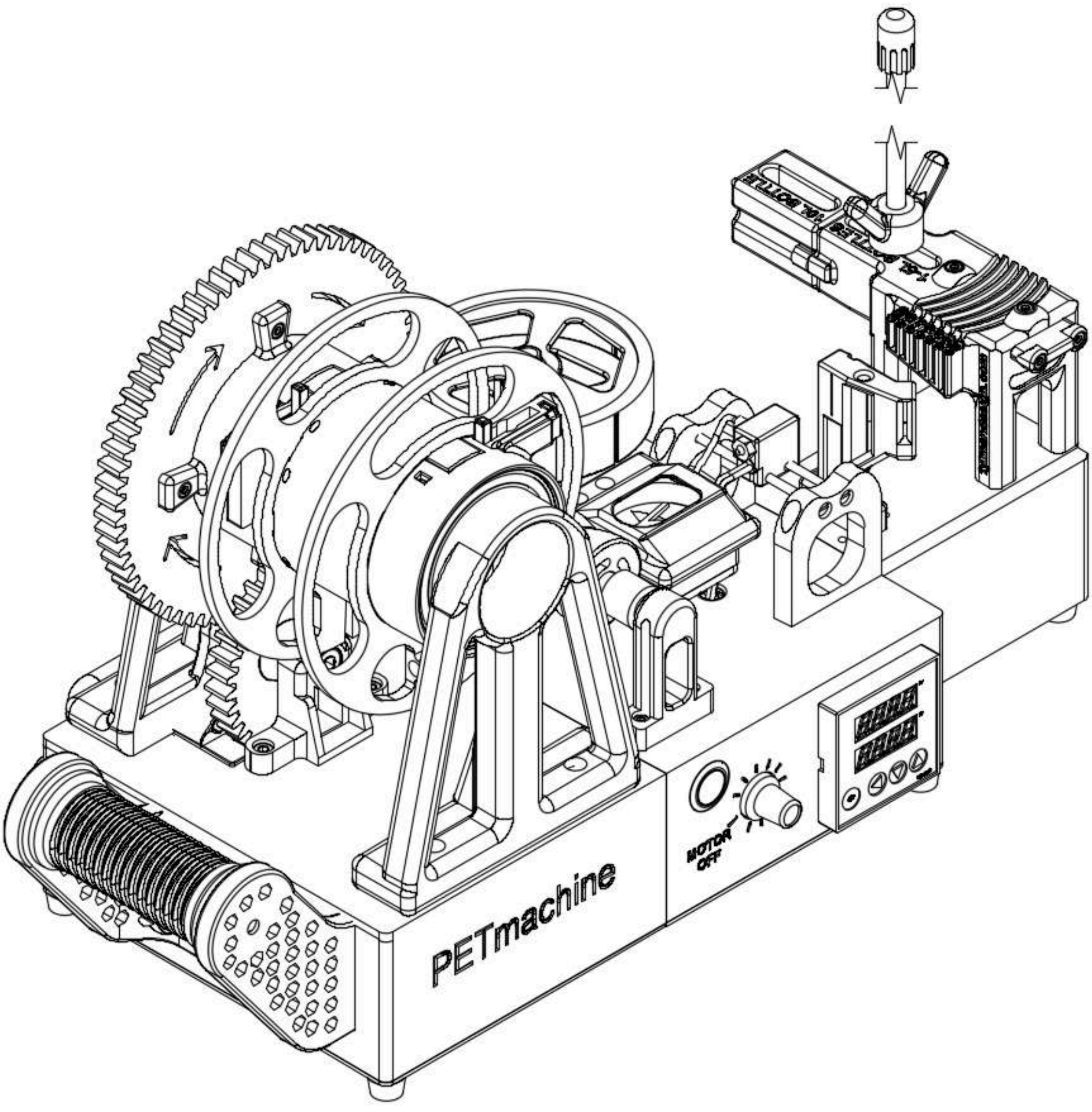
PETmachine
Assembly manual



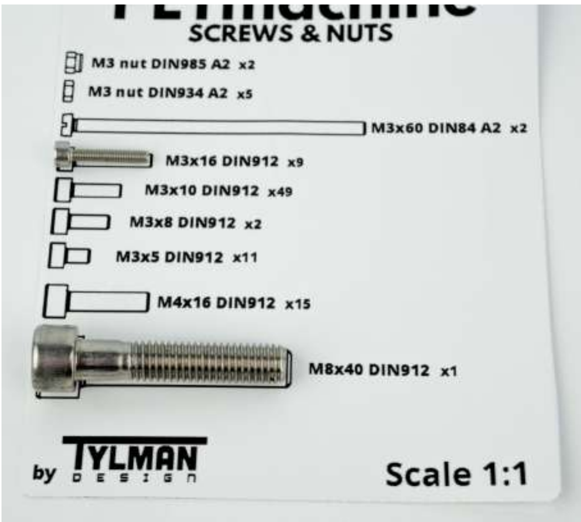
Assembly time: 3-4h

Difficulty: easy+

Disclaimer:

The manufacturer/distributor states that the assembly, connection, and commissioning of the device containing electrical components operating at 110-230VAC should only be performed by individuals with appropriate qualifications and experience in working with electrical devices. However, the assembly manual is written in a beginner- and user-friendly language, providing step-by-step guidance to help you successfully build the PETmachine. Please note that the manufacturer/distributor assumes no liability for damages resulting from assembly or use by individuals without the required qualifications.

1. Introduction



Tools necessary to build the PETmachine

i Wire crimping is **not** required

i Soldering is **not** required

- Allen key set (included in the **PETmachine® kit**):

- Screwdrivers:
    - Small flat screwdriver
    - PH1 crosshead screwdriver

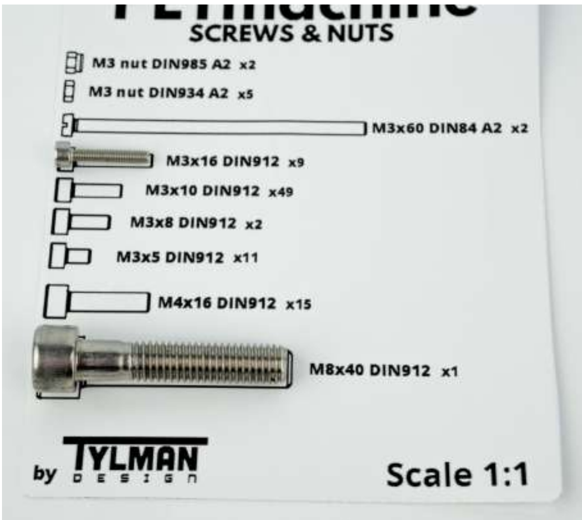
- Caliper (to check a plastic bottle wall thickness):

Use labels/pdf documents for reference

i The **PETmachine® kit** includes labels/documents with reference shown below.

i You can find all the parts lists with references in the folder called “Parts references”.

i You can use these labels/documents to identify the parts.



⚠Please don’t change printing scale of these documents, otherwise it won’t work!

1.Introduction

Spare parts (just with the PETmachine® kit)

i Pay attention that some bolts/nuts are packed more than needed as a spare, so don't be afraid that some of them will remain unused after building the machine!

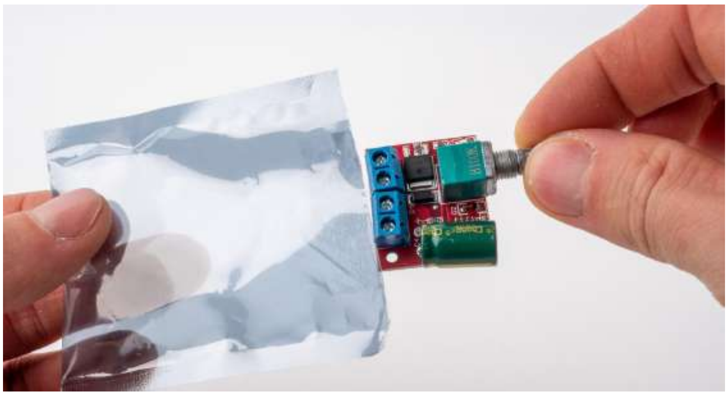
Support

iPictures in this document have high resolution, you can zoom it in to see everything better.

- In a “User guide” you can find a troubleshooting chapter that will help you to solve most of your problems when using/building the **PETmachine®** (We will update it all the time).

- We are always happy to help you, feel free to contact us:
  - writing an email to support@tylmandesign.com
  - using our Discord channel https://discord.gg/W8FmaCXm6V

Warning: Electronics



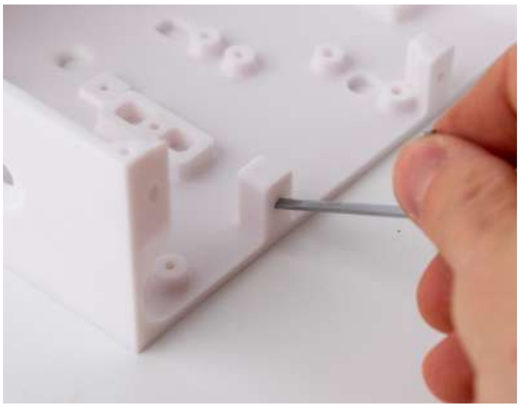
⚠ WARNING: Handle electronic components with care to prevent electrostatic discharge (ESD) damage.

- Don’t touch electronics unnecessarily with your fingers.

- Keep the electronics inside the ESD bag and open it just before you need it.

Tip: Inserting the bolts

iIf you have difficulty screwing the bolts into a hole to create a thread, use a 2.5mm Allen key (for an M3 bolt hole) or 3mm allen key (for M4 bolt hole) push it and twist to enlarge the holes (check pictures below).




Print model “TEST.stl” first


⚠ This print helps us to check accuracy of our printer and choose proper size for the “motor_gear.stl” and “guiding_roller_rod.stl” components. On the top and the bottom surface of the “TEST.stl” are visible numbers representing the size number of the “motor_gear.stl” or “guiding_roller_rod.stl” that we have to print.
In the holes we have to fit the motor shaft, it should be maximally tight but not stuck. Rods are for 608 bearing, fit should be more loose, but still a little bit tight.

2. Push button - installation

Tools necessary for this chapter

- Long-nose pliers.

Parts necessary for this chapter

- Push button.

3D printed parts necessary for this chapter

- housing_A.

STEP 1: Push button installation

- Prepare the push button, install the rubber ring on the button.

⚠ There is a new version of the button, with just 2 pins and orange rubber ring, if you have one, simply continue and follow the instructions, there is no difference with installation and connections compared to the previous version.

- Localize the mounting hole inside the housing_A.

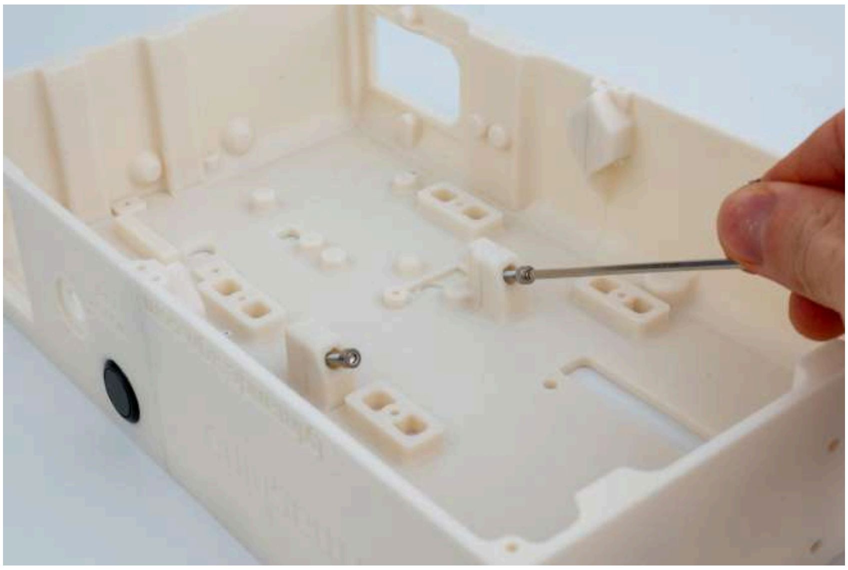
- Pass the push button through the hole and secure it with the nut.

⚠ Make sure the button switch will be tightened in a position as shown in the picture.

2. Push button - installation

- Tighten the nut using pliers.

3. Housing - assembly



Tools necessary for this chapter

- 2.5mm allen key.

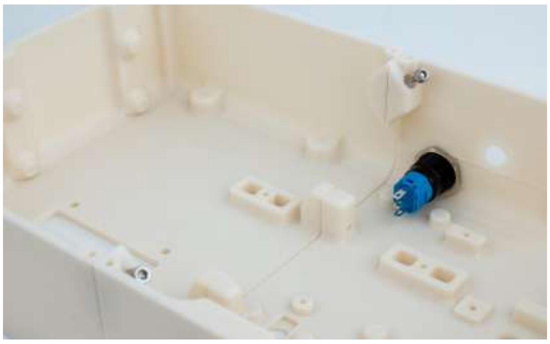
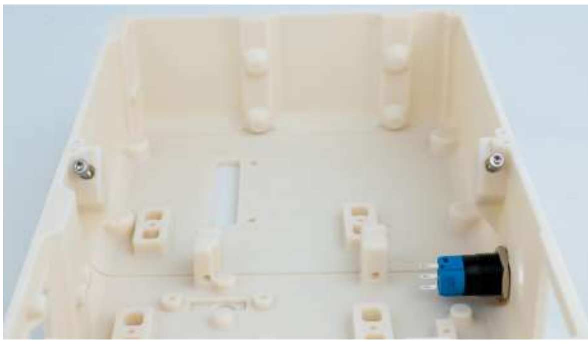
Parts necessary for this chapter

- 4x M3x16 DIN 912 bolt.

3D printed parts necessary for this chapter

- housing_A;
- housing_B.

