

## Z-VENT - Comprehensive ventilation upgrade for Zortrax M200



liftbag

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### Summary

This is the final upgrade of my ventilation system for the Zortrax M200.

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This is the final upgrade of my ventilation system for the Zortrax M200. It represents the development of previous projects published at the following links:

[Zortrax M200 dual airflow radial fan duct.](#)

[Zortrax M200 radial fan shroud for extruder heatsink.](#)

**If you need a better ventilation system for your zcory plus hotend, take a look at [EDIT 07/03/2018] at the bottom of this summary.**

## **Warning**

**As many have experienced, the Zortrax M200 has a bad management of the hotend temperature and is not able to provide for transients that cause a sudden temperature drop, such as the sudden switch to 100% of the fan. This upgrade substantially worsens this negative feature of the M200. It is therefore highly recommended to insulate the heating block with high temperature silicone compound, cotton coats or Teflon tape for high temperatures.**

## **Introduction**

As many people know, the M200/300 hotend throat cooling system is the bottleneck that often prevents you from printing materials like PLA or TPU. And again, the extrusion area ventilation is too low to get good results with PLA and related. It is also strongly asymmetric.

As far as throat cooling is concerned, it must be said that the best results are obtained by using a more effective heatsink, or a better thermal barrier, or both. Anyway, increasing the ventilation of the heatsink is a good help, at least, a starting point.

Regarding the cooling of the extrusion area, there are already many projects that duplicate the ventilation, both with two and with a single axial fan. But the axial fans exert a very low pressure which nullifies the possibility of making a substantial air volume.

The most practicable solution therefore results in the adoption of centrifugal fans, which exert 5 to 7 times the pressure of an equivalent axial fan.

## **Goal**

The goal of improving the final appearance of objects printed with pla had already been achieved with my previous projects. The goal of this project is to improve the shape of the shrouds to eliminate any interference with the chassis in the prints at maximum extension.

## Pros and cons

### Pros

Bottom shroud is far from touching any point on the printer. If you slightly lower the positioning of the front cover right magnet, the upper shroud is also free to move completely in the printing area.

The lower shroud is lighter and the two opposed air flows are almost perfectly symmetrical.  
It is well raised in the rear area, to avoid contact with the bed connector.

### Cons

The lower shroud blows slightly heated air from under the heatsink, compared to the previous version.  
It is mandatory to use some support for the bottom shroud, while the first versions could be printed without supports.

## Printing tips

### Upper shroud

The upper shroud can be printed without supports without changing the default orientation on bed, although some (easy to remove) support helps. If you don't use supports, pay attention to the distance from the raft or from the bed. You must have a good adhesion to prevent the piece from collapsing during printing.

Almost any rigid material can be used, with the exclusion of PLA, which does not guarantee the necessary structural rigidity at the usual operating temperatures. In any case, materials that allow easy bridging are definitely preferable if you do not use supports. Use at least two perimeters if you can. I use Simplify3D with my Zortrax, converting the gcode to zcode with Ztool. I set four perimeters in order to have a good full thickness on the walls of the holes.

### Lower shroud

You have to support all the rear raised area. Don't put any support inside the U shaped air duct. Supports in the inlet opening are easily removable and thus recommended.

A heat-resistant material is highly recommended. Imho the best material for this application is the PBT. If you print pla only and don't exceed 250 degrees at the extruder, maybe z-abs or z-ultrat are good alternatives. Same considerations made for the upper shroud about the number of perimeters to be set.

# Requirements

## Upper Z-VENT

1x radial fan 40x40x10.

3x M3x12mm button head or socket head cap screws.

3x M2.5x6mm screws (no flat head type) or 3x 2.2x6mm self tapping screws (no flat head).

## Lower Z-VENT

1x radial fan 40x40x10.

2x M3x20mm socket head cap screws.

3x M2.5x6mm screws (no flat head type) or 2.2x6mm self tapping screws (no flat head).

## General

Soldering iron, tin solder and wire stripper (to adjust the length of the fans wire).

M2.5 tap cutting tool if you choose the M2.5 screws to lock the fan.

**You cannot use** the powerful Delta 4010 radial fans as they are irretrievably damaged if they are powered directly by the pre-set connectors in the printing head.

Don't use this Delta 4010 radial fan.

# Mountings

## Fans adaptation (See the images below)

1. You have to shorten the long cable supplied with the fans. Cut the wire at 260mm from the head of the connector.
2. Peel no more than one mm of sheath from the copper wire and tin the bare wires.
3. Remove the round sticker under the fan so as to expose the wire welds.
4. Desolder the original wire.
5. Tin the wire previously cut to the right size, respecting the polarities.
6. Reapply the sticker.

