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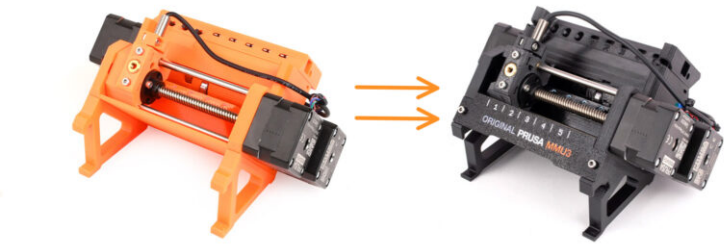
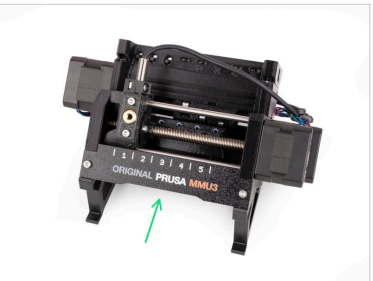
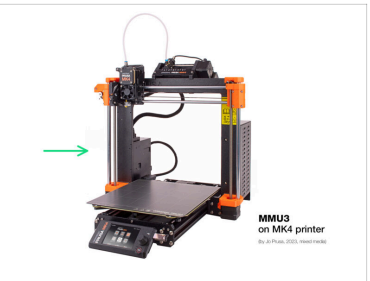
1. MMU Upgrade Intro



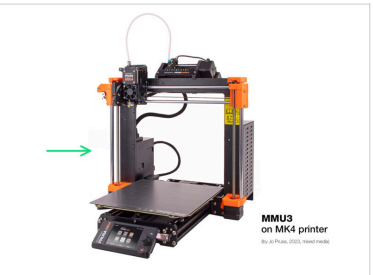
STEP 1 MMU History and Printer Compatibility

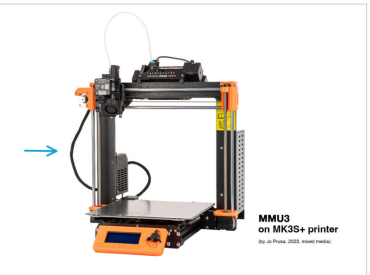




- **Welcome to the MMU3 guide!** There were several generations of the Original Prusa Multi-Material printing solution. Verify you are looking at the correct guide for your MMU unit and your printer.
  - MMU1 for MK2 and MK2S printers (introduced in 2016-2018)
    It used four separate extruders feeding 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.
    This is the version we are going to upgrade from.
  - **And finally, the current model**:
    MMU3 for MK3S+, MK3.5/S, MK3.9/S and MK4/S.
    This is the version we are going to upgrade to.

STEP 2 Supported printers





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

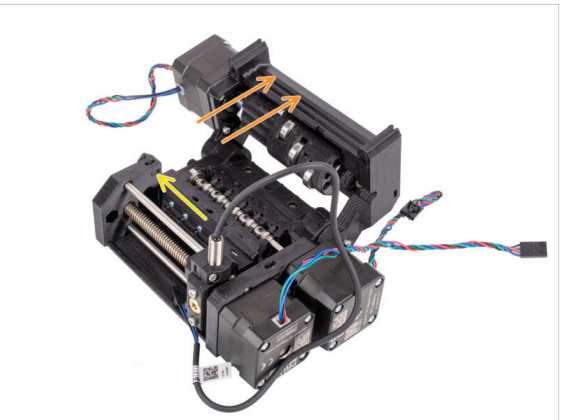
ⓘ For more info, visit the MMU3 Compatibility article.

STEP 3 MMU3 + Enclosure

ⓘ The MMU3 is also supported with the Original Prusa **Enclosure** for the classic printer models.

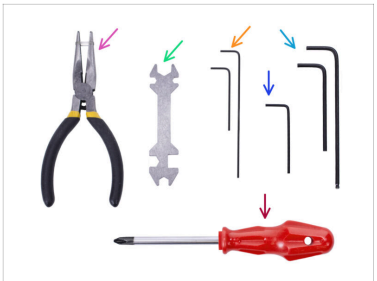
- If you plan to use this combination, **install the MMU3.** Then, continue to the Enclosure assembly guide.

