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1. Introduction

STEP 1 Preparing the upgrade kit

- Welcome to the tutorial how to upgrade your Original Prusa i3 **MK3/MK3S** to Original Prusa i3 **MK3S+**
- Please prepare the upgrade kit received from Prusa Research.

⚠ **WARNING:** Before you start disassembling the printer, make sure **you have printed all the necessary parts** for the upgrade!!!

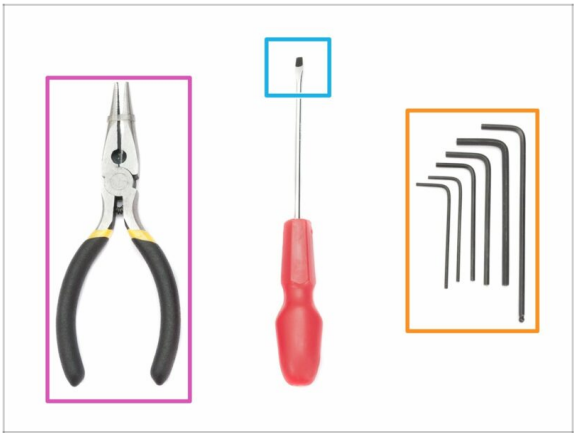
ⓘ Download all necessary parts on prusa3d.com/printable-parts.

ⓘ This assembly guide is valid only while upgrading your printer to a **SINGLE MATERIAL MK3S+**

STEP 2 What will be updated?

- **MK3/MK3S upgrade to MK3S+** includes changes to:
  - **E-axis:** New extruder design improving print performance. The package also includes a red filament sensor, which is the latest hardware iteration. It is recommended for both MK3 and MK3S users to change it.
  - **Y-axis:** New bearing holders (clips) and new printed smooth rod holders.
  - **LCD-knob:** New design, similar to the Original Prusa MINI (part included in Y-axis G-code)
  - **X-axis (optional)**: New x-end parts with redesigned belt tensioning system. This upgrade is optional, as it brings no extra performance, only easier assembly.

STEP 3 Getting the necessary tools



- For this upgrade you will need:
- Needle-nose pliers (1x)
- Allen key 2.5 mm (1x)
- Allen key 2.0 mm (1x)
- Allen key 1.5 mm (1x)
- Slotted screwdriver for the belt insertion (optional)

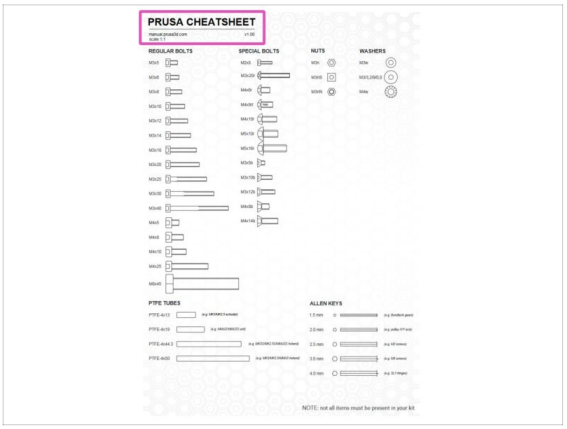
ⓘ No soldering is required. No wire crimping is required.

ⓘ Tools are not included.

STEP 4 Labels guide

- All the boxes and bags including parts for the build are labelled.
- Number (or numbers) in the header tells you for which chapter you'll need that bag (or box).

STEP 5 Use labels for reference



ⓘ Most of the labels are scaled 1:1 and can be used to identify the part :-)

- For the most common screws, nuts and PTFE tubes. You can also use the enclosed letter, which contains Prusa Cheatsheet on the other side.

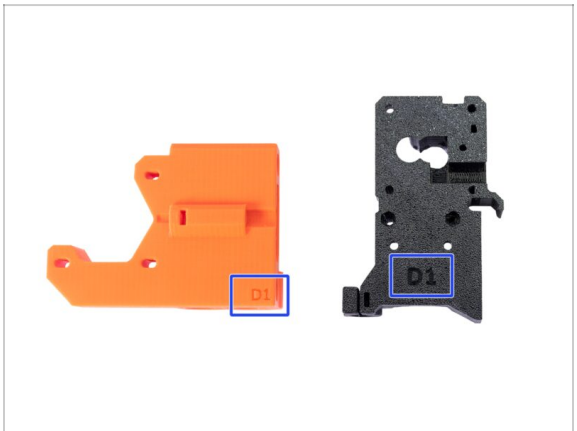
ⓘ You can download it from our site help.prusa3d.com/cheatsheet. Print it at 100 %, don't rescale it, otherwise, it won't work.

STEP 6 View high resolution images

ⓘ When you browse the guide on help.prusa3d.com, you can view the original images in high resolution for clarity.

- Just hover your cursor over the image and click the Magnifier button ("View original") in the top left corner.

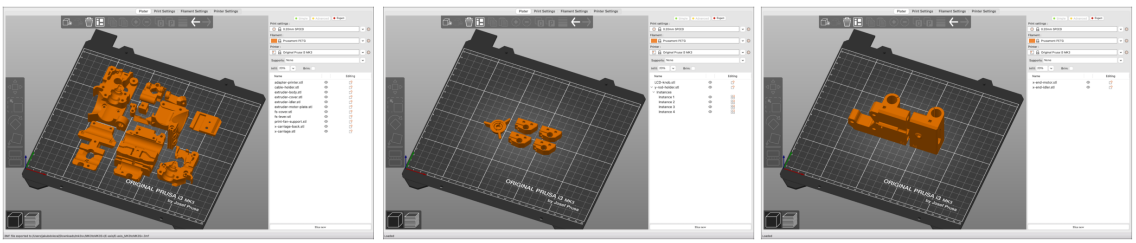
STEP 7 Printed parts - versioning



- Most of the 3D printed parts on Original Prusa i3 MK3S+ are marked with their version.
  - **Dx series** (e.g. D1) - those parts are printed on Prusa Research farm and are distributed with the kit.
  - **Rx series** (e.g. R6) - those parts are available for download at prusa3d.com/printable-parts. They are identical to the factory ones.

ⓘ In case you have issues while assembling the printer with the certain printed part, please try to find this label and tell it to our support team.

STEP 8 Printed parts - self printing



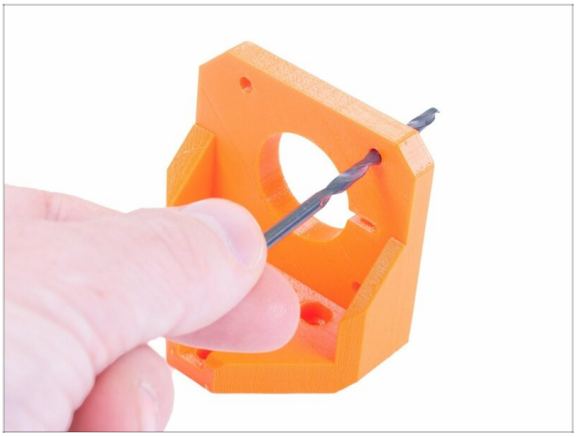
⚠ **Before we start disassembly**, you need to **print all the necessary parts**. Note that G-codes for MK3 and MK3S are different!!!

- For MK3/MK3S to MK3S+ upgrade, you need to print the parts, which are separated into more G-codes. Use enclosed **BLACK PETG** or similar material. The color should be black to avoid issues.
- G-codes and STL files are available on our website: prusa3d.com/prusa-i3-printable-parts

ⓘ For printing individual parts it is recommended to use PrusaSlicer with 0.2 mm layer height, GRID infill at 20 %, no supports!

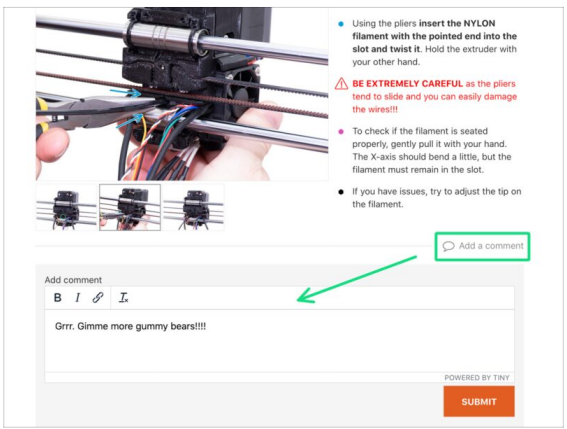
ⓘ Fan-shroud must be printed from ASA/PC/ABS only!!! We include this part in the upgrade package.
If you have printed the fan-shroud yourself, it prints out together with the inner support which needs to be removed first.

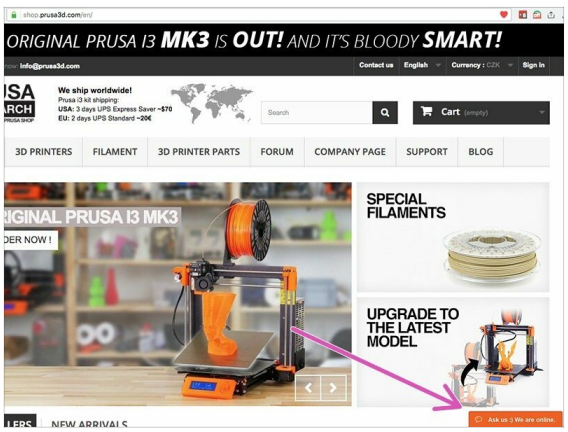
STEP 9 Printed parts post-processing



- **Some parts might require post-processing** in order to be ready for assembly.
- Once you finish the printing, please check the following article: How to post-process the printed parts

STEP 10 We are here for you!





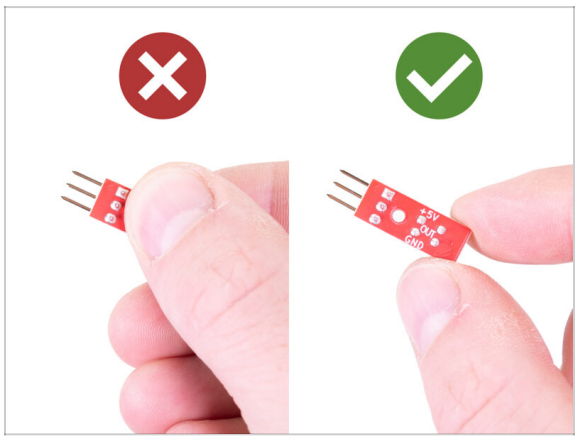
- Lost in the instructions? Missing screw or cracked printed part? **Let us know!**
- You can contact us using following channels:
  - Using comments under each step.
  - Using our 24/7 live chat at shop.prusa3d.com
  - Writing an email to info@prusa3d.com

STEP 11 Pro tip: inserting the nuts

- 3D printed parts are very precise, however, there still might be a tolerance in the printed part and same goes for the size of the nut.
- Therefore it might happen, that the nut won't fit easily in or might be falling out. Let's see, how to fix it:
  - **Nut won't fit in**: use a screw with a thread along its entire length (typically: M3x10, M3x18) and screw it from the opposite side of the opening. While tightening the screw, the nut will be pulled in. Remove the screw afterwards.
  - Nut keeps falling out: Use a piece of tape to fix the nut temporarily in place, as soon as you insert the screw in, you can remove the tape. *Using glue isn't recommended as it can partly reach into the thread and you won't be able to tighten the screw properly.*
- Every time we recommend using the "screw pulling technique", you will be reminded with Joe's avatar ;)

ⓘ Parts in the pictures are used as an example.

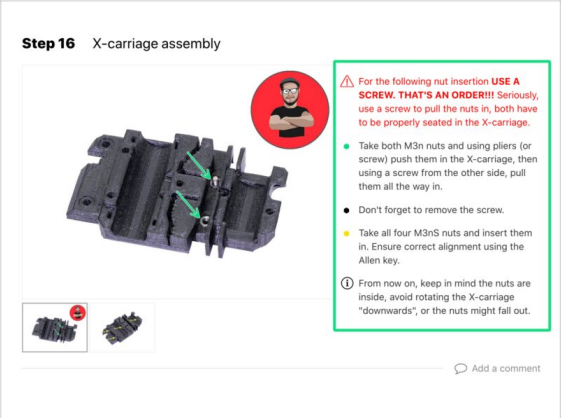
STEP 12 Important: Electronics protection

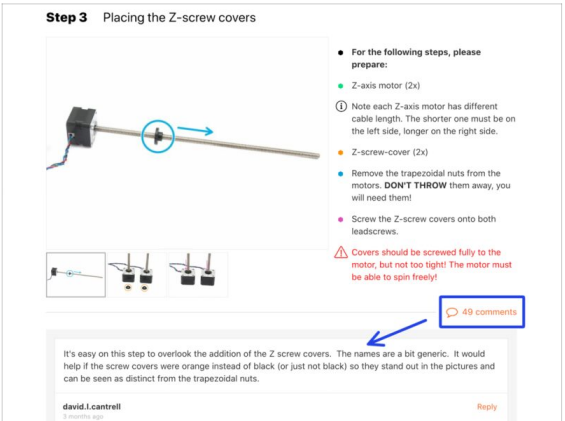


⚠ **WARNING:** Make sure to **protect the electronics against electrostatic discharge (ESD)**. Always unpack the electronics right before you need them!

- Here are some **tips to prevent damage to the electronics:**
  - **Keep the electronics inside the ESD bag** right until you are asked to install them.
  - **Always touch the sides of the board** while manipulating with it. Avoid touching the chips, capacitors and other parts of the electronics.
  - **Before you touch the electronics** use any conductive (steel) structure nearby to discharge yourself.
  - **Be extra cautious in the rooms with carpets**, which are a source of electrostatic energy.
  - Clothes from wool and certain synthetic fabrics can easily gather static electricity. It is safer to wear **cotton clothing**.

STEP 13 How to successfully finish the assembly



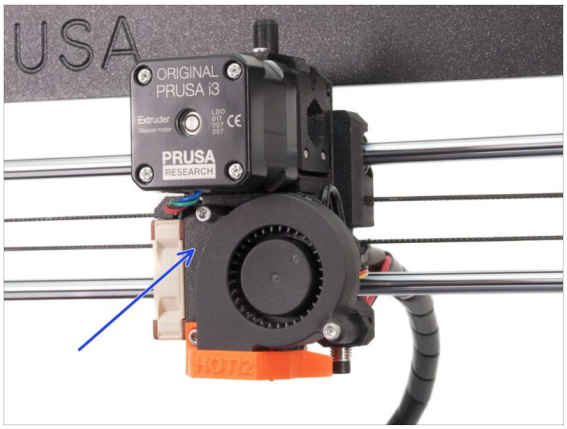


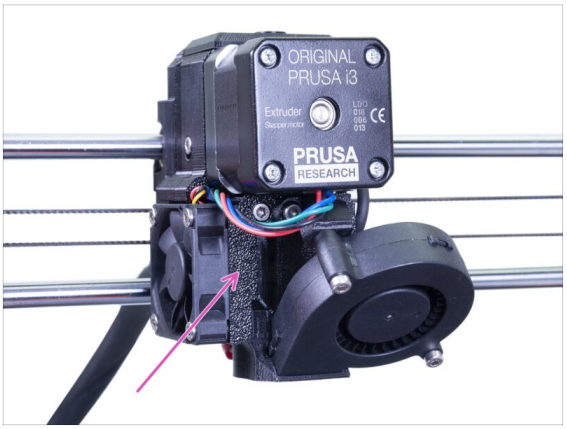
⚠ **To successfully finish the assembly please follow all these:**

- **Always read all the instructions at current step first**, it will help you to understand, what you need to do.
- **Don't follow pictures only!** It is not enough, the written instructions are as brief as they could be. Read them.
- **Read the comments** from the other users, they are great source of ideas. We read them too and based on your feedback improve the manual and the entire assembly.
- **Use reasonable force**, the printed parts are tough, but not unbreakable. If it doesn't fit, check your approach twice.
- **Most important: Enjoy the build, have fun.** Cooperate with your kids, friends or partners. *However, we take no responsibility for possible fights ;)*

⚠ Once again **check you have printed all the necessary parts** for the upgrade.

STEP 14 Choose your printer

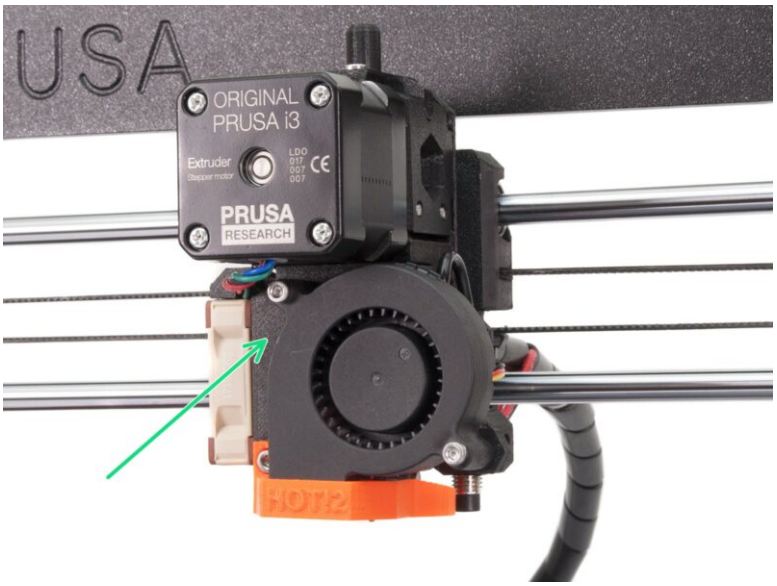




- Each printer requires a slightly different disassembly and upgrade procedure.
  - If you are upgrading **MK3 to MK3S+**, please follow this chapter: 2A. MK3 Extruder disassembly
  - If you are upgrading **MK3S to MK3S+,** please follow this chapter: 2B. MK3S Extruder disassembly

⚠ Make sure you have printed all the parts!!!

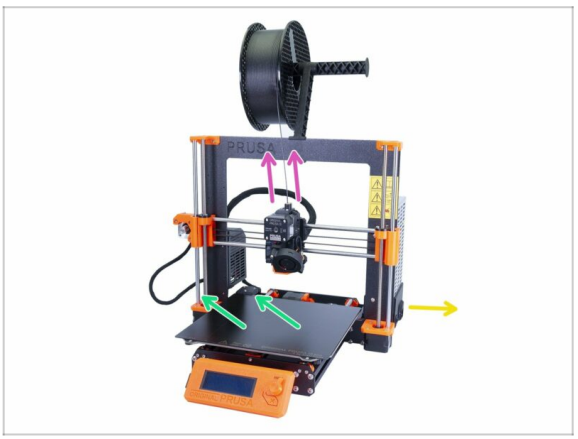
2A. MK3 Extruder disassembly



STEP 1 Tools necessary for this chapter

- Needle-nose pliers for cutting zip ties
- 2.5mm Allen key for M3 screws

STEP 2 Preparing the printer



⚠ **Before you start**, make sure that:

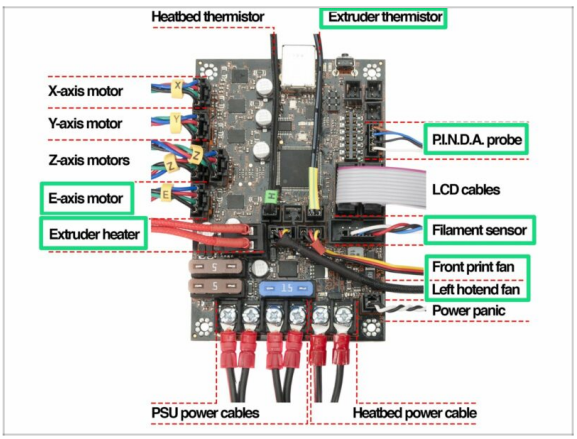
- the filament is unloaded from the hotend
- the printer is properly cooled down
- the printer is unplugged
- you removed the steel sheet

⚠ **Before you start disassembling the extruder, make sure you have printed all the necessary parts for the upgrade!!!**

STEP 3 Releasing the cable bundle

- Using an Allen key release the M3x40 screw and open the door.
- Release two M3x10 screws and remove the extruder-cable-clip. On older printers cut the zip tie.
- In case there are zip ties inside the Einsy-case, carefully remove them.
- Remove the zip ties on the cable holder.
- Remove the textile sleeve (spiral wrap) all the way to the Einsy-case.

STEP 4 Unplugging the extruder cables

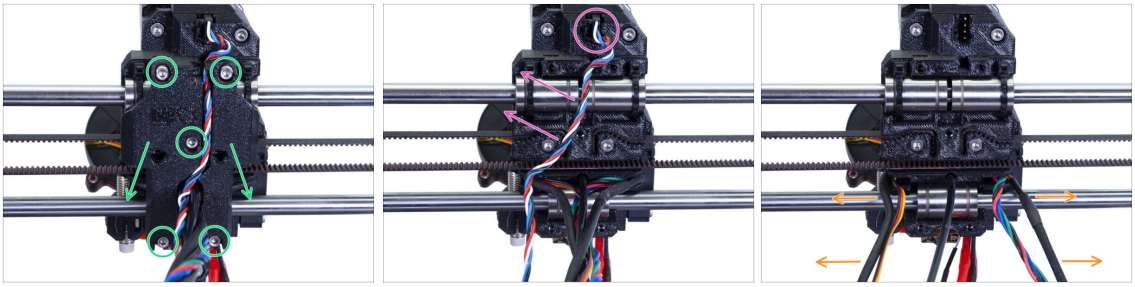


- Open the Einsy-case and follow all the cables from the extruder. Unplug them one by one.

⚠ **WARNING:** some cables have a safety latch, don't pull them! First, push the safety latch to ensure the connector is free to move.

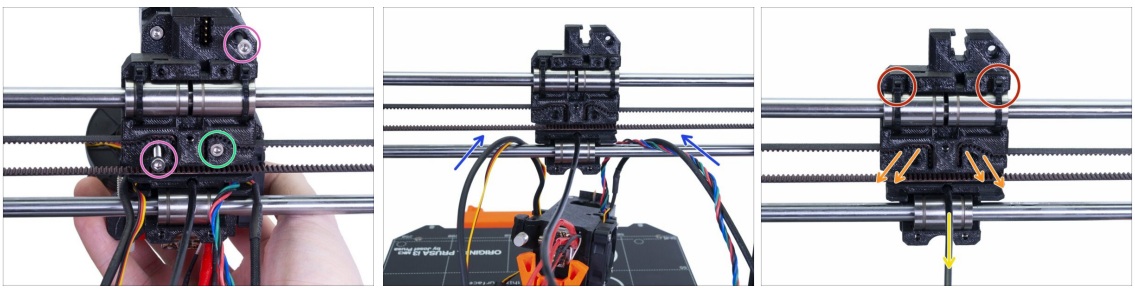
- Leave the other cables connected.

STEP 5 Removing the filament sensor cable



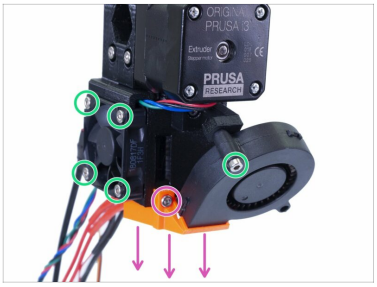
- Release all five screws and remove the X-carriage-back. Be careful with the wires. Disassemble the cable-holder and keep it for the rebuild.
- Unplug the connector and remove the filament sensor cable. **This cable is no longer needed** and will be replaced with a new one.
- Carefully separate the cables and push them to sides.

STEP 6 Removing the extruder



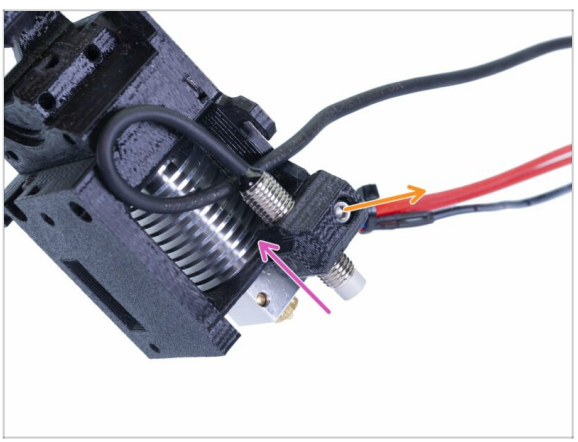
- Release both M3 screws.
- Before removing the last screw, **hold the extruder as it will fall down**.
- Carefully lay the extruder on the heatbed and push the cables through the X-axis.
- Return to the X-carriage:
  - Remove the black nylon.
  - Remove the belt and keep it for later.
  - Cut the zip ties and remove the carriage completely. For the MK3S you will need a different one.

STEP 7 Fans and motor removal



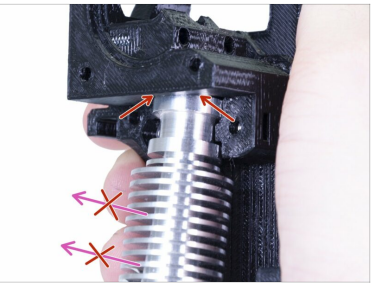
- Before removing the print fan, make sure the nozzle-fan (fan-shroud) is removed first.
- Release all screws on both fans and carefully remove them.
- Release both screws holding the idler.
- Remove the fan support.
- **NOW, BE CAREFUL**: release all three screws, but keep in mind the motor and the idler including Bondtech gear will fall off!

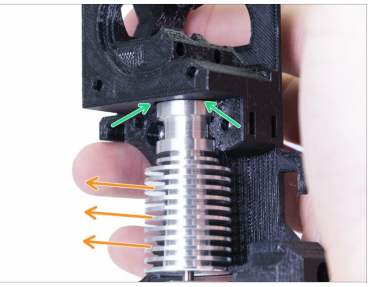
STEP 8 P.I.N.D.A. sensor removal



- Release the M3x10 screw.
- Remove the P.I.N.D.A. sensor.
- Be careful with the wire!

STEP 9 Hotend removal



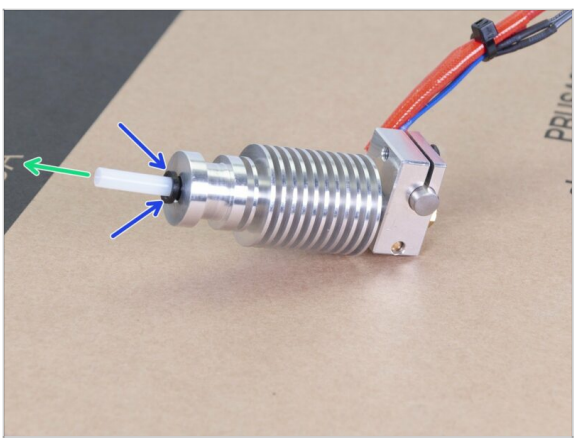


- Release both M3 screws and remove the Extruder-cover so you can reach the hotend.

⚠ **WARNING:** Removing hotend from the extruder requires "special" technique, then the hotend slides out quite easily. Don't use excessive force, or you will damage some parts irreversibly!!!

- The hotend is removed by inclining and pulling at the same time. See the picture showing the **WRONG** inclination. This hotend is inclined too much to the front and there is no gap between the hotend and the extruder body. Hotend is partly inside and you won't be able to remove it.
- The second picture is showing the **CORRECT** inclination. The hotend is tilted, but there is a gap between the hotend and the extruder body. You will be able to remove it.

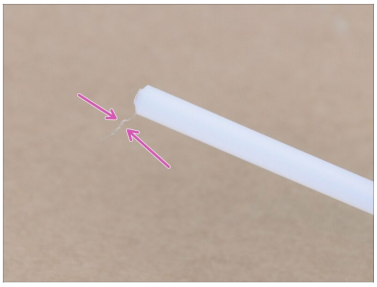
STEP 10 Removing the PTFE tube

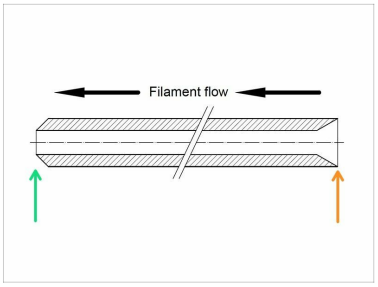


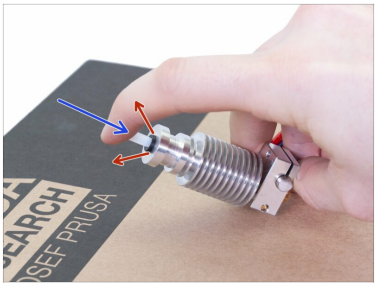
⚠ **THIS STEP IS OBLIGATORY!** The MK3S+ is using a shorter PTFE tube compared to the MK3, let's replace it now!

