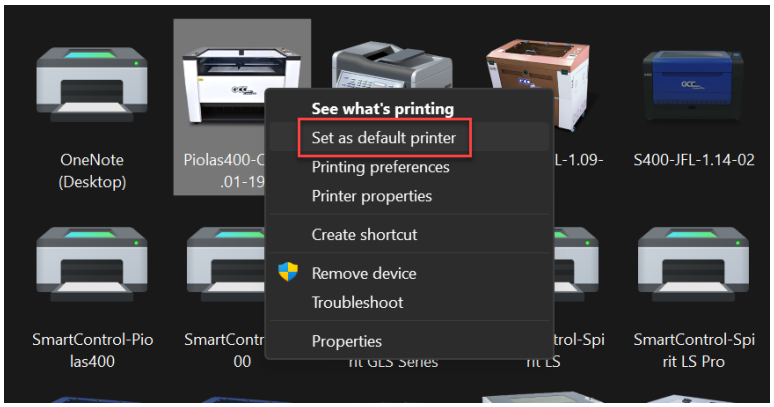
With the LaserPro print driver successfully installed, you will need to adjust the printer and page size default settings before you can begin editing and completing jobs. By doing so, you will be setting the work area in your graphics software to match the working table area.

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

The following take Piolas 400 machine as a demonstration.

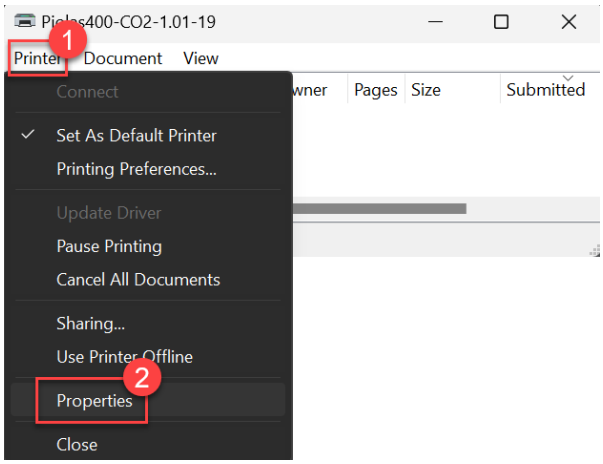
Step 1. After installing Piolas 400 print drive, please connect the machine with your computer/laptop by USB cable or Ethernet.

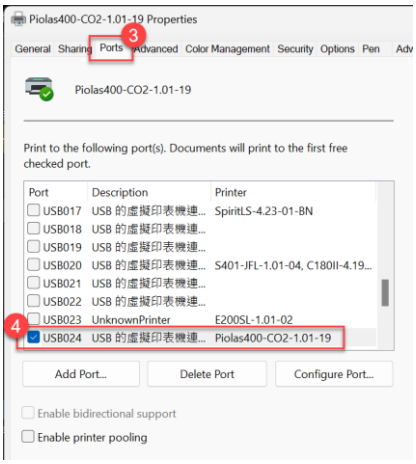
Step 2. Ensure that the LaserPro Piolas 400 has been selected as the DEFAULT PRINTER. You can go to Control Panel → Devices and Printers, then set Piolas 400 printer machine as default printer.



Step 3. After setting Piolas 400 laser as default print driver, please make sure the printer is online, not offline.

Step 4. If you discover the default setting machine – Piolas 400 offline, please double click the device and select Printer → Properties → Ports → Make sure it connected to the right port from Piolas 400 laser machine.





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 Siolas 400' work table's dimensions and orientation.

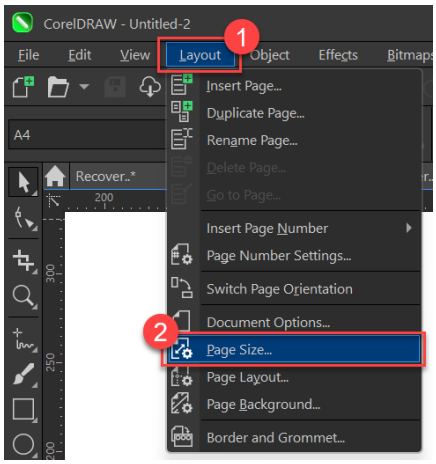
From your graphic software's Page Setup page:

- Set the page orientation in the graphics software to Landscape mode.
- Set page size to match laser machine work area size.
  Piolas 400: 1016 x 610 mm (40"x24")

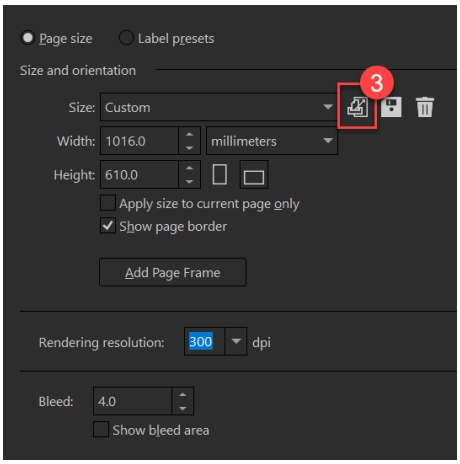
CorelDRAW Example (Page Setup and Orientation)

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 Piolas 400 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 LaserPro Piolas 400 Print Driver.

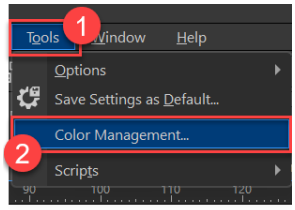
From your graphic software's Color Management page:

- Disable Color Management or set Color Management to Off.

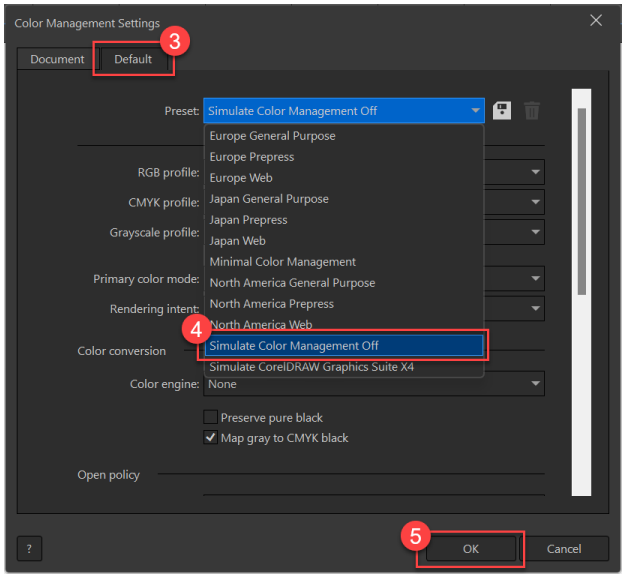
CorelDRAW Example (Color Management)

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 LaserPro Piolas 400 print driver by going to <FILE> → <PRINT> → <PROPERTIES>.

NOTE

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

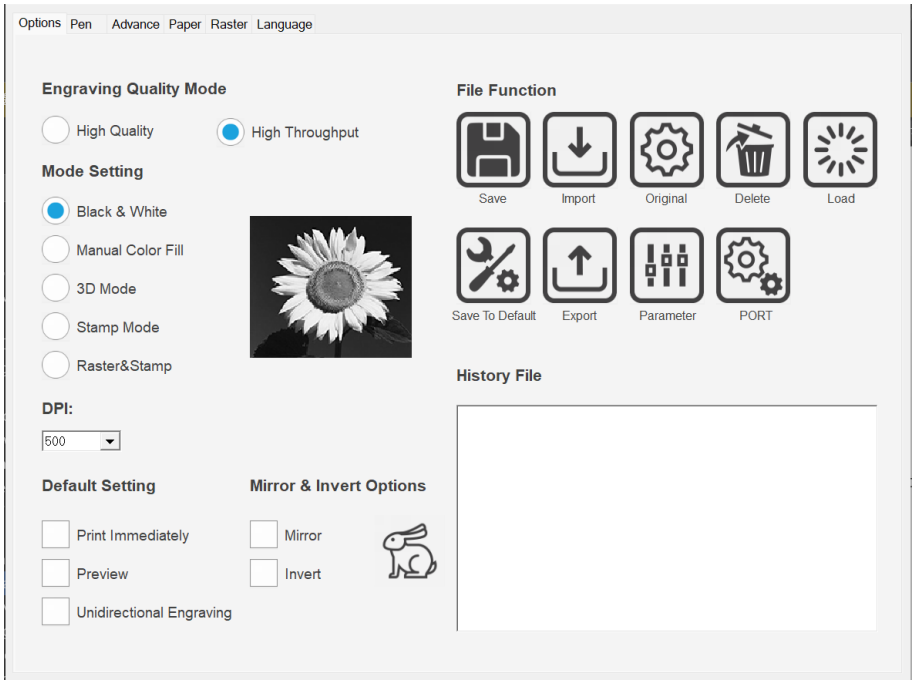
The LaserPro Piolas 400 Print Driver consists of seven primary sections (pages) in which you will be able to choose various engraving / cutting options and settings:

- 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 Pio 400 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 section.

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.

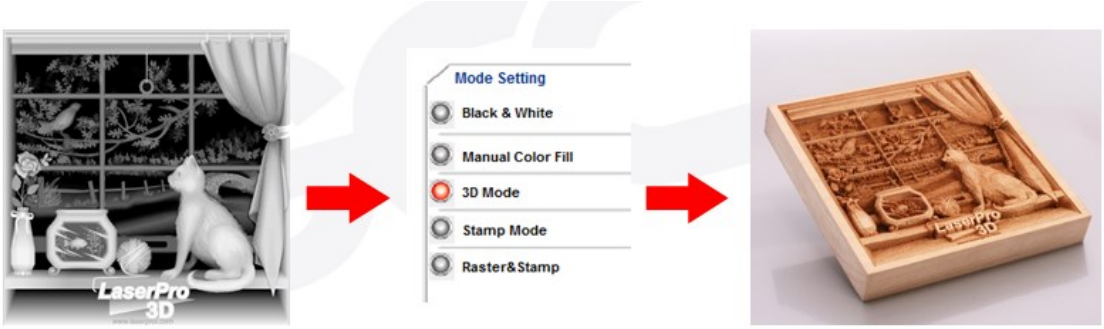
Manual Color Fill:

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

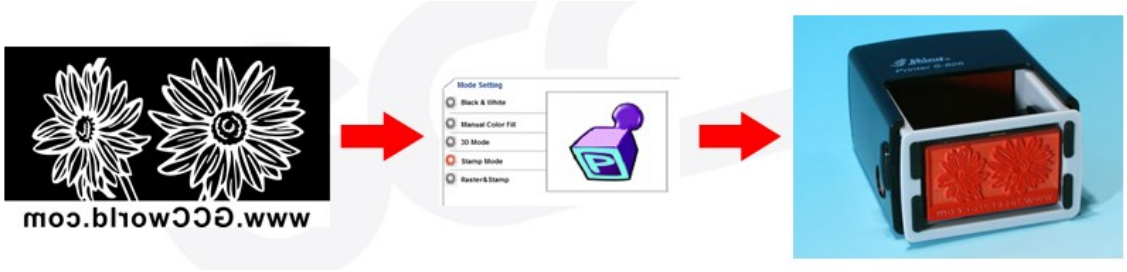
3D Mode:

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 Piolas 400 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 Piolas 400 Hybrid fiber laser, and CO2/Fiber dual lasers configurations.

DPI (Options Page) [DEFAULT SETTING: 500]

DPI (dots-per-inch) represents the number of times the laser will fire over a one-inch path. This setting determines the image resolution and quality when performing raster engraving functions. Higher DPI settings result in cleaner and deeper engravings, but require more time to complete. Lower DPI settings result in coarser and shallower engravings, but require less time to complete. The LaserPro Piolas 400 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.

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

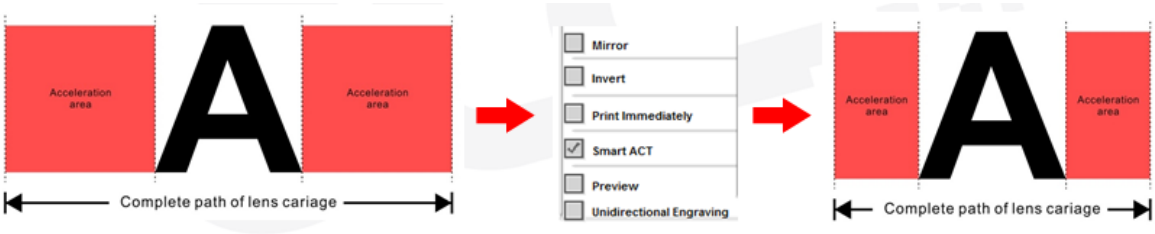
Invert mode is useful when creating a stamp in Stamp Mode, as inverting your normal image will set the negative space to be engraved out, with the remaining positive space (your stamp design) protruding out.

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

Checking this will instruct the LaserPro Piolas 400 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 LaserPro Piolas 400 system and will need to be initialized from the LaserPro Piolas 400 control panel.

SmartACT (Options Page) [DEFAULT SETTING: Unselected]

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



Tip

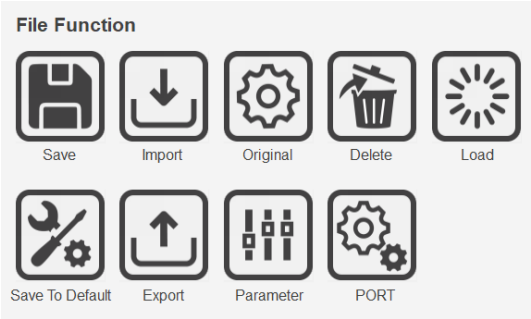
There is a greater performance gain when enabling SmartACT for designs that are vertically longer than they are horizontally wide, as the SmartACT optimization modifies the movement of the X-axis of the lens carriage.

Preview (Options Page) [DEFAULT SETTING: Unselected]

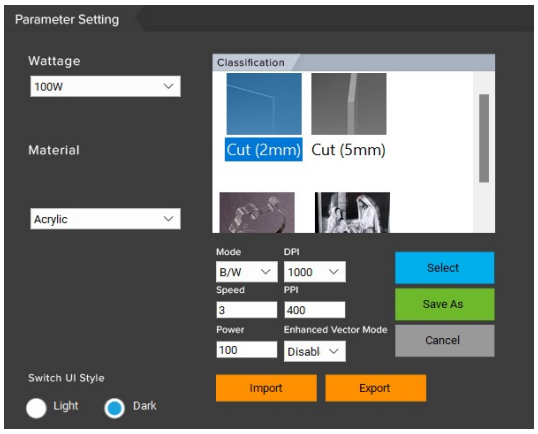
Users can use the Preview function to check a simulated output of the job. An estimated working time will a o be shown. Please make sure to set the file printing option to “print to file” in order to activate the Preview function.

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 .Spi extension)
- 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.
- 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.



