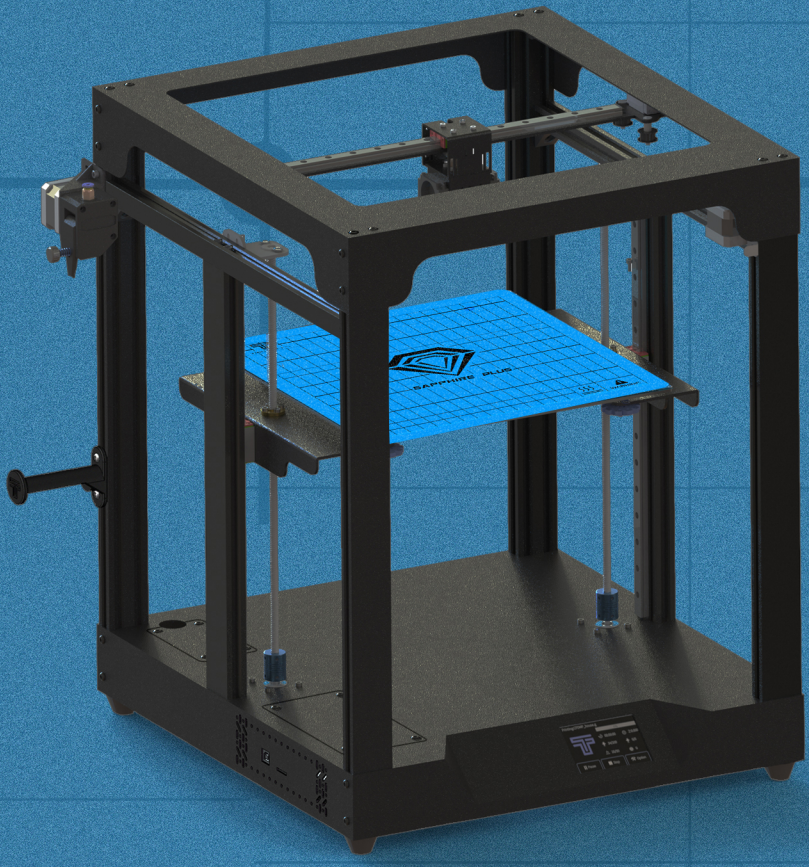
SAPPHIRE PLUS



Shenzhen Two Trees Technology Co., Ltd.

SAPPHIRE PLUS INSTALLION MANUAL

1、Please ensure that the packaging is complete before receiving the goods.

2、After unpacking, please check the parts list and accessories carefully.

3、If you find any problems please contact your 3D printer provider in time

4、The installation instructions in this graphic are model diagrams and are for reference only. The actual product is subject to receipt.

1. When the machine is in operation, no flammable and explosive items can be placed beside the machine.
2. The machine is a moving part. After using the machine, the customer needs to check whether the key parts of the machine such as the heating pipe screws are loose.

SAPPHIRE PLUS INSTRUCTIONS FOR SAFE USE

1、During use, please note that the key parts of the printer such as the hot bed and extrusion head are working.The high temperature generated by the heat during the process to avoid burns!

2、The printer with 220VAC / 110VAC and other high-voltage power interfaces. Please operate with care.
Avoid electric shock!

3、The key components of the printer (such as hot bed, extrusionhead, etc.) have relatively high power.During the process, please ensure that the terminals are firmly connected to avoid sparks due to loose wiring. Cause a fire. To ensure safety, please avoid unattended operation of the printer for a long time!

4、The printer is a kind of mechanical equipment. Please keep away from moving parts during machine operation.
Free from mechanical injuries!

5、Please regularly lubricate and maintain the guide rails!

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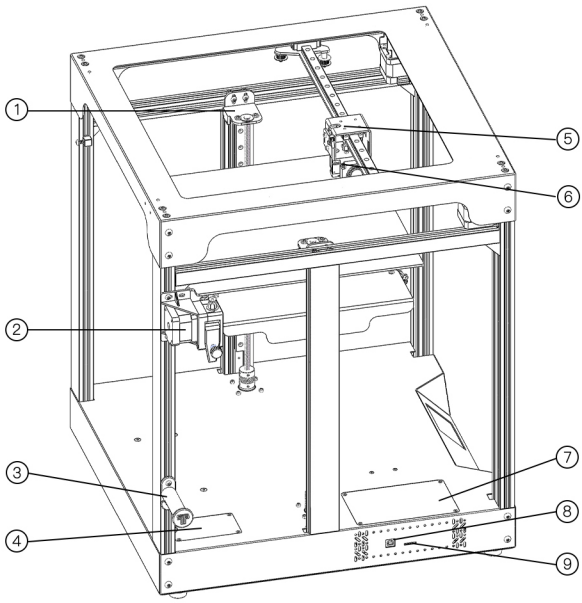
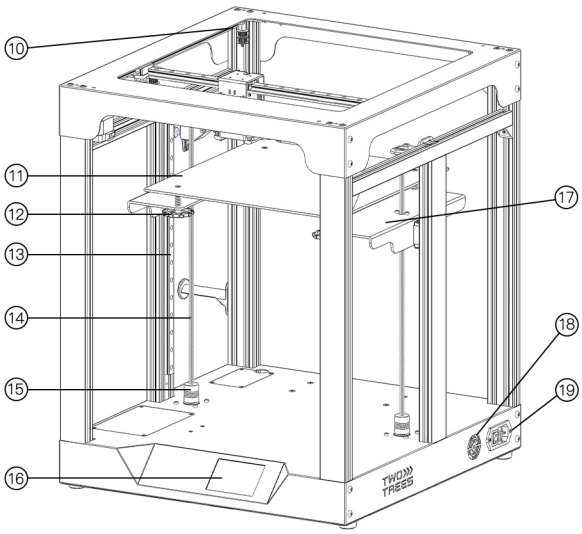
KNOW YOUR PRINTER



1. Screw Fixing Seat
2. BMG Extruder
3. Filament Holder
4. Cable Trough Cover
5. Beam Carriage
6. Extruder Head
7. Motherboard Cover
8. USB Ports
9. TF Card Slot



10. Y Axis Limit Switch
11. Hot Bed Printing Platform
12. Bed leveling screws
13. Z Axis Guide Rail
14. T8 Lead Screw
15. Blue Flexible Coupling
16. 3.5” Color Touch Screen
17. Hot Bed Support
18. Chassis Cooling Fan
19. Power Switch

PARTS LIST

1
Machine Bottom X 1

2
Machine Roof X 1

3
Extrusion Head Kit X 1

4
BMG Extruder Bag M4*8 X 1

5
Hot Bed Platform Support X 2

6
Hot Bed X 1

7
Hot Bed Glass X 1

8
Hot Bed Leveling Screw Bag X 4

9
2040 Profile X 4

10
2020 Profile X 2

11
Z-axis Mount X 2

12
T8 Lead Screw X 2

13
Z-axis Limit Switch Package M4*8 X 2

14
Profile Fixed Corner Bag M4*8 X 4

15
Filament rack package M4*8 X 1

16
Rubber Foot Bag M4*12 X 4

17
M5*30 X 4

18
M3*6 X 8

19
M5*10 X 22

20
M5*16 X 18

21
Material Detection Kit X 1

22
USB Data Cable X 1

23
AC Power Cable X 1
(For local specifications)

24
Filament X 1
(Random Color)

25
Tool Bag X 1
(With TF card and information files)

MACHINE PARAMETERS

BASIC PARAMETERS	
Model： Sapphire PLUS	**XY axis positioning Accuracy：** ±0.01mm
Colour： Black	**Z axis positioning Accuracy：** ±0.01mm
Machine material： Sheet Metal	**Print material：** PLA, ABS, PETG Wooden Filament
Number of nozzles： 1	**Filament diameter：** 1.75mm
Nozzle diameter： 0.4mm	**Operating language：** EN, RU, ES, FR, DE KR, ZH-CN
Hot bed size： 310*310mm	**Software format：** STL, OBJ, JPG
Print size: L300*W300*H330mm	**Print file format：** G-code
Printing accuracy： ±0.1mm	**Machine size：** L485*W460*H590mm
Layer thickness： 0.1-0.4mm	**Package size：** L620*W520*H240mm
Printing method： TF Card / Online Printing(PC)	**Machine weight：** 18kg
Display： 3.5" Color touch screen	**Package weight：** 20kg
Recommended speed： 60mm/s	**Power parameter：** 220V/110V 360W
Printing speed： MAX: 200mm/s	**Operating system：** Windows, MAC
Extrusion head Temperature (MAX)： 260 ° C	**Support software：** Cura, 3DPrinterOS, Repetier-Host and other slicing software
Hot bed maximum Temperature (MAX)： 100 ° C	**Working environment：** Temperature: 5-40 ° C, humidity: 20-60% RH