- Press the black plastic collet down towards the hotend.
- Remove the old PTFE tube from the hotend.

STEP 11 Inserting the new PTFE tube





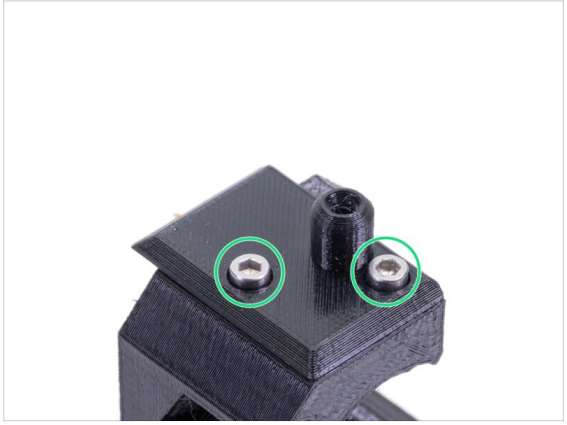


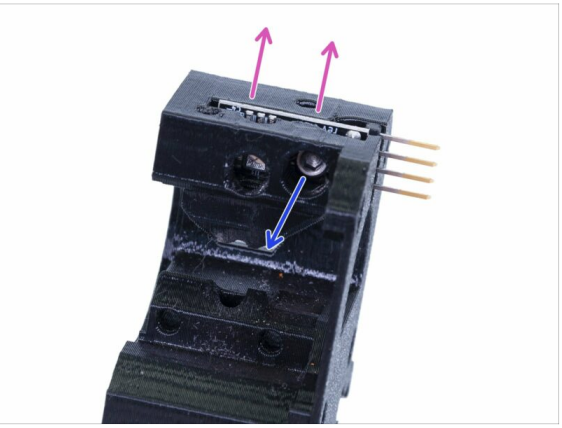
- Open the upgrade package and look for a bag with the new (shorter) PTFE tubes.
- Check the new PTFE tube. Make sure both ends are clean.
- Now it is time to insert the new PTFE tube. Note there are two different ends:
  - One end of the tube has a **"rounded"** outer edge. This end must be **inside the hotend**.
  - Look at the other end, where the tube is drilled inside, the shape of the **edge is "conical"**. This is the side, where filament enters the tube. This part must be outside the hotend.
- Push the black collet in. Slide the tube all the way in and hold it!
- Using second hand pull the collet out and only then release the tube!!! **THIS IS CRUCIAL** for the hotend to work properly. **The tube must not be able to move in or out!**

STEP 12 Idler disassembly

- Push and pull out the shaft. Keep it for later.
- Take out the Bondtech gear, **BUT BE CAREFUL**, there are two bearings inside. Don't lose them!!!

STEP 13 Removing the filament sensor (optional)

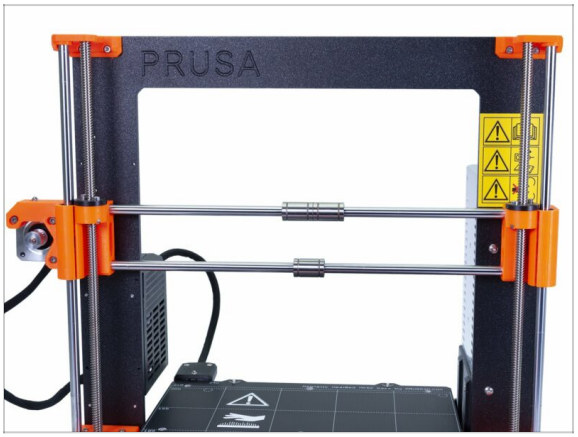




⚠ **This step is optional**, you will use a different sensor in the new extruder.

- Release two screws holding filament-sensor-cover.
- Release the M3x10 screw holding the filament sensor.
- Remove the sensor, avoid touching the PCB and the chips on it.

STEP 14 Disassembly is finished!



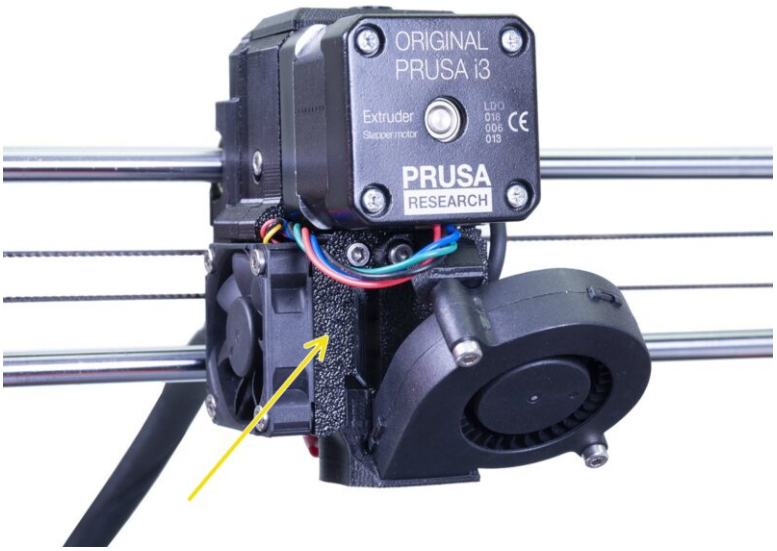
- **We are done here!**

⚠ **Before you move on, let's recap:**

  - Store or throw away all the old plastic parts, you won't need them.
  - Keep both fans, hotend (with replaced PTFE), Nylon filament and the X-axis belt.
  - Keep the motor and both Bondtech gears including bearings and the shaft.
  - The disassembled filament sensor with the cable will be replaced with a new one. You can keep this one for your future projects ;)
  - Fasteners are included in the upgrade kit. However, keep the ones from the extruder as a spare.

- Ready? It's time for: **3A. MK3 Extruder upgrade.**

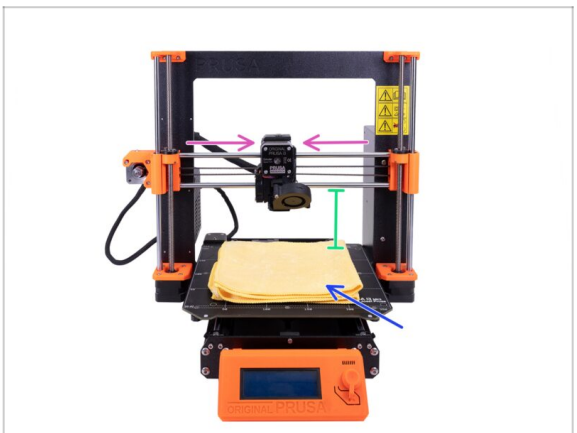
2B. MK3S Extruder disassembly



STEP 1 Tools necessary for this chapter

- Needle-nose pliers for zip tie trimming.
- 2.5mm Allen
- 1.5mm Allen

STEP 2 Preparing the printer



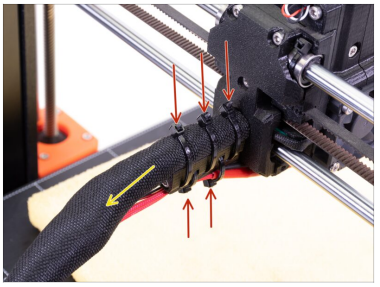
⚠ **Before you start**, make sure that:

- the filament is unloaded from the hotend
- the printer is properly cooled down
- the printer is unplugged

- Move the Z-axis to half its height.
- Move the X-axis to the center.
- It's recommended to use any cloth or piece of fabric, which is thick enough and covers the heatbed. This will ensure you won't damage (scratch) the surface during the disassembly.

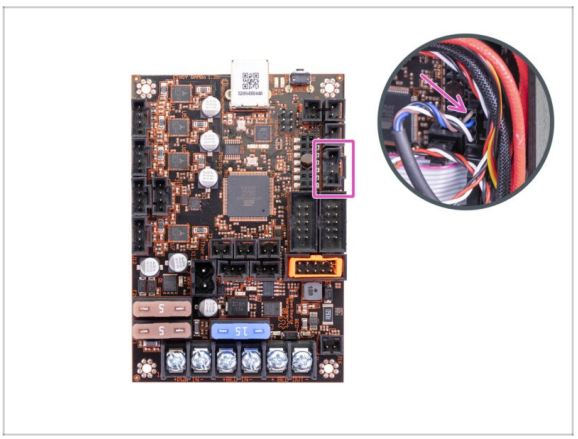
STEP 3 Releasing the cable bundle





- Using an Allen key release the M3x40 screw and open the door.
- Release two M3x10 screws and remove the Extruder-cable-clip. On older printers cut the zip tie.
- In case there are zip ties inside the Einsy-case, carefully remove them.
- Remove the zip ties on the cable holder.
- Remove the textile sleeve all the way to the Einsy-case.

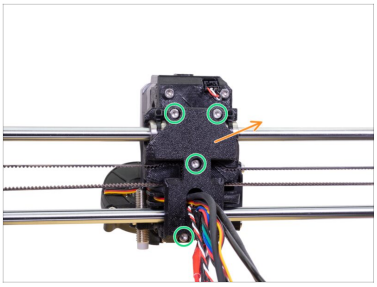
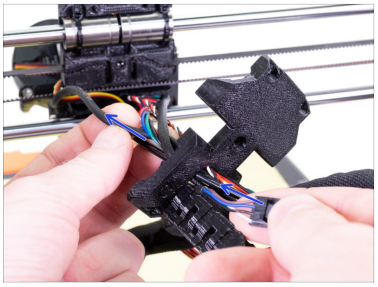
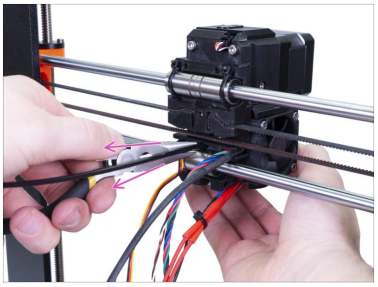
STEP 4 Disconnecting the electronics



- Disconnect the P.I.N.D.A. sensor from the Einsy board.

⚠ **WARNING:** the P.I.N.D.A. sensor cable has a safety latch, don't pull it! First, push the safety latch to ensure the connector is free to move.

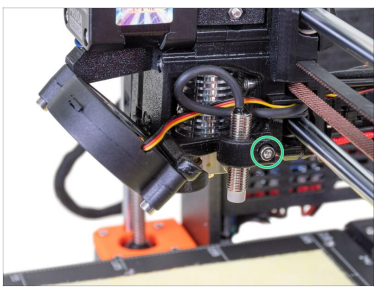
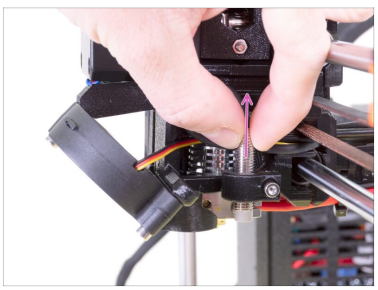
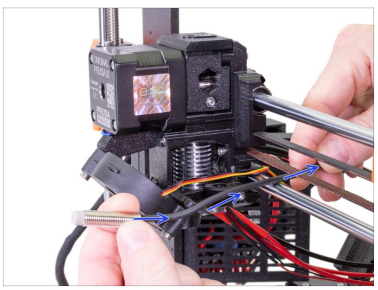
STEP 5 Removing the x-carriage-back

- Release four screws on the X-carriage-back part.
- Remove the X-carriage-back from the extruder and let it hang on the cable bundle.

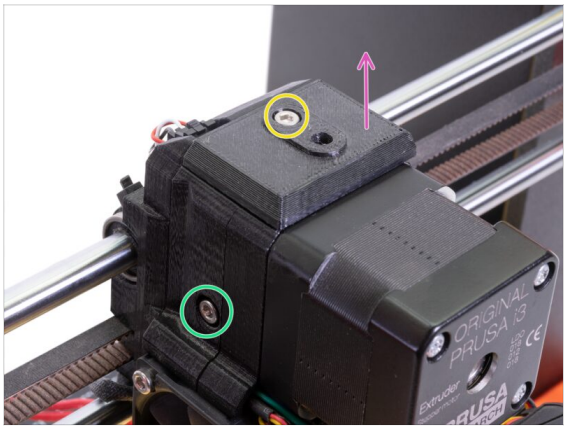
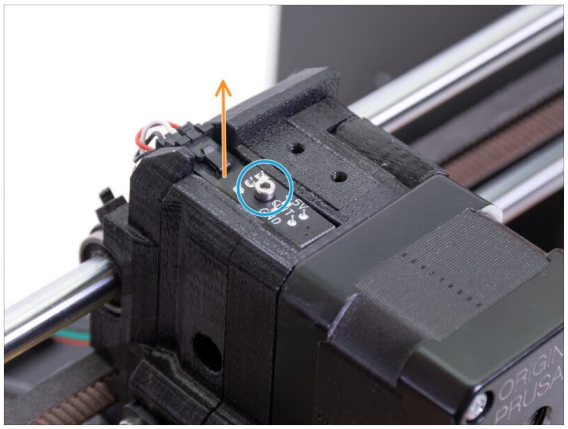
  ⚠ **Do not throw away the X-carriage-back**. Keep it for reuse in the following chapter.
- Push the P.I.N.D.A. sensor cable through the opening in the X-carriage-back so you can remove the probe later.
- Remove the the nylon filament from the printer.

STEP 6 Removing the P.I.N.D.A. sensor

- Release the screw on the P.I.N.D.A. holder.
- Remove the P.I.N.D.A. sensor from the printer.
- Push the P.I.N.D.A. cable out of the printer between the X-belt and the smooth rod.

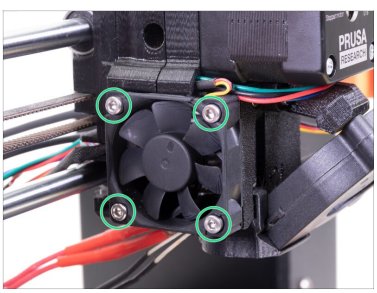
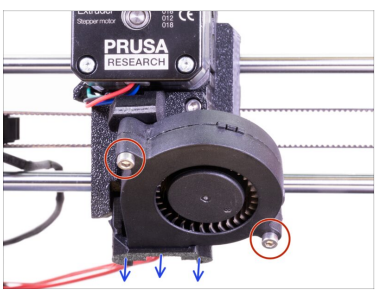
STEP 7 Removing the filament sensor

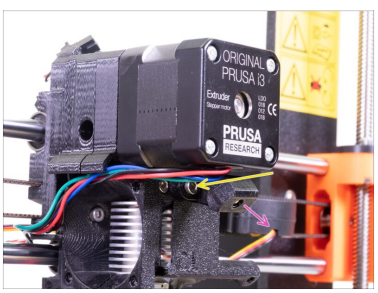



- Release and remove the M3x40 screw with the spring from the side of the extruder.
- Release the screw on the Fs-cover.
- Remove the Fs-cover from the extruder.
- Using the 1.5mm Allen key release the M2x8 screw holding the filament sensor.
- Unplug the sensor and remove it from the printer.

ⓘ Your printer may have a black or red version of the filament sensor. The red is a newer, more optimized version. If you have the red one already, you can re-use it later. If you have a black one, keep it as a spare. Filament detection works the same way on both.

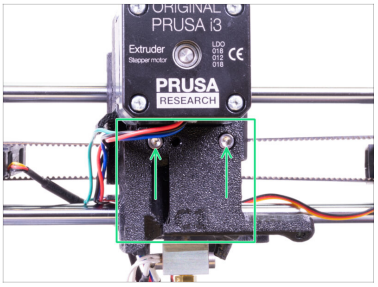
STEP 8 Removing the fans

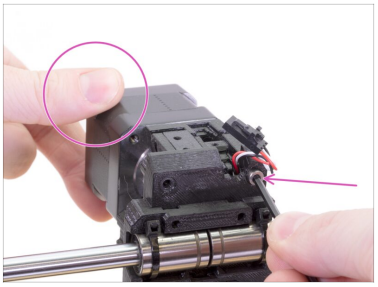





- Release four screws on the hotend (left) fan and remove it from the extruder.
- Release two screws on the print (front) fan and remove it from the extruder.
- Remove the Fan-shroud.
- Use the 2.5mm Allen key with the ball-end and release the screw on the Print-fan-support.
- Remove the Print-fan-support from the extruder.
- Carefully put both fans on the heatbed.

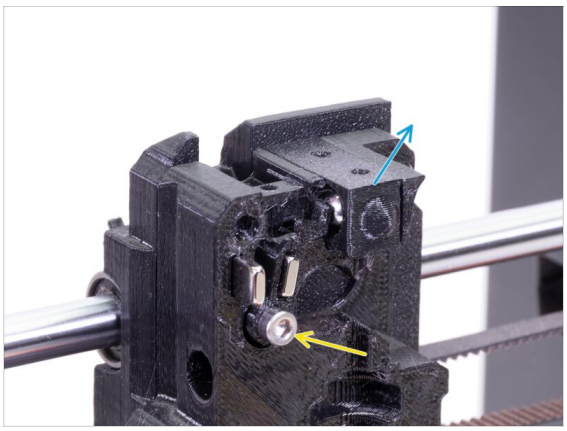
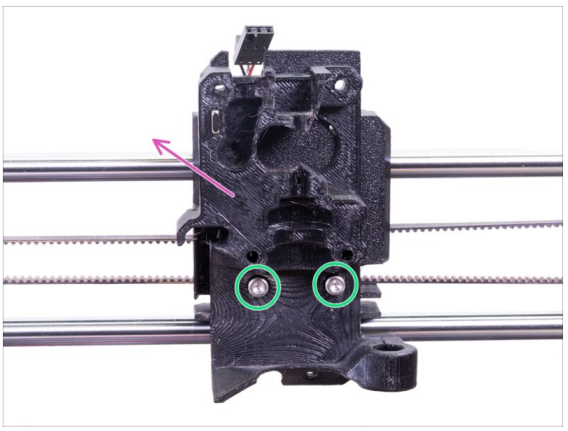
STEP 9 Extruder surgery



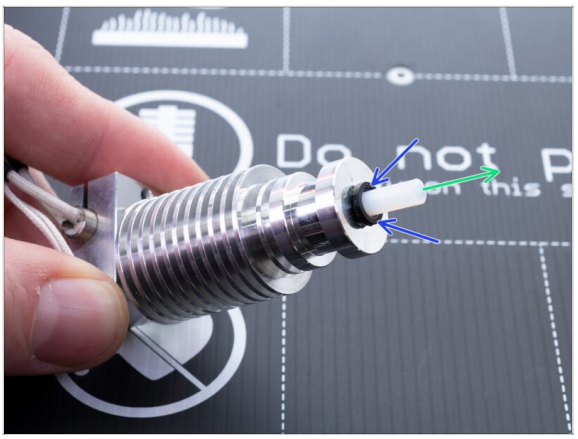
- Release two screws on the Extruder-cover and remove the Extruder-cover from the hotend.
- Release the left M3x40 screw from the back of the extruder.
- Remove the extruder idler from the printer.
- Hold by hand the extruder motor and release the second M3x40 screw from the extruder. Carefully remove the extruder motor.
- Carefully put the extruder motor on the heatbed.

STEP 10 Removing the extruder-body

- Remove the Adapter-printer with the ball inside from the extruder-body. Be careful, the ball tends to jump out and roll away.
- Release the M3x18 from the Fs-lever and remove it from the part.
- Release the remaining two screws from the Extruder-body.
- Remove the Extruder-body from the printer.

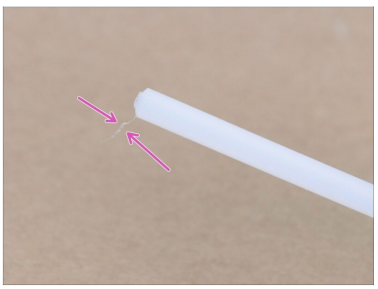
STEP 11 Removing the PTFE tube

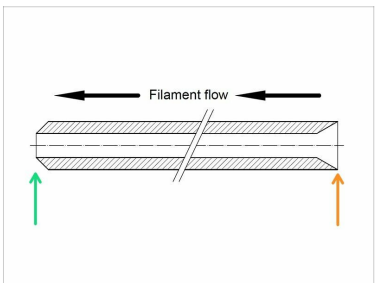


⚠ **THIS STEP IS OBLIGATORY!** The MK3S+ is using a shorter PTFE tube compared to the MK3S, let's replace it now!

- Press the black plastic collet down towards the hotend.
- Remove the old PTFE tube from the hotend.

STEP 12 Inserting the new PTFE tube



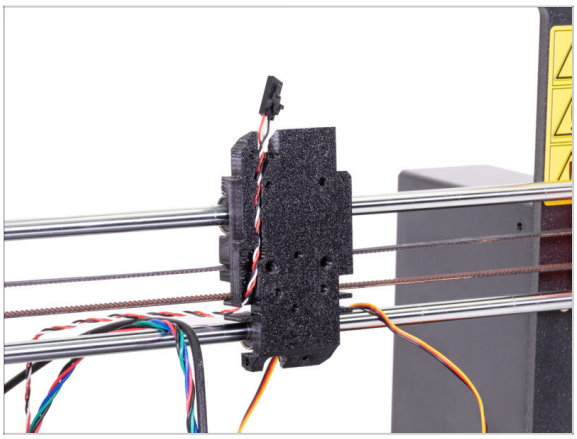


- Open the upgrade package and look for a bag with the new (shorter) PTFE tubes
- Check the new PTFE tube. Make sure both ends are clean.
- Now it is time to insert the new PTFE tube. Note there are two different ends:
  - One end of the tube has a **"rounded"** outer edge. This end must be **inside the hotend**.
  - Look at the other end, where the tube is drilled inside, the shape of the **edge is "conical"**. This is the side, where filament enters the tube. This part must be outside the hotend.
- Push the black collet in. Slide the tube all the way in and hold it!
- Using second hand pull the collet out and only then release the tube!!! **THIS IS CRUCIAL** for the hotend to work properly. **The tube must not be able to move in or out!**

STEP 13 Idler disassembly

- Push and pull out the shaft. Keep it for later.
- Take out the Bondtech gear, **BUT BE CAREFUL**, there are two bearings inside. Don't lose them!!!
- The printed part will be replaced with a new one.

STEP 14 Disassembly is finished!



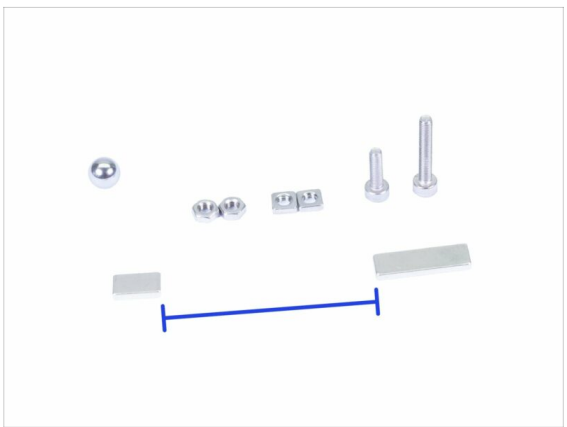
- **We are done here!**
- **Before you move on, let's recap:**
  - Store or throw away all the old extruder plastic parts, you won't need them. Except the X-carriage which is still attached to the bearings and the X-carriage-back with the cables going through.
  - Keep both fans, hotend (with replaced PTFE), Nylon filament and the X-axis belt.
  - Keep the motor and both Bondtech gears including bearings and the shaft.
  - The disassembled filament sensor with the cable will be replaced with a new one. You can keep this one for your future projects ;)
  - Fasteners are included in the upgrade kit. However, keep the ones from the extruder as a spare.
- Now let's move to: **3B. MK3S Extruder upgrade.**

3A. MK3 Extruder upgrade

STEP 1 Tools necessary for this chapter

- Needle-nose pliers for zip tie trimming
- 2.5mm Allen key for M3 screws
- 2mm Allen key for nut alignment
- 1.5mm Allen key for M2 screws

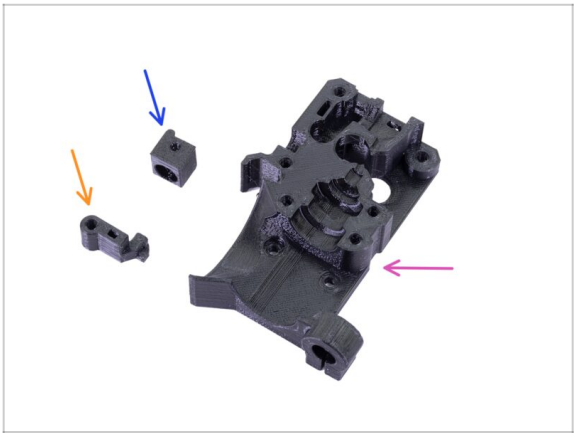
STEP 2 Few tips before we start



⚠ **This is the most important and hardest chapter.** So take your time and don't rush. A properly assembled extruder is essential.

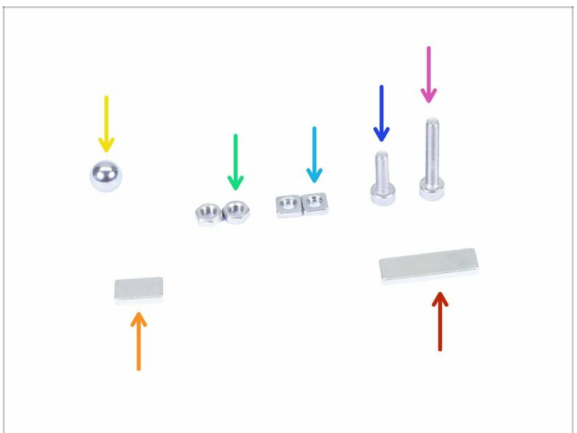
- **The bag with fasteners includes M3x20 and M3x18 screws. Make sure not to mix them!** Pay attention to the instructions, when to use the M3x20.
- **Keep the magnets a sufficient distance apart.** They can break each other!
- **The hotend for MK3S+ needs a shorter PTFE tube compared to the MK3** (more info at help.prusa3d.com/PTFE-MK3S+).
- **Pay careful attention to the cable management.** If you miss some important steps you will need to disassemble the extruder.
- **This bag includes extra fasteners**. Don't worry if you finish with few unused screws and nuts.

STEP 3 Extruder-body parts preparation



- **For the following steps, please prepare:**
- Extruder-body (1x)
- Adapter-printer (1x)
- FS-lever (1x)
- The list continues in the next step.

STEP 4 Extruder-body parts preparation

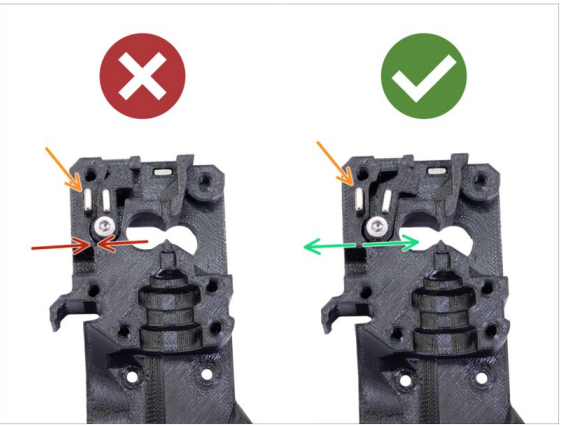


- **For the following steps, please prepare:**
- M3x18 screw (1x)
- M3x10 screw (1x)
- M3nS nut (2x)
- M3n nut (2x)
- Steel ball (1x)
- Magnet 10x6x2 (1x)
- Magnet 20x6x2 (1x)

STEP 5 Extruder-body assembly

- Take the M3nS nut and insert it in the Extruder-body. **Make sure the nut is all the way in.**
- ⓘ Ensure correct alignment of the nuts using the Allen key.
- Secure the nut using an M3x10 screw. *Tighten the screw just slightly. Later on we will need to add the SuperPINDA sensor here.*
- Take two M3n nuts and insert them in.
- ⓘ Use the screw pulling technique.
- Flip the Extruder-body and insert one M3nS nut all the way in the part.
- Take the smaller magnet (10x6x2) and insert it carefully in the FS-lever. The majority of the magnet will be hidden inside the printed part.

