Maintenance Manual

Spirit LS Pro

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Chapter 1：Overview

1.1 Introduction

This manual is designed for distributors to maintain and repair the Spirit LS Pro series.

- Chapter 1 provides an introduction to the contents, safety protocols, and operating environment.
- Chapter 2, we provide diagrams that show the part numbers for each component in various sections.
- Chapter 3, introduction to Electrical Systems
- Chapter 4, provides an introduction that will guide you on how to replace parts effectively.
- Chapter 5, discusses the laser system, focusing on the laser tube, beam alignment, and optical alignment.
- Chapter 6, provides instructions on how to upgrade the firmware.
- Chapter 7, troubleshooting & system diagnostics
- Chapter 8, FAQ

The contents of the manual may change without prior notice. For assistance, please contact GCC Customer Service by calling 886-2-2694-6687 or emailing tech.support@gccworld.com.

1.2 Safety

1.2.1 The Safety Interlock System

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

WARNING!

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

1.2.2 Product Label

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

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

1.2.3 Safety Measures

General Safety

- LASER RADIATION WARNING: Exposure to laser radiation may result in physical burns and severe eye damage. Proper use and regular maintenance of this machine is important to the safety of all people in the immediate area.
- Prior to operation, carefully read and familiarize yourself with the warning labels located on both your laser system and in this manual.
- Never leave the machine unattended during the laser cutting and engraving process. The laser may ignite combustible materials. A well-maintained fire extinguisher and operational smoke or fire detector should be kept in the vicinity of the machine.
- Caution: Using controls, making adjustments, or performing procedures not specified here may lead to hazardous radiation exposure.
- Resulting debris from laser cutting is very dangerous and may cause fire hazards.
- DO NOT leave debris and scraps inside the laser machine after the job is finished. Always keep the machine clean after the job is finished.

NOTE

For Spirit PRO CO2 model, the machine is shipped with a single pair of safety goggles. If additional safety goggles are required, please contact GCC directly or an authorized GCC distributor. If you wish to purchase one on your own, please make sure the safety goggles meet these requirements:

9000-11000nm OD5+

Visible Light Transmission: 92.9%

NOTE

For Spirit PRO CO2 model, the machine is shipped with a single pair of safety goggles. If additional safety goggles are required, please contact GCC directly or an authorized GCC distributor. If you wish to purchase one on your own, please make sure the safety goggles meet these requirements:

9000-11000nm OD5+
Visible Light Transmission: 92.9%

NOTE

For Spirit PRO fiber and dual model, the machine is shipped with a single pair of safety goggles. If additional safety goggles are required, please contact GCC directly or an authorized GCC distributor. If you wish to purchase one on your own, please make sure the safety goggles meet these requirements:

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

WARNING!

- Resulting debris from laser processing are very dangerous and may cause fire hazard
- **DO NOT** leave debris and scraps inside laser machine after job finished. Must keep machine clean after job finished.
- Always remove the vector grid to clean any small pieces that have fallen through the grid.

NOTE

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

- Enable the SmartAIR™ nozzle when engraving or cutting materials that may easily ignite, such as acrylic, wood, or paper.
- Always wear safety goggles when the laser system is in operation. Reflective materials such as mirrors, enameled brass, and anodized aluminum may partially reflect some of the invisible laser radiation. Severe eye damage may occur if proper safety goggles are not worn.
- Connect the machine to a properly grounded power outlet. Ensure the voltage of the power source is identical to the voltage of the machine.
- Do not open the laser access panel when the machine is plugged in.
- Do not attempt to modify or disassemble the laser module.
- Do not attempt to remove or modify any component of the machine's laser interlock safety system.
- Ensure the machine's immediate work area is well-ventilated. Odors, vapors, and dust are byproducts generated during the laser engraving and cutting process. An exhaust system, vacuum cutting box, and honeycomb table are recommended. Please contact GCC or your local GCC distributor for more information.
- Do not laser heat-sensitive surfaces or materials that may generate toxic fumes, such as PVC and Teflon.
- Regularly clean and maintain your machine according to our cleaning and maintenance Instructions in Chapter 8. Doing so will ensure your machine will operate effectively and safely over a long period of time.

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

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

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

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

- The operator is obliged to appoint **a trained Laser Protection Officer** responsible for compliance with the relevant regulations.

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

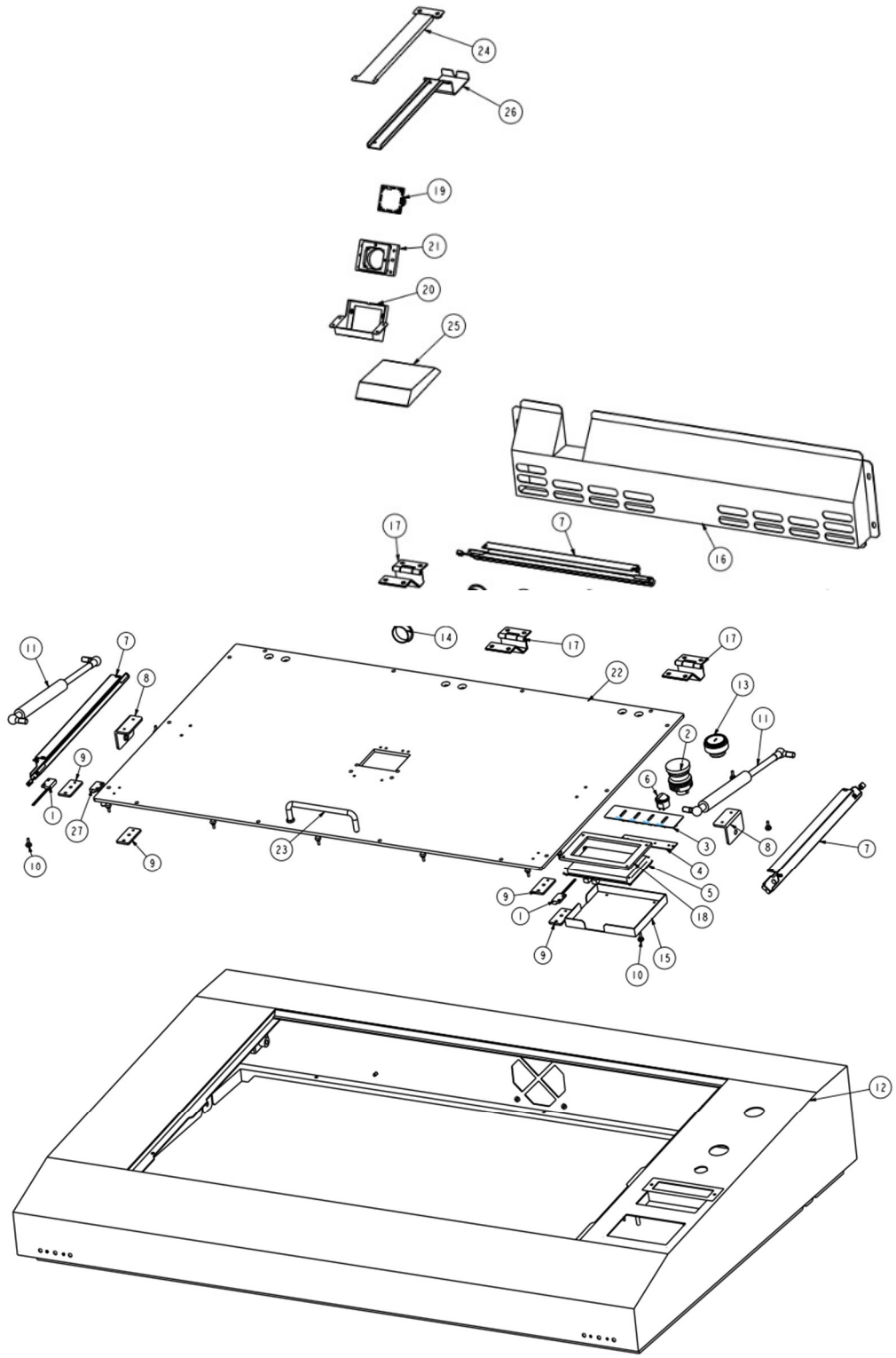
1.2.4 Operating Environment

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

- Avoid environments where the machine is exposed to high levels of dust, temperature (temperature exceeding 30°C or 85°F) or humidity (humidity exceeding 70% or where the ambient temperature is near the dew point).
- Avoid small, enclosed areas with poor ventilation.
- Avoid areas with high levels of noise and electrical noise.
- Select a location large enough to accommodate the LaserPro Spirit PRO Series, an exhaust system, a computer, and a work or storage table.
- Select a location in which the ambient temperature remains between 15°C and 30°C (60°F to 85°F)
- Select a location in which the relative humidity remains between 30% - 40%.
- Select a location in which there is a short, direct path to the fume exhaust system.
- Set the LaserPro Spirit PRO Series on a floor surface that is completely even.
- Make sure your smoke or fire detection system in the immediate area is functioning.
- Set up the machine to be apart from the wall for at least 60 cm (2 feet).

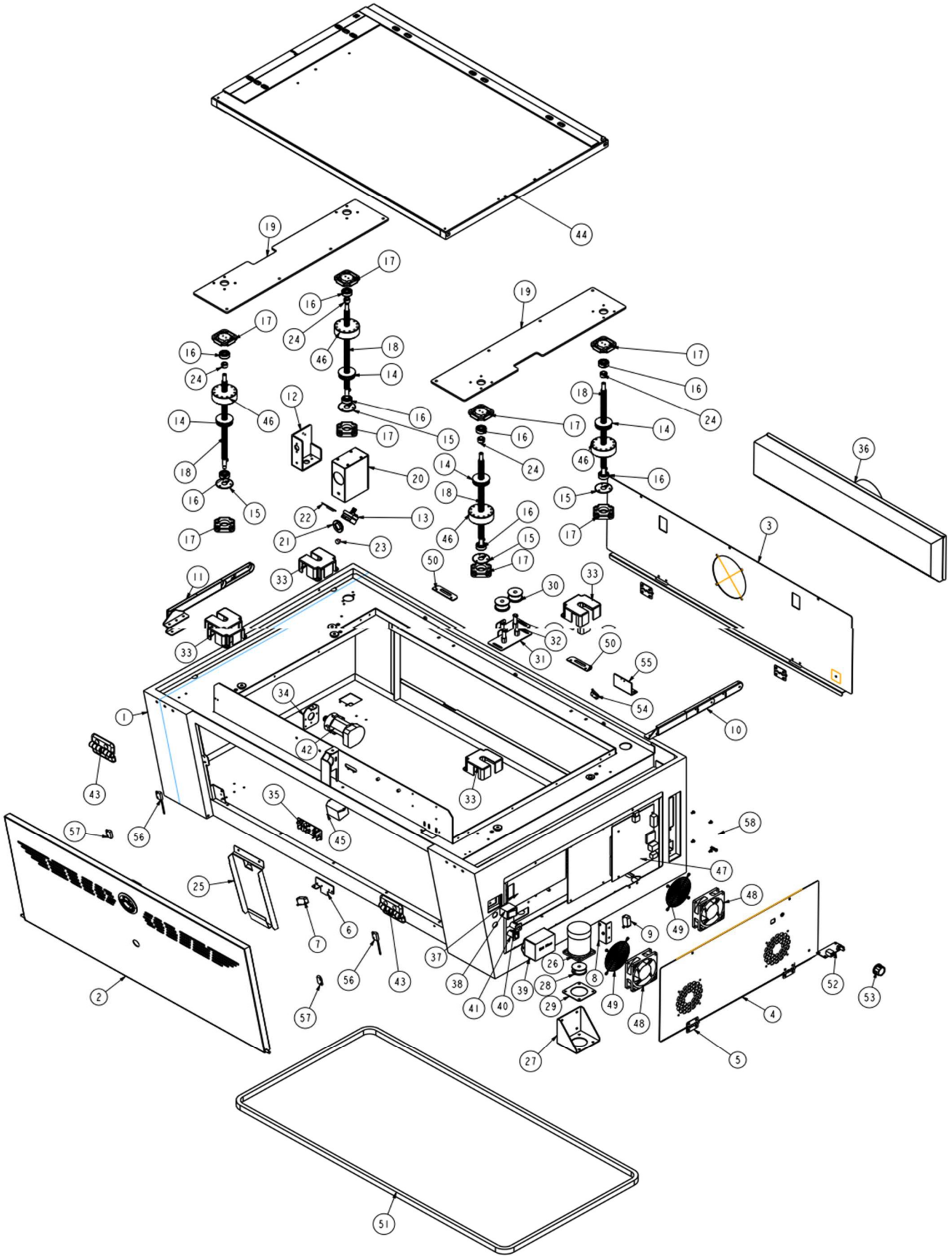
Chapter 2：Mechanical System

2.1 Top Cover



Top Cover Assembly_Spirit LS Pro		
No.	**Part No.**	**Description**
1	257001290G	Magnetic Switch (MS-324-3-1-0500)
2	25700095G	Emergency Switch (TN3BKR-2B)
3	290107260G	LED Board Assembly
4	290102740G	LED Display Board Assembly
5	290136020G	TFT Touch Panel Board
6	25700032G	LAMP SW(R13-112)
7	244051810G	LED lamp holder
8	24402675G	BKT CYLINDER
9	244075170G	Sensor Bracket
10	26500210G	Rubber Foot TNF-1
11	233016730G	Glass Window Cylinder (8kg)
12	244075580G	Top cover
13	25700094G	Key Switch (E3K2I1A.V)
14	23300093G	Hold plug
15	244075660G	Key Board Dust Proof Cover
16	244075670G	Wind Box
17	233021300G	Concealed Hinge(AS-110)
18	233017200G	Spacer
19	237001030G	Kingcent KS12A884-IMX377 112 degree, no distortion, 2.8mm Lens(with 3m USB wire)
20	244075720G	Mount Base Bracket
21	202004160G	Adjustable CCD Mount Assembly
22	228051050G	Window
23	233021310G	Handle
24	244075650G	Flat Cable Top Cover
25	244075700G	CCD Top Cover (Top view CCD)
26	244075710G	Flat Cable Bottom Cover
27	220006380G	Magnet (MSM-324)

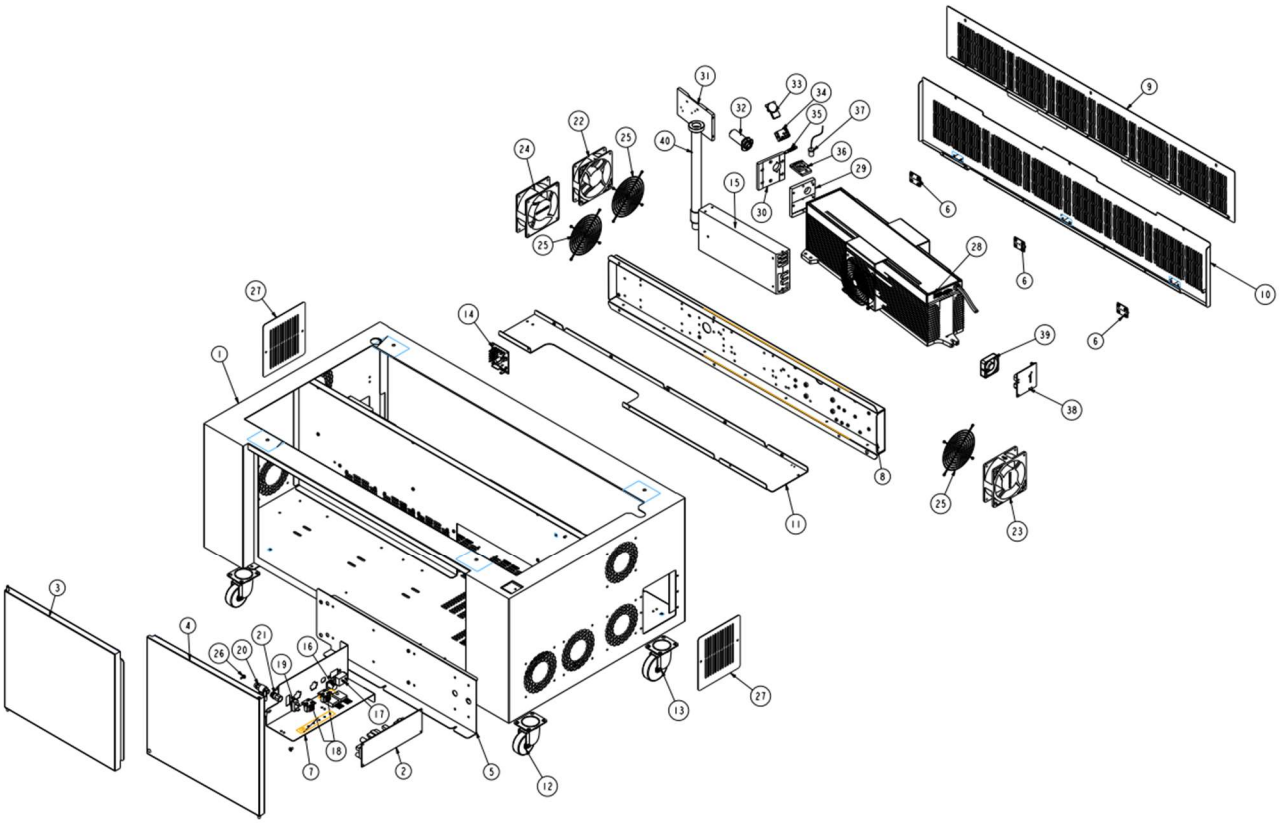
2.2 Mid-Section



Mid. Section _ Spirit LS Pro		
No.	**Part No.**	**Description**
1	244075560G	Main Unit
2	244075570G	Front Door
3	244075590G	Main Unit Back Door
4	244075600G	Side Door
5	24400991G	Plank hinge
6	24400984G	Z axis top Limit modulate seat
7	25700002G	LEVER SW
8	24400985G	Z axis down Limit Switch seat
9	25700002G	LEVER SW
10	23300307G	Top Cover left fixed stick
11	23300308G	Top Cover right fixed stick
12	24400987G	Mirror Bracket
13	202003240G	Prism Mounts Assembly
14	24100368G	Z axis pulley
15	24100367G	Z axis pulley cover
16	20700034G	Bearing 628ZZ
17	24100366G	Bearing seat
18	22801022G	Z-axis table screw
19	24401129G	Working table Bracket
20	24401108G	Dust Prevention Cap
21	22800269G	Lens fix mount
22	29002522G	Mirror Assembly
23	23300299G	Hand Knobs (CRKB.M4-6L)
24	228050540G	Z Axis Top Stopper
25	244054170G	Cover
26	29005784G	Z Motor Assembly
27		
28		
29		
30	241007340G	Idle Pulley

Mid. Section _ Spirit LS Pro		
No.	**Part No.**	**Description**
31	24401000G	Z-axis Idle wheel
32	22800964G	Core of Z-axis pulley
33	24100369G	Belt flange
34	24400986G	Y motor fix board
35	29002510G	Y Motor PCB
36	24401438G	Induced draft box
37	245001180G	Power Supply 300W 48V/7A
38	25700014G	AC power ON/OFF switch
39	21800007G	EMI Filter YE10T1L2
40	22300003G	Circuit Breaker 15A/250V
41	22300004G	Circuit Breaker 3A/250V
42	290103040G	Y Motor Assembly
43	23300301G	Top cover hinge
44	290136870G	Working Table
45	220005520G	Inverter for GCC LaserPro EL-Logo
46	22802906G	Z axis screw thread
47	290136860G	SLS Pro Mainboard + Driver Board Assembly (include firmware)
48	22200023G	DC 12V Fan 80*80*25mm
49	22000053G	80mm Fan Finger Guard
50	244075740G	Door-Retaining fixing plate
51	20600024G	Z-axis belt
52	290098630G	CCD USB B-type PCB Assembly
53	220005680G	Carbon Film 24ΦKnob
54	25700008G	Level Limited Switch
55	244075730G	Top Limit Switch Bracket
56	257001290G	Magnetic Switch
57	220006380G	Magnet
58	244056531G	Adapter

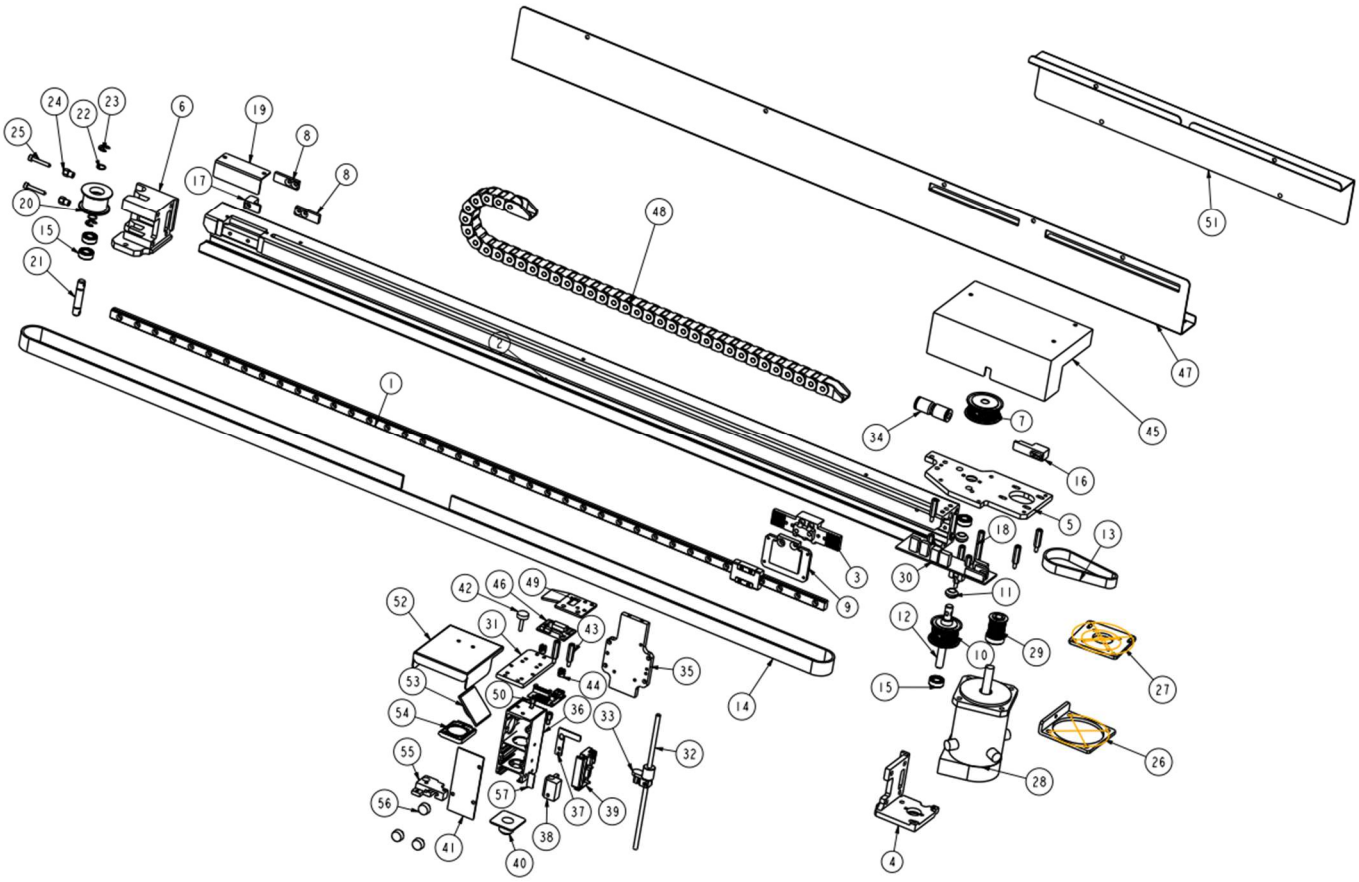
2.3 Base Section



Base Chassis Assembly _ Spirit LS Pro		
No.	**Part No.**	**Description**
1	244075460G	Base Chassis
2	24500037G	Power Supply 150W 12V/12.5A
3	244075470G	Left Door
4	244075480G	Right Door
5	244075770G	Protect Board
6	24400991G	plank hinge
7	244075490G	12V Power Fixed Board
8	244075530G	Power Supply Fixture
9	244075800G	Back Door
10	244075810G	Lower Door
11	244075790G	Middle Plate
12	233013940G	2.5" PR Stand Wheel with Brake
13	233013930G	2.5" PR Stand Wheel
14	29005059G	DC12V POWER MODULE
15	24500048G	Power Supply 1500W 48V/32A
16	22300003G	Circuit Breaker 15A/250V
17	21100184G	AC Power Socket
18	21100149G	AC Power Socket
19	25700017G	Rocker Switch- Black Case
20	26500488G	Air Flow Valve JSC6-02BT(Black)
21	26500489G	Airflow valve
22	22200022G	DC 12V Fan 120*120*25mm
23	22200024G	DC 12V Fan 120*120*38mm
24	22200036G	DC 12V Fan 120*120*38mm
25	22000106G	Fan finger guard 12cm(008170)
26	26500210G	Rubber Foot TNF-1
27	244075520G	Plate B
28		Laser Tube
29	22801470G	Laser reconnect board
30	22801471G	Laser front bracket

Base Chassis Assembly _ Spirit LS Pro		
No.	**Part No.**	**Description**
31	228039410G	Laser Front Board
32	29002528G	3x Beam Expander
33	290077670G	1st mirror block(1")
34	202003240G	Prism Mounts Assembly
35	290094490G	Beam Combiner Assembly
36	202003490G	Red Pointer Mounts Assembly
37	290105600G	Red Pointer Assembly
38	290079640G	DC & AC Fan Control Board Set
39	22200044G	DC 12V Fan 50*50*15mm
40	29003150G	600 Contraction pipe Assembly

