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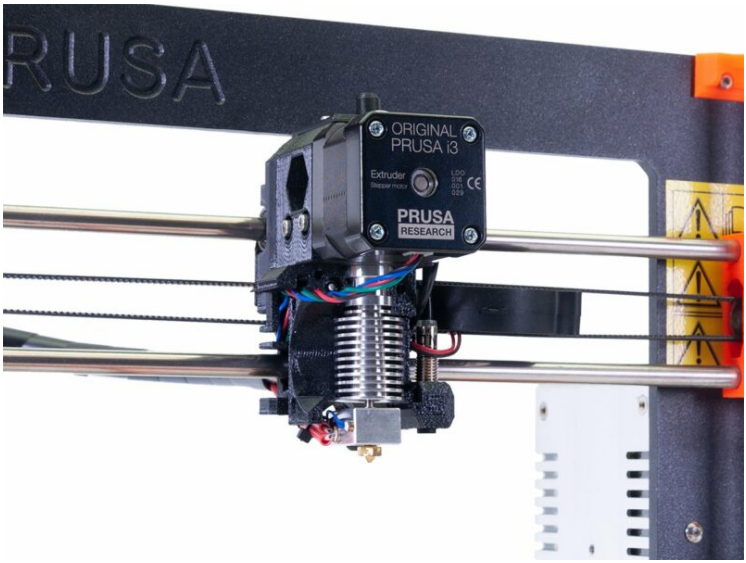
How to replace a heatbreak/heaterblock/heatsink (MK3/MK2.5)



help.prusa3d.com/g14944

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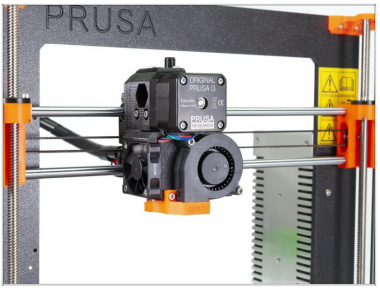
STEP 1 Introduction



- This guide will take you through the replacement of the **heatsink**, **heatbreak** and **heaterblock**.
- All necessary parts are available in our eshop shop.prusa3d.com

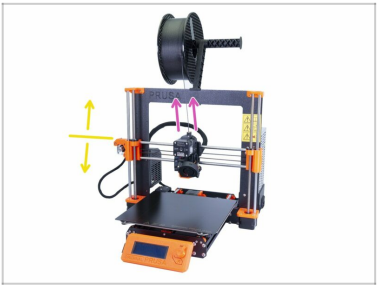
NOTE: Read the instructions carefully. Some steps may vary depending on the type of replacement part.

STEP 2 Tools necessary for this guide

- Needle-nose pliers for zip ties (1x)
- Wrench size 16 EU / 0.63" US (1x)
- Allen keys - 2.5/2.0/1.5 mm (1x)
- Torque wrench (1x)
- Standard socket size 7mm EU / 1/4" US (1x)
- Cloth or piece of fabric *15x15cm* (2x)

ⓘ The torque wrench has to be set to values around 2-3 Nm and is critical for the proper tightening of the nozzle. You can use a regular wrench, but there is a risk of damaging the hotend.

STEP 3 Prepare the printer

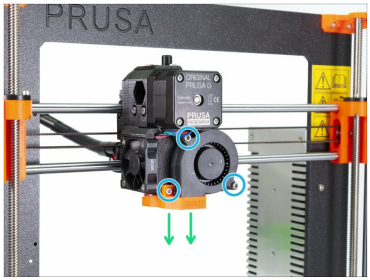


⚠ **Make sure that:**

- The filament is unloaded from the hotend (remove also the spool and the spool holder).
- X-axis with the extruder is slightly above the middle of the height (Z-axis) of the printer.

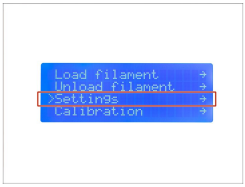
⚠ **CAUTION:** In some steps, you will need to preheat the printer. **Avoid touching the HOT parts!**

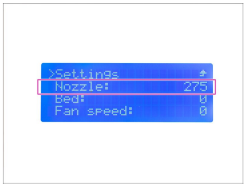
STEP 4 Partial disassembly of the extruder



- Release and remove marked M3 screws.
- Remove the fan-nozzle completely.
- Carefully insert the Front print fan in the X-axis belt.