STEP 6 FS-lever assembly

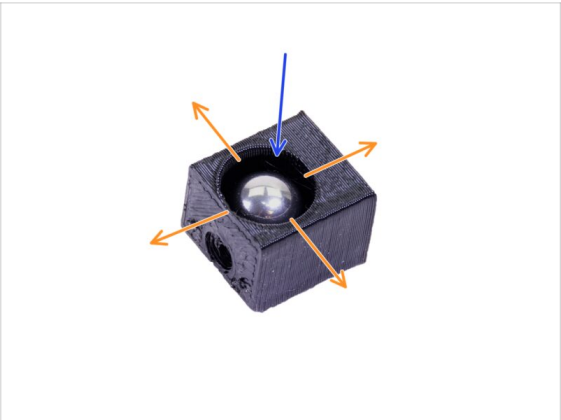


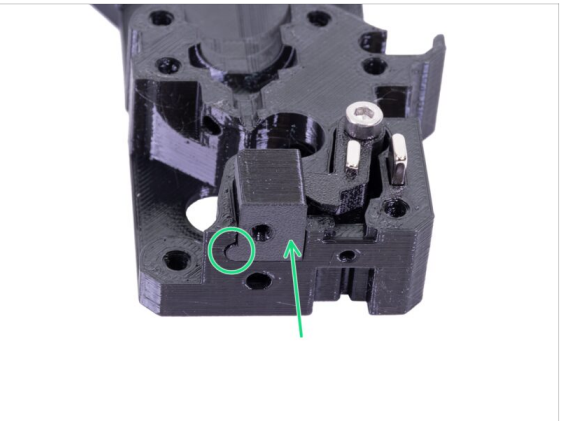
- Insert the FS-lever in the body.
- Secure the part with a M3x18. Tighten it, but ensure the lever can move freely.

⚠ **WARNING:** make sure the following procedure is done right, otherwise the **filament sensor won't work!!!**

- Insert the bigger magnet (20x6x2) in the Extruder-body. It will still stick out:
  - **Incorrect setup:** magnets are attracting each other, thus the **lever is pulled to the left**.
  - **Correct setup:** magnets are repelling each other, thus the **lever is pushed to the right**.

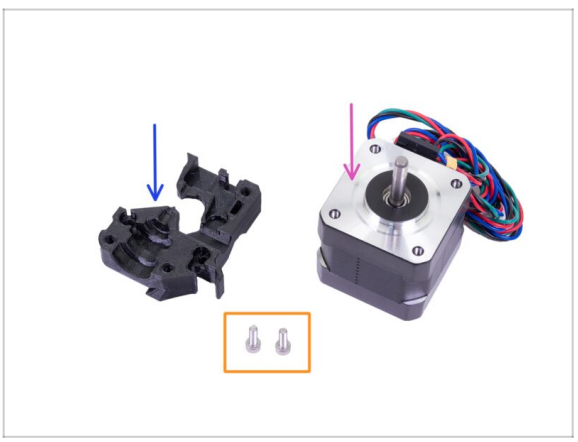
STEP 7 Steel ball assembly





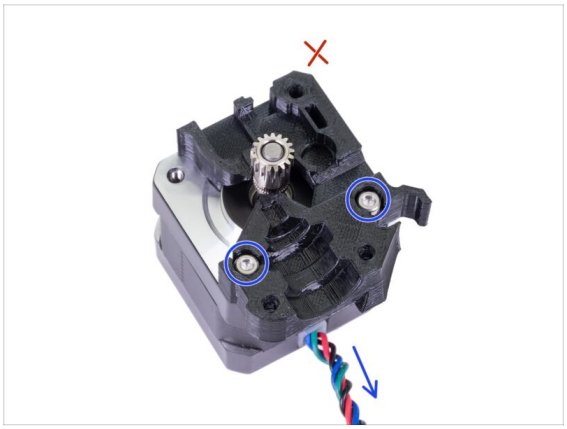
- Take the printed part Adapter-printer and insert the steel ball in.
- Roll with the ball to all sides to ensure smooth movement.
- In case of any rough surface, remove the ball and clean the inside of the printed part.
- Place the printer part together with the steel ball in the Extruder-body. See the rounded protrusion on the printed part. It must fit to the groove in the Extruder-body. The surfaces of both parts should be almost aligned.
- **DON'T** use any screw to secure the Adapter-printer. It should hold inside the Extruder-body by itself.

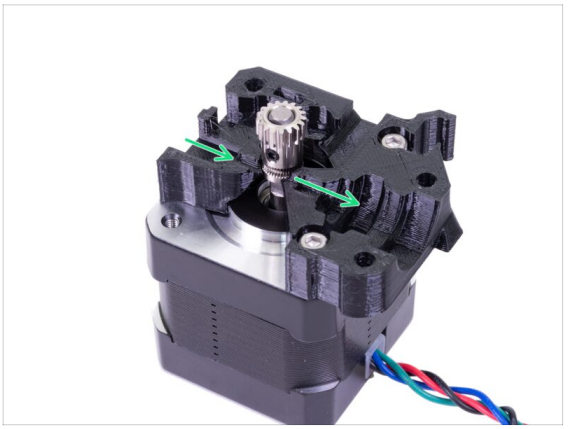
STEP 8 Extruder motor parts preparation



- **For the following steps, please prepare:**
- Extruder motor (1x)
- Extruder-motor-plate (1x)
- M3x10 screw (2x)

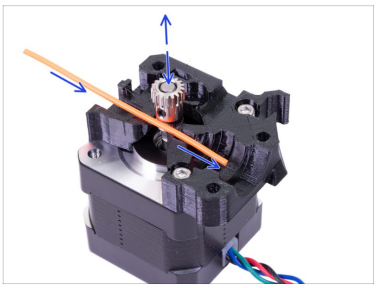
STEP 9 Extruder-motor-plate assembly

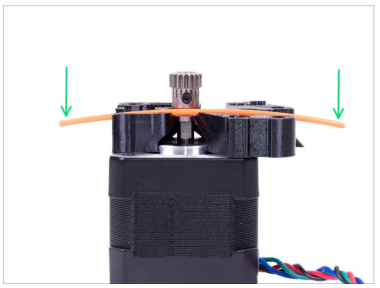


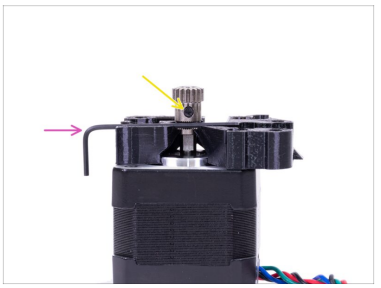


- Take the Extruder-motor-plate and secure it using **two M3x10 screws**. Use the cable as a guide to properly orient the part.
- Resist the temptation to place a screw in the third hole! Leave it for later ;)
- There is a "channel" for the filament inside the printed part. Make sure the teeth on the pulley are aligned with it.

STEP 10 Bondtech gear alignment







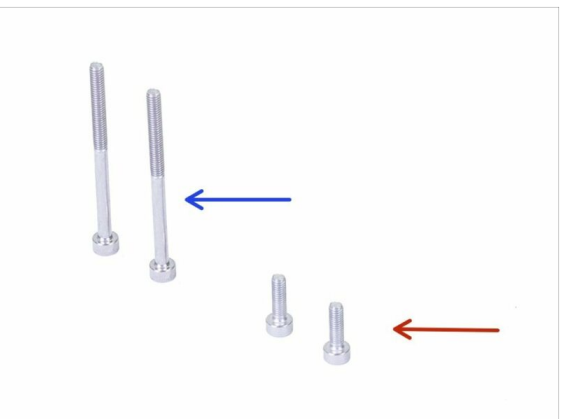
- Take a piece of the 1.75 filament. You can use the bundled one on a spool, don't use the black nylon, which is too thick. Straighten the filament as much as possible.
- Place the filament along the path and align the gear properly.
- The filament will be always slightly bent. Use it anyway for the initial alignment.
- For a final check replace the filament with an Allen key. Bear in mind, the key has slightly different size than the filament.
- Tighten the screw slightly to temporarily fix it. We will make the final check and tightening later on. **Be careful, you can strip the thread.**

ⓘ Don't use any glue to fix the screw in place, you won't be able to release it, in such case you might have to replace the entire motor.

STEP 11 Extruder-cover part preparation

- **For this step, please prepare:**
- Extruder-cover (1x)
- M3nS nut (1x)
- Slide the nut all the way in.
- Ensure correct alignment using the Allen key.
- Leave the hole on the "arm" empty for now. We will use it later, while assembling a print fan.
- The list continues in the next step...

STEP 12 Hotend parts preparation



- **For the following steps, please prepare:**
- Hotend for the MK3S+ (1x)
- **Make sure you have replaced the hotend PTFE tube** in the previous chapter. **MK3 tube is not compatible with MK3S+.**
- M3x40 screw (2x)
- M3x10 screw (2x)

STEP 13 Hotend assembly

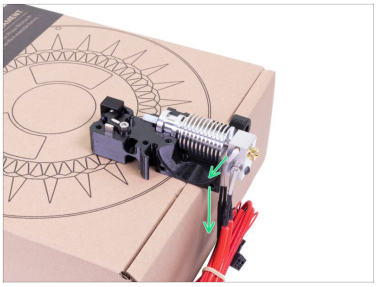
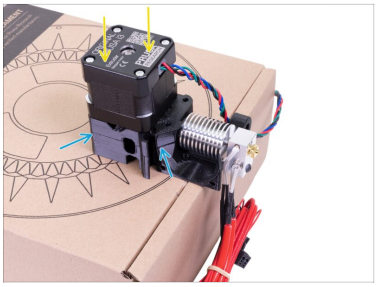
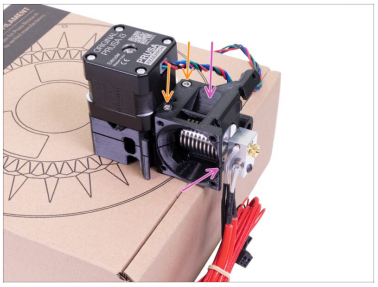


- Take two M3x10 screws and insert them in the holes. Doing this now makes the assembly slightly easier, but both holes are shallow and the screws might fall out. If this happens, you can continue without them and put them back later on (you will be notified later). *Also note, that in few upcoming pictures the screws might be missing.*

ⓘ Hotend assembly was completely reworked from MK3 to avoid bad placement. Also any future maintenance is much easier.

- Place the hotend next to the Extruder-body. See the grooves in the printed part which share the shape with the hotend.
- Correctly placed hotend. The hotend cables should point to the left, we will align them in the next step.

STEP 14 Extruder assembly

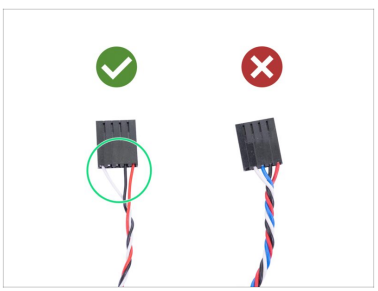
⚠ **In order to protect the hotend cables and ensure proper orientation**, it is highly recommended to use a box. Use the one provided in the kit.

- Place the Extruder-body with the hotend on the box and make sure the cables are on the left side and pointing down.
- Place your finger temporarily on the longer magnet and place the extruder motor assembly on the Extruder-body. The Bondtech gear might pull the magnet out while assembling parts together.
- Make sure both parts are aligned.
- Place the Extruder-cover on the Extruder-body. Again, make sure that all three parts are properly aligned.
- Insert two M3x40 screws, you've prepared earlier. Tighten them but be careful. They are slightly longer (2-3 mm), than the thickness of the entire assembly.

ⓘ Place the extruder aside for a few steps, we need to prepare another part. Leave it on the box to prevent damaging the cables.

STEP 15 X-carriage parts preparation

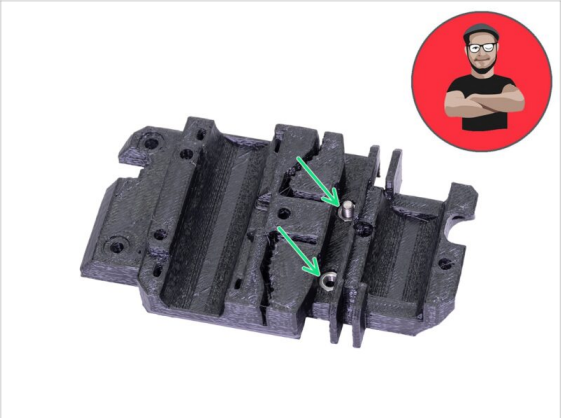




- **For the following steps, please prepare:**
- X-carriage (1x)
- M3n nut (2x)
- M3nS nut (4x)
- New IR-sensor cable (1x)

⚠ Make sure you have prepared the proper IR-sensor cable. **The version for MK3S+ has only three wires.**

STEP 16 X-carriage assembly

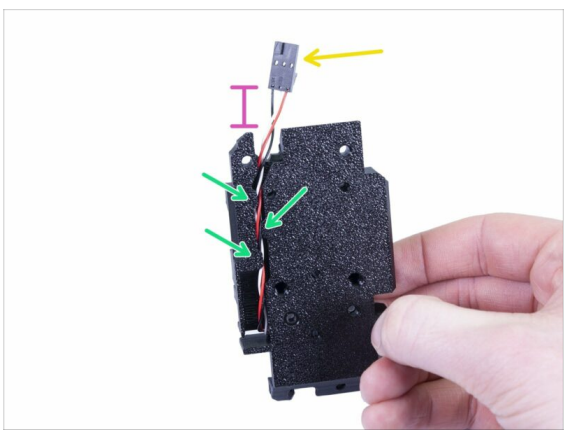


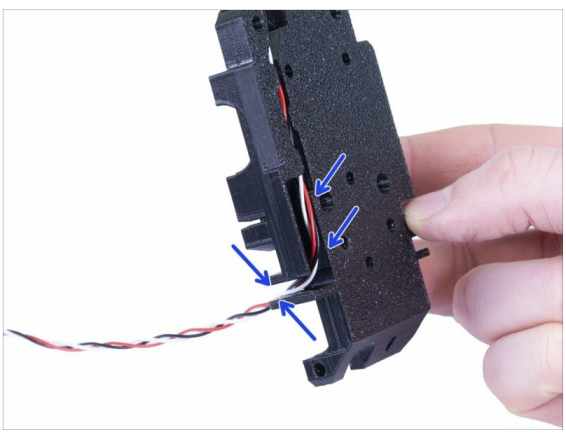
⚠ For the following nut insertion **USE A SCREW. THAT'S AN ORDER!!!** Seriously use a screw to pull the nuts in. Both have to be properly seated in the X-carriage.

- Take both M3n nuts and using pliers (or screw) push them in the X-carriage, then using a screw from the other side, pull them all the way in.
- Don't forget to remove the screw.
- Take all four M3nS nuts and insert them in. Ensure correct alignment using the Allen key.

ⓘ From now on, keep in mind the nuts are inside, avoid rotating the X-carriage "downwards", or the nuts might fall out.

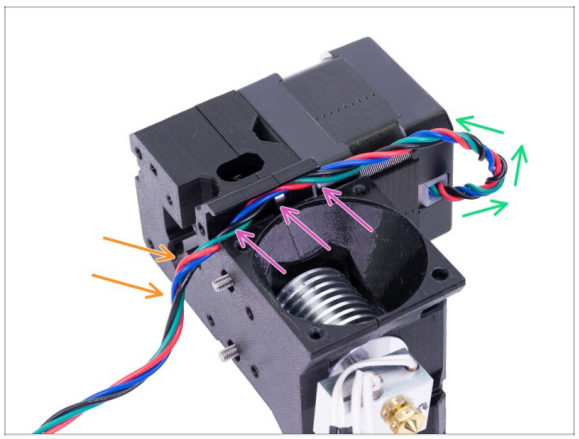
STEP 17 Assembling the IR-sensor cable





- Take the IR-sensor cable and locate the end with the smaller connector.
- Place cable in the X-carriage, use the small printed overhangs to keep the cable inside.
- The distance between the connector and the X-carriage should be around 15 mm (0.6 inch). We will adjust it later.
- Guide the cable through the slot. **Remember this path**, we will use it for other cables as well.

STEP 18 Assembling the X-carriage

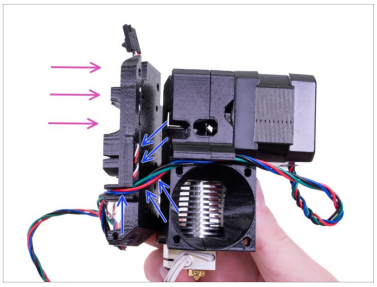
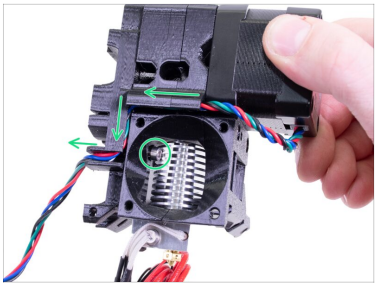
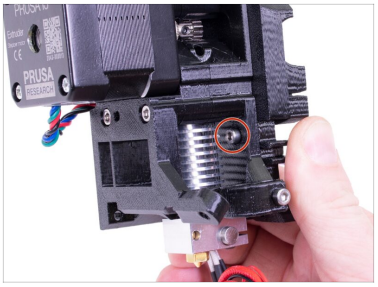


⚠ Following cable management is **CRUCIAL** for the extruder **TO WORK PROPERLY!** Read the instructions carefully.

- Start by making a small loop just below the extruder motor. Leave a slack about 2-3 cm (0.8 - 1.2 inch). *This is comes handy for easier disassembly in the future.*
- Then guide the cable in the "channel" all the way to the back.
- Slightly bend the cable down to form it around the edge.

ⓘ Also, prepare the X-carriage, both M3x10 screws (if you haven't used them already) and the longest Allen key with the ball-end, you will need it.

STEP 19 Assembling the X-carriage

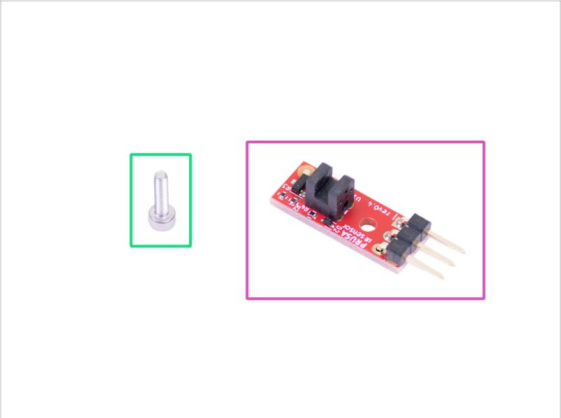




⚠ Following cable management is **CRUCIAL** for the extruder **TO WORK PROPERLY!** Read the instructions carefully.

⚠ Before you assemble the X-carriage, **check the nuts in the Extruder body are still in place**. The upper nut sometimes falls out.

- Grab the X-carriage and place it onto the back of the extruder assembly as shown in the picture.
- Make sure the motor cable follows the channel both in Extruder-body and X-carriage. In the X-carriage the motor cable will follow the path of the IR-sensor cable.
- **ENSURE NO WIRE IS PINCHED!** Then use the M3x10 screw and **Allen key with ball end** to connect both parts together. If you are inserting the screw at this moment, it will be slightly inclined in the beginning, but it will "straighten up" after few turns. Don't tighten the screw completely, we need to adjust the IR-sensor cable.
- Turn the extruder to the other side and if needed insert the second M3x10 screw. Don't tighten the screw, we need to adjust the IR-sensor cable.

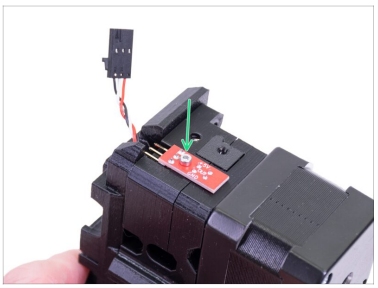
STEP 20 IR-sensor parts preparation

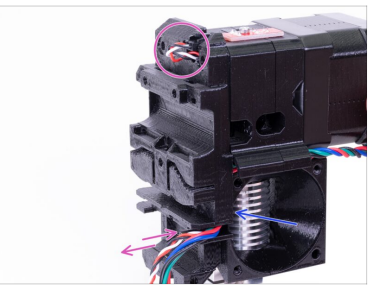


- **For the following steps, please prepare:**
- New Prusa IR-sensor (1x)
- M2x8 screw (1x)
- M3x40 screw (1x)

⚠ **BE CAREFUL** with the filament sensor, do not touch the PCB nor the chips on it. Hold the PCB from sides.

STEP 21 IR-sensor assembly



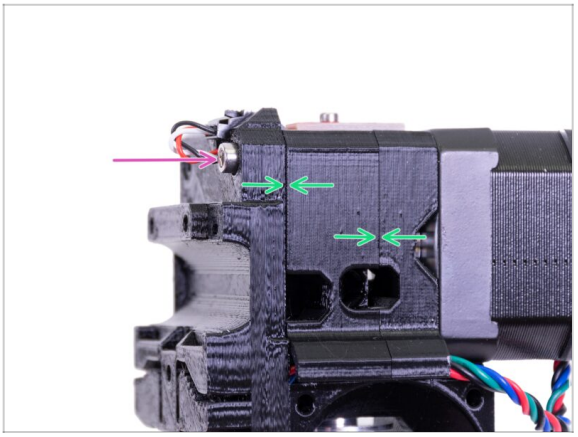


- Place the IR-sensor on the top of the Extruder-body and secure it with the M2x8. **Make sure the black plastic "u-shaped" part is facing down**.

ⓘ Tighten the M2x8 screw. The sensor shouldn't be able to move. Be careful, the PCB isn't indestructible ;)

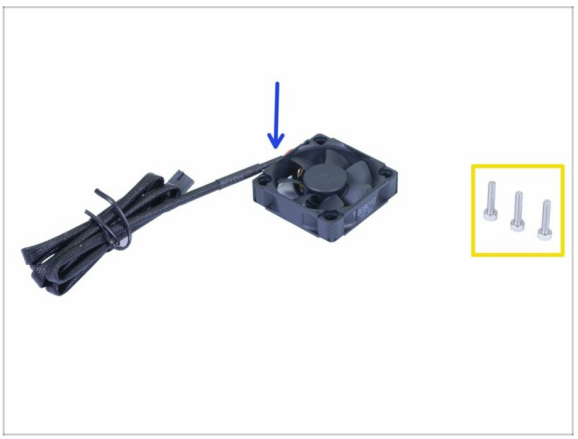
- Connect the cable, mind the correct orientation of the connector and wires.
- Leave some slack behind the sensor as in the picture. Don't create a too big loop as it might interfere with the frame. If needed adjust the length by gently pulling/pushing the cable.
- Ready? Ok, check once more no cable is pinched and **tighten both M3x10 screws** installed previously.

STEP 22 IR-sensor assembly



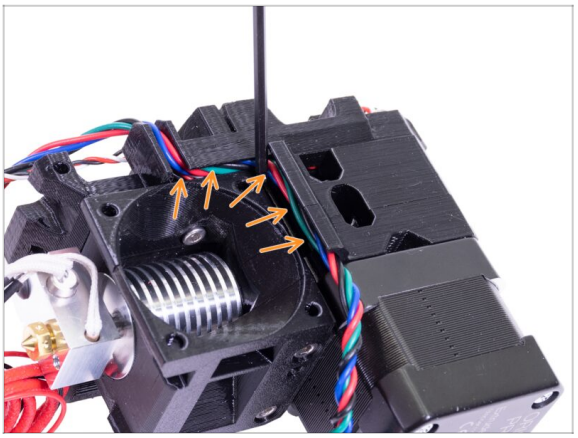
- Finish the sensor assembly by inserting an M3x40 screw.
- Make sure all the gaps are gone.

STEP 23 Hotend fan parts preparation



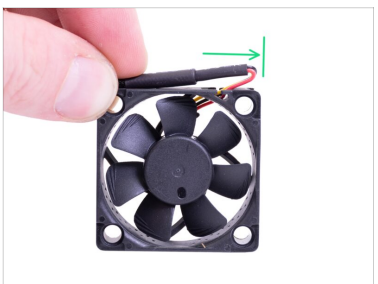
- **For the following steps, please prepare:**
- Hotend fan (1x)
- M3x14 screw (3x)
- Make sure you are using the correct screws.

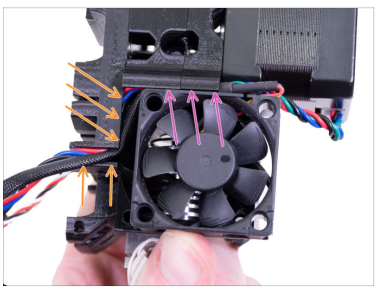
STEP 24 Guiding the Extruder motor cable

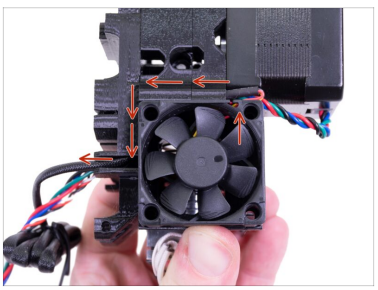


- Before you move to the next step, take an Allen key and **GENTLY PUSH** the motor cable to the channel to create space for the fan cable.

STEP 25 Hotend fan assembly





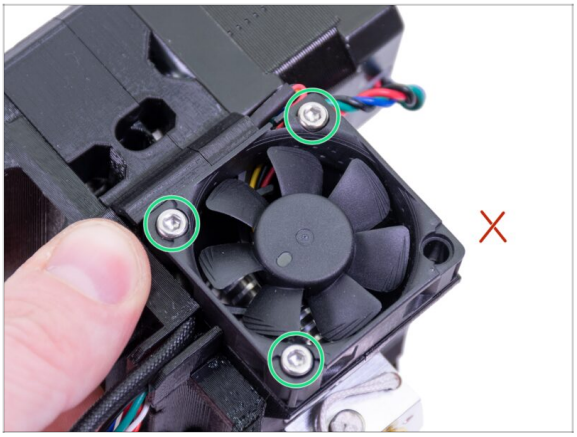


⚠ **The fan has two sides.** One has a sticker. Make sure this side is facing inside the extruder.

- First, create a loop on the cable. Make sure the black protective wrap is close to the edge of the fan. See the picture.
- Place the fan on the extruder and proceed in the following manner:
  - Start by placing the fan's cable in the upper channel
  - Slide the fan close to the X-carriage and **GENTLY PUSH** the cable in using an Allen key. Before you push the fan all the way to the left, place the cable in the X-carriage channel.

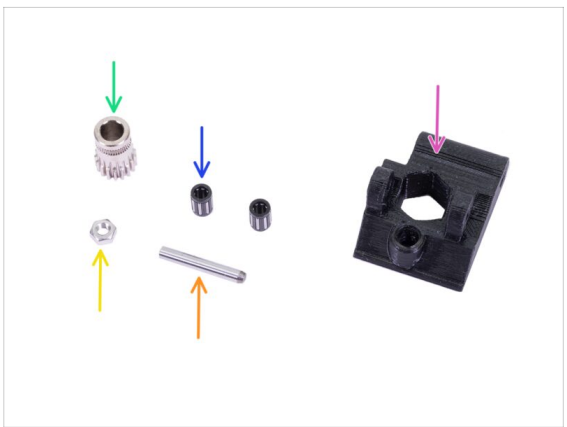
⚠ **FINAL CHECK!** The fan is oriented with the cable facing up, then the cable goes through the upper channel all the way to the X-carriage. In the X-carriage don't forget to use both channels. Make sure the **CABLE ISN'T PINCHED** along the way!

