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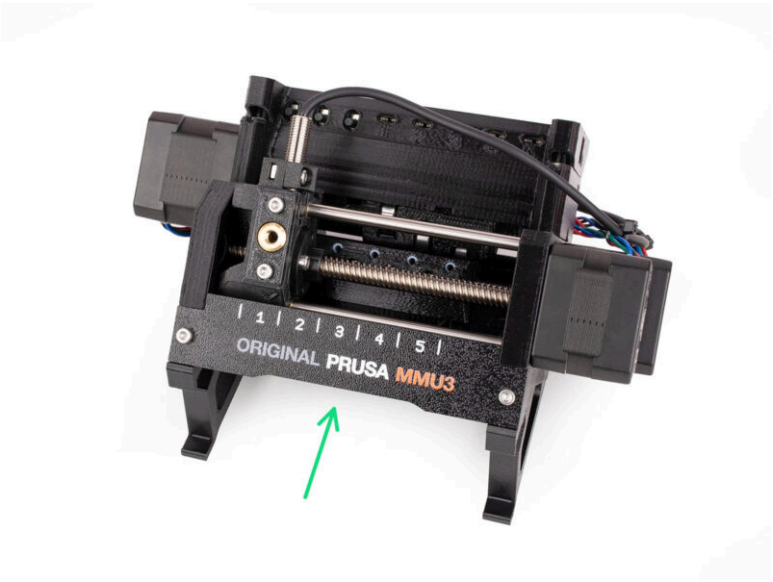
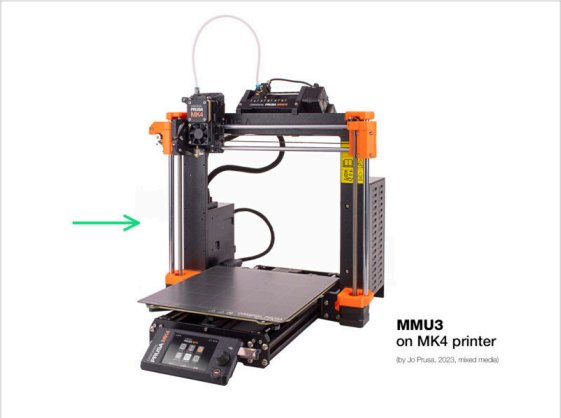
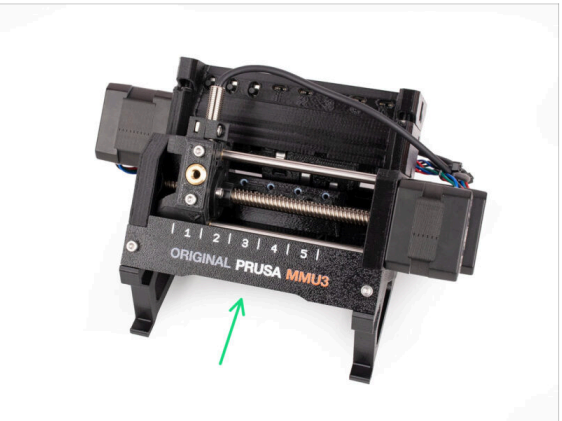
1. Introduction



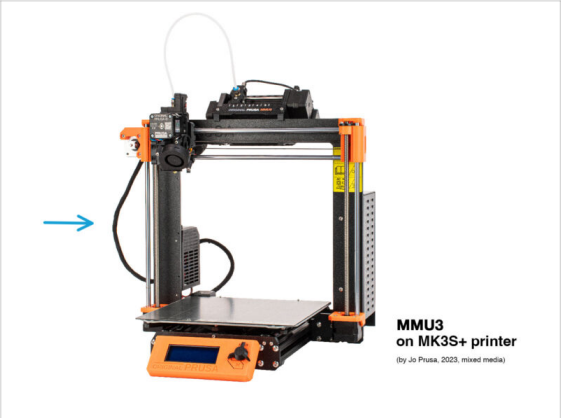
STEP 1 MMU History and Printer Compatibility

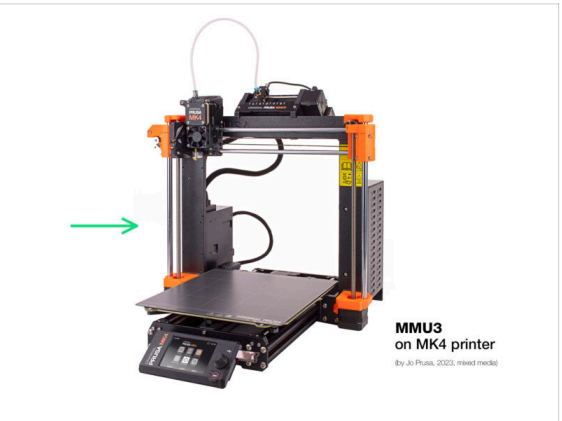




- **Welcome to the MMU3 guide!** There were several generations of the Original Prusa Multi-Material printing solution. Verify you are looking at the correct guide for your MMU unit and your printer.
  - MMU1 for MK2 and MK2S printers (introduced in 2016-2018)
    It used four separate extruders feeding one nozzle.
  - MMU2 for MK2.5 and MK3 (2018-2019) *Five filaments feeding one direct-drive extruder.*
  - MMU2S for MK2.5S, MK3S, MK3S+ (2019-2023)
    Introduced a chimney on the extruder with the IR-filament sensor.
  - **And finally, the current model**:
    MMU3 for MK3S+, MK3.5/S, MK3.9/S and MK4/S.
    MMU3 is the one we will be dealing with in this guide.

STEP 2 Supported printers





- Original Prusa Multi-Material **MMU3** is currently officially supported only in combination with these printer models:
  - Original Prusa i3 **MK3S+**
  - Original Prusa **MK3.5/S**
  - Original Prusa **MK4/S** or **MK3.9/S**

ⓘ If you have an older machine like the MK3 or MK3S, it is recommended to upgrade it to at least MK3S+ first.

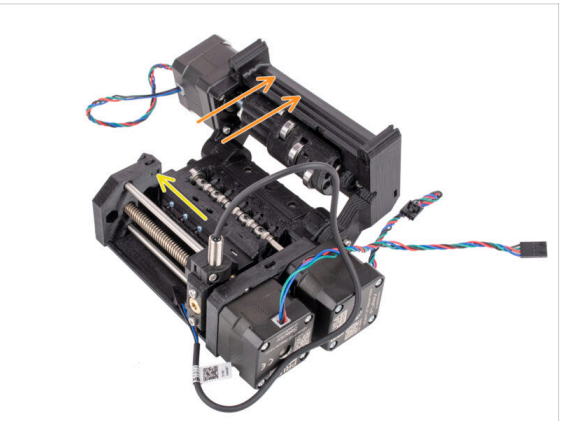
ⓘ For more info on Printer compatibility, visit the MMU3 Compatibility article.

STEP 3 MMU3 + Enclosure

ⓘ The MMU3 is also supported with the Original Prusa **Enclosure**.

- If you plan to use this combination, **install the MMU3** onto the assembled printer using this guide.
  - Once you've completed the MMU3 installation, continue to the Enclosure assembly guide.

STEP 4 Disclaimer



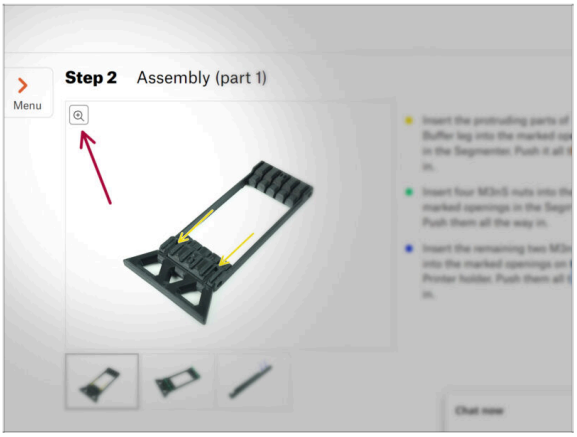
- **Make sure your printer** is fully assembled and **works perfectly** before you proceed to attach the MMU3 onto it. Make a few single material prints. If it has any issues, fix the issues first. Diagnosing printer issues can be harder with the MMU attached.
- As you embark upon the assembly process, we cannot stress enough the importance of carefully following each and every step.

STEP 5 Tools required

- The **tools needed** for the MMU3 Kit assembly are available as an **optional bundle**.
  - Needle-nose pliers (1x)
  - Universal wrench (1x)
  - Philips PH2 screwdriver (1x)
  - Allen key 1.5mm (2x) *the short and long one*
  - Allen key 2mm (1x)
  - Allen key 2.5mm (1x) *the short and ball-end long one.*

For some steps, we recommend having the following extras:
- A measurement tool, preferably a caliper or digital caliper Or - you can print one.
- Flush cutters, which can be useful during assembly.

STEP 6 View high resolution images

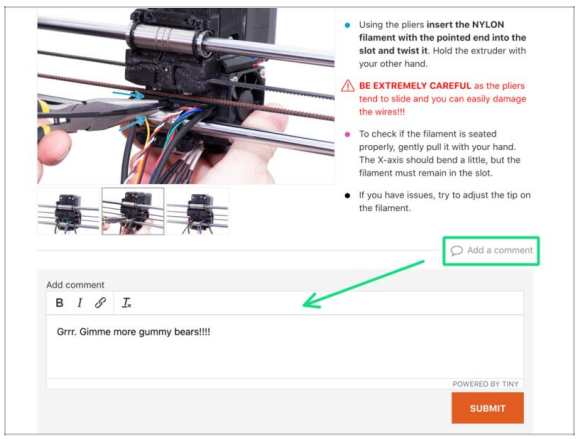


- When you browse the guide on help.prusa3d.com, you can view the original images in high resolution for clarity.
- Just hover your cursor over the image and click the Magnifier icon ("View original") in the top left corner.

STEP 7 Labels guide

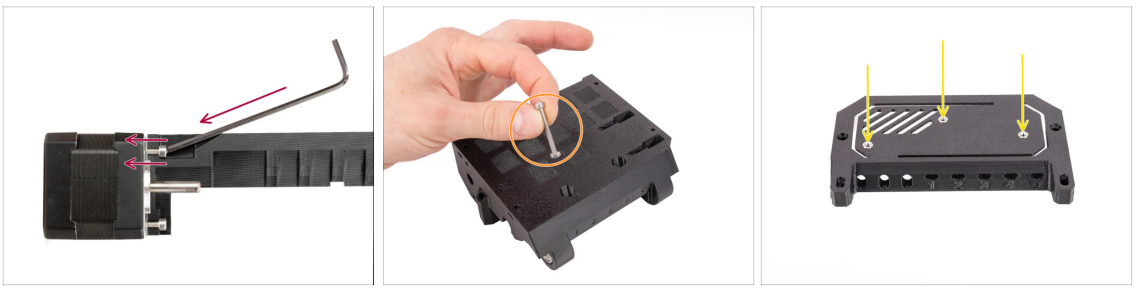
- All the boxes and bags containing the parts for the build are labeled.
- Most of the part drawings on the labels are scaled 1:1 and can be used to identify a part.
- You can download and 2D print a Prusa Cheatsheet with the 1:1 scaled fastener drawings. help.prusa3d.com/cheatsheet. Print it at 100 %, don't rescale it, otherwise, it won't work.

STEP 8 We are here for you!



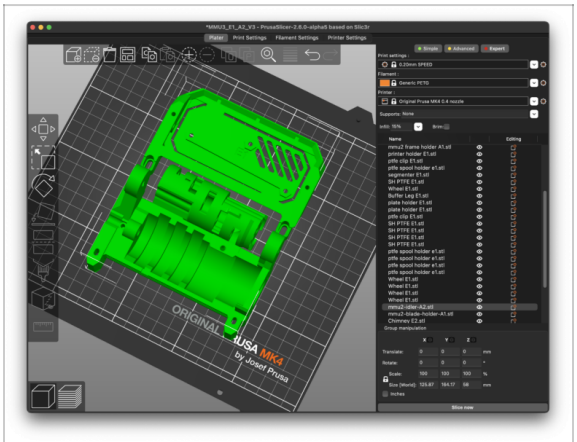
- Lost in the instructions, missing screw or cracked printed part? **Let us know!**
- You can contact us using following channels:
  - Using our 24/7 live chat
  - Or by writing an email to info@prusa3d.com
  - Or, you can use the comments under each step.

STEP 9 Pro tip: inserting the nuts



- During the MMU3 kit assembly, some screws require tightening with an angled Allen key. Ensure the screw stays perfectly perpendicular to the thread. If it's difficult to turn, fully release it, realign, and start again to avoid cross-threading.
- For deep openings, use a long screw like the M3x30 as a handle to help position the nut.
- If a hex nut won't fit, use a fully threaded screw (e.g., M3x10, M3x18) and insert it from the opposite side to drive the nut into place.

STEP 10 Printed parts



- If you ordered the MMU3 Kit without plastic parts, you will need to print them using the pre-sliced G-codes before you can proceed with the assembly.

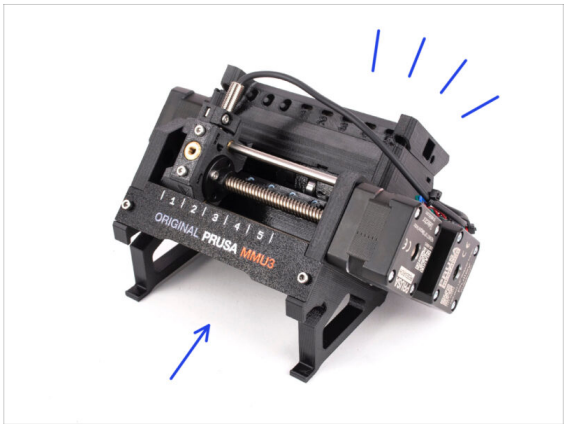
  ⚠ The parts **must be printed perfectly** in order for the MMU3 to work correctly: no warping or lifted corners, stringing or other irregularities.
  If you can't guarantee the parts being flawless, get the MMU3 kit with the factory-printed plastic parts instead.

- In case some parts get broken during the assembly, you can reprint them. Please check all plastic parts before starting your build to make sure there are no issues.
- The MMU3 printable parts are available at Prusa3D.com Printables profile
  More info is available at: Prusa3D.com/prusa-i3-printable-parts/

STEP 11 Prepare your desk

- Tidy up your desk! Tidying up decreases the probability of losing small parts.
- **Clear your workspace.** Make sure you have enough room. A nice clear flat workbench will get you the results you are aiming for.
- **Let there be light!** Make sure you are in a well-lit environment. Another lamp or even an extra flashlight will probably come in handy.
- Prepare something to contain the plastic bags and the removed packing materials so you can recycle them afterwards. Make sure there are no important parts being discarded.
- OK, we are ready. Let's start!

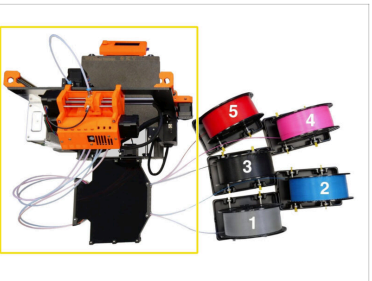
STEP 12 Continue



- If you're building the **MMU3 Kit** from scratch,continue to the chapter:
  - 4. Idler Body Assembly
- If you have the **Assembled MMU3 unit**, continue to the chapter:
  - 7. Cassette Buffer Assembly
- For the **MMU2S to MMU3 Upgrade**,continue to the chapter:
  - 2. MMU2S Disassembly (UPG)

2. MMU2S Disassembly (UPG)

STEP 1 Introduction



- In this chapter, we will partly **disassemble the MMU2S** unit and harvest a few key parts to be used for the **MMU3** build.

⚠ Ensure your MMU printer is powered off and disconnected. Unload all filaments from both the printer and the MMU unit.

- If there is a filament loaded in the extruder, use the **Unload filament** function in the menu.

- In the upcoming steps, we'll start by detaching the MMU unit from the printer and disconnecting the buffer from it.

Pay close attention to the description. When instructed, put aside the components from the MMU2S. Specific parts will be used again in a later step.

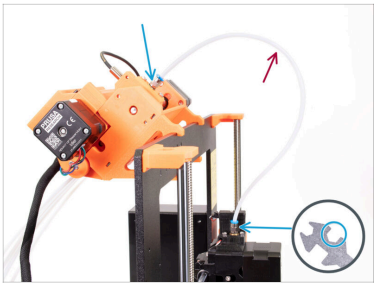
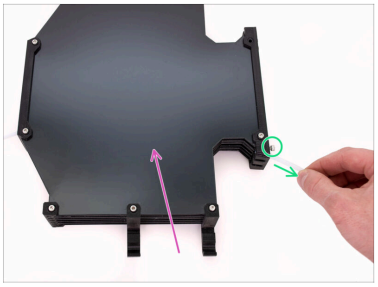
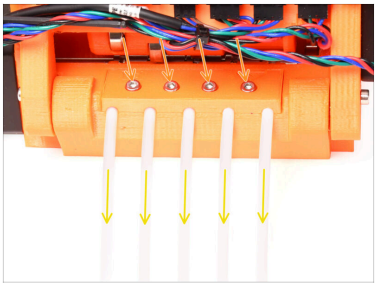
ⓘ Maintain a well-organized workspace to avoid mixing older parts with the new ones. **Although some new components might resemble the old ones, they are actually distinct.** Note that certain components shouldn't be reused for MMU3, while others are necessary for the upgrade.

STEP 2 Tools necessary for this chapter

- **Please prepare tools for this chapter:**
  - Needle-nose pliers
  - Unikey to loosen the Festo fittings
  - 2.5mm Allen key(s) for M3 screws
  - Phillips screwdriver for power cable terminals

ⓘ You can use your own tools if you find them more suitable.

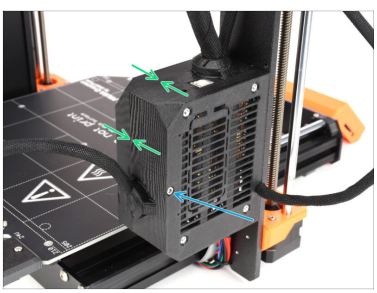
STEP 3 Disconnecting the PTFE tubes

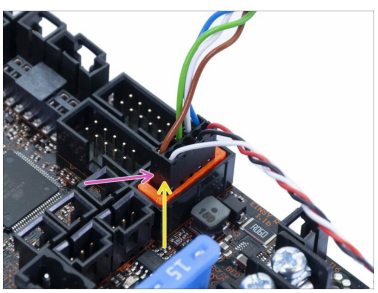




- Unscrew the M5-4 fittings from both the printer and the MMU unit. If the fittings are tight, you can use the Unikey or an 8mm wrench.
- Keep the PTFE tube with the fittings aside for disassembly later.
- We will have to disconnect the buffer from the MMU unit.
  - Loosen all the screws on the buffer securing the PTFE tubes connected to the MMU unit. Remove all five tubes by pulling them out.
  - **Keep the buffer** for a later disassembly in the next chapter.
- On the back of the MMU unit, slightly loosen the four screws holding the rear-PTFE holder.
- Remove all five PTFE tubes and **dispose of them immediately. These tubes will not be used again for MMU3.**

⚠ **MMU3 is designed to work with differently-sized PTFE tubes.** Reusing MMU2S tubes during the assembly of MMU3 will result in incorrect operation.

STEP 4 Disconnecting the MMU2S (part 1)



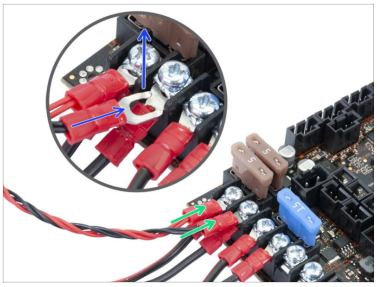


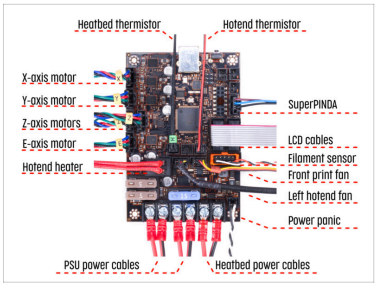
- Loosen the M3x40 screw on the printer's electronics box.
- Open up the electronics box.
- From the MMU, you'll see a **data cable** along with two **power cables**, all connected to the Einsy control board of the printer.

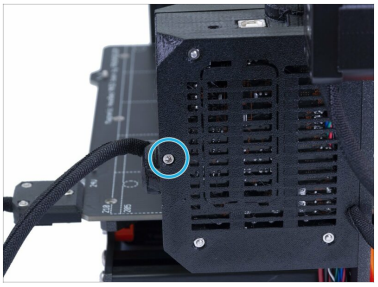
⚠ Never move, connect, or disconnect cables while the printer is powered on. Doing so can cause damage to the electronics.

- Begin by disconnecting the MMU data cable.
  - Be careful not to disconnect the Filament sensor cable located just below the MMU data cable.

STEP 5 Disconnecting the MMU2S (part 2)

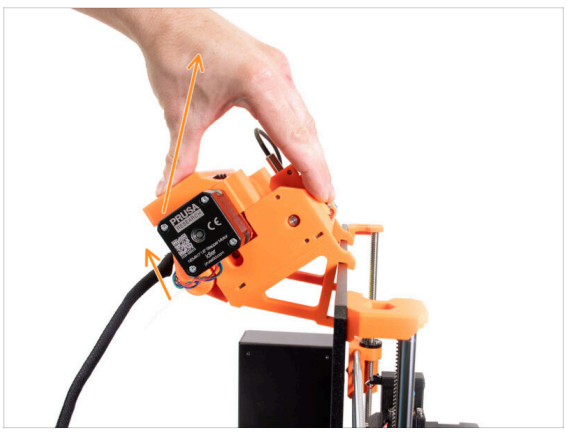


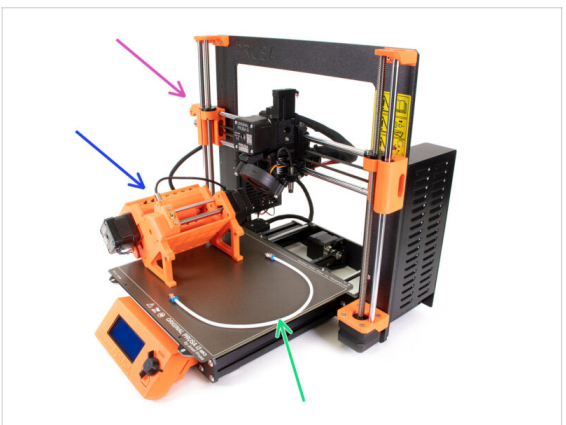




- With a Philips screwdriver, gently loosen the two power terminals located on the bottom left side of the Einsy board.
- The MMU power cable fork connectors are stacked over the main power supply connectors for the Einsy. Remove only the MMU's fork connectors individually, leaving the main supply connectors in place.
- Using the Philips screwdriver, thoroughly **secure the power terminals** with the MMU disconnected. Confirm that all connections match the picture.
- Take out the MMU cable bundle from the electronics box. Close the box and secure it using the M3x40 screw for now.

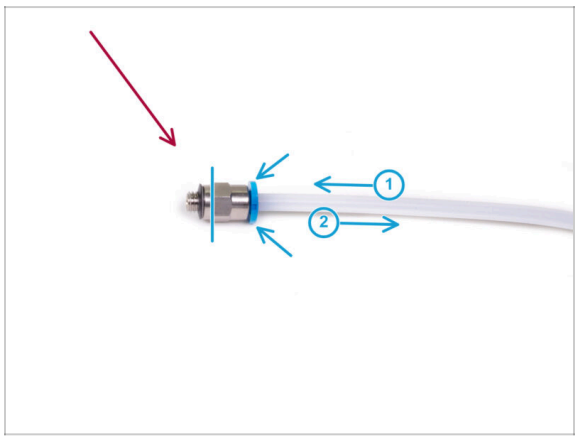
STEP 6 Removing MMU2S from the printer





- The MMU2S unit has been successfully disconnected.
- Raise the rear of the unit to detach the holders from the printer's frame. Then, remove the MMU from the printer.
- You can set the printer aside for now.
- We can move onto disassembling the MMU2S unit itself.
- For the following step, please prepare the **MMU-to-Extruder PTFE tube with the Festo fittings QSM-M5** attached.

STEP 7 MMU-to-Extruder PTFE tube disassembly



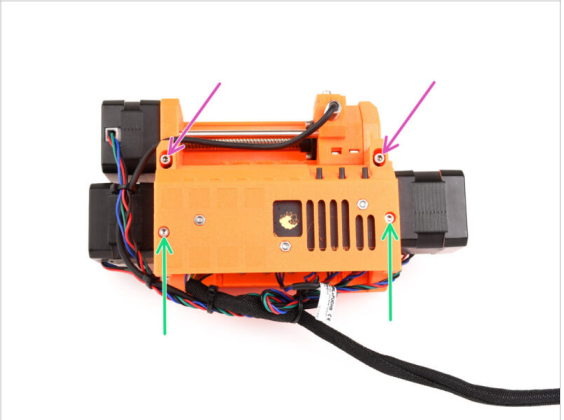
- Take the MMU-to-Extruder PTFE tube with the M5-4 fittings.
- Remove both fittings from the old PTFE tube.
  - Hold the fitting by the metal part and press the collet in. While the collet is pressed, first press the PTFE tube in, then pull it out entirely.

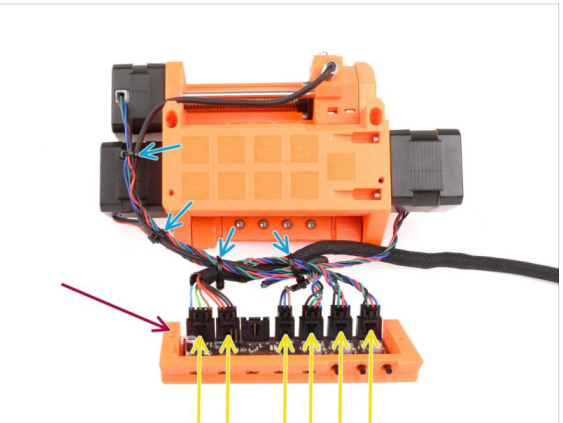
⚠ **MK3S+ & MK3.5/S owners: Save the fittings** for later use. **Discard the PTFE** tube so you don't confuse it with a new one later on!

⚠ **MK4/S & MK3.9/S owners:** Throw the fittings and the PTFE tube away now! Your package includes new ones! Mixing them may lead to issues!

⚠ **MMU3 is designed to work with differently-sized PTFE tubes.** Reusing MMU2S tubes during the assembly of MMU3 will result in incorrect operation.

STEP 8 MMU2S Unit disassembly





- Remove the two M3x18 screws holding the electronics on top of the unit.
- Remove the two M3x30 idler tension screws with the springs.
- Remove the electronics board assembly from the unit.
- Disconnect all cables from the electronics board. Remember that each connector has a safety latch that needs to be pushed in order to remove a plug. Set aside the board assembly.
- Gently cut the zip ties that are securing the cables together.

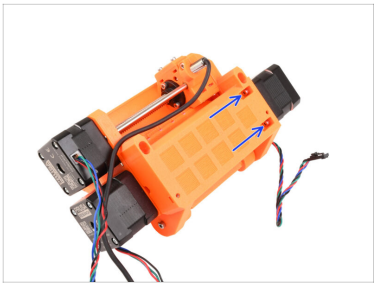
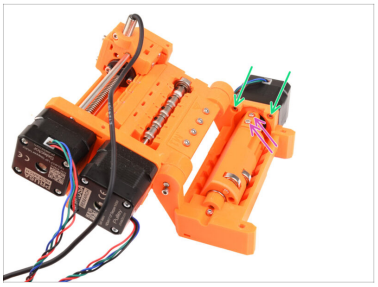
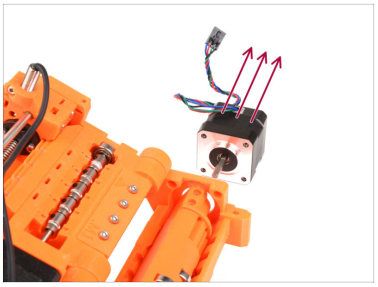
⚠ Be extremely careful not to damage the cables!

STEP 9 Textile wrap removal

- Separate the power and data cable bundle from the rest of the cables.
- Remove the textile wrap off the cables and **save the textile wrap for later use**.

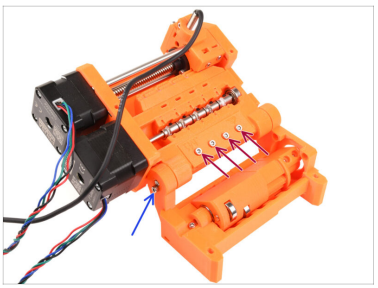
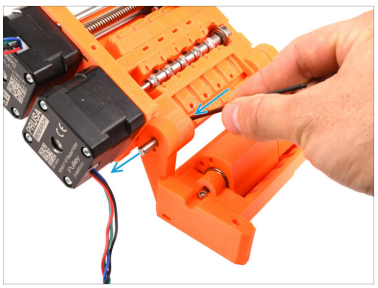
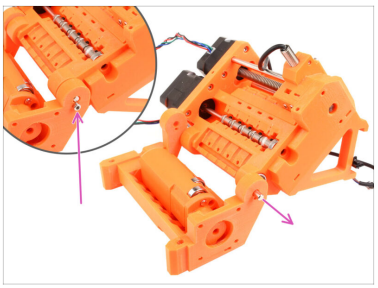
ⓘ The MMU2S power and data cables won't be used in MMU3.

STEP 10 Idler motor removal

- Using the ball-end Allen key at an angle, remove the two M3x10 screws from the top holding the Idler motor.
- Open the idler body and remove the two M3x10 screws that secure the motor from the opposite side.
- Remove the two M3x10 screws holding the motor shaft to the idler barrel.
- Pull out the **idler motor** from the unit. **Save it for future use.**

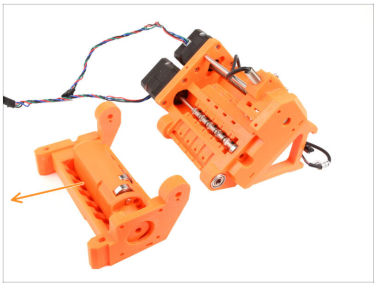
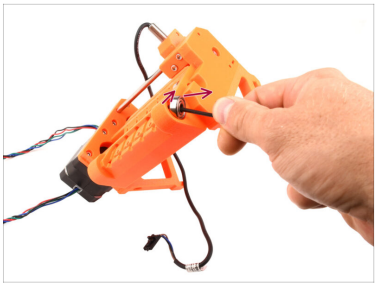
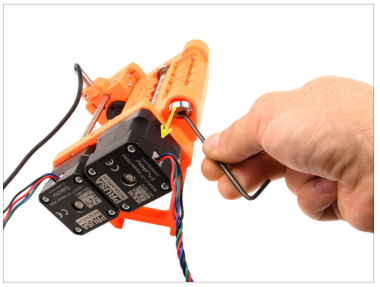
STEP 11 5x16sh shafts removal

- Remove the four M3x18 screws holding the Rear-PTFE holder. Remove the holder as well as all the PTFE tubes underneath.
- Remove the M3x10 screw on the side securing the 5x16sh shaft.
- Using the shorter side of the 2.5mm Allen key, push the **5x16sh shaft** from the inside out.
- Repeat the same process on the other side. Remove the M3x10 screw and push the 5x16sh shaft outward.

ⓘ **Save the 5x16sh shafts for later use.**

STEP 12 Bearings removal

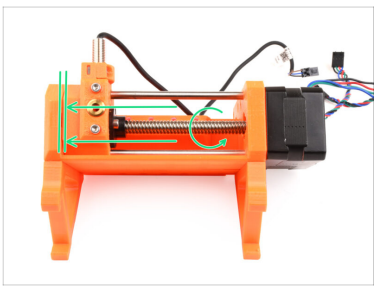
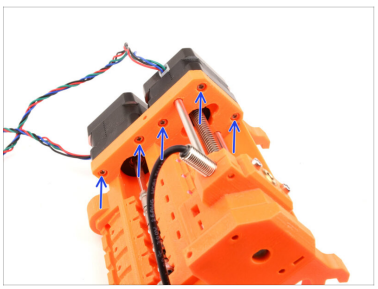
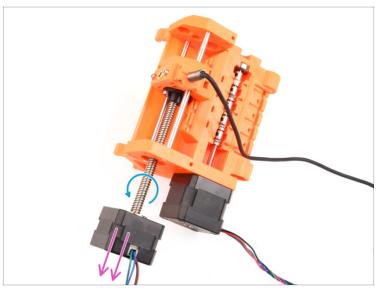
- Remove the Idler body with the Idler.

  These components are no longer needed. However, they contain valuable spare parts inside. Disassembling them can be challenging, so we won't do it at this point.

- Using the Allen key, tilt the **625ZZ bearing** on the right side of the Pulley body in order to remove it.
- Using the same technique, remove the bearing on the other side too.

Save both the 625ZZ bearings for later use.

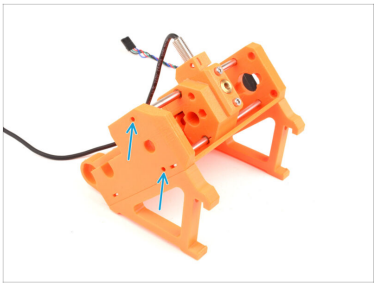
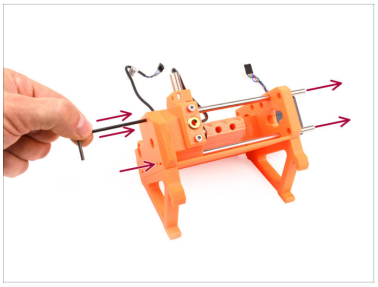
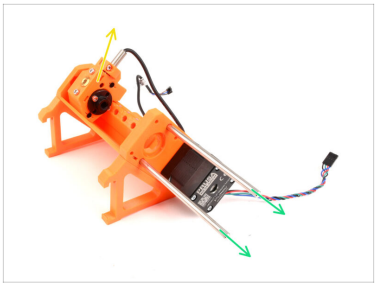
STEP 13 Selector motor removal

- By rotating the selector motor shaft, move the selector all the way to the left side.
- Using the 2.5mm Allen key, remove the **five M3x10 screws** holding the motors.
- Rotate the motor shaft some more to disengage it from the selector.
- Pull out the selector motor to remove it from the unit.

Save the motor for later use.

STEP 14 Selector removal

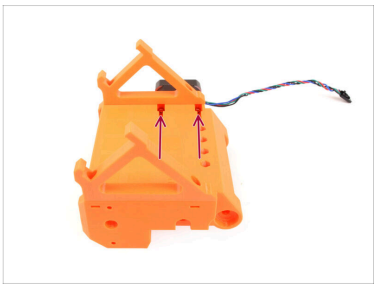
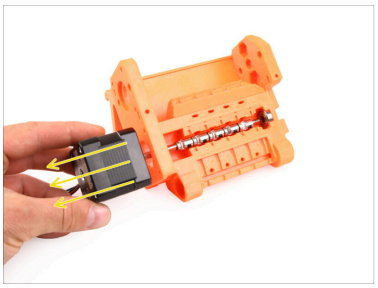
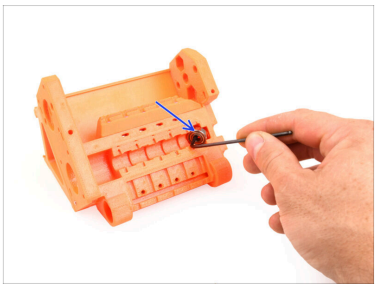




- There are two openings on the side of the unit. You can see the selector shaft ends through them.
- Insert the Allen key into the openings to push both the shafts all the way in.
- Pull out both the **5x120sh shafts** and **save them for later use.**

  ⚠ If you opt to use the needle-nose pliers to pull the shafts out, pull them out while doing a twisting motion. **Be careful not to scratch them!**
- Lift the **selector** up and remove it from the unit. Set it aside for now, as we will be further disassembling it.

  ⚠ There is a sharp blade on the back of the selector. Proceed carefully to avoid an injury!

STEP 15 Pulley motor removal

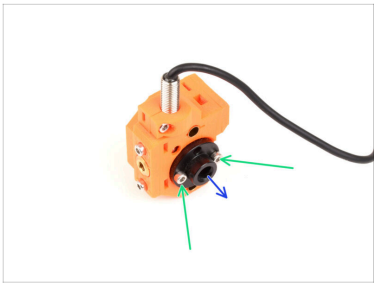
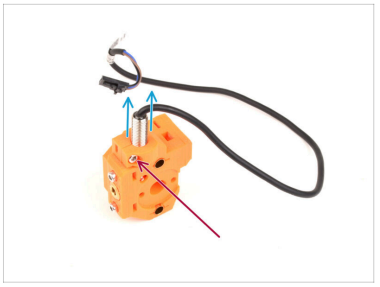




- Turn the unit around.
- On the bottom side, remove the remaining M3x10 screws holding the pulley motor.
- Remove the **pulley motor** from the unit.

ⓘ **Save the motor for later use.**

- Using the Allen key, tilt the pulley **bearing** in order to remove it. **Save it for later use too.**

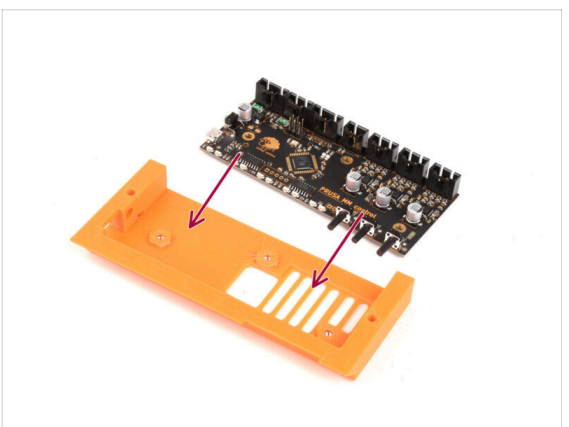
STEP 16 Selector disassembly


- Remove the two M3x10 screws holding the trapezoid nut.
- Remove the trapezoid nut and **save it for later use.**
- Remove the M3x10 screw on the side of the selector.
- Remove the **FINDA / SuperFINDA sensor** and **save it for later use.**
- A steel ball will fall out of the selector.

  ⚠ The ball isn't magnetic and **won't be re-used.** We will use a magnetic one later on. Set it aside not to confuse it with the new one.
- You don't need the other parts in the selector anymore, but you can keep them as spares.

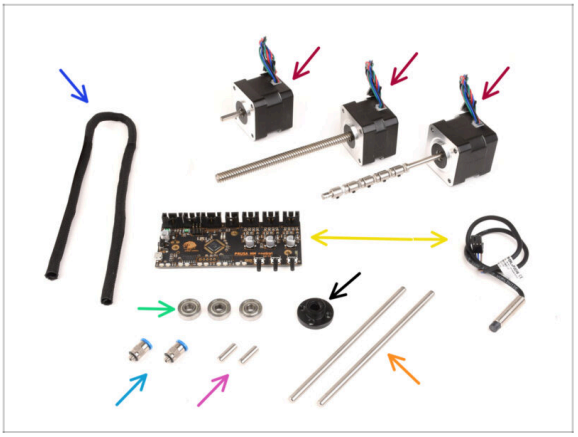
STEP 17 Control board disassembly

- Prepare the electronics board assembly.
- Carefully remove the three M3x6 screws holding the electronics board.
- Gently loosen the electronics board from the assembly, but don't take it out completely yet. **Keep the control board within the plastic part** to safeguard it from any harm, for now.

⚠ Handle the board by its sides to avoid damage. Be careful around the electronics, do not touch the individual components on the board. Remember that the board is sensitive to electrostatic discharge (ESD).

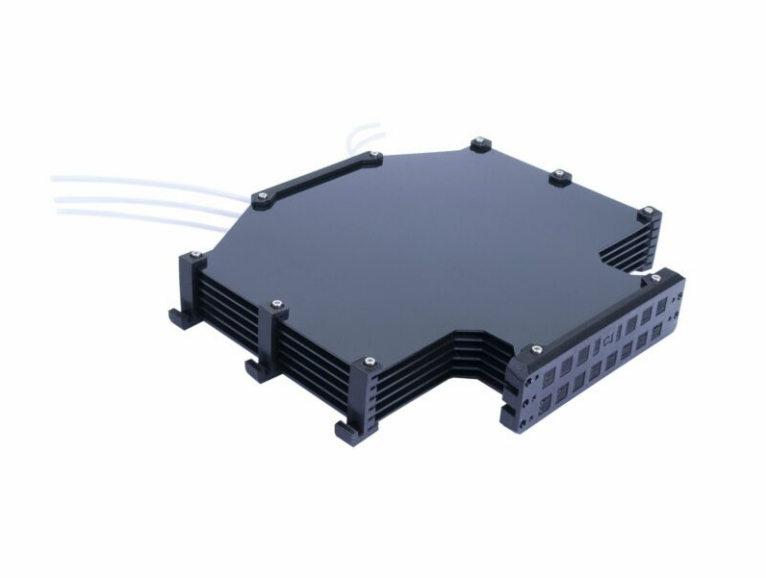
STEP 18 Summary



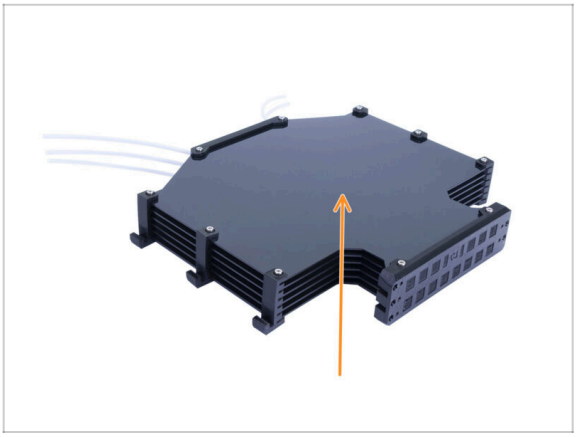
- **Here's a summary of the parts to keep for later use:**
  - Textile sleeve 450x5 (1x)
  - Stepper motor (3x) *Idler, Selector and Pulley motor (with pulleys still attached)*
  - Electronics: the control board (1x) and FINDA/SuperFINDA sensor (1x)
  - 625 bearing (3x)
  - Trapezoid nut (1x)
  - M5-4 Fittings (2x)

    ⓘ These fittings are only required for the MK3S+ version. If you are assembling the MK4/S version, use the newly provided fittings instead!!
  - 5x16sh shaft (2x)
  - 5x120sh shaft (2x)

3. MMU2S Buffer Disassembly (UPG)

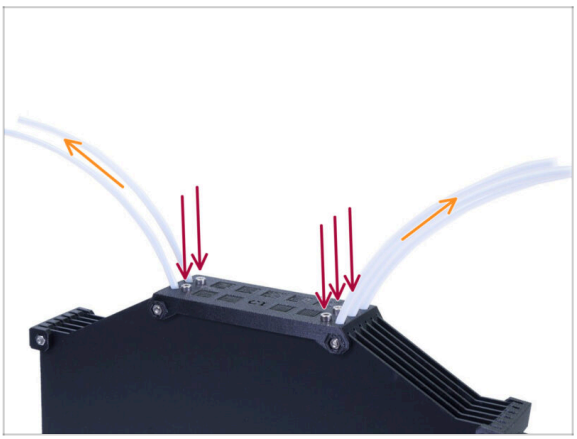


STEP 1 Preparation



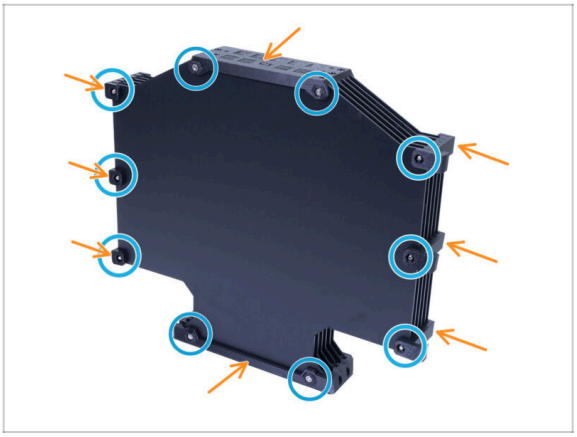
- In case you have the old version of the buffer in the assembled state, it is necessary to disassemble it first.
- We will re-use only the **six large plastic plates** from it.
- If you have the plastic sheets alone, please skip to the next chapter.

STEP 2 Disconnecting the PTFE tubes



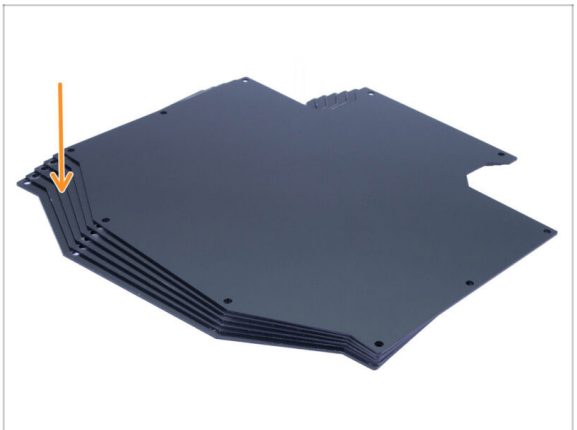
- Remove the five **M3x10** screws holding the PTFE tubes in the buffer.
- Pull all the PTFE tubes out.
- Dispose of the tubes to prevent them from getting mixed up with the new ones in the future. **These tubes will not be used again.**

STEP 3 Buffer disassembly



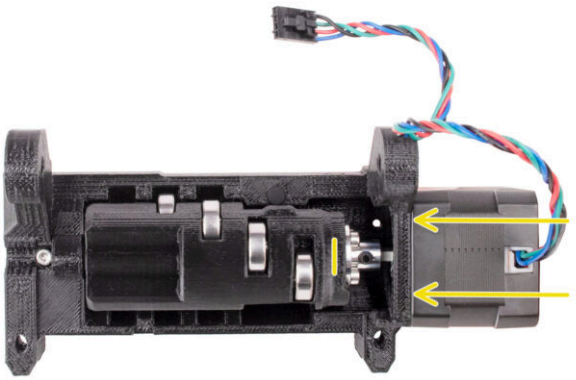
- Remove the ten M3x40 screws.
- Remove all the printed parts.
- ⚠ Set the printed parts aside so that they don't mix up with the new parts. These parts won't be re-used.

STEP 4 Summary



- That was simple, wasn't it?
- From the disassembled buffer, please save the **buffer plates** for later use.

4. Idler Body Assembly



STEP 1 Tools necessary for this chapter

- **Please prepare tools for this chapter:**
  - Needle-nose pliers
  - 1.5mm Allen key for possible nut alignment
  - 2mm Allen key for M4 grub screws
  - 2.5mm Allen key for M3 screws

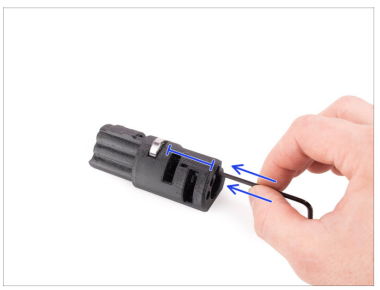
STEP 2 Idler versions

- **There were two versions of the Idler:**
- 1. The **MMU3 Idler** to be used with the metal **Coupler**
  - This is the correct part bundled in the MMU3 Kit.
- 2. The old **MMU2S Idler** with a printed coupling part.
  - This is an obsolete version which shouldn't be used in MMU3.

STEP 3 Idler parts preparation

- **For the following steps, please prepare:**
- Idler (1x)
- 625 Bearing (6x)
- 5x16sh Shaft (5x)
- Note you need 6 bearings, but only 5 shafts ;)

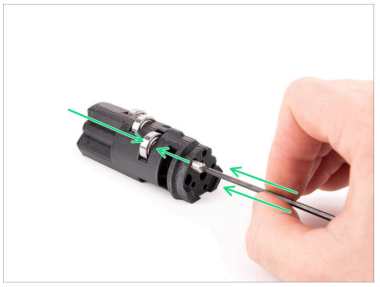
STEP 4 Idler bearings assembly (part 1)



⚠ **WARNING:** read the instructions carefully, you have to **assemble bearings in the correct order**, otherwise you will encounter problems later!

- Insert one of the bearings into the **middle** slot in the idler. Insert the shaft from the side as seen in the picture. Make sure you are inserting it from the correct side and into the correct opening.
- Push the shaft all the way in using the 2.5 mm Allen key. **Make sure the shaft is all the way in** and not blocking the other bearing slots.
- Install the second bearing and the shaft in the same way as the first one. Make sure you are inserting the parts into the exact same openings as seen in the picture.
- Install the third bearing and the shaft into the corresponding opening using the same technique.

STEP 5 Idler bearings assembly (part 2)

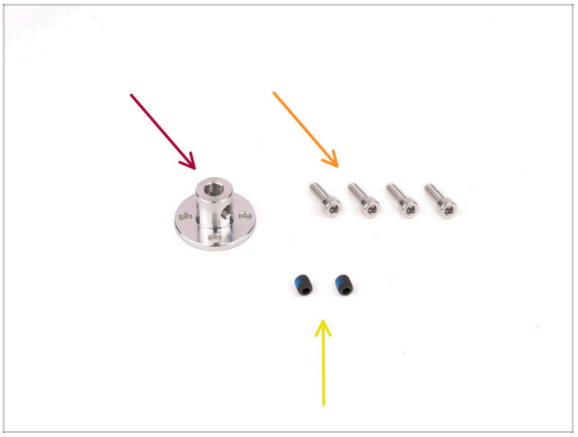

- Turn the idler around to continue with the bearing assembly from the other side.
- Insert a bearing and then a shaft into the empty slot closer to the center of the idler.
- Finish bearing assembly with the last slot on the side.
- Ensure all bearings can rotate freely. You shouldn't feel significant friction or bumps while rotating the bearing.

ⓘ There are small openings, which can be used to push a shaft out in case of a disassembly. Shafts can be pushed out using a 2mm Allen key in the opposite order from the installation.

STEP 6 Idler center bearing assembly


- Take the remaining bearing and push it into the opening on the side of the idler.
- Make sure the bearing is flush (aligned) with the surface.

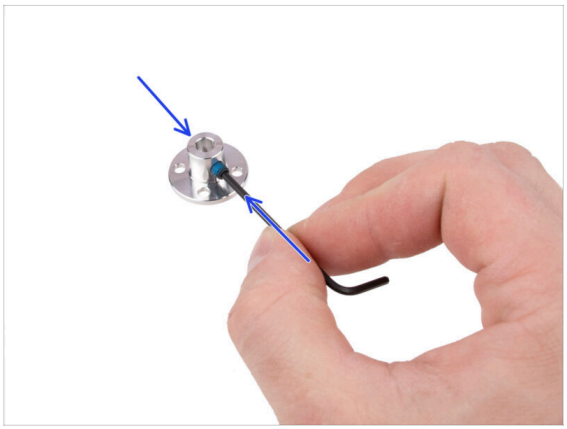
STEP 7 Coupler parts preparation

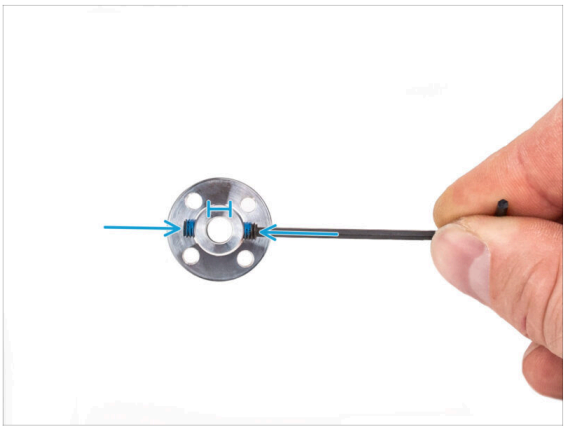


- **For the following steps, please prepare:**
- Coupler 5mm (1x)
- M3x10 screws (4x)
- M4x5 grub screws (2x)

Labeled M4x5. Color may vary.

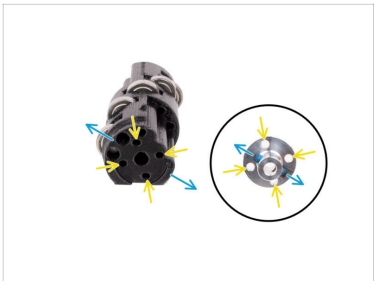
STEP 8 Coupler preparation





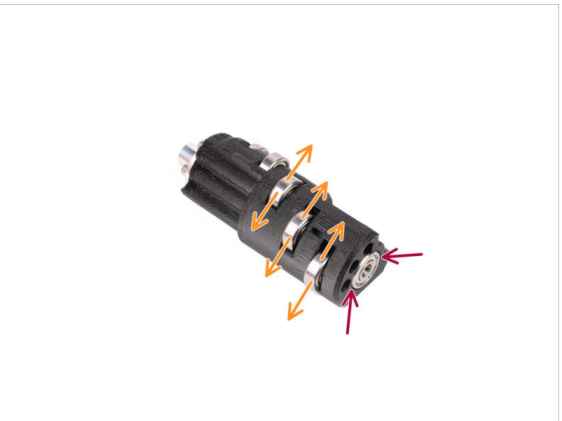
- Using the 2mm Allen key, install the M4 grub screws into the threaded openings on the sides of the coupler.
  Just start the thread so that the grub screw holds in.
- Make sure none of the two grub screws is protruding into the opening in the center. Otherwise, the coupler will be hard to slide onto the motor shaft later on.

STEP 9 Coupler assembly



- Before we install the Coupler onto the Idler, Take a look at both parts. There are four screw openings that must line-up.
- Orient the coupler so that the two grub screws are oriented exactly as in the picture.
- Add the Coupler onto the side of the Idler in a way so that all four screw openings line up.
- Before proceeding, make sure the M4 grub screws are oriented as seen in the picture.
- Fix the Coupler to the Idler using four M3x10 screws.

STEP 10 Final check

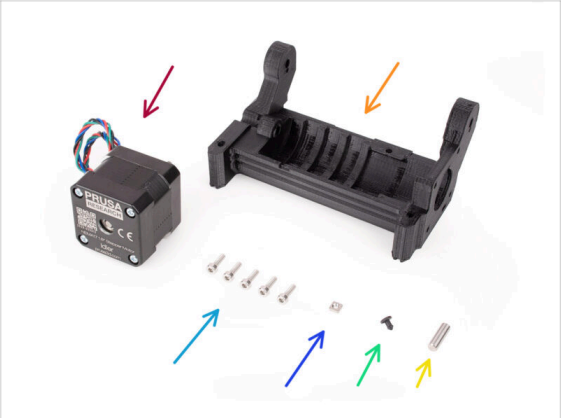


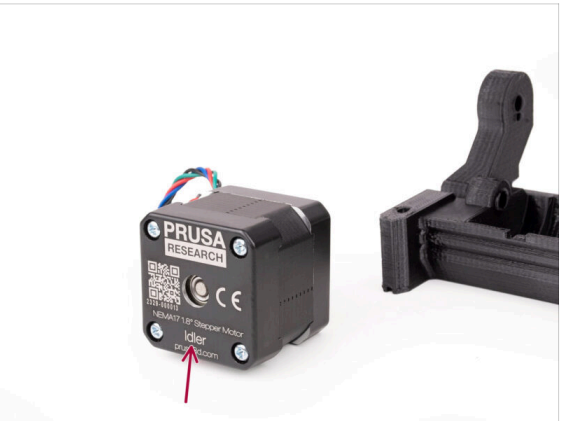
- **Before you proceed, check the following:**
- All M3x10 screws are tight.
- The grub screws are oriented properly and not protruding into the center opening in the coupler.