STEP 5 Preheating the nozzle

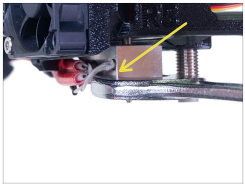


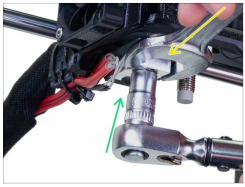


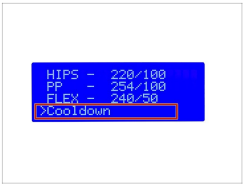
⚠ **WARNING: This and the next step are not intended for the HEATSINK replacement!** Skip to Protecting the heatbed

- On the information screen navigate to the **Settings**.
- Open the **Temperature** menu.
- Set the **nozzle** temperature to **275 °C** by turning the knob.

STEP 6 Releasing the nozzle







⚠ **WARNING:** Avoid touching the **HOT nozzle!!!**

- Set the torque wrench to 3 Nm (26.5 in-lb).

ⓘ Some torque wrenches are not intended for loosening. **Read the instructions for your torque wrench**. Alternatively, you can use a ratchet or a side wrench size 7 mm / 0.28".

- With one hand, hold the heaterblock using the wrench size 16 (0.63"). **Place the wrench under the cables to avoid damage.**
- With the other hand, use a torque wrench, place it on the nozzle and slightly loosen it. **Do not remove the nozzle at the moment.**
- Navigate to the Preheat menu and at the end of the menu select **Cooldown**.

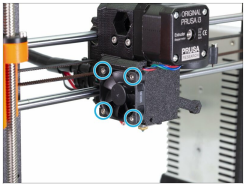
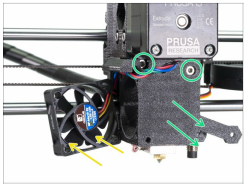
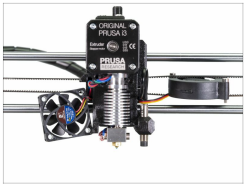
⚠ **Wait 15 - 20 minutes to cool down completely before proceeding to the next step.**

STEP 7 Protecting the heatbed

⚠ **Turn the printer off and unplug it!**

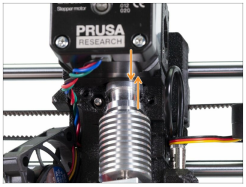
- **Before these steps, it is recommended to protect the heatbed!**
- Tak off the flexible steel sheet.
- Use any cloth or piece of fabric, which is thick enough and cover the heatbed. This will ensure you won't damage (scratch) the surface during the disassembly.

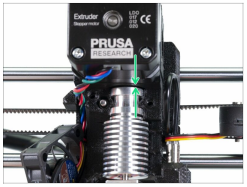
STEP 8 Partial disassembly of the extruder

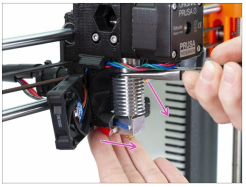




- Release and remove all four M3x18 screws on the Left hotend fan.
- Release and remove both M3x25 screws, then remove carefully the extruder-cover part.
- Your extruder and fan arrangement should look like in the last picture.

STEP 9 Partial disassembly of the extruder







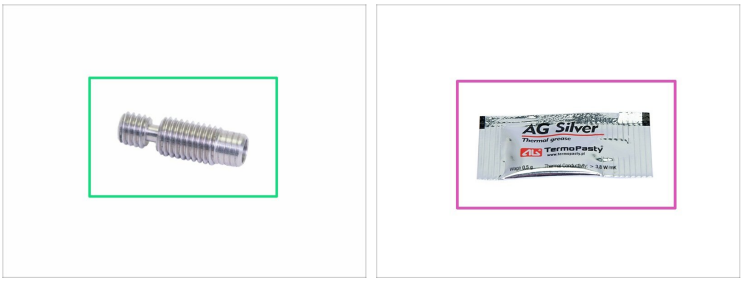
⚠ **WARNING:** Removing hotend from the extruder needs a "special" technique, then the hotend slides out quite easily. Don't use excessive force, or you will damage some parts irreversibly!!!

