

# CNC Carving Machine



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## Routine maintenance Disclaimers

Before operating the ROBO CNC, please read the instruction manual carefully. This is to avoid undesirable results that may damage the CNC machine or cause personal injury. Anyone operating a CNC machine should know and understand the content of this manual.

1. COMGROW cannot verify and ensure that you are assembling the ROBO CNC correctly. We are not responsible for and expressly disclaim liability for loss, injury, damage or expense associated with the assembly, handling, storage, use or other disposal of the product.
2. The information in this manual is provided without warranty of any kind, either expressed or implied.
3. Please be careful when using the CNC machine. This machine is an electrical device with moving parts and dangerous areas.
4. The ROBO CNC machine is for indoor use only.
5. You must be 18 or older to operate this machine, unless under the supervision of an adult skilled in the use of this machine.
6. Please wear appropriate personal protective equipment (safety glasses, etc.).
7. Please place the CNC machine on a stable surface.
8. ROBO CNC machine provides switchable power supply 230 VAC or 110 VAC. It is forbidden to use different power supply, it may lead to machine malfunction or even damage.
9. Please make sure that the emergency stop button is functional at all times.
10. Do not disassemble the power supply or electrical components. This will void the warranty.
11. Do not touch the machine spindle or place any body part near the work area while the machine is running.
12. Please do not allow children near the machine, as damage may occur even if the CNC machine is not working.
13. Please do not run the machine unattended.
14. Please make sure your CNC machine is in a well ventilated area. Some materials may emit fumes during operation.

# WELCOME TO COMGROW!

Comgrow was founded in 2017 by people who have a serious passion for technology that helps you make things. With this deep-rooted dedication, we wanted to make the digital manufacturing process more accessible, giving educators, engineers, manufacturers, small businesses and tinkerers the power to make anything.

Headquartered in Southern China, Shenzhen, Comgrow's dedicated staff is committed to providing the kind of service that makes you say "wow." We offer the highest quality materials, machines, and accessories - from industrial-grade 3D printers to DIY laser cutters - all of which have been tested and approved by our in-house experts. Our amazing gals and guys in customer service are here Monday through Saturday to help with anything you may need, from finding the right material to package your specific product, to discussing which printer is best for new users. Bottom line is, we're here to make 3D printing, laser cutting, and CNC (will release in May, 2021) milling magic happen. Contact us.

Thanks again for using our CNC engraving products, if you encounter any problems during the use, we will reply you at the first time.

Service Email: [service@comgrow.com](mailto:service@comgrow.com)

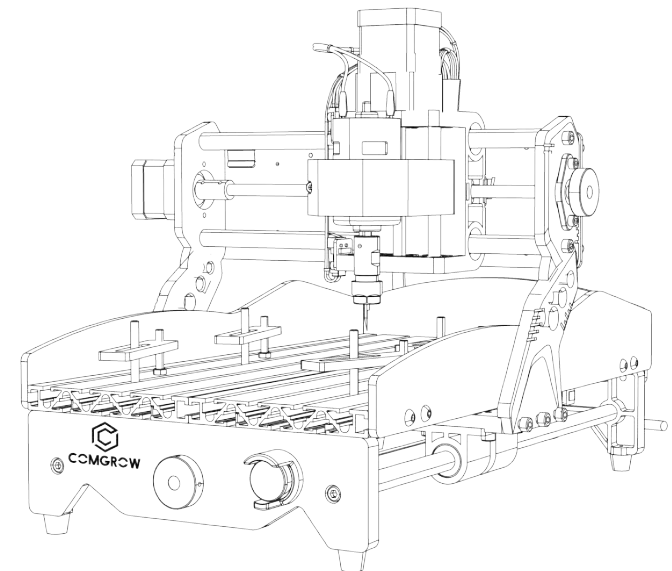
For related installation files, please check: <https://www.comgrow.com>

Join our Facebook support group: <https://www.facebook.com/groups/comgrow/>











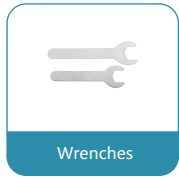
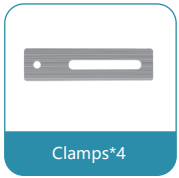















## Characteristics

Product exterior size	400*275*268mm(motor not included)
Milling size	300*180*45mm
Weight	7.5KG
Drive motor	42 stepper motor, 0.48 N.m.
Spindle	775 motor, 12V~24V,10000RPM
System	Windows XP, Windows 7 32/64 bits, Windows 8, Windows 10, Linux system.
Composed of aluminum, the overall structure is stable to meet the needs of milling a wider range of materials; available for engraving and cutting wood, plastic, acrylic, PCB, soft aluminum and so on; unavailable for hard metals, jade and other hard objects	
Acrylic baffle prevents from dust and make it easier to clean up; equipped with emergency stop button, stop milling with one press	
Operating by GRBL software or offline control handle;	



# Contents

 Y-axis base	 XZ-axis gantry	 Protective baffle	 Plug	 24V/5A Adapter
 Spindle motor	 Spindle	 Tool holders	 offline control handle	 offline control handle cable
 Wrenches	 Clamps*4	 SD Card	 USB cable	 Tool setting gauge block
 Milling tool kit	 Brushes	 M5X12 Screw *10	 Hexagonal wrench	 Wire Buckle
 M5X10 Screw *8	 T-nuts *8	 Butterfly nuts *4	 M5X40 Screw *8	 M4X25 Screw & Square Nut*1

# Assembly: Part 1

Ready:



a: Protective baffle (x2)



b: Y-axis base (x1)



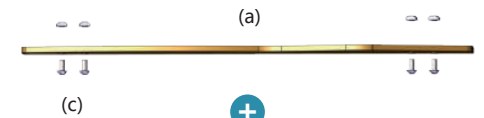
c: M5X10 Screw (x8)



d: M5 T-nuts (x8)



(d)

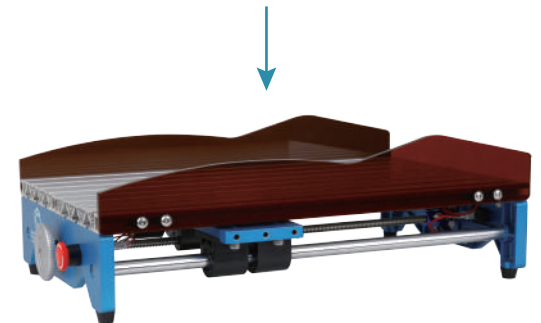


(c)



Remove the two protective baffles (a) and install the M5\*10 (c) screws and M5 T-nuts (d)

Install the protective baffle on both sides of the Y-axis base (b)

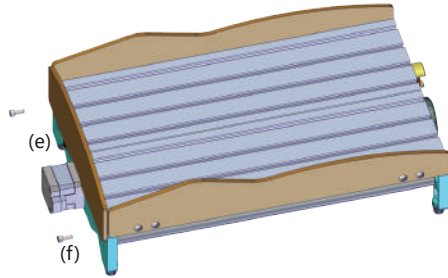


## Assembly: Part 2

Ready:



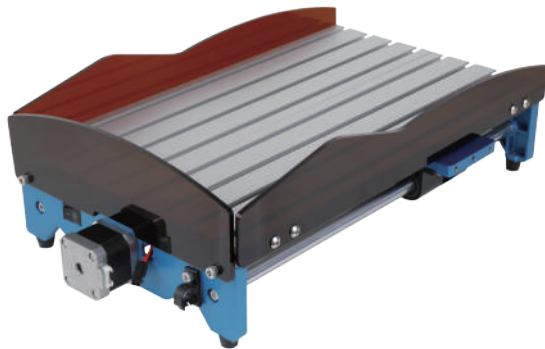
e: back side panel (x1)



Use two M5\*12 screws (f) to secure the back side panel (e) to the rear of the Y-axis base



f: M5X12 Screw (x2)



## Assembly: Part 3

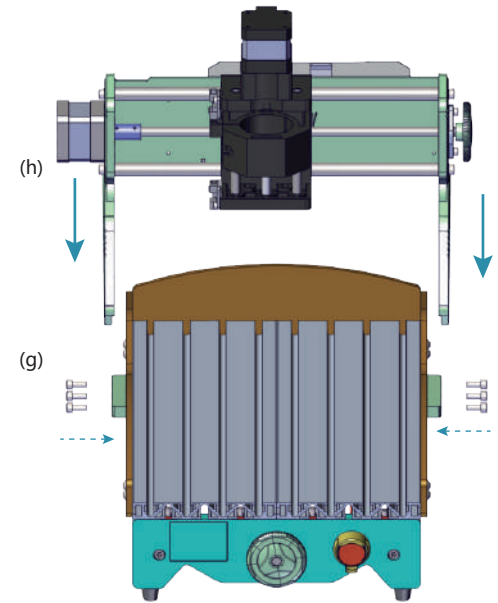
Ready:



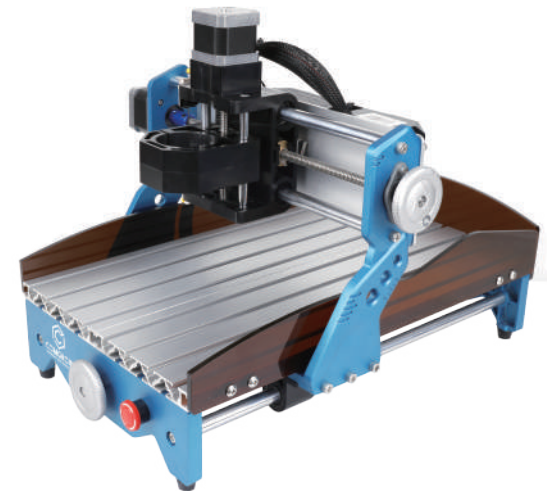
g: M5X12 Screw (x6)



h: XZ-axis gantry (x1)



Using six M5\*12 screws (g), secure the XZ-axis gantry (h) to the side of the Y-axis base.



# Assembly: Part 4

Ready:



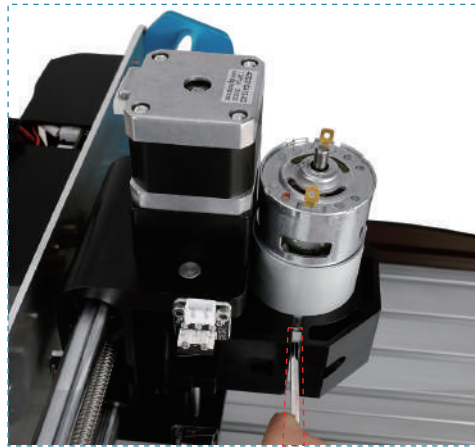
i: M4X25 Screw (x1)



j: M4X25 Screw (x1)

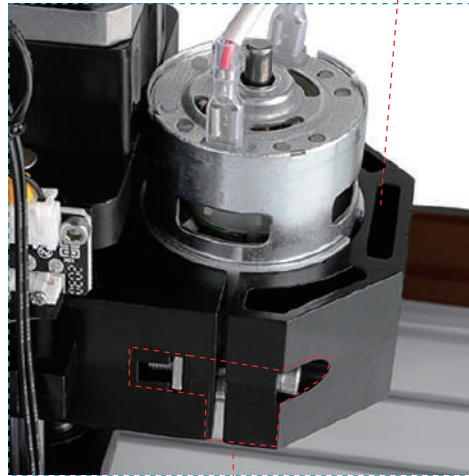


k: Square nut (x1)



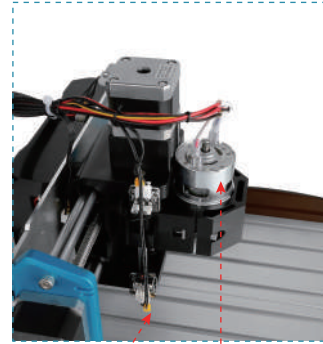
Take out the spindle motor and load into the collet, Use an Hexagonal wrench to jam the gap

After holding the collet open, slide down the spindle motor. Note: Do not block the spindle fan outlet with the Z-axis chuck. Make sure that at least 2/3 of the length of the Z-axis chuck is clamped to the motor.

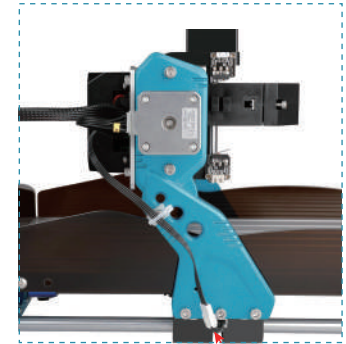


Use M4\*25 screws (j) and square nuts (k) to secure the collet. Note: Don't lock the screw too tightly to avoid damage to the collet.

# Wiring schematic



Z-axis limit switch cable

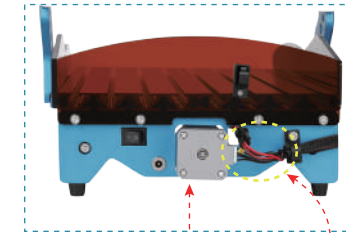


Y-axis limit switch cable

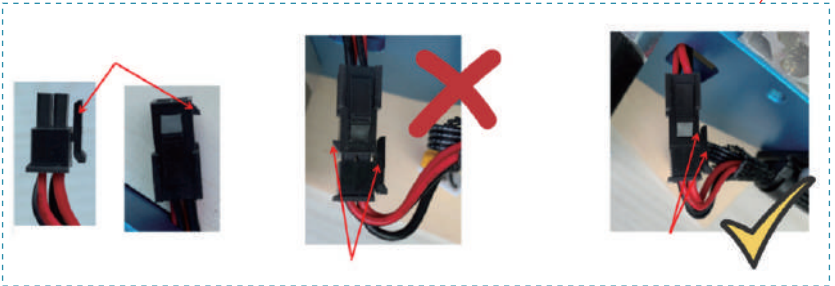


The spindle red wire is connected to the port next to the red dot mark on the motor

The side with the red dot is the "+" pole



Y-axis limit switch cable

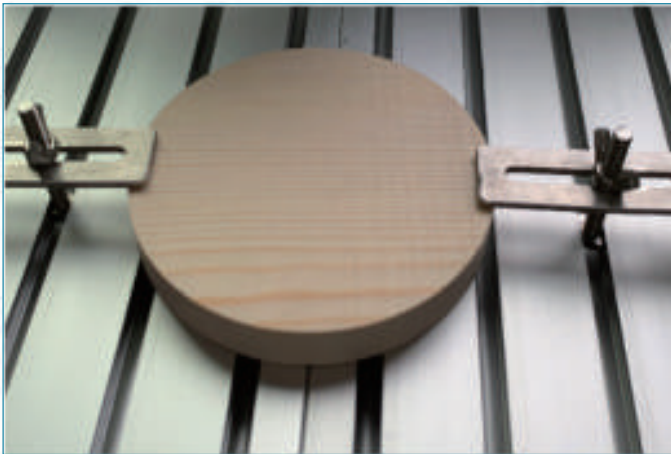


The power supply and the direction of the plug have requirements, do not allow thereverse connection, otherwise there will be the risk of burning the motherboard.