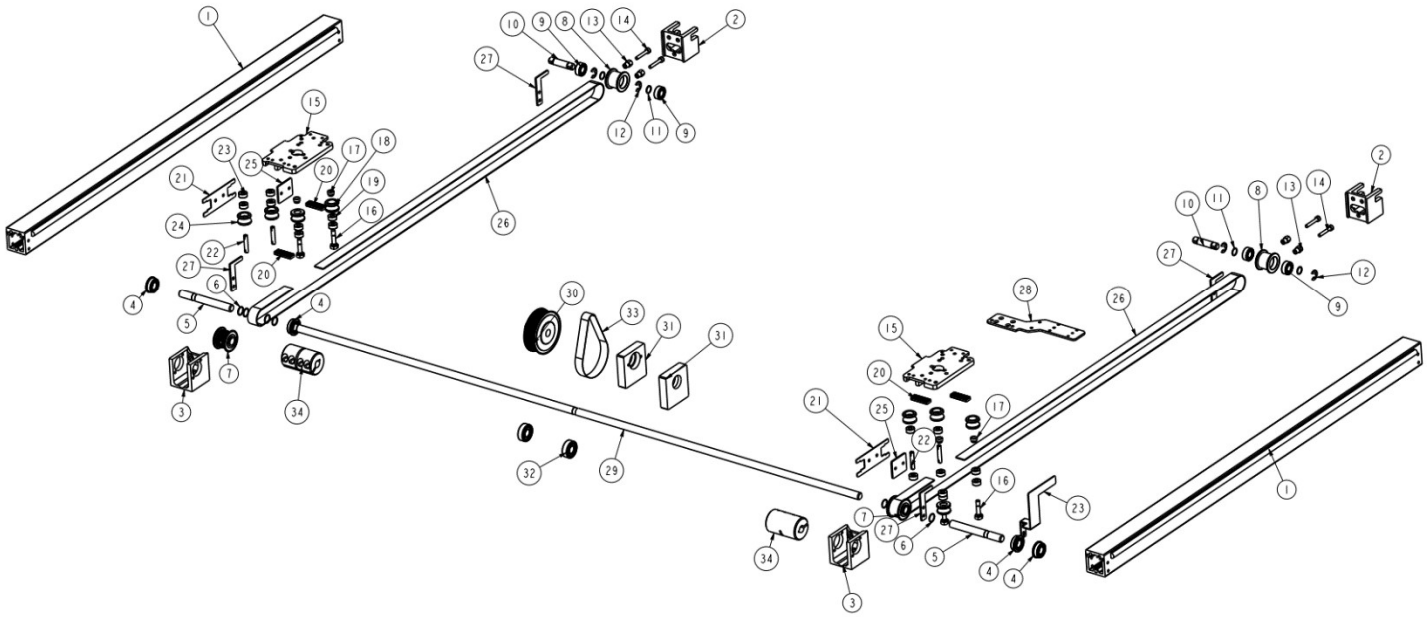
2.4 X-Axis Assembly



X-Axis Assembly_Spirit LS Pro		
No.	**Part No.**	**Description**
1	233013550G	Linear Guide
2	228035051G	X-Axis Slideway
3	22803046G	Carriage belt plate bracket
4	228033300G	X-Axis between below axle bracket
5	228033311G	X-Axis between top axle bracket
6	228033320G	Tension pulley shaft bracket
7	228051040G	X-Axis Middle Belt Wheel
8	22803050G	Belt retainer
9	228032960G	Lens carriage base
10	228036680G	X-Axis Transmit Belt Wheel (P40)
11	22803053G	Spacer
12	228033340G	X-Axis transmit shaft
13	20600159G	X-Axis/Y-Axis Close Kevlar Belt
14	20600176G	X-Axis Open Kevlar Belt
15	20700053G	Bearing (687ZZ)
16	228033391G	Right Stopper
17	228033381G	Left Stopper
18	23300584G	Hex Screw M3.0*40mm
19	244045961G	Oil Hole Cover
20	22803056G	Tension idle pulley
21	22803055G	Tension pulley shaft
22	25500049G	Wire ring φ7
23	24900002G	E-shape retaining ring.D11*d5*t0.6
24	22800929G	Strain stable screw
25	22802302G	Adjust screw
26	244076870G	Motor Adjustment Plate
27	228051030G	Motor Adapter
28	290106140G	X Motor Assembly
29		
30	290101080G	X Motor PCB with AAS I/O Assembly-5A

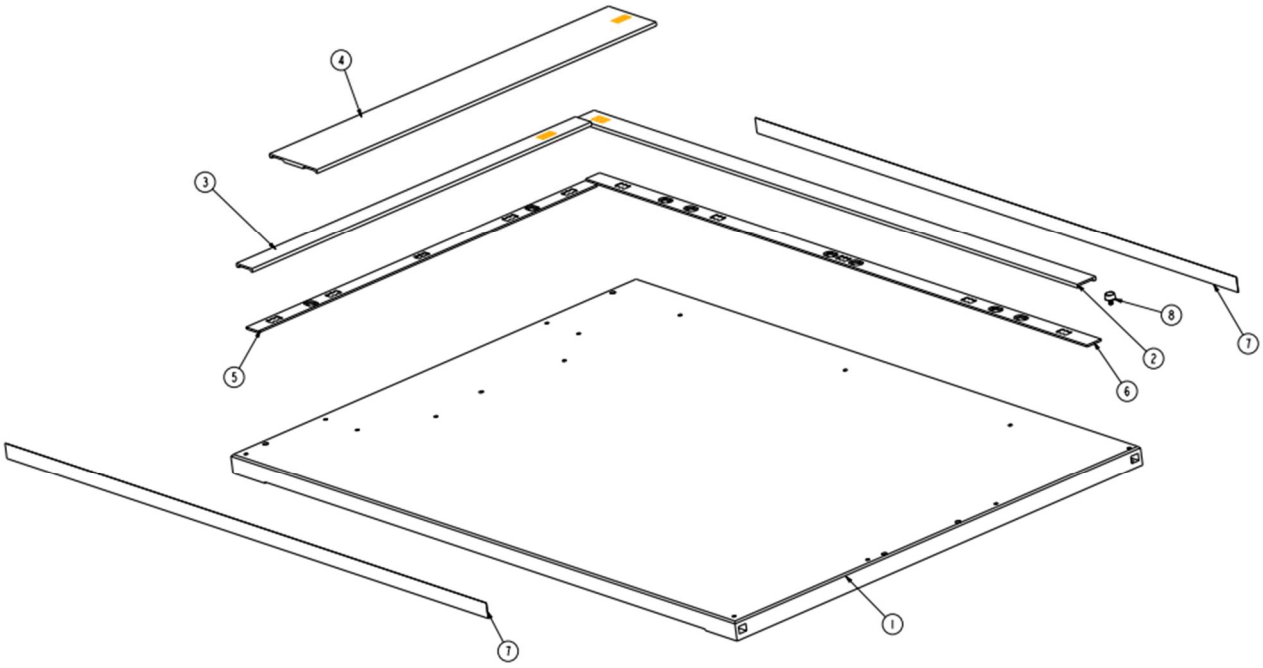
X-Axis Assembly_Spirit LS Pro		
No.	**Part No.**	**Description**
31	22802917G	Lens carriage assist base
32	29006010G	Auto focus pin Assembly
33	228050860G	AMC Extension Bracket
34	23300084G	Airflow valve(PU-6)
35	22802108G	Lens carriage reconnect board
36	22801996G	Lens carriage Assembly-V2
37	244053270G	X Axis Detector
38	228050841G	Carriage Airflow Valve Holder
39	29002546G	Auto focus seat Assembly
40	22802117G	Air nozzle
41	22802084G	Lens carriage front shingle
42	23301054G	Screws with knurled resin head(CRKB.M3-15L)
43	233000070G	Hexagonal Post of Female Screw Type L18*M3+Male Screw Type L6*M3
44	22000363G	PC spacer support
45	244076160G	X motor dust-proof lid
46	29005108G	AAS I terminal board Module
47	244077050G	X-Axis Cable Chain Fixture
48	233014060G	CCD tube chain
49	244076190G	Wire Mount Bracket
50	22000094G	Hex Screw M3*6
51	244077040G	USB Protect Cover
52	244040540G	Lens Carriage Top Shingle
53	29004736G	Carriage Mirror Assembly (4th Mirror0
54	29004968G	2.0" Focal lens Assembly
55	228050850G	(Female) Bracket for CCD
56	23300298G	Hand Knobs(CRKB.M3-6L)
57	244074720G	Magnetic Plate

2.5 Y-Axis Assembly



Y-Axis Rail Assembly_Spirit LS PRO		
No.	**Part No.**	**Description**
1	228035080G	Y-Axis Slideway
2	22800928G	Tension pulley shaft
3	22800936G	Transmission wheel set
4	20700054G	Bearing
5	22800950G	Y-Axis passive axle center
6	25500048G	Wire ring φ8
7	228036650G	Y-Axis transmit belt wheel (P30)
8	22800926G	Tension idle pulley
9	20700053G	Bearing
10	22800927G	Tension pulley core
11	25500049G	Wire ring φ7
12	24900002G	E-shape retaining ring.D11*d5*t0.6
13	22800929G	Strain stable screw
14	22800957G	Tension fixing screw
15	22802955G	X-Axis double- mount
16	22800952G	Small roller screw - 4*11
17	22800951G	Interval pillar - 4*4.5
18	22801859G	Unilateral Wheel(J) - 4*9
19	20700038G	Bearing
20	22800917G	Belt retainer
21	25500047G	Wheel spring
22	22800937G	Actions wheel stable axle
23	244049921G	Y-Axis Detector
24	22801860G	Both sides wheel(J) - 4*9
25	24401001G	Guiding plate of spring
26	20600161G	Y-Axis Open Kevlar Belt
27	24400997G	Stopper board
28	244076150G	Y Protected Pad
29	22800942G	Y-Axis transmit shaft
30	228036660G	Y-Axis Mid Belt Wheel (P72)
31	22800934G	Y transmit shaft seat
32	20700052G	Bearing (698ZZ)
33	20600160G	Y-Axis Close Kevlar Belt
34	228050390G	Coupling - 8mm

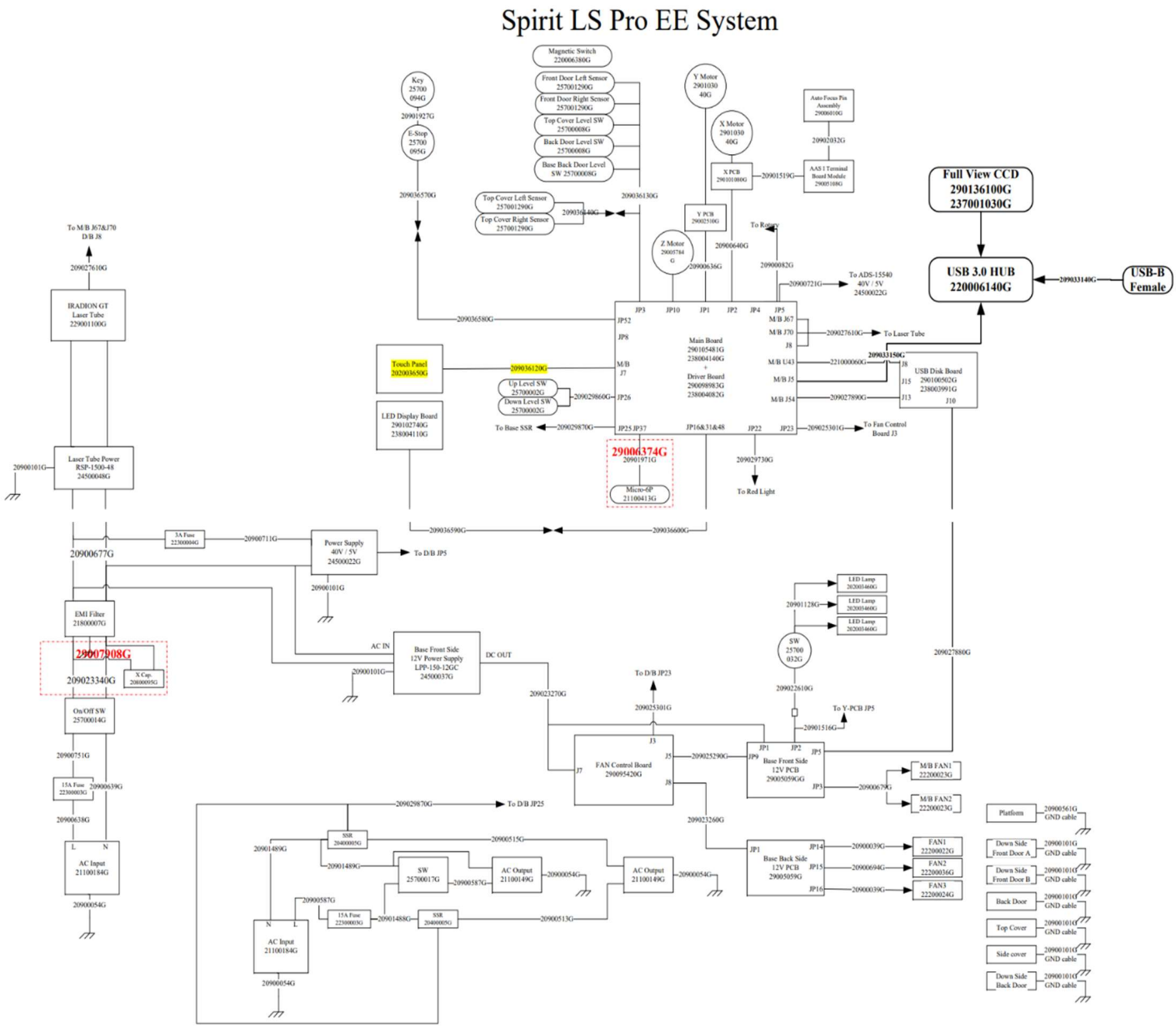
2.6 Working Table



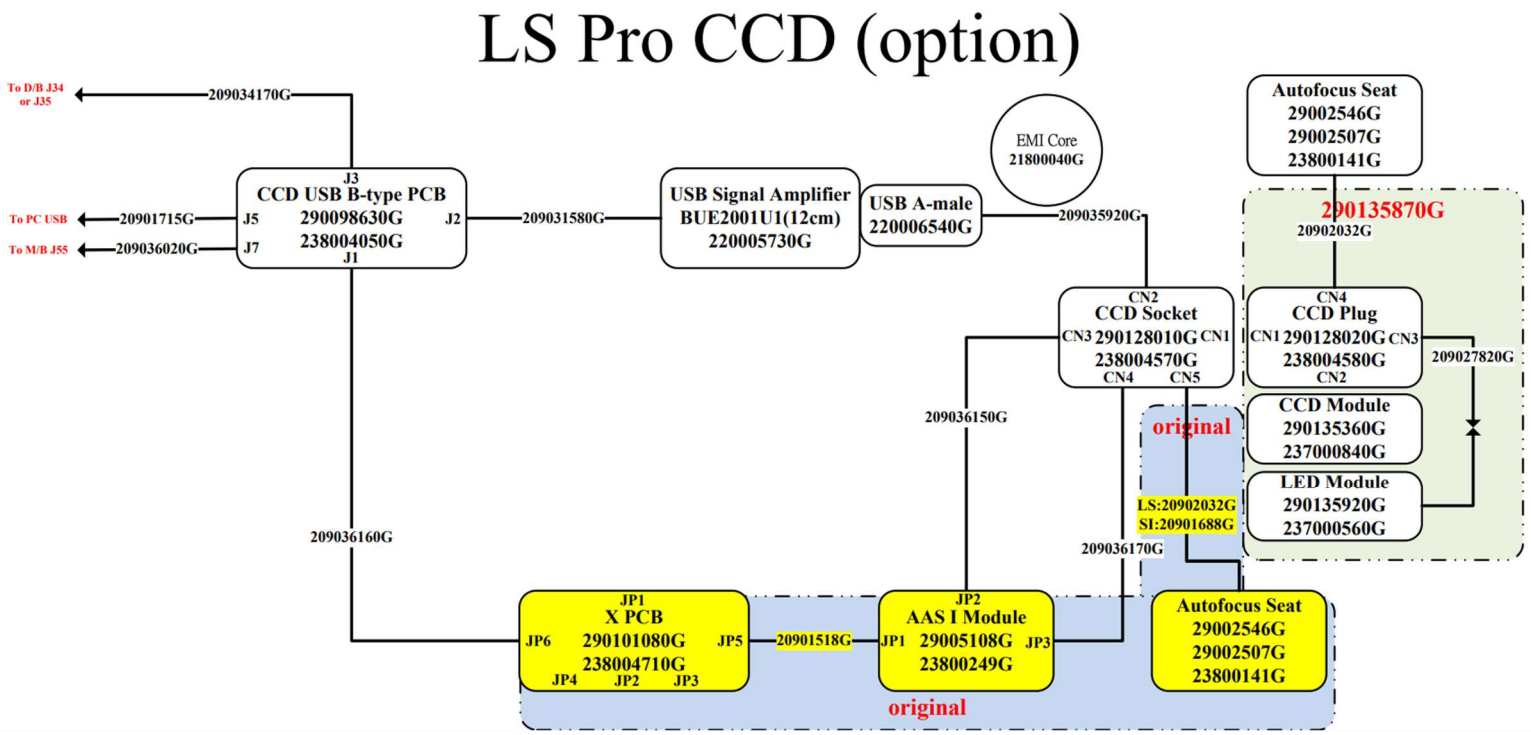
Working Table Assembly - Spirit LS Pro		
No.	**Part No.**	**Description**
1	290105260G	Engraving Platform Assembly
2	290135381G	Magnetic Ruler Set for X-axis
3	290133601G	Magnetic Ruler Set for Y-axis
4	290133611G	Magnetic Space Ruler Set for Y-axis
5	290133621G	Magnetic Ruler Base Set for Y-axis
6	290135391G	Magnetic Ruler Base Set for X-axis
7	233017650G	Aluminum Sticker(758*17*0.3)
8	23300299G	Hand Knobs (CRKB.M4-6L)

Chapter 3 : Electrical System

3.1 Spirit LS Pro



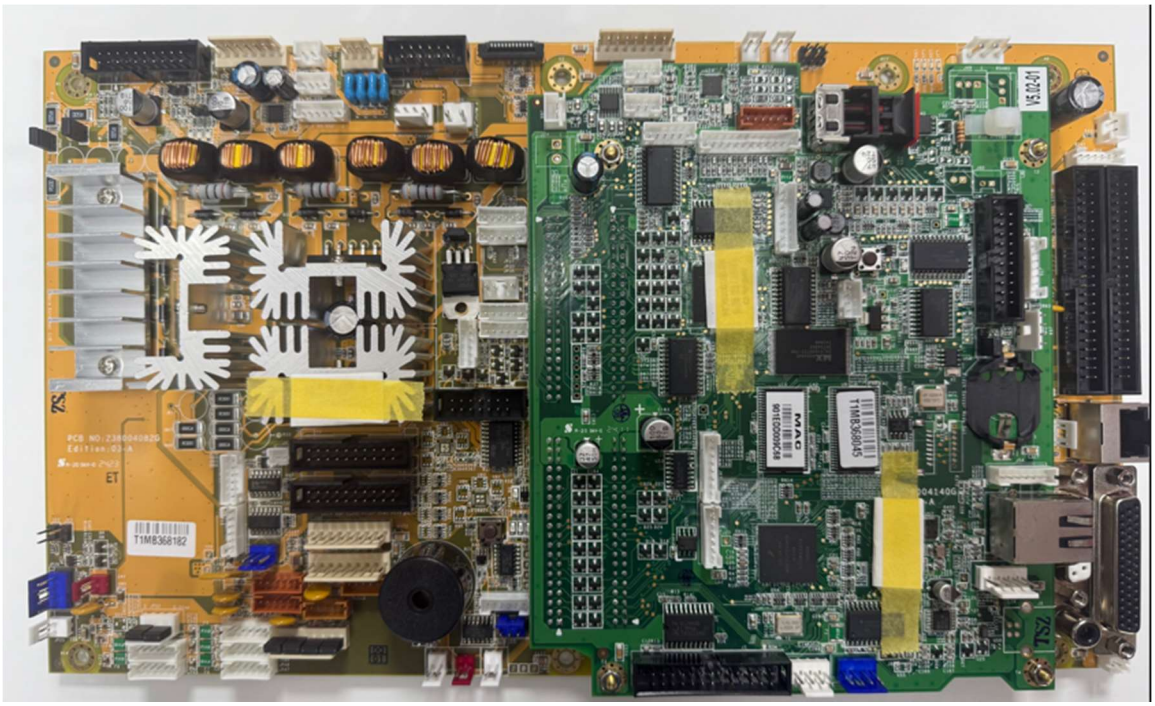
3.2 Spirit LS Pro – CCD(Optional item)



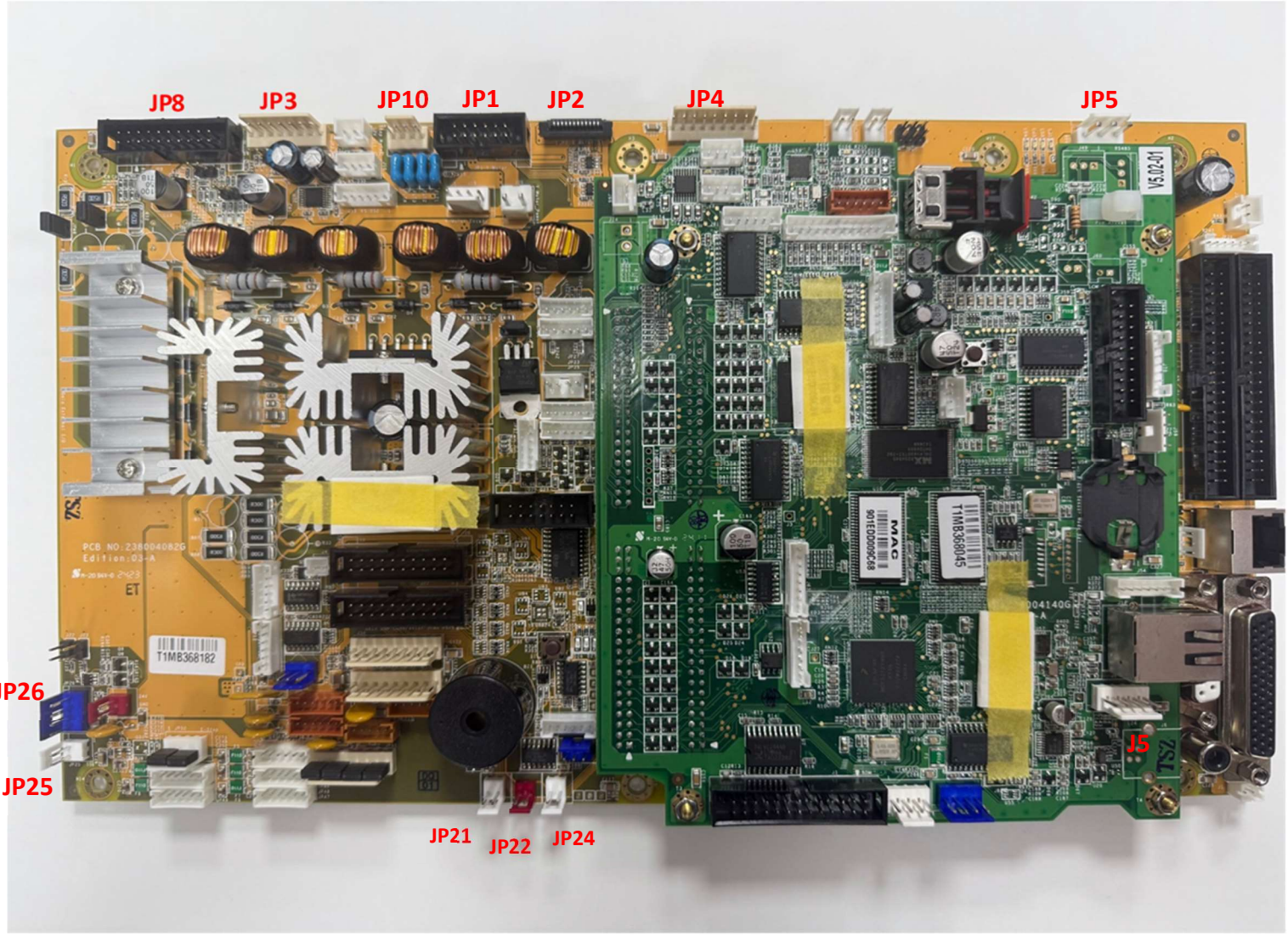
290136860G-SLS Pro 5272V3 mainboard + Driver Board Assembly (include Firmware)

