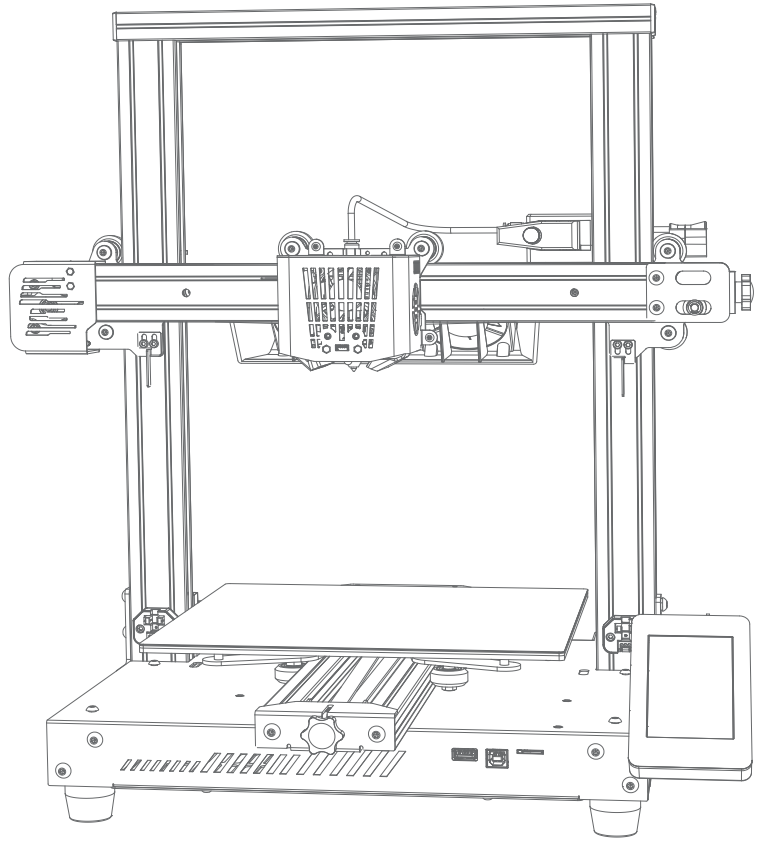
GEEETECH®

THUNDER

USER MANUAL V1.0



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Thunder Wiki

Technical support

CONTENTS

1 WARM TIPS

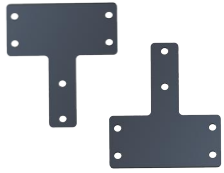
- After unpacking, please check whether the accessories are complete or not. If any accessories are missing, please contact customer service.
- Please read this document carefully to ensure that you understand each installation step, which will improve the efficiency of your assembly and reduce errors.
- Please place the printer in a spacious, flat and ventilated environment. If you do not use the machine for a long time, please pay attention to waterproof and moisture-proof protection for the printer.
- Do not touch any moving parts while the printer is running to avoid personal injury.
- Do not touch the nozzle and hot bed when the printer is working, so as not to cause burns.
- When using the touch screen in the printing process, please pay attention to the movement of the hot bed to prevent the hot bed from hitting your fingers.
- Please use the printer in the environment of 10~40℃, otherwise the printing will be adversely affected.
- Before using the 3D printer, please level the hot bed first. Thunder is equipped with 3D-Touch automatic leveling accessory. Please install the 3D-Touch before leveling the hot bed.You can also use manual hot-bed leveling if you do not have 3D-Touch installed.
- There may be slight differences between the actual product and this document, which will not affect your use, please refer to the actual product.

2 PACKING LIST

Hot bed kit *1

Gantry kit *1

Screen kit *1

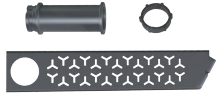


T-type metal part *2

Shovel *1 & TF card *1

USB cable *1

Teflon Tube*3 & Zip Ties*1



Filament holder *1

Tool kit

M5*50/6pcs M5*20/16pcs

Screws

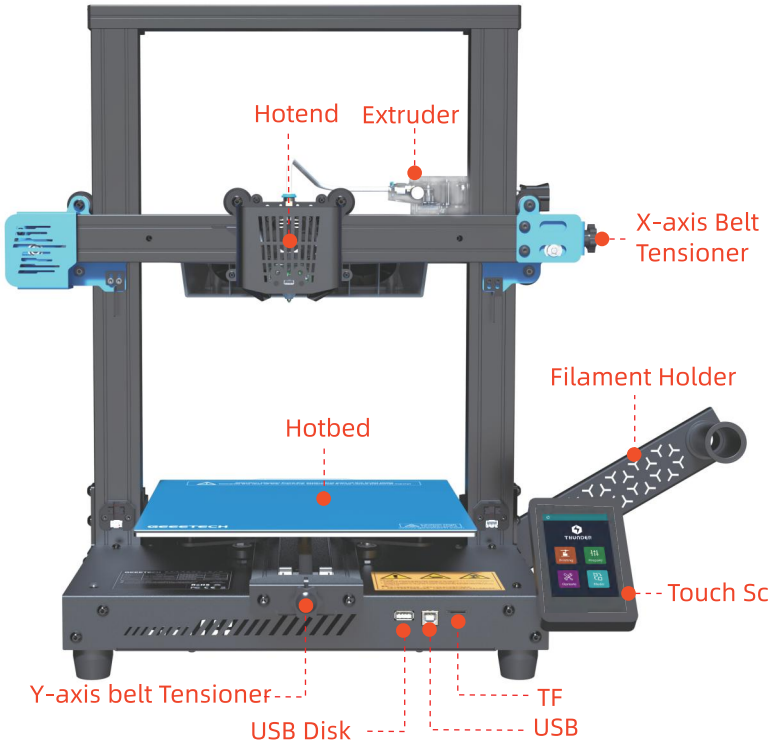
Spare nozzle *2

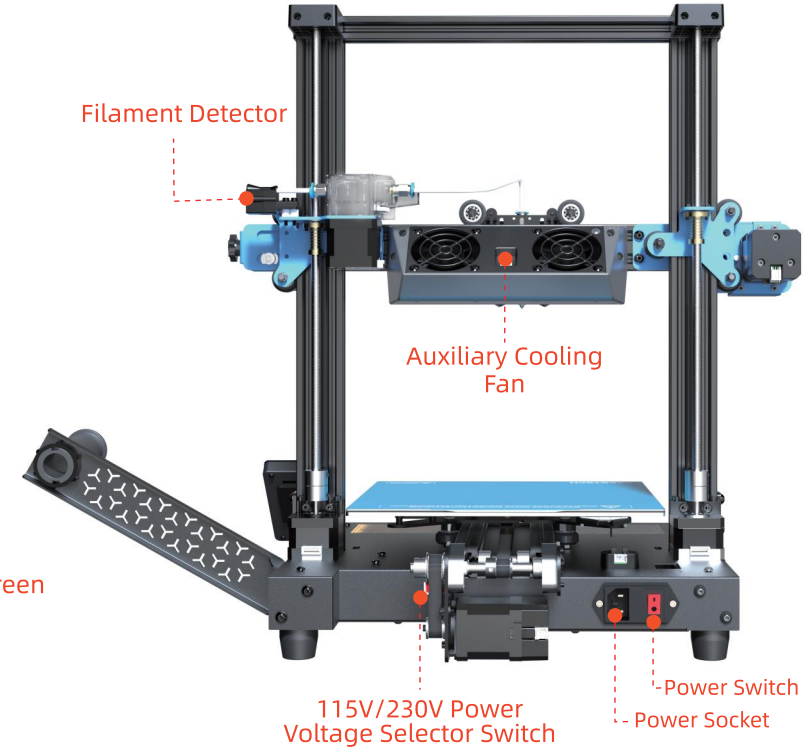
Test filament *1

Quick Plug *4

After-sales service card *1
& User manual *1

Buckle *4


Hotend
Extruder
X-axis Belt Tensioner
Filament Holder
Hotbed
Touch Screen
Y-axis belt Tensioner
USB Disk
TF
USB

