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Revo Six Prusa (MK3S+) upgrade guide



Introduction

Before upgrading your Prusa i3 with Revo Six please read the following safety cautions.

This is a complete upgrade guide suitable for an original Prusa MK3, MK3S, and MK3S+. You will also need Revo Six.

Warning:

You should read through the whole guide before attempting the upgrade to ensure you understand exactly what is required to successfully complete it.

Please note, your printer may vary from the one illustrated in this guide, depending on the model and your own upgrade choices. If you have an MK2/2.5 you can still follow this guide but you may want to refer to the Prusa documentation for extruder disassembly as some aspects will vary.

Preparation

Please move your extruder to roughly the centre of your bed and around 100mm above the build plate before starting this upgrade, this will give you easier access to the extruder.





You should also ensure there is no filament loaded and that the printer is unplugged from the power source.

Warning:

You should also place a cloth or piece of fabric over your heatbed to give it some protection in case you drop something onto it.

You will need:

- 2.5mm Allen Key
- Flush Cutters/Cutting Pliers
- A handful of cable ties
- Razorblade or carpet knife
- Small flathead screwdriver
- Fine tipped Pen
- Prusa MK3/MK3S/MK3S+
- 24V Revo Six

Double-check your printer before buying 12V or 24V. All MK3 Prusa Printers are 24V as standard. Check out our Blog if you are unsure on whether you need a 12 or 24V Revo Six:

https://e3d-online.com/blogs/news/12v-vs-24v



1. Remove the two M3 x 20mm screws holding the part cooling fan in place.

Note:

You may find you have the early MK3 style upright fan on your extruder. You should still be able to follow this guide in the same way, although some illustrations may vary from what you have in front of you.





2. Tuck the fan between the belt and the rod on the X-axis. Make sure you do not stress the fan wires, they are very fragile.

Warning:

Leaving the fan dangling can damage the wires.





3. Next, remove the two screws on the right side of the heatsink fan. The top M3 x 14mm and the lower M3 x 20mm. The lower M3 x 20mm screw also holds the fan shroud in place so be sure to remove this too.



4. Remove two M3 x 40mm screws from the front of the extruder body. The one alongside the fan arm can be a little awkward to reach. Carefully remove the front face of the extruder.





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though. Turn your Prusa around, so that you can access the back of the extruder.

5. Remove the two screws closest to the top of the extruder and carefully take off the cover. (M3 x 40mm)

Note:

Make sure you support the motor as you remove the screws at the back, to avoid straining the wires and/or dropping it



6. Pull the Motor just far enough out so that you can dislodge your V6.

Warning:

If you pull the motor out further, make sure you do not leave it hanging by the wires. This can damage the wires.





If the wires are too tight to remove it, you may have to take out your thermistor and/or heater cartridge from the heaterblock first.

7. At this point it also helps to cut the cable ties holding the thermistor and heater on the back of the extruder. This will give you more room to install your Revo Six.



Warning: Try not to cut the wires as you may want to reuse your old Heater/Thermistor at some point.

8. Start by removing the fan and shroud from your Revo Six, you won't be needing it on your Prusa.





Your Revo Six is sent fully assembled. If it has partially disassembled in transit, or if you have taken it apart yourself, check out this guide for how to assemble it.

9. Remove the collect clip from the V6, press down on the collet and slide the PTFE tube out.







10. Now take out the collet clip from the Revo Six and slide in the PTFE tube you just took from the old V6.



If the PTFE tube is looking bent, melted, burnt, or damaged in any way, it is a good idea to use a fresh piece.

11. Next you will need to trim down the excess PTFE tube. If you want a more detailed step-by-step, please see this guide from Prusa.

The tube must be trimmed so that it matches the 10mm stick out of your V6.

Measure 10mm from the top of the V6 (the aluminium not the collet) and mark it on the tube using a fine-tipped pen.

Note:

Your PTFE stick out may be different if you are using an MK2.5 or MK2 Prusa.



12. Pull out the tube (take out the collet clip first) and trim it to size. Try to cut into the tube as straight as possible.

Warning:

Make sure the tip of the tube is circular and not squashed. Rework it back into shape if needed.





13. Finally, create a new conical entrance on the trimmed end of the tube, it is easiest to do this with a 3.5mm - 4mm drill bit but it can also be done with a knife.



Warning:

Make sure there are no PTFE shavings left behind inside the tube, as this could lead to a blockage.

14. Put the tube back all the way back into the Revo Six for the final time, making sure the collet clip is in place.



15. Place your Revo Six into the groove mount, in place of your V6.





16. Check that the PTFE tube is not touching the extruder gears. If it is, remove and trim down slightly. You will have to create the conical entrance again if you trim it down.





17. Make sure the wires are coming out the back of the extruder, leave them like this for now, you will secure them later.