Mainboard Board – Green color

Driver Board – Peanut color



3.3 Definition of Pin

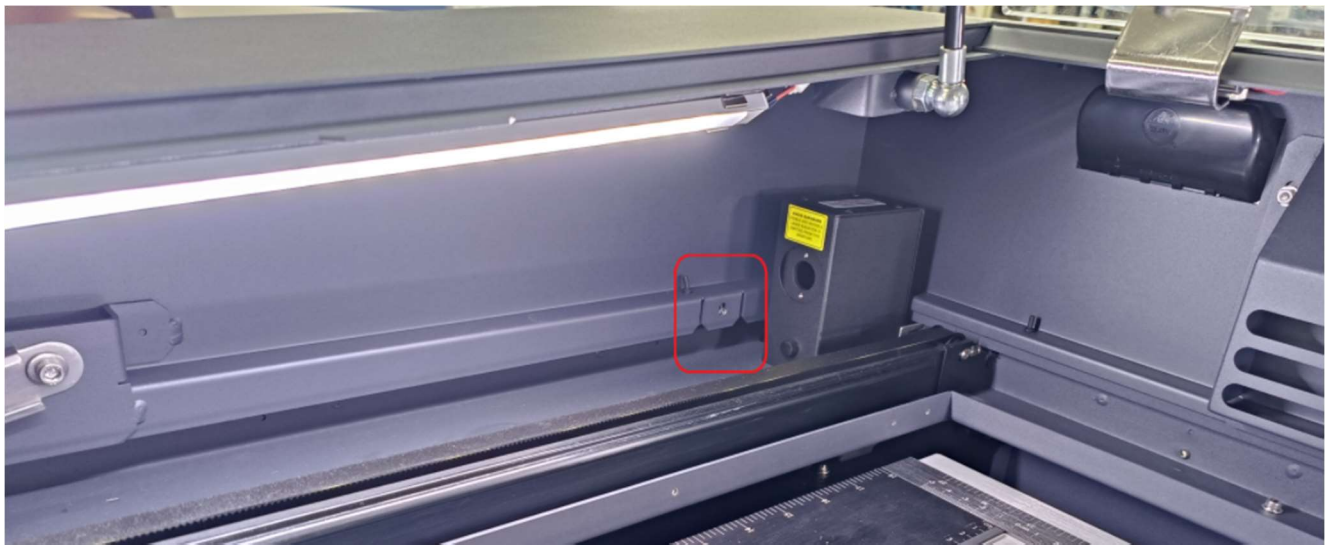


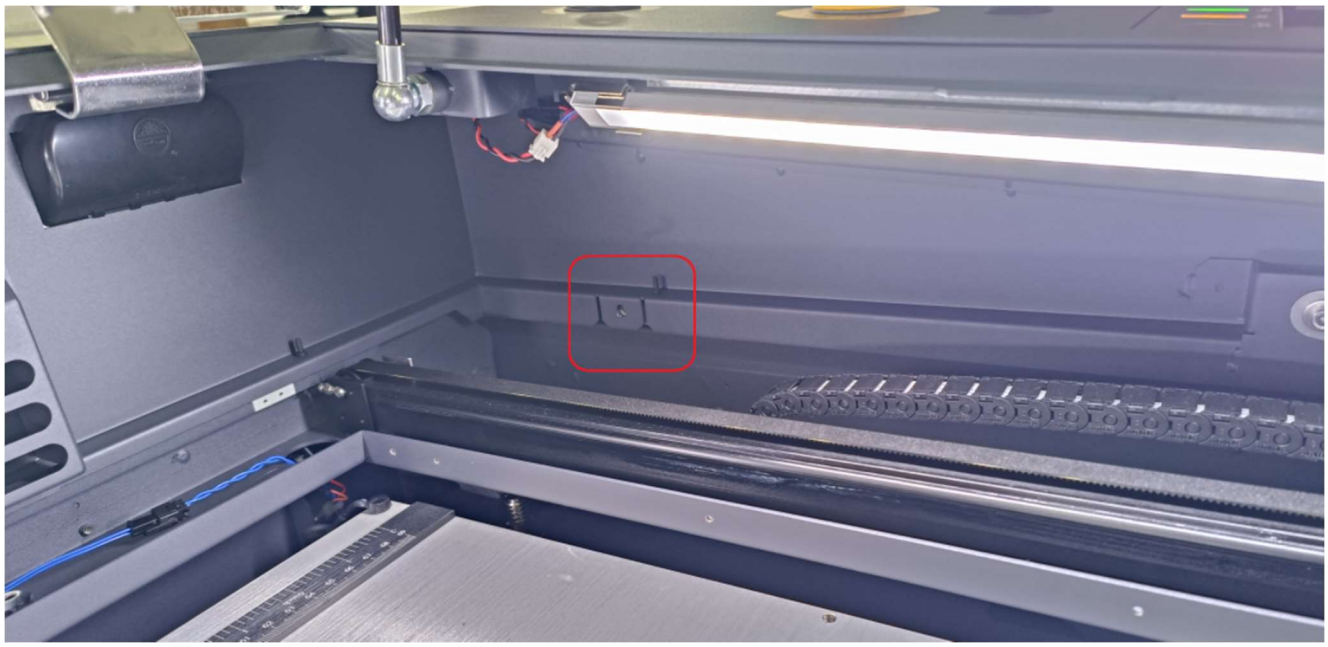
The Definition of Pin 5272V3 Mainboard + Driver Board	
Driver Board JP5	3 pin
Driver Board JP4	Rotary Motor
Driver Board JP2	X-motor flat cable
Driver Board JP1	Y-motor
Driver Board JP10	Stepper motor 4 pin
Driver Board JP3	Doors 6 pin
MainBoard J5	USB Port 5pin
Driver Board JP24	3 pin
Driver Board JP22	Laser Diode 2 pin
Driver Board JP21	Buzzer 2 pin
Driver Board JP26	4 pin
Driver Board JP25	SSR 2 pin
Driver Board JP8	Control Panel Cable

Chapter 4 : Components Replacement

4.1 Touch Panel Changing Process

- Dismount 2 screws of top cover(M4 *8)





- Lift the top cover

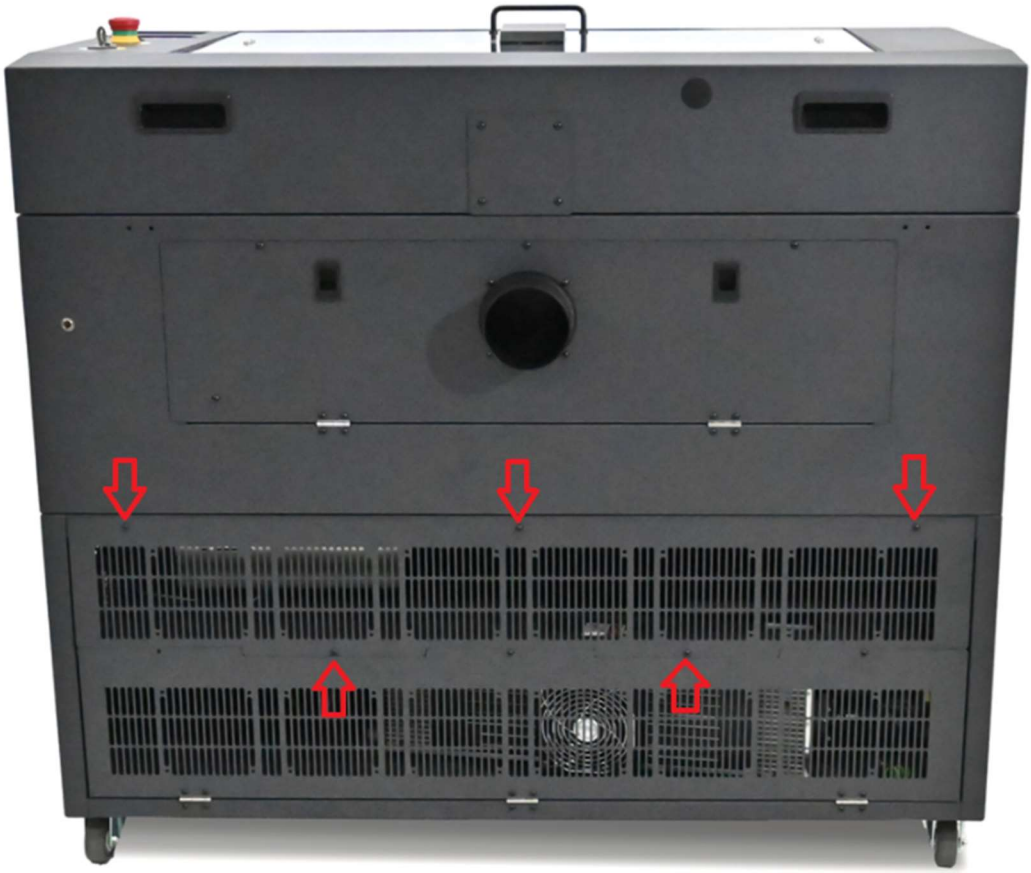
- Please turn the safety lock switch to **LOCK** status according to the direction shown on the sticker (see picture) to prevent the top cover from collapsing.

- Dismount 4 screws for cover of touch panel.

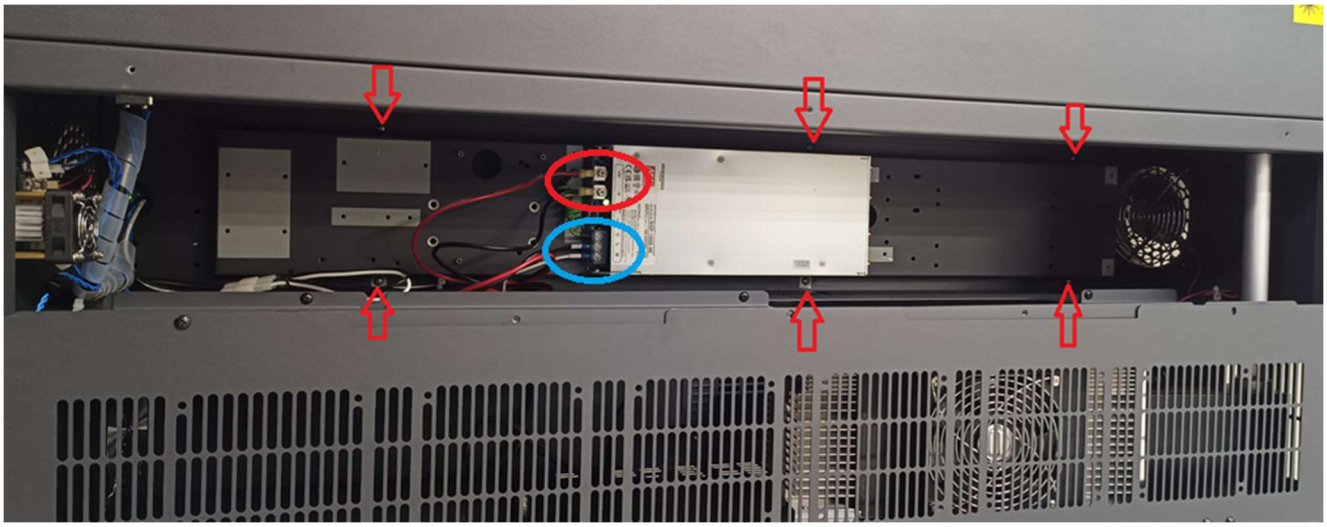
- After the touch panel cover is removed, the 4 Spacer Supports (MAE-9T) and the cable (in the green connector) need to be removed. Then, the touch panel can be removed and replaced with a new one.

4.2 Power Supply Changing Process

- Dismount 5 screws on the back panel (see red arrow below)



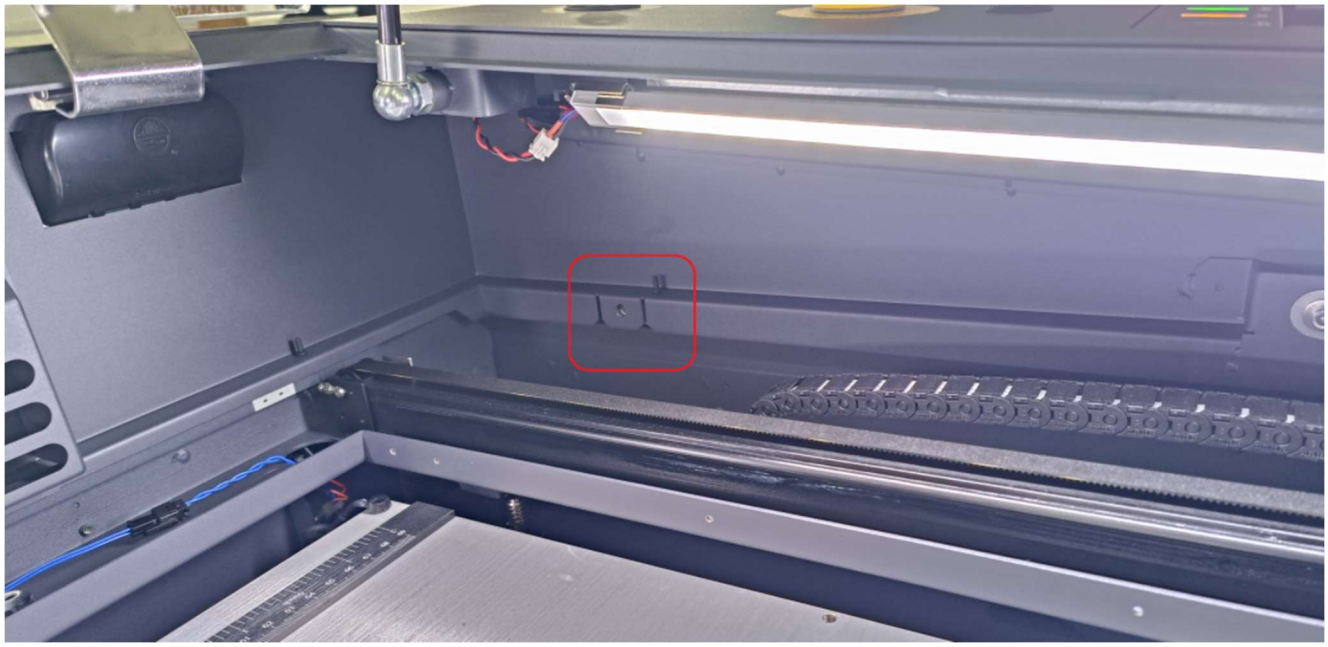
- Loosen the screws and remove the 2 power supply AC side cable (blue circle below)
- Remove the DC side 2 cables (red circle below)
- Dismount 6 screws on the power supply panel (see red arrows below)



- Dismount three screws on the power supply panel to replace it.

4.3 X Motor Changing Process

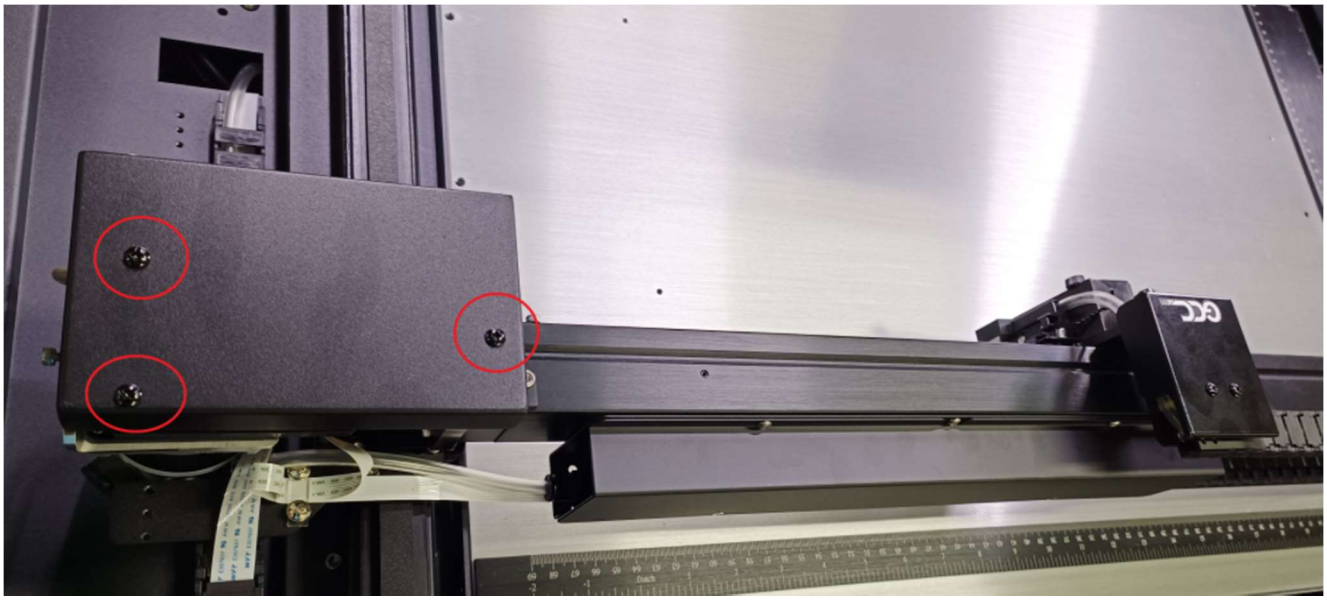
- Dismount 2 screws of top cover(M4 *8)



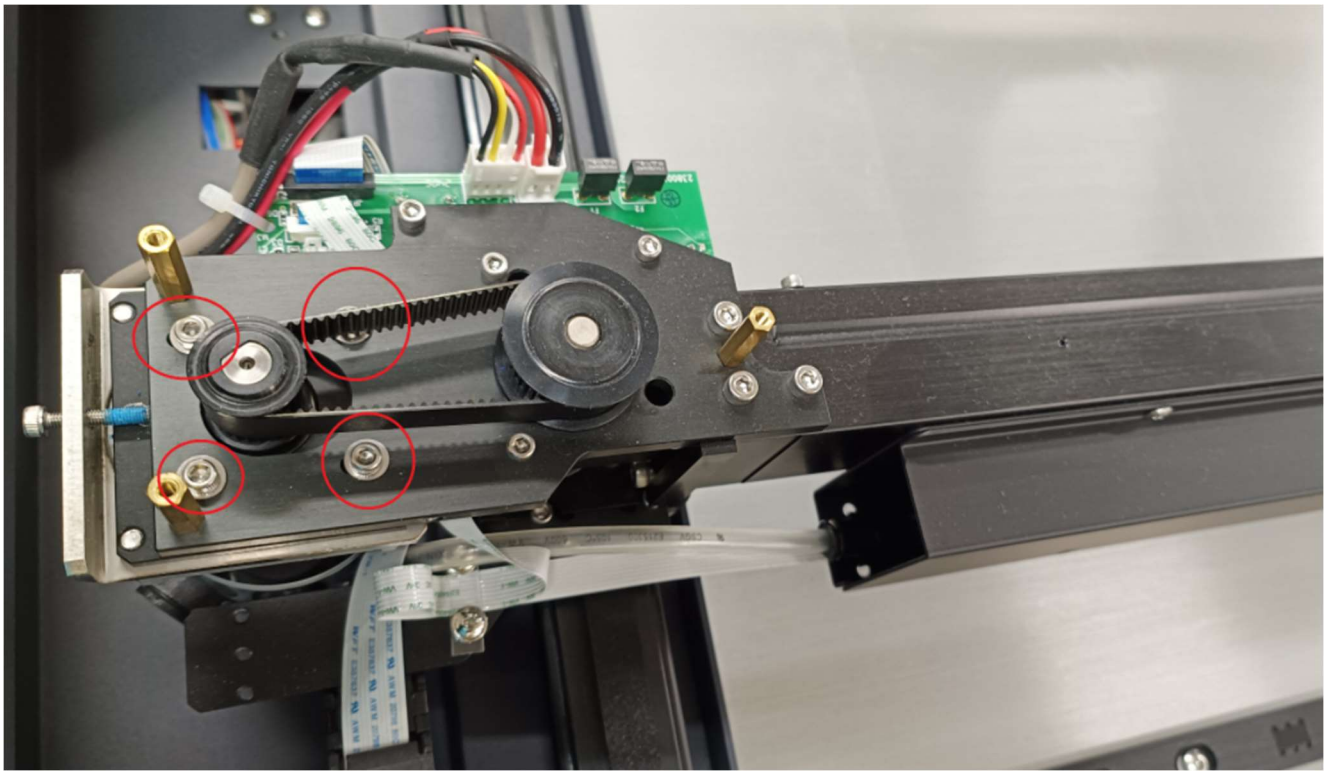
- Lift the top cover

- Please turn the safety lock switch to **LOCK** status according to the direction shown on the sticker (see picture) to prevent the top cover from collapsing.

- Dismount 3 screws of x motor cover (M3 *6)

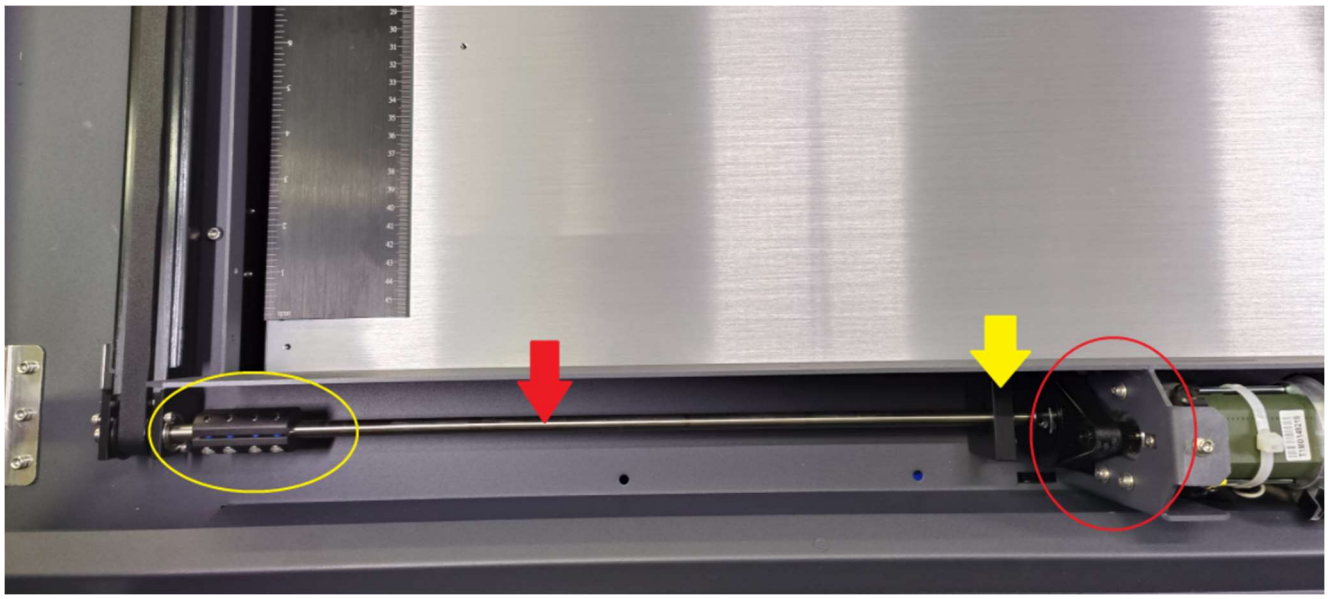


- Remove the four screws from the X motor (M3 *10, indicated by the red circle below) and disconnect the X motor cable for replacement.



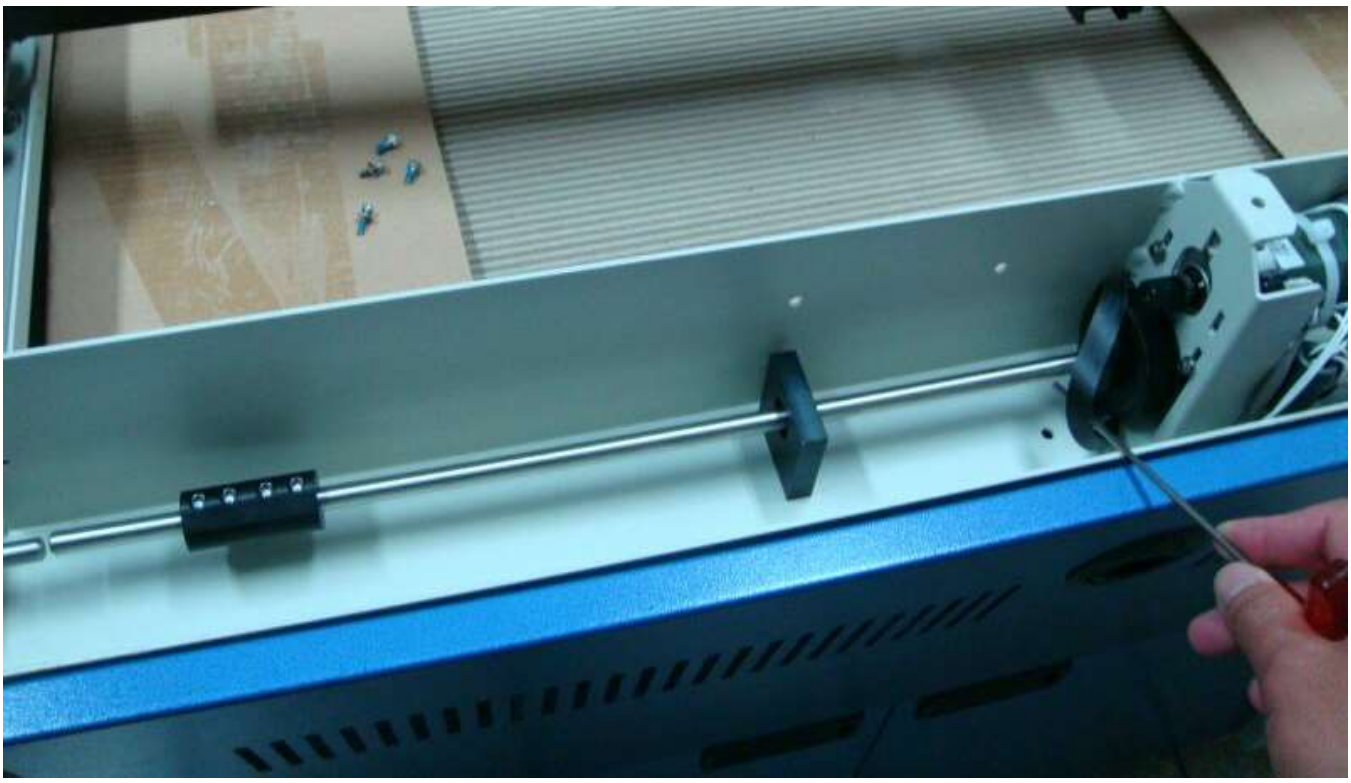
4.4 Y Motor Belt Dismount Process

- To remove the Y-axis synchronizer bar (indicated by the red arrows), first unscrew the synchronizer bar holders located at the bottom (pointed out by the yellow arrow). Next, remove the four screws from the Y motor holder (marked by the red circles) and take out the four screws from the coupler (shown by the yellow circles).