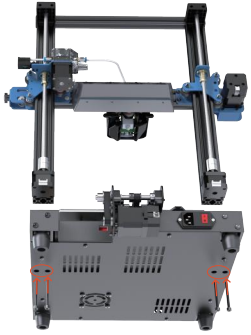

Filament Detector
Auxiliary Cooling Fan
115V/230V Power Voltage Selector Switch
Power Switch
Power Socket

4.1 First, place the hot bed kit and gantry kit on a flat workbench. Please be careful not to pull the cables between the hot bed and gantry assembly(See Pic 4-1).

Pic 4-1

4.2 Assemble the gantry kit and hot bed kit, please use 2# (M5*50) screws to assemble the gantry kit and hot bed kit according to the figure below(See Pic 4-2, Pic 4-3).

Pic 4-2



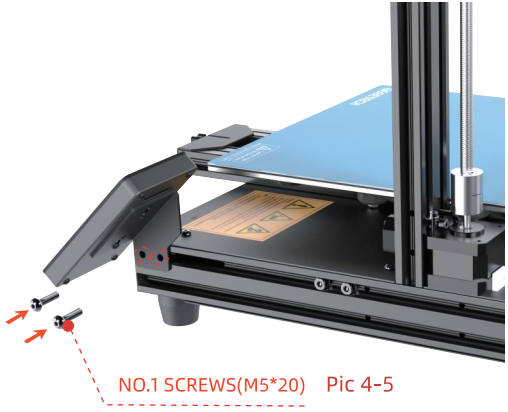
No.2 SCREWS(M5*50)

Pic 4-3

4.3 Assemble the T type metal parts, please use 1# (M5*20) screws to assemble T type metal parts on both sides of the gantry frame(See Pic 4-4).

Pic 4-4

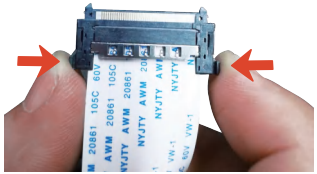
4.4 For screen components, please use 1# (M5*20) screws to assemble screen components according to the figure below(See Pic 4-5).



Pic 4-5

4.5 Connect the screen wires. When connecting the screen cabling, please connect and insert the screen cables according to the following figure. Pay attention to the direction of the cable routing. Otherwise, the interface of the cable routing may be damaged (See Pic 4-6). If you want to remove the cable, be sure to press the buckles on the both sides(See Pic 4-7).

Pic 4-6

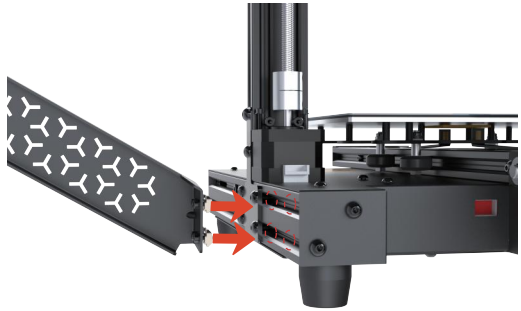


Pic 4-7

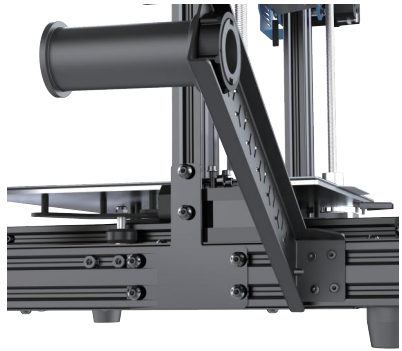
4.6 Assemble the filament holder. Please assemble the plastic part and metal part of the filament support together(See Pic 4-8).

Pic 4-8

4.7 Install the filament holder. Please use 4 M3*6 screws(installed on the holder) to fix the assembled filament holder to the position indicated by the figure below (See Pic 4-9, Pic 4-10).

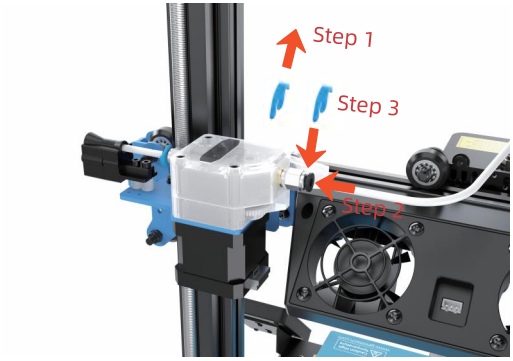


Pic 4-9



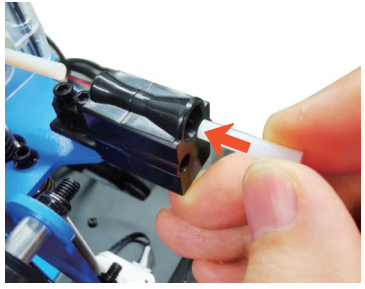
Pic 4-10

4.8 Step 1: Remove the blue buckle from the quick plug.
Step 2: Insert the other end of the hot teflon tube into the quick plug of the extruder.
Step 3: Reinstall the blue buckle on the quick plug(See Pic 4-11).



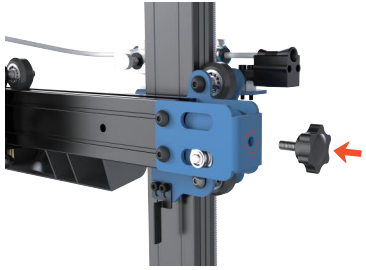
Pic 4-11

4.9 Install the teflon tube at the end of the filament break detection sensor. If this section of teflon tube is not installed, it will lead to serious wear and tear of the shell of the filament break detection sensor(See Pic 4-12).



Pic 4-12

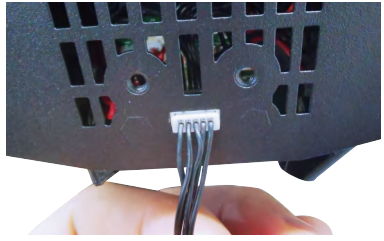
4.10 Replace the belt quick adjustment nut. THUNDER use screws for factory default, users can replace according to need(See Pic 4-13, Pic 4-14).