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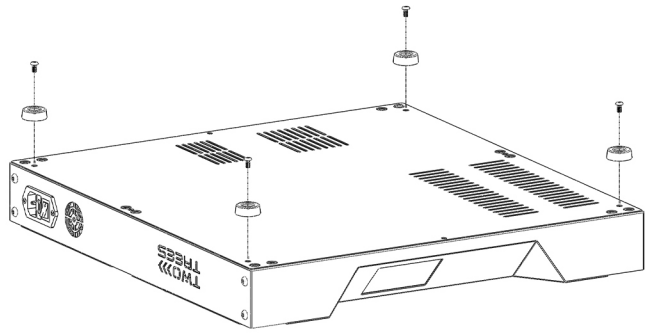
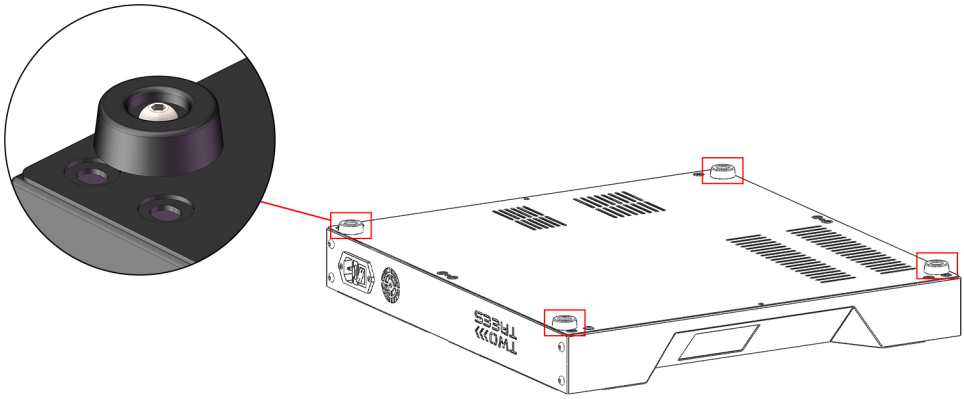
1.Install the Feet

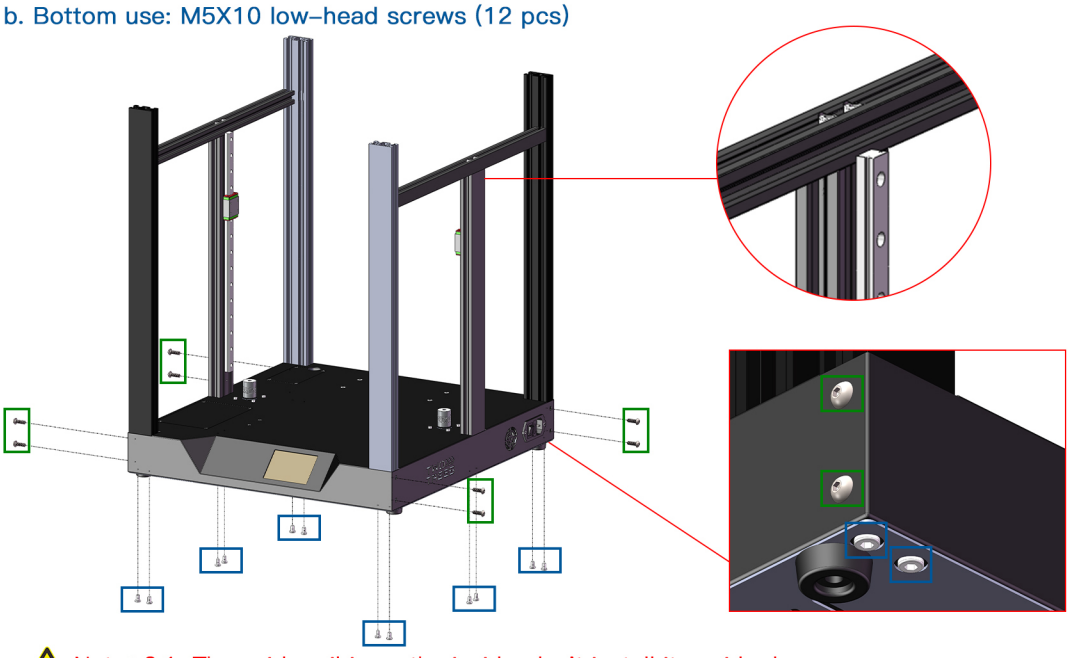
M4x12 screws (4 pcs)
Black foot pads (4 pcs)





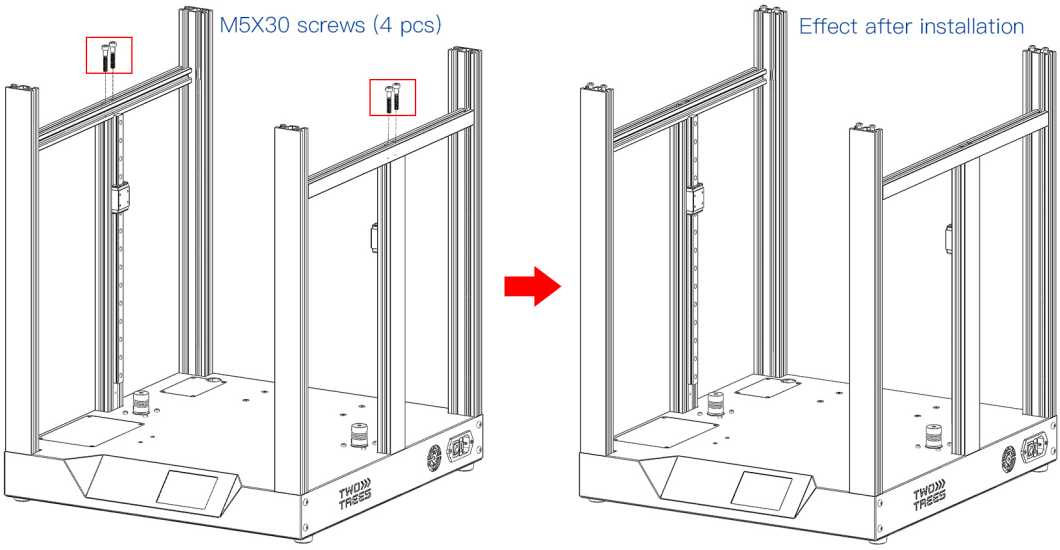
2.Installation Frame

a. Side use: M5X16 round head screws (8 pcs)
b. Bottom use: M5X10 low-head screws (12 pcs)



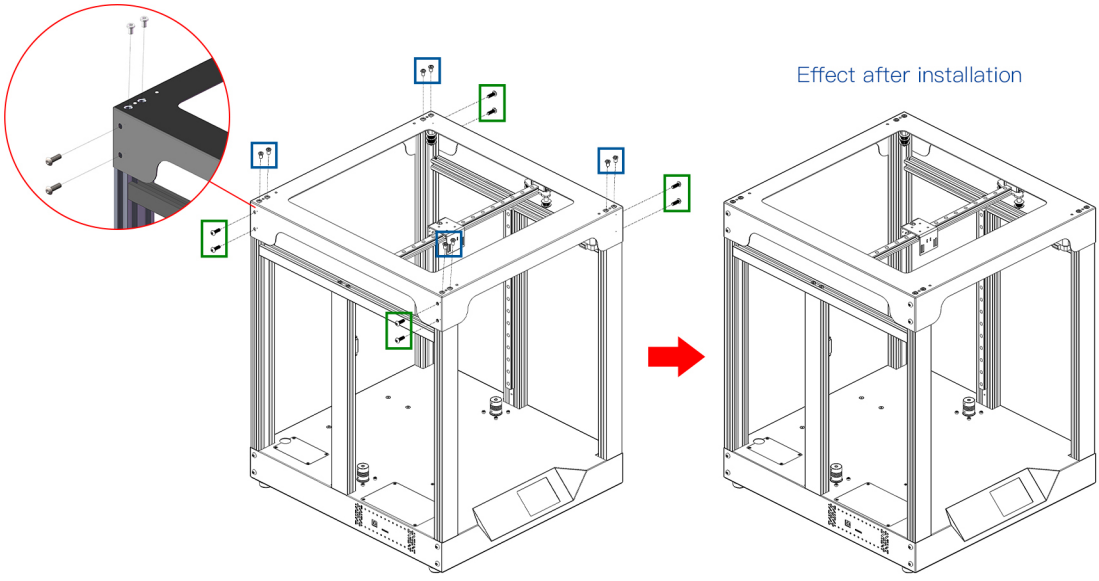
⚠ Note: 3.1. The guide rail is on the inside, don't install it upside down,
3.2. The slider cannot be separated from the guide rail to avoid damage;