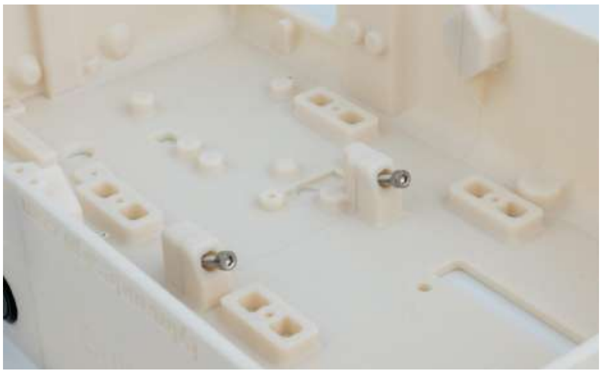
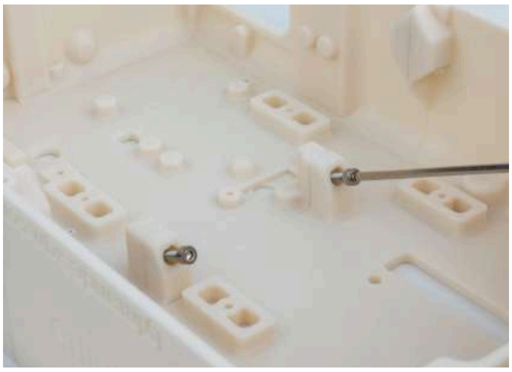
STEP 1: Housing assembly

- Place 2x M3x16 DIN 912 bolt in the sockets shown in the pictures.

- Tighten the bolts.

- Insert 2x M3x16 DIN 912 bolt in the sockets shown in the pictures and tighten.

4. Filament runout sensor - assembly and installation

Tools necessary for this chapter

- allen key 2mm;
- allen key 2.5mm.

Parts necessary for this chapter

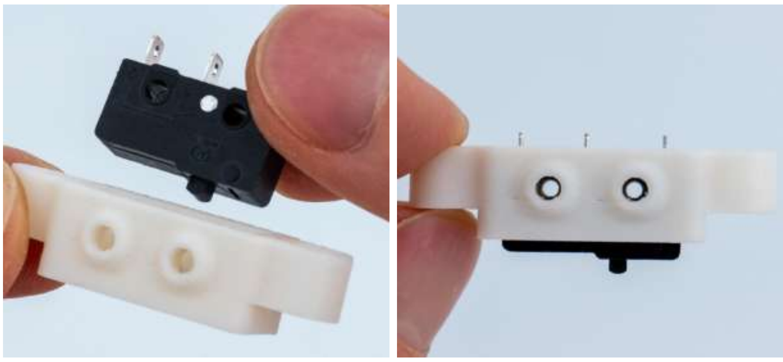
- **endstop switch***;
- **2x M2.5x14 DIN 912 bolt***;
- 3x M3x5 DIN 912 bolt.

*** You can find those in a “PETmachine Bolts & Nuts” zip bag.**

3D printed parts necessary for this chapter

- endstop_case.

STEP 1: Assembly

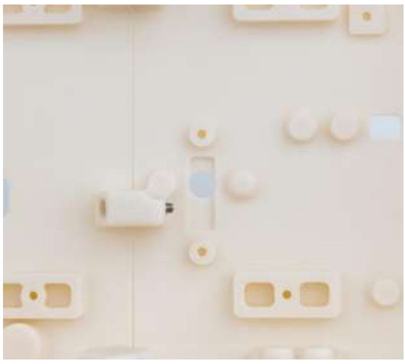


- place the endstop switch inside the endstop_case. Pay attention to the orientation of the endstop switch.

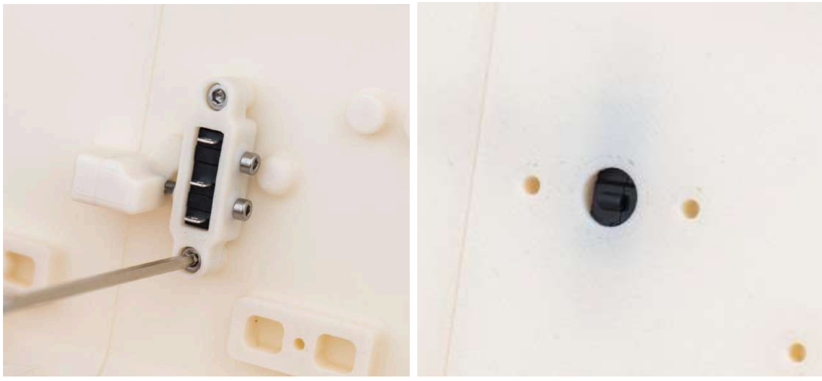
- fix the endstop switch using a 2x M2.5x14 DIN 912 bolt.

⚠ Check on more time if orientation of the bolts and endstop switch are the same as shown in the picture.

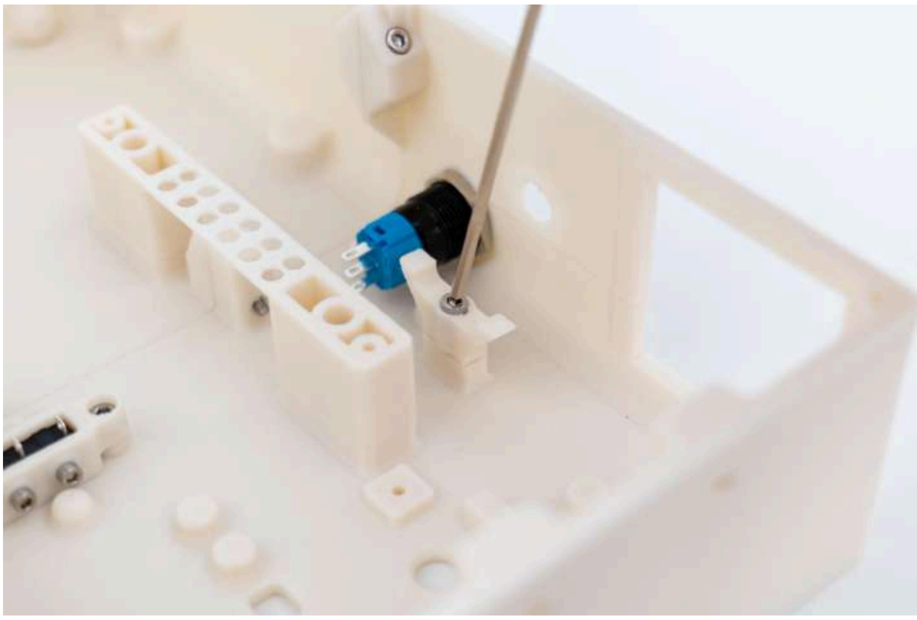
- place 2x M3x5 DIN 912 bolt in the endstop_case slots as shown in the picture, then find the same spot inside the housing (like in the right picture).

STEP 2: Installation



- Place and fix the endstop_case to the housing. Pay attention to the orientation of the component (mainly bolts head).
- Rotate the housing to check if you can see the push button of the endstop switch on the other side of the housing (picture on the right)

5. PWM_controller_support and power_supply_adapter - installation



Tools necessary for this chapter

- allen key 2.5mm.

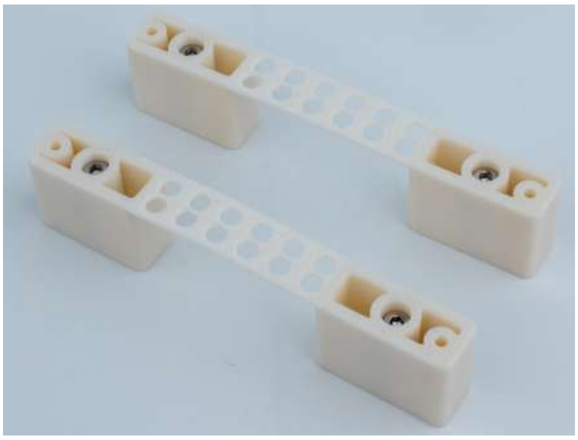
Parts necessary for this chapter

- 5x M3x10 DIN 912 bolt.

3D printed parts necessary for this chapter

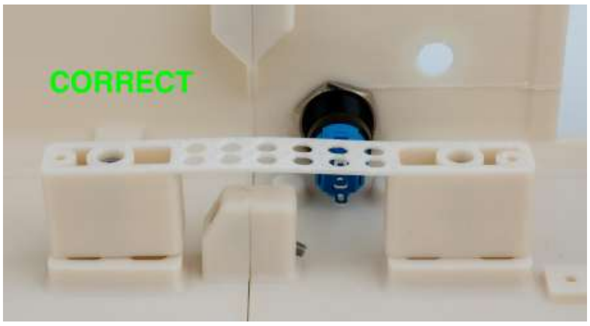
- 2x power_supply_adapter;
- PWM_controller_support.

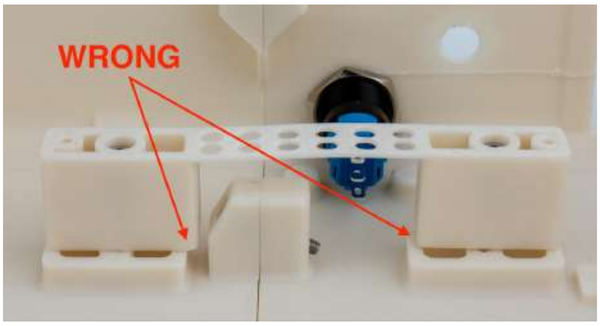
STEP 1: Power_supply_adapter Installation



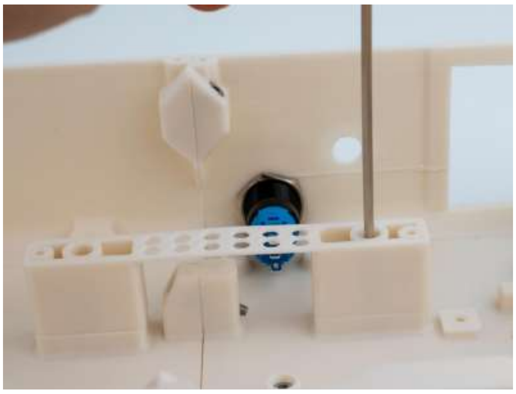
- Insert 4x M3x10 DIN 912 in the 2x power_supply adapter sockets as shown in the picture.

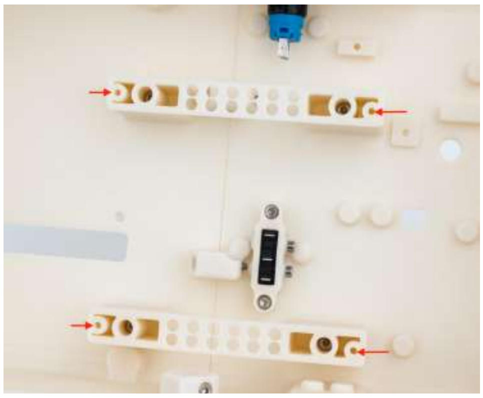
5. PWM_controller_support and power_supply_adapter - installation





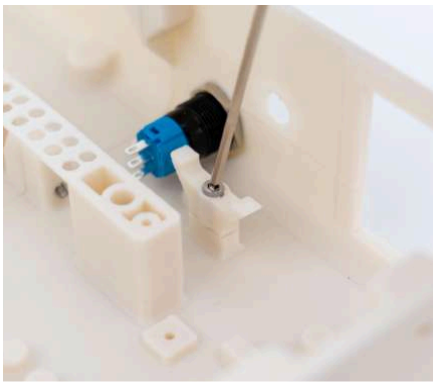
- Place the power_supply_adapter on a dedicated stand in the housing (pay attention to the correct orientation - one “feet” is wider).

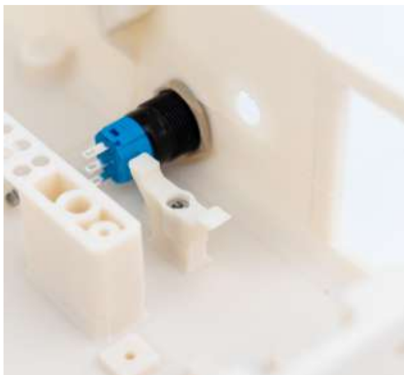




- Tighten the bolts and repeat with the 2nd power_supply_adapter. Check orientation of the parts again (the right picture is a reference).

STEP 2: PWM_controller_support Installation





- Place PWM_controller_support on a dedicated stand in the housing and fix it with an M3x10 DIN 912 bolt. Pay attention to the orientation of the part.

6. Power socket - installation

Tools necessary for this chapter

- allen key 2mm.

Parts necessary for this chapter

- 2x M3x8 DIN 7991 bolt;
- Power socket.

STEP 1: Power socket Installation

- Place the power socket in a dedicated slot in the housing, then fix it using 2x M3x8 DIN 7991 bolt.

7. Gearmotor - assembly and installation

Tools necessary for this chapter

- allen key 2.5mm

Parts necessary for this chapter

- gearmotor;
- 2x M3x5 DIN 912 bolt;
- 1x M3x8 DIN 912 bolt;
- 6x M3x10 DIN 912 bolt;
- 2x M4x16 DIN 912 bolt;
- 1x M3 nylon nut DIN 985.

3D printed parts necessary for this chapter

- motor_gear;
- motor_bracket;
- double_gear_base;
- motor_distancer;
- motor_gear_cover.

STEP 1: Gearmotor assembly

⚠ Remember to use “TEST.stl” file first, make test to check what’s your (x) and then print “motor_gear(x)” and “guiding roller_rod(x)”.

- Place motor_bracket on the gearmotor and fix it using a 6x M3x10 DIN 912 bolt



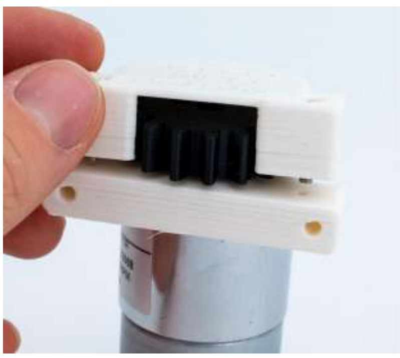
- Place M3 nylon nut in a dedicated motor_gear slot. Pay attention to the nut orientation. Screw M3x8 DIN 912 bolt as shown in the picture, don’t tighten it yet.