Pic 4-13

Pic 4-14

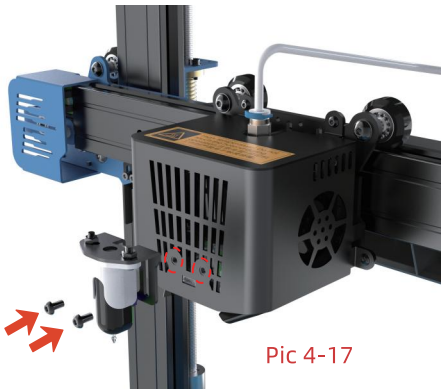
4.11 Insert one end of the 5pin electronic wire into the hot end and the other end into the 3D-Touch(See Pic 4-15, Pic 4-16).



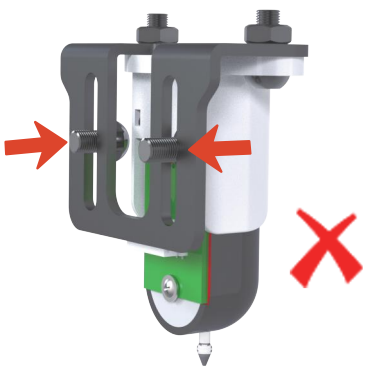
Pic 4-15

Pic 4-16

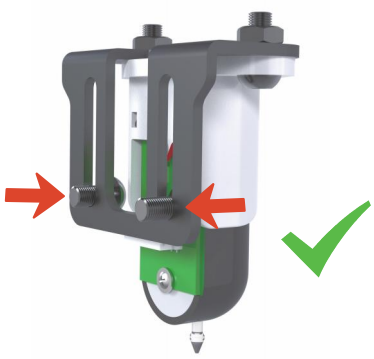
4.12 Use two M5*14 screws to fix the 3D-Touch bracket on the shell of the hot end. Please note that the bottom of the strip of the bracket is close to the mounting screw, otherwise 3D-Touch will not work properly(See Pic 4-17, Pic 4-18, Pic 4-19).



Pic 4-17

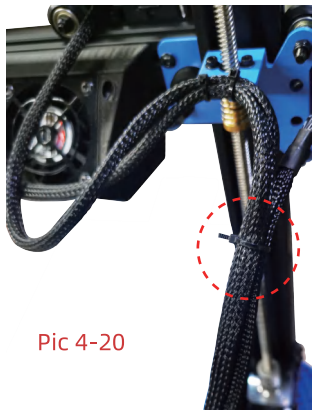


Pic 4-18

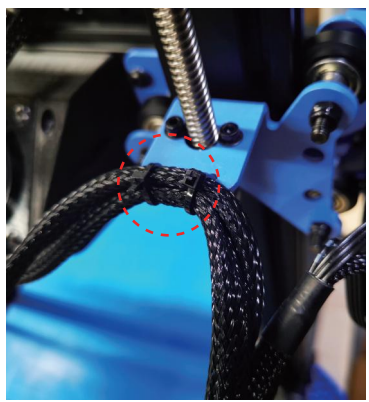


Pic 4-19

4.13 To prevent cables from being damaged, please move the X-axis to the top of the Z-axis first, and then secure the cables with cable ties(See pic 4-20,pic 4-21).



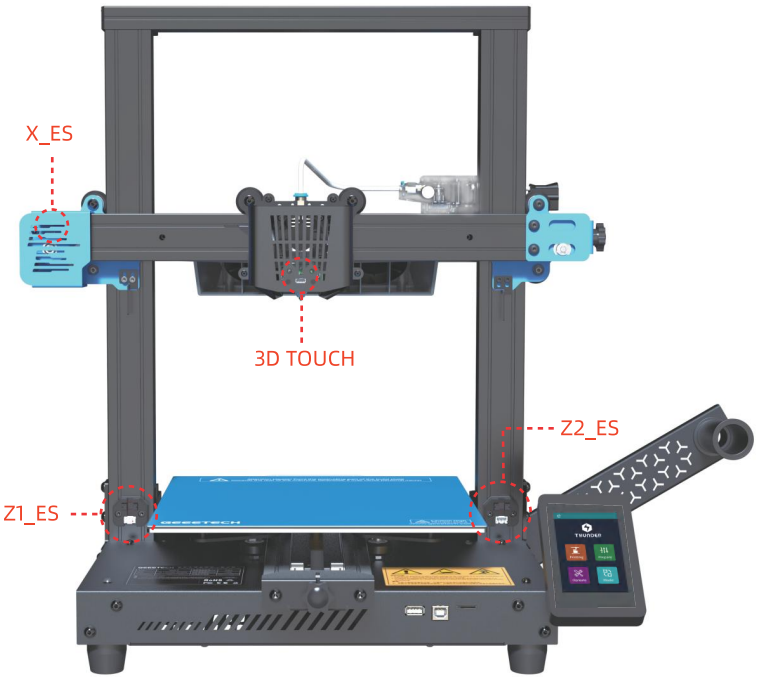
Pic 4-20



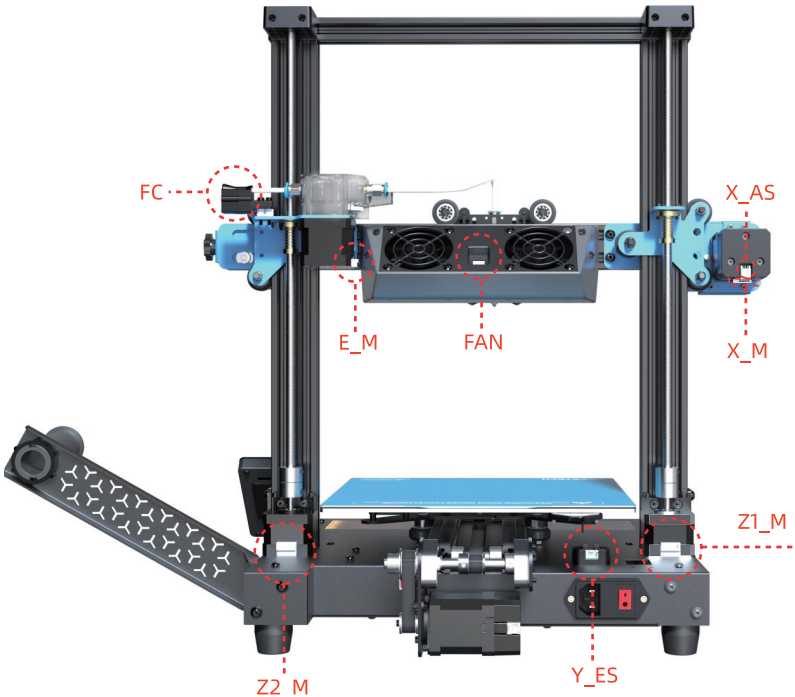
Pic 4-21

5 CONNECT CABLES

Each cable of the printer has a text label on the end. Please connect the cables correctly according to the following picture.



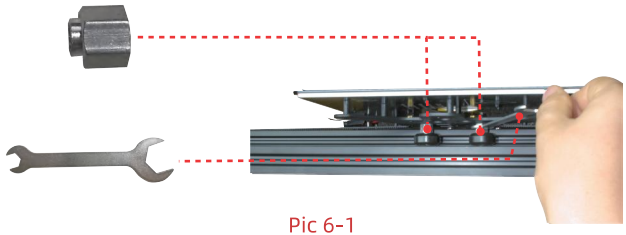
FRONT



BACK

6.1 Check the hotbed(See Pic 6-1).

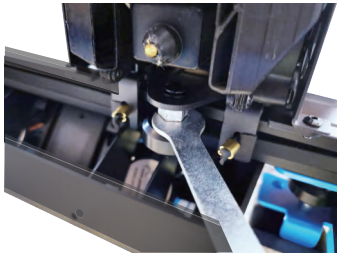
Move the hot bed by hand to check whether it runs smoothly on the Y-axis. If it is loose or stuck, use the wrench in the tool kit to adjust the two eccentric nuts under the hot bed. It is recommended to move the hot bed while adjusting to prevent it from being too loose or too tight on the Y-axis.