⚠ The **grub screw orientation** is important so that the grub screws remain accessible even after the Idler is installed inside the MMU unit.

- All five bearings are able to rotate.
- The sixth bearing is flush with the surface.

STEP 11 Idler Body parts preparation





- **For the following steps, please prepare:**
- Idler motor (1x) *(the one with a short shaft)*
- Idler Body (1x)
- M3x10 screw (5x)
- M3nS nut (1x)
- Silicone stopper (1x)
- Shaft 5x16sh (1x)

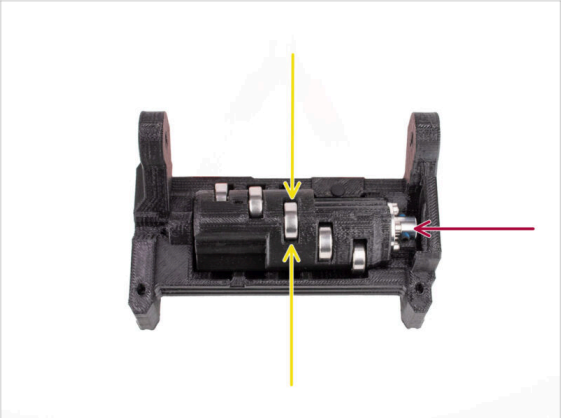
STEP 12 Silicone stopper instalation

- Orient the Idler body as seen in the picture.
- Insert the silicone stopper into the small opening on the Idler body.
- Push it in and keep it pressed with your finger until you feel it fully engage into the opening. If it doesn't engage, try cleaning up the opening with an Allen key and rotating the stopper while inserting.

  ⓘ If it doesn't engage, try cleaning up the opening with an Allen key and rotating the stopper while inserting.

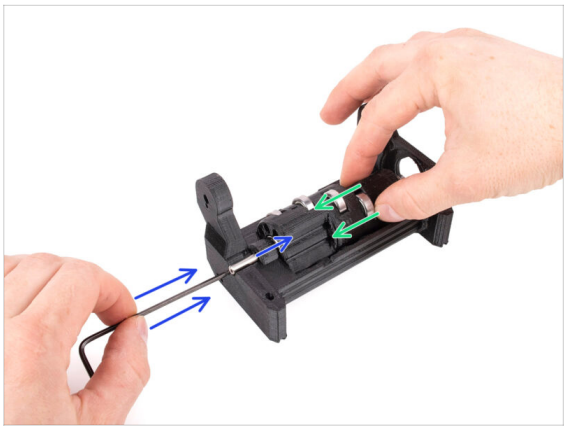
  - Verify it is seated properly and doesn't fall out.
    When fully inserted, the bottom part of the stopper should be visible from the side.

STEP 13 Idler installation



- Insert the Idler into the Idler body. Correct orientation is important. Make sure the middle bearing is pointing to the top.
- Make sure the metal coupler is pointing to the large opening in the Idler body.
- Push the Idler to the left so that there is as small gap as possible.

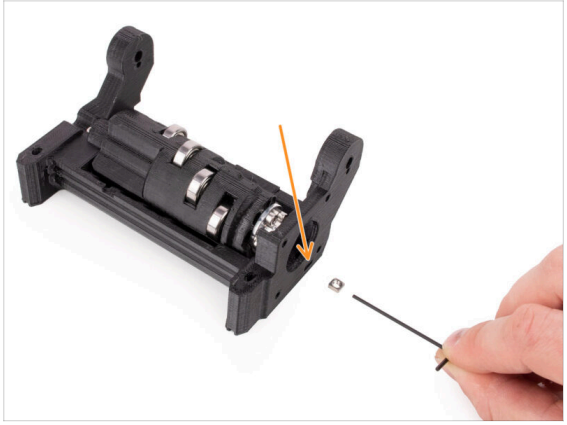
STEP 14 Idler center shaft assembly

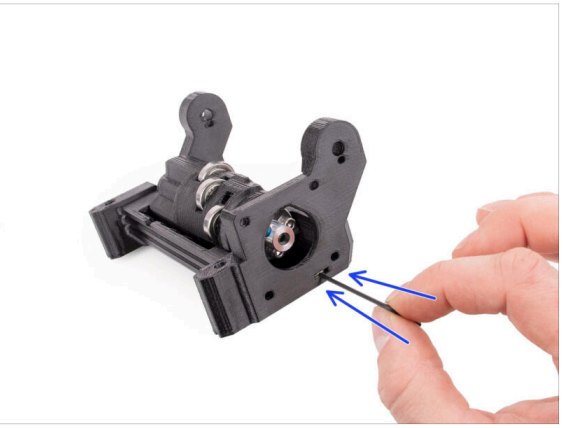


- Hold the Idler in place with your hand and keep pushing it to the left side.
- Insert the 5x16 shaft into the opening on the left side of the idler body and push it in all the way through.

  The shaft must engage into the bearing in the Idler. Press the shaft all the way in using the 2.5mm Allen key.
- Secure the shaft in place by attaching an M3x10 screw into the marked position. Tighten it up.

STEP 15 Idler body M3nS nut

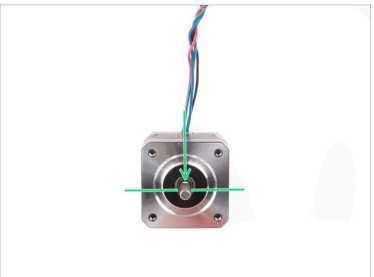


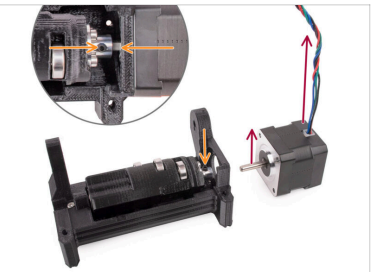


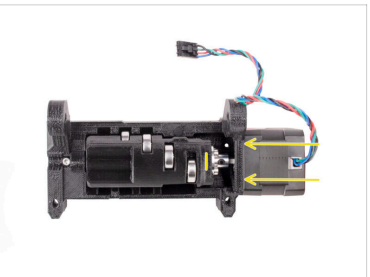
This will be easy!

- Insert the M3nS nut into the marked opening on the Idler body.
- Using the 1.5mm Allen key, push the nut all the way in.

STEP 16 Idler motor assembly (part 1)



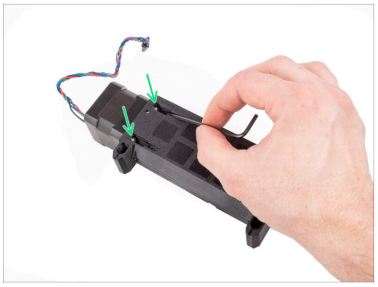




Before we add the motor to the assembly, we need to align the motor shaft and the idler coupler.

- Notice there is a flat part on the motor shaft.
- Orient the motor as seen in the picture, so that both the flat part of the shaft and the cable are pointing up.
- Before you start installing the motor, the flat part of the motor shaft must be aligned with one of the two grub screws in the metal coupler.
  Orient the coupler so that one of the grub screws is pointing up.
- Insert the motor shaft into the metal coupler on the Idler. Push the motor towards the Idler body until flush.

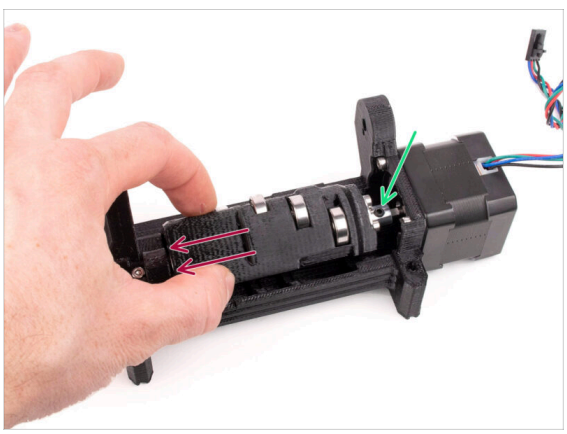
STEP 17 Idler motor assembly (part 2)


- Insert two M3x10 screws into the marked openings.
  Start the thread so that the screws engage into the motor. Don't tighten them up all the way yet!
- Turn the unit around.
- From the opposite side, add another two M3x10 screws into the openings. Push them towards the motor. Using the ball-end 2.5mm Allen key at an angle, tighten them up fully.

  ⚠ Make sure the screw is **perfectly perpendicular** to the motor while tightening it. If it is hard to turn, release the screw fully, re-align it, and start tightening it **from the beginning** to avoid cross-threading it.
- Now, tighten the first two M3x10 screws fully.

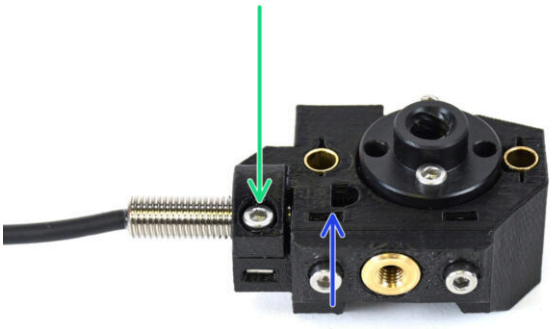
STEP 18 Idler motor assembly (part 3)




- Pull the idler to the side all the way away from the motor. There should be just a very small gap on the left side.

  ⚠ A substantial gap could cause the MMU to experience difficulties with filament loading/unloading, as the idler bearings might not align correctly with the filaments.
- Make sure the grub screw in the metal Coupler is still aligned to the flat part of the motor shaft. Tighten it up fully using the 2mm Allen key.
- Rotate the idler so that the second grub screw on the metal coupler is accessible. Tighten the other grub screw fully too.

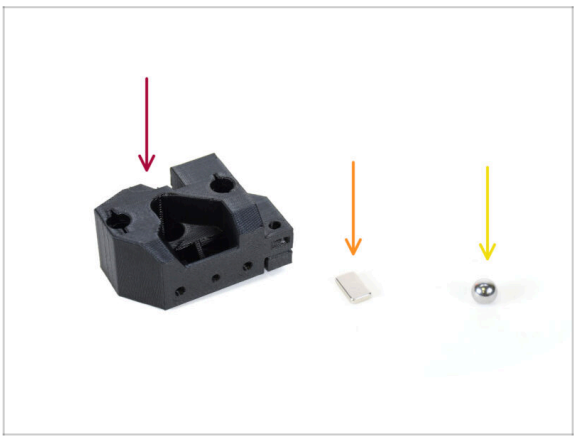
5. Selector Assembly



STEP 1 Tools necessary for this chapter

- **Please prepare tools for this chapter:**
  - 1.5mm Allen key for possible nut alignment
  - 2.5mm Allen key for M3 screws

STEP 2 Selector assembly: Parts preparation

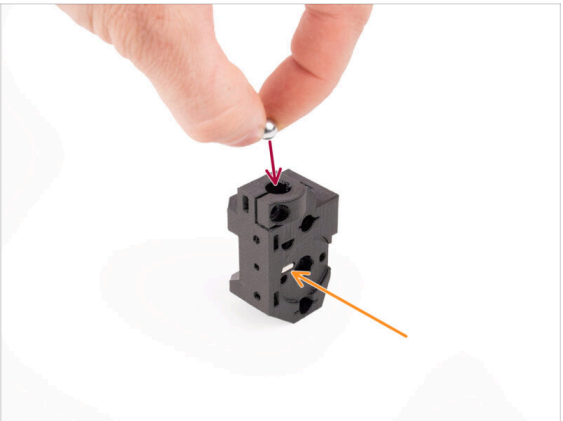


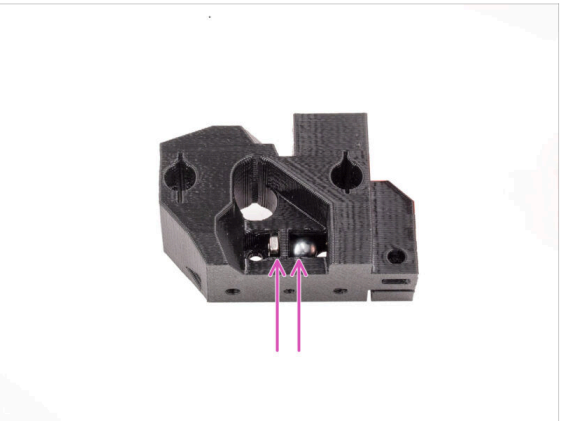
- **For the following steps, please prepare:**
- Selector (1x)
- 10x6x2 Magnet (1x)
- Magnetic steel ball (1x)

ⓘ When upgrading from the MMU2S, ensure you use the new ball provided in the upgrade kit, not the old one.

The new ball is made of a ferromagnetic material.

STEP 3 Selector assembly: Magnetic ball



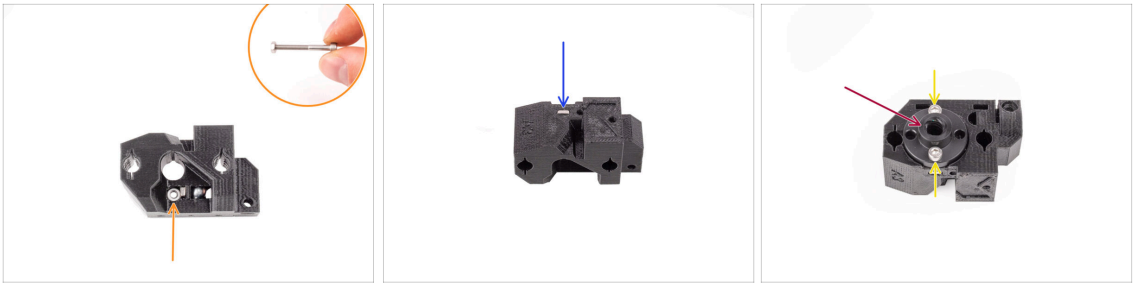


- Insert the magnet into the marked opening on the selector. Push it in until it is flush with the surrounding surface.
  - ⓘ The orientation of the magnet doesn't matter.
- Insert the magnetic ball into the marked hole on the top of the selector.
- The steel ball should be attracted to the magnet below and stay in place. If not, verify you are using a correct ball.
  - ⓘ There is an opening on the side of the selector through which you can observe the ball's position.
  - The selector ball from the older MMU2S can't be re-used as it is non-magnetic. Use only the supplied MMU3 magnetic version.

STEP 4 Selector assembly: Trapeze nut parts preparation

- **For the following steps, please prepare:**
- Trapeze nut (1x)
  - In case you're assembling the unit from scratch, the nut is inside the *Motor kit* box, attached to the selector motor.
- M3n nut (1x)
- M3nS nut (1x)
- M3x10 screw (2x)

STEP 5 Selector assembly: Trapeze nut installation

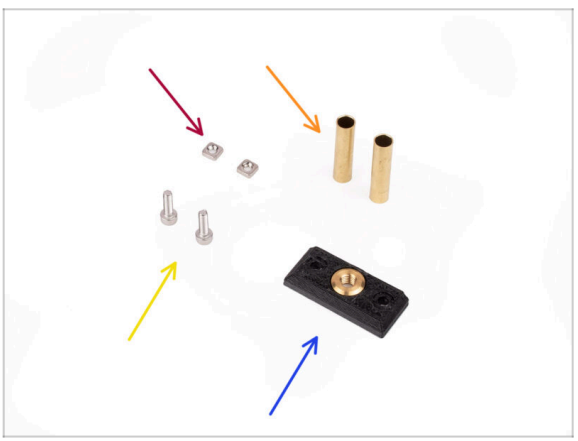


- Insert the M3n nut into the marked opening in the selector, just below the magnet. Push it all the way in. Make sure the magnet doesn't get pushed out.

  ⓘ The easiest way of inserting the M3n nut is by an M3x30 screw used as a handle.

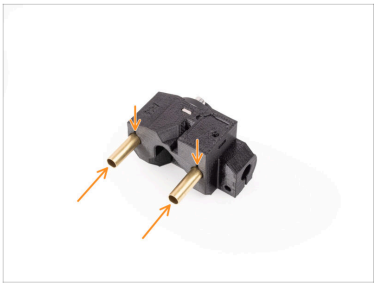
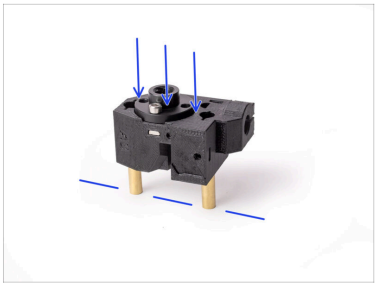
- Insert the M3nS nut into the marked opening on the other side of the selector.
- Attach the trapeze nut onto the selector. There is a recess into which it should fit nicely.
- Fix the trapeze nut in place with two M3x10 screws. Tighten them just slightly for now. We will tighten them up fully later on.

STEP 6 Selector assembly: Rods and Cover parts preparation



- **For the following steps, please prepare:**
- M3nS nuts (2x)
- Bushing tube 5x6x25bt (2x)
- M3x10 screws (2x)
- Selector front plate (1x)

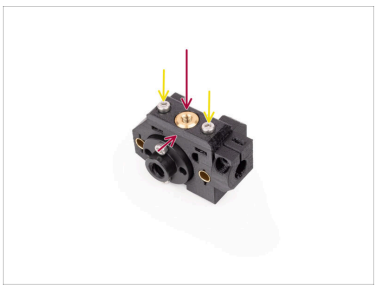
STEP 7 Selector assembly: Bronze bushing tubes


- Insert the bronze bushing tubes into the marked openings on the selector as far as you can, using your hand. Make sure you are inserting them from the correct side.
- Press the tubes in by carefully pushing the assembly against a flat surface.
- In the end, the tubes should end up flush with the surface on the other side.

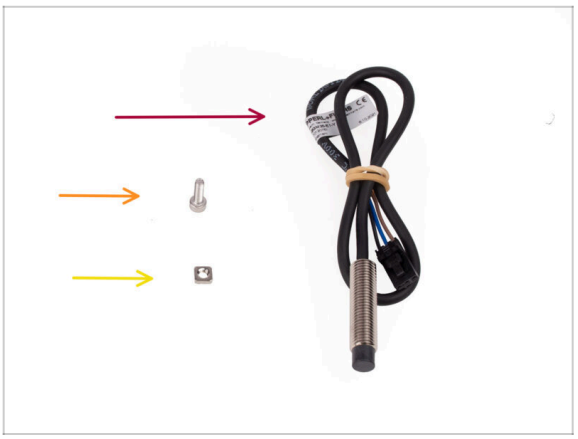
STEP 8 Selector assembly: Rods and Cover





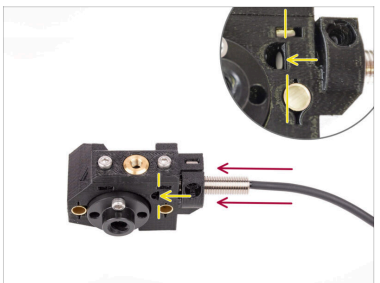
- Insert the two M3nS nuts into the marked openings on the side of the selector. Push the nuts all the way in using the 1.5mm Allen key.
- Add the front plate onto the selector. Make sure the side of it is flush with the flat part of the selector.
- Attach the front plate with two M3x10 screws. Tighten them up.

STEP 9 Selector assembly: Finda parts preparation



- **For the following steps, please prepare:**
- SuperFINDA sensor (1x)
  - Your sensor might look slightly different if you are re-using the older FINDA sensor. But don't worry, it will work just as good.
- M3x10 screw (1x)
- M3nS nut (1x)

STEP 10 Selector assembly: SuperFINDA probe

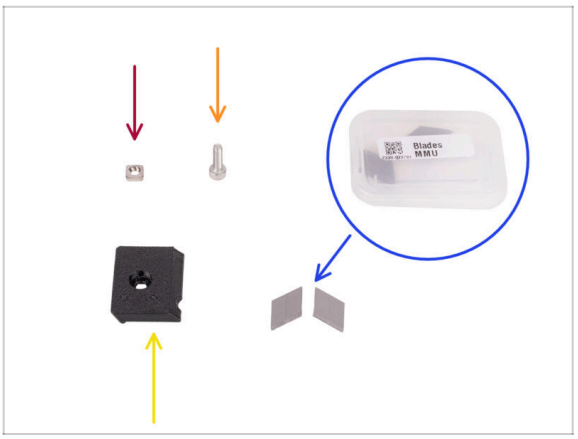


- Insert the M3nS nut into the marked opening on the front of the selector.
- Insert the SuperFINDA sensor into the corresponding opening in the selector.
- Adjust the position of the sensor so that it ends flush or slightly above the inner surface of the D-shaped opening on the side of the selector.

  Ensure the sensor's bottom part is aligned and doesn't protrude into the D-shaped opening! Even though the SuperFINDA sensor's height might need further adjustment, this is usually a good starting point.
- Fix the probe in place with M3x10 screw. Tighten the screw up just so that the sensor can no longer be moved.

  Avoid over-tightening the screw; if SuperFINDA is securely held in place, that's sufficient.

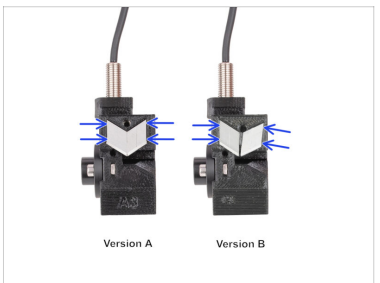
STEP 11 Selector assembly: Cutter parts preparation



- **For the following steps, please prepare:**
- M3nS nut (1x)
- M3x10 screw (1x)
- Blade holder (1x)
- Blade (2x) - stored in the little plastic box

⚠ Be very careful while handling the blades! You might easily harm yourself!

STEP 12 Selector assembly: Cutter assembly

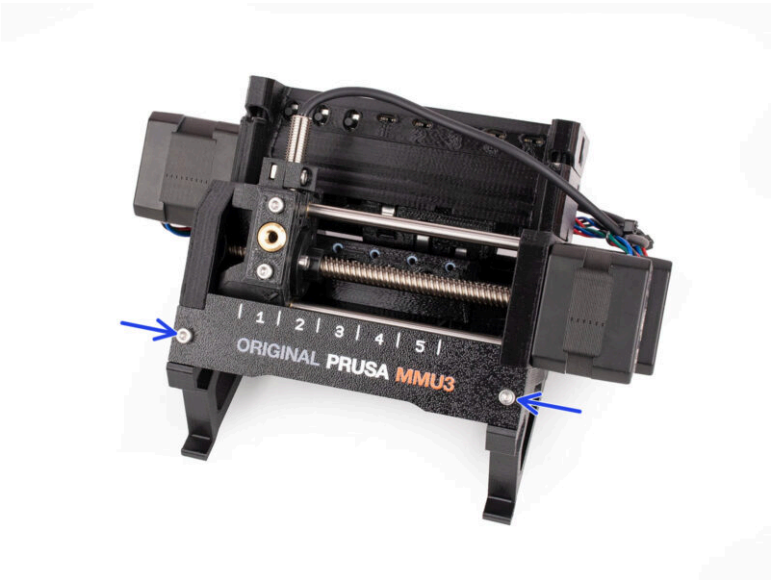


- Insert the M3nS nut into the marked opening on top of the selector. Push it all the way in.
- Insert the two blades into the recess on the back of the selector. **Make sure the blades are seated nicely.**

ⓘ There have been several versions of this part available, which might look slightly different. However, the assembly process remains the same. Markings on the part may be different than the ones seen in the photo.

- Cover the blades with the blade holder. Verify the blades are still seated perfectly in place while attaching the cover.
- Fix the blade holder in place with M3x10 screw. Tighten it up fully.

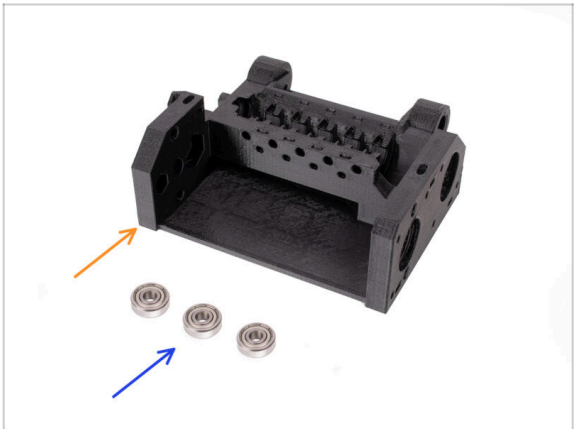
6. Pulley Body Assembly



STEP 1 Tools necessary for this chapter

- **Please prepare tools for this chapter:**
  - Needle-nose pliers
  - 1.5mm Allen key for nut alignment
  - 2.5mm Allen key for M3 screws
  - A measurement tool (optional), a digital caliper would work the best.

STEP 2 Pulley-body parts preparation



- **For the following steps, please prepare:**
  - Pulley body (1x)
  - 625 bearing (3x)

STEP 3 Pulley body: Inserting bearings

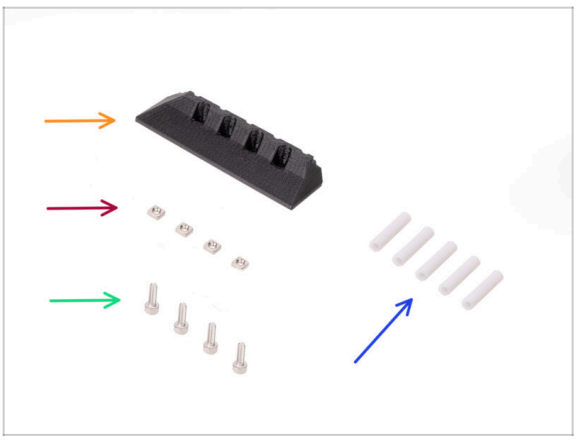


- Insert one of the 625Z bearings into the marked side opening on the back of the Pulley body. Push it in until flush with the surface.

  In case you have trouble getting the bearing inserted fully, try pushing it in against a side of a table.

- Insert the second bearing into the groove on the opposite side of the pulley-body.
- Insert the third bearing into the marked groove on the inside of the Pulley body. Insert it at an angle and tilt it in place.

STEP 4 Pulley-body parts preparation



For the following steps, please prepare:

- Front PTFE-holder (1x)
- M3nS nut (4x)
- M3x10 screw (4x)
- PTFE tube 19mm (5x)

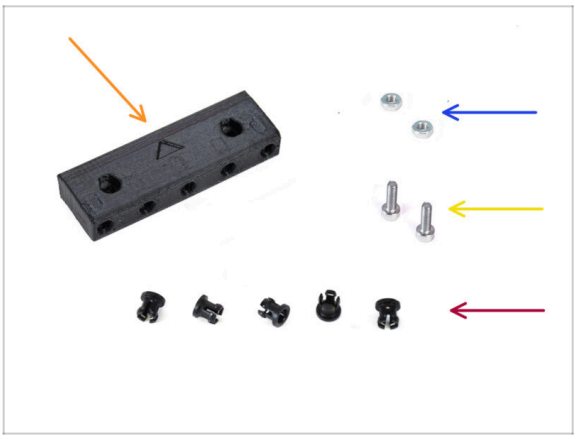
MMU2S and MMU3 PTFE tubes differ. If you are upgrading your MMU, Make sure you are not re-using the MMU2S PTFE tubes.

All the PTFE tubes are supplied pre-cut to the correct size. There is no need to cut the tubes.

STEP 5 Front-PTFE-holder assembly

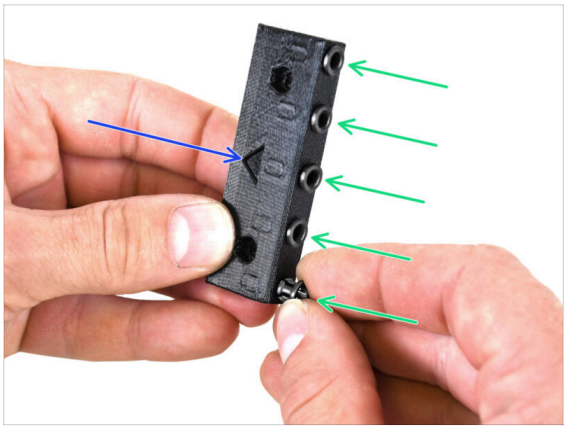
- Insert the four M3nS nuts into the marked openings on the idler body. Push the nuts all the way down with the 1.5mm Allen key.
- Insert the five 19mm PTFE tubes into the marked openings in the pulley body.
  - ⓘ There is a small chamfer on one side of the PTFE tubes. The chamfer should be facing out.
- Attach the Front PTFE holder onto the PTFE tubes and **push it all the way towards the Pulley body.** Mind the correct orientation seen in the picture.
- Secure the holder with four M3x10 screws from the front.

STEP 6 Collet holder parts preparation



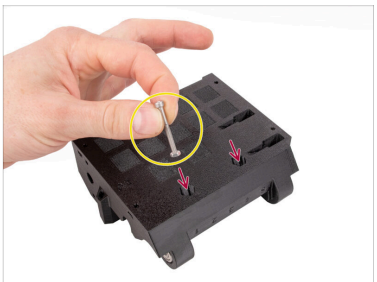
- **For the following steps, please prepare:**
- Collet holder (1x)
- M3n nut (2x)
- M3x10 screw (2x)
- Collet (5x)

STEP 7 Collets installation



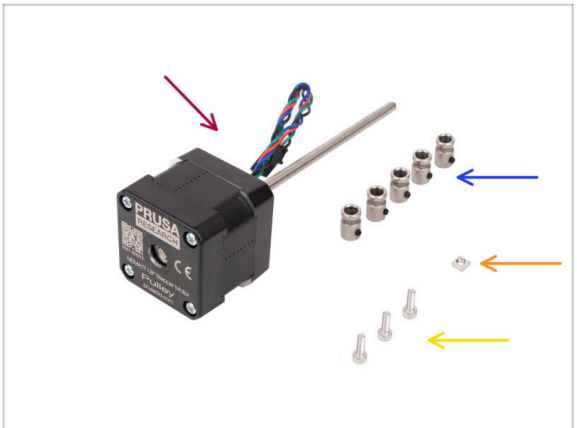
- Take the collet holder. Note the correct part orientation marked by the imprinted arrow.
- Insert the collets into the marked openings on the collet holder.
  - For the sake of easier installation, you might need to squish the fins on the collet with your fingers while you insert the collet. Then it will click in easily.

STEP 8 Collet holder installation



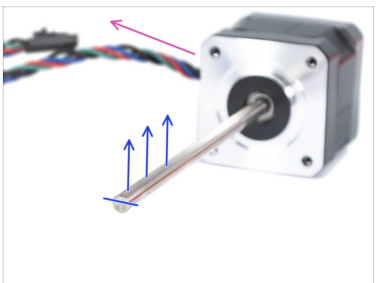
- Insert two M3n nuts into the marked openings on the bottom of the pulley body. Push the nuts all the way in.
  - Attach the nut to the end of the M3x30 screw. Use the screw as a handle for inserting the nut.
- Attach the collet holder into the pulley body. Note the correct part orientation marked by the arrow.
  - ⓘ The arrow on the collet holder should be pointing towards the pulley body.
- Secure the collet holder in place by two M3x10 screws.

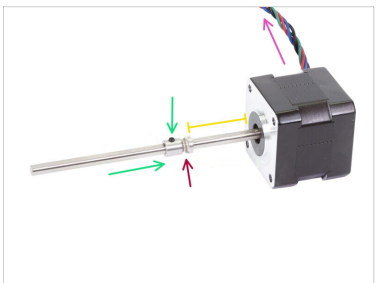
STEP 9 Pulley motor parts preparation

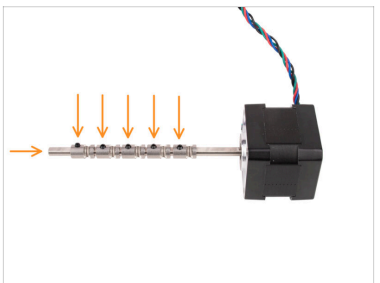


- **For the following steps, please prepare:**
- Pulley motor (1x)
- Pulley (5x)
  - ⓘ In case you're upgrading from the MMU2S, the pulleys might be already attached to the motor.
- M3nS nut (1x)
- M3x10 screw (3x)

STEP 10 Pulley assembly

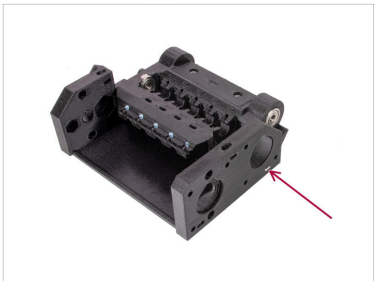
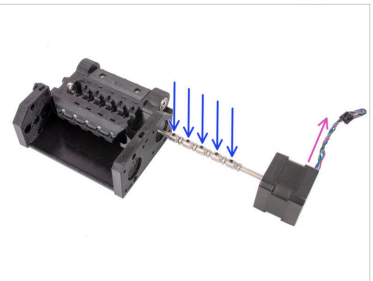
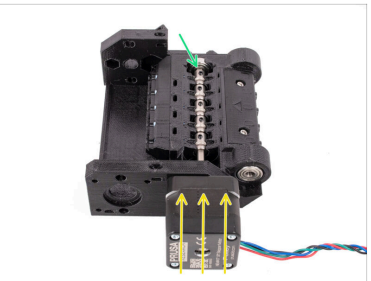






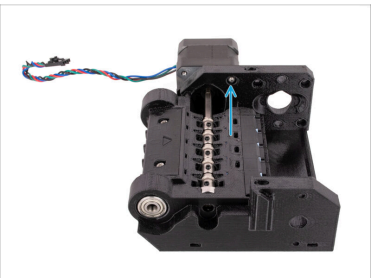
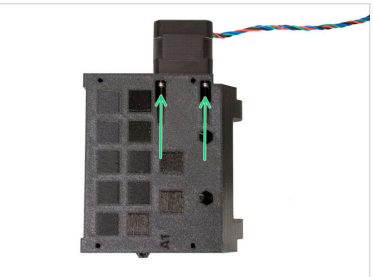
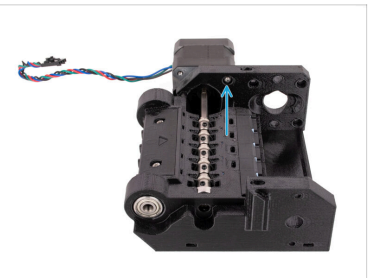
- Orient the motor as seen in the pictures. Make sure the motor cable is facing to the back.
- Rotate the motor shaft so that the flat part is facing up.
- Slide the first pulley onto the shaft. Ensure the lock screw is on top (facing the flat part of the shaft). Tighten the grub screw just slightly.
- The first pulley should be around 30 mm (1.18 inches) from the motor. Don't tighten the grub screw fully yet!
- Ensure the grooved part of the pulley is on the motor side.
- Slide the other pulleys onto the shaft using the same technique. Tighten the grub screws just slightly for now.

STEP 11 Pulley motor assembly (part 1)

- **Insert the M3nS** nut into the marked slot on the pulley body. Push it all the way in.
- Orient the motor shaft so that all the **grub screws on the pulleys are facing up**.
- Make sure the motor cable is facing to the right (to the back of the MMU unit)
- Insert the motor into the pulley body as seen in the picture.
- Make sure the motor shaft has engaged into the bearing at the end of the groove.

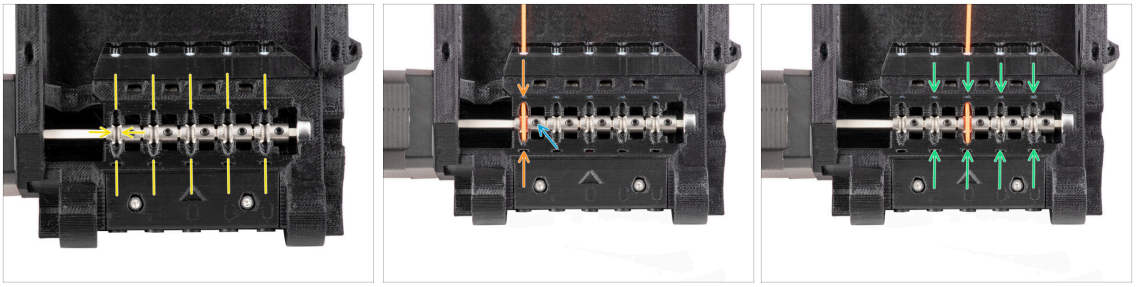
STEP 12 Pulley motor assembly (part 2)

- Attach the motor with one M3x10 screw on top.
  Just start the thread so that it holds in, don't tighten it up yet!
- Turn the unit around and attach the motor with the other two M3x10 screws at the bottom. Use the ball-end 2.5mm Allen key at an angle to tighten up the screws fully.

  ⓘ Make sure, the screw is **perfectly perpendicular** to the motor while tightening. If it is hard to turn, release the screw fully, re-align it, and start tightening it from the beginning to avoid cross-threading it.
- Now, turn the unit around again to tighten up the top screw fully too.

STEP 13 Pulley alignment

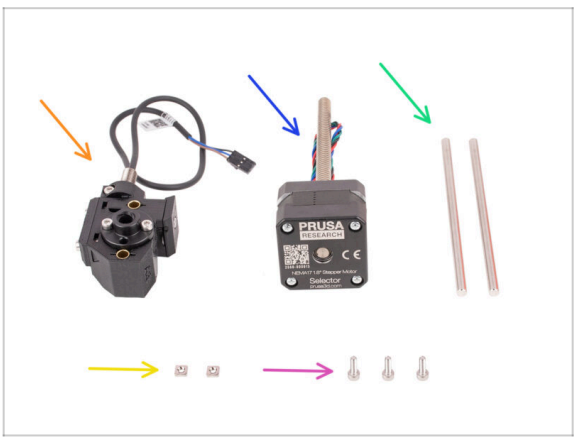


⚠ **WARNING:** this step is crucial in order for the MMU unit to work properly! **Please check your pulley alignment multiple times!!!**

- The groove inside the pulley must be perfectly aligned with the filament openings in the pulley body.
  Align the pulleys one by one.
- Take a perfectly straight piece of filament and guide it through the first opening. Align the pulley so that the filament is perfectly centered.
- Make sure the lock screw is still perpendicular to the flat part of the shaft. Then tighten it. Use reasonable force as you might strip the screw.
- Align and tighten the remaining four pulleys using the same technique.

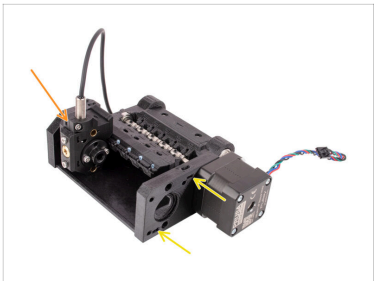
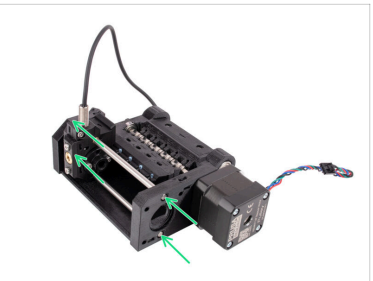
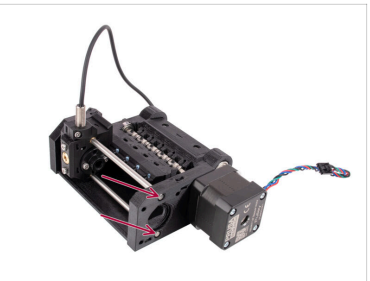
⚠ Check the proper positioning of all of the pullies again. Adjust it if necessary.

STEP 14 Selector: parts preparation



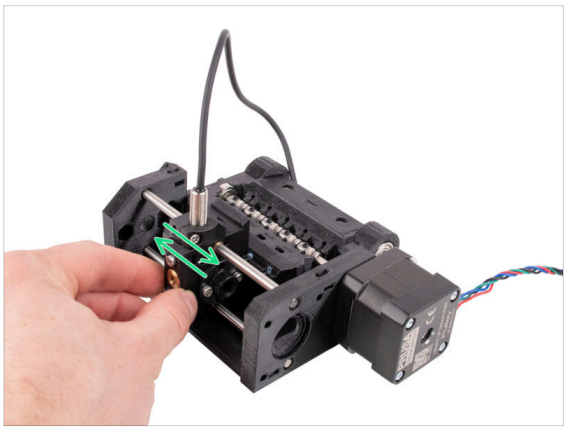
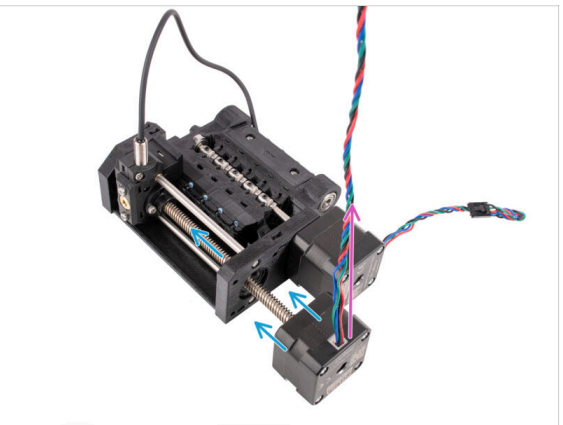
- **For the following steps, please prepare:**
- Selector assembly (1x) *you prepared earlier.*
- Selector motor (1x)
- 5x120sh Shaft (2x)
- M3nS nut (2x)
- M3x10 screw (3x)

STEP 15 Selector installation

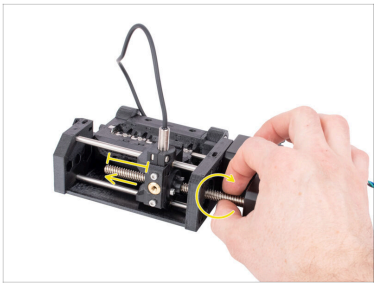
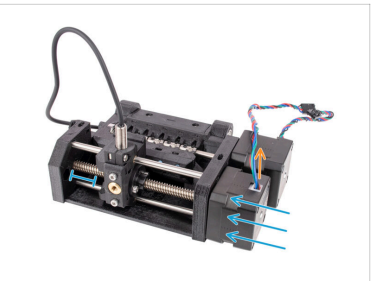
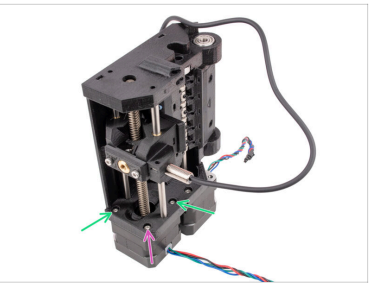
- Insert two M3nS nuts into the marked openings in the pulley body. Push the nuts all the way in.
- Insert the selector into the pulley body as seen in the picture.
- Insert the two shafts through the marked openings in the pulley body. The shafts must pass through the selector and engage into the other side of the pulley body.
- Push the shafts in until they are fully inserted - slightly below the surface on the side.

STEP 16 Selector movement check / motor prep

- Verify the selector can move around freely while the rods are in place.
- Insert the selector motor so that its trapezoidal shaft goes through the pulley body as seen in the picture.
- Make sure the selector motor cable is pointing up before you proceed to attach the motor.

STEP 17 Selector motor installation

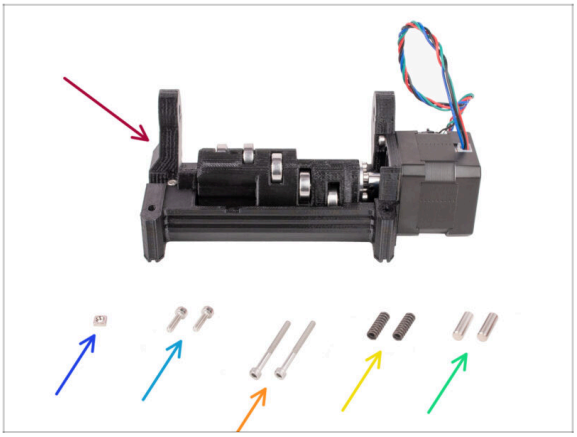
- Rotate the threaded rod while pushing it towards the selector to engage it into the trapeze nut.

  Continue rotating the rod until it passes entirely through, leaving around 2cm / 1in. of the shaft exposed on the left side of the selector.
- Ensure that the selector motor cable is oriented upwards.
- Push the motor all the way in. Check there is some clearance between the selector and the end of its travel on the left.
- Attach the selector motor to the pulley body with **two** M3x10 screws in the marked openings. Tighten them up using the ball-end 2.5mm Allen key.
- Add the last M3x10 screw in the corner. Tighten it snugly. **Don't overtighten the screw in the corner!** Otherwise, you might tilt the selector motor.

STEP 18 Trapezoid nut positioning

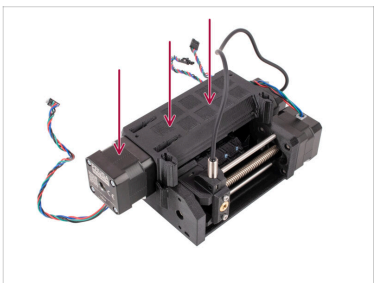

- Using the ball-end 2.5mm Allen key, slightly loosen the two screws holding the trapezoid nut on the selector. **Don't remove them completely.**
- Verify the selector can move when forced left and right. There should be no hiccups along the way. Note that you have to excert some force to move it as the motor has physical resistance.
- Move the selector all the way to the left.
- Fully tighten the two screws that secure the trapezoid nut.

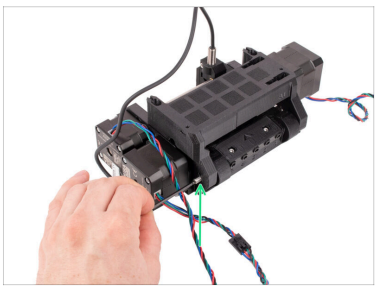
STEP 19 Idler body installation parts preparation

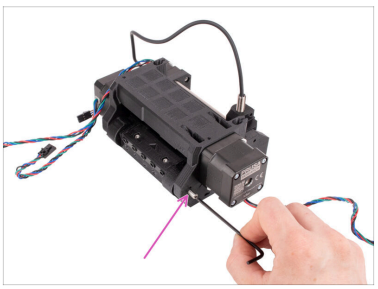


- Idler assembly(1x) *with the idler and motor installed*
- M3nS nut (1x)
- M3x10 screws (2x)
- M3x30 screws (2x)
- 15x5 Springs (2x)
- 5x16sh Shaft (2x)

STEP 20 Idler body installation (part 1)

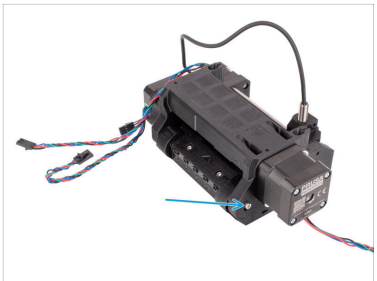
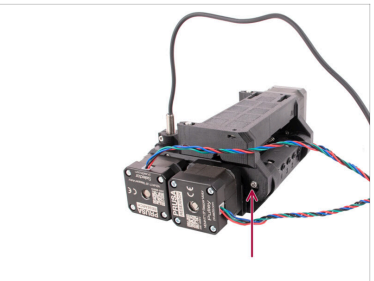
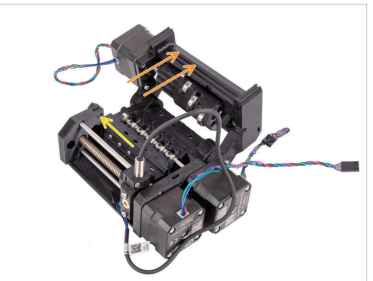






- Attach the Idler assembly onto the pulley body as seen in the picture. The Idler motor should be on the left.
- Now, take a look from the opposite side of the unit.
- Insert the 5x16 shaft into the marked opening and push it all the way in until it engages into the bearing in the pulley body.
- Insert the other 5x16 shaft into the marked opening on the other side. Push it all the way in.

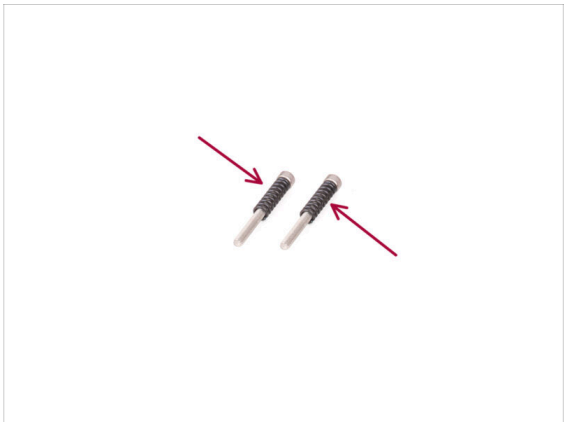
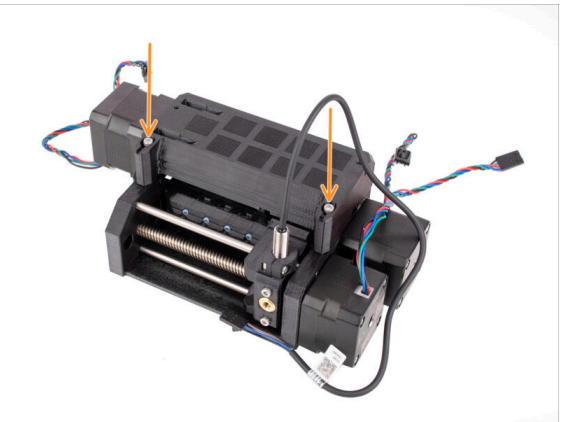
STEP 21 Idler body installation (part 2)

- Fix **the shaft** in place by attaching the **M3x10** screw into the opening above it.
- Fix the shaft on the other side in place by attaching the **M3x10** screw into the opening above it too.
- Open up the Idler body.
- Insert the **M3nS nut** into the marked opening on the inside of the Pulley body. Push it all the way in.

You may need to move the selector away slightly, in order to access the opening.

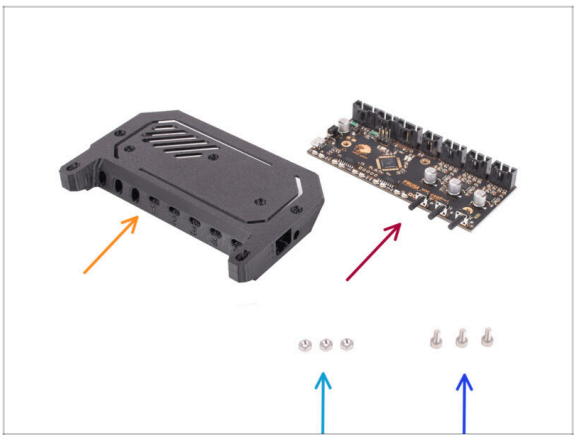
STEP 22 Idler body installation (part 3)

- Attach both **springs** onto the two **M3x30** screws.
- Close the Idler, insert the **M3x30** screws with the springs into the marked openings. Tighten them until the screws are just above the surface.

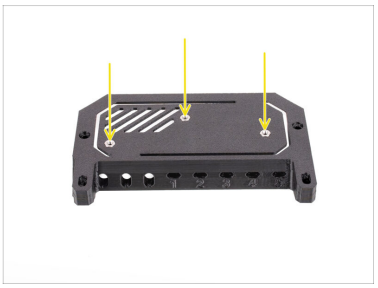
Do not tighten the screws too much. The top of the screw heads shouldn't be below the surface.
Later on, we will use these screws to set the **Idler tension.**

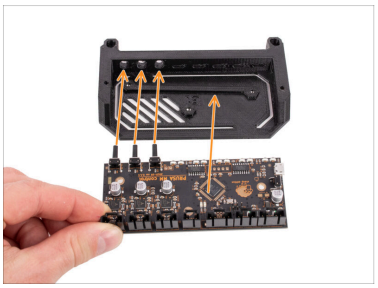
STEP 23 Control board parts preparation



- **For the following steps, please prepare:**
- Electronics cover (1x)
  - ⓘ There have been several versions of this part available, which might look slightly different. The version shipped after April 2024 is slightly taller to comply with ESD regulations.
- MMU Electronics - Control Board (1x)
- M3n nuts (3x)
- M3x6 screws (3x)

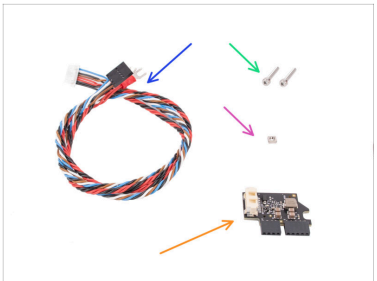
STEP 24 Control board assembly

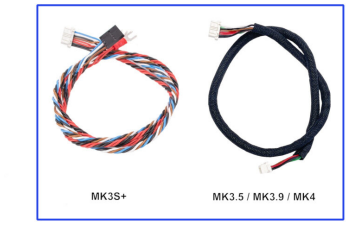




- Insert the three M3n nuts into the marked openings on top of the electronics cover. Push them all the way in.
- Slide in the Control board into the cover. Note the three buttons in the front have to go in first.
  - ⚠ To prevent electrostatic discharge (ESD) damage, handle the board by its sides during manipulation. Avoid touching the chips, capacitors, and other electronic components.
- Fix the board in place with three M3x6 screws.
  - ⓘ Be careful not to damage any of the small components on the board.

STEP 25 PD-board parts preparation





- **For the following steps, please prepare:**
- MMU / printer cable (1x) ***MK3S+*** *version is in the first picture.*

  ⚠ Use the correct cable for your printer type e.g. **MK3S+** or **MK3.5 / MK3.9 / MK4**

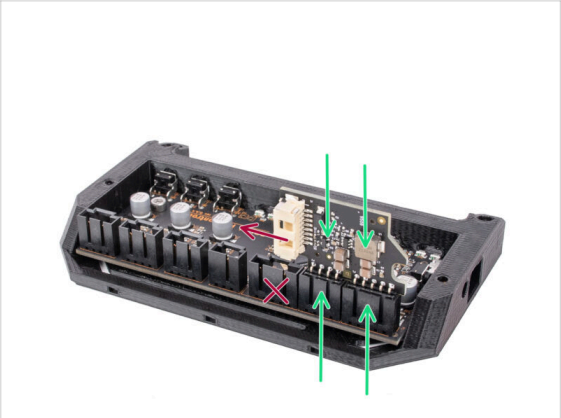
  ⓘ Note, this cable is different from the old MMU2S cables. Don't use the old cables.
- M3x18 screw (2x)
- M3nS nut (1x)
- PD-board addon (1x)
- PD-board-cover (1x) *may not be included in some of the earlier MMU3 packages. If your MMU3 package or printed parts does not contain this item, you can proceed without it.*

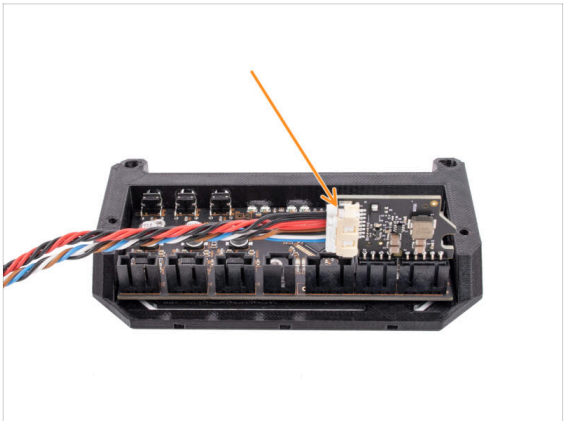
STEP 26 Installing the PD-board-cover

- **This step is for those units that have the PD-board-cover in the package**. If your package does not contain this part, skip this step.
- Slide the PD-board into the brackets on the PD-board-cover. Note the correct orintation of the parts.