3. Install the Frame Beam



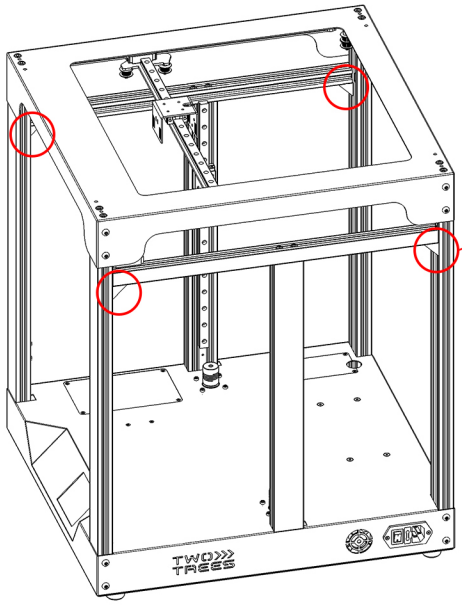
4. Install the Top Frame

Side use: M5X16 round head screws (8 pcs)
Top use: M5X10 low head screws (8 pcs)

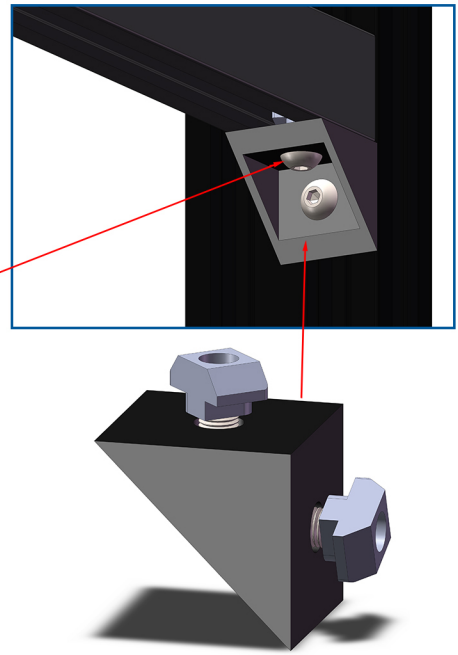


5. Install the Set Square

Use: M4x8 screws (8 pcs)
T nut (8 pcs)



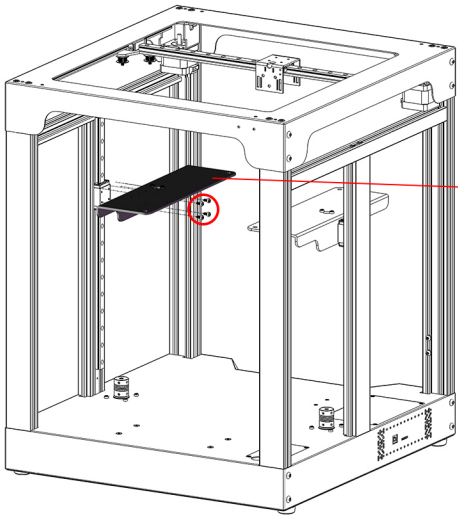
Effect after installation



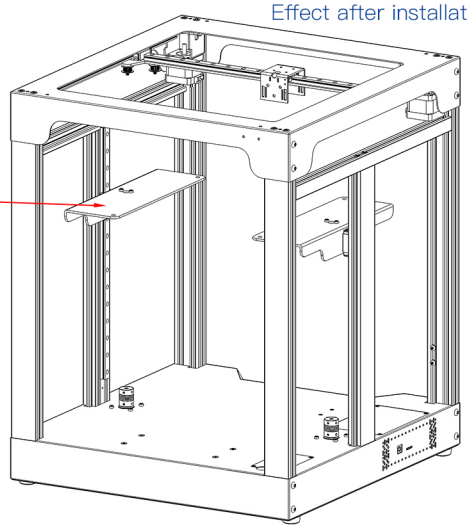
⚠ Note: Before tightening the screws, control the four profiles in a plane to avoid distortion.

6. Install the Hot Bed Support

Use: M3x6 Screws (8 pcs)
Hot bed support (2 pieces)
Fix it on the sliders on both sides, and keep it horizontal and not skewed;



Effect after installation

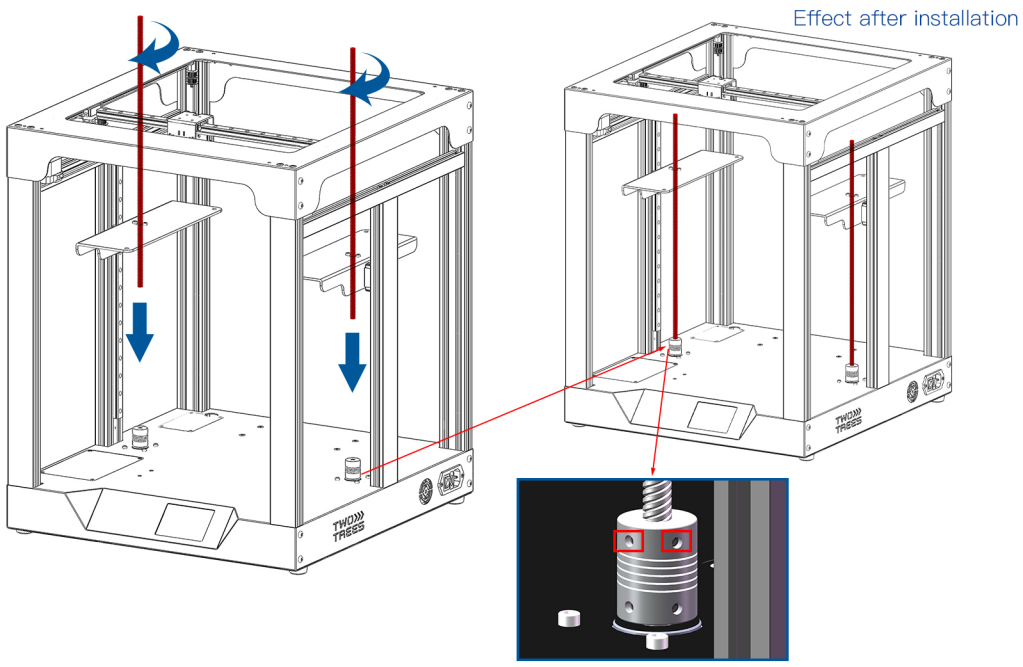


⚠ Note: 6.1 The slider cannot be separated from the guide rail to avoid damage;
6.2 Do not tighten this position too tightly. When testing the smoothness of the Z-axis movement, you may need to adjust the installation position of this step;

7. Install the Screw

Use: 8 lead Screw (2)

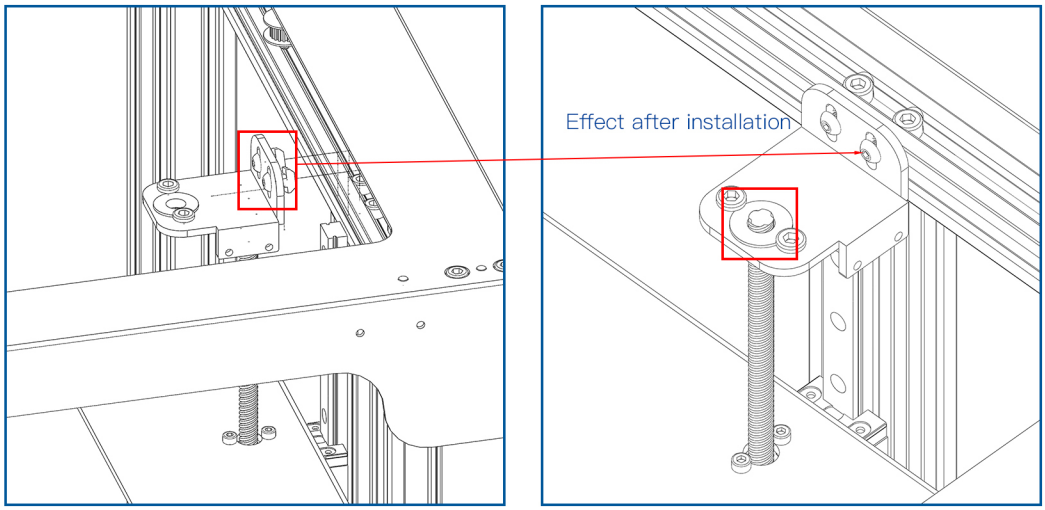
Insert the bottom coupling and contact with the motor shaft;Tighten the screws on the coupling to ensure that the screw rod can be linked with the motor;



8. Install the Top Frame

Use: M4x8 Screws (4 pcs), T nut (4 pcs)

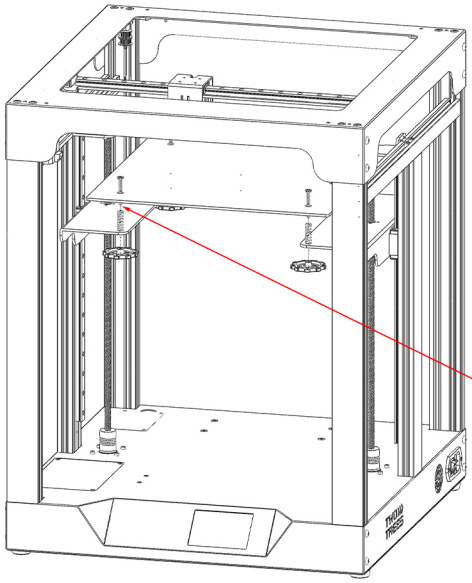
Fixed position: the bearing position is slightly lower than the end face of the screw rod;
The bent side of the bracket is behind;

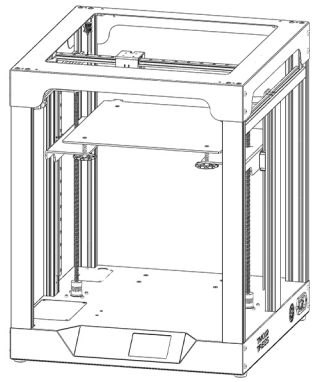


⚠ Note: Do not tighten this position too tightly. When testing the smoothness of the Z-axis movement, you may need to adjust the installation position of this step.