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.

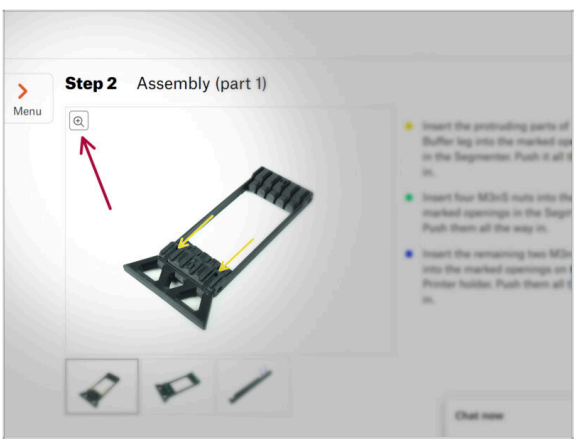
STEP 5 Tools required



- 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

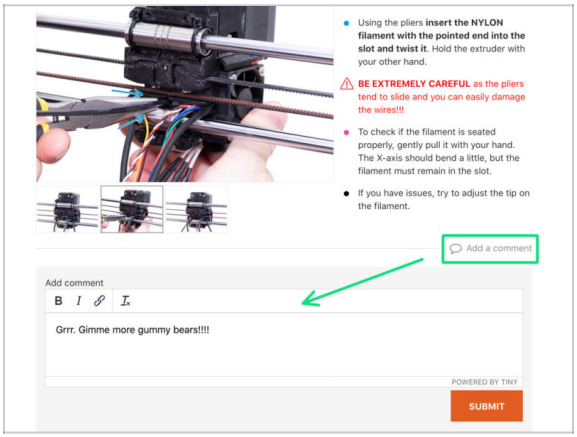


- When you browse the guide on help.prusa3d.com, you can view the original images in high resolution for clarity.
- Just hover your cursor over the image and click the Magnifier icon ("View original") in the top left corner.

STEP 7 Labels guide

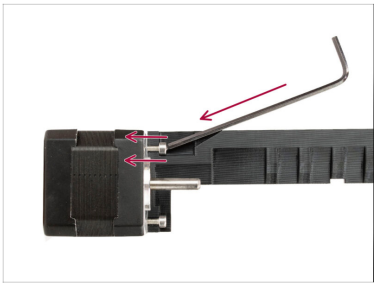
- All the boxes and bags containing the parts for the build are labeled.
- Most of the part drawings on the labels are scaled 1:1 and can be used to identify a part.
- You can download and 2D print a Prusa Cheatsheet with the 1:1 scaled fastener drawings. help.prusa3d.com/cheatsheet. Print it at 100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

STEP 8 We are here for you!



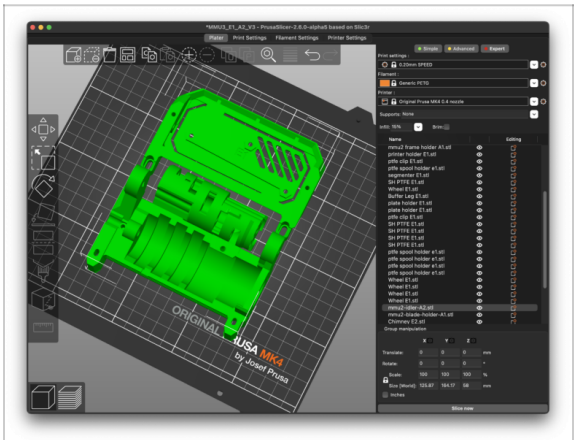
- Lost in the instructions, missing screw or cracked printed part? **Let us know!**
- You can contact us using following channels:
  - Using our 24/7 live chat
  - Or by writing an email to info@prusa3d.com
  - Or, you can use the comments under each step.

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

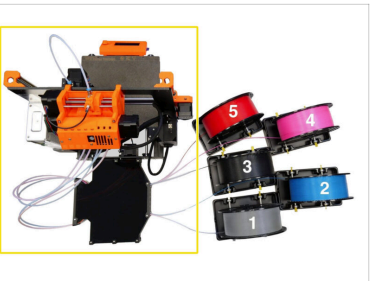
- Tidy up your desk! Tidying up decreases the probability of losing small parts.
- **Clear your workspace.** Make sure you have enough room. A nice clear flat workbench will get you the results you are aiming for.
- **Let there be light!** Make sure you are in a well-lit environment. Another lamp or 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

- 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.

