

Mechanical Counter desktoy



Johan

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Summary

A print-in-place mechanical counter desktoy

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What is this?

This model is made purely for the design contest "Counters". I happened to see that it was running and figured that it would be a good opportunity to practise designing a mechanical model, something that I have very little experience with. Another thing I decide to try was to make it a print-in-place design, so no assembly needed. I spent a couple of nights testing things and ended up with this.

As a result, the model itself was a bit rushed and ended up with a number of errors and nonworking parts. Since publishing the model I've had several updates to make it work, see the "Updates" section below.

Usage

The counter will count up or down (0-999) when you turn the first wheel (depending on which model you've printed). You do this on the right side when looking at the counter straight on.

To reset the counter, just keep turning that wheel. You'll get there eventually...

Print settings

The model is designed for a 0.4 mm nozzle and a layer height of 0.2 mm, and I printed it with 3 perimeters and 20% lightning infill. It should not need any supports, brim, elephant's foot compensation, etc, but there are three small built-in supports for the teeth of the small gear on the right. If they don't fall off by themselves they're very easy to break off. Print the model in the supplied orientation.

After printing you will most like have to jiggle the gears a bit to get them to turn, but no excessive force should be needed. If the gears fuse in the bottom, add a small elephant foot compensation.

Design

This is based on how a regular clicker type counter works, but I decided to lay it out flat and make a kind of desktop toy out of it. The design is kept open so that it is possible to see the gears and how everything moves when used. The holes in the gears have no use except for aesthetics. In reality they actually add quite a bit of print time, but I do like the look.

Colours

It is a print-in-place design, but I think it would look very nice if printed in multiple colours. Sadly, I do not have a multi-material/colour printer. If I did I would have printed the gears in a bronze/gold colour, the case in a metallic silver and the numbers and border around the active numbers in white.

On this print I simply used a white marker to colour in the numbers, and it works quite well.

Updates

2024-01-17

First if all, huge thank you to @akando for letting me know if things they found that hasn't been working as expected with the model.

I've fixed the cutout for the thumb-wheel so that it doesn't interfere with the mechanism and also tightened the amount the wheel sticks out so it's easier to move just one digit.

Everything should work as expected now...

I've added two versions of the counter, one that counts up and one that counts down, and I'm planning on adding a third version that's multidirectional.

I've also removed the reset tool, with the increase of arms in the ratchet mechanism it just didn't work. No plans to introduce anything else for this (apart from the multidirectional model mentioned above).

2024-01-15

I got a report that the first digit wheel tended to size up solid during printing. I've tried adjusting the tolerances a bit in this file. I also took the opportunity to update both the ratchet (more arms for a more satisfying click) and the reset tool.

2024-01-14

Seems like I accidentally broke the model when doing the previous update. Now fixed.

2024-01-09

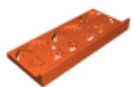
I realised I could mitigate some of the warping of the teeth on the small gear between the single digits wheel and the tens gear by adding small supports.

2024-01-08

Updated both models. The ratchet mechanism had accidentally gotten too tight tolerances and had a tendency to print solid/seize up.

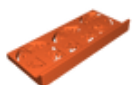
The reset tool had accidentally gotten a wrong angle for the slot insert.

Model files



mechanical_counter_count_up.stl

📄 Updated 2024-01-17 (fixed thumb-wheel interference)



mechanical_counter_count_down.stl

📄 Uploaded 2024-01-17 (New version that counts down)

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