There is a guide for printing too, see the docs section of the website.

There is also a document that discusses the design and why it is the way it is, what else has been tried etc., in case you would like to change the design, this allows you to start where I left off, instead of repeating things.

Inspect the fusion 360 file in fusion, you can download a copy for free and get a free personal use license. I recommend inspecting the whole machine and getting an idea of how the parts fit together. Use the section analysis and toggle visibility of the various parts so you can see in there.

The lower grid and top grid bodies are printed with grid infill and no top or bottom layer, to form a grid with about 4mm spacing. They are merged in Cura. Fusion can’t handle actually modelling the grid structure, so it has to be done this way for now.

You need to export the STLs from the fusion file. I may do this later to make it easier, but you have to re-do it every time there is any change, so I don’t do it while things are in flux at all or I would have to go around and update everything every time.  
  
Stls are not really source code, they are more like compiled code.

I still need to make some videos and pics to show the assembly process.

See the file on printing notes for the details of how to produce good parts. I can get some example cura files up which can help.

Basically, you have to have your printer working well, then slice with suitable settings, print with bed adhesive, allow things to cool, then remove the parts with a box cutter or scraper from the print bed, post process the parts, mostly remove and blobs on the surface, and stringy stuff. The seal on the thermal wheel and the area where it comes close to the regenerator esp has to be sanded smooth, free of blobs etc.

This is standard 3d printing and post processing stuff. Don’t forget to sand off the z seam on the main seals and the regenerator, especially.

Do some basic checking to see if the parts are within tolerance. Put the bearings in and make sure they fit tightly but go in ok, and try putting some on the relevant shafts, ideally they fit tightly but a loose fit is ok, too.

If not sometimes you can sand the parts to fit, if they are too far off in the wrong way, you have to reprint them.

Then, assemble the thermal wheel. First, load the straws into regenerator module. This is kind of a drag and takes about 45 minutes. I can make a video later to show the general technique I have developed.

Then snap the top grid in place, it takes some force. Glue it in place with some CA glue, this isn’t always necessary, depending on print quality. I use the low viscosity stuff, “lepage ultra liquid super glue”. Make sure it doesn’t stick up anywhere, be careful not to glue it in a bad position, above all, that would be a real problem. The top of the grid component should be flush with the top edge of the regenerator media holder component.

Once you have a good regenerator component done, put the bearings into their sockets, and put the regenerator into the base component. Then put the belt approximately in place, put the outer seal component on, and make sure everything turns ok, no noise, no touching. If anything touches, you have to figure out where it touches and dismantle and sand that area until it’s all good.

Pick the thermal wheel module up and make sure that even if you squeeze or bend it a bit, things still don’t touch or make noise.

Then, add grease to the main seals. You can either continue assembling things until the motor and belt are in place, and then turn it on and use the syringe and needle to inject grease, or you can add it by dismantling the thermal wheel and putting it on the components and then re assembling them. I recommend the dismantling method, it is less stressful and prone to error. You need to do this after checking for rotation and fit because it is hard to sand after you add grease.

Don’t get any grease on the regenerator media, ideally.

Reassemble it all, don’t forget the belt as you go, and turn it a few times to make sure it turns well.

Then assemble the motor and pulley and it’s mounting bracket, the glue takes a few hours to set for the pulley.

Put a rubber washer on each screw, so they are ready, and put the screws through the holes in the mounting bracket, and put more washers on the other side.

Put the motor and pulley with mounting bracket in place, and drive the screws in most of the way, but don’t tighten them.

Adjust the position of the motor so the belt is a bit tight, but not too tight, there should be basically no actual tension on th ebelt while it’s not moving. Tighten the screws a bit, move the belt several full rotations to make sure things are in place, check the alignment of the motor if the belt is wandering to the end of the pulley, the shaft should be parallel to the axis of rotation of the thermal wheel . Rotate everything carefully by pulling on the belt or rotating the motor and observe that things are nicely aligned.

Once things are aligned, tighten the screws.

Wire up the motor, put the power plug into it’s mounting point, solder the wires, mount the electronics, and connect things so that the gimbal motor will turn when things are powered on, and give it a test.

Pick it up, squeeze it and distort it carefully but firmly to make sure everything works smoothly and reliably.

If it’s ok, you are done the thermal wheel.

Run the wires for the motors, then tape the motors in place, onto the duct modules. I use 3 loops of tape in a triangle around the hole, to act like double sided tape, to hold the motors in place, then seal the edges with more tuck tape. Try to make the tape so that it doesn’t show after adding the rain/cosmetic covers.

Finish the electronics in the interior duct module, wire the potentiometer, connect the fans etc.

Check for any errors.

Test everything by powering up the electronics before you screw the motors in place. The fans should spin up, turn the pot to adjust their speed, make sure things work.

Put the screws slightly into the holes on the corners of the duct/fan sections, so it is not hard to drive the screws the rest of the way later, the screw is in place ready to be driven. Otherwise it’s hard to get the screw in, and if you drop one into the duct it is a real problem.

Put the duct/fan assembly units in place and screw them down, add some sealant to that dividing wall when you do. I use glue gun glue for now as it sets fast, but shoe goo or silicone caulk can work.

Only partially tighten the screws, because the base components curls during printing, you have to be careful not to overtighten the screws, or it may cause distortion and cause the thermal wheel to jam. I leave the thermal wheel turning during this stage to make sure there are no issues as I tighten the screws, but it’s a matter of preference.

As you add each duct, turn the gimbal motor/ pull on the belt to rotate things, and make sure things still work ok, or leave it turned on.

Turn the thermal wheel on after adding both duct modules, to make sure things still work ok, if it was not turned on during the process.

Now things are almost done, just screw/glue the rain covers in place and seal things up. Only the outside raid cover needs to be sealed, the indoor side should be fine, however you may wish to add some sealant to prevent air from leaking through the crack around the duct and thermal wheel, especially if you cannot fully tighten the screws, there may be a substantial sized crack.

Add the cover to the motor, then turn the pot to the middle position, carefully connect the power and test it out. Plug the barrel connector in first carefully, you may need to rotate the plug to get it to go in gently, then connect the wall wart to the electrical socket.

Pick it up carefully and make sure it keeps turning and working ok. If so, you are done.