- The hotend is removed by inclining and pulling at the same time. See the first picture showing the **WRONG inclination**. This hotend is inclined too much to the front and there is no gap between the hotend and the extruder body. Hotend is partly inside and you won't be able to remove it.
- The second picture is showing the **CORRECT inclination**. The hotend is tilted, but there is a gap between the hotend and the extruder body. You will be able to remove it.
- Now, let's incline the hotend properly. Take pliers in the second hand, grab the hotend above heatsink's ribs, pull downwards and slightly towards you. The hotend should "jump" out. Make sure you don't stretch the cables too much or you might damage them.

STEP 10 Guidepost

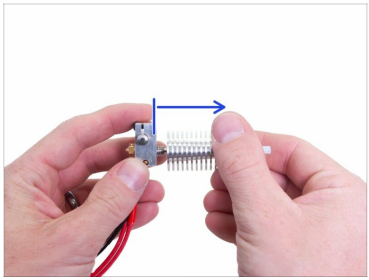
- **Choose the guide for the part you need to replace:**
  - Heatbreak replacement
  - Heatsink replacement
  - Heaterblock replacement

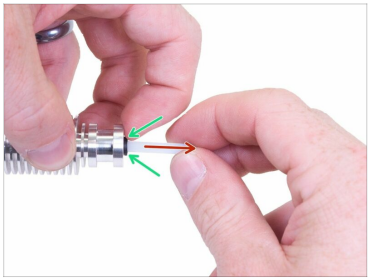
STEP 11 Heatbreak replacement - parts preparation



- **For the following steps, please prepare:**
  - New heatbreak (1x)
  - Thermal paste (1x)

STEP 12 Removing the PTFE tube

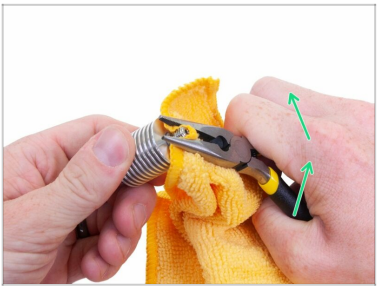




⚠ **Before you continue with this step, make sure the nozzle is loose.**

- Hold the heaterblock with one hand and start screwing the heatsink with the heatbreak out.
- Press the black plastic collet down to release the PTFE tube.
- Pull out the PTFE tube from the heatsink.

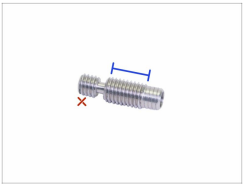
STEP 13 Removing the heatbreak

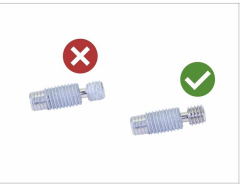


⚠ Use the second cloth to **protect the thread** of the heatbreak.

- Hold the heatsink and using pliers release and remove the heatbreak.
- We are done with removing the old heatbreak, let's move to the next step and install a new one ;)

STEP 14 Applying the thermal paste





- **Take the new heatbreak** and apply most of the content of the thermal paste package on the long thread. Spread it evenly with a paper towel.

⚠ **Do not apply the paste on the short thread!:**

- **Incorrect application:** the thermal paste is covering both threads of the heatbreak.
- **Correct application:** the thermal paste is covering on the longer thread of the heatbreak.

ⓘ Applying the paste on the short thread can create a gap between the heatbreak and the nozzle. The nozzle might then become clogged when the filament is loaded.