Pic 6-1

6.2 Check the hotend(See Pic 6-2).

Manually move the hot end to check whether it runs smoothly on the X-axis. If it is loose or stuck, use the wrench in the tool kit to adjust the eccentric nut behind the hot end. Please move the hot end while adjusting it to prevent the hot end from being too loose or too tight on the X-axis.



Pic 6-2

6.3 Check X/Y axis belt.

Pull the belt of the XY axis by hand and check whether the tightness is appropriate. If the belt is loose or too tight, please use the belt adjustment nut on the XY side to adjust it

6.4 Check the Z-axis pulley(See Pic 6-3, Pic 6-4).

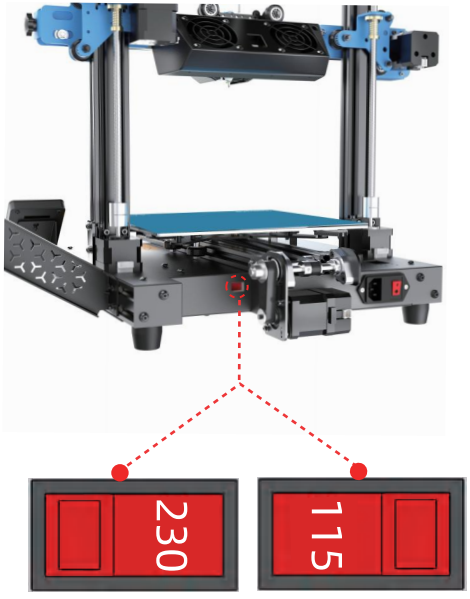
Shake both ends of the X-axis by hand to check whether the tightness of the Z-axis pulley is appropriate. If it is too loose or too tight, please adjust the eccentric nuts on both sides of the X-axis.

Left side of X-axisPic 6-3

Right side of X-axisPic 6-4

7 CHECK THE POWER SUPPLY

Thunder power supply has two voltage ranges of 230V and 115V. Please select the voltage range according to the country or region where you are located and ensure that the voltage range is in the correct position. Otherwise, the power supply will be damaged. Please make sure, then power on the printer(See Pic 7-1).



Pic 7-1

8 SYSTEM UI INSTRUCTION

8.1 Home(See Pic 8-1).

Pic 8-1

Printing For choosing G-code files and start printing.

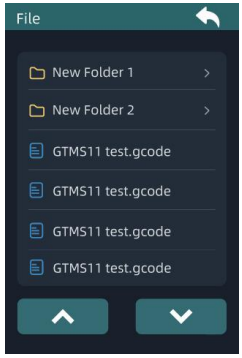
Prepare Preparations before printing can be operated here, such as preheating the hot end and hot bed, replacing filament, turning on or off the filament broken detection switch, turning on or off the LED light, turning on or off the buzzer switch.

Operate In this menu, you can operate hotbed leveling,one button to ALL Home,move X/Y/Z axis, and some parameter settings.

Mode This menu is for choosing the printing mode.

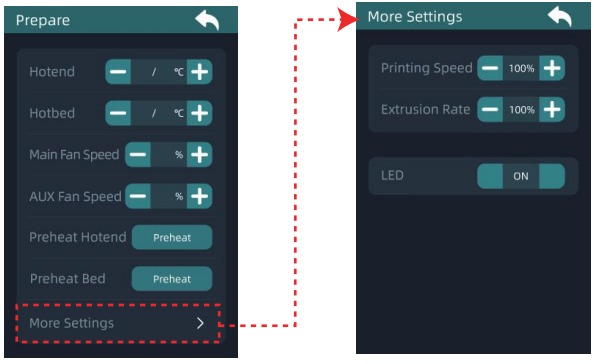
8.2 Printing(See Pic 8-2).

This menu is for choosing G-code files and start printing



Pic 8-2

8.3 Preparation(See Pic 8-3, Pic 8-4).



Pic 8-3 Pic 8-4

Hotend For setting nozzle temperature.If you adjust the temperature here,nozzle will start heating directly.

Hotbed For setting hotbed temperature.If you adjust the temperature here,hotbed will start heating directly.

Main Fan Speed Control the speed of heat dissipation fan at the hotend. The automatic speed is 100%. User can manually adjust the speed to 150%,accordingly, the noise of the fan is higher.

Aux Fan Speed Control the speed of the auxiliary fan, maximum of 100%. If you need to use the auxiliary fan, you need to turn it on manually here.

Preheat Hotend Preheat nozzle, default temperature is 200℃, press the icon to start preheating, press again to stop preheating.

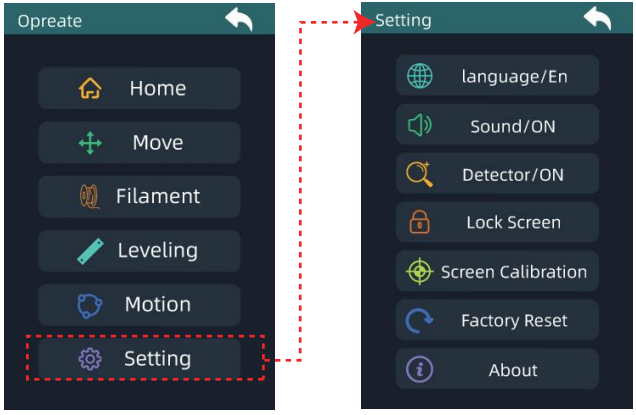
Preheat Bed Preheat the hotbed,default temperature is 60℃， press the icon to start preheating, press again to stop preheating.

Printing Speed For speed up or slow down the printing speed.

Extrusion Rate For speed up or slow down the filament extrusion mount of filament. Default extrusion is 100%.Without special case, you are not advised to adjust this parameter.

LED Turn on or off the nozzle light LED.

8.4 Operation(See Pic 8-5, Pic 8-6).



Pic 8-5 Pic 8-6

Home you can set X axis or Y axis zero home alone, or set X/Y/Z axis zero home at the same time. This can be used for printer debugging; It is especially reminded that due to the property limitation of closed-loop drive, when X-axis and Y-axis return to zero, please ensure that the hot end cannot be at the most right side of X-axis and the hot bed cannot be at the most front end of Y-axis, otherwise the motor will appear blocking alarm. If there is a blocking alarm, THUNDER will automatically terminate the X-axis or Y-axis return to zero. At this time, the user needs to manually push the hot bed to the rear of the Y-axis, or manually move the hot end to the left of the X-axis to restart the return to zero operation.

Move You can move the X axis, Y axis and Z axis separately. The moving distance of each click is 0.1mm, 1mmN, 10mm and 100mm, you can choose freely.

Filament In this menu, you can exchange filament.