STEP 26 Hotend fan assembly



- Use the three M3x14 screws to fix the fan in place. Don't over tighten them, you can break the fan's plastic casing. Also make sure the fan can rotate freely.
- Note that the screws are "self-tapping" in the printed parts. There are no nuts.
- Leave the last hole empty, for now.

STEP 27 Extruder-idler parts preparation

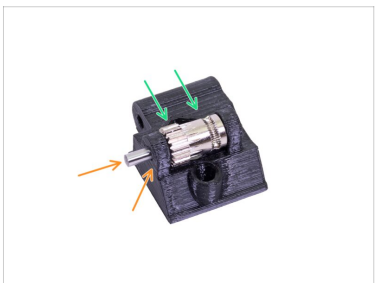


- **For the following steps, please prepare:**
- Extruder-idler (1x)
- Bondtech **WITHOUT** the hole for the set screw (1x)
- Bearing (2x) *might be stuck inside the gear*
- Shaft (1x)
- M3n nut (1x)
- M3x40 screw (2x)
- Idler spring (1x) *place the spring on the screw*

STEP 28 Bearing assembly

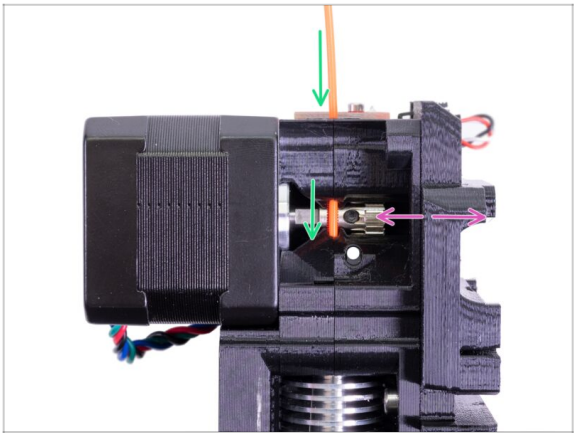
- **Insert both bearings** in the pulley. Be aware that bearings can slip out during assembly.

STEP 29 Extruder-idler assembly



- Take M3n nut and place it in the Extruder-idler.
- Use the screw pulling technique.
- Insert the pulley in idler as shown in the picture.
- Slide the shaft through the idler and pulley. Use reasonable force or you will **BREAK** the printed part. The shaft should be flush with the surface of the printed part.
- Place your finger on the bearing and ensure it can rotate freely.

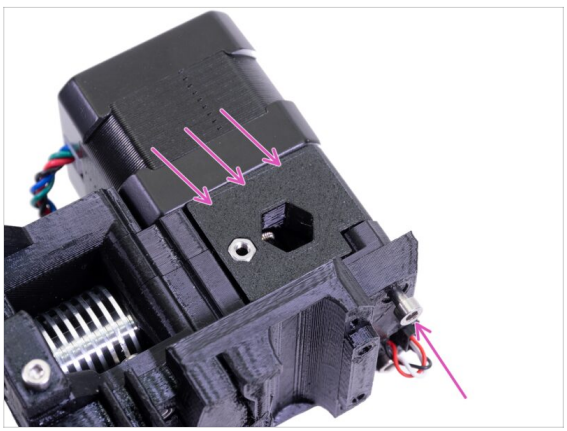
STEP 30 Filament alignment check

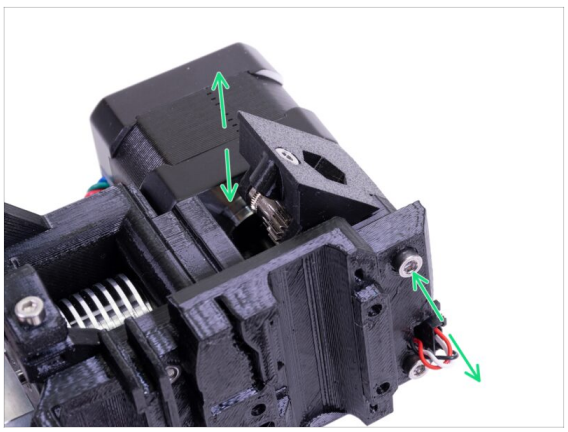


ⓘ Let's use this opportunity to check once more the proper alignment of the filament and the Bondtech gear.

- Push the filament from the top, through the Bondtech into the PTFE tube.
- Check the alignment and if needed, adjust the position.
- **Tighten the screw, but be careful**, you can easily strip it.
- **REMOVE** the filament.

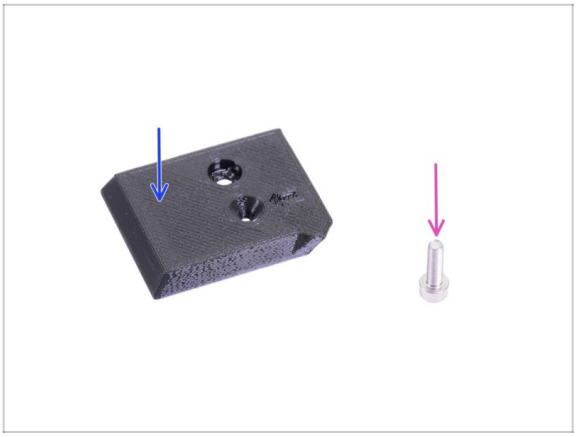
STEP 31 Extruder-idler mounting





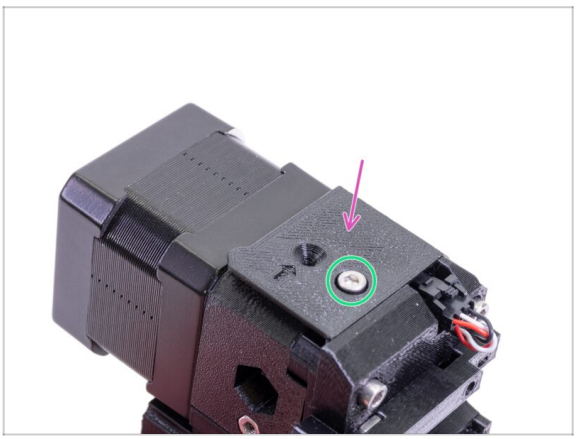
- Place the Extruder-idler in place and secure it using a M3x40 screw.
- Don't tighten the screw too firmly, it serves as a shaft for the idler. Check that the idler can rotate freely.

STEP 32 FS-cover parts preparation



- **For the following steps, please prepare:**
- FS-cover (1x)
- M3x10 screw (1x)

STEP 33 FS-cover assembly



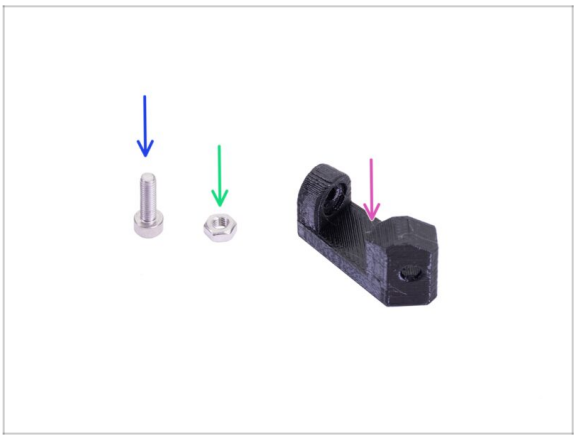
- Place the FS-cover on the extruder and align it according to the picture.
- Insert the M3x10 screw (mind the correct hole) and tighten it.

Tip: If you can't reach the nut, try to align it using an Allen key or pulling it up using a longer full-threaded screw from the spare bag.

STEP 34 Pretensioning the Extruder-idler

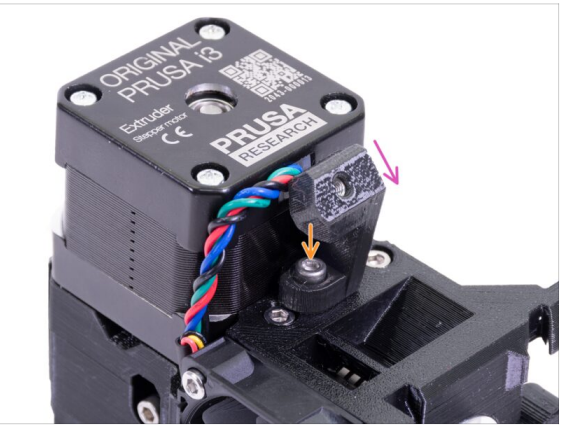
- Use the M3x40 screw with the spring to introduce tension to the Extruder-idler.
- Hold the Extruder-idler on the other side, until the screw reaches the nut.
- Since there is only one screw, you need to use a large amount of force. The head of the screw should sit flush or slightly below the surface.

STEP 35 Print-fan-support parts preparation



- **For the following steps, please prepare:**
- Print-fan-support (1x)
- M3x10 screw (1x)
- M3n nut (1x)

STEP 36 Print-fan-support assembly

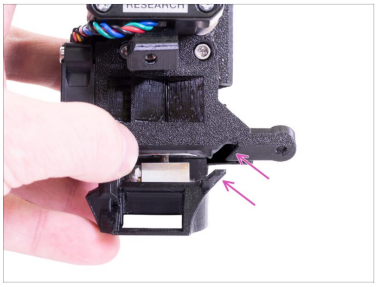
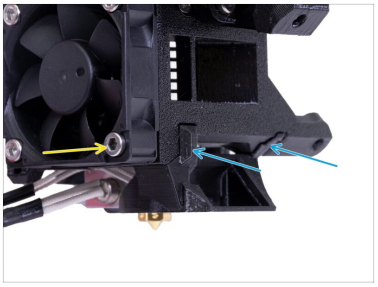


- Take the M3n nut and insert it all the way to the support. **It is crucial!**
- (i) Use the screw pulling technique.
- Place the support on the extruder and ensure the inclined part is facing "down" (towards the nozzle)
- Secure the support using an M3x10 screw.

STEP 37 Fan-shroud parts preparation

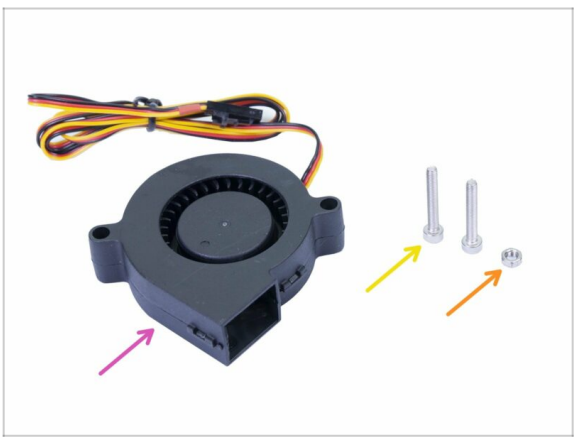
- **For the following steps, please prepare:**
- Fan-shroud (1x)
- M3x20 screw (1x)
- M3nS nut (1x)
- (i) If you have printed the fan-shroud yourself, it prints out together with the inner support which needs to be removed first.

STEP 38 Fan-shroud assembly

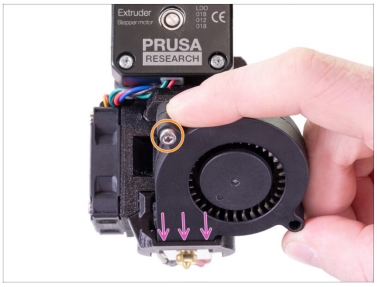
- Insert M3nS nut in the Fan-shroud, all the way in.
- Ensure correct alignment using the Allen key.
- See the protrusion on the Fan-shroud and the groove in the extruder.
- Slide the Fan-shroud into the extruder. Make sure that both protrusions on the Fan-shroud fit in the grooves on the extruder (see the picture).
- Secure it using the M3x20 screw. Don't overtighten the screw, you can break the plastic casing. Also make sure the fan can rotate freely.

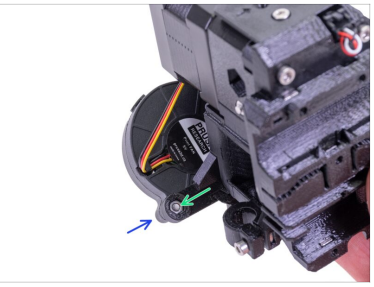
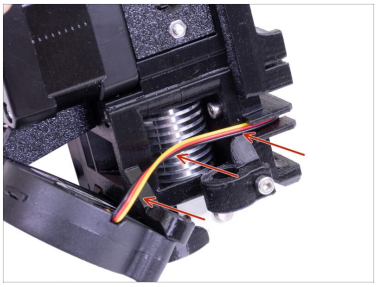
STEP 39 Print fan parts preparation



- **For the following steps, please prepare:**
- Print fan (1x)
- M3x20 screw (2x)
- M3n nut (1x)
- You need M3x20 screw due to its length. If you have used them accidentally somewhere else, head for the spare bag ;)

STEP 40 Print fan assembly



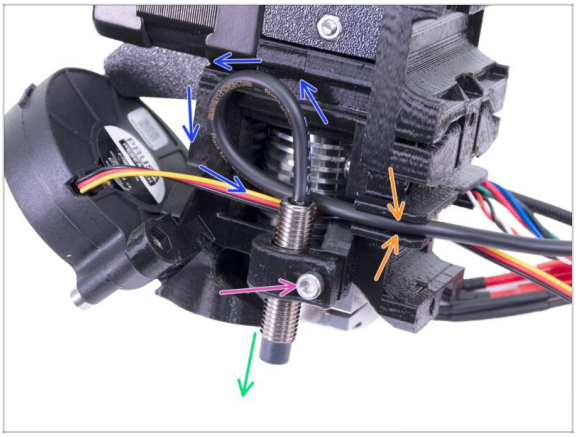
- First, slide the fan in the Fan-shroud and make sure it is aligned properly.
- Second, fix the fan in place using one M3x20 screw. **Tighten carefully**, or you will damage the fan's casing.
- Turn the extruder around and insert the M3n nut. No need to pull it in, we will use the screw.
- Place the remaining M3x20 screw from the other side and tighten it, **but carefully,** or you will damage the fan's casing.
- Guide the cable according to the picture in the channel. Bend it slightly towards the extruder. **DON'T stretch the cable!**

STEP 41 SuperPINDA sensor parts preparation

- **For the following steps, please prepare:**
- SuperPINDA sensor (1x)

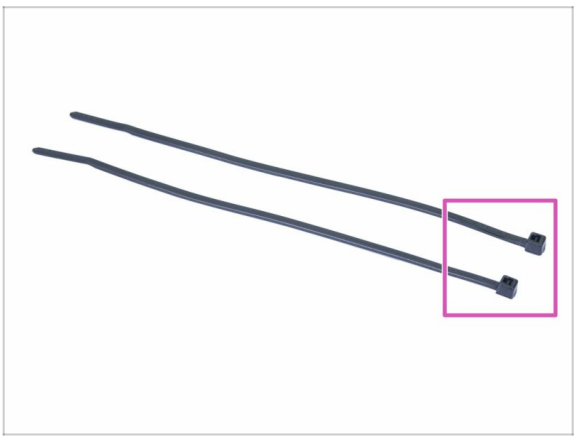
ⓘ Note that the SuperPINDA differs from the previous generation of the PINDA sensor. Now, there are only three wires in the connector.

STEP 42 SuperPINDA sensor assembly



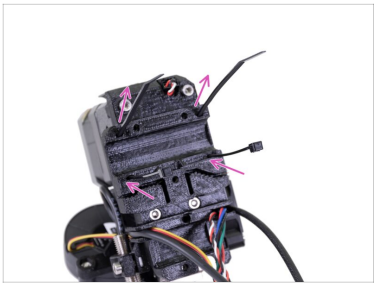
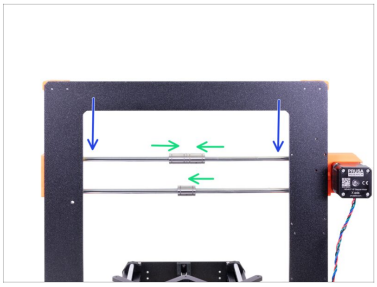
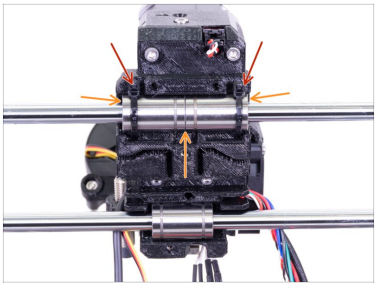
- Insert SuperPINDA sensor in the holder. Exact position doesn't matter, we will adjust it later.
- Tighten the M3x10 screw, but just slightly.
- Create a loop on the cable from the sensor.
- Push the cable in the channel together with the fan cable.

STEP 43 Extruder parts preparation



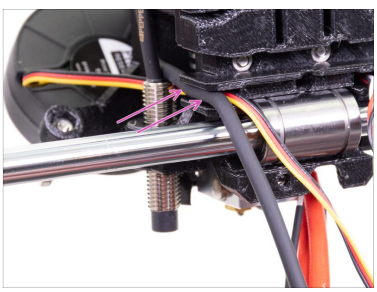
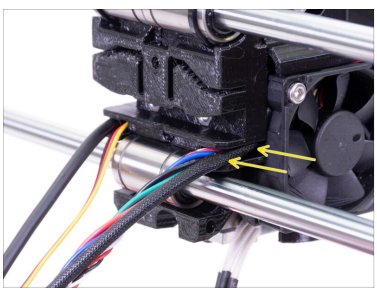
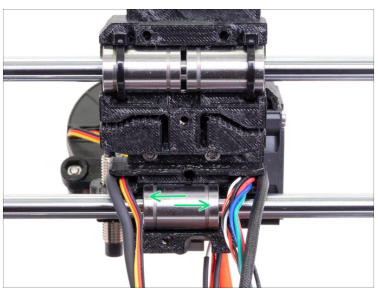
- **For the following steps, please prepare:**
- Zip tie (2x)

STEP 44 Extruder preparation and mounting

- Insert the zip ties in the X-carriage like in the picture.
- Lower the X-axis at about 1/3 from the top.
- Turn the printer like in the picture with X-axis motor and shorter extrusions facing towards you. Align the bearings similarly to the picture. The exact position of the lower bearing doesn't matter for now.
- Place the extruder on the bearings. The top couple must fit perfectly. Make sure the X-carriage is facing towards you (together with the shorter extrusions).
- We will adjust the lower bearing later on.
- Tighten and cut the zip ties.

STEP 45 Extruder channels cable management

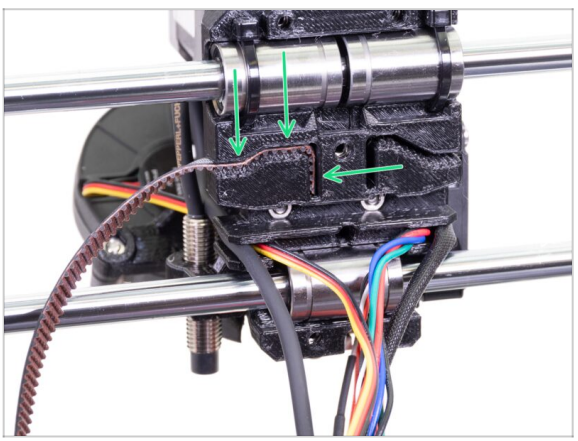




- Place the cables on the SuperPINDA sensor side over the lower smooth rod and push them back in the channel.
- Place the cables on the hotend fan side over the lower smooth rod and push them back in the channel.
- Align the bearing so it fits nicely in the X-carriage.

STEP 46 X-axis belt parts preparation

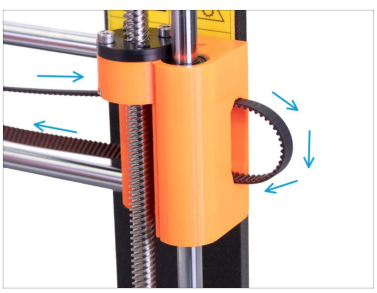
- **For the following steps, please prepare:**
- X-axis belt (850 mm)
- The MK3 X-axis belt may be slightly longer. It doesn't matter, we'll cut it later.

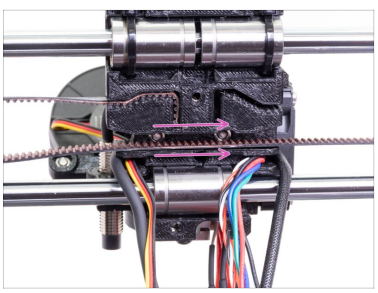
STEP 47 X-axis belt assembly

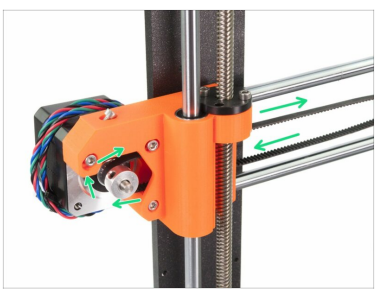


- Insert the flat part of the X-axis belt into the X-carriage as in the picture.
- Use a screwdriver or the smallest Allen key to push the belt in.

STEP 48 X-axis belt assembly

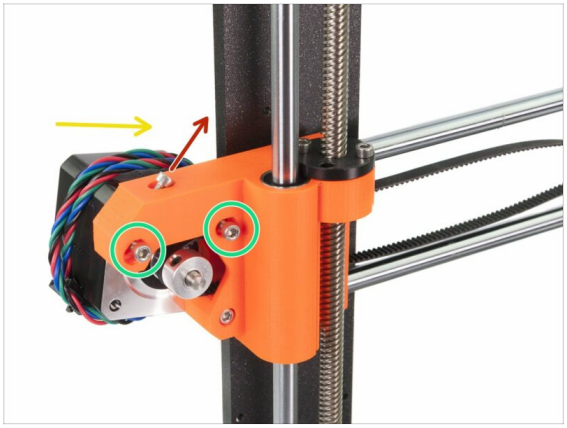


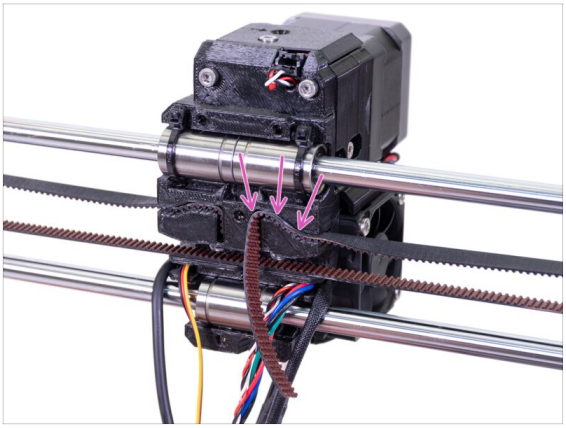




- Guide the X-axis belt through the X-end-idler around the 623h bearing with the housing and back.
- Continue with the belt through the X-carriage.
- Guide the X-axis belt through the X-end-motor around the GT2-16 pulley and back.

STEP 49 X-axis belt assembly



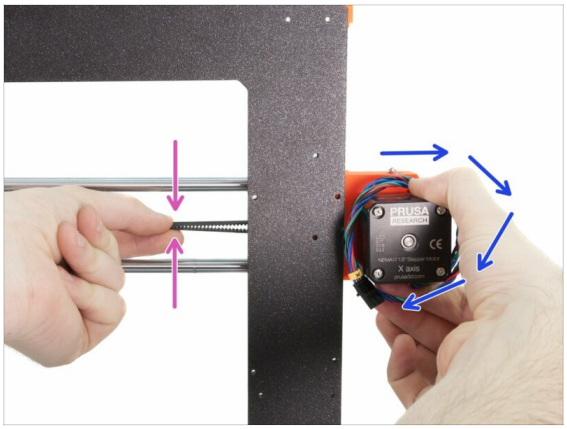


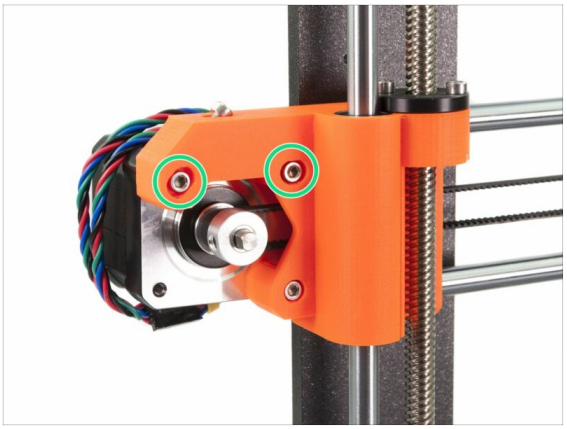
- First, release the screw used later for fine tuning the belt tension. No need to remove the screw. Just make sure it is loose.
- Please release two M3 screws on the X-end.
- Rotate the X-axis motor as indicated towards the frame.
- Insert the flat part of the X-GT2 belt into the X-carriage as in the second picture.

ⓘ Use a screwdriver or the smallest Allen key to push the belt in.

⚠ There will be belt overhang on this side, **DON'T TRIM IT** yet.

STEP 50 Tensioning the X-axis belt



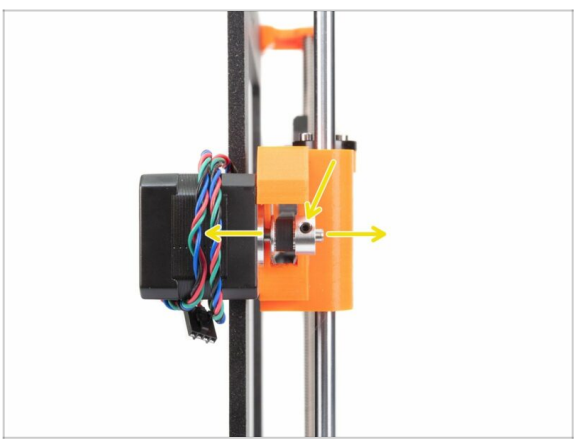


- Using right hand rotate the motor to its original position and hold it (tension is applied to the belt).
- Using two fingers on your left hand push the belt together. Very small force should be needed for bending the belt, BUT the belt shouldn't be bent by its own weight before being pressed with your fingers. It must hold straight.

ⓘ If you are struggling to rotate the motor back into position, the belt tension is too high.

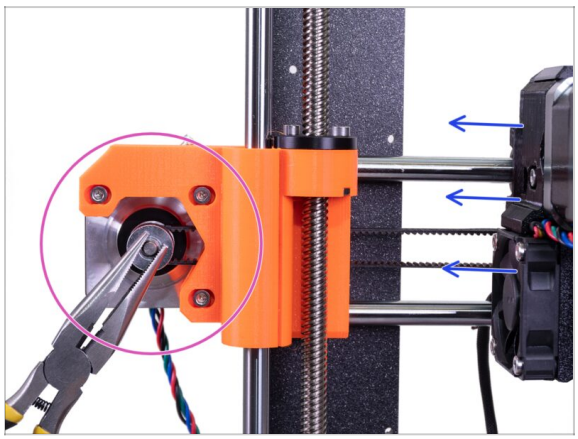
- Depending on the belt being under or overstretched, adjust the amount of the belt in the X-carriage.
- When done, rotate the motor to its original position and tighten the M3 screws again.

STEP 51 Aligning the X-axis belt



- Both top and bottom part of the belt should be parallel (above each other).
- To adjust the belt position, release the screws on the pulley and move it slightly until you reach the best position.
- Tighten both screws on the pulley.