  ⓘ Start sliding in at a slight angle.
- Plug the PD-board into the leftmost connectors on the electronics board. Gently push down on the PD-board.

STEP 27 PD-board installation





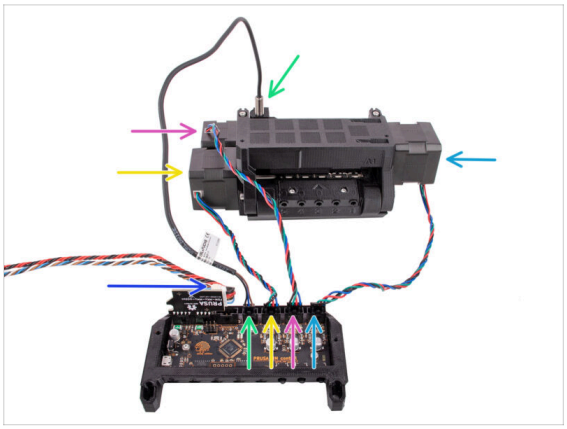
- Attach the **PD-board** into the marked connectors on the electronics board so that it occupies the two connectors on the side of the control board
  - The white connector on the PD-board is pointing inwards.

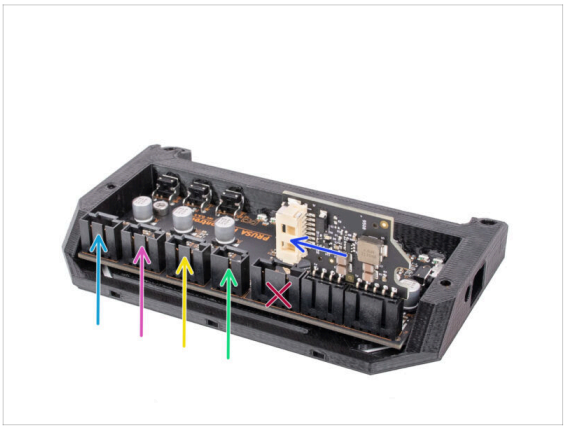
⚠ **Make sure the PD-board is connected the exact same way as seen in the picture.** If you plug in the PD-board incorrectly, you will damage the electronics. Any damage caused to the printer due to an incorrect electronics assembly is not covered by warranty.

⚠ Don't connect or disconnect the cable if the printer is connected to the power outlet or is powered on.

- Connect the **MMU/printer cable** into the PD-board.

STEP 28 Connecting the cables

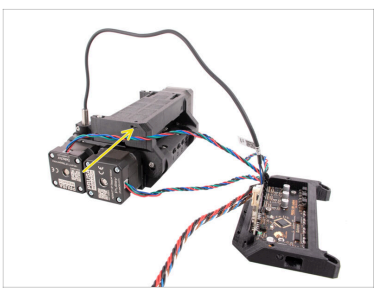


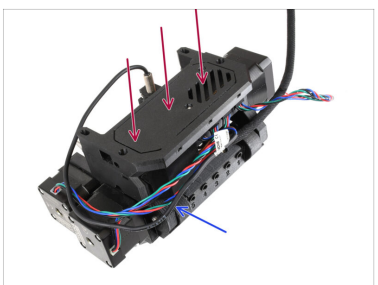


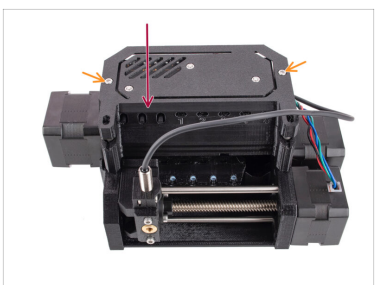
- Prepare the unit and the electronics board assembly as seen in the picture. Follow the cables to plug them in the correct order.
- MMU/Printer cable
- SuperFINDA sensor cable
- Pulley motor cable
- Selector motor cable
- Idler motor cable

ⓘ Rule of thumb for the motor cables is; if you look from the back of the unit, the motor connectors are on the same sides as the motors, while the motor at the front (selector) occupies the middle connector.

STEP 29 Electronics assembly







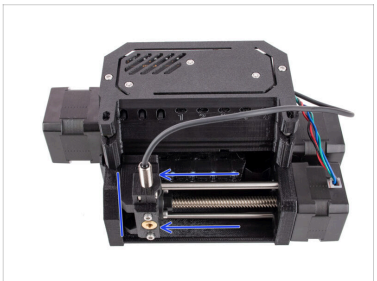
- Insert the **M3nS nut** into the marked opening and press it all the way in.
- Attach the electronics assembly to the MMU unit.
  Make sure the side with the buttons is pointing to the front.
- Look at the back to see if the PD-board doesn't interfere with the cables. The cables should be guided **over** the PD-board, not beneath.
- Fix the electronics in place by two M3x18 screws.

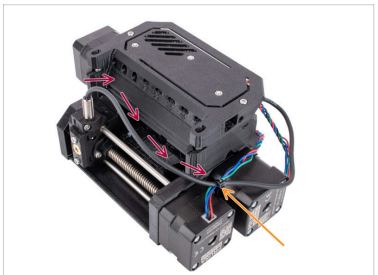
ⓘ Use the correct type of screws. In case you used longer ones, the unit might not work as expected.

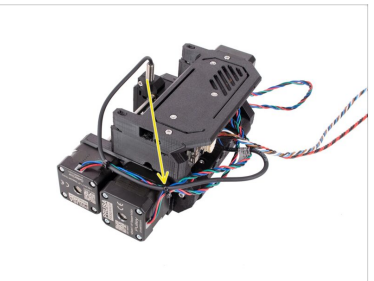
STEP 30 Textile sleeve parts preparation

- **For the following steps, please prepare:**
- Textile sleeve 5x450 (1x)
  - ⓘ Note the MK3.5 / MK3.9 / MK4 cable comes with the textile sleeve already pre-installed.
- Zip-tie (4x)

STEP 31 Cable management (part 1)





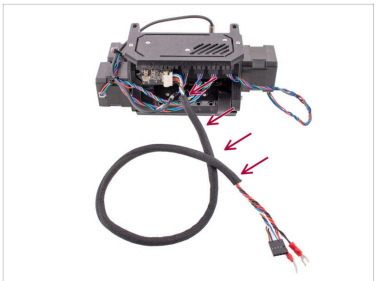
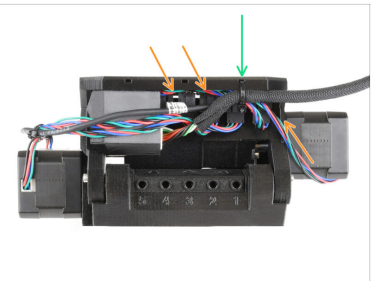
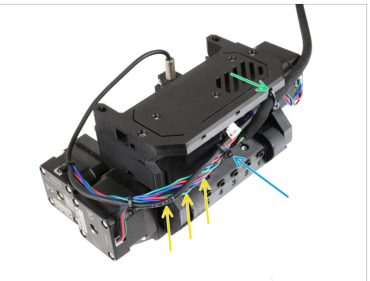


- Ensure that the selector is fully moved to the left.
- Arrange the **SuperFINDA cable** so that it joins the motor cables on the side of the unit as seen in the picture.

⚠ Leave enough slack in the cable so that it doesn't bend too much with the selector reaching even the first filament position!

- Join the **Selector motor cable** with the SuperFINDA cable using a **zip-tie** in the marked position, as seen in the picture.
- Join the cables together with the **Pulley motor cable** in the marked position using a **zip-tie**.

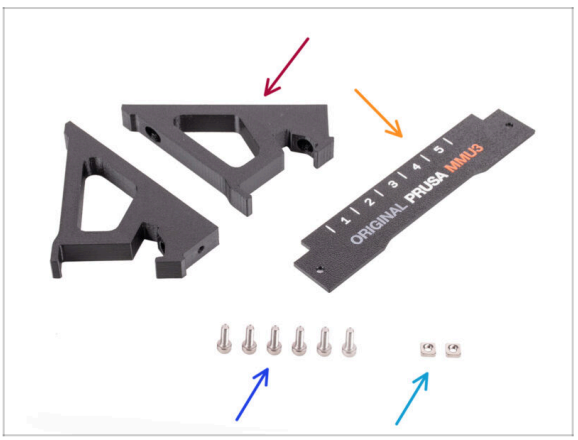
STEP 32 Cable management (part 2)

- Wrap the MMU/Printer cable in the **textile wrap** if it isn't wrapped already.
- Join the **Idler** motor cable with the MMU/Printer cable on the right side. Tuck any excess cable length under the electronics cover.
- Fix these cables to the marked **attaching point** on the ele-cover using a zip-tie.

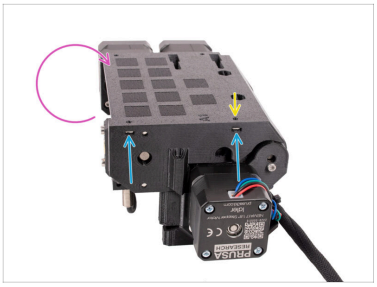
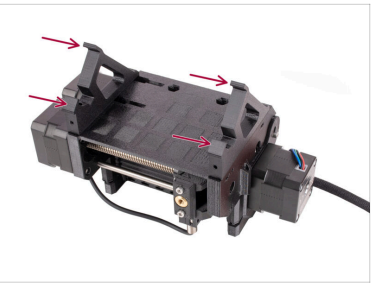
  ⚠ Ensure there is enough slack in the cables so that the zip-tie does not pull by them when tightened.
- **Leave as much slack as possible** in the cable bundle between the motors and the electronics so the unit can be opened up later on without the risk of damaging the cables!
- Bundle the loose cables together using a zip tie.

STEP 33 Frame holders parts preparation



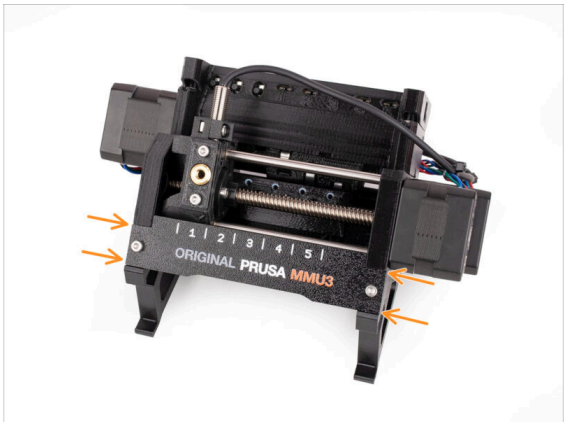
- Frame holder (2x)
- Label-plate (1x)
- M3x10 screws (6x)
- M3nS nut (2x)

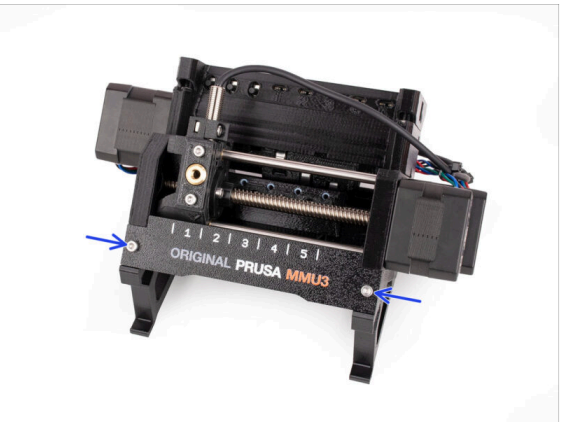
STEP 34 Frame holders assembly


- Turn the unit around.
- Insert the two **M3nS** nuts into the marked openings on the side of the unit. Push the nuts all the way in using the 1.5mm Allen key.
- Add the **frame holders** onto the unit. Make sure the part with the hooks is on the selector side of the MMU.
- Fix the frame holders to the unit with four **M3x10** screws.
- If the bolt doesn't go in easily, use the 1.5mm Allen key to adjust the nut position inside the Pulley body.

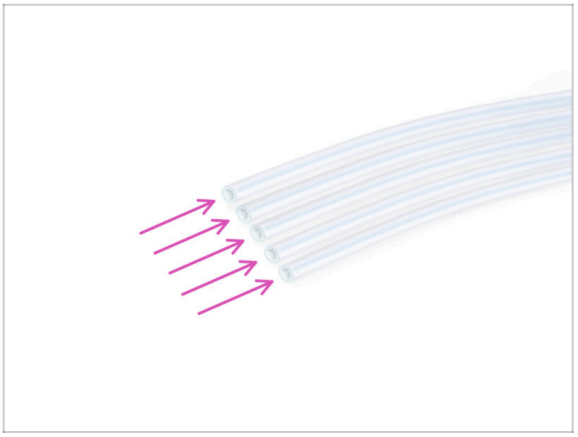
STEP 35 Label plate installation





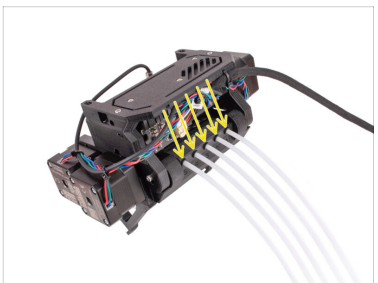
- Insert the **label plate** into the recess on the front of the frame holders.
- Fix the label plate in place using the two **M3x10** screws.

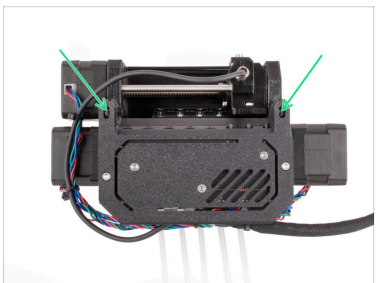
STEP 36 Rear PTFE parts preparation

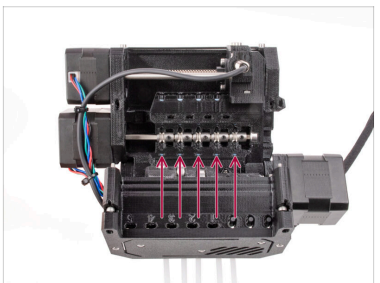


- **For the following steps, please prepare:**
- PTFE tube 4x2.5x650 (5x) *five of the ten long ones.*

STEP 37 Rear PTFE installation







- Insert the five long PTFE tubes into the openings with the black collets on the back of the MMU unit.

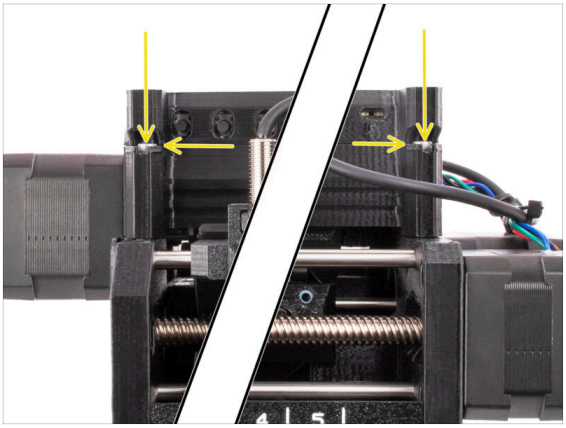
  From now on, if you need to remove the PTFE tube, push the black collet in, and pull the PTFE tube out.

- Undo the two idler tension screws and open up the unit.

  Don't worry, the screws won't fall out.

- There are small windows next to each of the pulley positions. Verify the PTFE tube is fully inserted and its end is visible inside the window. If not, push the tube in some more.

STEP 38 Setting the Idler tension



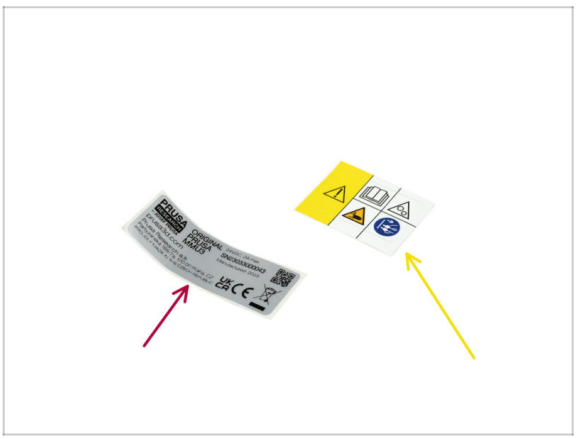
- Close the unit and tighten the idler **tension screws** slightly.
- Adjust both of the idler tension screws so that the top of the **screw head is slightly above** the top surface of the idler-body.

This is the setting which works for the majority of materials. Some specific filaments might require a slightly different idler tension setting.

The correct **idler tension** is crucial and might require further adjustment on your MMU unit.

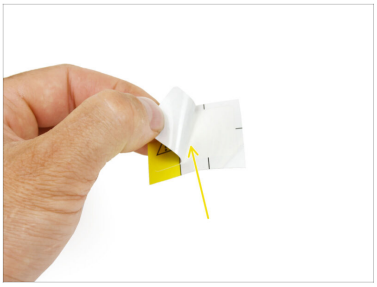
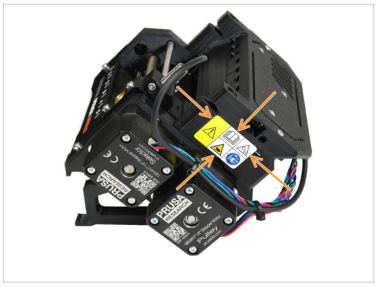
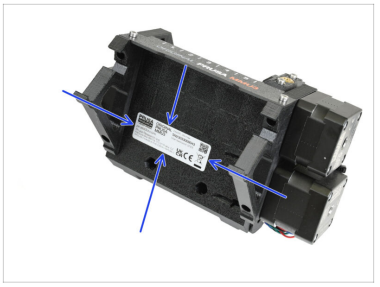
- With **too low** idler tension, the MMU unit might struggle with grabbing the filaments properly.
- With **too high** idler tension, the idler will struggle with determining its home position and the MMU unit won't work properly.

STEP 39 Stickers parts preparation



- **For the following steps, please prepare:**
- Serial number sticker (1x)
- Safety sticker (1x)

STEP 40 Applying the stickers

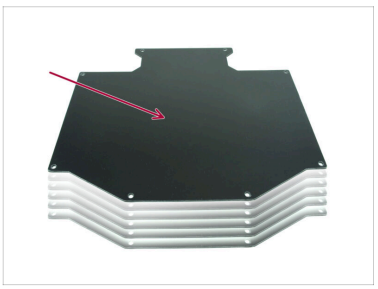
- Remove the safety sticker from the protective layer.
- Apply the safety sticker onto the right side of the MMU3 unit. The correct position is depicted in the second picture.
- Apply the serial number sticker on the bottom of the MMU3 unit using the same method as before. Ensure that it is attached securely and aligned properly.

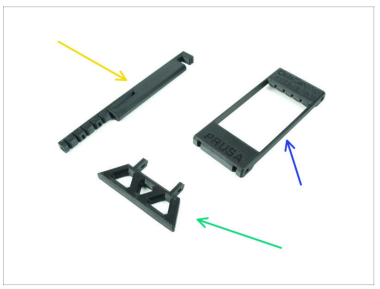
7. Cassette Buffer Assembly

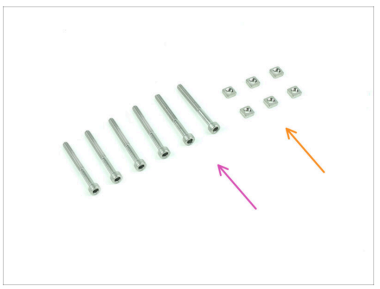
STEP 1 Tools necessary for this chapter

- **Please prepare tools for this chapter:**
  - 1.5mm Allen key for possible nut alignment
  - 2.5mm Allen key for M3 screws

STEP 2 Parts preparation

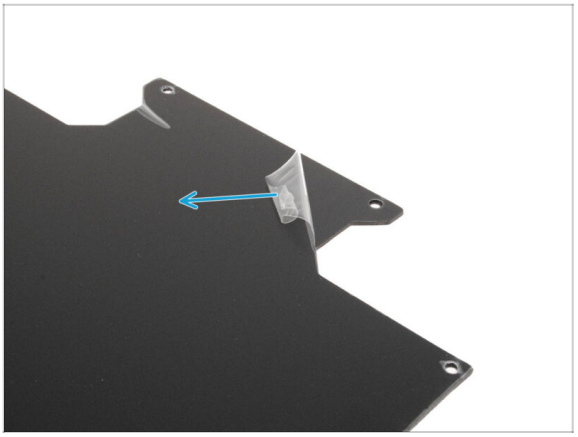






- **For the following steps, please prepare:**
- Buffer plate (6x)
- Printer holder (1x)
- Buffer-leg (1x)
- Segmenter (1x)
- M3x30 screws (6x)
- M3nS nuts (6x)

STEP 3 Peeling the plates

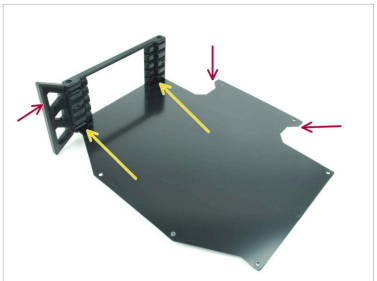


- Peel the **protective layers off the both sides** of the buffer plates.

STEP 4 Assembly (part 1)

- Insert the protruding parts of the Buffer leg into the marked openings in the Segmenter. Push it all the way in.
- Insert four M3nS nuts into the small marked openings in the Segmenter. Push them all the way in.
- Insert the remaining two M3nS nuts into the marked openings on the Printer holder. Push them all the way in.

STEP 5 Assembly (part 2)

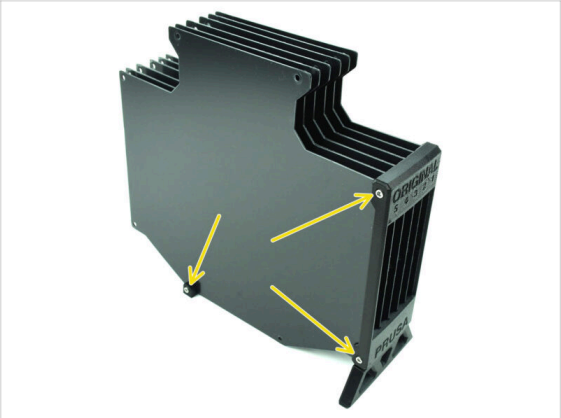


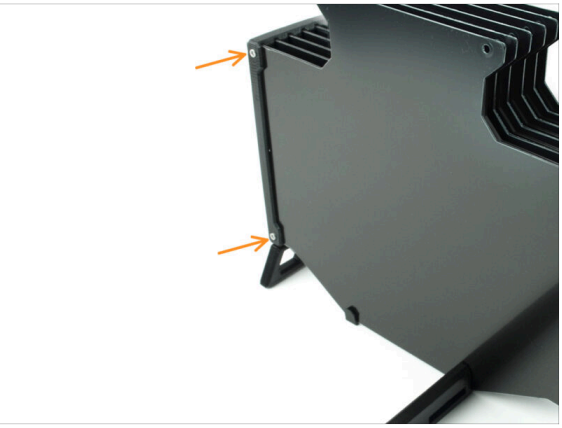
- Insert the first buffer plate into the marked bottom opening in the Segmenter. Push it all the way in so that the screw openings line up.
- Make sure the buffer leg and the cutout parts of the sheet are on opposite sides - as seen in the picture.
- Attach the printer holder to the marked position on the buffer sheet. For now, it should be pointed up. The sheet should attach to the bottommost opening in the printer holder.
- Orient the whole assembly so that the buffer sheet is standing up. Both the printer holder and the Leg should be on the ground.

STEP 6 Assembly (part 3)


- Insert the remaining 5 buffer plates into the corresponding openings on the Segmenter and Printer holder.
- The whole assembly now should look like the one in the second picture.

STEP 7 Assembly (part 4)





- Insert three M3x30 screws into the marked openings on the side of both the Segmenter and the Printer holder. Tighten them up.

ⓘ If the screw doesn't go in, make sure all the holes align with the plates.

⚠ Do not overtighten the screw. Otherwise, the buffer plates might deform.

- Attach another two M3x30 screws into the openings on the other side of the Segmenter.

STEP 8 Assembly (part 5)

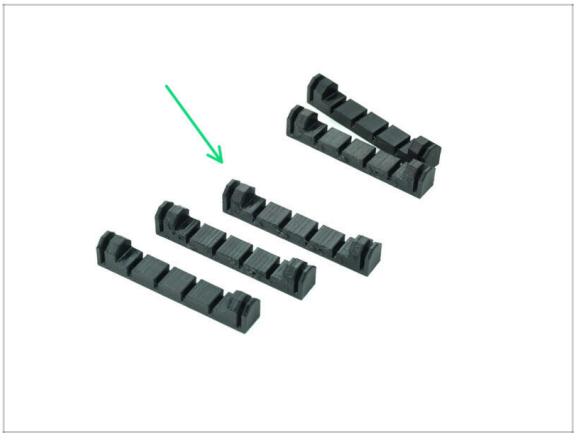
- Insert the last M3x30 screw into the marked opening in the Printer-holder.

ⓘ Note that some versions of the part may have the opening on the opposite side, but the assembly process remains the same.

⚠ **Do not overtighten the screw.** Otherwise, the buffer plates might deform.

- Push the screw into the assembly until it reaches the nut. Tighten it up.

STEP 9 Parts preparation: Plate-holders

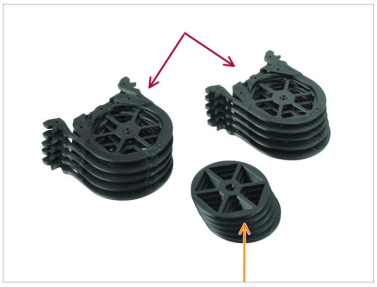
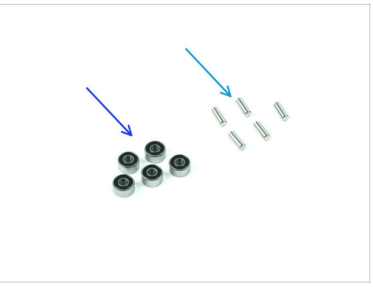
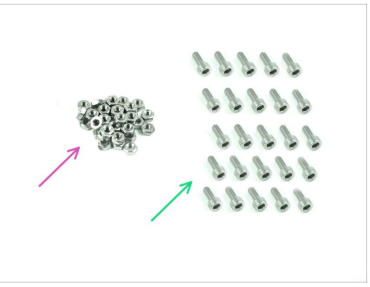


- **For the following steps, please prepare:**
- Plate-holder (5x)

STEP 10 Assembly (part 6)

- Attach the plate holders to the plates in the marked positions.

STEP 11 Buffer segment parts preparation

- **For the following steps, please prepare:**
- Buffer Segment (10x)
- Wheel (5x)
- Ball Bearing 693-2rs (5x)
- Shaft 2.9x8.5 (5x)
- M3n nut (15x)
- M3x6 screw (25x)

STEP 12 Buffer cartridge INFO

There have been several versions of this part available, which might look slightly different. However, the assembly process remains the same.

- The MMU3 for the **MK4** printer necessitates the use of the most recent buffer cartridge design, Version B.

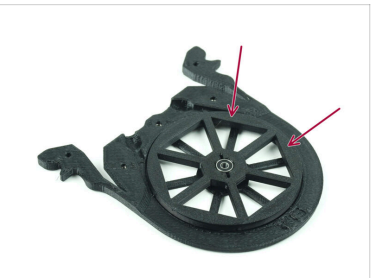
Version B has been introduced in April 2024.

The version B accommodates the slightly longer unload distance of the Nextruder. If you're **adapting an older MMU3 unit to the MK4**, it's necessary to reprint the plastic parts of the buffer cartridges to ensure proper compatibility.

STEP 13 Segment assembly (part 1)

- Insert the **bearing** into the center opening in the wheel.
- Make sure the bearing is inserted all the way in, until flush with the surface.
- Repeat for the remaining four wheels.

STEP 14 Segment assembly (part 2)



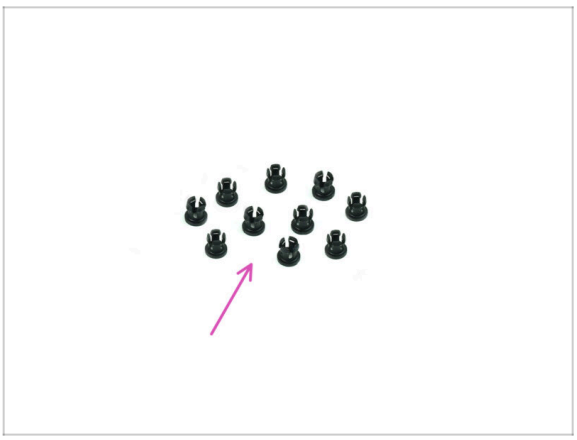
- Insert three **M3n nuts** into the marked openings on the Segment and push them all the way in.
- Add the wheel into the center of the segment.
- Push the **Shaft** all the way through the middle of the bearing, until it engages into the segment below.

STEP 15 Segment assembly (part 3)



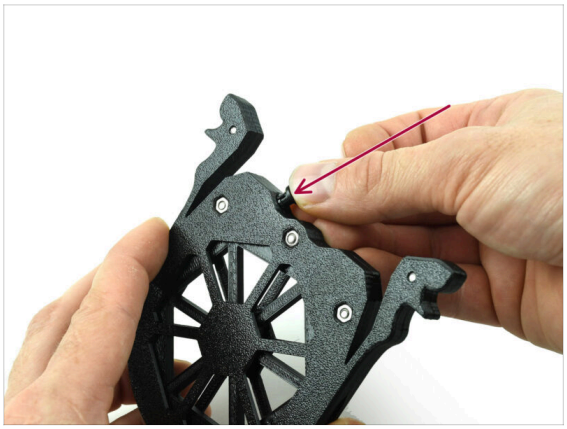
- Cover the assembly with another **Segment** part. Push both parts together to make sure the center shaft engaged into the top segment too.
- Join both parts together using four **M3x6** screws.
- Turn the assembly around.
- Add the fifth **M3x6** screw from the other side.
- **Assemble all the remaining segments**, using the same technique.

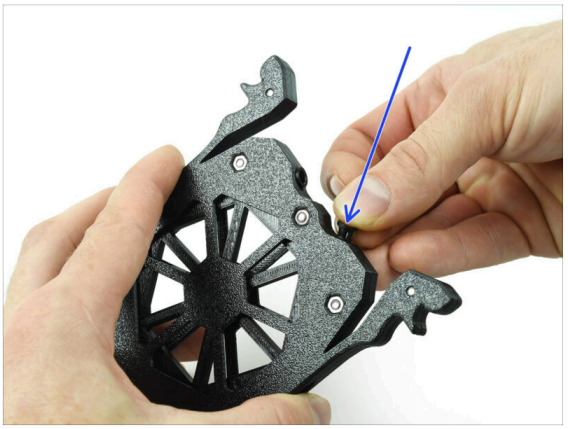
STEP 16 Collets: parts preparation



- **For the following steps, please prepare:**
- Collet (10x)

STEP 17 Collet installation





- Insert one of the **collets** into the marked position on the cartridge.

⚠ Note, for an easier instalation, you might want to squish the small fins together while you insert the collet into the opening. Otherwise, one of the fins might spread outwards, resulting in a damaged collet.

- Insert another collet into the other opening.
- Install collets into the remaining four cartridges too.

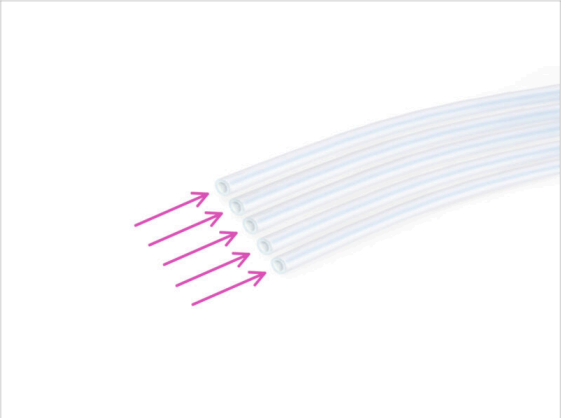
STEP 18 Cartridge installation

- Now, prepare all 5 cartridges and the buffer body.
- Take one of the cartridges and hold it by the two handles. Squish the handles together for insertion.
- Insert the cartridge into the buffer body.
- Make sure the cartridge is properly inserted.

For a later cartridge removal, squish the two handles together and pull it out.

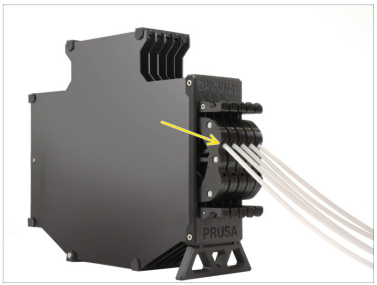
- Insert **all the cartridges** into the buffer body.

STEP 19 PTFE tubes parts preparation



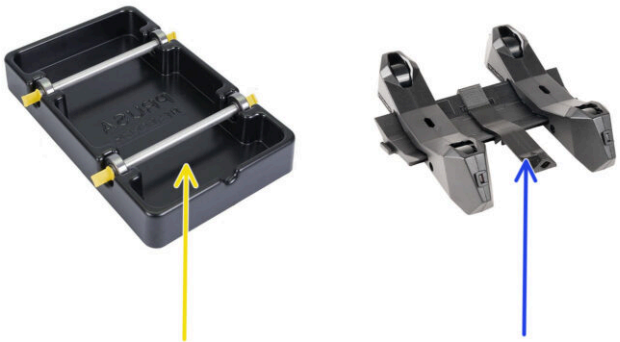
- **For the following steps, please prepare:**
- PTFE 650mm (5x)
- PTFE-clip (1x)

STEP 20 PTFE tubes installation

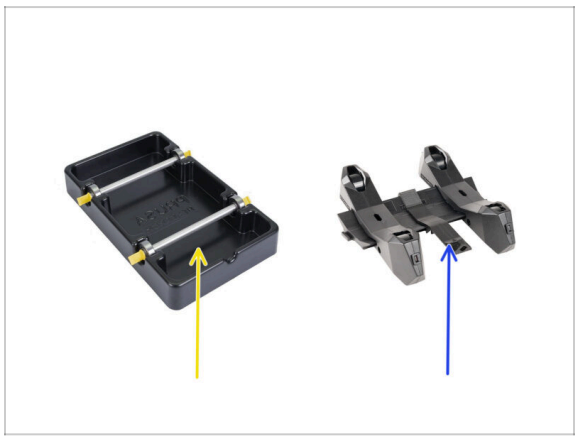


- Insert the PTFE tubes into the upper collet in each of the cartridges. Push them all the way in.
- Join the PTFE tubes together using the PTFE clip approximately in the middle.

8. Spool holder Assembly



STEP 1 Two Spoolholder types



- In this chapter, we will assemble the spoolholders, but before we proceed, note there are two types of the spoolholder.

⚠ Inspect the box your kit came in. If the large portion of the box is occupied by the **rectangular black trays**, you have the first version, the older vacuum-formed spoolholders.

- **1. Classic vacuum-formed** spoolholder

  If you have this version, continue to the following step Vacuum formed holder parts preparation

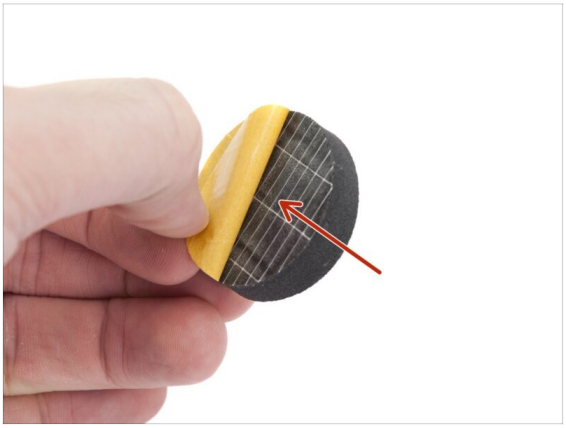
- **2. New injection-molded** spoolholder

  This version comes in five packages inside a smaller box. If you have this version, skip to Injection molded spoolholder: parts preparation

STEP 2 Vacuum formed holder parts preparation

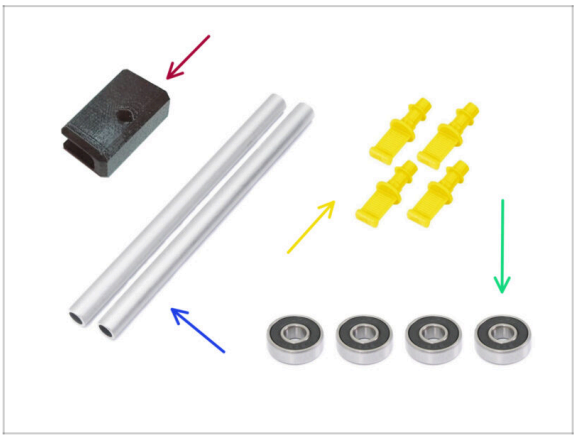
- **For the following steps, please prepare:**
- Spoolholder base (1x)
- Foam pad (4x)

STEP 3 Foam pads installation



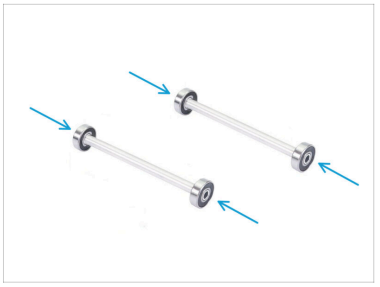
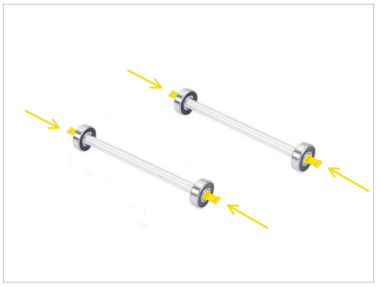
- Turn the spoolholder base upside down.
- Peel off the yellow protective layer off the foam pads.
- Attach the four foam pads into the bottom corners of the spoolholder base.

STEP 4 Rods, Bearings parts preparation



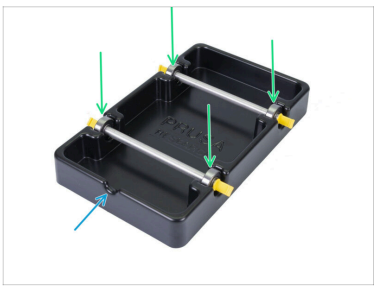
- **For the following steps, please prepare:**
- PTFE holder (1x)
- Shaft (2x)
- Plug (4x)
- Bearing (4x)

STEP 5 Rods and bearings assembly

- Attach a bearing onto each end of both rods.
- Attach the plugs onto the rod ends to fix the bearings on each rod.

STEP 6 Finishing up the Spoolholders (vac. form.)



- Attach the rods with bearings into the base part so that the bearings engage into the corresponding grooves on the base.
- There is a notch on the front part of the spoolholder.
- Attach the PTFE holder onto the notched front part of the spoolholder.
- Repeat the same steps to build the remaining spool holders until you finish all five.

STEP 7 Injection molded spoolholder: parts preparation

⚠ **If you have the injection-molded spoolholders instead, continue from here.**

- If you already assembled your **rectangular vacuum-formed spoolholders**, please, **skip to the next chapter.**

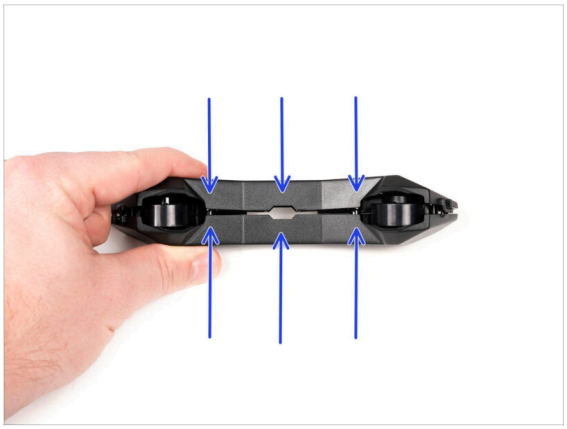
STEP 8 Injection molded holder parts preparation

- **For the following steps, please prepare:**
- Spool holder Base (4x)
- Spool holder Guide (1x)
- Spool holder Wheel (4x)
  - ⓘ Wheels shipped after April 2024 are made of POM. We recommend using this version over the earlier models made from ABS.
- sheet of Foam Pads (1x)
- PTFE holder (1x)

STEP 9 Base assembly (part 1)

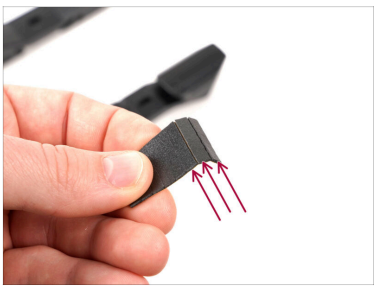
- Take one Base part. Arrange it as seen in the picture.
- Insert two wheels into the Base.
- Cover the assembly with another Base part on top.

STEP 10 Base assembly (part 2)



- Push both Base parts together until they fully engage one into the other.
- Verify the Base parts hold together properly.
- Repeat the same steps for the other side part of the spool holder, until you get two of these.

STEP 11 Foam pads installation (part 1)



- Take the foam pad sheet. Bend it to separate the individual foam pad strips.
- There is a bending line inside the inner opening on the bottom of the spoolholder side part.
- Attach an individual foam pad strip onto the middle of the bending line inside the opening, as seen in the picture.

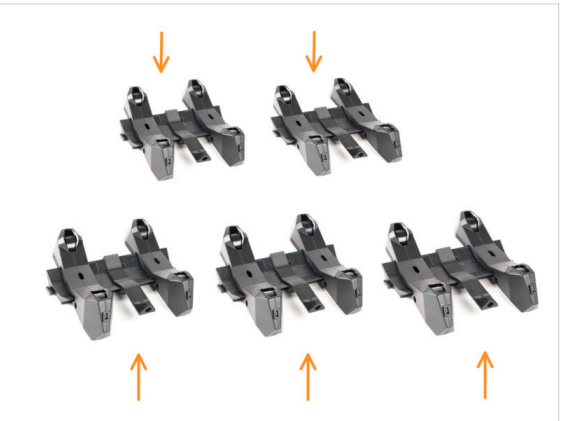
STEP 12 Foam pads installation (part 2)

- Attach another four foam pad strips onto the marked positions on the bottom of the spool holder side part.
- Install another six foam pad strips onto the other side part of the spool holder.

STEP 13 PTFE holder assembly

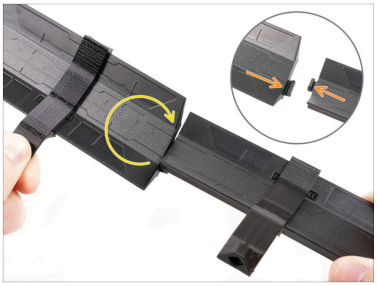
- Take the spoolholder Guide part. Hook the end of the PTFE holder onto the Guide
- Make sure the longer part of the PTFE holder is located at the narrower side of the Guide part.
- Push the PTFE holder down onto the Guide until it fully engages and locks in place.

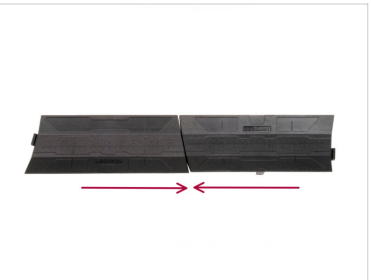
STEP 14 Finishing up the Spoolholders (inj. mol.)

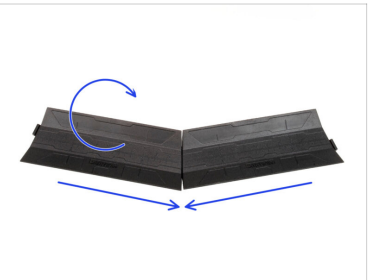


- Slide the side parts onto the Guide part.
- Repeat the same steps for the remaining Spool holders, until you assemble all five. (Don't forget about the foam pads on the bottom!)

STEP 15 Joining the Spoolholder Guides







- There are protrusions on each side of the Guide part.
- Using these protrusions, the Guide parts can be joined together. To join them together, simply tilt in the Guide parts one into the other until the protrusions click in.
- The Guides can be joined together in form of a straight line.
- Or, if you flip one of the Guides around, they can be joined in an arc pattern. This is handy to form an arc of spool holders around the Buffer so that each filament path is as straight as possible.

STEP 16 Continue

⚠ If you're installing the **MMU3** on an **MK4/S** printer, move to the chapter:

- **MK4/S Nextruder mod**

⚠ If you're installing the **MMU3** on an **MK3S+** or **MK3.5/S** printer, move to the chapter:

- **MK3S+ / MK3.5 Extruder mod (KIT)**

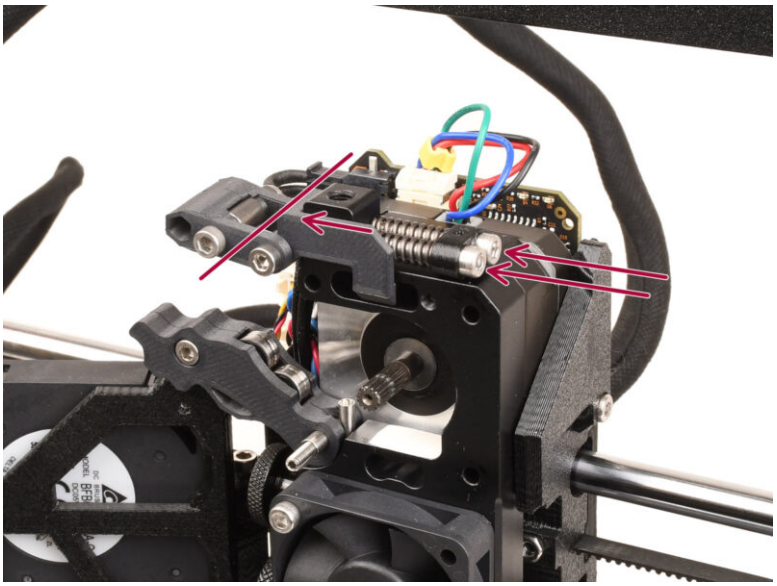
ⓘ In these chapters, we will convert the single-material extruder into the MMU3 version.

⚠ If you're doing the **MMU2S to MMU3 Upgrade** on **MK3S+**, continue to the chapter:

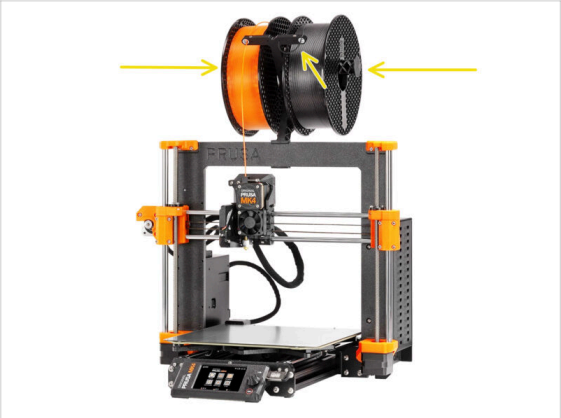
- **The MK3S+ Extruder (UPG)**

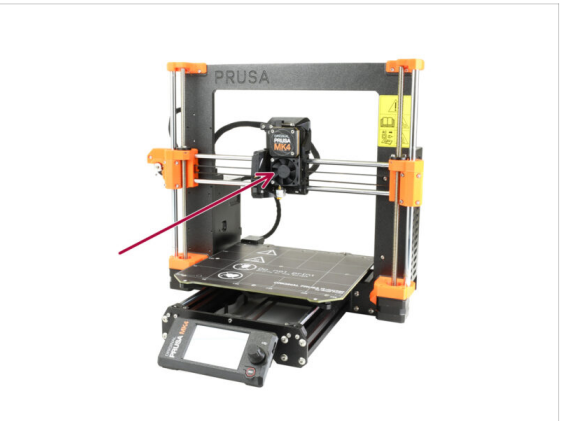
ⓘ This chapter will take you through the MMU2S Extruder to MMU3 Extruder upgrade.

9A. MK4/S, MK3.9/S Nextruder mod



STEP 1 Introduction





- In this guide, we're going to **modify the Nextruder** on your MK4/S, MK3.9/S to accomodate the MMU functionality.

  If you are using another printer type, please refer to the respective chapter for the given printer.

  The MK3.9/S printer is functionally equivalent to the MK4/S.

  The instructions are shown using the MK4 printer, so some parts may look different. This does not affect the procedure.

- Unload filament from the printer and remove the spool holder.
- Make sure the extruder on your printer is in the middle of both the X and Z axes.
- Power off your printer and disconnect it from the power.

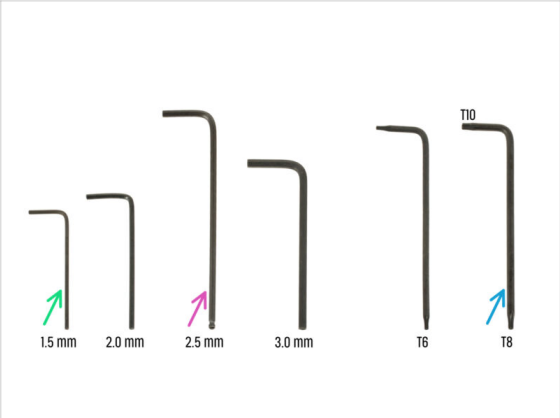
STEP 2 Spare parts bag

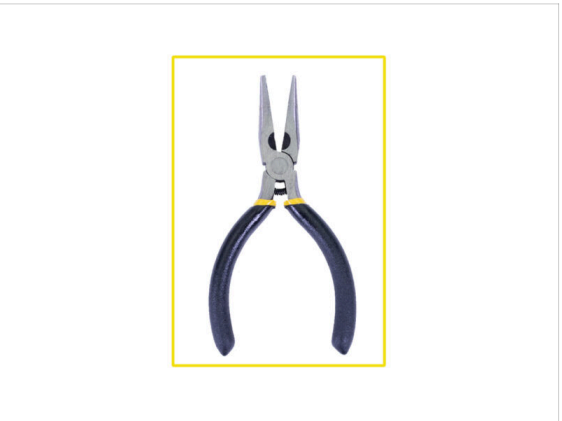
- During the conversion of the Nextruder to the multi-material version, you'll handle many parts that look similar but are different. We recommend setting aside a bag for spare parts to store components that won't be needed anymore.

  Rest assured, our guide will clearly indicate which parts will be reused and which won't.

- Let's begin!

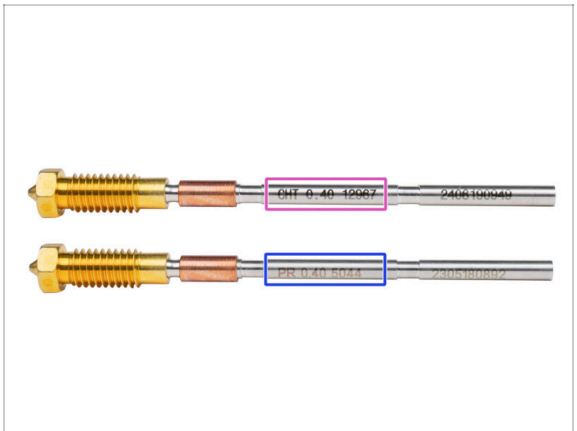
STEP 3 Tools necessary for this chapter





- **For this chapter, please prepare:**
- 2.5mm Allen key
- 1.5mm Allen key
- Torx key TX10/8
- Needle-nose pliers

STEP 4 Prusa Nozzle info (MK4S only)



⚠ There are two variants of the Prusa Nozzle that we ship with the printers:

- Prusa Nozzle brass CHT high flow *(marked CHT)*
- Prusa Nozzle brass *(marked PR)*

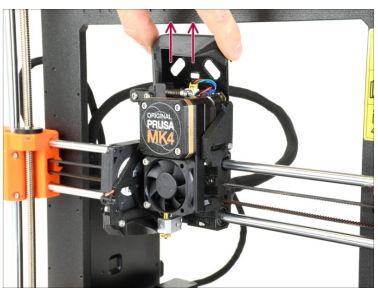
- The **MK4S** comes equipped with the Prusa Nozzle CHT by default. However, for optimal performance with the MMU3, **we recommend switching to a standard Prusa Nozzle**.

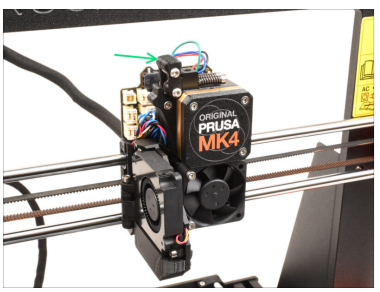
ⓘ While high-flow nozzles can be used too, they require specific HF Nozzle Slicer profiles with large purge volumes.

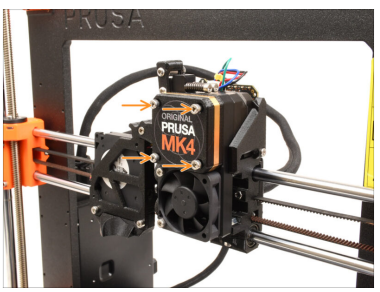
- The standard Prusa Nozzle is included in your MMU3 package.
- To replace the nozzle on the MK4S, please follow the instructions provided in the dedicated manual How to replace the Prusa Nozzle (MK4S/MK3.9S).

⚠ Once completed, return to this manual to continue with the assembly.

STEP 5 Nextruder disassembly (part 1)



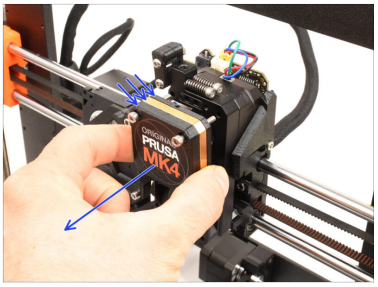
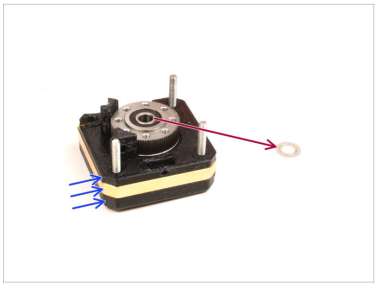
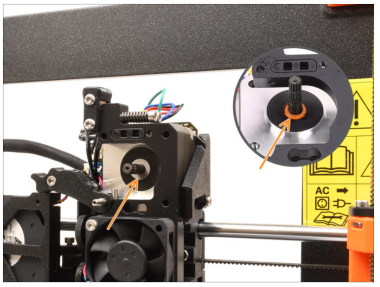




- Remove the top Loveboard-cover from the extruder by pulling it up.
- Open the Idler swivel.
- Fully loosen the M3x25 screws holding the gearbox cover.
  Leave the screws in place. Do not remove them entirely yet.