- Place the motor_distancer as shown in the picture and install the motor_gear.

- Tighten the M3x8 DIN 912 bolt firmly (you can push the motor_gear down when doing this). Remove motor_distancer

⚠Make sure the bolt is tighten well and bolt's head is hiding inside the socket, otherwise it will collide with other gear later and cause “jamming”.

- Place 2x M3x5 DIN 912 bolt in a motor_gear_cover slots (as shown in the pictures).



- Align bolts placed in a motor_gear_cover with holes in a motor_bracket and tighten them.



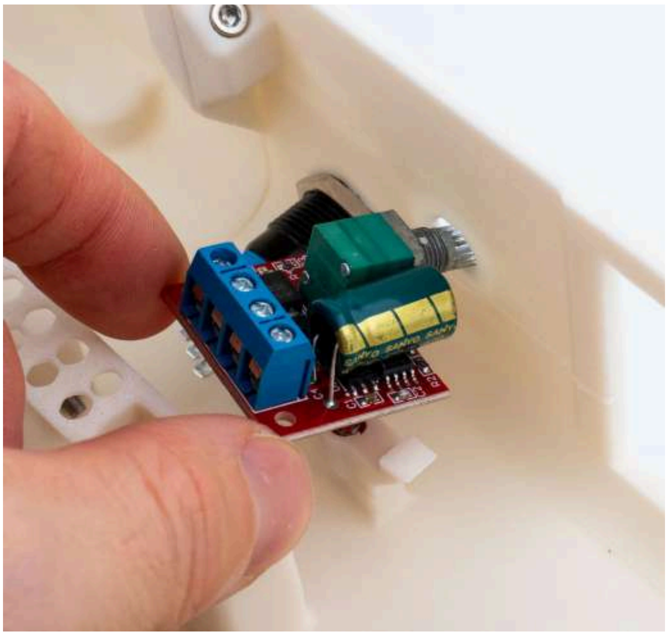
- Pass 2x M4x16 DIN 912 bolt through the double_gear_base holes as shown in the picture. Find a rectangular hole on the top of the housing and install double_gear_base in the near holes.

⚠ Ensure the double_gear_base is correctly positioned. The flat surface should face the rectangular hole.


- Rotate the housing to see the inside (keep the double_gear_base from falling out), then place the gearmotor and align motor_bracket mounting holes with protruding M4x16 bolts.


- Tighten the M4x16 DIN 912 bolts. Nice one, the gearmotor is installed!

8. PWM motor controller - installation



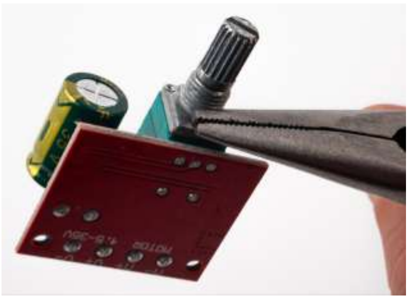
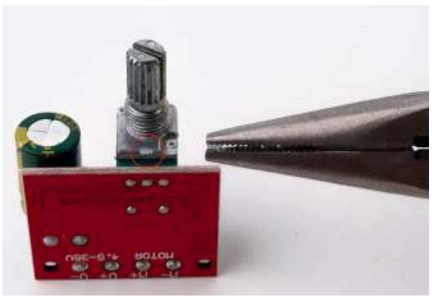
Tools necessary for this chapter

- pliers;
- flat screw driver.

Parts necessary for this chapter

- PWM motor controller;
- wire set.

STEP 1: Installation

- Remove the marked (red circle) part in the picture with pliers, otherwise the PWM motor controller won’t fully align to the housing.



- Pass the PWM motor controller through the hole as shown in the picture, then place the washer and nut on the threaded part.

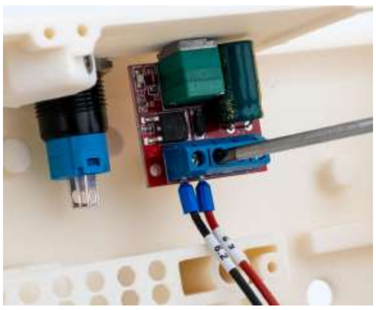
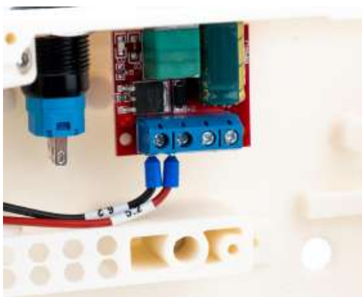
  

- Tighten the nut using pliers, then install the knob.

⚠ Ensure the knob is installed as shown in the picture. When the potentiometer of the PWM motor controller is in the extreme counter clockwise position, the knob should point to the “MOTOR OFF” mark.

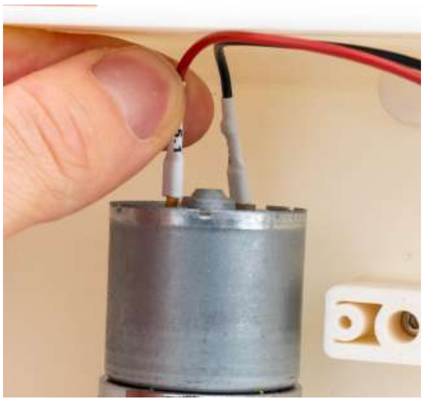
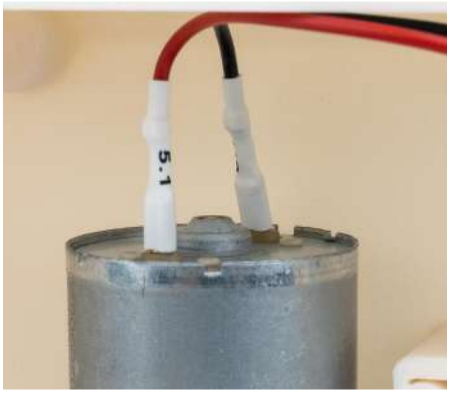
- Insert **6.2** and **5.2** pins in the PWM motor controller terminals as shown in the picture.

⚠ The color of the pin’s sleeve may vary (blue in the picture is just an example). Please do not use it as a reference.

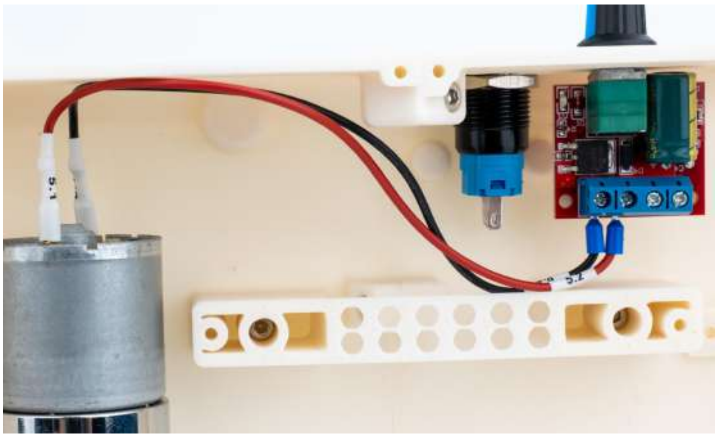
 

- Fix the connectors in terminals.

⚠ Make sure wires are connected in the same order as shown in the picture!

- Plug **5.1 to the motor + pin** and **6.1 to the motor - pin**.



⚠ Make sure terminals are connected in the same order as shown in the picture!

9. Electrical wiring and components - installation

⚠ **WARNING**:
Do not plug in the power cord until explicitly instructed, as it may result in electrical shock.

Tools necessary for this chapter

- pliers;
- allen key 2.5mm;
- cross-head screwdriver;
- flat screwdriver.

Parts necessary for this chapter

- REX C100;
- MeanWell LRS-75-15 power supply;
- thermocouple K;
- heater 12V 40W;
- Fan 12V;
- 2x M3x5 DIN 912 bolt;
- 2x M3x10 DIN 912 bolt;
- wire set.

3D printed parts necessary for this chapter

- controller_clamp;

STEP 1: Introduction

iEvery terminal is labeled with a number as a reference. In this chapter, I will refer to these numbers consistently.

- Take off the plastic bracket from the temperature controller, it won’t be needed.

- You can check the pin number on the top of the device, near every pin.

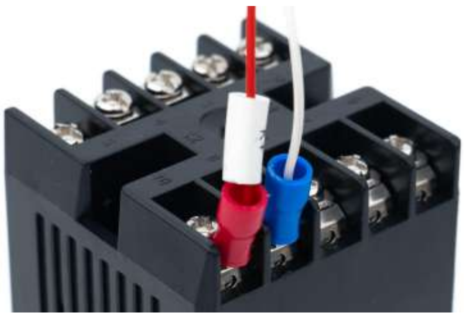
STEP 2: REX C100 wiring

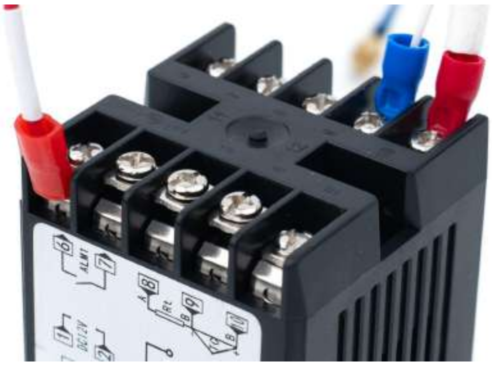
- Loosen the pin **1, 2, 3, 4** and **9, 10** screws.

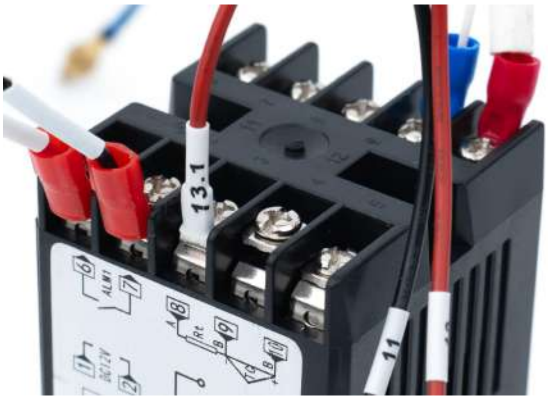
- Place the fork terminal of the thermocouple K (red sleeve) in a pin **10** and secure by tightening the screw.



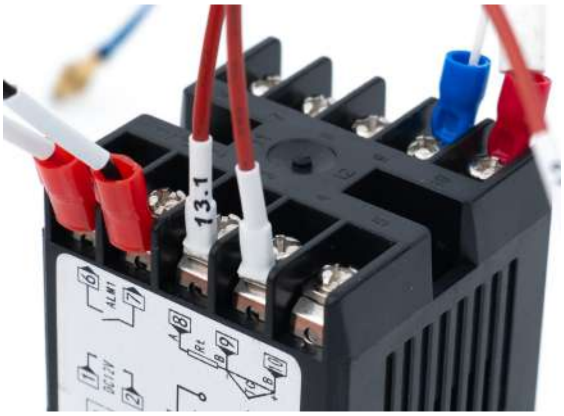
- Repeate with the fork terminal (blue sleeve) connecting to pin **9**.

- Connect the **14.2** fork terminal to pin **1** and fork terminal **14.1** to pin **2**.

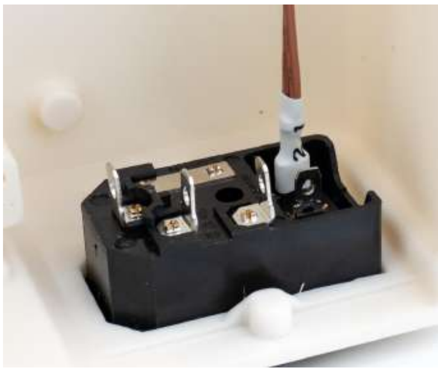


- Connect the **13.1** fork terminal to pin **3**.



- Connect the **10** fork terminal to pin **4**.

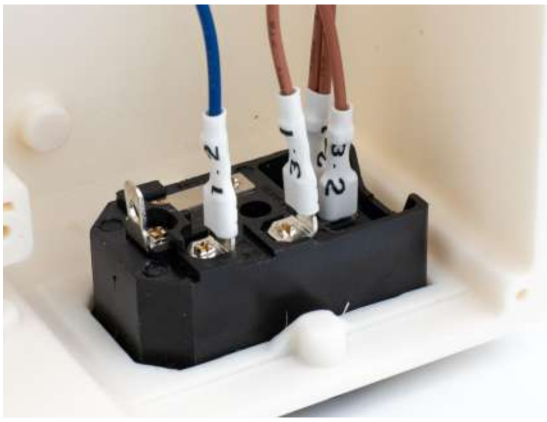
STEP 3: Power socket wiring



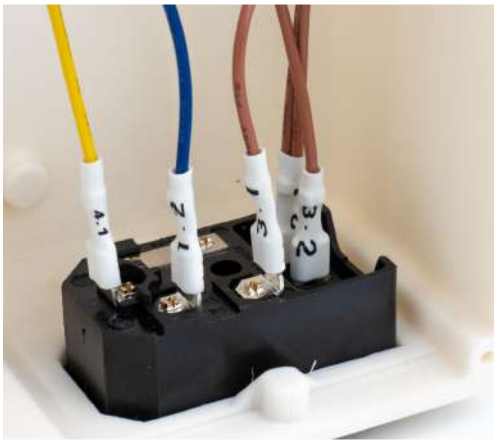
- Connect the **2.1** spade terminal to the power socket pin as shown in the picture.

- Connect the **3.2** spade terminal to the power socket pin as shown in the picture.