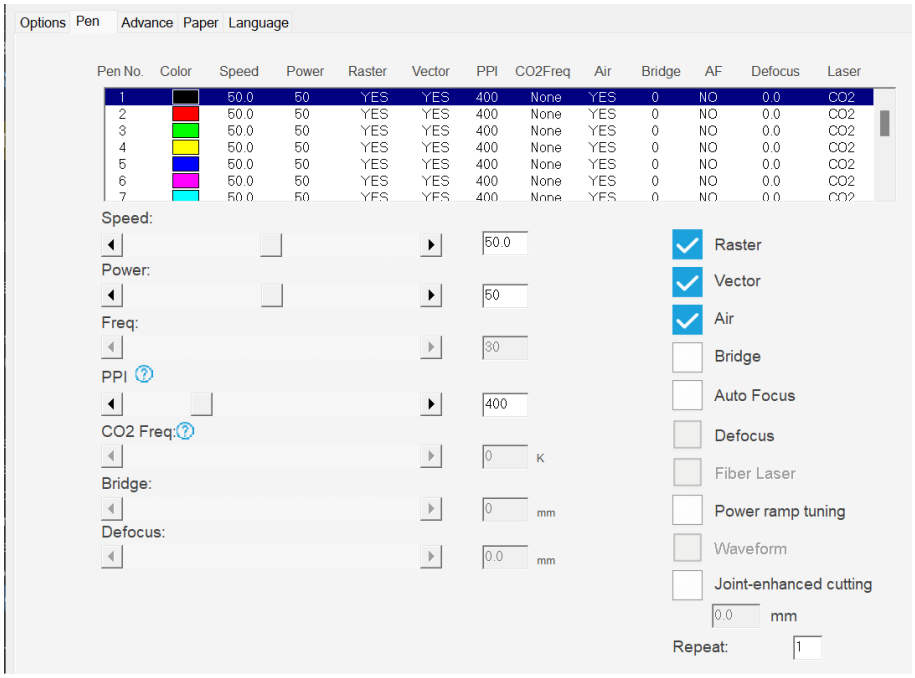
- History File: This section contains a list of the recent files you have recently created and worked with.

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

> **Tip**
>
> LaserPro material database settings allow you easy to load the several parameters.
> If you are loading LaserPro parameter database as your operating parameter, please click <Parameter> under OPTIONS page, and direct load from several build-in parameter folders.

5.3.3.2 Piolas 400 Print Driver – Pen Page

The LaserPro Piolas 400 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 Piolas 400 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 Piolas 400 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 control 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]

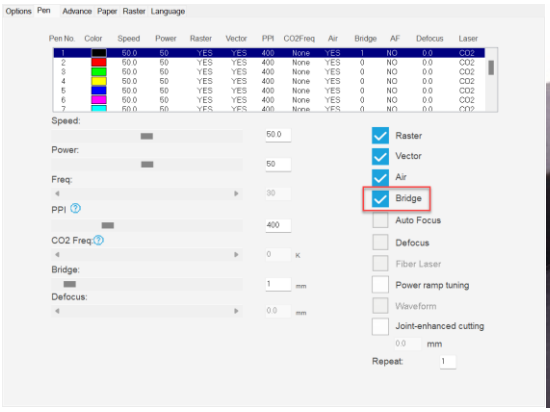
This checkbox control the SmartAIR air-assist function (if you have the optional air compressor installed). By selecting a pen color and checking this box will enable the SmartAIR air-assist function for that particular pen color. As an example, if you are performing a combination of both surface raster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

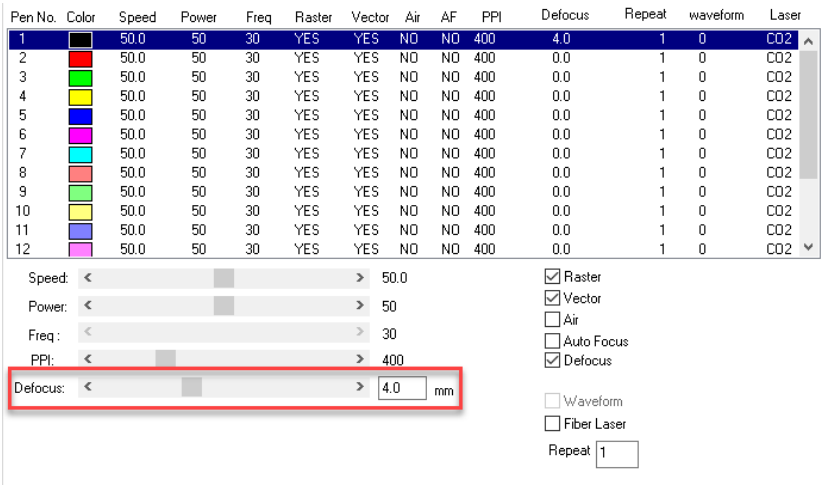


Auto Focus (Pen Page) [DEFAULT SETTING: Unselected]

This checkbox sets the Auto Focus for that particular job. With the Auto Focus button checked, the Piolas 400 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]

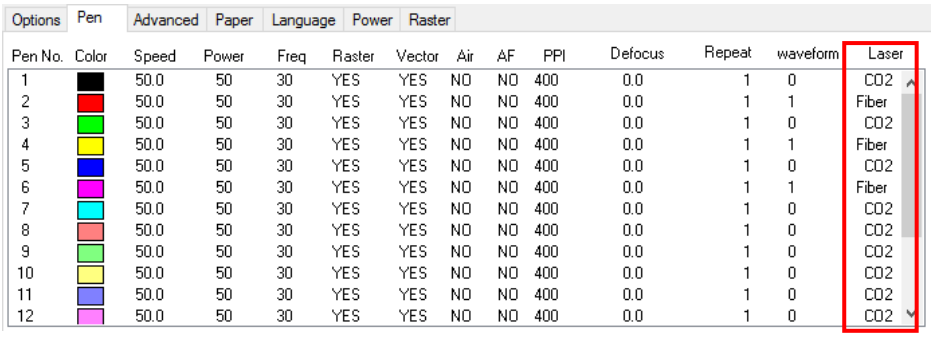
This function allow users to set the defocus or out of focus distance for a particular job. One of application is polishing, the acrylic can be polished after engraving.



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

You can assign Pen to apply different laser tube for Piolas 400 model, 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.



Pen No.	Color	Speed	Power	Freq	Raster	Vector	Air	AF	PPI	Defocus	Repeat	waveform	Laser
1		50.0	50	30	YES	YES	NO	NO	400	0.0	1	0	CO2
2		50.0	50	30	YES	YES	NO	NO	400	0.0	1	1	Fiber
3		50.0	50	30	YES	YES	NO	NO	400	0.0	1	0	CO2
4		50.0	50	30	YES	YES	NO	NO	400	0.0	1	1	Fiber
5		50.0	50	30	YES	YES	NO	NO	400	0.0	1	0	CO2
6		50.0	50	30	YES	YES	NO	NO	400	0.0	1	1	Fiber
7		50.0	50	30	YES	YES	NO	NO	400	0.0	1	0	CO2
8		50.0	50	30	YES	YES	NO	NO	400	0.0	1	0	CO2
9		50.0	50	30	YES	YES	NO	NO	400	0.0	1	0	CO2
10		50.0	50	30	YES	YES	NO	NO	400	0.0	1	0	CO2
11		50.0	50	30	YES	YES	NO	NO	400	0.0	1	0	CO2
12		50.0	50	30	YES	YES	NO	NO	400	0.0	1	0	CO2

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.

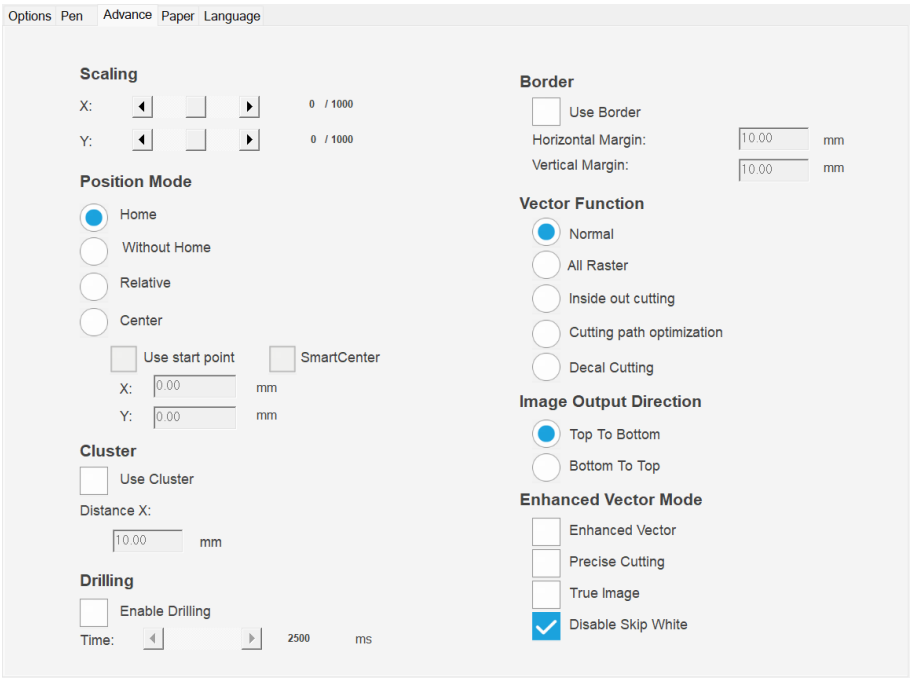
Below is the waveform parameter table for different fiber laser model:

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

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 Piolas 400 Print Driver – Advanced Page



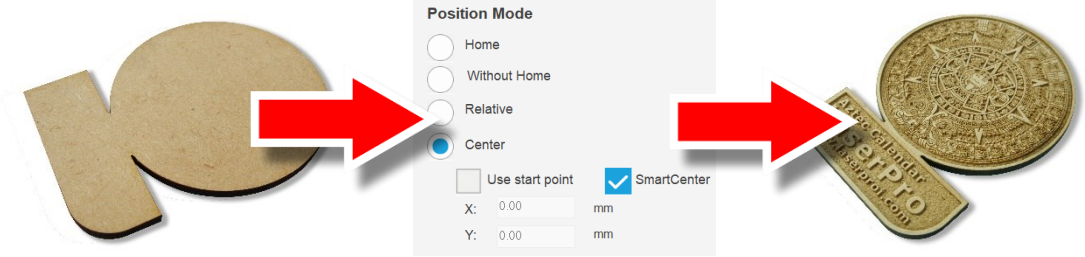
Scaling (Advanced Page) [DEFAULT SETTING: 0]

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 Piolas 400 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.

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 LaserPro Piolas 400 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.

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.

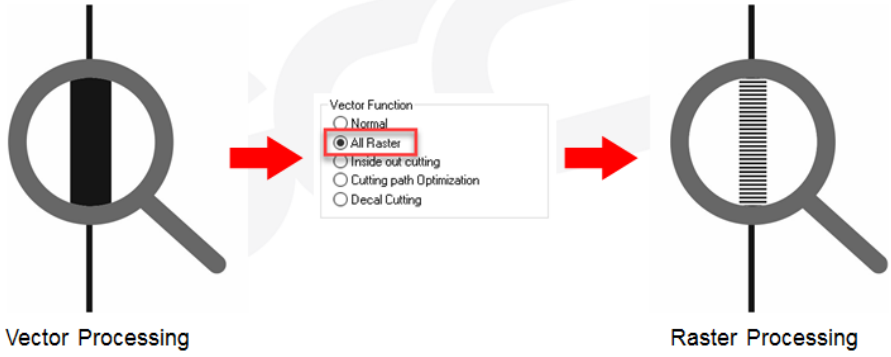
To properly add a border, you will first need to Invert your design from the Options Page, then check Use Border and specify a value for the thickness of the border you would like to add to your design. This mode is useful for engraving rubber stamps, as it allows you to create the outline around your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

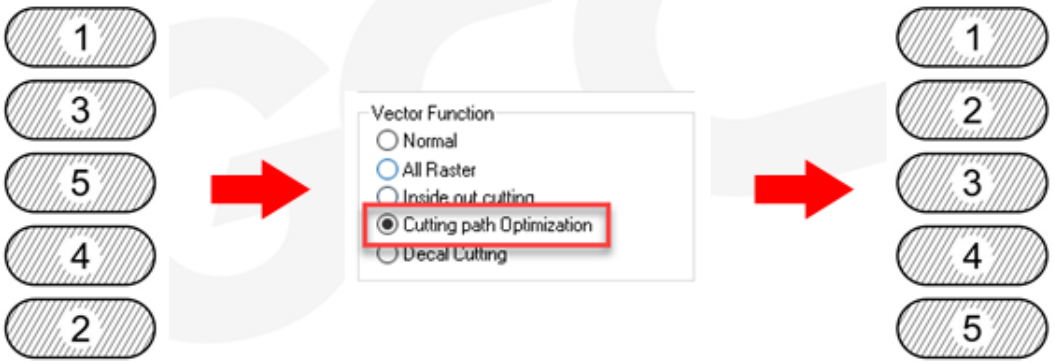
Vector Function (Advanced Page) [DEFAULT SETTING: Normal]

- 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.

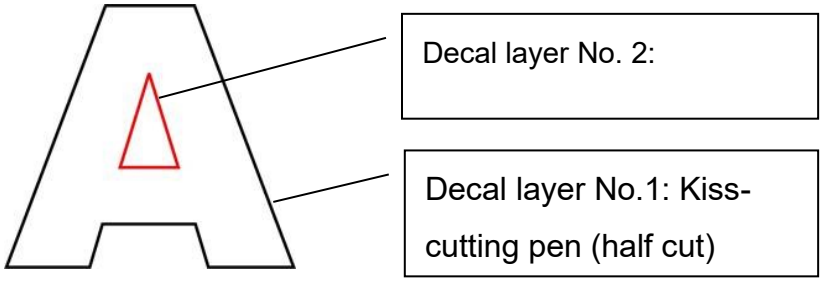


- Inside out Cutting: This setting will always automatically direct the laser to cut from the inner most vector shape and move outwards.

- 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

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

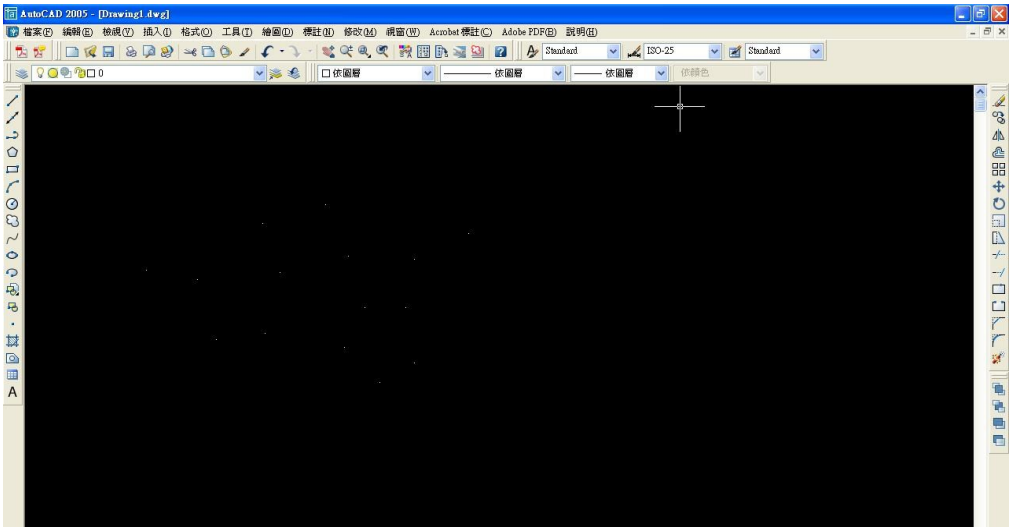
This setting allows you to improve the cutting quality at the expense of speed. Your engraving speed will be dropped by 50%, to maximize the cutting power. We recommend that you enable this function when cutting thicker material.