18. Carefully reposition the motor piece of the assembly and slide two M3 x 40mm screws through the back of the extruder. Tighten these fully.





Don't panic if you don't know which screw is which, simply measure the length from the underside of the cap to the tip and refer to the dimensions listed in the steps.







20. Re-secure the fan shroud and heatsink fan next, the top screw should be the M3 x 14 and the bottom an M3 x 20.







21. You should have two M3 \times 20mm screws left. Use these to reattach the part cooling fan.





Wiring

With assembly finished, you must now rewire the heater and thermistor.

If you have an original heater and thermistor, you will need to open up the mainboard case to replace them.

22. First, unscrew the M3 x 40mm bolt from the side of the case, you shouldn't need to unscrew it far and it will allow you to open up the housing door.





23. Also unscrew the two M3 x 10mm bolts clamping the wiring sleeve in place at the top of the case.



24. Look inside the case and identify where the thermistor and heater wires are plugged in. They may be obscured by wiring and it is likely you will need to cut some cable ties to release them.

Warning:

Cut and remove these cable ties but be extremely careful not to cut any wires.



Note:

Diagrams show the expected configuration for the stock Einsy Rambo board that Prusa MK3 printers use.

25. If you have not done so already, carefully remove just the V6 thermistor and heater wires from the sleeve. Try to leave the rest of the wires inside the loom as you do this. You shouldn't need to cut any more cable ties at the extruder end of the loom.

26. Unplug the heater wire at the board, the ends of the wire are held in place but you can carefully pull off the whole terminal.





27. The thermistor wire should also be unplugged from the board.You will need to press on the small tab on the side as you pull to release it.



If your view is obscured by the screen's ribbon cables, you can unplug these to give you more room to work in. Do not mix the ribbon cables up though, they need to be the correct way around.



28. Locate your Thermistor and Heater extension cables and plug them into the Revo Six heater and thermistor using the diagram. Red striped white cable is the Heater. Blue cable is the Thermistor.





Heater Conne ction

29. Feed the new extension cables into the wire sleeve and then re-clamp the sleeve in place using the two M3 x 20mm screws.

Note:

This is sometimes a little fiddly, try to pull the sleeve tight around the cables so that it will fit between the clamps.





30. Unscrew the V6 heater connections from the terminal using a small flathead screwdriver and replace them with the Revo Six heater extension cable (black with red ferrules). Then plug the terminal back into the board.

Note:

Heaters also do not have polarity so it doesn't matter which way around the cables go into the terminal.





31. Plug your thermistor extension cable (white with light blue streaks) into the board from where you have just removed the original.

The thermistor extension cable doesn't have the same locking tab as the original cable. Thermistors do not have a polarity though, so you can plug it in either way around.



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Warning:

You should tidy up the excess cable using cable ties. It is important that you don't leave the cables tangled/messy as this can lead to loose connections and even a fire hazard.

32. Also use cable ties to secure the loose thermistor and heater cables to the back of the extruder, remembering to trim off the excess cable tie.



33. Close the housing door and secure it with the M3 x 40mm screw.



Final Calibration

With the assembly and wiring complete, you are just one PID tune away from starting a print.

Note: Although the Revo Heatercore will normally hold its temperature fine without PID tuning, it is good practise to always PID tune a new heater/thermistor as it will improve temperature stability and optimise heatup times. It's also super easy to do on a

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I. Flug in and turn on your printer.

PID tune is available from the LCD Screen Menu. If you have a modified mainboard, you can find PID Tuning guides for other firmware's HERE.

2. Go to Calibration in the on screen menu and scroll down until you find PID calibration. Click on it.

Note:

Please note, when heating up your Revo for the first time, you may notice small amounts of smoke coming from the nozzle. This is just residue burning off and is nothing to worry about.

You will need to select what temperature to PID tune at. At E3D, we recommend you PID tune for the temperature that you will most commonly be printing at.

For example:

If you plan to print mostly PLA, PID tuning at 200°C should give you good results. However, if you plan to print at a wide range of temperatures, say between 200 and 280 degrees, you might want to PID tune at 240°C to limit potential inaccuracy.

3. Wait for the PID tune to finish.

Revo Six should be an identical height to the V6 that was previously installed. However, it is a good idea to recalibrate Z because even as little as 0.2mm of variation could cause the nozzle to scrape the bed.

4. Load some filament into the machine as you normally would.

- 5. Go to Calibration > First layer calibration.
- 6. Click 'Start from Zero'.
- 7. Adjust the Z value until you have a perfect first layer.
- You have successfully upgraded your Prusa to Revo!

Why not print a colour-coded holder for your new Revo Nozzles? https://www.printables.com/model/158084-prusa-mk3bracket-revo-connect





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