# USER MANUAL FOR JINGYAN MINI CNC

## Revision Date：202003

**Adopt:JINGYAN Mini CNC**

**JINGYAN INSTRUMENTS TECHNOLOGY CO.,LTD.**

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# Chapter 1 Description

## 1.1 Product Description

This machine is a learning kit for beginners. It is packaged and shipped after a complete test before leaving the factory.

Before purchase, it is necessary to understand that all CNC engraving machines only execute G code for engraving, not directly input the drawings it will automatically carve. Laser engraving has special software that can directly import pictures to engrave, and the software that generates G code needs a lot of self-study by users. We will provide tutorials and learning materials for customers to learn. Due to product cost, we do not provide relevant software technical guidance.

This machine is provided to customers as a CNC machine. Please read the installation instructions carefully before installation.If the parts are damaged due to the wrong installation and use by the customer, the user shall bear the cost of the replacement of the parts.Before you confirm the receipt, please test the function of the machine, but please be careful not to make the machine scratch during the test, because the customer's own reasons caused by the machine scratch affect the second sales, generally not returned.

This machine adopts specially developed laser/engraving integrated motherboard with customized software functions far superior to similar models.Motor can carve/cut wood, plastic, acrylic, PCB copper clad board, soft metal aluminum copper (not cutting) and other materials, can not carve hard metal, jade and other materials are very hard.Laser can carve paper, wood, plastic, leather and other materials, can not carve metal, jade and transparent high reflective material hard material.

This is an entry-level learning machine. It can't be compared with a commercial machine.Mechanical engraving needs to make G code we send ArtCAM software and tutorial, laser without transcoding.

Engraving machine operation process

| Type | Graphics or text production→ | G code generation→ | Control Software |
|------|------------------------------|--------------------|------------------|
| CNC | CAD/AI/CDR | Artcam/JDpaint | Candle Control |
| Laser | PIC/CAD/AI/CDR | None | MiniLaser |

## 1.2 Product Specification

**Machine Dimension:** 281mm*281mm*290mm

**Working Range:** 135*115*45 mm

**CNC Software:** Candle Control    **Laser Software**：LiteFire Control

**Machine Material:** Aluminum+Profile

**Spindle:** 775 Spindle(12-36V)    (8000r/min, if 24V)

**Stepper Motor:** 2-Phase 4-Wire Stepper Motors    (1.3A 0.25N.m)

**Lead Screw:** T8 Lead Screw

**Power Supply:** 12V (110V-240V)

**Supported OS:**    XP, Win 7, Win8, Win 10, Linux

**Applicable Material:** Copper, Aluminum and other soft metal，Plastic, Wood, Acrylic, PVC,PCB,etc...

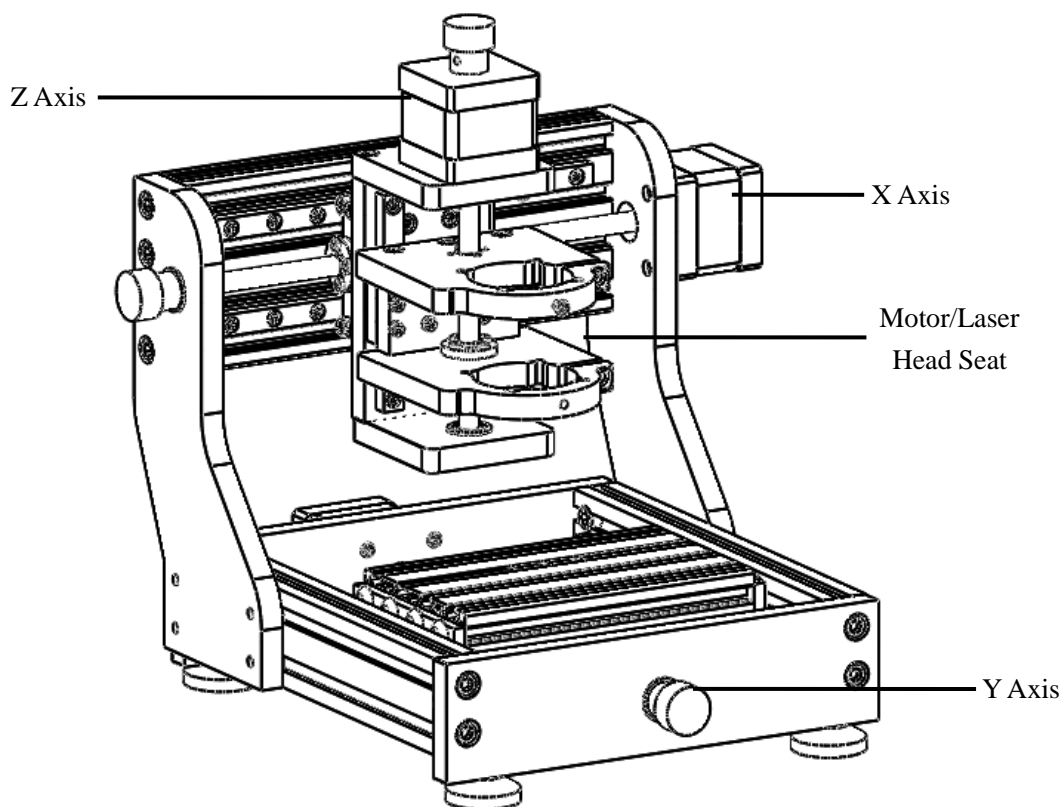**Laser Head:**Adjustable focus 500mW Laser Head  （If choose）

**Package Size:** 330*330*330 mm

**Package Weight**：6.5kg

**Standard Package:** Complete machine

# Chapter 2 Introduction

## 2.1 Machine Parts

Z Axis

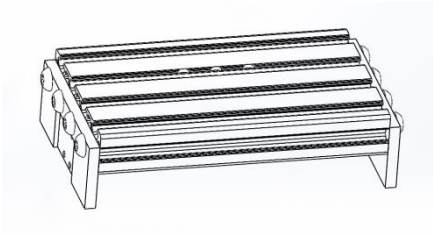X Axis

Motor/Laser
Head Seat

Y Axis

## 2.2 Machine Installation

● **Y Axis Parts**：  Y Axis Frame x1、Table Support Frame x1、Table x1、Hand Nut x1、