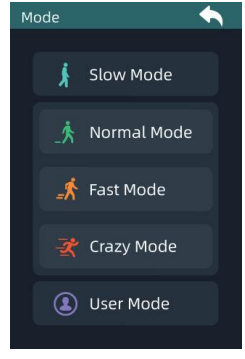
Leveling You can complete the auto-leveling and manual leveling operation in this menu. Users can choose the leveling method according to their own needs. The 3D-Touch sensor needs to be installed in advance for auto-leveling.

Motion Under this menu, it shows some motion parameters of the printer. It can also complete the X/Y axis closed-loop drive calibration. Detailed calibration method will be explained in the later sections.

Setting In this menu, you can set language, buzzer switch, filament detection, password, factory reset and check firmware version information.

8.5 Printing Modes(See Pic 8-7).

Thunderprovides low speed, normal, fast, crazy, custom 5 working modes. User can set before start printing, also can switch the printing mode during the printing process, each mode for different use scenarios, the user mode can be set only on PC.



Pic 8-7

9 HOTBED LEVELING

THUNDER supports auto-leveling and manual leveling. Automatic leveling requires the installation of a 3D-Touch leveling sensor(See details steps in 4.12). We provide a 3D-Touch leveling sensor as a gift in standard package, please install the 3D touch in advance. THUNDER adopts a fixed hot bed, so it can be used for a long time after leveling is completed. If THUNDER does not perform leveling, the system will prohibit printing. So please do leveling first. Manual leveling does not take precedence over automatic leveling, THUNDER will only use the calibration data from the latest leveling.

9.1 Auto-Leveling(See Pic 9-1).

Pic 9-1

Pic 9-2

A) First, please ensure that the 3D-Touch leveling sensor has been installed.

B) Click "Operation" menu on the main page to enter the next level, and then click "Leveling" to enter the leveling page.

C) Click the "Test" button in the page, and a page will pop up for 3D-touch test. Click "Probe up" at this time, you can see that the probe of 3D-TOUCH will retract; Click "Probe down" at this point, you can see the probe of 3D-Touch will extend. If the probe is not properly extended or retracted, it is indicated that the 3D-Touch is faulty, please check whether the 3D-Touch assembly is correct(See pic 9-2).

D) Click the red area to exit the 3D-Touch test page and Back to Pic 9-1 page

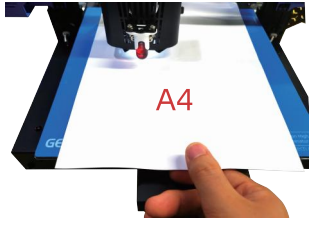
E) By default, THUNDER is in auto-leveling mode. Users can directly click "Start" in the page to start automatic leveling.

F) After the automatic leveling begins, the X/Y/Z axis will automatically return to zero, and the nozzle will automati cally heat to 130℃, which will take about 40 seconds, please wait patiently.

G) After the nozzle is heated, THUNDER will automatically start 16-point leveling. Please wait patiently.

H) After leveling the 16 points, the hot end will automatically move to the center of the hot bed. At this time, we need to manually calibrate the 17th point, please clean the nozzle with tweezers or other tools before calibrating the 17th point.

I) After cleaning the nozzle, please take out a piece of A4 paper, put it under the nozzle, and select the appropriate Z-axis moving scale. Then click the moving down icon, the nozzle will move down. When the A4 feels a slight friction resistance between the hot bed and the nozzle, it means that the distance between the nozzle and the hot bed is just right.



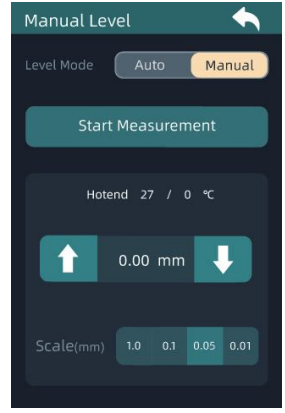
J) Click the "Save" button, the buzzer will ring, and the page will pop up a message indicating that it is saved successfully. At this time the leveling of the hot bed is completed.

K) Automatic leveling exception elimination

Check whether the red light comes on from the 3D-touch, if not, check whether the cable connection to the 3D-Touch is correct.

If the nozzle hits the hot bed during leveling or the 3D-Touch probe hits the hot bed after leveling, it means that the installation position of 3D-Touch is incorrect. Please refer to the correct installation method of 3D-Touch in Section 4.12 of the manual.

9.2 Manual Leveling(See Pic 9-3).



Pic 9-3

A) Click "Operation" on the main page to enter the next menu, then click "leveling" to enter the leveling page, and then click "Manual" button to enter the manual leveling page.

B) Click "Start measurement", the X/Y/Z axis will automatically return to zero, and the nozzle will start to heat to 130℃ automatically, which will take about 40 seconds, please wait patiently.

C) After heating, the hot end will move to the first leveling point. At this time, please clean up the nozzle.

D) After cleaning the nozzle, please take out a piece of A4 paper, put it under the nozzle, and select the appropriate Z-axis moving scale. Then click the downward icon, the nozzle will

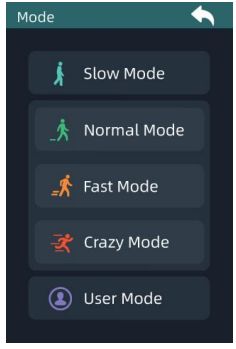
move down. When the nozzle is close to A4 paper, please switch to a smaller Z-axis moving scale to avoid damaging the build plate. While moving the A4 paper, when you feel that there is slight friction resistance on A4 paper, the distance between the nozzle and the hot bed at the first leveling point is just right. Then click "Next" to start the leveling of the second point. The method is the same as above, there are 9 points in total.

E) After the 9th point leveling is completed, the X/Y/Z axis will automatically return to zero once, and then the hot end will move to the middle of the hot bed again. At this time, please level the 10th point with A4paper, the method is the same as above. After the leveling is complete, click "Next", THUNDER will automatically save the manually leveling data.

F) Due to the uncontrollable deviation of manual leveling, if the adhesion of the first layer is not firm or too thin after leveling, please do manual leveling again.

10 *CHOOSE PRINTING MODE*

THUNDER provides users with 5 printing modes, with different printing speeds and quality. Their specific functions are as follows(See Pic 10-1).



Pic 10-1

Slow Mode THUNDER limits the print speed to a maximum of 150mm/s, which is the suitable for overnight printing or requires low-noise environment. Printing speed is slowest.

Normal Mode In this mode, there is a good balance between print time and print quality, you can get good print quality for most common models in short print time.

Fast Mode In this mode, print time takes priority over print quality, resulting in some loss of print quality compared to normal mode, but you gain a shorter print time compared to normal mode.

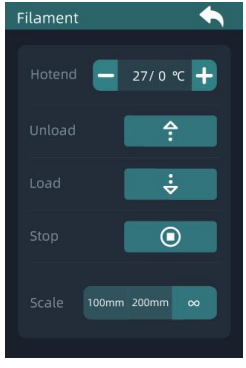
Crazy Mode In this mode, the print time has the highest priority, the print quality is further compromised and the print time is further shortened compared to the fast mode, and this mode is suitable for situations that require relatively low quality of the model.