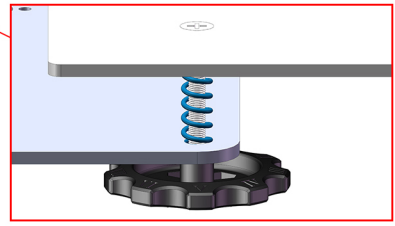
9. Install Hot Bed

Use: M4x40 Screws (4 pcs), Spring (4 pcs), Finger screw nuts (4 pcs)
After screwing on, the spring is slightly pre-tightened, the hot bed does not shake, and the four corners can be balanced;Do not tighten too much, improper operation may cause deformation of the hot bed;



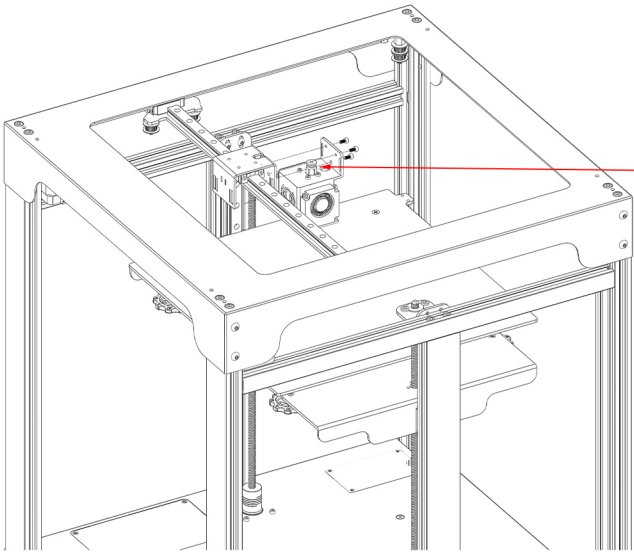


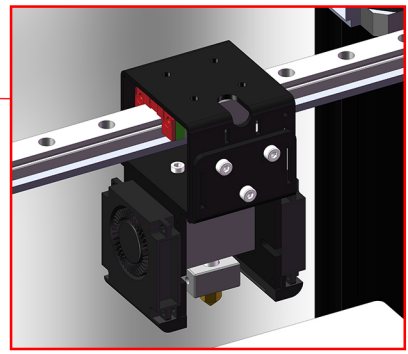
Effect after installation



10. Install the Extrusion Head

Use: M4x8 Screws (3 pcs)
The fan opening faces the front;

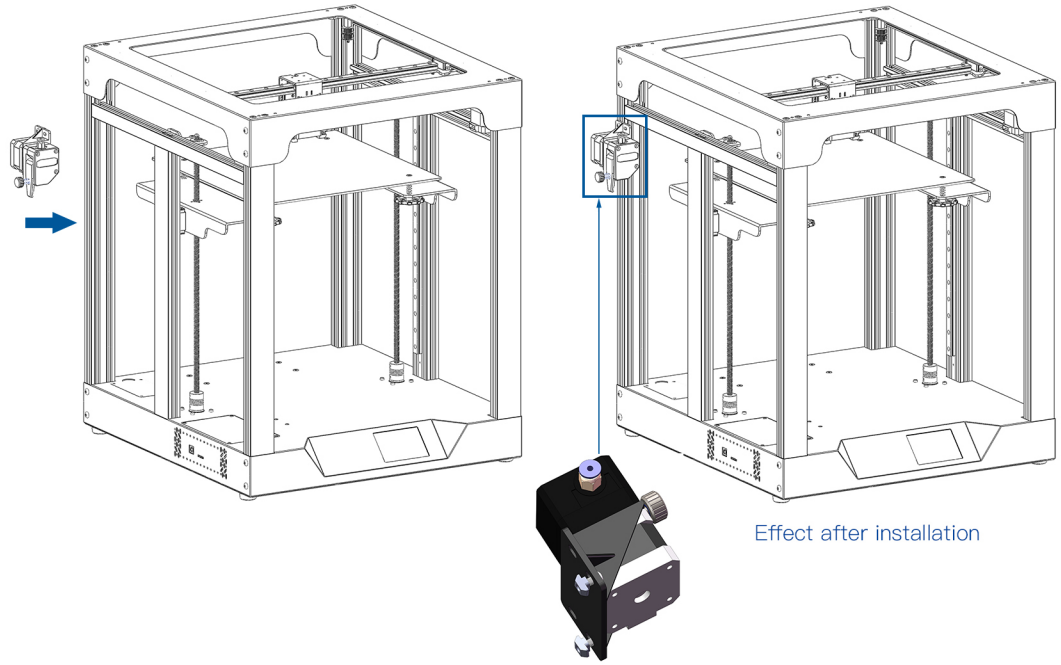




Effect after installation

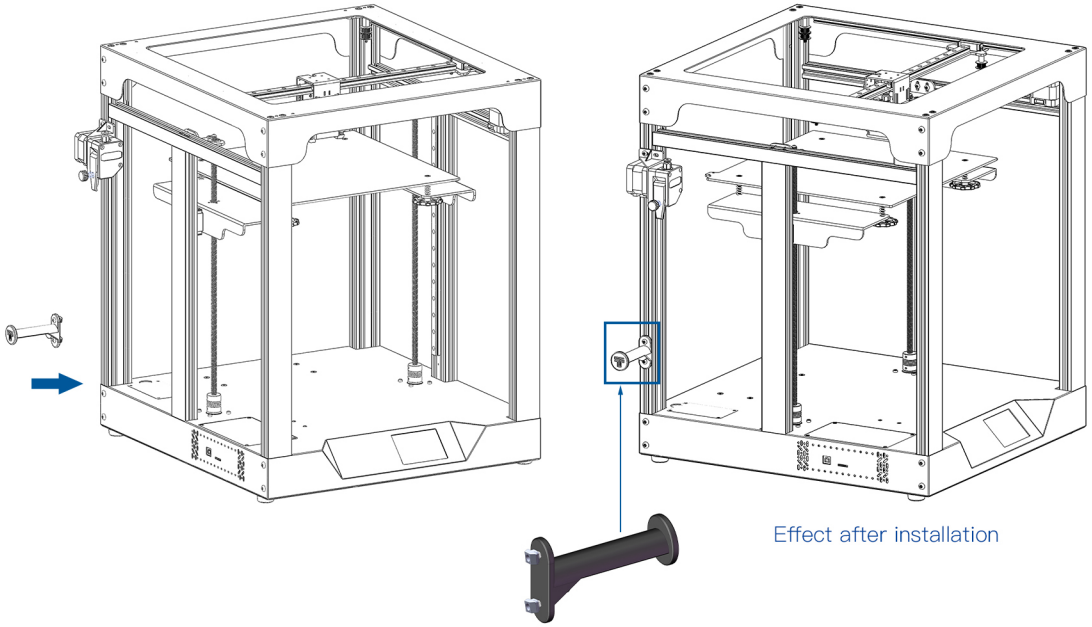
11. Install the Extruder

Use: M4x8 Screws (2 pcs)
T nut (2 pcs)



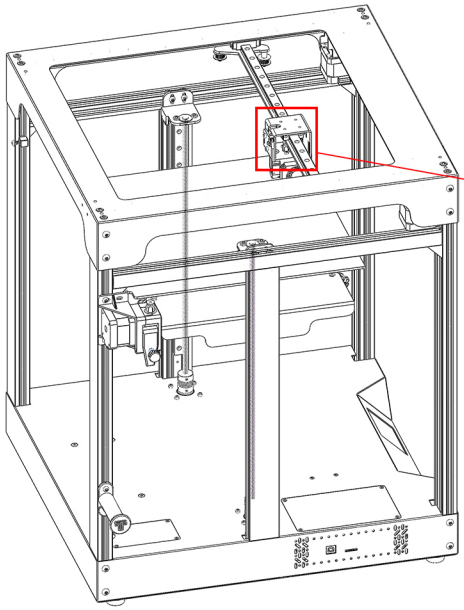
12. Install the Rack

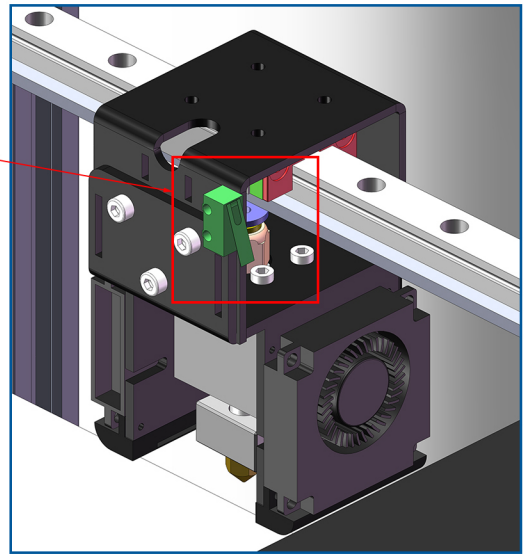
Use: M4x8 Screws (2 pcs)
T nut (2 pcs)