Foot Pad x4、Y Axis Screw Motor、（Table）Screw M4*20x3、（Sliding Rail）Screw

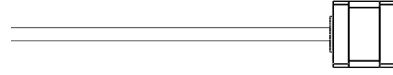M3*8x8、（Stepper Motor）Screw M3*16x4、（Hand Nut）Screw M3X8x1、（Foot
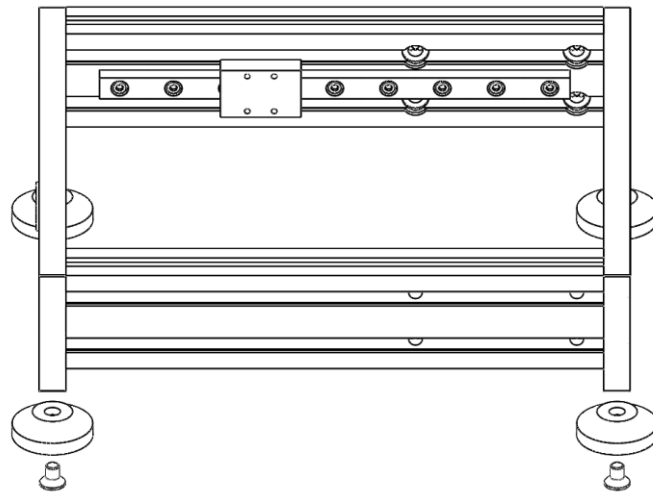
Pad）Screw M5*8x4
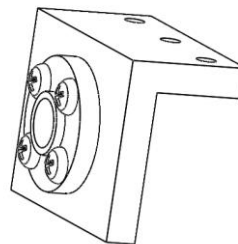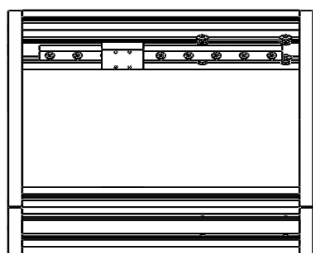
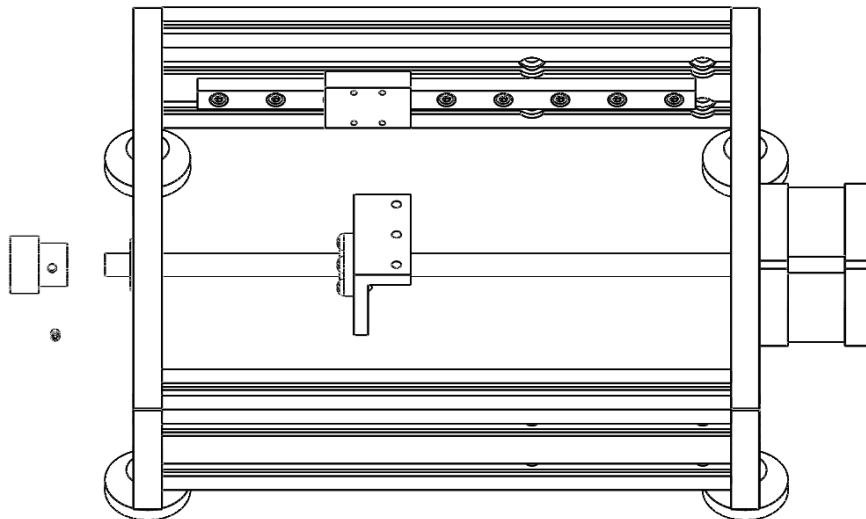Y Axis Frame                                    Table Support Frame



Table                                           Y Axis Screw Motor

● **Y Axis Installation**
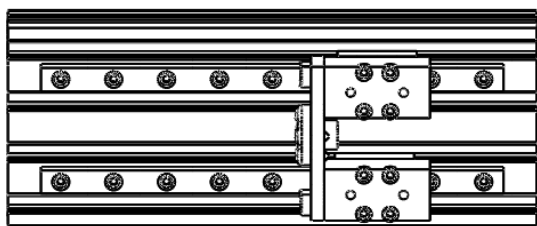


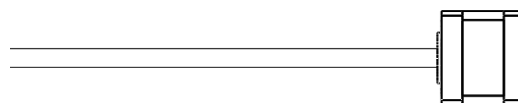Foot Pad Installation
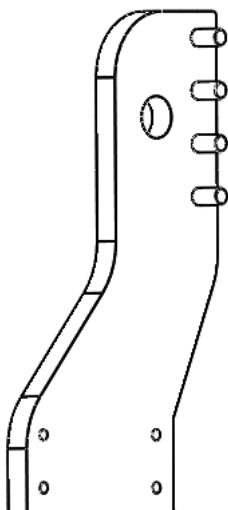


Screw Motor Installation
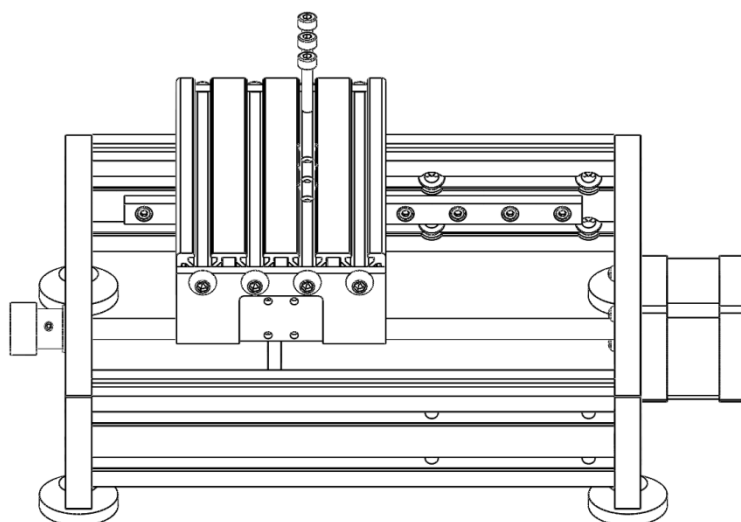
Table Installation
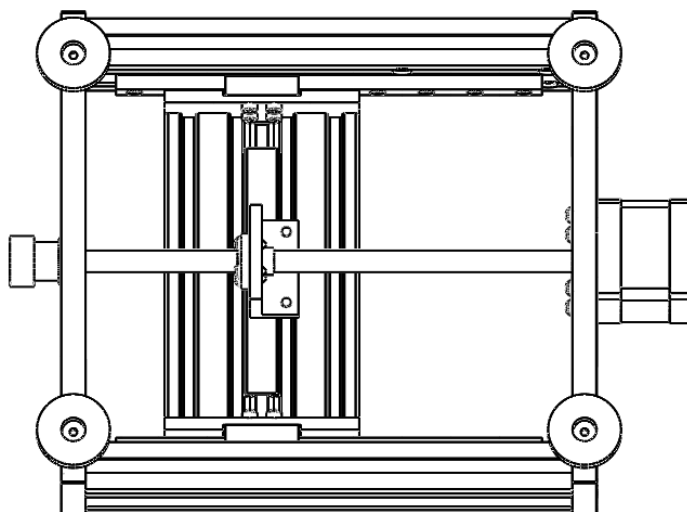


Fix Table to the Sliding Rail

● **X Axis Parts**：X Axis、Left And Right Arm、X Axis Screw Motor、 （Hand Nut）Screw M3X8x1、（Left And Right Arm）Screw M6*16x8、（Stepper Motor）Screw M3*16x4、Hand Nut x1



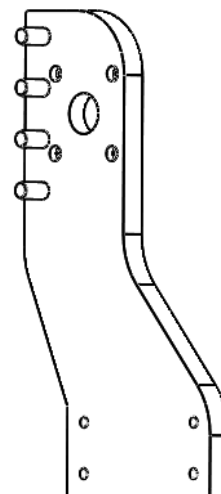X Axis                                              X Axis Screw Motor