User Mode This mode opens up many core parameters of the THUNDER firmware to the user. Users can set the parameters using the Smartto Kits tool provided by GEEETECH, and also export and share their customized parameters with other THUNDER users.

Due to the length of this document, this document does not provide the method for using the Smartto Kits tool. We have included the Smartto Kits tool and using instruction in the attached Micro SD. You can also download the Smartto Kits tool and using instruction from the GEEETECH website.
THUNDER is set to Normal mode by default. Users can set the printing mode before printing or switch the printing mode during the printing process
Please be noted that switching between different printing modes may cause a texture on the surface of the printed model. Please use the mode switching carefully after printing starts.

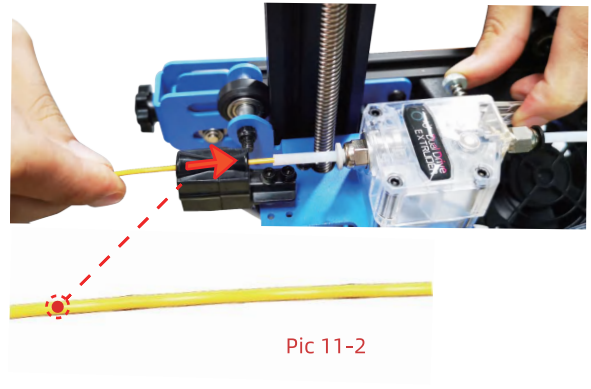
11 LOADING FILAMENTT

A) Click "Operation" → "Replace filament" to enter the page of filament replacement. Then click "+" button to set the tempera ture to the required temperature of the new filament, and then wait for the nozzle to heat to the set temperature(See Pic 11-1).



Pic 11-1

B) While waiting for the nozzle to be heated, please prepare the filament to be used or replaced, and arrange the heads of filament into a straight line about 10cm in length to facilitate the insertion of filament into the extruder(See Pic 11-2).



Pic 11-2

C) After nozzle heating is completed, click on the "down" arrow on the page, extruder begin to work now. At this time, please insert the filament into the extruder as shown in figure below, and ensure the filament pass through the whole extruder, otherwise filament may not be able to pass through the machine. Defaultly, THUNDER will continue promoting the filament length of 200 cm by one time click "+" button. Users can choose "100cm" and "∞" scale according to their needs, where "∞" means that the extrusion opportunity has been working and will not automatically stop, please use "∞" scale carefully.

D) When the nozzle is extruded with melted filament, it means that the filament is successfully loaded. At this time, user can press the "Stop" icon to stop the extrusion.

12 SLICING

Slicing refers to the process of converting a 3D model of an object (STL format file) into a G-code file that can be recognized by a printer. This process is completed by slicing software. When using THUNDER, it is recommended to use Cura slicing software. We have put Cura version 5.1.0 in the attached Micro SD. Of course, you can also download the latest version from Cura and search for the using method from internet.

To enable THUNDER users to quickly use Cura to generate G-code, we have included THUNDER's Cura profile in the attached Micro SD. Users need to place the profile in the correct folder according to the instructions provided. You can also download this profile from our official website.

13 START PRINTING

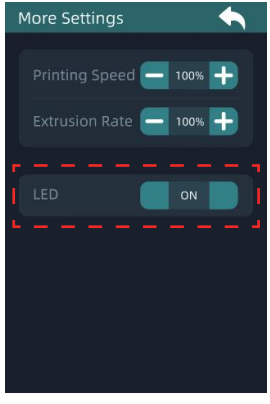
THUNDER only supports G-code files. You can put the G-code files in the Micro SD or USB flash drive and insert it into the corresponding interface of THUNDER. It should be noted that THUNDER supports reading the Micro SD and USB flash drive at the same time. THUNDER will display "SD Card" and "U-Disk" respectively under the "Print" menu of HOME. Users can choose which option to enter according to their needs. If only the Micro SD or USB flash drive is inserted, the Print menu displays the root directory of the storage device. THUNDER can identify G-code files in Micro SD and USB flash drive folders. Here are the steps:

A) Insert the G-code into the Micro SD or USB flash drive and insert it into the corresponding interface of THUNDER.

B) Click "Print" on the home page and choose the G-code file to be printed. The page will prompt you whether to print the selected file. Select "Yes" to start printing.

C) After printing, please pay close attention to the condition of the first layer. If the hot bed is rubbed by the nozzle or the fist layer is not adhered to hot bed when printing the first layer, it is necessary to enter the "Z-axis Compensation" menu on the printing status page and adjust the height of the nozzle to obtain the best first layer. For details, please refer to 9.3.

14 PRINT LIGHTING

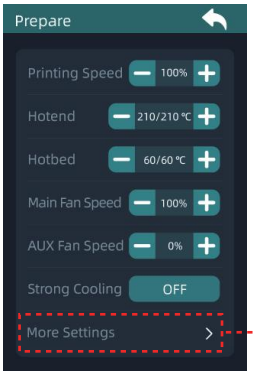


To make it easier for users to observe the nozzle and print, THUNDER designed a white LED besides the nozzle, which can be turned on before or after printing starts.

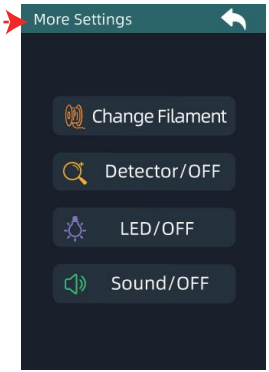
LED light setting path: Preparation → More Settings →LED light, users can turn on or off the LED according to their needs.

15 ADJUST PARAMETERS AFTER PRINTING STARTS

After THUNDER starts printing, users can adjust the parameters according to their needs by entering the "Prepare" menu in the print status page(See Pic 15-1, Pic 15-2).



Pic 15-1



Pic 15-2

Printing Speed For adjusting the printing speed of the current model. Percentage represents the percentage of the G-code speed.

Hotend For adjusting the current nozzle temperature,user can adjust the nozzle temperature appropriately when the model is short of filament.

Hotbed For adjusting the temperature of the current hot bed.

Main Fan Speed This parameter is used to adjust the hotend fan speed. This fan speed is generally controlled by G-code and you do not need to adjust it. When THUNDER is designed, the speed of the hot fan has a allowance. When printing some thin-wall models at high speed, you can manually adjust the speed of the hotend fan to 150%. In this case, the wind noise of the hot fan is large, please turn on according to your needs.

Aux Fan Speed This parameter is used to adjust the speed of the auxiliary fan, which is manually controlled. In general, the fan cannot be controlled by G-code. Users can choose whether to enable the fan according to the printing speed and model type. It is suggested to turn on the auxiliary fan when printing thin-wall models. Meanwhile, if the user finds that the heat dissipation of the model is insufficient during the printing process, user can also manually turn on the auxiliary heat dissipation fan.

Strong Cooling When the "One-button strong" function is enabled, the hot fan and auxiliary cooling fan will be turned on at the same time at the maximum speed. The hot fan will be turned on to 150%, and the auxiliary fan will be turned on to 100%. When the "one-button strong cooling" function is turned off, the hot fan will be slow down to 100%, and the auxiliary fan will be turned off.

Change Filament Users can use this function to change filament during the printing process without damaging the printing process.