13. Install X Limit Switch

Use: M2x10 Screws (2 pcs)
X Limit Switch (1pcs)

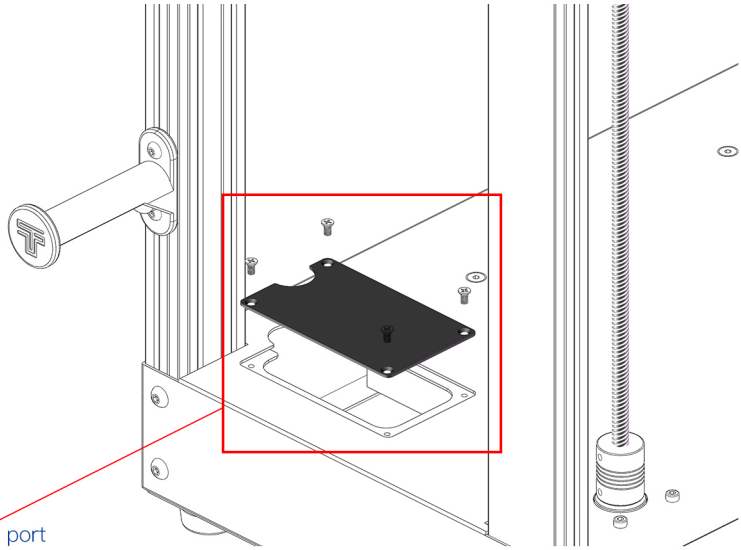




Effect after installation

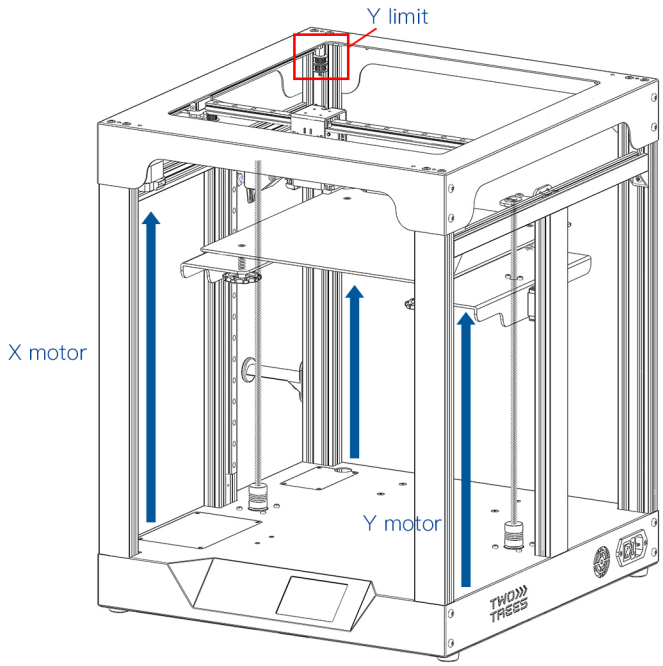
14. Wiring Position

Remove M3X4 screws and open the cover to complete the patch cord.



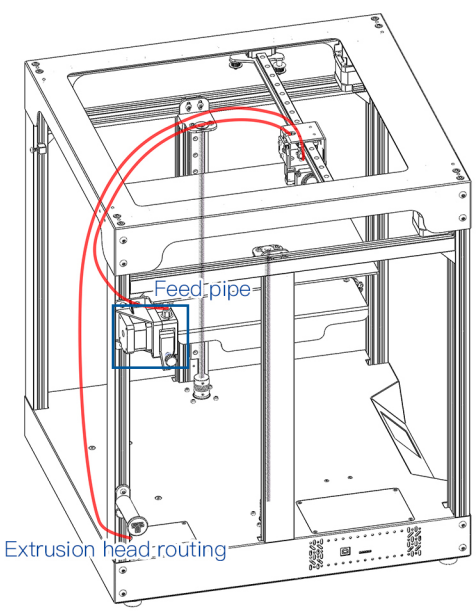
15. X Axis motor, Y Axis motor, Y limit Wiring

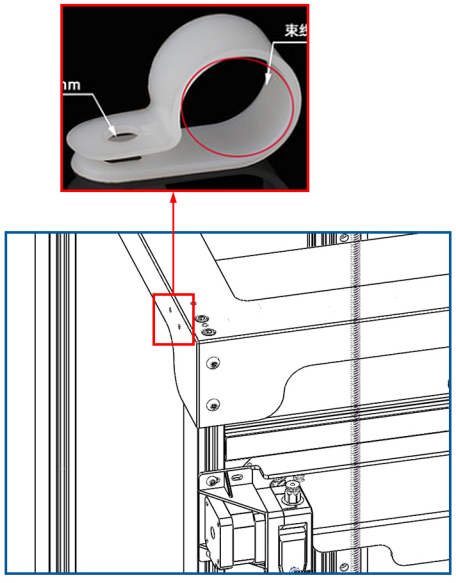
The wiring goes up along the profile groove, hidden inside the groove, and fastened with a plastic cover strip.



16. Fixed Extrusion Head and Feed Tube

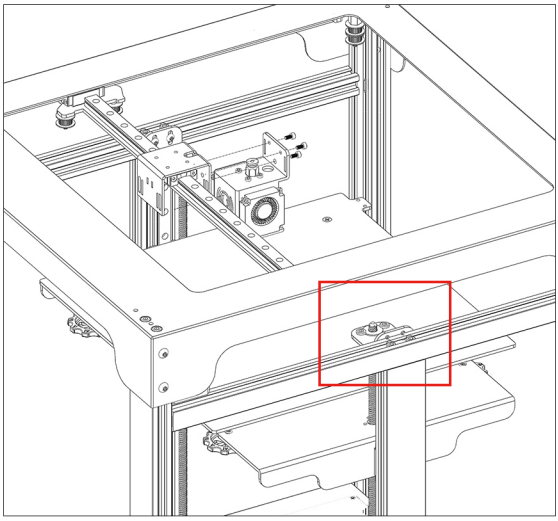
Use wire clamps (1 pcs) and M4X8 screws (1 pcs) to fix the wires and tubes on the back of the machine,





17. Install Z axis limit switch

Use: M3X12 screw (2PCS) Z axis limit switch (1PCS)



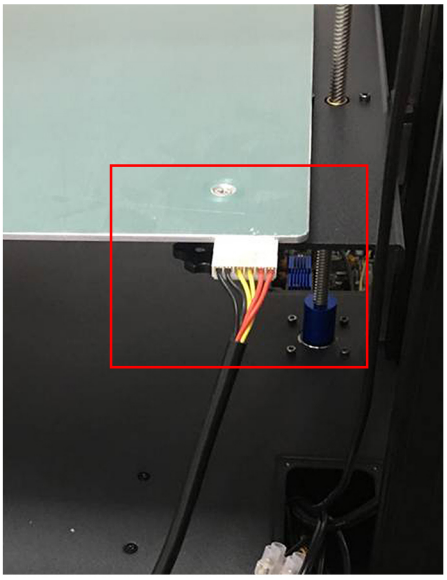
Effect after installation

18. Connect the E-axis Motor Cable and Detect Material Dreakage

a. Insert the E-axis motor wire into the installed extrusion motor
b. After the consumables are hung on the material rack, the consumables pass through the material break detection switch and are directly put into the extruder and hung on it. It is best to insert the 3P terminal wire with E mark into the material break detection switch

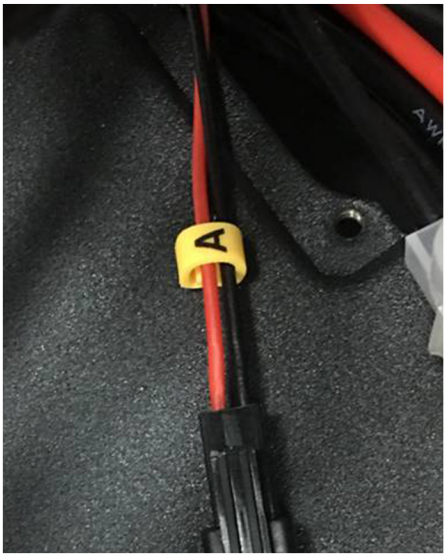
19. Connect the Hot Bed Line and Y Axis Motor Line

a. The hot bed line is directly inserted into the printing platform (hot bed)
b. Connect the Y-axis limit switch line with the Y-axis limit switch line and then fix it on the profile.