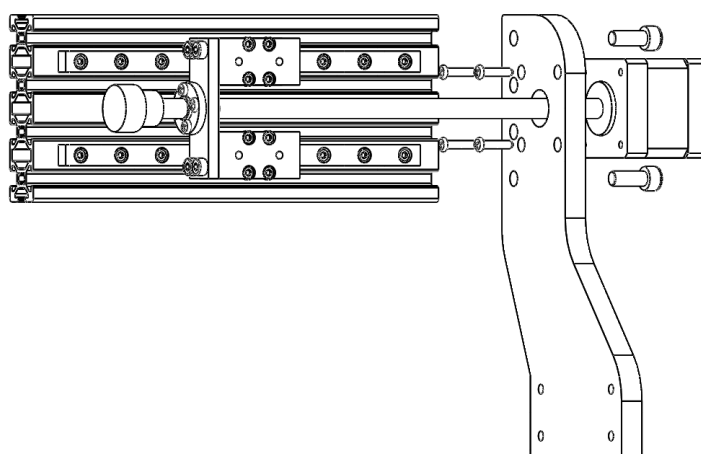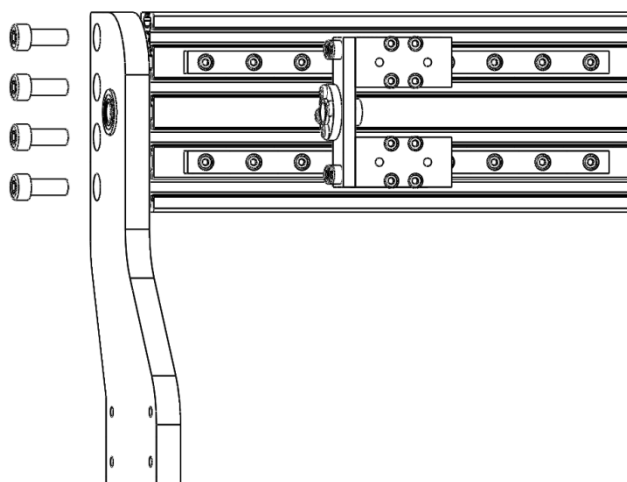X Left Arm                                                                                              X Right Arm
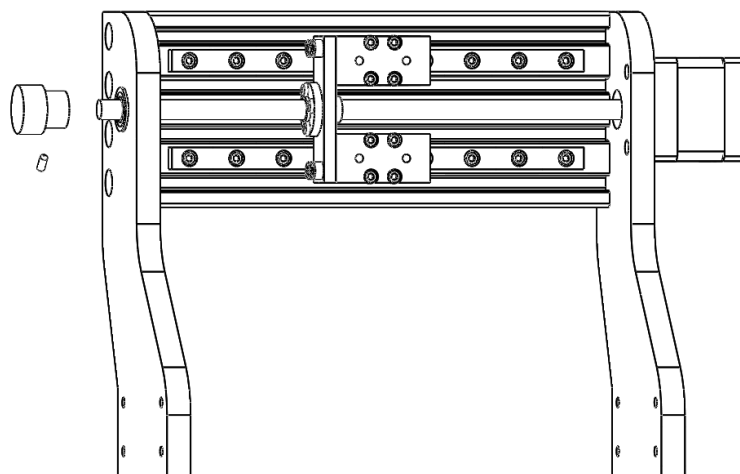
## ● **X Axis Installation**

Right Arm Installation

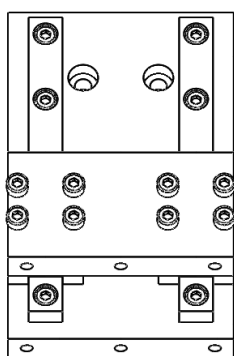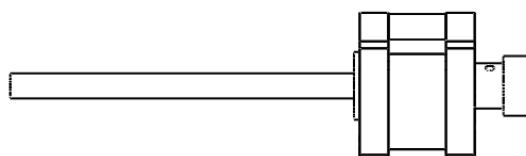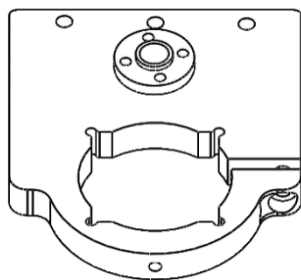Left Arm Installation

Screw Motor Installation

- **Z Axis Parts**：Z Axis、Z Axis Screw Motor、Down Spindle Seat、Up Spindle Seat、Z Up Board、Z Down Board、（Stepper Motor）Screw M3*16x4、（Hand Nut）Screw M3X8x1、（Spindle Seat）Screw M4*10x6、（Z Up And Down Board）Screw M4*10X6、Hand Nut x1
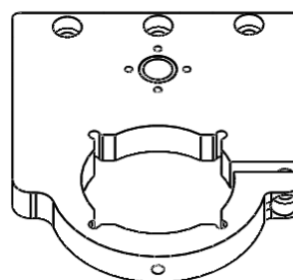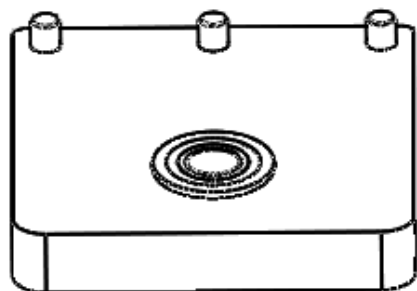


Z Axis



Z Screw Motor



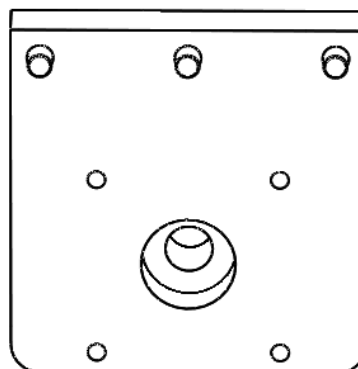Down Spindle Seat



Up Spindle Seat

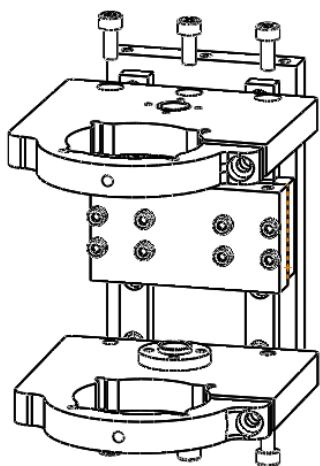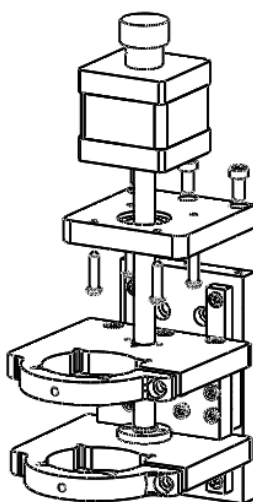Z Up Board                                      Z Down Board

- **Z Axis Installation**

Up/Down Spindle Seat Installation          Z Up Board Installation          Z Down Board Installation
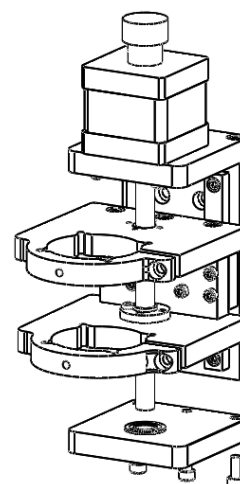
- **Frame Installation**