**The correct way to connect:** snap and convex bit with the same direction. Attach the Wire Buckle to the backplane to secure the wires

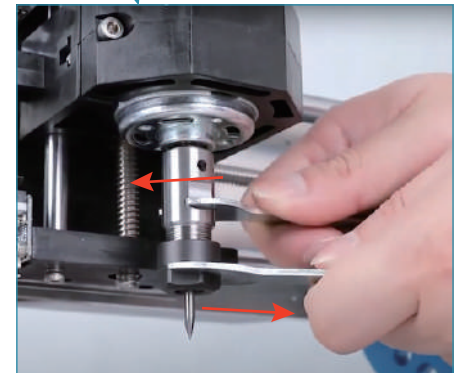
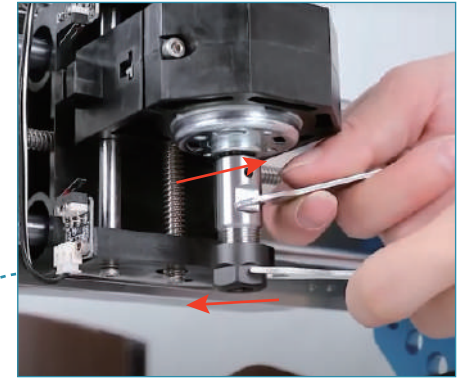
## Assemble the hold downs

- Fixing the material (PVC, wood, acrylic, or other plastic boards.) on the table of the engraving machine with clamps.
- Note: Make the screws supporting the profile plane and the thickness of the engraving material the same height, please avoid tightening the screws too hard to avoid deforming the table T-slot.
- Consider the size of the carving size when clamping the material, because the chuck of the spindle motor will occupy the space, which will avoid the spindle tool to touch the platen when carving.

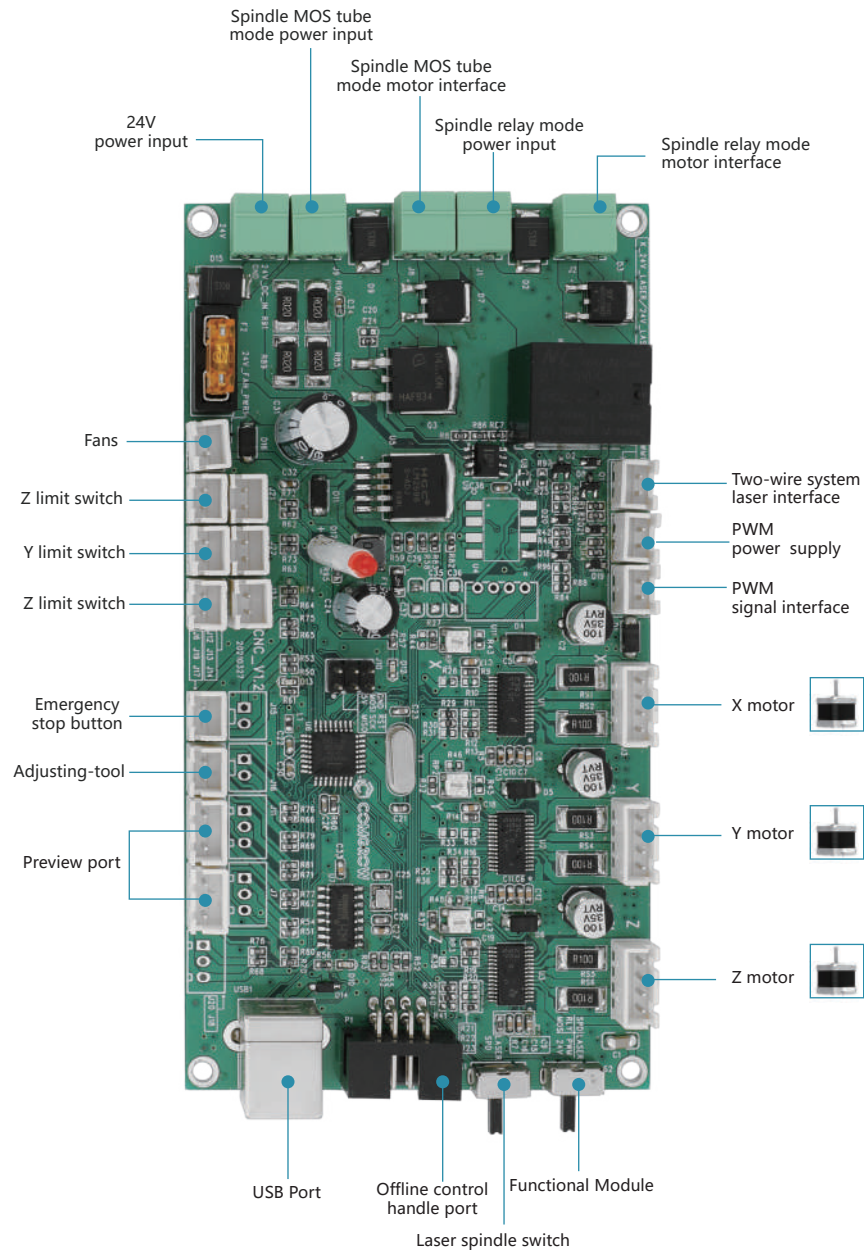


## Tool Change

Use two wrenches to remove the lock nut on the spindle, select the appropriate tool into the handle, need to pay attention to the handle orientation, and then install together on the spindle, finally use two Wrenches to lock the nut on the spindle.