- Connect **3.1** spade terminal to the power socket as shown in the picture.



- Connect the **1.2** spade terminal to the power socket as shown in the picture.



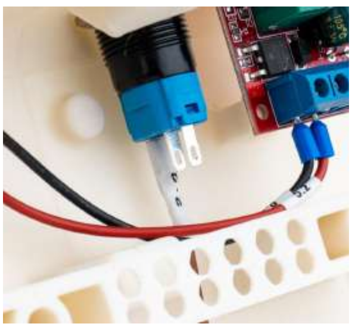
- Connect the **4.1** spade terminal to the power socket as shown in the picture.

STEP 4: Endstop switch and push button wiring

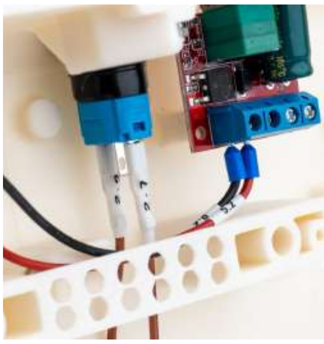
i You can use flat screwdriver to enlarge/wear the spade terminal **2.2** and **2.6** slot. It can help a lot when connecting to the endstop switch.

- Connect the **2.2** spade terminal to the middle pin of the endstop switch.

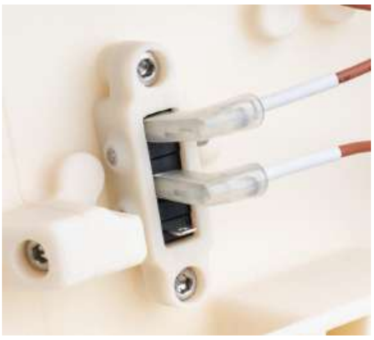
⚠ Please slide terminal very carefully and straight to avoid bending the endstop switch pin!




- Connect the **2.3** spade terminal to the push button pin as shown in the picture. Pass the wire under the power_supply_adapter.



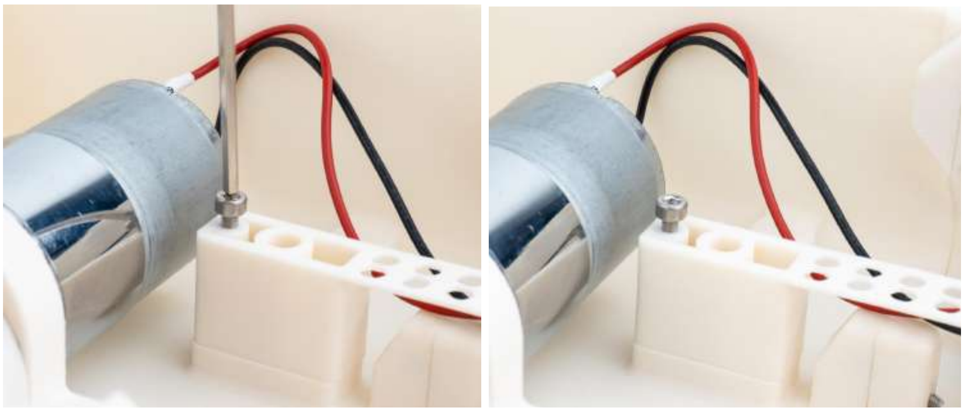
- Connect the **2.7** spade terminal to the push button pin as shown in the picture. Pass the wire under the power_supply_adapter. Middle pin in the previous version of the push button will remain unused.



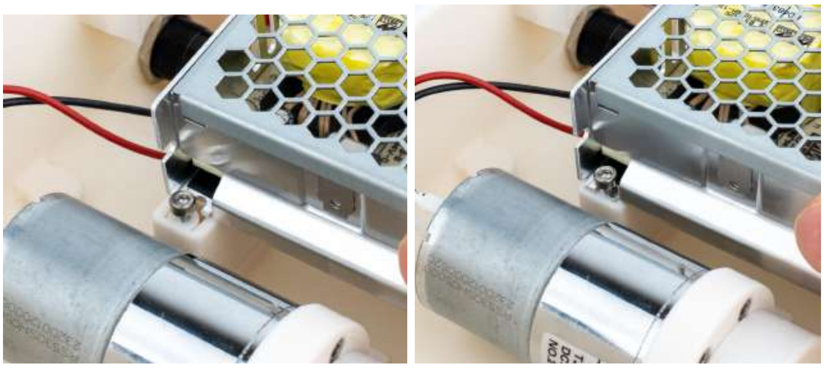
- Connect the **2.6** spade terminal to the upper pin of the endstop switch. Bottom pin will remain unused.

⚠ Please slide terminal very carefully and straight to avoid bending the endstop switch pin!

STEP 5: Power supply installation

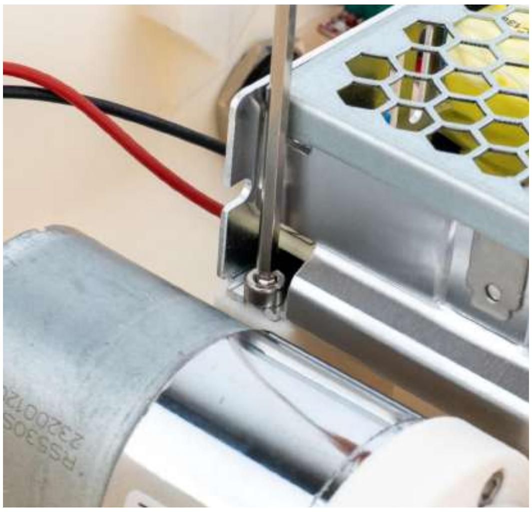


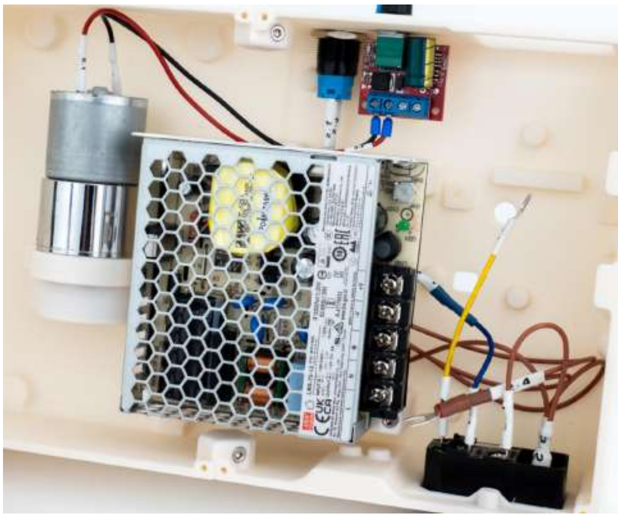
- Screw M3x5 DIN 912 bolt in a power_supply_adapter hole. Don’t tighten it yet.



- Lock in the power supply as shown in the picture.

- Screw the M3x5 DIN 912 bolt from the other side of the power supply completely.





- Now, tighten the 1st mounting bolt. The power supply is installed.

STEP 6: Power supply wiring

- Loose all the power supply terminal screws, but don’t unscrew them completely.

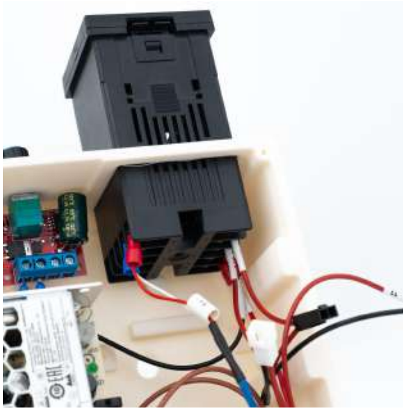
- Slide in the **2.4** fork terminal to the power supply **L** terminal and tighten the screw.

- Slide in the **1.1** fork terminal to the power supply **N** terminal and tighten the screw.

iIn some versions instead of 1.1 label it can have just blue sleeve.

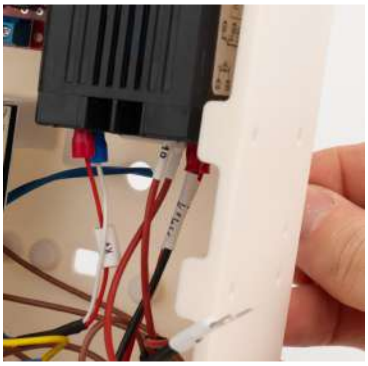
- Slide in the **4.2** fork terminal to the power supply ⏚**(GND)** terminal and tighten the screw.

STEP 7: REX C100, heater, fan and PWM controller wiring



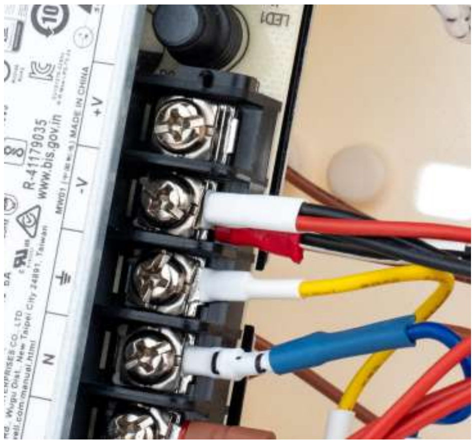

- Pass all the REX C100 wires through the square hole in the housing.

⚠ Make sure REX C100 front panel orientation is correct (the same like in the right picture).

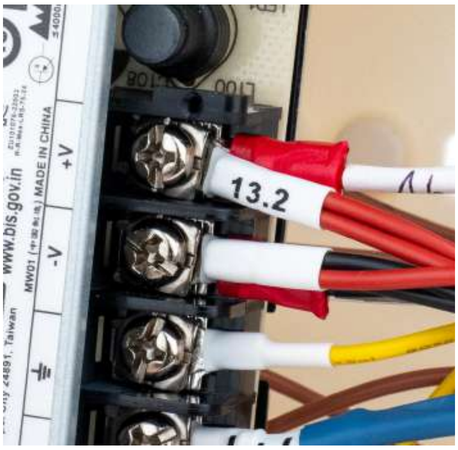

- Pass thermocouple K brass screw through the round hole in the housing.


- Pass the heater through the same hole.



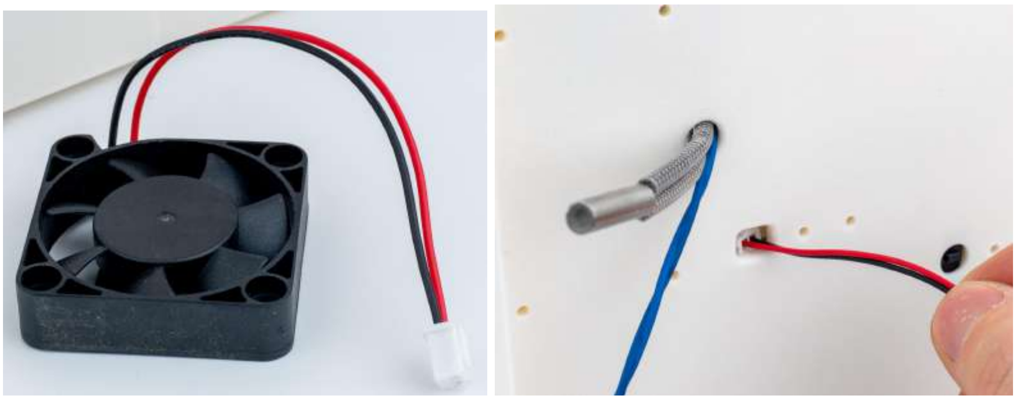
- Slide in the **14.3** fork terminal to the power supply **V-** terminal <u>bulge downwards</u> (red plastic part), don't tighten the screw yet. Place **9** fork terminal in the same power supply **V-** terminal <u>bulge upwards</u> (white tubing with number). Tighten the screw firmly.

- Connection should look like this after tightening the screw.

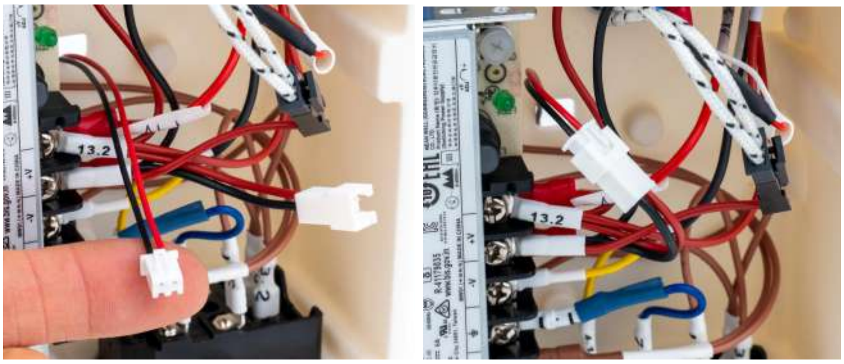


- Slide in the **14.4** fork terminal to the power supply **V+** terminal <u>bulge downwards</u> (red plastic part), don't tighten the screw yet. Place **13.2** fork terminal in the same power supply **V+** terminal <u>bulge upwards</u> (white tubing with number). Tighten the screw firmly.

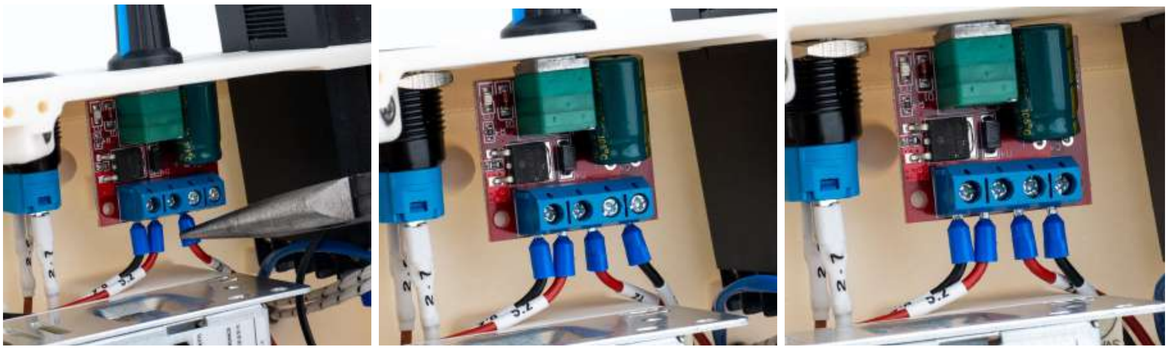
- Plug in heater connector (part of the wire with x fork terminal).