Fix Z Axis to X Axis:Screw M4*16x4
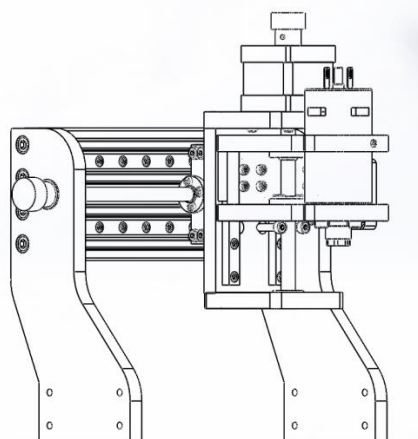
Fix Z Axis to X Axis
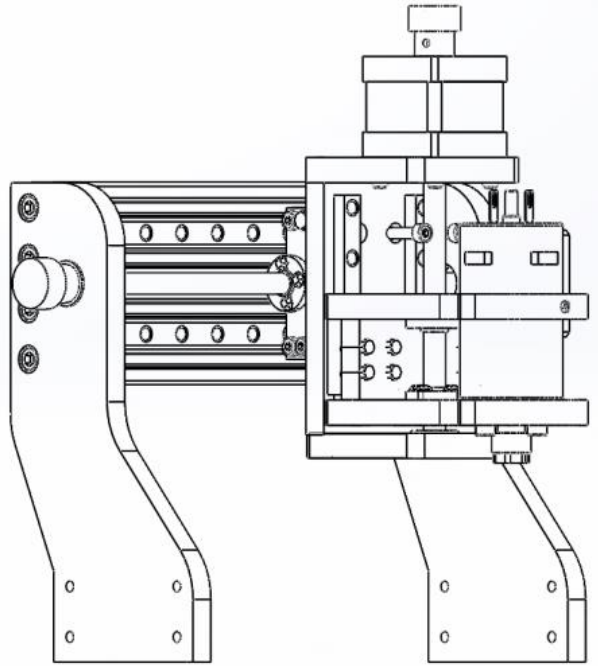
Fix Z Axis to X Axis

Fix Y Axis to X、Z Axis：Screw M6*20x8
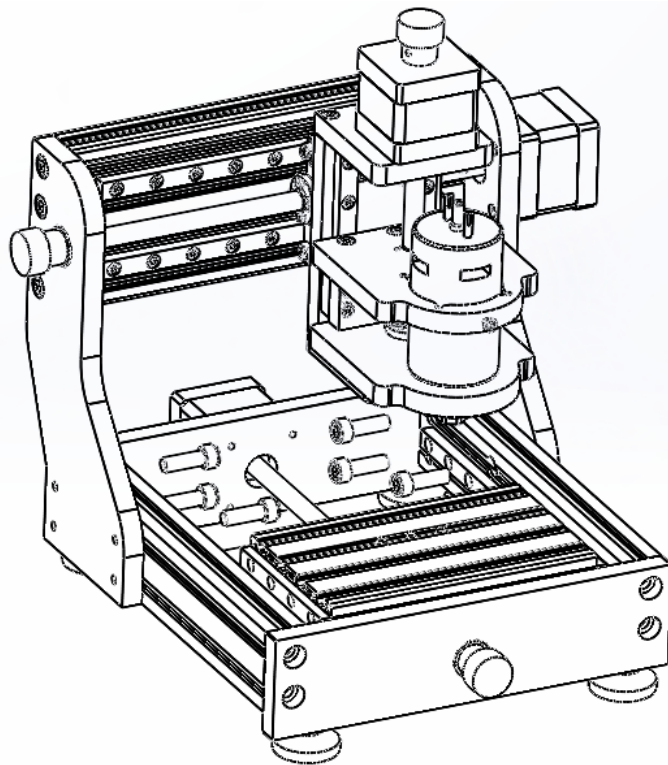


Fix Y Axis to X、Z Axis

● **Motor Installation**
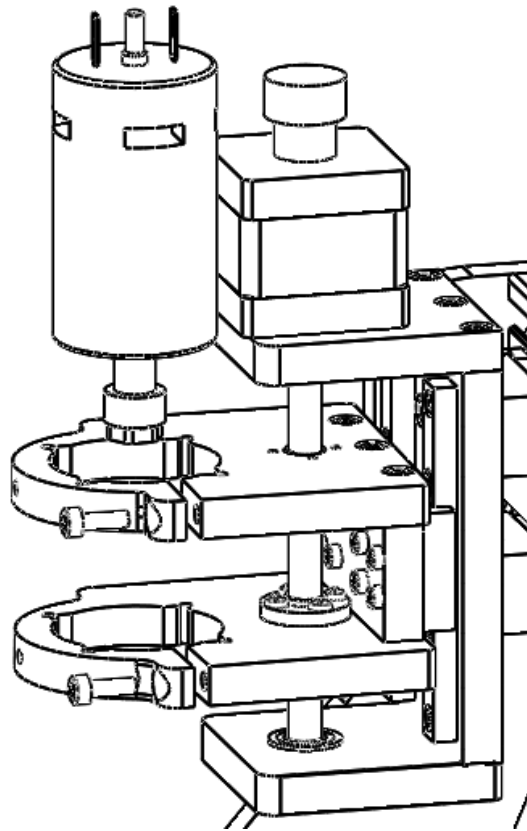
● **Laser Head Installation**
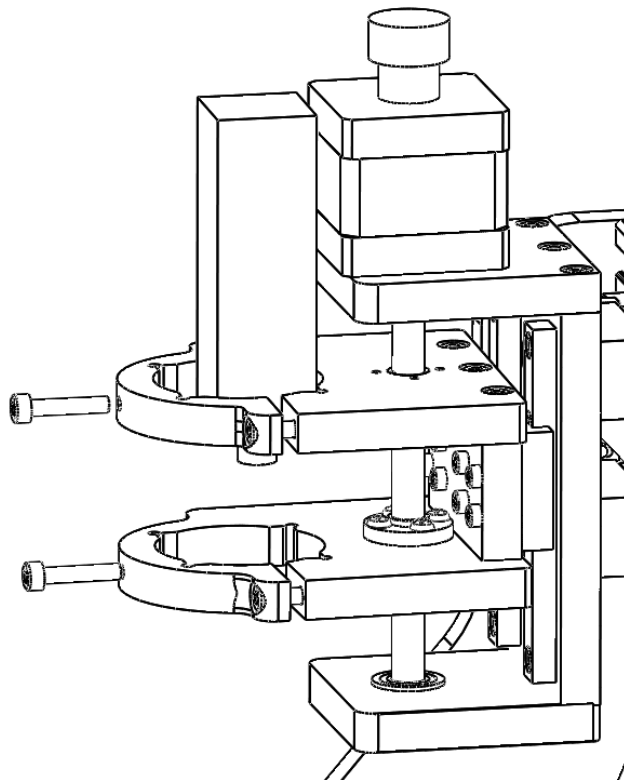
- **Motherboard Installation And Connection**：Screw M4*5X4，X Axis to Motherboard X Axis、Y Axis to Motherboard Y1 Axis、Z Axis to Motherboard Z Axis、Spindle to Motor(Red+Blue-)，Laser to TTL output.
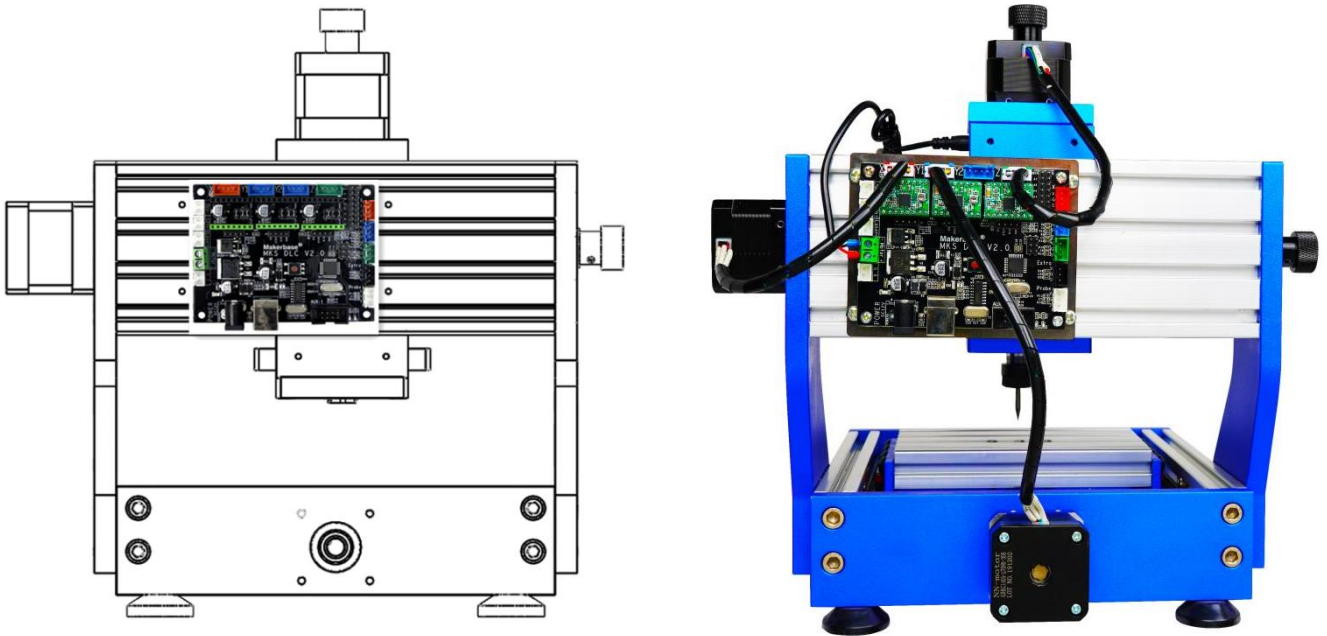