Detector/OFF You can enable or disable the filament detection sensor delivered with THUNDER. After this function is enabled, THUNDER will automatically suspend the current printing work if filament is exhausted or broken unexpectedly. Users can resume the previous printing work after handling the filament abnormality.

LED/OFF Users can manually turn the LED on or off during the printing process.

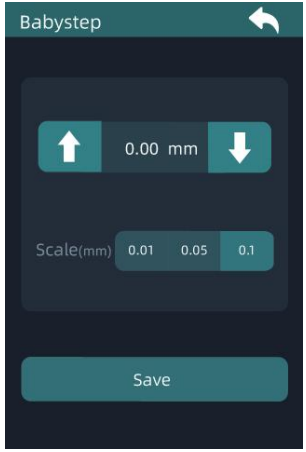
Sound/OFF The user can turn the buzzer on or off during the printing process.

Babystep If you find that the first layer does not adhere to the hot bed well or the nozzle is too close to the hot bed, causing the first layer to be too thin when you start to print the model with THUNDER, you can adjust the distance between the nozzle and the hot bed quickly by adjusting the Z-offset to solve the problem of the poor adhesion of the first layer and the thin first layer. The specific process is as follows:

A) Click the "Z-axis (Babystep)" button in the lower right corner of the print status page to enter the Z-axis compensation setting page. Users can choose to move the nozzle up or down according to the current printed question on the first layer. There are different nozzle moving scales on the page.

B) After adjusting "Babystep", click "Save" button on the current page, and select "Yes" in the dialog box that pops up to save the adjusted parameters of "Babystep".

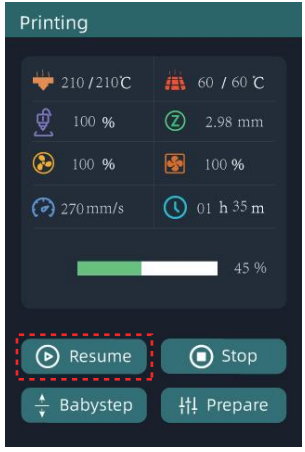
If the save function is used, THUNDER will automatically calibrate the nozzle height according to the current saved compensation parameters in the next print. otherwise, the Babystep adjustment is only valid for the current print.



16 *PAUSE PRINTING*

During the printing process, click the "Pause" icon on the print status page to pause the current printing. To Resume printing, click the "Resume" button on the page(See Pic 16-1).

Please be note that the hot bed and nozzle will be heated all the time during the pause of THUNDER, so please do not pause for a long time to avoid unnecessary energy waste and potential safety risks.



Pic 16-1

17 REPLACE FILAMENT

If filament is used up or abnormal during printing, users can replace filament through the "Replace Filament" menu. When replacing filament, THUNDER will automatically stop printing. The detailed operation path is as follows.

Print status page → Preparation → More Settings → Replace Filament → Click Confirm → Enter the page of replacing consumables. The following steps are required.

A) After entering the replacing filament page, click the arrow "Up" on the page, and then the extruder will exit the remaining filament. After exiting filament, click the icon "Stop" to stop exiting filament.

B) Click the "Down" button to extrude the feed. At this time, insert the straightened filament in the front end into the extruder (refer to Chapter 11) until you see the new filament extruded from the nozzle. At this time, click the "Stop" button on the page to complete the refueling.

C) Click the "Back" button until you return to the print status page, then click the "Resume" button on the page, THUNDER will continue printing.

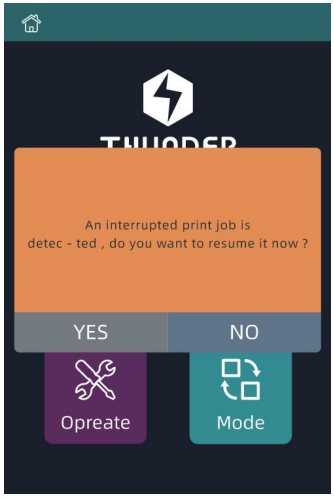
Note: If the filament is not replaced during the printing process, the nozzle will be heated from the cooling state. When the nozzle reaches the preset temperature, it is not allowed to withdraw the filament directly. The filament should be extruded about 10cm first, and then the filament should be returned, which can effectively avoid nozzle blockage.

18 BREAK-RESUMING

If THUNDER encounters a sudden power failure during the printing process, the printer will save the current printing task. After the power is restored, the user only needs to choose to resume printing according to the prompt of the screen.

After the printer is powered off, please do not move the Z-axis, otherwise, printing recovery will fail.

If the user actively pauses printing and needs to power off, it is recommended to click "Pause printing" before the power off, and wait for the X/Y axis motor to return to zero and then disconnect the power supply of the printer to ensure that the printer can correctly save the current printing progress.



In order to make the surface of the model without obvious defects after power failure and refilling, the user can use tweezers to clean up the overflow of the nozzle in time during the nozzle heating process after resuming printing

19 FILAMENT DETECTOR

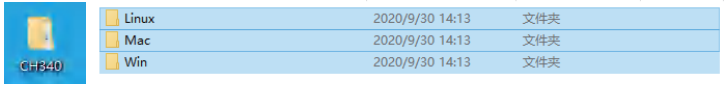
THUNDER comes with filament broken detection sensor, in the printing process, if there is a filament fracture or depletion of filament, THUNDER will automatically suspend the current printing, to prevent printing failure due to lack of materials, users only need to replace the filament,then continue the suspended printing task.

Filament broken detection has switch button in the menu, you can open and close the filament broken detection. Please confirm filament broken detection switch is turned on before the start of printing, the user can also turn on the filament broken detection after the start of printing.

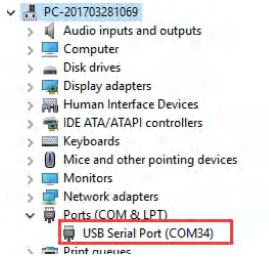
20 ONLINE PRINTING

Online printing refers to connecting PC and printer through USB cable (THUNDER standard accessory), and then controlling printer to work through slicing software (Easy Print Pro, Cura, Repetier Host, etc).

If users need to use the online printing function, you need to install the printer driver first. Thunder uses CH340 chip, and the driver has been prepared in the TF card attached with the serial port. Please select the corresponding OS version driver according to your needs.



After installing the driver, turn on the power supply of the printer, connect the USB cable to PC and printer respectively. Take PC as an example. You need to check the port that is connected to the printer in" Device Manager" . If no port is found in Device Manager, check whether the driver is installed correctly and whether the USB port on the PC works properly



Open the slicing software, set the port and baud rate of the printer. The baud rate of the serial port of THUNDER is 115200. Please fill it correctly in the slicing software, otherwise the slicing software may fail to connect to the printer.

Tips:

1) Due to unstable factors such as signal interference in the USB cable, it is easy to lead to printing failure. Therefore, it is recommended to choose TF card for offline printing.

2) For Online printing, break-resuming capability is disabled. If you need to print a large model, it is not recommended to use online printing in order to ensure the successful completion of the printing task.

21 DAILY MAINTENANCE AND USAGE SUGGESTIONS

To ensure THUNDER to work optimally, maintain it after you use it.

A) regularly add lubricating oil to the Z-axis screw, can reduce the friction between the moving parts, reduce the wear of the screw.