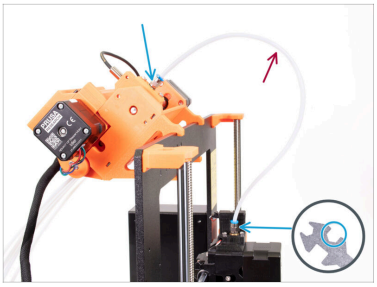
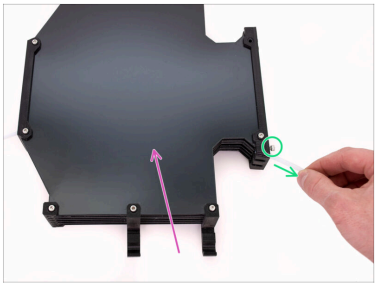
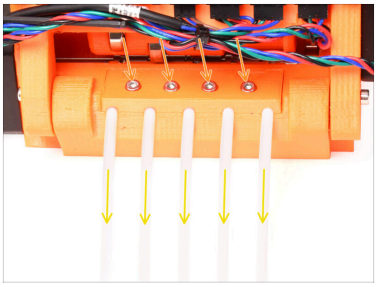
ⓘ Maintain a well-organized workspace to avoid mixing older parts with the new ones. **Although some new components might resemble the old ones, they are actually distinct.** Note that certain components shouldn't be reused for MMU3, while others are necessary for the upgrade.

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.

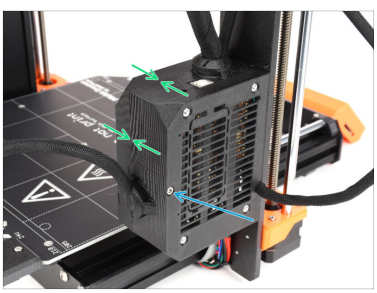
STEP 3 Disconnecting the PTFE tubes

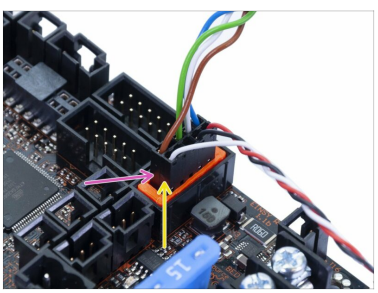




- Unscrew the M5-4 fittings from both the printer and the MMU unit. If the fittings are tight, you can use the Unikey or an 8mm wrench.
- Keep the PTFE tube with the fittings aside for disassembly later.
- We will have to disconnect the buffer from the MMU unit.
  - Loosen all the screws on the buffer 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)



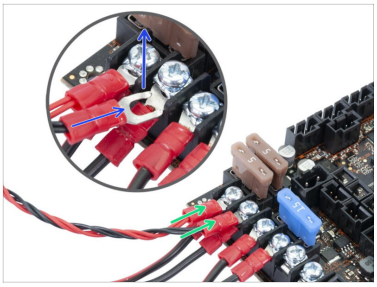


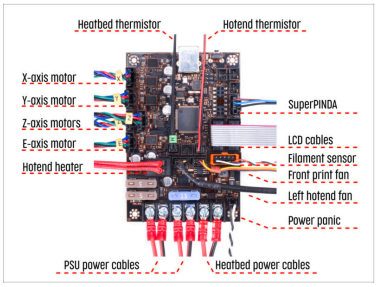
- Loosen the M3x40 screw on the printer's electronics box.
- Open up the electronics box.
- From the MMU, you'll see a **data cable** along with two **power cables**, all connected to the Einsy control board of the printer.

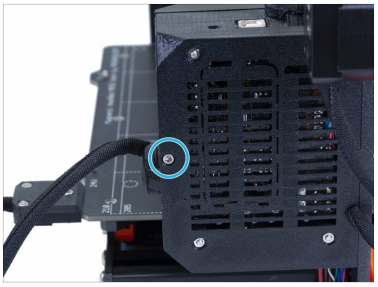
⚠ Never move, connect, or disconnect cables while the printer is powered on. Doing so can cause damage to the electronics.

