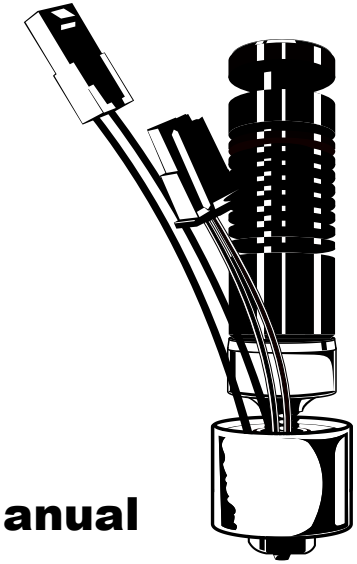


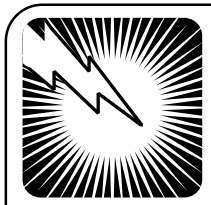
13S
Hot End Manual

Thank you for purchasing a Ubis 13 hot end. If you are anything like us, you probably disregard manuals as gibberish that you, undoubtedly a sophisticated maker, already know. All you want to do is plug this guy in and start printing. Frankly, we consider it a small miracle that you read even this far.

At the risk of exhausting your already strained patience, we encourage you to read this manual carefully. Although you may learn much from trial and error, we worked very hard to save you from some of the pain, both literal and metaphorical, that can result from improper use.

Hang on to this manual. Stuff it in the drawer where you inexplicably keep all of the other manuals that you have no intention of reading. You may wish to refer to your Ubis 13 manual down the line when performing maintenance, replacing parts or installing accessories. At least read the warnings and safeguards before the manual disappears into that drawer.

WARNINGS & SAFEGUARDS



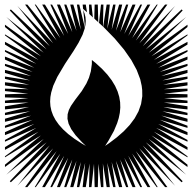
Electrical Hazard

This product uses electricity, which is not your friend. It will hurt you, kill you or damage your nice things without remorse.

Do NOT use the hot end if wires are frayed, connections are loose, or you detect unusual conditions that could indicate a short.

Do NOT use your hot end in or around water.

If any of these hazardous conditions exist, disconnect your printer from its power source until it is resolved.



Heat Hazard

This product is designed to melt plastic. During and after use, parts of the hot end may burn or ignite objects that touch it, including you, resulting in property damage, personal injury or death.

Do NOT touch, or allow any object to touch, the hot end until it is completely cooled.

Do NOT use near volatile or flammable substances.

Cutting Hazard

Much of this product is machined metal, which may retain sharp edges or fragments capable of cutting objects, including your flesh. Improper handling may result in property damage, personal injury or even death. Okay, you're right. You would need to work really hard to cut somebody enough to kill them, but we feel like we should warn you that if you aren't cautious, bad stuff will happen.

When handling the heat sink, wear gloves to help protect your hands. In our experience, even exam gloves help.

Do NOT grip the hot end, and the heat sink in particular, tightly. Examine the hot end for fragments and debris, carefully removing any, before handling or use.

Supervision Required

We just finished telling you that this product can electrocute, burn, ignite, slice and dice. It might not be a murderous robot from the future, but it's still a good idea to keep an eye on it. If something goes wrong, you should be nearby to spot and stop it before people or things are harmed.

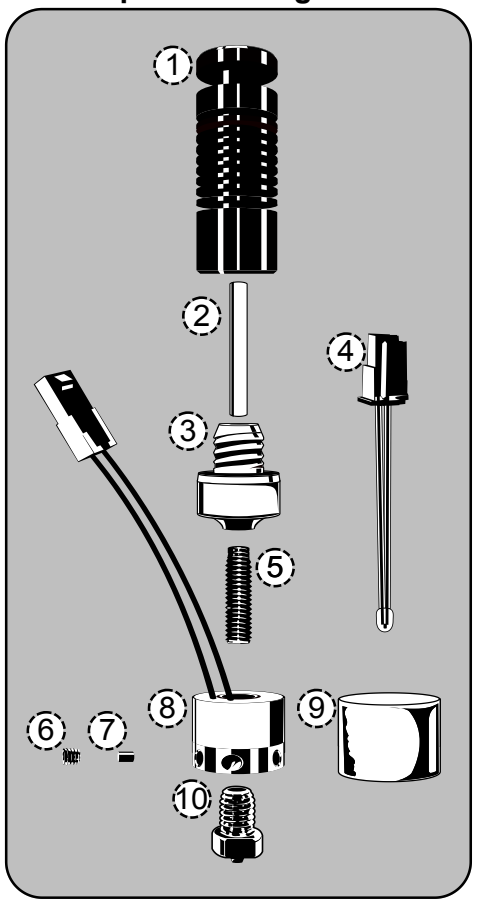
If children are near or using this product, supervise them too. Kids are wonderfully creative, but they're still developing common sense. Supervise exploration and learning.