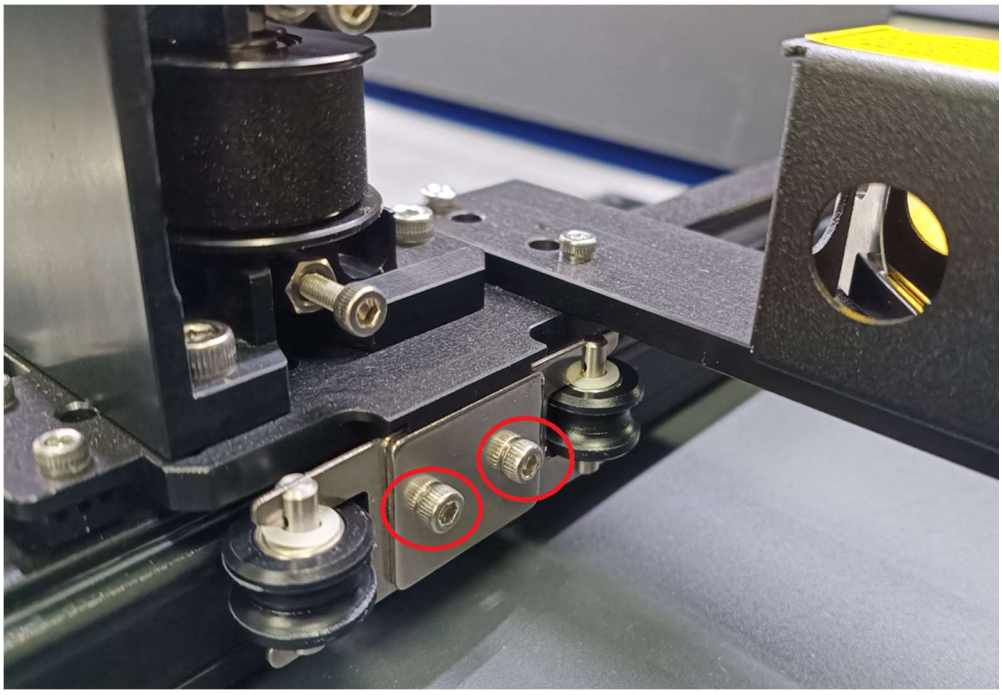
- The screws of synchronizer bar holders.

- The entire Y-axis synchronizer bar can now be moved slightly upward. This also loosens the Y motor belt, allowing it to be removed. The Y motor belt can slide across the synchronizer bar and its holders. You can either remove the Y motor belt or replace it with a new one.

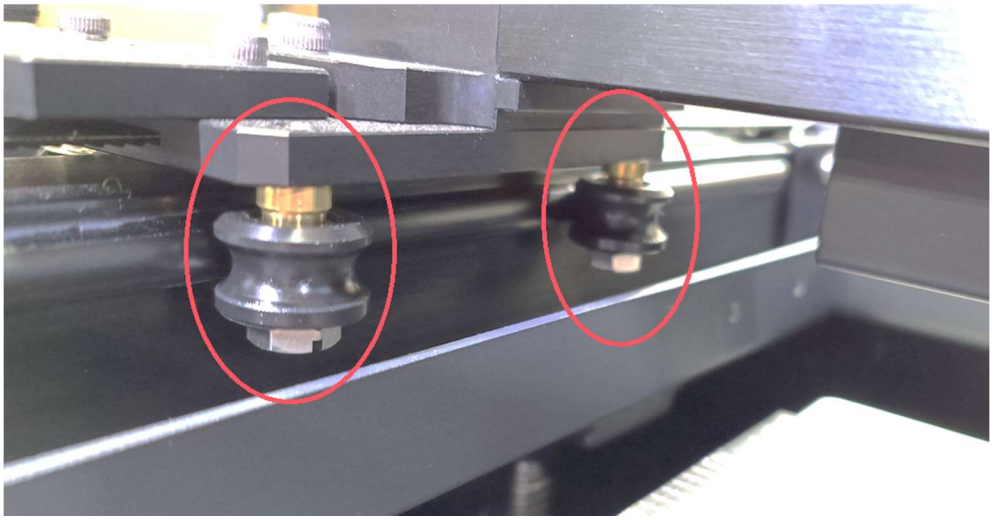


4.5 Y Rollers Changing Process

- Changing the Y rollers. Remove the following screws to completely remove the Y rollers.



- Unscrew the following screws to remove the A roller.



Chapter 5 : Laser System

5.1 Wattage of Spirit LS Pro

GCC offers power options of 30W, 40W, 60W, 80W, and 100W for the Spirit LS Pro.

5.2 How to measure the power output of a laser tube?

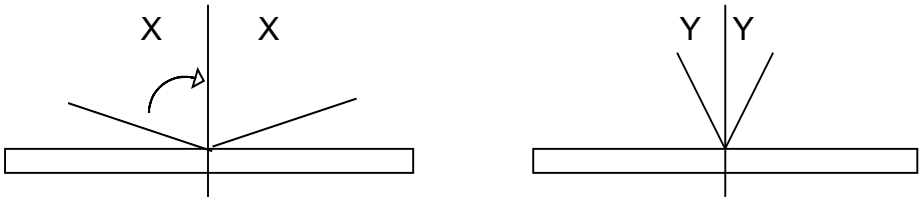
To measure the power output of a laser tube, we need to use a power meter to gauge the heat generated by the laser and convert that measurement into a power reading. The optimal location for measuring the laser's output power is at the immediate output of the laser tube, before mirror 1.

5.3 How does the laser beam travel to the working area ?

The laser beam generated by the laser source is reflected and guided by 4 optical lenses onto the working area. Therefore, their proper adjustment and maintenance are crucial.

5.3.1 Optical Alignment

Understanding Reflection.

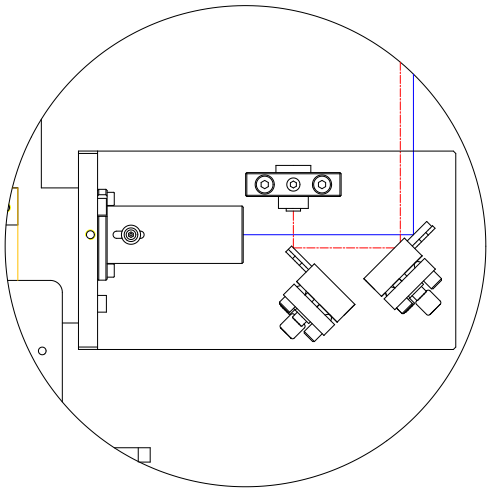


Light enters at an angle and leaves at an angle.
If light enters at an angle X, it will leave at an angle X.
If light enters at an angle Y, it will leave at an angle Y.

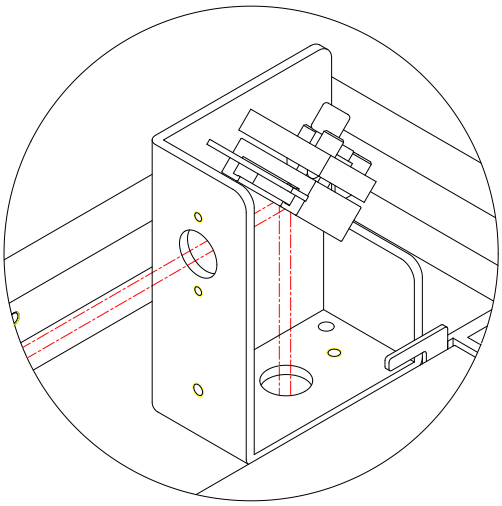
5.3.2 Basic Beam Alignment

The laser beam is guided to the top of the working area by using 4 reflective mirrors. Therefore, these mirror adjustments are crucial to the proper functioning of the machine. If the laser beam is not aligned correctly, the beam path will be shifted or tilted and both rastering and vectoring quality will be affected.

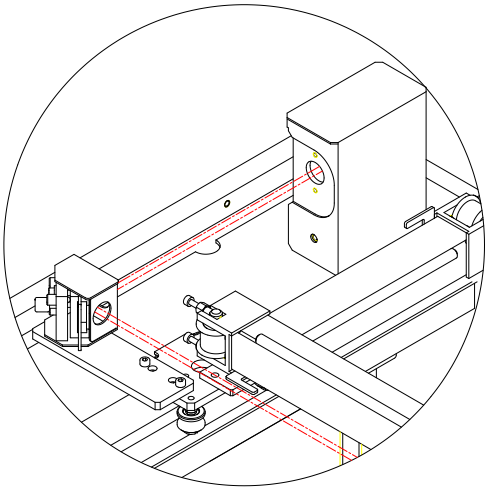
Step 1: Unscrew the back panel of the machine revealing the laser tube and Mirror 1. Turn on the machine and enter the hidden diagnostic menu by holding down the Autofocus keys while turning on the machine. Select test laser source. Set laser power to about 5%. Remove the protective cover of Mirror 1 and remove Mirror 1. Place a cardboard or paper about 1.5 meters away from the laser source. Fire the laser until you get a small burnt mark on the cardboard. (Determine the laser beam and the red beam are aligned by seeing if the burnt hole is at the exact location of the red beam. If they are not, adjust the red beam diode so that the red beam and the burnt mark are at the same location.) Place Mirror 1 back to the mirror holder.



Step 2: Place a piece of masking tape over the tube opening that leads to Mirror 2. Fire the laser and see if it leaves a burnt mark in the center of the hole. Also check that the burnt mark left by the laser beam is circular in shape. If it is not circular, i.e. oval or other shape, then the laser beam might have hit the inner tubing and get reflected on the way from Mirror 1 to Mirror 2. If this is the case, place a piece of masking tape before the tube entrance, fire laser and adjust Mirror 1 so that laser passes through the center of the opening.



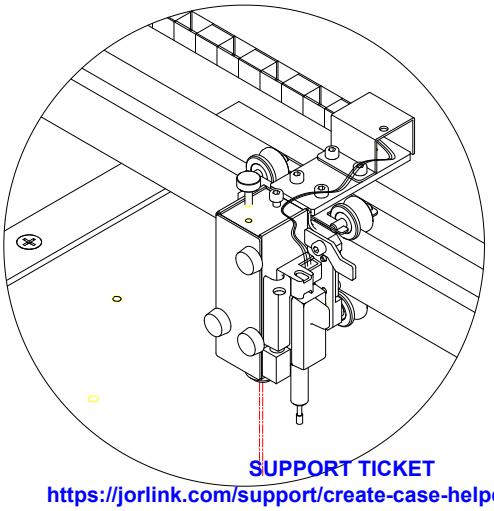
Step 3: Place a masking tape on the opening before Mirror 3. Move the rail along the Y-axis so that Mirror 3 is close to Mirror 2. Fire the laser and see if the laser beam goes through the center of the circle. Then move the rail so that Mirror 3 is to the far end of Mirror 2. Fire the laser and see if it leaves a mark at the same location when it was close to Mirror 2. Adjust Mirror 2 repeatedly so that the burnt mark is at the center and on top of one another when Mirror 3 is both close and far from Mirror 2.



Step 4: Place a masking tape on the opening before Mirror 4. Move the pen carriage to the upper left corner of the working area. Fire the laser and adjust Mirror 3 so the laser beam passes through the center of the opening. Move the pen carriage to the upper right end of the working table. Fire the laser and adjust Mirror 3 so the laser beam passes through the center of the opening. The laser should pass through the same spot when the pen carriage is positioned at upper left and upper right. Do the same for the bottom left corner and bottom right corner.

Place a masking tape over the nozzle opening. Position the pen carriage at one of the 4 corners of the working area. Fire the laser and adjust Mirror 1 so the laser passes through the center of the nozzle opening. Repeat for all 4 corners of the working area. After adjusting Mirror 1, you may have to re-adjust Mirror 2 and Mirror 3 as well. (Repeating Steps 2 & 3.)

If the laser beam passes through the center of the nozzle opening at all 4 corners, then the laser beam should have been aligned properly. Cut four 20x20 mm squares at the four corners of the working area to double check that the edges of the square are not slanted



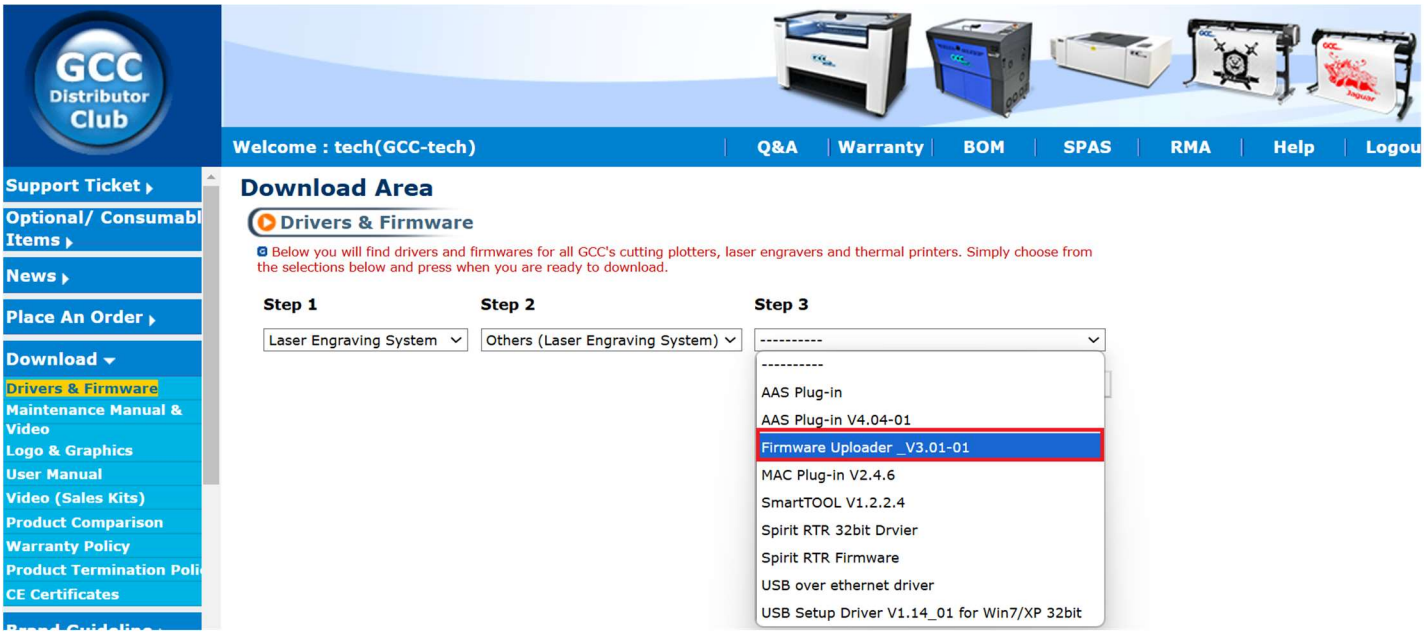
Chapter 6 : Software Update

6.1 How to update firmware

To update the firmware for your machine, please follow the steps below:

I. Firmware Uploader

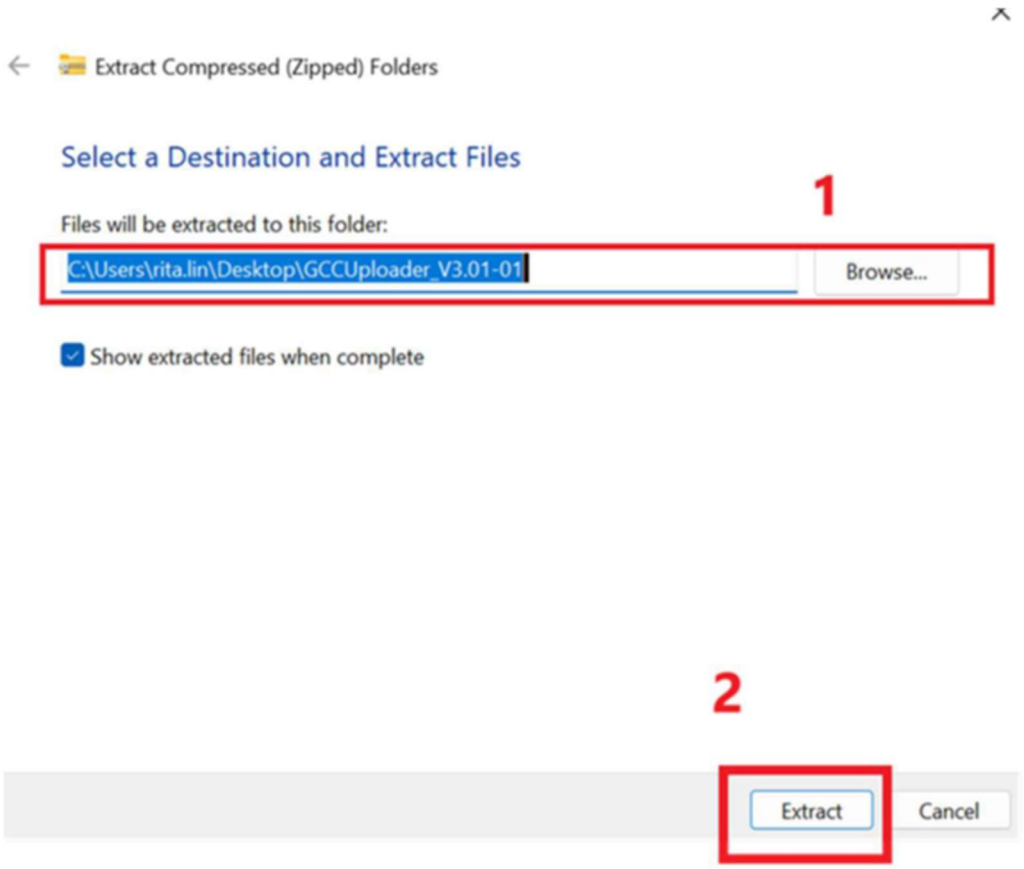
A. Download the Firmware Uploader from GCC Distributor Club website: http://gccf.gcc.com.tw/distributor/login.aspx



B. Extract Zipped Folder

GCCUploader_V3.01-01.zip

C. Click on "Browse" to select the location where you want to save the file, then click "Extract."

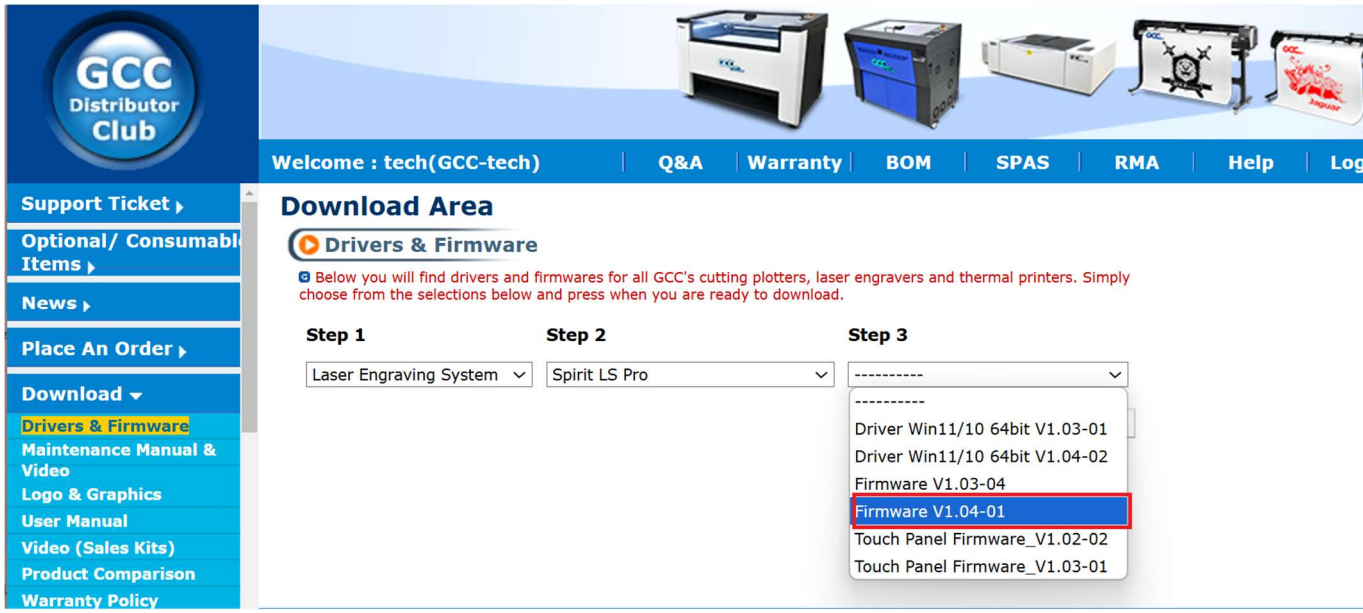


D. Install GCC Uploader

II. Firmware

A. Download the latest firmware from GCC Distributor Club
http://gccf.gcc.com.tw/distributor/login.aspx

B. Unzip the zip file

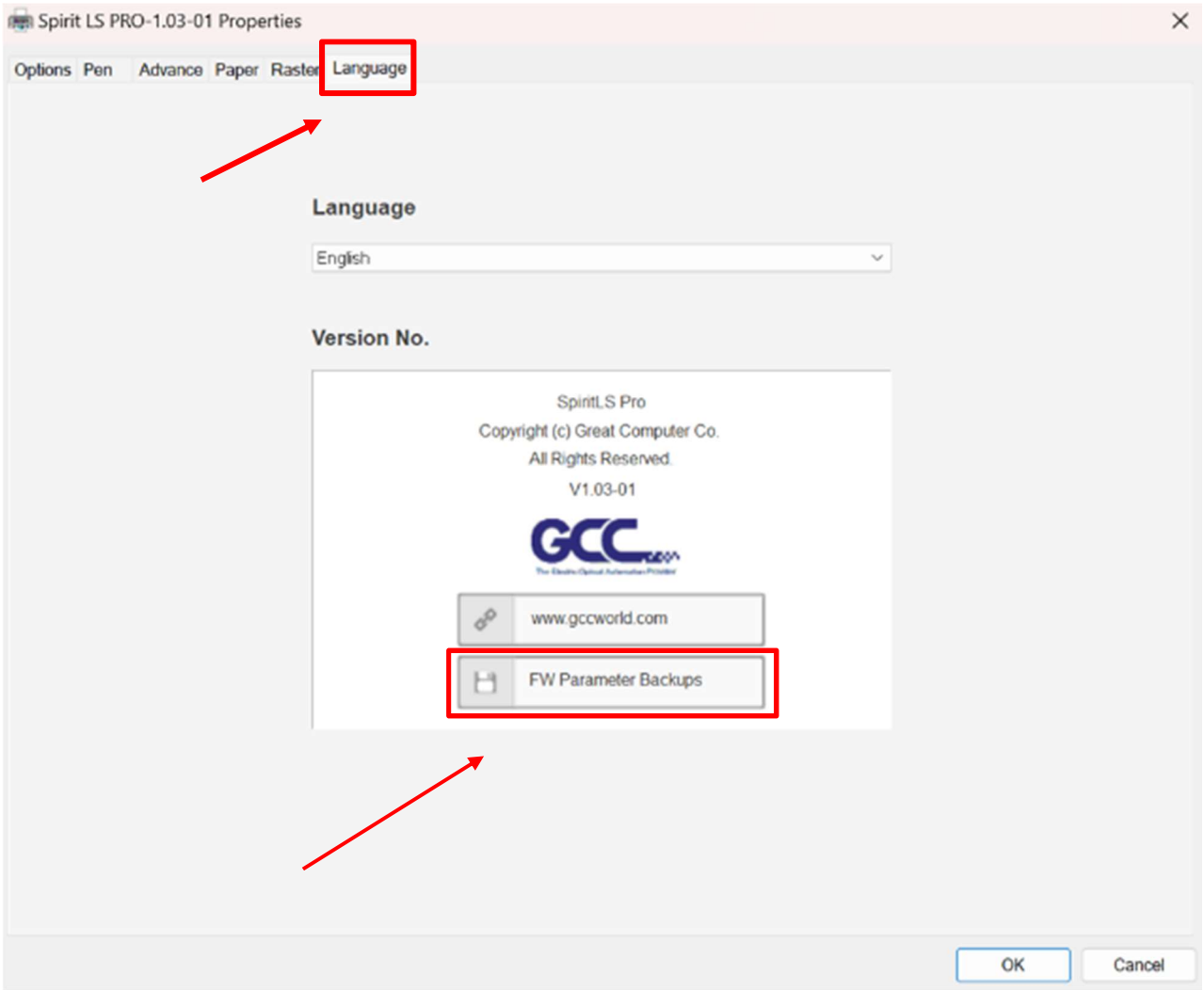


III. Backup Firmware Settings

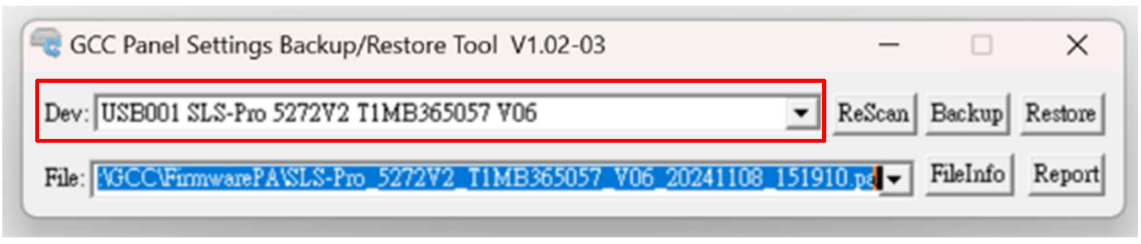
Backup the firmware settings (such as origin point、focal distance⋯..etc.)