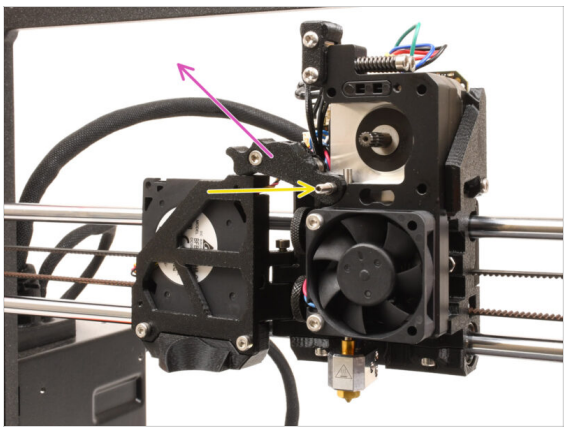
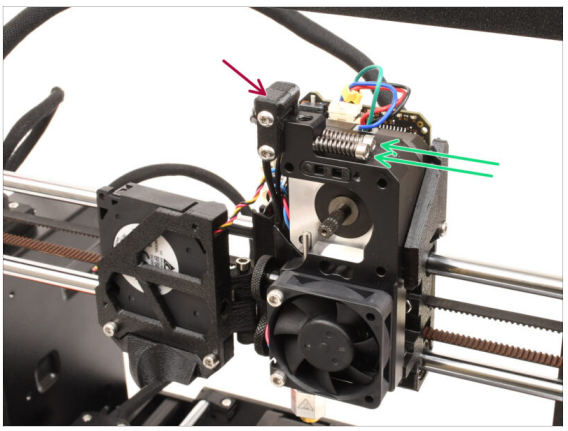
⚠ There were multiple versions of the Nextruder. The earlier models have **four screws** on the front. The newer model has **three screws**.

STEP 6 Nextruder disassembly (part 2)

- Remove the whole **gearbox assembly** from the Nextruder.
- Locate the **metal washer** that should be between the gearbox and the motor. It might be stuck to the gearbox assembly.
  - Earlier versions of the Nextruder use an **orange spacer** instead of the **metal washer**.
- Reseat the washer / spacer on the motor shaft, in case it has come off the shaft.
- The parts might be greasy. Clean off any excess grease.

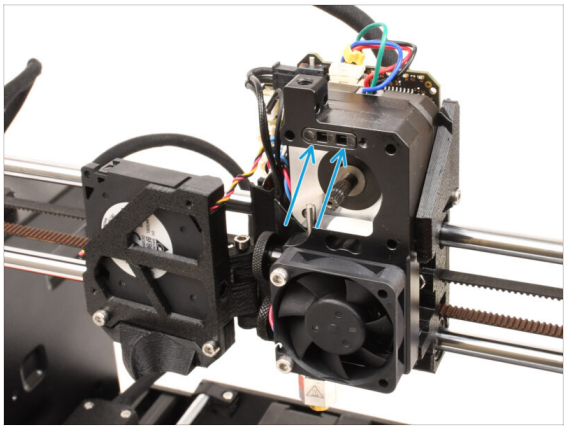
STEP 7 Nextruder disassembly (part 3)

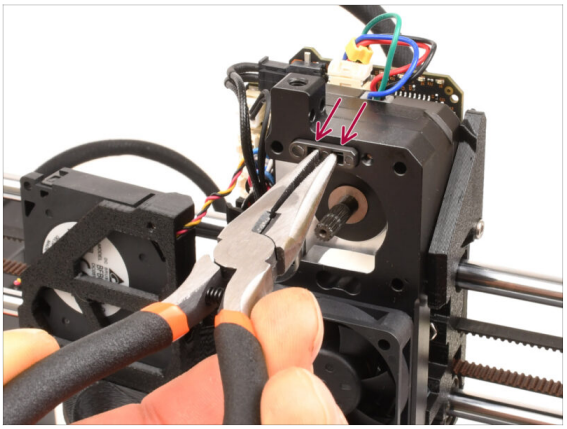



- Using the 1.5mm Allen key, remove the **set screw**.

  ⓘ If you own the 4-screw version of the Nextruder, this specific type of set screw is not included.
- Remove the Idler.
- Remove the two M3x30 screws with the springs.
- Remove the idler swivel assembly.

STEP 8 Nextruder disassembly (part 4)



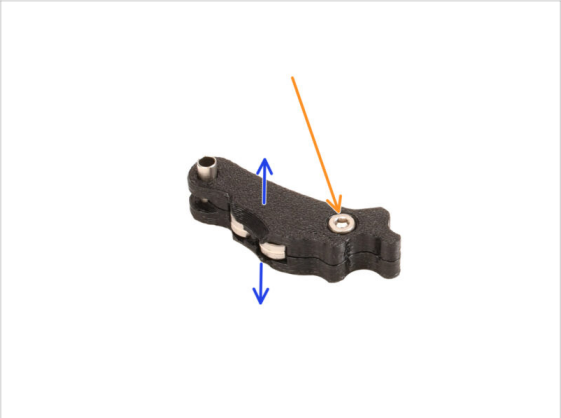


- On top of the **Nextruder heatsink**, there is a **filament sensor assembly.** We will need to remove it.
- Using the needle-nose pliers, gently pull the filament sensor assembly out of the heatsink.

  Proceed very carefully, there is a spring and a very tiny ball that can fall out!

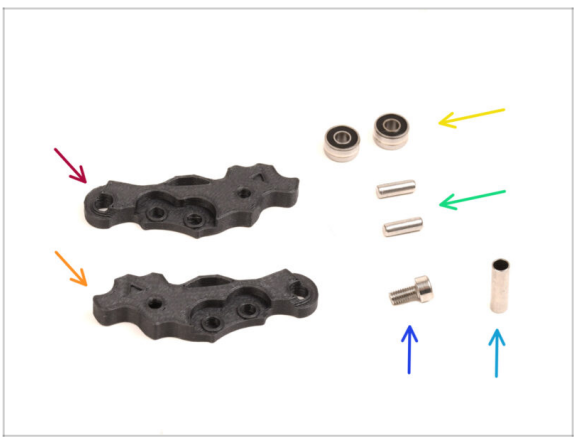
  In case the filament sensor assembly is hard to pull out, reach into the filament opening on top with the 2.5mm Allen key to push the steel ball inside the assembly in. Then, pull the filament sensor assembly out.
- This filament sensor assembly will not be used with the multi-material Nextruder. It's recommended to store it in a spare parts bag.

STEP 9 Idler disassembly



- We will need to take the Idler assembly apart.
- Remove the M3x6 screw.
- Split the printed parts to open it up.
- Set aside for later use: **Bearings, pins, spacer and the screw.**
- The printed parts won't be re-used. Set them aside so that they don't mix up with the new parts.

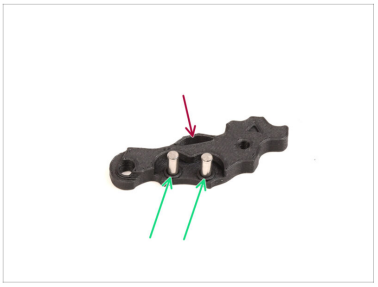
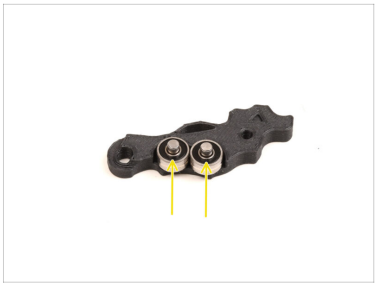
STEP 10 New Idler parts preparation



- **For the following steps, please prepare:**
- Idler-lever-a (1x) *the new part*
- Idler-lever-b (1x) *the new part*

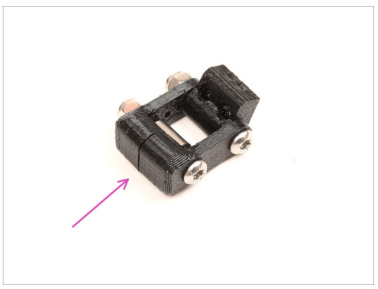
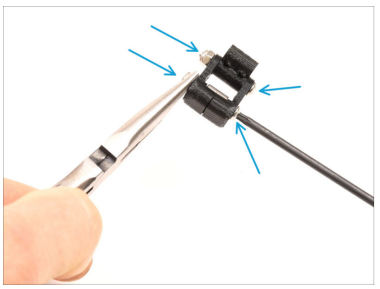
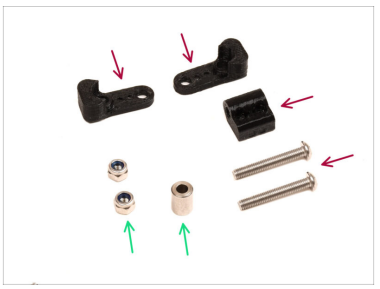
  ⚠ The older Idler printed parts, made from PETG, are prone to bending over time. Do not reuse these old parts, as they may cause the printer to malfunction.
- Bearing 693 2RS (2x) *you removed earlier*
- Pin 2.9x8.5 (2x) *you removed earlier*
- M3x6 screw (1x) *you removed earlier*
- Spacer tube 13.2x3.8x0.35 (1x) *you removed earlier*

STEP 11 New Idler assembly

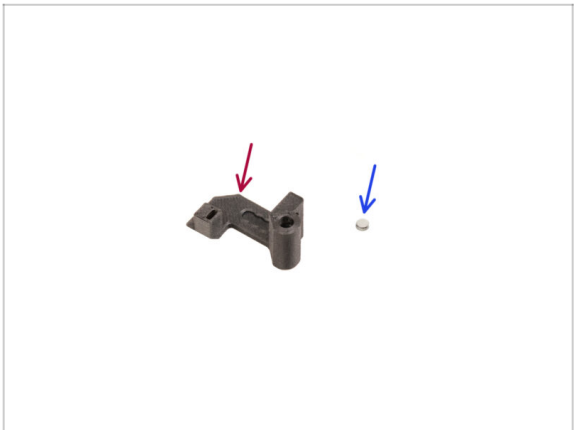

- Take the new Idler-lever-a part.
- Insert the two pins into the corresponding openings.
- Mount the bearings onto the pins.
- Cover the assembly with the Idler-lever-b part.
- Insert the spacer tube into the corresponding opening.
- Fix the assembly together using the M3x6 screw.

STEP 12 Swivel disassembly

- We will need to take the Swivel assembly apart.
- Using the T10 Torx key, remove the screws while you hold the nuts using the needle-nose pliers.
- Set aside for later use: **M3nN nuts and spacer**.
- The printed parts and the screws won't be re-used. Set them aside so that they don't mix up with the new parts.

STEP 13 Idler nut FS parts preparation



- **For the following steps, please prepare:**
- Idler nut FS (1x) the new part
- Magnet 3x1mm (1x)

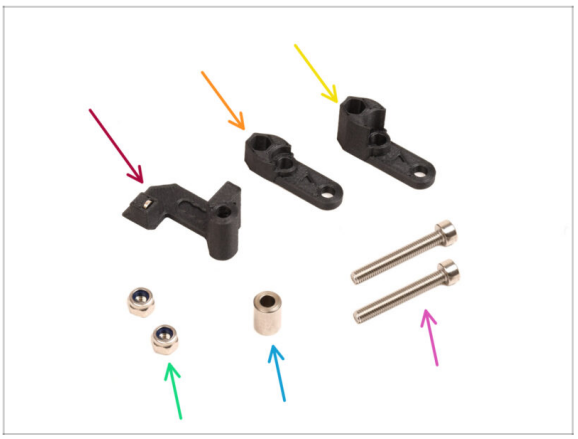
  ⓘ There are two of these tiny magnets included in the package. Please separate them and use only one; the other magnet serves as a spare.

STEP 14 Idler nut FS assembly

- Arrange the **Idler nut FS** part as seen in the picture.
- Install the tiny 3x1mm magnet into the marked opening on the Idler nut FS part.
- Push the magnet all the way in, until it stops.

  ⓘ The polarity / orientation of the magnet isn't important. The printer will automatically adapt to it during the filament sensor calibration process.

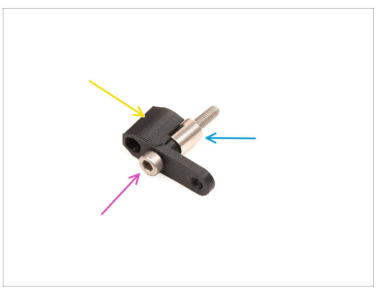
STEP 15 New Swivel parts preparation



- **For the following steps, please prepare:**
- Idler nut FS (1x) *with the 3x1mm magnet installed*
- Swivel B (1x) *the new part*
- Swivel A (1x) the new part
- M3nN nut (2x)
- Spacer 6x3.1x8 (1x) *you removed earlier*
- M3x22 screw (2x)

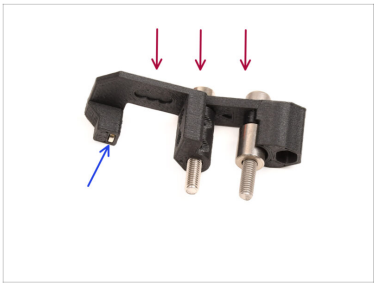
⚠ This screw is a new type not previously used on a printer! Do not reuse old screws, as they are a different size and would not fit properly!

STEP 16 New Swivel assembly (part 1)



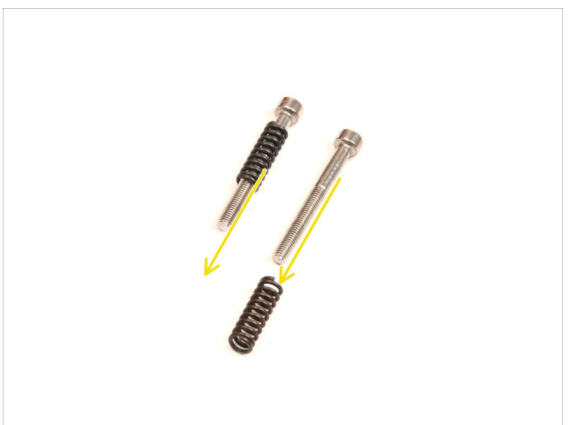
- Take the Swivel A part and orient it as seen in the picture.
- Insert the **M3x22 screw** into the opening near the thick part of the Swivel A.
- Slide the **spacer** onto the screw.
- Insert the second **M3x22 screw** into the other opening on the side.
- Slide the **Idler nut FS** part onto the M3x22 screw.

STEP 17 New Swivel assembly (part 2)



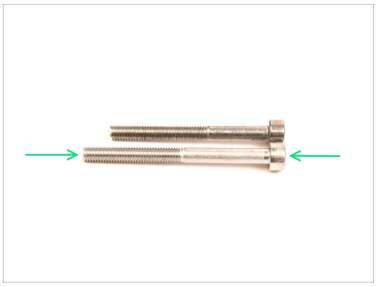
- Orient the Swivel assembly as seen in the picture.
- There is a tiny magnet in the Idler nut FS part. Make sure it is in place.
  - ⓘ In case the magnet has fallen out, there is a replacement one in the package.
- Slide the **Swivel B** part onto the screws.
- Attach the M3nN nuts onto the screws. Tighten the screws gently while holding the nuts using the neeedle-nose pliers.
  - ⚠ Do not overtighten the nuts. The Swivel must be able to move freely.

STEP 18 Tension screws parts preparation

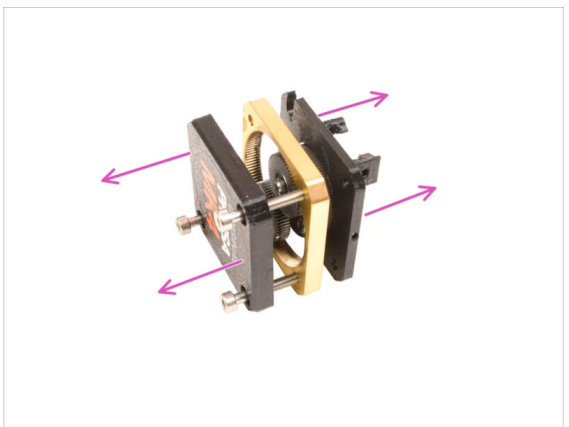
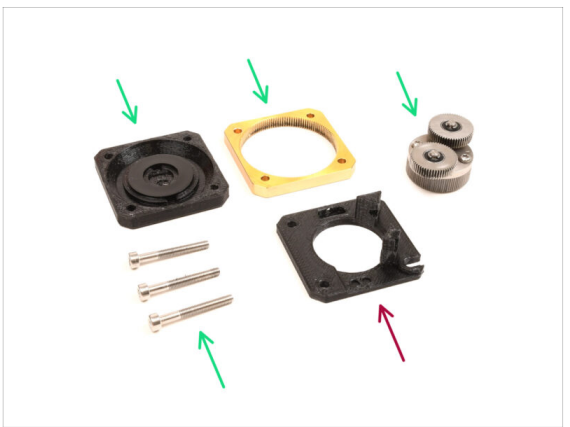
- **For the following steps, please prepare:**
- **M3x30** screws with the springs (2x) *you have removed earlier*
  - ⓘ We will need the **springs alone**. The old M3x30 screws won't be re-used.
    - Remove the springs from the old M3x30 screws.
- **M3x35** screws (2x) *the new, slightly **longer** ones.*
  - ⚠ This screw is a new type not previously used on a printer! Do not reuse old screws, as they are a different size and would not fit properly!
- Screw guide (1x)

STEP 19 Tension screws assembly



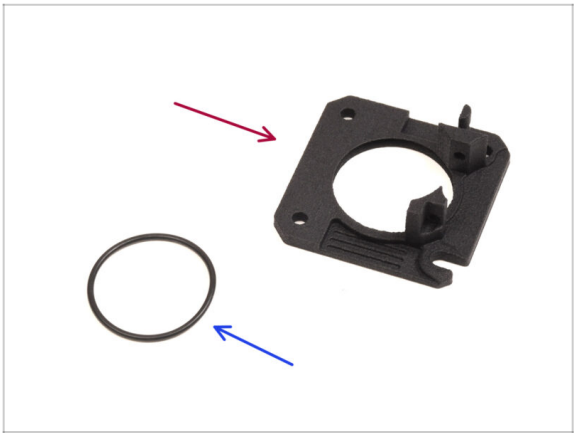
- Take the new M3x35 screws.
  - ⚠ Compare the size of the screws. Set the old M3x30 and the **new M3x35** screws apart so that they don't mix up.
  - The old shorter M3x30 screws won't be re-used.
- Push the M3x35 screws through the screw guide.
- Attach the springs onto the end of both the screws.

STEP 20 Gearbox disassembly

- Take the gearbox assembly and split it apart.
- The parts might be greasy. Clean off any excess grease.
- Set aside for later use: **PG-case, PG-ring, PG-assembly, M3x25 screws.**
- The printed main-plate won't be re-used. Set it aside so that it doesn't mix up with a new part.

STEP 21 Main plate parts preparation

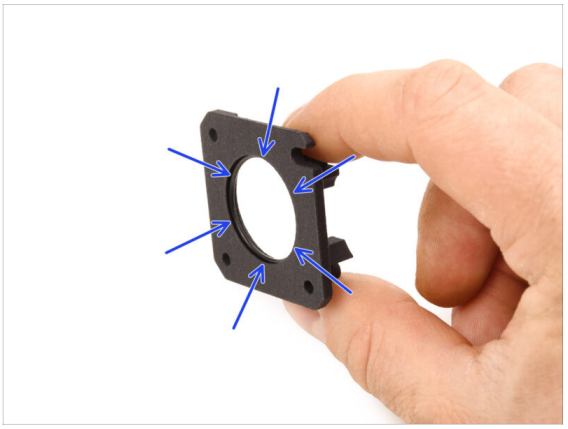


- **For the following steps, please prepare:**
- new Main Plate (1x)

  ⚠ We will need the newly supplied main-plate. It is different than the original one in the gearbox assembly, printed from PETG. Do not reuse the old main plate, as it may cause the printer to malfunction!

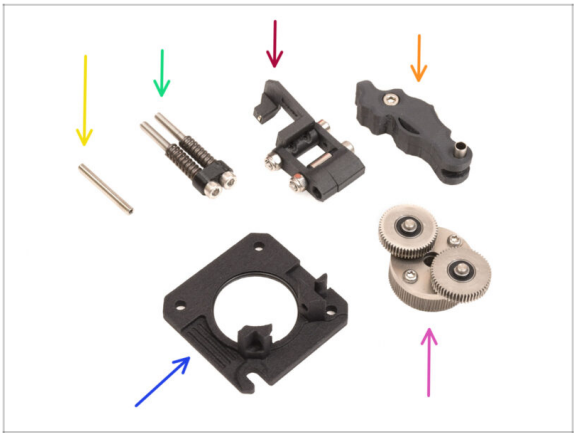
  ⓘ The new main plate is 3D printed using MJF technology. It cannot be replicated with the same quality using FDM printing.
- O-ring 24,5x1,5 (1x)

STEP 22 Main plate assembly



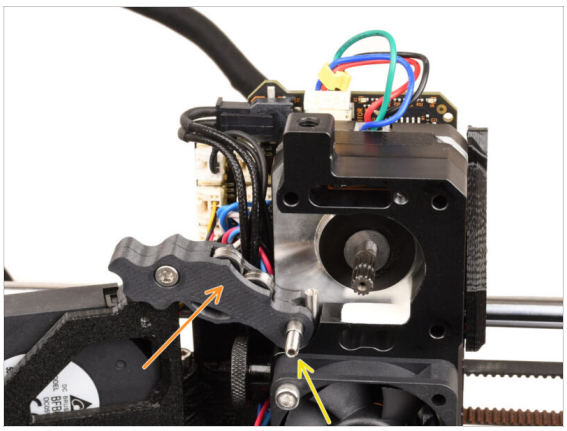
- There is a V-shaped groove on the inside of the large round opening on the new main-plate.
- Insert the O-ring into the groove. Make sure it is seated properly.

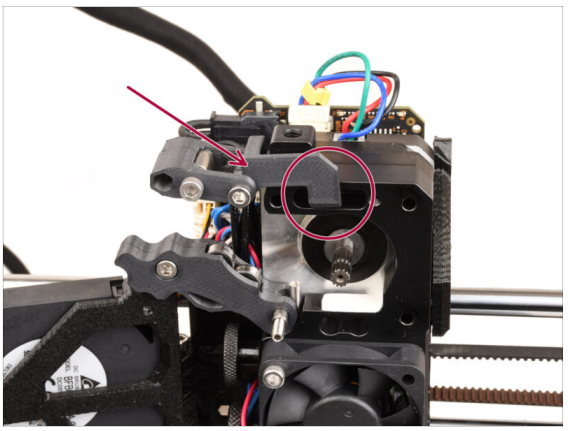
STEP 23 MMU Nextruder: parts preparation



- **For the following steps, please prepare:**
- Set screw M3x25 (1x)
  - ⓘ If you own the 4-screw version of the Nextruder, this specific type of set screw is not included.
- Tension screws assembly (1x)
- Swivel assembly (1x)
- Idler assembly (1x)
- Main plate assembly (1x)
- PG-assembly (1x)

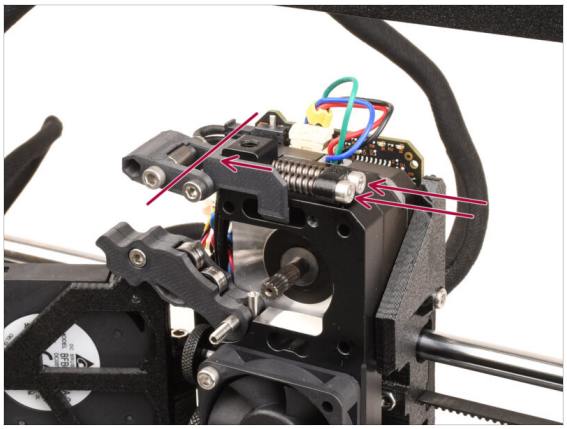
STEP 24 MMU Nextruder assembly (part 1)

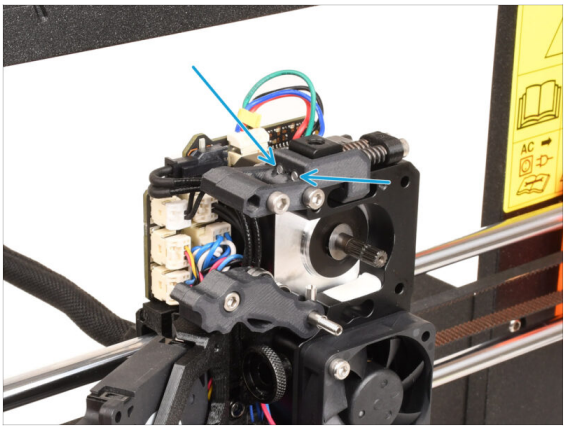




- Add the **Idler assembly** onto the extruder.
- Fix it in place using the **M3x25 Set screw**.
  - ⓘ In case you have the 4-screw version of the Nextruder, you might use the M3x25 screw to temporarily hold the Idler assembly in place.
- Add the **Swivel assembly** onto the extruder. The protruding part of the Idler nut FS component should fit inside the filament sensor pocket in the heatsink, as seen in the picture.

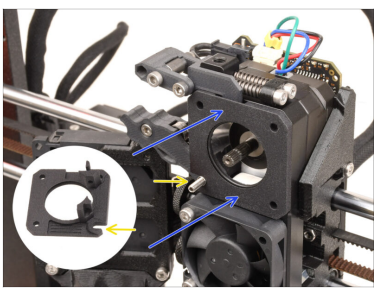
STEP 25 MMU Nextruder assembly (part 2)

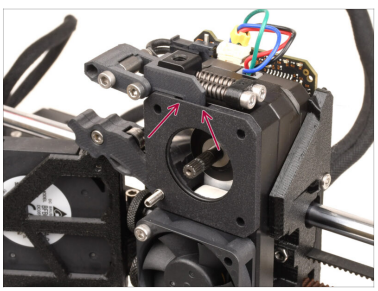


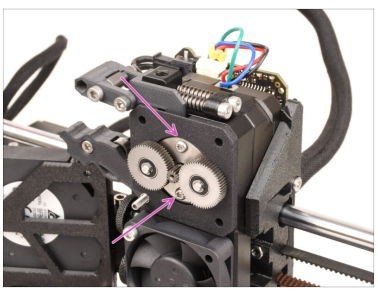


- Insert the **tension screw assembly** through the heatsink and direct it towards the Swivel assembly.
- **Tighten the tension screws gradually**, one at a time, until the ends of the screws are flush with the surface of the Idler nut part on the opposite side, as shown in the picture.

STEP 26 MMU Nextruder assembly (part 3)



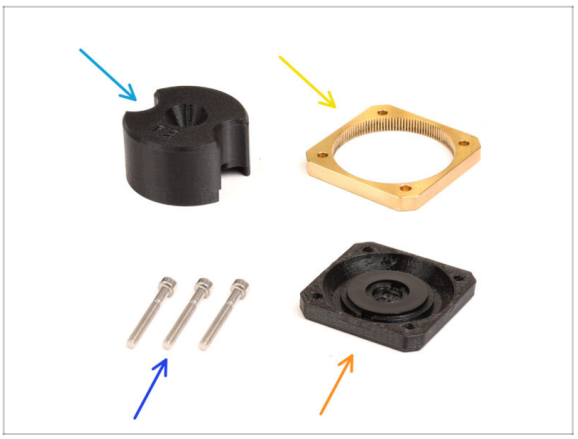




- Attach the new **main plate assembly** to the extruder, ensuring the protruding parts fit correctly into the heatsink.
  - The **notch** in one of the corners is designed to fit over the Idler spacer / set screw.
- Ensure the lever on the Swivel assembly fits correctly into the cutout on the main plate.
- Attach the **PG-assembly** to the motor shaft. Be very careful when inserting the assembly into the opening with the O-ring. Watch out for any deformation or damage to the O-ring. Ensure the O-ring stays properly seated in its groove on the main plate. A slight wiggling motion can assist with this.

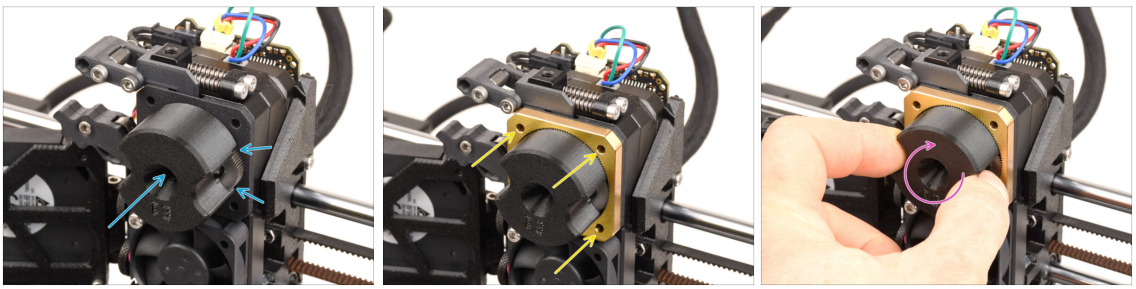
  ⚠ Watch out for any deformation or damage to the O-ring. **Ensure the O-ring stays properly seated** in its groove on the main plate. A slight wiggling motion can assist with this.

STEP 27 Gearbox assembly: Parts preparation



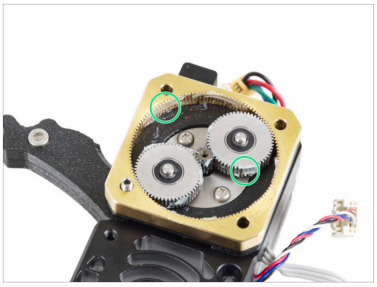
- **For the following steps, please prepare:**
- PG-assembly adapter (1x)
- PG-ring (1x)
- M3x25 screws (3x or 4x depending on the Nextruder version)
- PG-case assembly (1x)

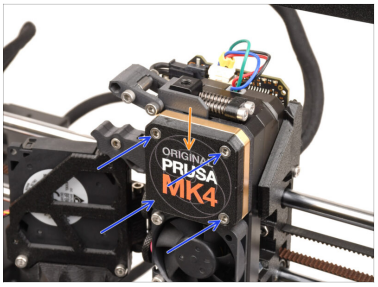
STEP 28 Gearbox assembly (part 1)

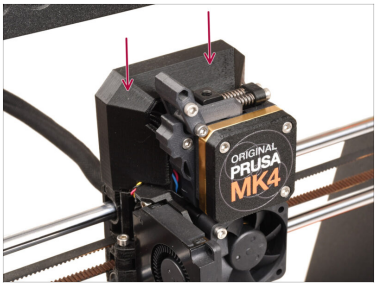


- Attach the **adapter** to the PG-assembly, making sure the spur gears are correctly aligned and fit snugly into the pockets on the adapter.
- Carefully slide the **PG-ring** onto the adapter, pushing it all the way in gently, until it locks onto the gears.
  - ⓘ Note there is a chamfer on one side of the PG-ring. This side should be facing the gears, while inserting the PG-ring.
  - Gently rotate the adapter while sliding the PG-ring onto the gears to align the gearbox properly.
- Remove the adapter, while holding the gearbox in place.

STEP 29 Gearbox assembly (part 2)







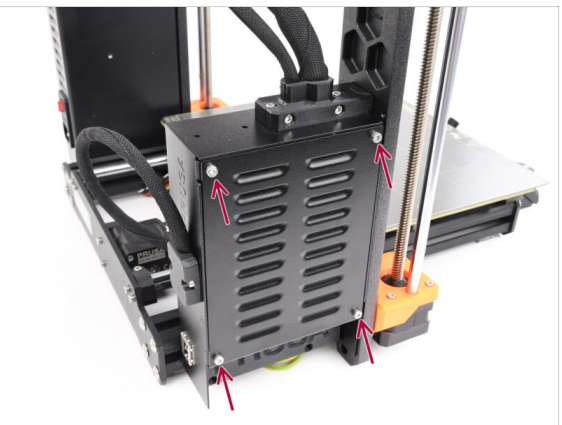
- Check the PG ring for adequate lubrication. If necessary, apply a slight amount of grease, similar to the procedure for the MK4 kit.
- Cover the gearbox using the **PG-case.**
- Secure the case using the M3x25 screws. Do not overtighten the screws!
- Attach the top Loveboard cover back onto the extruder.

9B. MK3S+ / MK3.5 Extruder mod (KIT)

STEP 1 Tools necessary for this chapter

- **Please prepare tools for this chapter:**
  - Needle-nose pliers
  - 1.5mm Allen key for nut alignment
  - 2.5mm Allen key for M3 screws
  - A measurement tool (optional), a digital caliper would work the best.

STEP 2 Printer preparation

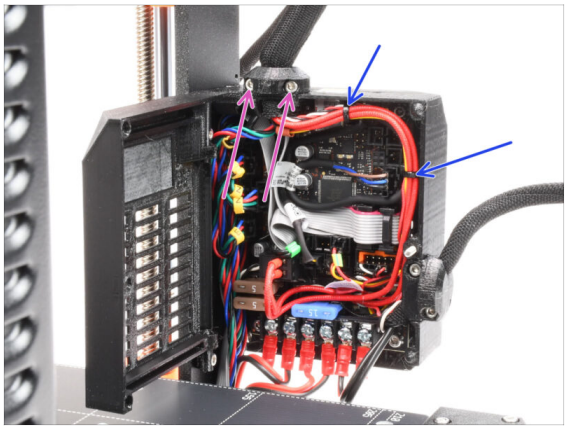


- This chapter will describe a modification of the **single-material MK3S+ / MK3.5** extruder to accomodate **MMU3.**

⚠ Keep all the parts. Some of them will need to be re-installed back in place.

- **Before you start**, make sure that:
  - The filament is unloaded and the print head is at a height it is easily accessible at.
  - The printer is properly cooled down and the steel sheet has been removed.
  - The printer is turned off and unplugged.
  - On the **MK3.5** printer, ensure you have easy access to the electronics box on the left side.

STEP 3 MK3S+ Releasing the cable bundle

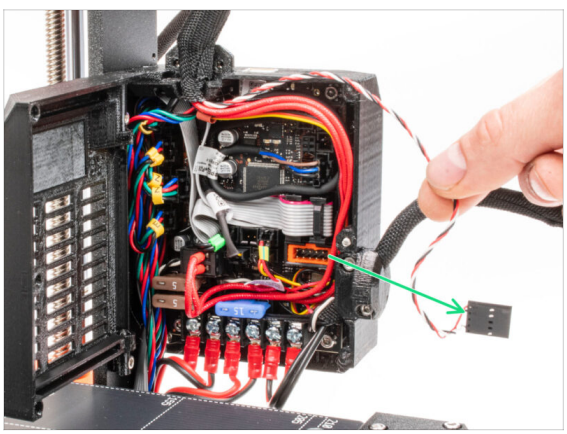


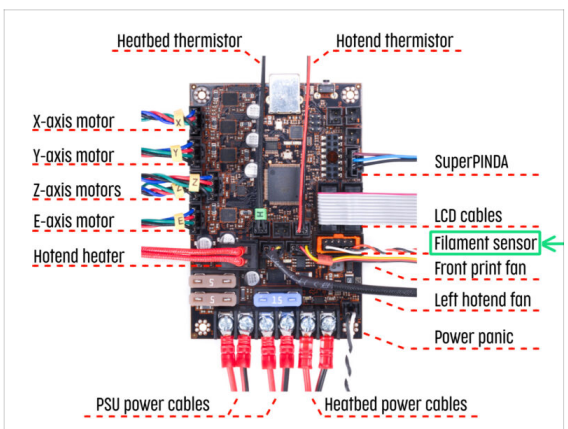
⚠ In order to use **MMU3** on your **MK3S+**, a few components on the print head need to be changed. First, we need to release the extruder cable bundle.

⚠ If you use **MK3.5** printer, skip two steps ahead.

- Using an Allen key release the M3x40 screw on the **electronics box** and open the door on the other side.
- Release two M3x10 screws and remove the extruder-cable-clip on top.
- In case there are zip ties holding the cables inside the electronics box, carefully cut and remove them.

STEP 4 MK3S+ Unplugging the IR filament sensor cable

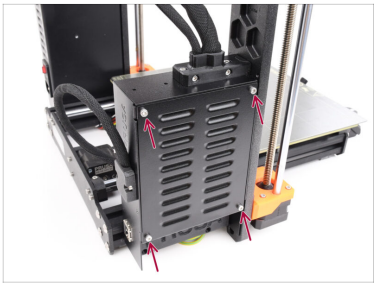
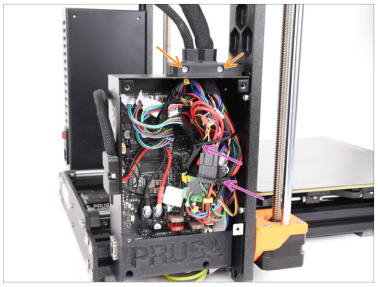
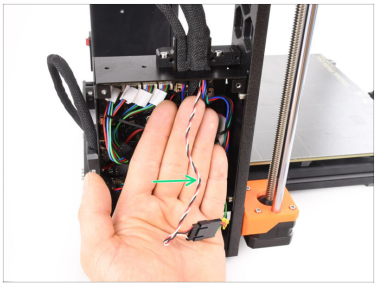




- Carefully unplug the **IR filament sensor cable** and make sure it is free inside the electronics box.

ⓘ We need to gently pull the **IR filament sensor cable** slightly towards the extruder as the sensor will be in a **different position**. Make sure the entire path of the cable is free. However there is no need for a complete disassembly.

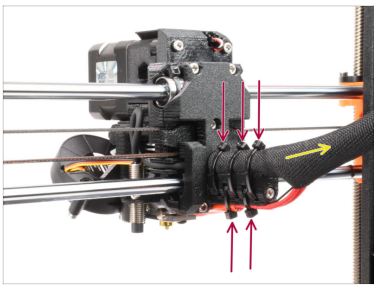
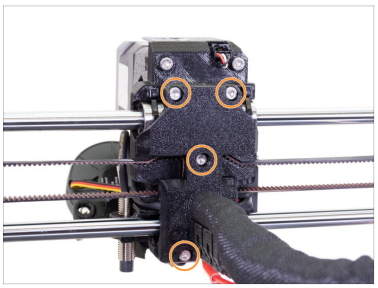
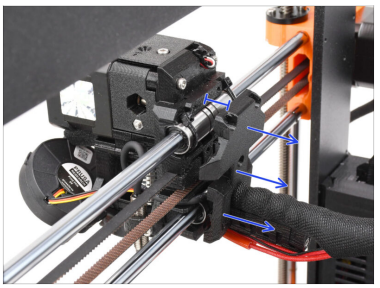
STEP 5 MK3.5 Releasing the cable bundle

⚠ This step is valid for **MK3.5** printer only. If you are using the MK3S+, skip to the next one.

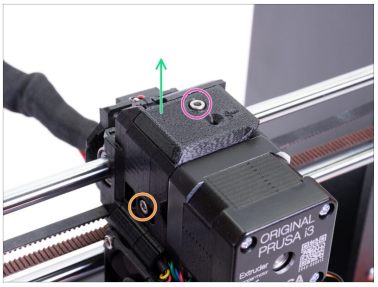
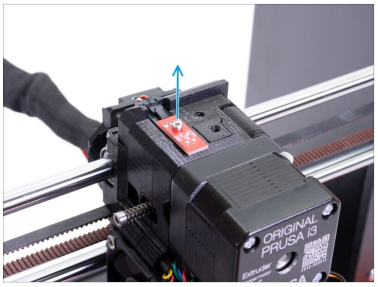
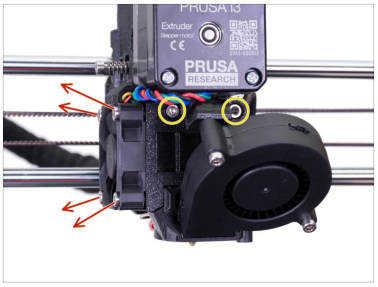
- Remove four M3x6 screws holding the xBuddy cover. Remove the cover.
- Remove the two M3x18 screws holding the front part of the cable holder and remove the Ext-cable-holder-a part.
- Carefully cut and remove the zip ties securing the cable bundle, taking care not to damage any cables.
- We need to gently pull the **IR filament sensor cable** slightly towards the extruder as the sensor will be in a **different position**. Make sure the entire path of the cable is free. However there is no need for a complete disassembly.

STEP 6 X-carriage-back disassembly

- Cut and remove all the zip ties on the cable holder behind the extruder.
- Release the textile sleeve on the cable bundle by pulling it back slightly. Usually, there is no need to remove it completely.
- Remove all four M3x10 screws on the X-carriage-back part.
- Split the x-carriage about 10 mm (0.4 inch) apart in the back to ensure the cables will be able move through more easily.

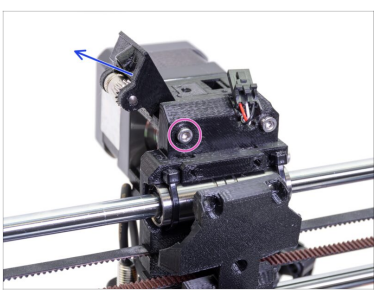
STEP 7 FS-cover and hotend fan disassembly

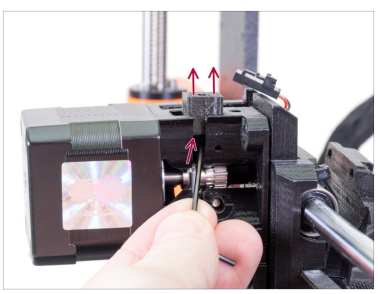




- Release and remove the M3x10 **screw on top**.
- Remove the **FS-cover**. It will be replaced with a new one.
- Release the M3x40 **Idler tension screw** with the spring on the side. You can leave it in place.
- Release the M2x8 screw, unplug and remove the IR filament sensor.

  ⚠ **Be careful** with the IR filament sensor, hold it by its sides. Try not touching the components on the PCB. **Keep it in an ESD-safe place.**
- Release both M3x40 screws on the front, just few turns to create about 0.5cm (0.2inch) gap in the extruder body.
- Release and remove all screws holding the Hotend fan on the side. **Remove the fan**. We need to reach a screw behind the fan.

STEP 8 Extruder-body disassembly





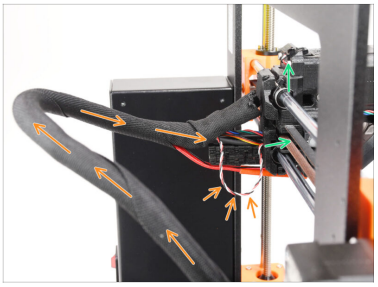
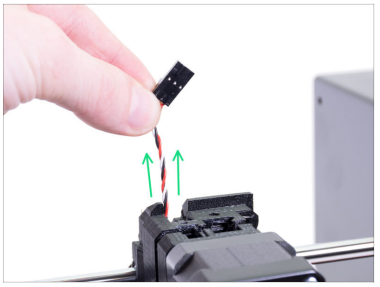
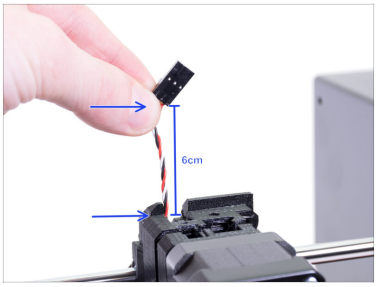
- Release and remove the M3x40 screw on the back holding the Extruder-idler on the side.
- Remove the Extruder-idler from the printer.
- Remove the other M3x40 screw on the back.

⚠ From now on, try keeping the extruder parts together as it can easily fall apart while it's not being held together by the screws!

- Using an Allen key, push the black **Adapter-printer part** up. Keep in mind there is a steel ball inside, which usually falls out. Remove the part entirely.

  ⓘ We will replace Adapter-printer part with a new part.

STEP 9 IR Filament sensor cable

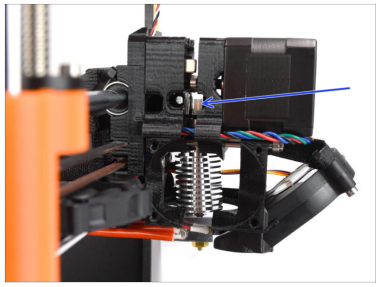
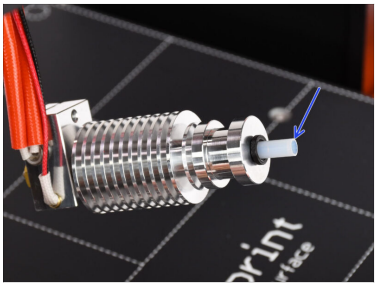
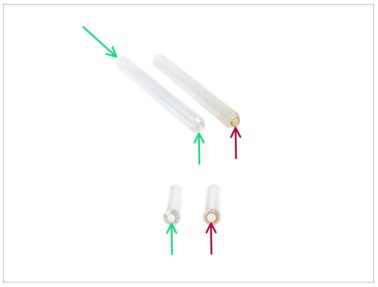




- Find the IR filament sensor cable inside the cable bundle and move it from the electronics box towards the extruder slightly.
- Grab the wires of the IR filament sensor cable and try gently pulling it up to the top of the extruder.

  ⚠ Don't pull hard on the cable.

  - **Push** the cable towards the extruder from the electronics box, while you are **pulling** the cable on top. This way, the cable should slide without a significant resistance.
  - Combine **gentle** pushing and pulling on the cable to avoid damage.
- We aim to get **6cm (2.4in) of the cable** above the top of the extruder body.

STEP 10 Hotend PTFE tube INFO

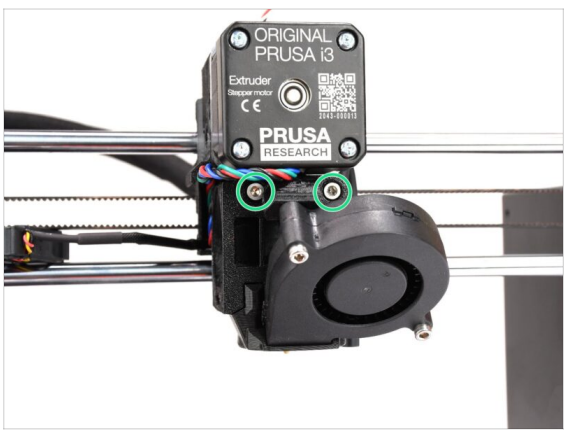
VERY IMPORTANT INFO! READ CAREFULLY!!

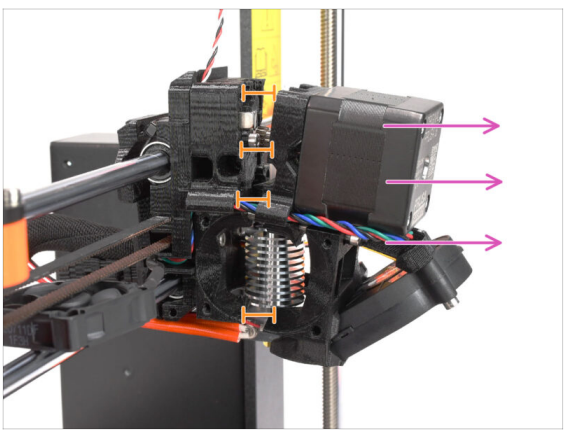
- There is a short PTFE tube inside the extruder's hotend. It plays a **major role** in the MMU operation. This tube cools down a molten filament tip to form a narrow sharp end on it, while the MMU does a material change.

  The tube is considered a consumable as it wears down over time during the regular use. Therefore, it should be replaced once in a while, after the printer went over certain amount of material changes. We strongly recommend replacing it now, since the extruder is partly disassembled already.

  - A new hotend PTFE tube has a 1.85mm internal diameter. *If your printer is new or very lightly used, you can skip the PTFE replacement in the upcoming steps and proceed to "**Adapter-printer parts preparation.**"*
  - The specimen on the right, however, was taken off a printer after approx. 20000 material changes, using a high-temperature abrasive filament that wore down the tube's bore up to 2.4mm. This caused increased stringing and malformed filament tips, leading to frequent MMU filament loading problems on that machine. The worn PTFE tube needed replacement.

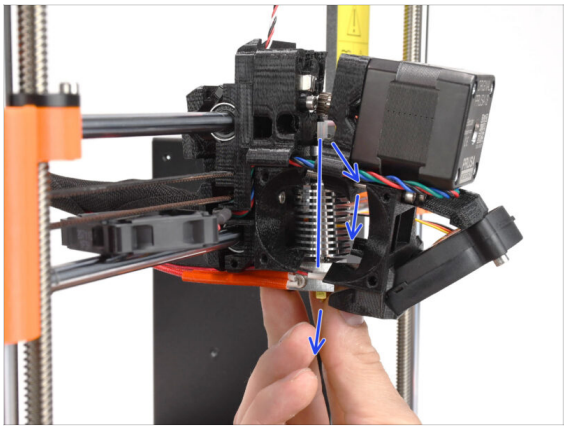
STEP 11 Splitting the extruder

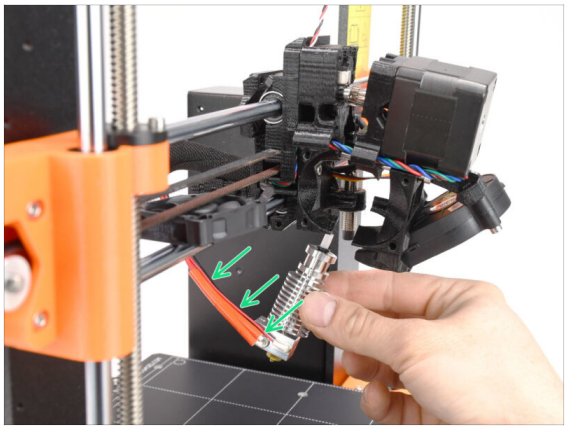




- Release both M3x40 screws at the front, just below the extruder motor. Don't remove them completely. We will use them to hold the extruder parts together.
- Carefully split the extruder apart by pulling the front out.
- Create approx. a 1cm (0.5in) gap similar to the one seen in the picture.

STEP 12 Partial extruder disassembly



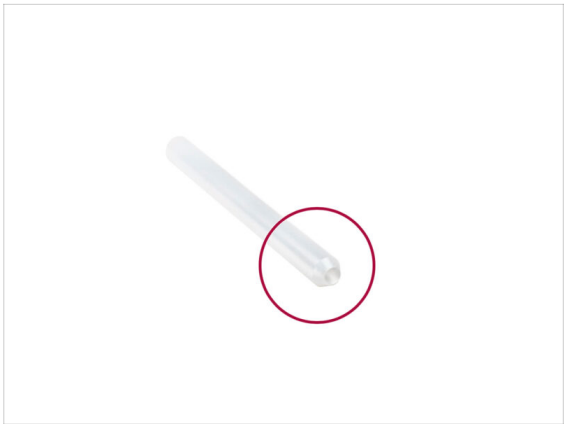


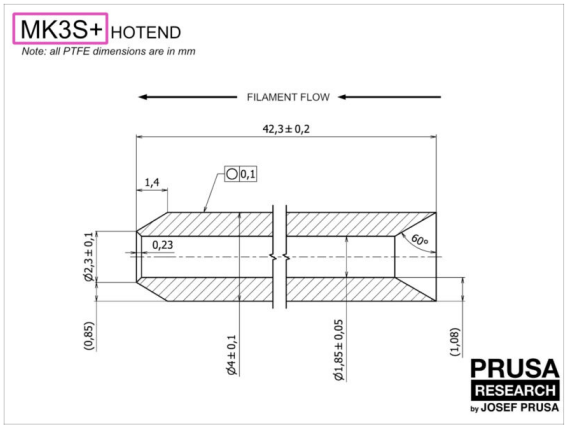
- Reach for the hotend and incline its upper part towards the motor. Wiggle it to slide it down.

ⓘ If the hotend is still stuck inside, release the screws below the motor some more to increase the gap between the printed parts.

- **BE EXTRA CAUTIOUS** with the hotend cables!!! You can break them! Use a reasonable force to pull the hotend out. Don't bend the cables too much.

STEP 13 PTFE tube parts preparation

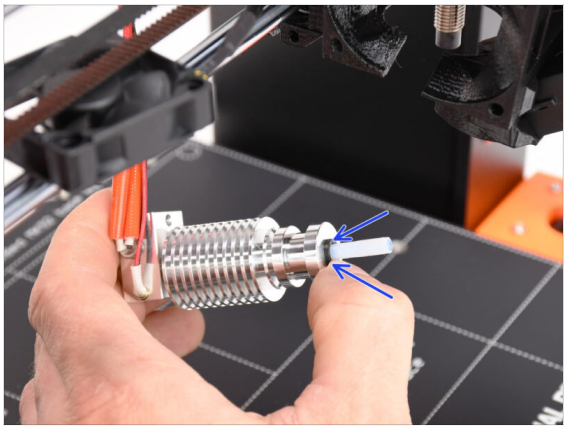


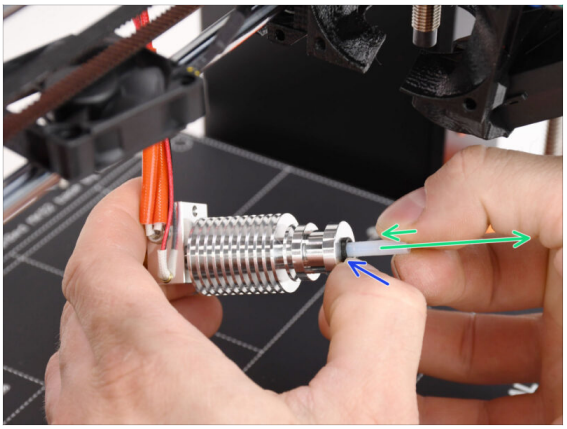


- **For the following steps, please prepare:**
- Hotend PTFE tube (1x)
  - PTFE for MK3S+ is 42.3mm long, 1.85mm ID, 4mm OD, inner chamfer on one side, outer chamfer on the other.

ⓘ The bundled PTFE tube is intended for MK3S+ only. The PTFE tubes for MK3S and MK3S+ differ in length.

STEP 14 Old PTFE tube removal

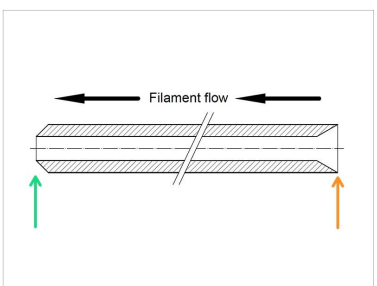


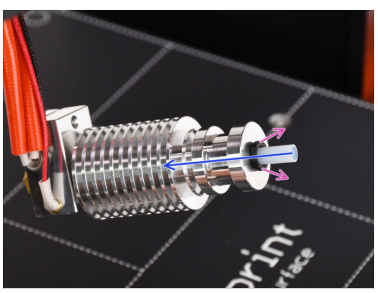


- Press the black plastic collet.
- Remove the PTFE tube from the hotend.
  - **While the black collet is still pressed down, push the PTFE tube in and then pull it out.** This way, you will disengage the small metal hooks inside the black collet first. If you force the PTFE tube out without the hooks properly disengaged, the PTFE tube can jam inside.