Drilling (Advanced Page)

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.



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

This setting allows you to change how the Piolas 400 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.

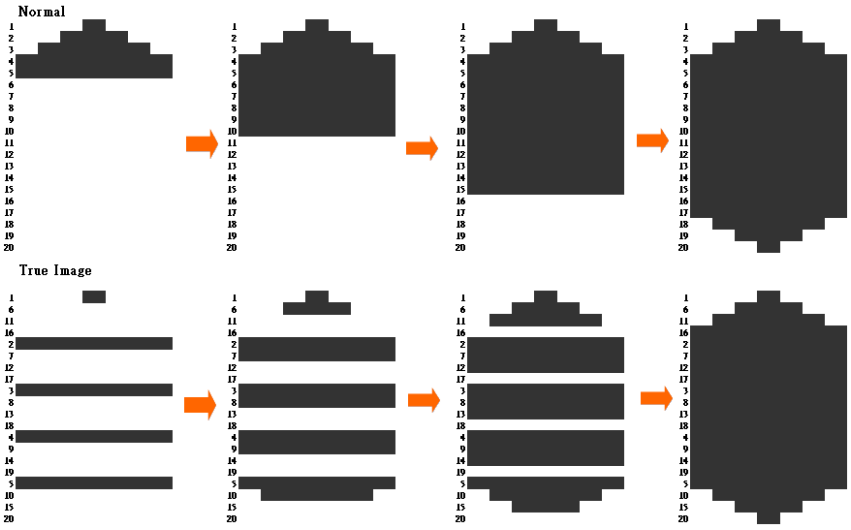
NOTE

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.

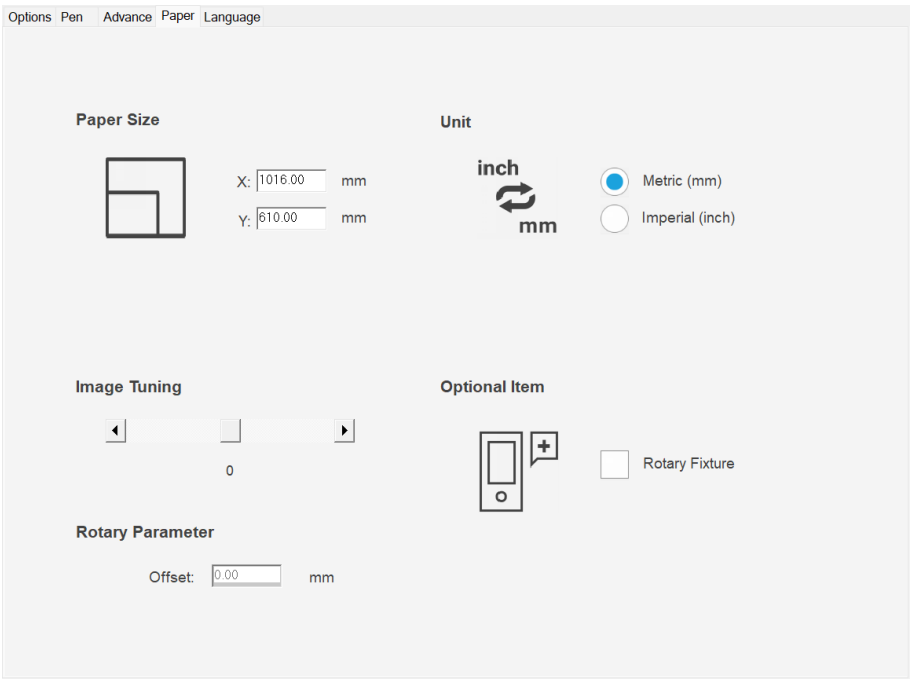
True Image Mode (Advance Page) [DEFAULT SETTING: Unselected]

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.



5.3.3.4 Piolas 400 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).

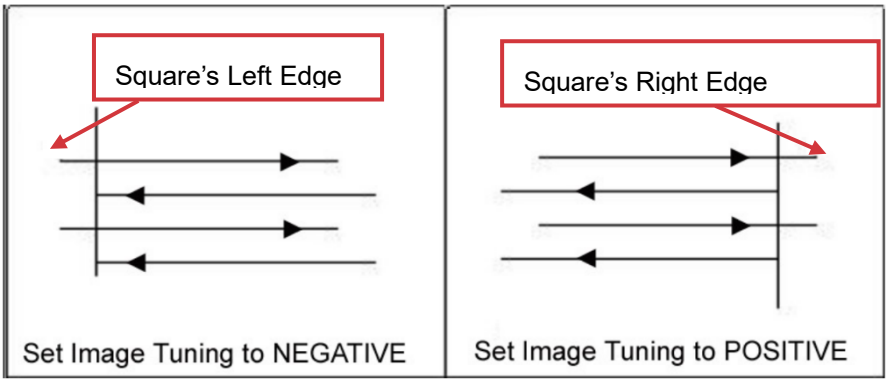
Unit (Paper Page) [DEFAULT SETTING: Metric (mm)]

Here you can set your preferred measurement standard in which you would like to use with the Piolas 400 print driver. You can choose between metric or imperial standards.

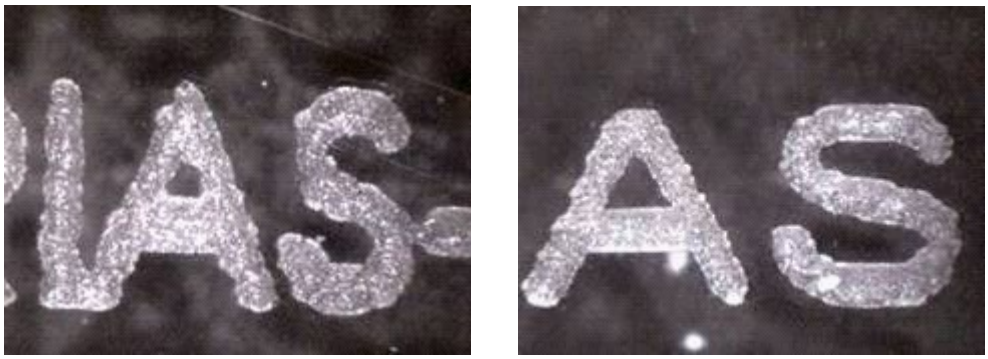
Image Tuning (Paper Page) [DEFAULT SETTING: 0]

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 Piolas Piolas 400 maximum work area to 40" x 24" (1016 mm x 610 mm) from the default 36" x 24" (916 mm x 610 mm). This function is enabled at the expense of some quality loss, usually on the left and right edges of your full-size engraving. Usually the quality loss is minimal and may not be apparent, depending on your design.

NOTE

With the Extend function enabled, the following functions are disabled: 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]

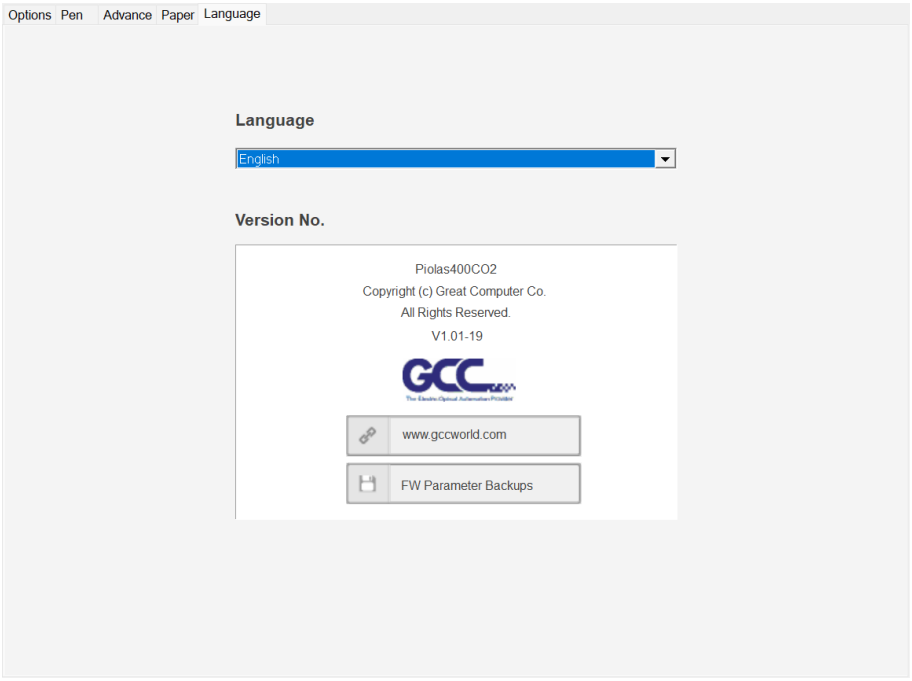
This option is only to be used with the CCD optional accessory properly set up. The CCD optional module allow you to laser contour cut the printed image, the CCD module will find the registration marks printed around the image, and position the laser contour cutting line automatically. For instructions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

NOTE

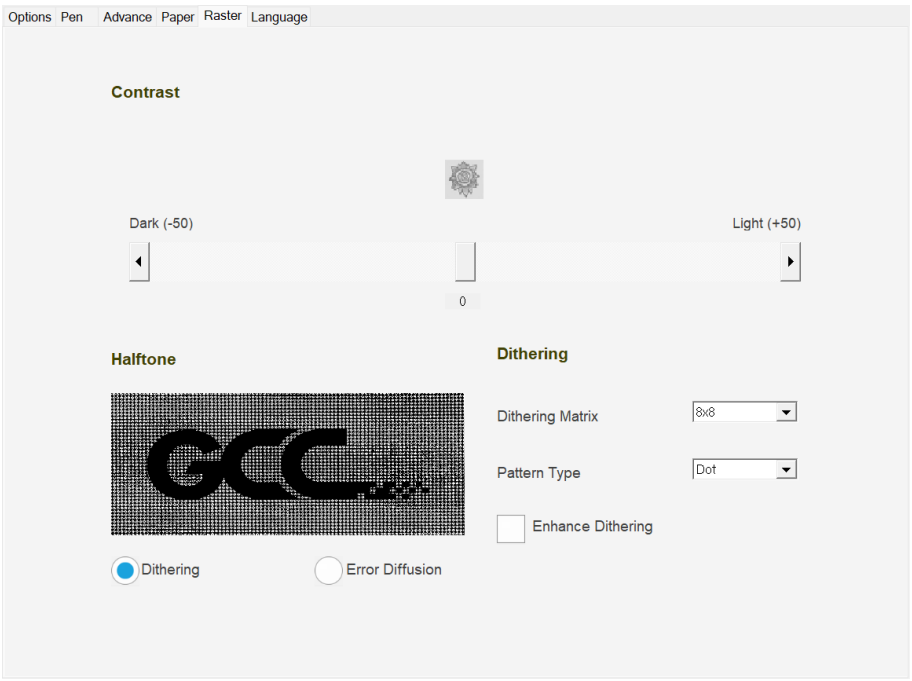
This option is only to be used with the CCD optional accessory properly set up.

5.2.3.5 Piolas 400 Print Driver – Language Page

This page allows you to specify the language displayed by the Piolas 400 Print Driver. Current language options allow for: English, Spanish, French, Chinese (Simplified, Traditional), Japanese, and German. Remember to select “Save to Default” on Options Page to save the specified language.

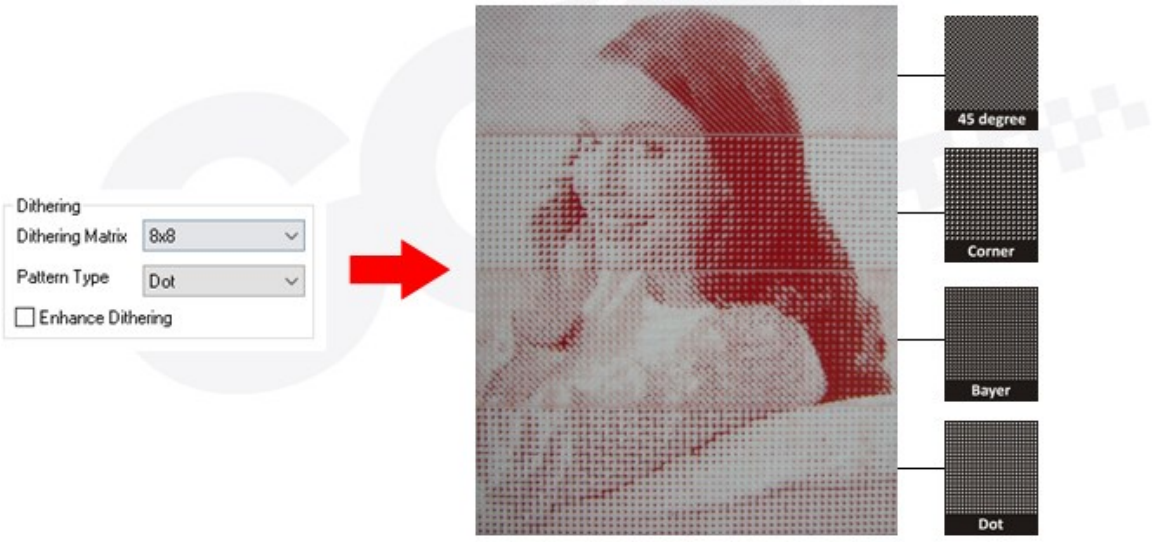


5.2.3.6 Piolas 400 Print Driver – Raster Page



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.

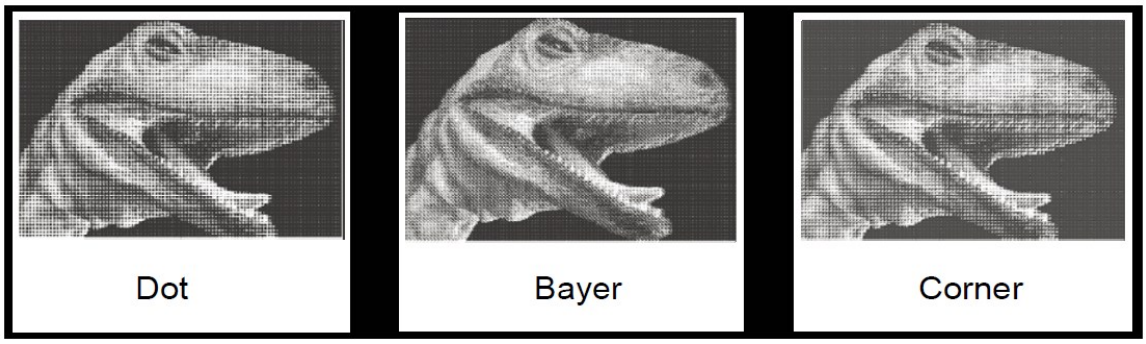
Tip

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]

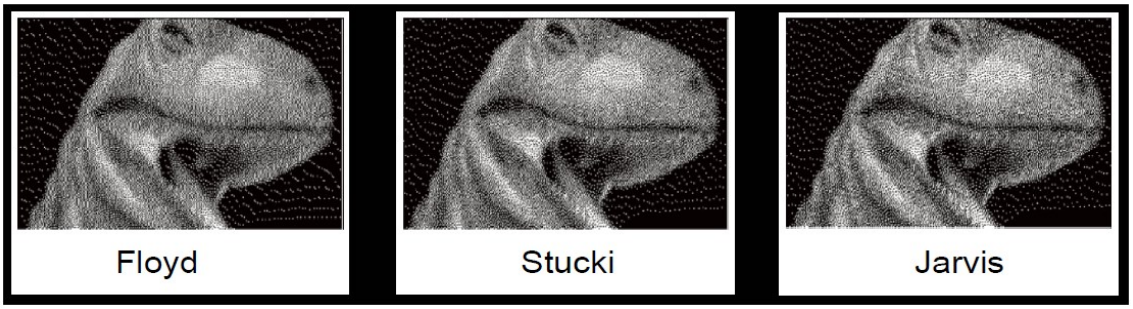
  Selecting this will produce a finer dithering output.