- 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)

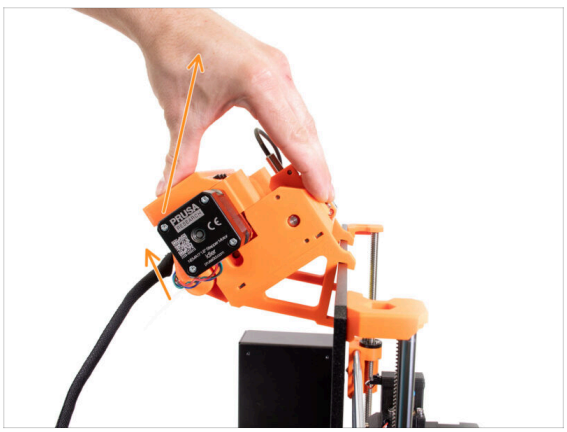


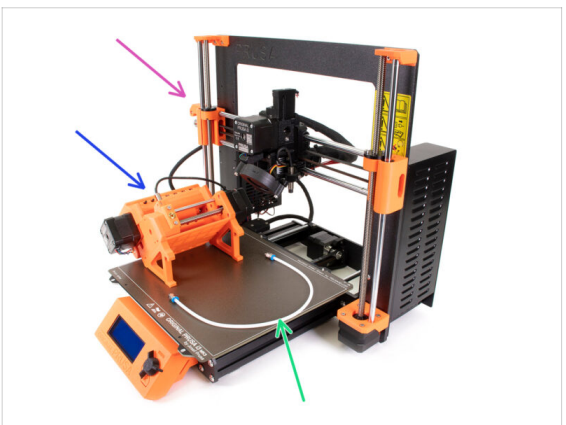




- With a Philips screwdriver, gently loosen the two power terminals located on the bottom left side of the Einsy board.
- The MMU power cable fork connectors are stacked over the main power supply connectors for the Einsy. Remove only the MMU's fork connectors individually, leaving the main supply connectors 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.

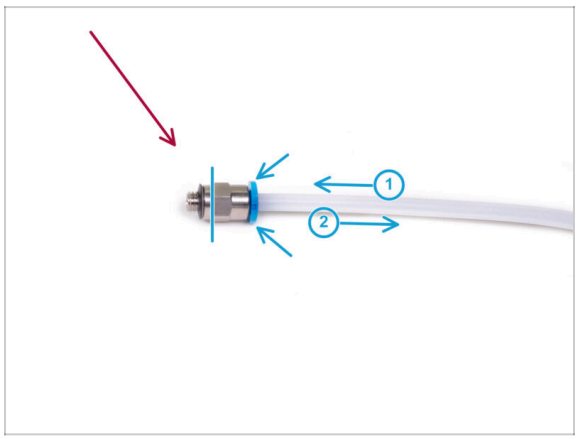
STEP 6 Removing MMU2S from the printer





- 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



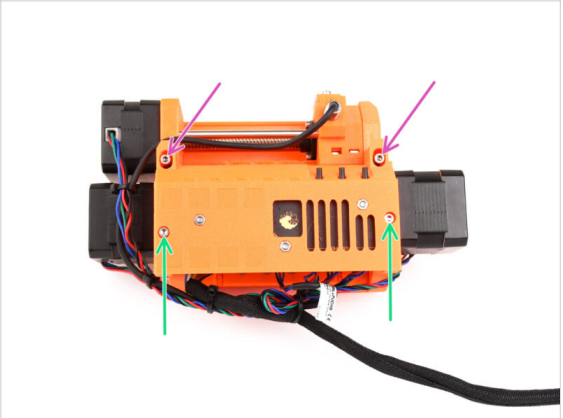
- Take the MMU-to-Extruder PTFE tube with the M5-4 fittings.
- Remove both fittings from the old PTFE tube.
  - Hold the fitting by the metal part and press the collet in. While the collet is pressed, first press the PTFE tube in, then pull it out entirely.