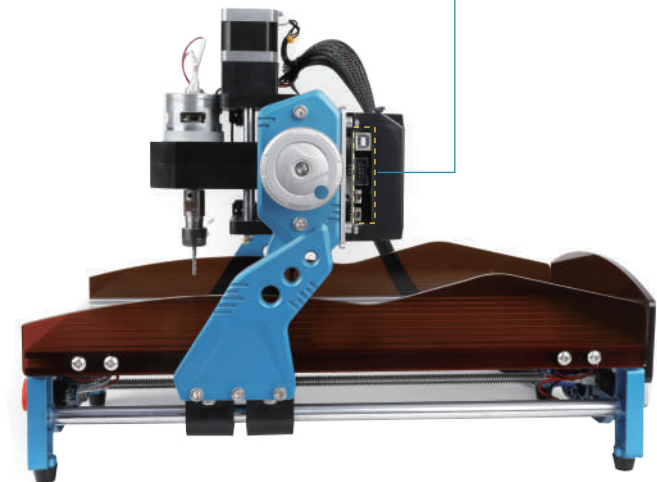
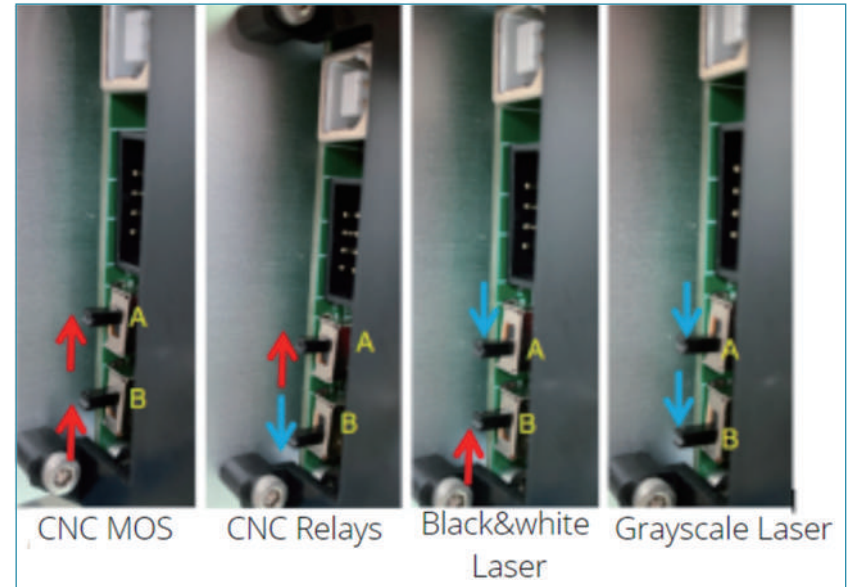


# Mainboard Module




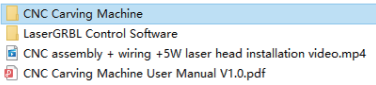
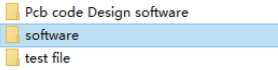
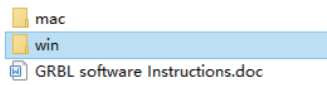
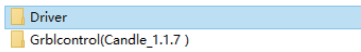

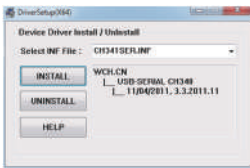
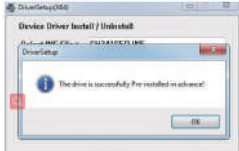
## Instructions for use of the main board mode:

- AB top at the same time, for MOS tube mode, can adjust the spindle speed, the motherboard default wiring in this mode.
- A up B down, for the relay mode, can not adjust the spindle speed, you need to use an external current greater than on the motherboard.
- A down B up, f12A power supply, while changing the plug connection or black and white carving mode.
- A down B down for grayscale engraving mode.



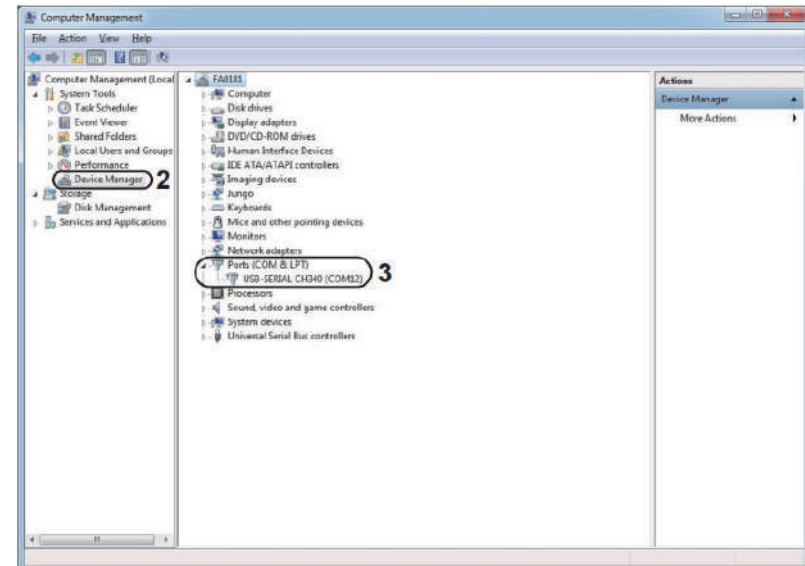
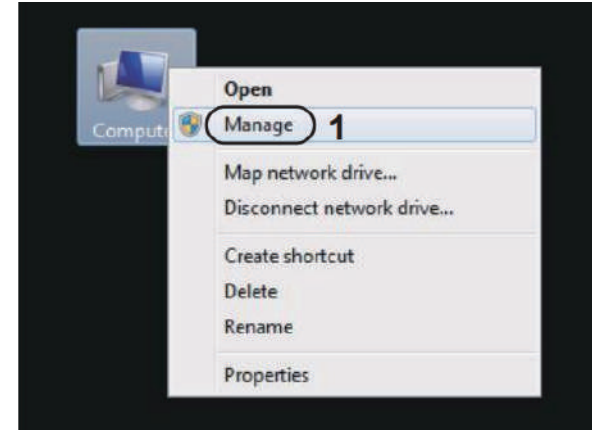
# Install Driver & Software

## 1. Install the driver

<p>1.If you are using it for the first time, you need to perform steps 1-9 to Install the driver.Firstly ,Insert the complimentary SD card into your computer via USB.</p>	
<p>2.Open the SD card, select "CNC Carving Machine".</p>	
<p>3.Select "software".</p>	
<p>4.Select "win".If you're on ios, choose "mac".</p>	
<p>5.Select "Driver".</p>	
<p>6.Double click "CH340SER".</p>	
<p>7.Click "INSTALL",start installing drivers.</p>	
<p>8.Click "OK", finish Install the driver.</p>	

## 2. To Determine your Machine's COM port:

- Windows XP: Right click on "My Computer", select "Manage", select "Device Manager".
- Windows 7: Click "Start" Right click "Computer" Select "Manage" Select "Device Manager" from left panel.
- In the tree, expand "Ports (COM & LPT)"
- Your machine will be the USB Serial Port (COMX), where the "X" represents the COM number, for example COM12.
- If there are multiple USB serial ports, right click each one and check the manufacturer, the machine will be "CH340".