STEP 15 Placing the heatbreak back in



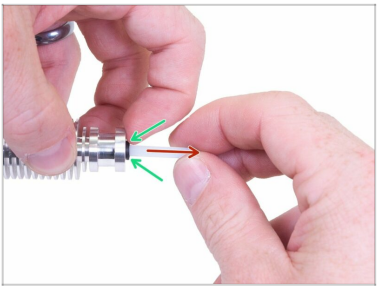
- Screw the longer thread of the heatbreak (with the paste) into the heatsink. Ensure the entire thread is screwed in.
- After you screw the heatbreak in clean the excess paste residues.
- **To finish the replacement process** jump to Reassembly of the hotend

STEP 16 Heatsink replacement - parts preparation


- **For the following steps, please prepare:**
  - New heatsink (1x)
  - Thermal paste (1x)

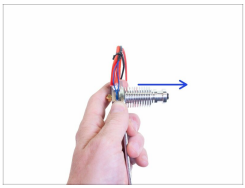
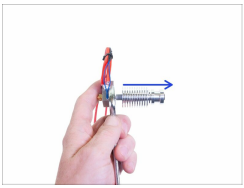
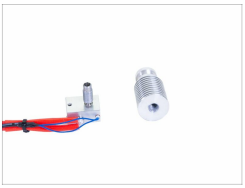
ⓘ The heatsink includes a new black plastic collet, don't use the old one.

STEP 17 Removing the PTFE tube



- Press the black plastic collet down to release the PTFE tube.
- Pull out the PTFE tube from the heatsink.

STEP 18 Removing the old heatsink

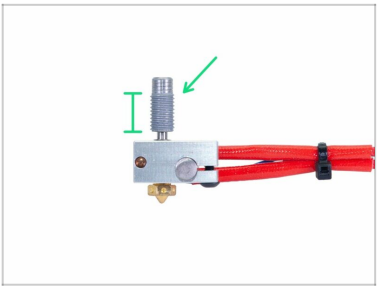
- Hold the heaterblock with one hand and start screwing the heatsink out.

⚠ **Avoid loosening the heatbreak from the heaterblock!**

ⓘ To hold the heaterblock firmly we recommend using the wrench size 16 (0.63") **Keep the wrench away from the cables to avoid damage.**

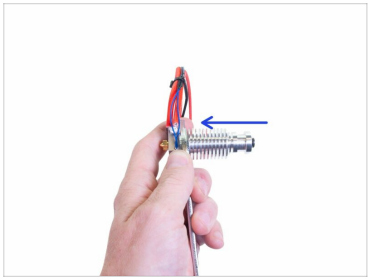
- We are done with removing the old heatsink, let's move to the next step and install a new one ;)

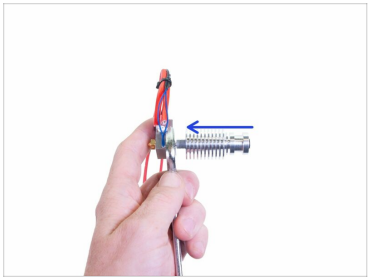
STEP 19 Applying thermal paste



- Before we install the new heatsink, clean the old thermal paste from the heatbreak.
- Apply most of the content of the thermal paste package on the longer heatbreak thread. Spread it evenly with a paper towel.

STEP 20 Reassembly of the hotend



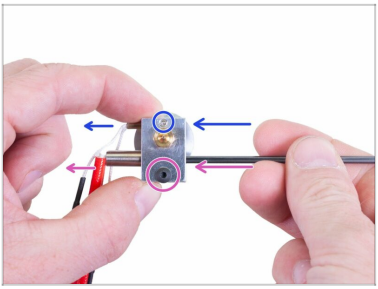


- **Screw the new heatsink** on the heatbreak. Make sure the heatbreak is all the way in the heatsink.
- After you screw the heatbreak in, clean the excess paste on the surface of the heatsink.
- **To finish the replacement process** jump to Assembling the PTFE tube

STEP 21 Heaterblock replacement - parts preparation

- **For the following steps, please prepare:**
  - New heaterblock (1x)

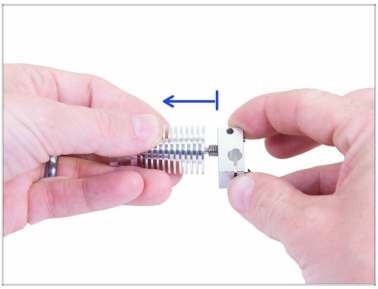
STEP 22 Disassembly of the hotend



⚠ **WARNING:** Do not pull the thermistor or heater cables. Follow the instructions!