⚠ **Throw the worn-out PTFE tube immediately to the nearest trash** bin to avoid installing it back by accident ;)

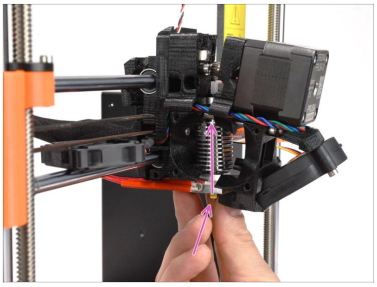
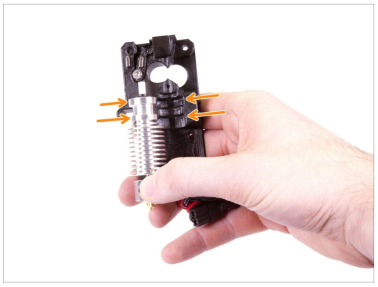
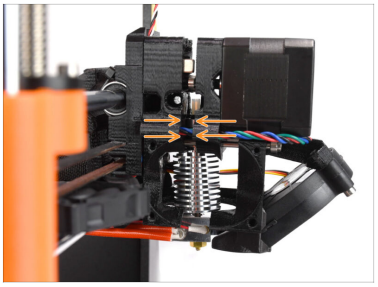
STEP 15 New PTFE tube installation





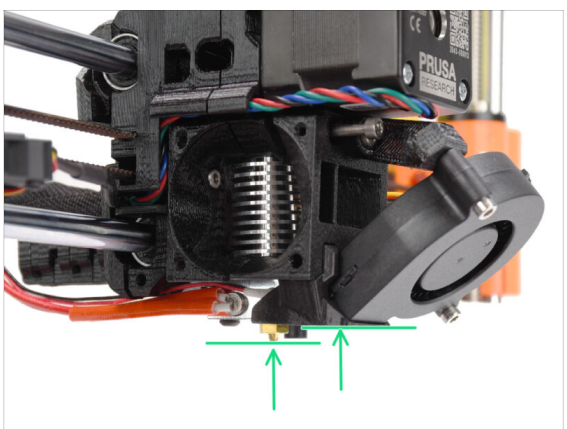
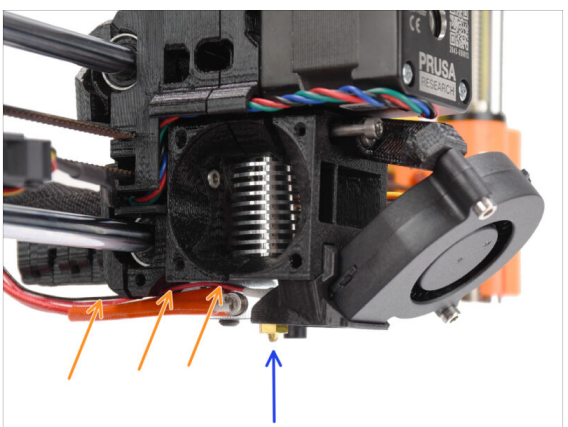
- Now it is time to insert the new PTFE tube. Note, that each end of the tube is different.
- One end of the tube has an **outer chamfer**. This end must be inside the hotend.
- The other side has an **inner chamfer**. This conical shape is the filament entry. This part must be outside the hotend.
- Push the PTFE tube in. Slide it all the way in and hold it!
- Using your other hand **pull the collet out** while you keep pushing the PTFE tube in. **THIS IS CRUCIAL** for the hotend to work properly.
- After you finish inserting the new PTFE tube, check that the whole hotend is tightened up and nothing got loose during the process.

STEP 16 Extruder reassembly (Part 1)

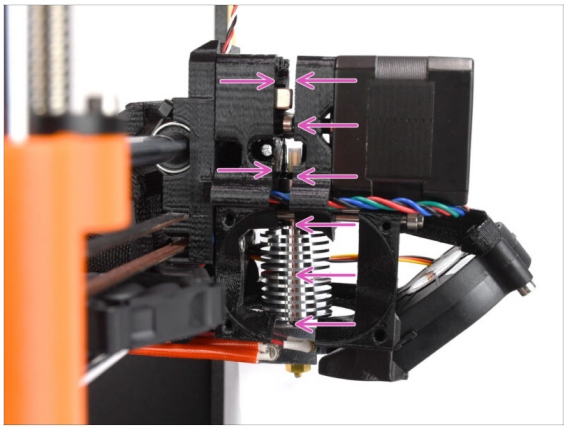
- Re-insert the hotend back into the extruder. Ensure its orientation is the same as seen in the picture.
- **IT IS CRUCIAL** to ensure the hotend is fitted properly in the extruder-body!!! The top of the hotend must fit into the correct recesses in the printed parts. See the second and the third picture for a reference!

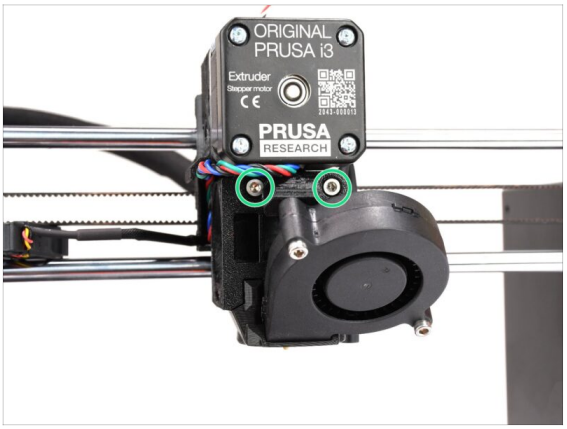
STEP 17 Extruder reassembly (Part 2)

- **Check once again the correct position of the hotend.** Look from below the extruder. The heater block should be oriented as seen in the picture. Perpendicular to the printed parts, with the cables pointing to the back.
- Guide the thermistor cables **above** the thick heater cables.
- Take a look from the side of the extruder. The nozzle should be slightly below the printed fan-shroud.
  If it is significantly lower than in the picture, your hotend isn't inserted correctly.

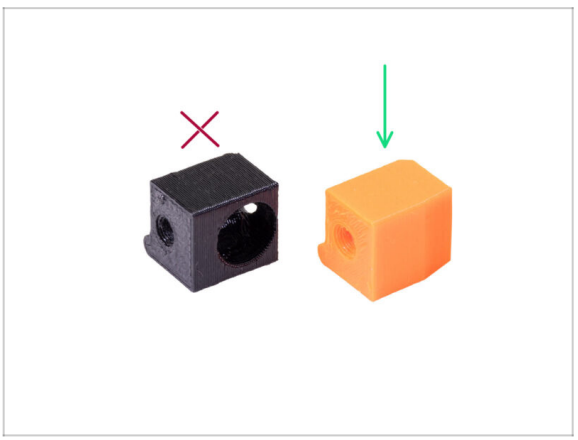
STEP 18 Extruder reassembly (Part 3)





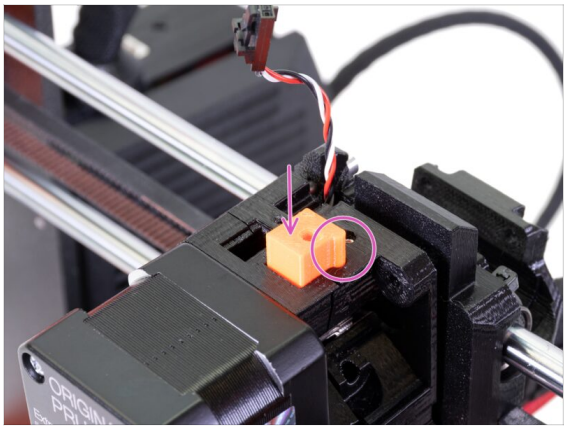
- Carefully and slowly push all the parts together.
- ⚠ **In case of any significant resistance STOP** immediately and check, which part is blocking the movement.
- Tighten the two M3x40 screws on the front of the extruder slightly - just so that the extruder parts are held closer together. We will tighten the screws fully later on.

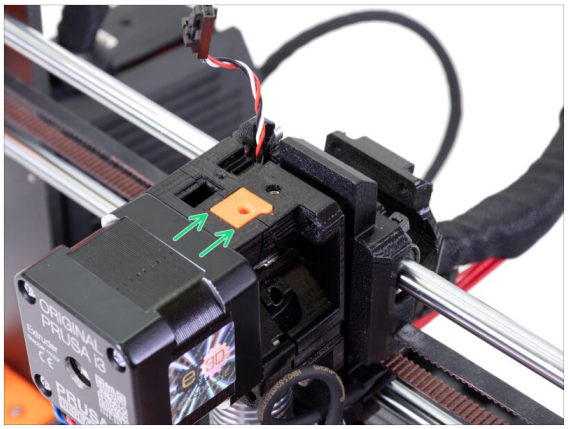
STEP 19 Adapter-printer parts preparation



- **For the following steps, please prepare:**
- Adapter-printer-mmu (1x)
- ⚠ The package should include only the orange adapter. If you have printed parts yourself, please **don't use the version with the hole for steel ball.** (used for single-material printers)

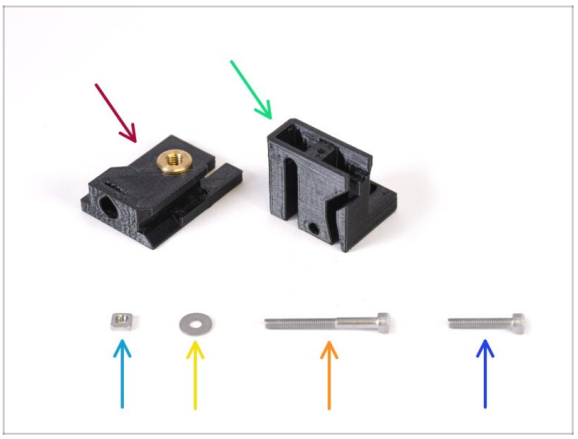
STEP 20 Adapter-printer assembly





- Insert the Adapter-printer into the opening on top of the extruder-body. See the protrusion, it must fit into the groove.
- Push it down until it's flush with the surface.

STEP 21 New chimney: parts preparation

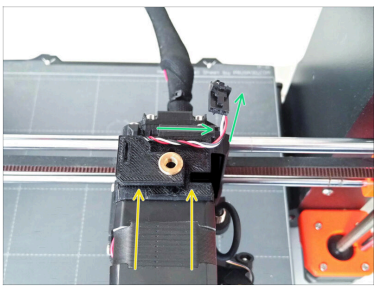


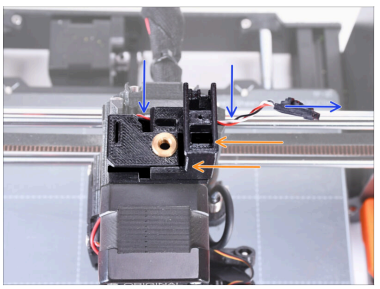
- **For the following steps, please prepare:**
- Chimney base (1x) with the Tappex Microbarb 0006-M5 threaded insert
- Chimney (1x)
- M3nS nut (1x)
- M3 washer (1x)
- M3x30 screw (1x)
- M3x18 screw (1x)

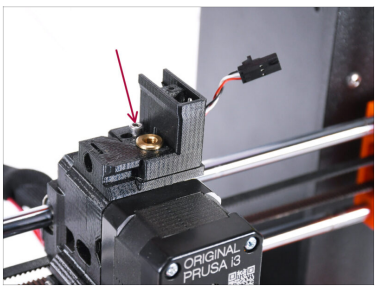
STEP 22 New chimney assembly (Part 1)

- Take the Chimney part and orient it as seen in the picture.
- Insert the M3nS nut into the marked opening on the bottom of the printed part.

STEP 23 New chimney assembly (Part 2)

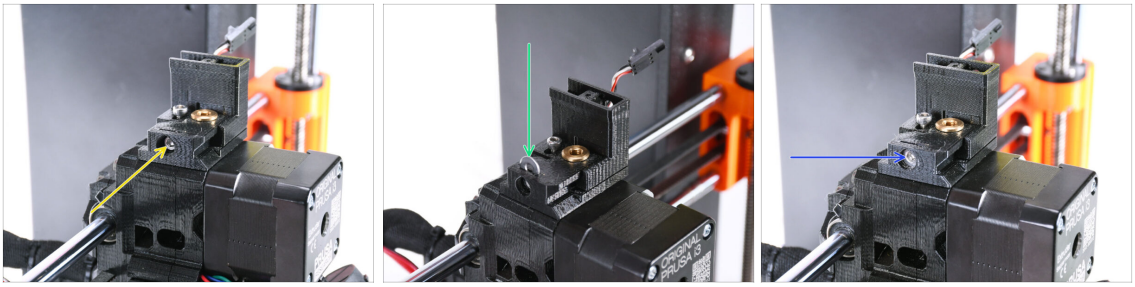






- Add Chimney base onto the extruder. Note the correct orientation on the picture.
- Make sure the cable is above the Chimney base and oriented as seen in the picture.
- Slide the Chimney onto the base part from the right side.
  - Make sure the cable goes through the channel on the bottom of the Chimney base and goes out on the right side.
- Fix the parts together by M3x18 screw. Tighten it up just so that the parts hold on the extruder. Don't tighten it up fully yet. We will need to move the parts later on.

STEP 24 New chimney assembly (part 3)



- Insert the M3x30 screw into the marked opening on the side of the Chimney Base. Screw it in until it pulls the chimney all the way in.

  ⚠ Stop tightening after you feel a slight resistance. Do not over-tighten the screw!

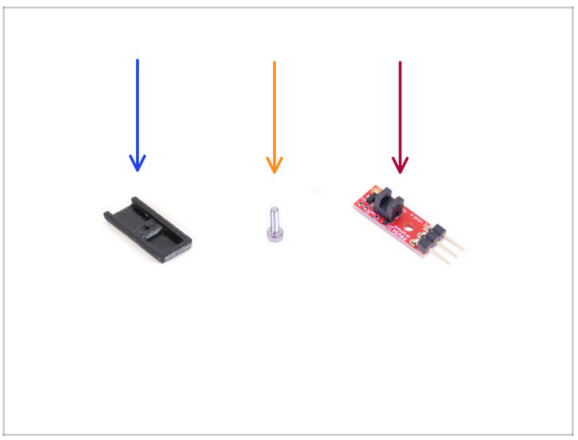
- Insert the M3 washer into the marked opening on top of the Chimney Base.

  Push it all the way in so that it locks the screw head in place.

  ⚠ Make sure **the screw head is behind the washer.** This way, you will be able to move the chimney precisely in both directions, by rotating the screw.

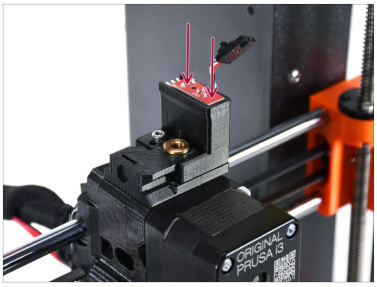
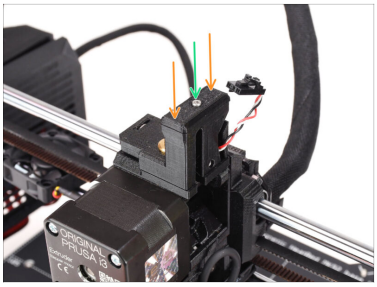
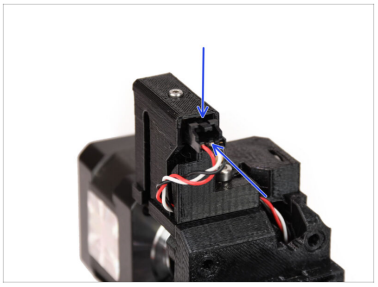
- Using the 2.5mm Allen key, adjust the position of the washer so that it is centered and you can reach the screw head underneath later on.

STEP 25 IR Filament sensor: parts preparation



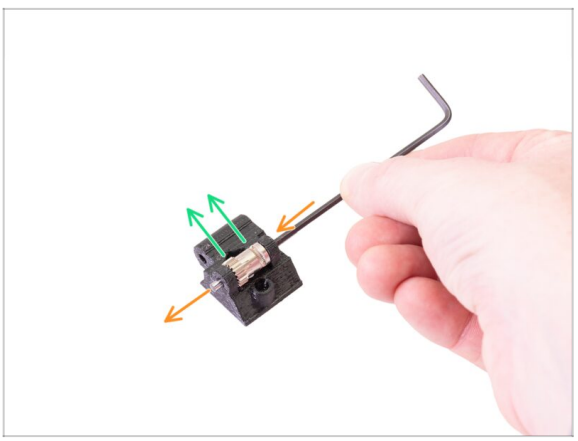
- **For the following steps, please prepare:**
- Chimney cover (1x)
- M2x8 screw (1x) you removed from the printer earlier
- Prusa IR filament sensor (1x) you removed from the printer earlier

STEP 26 IR Filament sensor assembly

- Attach the IR filament sensor onto the top of the chimney.
  - ⚠ Make sure the electronic components on the sensor board are facing down and the three connection pins are in the back.
- Add the cover onto the sensor.
- Using the 1.5mm Allen key, lock the cover in place with the small M2x8 screw.
- Look at the back of the extruder. Connect the cable to the filament sensor.
  - ⚠ Make sure the safety latch on the connector is pointing up and the connector aligns with the pins.
  - ⚠ If you plug the connector incorrectly, you can damage the eletronics!!!

STEP 27 Extruder-idler disassembly



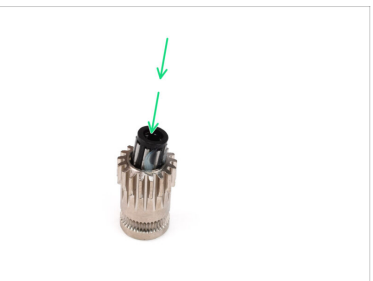
- Now, take the **Extruder-idler part** you removed from the extruder earlier. We need to get the Bondtech gear, the bearings and the shaft out of it.
  - ⓘ The printed part will be replaced with a new one.
- Using a 2.5mm Allen key, push the shaft out. Keep it for later use.
- Take the Bondtech gear out, **BUT BE CAREFUL**, there are two bearings inside. Don't lose them!!!

STEP 28 Extruder-idler-mmu parts preparation



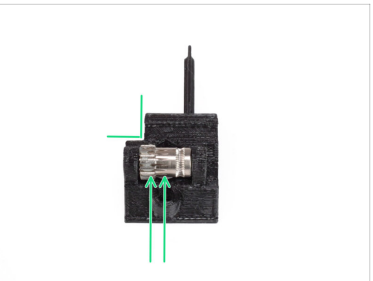
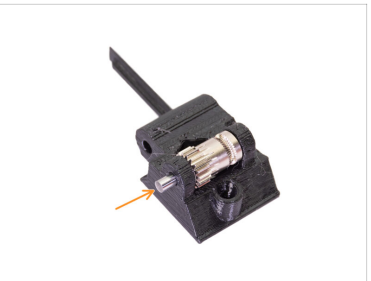
- **For the following steps, please prepare:**
- Extruder-idler-mmu (1x)
  - ⓘ Make sure you're using the correct new part.
- Bondtech gear (1x) *you have removed from the original idler before.*
- Needle Bearing (2x) *you have removed from the original idler before. Might still be inside the gear.*
- M3n nut (1x)
- Shaft (1x) *you have removed from the original idler before.*
- PrusaLube (1x) the supplied lubricant

STEP 29 Bearing assembly & Greasing



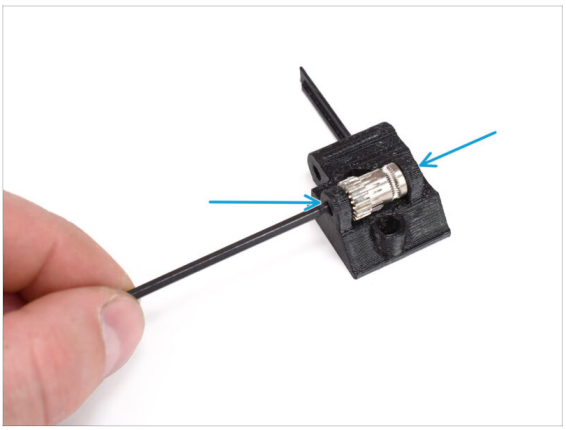

- Add a **tiny bit of lubricant** into the needles in both of the bearings. Wipe off the excess grease to prevent spreading it all over the place.
- **Insert both bearings** into the Bondtech gear. Make sure the bearings do not slip out during the assembly.
- Add a tiny bit of lubricant into the **geared part** of the Bondtech gear.
  - Make sure the lubricant doesn't get into the filament groove.
  - ⚠ Do not use excessive amount of lubricant. Just a tiny bit will do.

STEP 30 Extruder-idler-mmu assembly (Part 1)

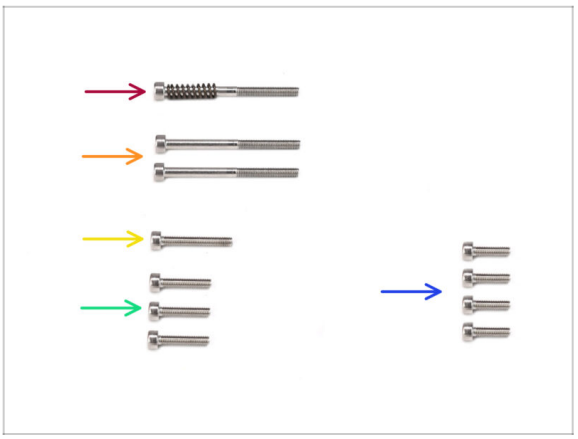
- Take M3n nut and place it in the Extruder-idler-mmu2s.
  - ⓘ Use the screw pulling technique.
- Insert the Bondtech gear into the idler as shown in the picture. Make sure the geared part of the Bondtech is on the side of the plastic part with the cutout.
- Slide the shaft in through the idler and the Bondtech gear. Use reasonable force to prevent breaking the plastic part.

STEP 31 Extruder-idler-mmu assembly (Part 2)



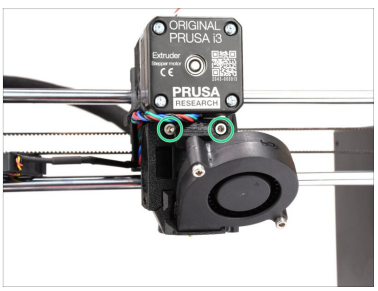

- Using the 2.5mm Allen key, push the shaft in so that it is inserted evenly on both sides.
- Ensure the Bondtech gear is able to rotate freely.

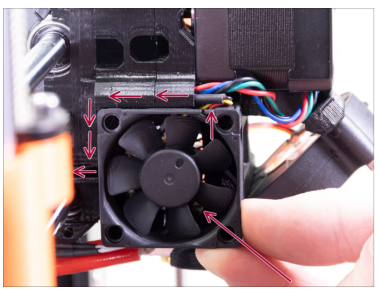
STEP 32 Extruder fasteners parts preparation

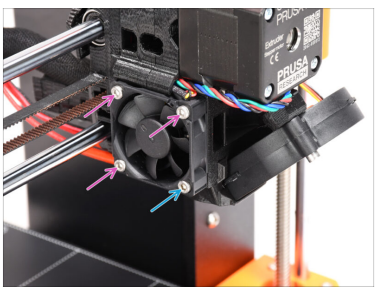


- **For the following steps, please prepare:**
- M3x40 screw with spring (1x) (Extruder Idler tension screw. *Might be still in the extruder.*)
- M3x40 screw (2x)
- M3x20 screw (1x) (Extruder fan bottom corner)
- M3x14 screw (3x) (Extruder fan)
  - ⓘ There were two versions of the Extruder fan supplied. Most printers have Noctua fan, but if you have Delta fan, there are slightly different M3x16b and M3x22b screws. Use the screws you removed from the fan earlier.
- M3x10 screw (4x) (x-carriage-back)

STEP 33 Extruder reassembly

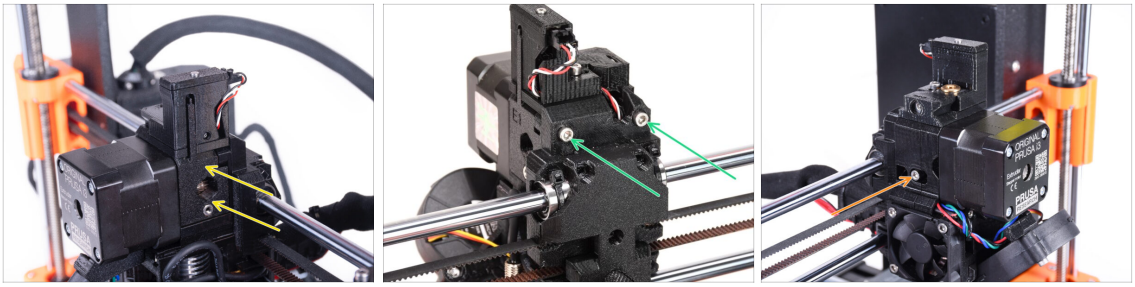






- Fully tighten the two M3x40 bolts at the front of the extruder.
- Add the fan to the extruder and push it to the back. There are cables behind the fan. You can GENTLY push the cables into the dedicated channel using an Allen key.
  - ⚠ Before you proceed to attach the fan, make sure all the cables are inside the channel.
  - ⚠ **The fan has two sides**, one has a sticker with markings on it. Make sure, this side is facing to the inside of the extruder.
- Fix the fan using the following screws (depending on the fan version):
  - **M3x14** / M3x16b screw (3x)
  - **M3x20** / M3x22b screw (1x) in the bottom corner.

STEP 34 Extruder-idler-mmu installation

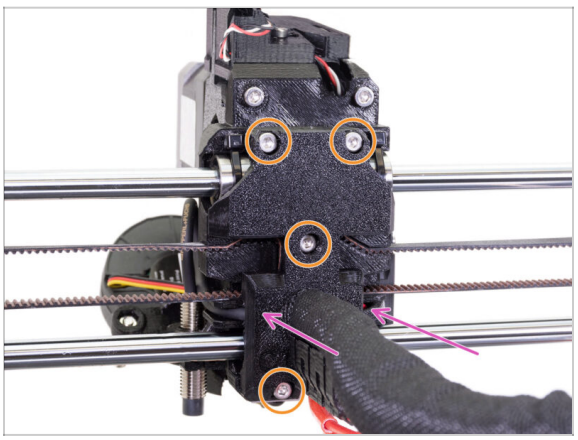


- Add the Extruder-idler-mmu onto the extruder.
- Add two M3x40 screws into the openings at the back of the extruder. Tighten them up slightly.

  ⚠ Do not overtighten the screw holding the extruder-idler part. Otherwise, the idler won't be able to move freely.
- Add the M3x40 Idler tension screw **with the spring** into the opening on the left side of the extruder.

  ⓘ Hold the idler with one hand while you tighten the tension screw from the other side. The screw head should be aligned or slightly below the surface. That way, the idler is pulled with the correct amount of force.

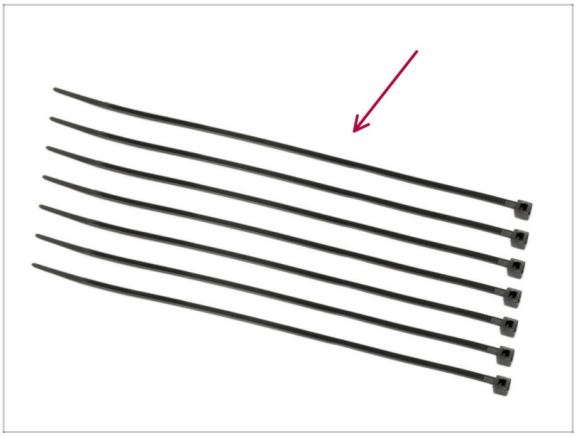
STEP 35 X-carriage-back reassembly



- Now, look from the back of the extruder. Gently push the X-carriage-back part in towards the extruder. Ensure no wires are pinched between both parts and that the cables engage into the dedicated channels properly!
- Tighten all four M3x10 screws.

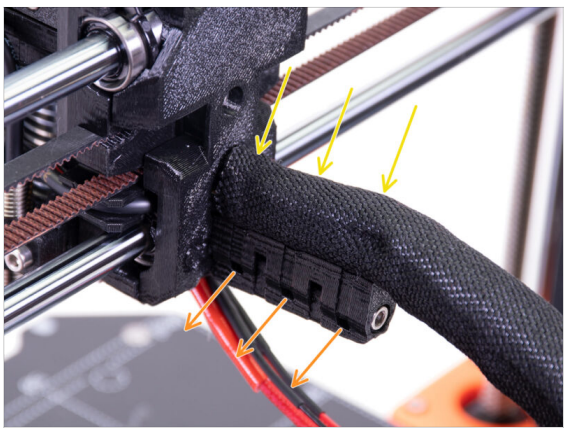
  ⚠ **Tighten the screws with a reasonable force.**
  In case the top two screws are tightened up excessively, the top two bearings will resemble a V-shape, the axis won't be able to move correctly and the top X-axis rod will get damaged. Tighten the top screws just lightly. Remember, the top two bearings are secured by the zip-ties - so the top two screws do not have to be overly tight.

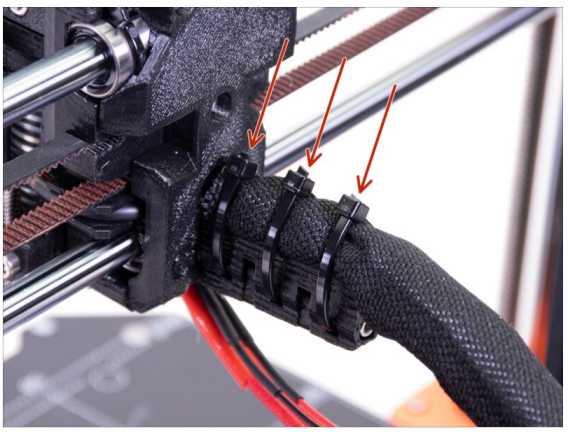
STEP 36 Zip-Ties!



- **For the following steps, please prepare:**
- Zip tie (7x)

STEP 37 Tightening the textile sleeve

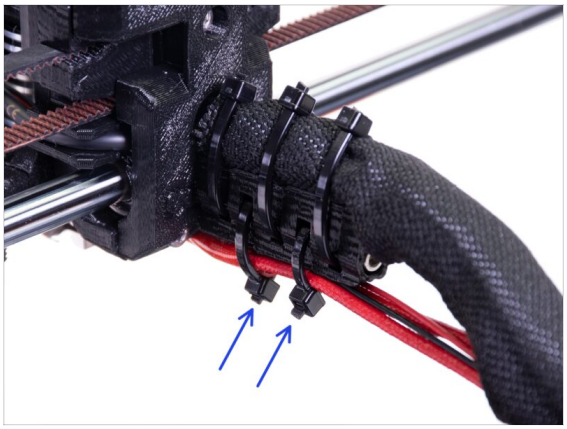


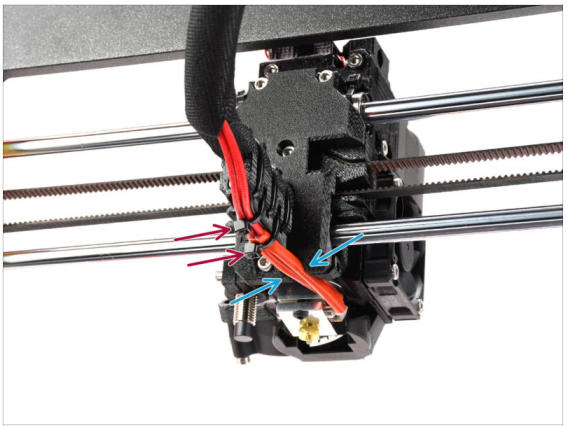


- Gently twist the sleeve to tighten it up around the cables. Slide the sleeve towards the extruder.
- Take **3 zip-ties** and insert them into the **lower row** of holes on the cable-holder.
- Tighten up the sleeve around the cable bundle (without twisting the cables inside). Hold it tight while you fix it in place with 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 (pointing up)

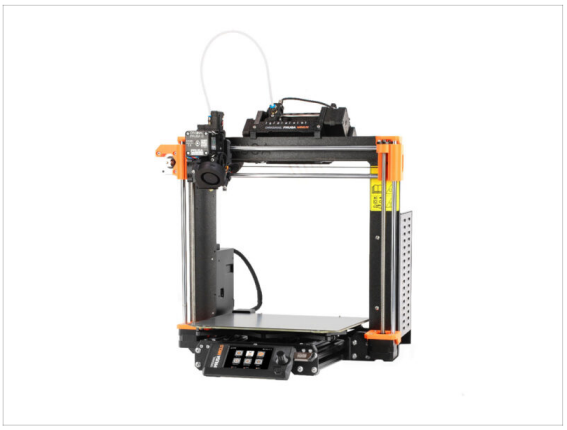
STEP 38 Attaching the hotend cables





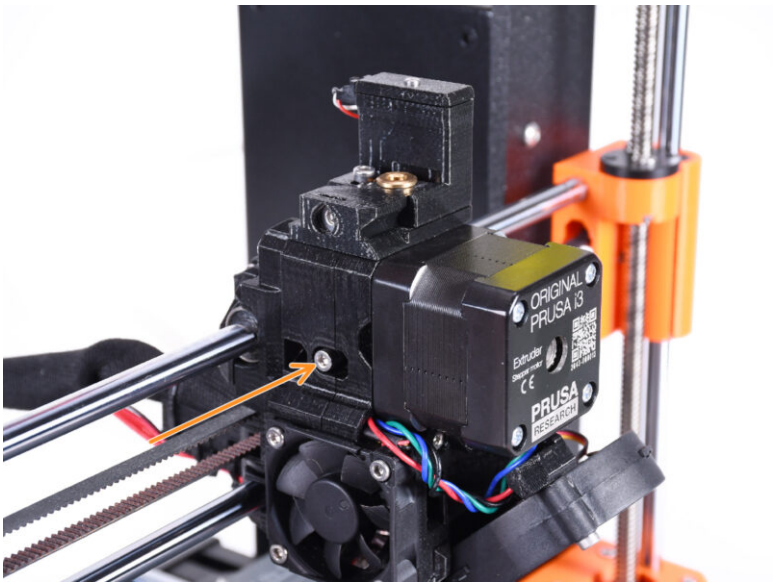
- Push two zip-ties through the upper slots on the cable-holder. Tighten the zip-ties up slightly around the hotend cables.
- Arrange the cables from the hotend into the dedicated channel on the bottom.
- Tighten up the zip-ties and cut the remaining parts of the zip-ties.

STEP 39 Continue



- If you're installing the MMU3 on an **MK3S+** printer, move to the chapter:
  - **MK3S+ Setup and Calibration**
- If you're installing the MMU3 on an **MK3.5** printer, move to the chapter:
  - **MK3.5 Setup and Calibration**

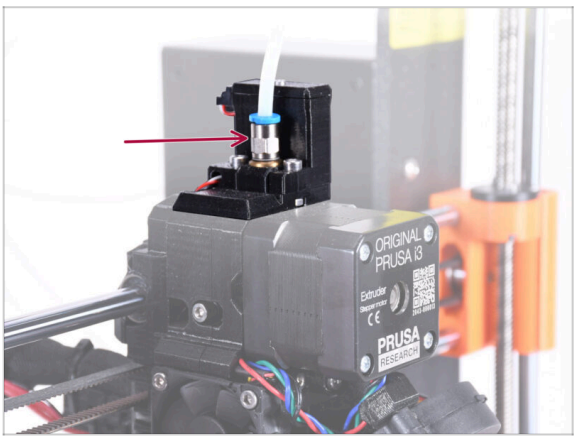
9C. MK3S+ Extruder (UPG)



STEP 1 Tools necessary for this chapter

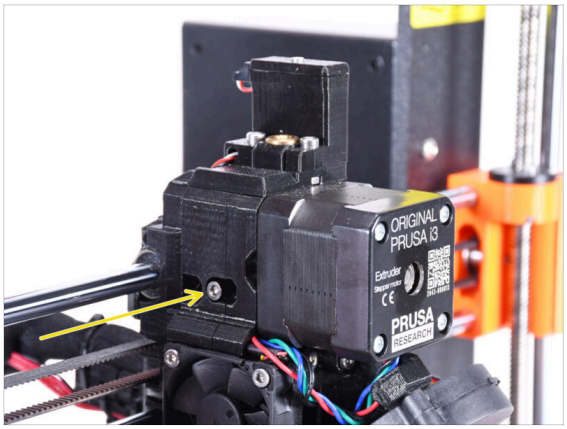
- **Please prepare tools for this chapter:**
  - 1.5mm Allen key
  - 2.5mm Allen key for M3 screws

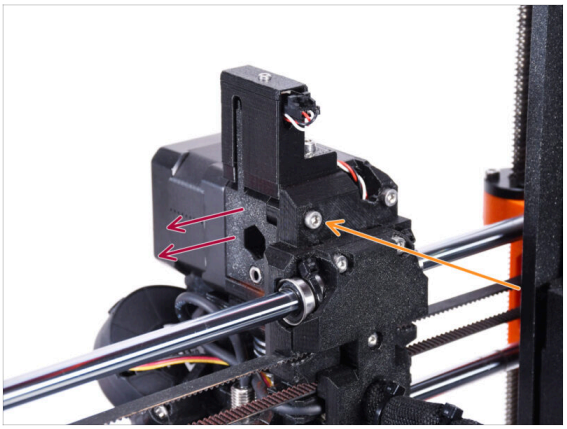
STEP 2 Introduction



- Your MMU unit is now ready. In the following steps, we will work on the extruder. Namely, the filament sensor inside the "chimney".
- First, make sure the extruder PTFE tube with the fittings is removed from the printer.

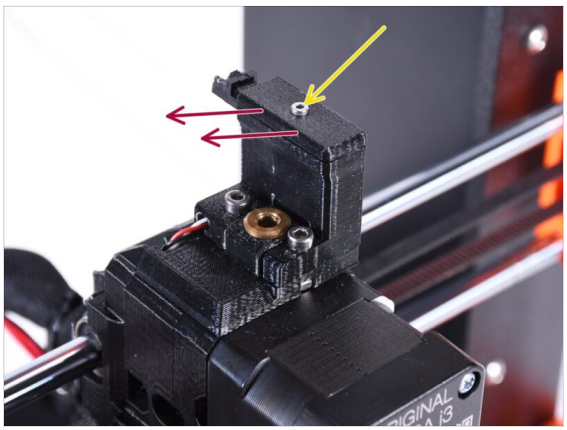
STEP 3 Old chimney disassembly (part 1)

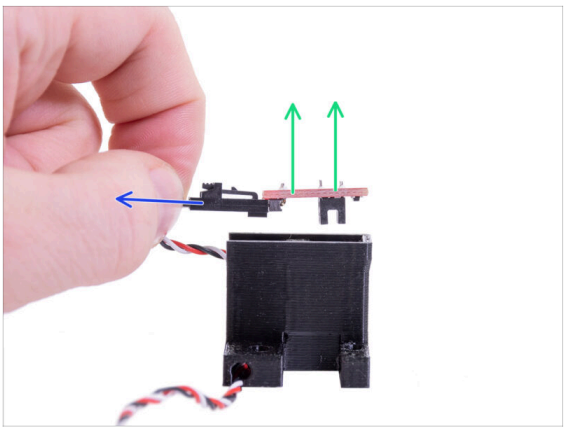




- Remove the M3x40 idler tension screw with the spring and set it aside for later use.
- Remove the M3x40 screw from the back of the extruder.
- Remove the idler door.

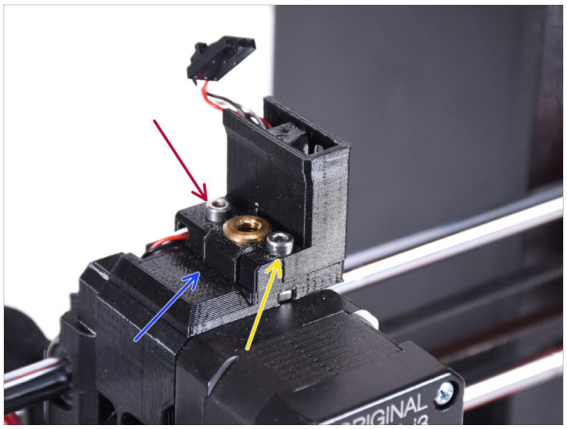
STEP 4 Old chimney disassembly (part 2)

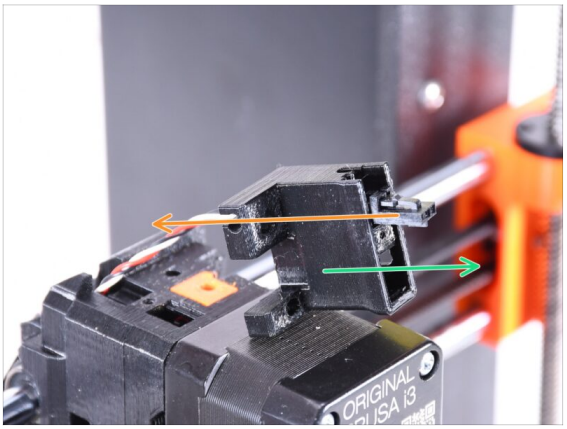




- Using the 1.5mm hex key, remove the M2x8 screw and set it aside for later use.
- Remove the cover. Set it aside so that it won't mix up with the new parts.
- Disconnect the plug from the IR Filament sensor.
- Remove the IR Filament sensor and set it aside for later use.

STEP 5 Old chimney disassembly (part 3)

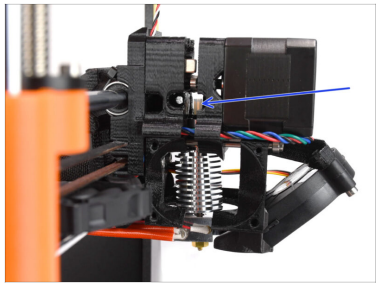
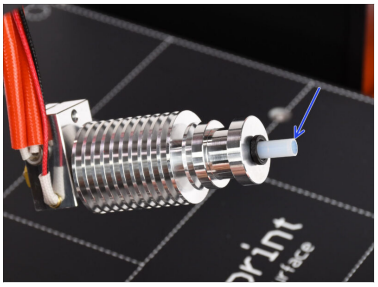
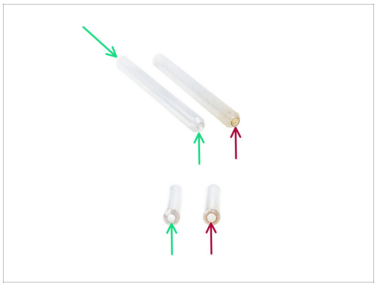




- Remove the M3x18 screw and set it aside for later use.
- Remove the M3x10 screw.
- Remove the old FS-cover and set it aside so it won't mix up with the new parts.
- Pull the cable out From the ir-sensor-holder part.

  ⓘ Note the connector orientation on the picture. This way, the connector will pull out of the part easily without a risk of damaging it.
- Remove the ir-sensor-holder and set it aside so it won't mix up with the new parts.

STEP 6 Hotend PTFE tube INFO

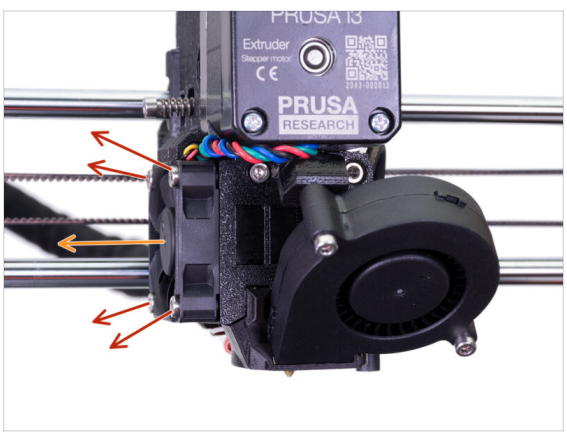
VERY IMPORTANT INFO! READ CAREFULLY!!

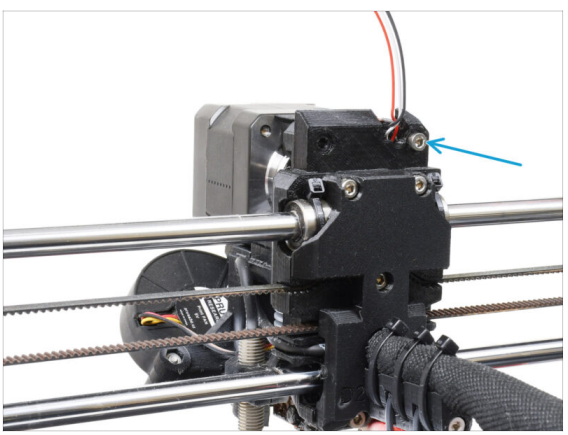
- There is a short PTFE tube inside the extruder's hotend. It plays a **major role** in the MMU operation. This tube cools down a molten filament tip to form a narrow sharp end on it, while the MMU does a material change.

  The tube is considered a consumable as it wears down over time during the regular use. Therefore, it should be replaced once in a while, after the printer went over certain amount of material changes. We strongly recommend replacing it now, since the extruder is partly disassembled already.

  - A new hotend PTFE tube has a 1.85mm internal diameter. *If your printer is new or very lightly used, you can skip the PTFE replacement in the upcoming steps and proceed to "**New chimney: parts preparation.**"*
  - The specimen on the right, however, was taken off a printer after approx. 20000 material changes, using a high-temperature abrasive filament that wore down the tube's bore up to 2.4mm. This caused increased stringing and malformed filament tips, leading to frequent MMU filament loading problems on that machine. The worn PTFE tube needed replacement.

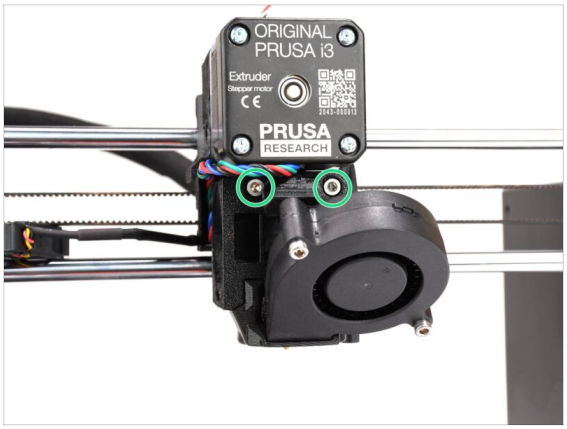
STEP 7 Fan removal

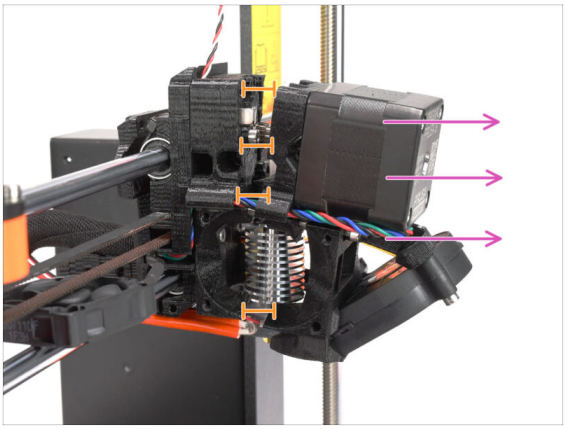




- Release and remove all screws holding the Hotend fan on the side.
- Remove the fan. We need to split the extruder in order to replace the hotend PTFE tube.
- Look at the back of the extruder. Remove the M3x40 screw in the top right corner.

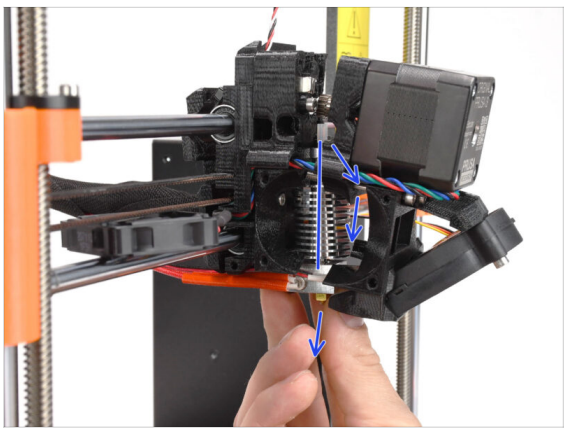
STEP 8 Splitting the extruder

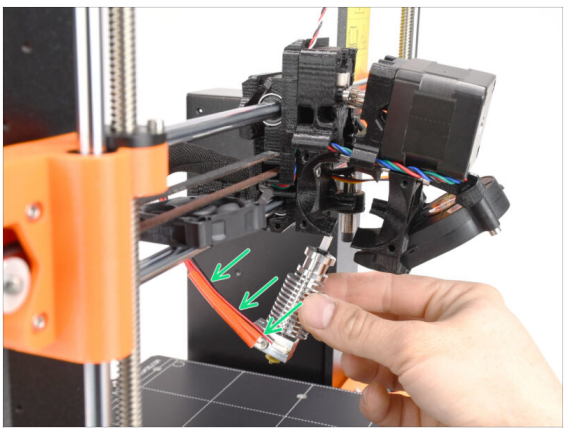




- Release both M3x40 screws at the front, just below the extruder motor. Don't remove them completely. We will use them to hold the extruder parts together.
- Carefully split the extruder apart by pulling the front out.
- Create approx. a 1cm (0.5in) gap similar to the one seen in the picture.

STEP 9 Partial extruder disassembly



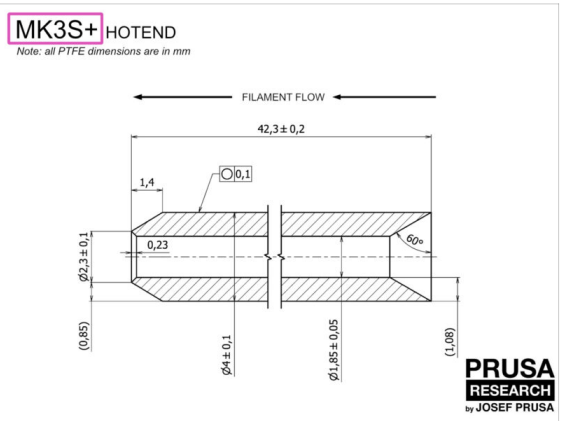


- Reach for the hotend and incline its upper part towards the motor. Wiggle it to slide it down.

ⓘ If the hotend is still stuck inside, release the screws below the motor some more to increase the gap between the printed parts.

- **BE EXTRA CAUTIOUS** with the hotend cables!!! You can break them! Use a reasonable force to pull the hotend out. Don't bend the cables too much.

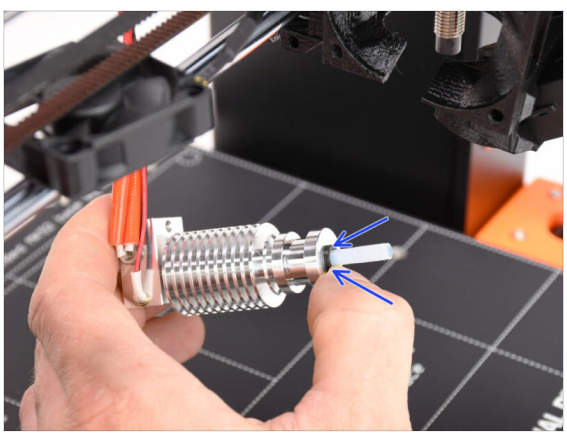
STEP 10 PTFE tube parts preparation

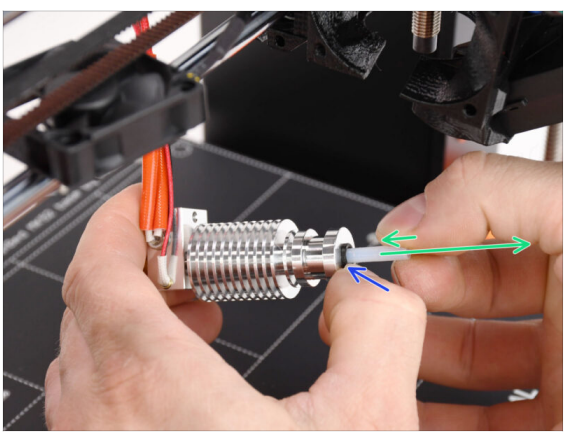


- **For the following steps, please prepare:**
- Hotend PTFE tube (1x)
  - PTFE for MK3S+ is 42.3mm long, 1.85mm ID, 4mm OD, inner chamfer on one side, outer chamfer on the other.

  The bundled PTFE tube is intended for MK3S+ only. The PTFE tubes for MK3S and MK3S+ differ in length.

STEP 11 Old PTFE tube removal

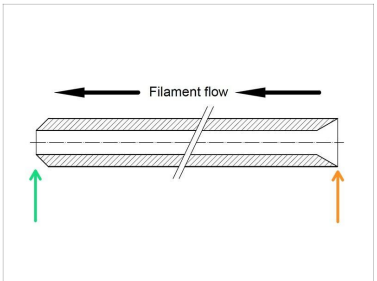


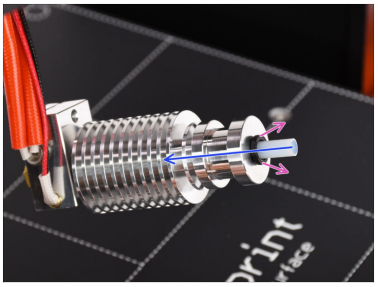


- Press the black plastic collet.
- Remove the PTFE tube from the hotend.
  - **While the black collet is still pressed down, push the PTFE tube in and then pull it out.** This way, you will disengage the small metal hooks inside the black collet first. If you force the PTFE tube out without the hooks properly disengaged, the PTFE tube can jam inside.

Throw the worn-out PTFE tube immediately to the nearest trash bin to avoid installing it back by accident ;)

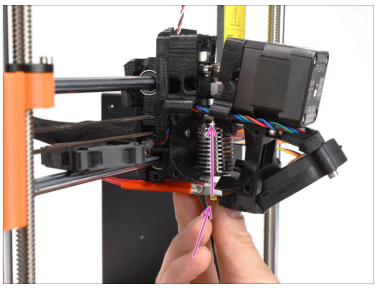
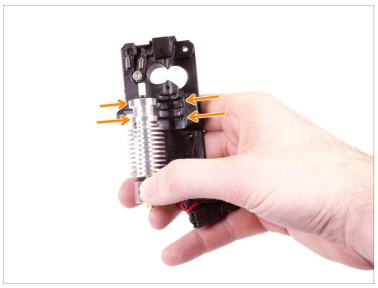
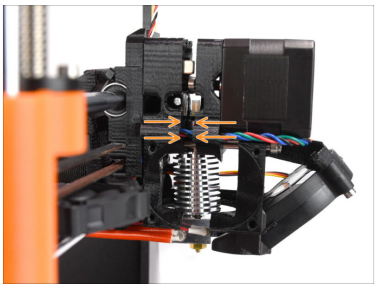
STEP 12 New PTFE tube installation



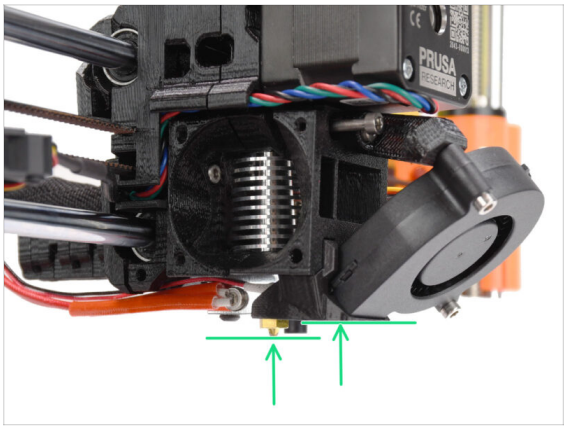
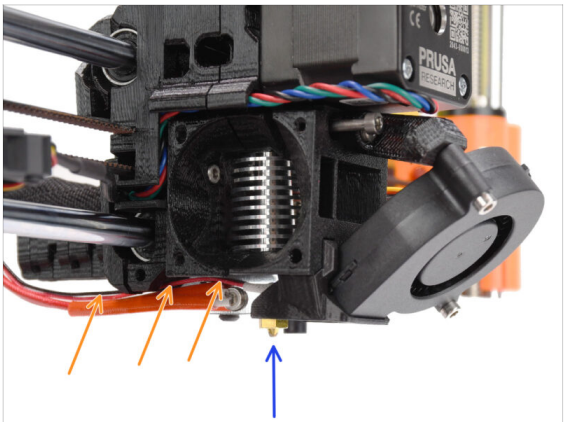
- Now it is time to insert the new PTFE tube. Note, that each end of the tube is different.
- One end of the tube has an **outer chamfer**. This end must be inside the hotend.
- The other side has an **inner chamfer**. This conical shape is the filament entry. This part must be outside the hotend.
- Push the PTFE tube in. Slide it all the way in and hold it!
- Using your other hand **pull the collet out** while you keep pushing the PTFE tube in. **THIS IS CRUCIAL** for the hotend to work properly.
- After you finish inserting the new PTFE tube, check that the whole hotend is tightened up and nothing got loose during the process.

