



Mantis Clamp



zuberio

[VIEW IN BROWSER](#)

updated 4. 12. 2025 | published 4. 12. 2025

Summary

Very happy with this creation, it's a 35:1 PRINT-IN-PLACE!! dual stage planetary gear system (sun 1 : ring 2).



3.25 hrs



1 pcs



0.20 mm



0.40 mm



PLA



25 g



Prusa MINI /
MINI+

[Hobby & Makers](#) > [Tools](#)

Tags: [printinplace](#) [planetarygear](#) [pcbholder](#)

Very happy with this creation, it's a **35:1 print-in-place dual stage planetary gear system** (sun 1 : ring 2). The really cool thing is that the rings won't shift without the inner gears being turned, so **no back-driving**; the arms are locked if the dial isn't turned.

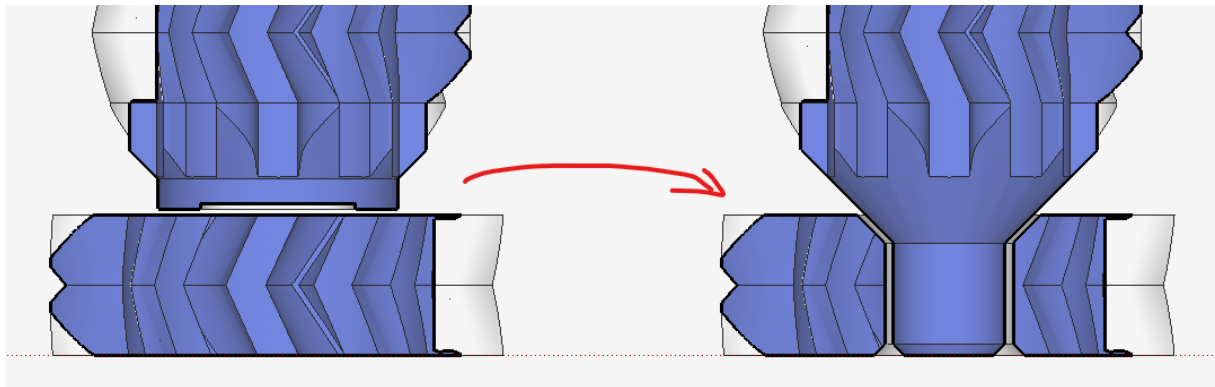
Saw the '[Falcon Clamp](#)' by [tmackay](#) on TeachingTech and realized I could make something similar - but more to my liking. I used:

- [Satisfying Dual Stage Planetary Gears OpenSCAD script](#) by Snaxxus to generate the gears.
- [Print In Place PCB-Holder / Gripper](#) by Turbo_SunShine for the arms.
- Sketchup 8 to put it all together.

PRINT INSTRUCTIONS

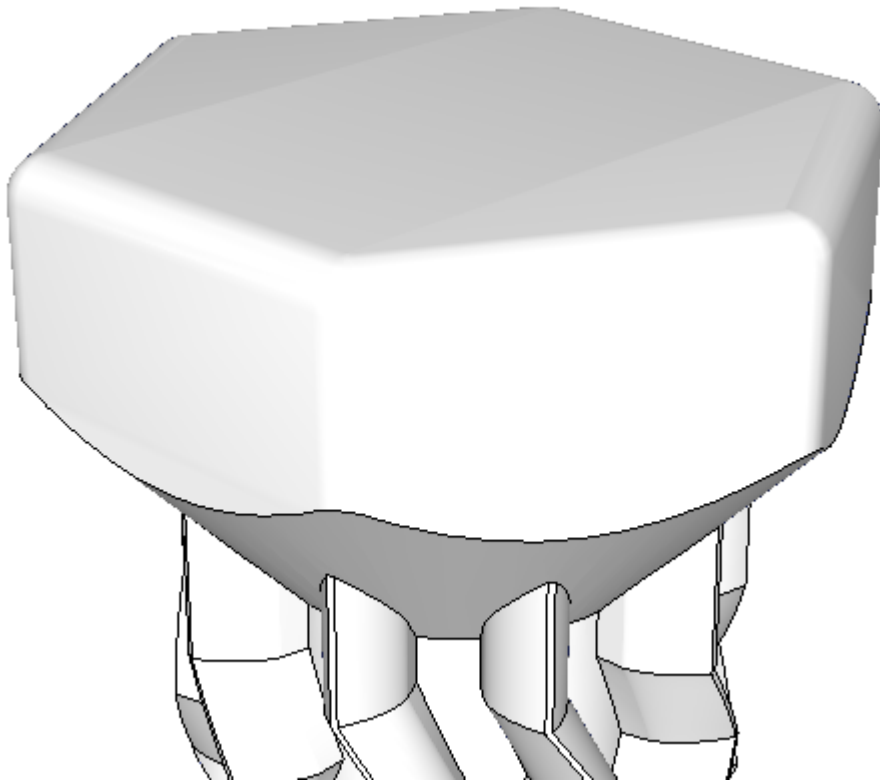
- 0.4mm nozzle
- 0.2mm layer height
- 3 perimeters
- 5 layers top and bottom
- 15% infill
- no supports

For 'cracking' the print for the first time, I insert a scraper between the top and bottom rings to separate them apart - I find this manages to take care of the majority of the needed 'cracking'.