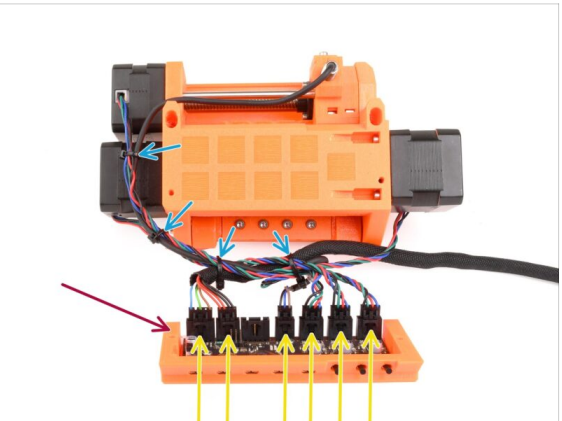
⚠ **MK3S+ & MK3.5/S owners: Save the fittings** for later use. **Discard the PTFE** tube so you don't confuse it with a new one later on!

⚠ **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.

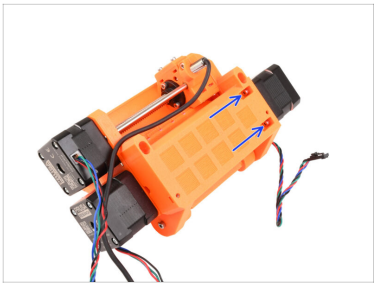
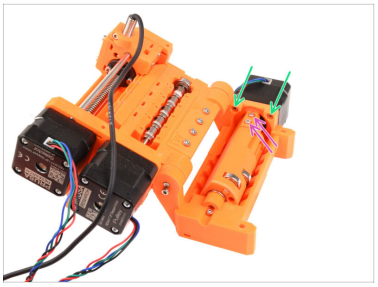
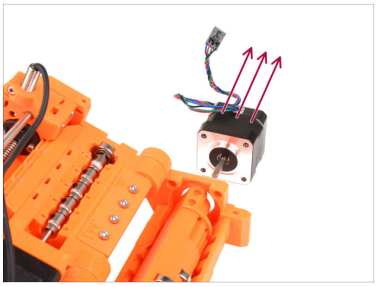
⚠ Be extremely careful not to damage the cables!

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**.

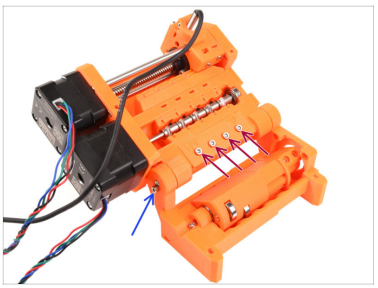
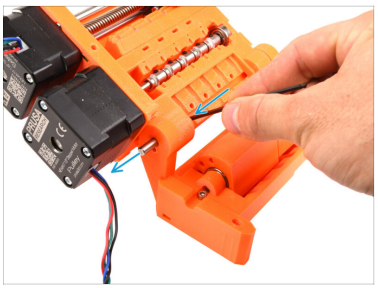
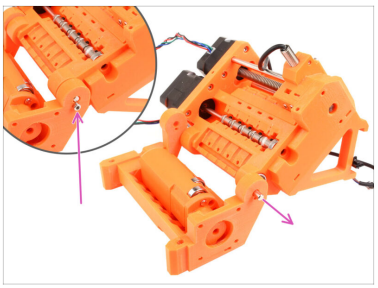
ⓘ The MMU2S power and data cables won't be used in MMU3.

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.**

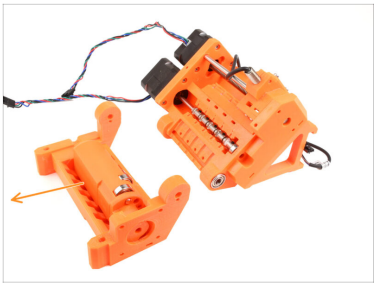
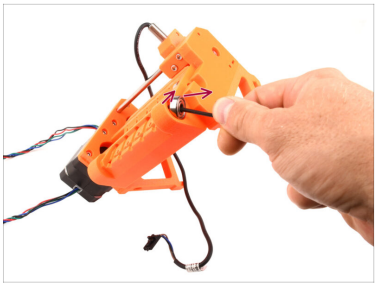
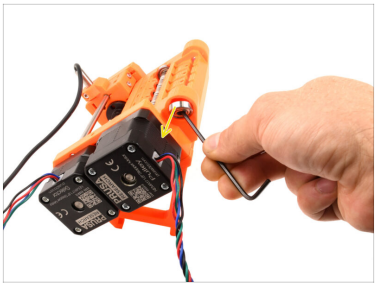
STEP 11 5x16sh shafts removal