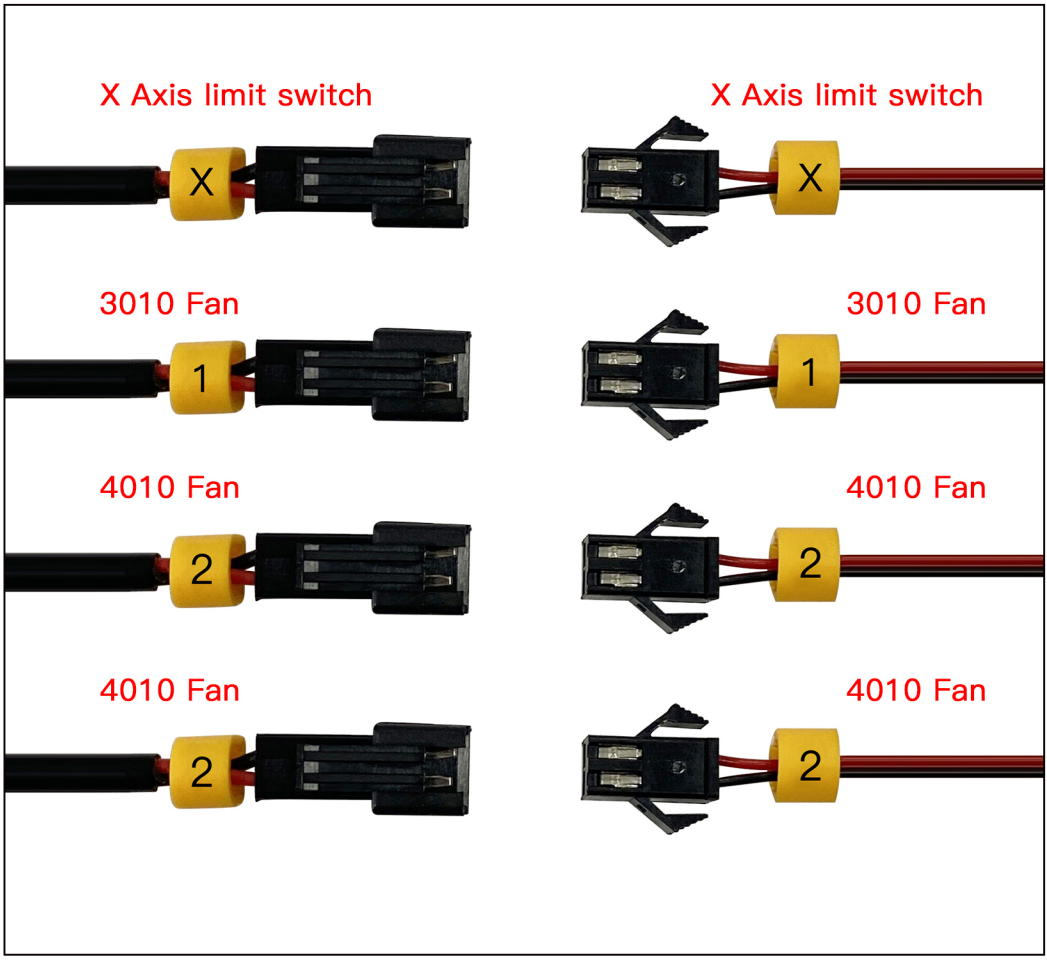
20. Connect the Thermistor Wire and Heating Rod

a. Line A is the thermal transfer cable of the nozzle. Connect the thermistor wire (white wire) of the nozzle to this wire.
b. The heating rod is connected to the black and red wire (this wire is not positive or negative) and tighten the screws



21. Connect the Dan Wire and the X Axis Limit Switch Wire

1 and 2 are both fan wires (there are 2 no. 2 wires are model cooling fan wires) plug in the wires according to the corresponding numbers.



X-axis limit switch line is inserted into the X-axis limit switch line
(X-axis is on the top carriage)

23. Seal the Wiring Cover

Hide the adapter cable into the printer case and screw the cross M3*6 screw

ROBIN NANO
TYPE OF ERROR AND SOLUTION

ERR1: The hot bed exceeds the maximum temperature limit,please check whether the thermal interface is shorted;

ERR2: The nozzle exceeds the maximum temperature limit,please check whether the thermal interface is shorted;

ERR3: The hot bed exceeds the minimum temperature limit,please check whether the thermal interface is disconnected;

ERR4: The nozzle exceeds the minimum temperature limit,please check whether the thermal interface is disconnected;

ERR5: The heating of the nozzle fails. If the nozzle does not reach the set temperature difference within the set time,
an error will be reported; please check the configuration file settings or check whether the power supply is sufficient;

ERR6: The heating of the heating bed fails. If the heating bed reaches the set temperature difference within the set
time, an error will be reported; please check the configurationfile settings or check whether the power supply is sufficient;

ERR7: Thermal runaway; when the temperature reaches the target temperature, the current temperature is lower than the target temperature value within the set time and exceeds the set temperature, an error will be reported; please check whether the thermal sensitivity is normal or whether the PID value is appropriate.

FAQ CATALOG

(Summary of Question&Answer)

1. Q&A of Screen ---------- 10

2. Q&A of Motor ---------- 11

3. Q&A of SD Card ---------- 12

4. Q&A of Extruder ---------- 13

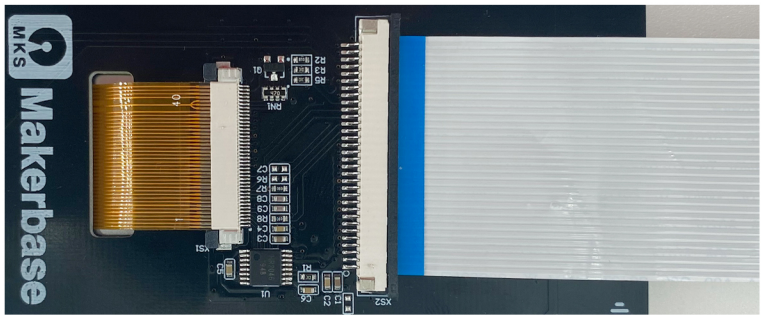
5. Q&A of Heat Bed ---------- 14

6. Q&A of Printing ---------- 14

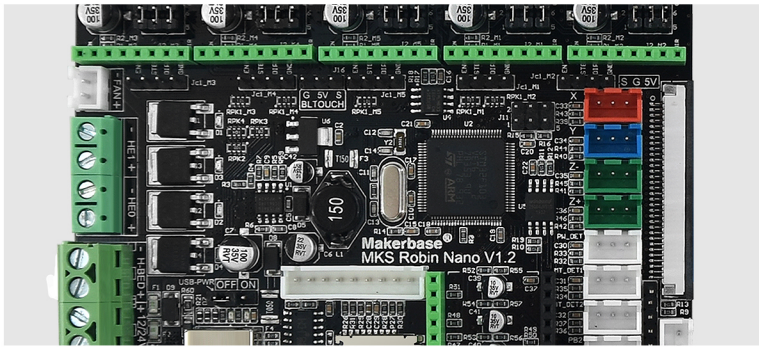
1. Q&A of Screen

1.1 When the screen turns white : 1. pls check if the screen cable is loose and re-tighten.

1.2 (Place of screen connection)



(Place of motherboard connection)



1.3 The screen line is loose: There will be a vibration during the transportation of the machine.The vibration may cause the wire plug inside the machine to loosen and cause poor contact or no contact. At this time, the screen of the machine will turn white and not work properly.Pls check if the line have problems firstly.

1.4 Motherboard or screen problem: If there is no problem with the screen line,then there is a problem with the motherboard or the screen. If there are multiple machines, you can replace the "bad" with a normally displayed screen. if the good screen can be displayed normally, it is a problem with the original screen,if not, there is a problem with the mother-board. If you encounter this problem,youcan contact the after-sales customer service.

1.5 Pls make sure if there is any high frequency interference nearby? High frequency interference will cause the screen to be white.