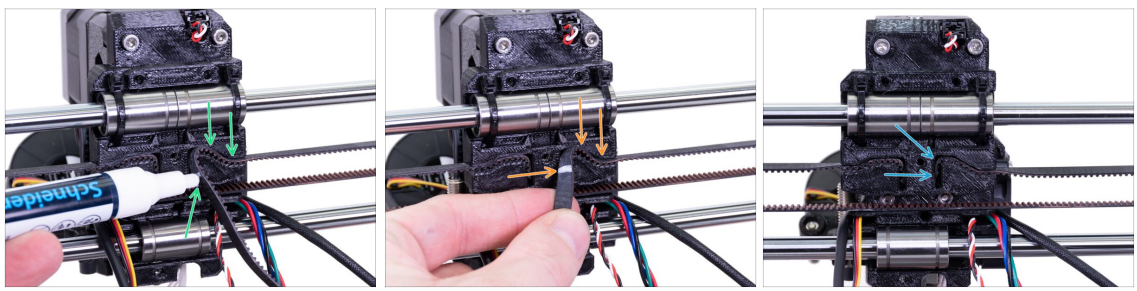
STEP 52 Testing the X-axis belt



- Use the technique described below to test if the belt is properly stretched.
- Use pliers to hold the X-axis motor shaft.
- Move the extruder towards the X-axis motor. Don't use excessive force.
- If the belt is stretched properly, you should feel a resistance and the extruder won't move at all. If the belt is too loose, it will deform (create a "wave") and jump over the teeth on the pulley.

ⓘ Belt too loose? Return to step 49 and repeat all steps until now. You have to rotate the motor and retighten the belt in the X-carriage. Shortening the belt length by moving one or two teeth outside X-carriage should be enough.

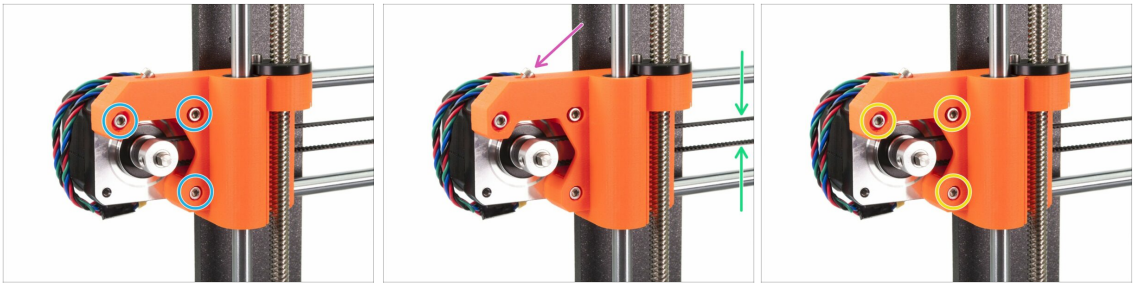
STEP 53 Trimming the X-axis belt



ⓘ For the following step we recommend getting a white marker, but you can also trim the belt without it.

- Measure the part, which must be trimmed and gently take the end of the belt away, from the X-carriage, but make sure at least 3-4 teeth are still in the X-carriage, as you don't want to lose the tension. If possible make a mark, where to cut the belt.
- Ensure again your mark is in the correct position and the belt is still stretched.
- Using pliers cut the belt and push it inside X-carriage. Use screwdriver or Allen key, if needed.

STEP 54 Fine tuning the x-axis belt



In this step, we will finish tensioning the belt. Please read the instructions first, your belt might have proper tension already, then there is no need for additional screw adjustment.

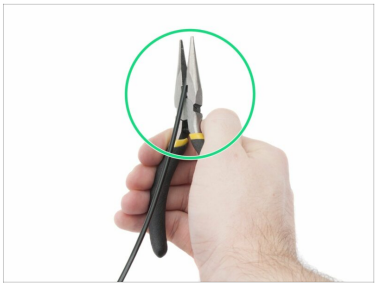
- First, slightly release all the screws holding the motor, otherwise, the "tensioner" won't work (the motor must be able to move).

ATTENTION !!! BE EXTREMELY CAREFUL WHILE TIGHTENING, YOU CAN CRACK THE PART IF YOU OVER TIGHT THE SCREW.

- Using Allen key start tightening the M3x18 screw inside the X-end-motor, but after each turn or two check the tension in the belt.
- For the optimal performance, the belt must be a bit harder to press with your fingers. Move the extruder all the way to the X-end-idler and try the belt tension in the middle of the X-axis.
- When you achieve optimal tension, please tighten the screws again.

In case you experience X-axis failure during calibration or skipped layers in the X direction, you can adjust this screw accordingly. Tightening the screw stretches the belt. Releasing the screw has opposite effect. Each time don't forget to release the screws on the motor first.

STEP 55 Nylon guide parts preparation

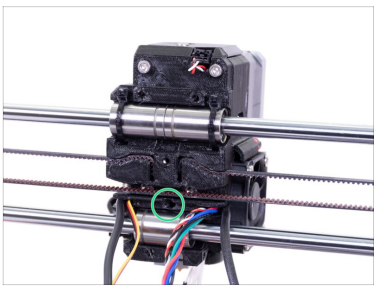
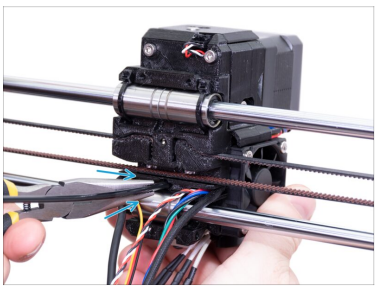
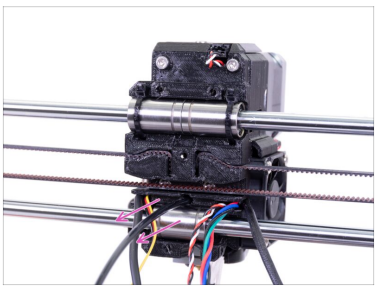




ⓘ It is recommended to wear **safety glasses** while cutting the nylon filament.

- **For the following steps, please prepare:**
- Black nylon filament 50 cm / 19.7 inch (1x)
- Using the pliers cut one end of the filament to create a tip.
- Check the tip is similar to the third picture.

ⓘ The upgrade package includes new nylon in case yours from the disassembled printer is damaged or no longer rigid enough.

STEP 56 Nylon guide assembly

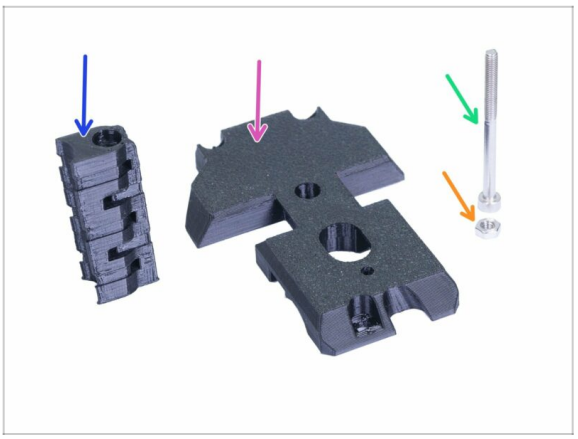




- Locate the hole for the NYLON filament. Using the smallest Allen key ensure there are no obstacles inside.
- Using the pliers **insert the NYLON filament with the pointed end into the slot and twist it**. Hold the extruder with your other hand.

⚠ **BE EXTREMELY CAREFUL** as the pliers tend to slide and you can easily damage the wires!!!

- To check if the filament is seated properly, gently pull it with your hand. The X-axis should bend a little, but the filament must remain in the slot.
- If you have issues, try to adjust the tip on the filament.

STEP 57 X-carriage-back parts preparation



- **For the following steps, please prepare:**
- X-carriage-back (1x)
- Cable-holder (1x)
- M3x40 screw (1x)
- M3n nut (1x)

STEP 58 Cable-holder assembly

- Prepare the M3x40 screw and cable-holder.
- Drive the screw all the way through the printed part.

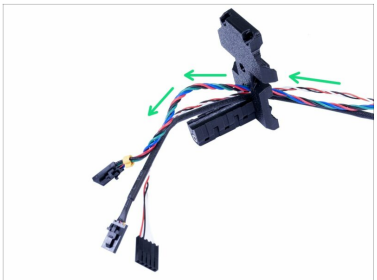
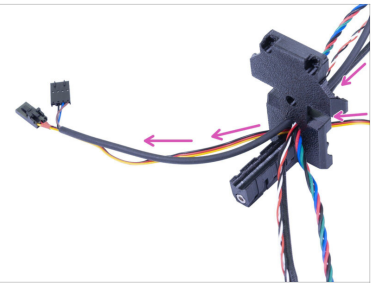
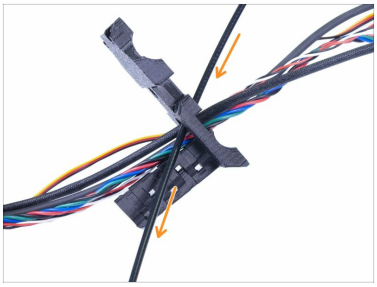
⚠ Note there is a recess (slot) for the screw's head on one side of the printed part.

STEP 59 X-carriage-back assembly



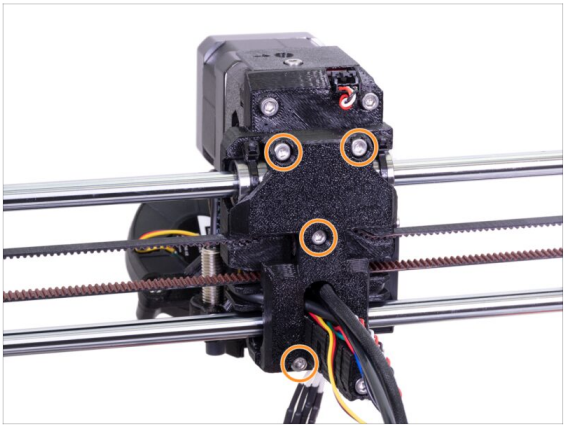
- Take the M3n nut and place it in the printed part (all the way in).
- Use the screw pulling technique.
- Rotate the X-carriage-back and tighten it together with the cable-holder.
- Check the "u-shaped" slot is aligned properly on both parts.

STEP 60 Mounting the X-carriage-back

- Push the cables from the Extruder **THROUGH** the X-carriage-back. Start with IR-sensor cable, then the extruder motor and hotend fan.
- Next, add the print fan and SuperPINDA sensor cables.
- Cables from hotend are **NOT GOING** through the X-carriage-back!
- Carefully insert the nylon filament and then slide the X-carriage-back towards the X-axis.

STEP 61 X-carriage-back assembly



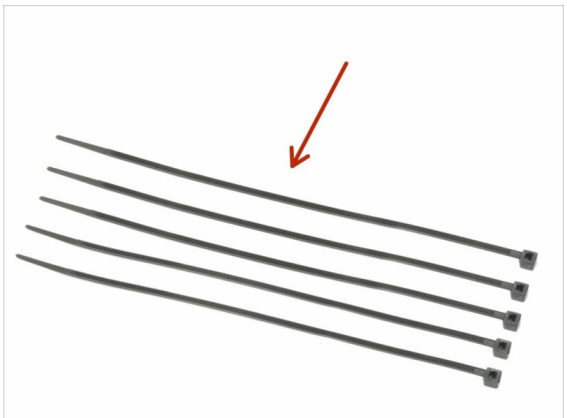
- **For this step, please prepare:**
- M3x10 screw (4x)

⚠ Before you tighten the X-carriage-back, arrange all cables. Make sure none is pinched.

- Use all four screws and tighten the X-carriage-back.

ⓘ Tighten the screws with a reasonable force. Make sure you won't deform/squeeze the bearings between the printed parts.

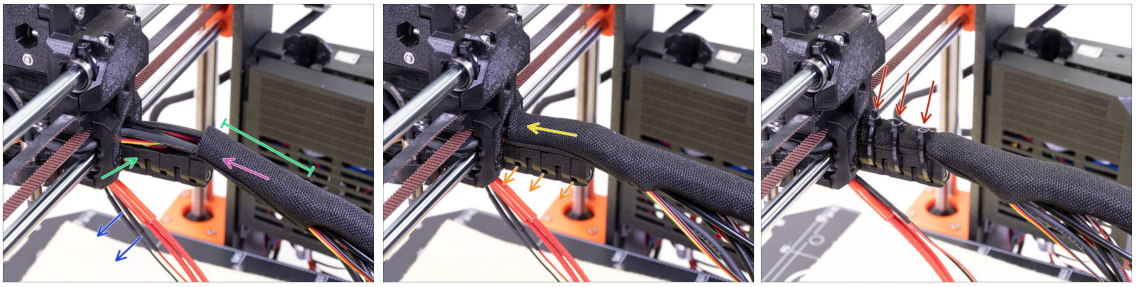
STEP 62 Textile sleeve parts preparation



- **For the following steps, please prepare:**
- Zip tie (5x)
- Textile sleeve 13 x 490 mm (1x)

ⓘ The upgrade package includes a new textile sleeve in case yours from the disassembled printer is damaged.

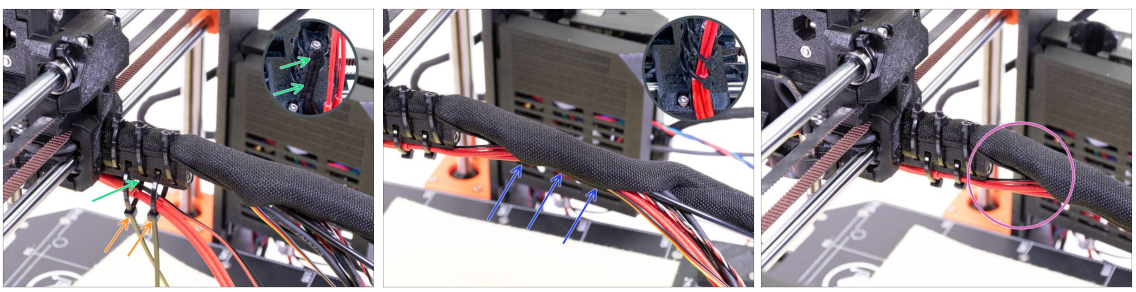
STEP 63 Tightening the textile sleeve



- Open one end of the textile sleeve and slide it on the cable bundle leading from the extruder. **Don't forget to include the black nylon filament inserted earlier!**
- Leave the cables from the hotend out for now.
- Length of the first wrap should be slightly longer than the cable-holder part, about 5 cm is enough.
- Gently twist the sleeve to make it smaller and tighter around the cables, orient the sleeve's seam downwards, then slide the sleeve towards the extruder.
- **Take 3 zip ties** and insert them into the **lower row** of holes on the cable-holder.
- Twist the sleeve again (without twisting the cables inside) and tighten the zip ties.

⚠ **IMPORTANT:** Cut the remaining part of each zip tie using pliers as closest to its head as possible. Note the correct position of each zip ties's head (slightly off-centre to the left).

STEP 64 Tightening the hotend cables



- Use two zip ties and push them through the upper slots on the cable-holder.
- **ATTENTION!** Before tightening the zip ties add the cables from the hotend. Use the channel in the printed part to arrange them properly.
- Once the hotend cables are included, tighten the zip ties and cut remaining parts.
- Open the textile sleeve and insert the cables from the hotend.
- Compare the look of the cable management with the last picture.

STEP 65 E-axis is finished!

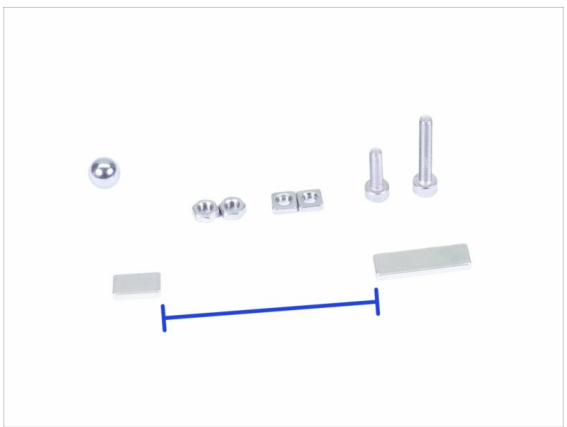
- **Are we there yet? Almost!**
- Check the final look, compare it to the picture.
- Checked everything? Let's move to: **4. Electronics assembly.**

3B. MK3S Extruder upgrade

STEP 1 Tools necessary for this chapter

- Needle-nose pliers for zip tie trimming
- 2.5mm Allen key for M3 screws
- 2mm Allen key for nut alignment
- 1.5mm Allen key for M2 screw

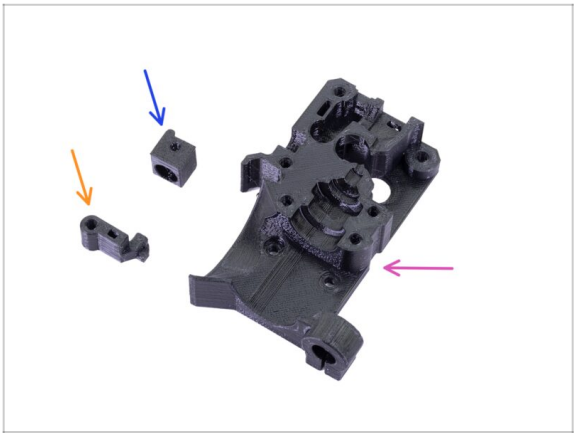
STEP 2 Few tips before we start



⚠ **This is the most important and hardest chapter**. Take your time, don't rush. Properly assembled extruder is essential.

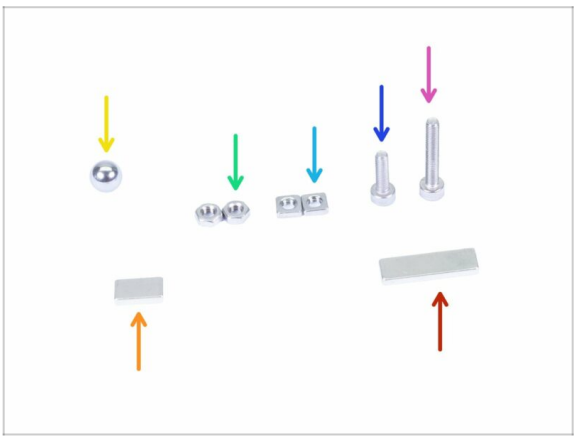
- **The bag with fasteners includes M3x20 and M3x18 screws make sure you won't mix them up!** Pay attention to the instructions, when to use the M3x20.
- **Keep the magnets a sufficient distance apart.** They can damage each other!
- **The hotend for MK3S+ needs a shorter PTFE tube compared to the MK3S** (more info at help.prusa3d.com/PTFE-MK3S+).
- **Pay great attention to the cable management**, if you miss some important steps you will need to disassemble the extruder.
- **This bag includes extra fasteners.** Don't worry if you end up with a few unused screws and nuts.

STEP 3 Extruder-body parts preparation



- **For the following steps, please prepare:**
- Extruder-body (1x)
- Adapter-printer (1x)
- FS-lever (1x)
- The list continues in the next step.

STEP 4 Extruder-body parts preparation

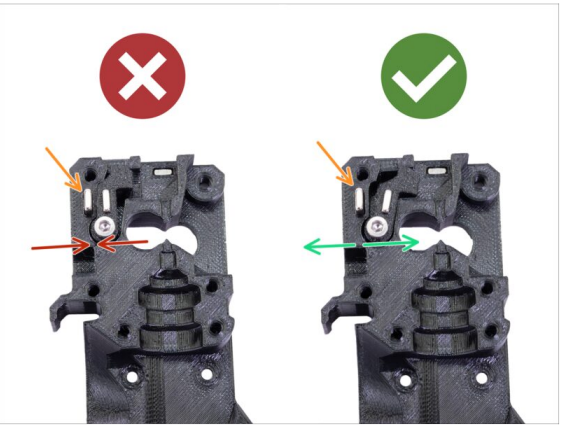


- **For the following steps, please prepare:**
- M3x18 screw (1x)
- M3x10 screw (1x)
- M3nS nut (2x)
- M3n nut (2x)
- Steel ball (1x)
- Magnet 10x6x2 (1x)
- Magnet 20x6x2 (1x)

STEP 5 Extruder-body assembly

- Take the M3nS nut and insert it in the Extruder-body. **Make sure the nut is all the way in.**
- Ensure correct alignment of the nuts using the Allen key.
- Secure the nut using an M3x10 screw. *Tighten the screw just slightly, later on we need to add the SuperPINDA sensor.*
- Take two M3n nuts and insert them in.
- Use the screw pulling technique.
- Flip the Extruder-body and insert one M3nS nut all the way in the part.
- Take the smaller magnet (10x6x2) and insert it carefully in the FS-lever. Majority of the magnet will be hidden inside the printed part.

STEP 6 FS-lever assembly

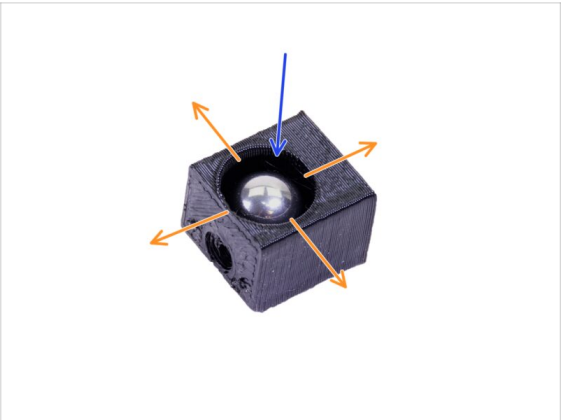


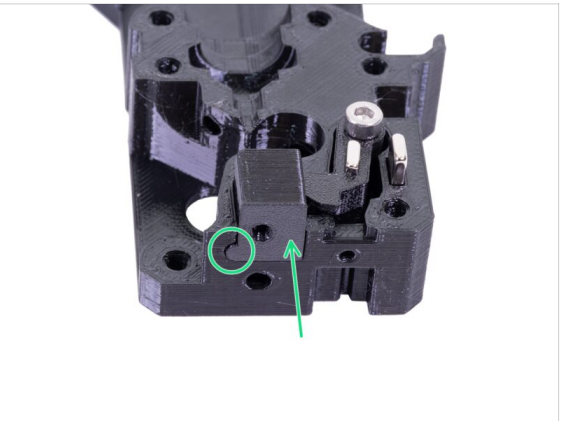
- Insert the FS-lever in the body.
- Secure the part with the M3x18. Tighten it, but ensure the lever can move freely.

⚠ **WARNING:** make sure the following procedure is done right, otherwise the **filament sensor won't work!!!**

- Insert the bigger magnet (20x6x2) in the Extruder-body, it will stick out:
  - **Incorrect setup:** magnets are attracting each other, thus the lever **is pulled to the left**.
  - **Correct setup:** magnets are repelling each other, thus the **lever is pushed to the right**.

STEP 7 Steel ball assembly



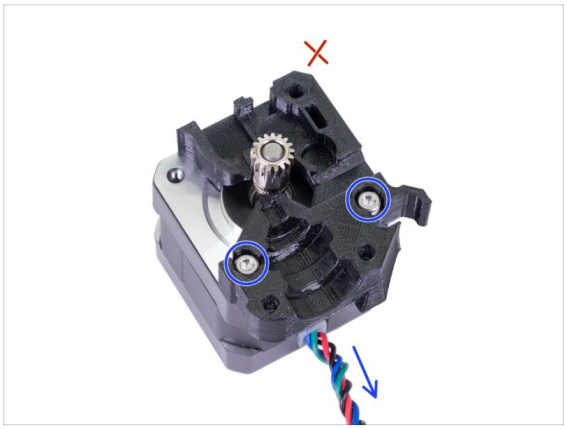


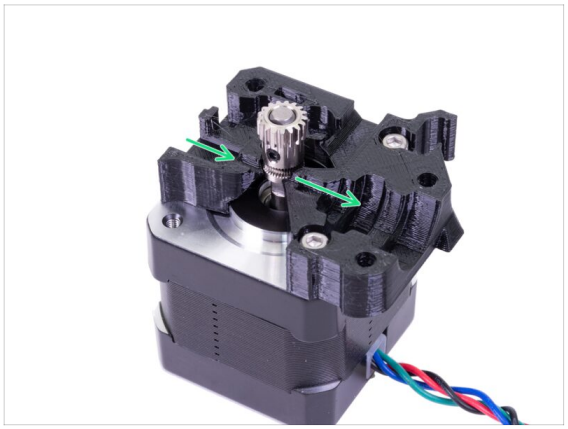
- Take the printed part Adapter-printer and insert the steel ball.
- Roll with the ball to all sides to make sure it can move smoothly.
- In case of any rough surface, remove the ball and clean the inside of the printed part.
- Place the Adapter-printer part together with the steel ball in the Extruder-body. See the rounded protrusion on the printed part. It must fit into the groove in the Extruder-body. The top surfaces of both parts should be almost aligned.
- **DON'T** use any screw to secure the Adapter-printer. It should hold inside the Extruder-body by itself.

STEP 8 Extruder motor parts preparation

- **For the following steps, please prepare:**
- Extruder-motor-plate (1x)
- M3x10 screw (2x)

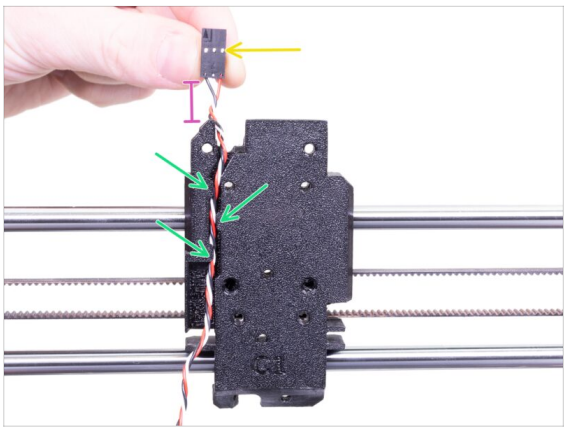
STEP 9 Extruder motor assembly

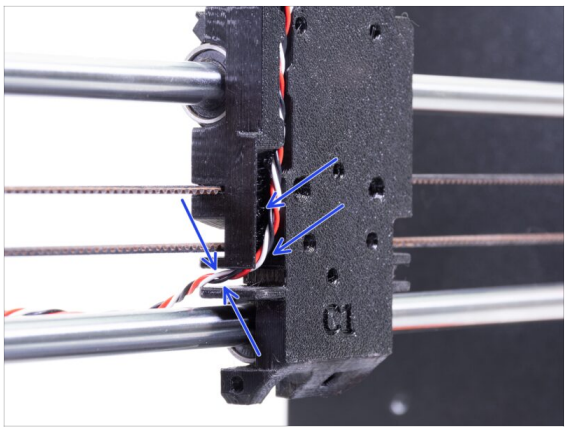




- Take the Extruder-motor-plate and secure it using two M3x10 screws. Use the cable as a guide to properly orient the part.
- Resist the temptation to place a screw in the third hole! Leave it for later ;)
- There is a "channel" for the filament inside the printed part. Make sure the teeth on the pulley are aligned with it.

STEP 10 Guiding the IR-sensor cable





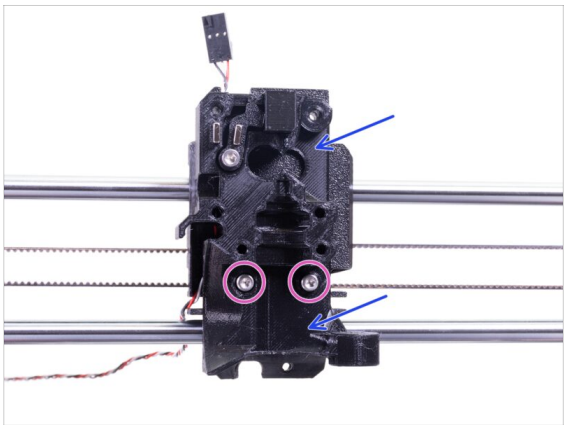
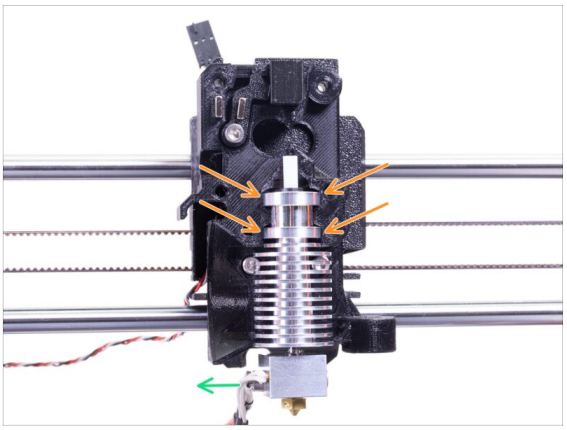
- **Make sure the IR-sensor cable does not fall out of the X-carriage-back** during disassembly. If it does, follow these instructions:
  - Take the IR-sensor cable and locate the end with the smaller connector.
  - Place cable in the X-carriage. Utilize the small printed overhangs to keep the cable inside.
  - The distance between the connector and the X-carriage should be around 15 mm (0.6 inch). We will adjust it later.
  - Guide the cable through the slot, **remember this path**, we will use it for other cables as well.