- 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.

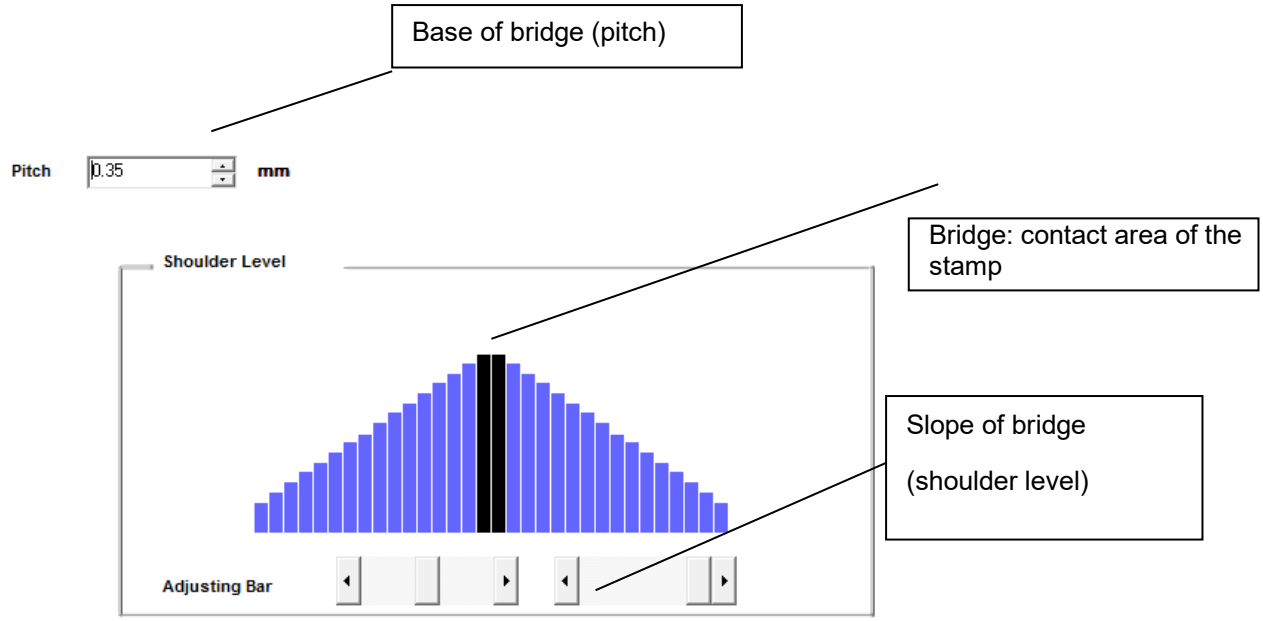


Tip

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 Piolas 400 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 Piolas 400 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.

Chapter 6
Setup and Installation

- 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 Piolas 400 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 Piolas 400) 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 LaserPro Piolas 400 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.

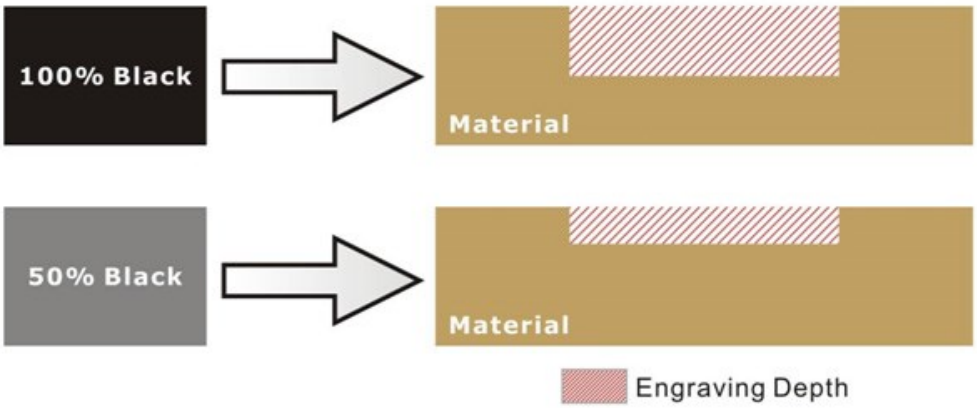
6.4 3D Tips

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.

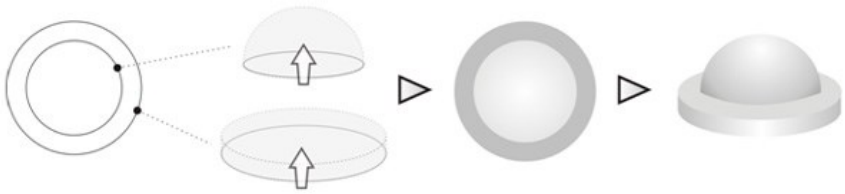
Introduction to software for 3D graphic production

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.

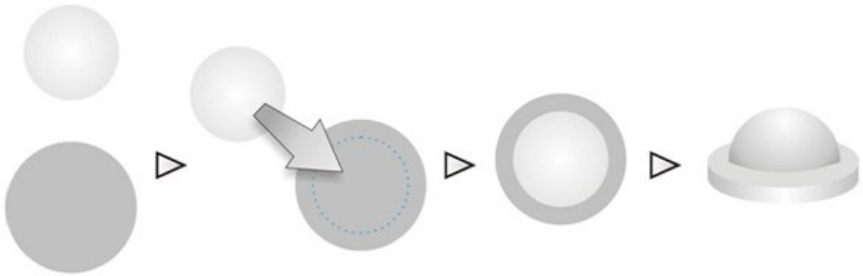


Concept illustration of 3D graphic production with Laser Professional AP

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.



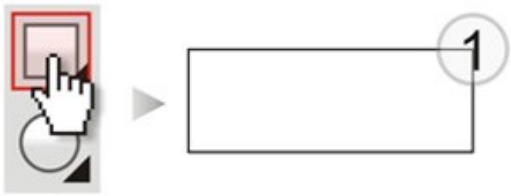
Both Photoshop and CorelDRAW may produce 3D graphics in the manner of combinatio

A way to produce 3D graphics

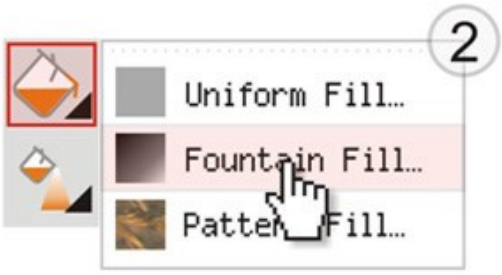
For the production of 3D graphics, in addition to the requirement of having great familiarity with the software, a significant amount of time is required to design and arrange the layout. Thus, we use a relatively simple graphic for illustration so that you would understand how to produce 3D graphics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

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

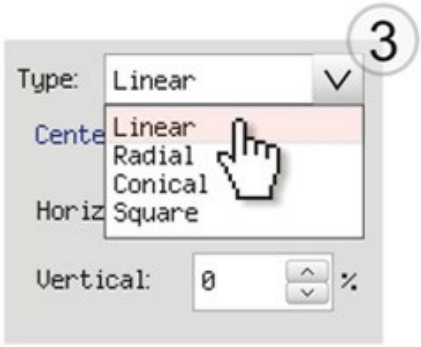
Step 1. Produce the gray level background



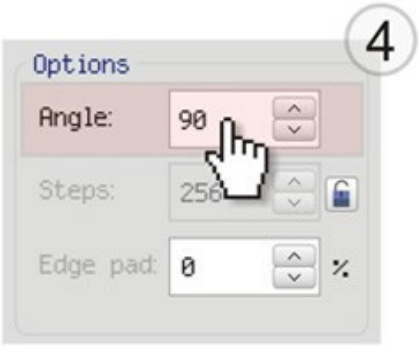
▲Draw a rectangular box with the drawing tool



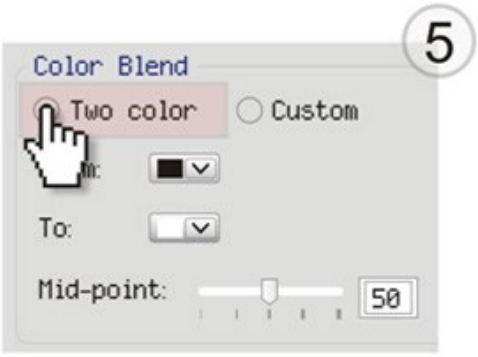
▲Select Fountain Fill to fill in the gray level



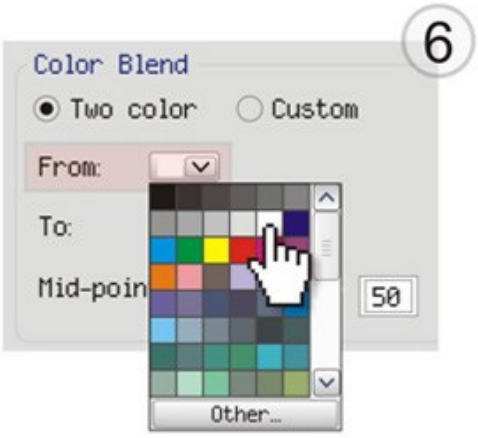
▲Select Linear as the type of the gray level



▲Set the gray level angle as 90 degrees

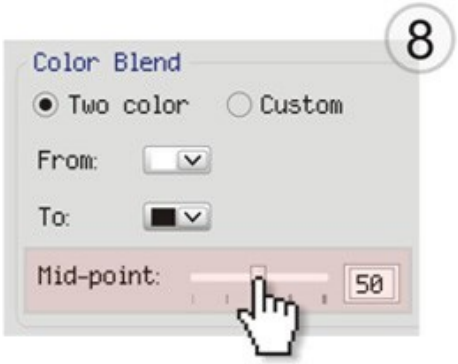


▲Select Two color as the type of the gray level



▲Set the From color as 0% Black

▲Set the To color as 100% Black



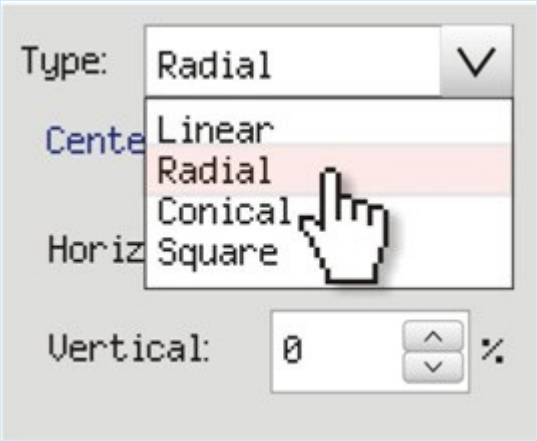
▲Set the Mid-point as 30

▲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.



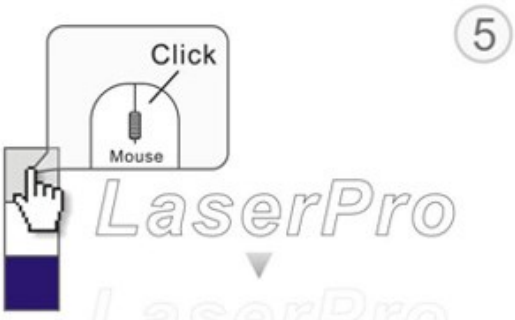
Step 2. Produce three-dimensional characters

▲Edit the word with the Text toolbox

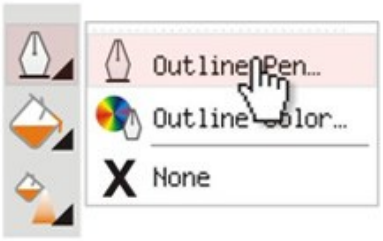
▲Use the Color toolbox on the right to fill the white color into the characters

▲Select the desired font and size

▲**Bold** and *italic* style may also be used

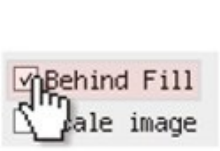


▲On the palette, set the exterior frame as 10% gray level (Right click the mouse to set the color of the line for the exterior frame quickly)



▲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

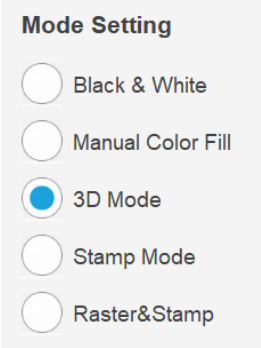
▲Select the desired font and size

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

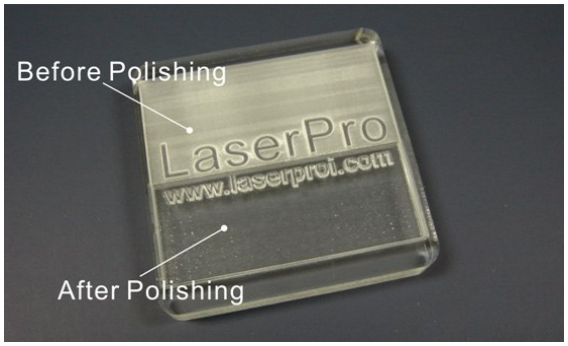
LaserPro Application Lab provides a few reminders that may require your attention during the 3D engraving in order to improve the result of the engraving.

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.