2. Q&A of Motor

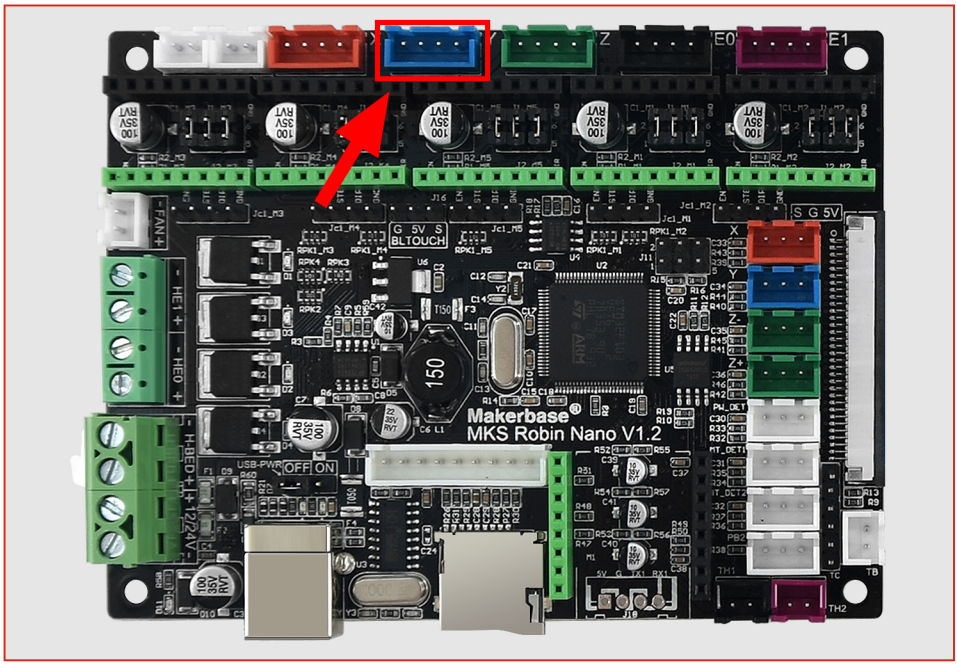
If the motor has a jitter fault, or there is no response after plugging in the power.

2.1 First check whether the motor wire and the motor terminal or the motherboard port are firmly connected. if there is looseness or poor contact,and the power can be tested afterre-plugging.

2.2 Exchange the positions of the motors . If there is no response after re-plugging, the problematic motor and the normal motor can be exchanged at the motherboard port for testing. After the test, the motor fault is judged. (A.Motor line Problem B. Drive problem C. Motor problem)

A. Motor line problem: After confirming that the motor is ok, please exchange positions of the problematic line on the main board and the motor with the motor line that has no problem,and then test it. If there is no problem, then it is the problem of the motor line. If it still doesn't work, pls check the driver.

Note: Adjust the motor wiring on the main board. As shown in the figure, if it is Y-axis jitter,you can exchange the bad motor line and the good motor line (Y/XZ/E-axis motor line are ok) ports. At the same time, it is necessary to match the motor line to the corresponding motor. After power-on, test it by testing the function of the moving shaft.



B. Drive problem: Under the premise of confirming that the motor and the motor line are no problem, check the motor drive again. There may be a problem with the drive and a new drive needs to be replaced.

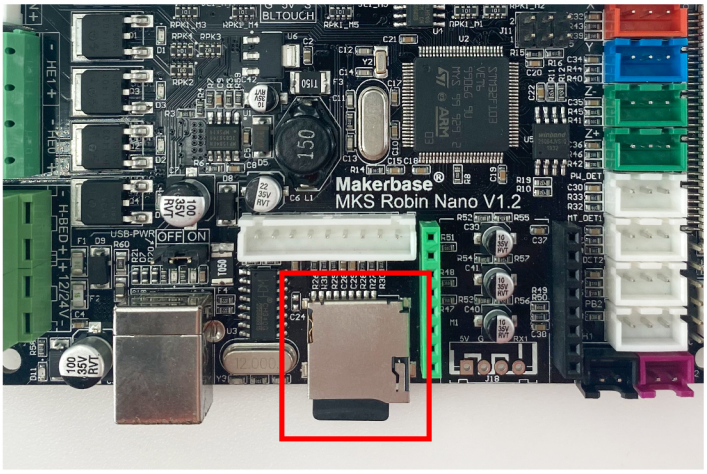
3. Q&A of SD Card

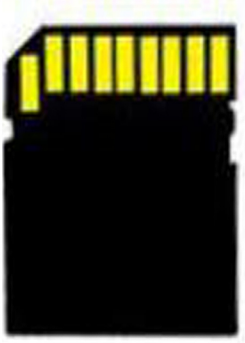
The card slot does not read the card and check if the SD card is broken

4.1 SD card problem: How to determine if there is any problem with the SD card,first check whether the card can be used normally on the computer. If the SD card can be used normally on the computer, first save the file to the computer and format the card at the same time.After the card is put on the machine and tested, if it is not recognized after the power-ontest, it proves that the SD card has a problem and needs to be replaced.

4.2 Check if the card slot is loose

Card slot problem: Long-term use of the card slot may cause the card holder to shake, resulting in poor card reading, and need to replace the new card holder to solve the problem. Sometimes the card may be inserted into the card for a moment and then suddenly no response. You can quickly plug in and out several times and then try to plug in after turning off the power, then take some alcohol to clean it on the card, then insert the card into the card slot, and then insert it several times to see if it can be used normally after cleaning.





SD Card

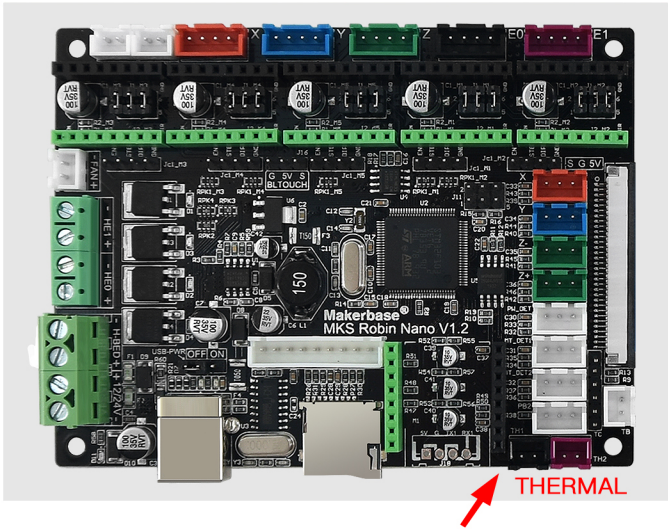
4.3 SD card chip oxidation, you can try to apply a little alcohol on the SD card,and then insert the card into the card slot, insert a few more times, see if it can be used normally after cleaning.

4. Q&A of Extruder

3.1 The motor of the extruder does not work. It may be damaged by the motor or the motor is poorly connected. It is necessary to check the fault and then go on the power-on test.

3.2 It is difficult to extrude the material after heating, and the nozzle is clogged and the discharge is abnormal. It is necessary to replace the nozzle or use the cleaning needle to clean the residual material of the nozzle to ensure the smooth flow of the nozzle.

3.3 The nozzle temperature is abnormally heated, which may be caused by damage to the thermistor of the hot bed. The normal display temperature is about plus or minus 2 degrees of the set temperature. You can check whether the thermistor on the heating block is off or the connection port of the main board is not well connected.

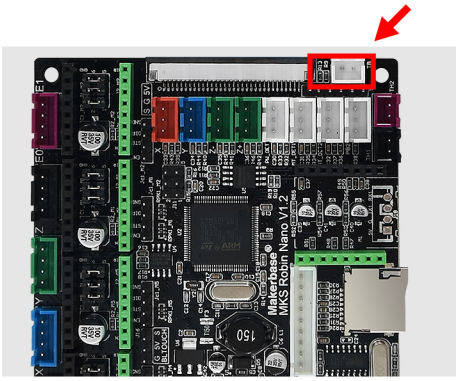


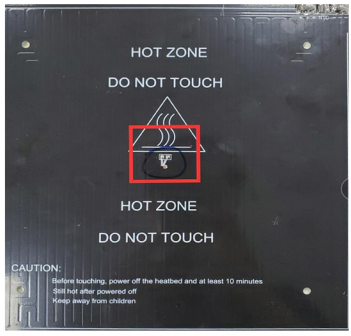
3.4 Q&A of Motherboard

If the new heating kit is replaced and it does not heat properly, it may be a motherboard problem. First check the heating tube line. If it is not possible, you can test the output voltage of the two ports of the motherboard heating tube. Normally, it is 24v. If there is no output voltage, it may be a problem with the motherboard. At this time, you need to repair the motherboard to solve the problem.

5. Q&A of Heat Bed

5.1 The temperature of the hot bed is abnormal, which may be caused by the damage of the thermistor of the hot bed. The normal display temperature is about plus or minus 2 degrees of the set temperature. You can check whether the thermistor on the hot bed is off or the connection port of the main board is not in good contact. as the picture shows.