STEP 13 Extruder reassembly (Part 1)

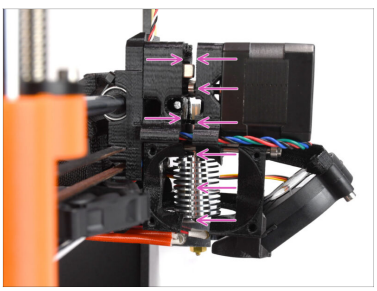
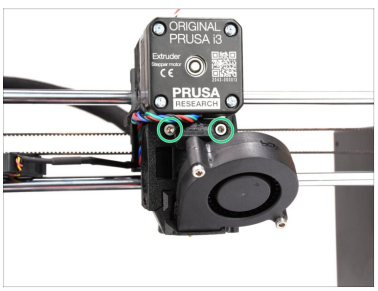
- Re-insert the hotend back into the extruder. Ensure its orientation is the same as seen in the picture.
- **IT IS CRUCIAL** to ensure the hotend is fitted properly in the extruder-body!!! The top of the hotend must fit into the correct recesses in the printed parts. See the second and the third picture for a reference!

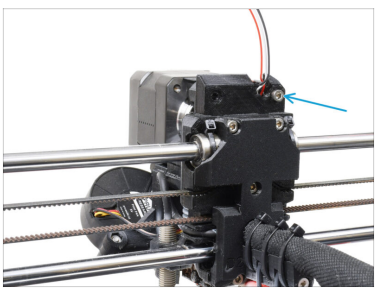
STEP 14 Extruder reassembly (Part 2)

- **Check once again the correct position of the hotend.** Look from below the extruder. The heater block should be oriented as seen in the picture. Perpendicular to the printed parts, with the cables pointing to the back.
- Guide the thermistor cables **above** the thick heater cables.
- Take a look from the side of the extruder. The nozzle should be slightly below the printed fan-shroud.
  If it is significantly lower than in the picture, your hotend isn't inserted correctly.

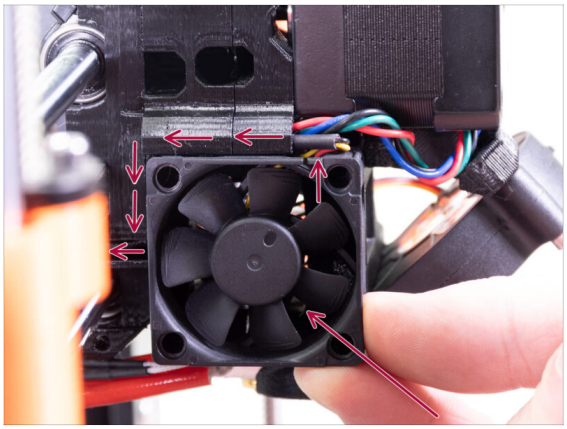
STEP 15 Extruder reassembly (Part 3)

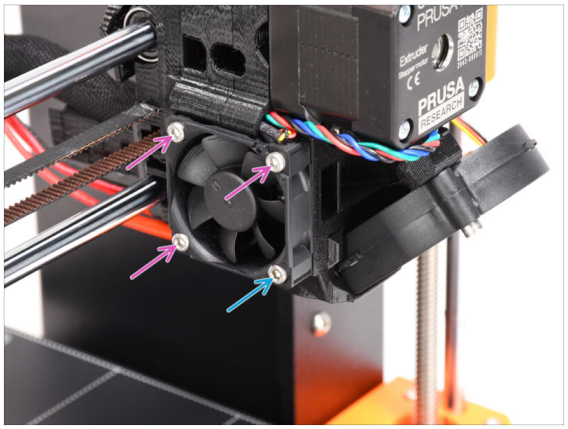





- Carefully and slowly push all the parts together.
- ⚠ **In case of any significant resistance STOP** immediately and check, which part is blocking the movement.
- Tighten the two M3x40 screws on the front of the extruder.
- Now, look at the back of the extruder. Re-insert and tighten up the M3x40 screw on the right.

STEP 16 Extruder fan reassembly





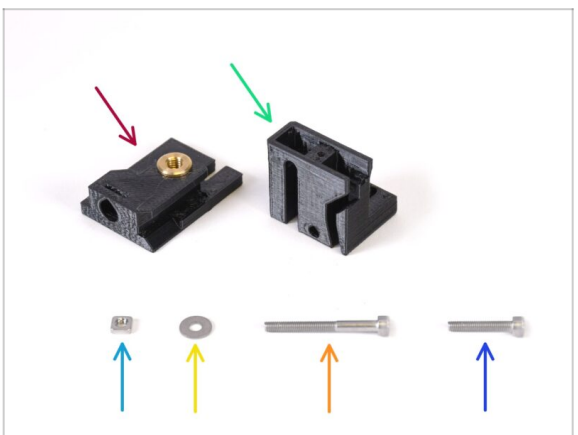
- Add the fan to the extruder and push it to the back. There are cables behind the fan. You can GENTLY push the cables into the dedicated channel using an Allen key. Before you proceed to attach the fan, make sure all the cables are inside the channel.

  ⚠ Before you proceed to attach the fan, make sure all the cables are inside the channel.

  ⚠ **The fan has two sides**, one has a sticker with markings on it. Make sure, this side is facing to the inside of the extruder.

- Fix the fan using the following screws (depending on the fan version):
  - **M3x14** / M3x16b screw (3x)
  - **M3x20** / M3x22b screw (1x) in the bottom corner.

STEP 17 New chimney: parts preparation

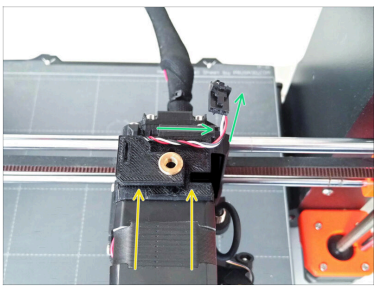


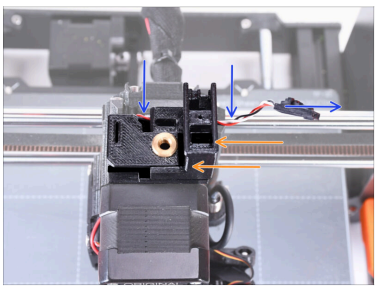
- **For the following steps, please prepare:**
- Chimney base (1x) *with the Tappex Microbarb 0006-M5 threaded insert*
- Chimney (1x)
- M3nS nut (1x)
- M3 washer (1x)
- M3x30 screw (1x)
- M3x18 screw (1x)

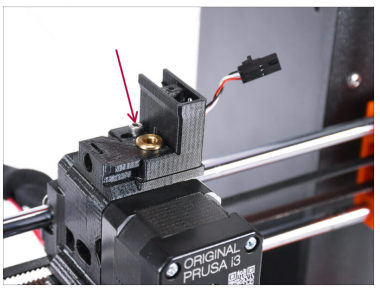
STEP 18 New chimney assembly (part1)

- Take the Chimney part.
- Insert the M3nS nut into the marked opening on the bottom of the printed part.

STEP 19 New chimney assembly (part 2)

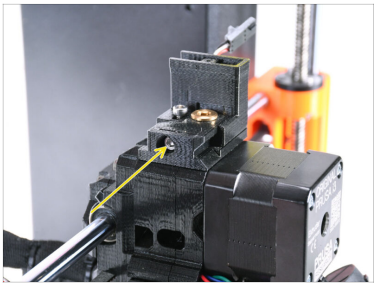
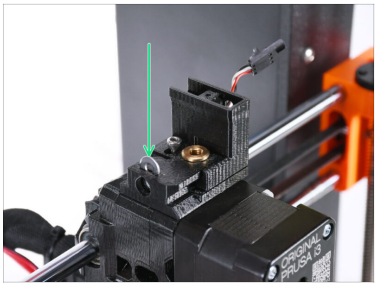
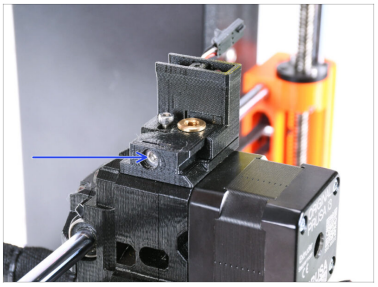






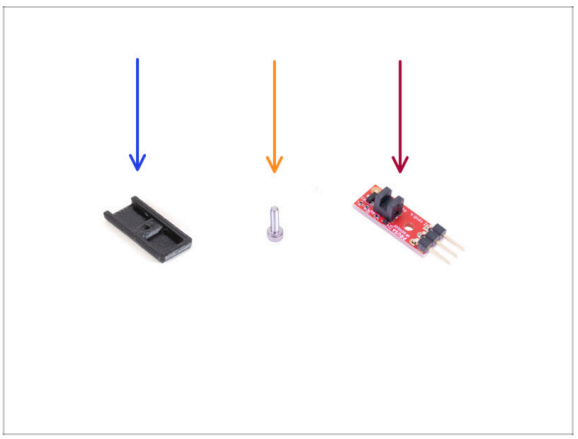
- Add Chimney base onto the extruder. Note the correct orientation on the picture.
- Make sure the cable is above the Chimney base and oriented as seen in the picture.
- Slide the Chimney onto the base part from the right side.
  - Make sure the cable goes through the channel on the bottom of the Chimney base and goes out on the right side.
- Fix the parts together by M3x18 screw. Tighten it up just so that the parts hold on the extruder. Don't tighten it up fully yet. We will need to move the parts later on.

STEP 20 New chimney assembly (part 3)

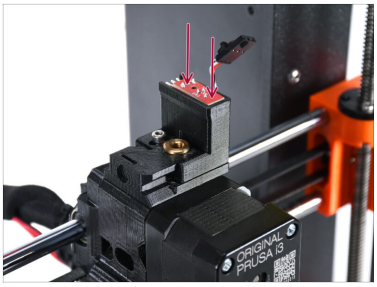
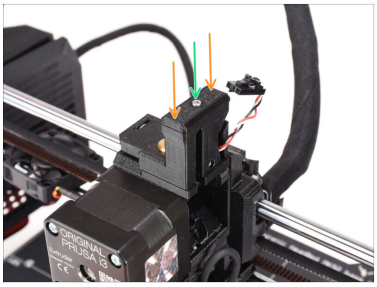
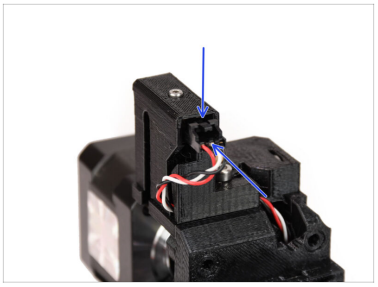
- Insert the M3x30 screw into the marked opening on the side of the Chimney Base. Screw it in until it pulls the chimney all the way in.
- Insert the M3 washer into the marked opening in the Chimney Base. Push it all the way in so that it locks the screw head in place.
- Using the 2.5mm Allen key, adjust the position of the washer so that it is centered and you can reach the screw head underneath later on.

STEP 21 IR Filament sensor: parts preparation



- **For the following steps, please prepare:**
- IR-sensor cover (1x) *The new one*
- M2x8 screw (1x) *you removed from the printer earlier*
- Prusa IR filament sensor (1x) *you removed from the printer earlier*

STEP 22 IR Filament sensor assembly

- Attach the IR filament sensor onto the top of the chimney.

  ⚠ Make sure the electronic components on the sensor board are facing down and the three connection pins are in the back.

- Add the cover onto the sensor.
- Using the 1.5mm Allen key, lock the cover in place with the small M2x8 screw.

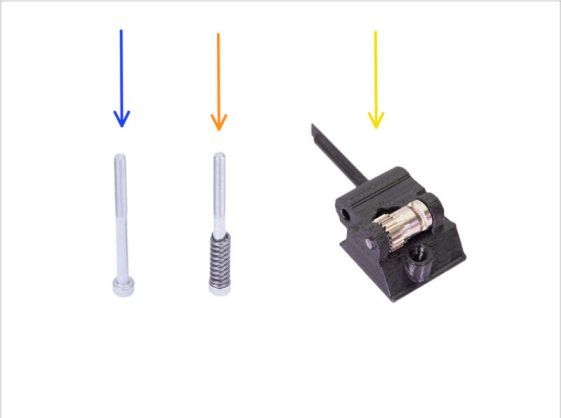
  ⓘ You can add a tiny microscopic bit of lubricant onto the thread so that it screws in more easily.

- Look at the back of the extruder. Connect the cable to the filament sensor.

  ⚠ Make sure the safety latch on the connector is pointing up and the connector aligns with the pins.

  ⚠ If you plug the connector incorrectly, you can damage the eletronics!!!

STEP 23 Extruder-idler-mmu2s parts preparation.

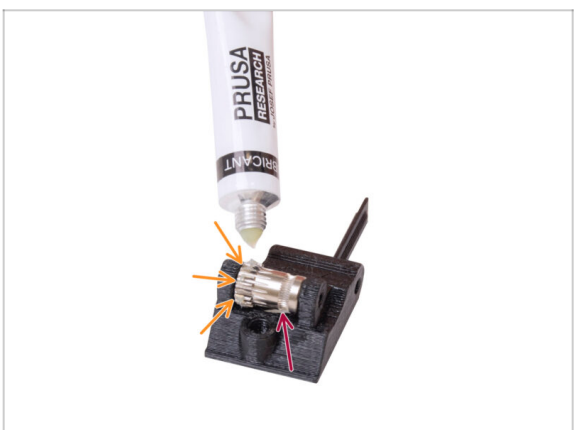


- **For the following steps, please prepare:**
- M3x40 screw (1x) *The one you removed earlier.*
- M3x40 screw with spring (1x) *The one you removed earlier.*
- Extruder-idler-mmu2s (1x) *The one you removed earlier.*

  ⚠ Compare the old plastic part to the new one from the upgrade kit. If it has the exact same shape, use the old one. If the shape differs, you might need to transfer the Bondtech gear and the nut into the new plastic part.

  ⓘ MK3S MMU2S Idler is different than MK3S+ MMU2S / MMU3 Idler and cannot be re-used.
- PrusaLube (1x) the supplied lubricant

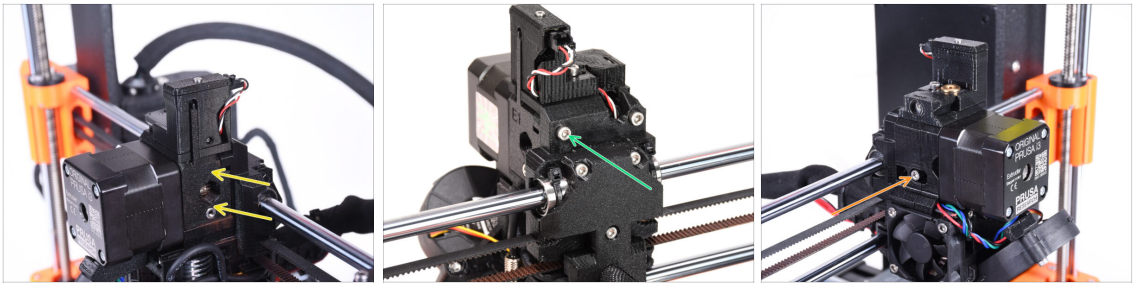
STEP 24 Bondtech lubrication



- Add a tiny bit of lubricant into the **geared part** of the Bondtech gear.
- Make sure the lubricant doesn't get into the filament groove.

  ⚠ Do not use excessive amount of lubricant. Just a tiny bit will do.

STEP 25 Extruder-idler-mmu2s installation.

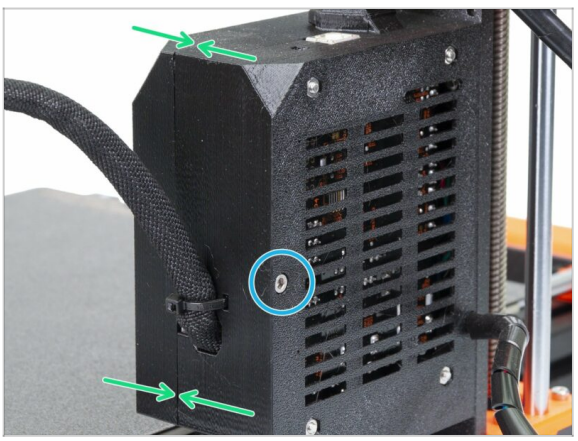


- Install the extruder-idler-mmu2s back onto the extruder.
- Fix the part in place by adding a M3x40 screw into the opening at the back of the extruder. Tighten it up just so that it holds in place.

  ⚠ Do not overtighten the screw. Otherwise, the idler won't be able to move freely.
- Add the M3x40 tension screw **with the spring** into the opening on the left side of the extruder.

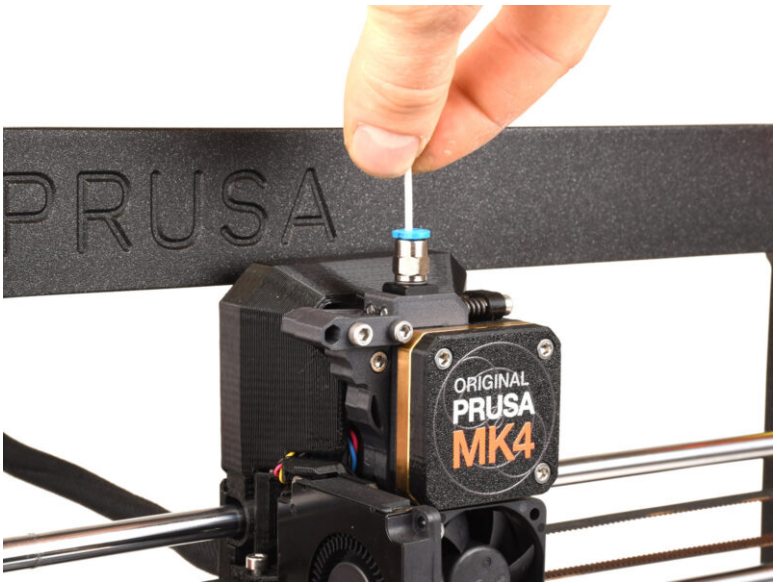
  ⓘ Hold the idler with one hand while you tighten the tension screw from the other side. The screw head should be aligned or slightly below the surface. That way, the idler is pulled with the correct amount of force.

STEP 26 Opening the electronics box

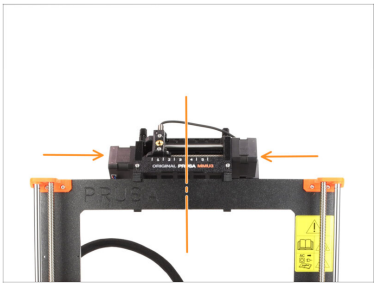
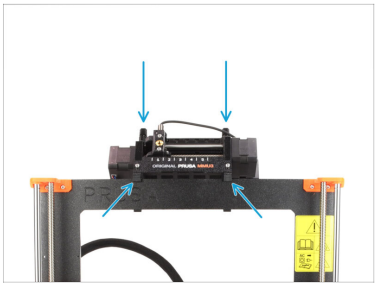
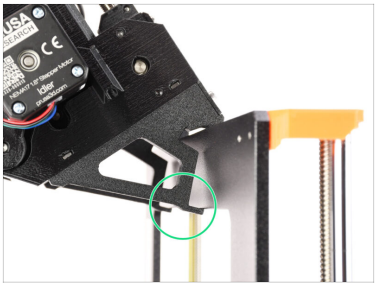


- Undo the M3x40 screw on the Einsy box to open up the electronics box on the printer.
- Open up the Einsy-door on the inner side of the electronics box.

10A. MK4/S, MK3.9/S Setup and Calibration



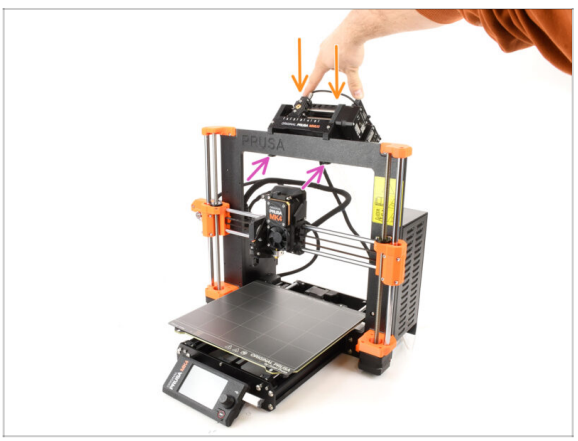
STEP 1 Attaching the MMU unit (part 1)

- The MMU3 unit should be placed onto the top part of the printer's frame.
- Place the MMU3 unit onto the frame.

  Attach it just by the top hooks.
- Look from behind, there are "clamps", which will be used to lock the unit to the frame in the next step.

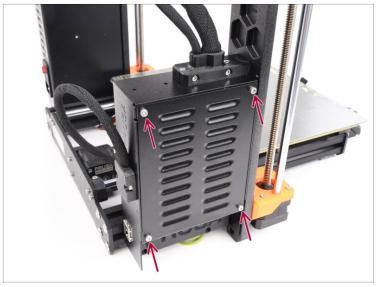
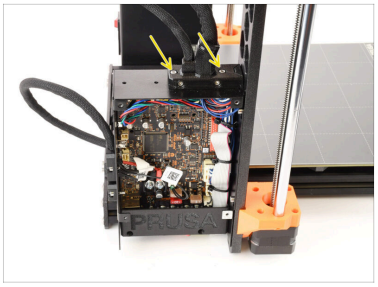
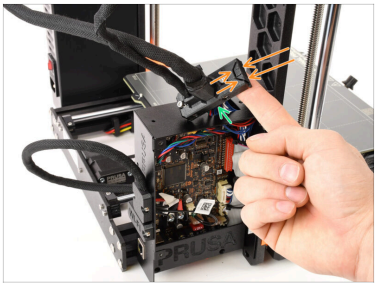
STEP 2 Attaching the MMU unit (part 2)



- Press the back part of the MMU3 unit downwards slightly, until the clamps lock to the frame.
- Check that both bottom clamps on the unit are fully engaged.

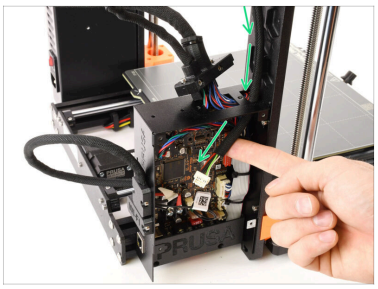
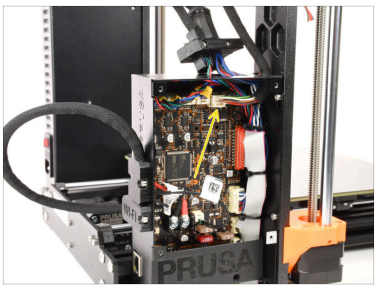
ⓘ If you need to remove the unit from the frame, simply lift the back part up to disengage the clamps.

STEP 3 xBuddy preparation

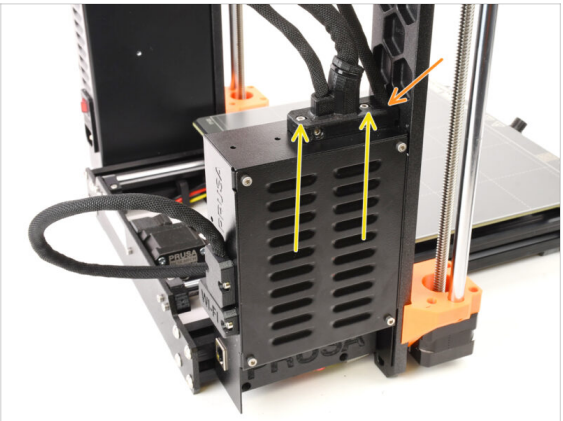
- On the left side of the printer, remove the four M3x6 screws holding the **xBuddy box cover** in place. Then, take off the cover.
- Loosen the two M3x18 screws holding the ext-cable-holder.
- Raise the cable holder.
- Use needle-nose pliers to remove the indicated part of the cable holder, creating space for the MMU cable.

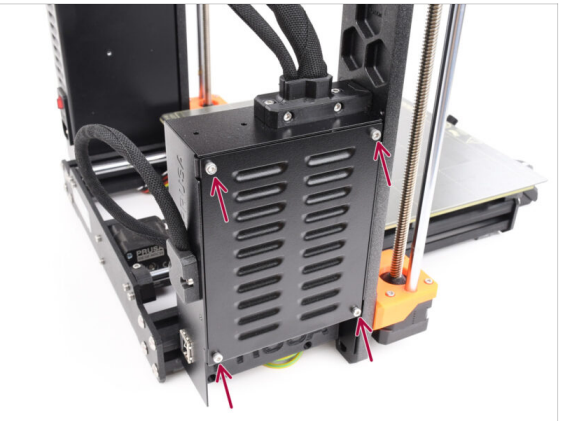
STEP 4 Guiding the cable

- Guide the cable from the MMU unit along the frame, directing it towards the electronics.
- Guide the cable into the xBuddy box through the opening on top.
- Connect the MMU cable into the marked connector on the xBuddy board.

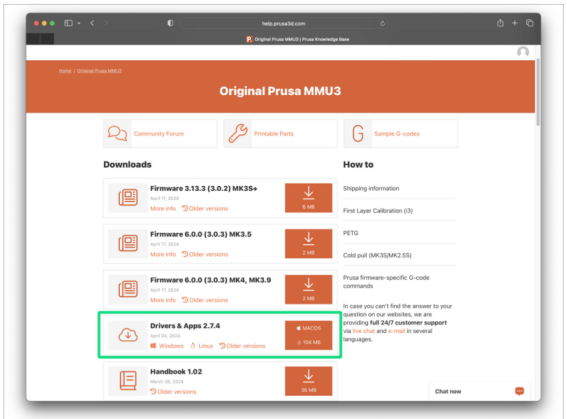
STEP 5 Closing the electronics box

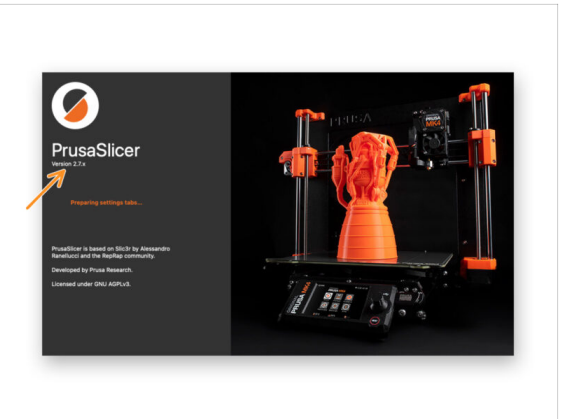




- Reattach the **ext-cable-holder**, ensuring that the MMU cable on the side is properly seated and that none of the cables are being compressed.
- Tighten the two **M3x18 screws on top** of the ext-cable-holder.
- Align the xBuddy box **cover** with the xBuddy box and secure it with four M3x6 screws.

STEP 6 Software Download



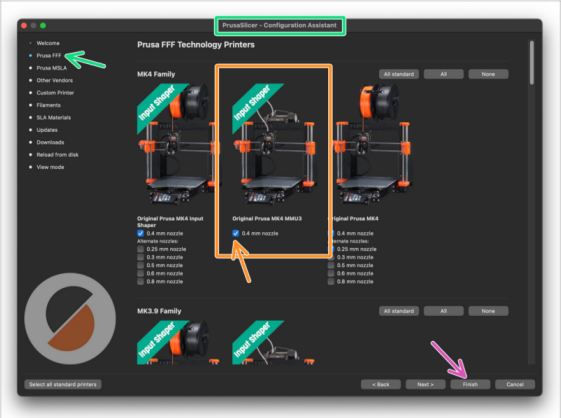


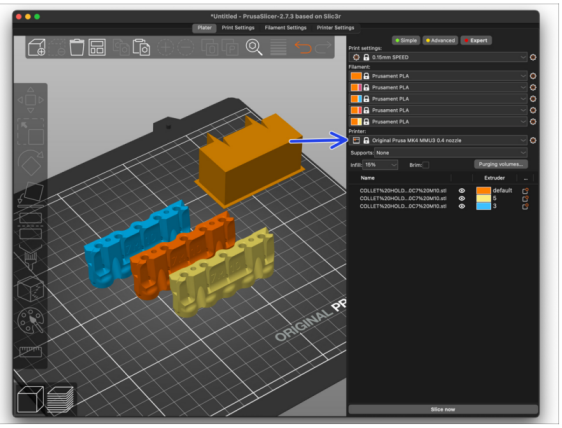
- Visit the MMU3 page on Help.Prusa3D.com
- We will need to install the latest Prusa Slicer.
- Download the latest **Drivers & Apps** package.

  MMU3 on MK4 requires Drivers & Apps (PrusaSlicer) version **2.7.3** or newer.
- Leave this page open for the upcoming steps!
- Install the downloaded package on your computer and open the **PrusaSlicer** app.

  PrusaSlicer is part of the Drivers package. It includes the firmware upgrade tool. The Drivers package also includes some sample objects to be printed.

STEP 7 PrusaSlicer setup for MMU3



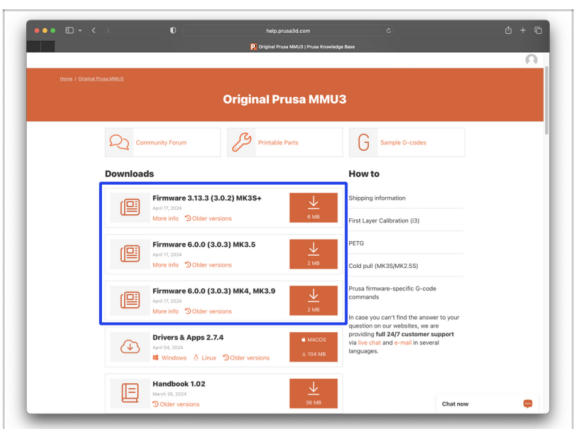


- Open the PrusaSlicer Wizard/Assistant. (from the menu **Configuration > Configuration Wizard/Assistant > Prusa Research)**
- Find the **MK4 Family** and make sure that **your printer model is selected.**
  - The default **nozzle is 0.4mm** from factory.
- Click Finish to close the Wizard.
- In **Printer:** menu, select the **MMU3** printer profile for future slicing.

⚠ Please be aware that the MMU3 on MK4 **IS NOT COMPATIBLE with older PrusaSlicer profiles or G-codes** for MMU2, MMU2S, or even MMU3 + MK3S+ or MK3.5.

Using an incompatible G-code file on the MMU3 + MK4 could lead to a failed print or potentially damage the printer!

STEP 8 Firmware files download

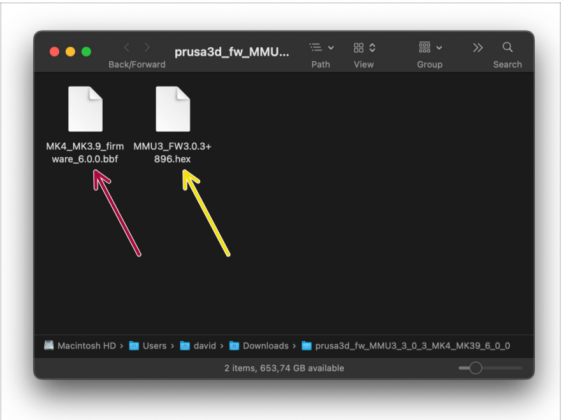


⚠ You will need to update both the firmwares for the printer as well as the MMU unit. Use just the newest firmware versions together.

⚠ Please refer to the MMU3 Firmware Compatibility article to find out exactly which firmware version you need.

- Head back to Help.Prusa3D.com
- Download the lastest **Firmware** package **for your printer** model.

STEP 9 Firmware Upgrade: Printer



⚠ IMPORTANT!!! Before you proceed further; There are two firmware files. One is for the printer. The other one is for the MMU3 unit. Both needs to be flashed to the respective device.

- **Printer's firmware - .bbf file**
  for the MK4 control board:
  (e.g. MK4_MK3.9_firmware_6.0.0.bbf)
  - Update the printer's firmware. First, transfer the firmware file onto a USB drive.
  - Turn on the printer and connect the USB drive into it. Press the RESET button to restart it. Then, select the FLASH option on the screen to begin the update.
- **MMU3 control board firmware:**
  (e.g. MMU3_FW3.0.3+896.hex)
  - This firmware update must be applied directly to the MMU unit using a computer. **We will flash the MMU unit firmware in the upcoming steps.**

STEP 10 Turning the MMU on

⚠ After finishing the firmware update, **make sure there are no filaments loaded** neither in the extruder, or in the MMU unit.

- Navigate to the **LCD menu > Settings > MMU**

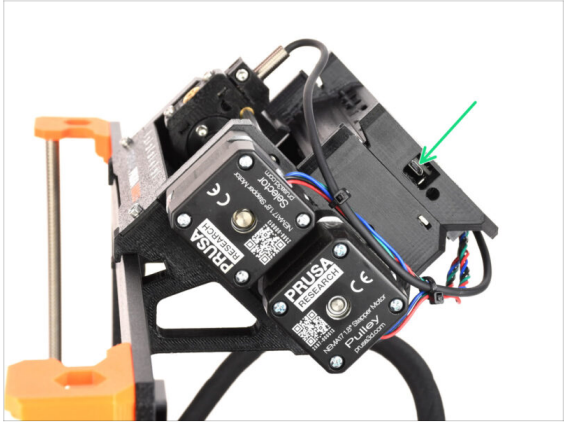
  and make sure the **MMU** is turned **on**.

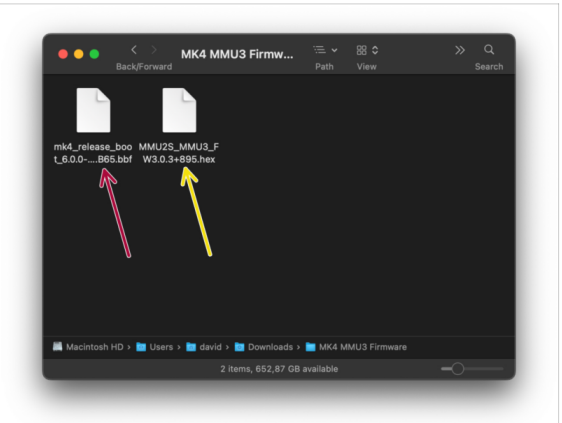
  This option not only turns on the MMU functionality in the firmware, but also turns on the power for the MMU unit, which is necessary to do a FW update.

  From now on, the reset button on the printer resets also the MMU unit. Wait for a while, the MMU unit will go through the self-test routine. (accompanied by flashing LED lights on the MMU unit) **Wait until it boots up** properly, before issuing any commands to the printer.

- Since you've converted the extruder to the MMU version, when prompted to reconfigure the filament sensor's behavior, which will appear immediately, choose '**Continue**'.

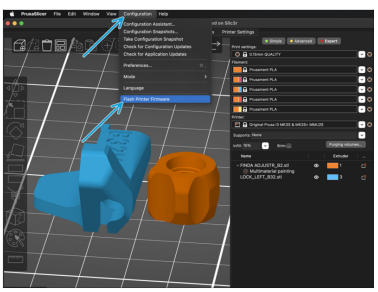
STEP 11 MMU3 Firmware flashing (part 1)

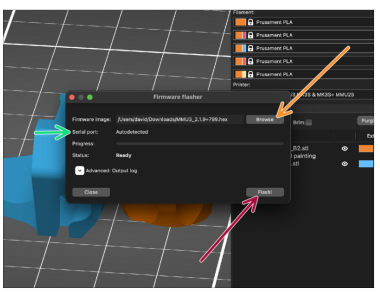


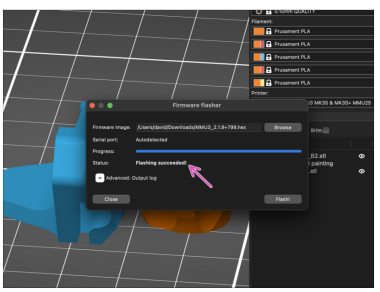


- The MMU3 firmware file needs to be flashed into the MMU unit itself. Find the **microUSB** connector on the right side of the MMU3 unit.
- Connect the unit to your computer using the bundled microUSB cable.
- On your computer, select the appropriate **MMU firmware file** compatible with your printer model.

STEP 12 MMU3 Firmware flashing (part 2)





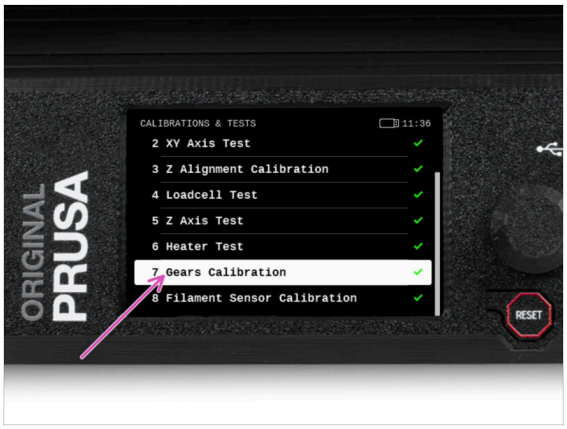


- Open PrusaSlicer and select **Configuration ->Flash Printer Firmware** from the top menu.
- Hit **Browse** and select the MMU3 firmware image file on your computer. (e.g. MMU2S_MMU3_FW3.0.3+895.hex)
- Serial port should be auto-detected.

  Hit **Rescan** if your printer is not listed in the Serial port: column
- Hit the **Flash** button.
- Wait until the **Flashing Succeeded**! message appears.
- After the flashing finishes, disconnect the USB cable.

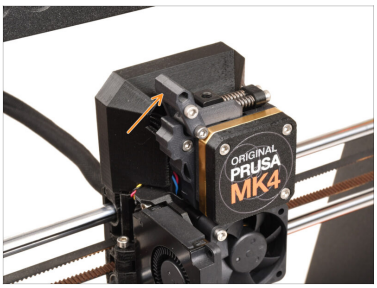
In case of any issues with flashing the firmware please visit our troubleshooting article.

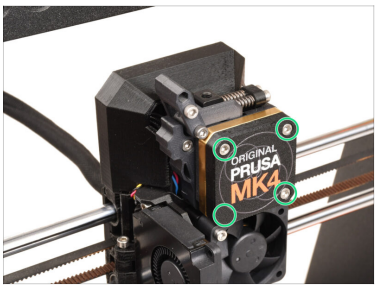
STEP 13 Gears calibration



- Now, we need to calibrate the planetary gearbox in the Nextruder.
- Go to the Home screen and navigate to *Control -> Calibrations & Tests,* scroll down and select **Gears Calibration.**
- Once you get to the Gearbox Alignment part, select **Continue** and follow the on-screen instructions.

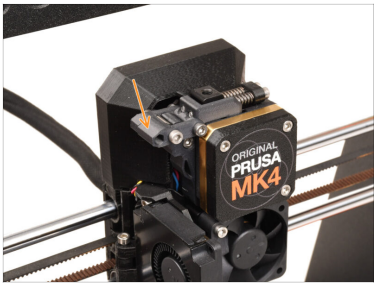
STEP 14 Gearbox Alignment

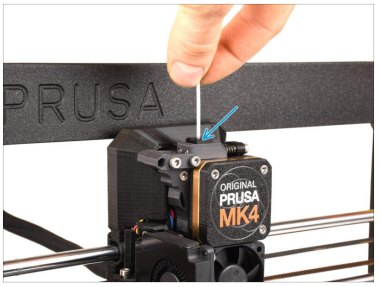




- During the Gear calibration process, you will be prompted to:
  - Make sure the **Idler lock** (swivel) is in the open position - lifted up.
  - Loosen the three screws on the front of the gearbox by 1.5 turns.
  - ⓘ The printer will go through the automatic gearbox alignment. This process can't be seen from the outside.
  - Once prompted, tighten the screws in the pattern indicated on the screen.

STEP 15 MMU Filament sensor calibration



- When the Gearbox Alignment is complete, you should be prompted to continue to the **filament sensor calibration**.

ⓘ There should be no filament inside the extruder before the calibration process starts.

- Close the **Idler lock** (swivel).
- During the filament sensor calibration, you will need to use a short piece of filament. Prepare a filament and select **Continue**.

⚠ Don't insert the filament before being prompted to do so!

- Once prompted to, insert the filament.
- After successfully calibrating the filament sensor, remove the filament from the extruder.

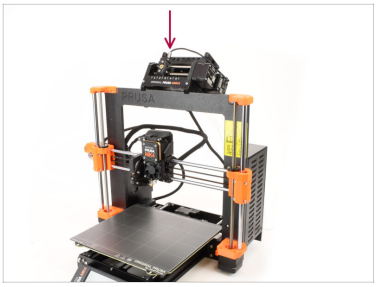
STEP 16 Footer adjustment

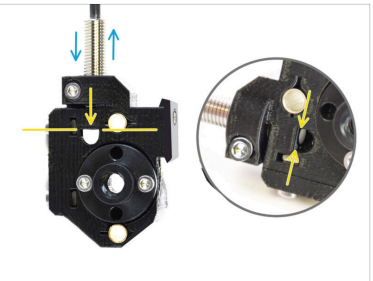

- Turning on the MMU unit automatically displays the filament sensor and Finda sensor information on the status bar on the display. If for some reason this information is not displayed or you want to adjust the order, proceed as follows.
  - On the printer, visit the **Settings > User Interface > Footer**.
  - Make sure there is **Filament sensor (FSensor)** selected in any of the fields.
  - Make sure there is **SuperFINDA sensor (Finda)** selected in any of the fields.

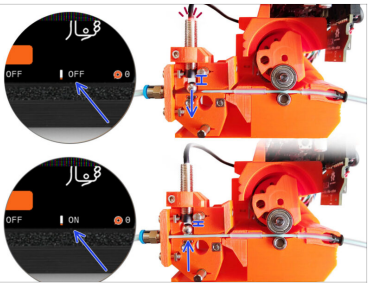
ⓘ You will see the respective symbols and sensor values displayed on the bottom of the screen.

- The sensor values are also shown in the **Info > Sensor Info** menu.

STEP 17 SuperFINDA sensor calibration info





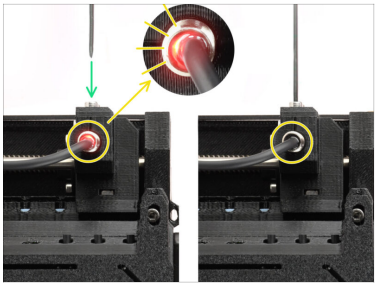


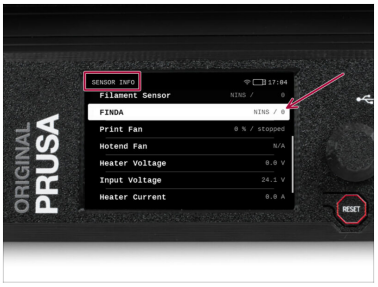
- If you built the MMU3, the **SuperFINDA sensor** inside the selector must be calibrated.
- For **factory-assembled MMU3** units, the SuperFINDA is pre-calibrated, so you can skip the calibration steps.
- In the next step, we'll calibrate the sensor's position.

⚠ **It is CRITICAL** that both the **filament sensor in the extruder and the SuperFINDA sensor function accurately**. Otherwise, you will have trouble with the device.

- Use the inspection window on the selector to align the bottom of the sensor with the top of the window, as a starting point.
- When filament is in the selector, the steel ball rises and should be detected by the SuperFINDA sensor. Ensure the distance between the ball and the sensor is perfectly calibrated.

STEP 18 SuperFINDA calibration





- Insert filament with a sharp tip into the brass opening at the front.
- Take a look at SuperFINDA from above and watch for the little red light inside the sensor to turn off when the filament raises the steel ball inside.
  - **Red light** = no filament detected = **FINDA 0 / OFF**

    No light = filament detected = **FINDA 1 / ON**
- If the light is still on, lower the SuperFINDA slightly.

  If the light doesn't ever go on, raise the SuperFINDA probe by releasing the screw by its side, moving the probe, and tightening the screw back up.
- Watch the **sensor readings on the LCD** (Info > Sensor Info -> FINDA) Note, there is a slight lag in the sensor's readings on the LCD; proceed slowly.

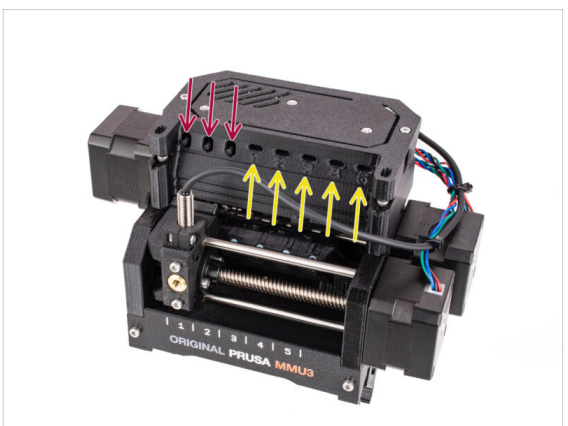
⚠ Repeat the test, adjusting SuperFINDA height **until consistent readings occur when inserting and removing filament.**

STEP 19 Error code details (Part 1)

- Later on, an **MMU error screen** will show up if something goes wrong during the operation. See the example image; the first line describes briefly, what's the error about.
  - prusa.io/04101 is a web address, where you can view a detailed article about the exact issue, and how to fix it.
- The status of the filament sensor is always displayed in the Footer section of the error screen to assist in diagnosis.
- Adjacent to it, you will find the status of the Finda sensor.

(Note the FINDA status reading on the LCD has a slight delay.)

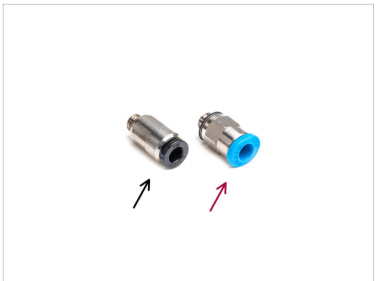
STEP 20 Error code details (Part 2)

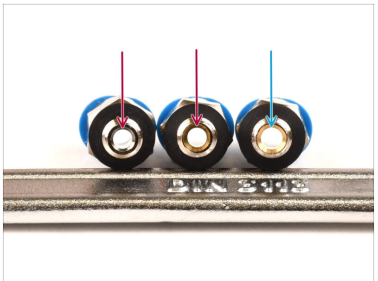


- The bottom line are the **solution buttons**. Some errors have multiple solutions.
- You can also visit a detailed error description page via the QR code.
- MMU unit being in an **error state** is also indicated by its LED lights flashing.
- While in an ERROR state, the buttons on the MMU unit can be used to resolve the error too.
  - The **middle button** usually replicates the LCD solution buttons function.

⚠ Note, if the MMU unit is in **IDLE state**, the buttons **have a different functions**; For example; If there is no filament loaded, the side buttons can be used to move the selector right and left. But more on that later.

STEP 21 Fittings INFO



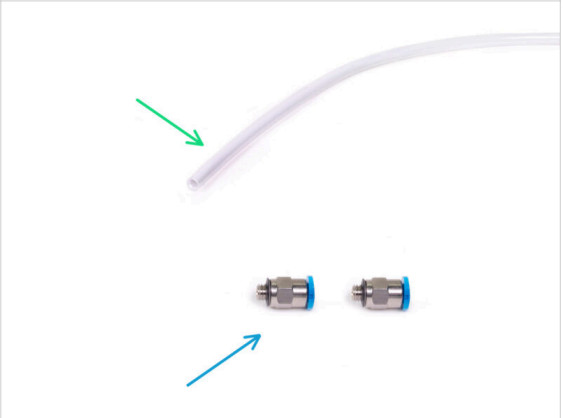


- On the MMU, the PTFE tube that guides the filament to the printer is secured using M5-4 pneumatic **fittings**.
- Older type of these fittings has a blue collet.
  Various versions of the blue fittings were included with Prusa products shipped before April 2024.
- The MMU3 on the **MK4** printer requires either the black fitting or the **latest evolution** of the blue fitting, which has an internal diameter of **2.6mm**.

⚠ Some M5-4 fittings appear identical from the outside. Be careful not to mix old with new ones.

Using an incorrect version of the fitting on the MK4 can lead to the printer malfunctioning. Ensure you **use only the fitting provided in your MMU3 MK4 package** to avoid any issues.

STEP 22 MMU-to-Extruder PTFE tube parts preparation

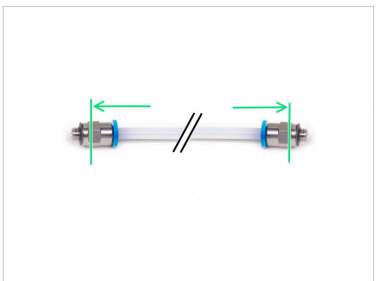


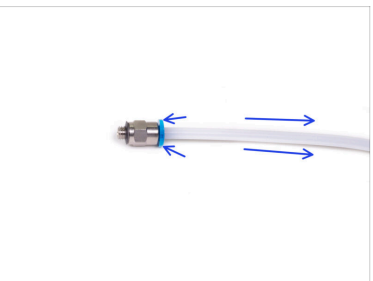
- **For the following steps, please prepare:**
  - 360x2.5mm PTFE tube (1x)

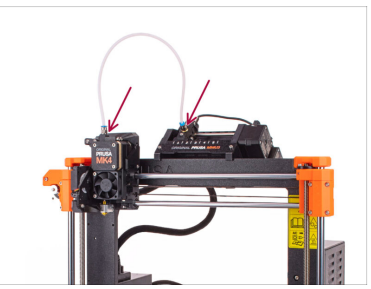
    The **PTFE** tube bundled with the MMU3 **for MK4** has an internal diameter of **2.5mm**. In case you are upgrading from the 2mm ID MMU2S tube, and you have trouble distinguishing between the old and the new one, try comparing the internal diameter of the two. See the second picture. The tube on the left is the new one.

    A 2.5mm ID PTFE tube is required for the MMU3.
  - M5-4 fittings (2x)

STEP 23 MMU-to-Extruder PTFE tube

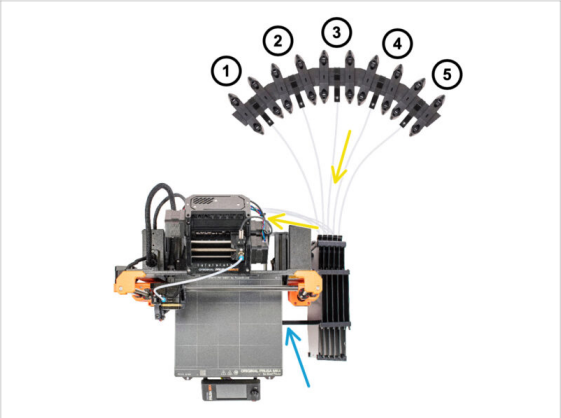


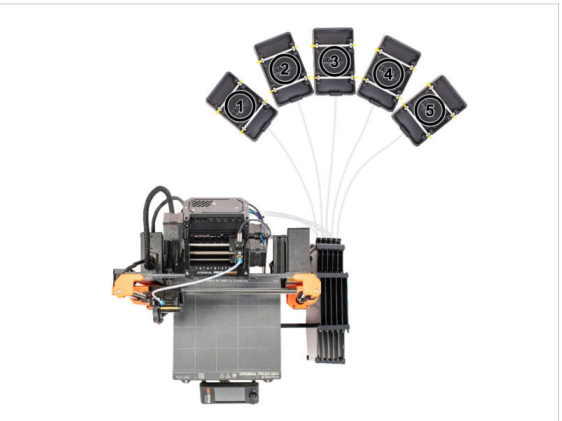




- Attach the M5-4 fittings onto both sides of the PTFE tube.
  - Push the PTFE tube fully in.
- Quick tip: **If you need to remove the PTFE tube** from the fitting, press the collet in. While the collet is pressed, first press the PTFE tube in, then pull it out entirely.
- Attach the PTFE tube onto the printer. One end goes onto the selector. The other goes onto the extruder. Tighten the fittings up using the Uniwrench.

STEP 24 Spoolholders setup





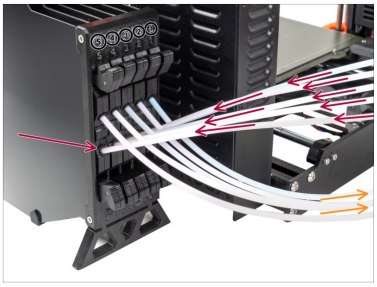
Congratulations! The hardest part is over.

- The Buffer and spools setup in the picture is the one we will be trying to achieve. Arrange the **spool holders** and the **buffer** as seen in the picture.
- Hook up the "printer holder" part on the buffer to the extrusion on the printer.
- The PTFE tubes should go from the spoolholders to the buffer. Then, from the buffer to the back of the MMU.

Note the spool holder positioning. It is important that filament has **as straight path as possible** and that nothing interferes. PTFE tubes should **not be bent too much**. Otherwise, the filaments will jam.

There were multiple versions of the spool holder available with the MMU3. Refer to one of the pictures, depending on your spool holder version.

STEP 25 Spoolholder-to-Buffer PTFE tube



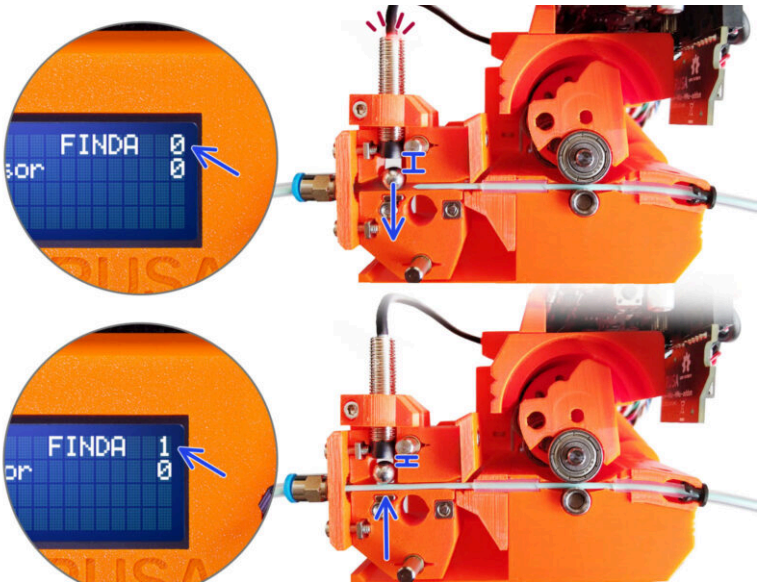
- Connect the PTFE tubes **from the MMU** unit to the **BOTTOM row of collets** on the buffer, ensuring you match the numbering on both the buffer and the MMU unit.
- Attach each end of the PTFE tube from the Buffer to the PTFE holder on each Spool holder.

  Make sure each spool holder is hooked up to the corresponding filament position number. (marked 1 to 5 on the MMU unit and the buffer.)

There have been several versions of buffer parts available, which might look slightly different. However, the assembly process remains the same.

The MMU3 for MK4 necessitates the use of the latest version of the buffer components. If you're using an older version, it's essential to rebuild the device using the most recent version available.