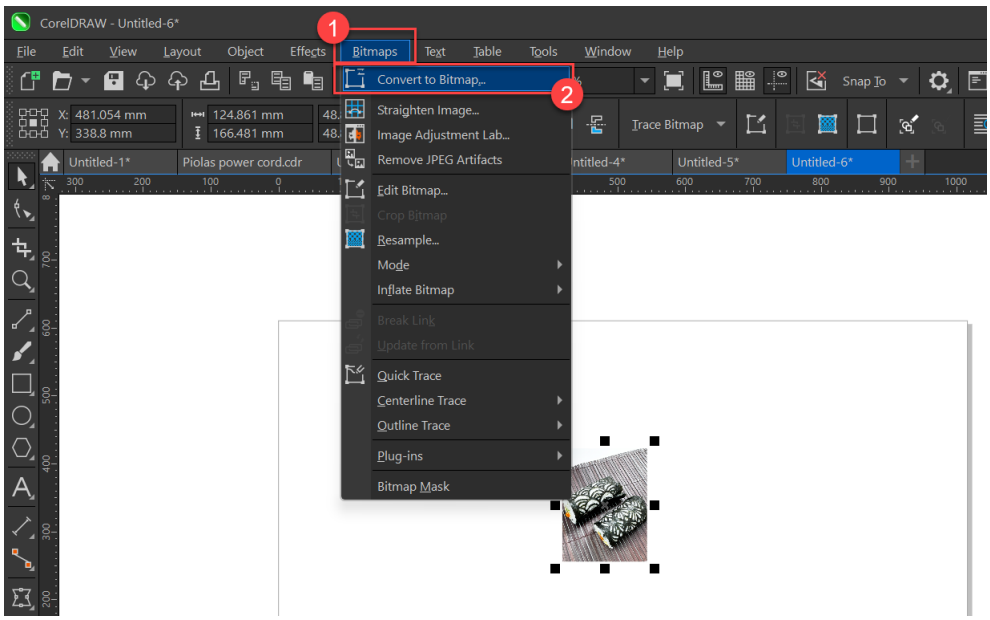
After engraving the wooden objects, please use a toothbrush with some clean water to remove the dust on top of the object.

▲ Before cleaning

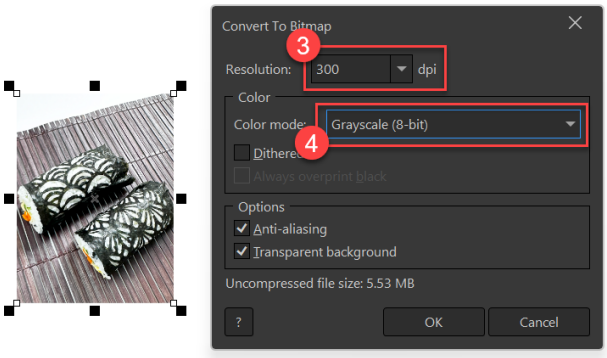
▲ After cleaning

6.5 Modify Image Settings of Picture for Better Engraving Quality

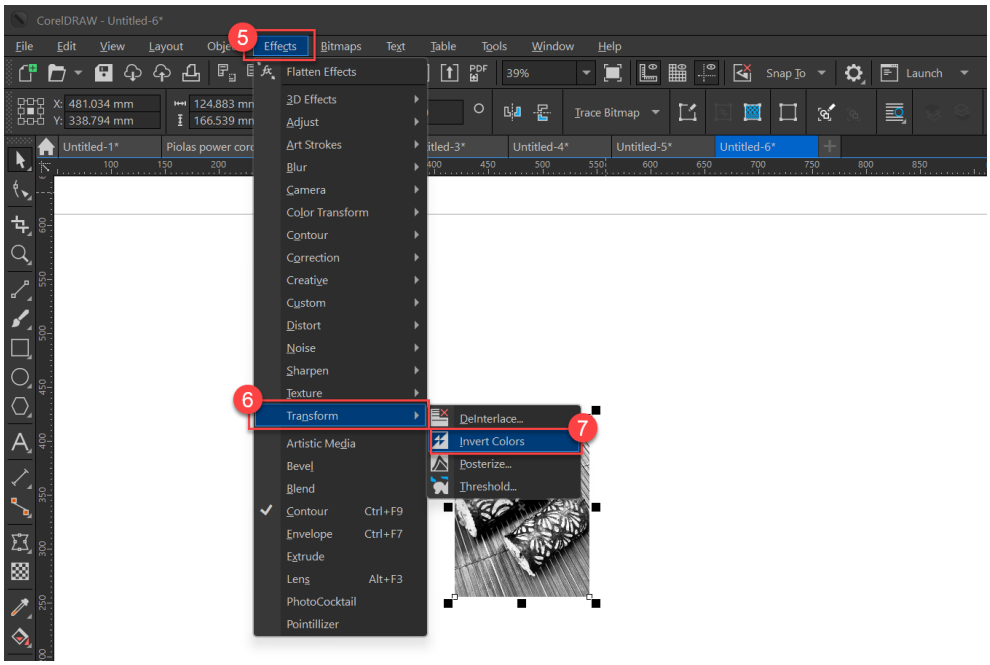
1. Import a picture into CorelDRAW.
2. Convert the image to Bitmap by selecting the image and click on Bitmaps/Convert to Bitmap



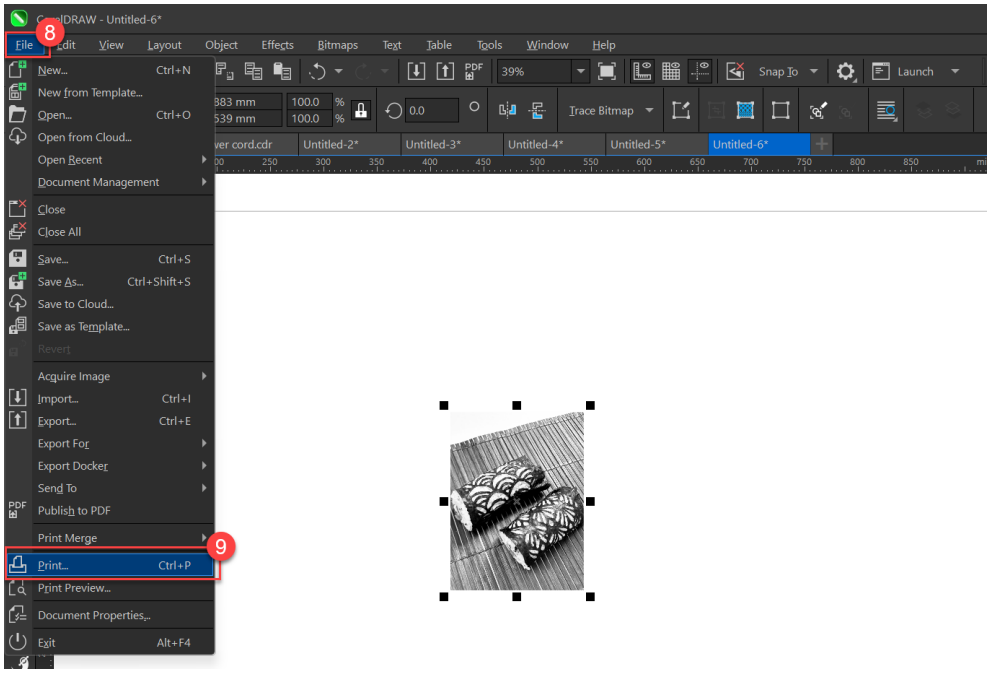
3. Change the Bitmap settings by setting “Color” to Grayscale (8-bit) and “Resolution” to 300 dpi and click OK.



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

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

Several optional items are available to enhance your experience with the Piolas 400 system. If, at any time after purchasing your Piolas 400, 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.

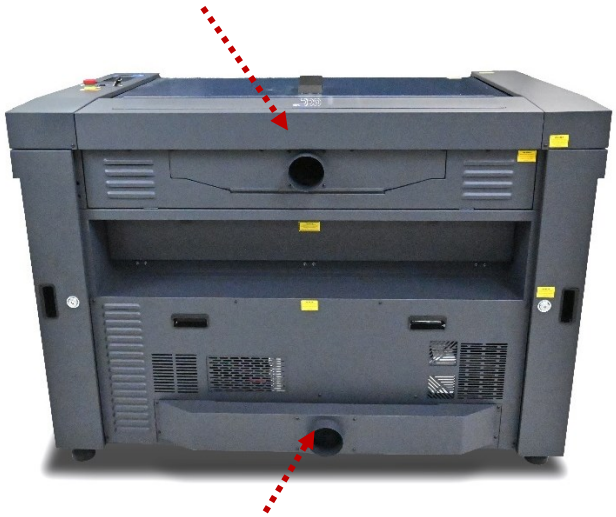
2) Mount the fume ventilation system in an obvious and accessible location, not too far from the GCC LaserPro machines, so it can be routinely switched on prior to laser engraving. The maximal distance you should mount the exhaust system away from the Piolas 400 depends on the blower’s vacuum capacity. 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.

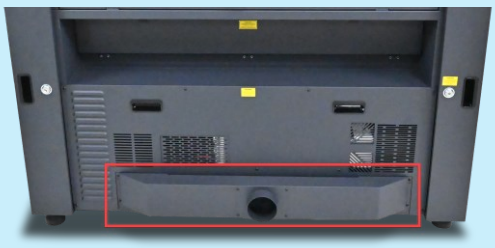
4” Ventilation Opening



5” Ventilation Opening

NOTE

1. The bottom ventilation opening is 5” when the machine shipped. You can find a 4” ventilation opening in the accessory box.
2. The bottom ventilation opening is designed to be removable, allowing for the connection of two fume extraction units. This configuration provides significantly enhanced suction for more efficient fume removal.

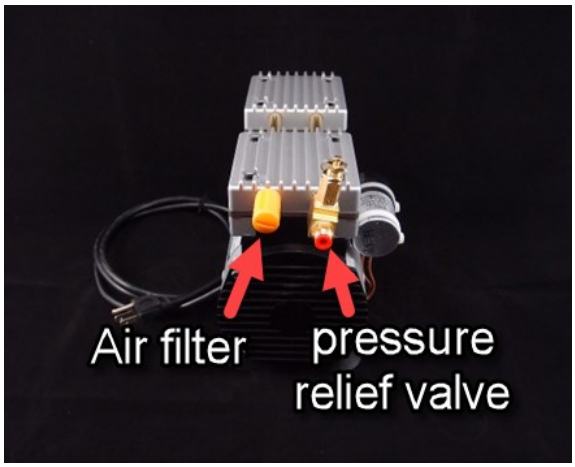


7.2 Air Compressor

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 Piolas 400 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) Plug the air compressor's power cord into the "For Air Compressor" power socket.

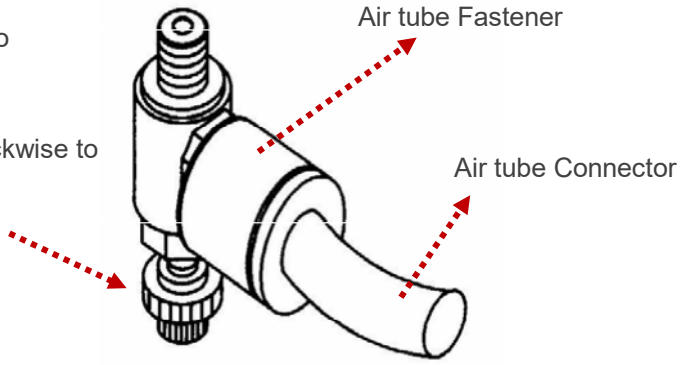
4) Plug the female end of power cord to the power cord B socket.

5) 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.

6) 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.

Air Flow Regulator:

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



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 Piolas 400 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.

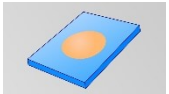
7.3 Focus Lens Options

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.

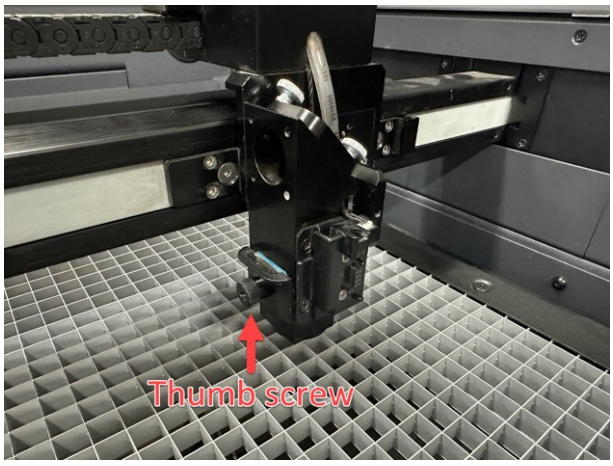
The resulting spot size from the different focus lens are a o different and the following chart shows the different spot sizes achieved from the different lenses.

- 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.
- 3.0” & 4.0” Lens: The 3.0” & 4.0” lenses are good for 10mm and above acrylic cutting.

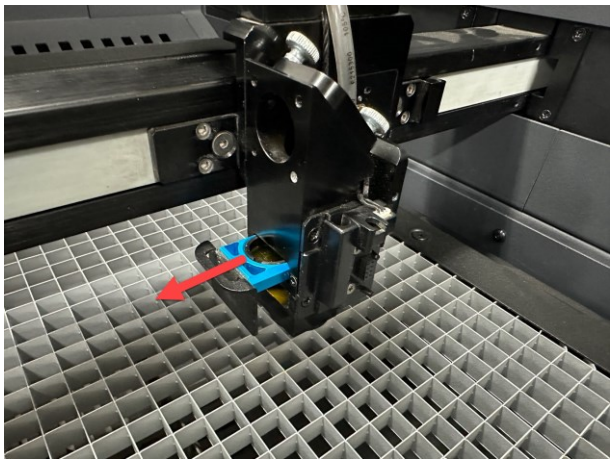
 Lens	1.5”	2.0”	2.5”	3.0”	4.0”
 Spot Size	0.073 mm (0.0029”)	0.099 mm (0.0039”)	0.121 mm (0.0048”)	0.147 mm (0.0058”)	0.198 mm (0.0078”)

Change a different focal lens

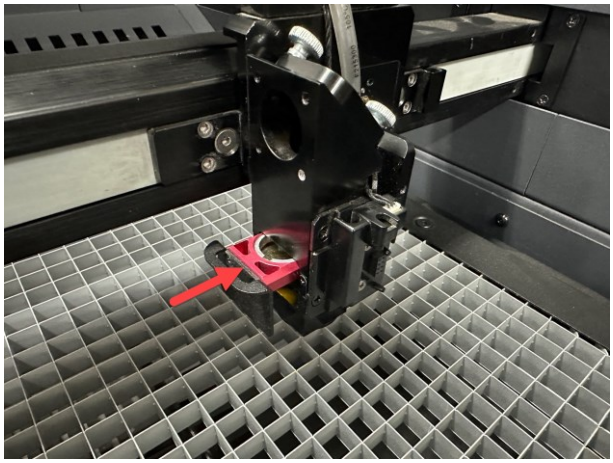
1) Unscrew the thumb screw on the left side of the lens carriage.



2) Remove the focal lens.