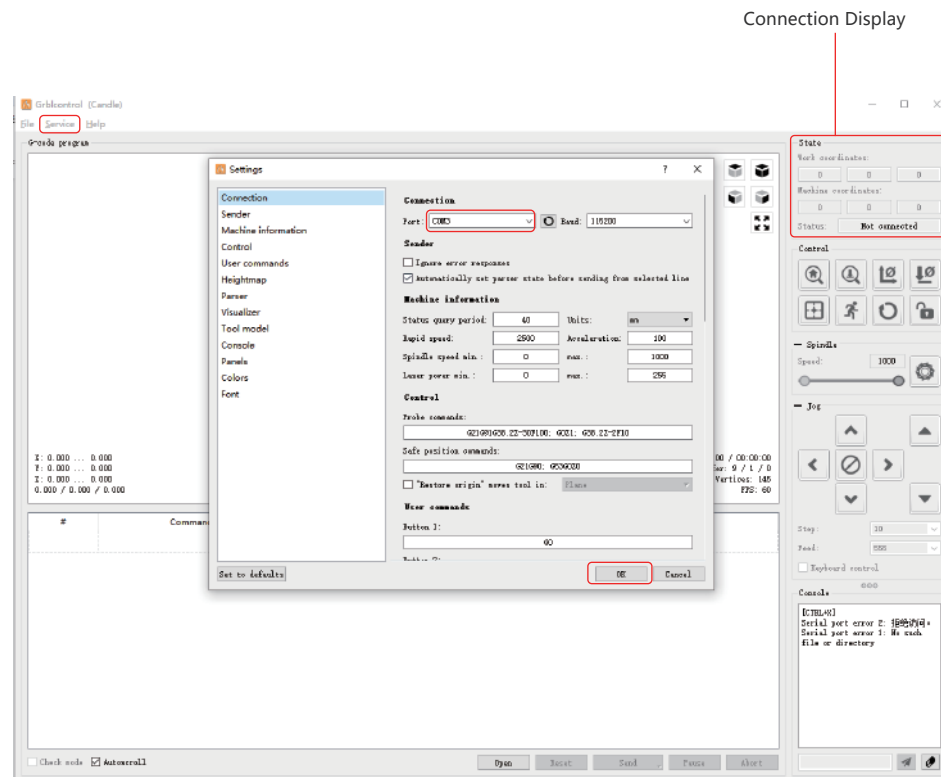


### 3. Open Grblcontrol software

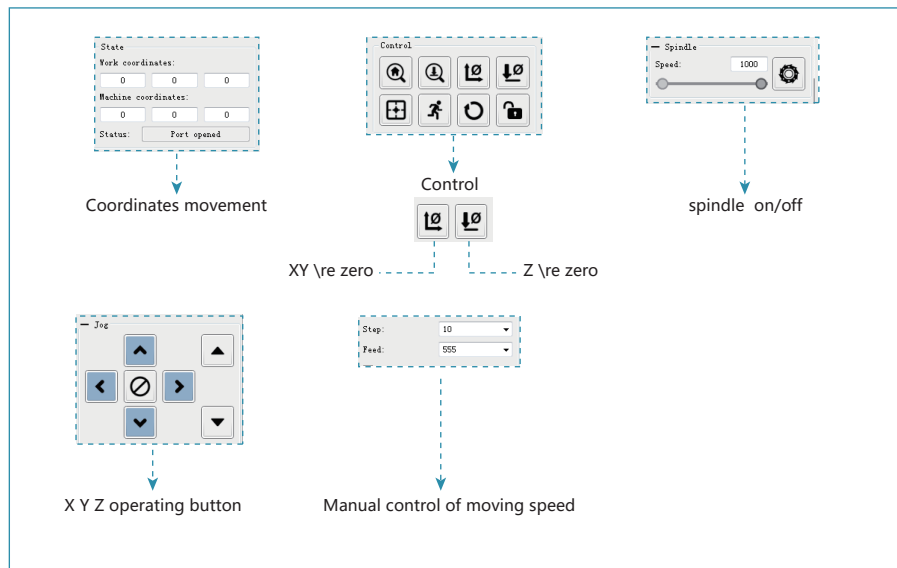
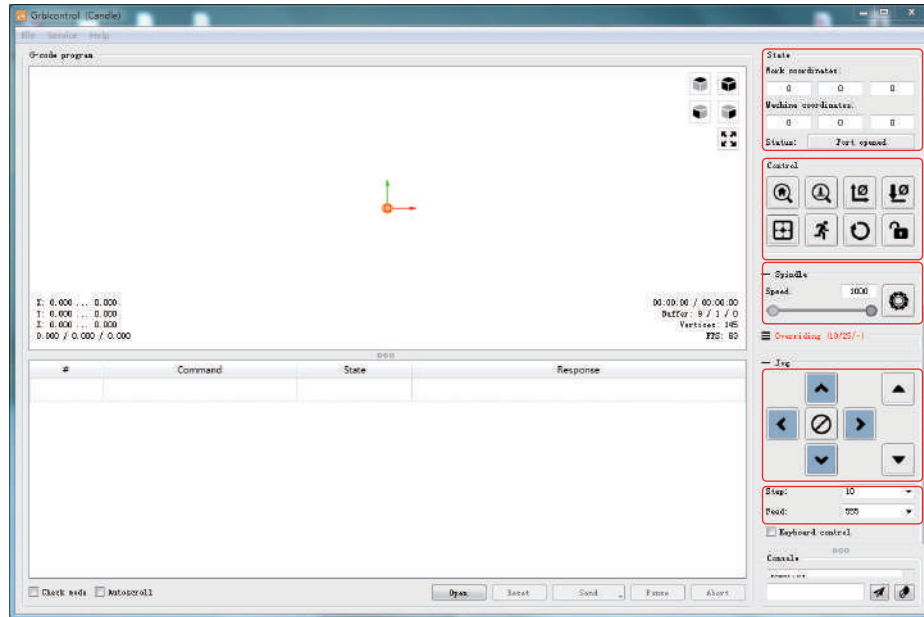
<p>1.You can obtain this software from others, or you can use our complimentary software . Open the SD card and find "software", then select "win".</p>	<ul style="list-style-type: none"> <li>mac</li> <li>win</li> <li>GRBL software Instructions.doc</li> </ul>
<p>2.Select "Grblcontrol (Candle_1.1.7)"</p>	<ul style="list-style-type: none"> <li>Driver</li> <li>Grblcontrol(Candle_1.1.7)</li> </ul>
<p>3.Find the"Grblcontrol (Candle) .exe" and open it .</p>	<ul style="list-style-type: none"> <li>platforms</li> <li>translations</li> <li>d3dcompiler_47.dll</li> <li>Grblcontrol (Candle).exe</li> <li>icudt54.dll</li> <li>icuin54.dll</li> <li>icuuc54.dll</li> </ul>

### 4.Grblcontrol Use

- Click Service
- Choose COMX port
- Click OK, connect
- Check connection display, if 'Not Connected' is displayed, connection fails if 'Port Opened' is displayed, connection is done