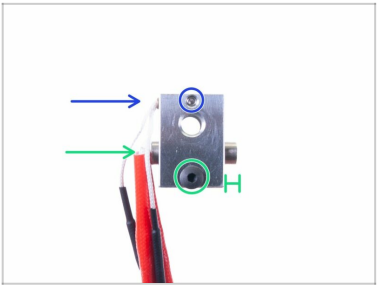
- Release the thermistor screw with the 1.5mm Allen key. Using the Allen key gently push the thermistor out.
- Release the heater screw with the 2.0mm Allen key. Using the Allen key gently push the heater out.

STEP 23 Disassembly of the hotend



- Remove the nozzle from the heaterblock and keep it for later use.
- Hold the heaterblock with one hand and start screwing the heatsink out.
- We are done with removing the old heaterblock, let's move to the next step and install a new one ;)

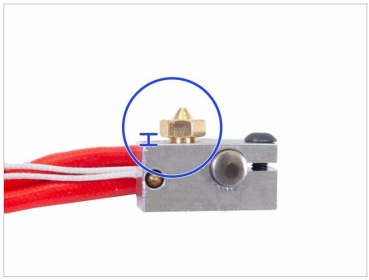
STEP 24 Reassembly of the hotend

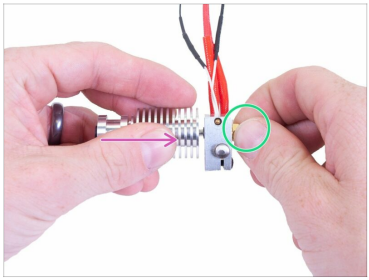


- Insert the thermistor to **the new heaterblock** and secure by tightening the lock screw.
- Then insert the heater to the heaterblock and secure it by tightening the black screw. **Make sure the heater hangs over on the right side,** see the picture.

⚠ Ensure both **thermistor and the heater** are **properly inserted** and **tightened!**

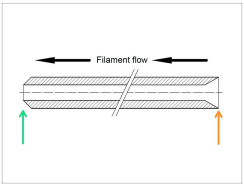
STEP 25 Reassembly of the hotend





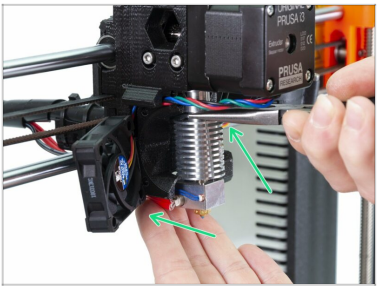
- Lightly screw in the nozzle. Create a gap 0,5 mm (0.02 inch) - similar to the picture.
- Secure the Nozzle against movement with one hand.
- With the other hand, lightly screw the heatbreak with heatsink into the heaterblock until it touches the nozzle. **Do not tighten by torque wrench at the moment.**

STEP 26 Assembling the PTFE tube



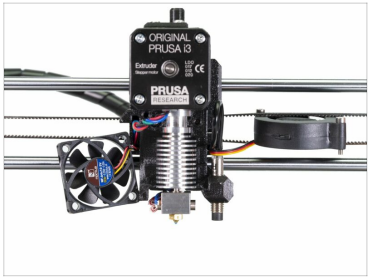

- Now it is time to insert the PTFE tube back in. Note, that each end of the tube is different:
  - One end of the tube has **"rounded" outer edge**. This end must be **inside the hotend**.
  - Look at the other end, where the tube is drilled inside, the shape of the **edge is "conical"**. This is the side, where filament enters the tube. This part must be **outside the hotend**.
- Push the black collet in. Slide the tube all the way in and hold it!
- Using the other hand pull the collet out and only then release the tube!!! **THIS IS CRUCIAL** for the hotend to work properly.

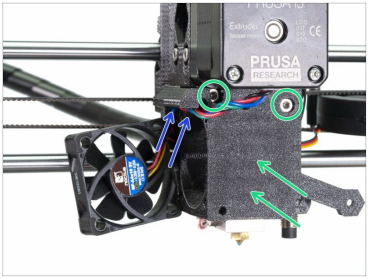
STEP 27 Reassembly of the extruder



- Carefully slide the hotend back to the extruder-body.