Details are as follows:

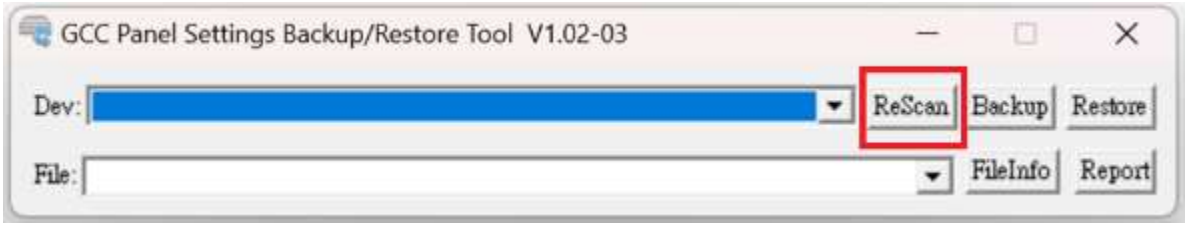
1. Turn on the machine and connect the USB cable to your computer.
2. Open the GCC LASER driver and go to the “Language” tab.
3. Click “FW Parameter Backups.”



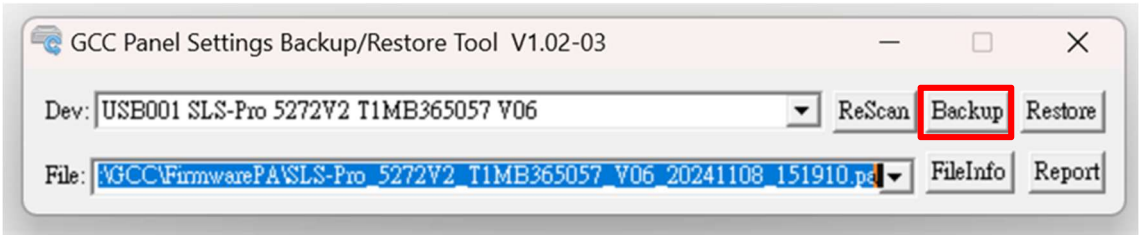
4. Device information should be presented as shown in the picture below.



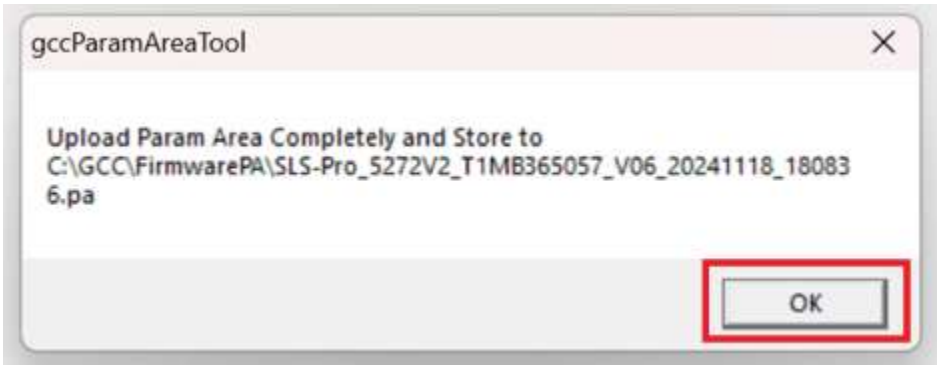
5. Press “ReScan” if Device information doesn’t appear.



6. Press the button “Backup” to backup current firmware settings.



7. Press the button “OK”
   The backup file will be saved in the path C:\GCC\FirmwarePA\



IV. Firmware Update

Follow the steps below to update the firmware：

Step 1: Turn on the machine and wait for the GCC logo to appear.

The GCC logo will be on the screen for about 11 to 12 seconds. Please click the logo (**just a quick click, no need to hold**) between the **3rd and 10th second**.

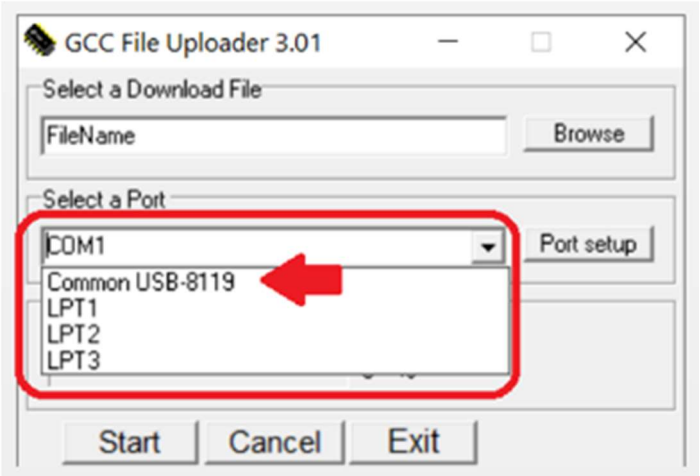
After clicking the GCC logo, two icons, “BL” and “HW,” will appear in the bottom right corner of the touch screen.

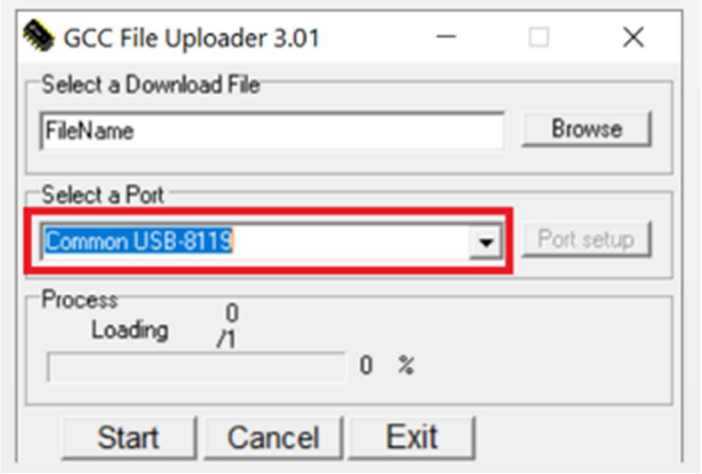
Click the “BL” icon to boot the machine into “USB PRINT SUPPORT” mode for firmware upgrades via USB cable.

When the touch screen displays "Boot loader in USB PRINT SUPPORT," this Indicates that you are ready to update the firmware.

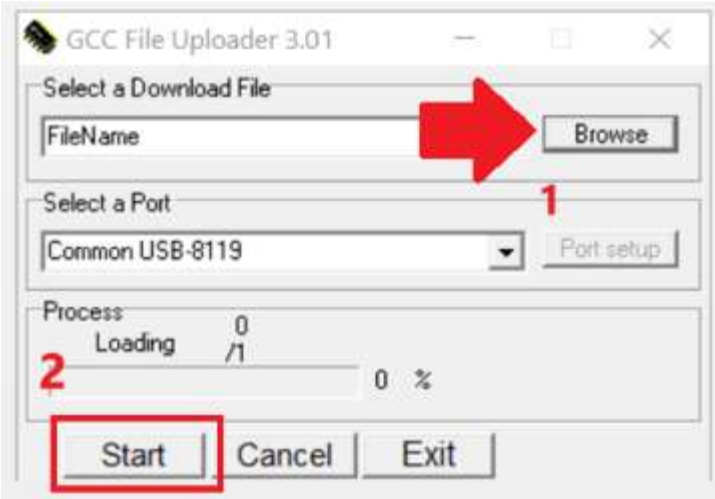
Step 2: Run “Uploader.exe” (The name of firmware upgrader program is “Uploader.exe”)

Step 3: Open the dropdown list under “Select a port” and select “Common USB-xxxx” (xxxx is variable according to the mainboard type of your PC/Laptop)





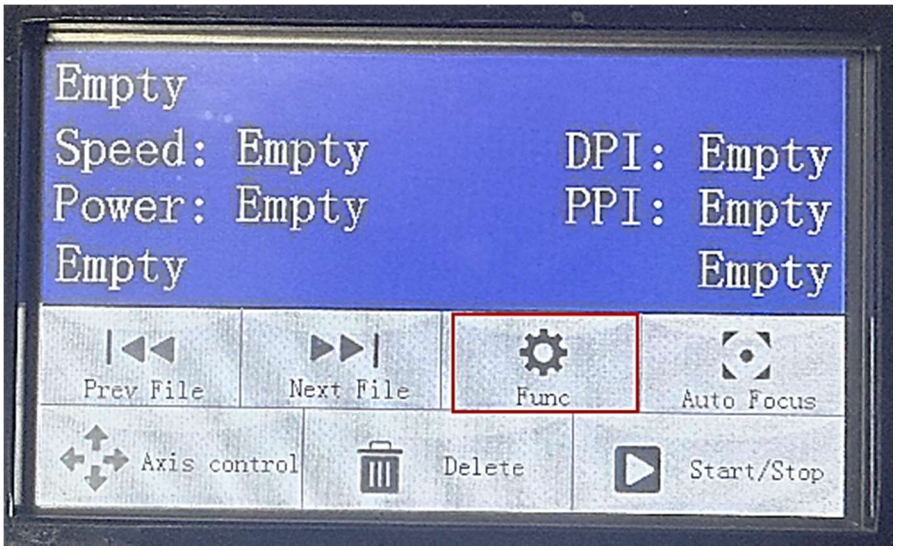
Step 4: Browse and select the firmware file and press the “Start” button to begin the upgrade.



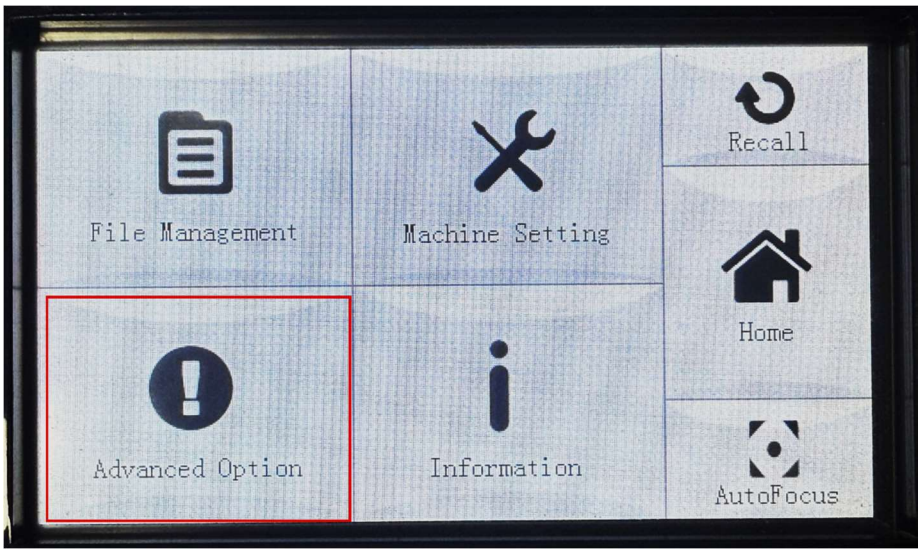
Step 5: Wait for it to complete, and the machine will reboot automatically.

V. System Reset

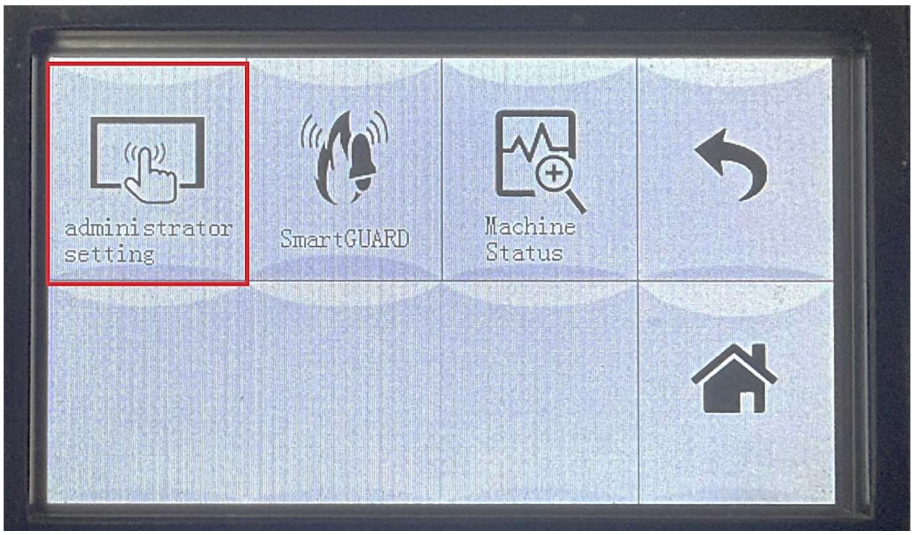
1. Press “Func”



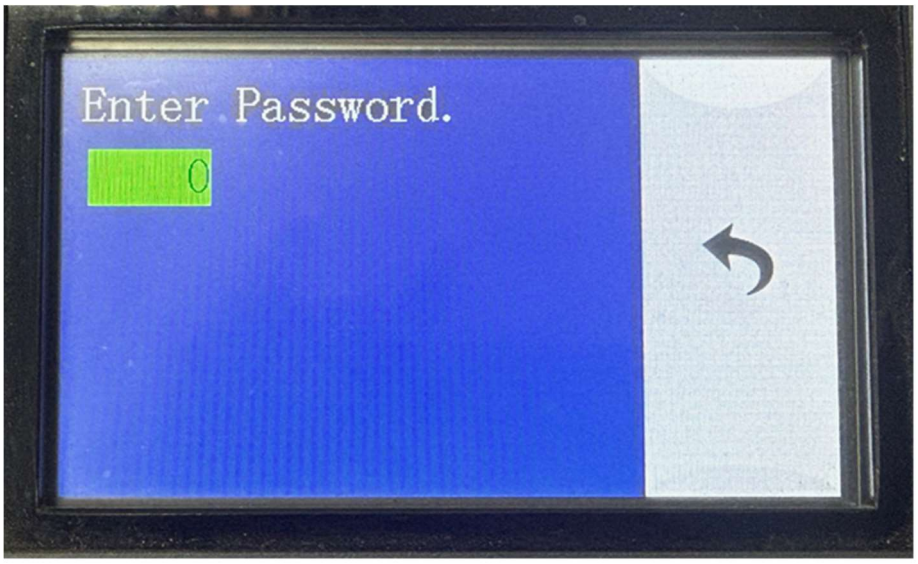
2. Press “Advanced Option”



3. Press “administrator setting”

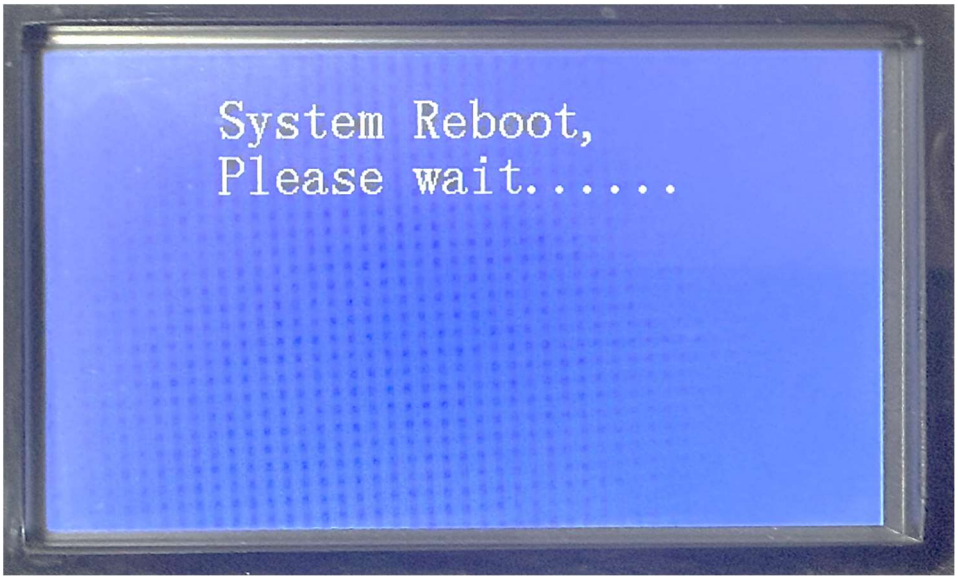


4. To proceed, please enter the password:「8047」and press 「↵」



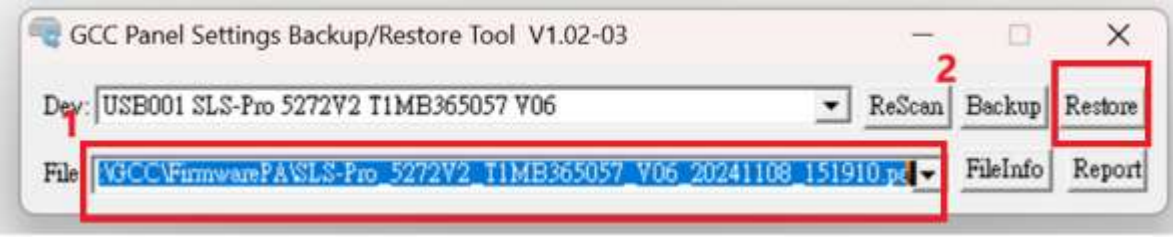
5. Press “System Reset” to perform a system reset.

6. The machine will reboot after completing the system reset.

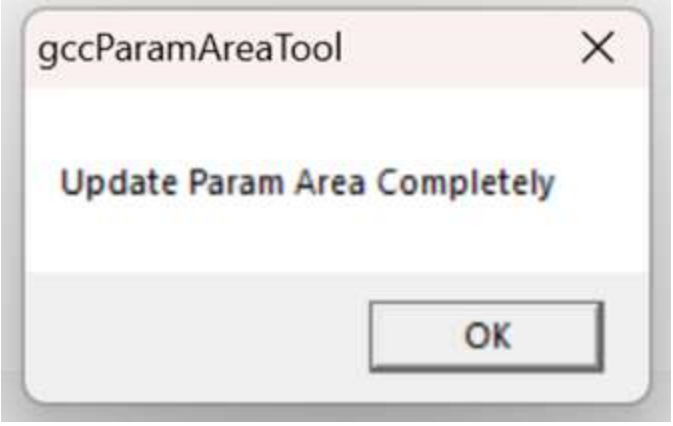


VI. Restore Firmware Settings

1. Backup file will be saved in the path C:\GCC\FirmwarePA\
2. Select backup file and press the button “Restore” to restore it back to LASER machine.



3. When the following message appears on the screen, it means the backup file has been successfully written.



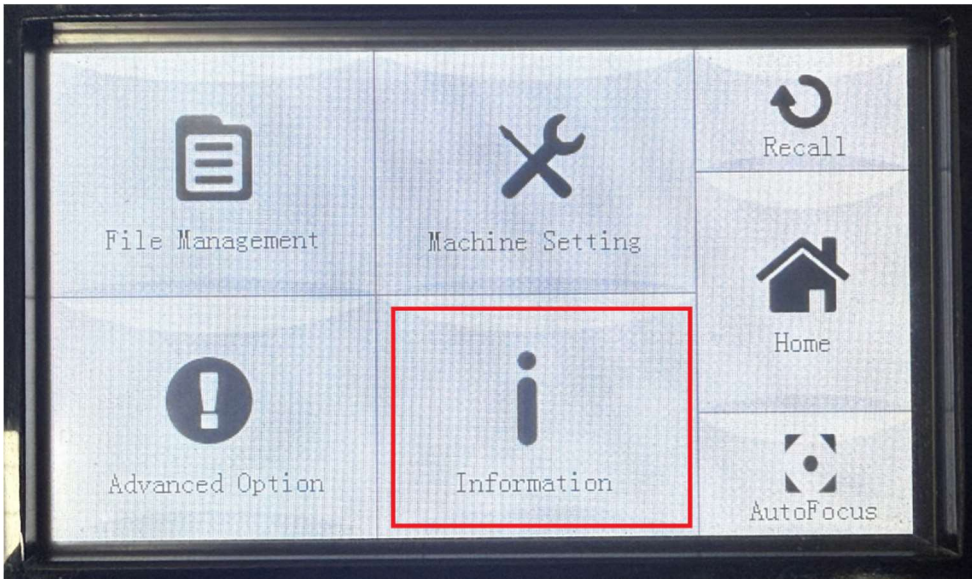
4. The machine will automatically reboot.

I. How to find the firmware version of your machine?

You can easily check the software version through the touch panel.

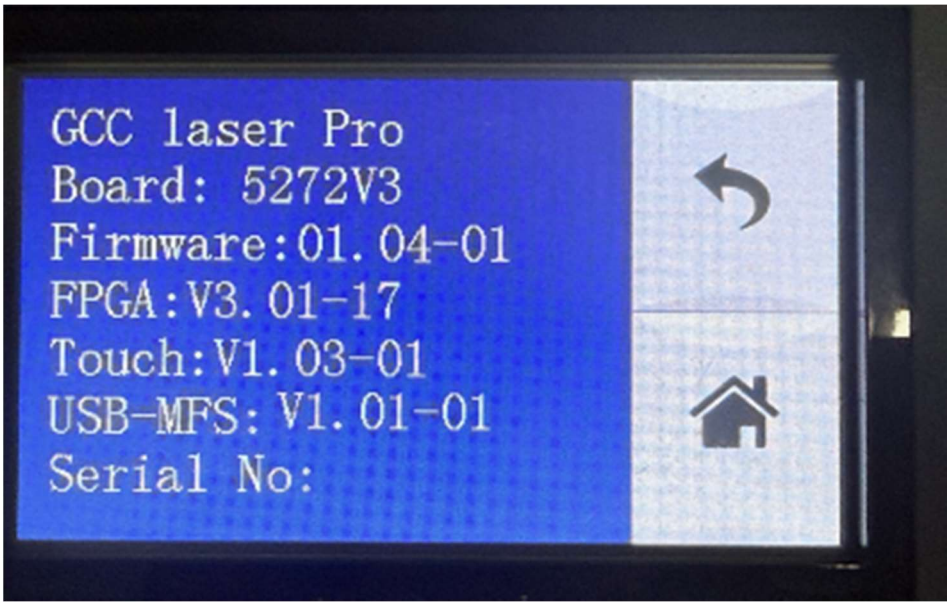
1. Press “Func”

2. Press “Information”



3. Press the graphic shown below :

4. You will find information related to the software version.



6.2 How to upgrade the touch screen panel

To update the Firmware of Touch Panel for your machine, please follow the steps below:

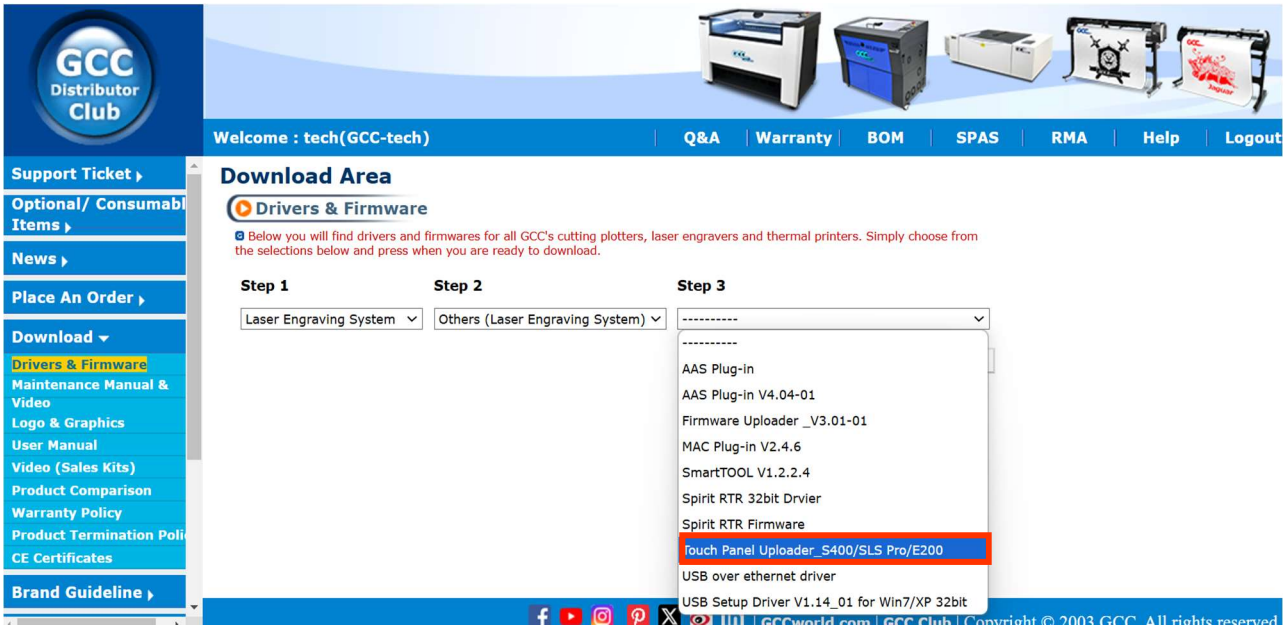
I. Tool Needed

Please prepare a mini USB cable

II. Touch Panel Firmware Uploader

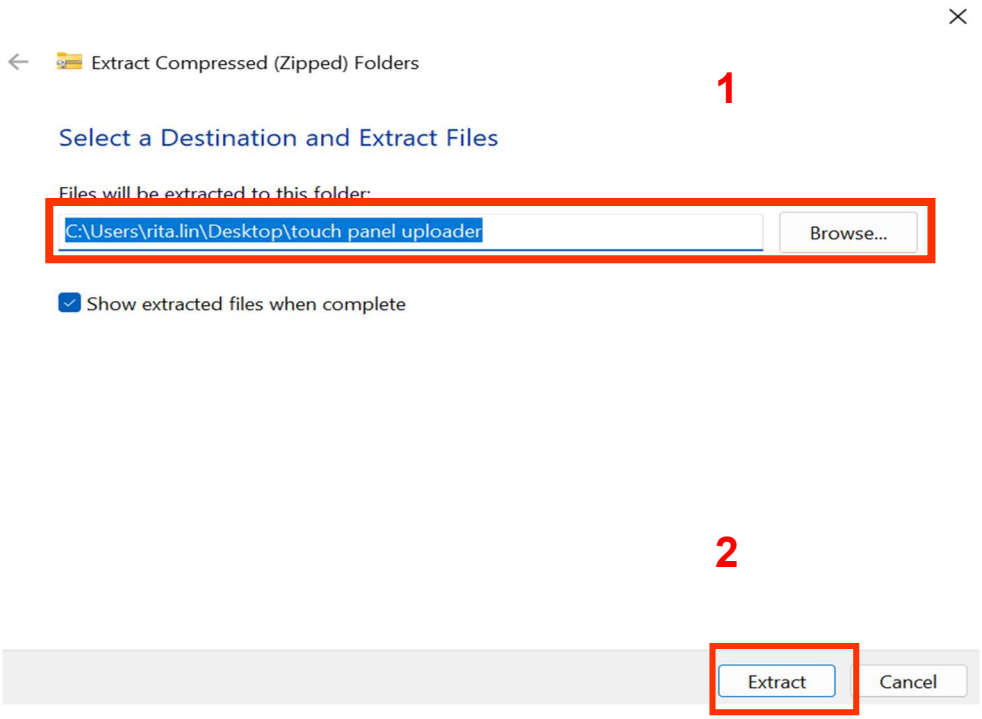
(Note : Compatible with Windows 10 and Windows 11)