B) Regularly check the tightness of X-axis and Y-axis belts, and adjust them according to the situation to prevent printing split-layer problems caused by belt relaxation.

C) Regularly check whether the X-axis, hot bed and hot end are loose. If they are loose, please use a wrench to adjust the eccentric nut on the X-axis, hot bed and hot end, and re-fix the X-axis, hot bed and hot end.

D) The printer should be placed in the appropriate temperature environ ment for use, the environment temperature is too high or too low may affect the normal work of the printer.

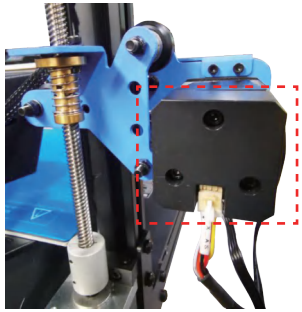
E) Please turn off the power supply in time after using the printer.

F) If you do not use the printer for a long time, please pay attention to the moisture-proof and waterproof treatment of the printer.

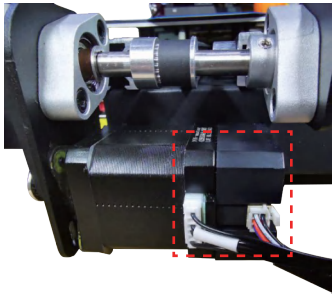
G)When taking off the printed model, please wait for the hot bed to cool down before taking off the model. Otherwise, the PC film on the building board will be torn.

H) If the filament adhered to the surface of the hot bed is difficult to be scraped off with a shovel knife, it is recommended to heat the hot bed to about 90℃ first, so that the filament adhered to the hot bed surface are softened, and then the adherent filament are easy to be cleaned up.

THUNDER's X/Y axis motors are all closed-loop controlled, and the closed-loop control sensors on the motors have been calibrated before delivery. Do not remove the closed-loop control sensor if the X-axis and Y-axis are not abnormal. Otherwise it will cause the calibration parameters of the closed-loop control sensor on the X-axis and Y-axis to be offset, resulting in the X-axis or Y-axis stuttering or abnormal jitter during the THUNDER printing process (See Pic 22-1, Pic 22-2).

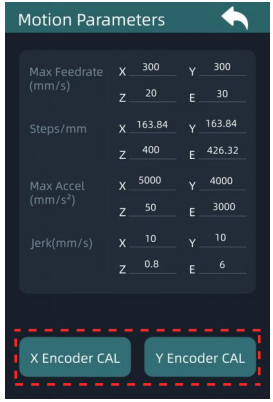


X Closed-loop Control Sensor
Pic 22-1



Y Closed-loop Control Sensor
Pic 22-2

On the screen menu of THUNDER, we provide the X-axis and Y-axis closed-loop control sensor calibration function. The specific path is "Operate" → "Motion". In the "Motion" menu, you can see two buttons "X Encoder Cal" and "Y Encoder Cal". They are X-axis and Y-axis closed-loop control sensor calibration buttons respectively. The specific calibration methods are as follows(See Pic 22-3):



Pic 22-3

X axis: First, ensure that the hot end can move smoothly on the X axis, and then move the hot end to the middle of the X axis. Then click the "X Encoder Cal" button, and the control panel will pop up to prompt whether to confirm the calibration of the X axis closed-loop control sensor. Choose "YES", and the hot end will move first to the right and then to the left. When the hot end stops, the calibration is complete, and the UI will prompt that the calibration is complete.

Y axis: Firstly, ensure that the hot bed can move smoothly on the Y-axis. Then, move the hot bed to the middle position of the Y-axis, and then click "Y Encoder Cal" button. The control panel will pop up to prompt whether to confirm the calibration of the Y-axis closed-loop control sensor. When the hot end stops, the calibration is complete, and the UI will prompt that the calibration is complete.

Nozzle discharge abnormality

1) Filament is knotted and stuck, and the feeding is not smooth.
2) The nozzle temperature is too low and does not reach the required melting temperature of filament.
3) There is carbonization residue in the nozzle, please replace the spare nozzle.
4) The heat dissipation of the nozzle is insufficient, resulting in the filament in the upper part of the pipe melting in advance, and the extrusion force is insufficient. Please check whether the cooling fan works normally.
5) The printing speed of model slices is too fast, and the nozzle extrusion speed cannot keep up with it. Please reduce the speed.
6) If the nozzle extrusion is not smooth due to scraping, please use the nozzle cleaner to dredge the nozzle after preheating.

The extruder gear slips and makes abnormal noise

1) Nozzle blocking, refer to the "nozzle discharge abnormality" treatment.
2) Check whether the friction force of extruder gear to filament is enough, please clean up the gear residue.

First layer abnormal

1) The first layer does not stick: the nozzle is too far away from the hot bed, please adjust the hotbed leveling again.
2) The first layer is not discharging, and the hot bed has scratches: the nozzle is too close to the hot bed, which is easy to damage the nozzle. Please level it again and check whether the discharging of the nozzle is normal.

Layer shift

1) The printing speed of model slices is too fast, please reduce the printing speed.
2) The belt of X axis or Y axis is too loose, please adjust the belt tightness.
3) X axis or Y axis synchronization wheel is not secured, please adjust the machine meter on the synchronization wheel.

Print stopped

1) Printing stopped during the online printing process: the signal line receives interference, so it is recommended to copy the model to TF card for offline printing.
2) Printing stopped during the offline printing process: the G-code file in the TF card is abnormal, and it is recommended to slice it again.
3)TF card quality is not stable, try to replace the TF card.
4) The regional power supply voltage is unstable. Please print after the voltage becomes stable.

X/Y axis Closed-loop Control Abnormality

During the using of THUNDER, if the X-axis or Y-axis is stuck in the process of movement, it may be caused by the following two reasons after excluding the non-pulley structure and improper connection of wiring:

1) The X-axis motor or Y-axis closed-loop control sensor is not calibrated or the calibration parameters fail, the closed-loop control sensor of the corresponding axis needs to be re-calibrated. For details, see the related methods in Section 23

2) The magnet of the closed-loop control unit of the X-axis motor or Y-axis motor is loose or falls off. The magnet needs to be fixed on the motor shaft with glue again.

For more troubleshooting and solutions of printer problems, please refer to the manuals in the attached TF card.

Printing Technology	FDM	Power Input	AC 115/230V, 50/60Hz
Layer Thickness	0.1~0.2mm	Power Output	DC24V/14.6A, 350W
Print Size	250*250*260mm	Printing Material	1.75mm PLA/ABS / PLA / wood-polymer/PVA/HIPS/PETG, etc
Printing Speed	≤270mm/s	Connectivity	TF Card, USB
Printing Accuracy	±0.1mm	Nozzle Diameter (mm)	0.4
Slicing Software	EasyPrint , Repetier-Host,Cura	Nozzle Quantity	1
Hotbed Max. Temperature (℃)	110℃	Supported File Format	.Gcode
Environmental Temperature (℃)	10~40℃	Hotend Max. Temperature (℃)	250℃
Machine Size	472(L)*488(W)*525(H)mm	Packing Size	553(L)*544(W)*330(H)mm
Machine Net Weight	10.7kg	Package Weight	13.4kg

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