6. Q&A of Printing

6.1 Misprint

A. The drive heat sink is not attached – paste the heat sink to the drive
B. Motor drive overheating – keep the drive's heat dissipation good
C. Motor drive current is too large – readjust the appropriate drive current
D. Motor synchronous wheel is not fixed – retighten the synchronous wheel
E. Optical axis Slider Screw stuck – Manually adjust to a smooth position afteroiling
F. X Y–axis belt is too slack – re–adjust the belt tension

6.2 X Y Z axis direction cannot be reset

A. Limit switch failure – replace the limit switch
B. Cannot return to zero after printing is complete – wrong axis direction
C. Home and motion speed is too slow – motor drive pulse setting is incorrect,

6.3 Print file is not recognized

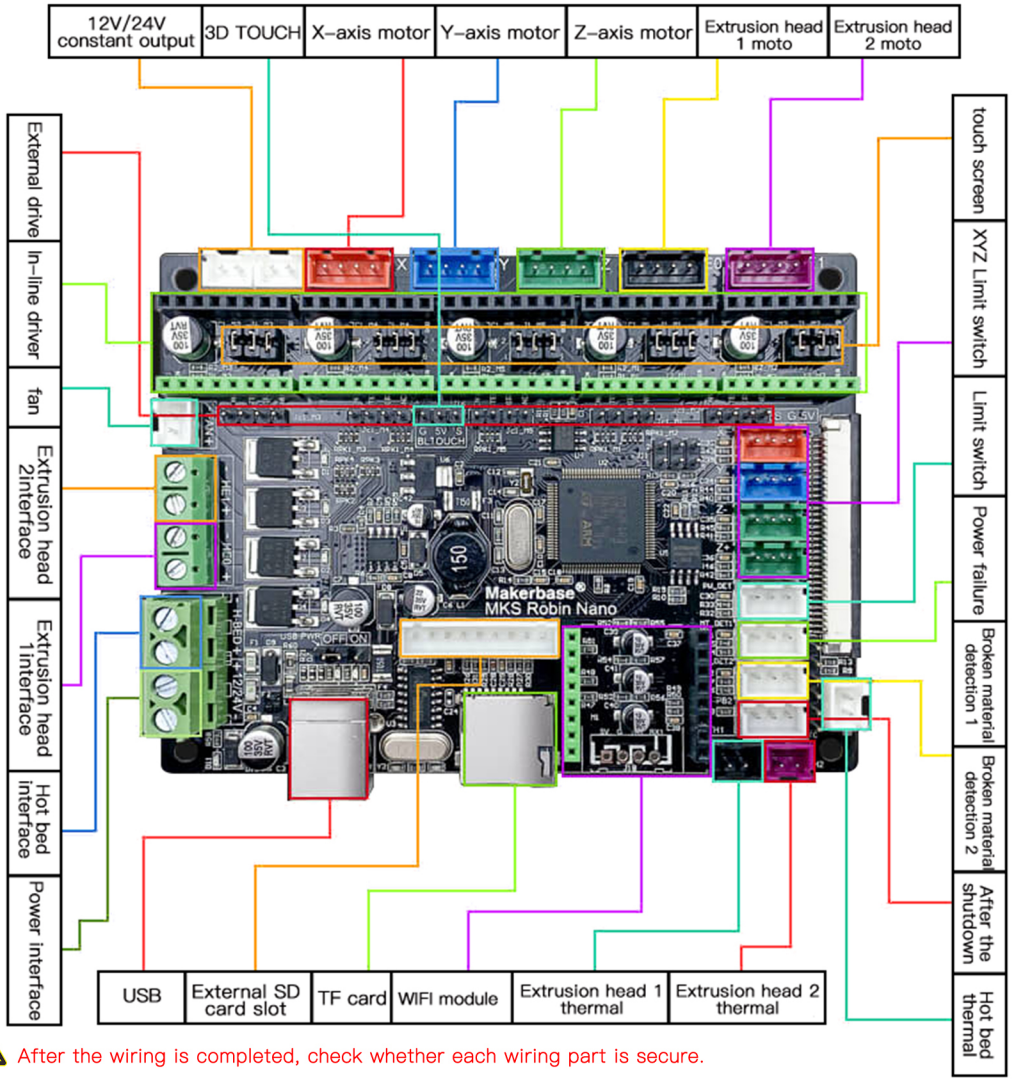
A. The SD file cannot be recognized after the SD card is inserted – the file code is incorrect and the code needs to be renamed.
B. Top printing after half of the print––Slice problem or poor SD card contact

6.4 Printer abnormal sound

A. Fan problem – there may be abnormal noise caused by the fan blade touching the outer casing
B. Structural problems – abnormal operation of the T8 screw and slider causes the sound to be too loud, re–oiling and correcting the direction.
C. Belt problem – abnormal sound caused by belt shedding and misalignment.

MOTHERBOARD INSTALLATION METHOD

1. Connect the hotbed power cord to the "hotbed connector".
2. Connect the hot bed thermistor wire to Hot Bed Heat.
3. Connect the X.Y-Endstop switch cable to the "X.Y limit switch".
4. Connect the Z-Endstop switch cable to the "Z Endstop connector". (Or use automatic induction switch)
5. Connect the X.Y.E motor cable to the "X.Y.E motor".
6. Connect the radiator cooling fan wire to "12V / 24V rated output".
7. Connect the print model cooling fan wires to the Fan Connector.
8. Connect the hot end heating rod to the "Extrusion Head 1 Port".
9. Connect the hot-end thermistor to "Extrusion head 1".
10. Connect the filament sensor to "Break Detection 1".



After the wiring is completed, check whether each wiring part is secure.

DRIVER DESCRIPTION

Drive current algorithm and adjustment

1. Vref measures Gnd and the intermediate voltage of the potentiometer. Turn the potentiometer clockwise to decrease the current and counterclockwise to increase it.
2. Be sure not to connect the motor when measuring the voltage, otherwise it will burn the drive easily.
3. Turn on the power when measuring the voltage, do not just connect the USB power supply.
4. Please pay special attention to the direction, do not insert the reverse.

I=Vref default current I = 1.25A

Default current: 1.25a

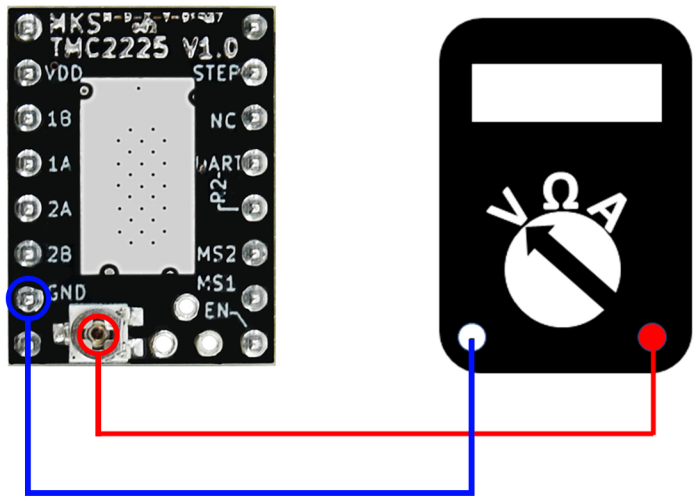
Maximum current: 2.5a

Logic voltage: 3.5v/5v

Input voltage: 5.5v/28v

Breakdown: up to 1/256

Mode: dir/step, uart



AFTER SALES SERVICE

The guarantee period is 12 months from the date of purchase.

1.Missing/Damaged/Defective Parts

a.Within 7 days of the delivery date, we will replace any parts free of charge including shipping fees.

b.After 7 days of the delivery date, we will replace any parts free of charge .But the customer need pay the shipping fees.

2.Customer Damaged Parts : The customer shall pay for the cost of the parts and the shipping fees.

3.Courier company loss, missing,damaged , and defective parts .

a.Claims for lost or damaged shipments must be reported to the carrier within the carrier's claim window,the customer needs to inform us within 7 days of the delivery date.

b.For any parts lost or damaged during shipping, the customer shall take photos or video and send the information to us.

c.Once the Carrier disupute got solved, please provide us with all communications with the carrier. It is the customer's responsi-bility to keep us up to date with ALL communication with the carrier.

d.For Missing Parts,the customer shall fill out a Service Ticket.

e.For Damaged Parts,the customer shall fill out a Service Ticket . and send us the photos or video.

f.If the part is the LCD Panel, Power Supply or Mainboard, the customer shall ship the part back to us and we will send a new part.

If you have any after-sales questions, please contact us as soon as possible and we will reply in time.

Phone: (86) 2398 7110

Website: www.twotrees3dprinter.com

Email: service@twotrees3dprinter.com

Facebook: https://www.facebook.com/groups/twotrees3Dprinter/

Please check other contents in TF

LETTER FROM TWOTREES

Dear Customers:

Thank you for choosing the Sapphire Plus 3D printer.

These operating instructions will guide you through the installation and first use of the Printer.

If you have any problems with the assembly, please contact us via

Facebook: https://www.facebook.com/groups/Bluer3DPrinter/

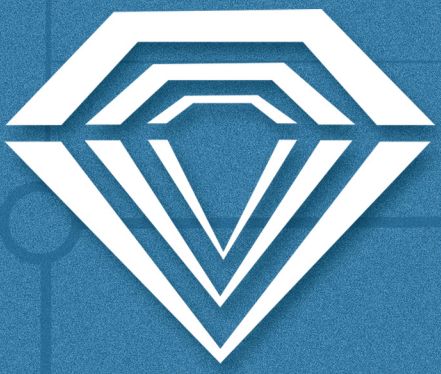
Website: www.twotrees3dprinter.com

Servicemail: service@twotrees3dprinter.com

Our customer service team will contact you within 48 hours.

Sincerely yours

Two Trees team



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