A. Download the Firmware Uploader from GCC Distributor Club website:
http://gccf.gcc.com.tw/distributor/login.aspx



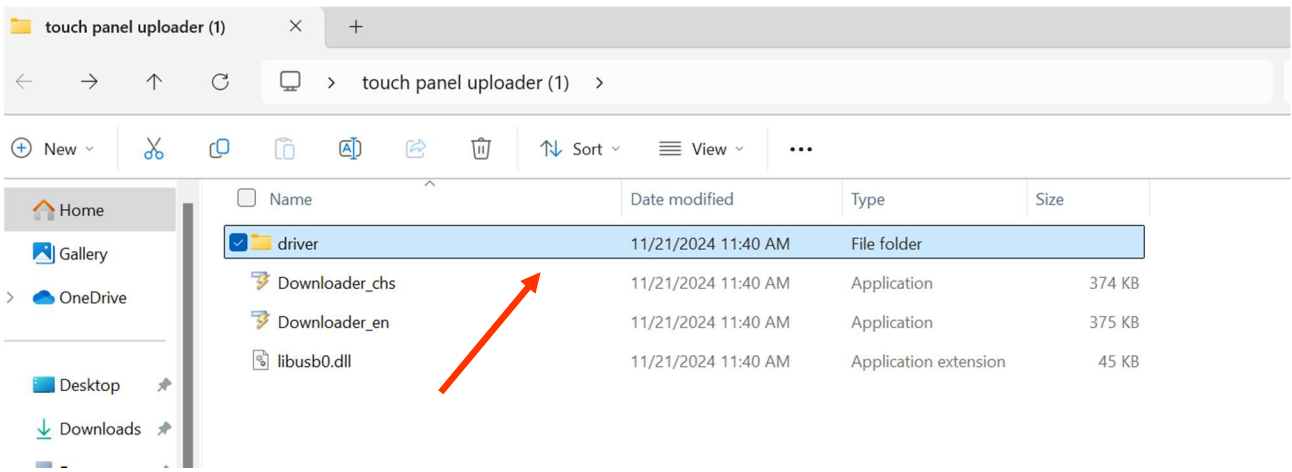
B. Extract Zipped Folder

C. Click on "Browse" to select touch panel uploader.zip the location where you want to save the file,
then click "Extract."



D. Install Touch Panel Firmware Uploader

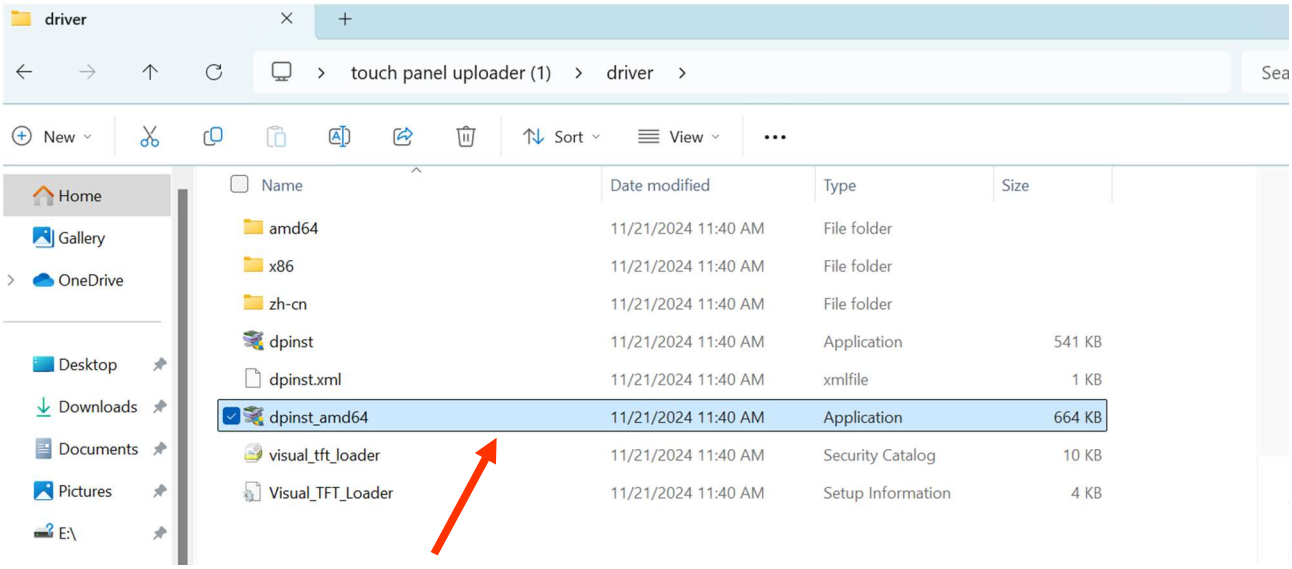
- Open the "Touch Panel Uploader (1)" folder and double-click on the "driver" folder.



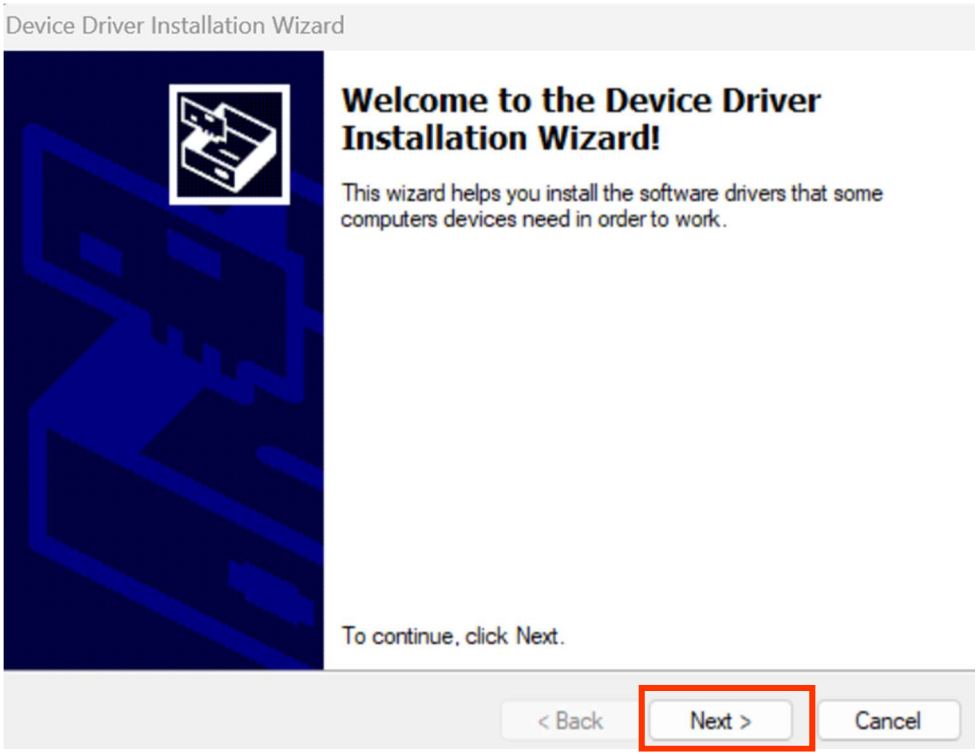
- To install the driver, double-click the file "dpinst.amd64" for Windows 64-bit

  Note: Windows 64-bit – please install “dpinst_amd64”

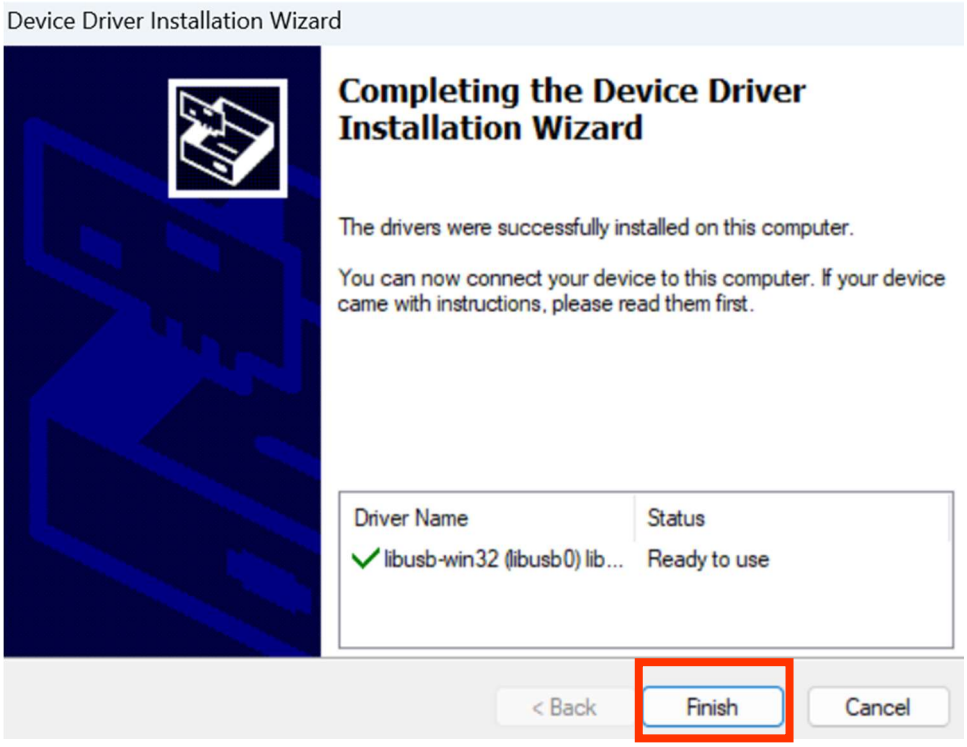
  Windows 32-bit – please install “dpinst”



Press “Next”

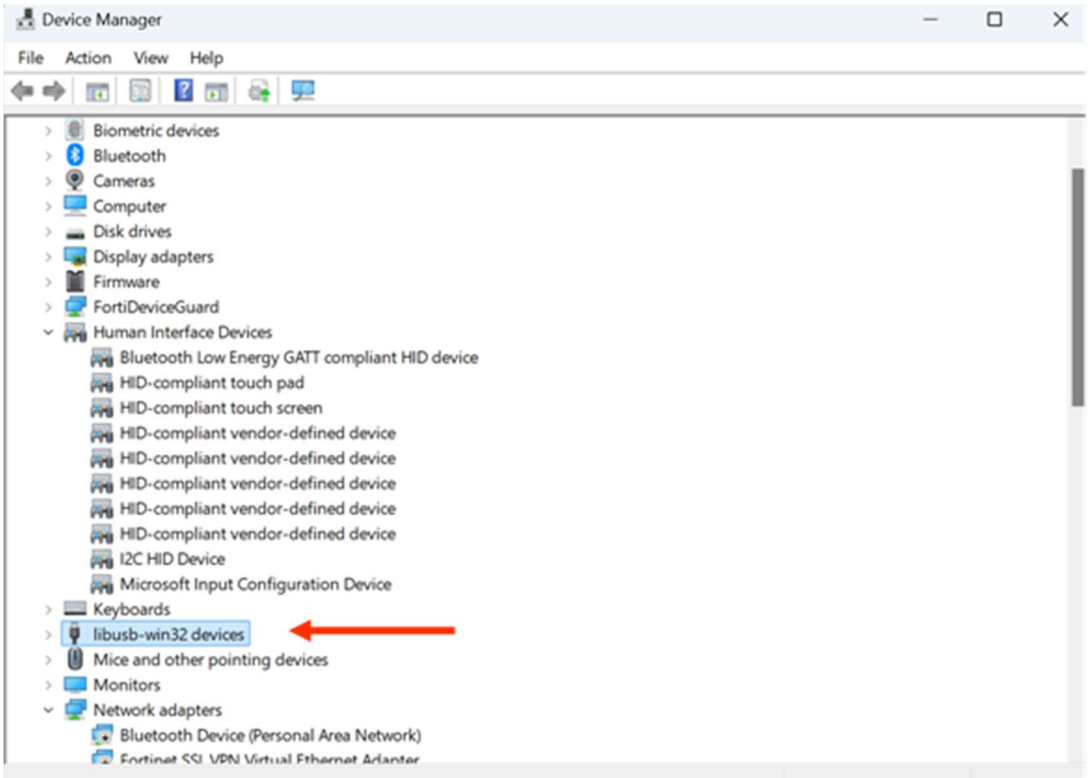


Press “Finish” to complete the installation.

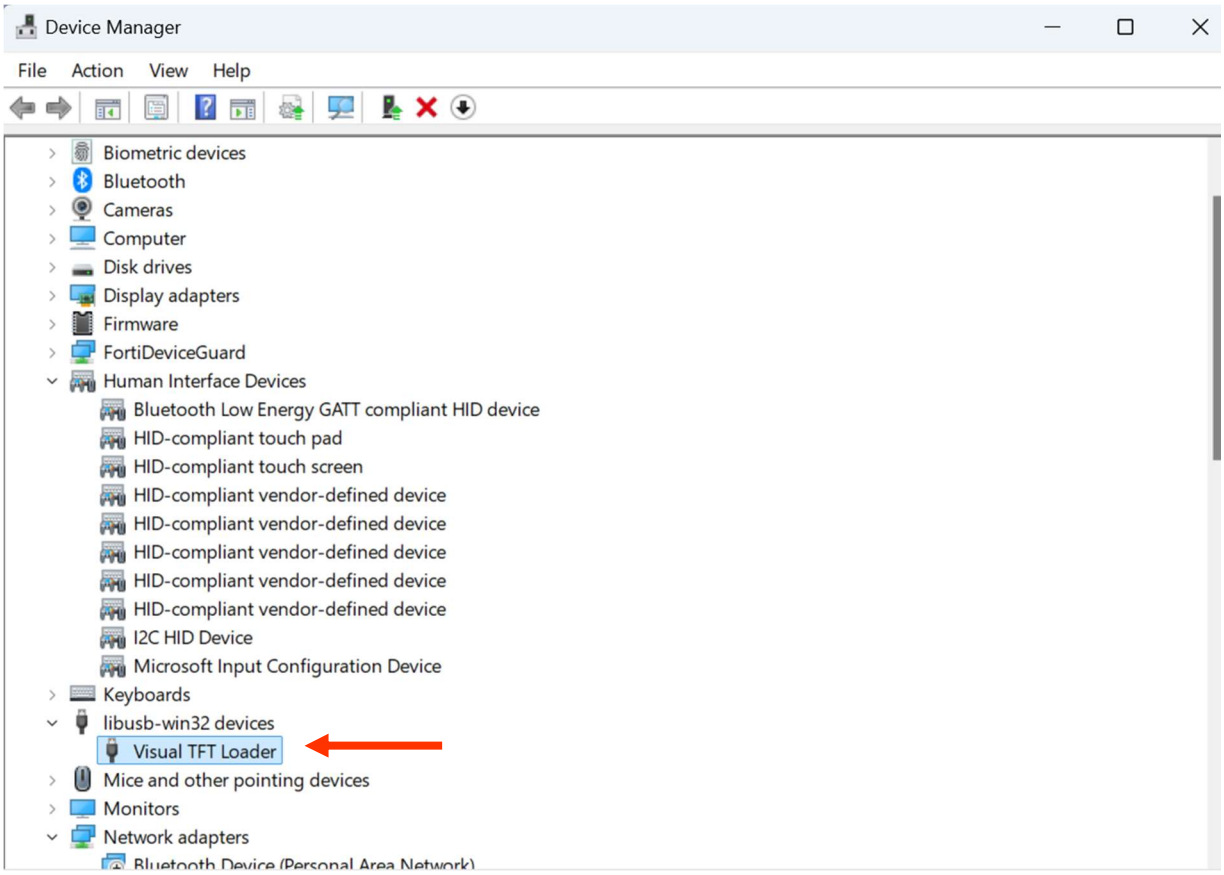


- How can you ensure that the driver has been successfully installed?

Run “Device Manager” on the PC. Click “libusb-win32 devices”

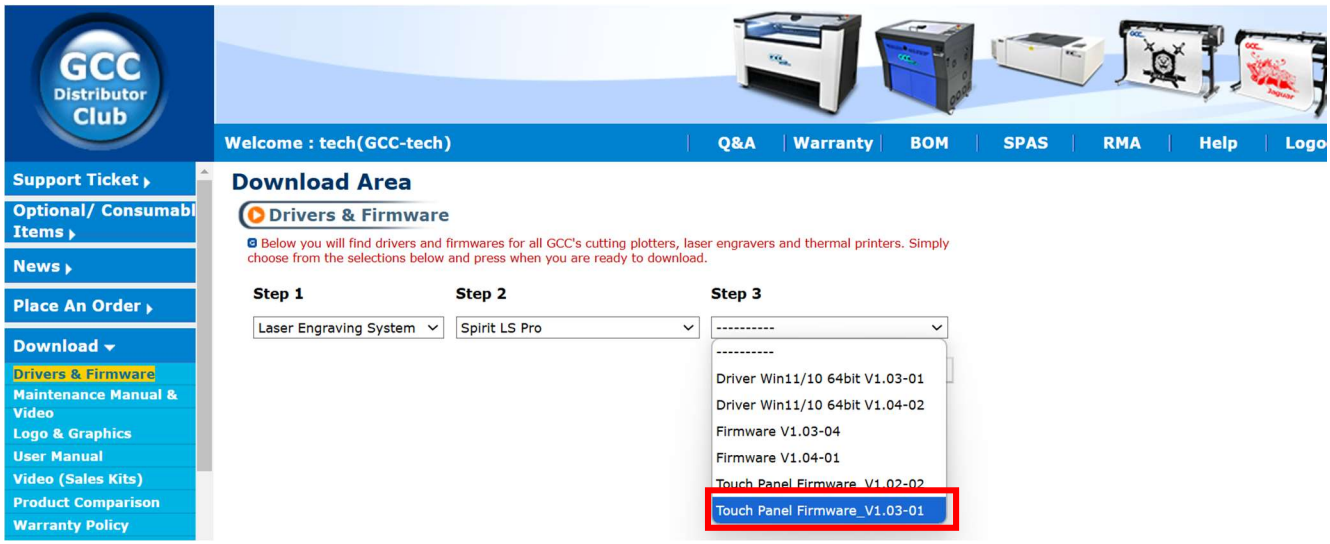


If you see "Visual TFT Loader," it means the driver has been installed successfully.



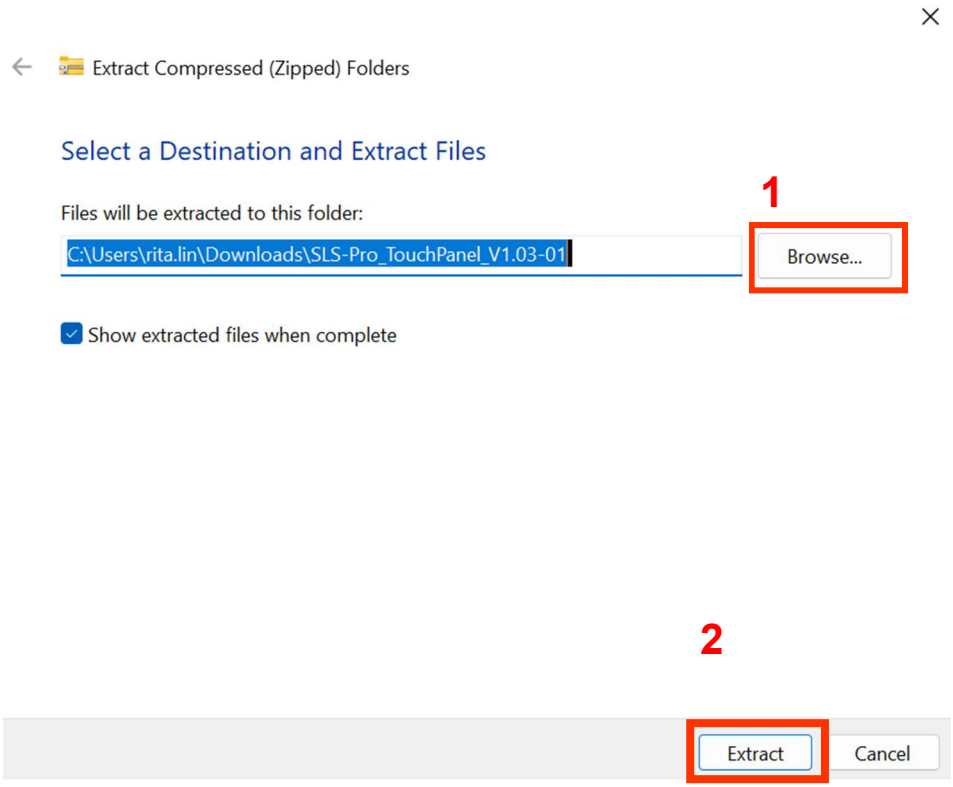
III. Touch Panel Firmware

A. Download Touch Panel Firmware from GCC Distributor Club website : http://gccf.gcc.com.tw/distributor/login.aspx



B. Extract Zipped Folder  SLS-Pro_TouchPanel_V1.03-01.zip

C. Click on "Browse" to select the location where you want to save the file, then click "Extract."



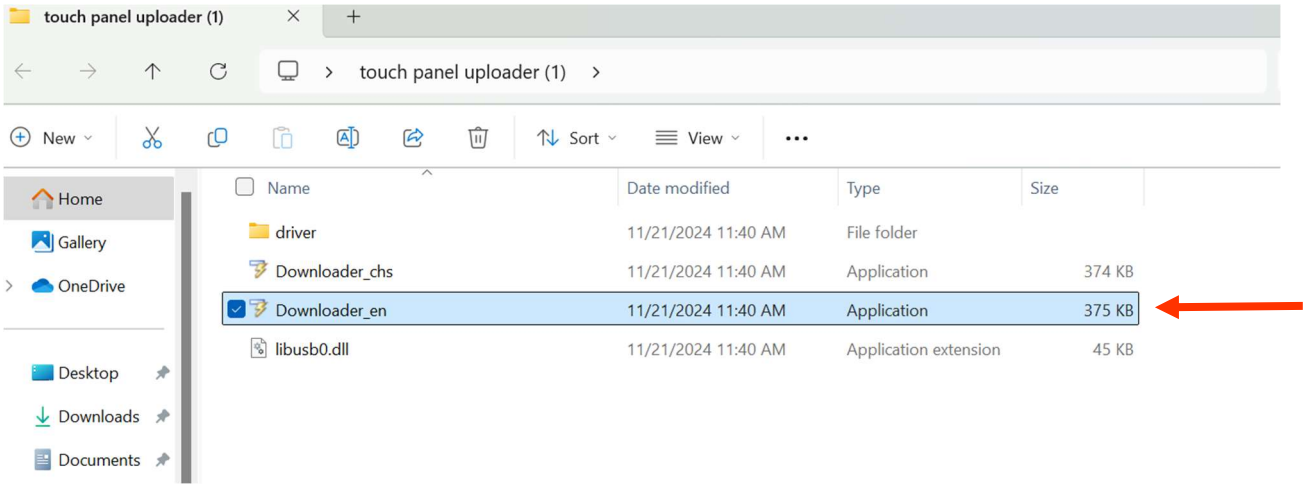
IV. Update Touch Panel Firmware

Step 1.

