

Assembly Instructions for the Isis One Dual Extruder Printhead by Isis3D. Design is released under the Creative Commons Attribution--ShareAlike 4.0 International License.

SUBASSEMBLIES:

Motor with gear: press gear onto motor shaft. Gear should sit ~1 mm from motor body. Cut off remainder of shaft (band saw works well) and grind flat.

Short shaft with gear: thread thin twinned gear onto shorter threaded end of shaft, until it stops. Use permanent strength thread locker (red loctite works well). Be sure not to get any on the portion of the shaft that sits in the bearing. This should be very difficult, due to the interference fit. Hold the shaft in vicegrips (failing something proper like a collet) and the gear in gear pliers.

Long shaft with gear: thread thick threaded gear onto dimpled end of shaft, using red loctite. Turn until it stops. Then add large gear, also with loctite.

Hotend: Stuff teflon tube into barrel, and cut 1 mm past end with a sharp razor blade. Make sure cut is tight. Set this aside. Screw nozzle into heater block. The hotends are right and left handed--in each case, the nozzle should go into the side such that with the heater cartridge hole to the back, the thermistor hole is on the motor side.

Nozzle bracket: use 3 M3X5 screws to attach the captive nut shelf to the nozzle bracket. The captive nut should spin freely in its slot. If it doesn't, the nozzle block was probably not manufactured correctly. Its contact surface should be utterly square.

Thread two stainless steel thin M6 nuts onto barrel, and tighten them into one another. Use ~3 in of PTFE plumber's tape folded in half on the teflon end. Thread the whole business into the heater block. The teflon will compress. When tight, loosen the nuts from one another, and bring one tight with the block. Leave the other about 3 mm up the barrel from the first.

MAIN ASSEMBLY: THE FIRST PLATE, GEARS, AND FEED WHEELS

Note: again, the printheads are right and left handed. The left printhead uses plates 1 and 2, while the right one uses the same process with plates 4 and 3.

Insert a bearing into the center bearing seat on plate 1. Place plate 2 over it to hold the bearing in place, and insert the short shaft assembly through the back of the plate. Press until tight. Actually tight, with the bearing all the way seated. If the gear is hard to turn, give the whole business a whack. This should loosen it up. Repeat the procedure with a second bearing and the long shaft assembly. The pair of gears should spin freely.

Thread on the feed wheels, turning them until they stop. They should be perfectly aligned. If they aren't, back one off slightly until they are. Peen both 12x with a center punch, spacing evenly. Both should be totally immobilized.

Take plate 2, and press bearings into its bearing seats. Press them onto the ends of the shafts past the feed wheels, and then remove the plate. Put M3x12 screws through the center hole and the hole in the corner near the bearing holes. The screws should go in through the side opposite the bearing seats. Put a 1/4" spacer on each screw, and attach plate 2 to plate 1. The gears should spin freely with the screws tight. If not, and if knocking the assembly with a hammer doesn't fix it, you have a problem. Chief suspects include feed wheels (not seated far enough down?) and spacers (too short?).

Place the nozzle bracket assembly into place on the bottom of the extruder, lining it up with its two holes. The open end should point toward the front edge of the extruder, and you should have a line of sight through the barrel hole to the gap between the feed wheels. Use an M3x18 screw (the back of the screw should be on the side with the gears) and an M3 nylock nut to hold it in place. Put a 1/4" spacer in between the plates aligned with the corner hole, and drop a M3x27 through it. This will eventually go into the motor, by way of the 9.5 mm spacer.

Align two more 1/4" spacers with the two remaining corner holes,

and press the mounting bracket into place, such that the thick aluminum blocks are on the side with the gears (the back). Drop two more M3x27s through to hold it in.

Now, mate the assembly with the motor. The motor wires should point in the same direction as the hotend will point when it is installed in the nozzle bracket. Place the 9.5 mm spacer on the screw in the lower front corner (nozzle bracket corner), align the extruder assembly with the motor, and screw it down tightly. The small and large gears should mesh and spin freely. If you encounter resistance turning the gear, and the problem is not an obvious matter of crud in the gears, the culprit is most likely with the original gear assembly. If this worked well, you should be fine.

Attach the hotend by placing the captive nut in its slot and threading the barrel into it. It should sit such that it almost touches the feed wheels but doesn't quite. When it is in position, lock it in place with its locking nut (the top M6 nut that you left loose before). Be sure you use a hotend made for the left extruder rather than the right one--its thermistor lead channels should point toward the motor.

Repeat this process for the right printhead. Both are then mounted to the X carriage with M3x5 flat head screws, such that the nozzles point over the edge with the two wheel holes (not the edge with the one center hole and the mess of belt clamp holes). The printhead is now complete, ready for wheels, belt clamps, and wiring.