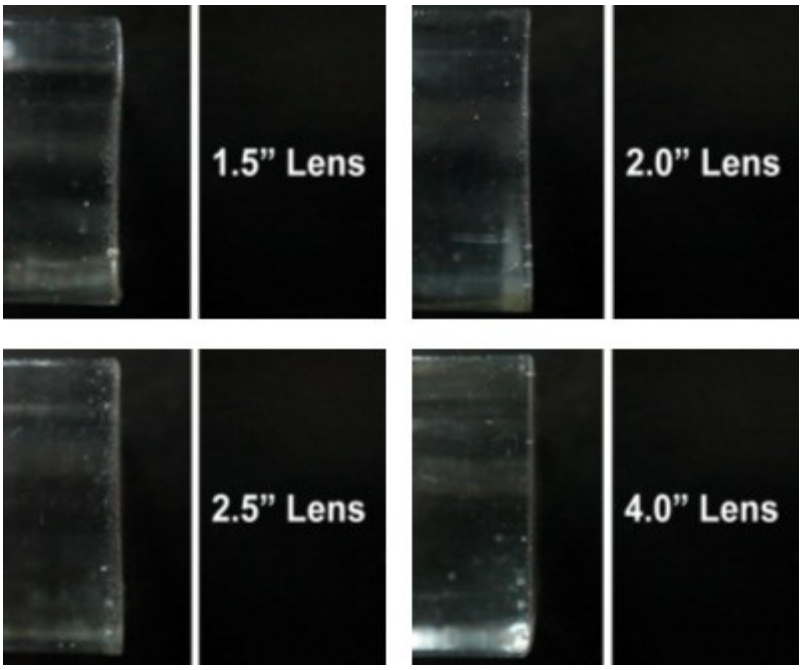


3) Insert the new focal lens and tighten the thumb screw.



Engraving effects achieved with the different lenses

Cutting edges achieved with the different lenses



7.4 Pass-Through Door Options

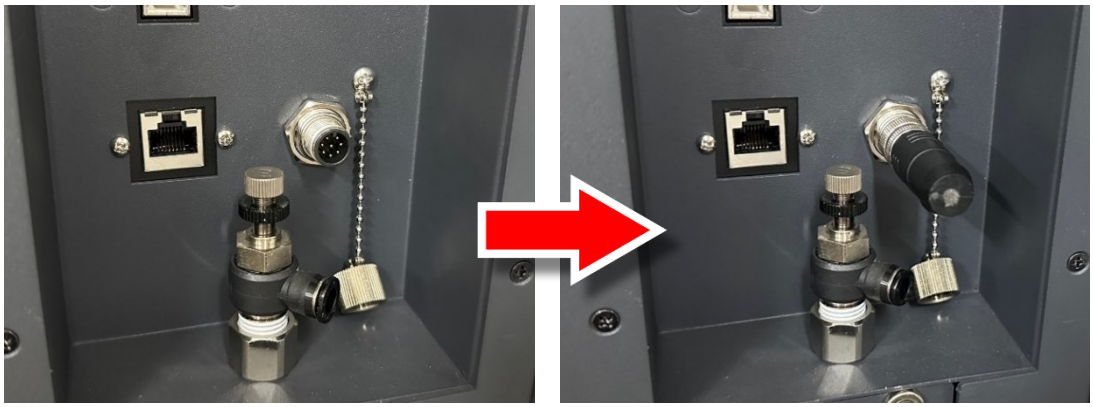
GCC Piolas laser systems are designed to be Class 2 (US: Class II) safety requirement, the laser would stop firing if any door open during operation to protect operator safety. For users installed optional Pass-Through Door switch module, GCC laser system will be converted to Class 4 (US: Class IV) safety 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

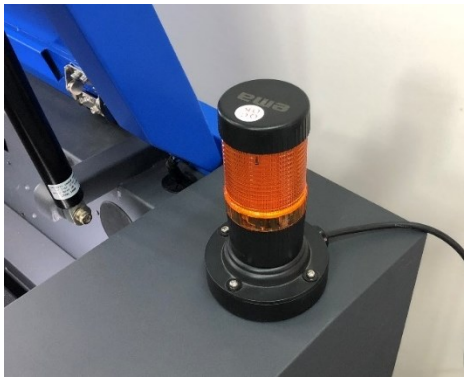
Step 1. Open the top window of laser machine then lower down the working table of laser system to the bottom.

Step 2. Locate the Pass-Through Door switch key connector at the top-right corner of machine chassis.

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



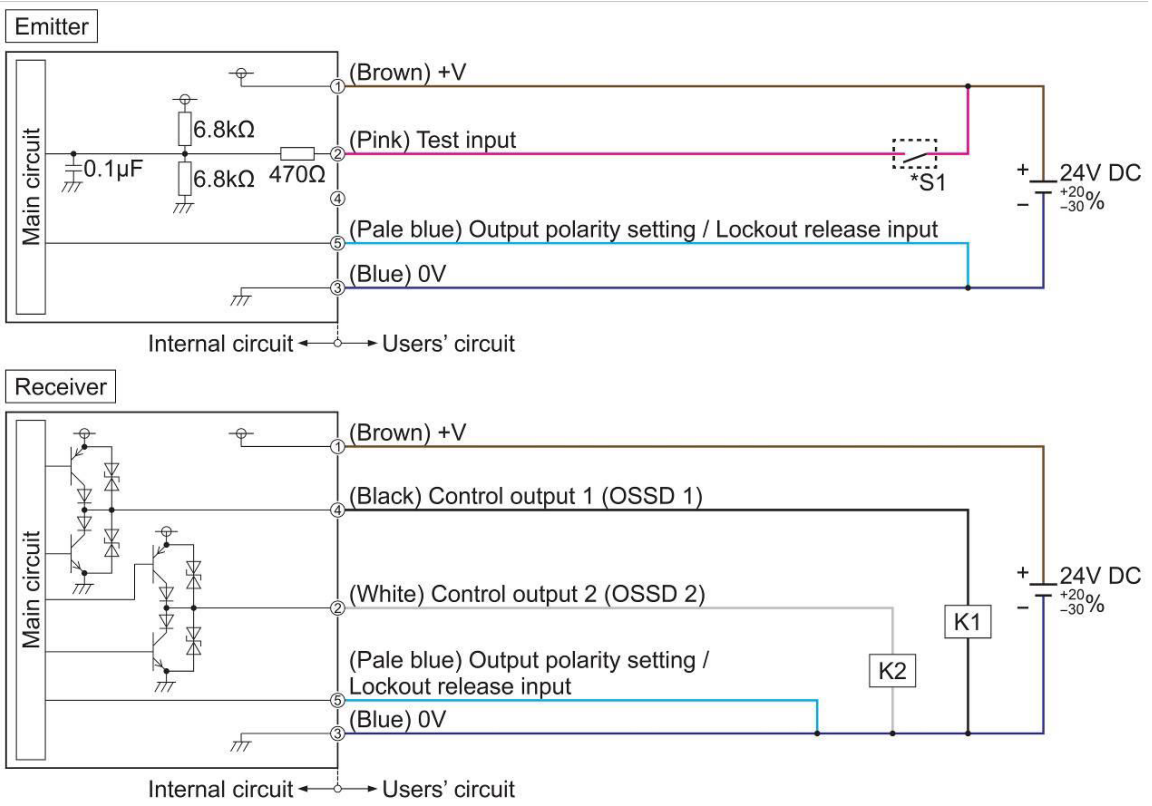
Step 4. Locate the external signal connector on the right side of laser system and plug the warning light to this port. Put the warning light on top of laser machine with high visibility as class 4 (US: class IV) safety requirement.



Step 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 Honeycomb Table / Down Vacuum Engraving Table

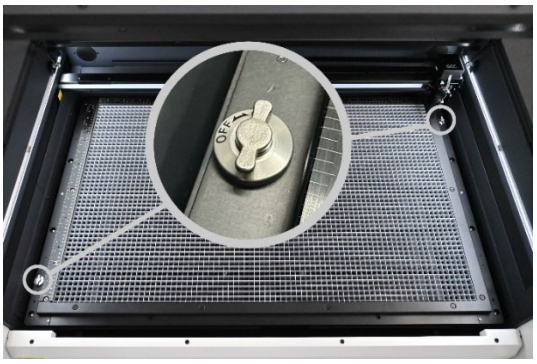
The GCC LaserPro Piolas 400 is equipped with an aluminum grid cutting table. If you are considering purchasing a honeycomb table or down vacuum engraving table for different applications, please contact your local authorized GCC distributor.

Table Switch

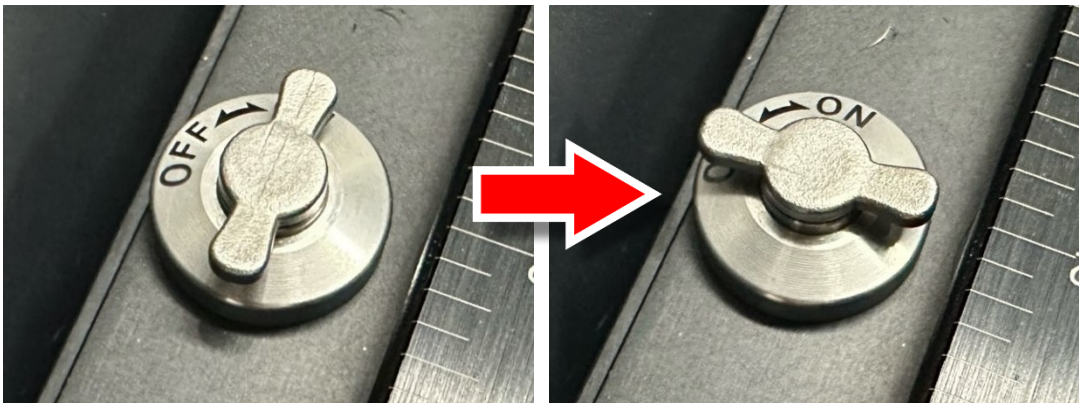
All tables use the same method to attach to the machine. Please refer to the following instructions to change the table.

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

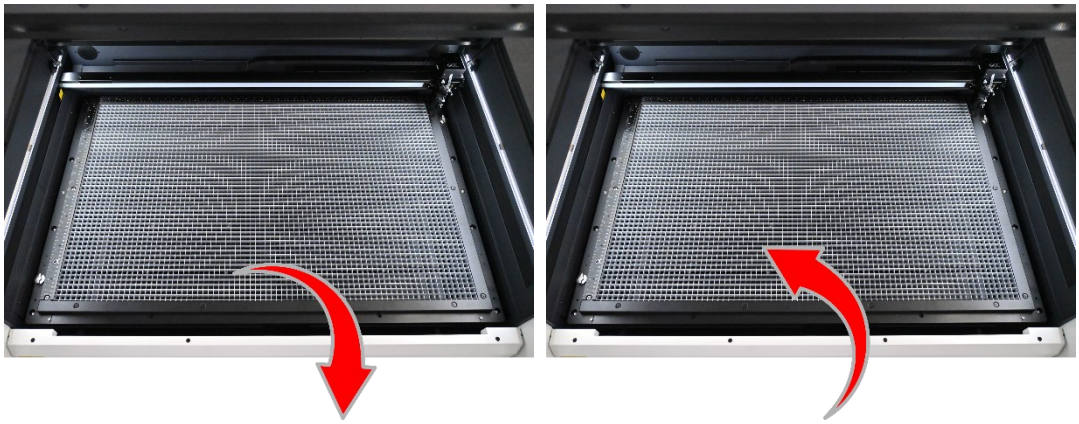
2) The Piolas series utilizes two quick keys located at the bottom left and top right of the working table to attach the table on the SmartBOX.



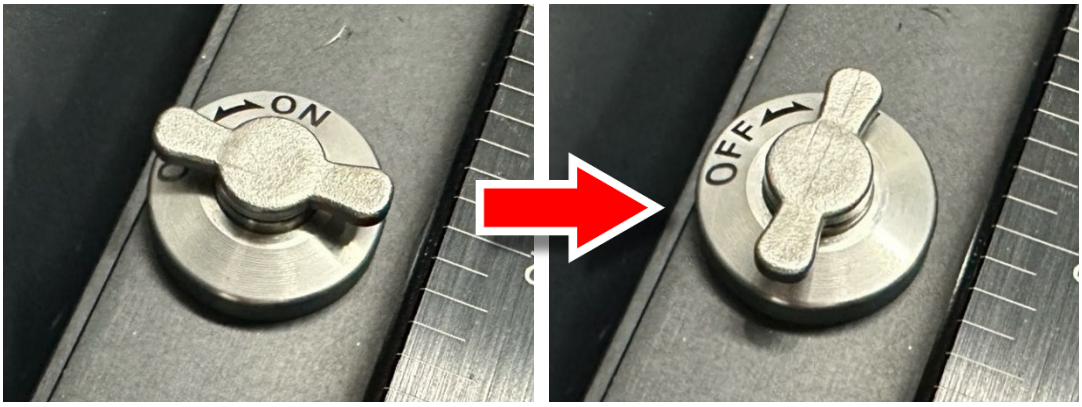
3) Rotate the two quick keys to the "OFF" position.



4) Move the table out and put a different table into the machine.



5) Ensure the table is correctly placed on the SmartBOX, then rotate the two quick keys to the "ON" position.



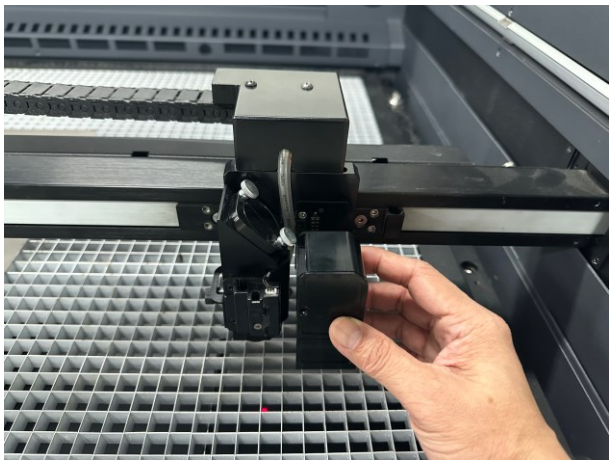
6) The table switch is completed.

7.6 SmartVISION Elite CCD

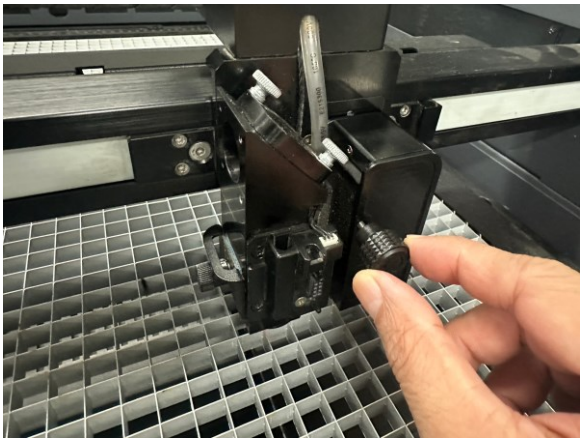
The SmartVISION Elite CCD enables you to read registration marks and achieve precise cutting, making it ideal for print-and-cut applications.

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 the thumb screw to fix it.



5) Connect the USB 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.