- 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

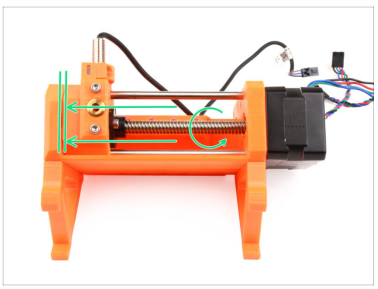
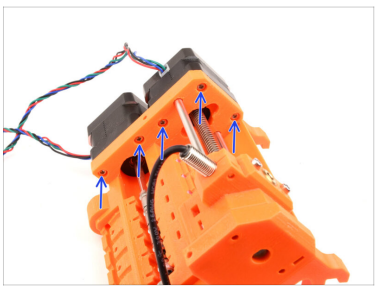
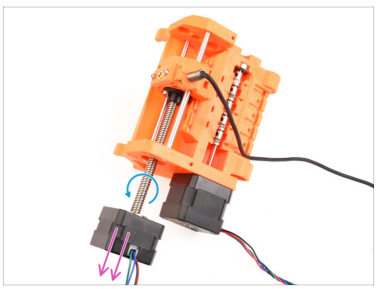
- Remove the Idler body with the Idler.

  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.

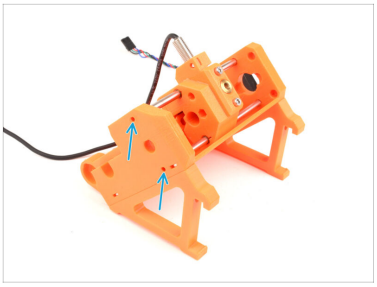
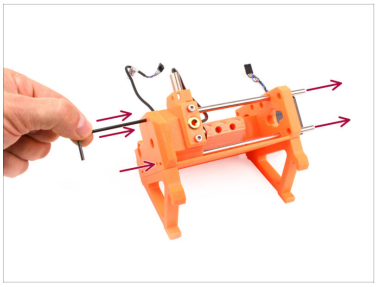
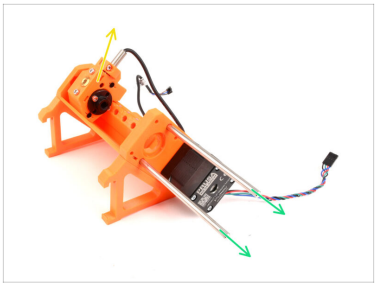
STEP 13 Selector motor removal

- 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

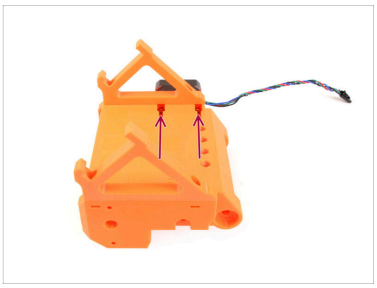
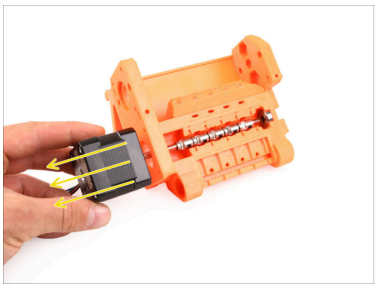
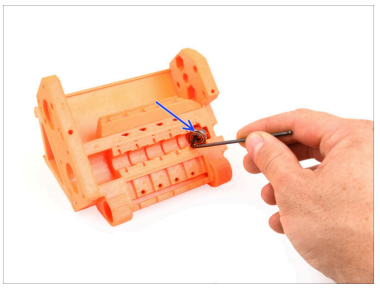