- **Motherboard Introduction**
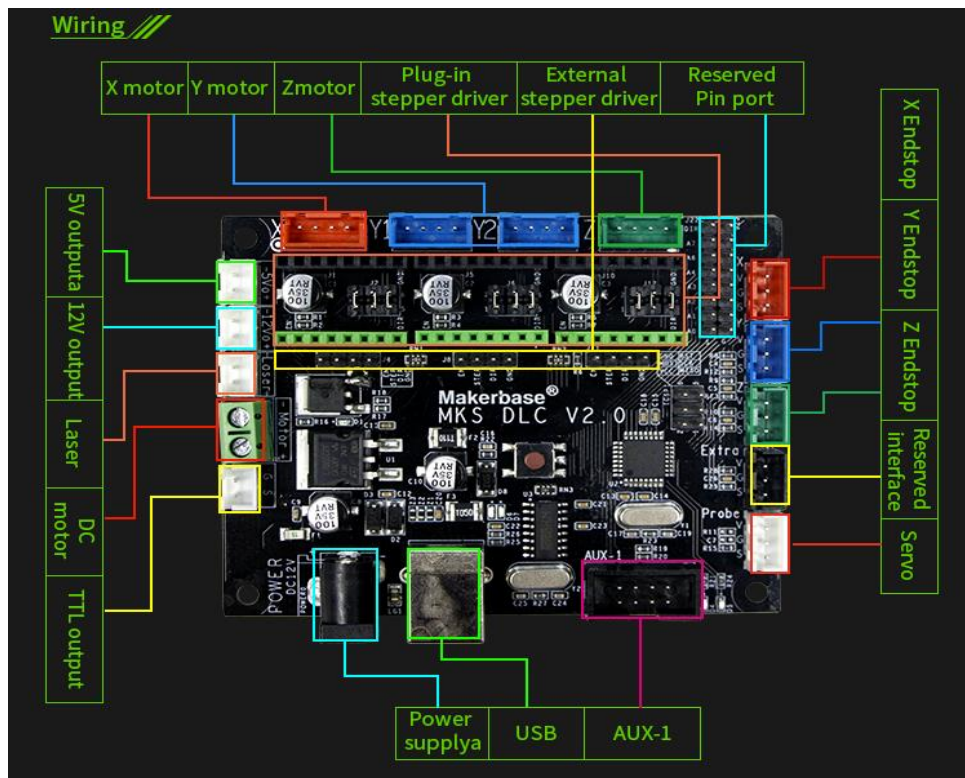
# Chapter 3 Software And Operation