STEP 11 Extruder-body assembly - parts preparation



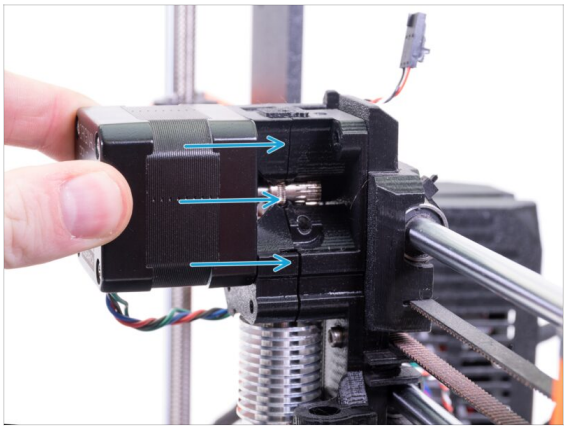
- **For the following steps, please prepare:**
  - Hotend for the MK3S+ (1x)
  - ⚠ **Make sure you have replaced the hotend PTFE tube** in the previous chapter. **MK3S tube** is longer and **is not directly compatible with MK3S+.**
  - M3x10 screw (2x)
  - M3x40 screw (1x)

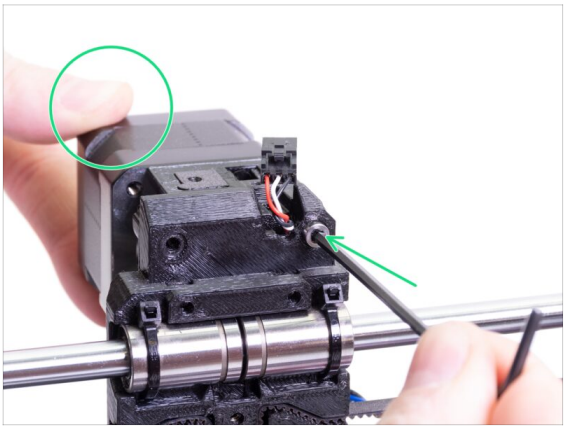
STEP 12 Extruder-body assembly

- Place the assembled Extruder-body to the X-carriage. **Do not pinch the IR-sensor cable between both parts!!!**
- Secure it with two M3x10 screws.
- ⚠ Once again **make sure you have replaced the hotend PTFE** tube in the previous chapter! **MK3S tube is not compatible with MK3S+.**
- Place the hotend in the Extruder-body. It must fit into the groove in the printed part, which shares the shape with the hotend.
- The hotend cables should point to the left.

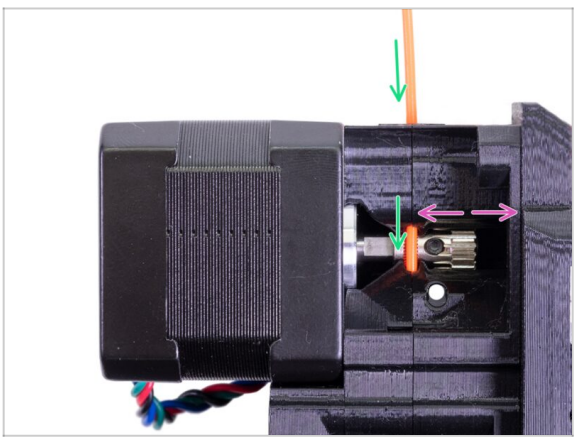
STEP 13 Extruder-body assembly





- Place the assembled extruder motor on the X-carriage as seen in the picture. The motor cable must point downwards.
- Hold the motor by hand and secure all parts together with the M3x40 screw. Use the right screw hole on the backside of the extruder.

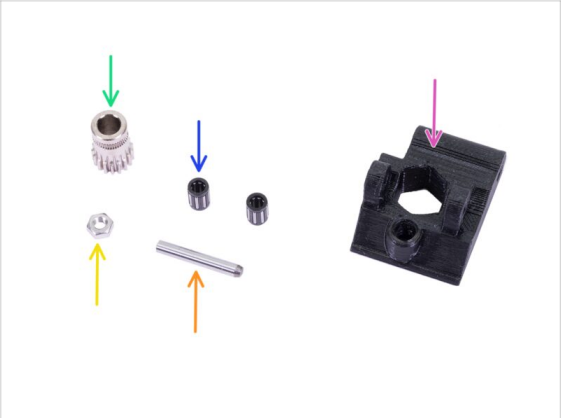
STEP 14 Filament alignment check



ⓘ Let's use this opportunity to check once more the proper alignment of the filament and the Bondtech gear.

- Push the filament from the top, through the Bondtech into the PTFE tube.
- Check the alignment and, if needed, loosen the set screw on the pulley and adjust the position. Then **tighten the screw, but be careful**, you can easily strip it.
- **REMOVE** the filament.

STEP 15 Extruder-idler parts preparation

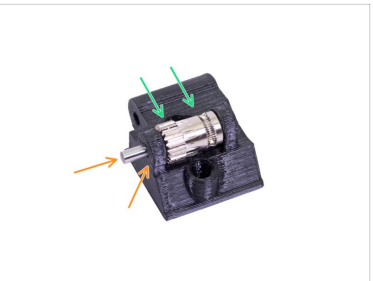


- **For the following steps, please prepare:**
- New Extruder-idler (1x)
- Bondtech WITHOUT the hole for the set screw (1x)
- Bearing (2x) might be stuck inside the gear
- Shaft (1x)
- M3n nut (1x)
- M3x40 screw (1x)

STEP 16 Bearing assembly

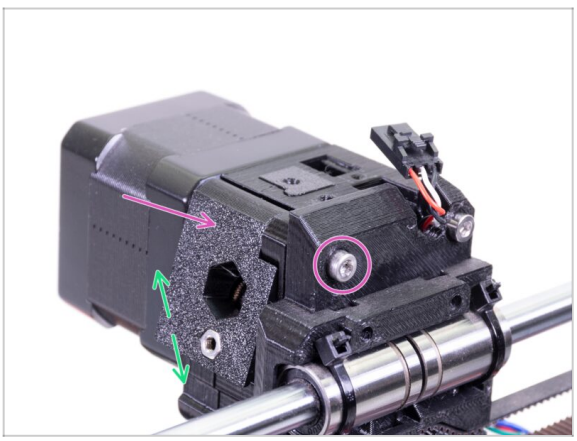
- **Insert both bearings** into the pulley. Be aware that bearings can slip out during assembly.

STEP 17 Extruder-idler assembly


- Take M3n nut and place it in the Extruder-idler.
- Use the screw pulling technique.
- Insert the pulley into the idler as shown in the picture.
- Slide the shaft through the idler and pulley. Use reasonable force or you will **BREAK** the printed part. The shaft should be flush with the surface of the printed part.
- Place your finger on the bearing and ensure it can rotate freely.

STEP 18 Extruder-idler mounting



- Place the Extruder-idler in place and secure it using a M3x40 screw.
- Don't tighten the screw too firmly, it serves as a shaft for the idler. Check that the idler can rotate freely.

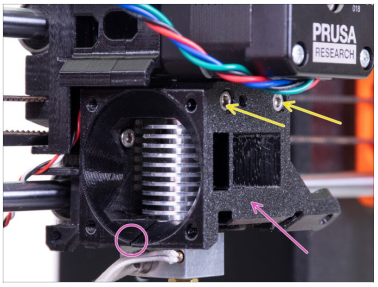
STEP 19 Extruder-cover part preparation

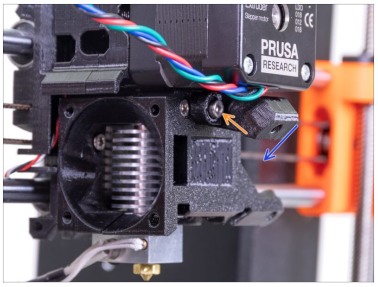
- **For the following steps, please prepare:**
- Print-fan-support (1x)
- M3x10 screw (1x)
- M3n nut (1x)
- M3x40 screw (1x)
- Idler spring (1x) *place the spring on the screw*
- ⓘ The list continues in the next step...

STEP 20 Extruder-cover part preparation

- **For this step, please prepare:**
- Extruder-cover (1x)
- M3nS nut (1x)
- M3x40 screw (2x)
- Slide the nut all the way in.
- ⓘ Ensure correct alignment using the Allen key.
- Leave the hole on the "arm" empty for now. We will use it later, while assembling a print fan.

STEP 21 Extruder-cover assembly



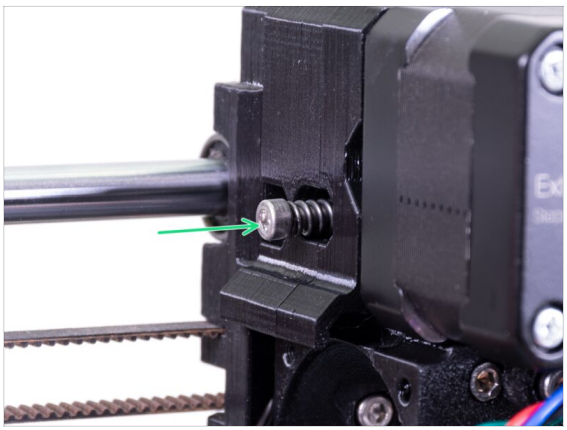
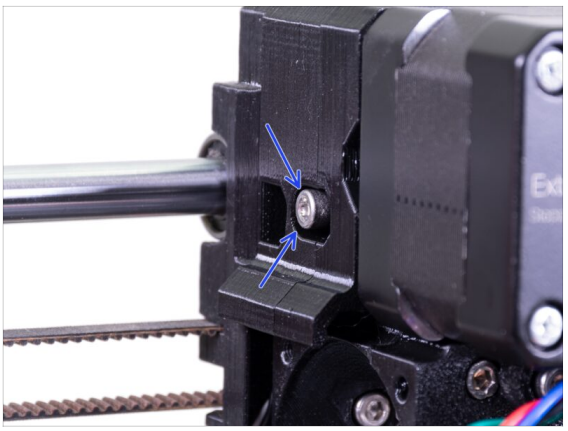



- Place the Extruder-cover onto the Extruder-body. Again, make sure all three parts are properly aligned.
- Insert two M3x40 screws. Tighten them, but be careful, they are slightly longer (2-3 mm) than the thickness of the entire assembly.
- Take the M3n nut and insert it all the way into the Print-fan-support. **It is crucial!**

ⓘ Use the screw pulling technique.

- Place the support on the extruder and ensure the inclined part is facing "down" (towards the nozzle)
- Secure the support using an M3x10 screw.

STEP 22 Pretensioning the Extruder-idler

- Use the M3x40 screw with the spring to introduce tension to the Extruder-idler.

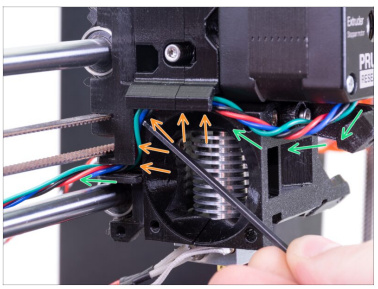
ⓘ Hold the Extruder-idler on the other side, until the screw reaches the nut.

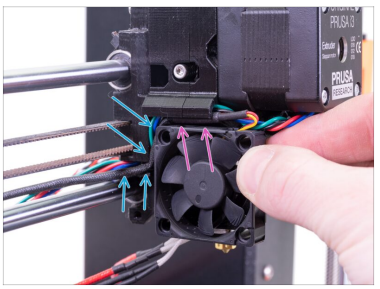
- Since there is only one screw, you need to introduce a large force. The head of the screw, should be aligned or slightly below the surface.

STEP 23 Hotend fan assembly - parts preparation

- **For the following steps, please prepare:**
- M3x14 screw (3x)
- Make sure you are using the correct screws.

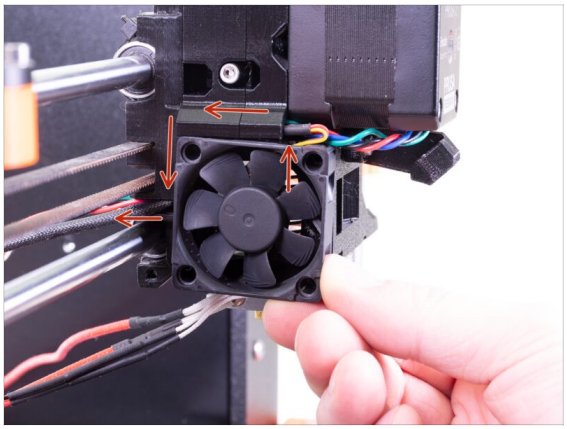
STEP 24 Hotend fan assembly

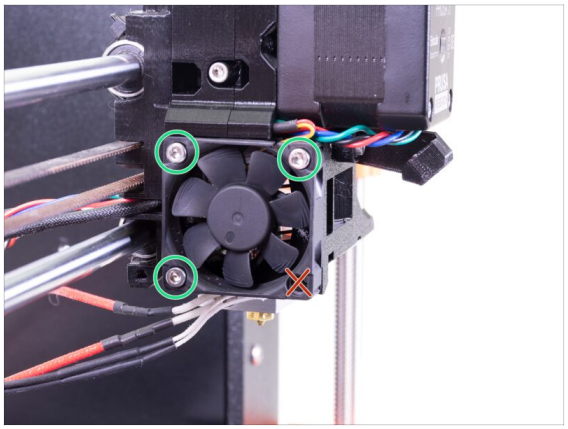




- Guide the extruder motor cable like in the picture. Leave some slack on the cable below the extruder motor. Leave a slack of about 2-3 cm (0.8 - 1.2 inch) below the extruder motor. *This comes in handy for easier disassembly in the future.*
- Then guide the cable in the "channel" all the way to the back.
- **The fan has two sides,** one has a sticker. Make sure, this side is facing inside the extruder.
- First, create a loop on the cable. Make sure the black protective wrap is close to the edge of the fan. See the picture.
- Place the fan on the extruder and proceed in the following manner:
  - Start by placing the fan's cable in the upper channel
  - Slide the fan close to the X-carriage and **GENTLY PUSH** the cable in using an Allen key. Before you push the fan all the way to the left, place the cable in the X-carriage channel.

STEP 25 Hotend fan assembly





⚠ **FINAL CHECK!** The fan is oriented with the cable facing up, then the cable goes through the upper channel all the way to the X-carriage. In the X-carriage don't forget to use both channels. Make sure the **CABLE ISN'T PINCHED** along the way!

- Use the three M3x14 screws to fix the fan in place. Don't over tighten them. You can break the fan's plastic casing. Also make sure the fan can rotate freely.

ⓘ Note that the screws are "self-tapping" in the printed parts. There are no nuts.

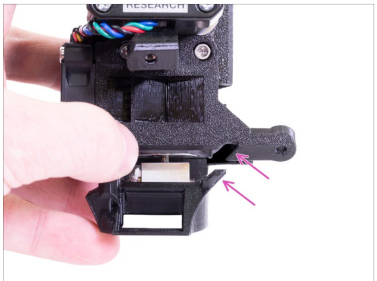
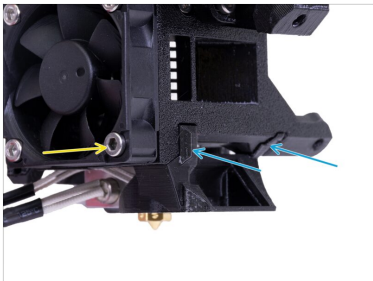
- Leave the last hole empty, for now.

STEP 26 Fan-shroud parts preparation

- **For the following steps, please prepare:**
- Fan-shroud (1x)
- M3x20 screw (1x)
- M3nS nut (1x)

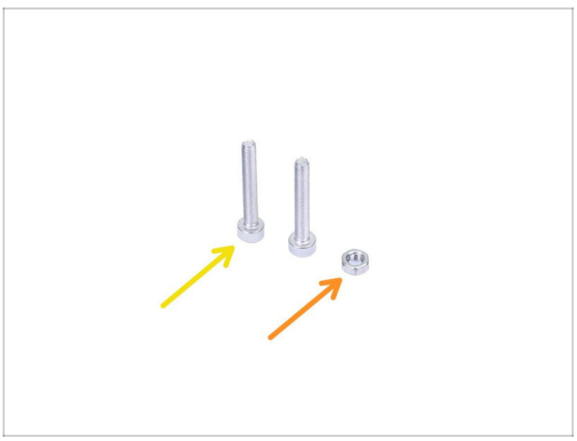
ⓘ If you have printed the **fan-shroud** yourself, it prints out together with the inner support which needs to be removed first.

STEP 27 Fan-shroud assembly

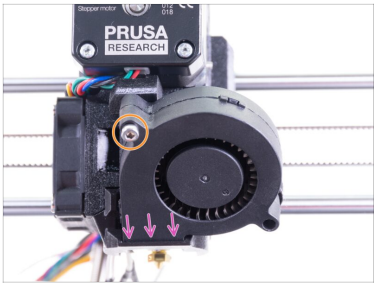
- Insert M3nS nut in the Fan-shroud, all the way in.
- Ensure correct alignment using the Allen key.
- See the protrusion on the Fan-shroud and the groove in the extruder.
- Slide the Fan-shroud into the extruder. Make sure that both protrusions on the Fan-shroud fit in the grooves on the extruder (see the picture).
- Secure it using the M3x20 screw. Don't overtighten the screw, you can break the plastic casing. Also make sure the fan can rotate freely.

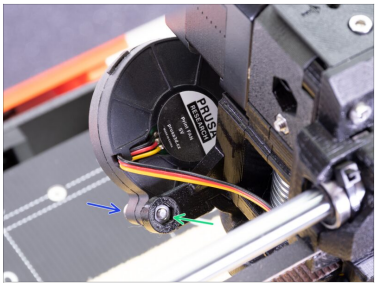
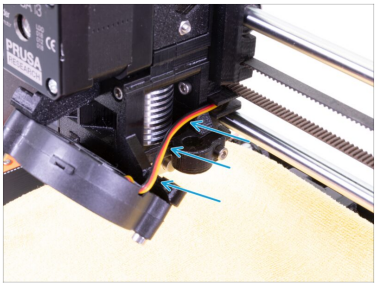
STEP 28 Print fan parts preparation



- **For the following steps, please prepare:**
- M3x20 screw (2x)
- M3n nut (1x)

STEP 29 Print fan assembly



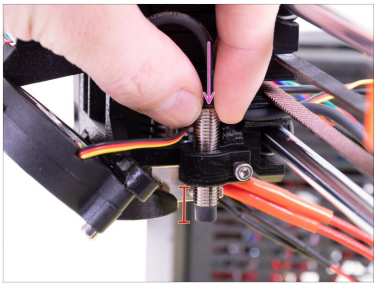
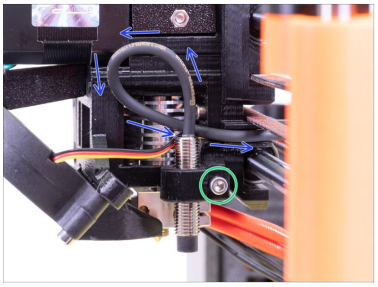
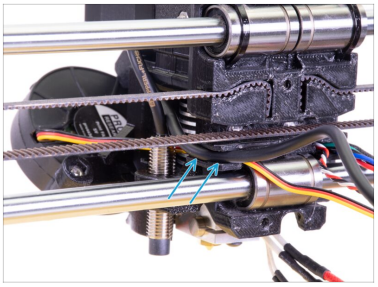
- First, slide the fan into the Fan-shroud and make sure it is aligned properly.
- Second, fix the fan in place using one M3x20 screw. **Tighten carefully**, or you will damage the fan's casing.
- Turn the extruder around and insert the M3n nut. No need to pull it in. We will use the screw.
- Place the remaining M3x20 screw from the other side and tighten it, **but carefully**, or you will damage the fan's casing.
- Guide the cable according to the picture in the channel. Bend it slightly towards the extruder. **DON'T stretch the cable!**

STEP 30 SuperPINDA sensor parts preparation

- **For the following steps, please prepare:**
- SuperPINDA sensor (1x)

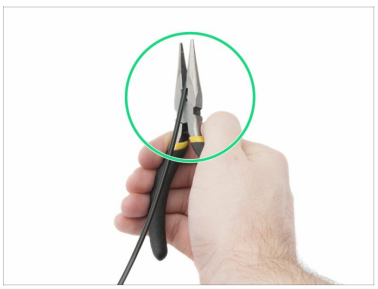
ⓘ Note that the SuperPINDA differs from the previous generation of the PINDA sensor. Now, there are only three wires in the connector.

STEP 31 SuperPINDA sensor assembly

- Insert the new SuperPINDA sensor into the holder.
- Slide-in about half of the sensor. *Exact position doesn't matter, we will adjust it later.*
- Create a loop on the cable from the sensor.
- Slightly tighten the screw. Do not tighten fully. We will adjust the height of the SuperPINDA sensor later.
- Push the cable into the channel together with the fan cable.

STEP 32 Nylon guide parts preparation


ⓘ It is recommended to wear **safety glasses** while cutting the nylon filament.

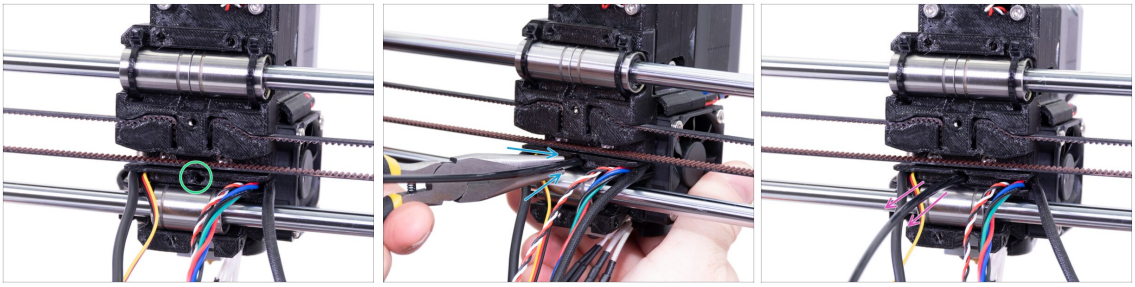
- **For the following steps, please prepare:**
  - New black nylon filament 50 cm / 19.7 inch (1x)

ⓘ The upgrade package includes new nylon in case yours from the disassembled printer is damaged or no longer rigid enough.

- Using the pliers, cut one end of the filament to create a tip.
- Check to make sure the tip is similar to the third picture.

ⓘ The upgrade package includes new nylon in case yours from the disassembled printer is damaged or no longer rigid enough.

STEP 33 Nylon guide assembly

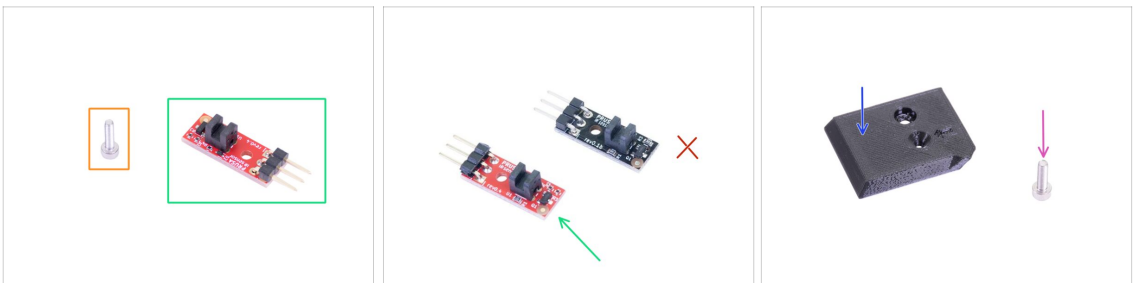


- Locate the hole for the NYLON filament. Using the smallest Allen key ensure there are no obstacles inside.
- Using the pliers **insert the NYLON filament with the pointed end into the slot and twist it.** Hold the extruder with your other hand.

⚠ **BE EXTREMELY CAREFUL** as the pliers tend to slide and you can easily damage the wires!!!

- To check if the filament is seated properly, gently pull it with your hand. The X-axis should bend a little, but the filament must remain in the slot.
- If you have issues, try to adjust the tip on the filament.

STEP 34 IR-sensor - parts preparation

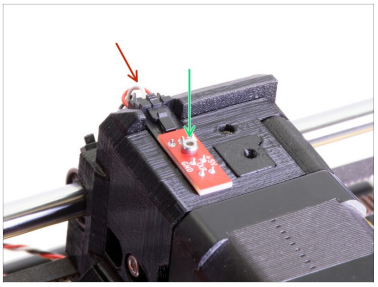
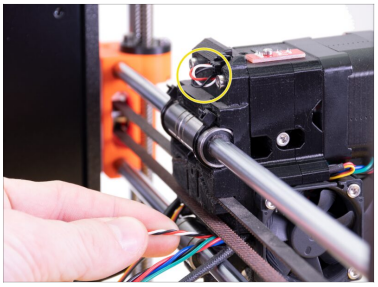
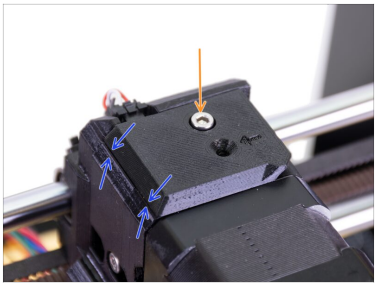


- **For the following steps, please prepare:**
- M2x8 screw (1x)
- New Prusa IR-sensor (1x)

⚠ **Make sure you have prepared the red version of the IR-sensor**. You can use the red IR-sensor you had on your printer before and keep the new one from the package as a spare. **Do not use the old (black) version of the sensor!**

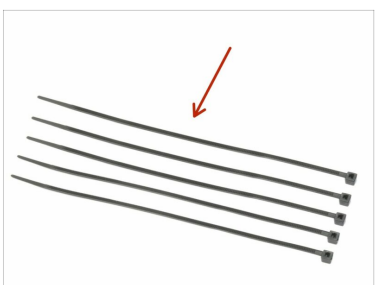
- FS-cover (1x)
- M3x10 screw (1x)

STEP 35 IR-sensor assembly

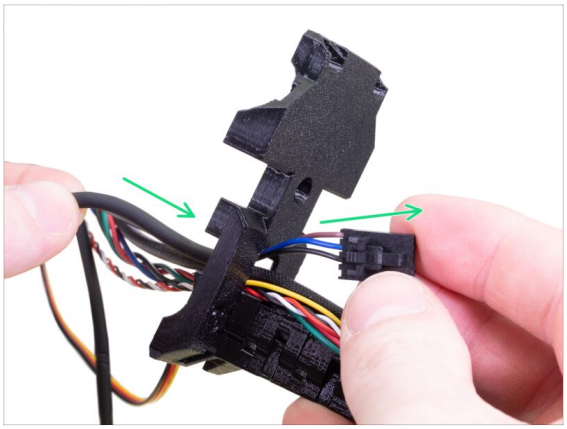
- Place the IR-sensor on the top of the Extruder-body and secure it with the M2x8. **Make sure the black plastic "u-shaped" part is facing down.**
- Tighten the M2x8 screw, the sensor shouldn't be able to move - but be careful the PCB isn't indestructible ;)
- Connect the cable. Mind the correct orientation of the connector and wires.
- Leave some slack behind the sensor like in the picture. Don't create too big cable loop as it might interfere with the frame. Adjust the length by gently pulling/pushing the cable if needed.
- Place the FS-cover on the extruder and align it according to the picture. *Tapered sides of the cover must be oriented towards you.*
- Insert the screw (mind the correct hole) and tighten it.
- Tip: If you can't reach the nut, try to align it using an Allen key or pulling it up using a longer full-threaded screw from the spare bag.