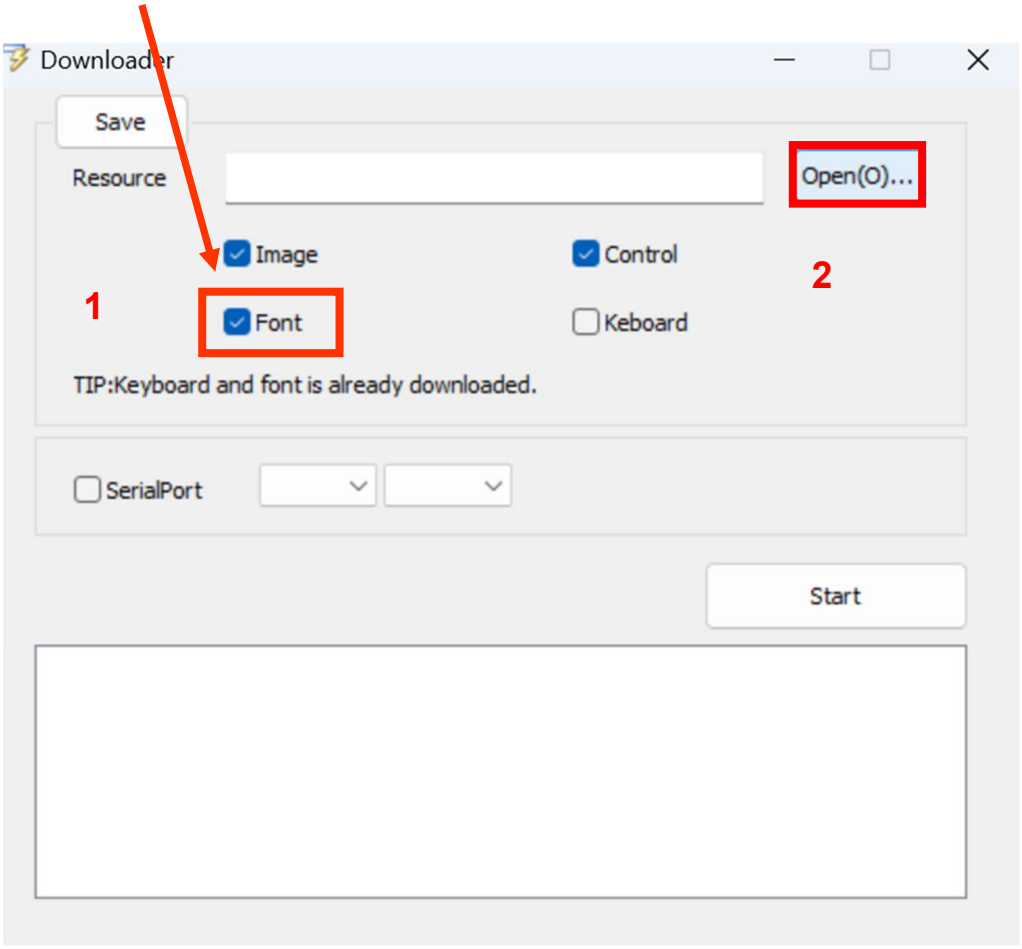
Turn on the machine. After the machine boots and completes the initialization process, connect the Mini USB cable to the left side of the control panel and to your PC or laptop.

Step 2.

Open the "Touch Panel Uploader (1)" folder and double-click on the "Downloader_en"

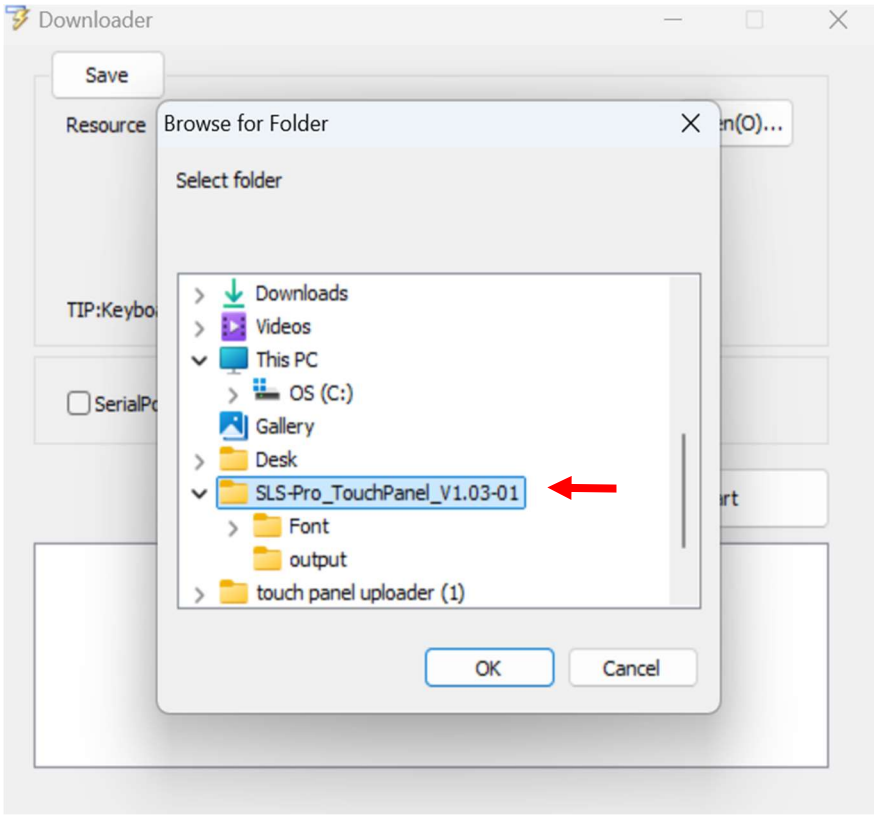


First, select "Font," and then click "Open" to choose the Touch Panel firmware folder.

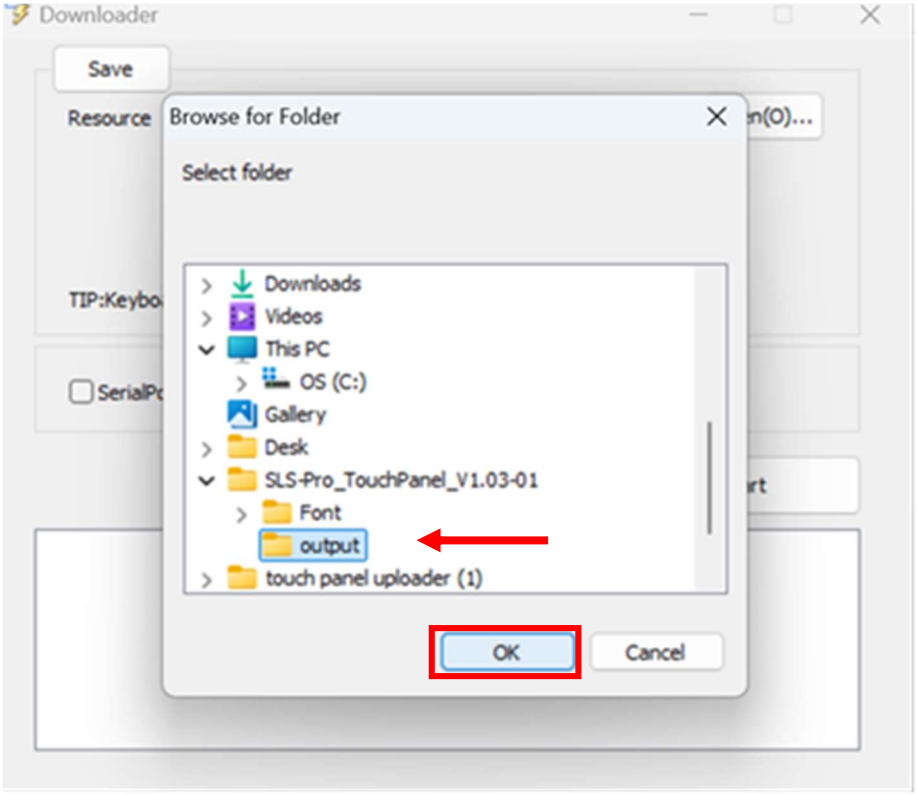


Step 3.

Click “SLS-Pro_TouchPanel_V1.03-01” folder

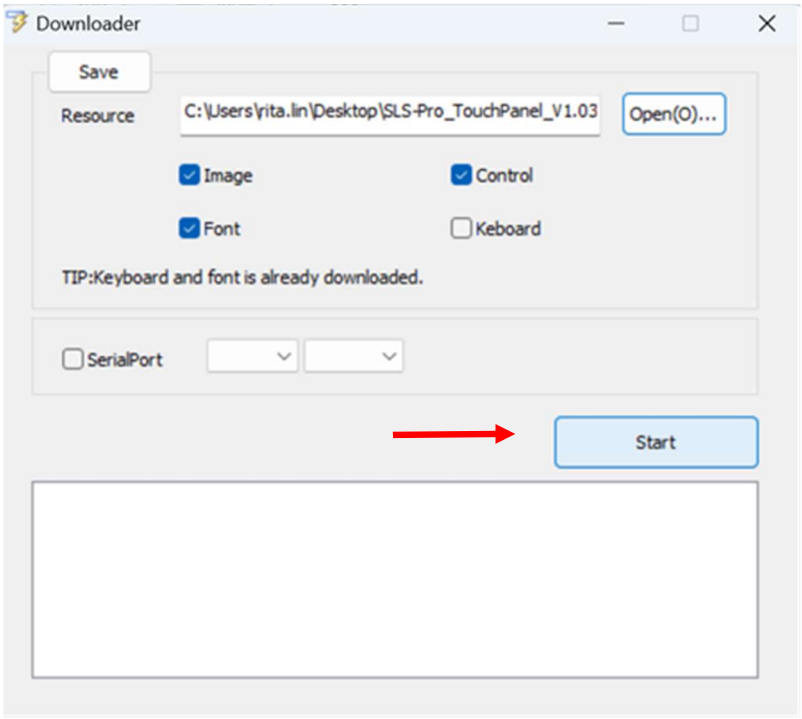


Select “output” folder, then press “OK”



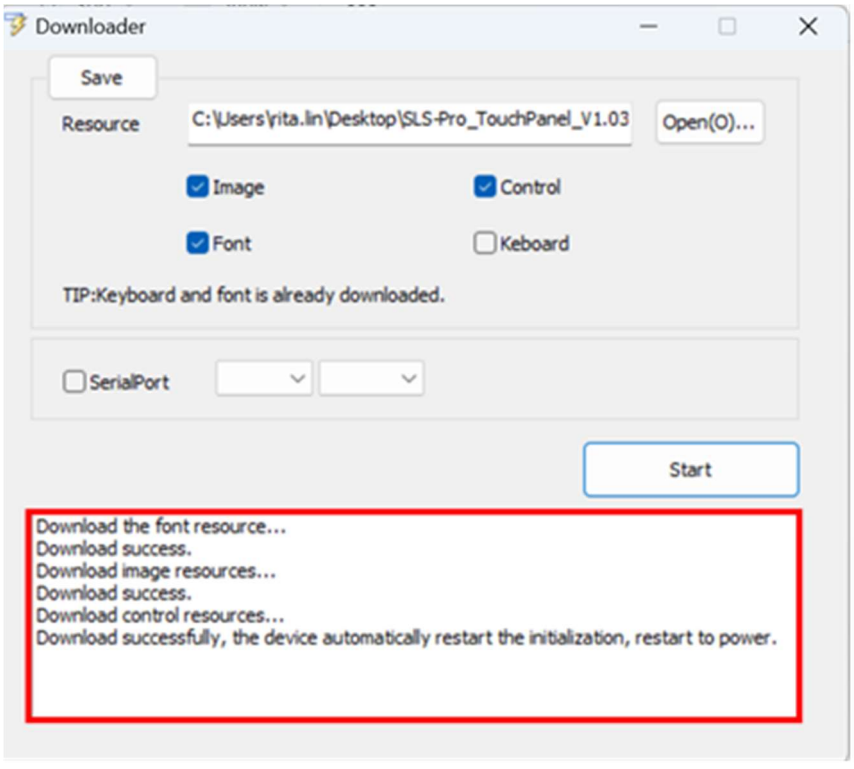
Step 4.

Press “Start” to initiate the update for the touch panel firmware.



Step 5.

When you see the following message, it means the update is finished.
Please close the update program and reboot the machine.



I. How can you find the firmware version of your machine?

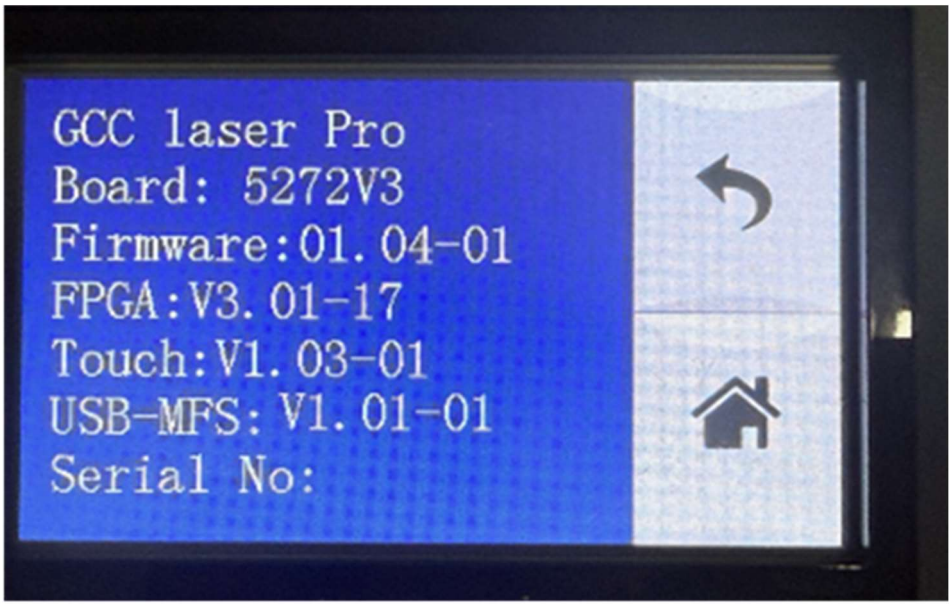
You can easily check the software version through the touch panel after the update.

- Press “Func”

- Press “Information”

- Press the graphic shown below :

- You will find information related to the software version.



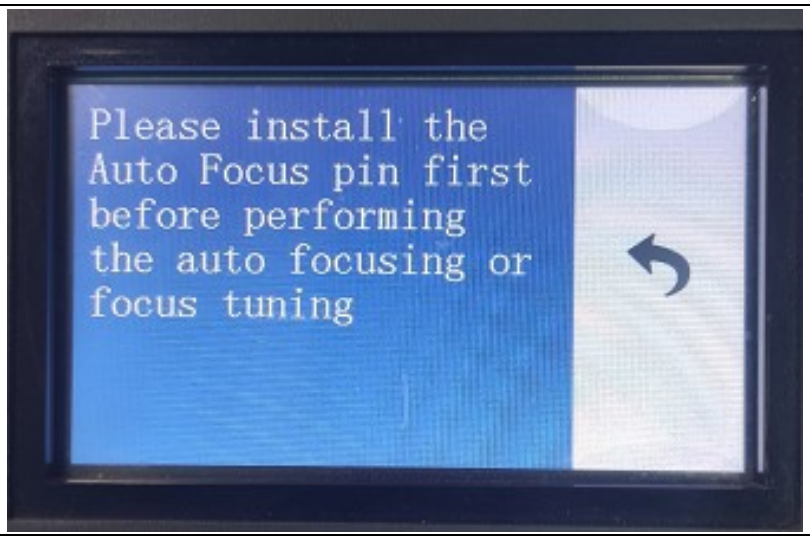
Chapter 7 : Trouble Shooting & Diagnostic

7.1 Firmware Error Message

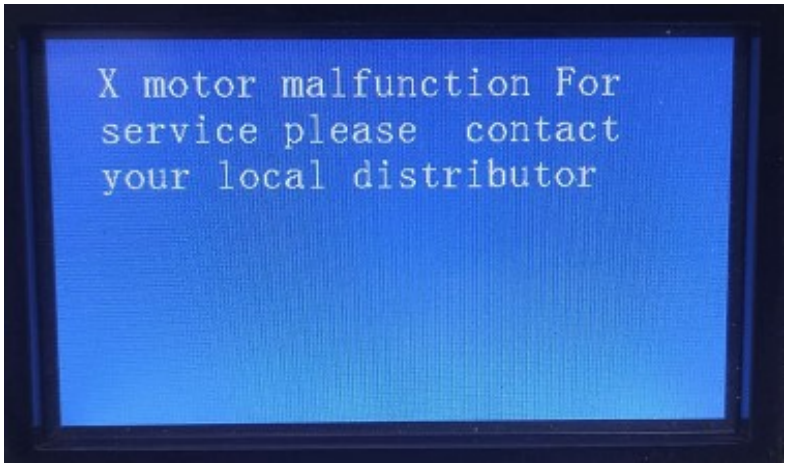
Message	Laser Tube Error Laser tube is overheat press any key to stop
Cause	V30 laser tube responses the over-temp signal for a period of time, and firmware recognizes the laser tube is over temperature.
Solution	Check if the cooling fans are functional, turn off the machine, wait for a while until the temperature goes down to the normal level.
	

Message	WARNING! SmartGUARD fire alarm system is activated,please reboot machine
Cause	Flame detected by SmartGUARD
Solution	Reboot the machine
	

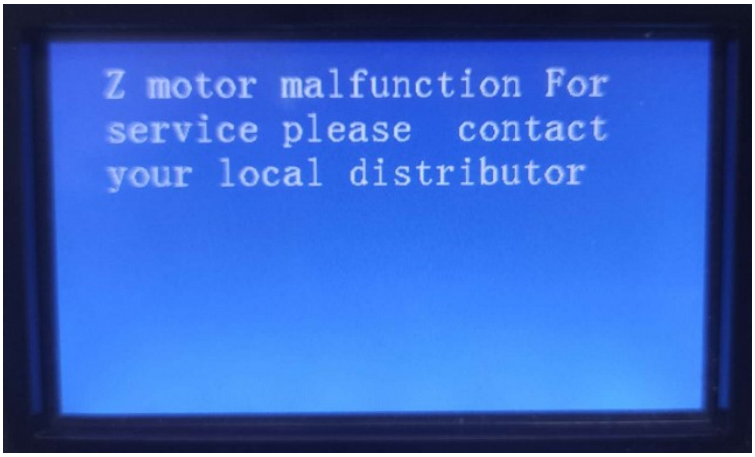
Message	WARNING! Emergency stop is activated, please free the emergency stop to continue next job
Cause	Emergency stop is pressed
Solution	Release the emergency stop button
	

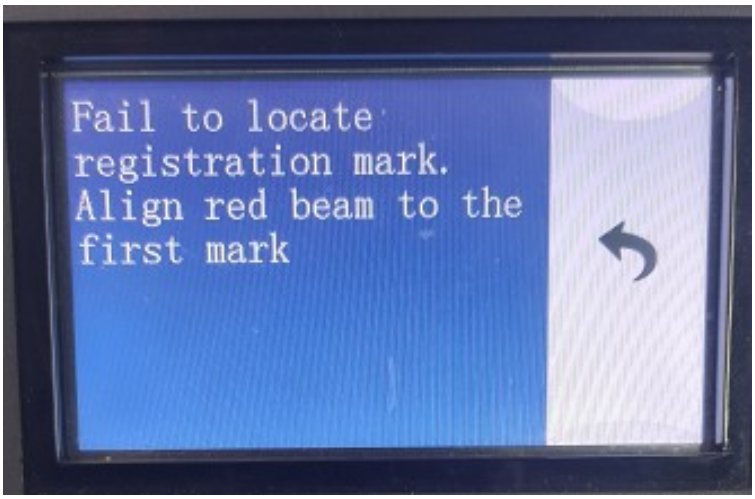
Message	Please install the Auto Focus pin first before performing the auto focusing or focus tuning
Cause	Auto Focus pin is not installed
Solution	Install the autofocus pin.
	

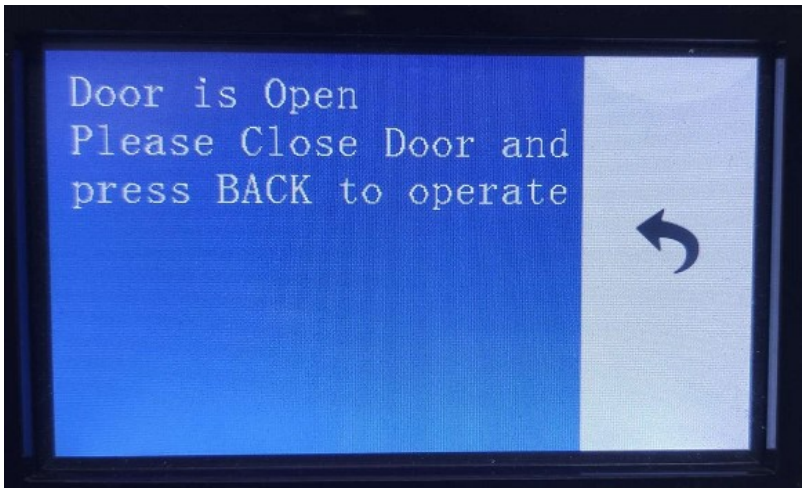
Message	Working table has reached the limit, please lower the table.
Cause	1. Platform reach the top limit 2. Platform reach the bottom limit 3. Certain object touches the limit switch 4. Limit switch malfunction
Solution	1. UP/Down platform to avoid the limit level 2. Remove the objects which touch the limit switch 3. Replace the limit switch
	

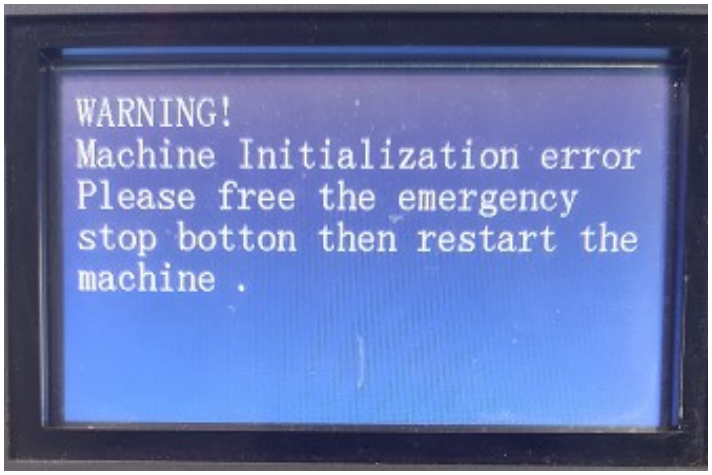
Message	X motor malfunction, For service please contact your local distributor
Cause	X motor is abnormal
Solution	Verification: 1. Check if the flat cable is properly connected. 2. Check if there is any abnormal sound made by the X motor. Solution: 1. Unplug and re-plug the flat cable. 2. Replace the motor.
	

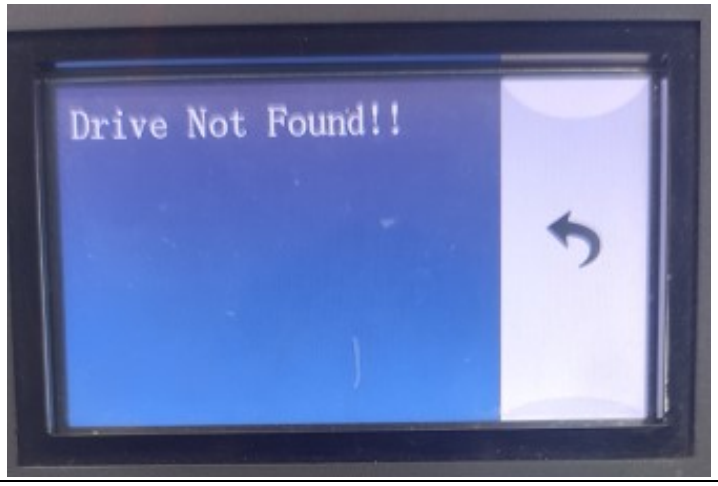
Message	Y motor malfunction, For service please contact your local distributor
Caus	Y motor is abnormal
Solution	Verification: 1. Check if the flat cable is properly connected. 2. Check if there is any abnormal sound made by the Y motor. Solution: 1. Unplug and re-plug the flat cable. 2. Replace the motor.
	

Message	Z motor malfunction For service please contact your local distributor
Cause	Z motor is abnormal
Solution	Verification: 1. Check if the cable between Z motor and mainboard is properly connected. 2. Check if there is any abnormal sound made by the Z motor. Solution: 1. Unplug and re-plug the cable. 2. Replace the motor.
	

Message	Fail to locate registration mark, Align red beam to the first mark.
Cause	CCD can't recognize the registration mark.
Solution	Do the CCD recognition again.
	