##### Shrouds adaptation Use a lighter to eliminate any visible oozes and webs from the inlet openings of the conveyors.

Tap M2.5 the small holes if you want to use the metric M2.5 screws to lock the fans. ##### Install the fans on the shrouds

- Lock the radial fan in the housing provided on the upper shroud with the three screws and insert the wire into the guide.
- Lock the radial fan in the housing provided on the lower shroud using three screws and insert the wire into the left guide.

##### Install the new shrouds

- Remove the printing head cap and disconnect the red and blue fans connectors.
  - Remove the upper axial fan completely (four screws).
  - Remove the lower axial fan and his stock shroud (three screws).
  - Install the upper shroud using the two M3x12mm screws, inserting the cable through the channel on the corner of the extrusion head and connecting it to the red connector.
  - Install the lower shroud with the two M3x20mm screws.
  - insert the cable through the channel on the corner of the extrusion head and connect it to the blue connector.
  - close the head cap and perform a fan test from firmware choices.
- ##### [EDIT 3/5/2018] Z-VENT\_V11.1.stl added. New lighter version. The fan is screwed from bottom to top with three screws. ##### [EDIT 3/6/2018] Sorry, but due to an oversight, the cable guide of the upper Z-VENT collides with the right hand bars-lock block. The Z-VENT\_upper\_V7.2\_alieux.stl has a different cable guide. In addition, it mounts on the heatsink with no. 3 M3x12 screws instead of two. It replaces the previous version. ##### [EDIT 3/12/2018] Z-VENT\_V10.stl removed. ##### [EDIT 4/3/2018] V11\_Z-Temp\_spacer.stl added. To be used with Z-temp hotend. You need no.2 M3x25mm screws to lock the z-vent and this spacer to the heatsink. ##### [EDIT 04/10/2018] Z-VENT\_V12.3.1.stl and V12.3.1\_Z-Temp\_spacer.stl added.

Please note, **this version is incompatible with the original heating block.**

I designed it for the reduced volume heating block that I currently use. There is some possibility that it can be used with the zcory hotend (V1, V2 and plus), but I have not personally verified it.

This conveyor exerts a well-centered and greater ventilation compared to the V11.1 as you can see here: [https://](https://www.youtube.com/watch?v=yq5bjbjFcel)

[www.youtube.com/watch?v=yq5bjbjFcel](https://www.youtube.com/watch?v=yq5bjbjFcel)

In addition, it could hit the rear bed connector in very large prints.

##### [EDIT 06/09/2018] Z-VENT\_V12.3.2.stl added. This is a slightly modified version where the two rear ventilation openings have been spaced 2 mm from the heating block.

In addition, I have included the design of a heating block (Z-HOT\_MS) suitable for the original V2 hotend or the Micro Swiss upgrade. The heating block is not tested, but it should be ok. ##### [EDIT

07/03/2018] Z-VENT3010\_ZC+.stl and Z-STORM\_ZC+.stl added.

Please note:**Z-STORM, witch is a dual 3010 ventilation system, is not compatible at all with the Zortrax M200, since it's not able to handle the temperature drop caused by the powerful ventilation. Only those few in the world who have replaced the motherboard with a higher performance one can use it.**

These three outlets shrouds are compatible with the Zcory+ hotend.**You cannot use it with the original heating block, unless you remove 3mm from the front and 2mm from the back, helping with a milling machine, or with an iron saw and file.**

I switched to 3010 radial fans for this latest version. They are smaller and better performing than 4010. You can grab them here: [radial fan 30x30x10@12V](#). You need to prolong the power cord to be able to wire it.

## **Print instructions Print Settings**

**Printer Brand:** Zortrax

**Printer:** Zortrax M200

**Rafts:** Doesn't Matter

**Supports:** Yes

**Resolution:** 0.10

**Infill:** low

**Notes:**

The \_Z-VENT\_upper\_V7aliex.stl can be printed supportless.

The \_Z-VENTV10.stl needs some supports, but don't put any supports inside the U shaped air channel.

## **Fan adaptation**

- 1. Cut the wire at 260mm from the head of the connector.**
- 2. Peel no more than one mm of sheath from the copper wire and tin the bare wires.**
- 3. Remove the round sticker under the fan so as to expose the wire welds.**
- 4. Desolder the original wire.**

**5. Tin the wire previously cut to the right size, respecting the polarities.**

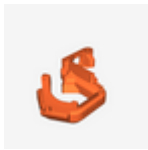
**6. Reapply the sticker.**

## Model files



**z-vent\_v111.stl**

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**z-storm\_zc.stl**

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**z-vent\_v1232.stl**

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**z-hot\_ms.stl**

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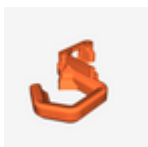
**v1231\_z-temp\_spacer.stl**

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**z-vent\_upper\_v72\_aliex.stl**

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**z-vent3010\_zc.stl**

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**z-vent\_v1231.stl**

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**v11\_z-temp\_spacer.stl**



**z-hot\_ms.step**

[Find source .stl files on Thingiverse.com](#)

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