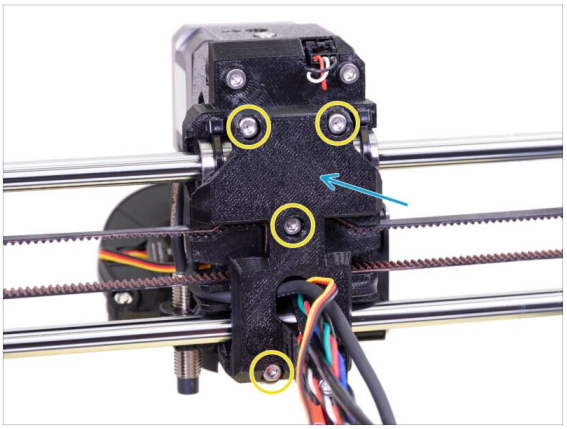
STEP 36 X-carriage-back assembly


- **For the following steps, please prepare:**
- M3x10 screw (4x)
- Zip tie (5x)
- New textile sleeve 13 x 490 mm (1x)
- The upgrade package includes a new textile sleeve in case yours from the disassembled printer is damaged.

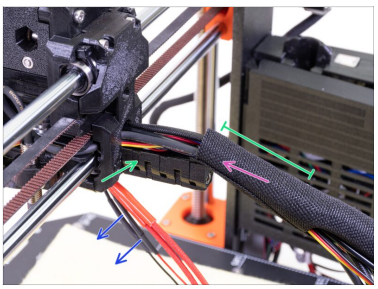
STEP 37 Mounting the X-carriage-back

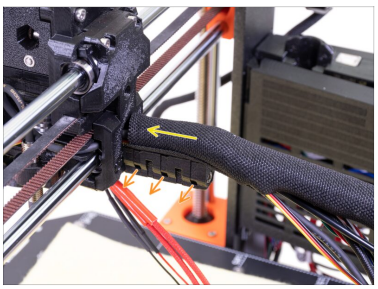


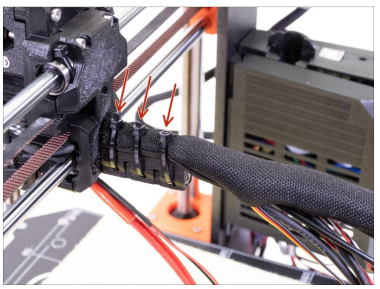


- Push the SuperPINDA sensor cable and the nylon filament through the opening in the x-carriage-back.
- Place the x-carriage-back on the extruder.
- Secure it using four M3x10 screws.

STEP 38 Tightening the textile sleeve



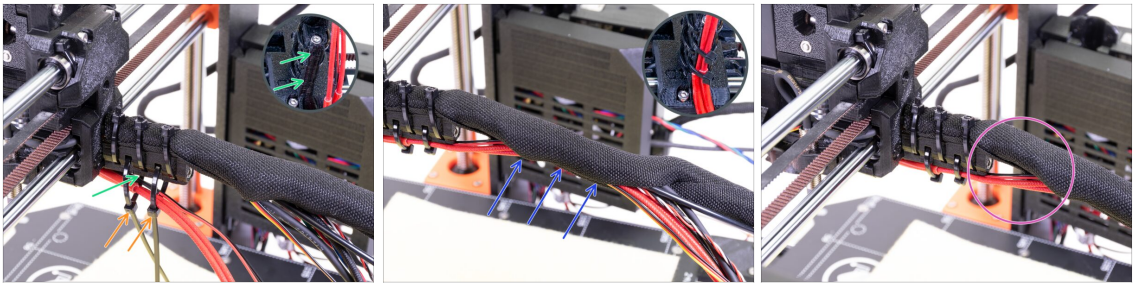




- Open one end of the textile sleeve and slide it on the cable bundle leading from the extruder.
- Leave the cables from the hotend out for now.
- Length of the first wrap should be slightly longer than the cable-holder part, about 5 cm is enough.
- Gently twist the sleeve to make it smaller and tighter around the cables. Orient the sleeve's seam downwards, then slide the sleeve towards the extruder.
- **Take 3 zip ties** and insert them into the **lower row** of holes on the cable-holder.
- Twist the sleeve again (without twisting the cables inside) and tighten the zip ties.

⚠ **IMPORTANT:** Cut the remaining part of each zip tie using pliers as closest to its head as possible. Note the correct position of each zip ties's head (slightly off-centre to the left).

STEP 39 Tightening the textile sleeve



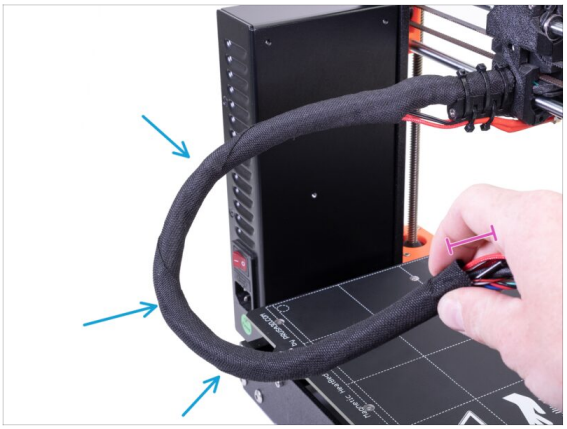
- Use two zip ties and push them through the upper slots on the cable-holder.
- **ATTENTION!** Before tightening the zip ties add the cables from the hotend. Use the channel in the printed part to arrange them properly.
- Once the hotend cables are included, tighten the zip ties and cut the remaining parts.
- Open the textile sleeve and insert the cables from the hotend.
- Compare the look of the cable management with the last picture.

STEP 40 E-axis is finished!

- **Are we there yet? Almost!**
- Check the final look, compare it to the picture.
- It is time for the next chapter: **4. Electronics assembly.**

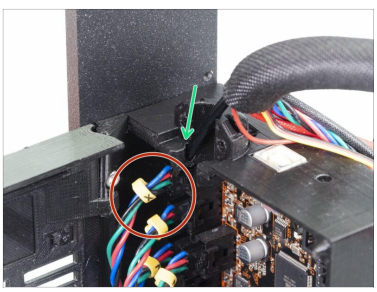
4. Electronics assembly

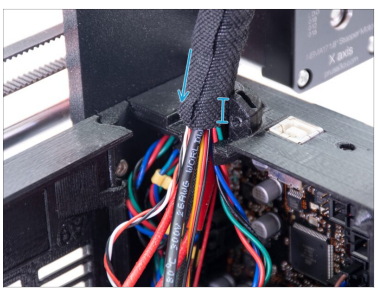
STEP 1 Connecting the extruder cable bundle

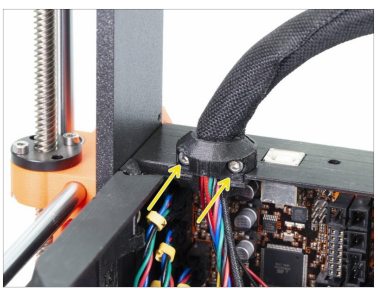


- Find the slot for the NYLON filament on the Einsy-base. You will need it in the next step.
- Before we proceed further, we need to twist the textile sleeve. This will prevent the cables inside to slip out during the printing.
- Using your fingers, gently twist the sleeve (not the cables) and create several wraps.
- Twisting the sleeve will effectively shorten its length. In the following steps, you might need to untwist the sleeve slightly to elongate it.

STEP 2 Connecting the extruder cable bundle







- Slide the NYLON filament in the hole.

ⓘ If the nylon is hidden inside the textile sleeve, use the technique in the previous step to reach it.

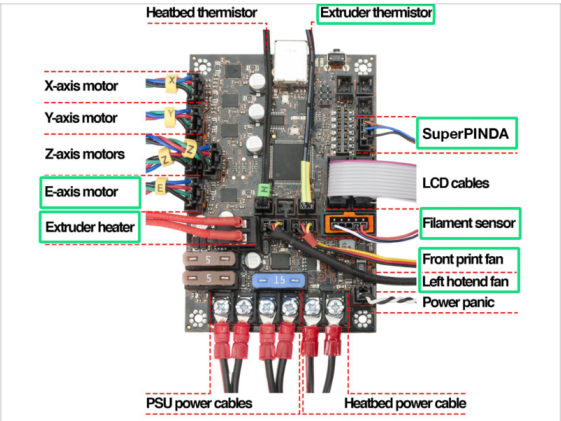
- Make sure the filament isn't pushing into the X-axis motor cable. This would indicate it is too long and you need to slightly unwrap the sleeve and push the filament back.
- Slide the sleeve in the holder at least 3/4 of the holder's height.

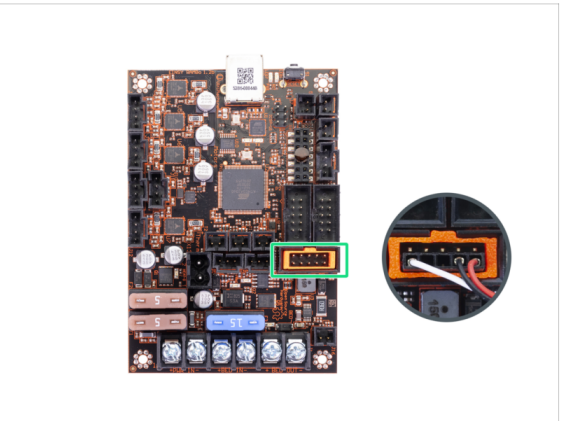
⚠ Again, ensure the filament isn't pushing the cables and if needed slightly unwrap the sleeve and push the filament up.

- Use the Extruder-cable-clip and two M3x10 screws to fix the cable bundle in place.

ⓘ Older MK3 units may have a zip tie cable harness mounting. Use a zip tie to secure the textile sleeve. **Do not overtighten the zip tie**, you can damage the cables!

STEP 3 Connecting the cables (MK3 to MK3S+ upgrade)





ⓘ If you are upgrading from MK3S to MK3S+,please skip this step.

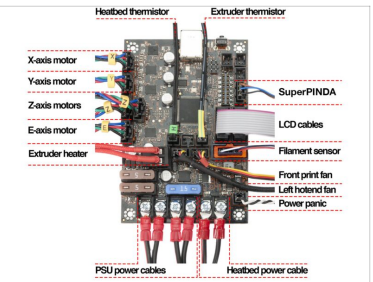
- Connect all unplugged cables according to the wiring diagram.

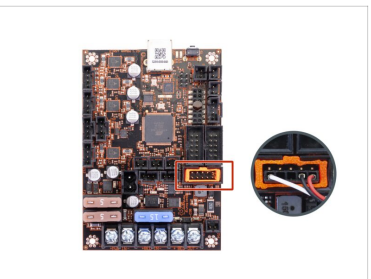
  ⓘ Some units may be without a plug-aligner (orange frame in the filament sensor slot). It has no effect on the function of the printer.

⚠ Make sure once more the Filament sensor cable is connected to all pins! **Misalignment might lead to permanently damaging the sensor.**

- Check your electronics connection according to the wiring diagram.

STEP 4 Connecting SuperPINDA cable (MK3S to MK3S+ upgrade)

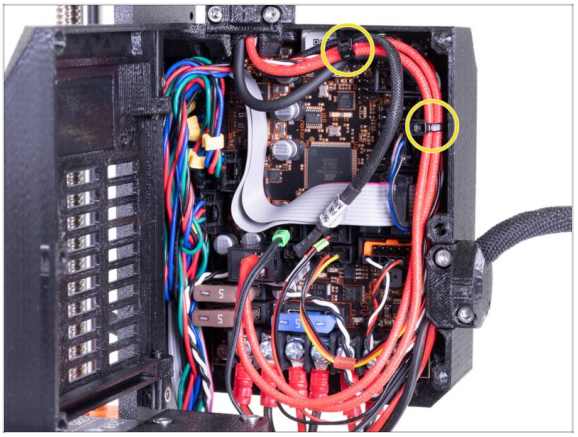




ⓘ If you are upgrading from MK3 to MK3S+, please skip this step.

- Connect the SuperPINDA sensor to the Einsy board.
- Check your electronics connections according to the wiring diagram.
- To make sure, check the correct connection of the filament sensor cable. **The connector must be plugged into the bottom row** of the slot. Misalignment might lead to permanently damaging the sensor.

STEP 5 Cable management



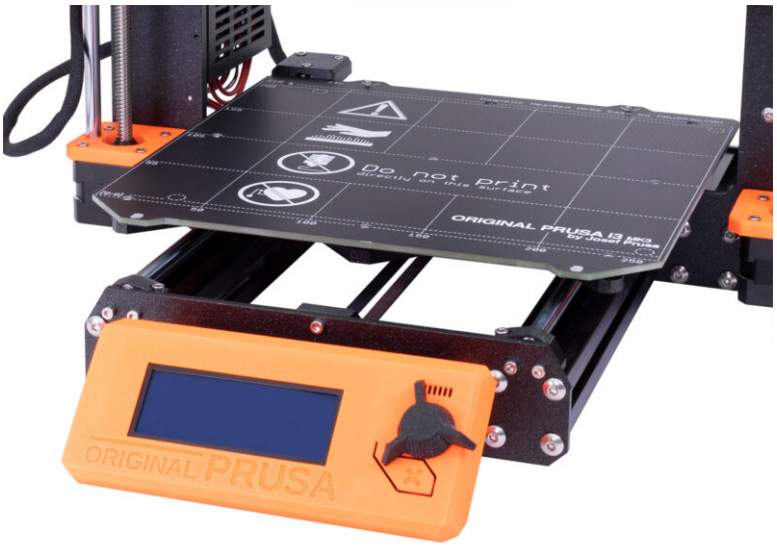
- Arrange the cable management according to the last picture and attach the cable bundle to the Einsy case with two zip ties.

  ⓘ Early MK3 units do not have protrusions on the Einsy case for attaching a zip tie.

STEP 6 It's done

- Close the Einsy-door and secure it with the M3x40 screw.
- You're almost there... follow the next chapter.

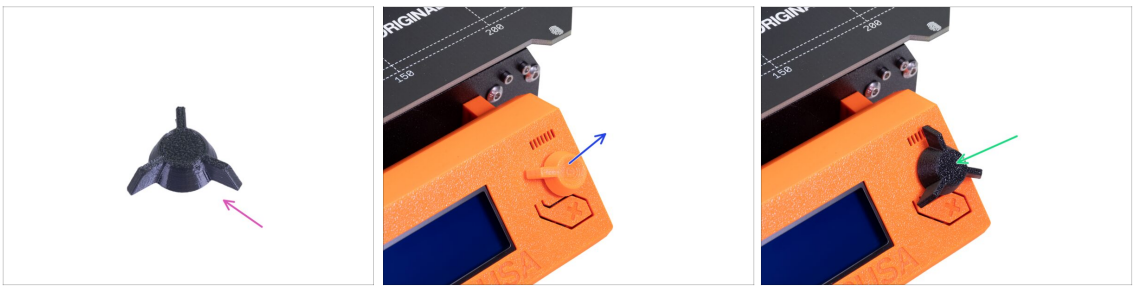
5. Y-axis upgrade



STEP 1 Tools necessary for this chapter

- Needle-nose pliers for cutting zip ties
- 2.5mm Allen key
- 2mm Allen key

STEP 2 New LCD-knob installation (optional)



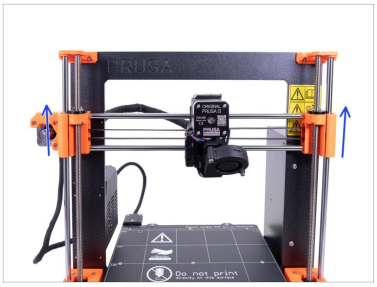
This step is optional. It depends on your choice whether you want to replace the LCD-knob with a new design.

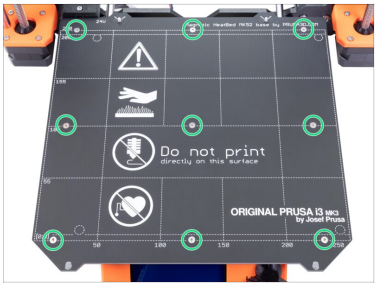
- **For the following steps, please prepare:**
  - New MK3S+ LCD-knob (1x)
- Pull out the old version of the knob and remove it from the printer.
- Replace it with the new LCD-knob.

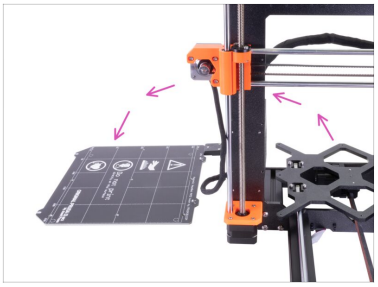
Knob mounting orientation doesn't matter.

Note that the knob for MK3S+ and MINI+ have a similar design, but different dimensions and are not compatible.

STEP 3 Removing the heatbed



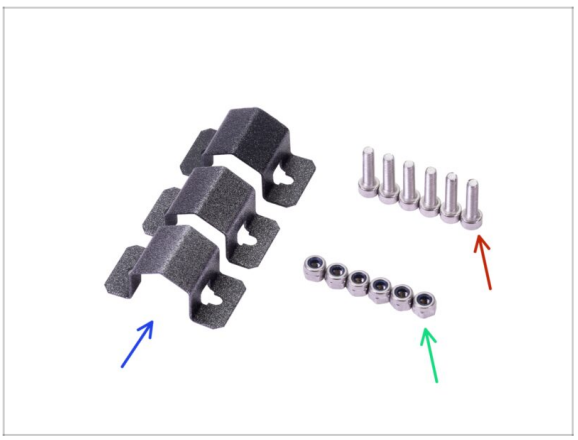




- By rotating BOTH threaded rods at the same time, move the Z-axis to 3/4 of its height.
- Use the 2mm Allen key and remove all screws on the heatbed.
- Remove the heatbed from the Y-carriage and put it next to the printer on the clean surface.

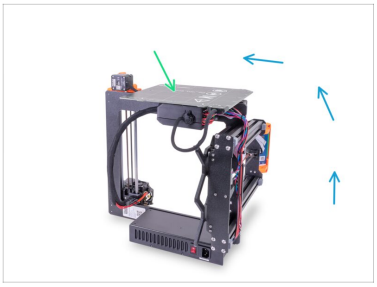
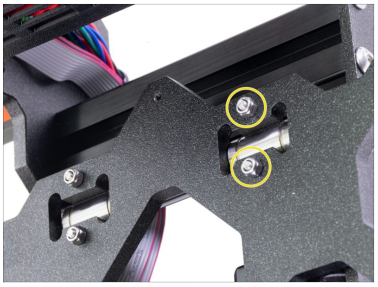
⚠ **Keep the screws and spacers** in a safe place (a box). You will need them for the reassembly!!!

STEP 4 Bearing clips assembly - parts preparation



- **For the following steps, please prepare:**
- Bearing clip (3x)
- M3nN nut (6x)
- M3x12 screw (6x)

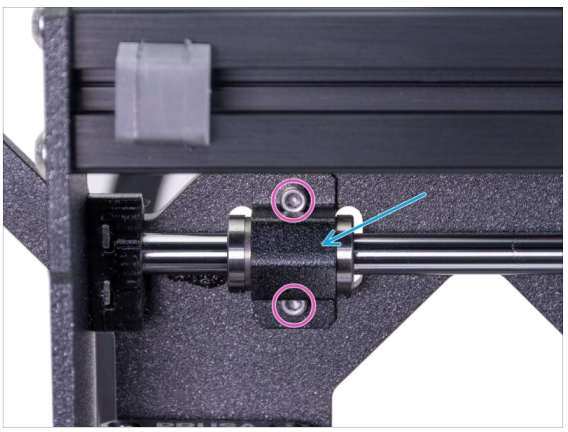
STEP 5 Bearing clips assembly


- Rotate the printer carefully on the side with the PSU. Turn the rear side of the printer towards you. See the picture.
- Put the heatbed with the top surface up on the electronics case. Make sure it is stable.
- Select one U-bolt in the upper row and remove two M3nN nuts.
- Once the nuts are removed, grab the U-bolt and remove it by pulling on the opposite side.

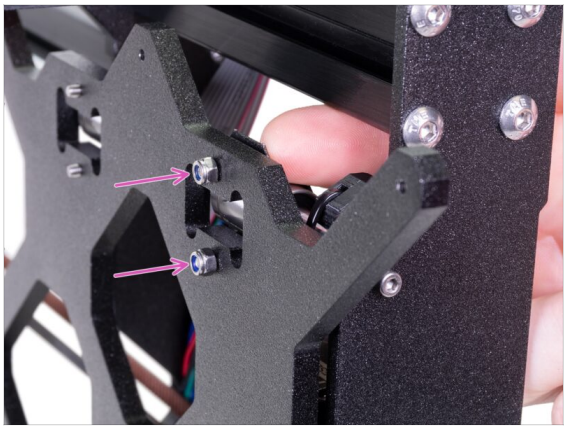
ⓘ The package includes new nyloc nuts (M3nN) and it is recommended to use them instead of the old ones. The U-bolts will be also replaced.

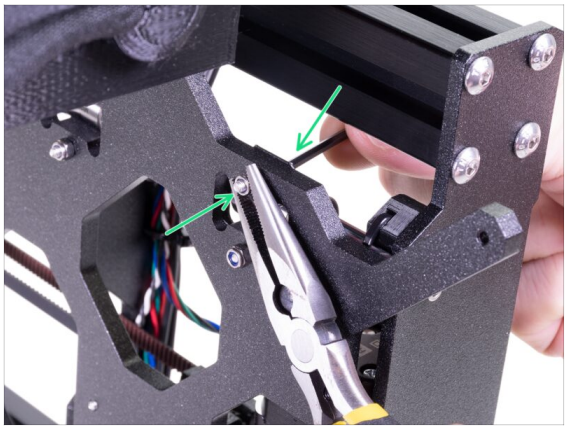
STEP 6 Bearing clips assembly

- Make sure the bearing is positioned at the center of the cutout. If not, adjust it accordingly. **Do not rotate with the bearing!**
- Place the bearing clip over the bearing.
- Align the holes in the clip with the holes in the Y-carriage and insert two M3x12 screws.

STEP 7 Bearing clips assembly





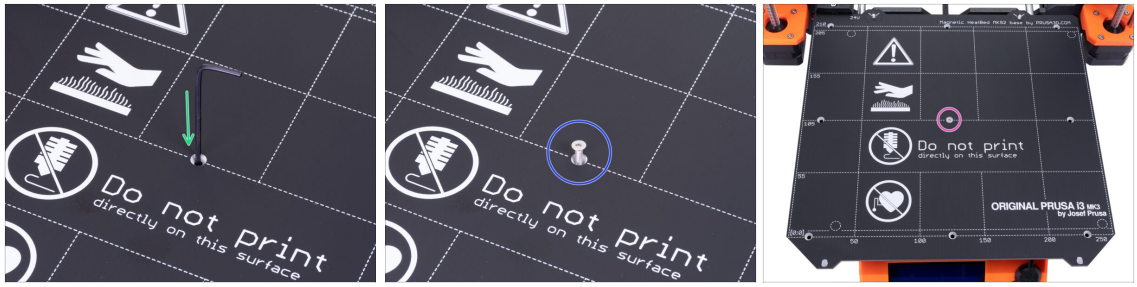
- Turn the printer carefully around to get access to the other side of the Y-carriage. Hold both screw heads in place using your fingers and put on the nyloc nuts.
- Tighten both nuts using the 2.5mm Allen key and needle-nose pliers.
- Repeat these steps for the remaining two linear bearings. Continue with the second upper bearing and then the lower one.

STEP 8 Mounting the heatbed (part 1)

- **Hold the heatbead** and carefully put the printer back on its "feet".
- Push the Y-carriage to the front and place the Heatbed behind.
- Locate a hole in the centre of the Y-carriage.
- Place one spacer on the top of the hole.

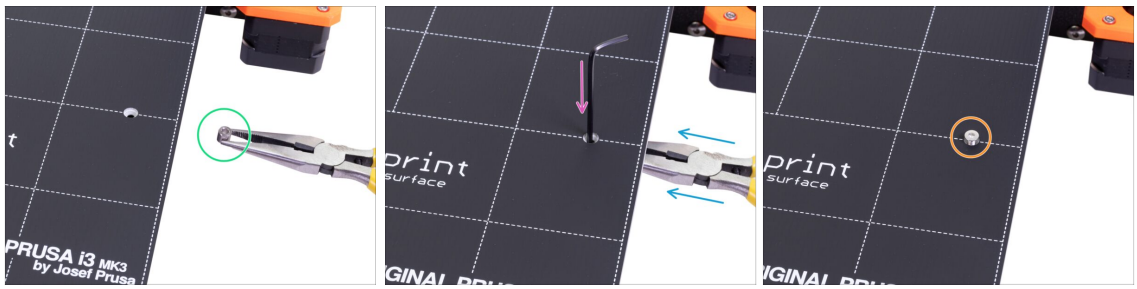
ⓘ The exact position of the spacer will be adjusted in the next step.

STEP 9 Mounting the heatbed (part 2)



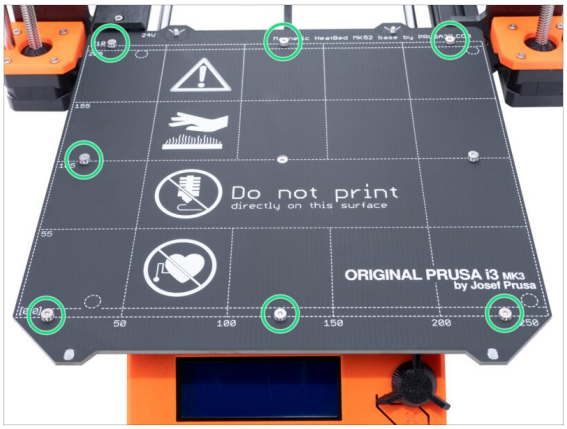
- Push the Allen key through the middle hole on the Heatbed and place it above the spacer. Use the Allen key to align all parts.
- After the alignment insert the M3x12b screw instead.
- Tighten the screw just slightly.

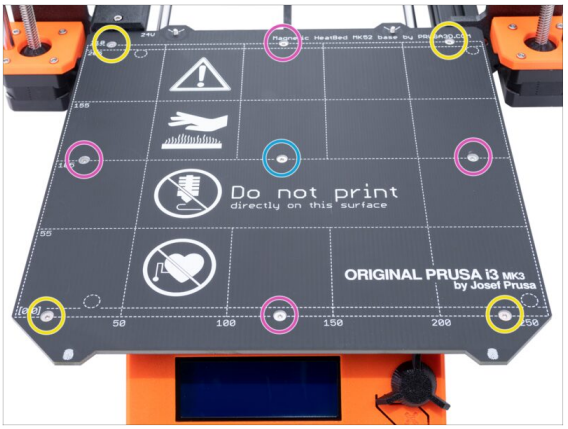
STEP 10 Mounting the heatbed (part 3)



- Move to the right side of the heatbed.
- Place another spacer with the pliers.
- Push the pliers between the heatbed and the Y-carriage.
- Use the Allen key to align the spacer.
- When aligned, insert the screw instead and tighten it slightly.