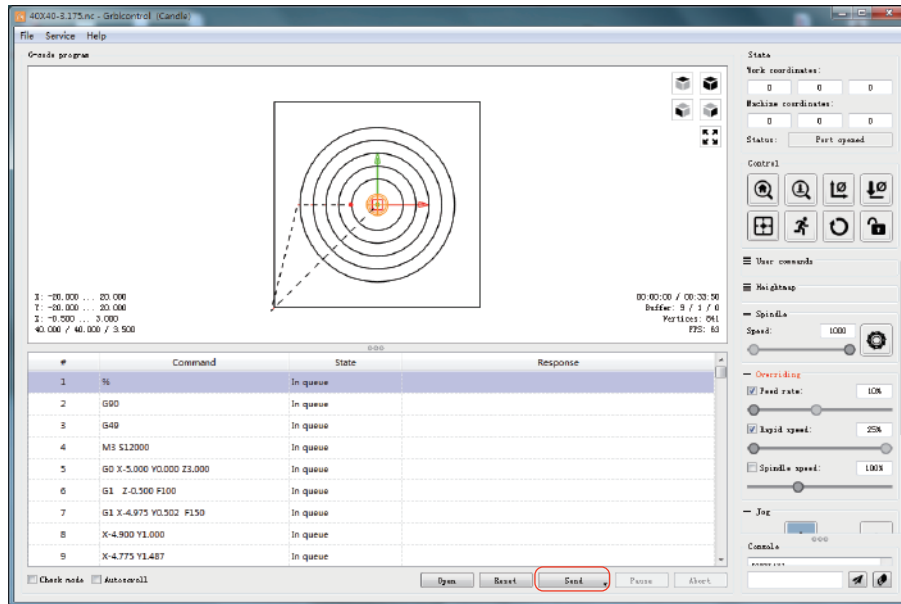
## 5.Grb1control software Interface introduction



## 6.Open the test file

<p>1.Select "file" from the menu bar, then select "Open".</p>	
<p>2.Open the SD card, select "CNC Carving Machine".</p>	
<p>3.Select "test file".</p>	
<p>4.Click the"40X40-3.175.nc" .</p>	

After the test file is opened, the software interface is as follows. Control the spindle head to move to the center of the engraved material, as shown below, the red box is the safety range of the engraved material (excluding the space occupied by the fixture), the center of the red and green coordinate arrow is the origin of the tool path position. Then move the spindle head (without mounting the milling cutter) to this position of the material. Raise the Z-axis to avoid running into the fixture screws. Finally, clear the parameters of each axis and click "Send", then the toolpath starts to run.

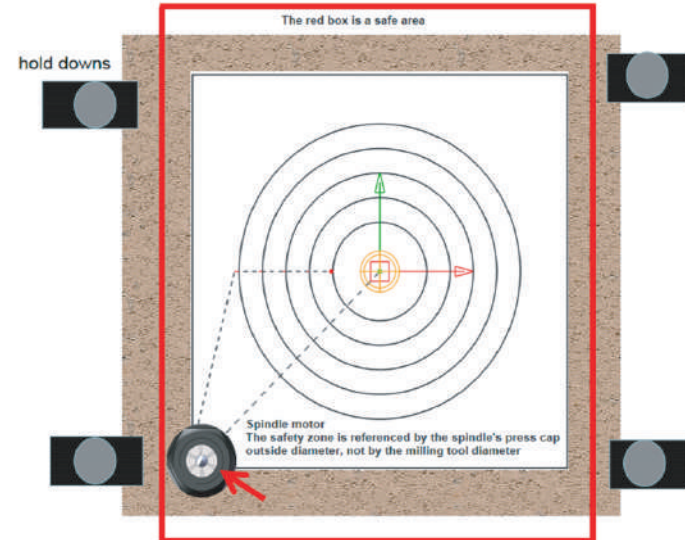


## 7.Start Running

Observe the tool path operation window at the top left of Candle, the moving dotted line is the line of machine operation. If you find the toolpath deviates, turn off the power immediately and check whether the coordinate direction of each axis is correct.

When running an empty toolpath, pay attention to see if the milling cutter will collide with the hold-down, because in the real engraving process, the mills hitting the hold-down will cause tool breakage and even damage the machine.

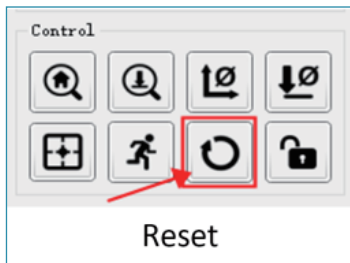
If it is found that it may come into contact with the platen, adjust the home position again.



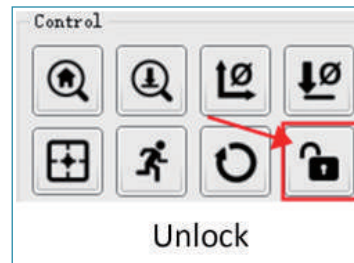
NOTE: If you want to hollow out the carving, remember to pad a flat board under the carving material to avoid the milling cutter hitting the work bench.

## How to use the emergency stop switch

When the machine is working abnormally, press the red E-stop to avoid damaging the machine and project.



Then turn clockwise to release the E-stop, click "Reset" and the status will change to "Alarm".



Click "Unlock" and the status will change to "IDLE". The machine will return to normal status.



The butterfly nut should be kept at least 10mm from the engraving work area.

# Operation precautions

Please check to make sure the CNC machine is assembled and wired correctly first, then start the machine test run.

## We recommend following the boot sequence below.

1. Plug one end of the USB cable into the motherboard connector and the other one to the computer, then boot the computer.
  - Start the Candle program and verify in the status window that no errors are showing. Normally, it will show "Idle". If an "Alarm" error is showing, with your mouse, click the Candle "Reset" then "Unlock" buttons in that order to get to the "Idle" condition.
  3. Connect the 24V/5A power adapter and turn on the controller board with the "O/I" button in white letters.
  4. Next, click on the "Spindle" button to turn on the spindle motor. Set "Feed:" to 500.
  5. Click on the left set of direction buttons with the mouse to verify that the X and Y axes are moving properly. Similarly, click on the right most up and down buttons to verify that the Z-axis moves properly. If all of these tests are completed properly, your CNC machine is assembled and wired correctly. Shutting down the machine for use is done in the opposite way to the start-up process.
  6. Turn off the controller board with the white letter "O/I" button.
  7. Unplug the 24V/5A power adapter.
- Shut down the Candle program. Turn off the computer.

If the spindle stops during operation, the following four suggestions can be followed to solve it.

## Spindle stop in the middle

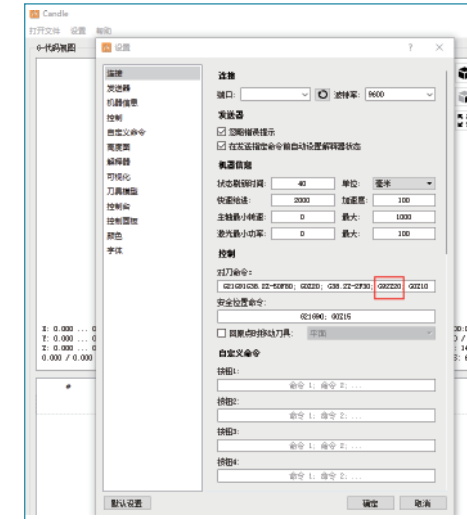
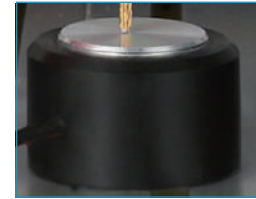
Possible causes :

1. Emergency stop button is not reset. If the candle software interface feedback error 3 or error 9, it means that the emergency stop button is not reset, manually reset can be.
2. The machine is now in laser mode. please change the laser engraving mode to CNC milling engraving mode, you try to AB two gears are set to the top, dial the paddles to adjust the mode (two paddles all up for milling engraving mode, and vice versa for laser engraving mode). Use LaserGRBL or lightburn software to connect to the machine, enter \$32=0 in the command bar to adjust to the milling mode. \$32=1 for laser mode (the main board of the machine is miter mode at the beginning, so you only need to adjust the gear, no need to change the command).
3. Trigger limit switch. Check whether the xyz axis triggers the limit switch, click reset and unlock after the candle control software is connected to the machine.  
candle unlock <https://www.youtube.com/watch?v=XIWYfNniBM>.  
Handle unlock <https://www.youtube.com/watch?v=bSJPHyufEXg>.
4. spindle motor overload trigger mos tube current limiting protection device. MOS limit start current is expected to be around 0.8A (spindle stable current at 0.5A), due to the motor instant start current is very large (1.5 ~ 2A), for safety reasons, the adapter has 7A current protection, when the current is too large mos tube will trigger the protection function automatically power off.