- Prepare the fan. Pass the connector through the rectangle hole in the housing (from the outside to inside).



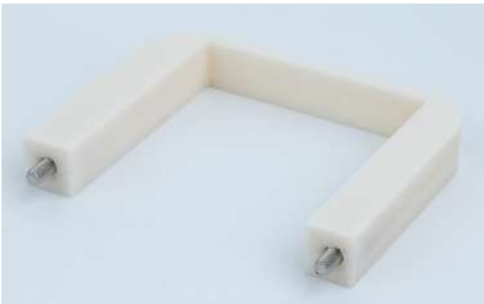
- Plug in the fan connector (part of the wire with x fork terminal).



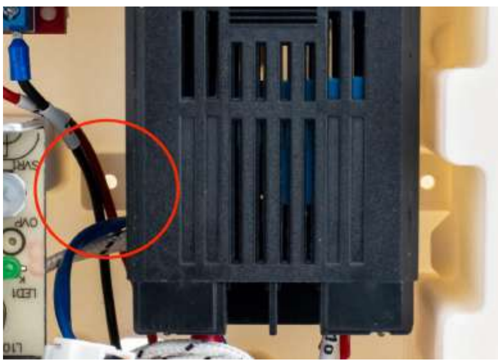
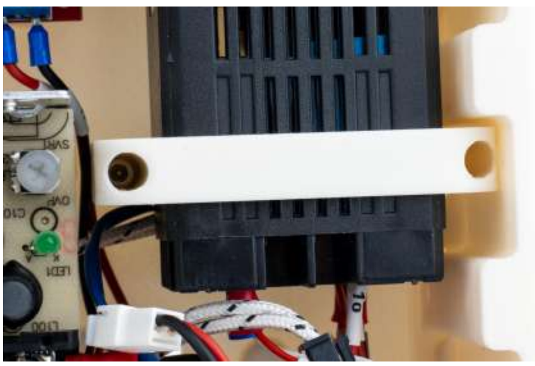
- Insert **12 (RED wire)** and **11 (BLACK wire)** pins in the PWM motor controller terminals as shown in the picture and tighten the terminal screws.

⚠ **Make sure wires are connected in the same order as shown in the picture!!!**

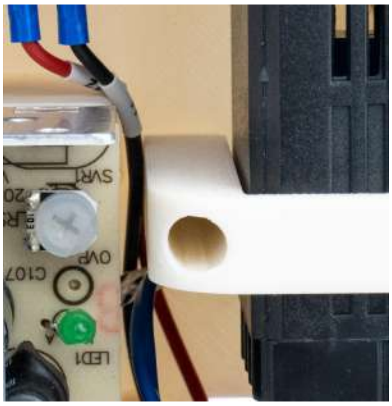
- Check all the connections again, then make an order inside. Bend and hide thermocouple K and heater wires under the power supply as shown in the picture, then push the REX C100 controller inside the housing carefully.




- Put 2x M3x10 DIN 912 bolt inside the controller_clamp sockets. Pay attention that one side of the controller_clamp is wider.

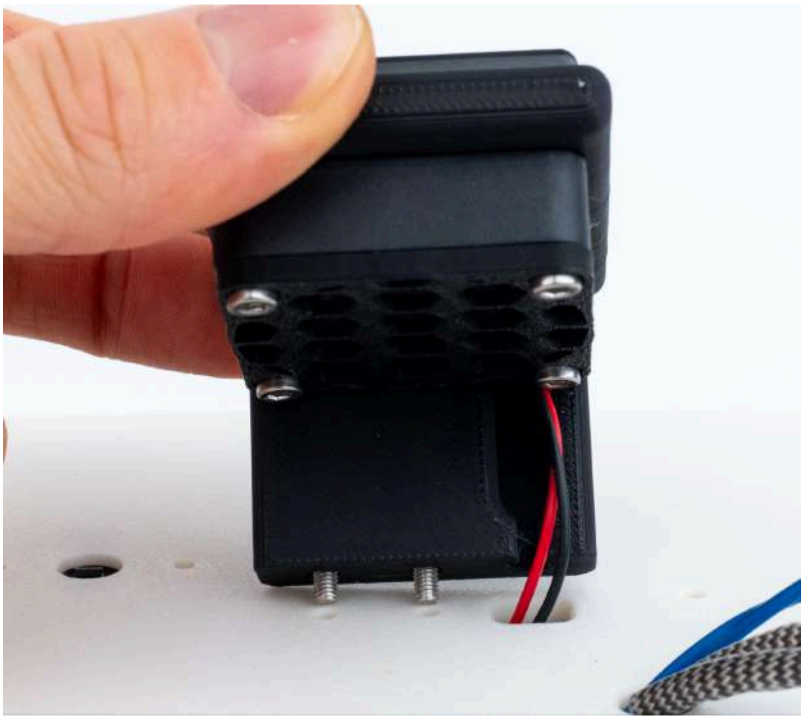
- Pushing down REX C100 controller all the time, install controller_clamp wider side to the left. Pay attention that none of the wires marked with the red circle collide with the controller_clamp!



- Check one more time if wires are not pinched. Then tighten the controller_clamp bolts firmly.

- Well done! PETmachine is getting shapes!

10. Cooling fan - assembly and installation



Tools necessary for this chapter

- allen key 2.5mm.

Parts necessary for this chapter

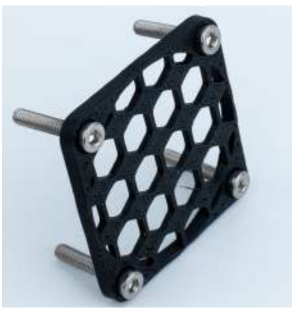
- 4x M3x16 DIN 912 bolt;
- 2x M3x10 DIN 912 bolt.

3D printed parts necessary for this chapter

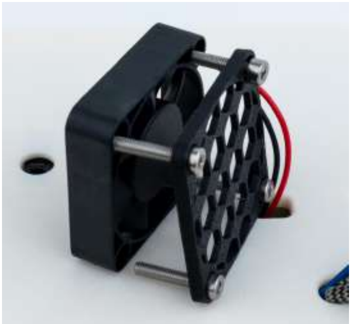
- fan_cover;
- cooling_fan_casing.

STEP 1: Cooling fan assembly

- Lay the housing on the bottom.



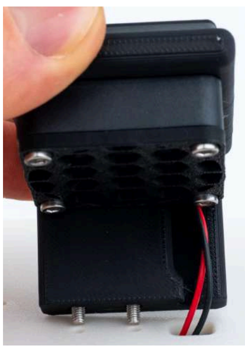
- Pass 4x M3x16 DIN 912 bolt through the fan_cover holes.




- Pass the fan_cover bolts through the fan holes, from the side without a sticker on the fan.

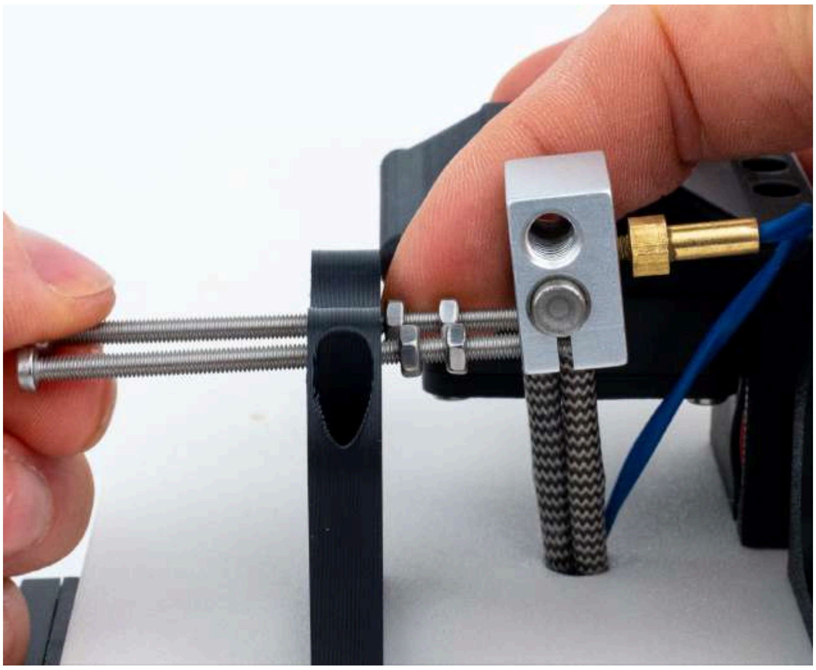

- Install the fan in a cooling_fan_casing as shown in the picture, tighten all 4 bolts.

⚠ Pay attention to the fan wire orientation, it should hide inside the cooling_fan_casing slot.


- Insert 2x M3x10 DIN 912 bolt inside the cooling_fan_casing holes and fix it by screwing the bolts inside two holes located near to the rectangle hole.

11. Hotend - assembly and installation



Tools necessary for this chapter

- allen key 2.5mm;
- allen key 2mm;
- flat screw driver;
- cutting pliers;
- pliers.

Parts necessary for this chapter

- 4x M3 DIN 934 nut;
- 2x M3x60 DIN 84;
- 4x M3x10 DIN 912 bolt.

In one bag:

- Volcano hotend block;
- Volcano hotend silicone cover;
- Modified volcano nozzle;
- high temperature zip tie;

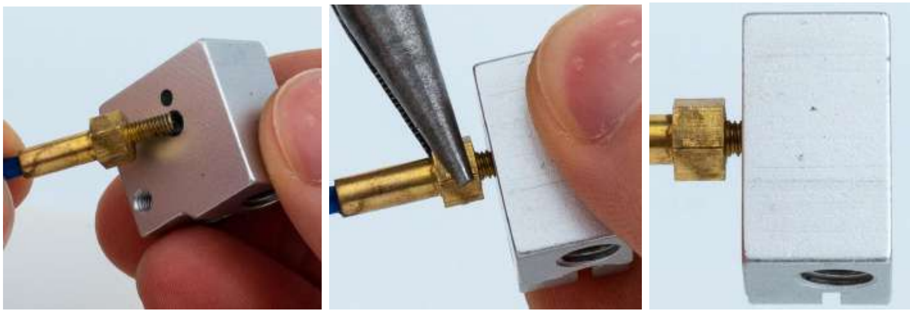
3D printed parts necessary for this chapter

- heater_base_A (physical part included in a kit);
- heater_base_B (physical part included in a kit);

STEP 1: Hotend assembly and installation

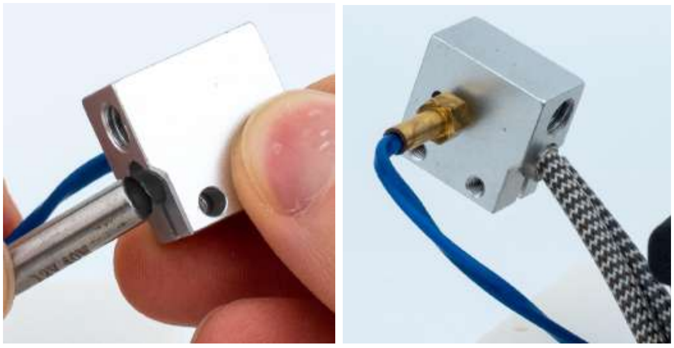
- Remove all the screws from the hotend block. You won’t need them. If your Volcano hotend has nozzle installed, keep it.

i There is a new version of the thermocouple K (“NEW VERSION” sticker is stuck on it). If you have it, the only difference is - the screw will hide inside the hotend **completely**. **Remove the sticker before use.**



⚠ (Just for the older version of the thermocouple K) The screw is 2 mm longer than the socket. Do not overtighten it - it can easily break. Even when fully tightened, a small gap will remain, similar to what's shown in the third picture.

- Install the thermocouple K. Rotate the block to catch the screw thread and tighten the screw using pliers.



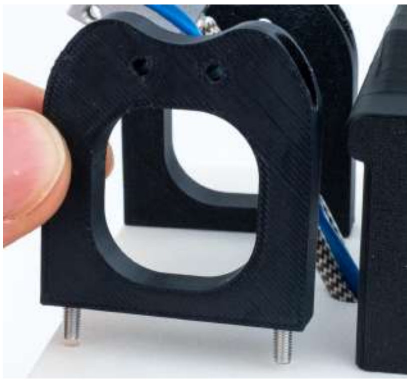
- Slide the heater inside the Volcano hotend block.

⚠ Pay attention to the orientation of the Volcano hotend block.

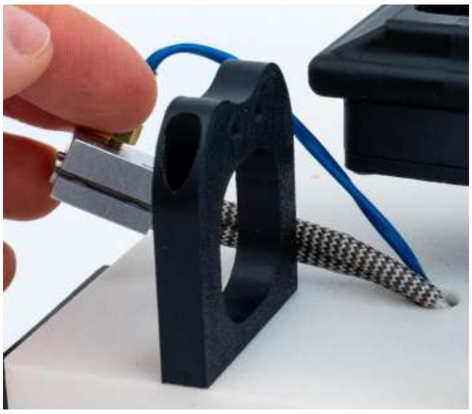
- Insert 4x M3x10 DIN 912 bolt inside the heater_base_A and heater_base_B.


- Fix heater_base_A to the housing.