Do NOT leave this product unattended while it is in use.

Supervise children who are near or using this product.

UBIS 13S COMPONENTS, TOOLS AND INDEX

A. Components Diagram



1. Heat Sink
Fan: Page 4, Diagram 4
PEEK insulator: Page 3, Diagram 1

The Ubis 13S's aluminum heat sink has an integrated printer mount. We recommend fan cooling the heat sink. to help it dissipate excess heat.

CUTTING HAZARD! Wear exam gloves when handling the heat sink to improve your grip and help protect your hands.

2. PTFE Guide Tube
Removal: Page 3, Diagram 1
Replacement: Page 3, Diagram 1

A tube of PTFE guides filament to the heat link and heater core. Renowned for its non-stick properties, the PTFE guide tube helps makes the Ubis 13S a very forgiving hot end that better tolerates lower quality filaments and user error, ideal for people new to 3D printing or wanting to avoid the headaches of filament conditioning.

3. PEEK Insulator
Removal: Page 3, Diagram 1
Replacement: Page 3, Diagram 1

PEEK is a robust medical grade plastic with incredible insulative qualities. Here, it acts like a heat break, keeping the heater hot and the heat sink cool.

4. Thermistor
Removal: Page 4, Diagram 2
Replacement: Page 4, Diagram 2

The thermistor monitors temperature, and the Ubis 13S is designed to allow user replacement.

Why would you replace your thermistor? Initially, a high-quality thermistor will be accurate to within 1%, but it will lose accuracy over time. As the process is affected by many factors during use, the rate of degradation is hard to predict.

If you suspect your thermistor is degrading, insert a separate temperature probe into the heater core as though it was filament. Check your instrument's readings against the thermistor's. Replace when necessary.

5. Heat Link
Heater core: Page 3, Diagram 1
PEEK insulator: Page 3, Diagram 1

The heat link couples the heater core with the PEEK insulator and heat sink. Unlike the Ubis 13P, which uses a heat break to isolate heat and increase precision, the Ubis 13S uses a heat link to extend the filament melting zone and increasing the flow rate.

6. Thermistor Set Screw
Thermistor: Page 3, Diagram 2

The thermistor set screw secures the thermistor within the heater core and helps to ensure the contact necessary for accurate temperature readings.

Proper tightening is crucial. Because the thermistor ends in a glass bead, **over-tightening or failing to use the thermistor cushion may damage or destroy the thermistor. Under-tightening or failing to use the thermistor cushion may reduce thermistor accuracy.**

7. Thermistor Cushion
Thermistor: Page 3, Diagram 1

The thermistor cushion compresses between the thermistor set screw and the glass tip of the thermistor, ensuring superb thermal contact and accurate readings while helping to protect the thermistor from damage.

Failing to use the thermistor cushion may damage or destroy the thermistor, or reduce thermistor accuracy.

8. Heater Core
Heat link: Page 3, Diagram 1
Nozzle: Page 3, Diagram 1
Thermal sock: Page 4, Diagram 3
Thermistor: Page 4, Diagram 2

The heater core is the heart of the Ubis 13 hot end. Rather than using an unreliable cartridge heater to slowly warm a block of metal to transfer heat to the filament, the precision Ubis heater core rapidly delivers heat directly to the filament, potentially saving considerable time and energy.

The Ubis 13S will melt filament at temperatures of up to 270°C. Exceeding 270°C will damage components of the Ubis 13S, including the PTFE guide tube, electrical leads and thermistor. Don't do it! Truly, 270°C is more than enough heat for most plastics.

If you want to print with exotic and high temperature plastics, consider the PTFE-free Ubis 13P, which can be equipped with leads and a thermistor that resist higher temperatures.

Note that improperly disconnecting or **connecting the heater core to either the heat break or nozzle may damage or destroy the heat break.**

Do NOT use the flat surfaces on the heat sink when removing or replacing either the heat break or nozzle.

Do NOT touch the heater core until it has cooled completely.

9. Thermal Sock
Placement: Page 4, Diagram 3

The distinctive red Ubis thermal sock slips over the heater core to help keep it hot and you safe.

Do NOT operate your Ubis 13 without the thermal sock.

For the best printing experience, ensure that the thermal sock does not extend above the heater core, which may increase heat transfer to the heat sink. Nor should it extend to the tip of the nozzle, which may disturb plastic extrusion.