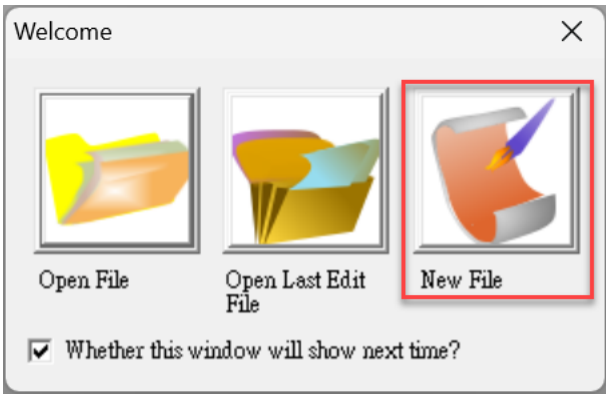
Operation:

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

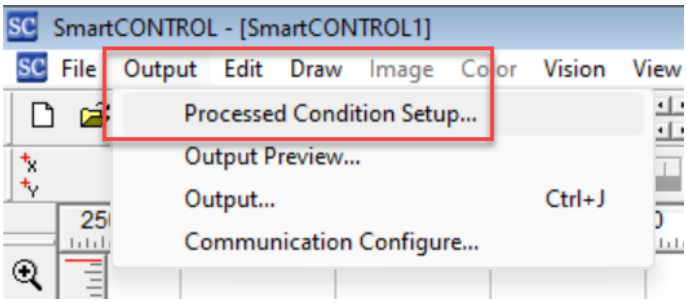
2) Install it to your computer/laptop and run it.

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.

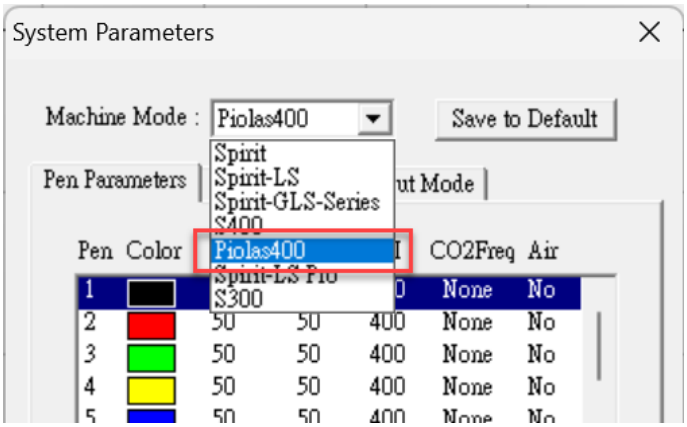
4) The Welcome window will appear, please click “New File” to continue.



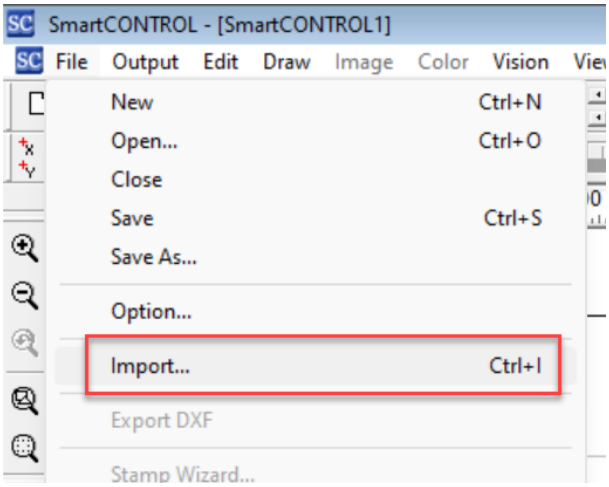
5) Go to Output → Processed Condition Setup… to set a correct model that you use.



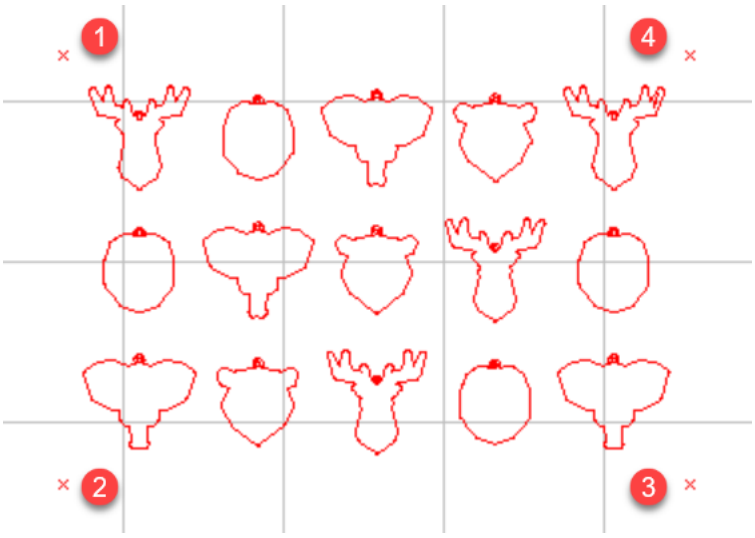
6) Select “Piolas 400” from the drop-down menu of the machine model and click OK,



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

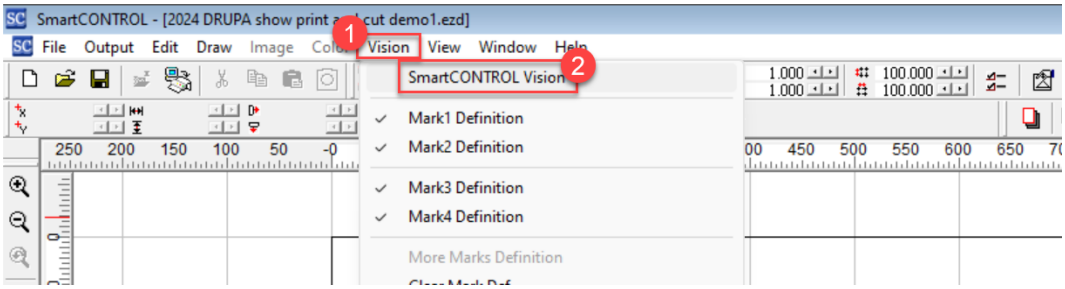


8) After importing the file, you will see some X symbols in SmartCONTROL, which indicate registration marks. If the file lacks these X symbols, it means it doesn't have registration marks and cannot be used with SmartVISION Elite CCD.

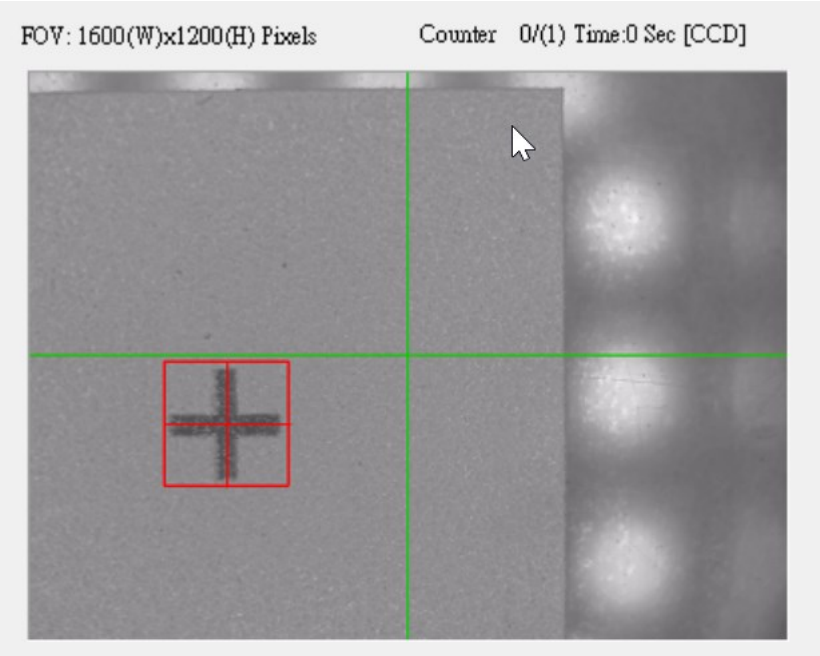


9) Place the printed media on the working table.

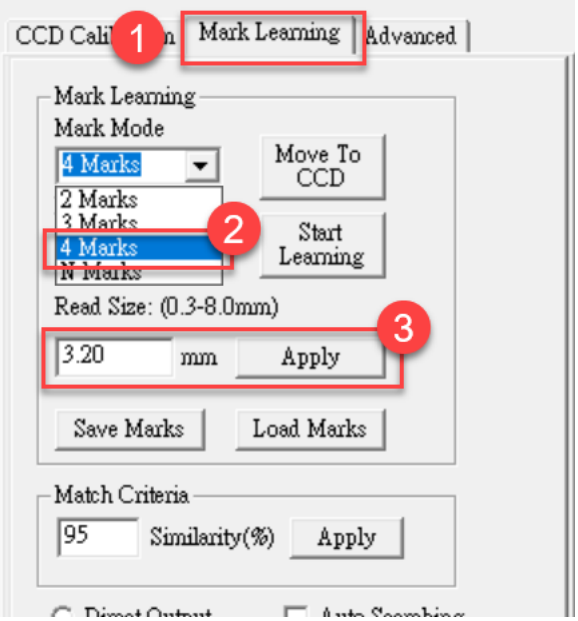
10) Go to <Vision> → <SmartCONTROL Vision> to open the SmartCONTROL window.



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.



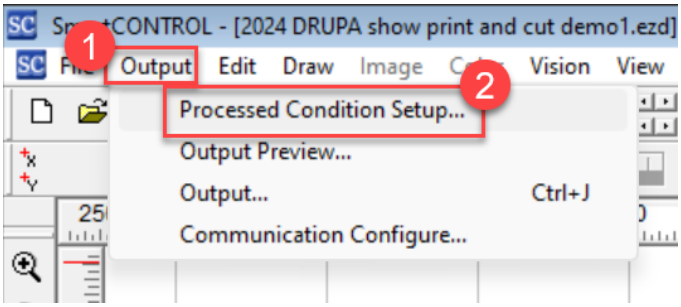
12) Click the <Mark Learning> tab and select a mark mode from the drop-down menu. Then set the read size based on the size of the mark.

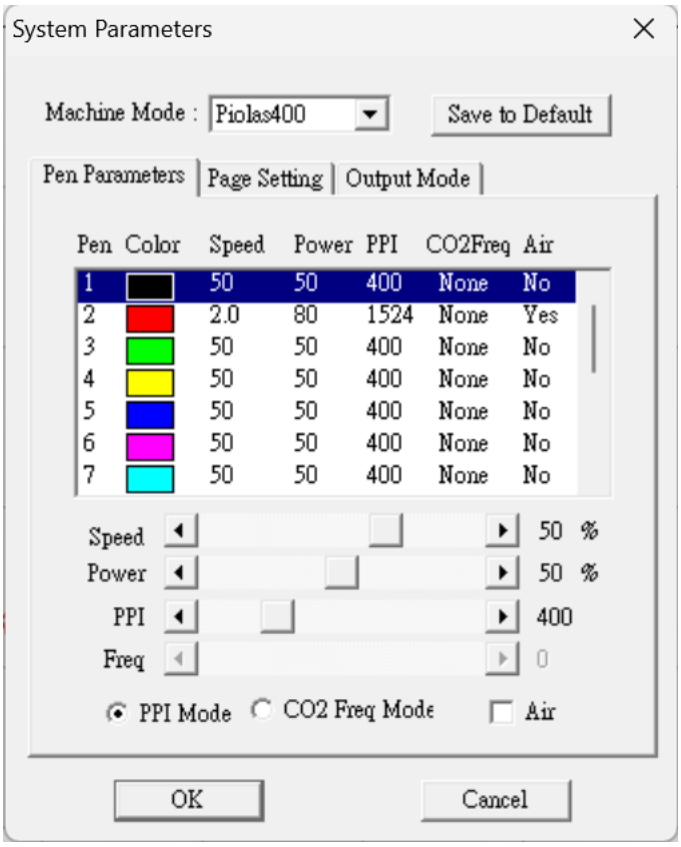


13) Move the Learn ROI (green frame) to the center of the mark and click the **Starting Learning** button to lean the mark.

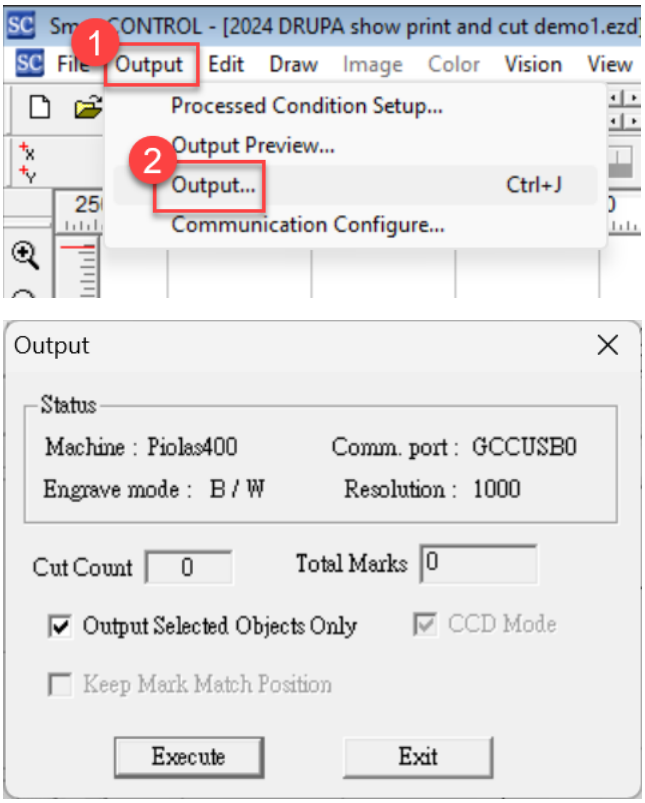
14) After learning the mark, it will appear a message to remind you that all marks have been learned.

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 (Coming soon)

7.8 SmartGUARD Fire Alarm Option (Coming soon)

Chapter 8
Basic Maintenance

- Suggested Cleaning and Maintenance Supplies
- Maintaining the Work table and Motion System
- Cleaning the Exhaust Duct

Keeping your LaserPro Piolas 400 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!

Always turn off and unplug the Piolas 400 before cleaning to avoid electrical shock and potential damage.

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 (left and right panels):

1) Loosen two screws from machine inside and the back of the panel (as shown in the picture below)

2) Open the left and right panels

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 Piolas 400 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 rai of the motion system.
5) Wait for all cleaning residue to dry completely before plugging in and operating the Piolas 400.

WARNING!

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

8.2.3 Lubrication of the X & Y Axis

In order to keep the motion system running smoothly, the X and Y axis 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 Piolas 400 mode 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 Piolas 400 model, and Y axis of Piolas 400. You can purchase PS2 grease from NSK dealers worldwide.

Please visit http://www.nsk.com/eng/company/network/index.html for additional information

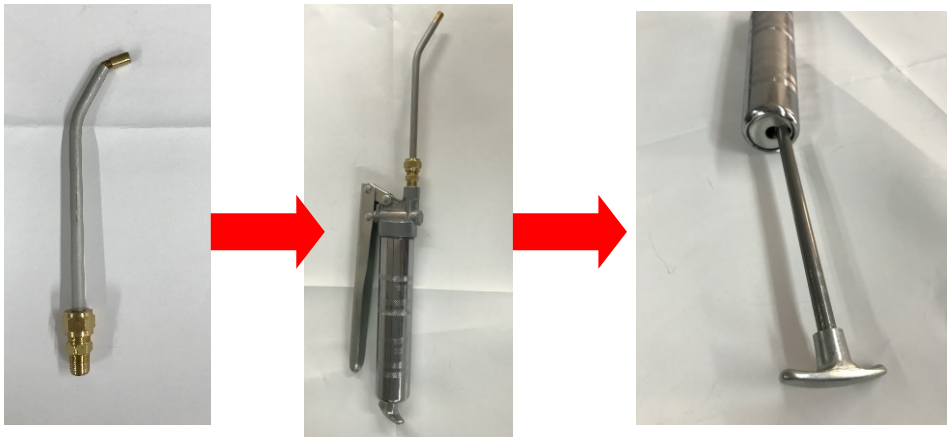
NOTE

- Clean and lubricate the X linear rail of Piolas 400 with 0.1ml grease from syringe every month to properly maintain the motion system.
- The lubrication oil for the X linear rail on Piolas 400 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 of Piolas 400, after working with material that produce lots of debris (such as wood).
- Too much oil or PS2 grease applied to the Y axis will accelerate the debris building up.