## 3.1 CNC Engraving Software

1.Install CH340 drive Program.Double-click CH340SER --Click Installation— Wait for the installation program to end.(This drive program Supports XP32/64WIN7 32/64)
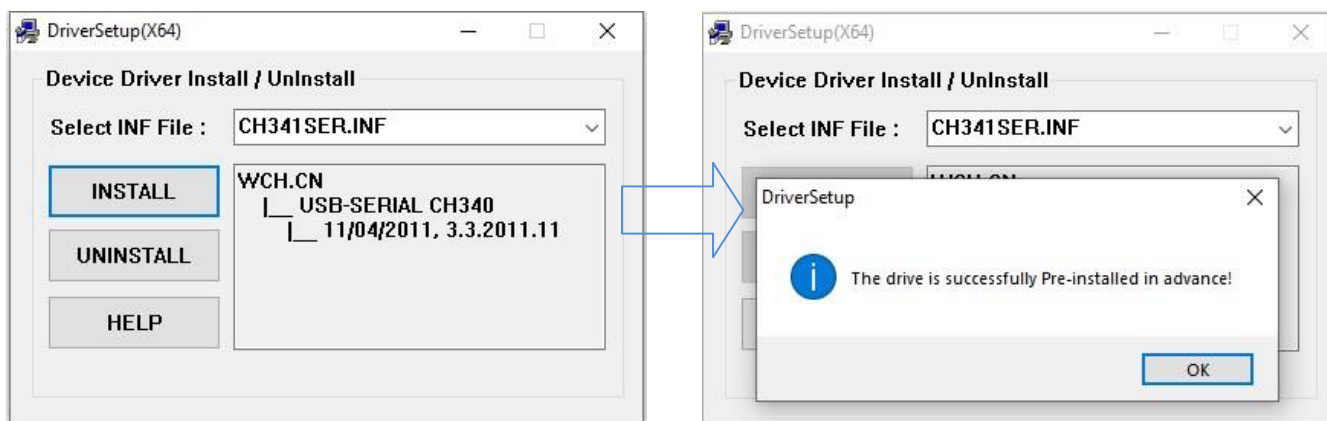
2.Right-click My Computer-Management-Equipment manager-Port, check whether there is CH340 Port number. If installation success will appear COMx, remember the number after COM.
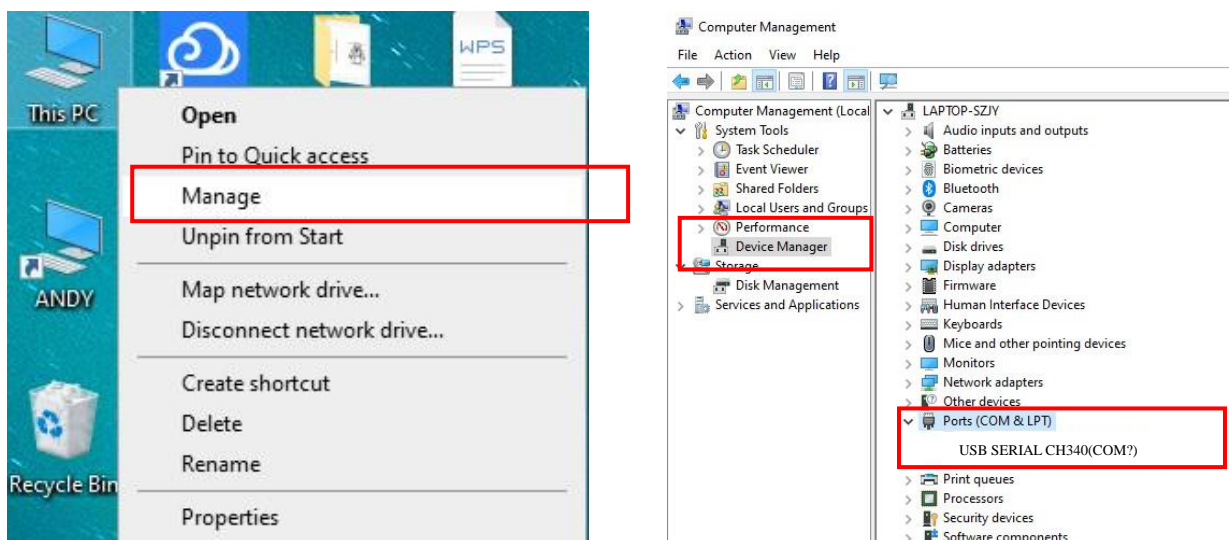
3.Use Candle control(Control Software) to connect machine:Open Control Software Candle control. This software is for control CNC 3 Axis carving.First of all set port number, and then return to the main interface of software,software will connection

machine automatically.
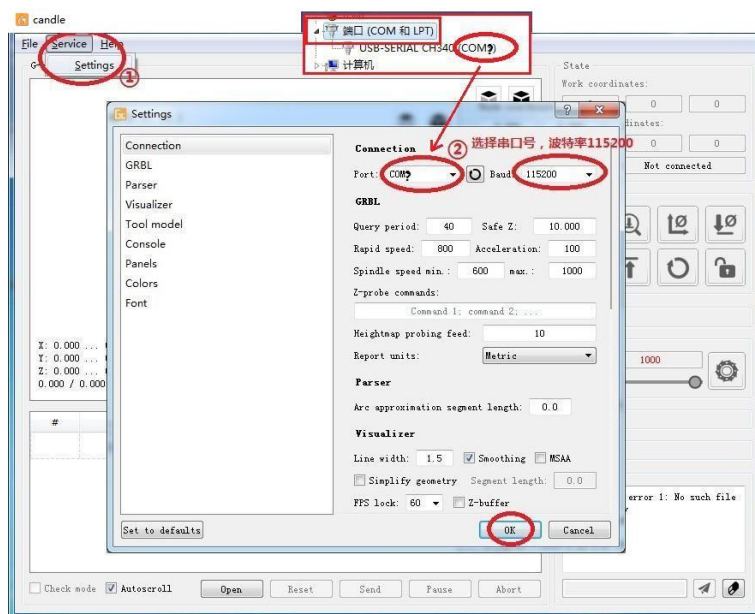


The port number must be the same as last step, otherwise software can not connect the machine.If connect machine successfully the main interface will display: [CTRL+X] < Grbl 1.1h ['$' for help]. If no this display or display other information it means connection failure. Please check whether you have followed all the steps. Or close software, pull out USB wire. And connect USB wire-open software-set port number-connect machine again.
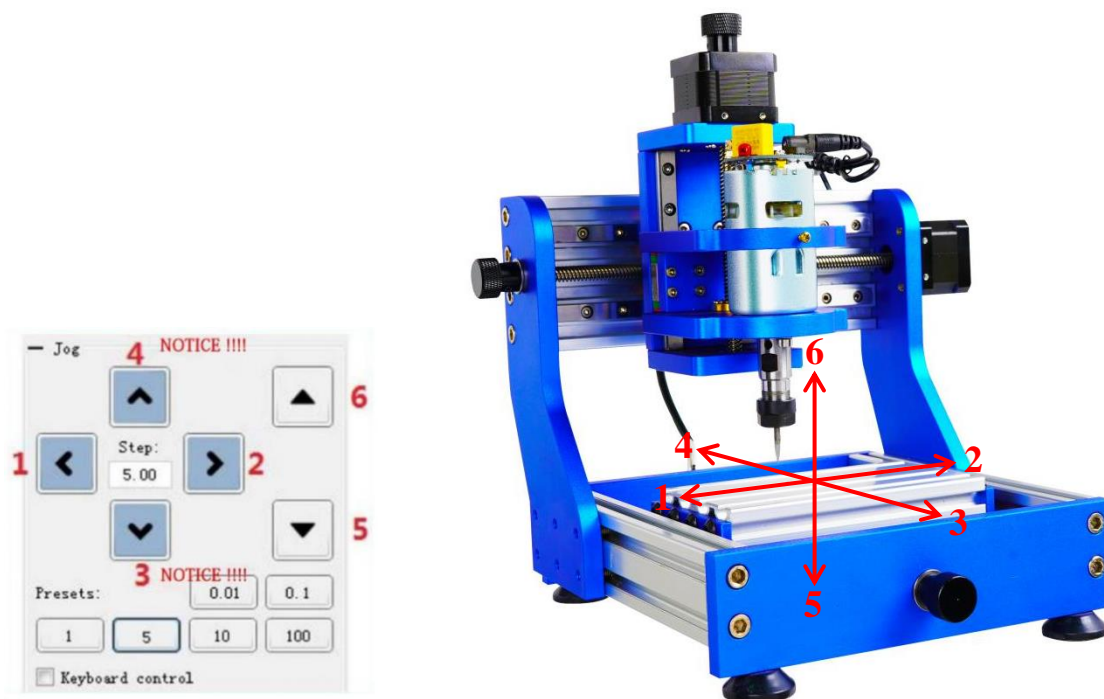
4.Direction check: check whether the machine moves the same direction when you click on the software.If you click the button,The machine is not moving in the corresponding numberical direction,that means the stepper motor in this direction is reversed . Please exchange the motor wire on the control board.