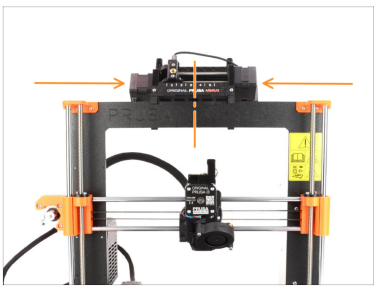
10B. MK3S+ Setup and Calibration

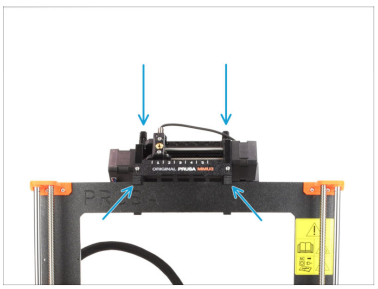


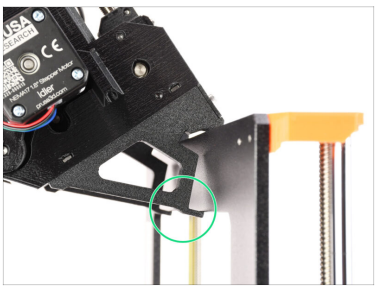
STEP 1 Tools necessary for this chapter

- **Please prepare tools for this chapter:**
- Unikey for tightening up the Festo fittings.
- 1.5mm Allen key for Filament sensor calibration
- 2.5mm Allen key for M3 screws
- Phillips screwdriver for power cable terminals

STEP 2 Attaching the MMU unit (part 1)



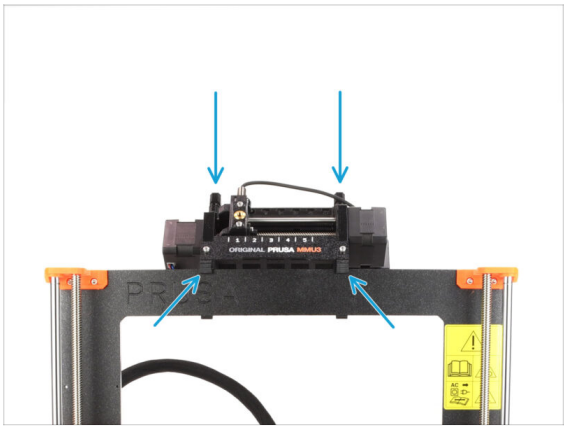


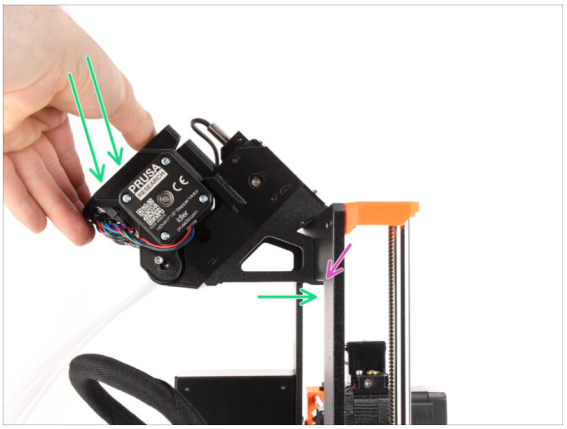


- The MMU3 unit should be placed in the middle of the top part of the printer's aluminum frame.
- Place the MMU3 unit onto the frame.

  Attach it just by the top hooks.
- Look from behind, there are "clamps", which will be used to lock the unit to the frame in the next step.

STEP 3 Attaching the MMU unit (part 2)

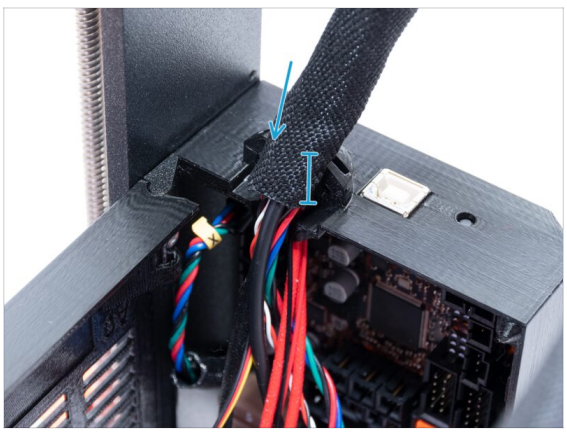


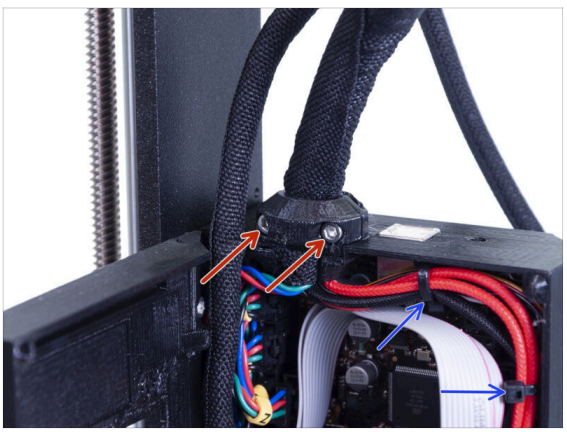


- Make sure the unit is in the middle of the frame. Once we engage the clamps, it won't move left and right as easily anymore.
- Press the back part of the MMU3 unit downwards slightly, until the clamps lock to the frame.
- Check that both bottom clamps on the unit are fully engaged.

ⓘ If you need to remove the unit from the frame, simply lift the back part up to disengage the clamps.

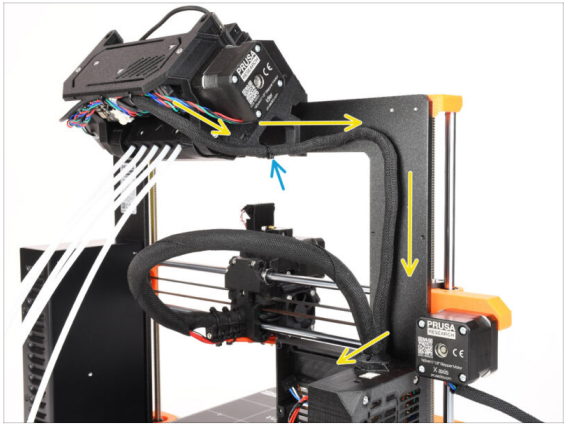
STEP 4 Attaching the cable bundle

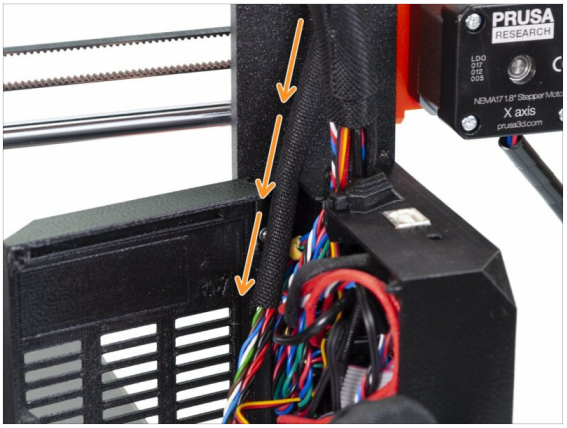




- Let's move onto the electronics box side of the **extruder cable** bundle.
- Tighten up the sleeve around the cable bundle. Hold it tight before you fix it in place with the clip and the screws. The textile sleeve should be held by the cable clip
- Fix the cable bundle in place by tightening the two **M3x10** screws holding the Extruder-cable-clip. Make sure no cable is getting pinched!
- For easier cable-management inside the electronics box, attach the extruder cable bundle to the hooks on the inside of the Einsy-base with two zip-ties in the marked positions.

STEP 5 Guiding the MMU cable



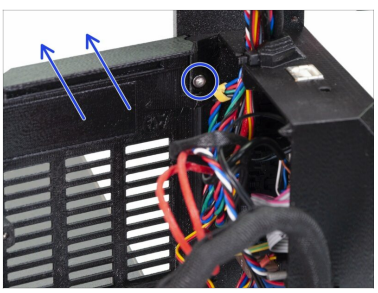


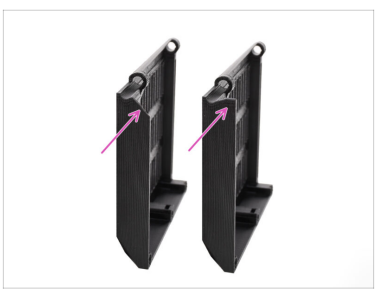
ⓘ Now, we will guide the cables from the MMU unit into the printer.

⚠ Make sure the printer is turned OFF and unplugged from the wall outlet. Do not ever connect or disconnect the MMU unit while the printer is ON.

- Guide the cable bundle from the MMU unit towards the printer's electronics. The cable should be placed just next to the printer's frame.
- You can fix the cable to the MMU3 holder using a zip-tie in marked location. Make sure it points to the side - not down. Otherwise, it might interfere with the extruder cable while printing.
- Guide the cable towards the electronics box.

STEP 6 MK3S+ Trimming the electronics box door



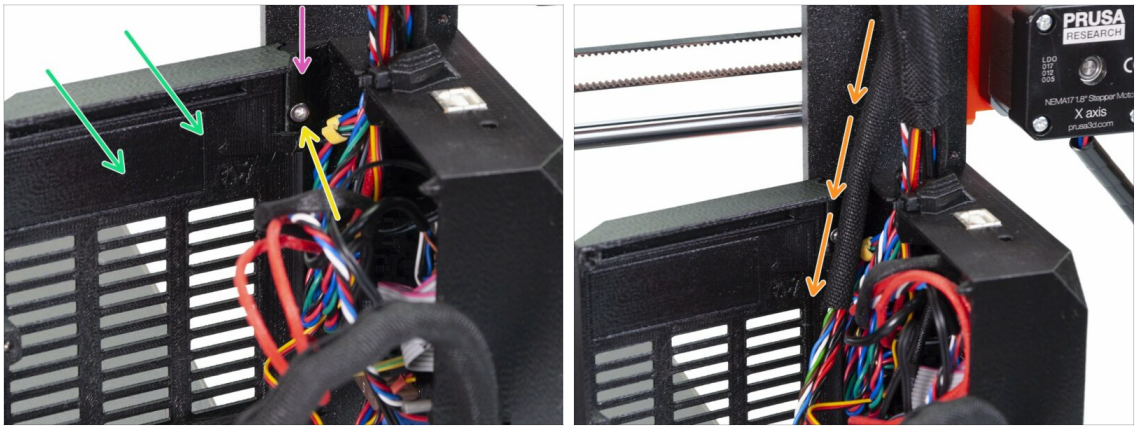


⚠ **WARNING:** We need to cut part of the plastic on the electronics box door to make some room for the MMU cable. Make sure you wear protective eyewear!

⚠ If you're upgrading from the MMU2S to MMU3 and your door has been trimmed already in the past, you can skip this step.

- Release and remove the M3x10 screw in the upper hinge. Remove the door together with the hinge by pulling it up.
- Using pliers, carefully cut the inner corner of the door. The MMU cable bundle will need some more clearance in the marked location.
- Comparison between the trimmed door (left) and its original shape (right).

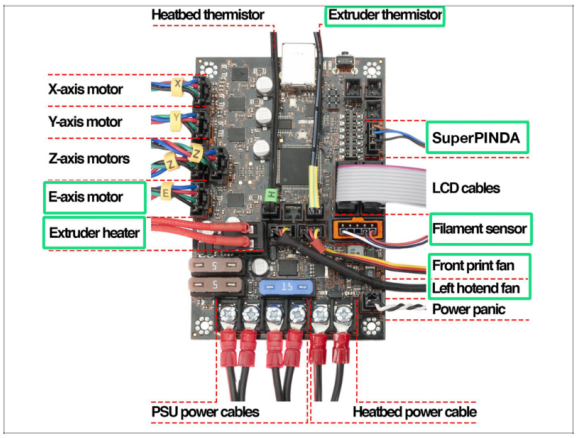
STEP 7 MK3S+ Trimmed electronics door installation



- Re-attach the door back onto the bottom hinge.
- Make sure the top hinge is in place.
- Attach the top hinge to the printers frame using the M3x10 screw.
- Make sure there is enough clearance for the MMU3 cable when you close the door.

⚠ The cable should be held by the door but must not be squished too much. Otherwise, you risk damaging the cable!

STEP 8 MK3S+ Electronics wiring diagram

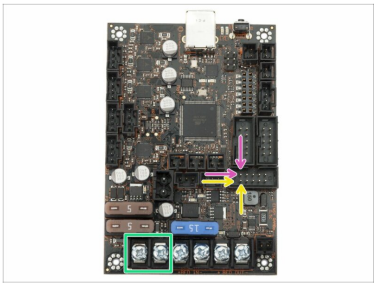
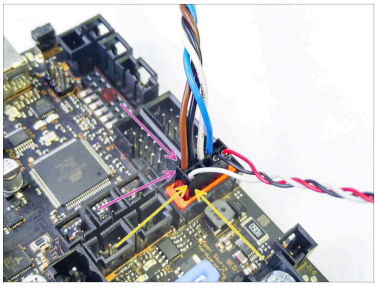
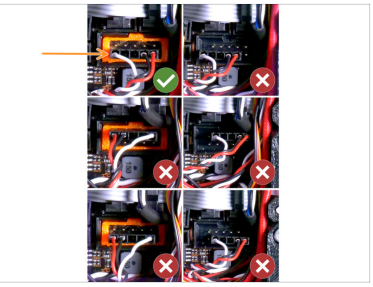


⚠ In the following step, we will connect the cables to the already existing connections on your **Original Prusa MK3S+. Please, proceed very carefully.**

- Follow the diagram shown here in case you need to reconnect any of the extruder cables into the Einsy Rambo control board.

Since, **MK2.5S** printer isn't officially supported in combination with the MMU3, this guide doesn't cover connecting the electronics on it. Instead, it is described in the MK2.5S MMU2S guide.

STEP 9 MK3S+ Connecting the data and FS cables

- Note the marked position. The **MMU Signal cable** connector should go here. (upper row of the pins, brown wire in the plug must be facing left)

  Upper row of the pins, the **brown** wire in the plug must be facing **left**!

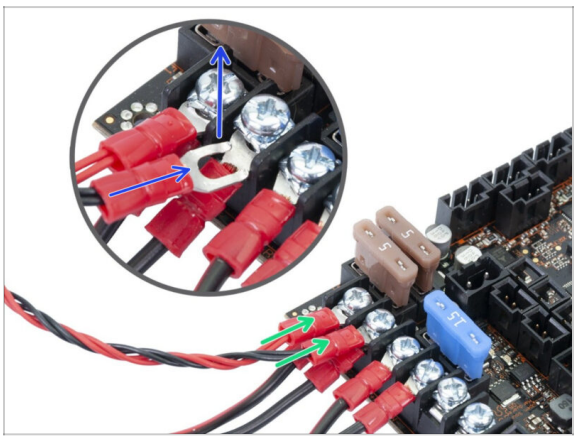
- **IR filament sensor cable** is just below the MMU signal cable.

  Bottom row of the pins, the **white** wire is facing **left**.

- Verify the IR Filament sensor connector is installed correctly. Make sure it is plugged in correctly as there are several ways for it to go wrong!

Make sure the signal cable is properly connected to all pins!

STEP 10 MK3S+ Connecting the power cables



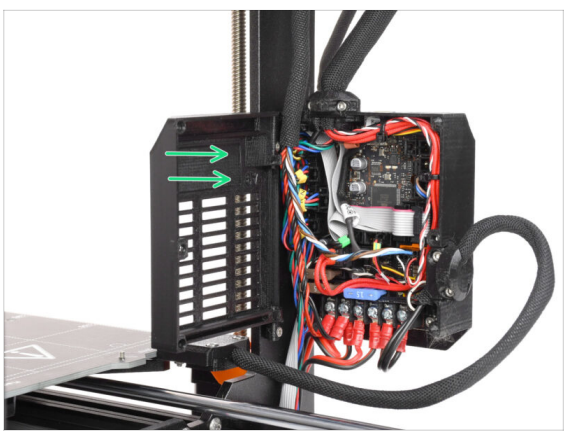
- Connect the Power cable fork connectors.
  First, loosen the screws on the terminals so that there is enough space.
  - Stack the MMU power connectors on top of the the PSU cable connections in the first two clamps on the left side of the Einsy board.
  - The power cable connector "fork" has bent ends. Make sure they point up. See the picture for a reference.
  - Red (+ / positive) wire goes into the first slot.

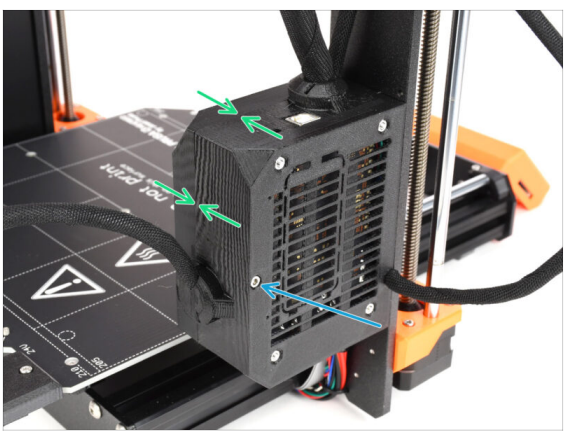
    Black (- / negative) wire goes into the second slot.

⚠ Tighten up the power cables firmly!

⚠ **Confirm that the cables are connected in the correct order to avoid causing damage to the device.**

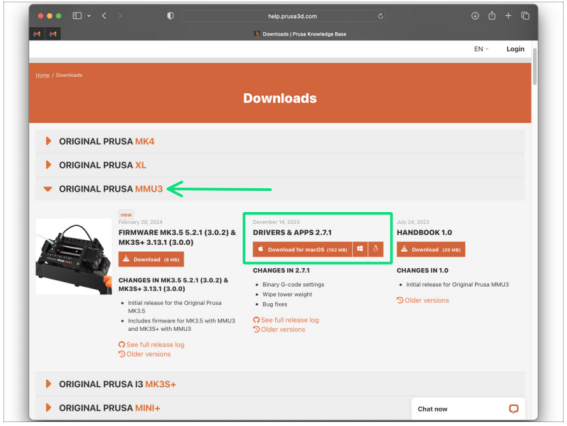
STEP 11 MK3S+ Closing the electronics box

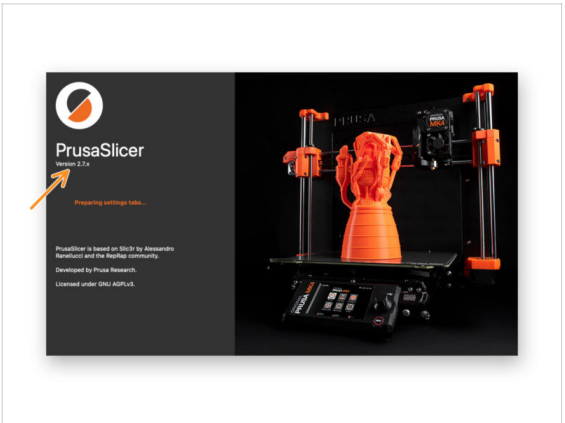




- Close the door. Make sure no wire is being pinched while you close the door.
- Tighten up the M3x40 screw from the other side to lock the door.

STEP 12 Software Download

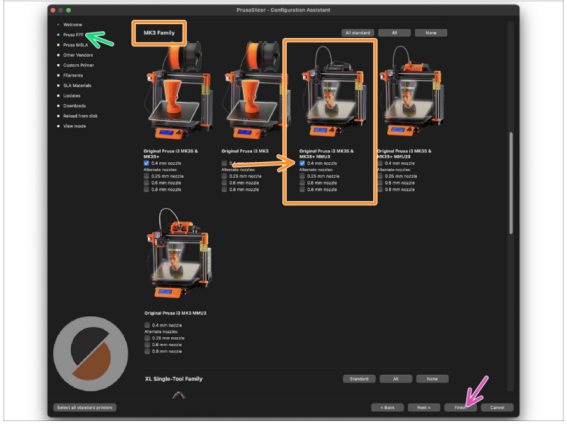


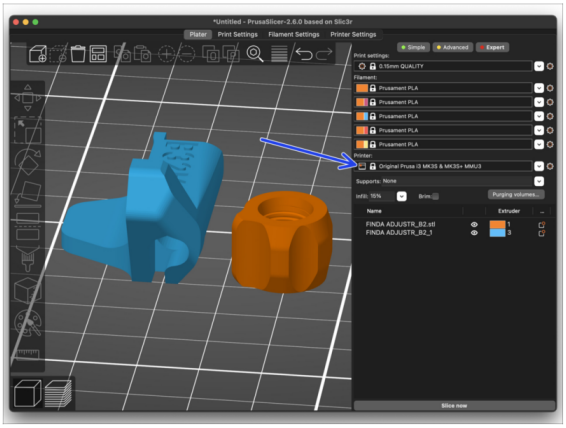


- Visit help.prusa3d.com/downloads
- Find the **ORIGINAL PRUSA MMU3** on the list. In the Drivers & Apps section, download the latest package.
- Leave this page open for the next steps!
- Install the package on your computer and open **PrusaSlicer.**

  ⓘ **PrusaSlicer app** is part of the Drivers package. It includes the firmware upgrade tool. The Drivers package also includes some sample objects to be printed.

STEP 13 PrusaSlicer setup for MMU3



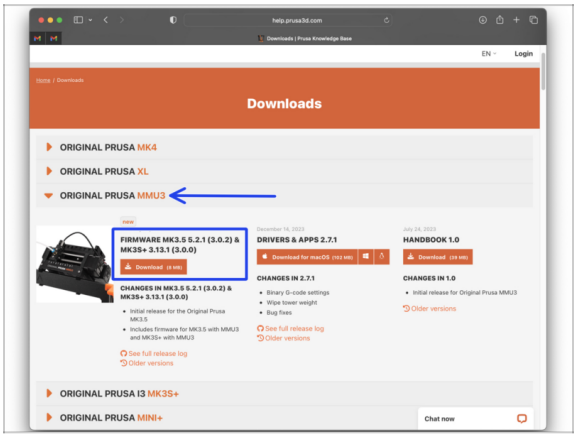


- Open the PrusaSlicer Assistant / Wizard. **(Configuration > Configuration Assistant > Prusa FFF)**
- Scroll down to **MK3** Family and make sure that the corresponding printer + **MMU3** option is selected, depending on which printer model you have.

  ⓘ The default **nozzle is 0.4mm** from factory.
- Click Finish to close the Wizard.
- In **Printer:** menu, select the **MMU3** printer profile for future slicing.

Note, the MMU3 on MK3S+ is reverse-compatible with the older MMU2S Slicer profile and G-codes - but not with the MMU2 profiles!

STEP 14 Firmware files download

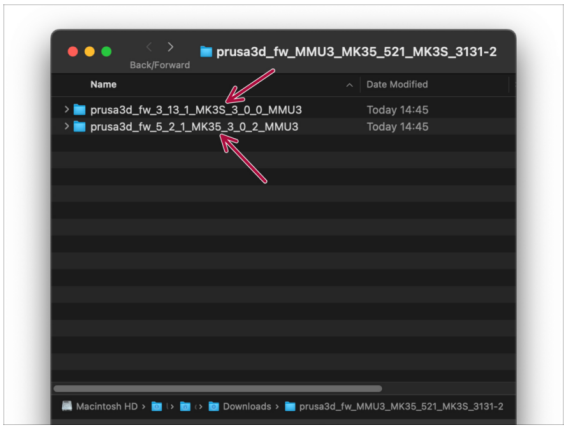


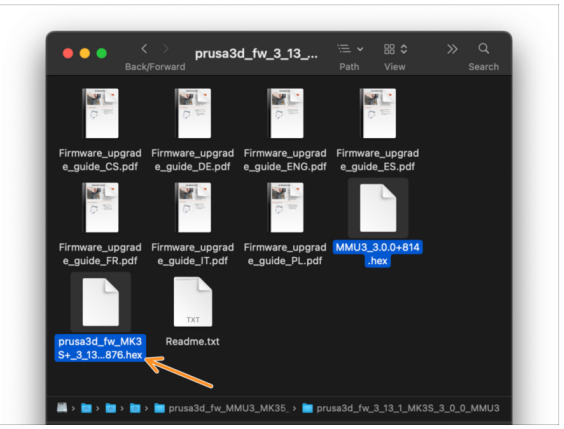
⚠ You will need to update both the firmwares for the printer as well as the MMU unit. Use only a combination of the newest firmware versions for both devices together.

⚠ Please refer to the MMU3 Firmware Compatibility article to find out exactly which firmware version you need.

- Go back to the help.prusa3d.com/downloads
- Find the ORIGINAL PRUSA **MMU3** on the list. Download the latest **FIRMWARE** file bundle.

STEP 15 Selecting a Printer firmware file



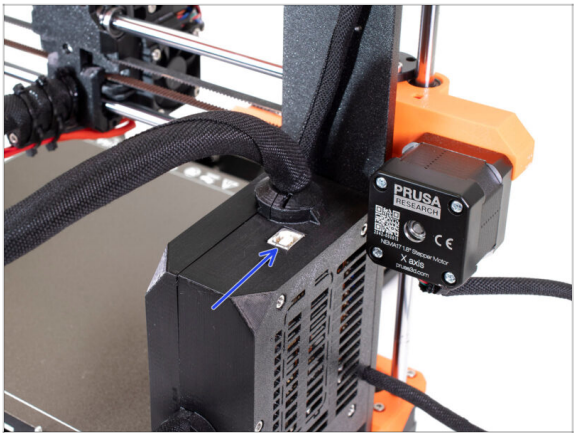


- Open up the firmware bundle you have downloaded earlier. Open one of the folders depending on the printer model you have (select "**MK3S" for MK3S+ model**)
- There are two firmware files in the folder. One for the printer, the other one for the MMU unit.
  - As a firmware file for the **MK3S+**, select the MK3S+ **.hex** file

⚠ On MK3S+ printer, MMU3 requires printer firmware **3.13 or newer!**

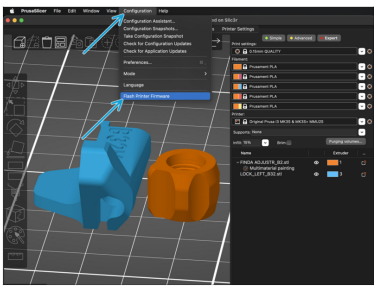
If you are updating from a printer firmware 3.11 or older, the printer will require you to do a thermal model calibration first.

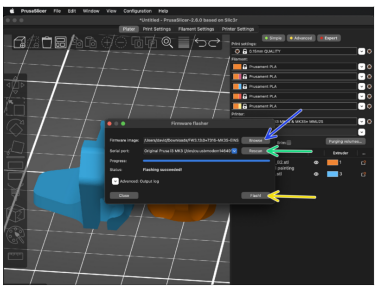
STEP 16 MK3S+ Firmware flashing (part 1)

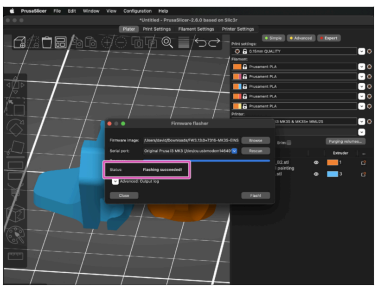


- Connect the printer to the electricity and **turn it on**.
- Now, let's flash the **printer's firmware.**
- To flash the **MK3S+**, use the bundled **USB Type B** cable to connect the computer to the top of the black electronics box on the printer.
  - Then, continue to the next step.

STEP 17 MK3S+ Firmware flashing (part 2)



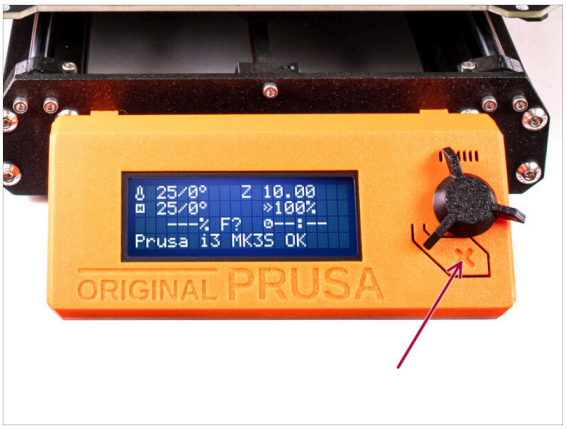




- Open PrusaSlicer and select **Configuration ->Flash Printer Firmware** from the top menu.
- First, select the **printer's firmware file** on your computer. (e.g. *FW3.13.0-MK3S-EINSY10a_MULTILANG.hex*)
- Hit **Rescan** to make sure your printer appears in the *Serial port:* column
- Hit the **Flash** button.
- Wait until you see the **Flashing succeeded** message.

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

STEP 18 MK3S+ Turning the MMU on and reset



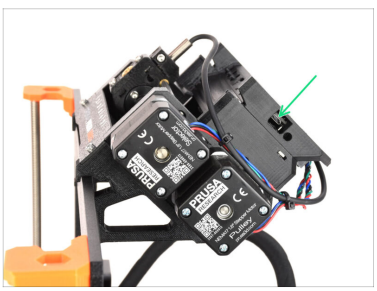
- After finishing the firmware update, **make sure there are no filaments loaded** neither in the extruder, or in the MMU unit.
- Navigate to the **LCD menu > Settings > MMU** and make sure it is set to **MMU [On]**
- Hit the reset button on the printer's LCD box.

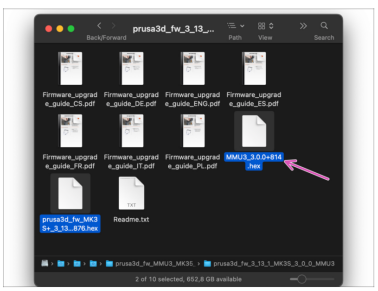
⚠ From now on, the reset button on the printer resets also the MMU unit. Wait for a while, the MMU unit will go through the self-test routine. (accompanied by flashing LED lights on the MMU unit) **Wait until it boots up** properly, before issuing any commands to the printer.

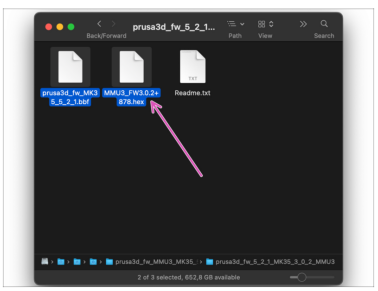
In case of necessity, the reset button is also useful to help you get out of some unrecoverable situations even for the MMU unit. But remember, it also aborts an ongoing print immediately.

ⓘ If you see the Unload manually error, check that the SuperFINDA sensor is not detecting a filament.

STEP 19 MMU3 Firmware flashing (part 1)

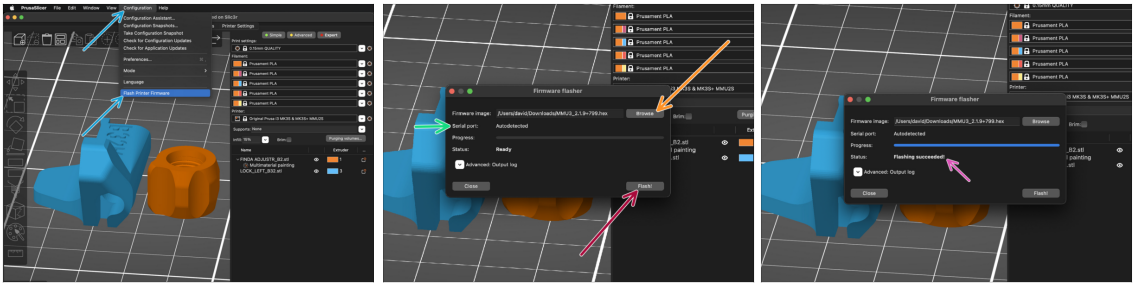






- The MMU3 firmware file needs to be flashed into the MMU unit itself. Find the **microUSB** connector on the right side of the MMU3 unit.
- Connect the unit to your computer using the bundled microUSB cable.
- On your computer, select the appropriate **MMU firmware file** compatible with your printer model.

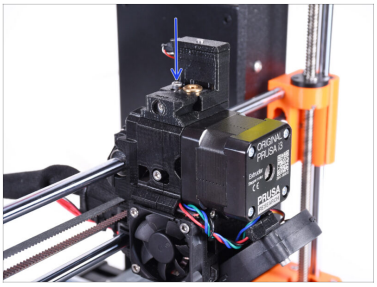
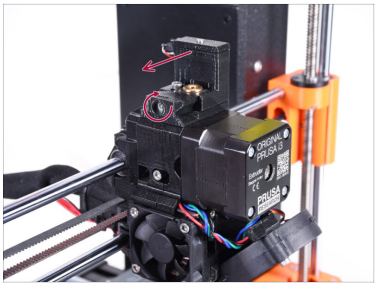
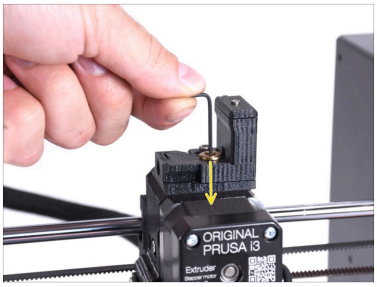
STEP 20 MMU3 Firmware flashing (part 2)



- Open PrusaSlicer and select **Configuration ->Flash Printer Firmware** from the top menu.
- Hit **Browse** and select the MMU3 firmware image file on your computer. (e.g. *MMU3_3.0.0.hex*)
- Serial port should be auto-detected.
- Hit the **Flash** button.
- Wait until the **Flashing Succeeded!** message appears.
- After the flashing finishes, disconnect the USB cable.

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

STEP 21 IR filament sensor calibration (Part 1)

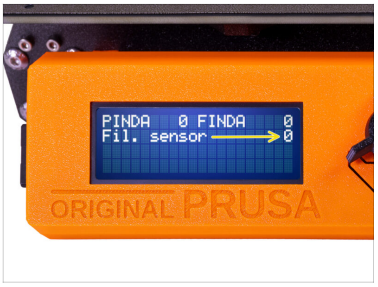




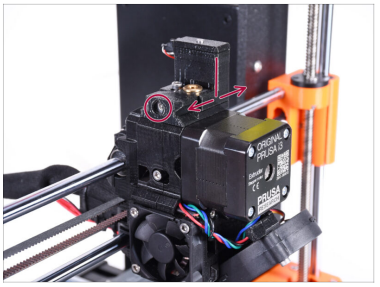
⚠ In the following steps, we will calibrate the IR Filament sensor iside the Chimney on the extruder. Follow the instructions carefully, **this part is very important!**

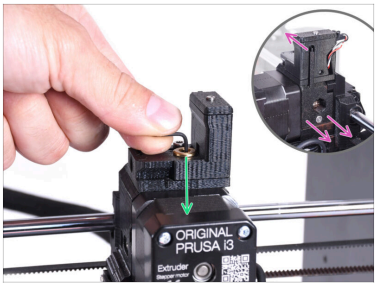
- Using a 2.5mm Allen key, make sure the **lock screw** for the chimney is not tightened up. Don't remove it entirely. It holds the chimney together.
- Carefully tighten the **calibration screw** on the side so that the chimney moves all the way to the left.
  - When **tightening** the calibration screw, the chimney moves to the left, making it **less** sensitive to triggering.
  - When **loosening** the calibration screw, the chimney moves to the right, making it **more** sensitive to triggering.
- Tighten the calibration screw until the chimney moves all the way to the left.
- Insert a 1.5mm Allen key into the extruder. Don't push it all the way in yet.

⚠ Make sure you are using the thinnest of the bundled Allen keys; 1.5mm. Do not use the 2mm one!!

STEP 22 IR filament sensor calibration (Part 2)







- Go to **Menu > Support > Sensor Info > Fil. sensor** on your MK3S+

  The Fil. sensor should indicate value 0 when the Allen key isn't pushed all the way in so the idler door isn't tilted outwards.

- Now push the 1.5mm Allen key down until it reaches in between the Bondtech gears.

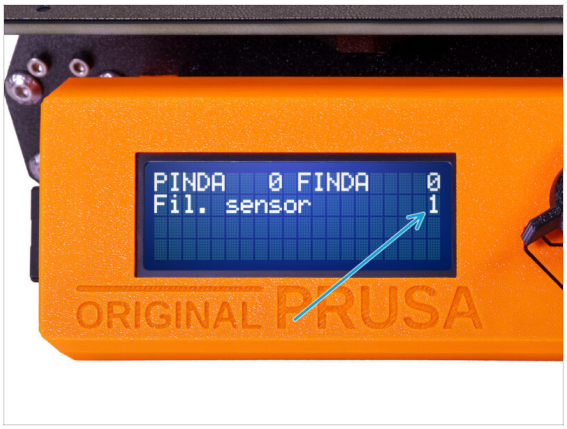
  ⓘ (don't be afraid to apply a fair amount of downwards force in order to get the key in between the gears)

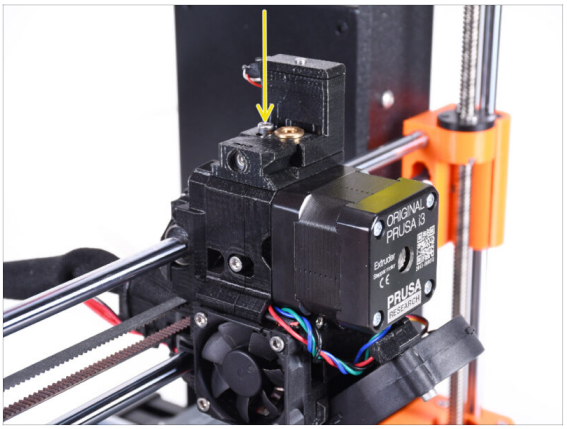
- The idler door on the right of the extruder should tilt outwards slightly simulating an inserted filament.

⚠ The **Fil. sensor:** line on the LCD now should indicate value **1** with the Allen key (or a filament) **inserted**. Keep releasing the calibration bolt until there is number **1 on the LCD.**
Then, release it another half turn.

- **By rotating the calibration screw, we need to fine-tune the chimney position so that the number on the LCD reliably changes when inserting and removing the Allen key or filament from the Bontech gears.**

STEP 23 IR filament sensor calibration (Part 3)





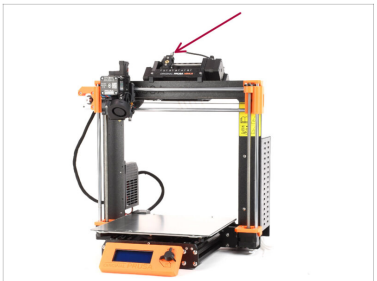
⚠ **Calibrating the IR filament sensor is super-crucial in order for MMU3 unit to work properly!**

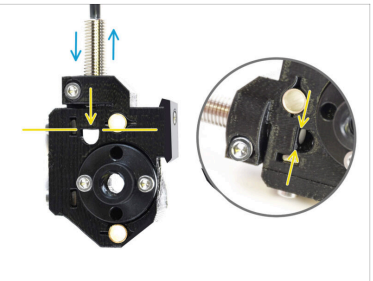
ⓘ Please, repeat this check several times.

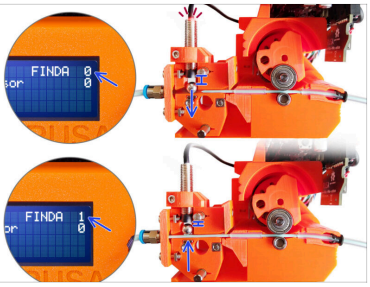
- Confirm the sensor works correctly: See the LCD again if the **Fil. sensor** number
  - displays **1** when Allen key (/filament) is inserted all the way
  - or **0** when it´s not inserted all the way in.
- When the sensor works reliably and correctly, please lock the chimney in place by tightening the lock screw from the top.
- After tightening the screw, verify the readings on the LCD are still correct when inserting and removing the Allen key.

ⓘ More info on filament IR-sensor calibration is in **Calibration procedure of the IR-sensor** article, or in chapter 7.1 in the Handbook.

STEP 24 SuperFINDA sensor calibration info





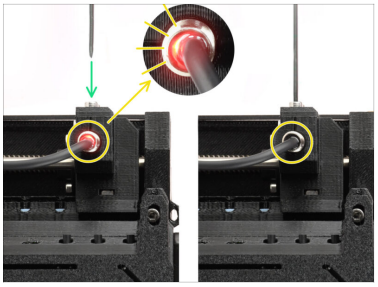


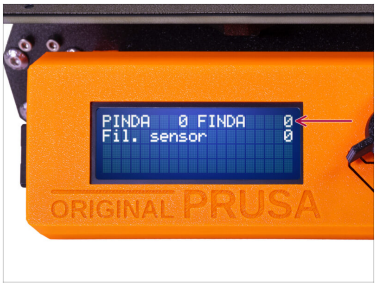
- If you built the MMU3, the **SuperFINDA sensor** inside the selector must be calibrated.
- For **factory-assembled MMU3** units, the SuperFINDA is pre-calibrated, so you can skip the calibration steps.
- In the next step, we'll calibrate the sensor's position.

⚠ **It is CRITICAL** that both the **filament sensor in the extruder and the SuperFINDA sensor function accurately**. Otherwise, you will have trouble with the device.

- Use the inspection window on the selector to align the bottom of the sensor with the top of the window, as a starting point.
- When filament is in the selector, the steel ball rises and should be detected by the SuperFINDA sensor. Ensure the distance between the ball and the sensor is perfectly calibrated.

STEP 25 SuperFINDA calibration





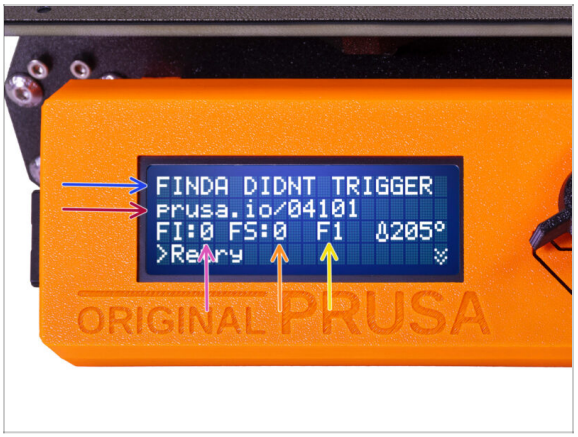
- Take a piece of filament with a sharp tip and insert it into the selector through the brass threaded opening on the front.
- Take a look at SuperFINDA from above and watch for the little red light inside the sensor to turn off when the filament raises the steel ball inside.

  Red light = no filament detected = FINDA 0
  No light = filament detected = FINDA 1
- If the light is still on, lower the SuperFINDA slightly.

  If the light doesn't ever go on, raise the SuperFINDA probe by releasing the screw by its side, moving the probe, and tightening the screw back up.
- Watch the sensor readings on the LCD (**Menu > Support > Sensor info** or **Info > Sensor Info**) Note, there is a slight lag in the sensor's readings on the LCD; proceed slowly.

⚠ Repeat the test, adjusting SuperFINDA height **until consistent readings occur when inserting and removing filament.**

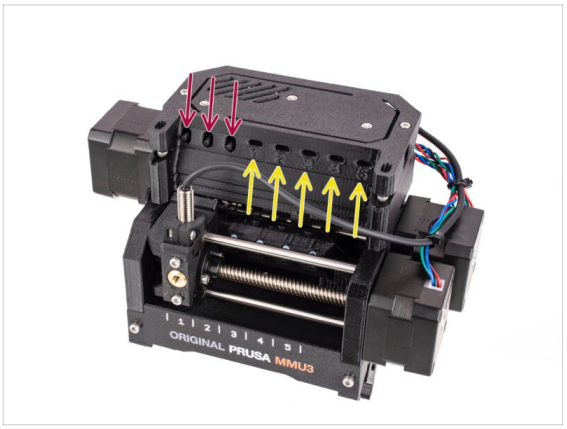
STEP 26 Error code details (Part 1)



- Later on, an **MMU error screen** will show up if something goes wrong during the operation. See the example image; the first line describes briefly, what's the error about.
  - **prusa.io/04101** is a web address, where you can view a detailed article about the exact issue, and how to fix it.
  - **FI:0** / **SuperFINDA** sensor reading. **FI:0 / OFF** = no filament detected. **FI:1 / ON** = it is detecting a filament.

    (Note the FINDA status reading on the LCD has a slight delay.)
  - **FS:0** = **Filament Sensor** reading. This is the sensor inside the chimney on the extruder / print head.
  - **F1** is the expected filament position. It means, the selector is in the first position. **1>3** would mean, the selector is changing from the first to the third. **F?** = position not yet set.

STEP 27 Error code details (Part 2)

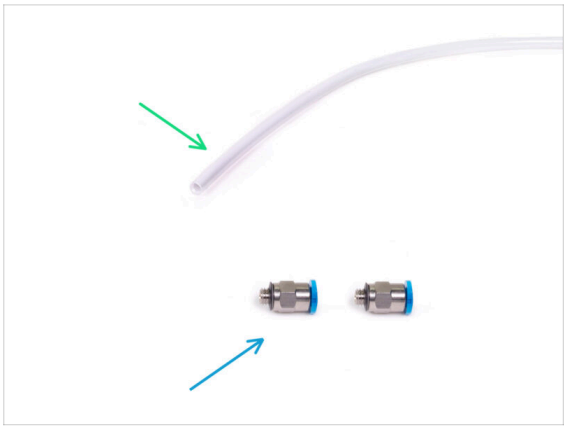


- The bottom line are the **solution buttons**. Some errors have multiple solutions.
  - In the bottom right corner, selecting the two **downward arrows** will get you a more detailed error description and possible solution, if the error persists.
- MMU unit being in an **error state** is also indicated by its LED lights flashing.
- While in an **ERROR state**, the buttons on the MMU unit can be used to resolve the error too.
  - The **middle button** usually replicates the LCD solution buttons function.

⚠ Note, if the MMU unit is in **IDLE state**, the buttons **have a different functions;** For example; If there is no filament loaded, the side buttons can be used to move the selector right and left. But more on that later.

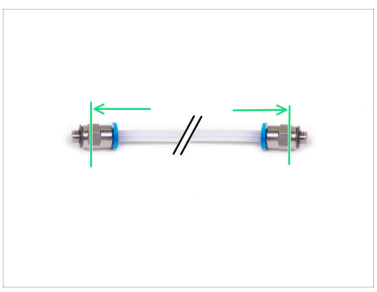
While in an error state, the printer might be beeping. You can change the **Sound setting** in the Tune or Settings menu.

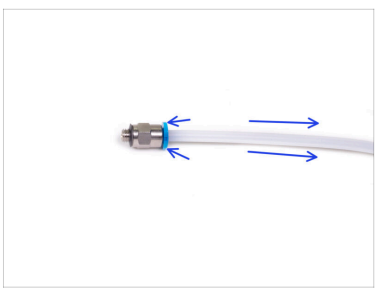
STEP 28 MMU-to-Extruder PTFE tube parts preparation

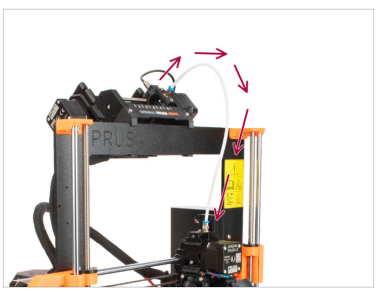


- **For the following steps, please prepare:**
- 360x2.5mm PTFE tube (1x)
  - The **new PTFE** tube has an **internal diameter of 2.5mm**. In case you are upgrading from the 2mm ID MMU2S tube, and you have trouble distinguishing between the old and the new one, try comparing the internal diameter of the two. See the second picture. The tube on the left is the new one.
  - A 2.5mm ID PTFE tube is required for the MMU3.
- M5-4 fittings (2x)
  - The fittings may have either a blue or a black collet. Functionally, they are the same.

STEP 29 MMU-to-Extruder PTFE tube

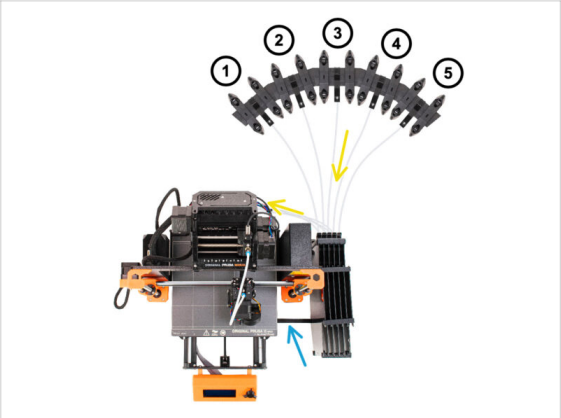






- Attach the fittings onto both sides of the new PTFE tube (4x2.5x360mm)
  - Push the PTFE tube in fully.
  - *Quick tip:* **If you need to remove the PTFE tube** from the fitting, press the collet in. While the collet is pressed, first press the PTFE tube in, then pull it out entirely.
- Attach the PTFE tube onto the printer. One end goes onto the selector. The other goes onto the extruder. Tighten the fittings up using the Unikey.

STEP 30 Spoolholders setup



Congratulations! The hardest part is over.

- The Buffer and spools setup in the picture is the one we will be trying to achieve. Arrange the **spool holders** and the **buffer** as seen in the picture.
- Hook up the "printer holder" part on the buffer to the extrusion on the printer.
- The PTFE tubes go from the spoolholders to the buffer. Then, from the buffer to the back of the MMU.

⚠ Note the spool holder positioning. It is important that filament has **as straight path as possible** and that nothing interferes. PTFE tubes should **not be bent too much**. Otherwise, the filaments will jam.

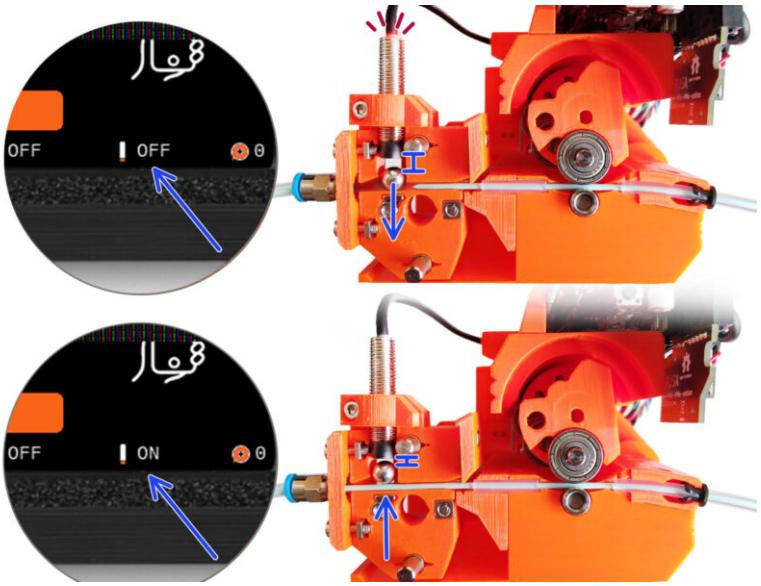
Note that due to the decreased filament friction in the MMU3 compared to the MMU2S, some of the 3rd-party MMU2S re-winding spool holders might no longer work with the MMU3.

STEP 31 Connecting Buffer PTFE tubes

- Connect the PTFE tubes **from the MMU** unit to the **BOTTOM row of collets** on the buffer, ensuring you match the numbering on both the buffer and the MMU unit.
- Attach each end of the PTFE tube from the Buffer to the PTFE holder on each Spool holder.

Make sure each spool holder is hooked up to the corresponding filament position number. (marked 1 to 5 on the MMU unit and the buffer.)

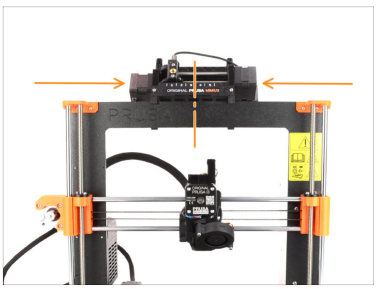
10C. MK3.5 Setup and Calibration

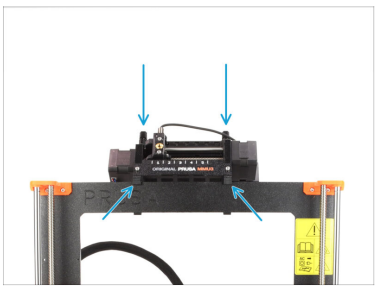


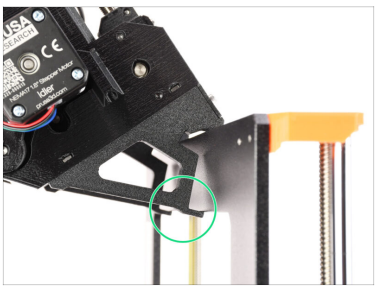
STEP 1 Tools necessary for this chapter

- **Please prepare tools for this chapter:**
- Unikey for tightening up the Festo fittings.
- 1.5mm Allen key for Filament sensor calibration
- 2.5mm Allen key for M3 screws
- Phillips screwdriver for power cable terminals

STEP 2 Attaching the MMU unit (part 1)



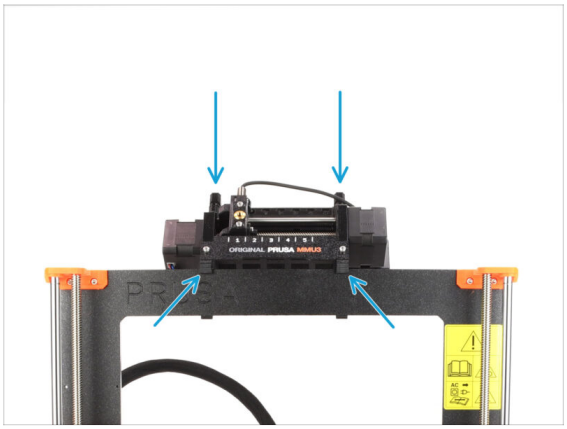


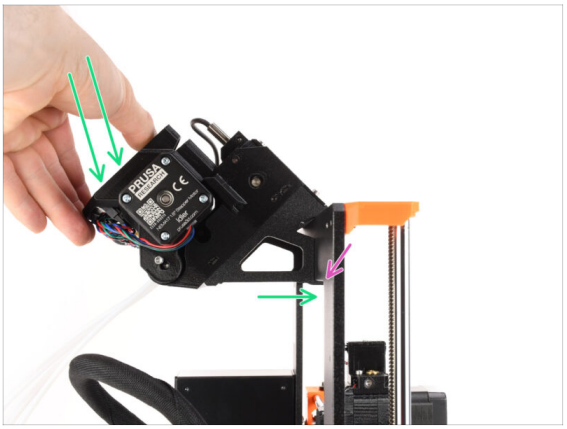


- The MMU3 unit should be placed in the middle of the top part of the printer's aluminum frame.
- Place the MMU3 unit onto the frame.

  Attach it just by the top hooks.
- Look from behind, there are "clamps", which will be used to lock the unit to the frame in the next step.

STEP 3 Attaching the MMU unit (part 2)





- Make sure the unit is in the middle of the frame. Once we engage the clamps, it won't move left and right as easily anymore.
- Press the back part of the MMU3 unit downwards slightly, until the clamps lock to the frame.
- Check that both bottom clamps on the unit are fully engaged.

ⓘ If you need to remove the unit from the frame, simply lift the back part up to disengage the clamps.