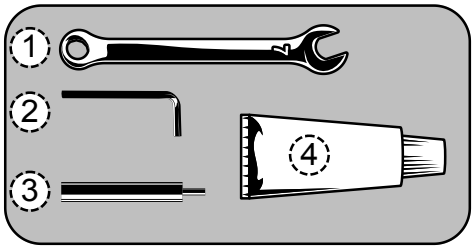
10. Nozzle
Removal: Page 3, Diagram 1
Replacement: Page 3, Diagram 1

The aperture of the standard brass nozzle is 0.4 mm, but a variety of nozzles are available from Ubis Technology, LLC, through your printer retailer. Accessory nozzles include smaller or larger apertures, and ceramic nozzles that hold up to exotic and abrasive filaments. Easily overlooked, your nozzle choice may profoundly affect your printing experience.

Please note that **improperly removing or replacing the nozzle may damage or destroy the heat break.**

Do NOT touch the nozzle until it has cooled completely. It will get very hot during use.

C. Tools Required



D. Tool Info and Index

1. 7 mm crescent wrench
Nozzle: Page 3, Diagram 1

Grip the flats on either side of the nozzle with the crescent wrench when removing the nozzle form the heater core or replacing it. Use it in combination with the heater core key.

2. 1.5 mm Allen key
Thermistor: Page 4, Diagram 2

Use the Allen key on the sew screw that secures the thermistor in place.

3. Heater core key
Nozzle: Page 3, Diagram 1

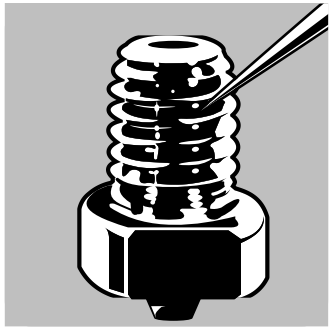
Use the heater core key in the unthreaded hole in the heater core to gain leverage while tightening the nozzle with a 7 mm crescent wrench.

4. Silicone thermal compound
Heat link to heater core: Page 3, Diagram 1
Nozzle to heater core: Page 3, Diagram 1

Apply to facilitate heat transfer between the heater core and both the heat link and nozzle.

Diagram 1: Hot end maintenance and assembly

A. Disassemble and clean



Begin by disassembling all of the components other than the thermistor, which may remain in the heater core. **Wear exam gloves** to improve your grip and protect your hands. When removing the nozzle from the heater core, use a 7 mm wrench and the heater core key to gain leverage. Once disassembled, clean the threads of each part with a miniature screwdriver, needle or pin to remove any plastic debris that might clog the hot end once it is reassembled.

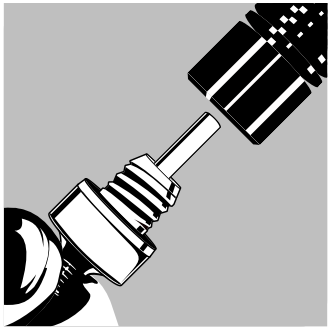
B. Add tubes to PEEK insulator

Still wearing the exam gloves to help protect your hands, screw the threadless end of the heat link into the PEEK insulator as depicted above.

Do NOT use any thermal compound to join the heat link and PEEK insulator.

Next, push the PTFE guide tube into the male end of the PEEK insulator until it is seated against the heat link.

C. Connect heat sink

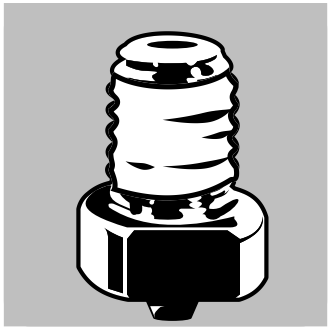


Align the PTFE guide tube with the inner opening of the heat sink, and insert the PEEK assembly into the heat sink. Manually screw together until snug.

Do NOT use tools as you may over-tighten the parts.

The heat sink may have sharp edges capable of cutting if gripped tightly. Wear exam gloves to improve your grip and help protect your hands.

D. Prepare nozzle

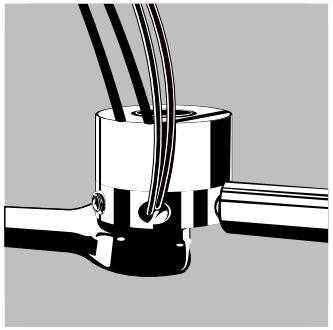


Set the heat sink assembly aside.

You will connect the nozzle and heater core before joining them with the heat sink assembly.

Liberally coat the nozzle's threads with silicone thermal compound. This step is very important to optimal printer performance as it will help the heater core to transfer heat to the nozzle and to maintain filament temperature during extrusion.