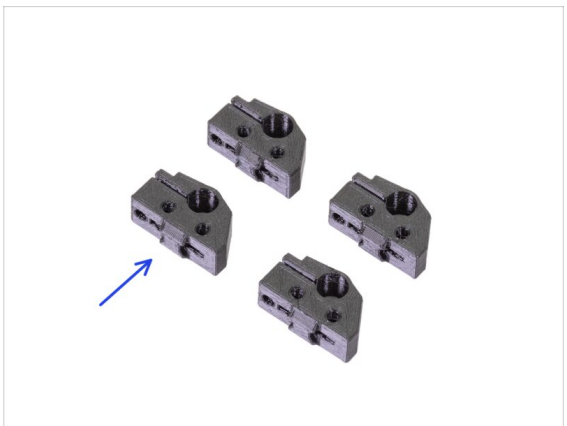
STEP 11 Mounting the heatbed (part 4)





- Using pliers, insert spacers and screw them into the remaining holes. DON'T fully tighten the screws.
- After all screws are in place, tighten them in the following order:
  - Center screw
  - First four screws (edges)
  - Last four screws (corners)

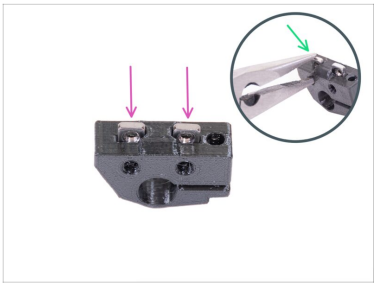
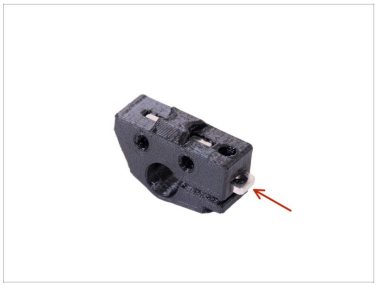
STEP 12 New Y-rod holders installation - parts preparation



- **For the following steps please prepare:**
- Y-rod-holder (4x)
- M3x10 screw (4x)
- M3nS nut (12x)

ⓘ *There are more M3x10 screws needed, we will reuse those in current Y-rod-holders.*

STEP 13 Preparing Y-rod-holder

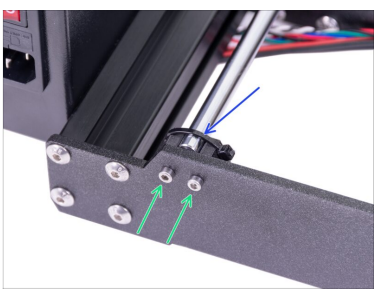
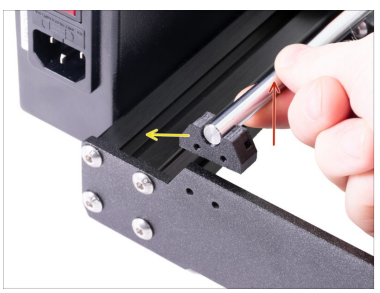
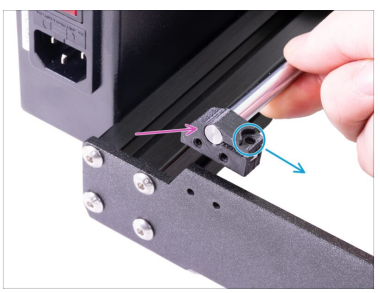




- Take one Y-rod-holder and insert two M3nS nuts.
- Make sure you've pressed the nuts all the way in. You can use pliers, **BUT** be careful, you can damage the printed part.

ⓘ In case you can't press the nuts in, don't use excessive force. First, check if there isn't any obstacle in the nut trap.

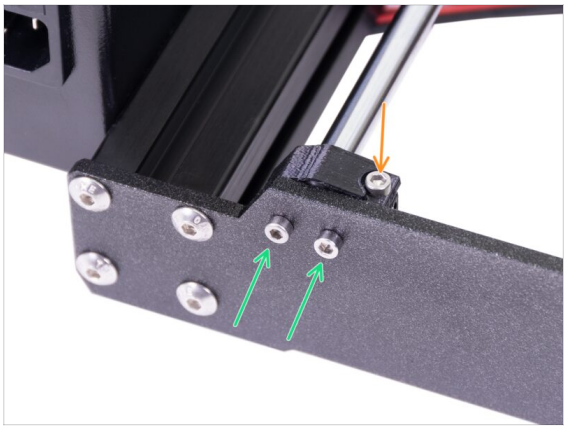
- Insert one M3nS nut from the side of the Y-rod-holder.
- Ensure and adjust the alignment of each nut with the 2mm Allen key.
- Repeat this step for the remaining Y-rod-holders.

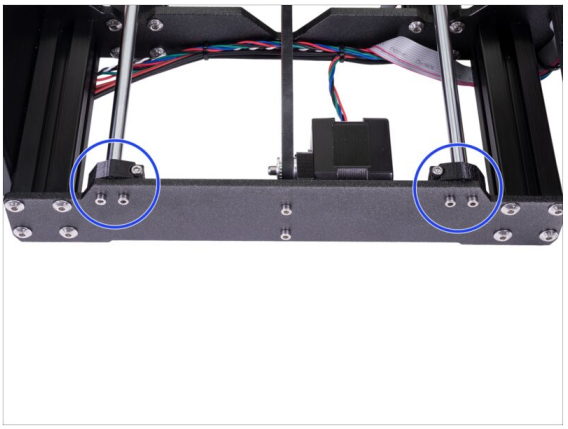
STEP 14 Removing the Y-rod-holders (rear side)

- Move the Y-carriage all the way from you.
- Start with the Y-rod-holders on the rear plate. Cut the zip tie on the left Y-rod-holder.
- Release the two screws holding the Y-rod-holder. Do not throw the screws away, you will need them in the upcoming step.
- Lift the smooth rod up, 1-2 cm (0.39 - 0.79 inch).
- Remove the Y-rod-holder from the printer.
- Push the new Y-rod-holder onto the rod. Align the front surface of the plastic part with the flat surface of the rod.
- Check the correct position of the Y-rod-holder. The screw hole must be facing up and towards the "inner" side of the Y-carriage (see the picture).

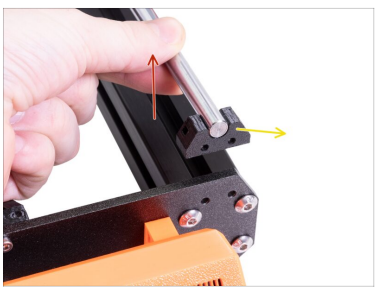
STEP 15 New Y-rod holders installation (rear side)





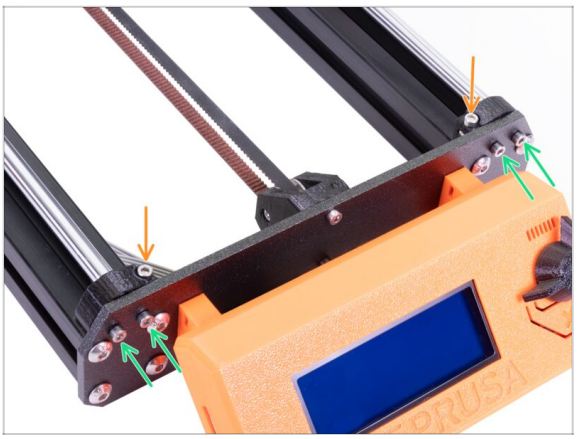
- Mount both Y-rod-holder to the rear plate by two M3x10 screws. **Do not tighten the screws completely, the Y-rod-holders must be loose.** We will tighten them fully later on.
- Insert the M3x10 screw into the hole in the Y-rod-holder and tighten it.
- Use the same procedure for the second (right) Y-rod-holder.
- Compare the look of the new Y-rod-holders assembly with the picture.

STEP 16 Removing the Y-rod-holders (front side)



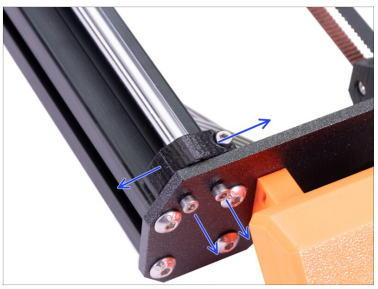
- Turn the printer so that the LCD is facing towards you.
- Move the Y-carriage all the way from you and cut two zip ties on the Y-rod-holders with the needle-nose pliers.
- Release four screws holding the Y-rod-holders. Do not throw away the screws, you will need them in the following step.
- Lift the smooth rod up, 1-2 cm (0.39 - 0.79 inch). **If you feel resistance, stop lifting!** Otherwise, you can damage the Y-rod-holder on the other end of the rod.
- Remove one Y-rod-holder from the printer.
- Push the new Y-rod-holder on the rod. Align the front surface of the plastic part with the flat surface of the rod.
- Check the correct position of the Y-rod-holder. The screw hole must be facing up and on the "inner" side of the Y-carriage (see the picture).
- Repeat these steps for the second Y-rod-holder.

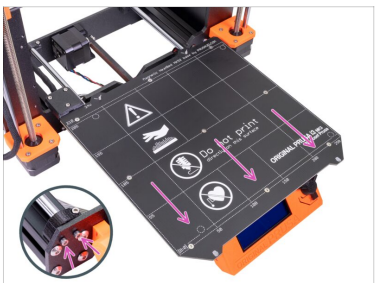
STEP 17 New Y-rod holders installation (front side)



- Mount both Y-rod-holders to the front plate by four M3x10 screws. Insert and tighten two screws on each holder equally, but not completely. We will tighten them fully later on.
- Insert the M3x10 screw into the hole in each front holder and tighten it.

STEP 18 Aligning the smooth rods

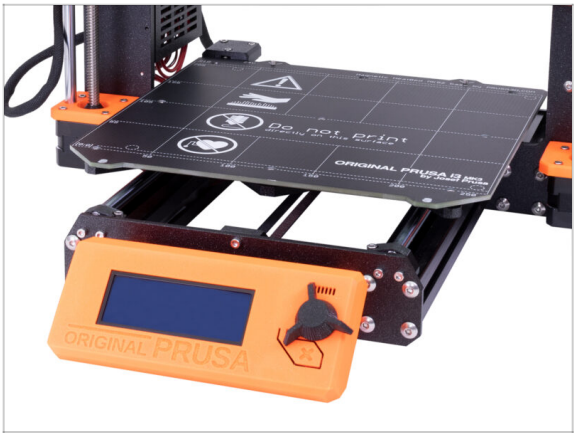




⚠ **IMPORTANT:** proper alignment of the smooth rods is crucial to reduce noise and overall friction.

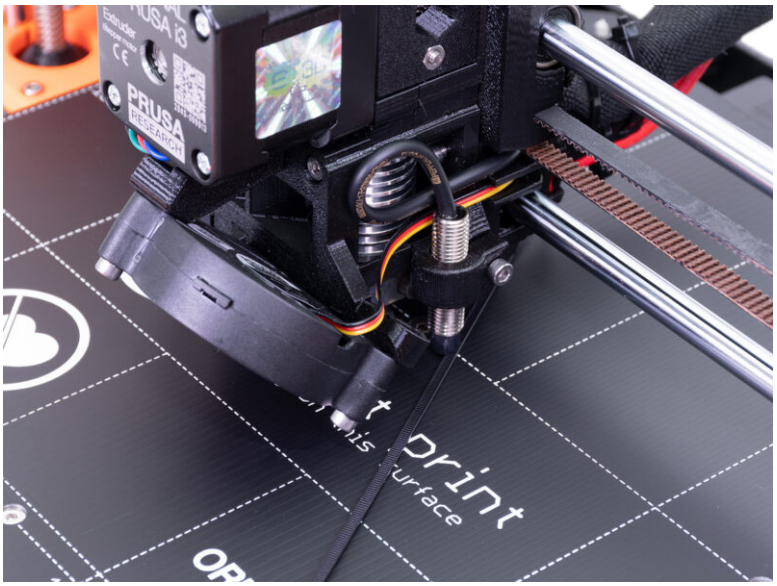
- Ensure all M3x10 screws on Y-holders are slightly loosened, so the printed parts are able to move.
- Move the Y-carriage back and forth across the entire length of the smooth rods to align them.
- Then move the carriage to the front plate and tighten all screws in the front-Y-holders.
- Move the Y-carriage to the rear plate and tighten all screws in the back-Y-holders.

STEP 19 Y-axis is finished!

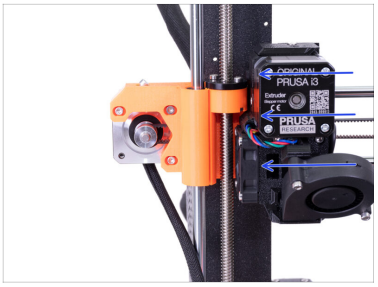
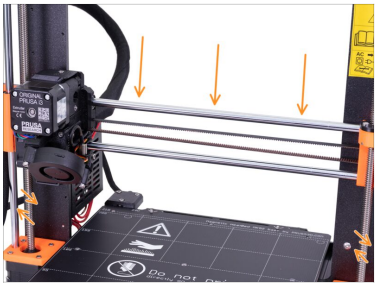
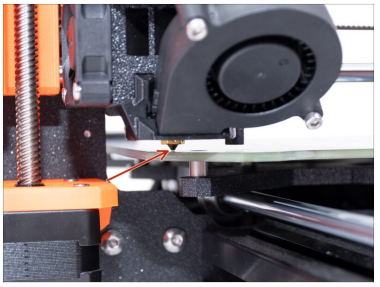


- Congratulations, you've just upgraded to the **Original Prusa i3 MK3S+ 3D printer!**
- We're done! Please follow the last chapter **6. Preflight check.**

6. Preflight check



STEP 1 SuperPINDA adjustment (part 1)

⚠ Ensure the printer is turned off and not plugged in.

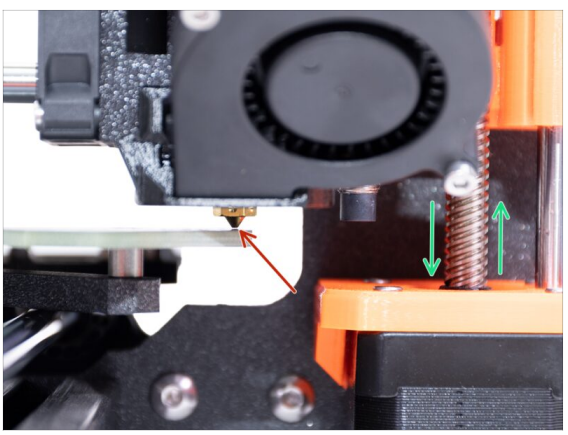
ⓘ While moving with the extruder, the X-axis motor works as a generator. You will create a small amount of electricity and the LCD might flicker. Move with the extruder reasonably slowly and in the future always use the printer's controls.

- Move the extruder manually all the way to the left.
- By rotating BOTH threaded rods at the same time on the Z-axis move the nozzle until you reach the heatbed. Try rotating both the rods equally!

⚠ Check again from a different angle that the nozzle is touching the heated slightly. Don't bend the heatbed!

ⓘ Don't place the steel sheet onto the heatbed during the entire SuperPINDA sensor adjustment process. Wait for the XYZ calibration.

STEP 2 SuperPINDA adjustment (part 2)

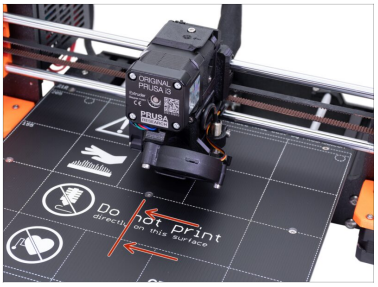
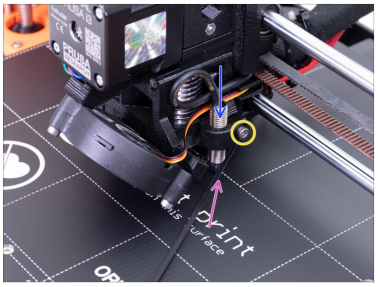
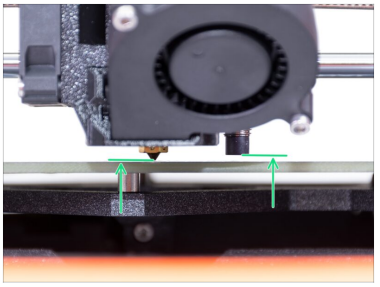


- Move the extruder carefully all the way to the right.

⚠ Make sure the nozzle is not scratching the surface during the movement! If it does, raise the right side of the X-axis by rotating the right Z motor (threaded rod) slightly clockwise.

- If an adjustment is needed, you can lower the nozzle height by rotating the right Z motor (threaded rod) counter-clockwise.

STEP 3 SuperPINDA adjustment (part 3)

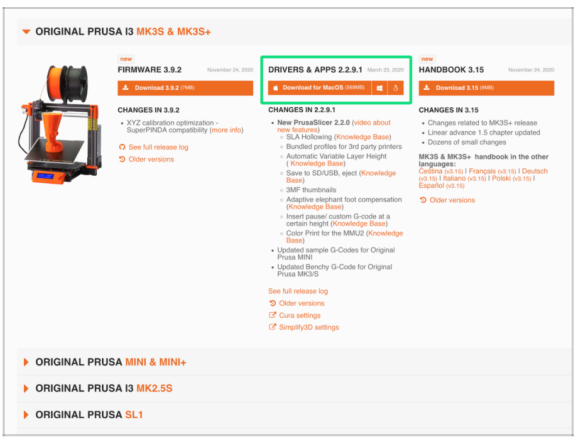




- Move the extruder to the centre of the X-axis.
- Take a zip tie from the package and place it under the SuperPINDA sensor. Use the middle part of the zip tie, not the tip.
- Release the screw holding the SuperPINDA sensor and gently press it against the zip tie.
- Tighten the screw on the SuperPINDA holder again.

⚠ **!!! DO NOT use glue to fix the SuperPINDA** sensor in the new type of holder with the M3 screw. You won't be able to release it again !!!

- A correct height of the SuperPINDA sensor compared to the nozzle should be similar to the last picture.

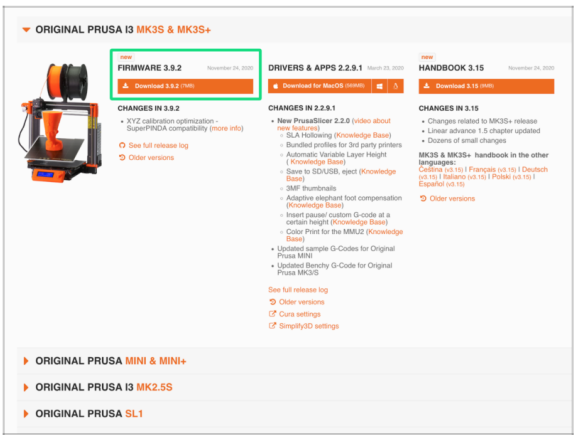
STEP 4 Download the necessary software



- **Firmware updater is now part of the PrusaSlicer** (previously Slic3r PE). In case you have it already installed, you can skip to the next step.
- Go to prusa3d.com/drivers and select the MK3S printer.
- Find the driver section and download the latest package. Leave this page open for the next step!
- Install drivers on your Windows, macOS or Linux system.

ⓘ PrusaSlicer (previously Slic3r PE) is a part of the driver's package. It also includes the tool for firmware upgrades.

STEP 5 Download the new firmware



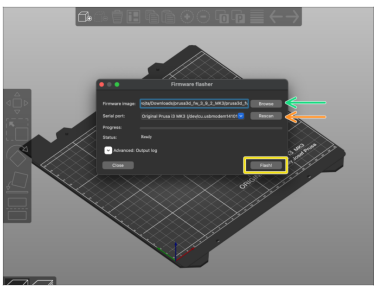
ATTENTION!!!

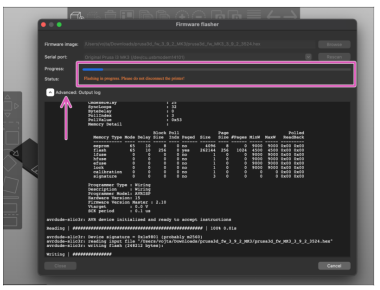
- **Firmware for MK3** is different from MK3S+, you **must perform an upgrade**.
- **Firmware for MK3S** is the same as for MK3S+. Just make sure you are running **version 3.9.2** or newer.

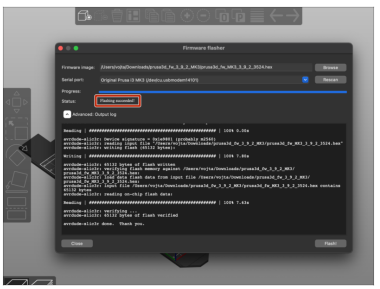
Download the zip file with the **firmware for the MK3S+** to your computer and unzip it.

To flash the firmware, the printer must be plugged and turned on!

STEP 6 Updating firmware using PrusaSlicer



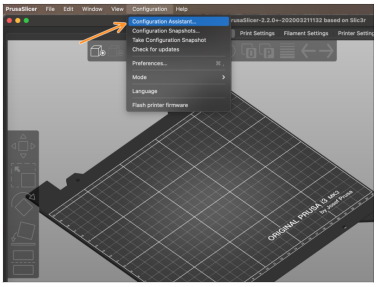
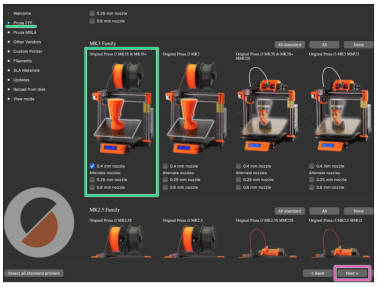
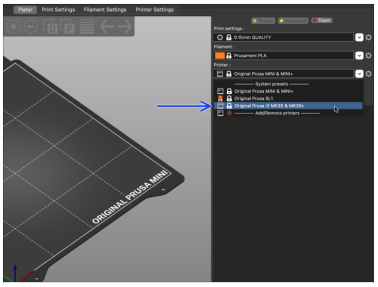




- Open PrusaSlicer and from the menu select **Configuration ->Flash Printer Firmware**
- Connect the printer to your computer using the bundled USB cable and select it from the menu. Hit **Rescan** if the printer is not on the list
- Select the firmware file on your harddrive *(.hex). Do not place the firmware on a network share.*
- Hit the **Flash** button.
- Wait until the process is completed. You can click on "Advanced: ..." to see the flashing process including detailed log.
- When the flashing process is done, you will be informed.
- **We're done here!** Your printer is ready to rock ;)

In case of issues with flashing the firmware please visit our troubleshooting article.

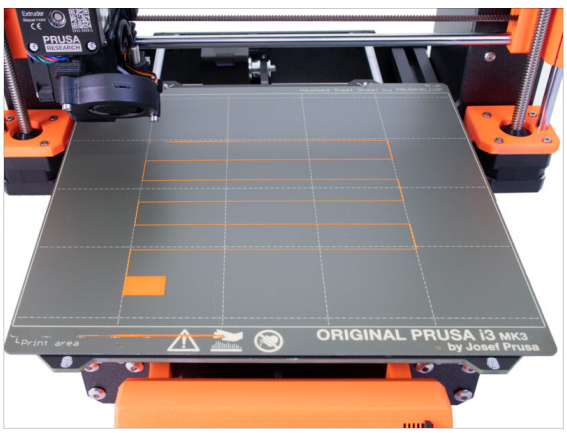
STEP 7 Adding MK3S+ settings to the PrusaSlicer

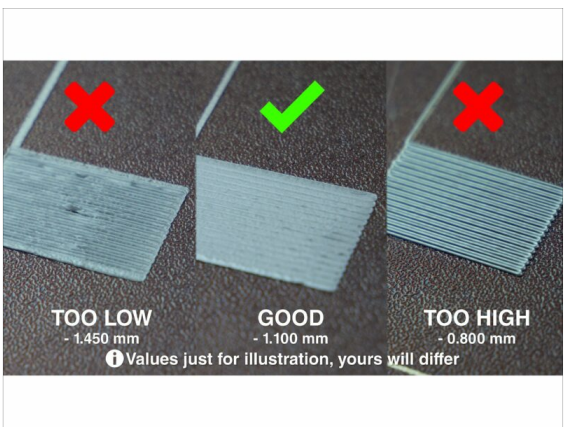




⚠ Before you leave PrusaSlicer, please add the **MK3S & MK3S+ printer profiles!!!** *You can also remove those for MK3.*

- From the top menu select **Configuration -> Configuration Wizard**
- Look for the MK3S+ option on the Prusa FFF printers list and select it.
- Click Next, then Finish.
- Expand the printer's menu and check if the MK3S & MK3S+ option is present. If not, please repeat the process again.

STEP 8 Calibrate Z and 1st layer calibration





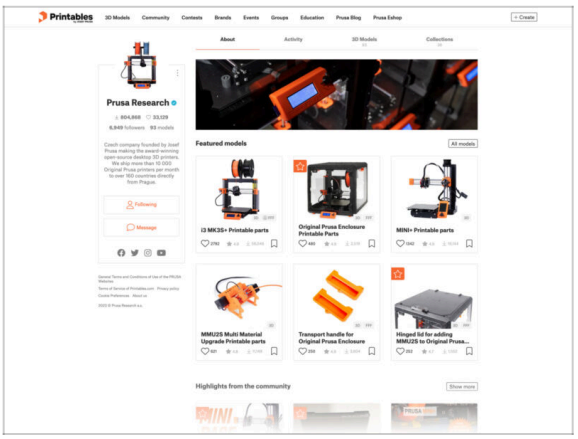
- Put the steel sheet back and clean it with IPA to remove dust and grease.

⚠ First, run the Calibrate Z to make sure the X-axis is absolutely level!

⚠ Then run the 1st layer calibration as we moved with the SuperPINDA.

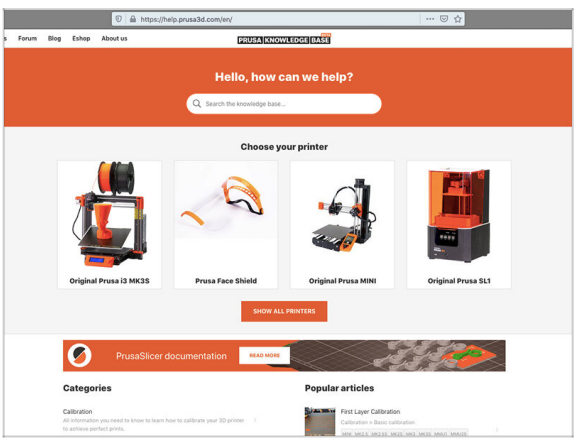
ⓘ Re-run the first layer calibration until you are satisfied with the results.

STEP 9 Printable 3D models



- Read the chapter *Printing* in 3D Printing Handbook.
- You can start by printing some of our test objects bundled on the included SD card.
- The sample objects are also available on the official Prusa Research Printables profile
- **Congratulations! You are ready to print NOW! ;-)**

STEP 10 Prusa knowledge base

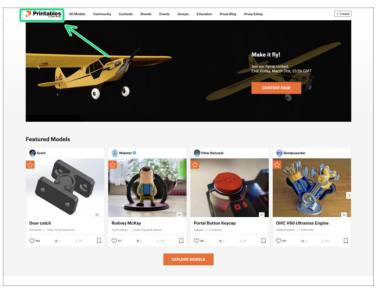


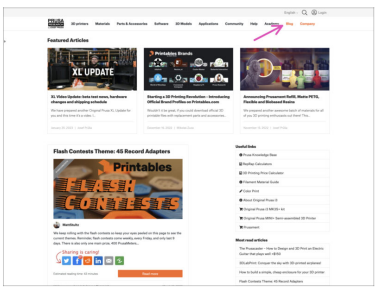
- If you encounter any problems at all, don't forget you can always check out our knowledge base at help.prusa3d.com
- We're adding new topics every day!

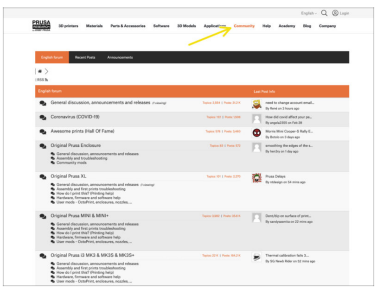
STEP 11 Quick guide for your first prints

- See our free **3D Printing Handbook** - prusa3d.com/3dhandbookMK3S+
- **That's it - the assembly is over.** Calibrate the printer according to the Handbook and you are ready to print!
- **We hope you've enjoyed the build. Don't forget to leave feedback and see you in the next one :)**

STEP 12 Join Printables!







- Don't forget to join the biggest Prusa community! Download the latest models in STL or G-code tailored for your printer. Register at Printables.com
- Looking for inspiration on new projects? Check our blog for weekly updates.
- If you need help with the build, check out our forum with a great community :-)
- ⓘ All Prusa services share one user account.

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