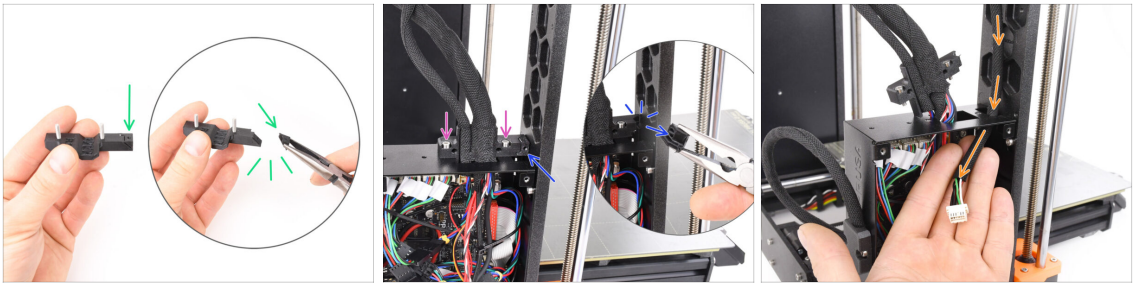
STEP 4 Guiding the cable

ⓘ Now, we will guide the cables from the MMU unit into the printer.

⚠ Make sure the printer is turned OFF and unplugged from the wall outlet. Do not ever connect or disconnect the MMU unit while the printer is ON.

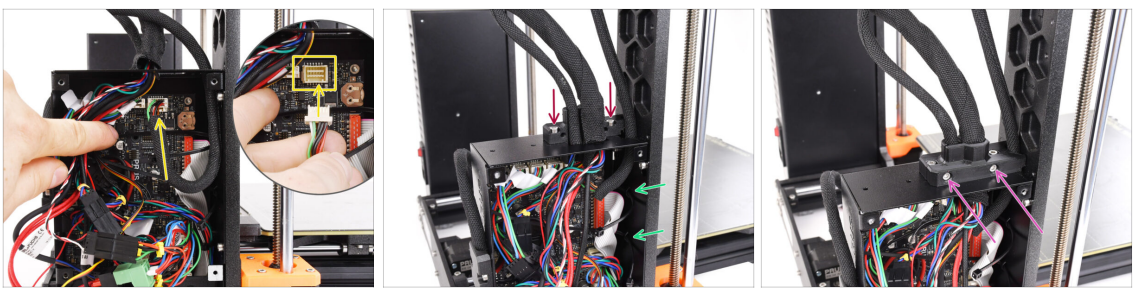
- Guide the cable bundle from the MMU unit towards the printer's electronics. The cable should be placed just next to the printer's frame.

STEP 5 MK3.5 Cable installation



- Take the **Ext-cable-holder-a** plastic component. There is a small part that needs to be breaked off in order to make space for the MMU cable. Remove the part using needle-nose pliers.
- Similarly, remove the break-off part on the **Ext-cable-holder-b**.
- Loosen the two M3x10 screws on top of the cable cover.
- Guide the **MMU/Printer cable** through the corresponding opening into the xBuddy box.

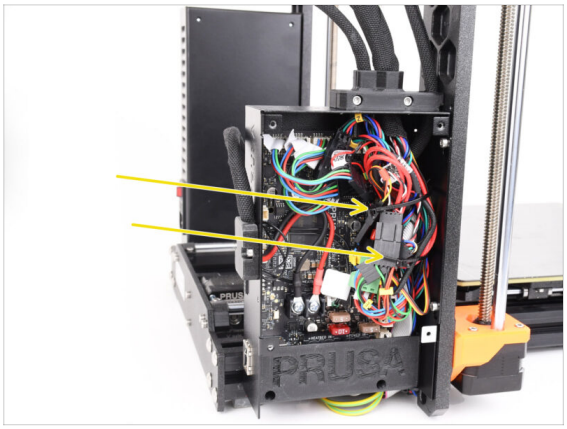
STEP 6 MK3.5 Cable management

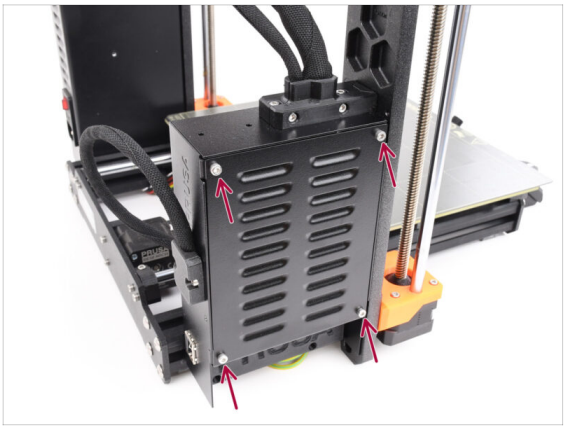


- **Plug the MMU/Printer cable** into the corresponding connector on top of the xBuddy board.
- Attach the **cable-holder-b** back onto the xBuddy box using two M3x10 screws.
- Insert two new zip-ties into the marked opening on the inside of the xBuddy box. Make sure the zip-ties wrap around the cable bundle.
- Attach the **cable-holder-a** part using two M3x18 screws. Make sure no cable is getting pinched.

ⓘ To verify the remaining cable connections are connected properly, refer to the MK3.5 assembly guide

STEP 7 MK3.5 Closing the electronics box

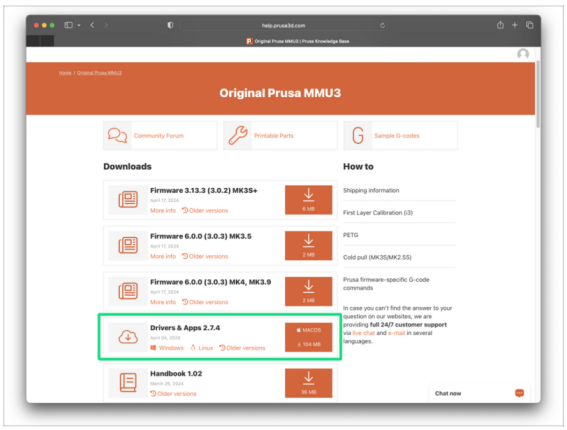


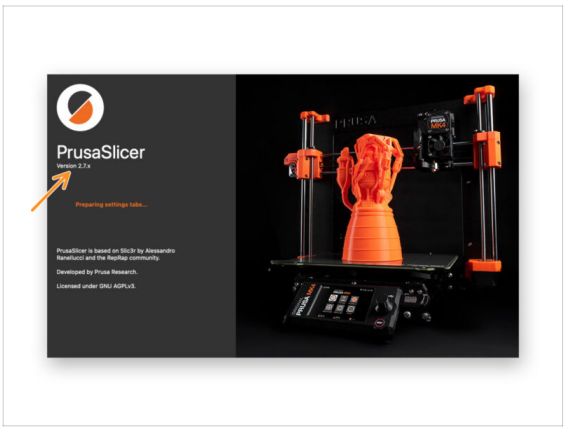


- Ensure all connectors in the cable bundle remain fully inserted.
- Wrap the **zip-ties** around the cable bundle and **gently tighten**. Cut off the remaining zip-tie.

  ⚠ Secure the zip-ties snugly but not too tight to avoid the risk of accidentally disconnecting or damaging the cables.
- Align the xBuddy box cover with the xBuddy box and secure it with four M3x6 screws.

STEP 8 Software Download

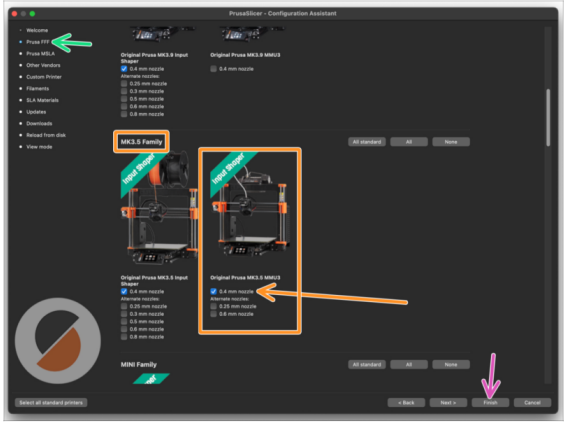


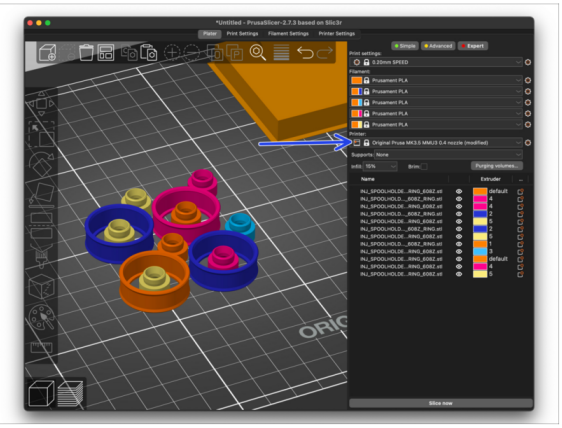


- Visit the MMU3 page on Help.Prusa3D.com
- Download the latest **Drivers & Apps** package.
- Leave this page open for the upcoming steps!
- Install the downloaded package on your computer and open the **PrusaSlicer** app.

  ⓘ **PrusaSlicer** is part of the Drivers package. It includes the firmware upgrade tool. The Drivers package also includes some sample objects to be printed.

STEP 9 PrusaSlicer setup for MMU3

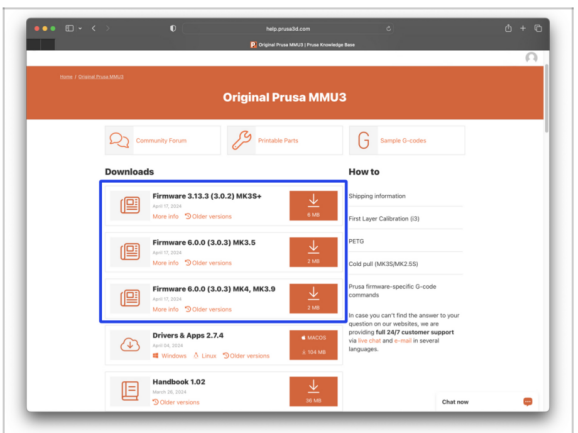




- Open the PrusaSlicer Assistant / Wizard. (Configuration > Configuration Assistant > Prusa FFF)
- Scroll down to **MK3.5 Family** and make sure that the corresponding printer + **MMU3** option is selected.
  - ⓘ The default **nozzle is 0.4mm** from factory.
- Click Finish to close the Wizard.
- In **Printer:** menu, select the **MMU3** printer profile for future slicing.

Note, the MMU3 on MK3.5 is reverse-compatible with the older MK3S+ MMU3 or MMU2S Slicer profile and G-codes - but not with the MMU2 profiles!

STEP 10 Firmware files download

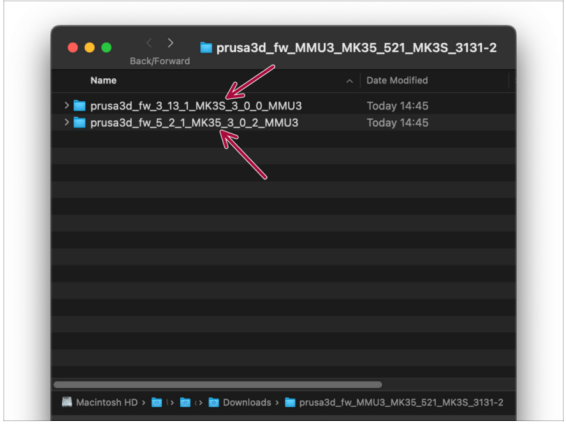


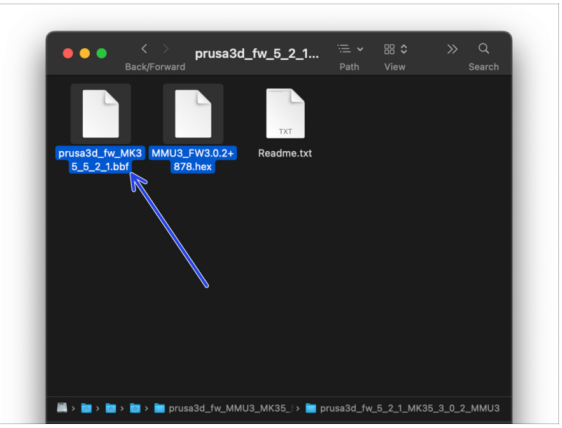
⚠ You will need to update both the firmwares for the printer as well as the MMU unit. Use only a combination of the newest firmware versions for both devices together.

⚠ Please refer to the MMU3 Firmware Compatibility article to find out exactly which firmware version you need.

- Head back to Help.Prusa3D.com
- Download the lastest **Firmware** package **for your printer** model.

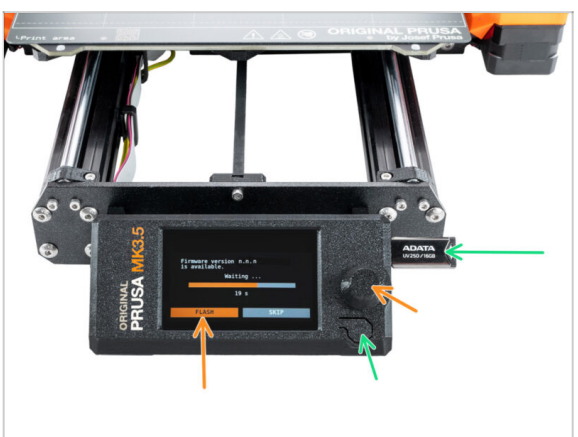
STEP 11 Selecting a Printer firmware file





- Open up the firmware bundle you have downloaded earlier. Open one of the folders dedicated to the MK3.5 printer (marked by **MK35**)
- There are two firmware files in the folder. One for the printer, the other one for the MMU unit.
  - As a firmware file for the **MK3.5**, select the MK35 **.bbf** file

STEP 12 MK3.5 Firmware flashing (part 1)



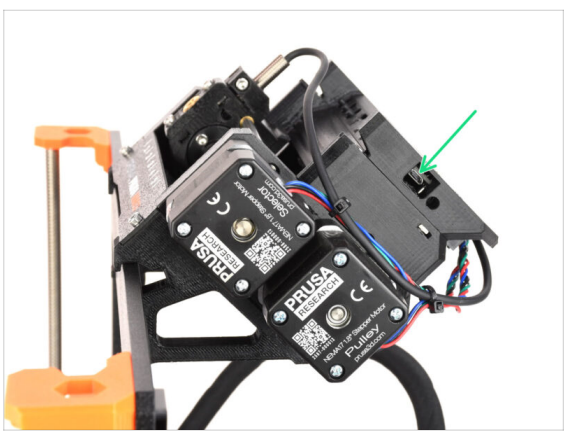
- Connect the printer to the electricity and **turn it on**.
- Now, let's flash the **printer's firmware**.
- To flash the **MK3.5** printer, insert a USB drive with the firmware file into the printer. Then, restart the printer using the reset button.
  - On the Firmware update screen, choose **"FLASH"** and wait for the process to complete.

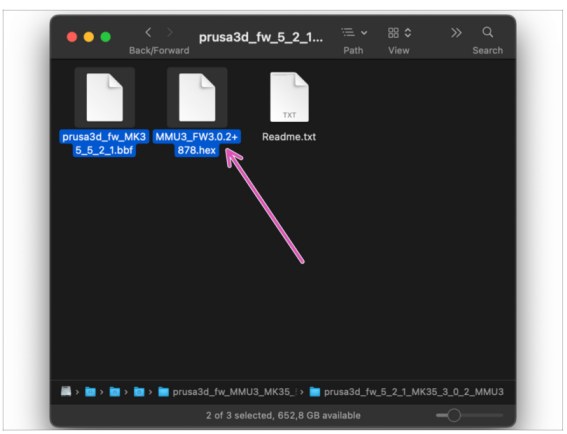
STEP 13 MK3.5 Turning the MMU on

- After finishing the firmware update, **make sure there are no filaments loaded** neither in the extruder, or in the MMU unit.
- Navigate to the **LCD menu > Settings > MMU**

  and make sure the **MMU** is turned **on**.
  - This option not only turns on the MMU functionality in the firmware, but also turns on the power for the MMU unit, which is necessary to do a FW update.
  - From now on, the reset button on the printer resets also the MMU unit. Wait for a while, the MMU unit will go through the self-test routine. (accompanied by flashing LED lights on the MMU unit) **Wait until it boots up** properly, before issuing any commands to the printer.
- Since you've converted the extruder to the MMU version, when prompted to reconfigure the filament sensor's behavior, which will appear immediately, choose '**Continue**'.
  - Extruder type can be changed in **Settings > Hardware > Extruder**

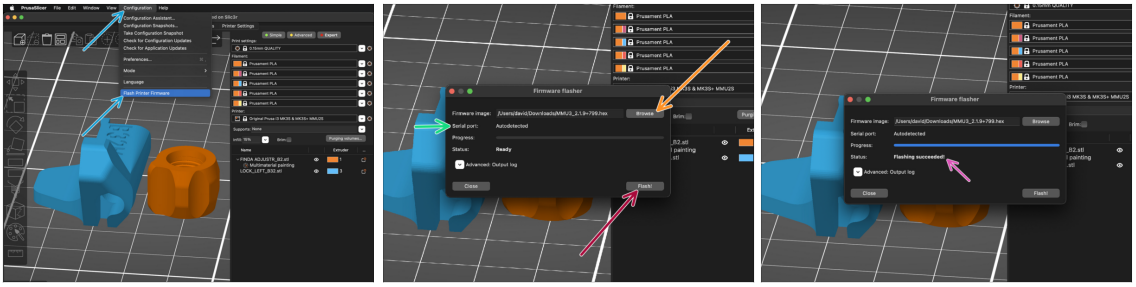
STEP 14 MMU3 Firmware flashing (part 1)





- The MMU3 firmware file needs to be flashed into the MMU unit itself. Find the **microUSB** connector on the right side of the MMU3 unit.
- Connect the unit to your computer using the bundled microUSB cable.
- On your computer, select the appropriate **MMU firmware file** compatible with your printer model.

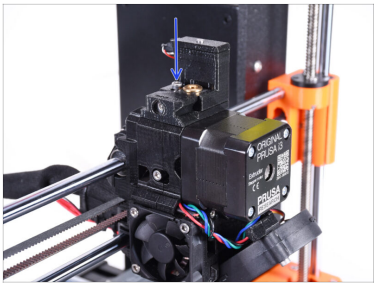
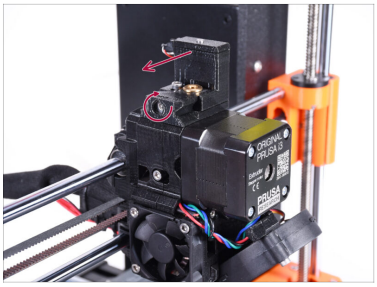
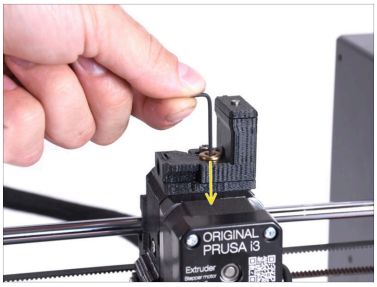
STEP 15 MMU3 Firmware flashing (part 2)



- Open PrusaSlicer and select **Configuration ->Flash Printer Firmware** from the top menu.
- Hit **Browse** and select the MMU3 firmware image file on your computer. (e.g. MMU3_3.0.0.hex)
- Serial port should be auto-detected.
- Hit the **Flash** button.
- Wait until the **Flashing Succeeded!** message appears.
- After the flashing finishes, disconnect the USB cable.

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

STEP 16 IR filament sensor calibration (Part 1)

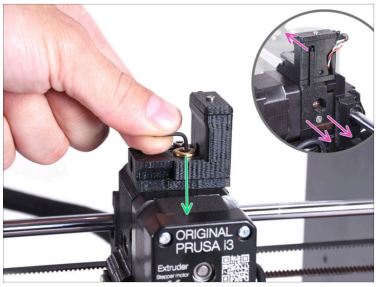




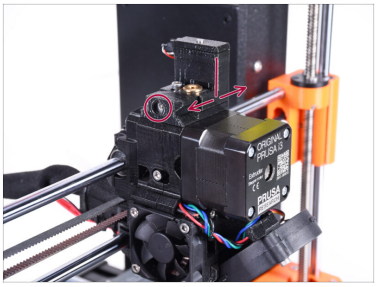
⚠ In the following steps, we will calibrate the IR Filament sensor iside the Chimney on the extruder. Follow the instructions carefully, **this part is very important!**

- Using a 2.5mm Allen key, make sure the **lock screw** for the chimney is not tightened up. Don't remove it entirely. It holds the chimney together.
- Carefully tighten the **calibration screw** on the side so that the chimney moves all the way to the left.
  - When **tightening** the calibration screw, the chimney moves to the left, making it **less** sensitive to triggering.
  - When **loosening** the calibration screw, the chimney moves to the right, making it **more** sensitive to triggering.
- Tighten the calibration screw until the chimney moves all the way to the left.
- Insert a 1.5mm Allen key into the extruder. Don't push it all the way in yet.

⚠ Make sure you are using the thinnest of the bundled Allen keys; 1.5mm. Do not use the 2mm one!!

STEP 17 IR filament sensor calibration (Part 2)





- Go to **Info > Sensor Info** on MK3.5

  The Fil. sensor should indicate **NINS** (not inserted) when the Allen key isn't pushed all the way in so the idler door isn't tilted outwards.

- Now push the 1.5mm Allen key down until it reaches in between the Bondtech gears.

  (don't be afraid to apply a fair amount of downwards force in order to get the key in between the gears)

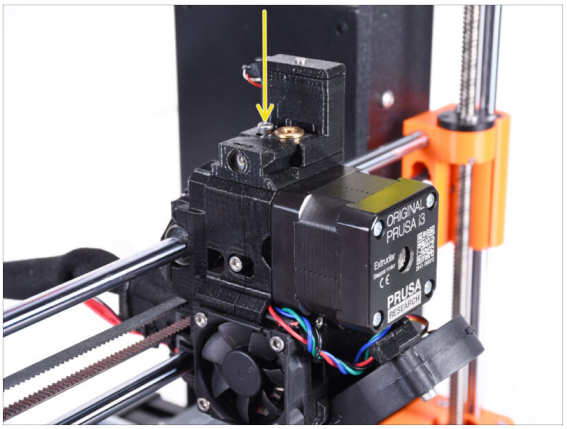
- The idler door on the right of the extruder should tilt outwards slightly simulating an inserted filament.

⚠ The **Filament sensor** line on the LCD now should indicate value **INS** with the Allen key (or a filament) **INSerted**. Keep releasing the calibration bolt until there is **INS on the LCD.**

Then, release it another half turn.

- **By rotating the calibration screw, we need to fine-tune the chimney position so that the number on the LCD reliably changes when inserting and removing the Allen key or filament from the Bontech gears.**

STEP 18 IR filament sensor calibration (Part 3)

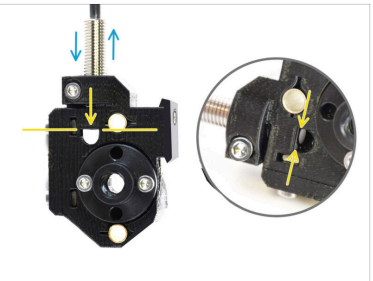


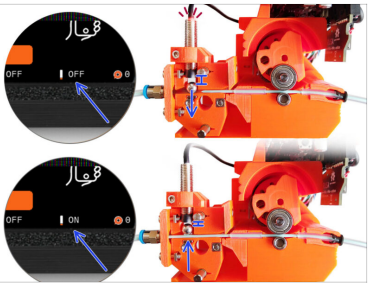
⚠ **Calibrating the IR filament sensor is super-crucial in order for MMU3 unit to work properly!**

ⓘ Please, repeat this check several times.

- Confirm the sensor works correctly: See the LCD again if the **Filament sensor** number
  - displays **INS** when Allen key (/filament) is inserted all the way
  - or **NINS** when it´s not inserted all the way in.
- When the sensor works reliably and correctly, please lock the chimney in place by tightening the lock screw from the top.
- After tightening the screw, verify the readings on the LCD are still correct when inserting and removing the Allen key.

STEP 19 SuperFINDA sensor calibration info



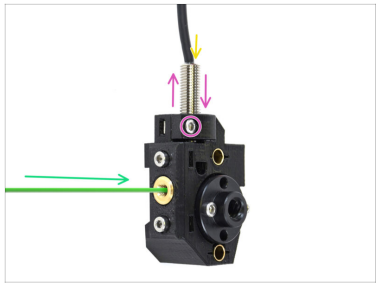


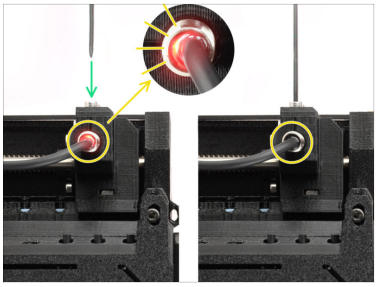
- If you built the MMU3, the **SuperFINDA sensor** inside the selector must be calibrated.
- For **factory-assembled MMU3** units, the SuperFINDA is pre-calibrated, so you can skip the calibration steps.
- In the next step, we'll calibrate the sensor's position.

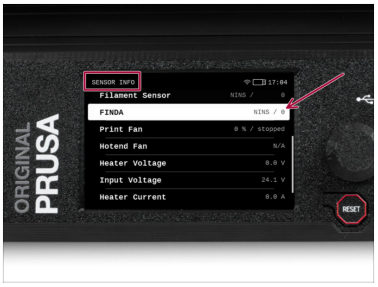
⚠ **It is CRITICAL** that both the **filament sensor in the extruder and the SuperFINDA sensor function accurately**. Otherwise, you will have trouble with the device.

- Use the inspection window on the selector to align the bottom of the sensor with the top of the window, as a starting point.
- When filament is in the selector, the steel ball rises and should be detected by the SuperFINDA sensor. Ensure the distance between the ball and the sensor is perfectly calibrated.

STEP 20 SuperFINDA calibration







- Take a piece of filament with a sharp tip and insert it into the selector through the brass threaded opening on the front.
- Take a look at SuperFINDA from above and watch for the little red light inside the sensor to turn off when the filament raises the steel ball inside.
  - **Red light** = no filament detected = **FINDA NINS / 0 / OFF**

    No light = filament detected = **FINDA INS / 1 / ON**
- If the light is still on, lower the SuperFINDA slightly.

  If the light doesn't ever go on, raise the SuperFINDA probe by releasing the screw by its side, moving the probe, and tightening the screw back up.
- Watch the **sensor readings on the LCD** (Info > Sensor Info -> FINDA) Note, there is a slight lag in the sensor's readings on the LCD; proceed slowly.

⚠ Repeat the test, adjusting SuperFINDA height **until consistent readings occur when inserting and removing filament.**

STEP 21 Error code details (Part 1)

- Later on, an **MMU error screen** will show up if something goes wrong during the operation. See the example image; the first line describes briefly, what's the error about.
- prusa.io/04101 is a web address, where you can view a detailed article about the exact issue, and how to fix it.
- The status of the filament sensor is always displayed in the Footer section of the error screen to assist in diagnosis.
- Adjacent to it, you will find the status of the Finda sensor.

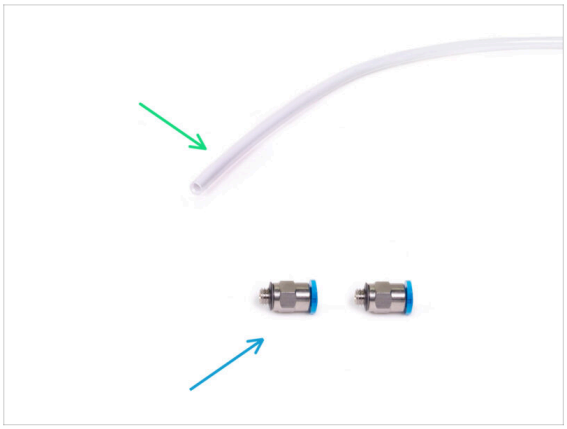
(Note the FINDA status reading on the LCD has a slight delay.)

STEP 22 Error code details (Part 2)

- The bottom line are the **solution buttons**. Some errors have multiple solutions.
- You can also visit a detailed error description page via the QR code.
- MMU unit being in an **error state** is also indicated by its LED lights flashing.
- While in an ERROR state, the buttons on the MMU unit can be used to resolve the error too.
  - The **middle button** usually replicates the LCD solution buttons function.

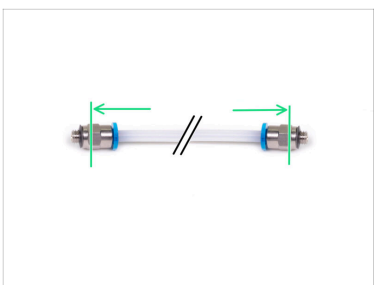
⚠ Note, if the MMU unit is in **IDLE state**, the buttons **have a different functions**; For example; If there is no filament loaded, the side buttons can be used to move the selector right and left. But more on that later.

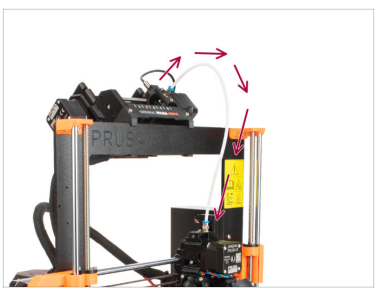
STEP 23 MMU-to-Extruder PTFE tube parts preparation



- **For the following steps, please prepare:**
- 360x2.5mm PTFE tube (1x)
  - The **new PTFE** tube has an **internal diameter of 2.5mm**. In case you are upgrading from the 2mm ID MMU2S tube, and you have trouble distinguishing between the old and the new one, try comparing the internal diameter of the two. See the second picture. The tube on the left is the new one.
  - A 2.5mm ID PTFE tube is required for the MMU3.
- M5-4 fittings (2x)
  - The fittings may have either a blue or a black collet. Functionally, they are the same.

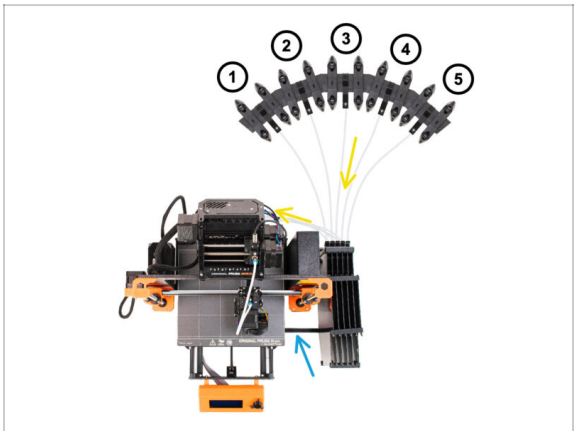
STEP 24 MMU-to-Extruder PTFE tube





- Attach the M5-4 fittings onto both sides of the new PTFE tube (4x2.5x360mm)
  - Push the PTFE tube in fully.
  - *Quick tip:* **If you need to remove the PTFE tube** from the fitting, press the collet in. While the collet is pressed, first press the PTFE tube in, then pull it out entirely.
- Attach the PTFE tube onto the printer. One end goes onto the selector. The other goes onto the extruder. Tighten the fittings up using the Unikey.

STEP 25 Spoolholders setup



Congratulations! The hardest part is over.

- The Buffer and spools setup in the picture is the one we will be trying to achieve. Arrange the **spool holders** and the **buffer** as seen in the picture.
- Hook up the "printer holder" part on the buffer to the extrusion on the printer.
- The PTFE tubes go from the spoolholders to the buffer. Then, from the buffer to the back of the MMU.

Note the spool holder positioning. It is important that filament has **as straight path as possible** and that nothing interferes. PTFE tubes should **not be bent too much**. Otherwise, the filaments will jam.

Note that due to the decreased filament friction in the MMU3 compared to the MMU2S, some of the 3rd-party MMU2S re-winding spool holders might no longer work with the MMU3.

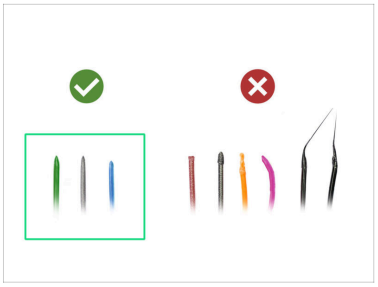
STEP 26 Connecting Buffer PTFE tubes

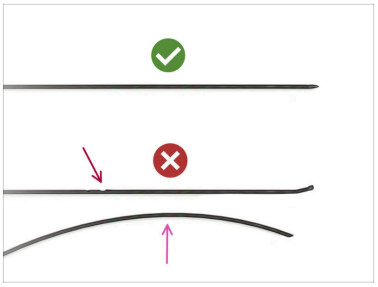
- Connect the PTFE tubes **from the MMU** unit to the **BOTTOM row of collets** on the buffer, ensuring you match the numbering on both the buffer and the MMU unit.
- Attach each end of the PTFE tube from the Buffer to the PTFE holder on each Spool holder.

Make sure each spool holder is hooked up to the corresponding filament position number. (marked 1 to 5 on the MMU unit and the buffer.)

11. First Flight

STEP 1 Filament preparation



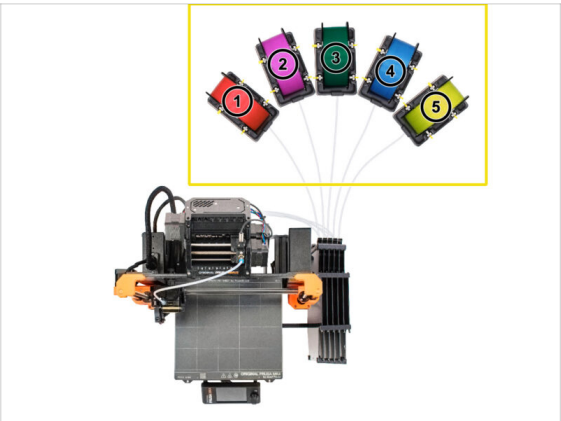


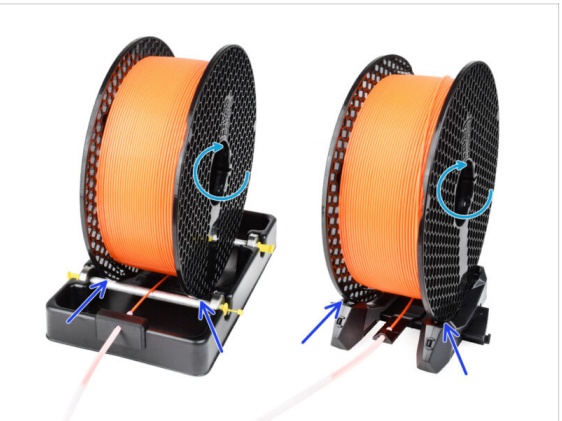
We can now move on to loading the filaments in and printing the test object! But first;

- Please prepare at least **five different PLA filaments** and **cut off the ends** to form a round **sharp tip** on each - as seen in the picture.
- The filaments must have a **sharp tip** in order to load properly into the MMU as well as into the printer. If the tip is deformed, bent or larger in diameter, it won't load properly.
- Inspect the last **40cm** (15") of each filament. Make sure there are **no dents** in it. Sometimes, if filament got jammed before, the pulley wheel makes an indent in it. This part of the filament can no longer be grabbed and moved by the MMU unit and must be cut off.
- If the filament end is bent, straighten it. **It must be perfectly straight.**

Use only high-quality filament with guaranteed low diameter deviation. In case you have filament loading / unloading issues in the future, re-visit this step as well. Make sure the filament is dried up. Moisture-sensitive filaments can be problematic during the MMU operation.

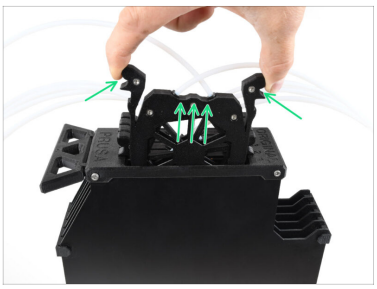
STEP 2 Suggested filament layout

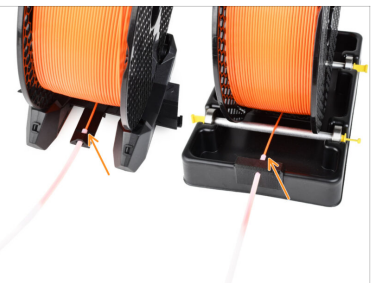


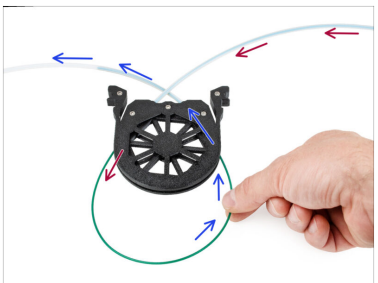


- Lay down the five filaments onto the spool holders. Make sure the spools do not interfere one with another.
- ⓘ Filament positions are labeled **1,2,3,4,5** from the left to right, from the user's point of view.
- Adjust each spool holder so that the spool fits the rollers correctly.
- Verify the spool is **able to rotate freely** and nothing interferes.

STEP 3 Loading a filament through the buffer

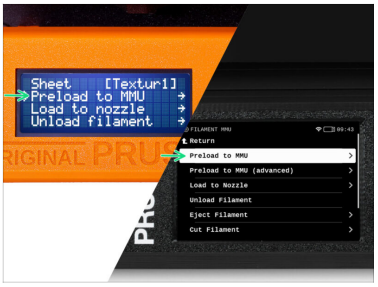


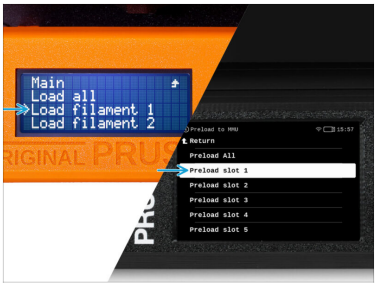




- Take the cassette for **filament 1** out of the buffer.
- Insert the **tip of the filament** into the bottom PTFE tube attached to the spoolholder.
- Keep pushing the filament into the PTFE tube until it appears in the corresponding buffer cassette.
- Take the tip and insert it through the cassette into the other PTFE tube, which goes into the MMU unit. Don't push it all the way into the MMU yet.

STEP 4 Preloading a filament to MMU

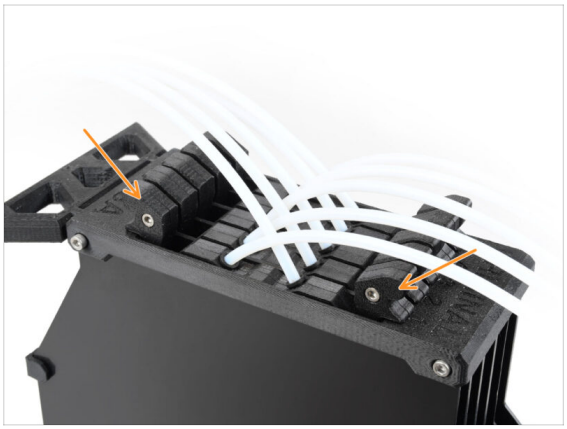




- On the printer, go to the **Menu -> Preload to MMU** (**Filament -> Preload to MMU** on MK3.5/MK4)
- Select **Filament slot 1**. The MMU unit will engage the idler into the first position and start rotating the pulley until the filament is loaded in.
- Keep pushing the corresponding filament end into the PTFE tube from the buffer into the MMU, until you feel the filament being pulled in.

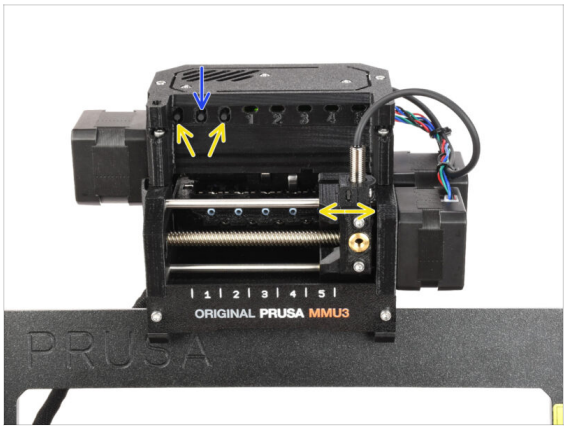
⚠ Remember, the filament tip must be straight and sharp in order to load it properly.

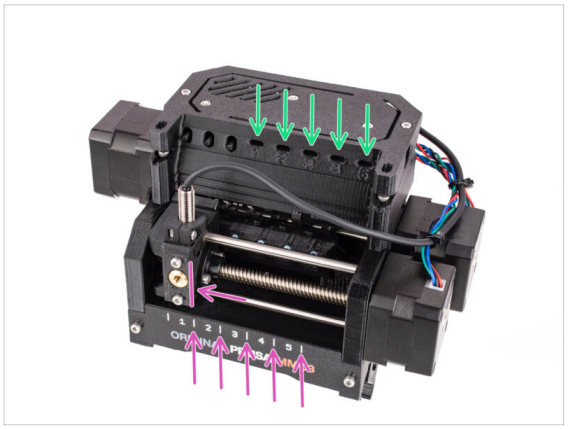
STEP 5 Closing the buffer



- After a given filament is successfully loaded into the MMU, return its cassette back into the buffer.
- Repeat the same process for the other filament positions, until you successfully load **all five filaments** into the MMU.

STEP 6 Pro tip: Loading using the buttons.



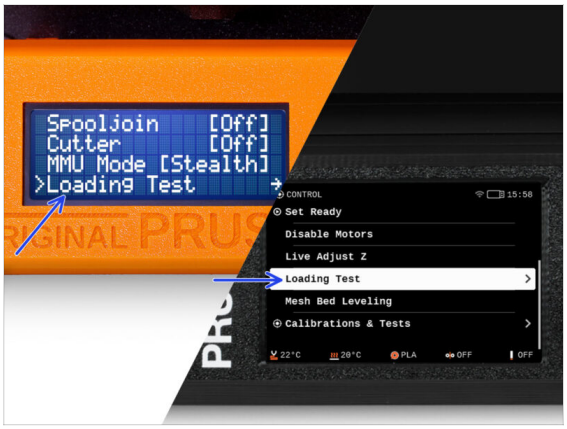


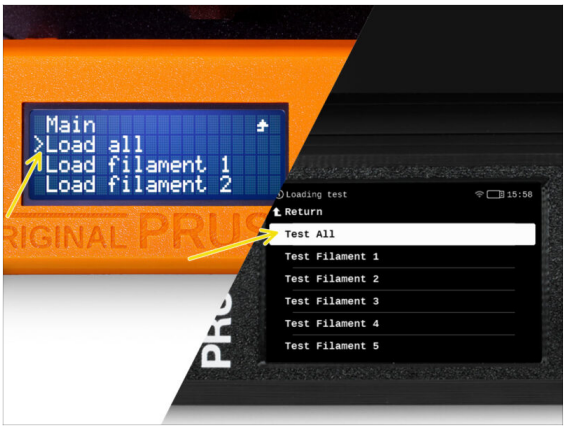
- You can also load a filament into the MMU using the buttons on the unit. Next time you load a filament, use the method you prefer. Either from the LCD menu, or using the physical buttons.
  - **While the MMU is idle**; (indicated by ALL LED lights OFF)
  - **The middle button** starts or aborts the filament preloading to MMU.
  - The **side buttons** move the selector left and right to switch filament positions.
- Use the side buttons to move the selector onto the desired filament position indicated by the selector being aligned with one of the lines on the label-plate.
- The ongoing **loading** process is indicated by a **blinking green LED** light for the respective filament position.

ⓘ **Stable green LED** light means the given filament is loaded to extruder.

Note, after you issue a command to the MMU unit, wait and let it finish the operation. Don't rush. Don't play around with the printer in the meanwhile. **Let it finish first if the MMU unit does something (homing, loading, unloading).**

STEP 7 Loading test (part 1)



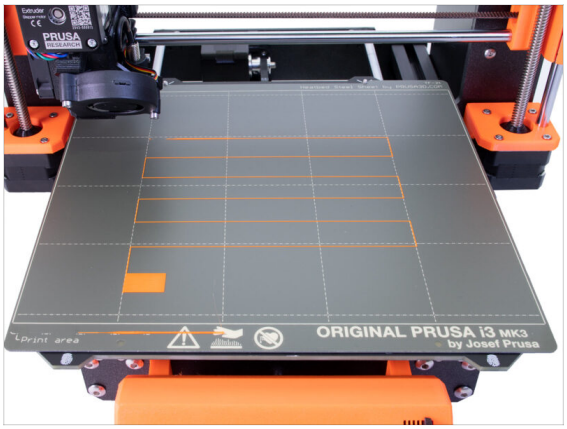


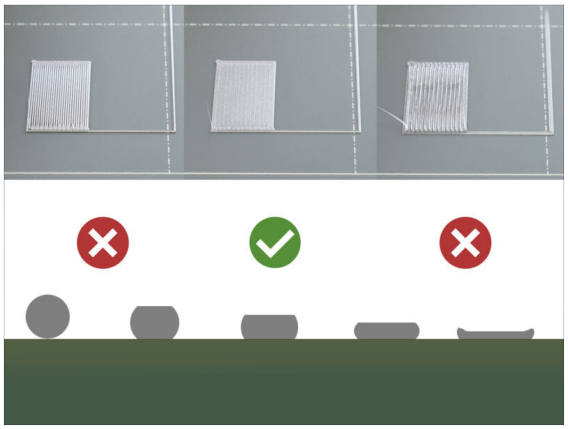
- Go to the **Menu > Settings > Loading Test** or **Control > Loading test** (on MK3.5/MK4)
- Select the filament type to preheat (PLA)
- Select **Load all / Test All** Or **test all the filaments from 1 to 5 manually**, if "Test All" item is unavailable on your firmware version.
- The MMU unit will now load and then unload all five filaments to see if all work correctly.

STEP 8 Loading test (part 2)

- On the **MK3.5 / MK4** printer, you can check the filament sensor's status in the "footer" area of the LCD screen to see if it's detecting the filament correctly.
- While your MK3S+ loads a filament into the extruder, it performs the loading check: **Solid blocks** should be generated on the bottom of the LCD representing the IR filament **sensor detecting a filament** during the process.
  - If there are **lines** instead of some of the solid blocks, it means the Filament sensor in the extruder is providing an **intermittent reading** and might require some aditional tuning.
  - In case several loading retries fail, a corresponding error screen is shown.

STEP 9 Z axis and first layer calibration (optional)

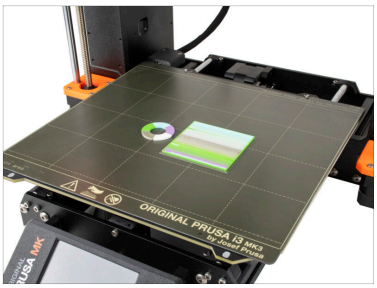


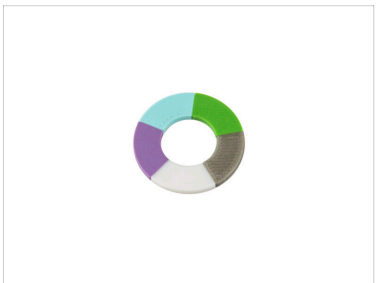


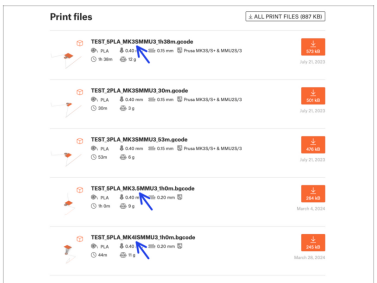
⚠ **IMPORTANT:** This step is necessary for the **MK3S+ / MK3.5** if you worked on the extruder head previously. If you only upgraded the old chimney to the new one, you can skip to the next step and use the **Live Adjust Z** function as usual to fine-tune the first layer.

- Go to **LCD Menu - Calibration - Calibrate Z.**
- Then run the First Layer Calibration.

STEP 10 Printing a test object



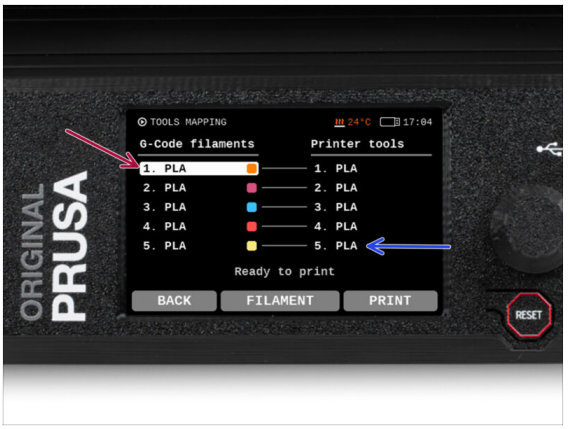




ⓘ We need to print a test object to verify that everything works correctly. Don't worry, it will be a quick print.

- Visit MMU3 Test objects on Printables.com
  - In the Print files section, download a G-code file pre-sliced for your **printer model.**
  - Save the **.gcode** or **.bgcode** file onto a storage media and print the test object.

STEP 11 Tools Mapping (MK3.5 / MK4)



- When you start a print on the MK3.5 or MK4, the **Tools Mapping** screen appears. This allows you to reassign the extruders with the specified color to another one as needed.
  - On the left side, you'll see a list of the required materials and their colors, as specified in the G-code file.
  - On the right side, you'll find a list of materials currently available on the printer, that will be used to print the object.

  For example, if the G-code requires orange filament in the first position, but you have orange loaded in the fifth position, select the first position on the left menu and then assign it to the fifth position on the right.

  Double-tap the filament positions or use the encoder to select the filament number.

STEP 12 Printable 3D models

- To further test your new MMU3, have a look at MMU3 Test Objects Collection on Printables.

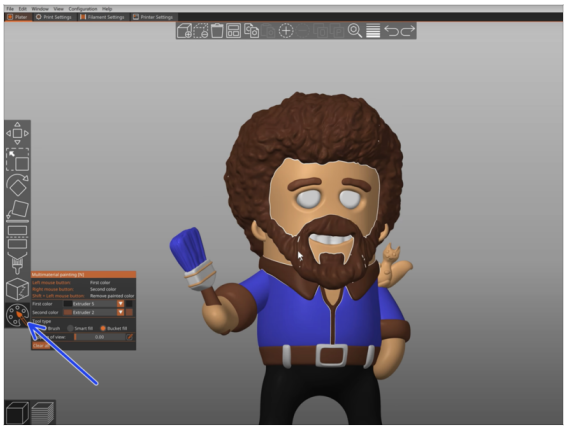
  We recommend printing the cute sheep, which has been the MMU mascot since the beginning.

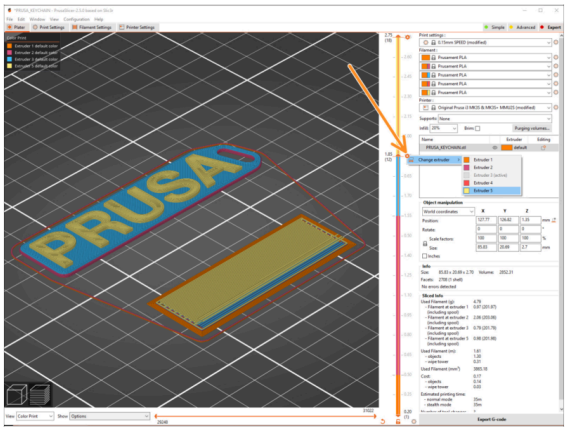
STEP 13 Print & Follow the Handbook.

- Start the print and wait until it finishes. In the meantime you can take a look at the **printed Handbook**.
- All the information regarding calibration, how to organise the printer, buffer, spools, or troubleshooting tips are all in the printed or online Handbook.

  To download the **Handbook** or if you encounter any issues, please visit our knowledge base at: http://help.prusa3d.com/en/tag/mmu3/
- If you are having any issues while printing, follow the on-screen instructions or visit the link from the LCD screen.

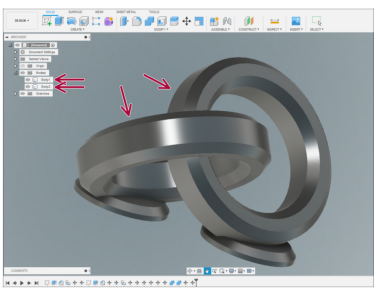
STEP 14 G-code preparation / Custom model preparation

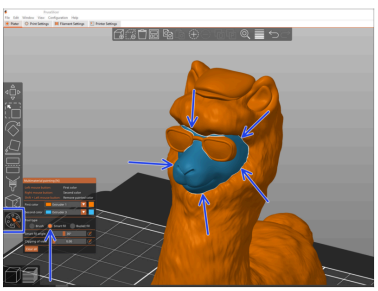


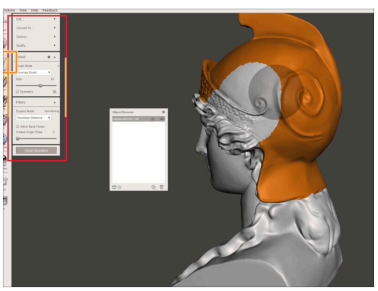


- Already printed all the bundled multi-material models from us as well as those seen at http://Printables.com? **Time to print your own designs!**
- The simpliest way of making a single-body object colorful is the MMU Painting function in PrusaSlicer.
- Basic steps for the manual method are described in our G-code preparation for multi material print section.
- For printing logos or text labels, you might also find the automatic color change at a given layer height useful. Simply, slice an object, select a certain layer height, click the small orange "+" icon next to the height marker and select the desired MMU filament position (Extruder number).

STEP 15 Making your own Multi-material models

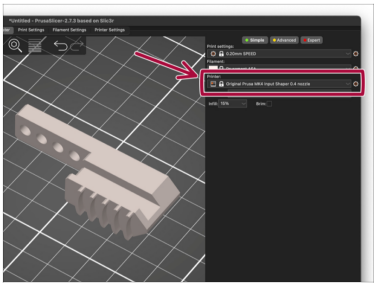
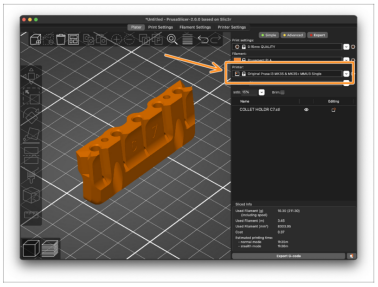
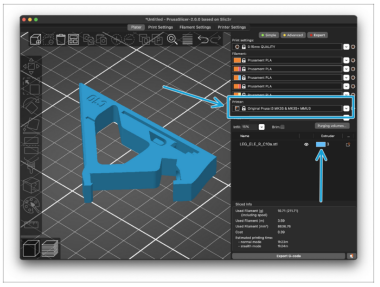






- If you have designed a model with multiple bodies, you may find the Exporting model from Fusion 360 guide useful.
- If you are designing a single-body model, part of which should be MMU-Painted, make sure there is a sharp line surrounding each distinct part so that you can use the **MMU Painting**'s **Smart-fill** function later on in **PrusaSlicer**.
- If you have an intricate STL file that can't be MMU-Painted easily, you can try the more sophisticated way of Splitting STL with single compact part or Splitting STL into multiple parts using MeshMixer.

STEP 16 MMU Single material operation

Did you know that MMU3 unit can also be used to make **single-material printing** more convenient too?

- You can keep up to five of your favorite materials loaded into the MMU unit.
  - On the MK3.5/MK3.9/**MK4**, use the regular MK3.5/MK3.9/**MK4 profile**, when slicing. The printer will allow you to choose which filament to use.
  - On the **MK3S+**, Slice an object with the MMU3 Single profile and start the print. Then, choose which filament to use from the LCD.
- If you know which of the five materials to use already while slicing, you can use the **MMU3 profile** and assign a single color (Extruder number) to the object.
- If a filament runs out, your print can continue automatically using the **SpoolJoin** function. For more information, refer to the SpoolJoin article.

STEP 17 Reward yourself

If you successfully made it all the way to here, you have to reward yourself.

Now, you can finally have some Haribos, while you watch the printer print.

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