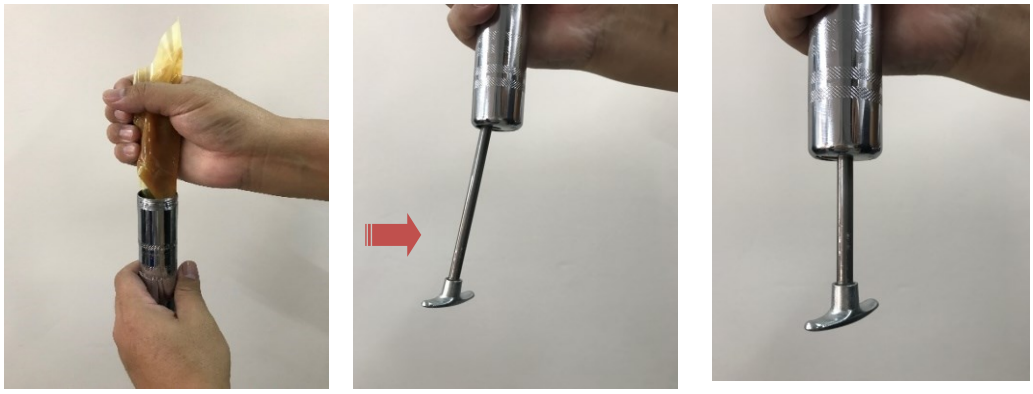
The X rail of Piolas 400 has linear bearing design which needs lubrication regularly depending on the job loading, recommend on bi-weekly base. Follow below procedures.

1. Take out the Grease Syringe from accessory box

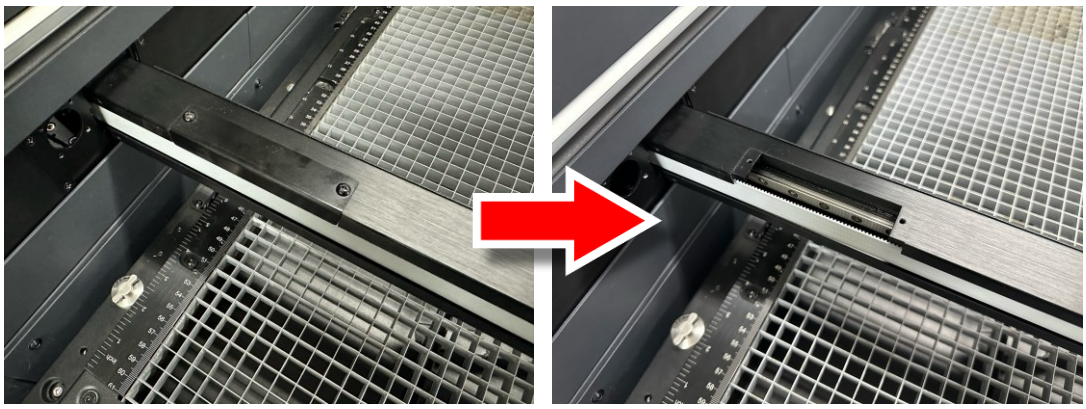
2. Select the following parts and compose the grease syringe as below pictures



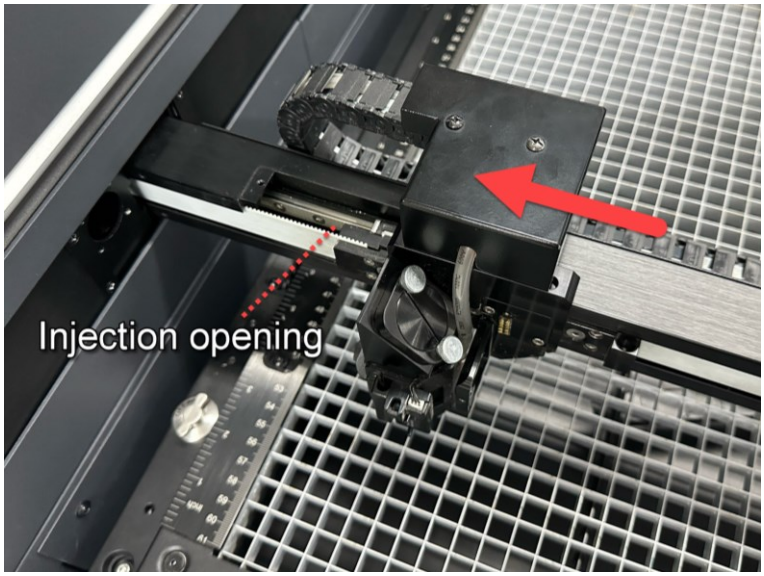
3. Inject 0.1ml of grease to the injection opening inside the linear bearing



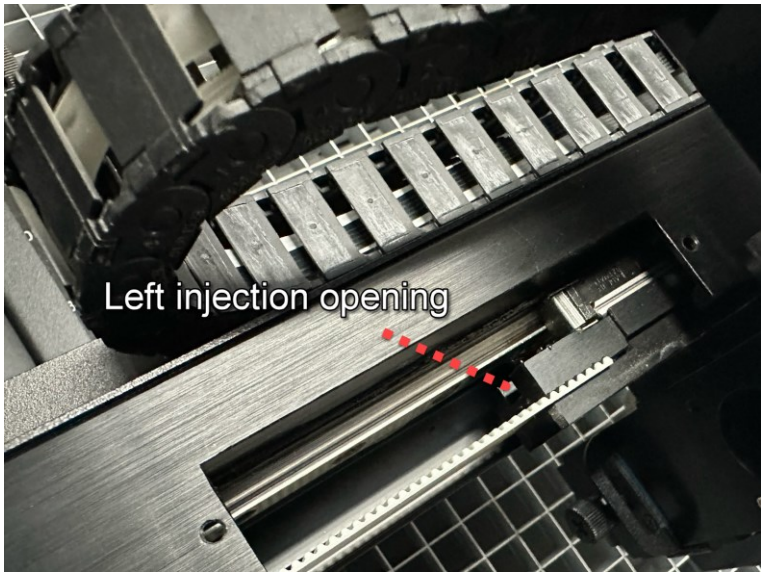
4. Remove the protected cover from the carriage



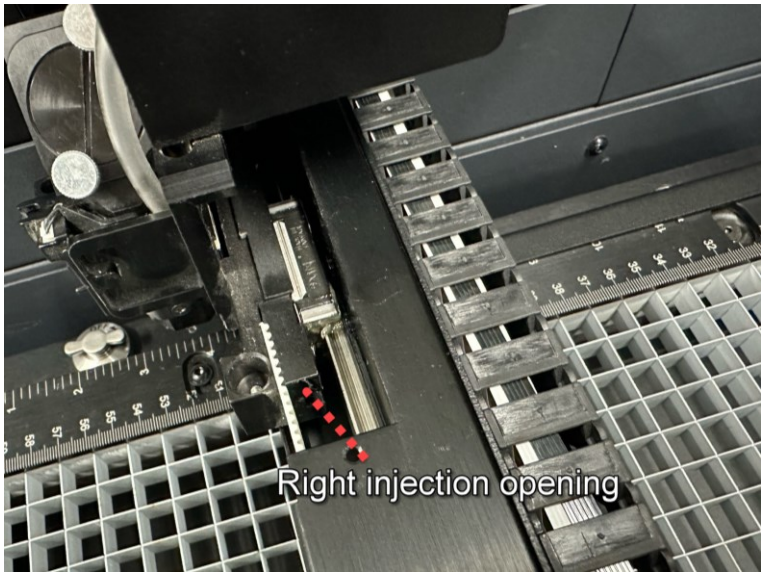
5. Slide the lens carriage to the left until the left injection opening appears.



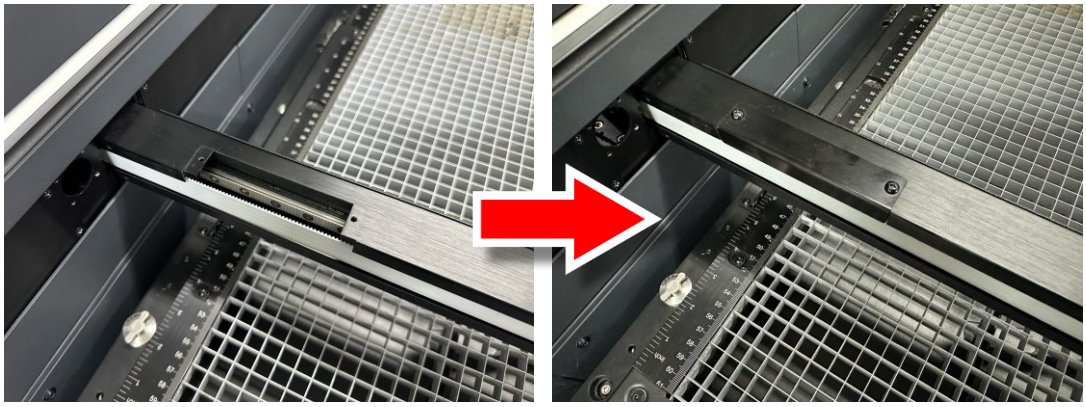
6. Inject small amount of grease to left injection opening inside the linear bearing



7. Slide the lens carriage all the way to the left until the right injection opening appears.



8. Inject small amount of grease to right injection opening inside the linear bearing
9. Tight the cover back to the X rail.



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 Piolas 400 for cleaning.

Mirror 1

Mirror #1 is located inside the bottom left access door panel of the LaserPro Piolas 400.

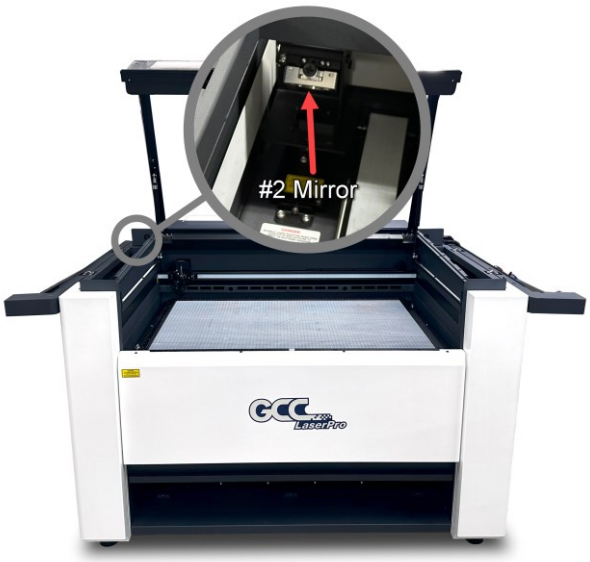
1) Use a #8 Allen key to release the lock on the left panel.

2) Slide left to remove the left access panel

3) Remove the mirror 1 cover and loosen the thumbscrew securing mirror 1.
4) Remove the mirror and clean it properly.
5) After cleaning, place the mirror back into the optics holder.
6) Tighten the thumbscrew.
7) Close and secure all the covers.

Mirror 2

Mirror #2 is located inside the left back panel of the LaserPro Piolas 400.



1) Remove the mirror 2 cover and loosen the thumbscrew securing mirror 2.
2) Remove the mirror and clean it properly.
3) After cleaning, place the mirror back into the optics holder.
4) Tighten the thumbscrew.
5) Close and secure all the covers.

Mirror 3

Mirror #3 is located inside the left panel of the LaserPro Piolas 400.

1) Loosen the thumbscrew securing mirror #3.
2) Remove the mirror and clean it properly.
3) Place the mirror back to the optics holder after cleaning.
4) Tighten the thumbscrew.

Mirror 4

Mirror #4 is located at the top of the lens carriage.

1) Loosen 2 thumbscrew securing mirror #4.
2) Remove the mirror and clean it properly.
3) Clean the mirror in the proper manner.
4) Place the mirror back to the optics holder after cleaning.
5) Tighten the thumbscrew.

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) Please refer to chapter 7.3.1 to know how to remove the focal lens.
2) 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).**
3) After cleaning, use a cotton swab to gently dry the focal lens and lens cover.

8.4 Cleaning the Exhaust Duct

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

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

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

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

Step 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 Setting. Set Focus Lens to see if it matches the type of the lens installed.
- Check if the focal lens is installed correctly or if focal lens is not fixed properly.
- Check if it is caused by the debris or dust builds up in the bearing tracks of X rail.
- Check if it is caused from the damaged or dirty focal lens and mirror 4 in the 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**
> Unplug the machine before examining the mirrors, lens, motion system or any other part of the laser system.

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
Basic Troubleshooting

- Glossary
- LaserPro Piolas 400 Specification Sheet

10.1 Glossary

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

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

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

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

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

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 Piolas 400 Specification Sheet

Work Area	**without CCD**	1,016 x 610 mm (40 x 24 in.)
	with CCD	
Max. Part Size (W x L x H)		1,091 x 680 x 280 mm (43 x 26.8 x 11 in.)
Max. Part Size (W x L x H) (with pass-through door module)		1,064 x ∞ x 165 mm (41.9 x ∞ x 6.5 in.)
Table Size		Standard Alu Grid Cutting Table 1,021 x 614 mm (40.2 x 24.2 in.)
Dimensions (L x W x H)		1,511 x 1,107 x 1,123mm (59.5 x 43.6 x 44.2 in.)
Weight		392 kg / 864 lb
Laser Source		CO2: 80, 100, 120W
Cooling		80W~120W - Air-cooled, Operating environment temperature 15°- 30°C (59°- 86°F)
Drive		Brushless DC motor closed-loop servo control
Camera	**SmartEYES**	Standard
	Live-view camera	Standard
	SmartVISION Elite	Optional
Maximum Engraving Speed*		4.44 m/s (175 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
Focus Lens		CO_2: Standard 2.0" (Optional 1.5", 2.5", 3.0" & 4.0")
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 USB Storage  – For connecting with the computer
Compatible Operating Systems		MS Windows
Control Panel		7" Touch panel
Safety		Class 1 Laser Product Complies with EN60825-1:2014, EN ISO 13849-1:2023 Class 2 Laser Product Complies with CDRH for CO2 Laser 2006/42/EC Machinery Directive Compliance Class 4 Laser Product Compliant with CDRH with the optional pass-through door module
Operation Voltage		80Watt and above, 200-240VAC, 50/60HZ Auto Switching, max. 15A
Exhaust Port Diameter		Upper exhaust port diameter: 4" (101mm) / Lower exhaust port diameter: 5" (127mm)
Fume Extraction System**		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.

∆ Specifications are subject to change without prior notice.