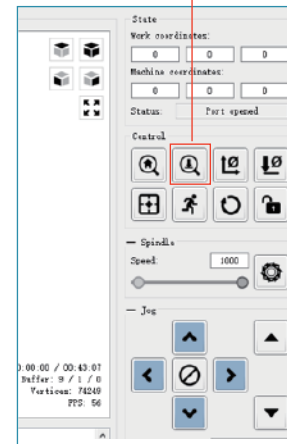
# Tool setting gauge block

The use of tool setting instrument is very convenient for users to determine the working zero position of Z-axis, when tool setting is completed, the system will confirm the current Z-axis position as the zero point of Z-axis working coordinate system.

1. Measure the thickness of the tool setting gauge block
2. Modify the tool setting parameters in the Candle software settings and click OK. (You must input the thickness of the tool setting gauge into the parameters, and the system will automatically shift the zero position down to the depth of the thickness of the tool setting gauge when executing the file, so that the Z-axis working zero point is really determined).
3. Connect the tool setting instrument block cable to the main board plug, and clamp the chuck to the carving tool shank part.
4. Press the button to execute the tool setting command.



Z-axis tool setting button



# Offline Controller

Notice: If you want to run the CNC machine with an offline controller, you must first disconnect the USB cable from the controller board.

1. Connect the memory card to the computer through a card reader, copy the G-code into the memory card, and then insert the memory card into the offline control handle.
2. Connect the offline controller to the control motherboard.
3. Press the [X+/X-/Y+/Y-/Z+/Z-] key to move the spindle to the machine origin, select the engraving file, click the [OK] key to start engraving.



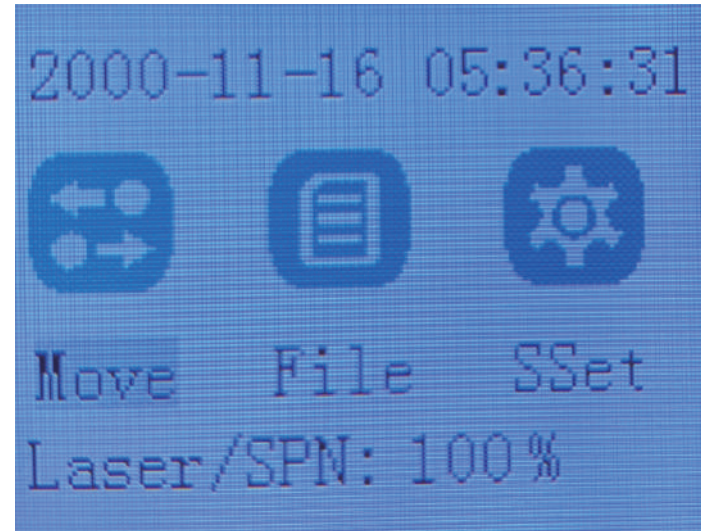
## 4. Interface introduction

### A. Off-line controller button

OK	Confirmation
BACK	Return to previous page
RESET	Reset system
X-/X+/Y-/Y+/Z-/Z+	Control X/Y/Z axis move

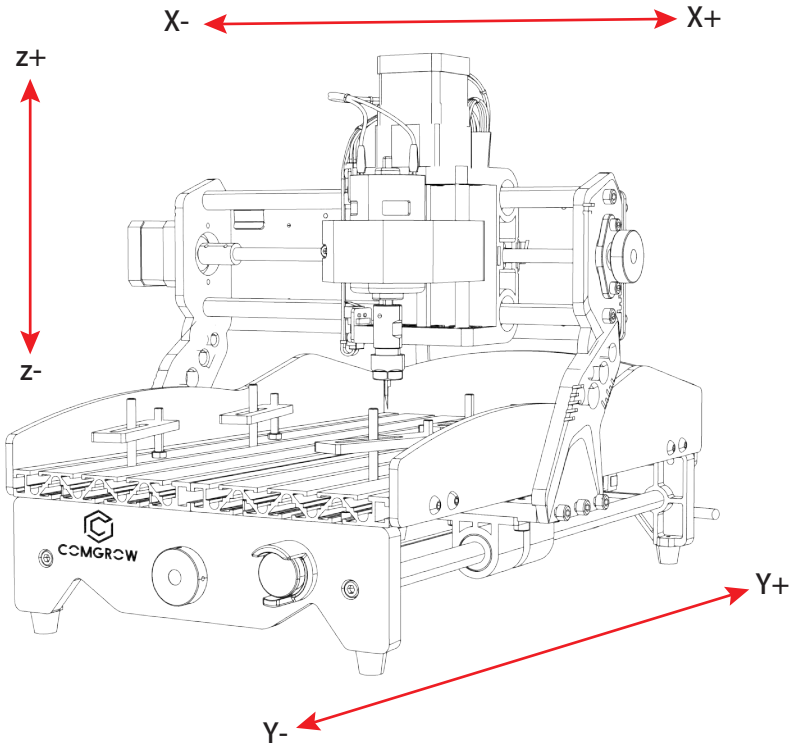


### B. Menu Page

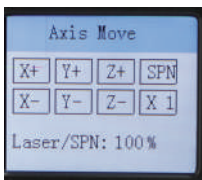
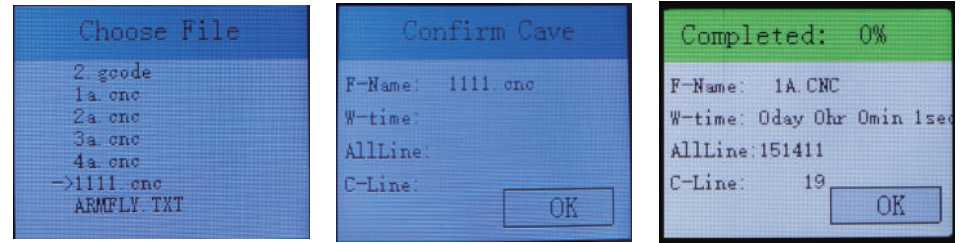


Move	Confirmation
File	Return to previous page
SSet	Reset system
Laser/SPN:100%	Power to spindle (Press [Z+]=add or press [Z-]=reduce)
Press key [X-] or [X+] to select	
Press key [OK] to Enter	
Press key [RESET] to reset system	