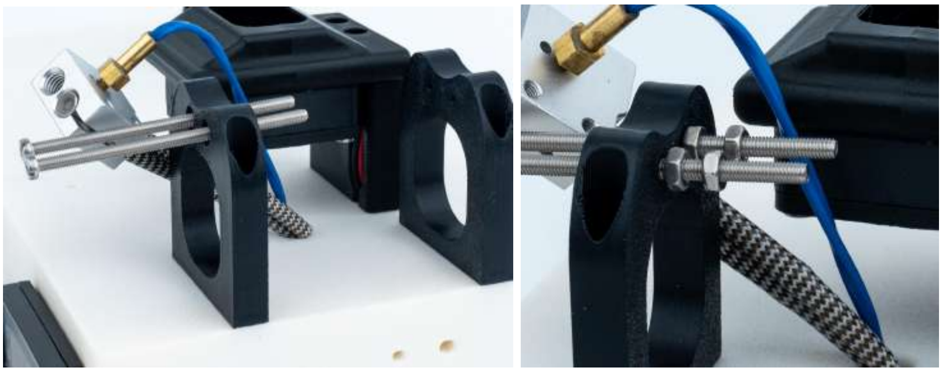
⚠ Heater_base_A bolt's head sockets should face the same direction the REX C100 front panel.




- Now fix the heater_base_B to the housing.

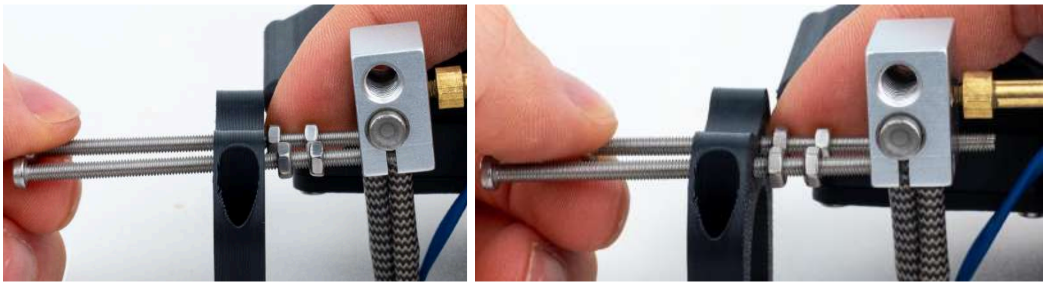


- Bend the hotend with wires to the side to make more space.

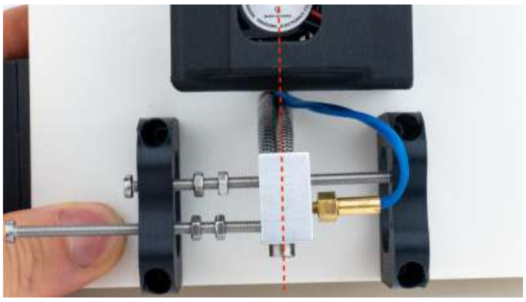


- Pass 2x M3x60 DIN 84 bolt through the heater_base_A holes, then screw the M3 nuts on them.

- Install bolts in the Volcano hotend.

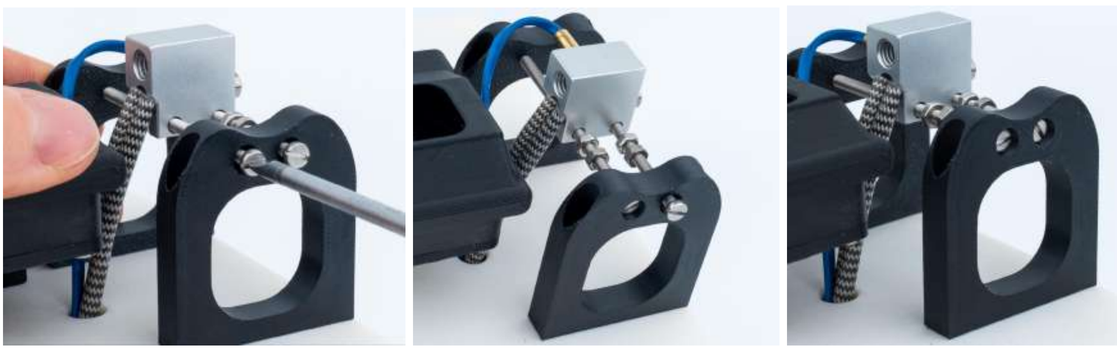


- Screw one of the bolts (holding nuts at the same time).



- Now, position the Volcano hotend in the center. When the bolt touches the the heater_base_B, check that the middle of the Volcano hotend is approximately aligned with the middle of the cooling_fan_case, if it's not, regulate the position of the Volcano hotend by screwing or unscrewing the bolt in the Volcano hotend (don't screw the bolt in the heater_base_B).

- If you positioned Volcano hotend successfully in the middle, screw the 2nd bolt till it touches the heater_base_B. Keep the nuts far from the Volcano hotend.

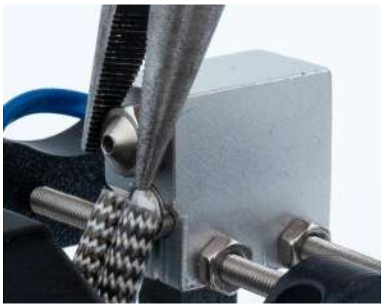


- Hold the heater_base_B with one hand and screw one of the bolts (push the bolt with the screwdriver hard at the same time). When the bolt's head hides inside the socket fully, repeat with the second bolt.

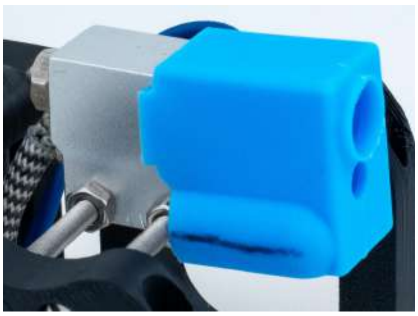


- Firmly tighten the two nuts against the Volcano hotend block.


- Now tighten the two nuts against the heater_base_A.

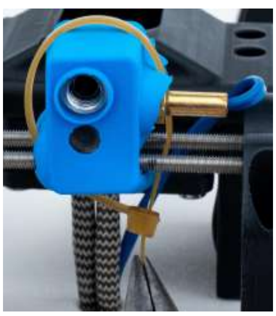

- If the nozzle was not pre- installed, do it.


- Slide the silicone cover onto the hotend from the back. Then, use a pen to mark lines where the thermocouple K or bolts are. Then cut the material around those lines.

- Ensure the silicone cover fits properly. If necessary, trim additional material for a better fit.

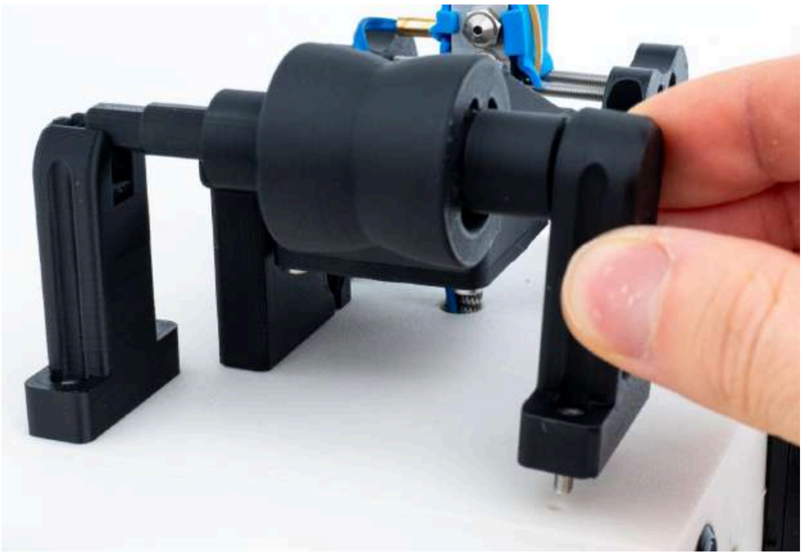

- Install the zip tie on the hotend.




- Tie the zip tie and cut the unused part.

- Hotend is installed, well done!

12. Filament tensioner and runout sensor - assembly and installation



Tools necessary for this chapter

- allen key 2.5mm;

Parts necessary for this chapter

- 4x M3x10 DIN 912 bolt.

3D printed parts necessary for this chapter

- tensioner_base_A;
- tensioner_base_B;
- trigger_rod;
- tensioner_rod;
- 2x tensioner_distancer;
- tensioner_roller.

STEP 1: Assembly and installation

- Insert 4x M3x10 DIN 912 bolt in the tensioner_base_A and tensioner_base_B holes as shown in the pictures.


- Place the tensioner_base_A above the hole where the endstop switch is installed, then fix it by screwing the bolts into the holes in the housing.

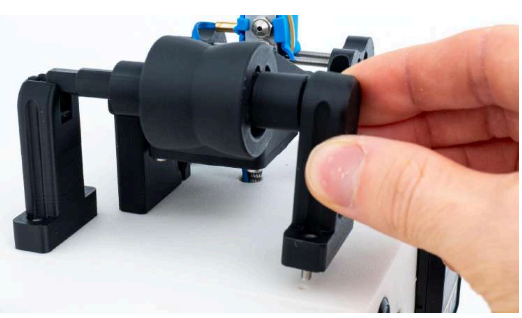
⚠ Ensure that the tensioner_base_A is correctly oriented before proceeding.


- Slide the tenioner_rod inside the tensioner_base_A.

- Press the trigger_rod to verify that the endstop switch clicks when activated.

- Create this unit, then install one end of the tensioner_rod inside the tensioner_base_B rectangle hole.

- Place the other end of the tensioner_rod on the trigger_rod, then screw the bolts of the tensioner_base_B to the holes in the housing.

- Check one more time if the filament runout sensor is working well (click click).

13. Spool base and spool unit - assembly and installation

O

Tools necessary for this chapter

- allen key 2.5mm;
- allen key 3mm;
- allen key 6mm;
- pliers;
- cutting pliers;
- flat screwdriver;

Parts necessary for this chapter

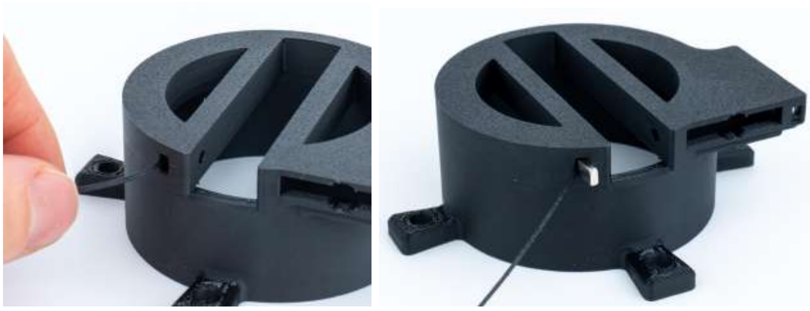
- 2x 6810 bearing;
- 1x 608 bearing
- **4x magnet***;
- 4x M3x5 DIN 912 bolt;
- **2x M3x30 DIN 912 carbon steel bolt***;
- 9x M3x10 DIN 912 bolt;
- 4x M4x16 DIN 912 bolt;
- 1x M8x40 DIN 912 bolt.

*** You can find those in a “PETmachine Bolts & Nuts” zip bag.**

3D printed parts necessary for this chapter

- spool_base_A
- spool_base_B_part_1
- spool_base_B_part_2
- spool_gear;
- spool_A;
- spool_B;
- spool_core;
- 2x spool_core_cover;
- 2x sliding_insert;
- gears_protective_cover;
- double_gear_part_1;
- double_gear_part_2.

STEP 1: Assembly and installation



- Insert magnet in the spool_B rectangle hole as shown in the picture.

i If your magnet fits too loose, you can use flat piece of 3D printed filament (for example Bambulab purging line works great).

- Push the magnet inside (you can use a flat screwdriver to do it). Optionally cut off the protruding piece of the purging line).

- Insert the sliding_insert into the spool_B chamber, ensuring it is correctly oriented. Once inside, rotate it 90 degrees clockwise to lock it into place, then slide it down.

- Pass M3x30 DIN 912 bolt through the spool_B hole as shown in the picture.

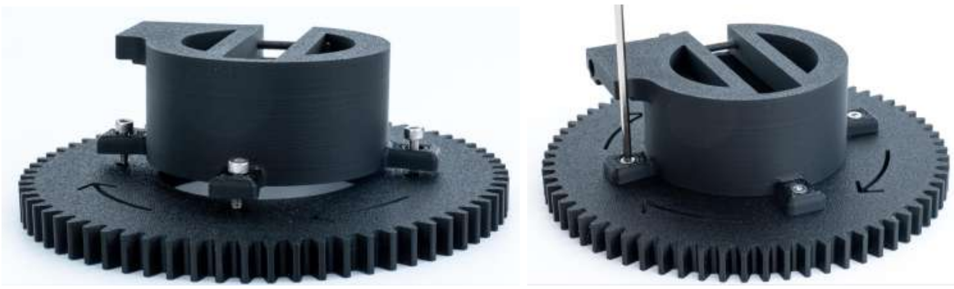

- Then screw it completely in the sliding_insert hole.


- Use pliers to move the bolt up and down, it will be hard in the beginning, till the mechanism will wear out a little bit. When the mechanism will work more smoothly, use a sliding insert to move it up and down, repeat this many times.

- Repeat the magnet installation procedure on the upper part of the spool_B.

- Repeat all steps for the spool_A.

- Insert 4x M3x10 DIN 912 bolt inside the spool_B sockets as shown in the picture.



- Align bolts in spool_B with spool_gear holes and tighten the bolts firmly.

- Insert 6810 bearing in the spool_A and spool_B slots.

- Insert 3x M3x10 DIN 912 bolt in the spool_base_B_part_1 as shown in the picture.
- Align spool_base_B_part_2 and secure it with bolts.

- Insert 2x M4x16 DIN 912 bolt in the spool_base_B holes as shown in the picture.