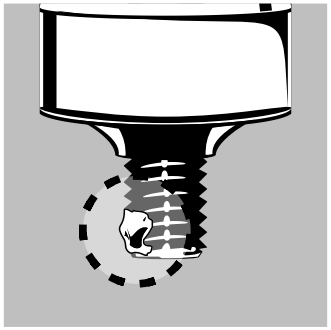
E. Tighten nozzle and retreat



Screw the prepared nozzle into the heater core. Insert the heater core key in the unthreaded opening at heater core's base. Grip the nozzle with a 7 mm crescent wrench. Gently screw the nozzle into the heater core until it bottoms out.

Retreat one half turn to permit final tool tightening after inserting the heat break. Leaving a gap for the nozzle to close is the only way to ensure a tool-tight seal between the heat link and nozzle.

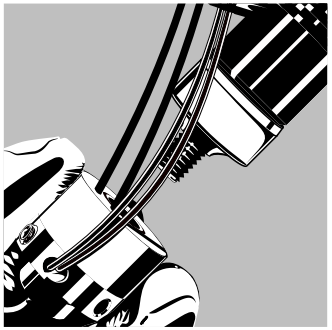
F. Prepare guide tube



Set the heater assembly to the side, and apply silicone thermal compound to the end of the heat link protruding from the heat sink assembly.

Wear exam gloves to help protect your hands.

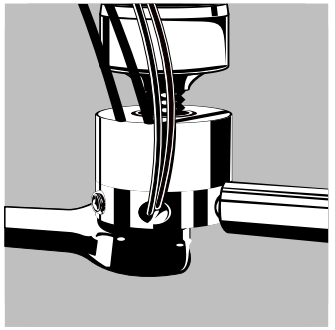
G. Connect heat sink and heater



Manually screw the heat sink and heater core assemblies together until they are snug. Do not use tools as this may strain or damage components.

Wear gloves to improve your grip and help protect your hands.

H. Tool tighten nozzle

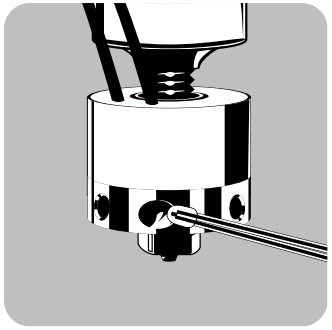


Tool tighten the nozzle to seal the nozzle and heat link to prevent plastic seepage that may cause jams. You should be able to observe a slight gap between the nozzle and heater core if you completed Diagram 1, Step E correctly. Firmly tighten the nozzle against the heat break using the heater core key and a 7 mm wrench. You should still see a small gap between the abutting faces of the nozzle and heater core.

Replace the red thermal sock as shown in Diagram 3 before connecting to your printer.

Diagram 2: Thermistor

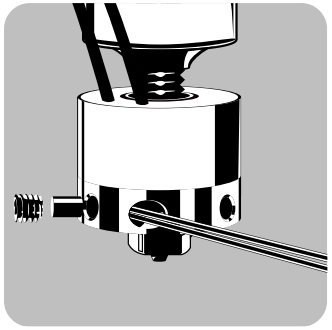
A. Insert thermistor



Insert the thermistor into the unthreaded opening that does not head toward the center of the heater core. Ensure that it extends just past the intersecting and threaded hole to its left.

Wear exam gloves to improve your grip and help protect your hands.

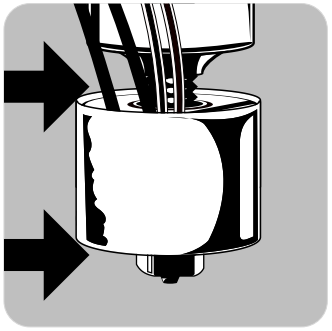
B. Secure



Place the thermistor cushion into the threaded hole, followed by the set screw. Tighten with an Allen key. Make firm contact, but no more. Secure seating will help ensure accurate readings, but over-tightening may harm the thermistor.

Reverse the process to remove the thermistor.

Diagram 3: Thermal Sock



Only operate your Ubis 13 with the sock in place.

It insulates the heater core, helping it maintain temperature with less energy while reducing the chances for mishaps. Prevent the sock from covering the exposed heat break, which can cause unwanted heat transfer to the heat sink, or extending the sock too low, which may cause it to disturb extruded filament.

Diagram 4: Fan

We recommend operating your Ubis 13 with fan cooling.

Premature filament softening can reduce print quality or cause jamming. Air cooling can help ensure that the filament softens as intended. If you use a fan to cool your Ubis 13, **do NOT allow the fan to blow on the heat link, heater core or nozzle**. You may require a shroud to direct airflow. Authorized Ubis hot end vendors should provide a shroud and/or files to print one.