5.After direction checking we can start to work.

Cutter setting: to set the position where we start to work. Move cutter to the position, click x y and z axis coordinate zero clearing,then it will start to engrave at this point.

When you do last step please make the spindle running because the cutter may touch the object you want to engrave.After first testing, then you can try to make your own gcode for engraving.Gcode is the command that make the machine move. It should be a .nc file. In the folder there are some .nc files. You can check.Matched software to make .nc file is ARTCAM.You can also watch these videos on Youtube to know how to make .nc files.
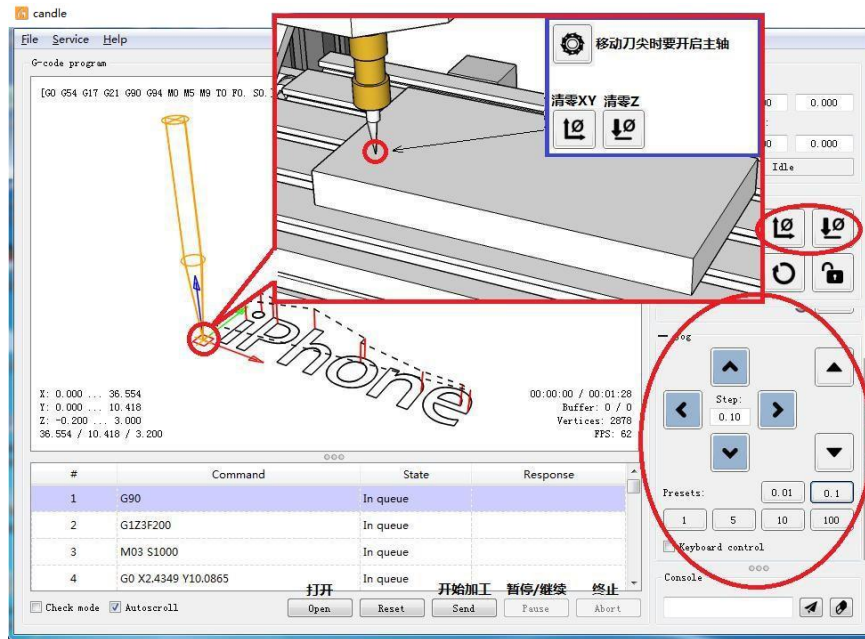
6. Candle-control The main interface introduction:
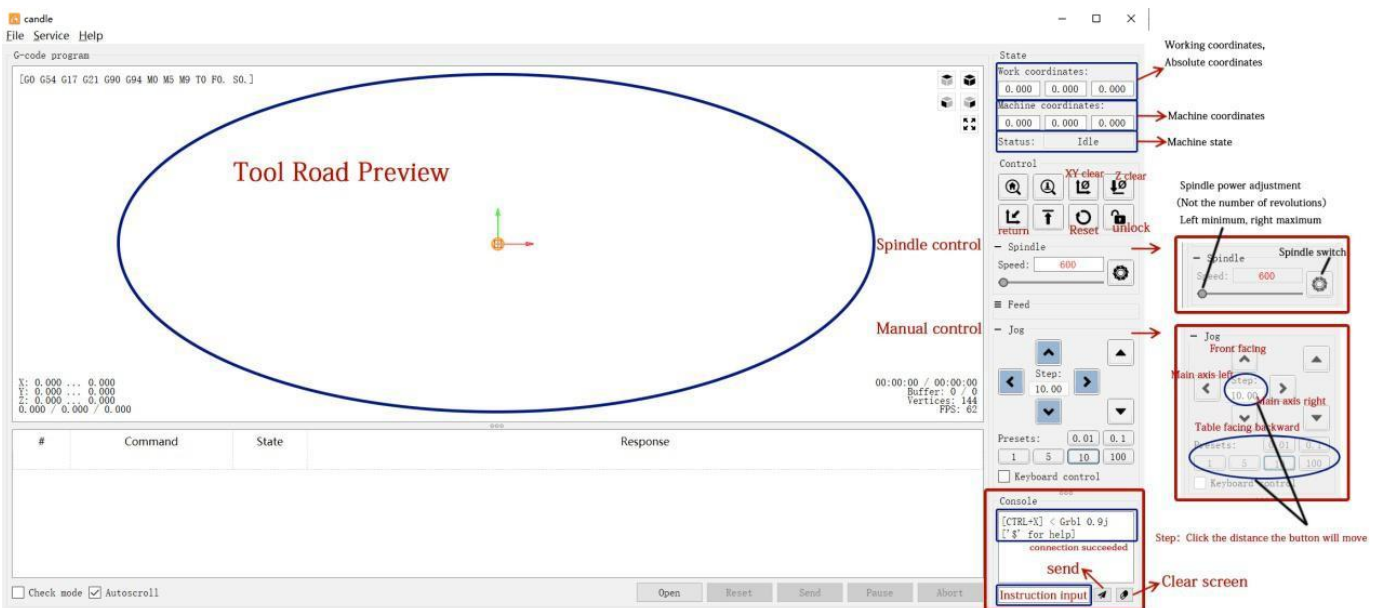


# 3.2 Laser Engraving Software

**1.Attentions：**

Non-working materials：

It cannot work on any metal, ceramic, jewelry, etc. Also, it cannot work on any

material that reflects light or is transparent.



2.The software used for laser engraving is minilaser. The following picture introduces

the main interface of the software:
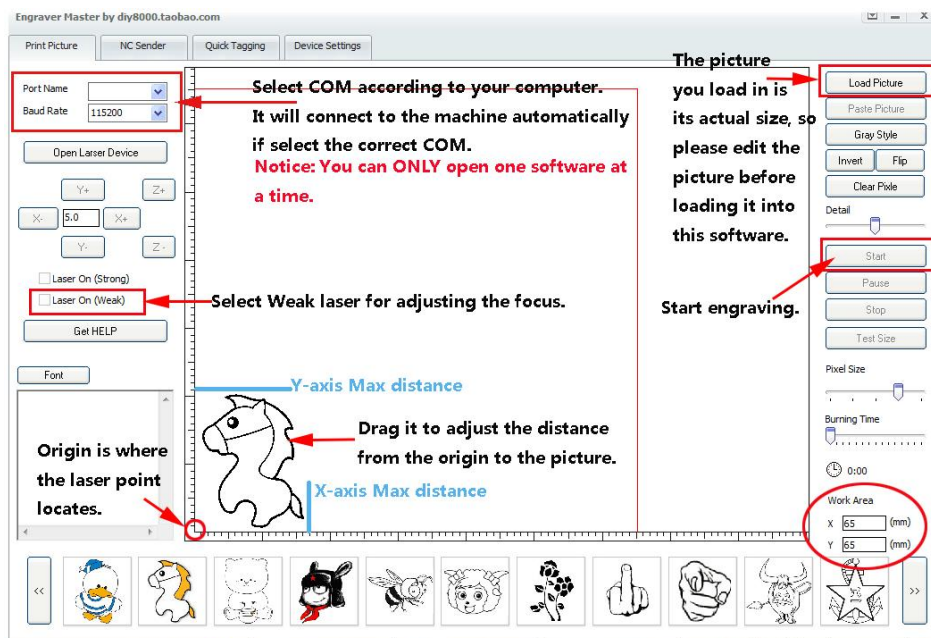


3.Turn on the weak light, it will appear a point on the work piece. Then swivel the