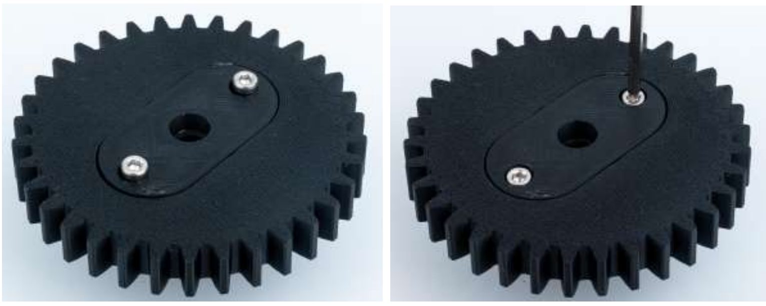
- Place spool_base_B on the housing (near the rectangle hole on the top), align the bolts with housing holes and tighten the bolts.

⚠ Ensure that the spool_base_B is correctly oriented before proceeding.

- Install spool_B on the spool_base_B.

- Place 608 bearing inside the double_gear_part_1 socket and cover it with double_gear_apart_2.

⚠ Ensure that the double_gear_apart_2 is correctly oriented before proceeding.

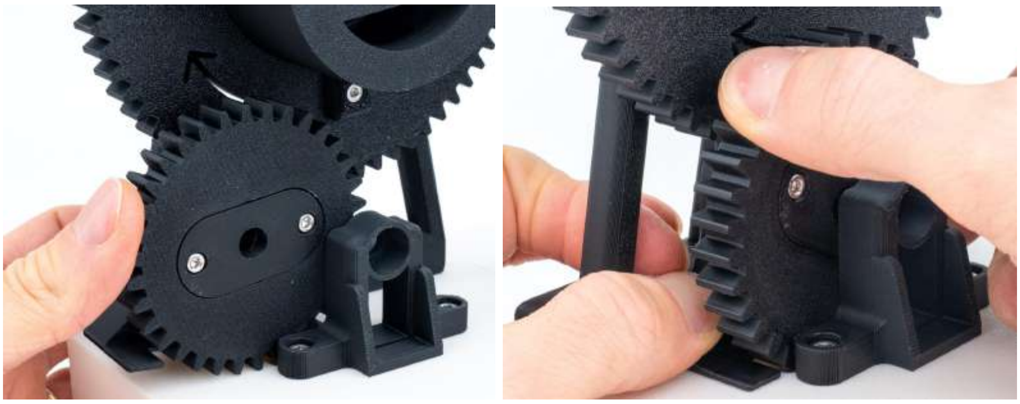


- Place 2x M3x5 DIN 912 bolt and tighten them.

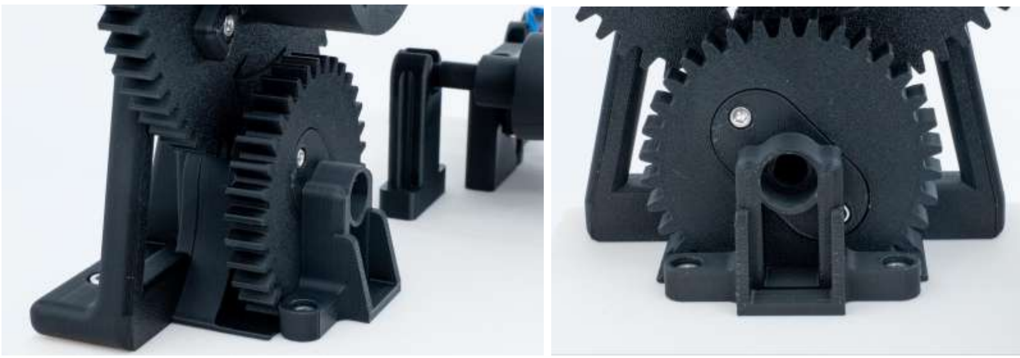
- Place gears_protective_cover on the double_gear.

⚠ Ensure that the gears_protective_cover orientation is correctly oriented before proceeding.

- Place the whole unit in the way shown in the picture.



- Push the unit under the spool_gear. It will require some force to do this, it should snap to its place, you will feel/hear click.



- Final position should look as shown in the picture.


- Install M8x40 DIN 912 bolt inside the double_gear_base socket.

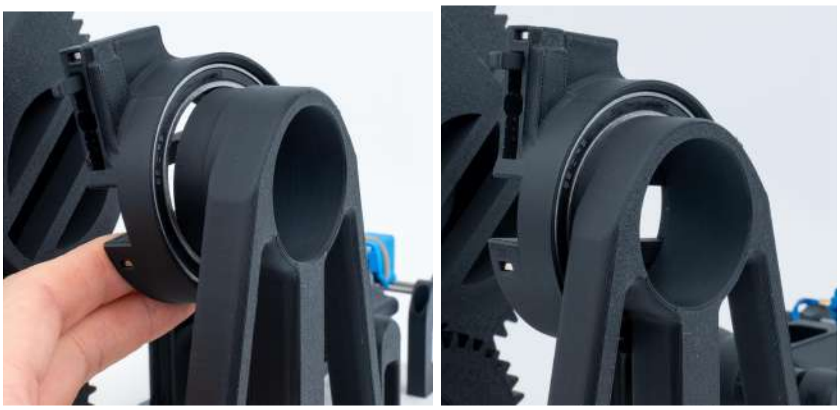

- Tighten the bolt. Do it delicately, don’t over tighten it.


- Move to the back of the spool_base_B, place 2x M3x5 DIN 912 bolt in the sockets as shown in the picture and tighten them.

- Insert 2x M4x16 DIN 912 bolt in the spool_base_A holes as shown in the picture.

- Place spool_base_A on the housing top (on the opposite site from the spool_base_B), align the bolts with housing holes and tighten the bolts.

⚠ Ensure that the spool_base_B is correctly oriented before proceeding (flat side to the outside).



- Place spool_A on the bearing socket of the spool_base_B.

- Lock-in pins of the spool_core_cover in the spool_core slots. You have to stretch the spool_core_cover around and put some force to do this.

- Ensure that the spool_core_cover is correctly oriented before proceeding. Repeat with the second spool_core_cover from the other side.

- Insert M3x10 DIN 912 bolt in the spool_core_cover socket as shown in the picture and tighten it. Don’t over tighten it, leave a small gap between.

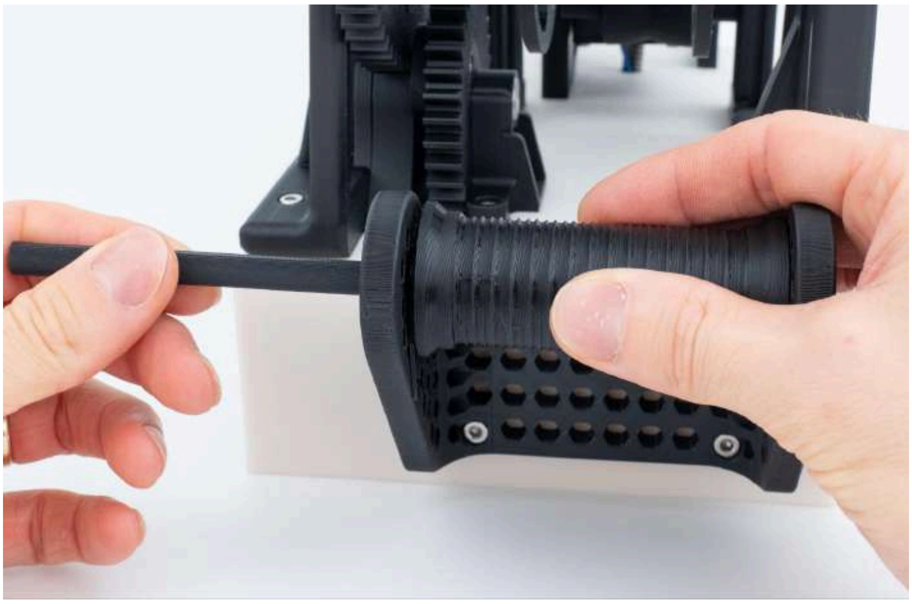

- Open the spool mechanism and slide in the assembled spool.

⚠ Ensure that the spool is correctly oriented before proceeding.


- Lock the spool mechanism.

- A lot of progress till now, great job!

14. Guiding roller - assembly and installation



Tools necessary for this chapter

- allen key 2.5mm;
- allen key 3mm;
- pliers.

Parts necessary for this chapter

- 2x 608 bearing
- 2x M3x10 DIN 912 bolt;
- 4x M4x16 DIN 912 bolt.

3D printed parts necessary for this chapter

- guiding_roller_base;
- 2x guiding_roller_distancer;
- guiding_roller_rod;
- guiding_roller;
- guiding_roller_blockade.

STEP 1: Assembly and installation

- Insert 4x M4x16 DIN 912 bolt inside the guiding_roller_base sockets as shown in the picture.

- Place the guiding_roller_base on the side of the housing and align the bolts with holes. Tighten the bolts firmly.

- Place 2x 608 bearing inside the guiding_roller sockets.

- Pass the guiding_roller_rod through the guiding_roller_base hole as shown in the picture. Place the guiding_roller_distancer on it.

- Place the guiding_roller on the guiding_roller_rod, then push the rod almost to the end.

- Place a second guiding_roller_distancer in the gap and pass the guiding_roller_rod through it. You can use pliers to hold the guiding_roller_distancer. Then push the guiding_roller_rod till it hides completely.

- Insert 2x M3x10 DIN 912 bolt in the guiding_roller_blockade sockets.

- Place the guiding_roller_blockade on the left side of the guiding_roller_base, align the bolts with holes and tighten the bolts.

15. Handle - assembly and installation

Tools necessary for this chapter

- allen key 3mm.

Parts necessary for this chapter

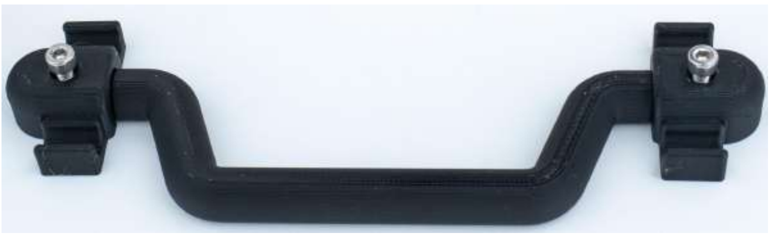
- 2x M4x16 DIN 912 bolt.

3D printed parts necessary for this chapter

- 2x handle_part_1
- handle_part_2

STEP 1: Assembly and installation

- Insert 2x M4x16 DIN 912 inside the handle_part_1 socket as shown in the picture.



- Place the handle_part_1 in both ends of the handle_part_2.

- Move the whole handle to the back of the PETmachine and find dedicated holes for the bolts.

- Screw the bolts, but don’t tighten them fully yet.

- You can twist handle_part_1 to reach the best position for the handle operation. Then tighten the bolts firmly.

i You can use slots in the handle to mount the rods and carry your PETmachine with ease!

16. Ribbon spool - assembly and installation

Tools necessary for this chapter

- allen key 2.5mm.

Parts necessary for this chapter

- 1x M3x10 DIN 912 bolt.

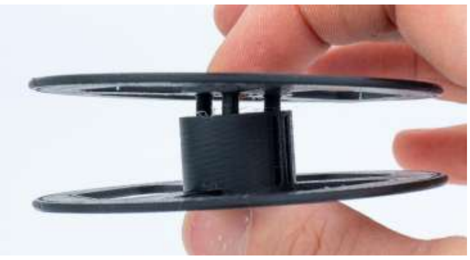
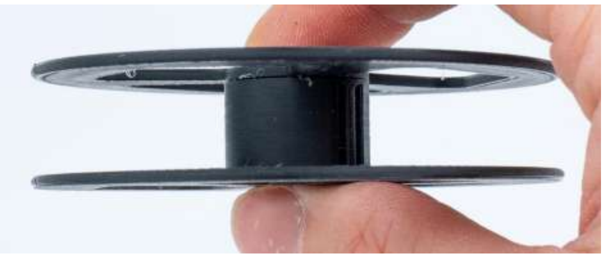
3D printed parts necessary for this chapter

- small_spool_base;
- small_spool_part_1;
- small_spool_part_2;
- small_spool_cover.

STEP 1: Assembly and installation

- Put M3x10 DIN 912 bolt inside the small_spool_base as shown in the picture.

- Find a dedicated hole on the top of the housing and screw the small_spool_base

- Snap small_spool_part_1 and small_spool_part_2 together. If fitting is too loose use glue.


- Snap small_spool_cover. This part will prevent the ribbon to unwind itself, when you wind it later.

- Install small_spool on the the small_spool_base.

17. Bottom cover - installation

Tools necessary for this chapter

- allen key 2.5mm;

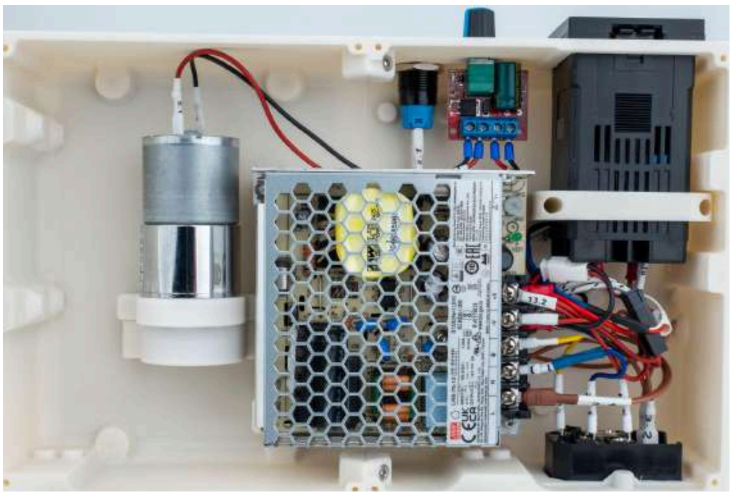
Parts necessary for this chapter

- 4x M3x5 DIN 912;
- 4x M3x10 DIN 912.