STEP 28 Reassembly of the extruder





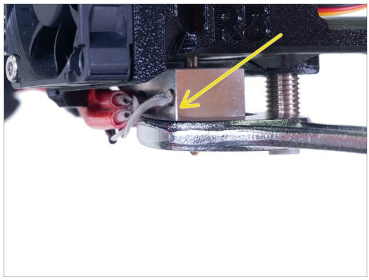
- Move back to the front side of the printer.

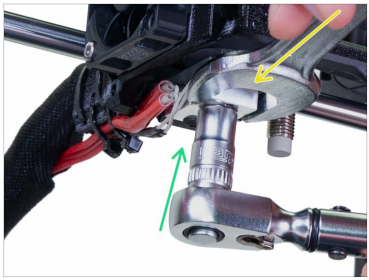
⚠ Be careful while assembling the extruder! Make sure you don't pinch any wire (e.g. P.I.N.D.A. cable).

- Assemble back the extruder-cover and tighten both M3x25 screws.
- Guide the motor cable back in the slot.

⚠ Ensure all the parts of the extruder are tight and not moving. **Pay special attention to the hotend!**

STEP 29 Tightening the nozzle





⚠ **NOTE: This and the next step are not intended for the HEATSINK replacement!** Skip to the next step.

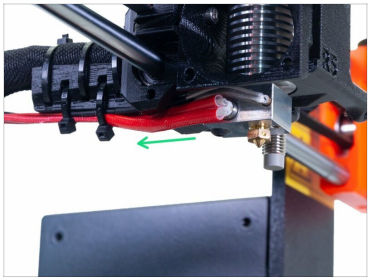
- Plug printer in, turn on it and preheat the nozzle to 250°C.

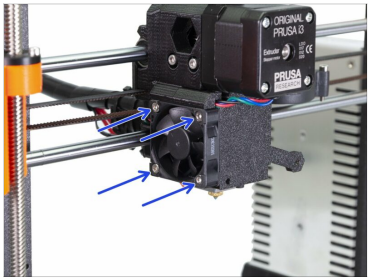
⚠ **WARNING:** Avoid touching the **HOT nozzle!!!**

- Set the torque wrench to 2.5Nm (22 in-lb).
- With one hand, hold the heaterblock using the wrench size 16 (0.63"). **Place the wrench under the cables to avoid damage.**
- With the other hand, use a torque wrench to grasp the nozzle. And tighten the nozzle.
- Navigate to the Preheat menu and at the end of the menu select **Cooldown.**

⚠ **Wait for 15 - 20 minutes to ensure the hotend is cooled down completely before proceeding to the next step.**

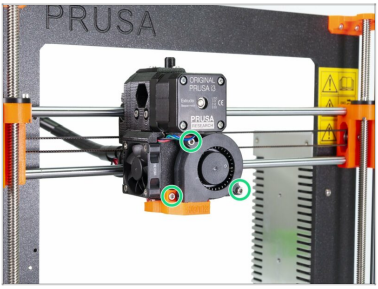
STEP 30 Reassembly of the extruder





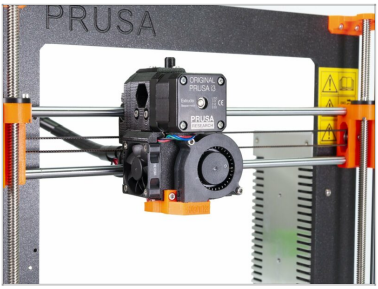
- **Check once again the correct position of the hotend.** Look from below the extruder. The heater block should be oriented as shown in the picture.
- Move back the Left hotend fan and tighten all four M3x18 screws. Tighten carefully, you can crack the plastic frame of the fan.

STEP 31 Reassembly of the extruder



- Place back the Front print fan and the fan-nozzle. Tighten all three screws. Proceed carefully, you can crack the plastic frame of the fan.
- Now, please follow the instructions for the First Layer Calibration (i3).

STEP 32 It is done!



- **Great job!**
- Heat up the printer and try it out ;)

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