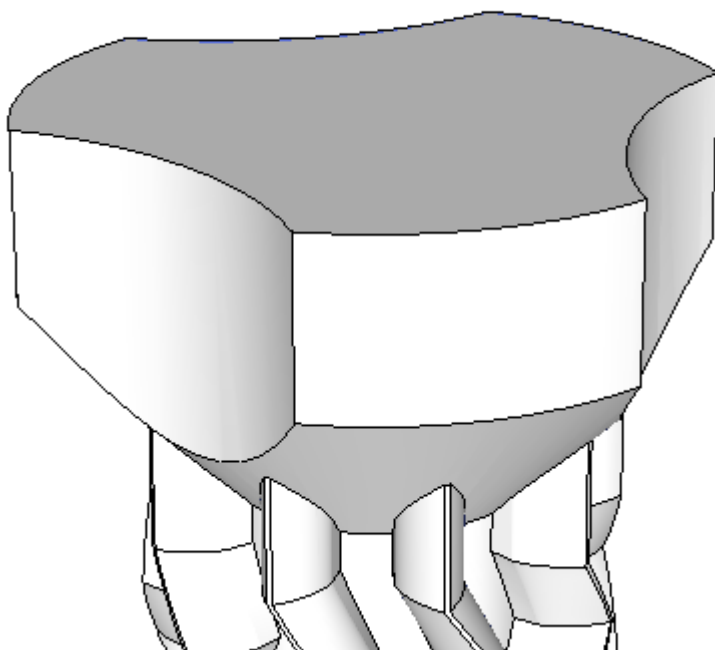
Thanks to the suggestion by Joe Programmer; the upper sun gear is now supported off a post that comes up through the lower sun gear. I've only made this edit to the version of the clamp with a Hex-dial. The first layer of the support post and the bottom sun gear are connected with tabs to ensure adhesion to the build plate. That's what I cut post-print in the above video.

DIALS



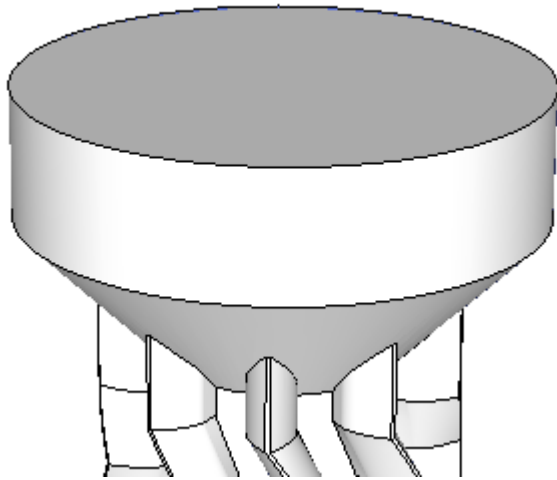
rev 3

Rounded **Hex-Dial** for improved grip while maintaining ease of rotation.



rev 2

Improved grip via a **Tri-Dial**.