3D printed parts necessary for this chapter

- bottom_cover_1;
- bottom_cover_2;
- 4x foot.

STEP 1: Test



- One more time check all your wiring.

- Insert 4x M3x10 DIN 912 bolt in a 4x foot as shown in the picture.

- Place each foot with a bolt in the bottom_cover_1 and bottom_cover_2 corners as shown in the picture.


- Install one corner of the bottom_cover_1 as shown in the picture and tighten the bolt, repeat with other foot.

- Install bottom_cover_2 in the same way.

- Install 4x M3x5 DIN 912 bolt in the center holes of each bottom cover part.

- Congratulations, your PETmachine looks amazing!

18. PETmachine test

Tools necessary for this chapter

- none

Parts necessary for this chapter

- none

3D printed parts necessary for this chapter

- none

STEP 1: Test

- Turn OFF (“O” position of the power switch) the PETmachine.

- Set potentiometer of the PWM controller in a “MOTOR OFF” position.

- Push button has two positions, flat and pushed. Set the push button in a pushed position.

- Plug in the power cord.

- Turn ON the power switch.

- If everything went fine you should see numbers on the REX C-100 display. Red ones showing actual temperature of the hotend, green ones set temperature.

⚠ WARNING: If the REX-C100 display does not turn on or the PETmachine exhibits unusual symptoms (such as smoke or abnormal noise), immediately turn it OFF and unplug it.

⚠ The hotend may produce a small amount of smoke when heating up for the first time due to residual drilling oil on the nozzle.

- Now you will test the gear motor. Set the speed to the 5th line.

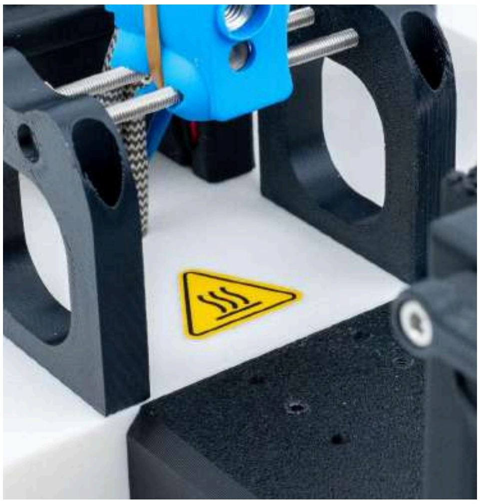
- Spool should start to spin.

⚠ Pay attention if spool spinning direction is the same like the arrows direction on the spool_gear. If not, you have to reverse the electrical connection of your gearmotor.

- Apply a load to the tensioner roller using your hand and keep it there at all times. Then, set the push button to a flat position while still maintaining the load with your hand.

- If you’ve kept your hand there for more than 10 seconds, take it off now. The PETmachine should turn OFF after 1-2s. It was a simulation showing how a filament runout sensor works. Set the push button to a pushed position once again and turn off the PETmachine.

19. CE/safety stickers



Tools necessary for this chapter

- Paper towel;
- Isopropyl alcohol.

Parts necessary for this chapter

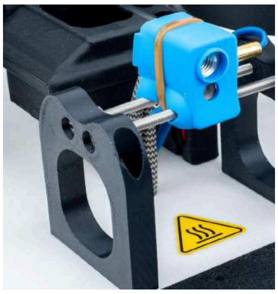
- CE stickers

3D printed parts necessary for this chapter

- none

STEP 1:: Introduction

iEvery PETmachine has a unique serial number displayed on the included nameplate sticker. If your 3D-printed parts meet the requirements outlined in the '3D Printing Instructions' file (applicable only to the essential parts kit), you can proudly attach the nameplate with the CE marking."



- Clean the housing area straight under the hotend and place a “hot surface” sticker.

- Clean the housing area near the gears and place a “moving parts” sticker.

- Clean the housing area near the power socket and place a “shock hazard” sticker.

- Clean the housing area near the joint of the housing parts and place a “nameplate” sticker.

20. Cutting module - assembly and installation

Tools necessary for this chapter

- allen key 2.5mm;
- allen key 3mm;
- pliers;

Parts necessary for this chapter

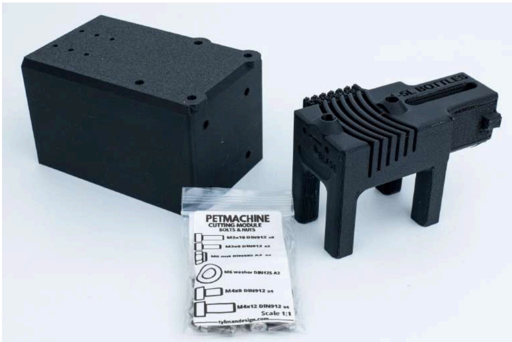
- 9mm blade;
- 43mm M6 threaded rod;
- 6x M3x10 DIN 912;
- 2x M3x8 DIN 912;
- 1x M6 washer DIN 125;
- 4x M4x8 DIN 912;
- 4x M4x16 DIN 912;
- 2x M6 nylon nut DIN 985.

3D printed parts necessary for this chapter

- cutting module;
- cutting_module_base;
- blade_cover;
- 2x cutting_module_foot;
- ribbon_guide;
- M6_rod_cap;
- M6_nut_knob;
- ext_module (optional);

STEP 1: Test

i You can assemble Cut-Man (hand cutter) perfectly the same way. Only one difference is Cut-Man has a handle instead of cutting_module_base.



- Prepare the parts, you can find bolts and nuts in a dedicated zip bag.

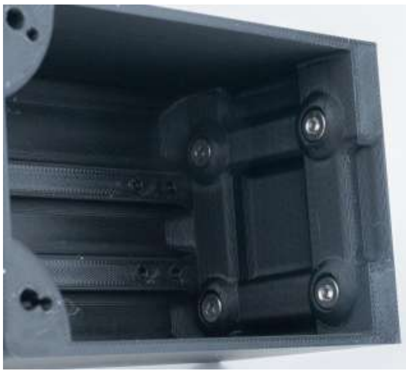
 

- Pass M4x8 DIN 912 bolt through the cutting_module_base hole as shown in the picture.

- Align one foot of the cutting_module with the protruding bolt and screw inside the foot - tighten it a little bit. Pay attention to the orientation of the cutting_module.

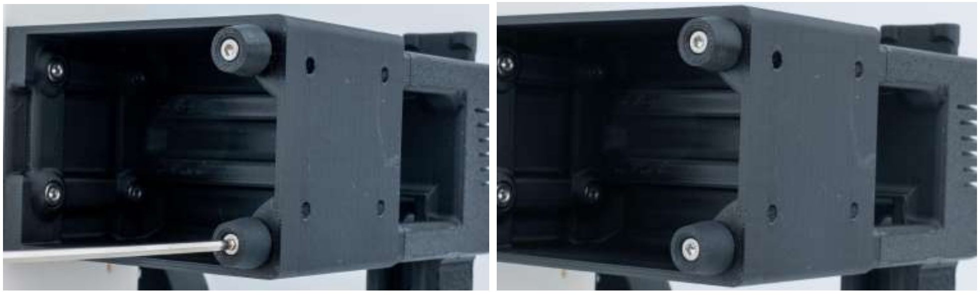

- Add one more M4x8 DIN 912 and this time tighten it firmly. Screw two more M4x8 DIN 912 bolt and tighten all the bolts.




- Insert 4x M4x16 DIN 912 bolt in dedicated cutting_module_base slots as shown in the picture.


- Align all fours bolts with holes on a side of the housing and tighten them firmly.

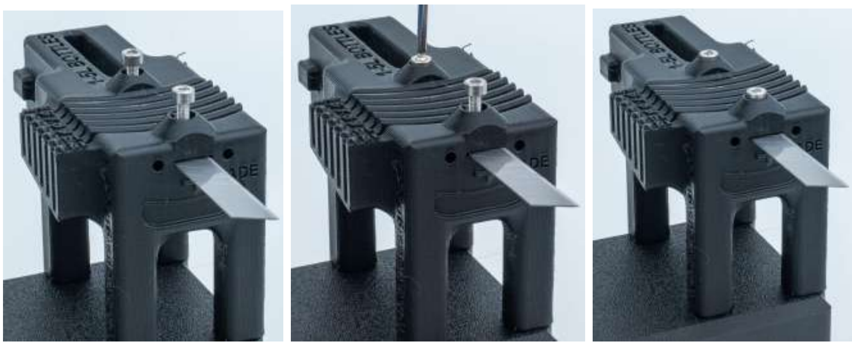
- Insert 2x M3x10 DIN912 inside the cutting_module_foot socket as shown in the picture.



- Fix the feet to the cutting_module.

- Place a 9mm blade inside the cutting_module slot as shown in the picture. Be very careful, the blade is extremely sharp.

⚠ Be sure the blade is facing the right direction.



- Secure the blade inside the cutting_module by tightening 2x M3x8 DIN 912 bolt as shown in the picture.

- Using pliers, grab firmly the blade possibly closest to the cutting_module wall and break the blade (do it confidently and fast).

- Insert 2x M3x10 DIN 912 bolt inside the blade_cover sockets as shown in the picture.

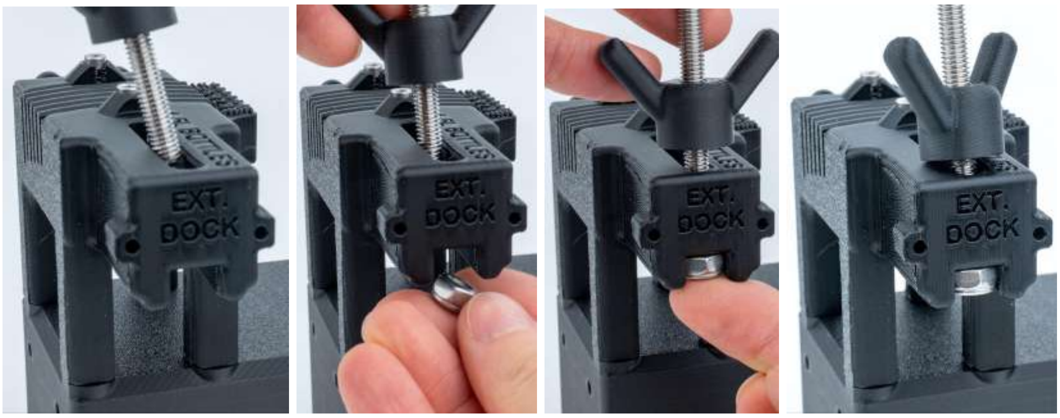

- Install the blade_cover on the cutting_module.


- Insert M6 nylon nut inside the M6_nut_knob as shown in the picture. Use pliers if needed.

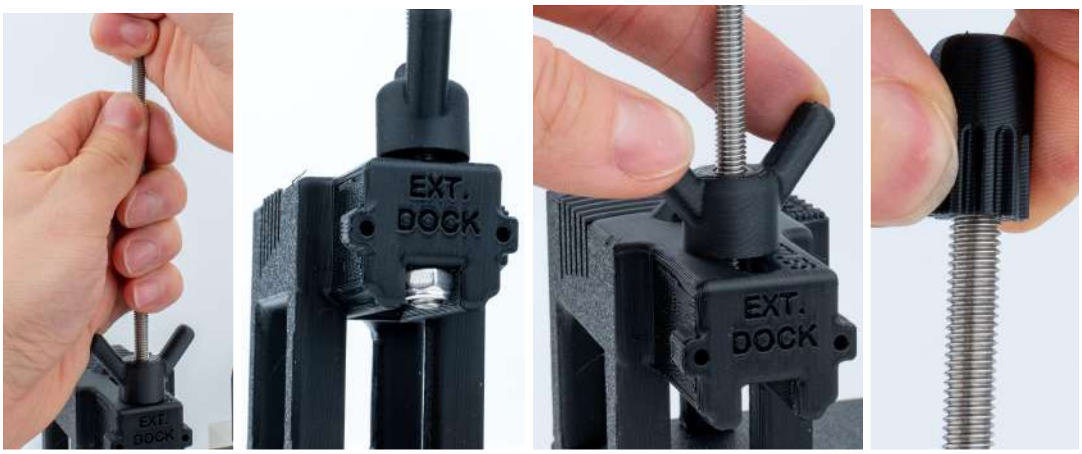

- Screw the M6_nut_knob on the M6 threaded rod (from the NOT sanded end of the rod).

- Just a little bit as shown in the picture will be ok, you just need to make a thread in the nylon plastic inside the M6 nylon nut.

- Screw the M6_nut_knob on the M6 threaded rod again, BUT this time from the other side of the M6_nut_knob. Turn the nut until you have 30mm of the rod exposed, then put an M6 washer on it.



- Place the M6 rod inside the cutting_module slot and secure it with an M6 nut.



- Screw the M6 rod using both hands till the M6 rod will pass through the nut, then tighten the M6_nut_knob. Install M6_rod_cap on the top of the rod.

- Insert 2x M3x10 DIN 912 bolt inside the ribbon_guide slots as shown in the picture.

- Fix the ribbon_guide to the cutting_module_base. Pay attention to the ribbon_guide orientation.

- **CONGRATULATIONS!** The PETmachine is ready! I'm proud of you!

21. Nylon string - installation

Tools necessary for this chapter

- cutting pliers;
- pliers;
- torch or any source of flame.

Parts necessary for this chapter

- none.

3D printed parts necessary for this chapter

- none

STEP 1: Nylon string installation



- Melt the end of the nylon string and when it’s still liquid grab and squeeze with pliers.


- Using cutting pliers make “arrow” shape”.

- Pass the nylon string all the way around the spool channels, till you reach the start.

- Make **two or three** loops, cut the free end and melt using the torch.

- On the other end of the nylon string make an 8 loop, like in this video:

  https://www.youtube.com/watch?v=D8jRok7Kofw

- Cut the free end and melt using the torch. Install filament_blocker in the end.

The PETmachine is ready to use! To know how to use the PETmachine please open a dedicated user guide (link below):

User guide.docx