C. Move Page



D. File Page



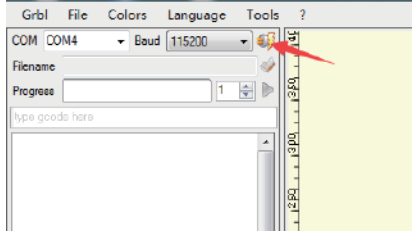
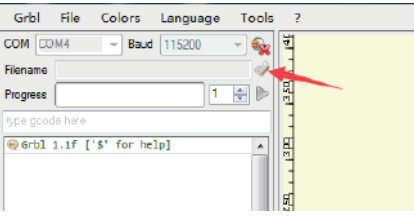
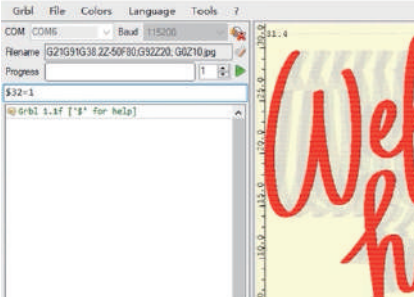
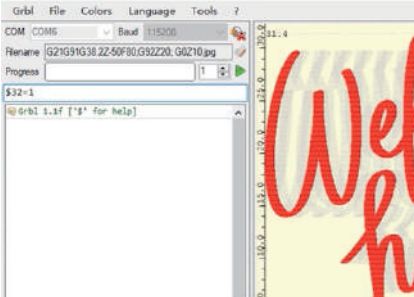
X+	X-axis positive direction
X-	X-axis negative direction
Y+	Y-axis positive direction
Y-	Y-axis negative direction
Z+	Z-axis positive direction
Z-	Z-axis negative direction
OK	Spindle On/Off
BACK	Long press to exit

Press key [Y+]or[Y-] to select file
Press key [OK] to Enter
Press key [OK] to Confirm cave
Press key [RESET] to pause or run
On first 2 pages, pressing and holding on the 'Back' button to return; on the last page, tapping on the 'Back' button to return

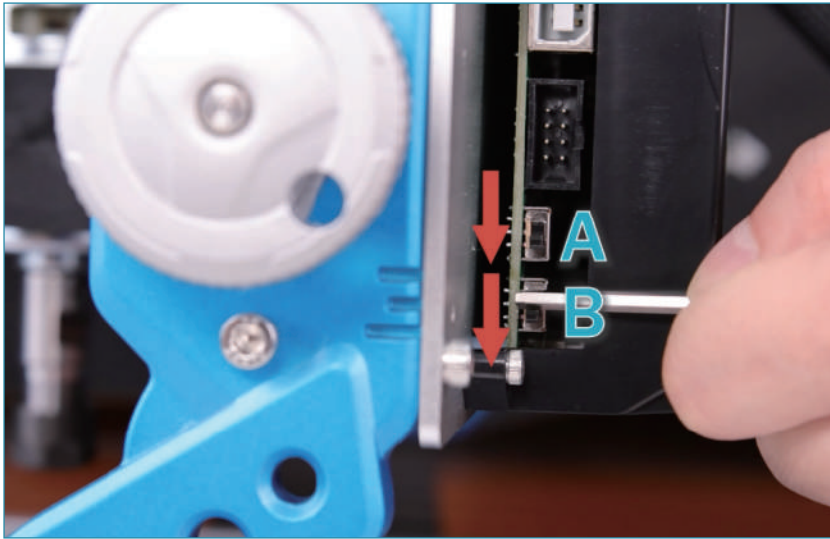
# Laser engraving

Our machine can be used to do CNC engraving or laser engraving. To use laser engraving, you need to install the LaserGRBL Control Software first.

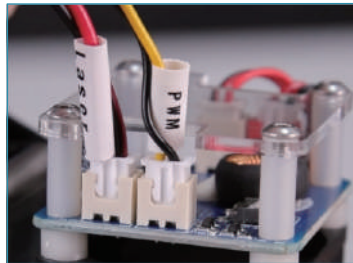
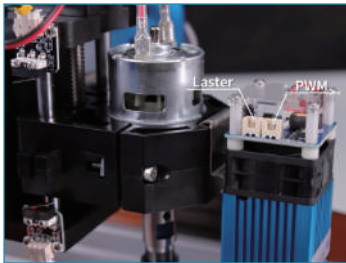
<p>1.If you are using it for the first time, you need to install the software. Open the SD card,select "LaserGRBL Control Software".</p>	<ul style="list-style-type: none"> <li>📁 CNC Carving Machine</li> <li>📁 LaserGRBL Control Software</li> <li>📄 CNC assembly + wiring +5W laser head installation video.mp4</li> <li>📄 CNC Carving Machine User Manual V1.0.pdf</li> </ul>
<p>2.Select "install.exe".start the installation .</p>	<ul style="list-style-type: none"> <li>📁 CH340</li> <li>📁 material</li> <li>📄 CustomButtons.gz</li> <li>📄 install.exe</li> </ul>
<p>3.Select an installation path and then click the"Next" .</p>	
<p>4.Click the"Next".</p>	
<p>5.Click the"Install", start the installation .</p>	
<p>6.Click the"Finish" to complete the installation and open it .</p>	

<p>7.When you open the software,click the "Connect" to connect the CNC machine</p>	
<p>8.Click "Open File" and select the engraving file.</p>	
<p>9.Enter the command "\$32=1" on the computer side to turn on the laser engraving mode,and then the spindle rotation mode is turned off.</p>	
<p>10.Enter "\$32=0" at the computer side to turn off the laser engraving mode, and then switch the spindle engraving mode .</p>	

To switch from milling engraving to laser mode, you need to switch the stop on the main board. A down B down for grayscale engraving mode.



5W or 10W laser head wiring:



The two terminal plugs cannot be connected in reverse. PWM is printed on the main board of laser head.

## Routine maintenance

1. Waterproof and dustproof, no use of coolant.
  2. Emergency stop switch button needs to be reset in time after pressing and then use the machine.
  3. Standardized installation of the pressure block, the pressure block can not be pressed in the carving work area, the butterfly nut needs to be retained with the carving work area at least 10mm distance to avoid collision knife.
  4. Reasonable choice of raw materials for carving, the shape of the raw material area needs to be larger than the carving range to ensure normal carving.
  5. Regular maintenance of CNC machine, you can add lubricating and anti-rust oil to the optical axis to prevent the optical axis rust.
  6. Regularly clean the surface dust of the spindle motor (note that the power is disconnected before cleaning).
  7. Regularly reinforce the top tightening screw of the coupling, because the screw may become loose after long time use.
  8. If you need to use relay mode, it is recommended that the current of external power supply should be more than 12A.
  9. In laser engraving mode, the focal length of laser head can be adjusted according to actual needs.
  10. If you want to upgrade a high power spindle motor, such as 300W, 500W, etc. You need to use relay mode, the use of external power supply independent control of the spindle.
- Upgrade spindle motor: <https://youtu.be/aF2GPAPU-Rk>

Thanks again for using our CNC engraving products, if you encounter any problems during the use, we will reply you at the first time.

Service Email: [service@comgrow.com](mailto:service@comgrow.com)

For related installation files, please check: <https://www.comgrow.com>

Join our Facebook support group: <https://www.facebook.com/groups/comgrow/>