knob to adjust the point to the smallest.
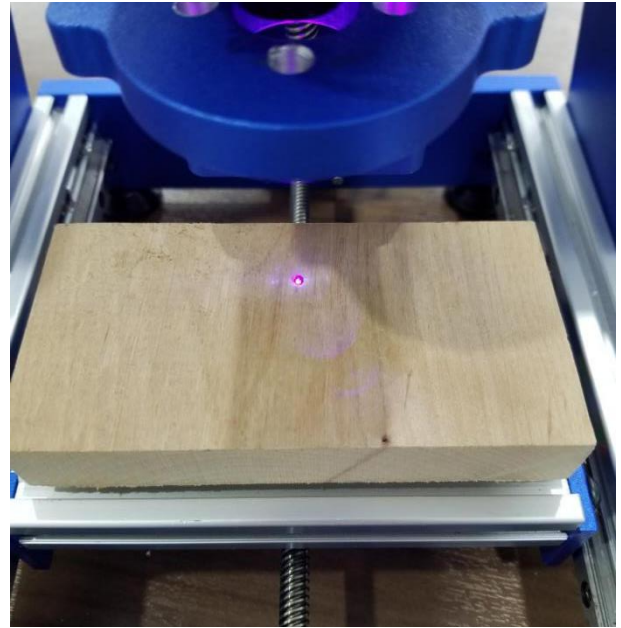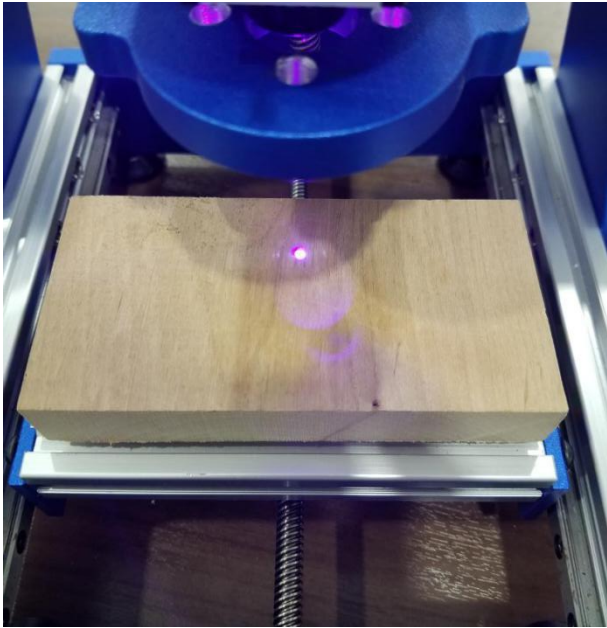
4. Find the suitable position by using the software X+, X-, Y+, Y- for your work, then you can start engraving.

# Chapter 4 Reference

## 4.1 Firmware Refresh

Connect the main board to your computer with USB cable. Close all the control software to make sure COM is not occupied.
先将主板用USB线与电脑连接（关闭控制软件，保证COM口不能被占用）。

**Steps 具体步骤**

1. Select the correct firmware file
   选择固件

2. Select Chip Uno (ATmega328)
   选择芯片型号Uno (ATmega328)

3. Select a correct COM port. It does not have to be the one as the picture shows.
   选择正确的COM（非固定为图中COM口）

4. Click Upload.
   点击上传(Upload)

5. Complete.

Check the running directions of all axis after you finish freshing the firmware.
If they run reversely, please modify the settings from laser software.
注意刷新完固件后，请检查各轴运行方向是否正确，若有反向，进入激光软件进行调整

## 4.2 Machine Configuration

To view the settings, type $$ and press enter after connecting to Candle.Candle should respond with a list of the current system settings, as shown in the example below. All of these settings are persistent and kept in EEPROM, so if you power down, these will be loaded back up the next time you power up your machine.The x of $x=val indicates a particular setting, while val is the setting value. In Candle each setting had a description next to it in () parentheses.

```
Grbl参数配置说明
$0=10 (steppulse, usec) 步进脉冲时间，建议10us
$1=25(step idle delay, msec) 步进电机除能延迟时间
$2=0 (stepport invert mask:00000000) 步进电机驱动端口有效位掩码
$3=6 (dirport invert mask:00000110) 步进电机驱动方向位掩码
$4=0 (stepenable invert, bool) 步进电机使能取反有效位设置
$5=0(limit pins invert, bool) 限位IO口取反有效位设置
$6=0(probe pin invert, bool) 探针IO口取反有效位设置
$10=3(status report mask:00000011) 状态报告掩码
$11=0.020(junction deviation, mm) 节点偏差
$12=0.002(arc tolerance, mm) 圆弧公差
$13=0(report inches, bool) 位置坐标的单位设置
$20=0(soft limits, bool) 软限位开关
$21=0(hard limits, bool) 硬限位开关
$22=0(homing cycle, bool) 归位使能位
$23=1(homing dir invert mask:00000001) 归位方向位掩码
$24=50.000(homing feed, mm/min) 归位进给速率
$25=635.000(homing seek, mm/min) 归位快速速率
$26=250(homing debounce, msec) 归位边界反弹时间
$27=1.000(homing pull-off, mm) 归位点坐标离限位器触发点的距离
$100=314.961(x, step/mm) x轴速度转化参数 步/毫米
$101=314.961(y, step/mm) y轴速度转化参数 步/毫米
$102=314.961(z, step/mm) z轴速度转化参数 步/毫米
$110=635.000(x max rate, mm/min) x轴最大速率 毫米/分钟
$111=635.000(y max rate, mm/min) y轴最大速率 毫米/分钟
$112=635.000(z max rate, mm/min) z轴最大速率 毫米/分钟
$120=50.000(x accel, mm/sec^2) x轴加速度 毫米/(s*s)
$121=50.000(y accel, mm/sec^2) y轴加速度 毫米/(s*s)
$122=50.000(z accel, mm/sec^2) z轴加速度 毫米/(s*s)
$130=225.000(x max travel, mm) x轴最大行程
$131=125.000(y max travel, mm) y轴最大行程
$132=170.000(z max travel, mm) z轴最大行程
```

The $x=val command saves or alters a Candle setting, which can be done manually by sending this command when connected to Candle through a serial terminal program.To manually change e.g. the microseconds step pulse option to 10usyou would type this, followed by an enter:$0=10.If everything went well, Candle will respond with an 'ok' and this setting is stored in EEPROM and will be retained forever or until you change them. You can check if Candle has received and stored your setting correctly by typing $$ to view the system settings again.