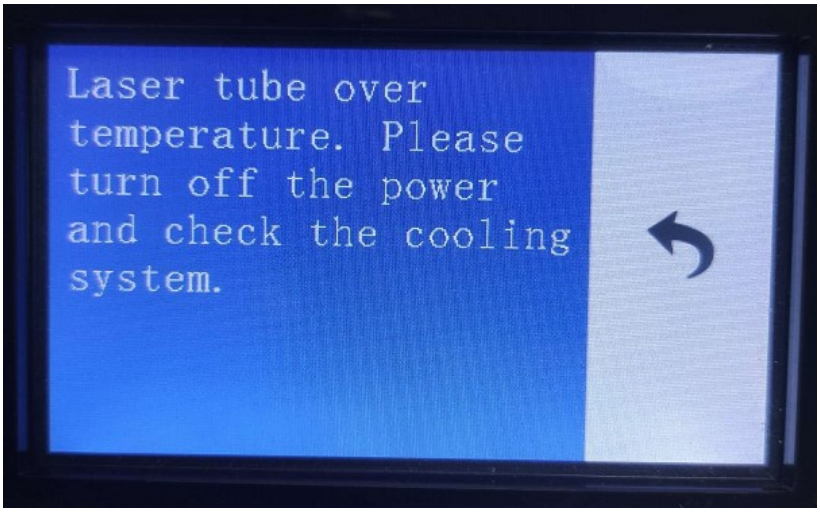
Message	Door is Open ! Please Close Door and press BACK to operate
Cause	Top cover is being opened while a job is running
Solution	Verification: 1. Check if the top cover is opened 2. Check if the Door sensor is working fine Solution: 1. Close the top cover 2. Replace door sensor
	

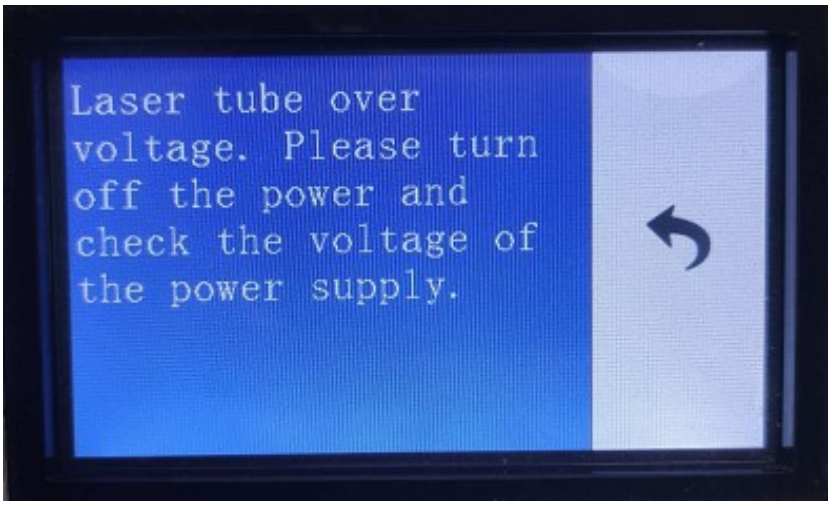
Message	WARNING! Machine Initialization error Please free the emergency stop then restart the machine
Cause	Emergency stop button is pressed while the machine is booting
Solution	Release the Emergency stop button
	

Message	Drive Not Found!!
Cause	USB storage is not plugged
Solution	Check if USB storage is plugged or plug again.
	

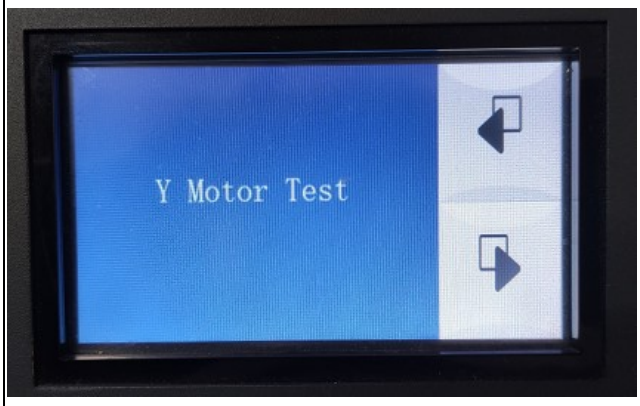
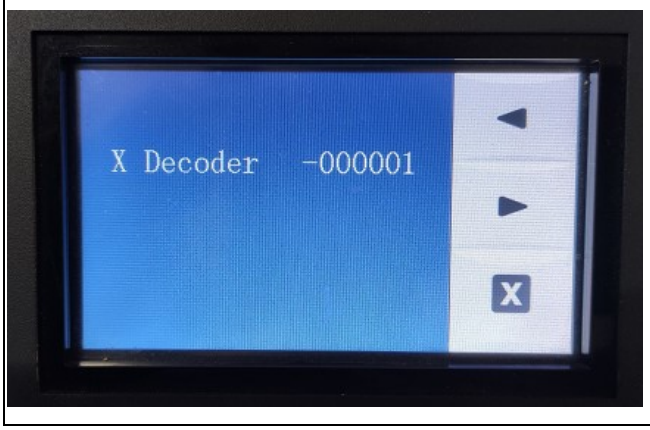
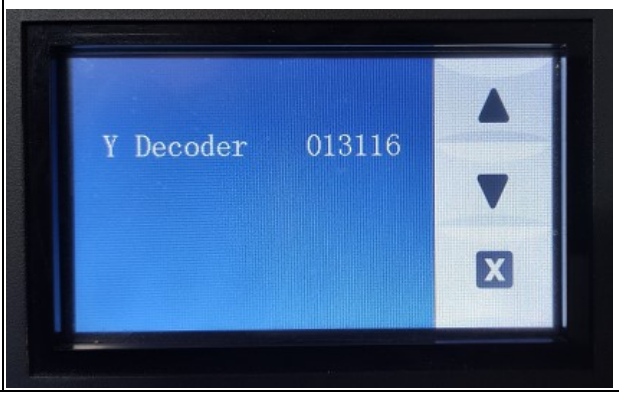
Message	Invalid File!!
Cause	1. The file format is not PRN or PLT. 2. The file name contains Chinese characters.
Solution	1. Change the file name. 2. Import PRN/PLT format files.
	

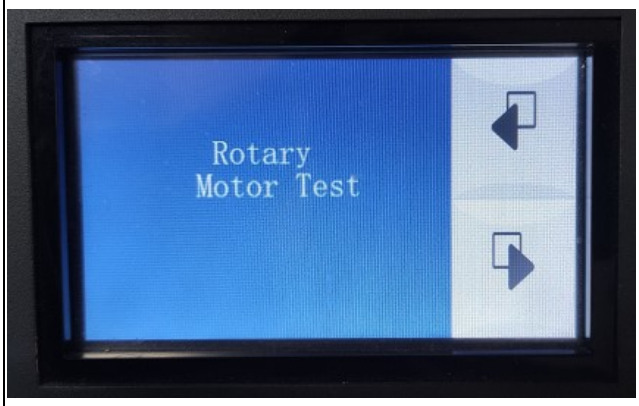
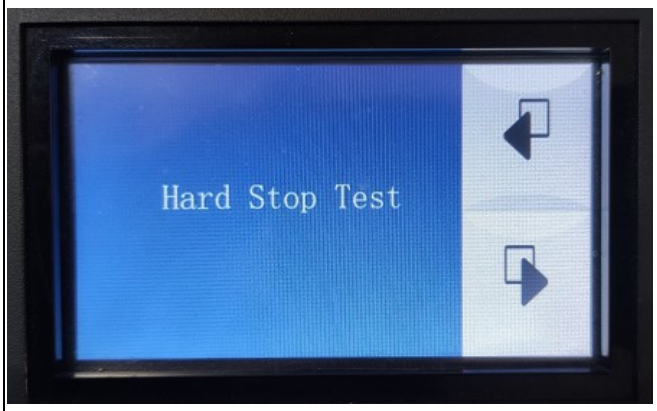
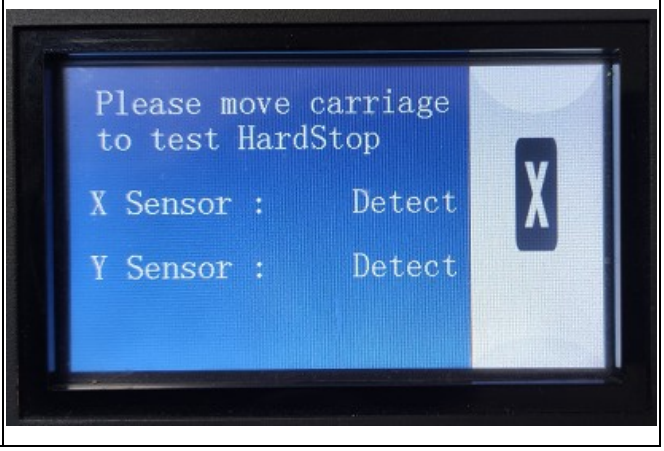
Message	WARNING! Invalid laser tube. Please contact your local distributor.
Cause	The GT laser tube is not from GCC.
Solution	Please use GCC laser tube.
	

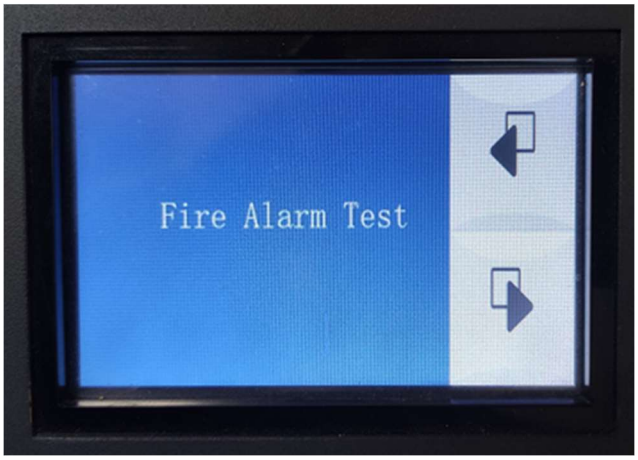
Message	Laser tube over temperature. Please turn off the power and check the cooling system.
Cause	GT laser tube is over temperature.
Solution	Please turn off machine to cool down or check the cooling system (fans are running or the machine is 20cm away from wall or the air temperature is too high)
	

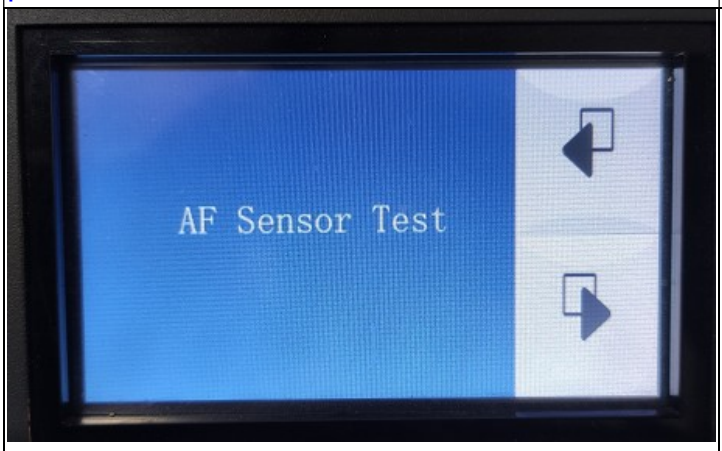
Message	Laser tube over voltage. Please turn off the power and check the voltage of the power supply.
Cause	GT laser tube is over voltage.
Solution	Check the voltage of the power supply, make sure the voltage value is within the proper range (80GT and 100GT requires 48V and 120GT requires 50V)
	

7.2 Hidden Diagnostics

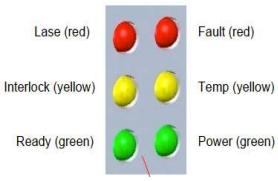
X Motor Test	Y Motor Test
X motor test checks if the X motor is functional, Click on the text “X Motor Test” to enter the test, press Left and Right arrow key on the right side of touch panel to move the carriage along the X axis, you will see the value of “X Decoder” varies with the moving of carriage.	Y motor test checks if the Y motor is functional, Click on the text “Y Motor Test” to enter the test, press Up and Down arrow key on the right side of touch panel to move the carriage along the Y axis, you will see the value of “Y Decoder” varies with the moving of carriage.
	
	

Rotary Motor Test	Hard Stop Test
Rotary Motor Test checks if the motor of the optional Rotary attachment is functional. Click on the test “Rotary Motor Test” to enter the test , press Left and Right arrow key on the right side of touch panel to roll the Rotary attachment, you will see the value of “R Decoder” varies with the rolling of Rotary attachment.	Hard Stop test checks that the X and Y sensors are functional by asking the user to manually move the pen carriage towards the X and Y sensor flags
 	 

Buzzer Test	Fire Alarm Test
Buzzer test checks if the following items are functional :Buzzer / Laser Diode / Air / Fans Those functions will run at the same time while users press the “Start/Stop” button.	File Alarm Test checks if the optional SmartGuard is functional. System buzzer will beep once fire is detected.
	
	

AFocus Sensor Test	Laser Test
AFocus Sensor Test checks if the sensor of AutoFocus pin is functional, the sensor will recognize if the AutoFocus pin is well installed on the AF seat. System buzzer will beep once you remove the AF pin from AF seat if the sensor is functional.	Laser test allow you to fire the laser with the laser power level you set. (This test is usually used to perform the Laser beam alignment.)
	
	

7.3 Indicator LEDs for GT Laser tube

Indicator	LED Color	Illumination Convention	Image
LASER READY	Green	Lights (cw) when the laser controller is ready for operation	
OVERTEMP	Yellow	Lights (cw) when the RFPA is getting too hot*	
FAULT	Red	Lights (or blinks) when the controller is in a Fault state	
LASE LED	Red	Lights with varying brightness whenever RF power is generated	
POWER	Green	Lights (cw) whenever DC power is applied	
INTERLOCK	Yellow	Lights (cw) when the interlock pin connected to ground	

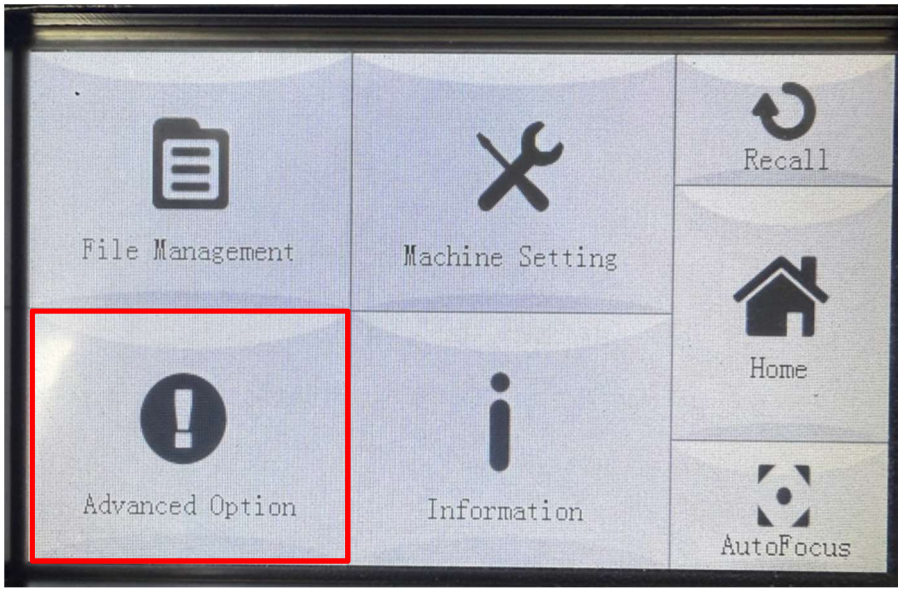
Chapter 8 : FAQ

8.1 How to adjust power level of Laser Power Tuning ?

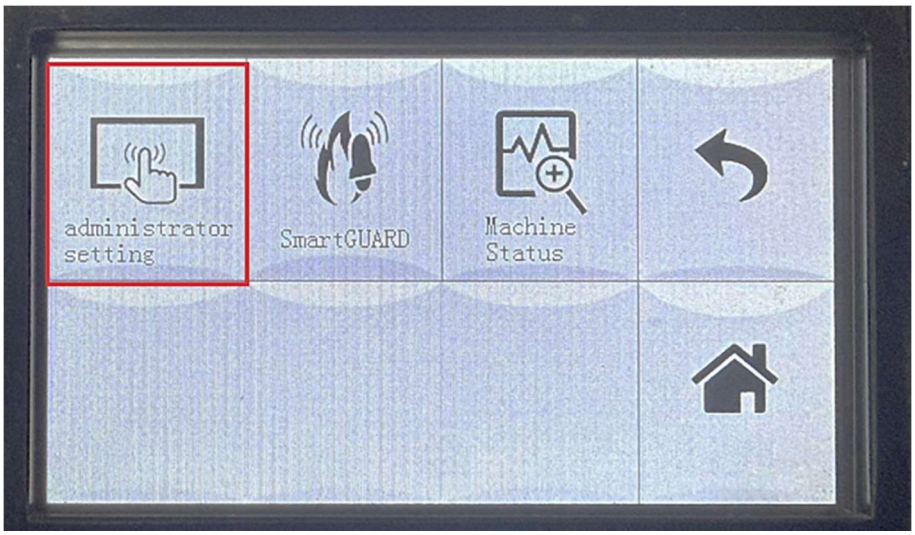
For companies purchasing more than two machines of the same model and wattage, the power tuning feature can adjust each machine's wattage to match. This allows customers to apply the same parameters across multiple machines.

To adjust the laser power, please follow these steps:

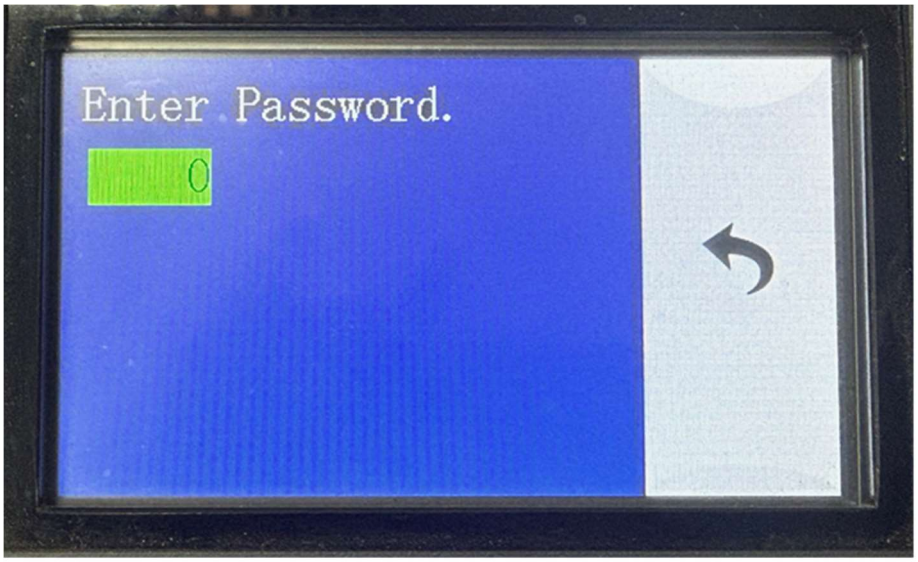
1. Press “Advanced Option”



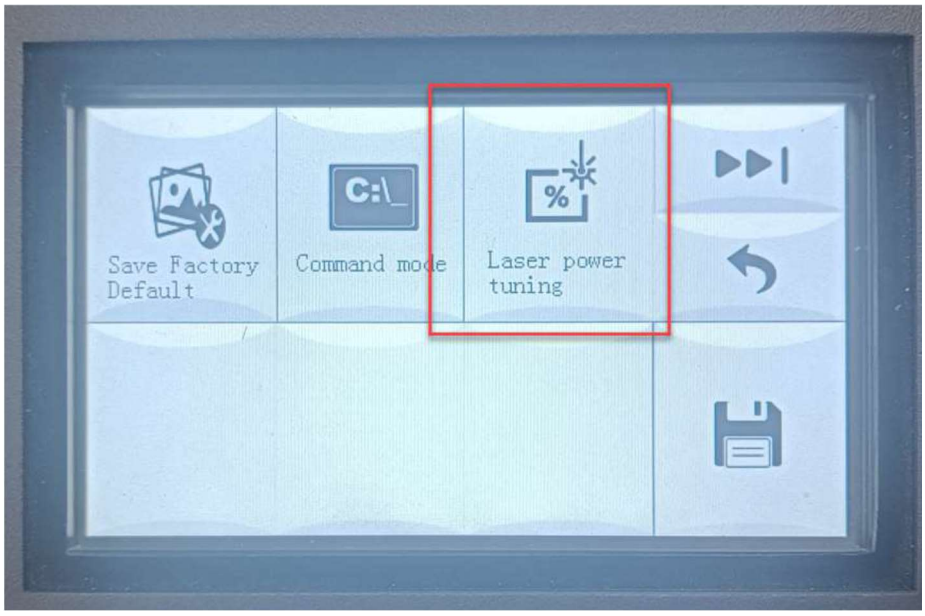
2. Press “administrator setting”



3. To proceed, please enter the password:「8047」and press 「↵」

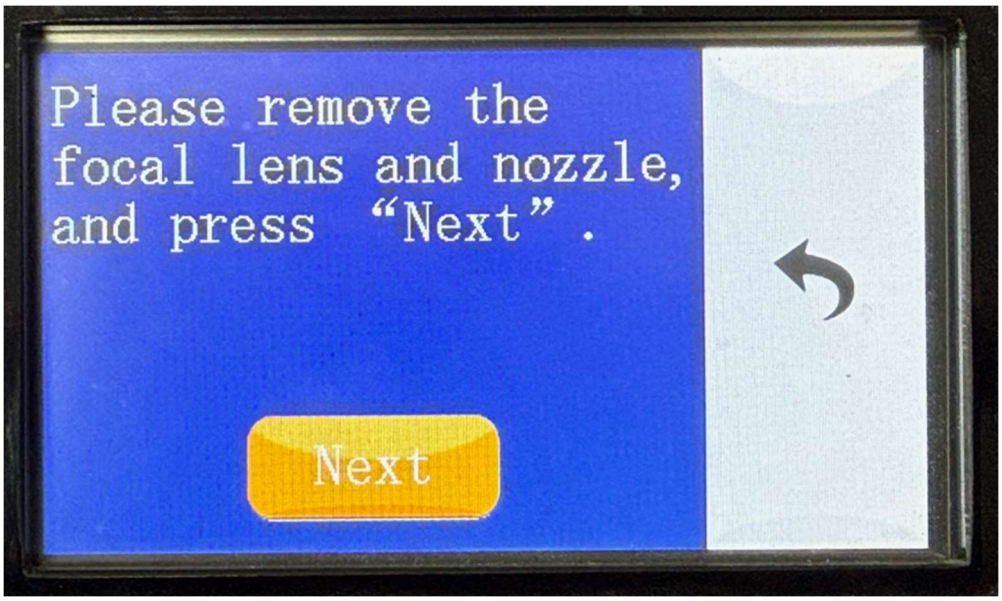


4. Enter “LASER power tunning”

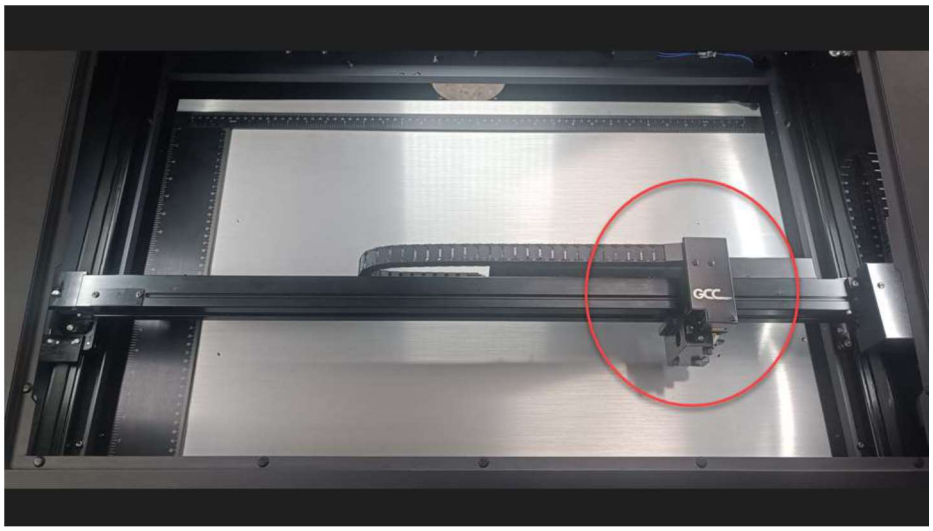


5. Press “Next”

6. Remove lens and nozzle, then press “Next”



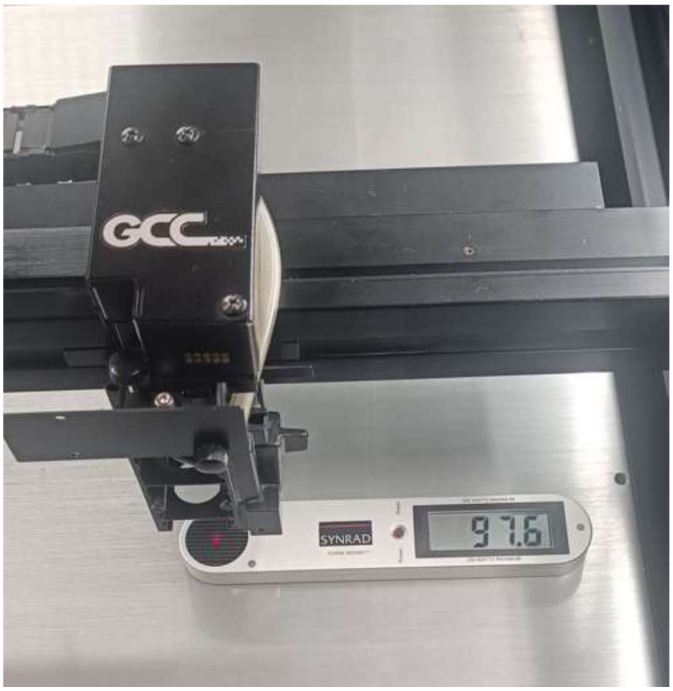
7. Carriage will move to this position



8. Put power meter and

9. Fire laser (use default power level 90%, firing time 10s)

10. Get the power reading



11. Adjust the power level, press “Save” and fire again