- There are two openings on the side of the unit. You can see the selector shaft ends through them.
- Insert the Allen key into the openings to push both the shafts all the way in.
- Pull out both the **5x120sh shafts** and **save them for later use.**

  ⚠ 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

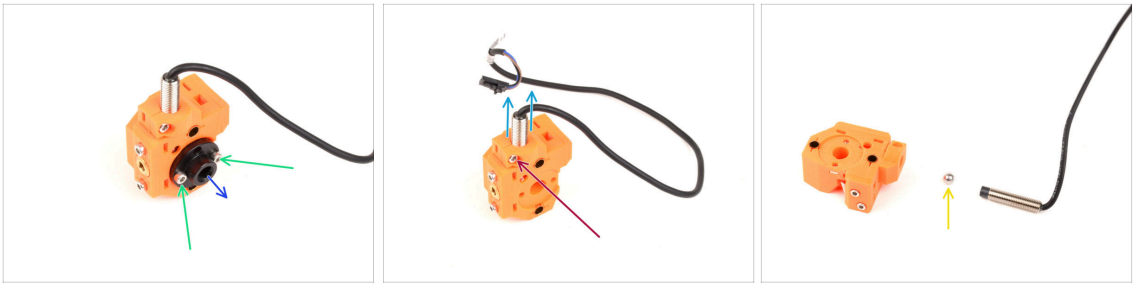




- Turn the unit around.
- On the bottom side, remove the remaining M3x10 screws holding the pulley motor.
- Remove the **pulley motor** from the unit.

ⓘ **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.

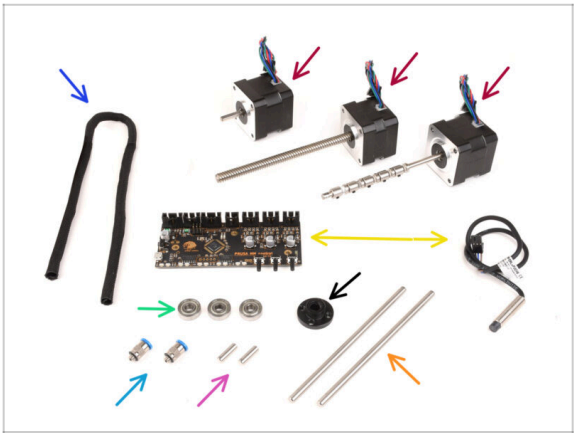
  ⚠ The ball isn't magnetic and **won't be re-used.** We will use a magnetic one later on. Set it aside not to confuse it with the new one.
- You don't need the other parts in the selector anymore, but you can keep them as spares.

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).