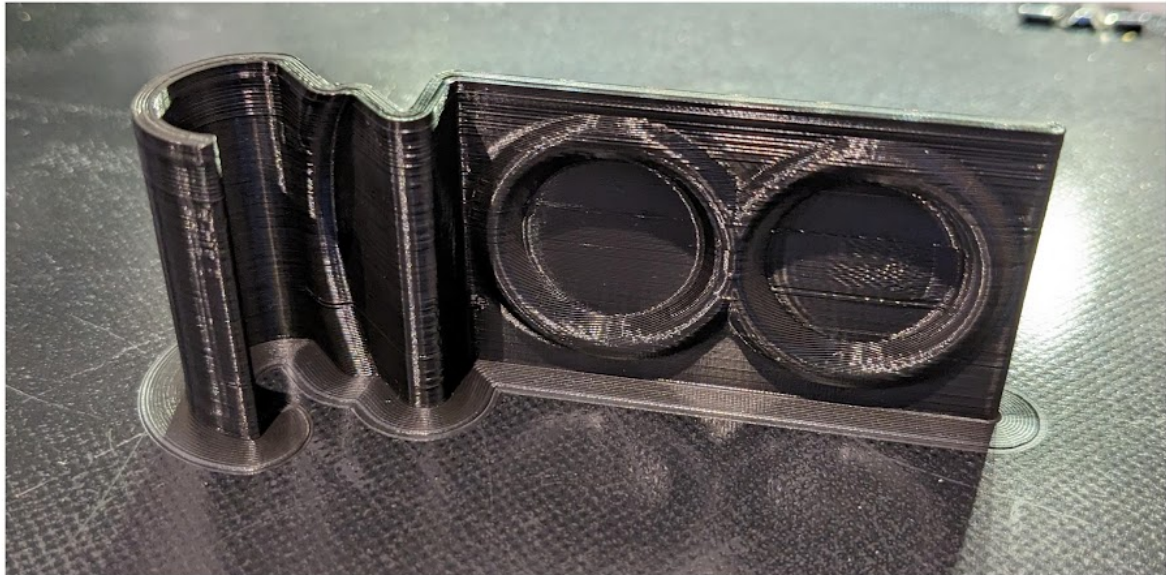


rev 1

Original design came with a simple **Round Dial**.

STANDS

Honestly, I've come to find that designing a suitable stand for my Mantis Clamp to be one of the biggest challenges for this project.



rev 5

Tension Stand generated with slightly deeper part trays and a 'jaw' that is 0.5mm smaller than the mantis clamp. Thus, the 'jaw' has to flex open to grip the clamp in position.

rev 4

Wedge Stand added based on TeachingTech's comments about the Mantis Feet not working out so well. Uses a progressively tighter grip socket to hold the Mantis Clamp in place with friction. Bonus: includes two small and shallow part trays!



rev 3

New stand concept that I've dubbed **Mantis Feet** (super original, I know). Note that these do not work with the version(s) of the Mantis Clamp that have removable supports under the arms.



rev 2

Version of the stand with PiP **locking** functionality! I print the locking stand at 100% infill. As well, there's a little bit of built-in support at the top end of the locking mechanism barrel that needs to be snipped off post-print.

EDITS

[2025-01-13] I've designed a new version of the clamp with hinged pads at the tip that allow for secure holding of small PCBs. I call this version the Mandible Clamp ... just because.

[2025-01-10] Thanks to various upgrades to my 3D printer (and PrusaSlicer's Arachne engine) I've successfully printed the 0.10mm backlash model, it's no longer experimental :)

[2024-05-03] Thanks to discussions with @VaguelyUseful, I've now also added an experimental version of the Mantis Clamp that reduces the backlash down to 0.10mm. Good luck to those who attempt this version!

[2023-03-10] Owing to several comments that there's too much play (backlash) in the gears, I've uploaded a version of the Mantis Clamp that reduces the backlash from 0.25mm to 0.20mm. I still recommend the 0.25mm backlash though - to better avoid a fused print.

[2023-02-23] In response to Invalid_Maus's comment about the round dial version of the Mantis Clamp still having removable supports under the arms, I've uploaded a new file that turns the supports into a strengthening feature of the arms instead.

BONUS

OMG!!! **TeachingTech** talked about the Mantis Clamp!!!

Model files

 STABLE (TESTED)		7 files
	mantis-clamp-hex-dial-0_10.stl ☐ 0.10mm spacing between gears (do tolerance test) (Check slicer slice gap closing radius!)	
	mandible-clamp-hex-dial-0pt10-spacing.stl ☐ 0.10mm spacing between gears (do tolerance test) (Check slicer slice gap closing radius!)	
	mantis-clamp-hex-dial-0_20.stl ☐ 0.20mm spacing between gears (tolerance test recommended!)	
	mandible-clamp-hex-dial-0pt20-spacing.stl ☐ 0.20mm spacing between gears (tolerance test recommended!)	
	mantis-clamp-hex-dial-0_25.stl ☐ 0.25mm spacing between gears	
	mantis-feet.stl	



tension-stand.stl

☐ Recommend printing with a brim



DEPRECIATED (OLD)

7 files



mantis-clamp-tri-dial-0_25.stl

☐ 0.25mm spacing between gears



mantis-clamp-tri-dial-0_20.stl

☐ 0.20mm spacing between gears



mantis-clamp-round-dial-0_25.stl

☐ 0.25mm spacing between gears



wedge-stand.stl

☐ Recommend printing with a brim



mantis-clamp-locking-stand-v2.stl

☐ For information only



mantis-clamp-locking-stand-v1.stl

☐ For information only



mantis-stand.stl

☐ For information only

Print files



mantis-clamp-feet_02mm_pla_mini_3h15m_dont_use.gcode

PLA 0.40 mm 0.20 mm 3.25 hrs 25 g Prusa MINI / MINI+

License



This work is licensed under a
[Creative Commons \(4.0 International License\)](#)

Attribution—Noncommercial—Share Alike

-
- ✗ | Sharing without ATTRIBUTION
 - ✓ | Remix Culture allowed
 - ✗ | Commercial Use
 - ✗ | Free Cultural Works
 - ✗ | Meets Open Definition