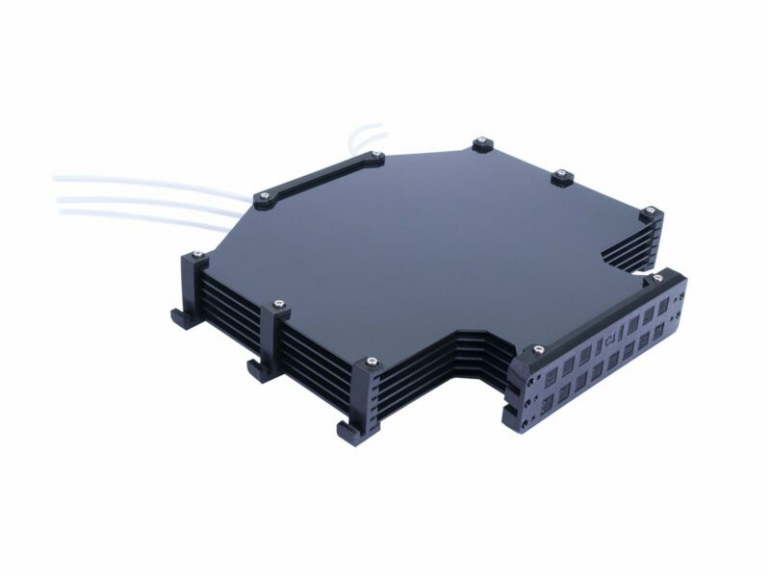
STEP 18 Summary



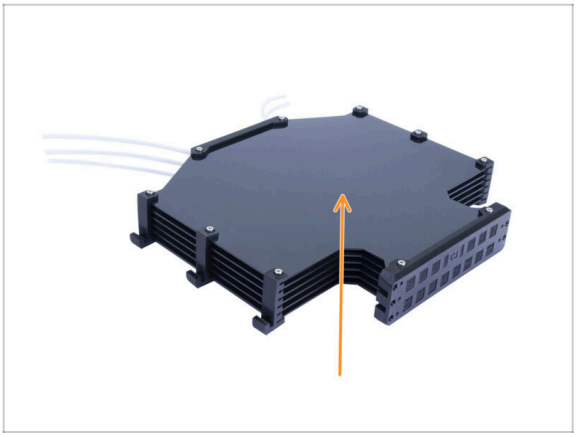
- **Here's a summary of the parts to keep for later use:**
  - Textile sleeve 450x5 (1x)
  - Stepper motor (3x) *Idler, Selector and Pulley motor (with pulleys still attached)*
  - Electronics: the control board (1x) and FINDA/SuperFINDA sensor (1x)
  - 625 bearing (3x)
  - Trapezoid nut (1x)
  - M5-4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

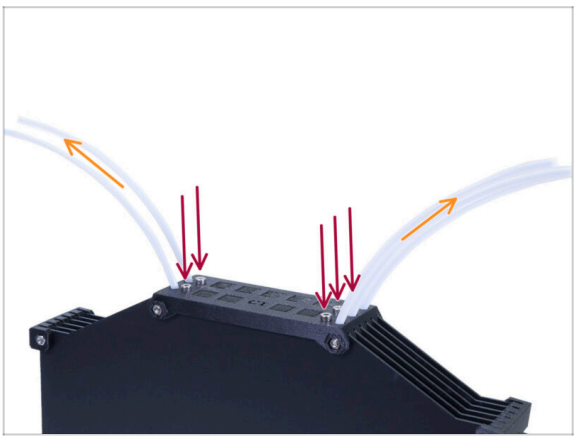


STEP 1 Preparation



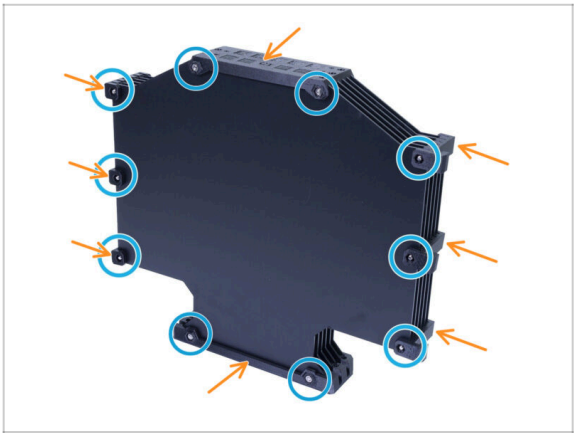
- In case you have the old version of the buffer in the assembled state, it is necessary to disassemble it first.
- We will re-use only the **six large plastic plates** from it.
- If you have the plastic sheets alone, please skip to the next chapter.

STEP 2 Disconnecting the PTFE tubes



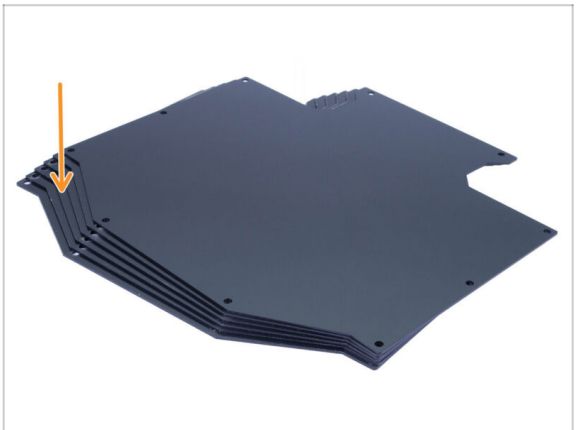
- Remove the five **M3x10** screws holding the PTFE tubes in the buffer.
- Pull all the PTFE tubes out.
- Dispose of the tubes to prevent them from getting mixed up with the new ones in the future. **These tubes will not be used again.**

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.

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