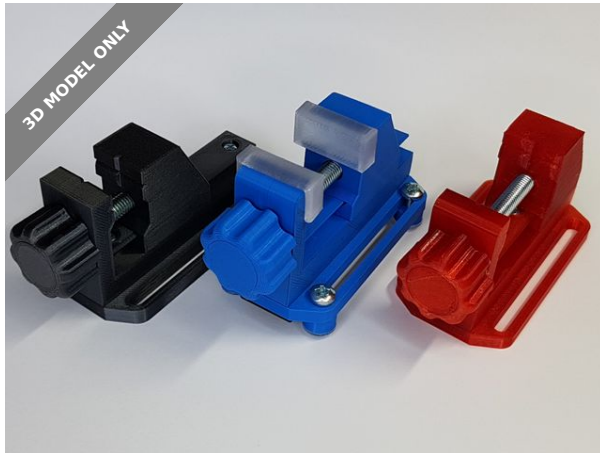




Miniature Vise 2.0 (much easier to assemble and 100% printable)



HD_Creator

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Summary

The very popular miniature vise is now much easier to assemble. And finally no metal screws are needed any more.

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History of the miniature vise

This is the completely reworked version 2.0 of my very popular miniature vise, which is much easier to assemble now.

Around Christmas 2020, I had published the first version of my miniature vise here:

<https://www.prusaprinters.org/prints/50151-modular-miniature-vice>

This vise shows remarkable strength despite it's very handy form factor. Within a few weeks, it became the third most liked part in the "hobby/ makers - mechanical parts" category, right behind two featured designs from Prusa themselves. Based on the number of downloads it even is by far the number one in this category today. With that many people enjoying

this design, I have continuously worked to do some slight improvements and released upgraded parts and add-ons over the weeks.

Update 14.03.2022:

For all my friends and followers in countries that use the imperial system, I have now added an upgrade kit that allows to use this vice with a quarter inch screw (1/4"-20) and nut, instead of the metrical M6 screw and nut. Only two of parts need to be replaced. The new parts can be found here: <https://www.prusaprinters.org/prints/149876>

Everything is now 100% 3D-printable

The most frequent feedback that I got is now finally addressed: There is no need any more for additional metal screws. If you happen to have the needed M6x70 screw and a metal M6 nut, feel free to use it, it looks and works fine. But if you have troubles to get your hands on these parts, simply go here and print them. The printed parts work absolutely fine as well:

<https://www.prusaprinters.org/prints/65687>

If you also miss the M3 screws, simply align the parts based on the through holes and glue them together with superglue. That is was I have done for the light blue vice in the pictures, it does not contain any metal parts at all and works perfectly fine.

There also is a 100% printable table clamp for the vice now:

<https://www.prusaprinters.org/prints/123038>

Update 19.04.23: If you prefer the stand-up version without the table clamp, I recommend to have a look at the little feet with internal M4 thread that I have now released. They make adding feet to the vise very simple, as there is no need for thread-cutting any more:

<https://www.printables.com/model/456375>

Other improvements made over time, thanks to the feedback I got:

Most importantly, there is no need for thread cutting any more. The parts can be assembled within two minutes, right out of the printer. All you need are three screws M3x16, three nuts and a screw driver. (Plus a M6x70mm and a M6 nut for the spindle, see details below).

Another significant improvement is on the moving block. It had the design flaw of a very sharp edge (well below 90° angle) directly towards the dove tail rail. That caused significantly more or less friction, depending on how

exactly that edge came out of your printer. It is now replaced by a clean 90° edge.

Originally my idea was to have the vice as a self-contained part of a modular clamping system. That caused the need for a relatively thick stabilizer bar, mounted to the dove tail rail, to withstand bending forces when a part is clamped very hard. But since the vise only makes sense in combination with the ground plate or a table clamp (which can also take some of the force) I have reduced the material need by making this part slimmer.

The ground plane is reworked to take M3 nuts from the bottom side, which is part of eliminating the need for the thread cutting. It is also 0.5mm thicker to avoid the screws sticking out at the bottom.

In general all parts have been printed several times on different printers and have been optimized on sub-millimeter level to achieve the most perfect fit on all printers.

By recommending a M6x70mm spindle screw now, rather than a M6x60 which I preferred earlier, the yaw opening can be extended to 50mm, with still enough dove tail rail being used to safely hold the moving block.

Due to the assembly simplification, the table clamp also required some redesign for compatibility with this new version of the vise. During the rework, I have also optimized and streamlined the design a bit, to make the whole assembly a bit more aesthetic .

You can download it here together with it's assembly instructions:

<https://www.prusaprinters.org/prints/53706>

Other accessories, which are compatible to the first version of the vice are:

An upgraded hand knob with more space towards the static leg of the vice. Especially handy when the vise is used together with the table clamp, which somewhat blocks access to the original hand knob. <https://www.prusaprinters.org/prints/58255>

The vice jaw protectors (simple clip-on). <https://www.prusaprinters.org/prints/51570>

The fixture for round parts (also fits for every other vise) and the little round feet that can be found in this combined publication. <https://www.prusaprinters.org/prints/50551>

Print instructions

Simply print all parts in the orientation that I uploaded.

I have tested the parts made from PETG on a Pursa i3 MK3S and from PLA and PETG on a Ender3Pro. (The blue one in the photos is the one from PLA, the others are PETG). As for all mechanically functional parts, I do recommend to use PETG.

As an homage to Prusa for hosting this site for free and for being a great company in general, I have printed one vice in the typical Pursa colors orange and black.

I have printed basically all parts with 100% infill, except the lid for the hand knob that holds the M6 screw in in the knob, which should be a bit flexible, because it is pressed into the knob (I used 15% infill for that part). If you want to save a bit of material, you can have some areas of lower infill in the middle part of the ground plane.

Assembly:

Option A, using metal screws:

All you need in addition to the printed parts are

- 3x M3x16 screw (with any kind of round head)
- 3x M3 nut (standard hex nut, nothing special)
- 1x M6x70 screw, with hexagon head (any length from 50 to 80mm is useable, but your yaw opening will vary)
- 1x M6 nut (standard hex nut, nothing special)

Step 1: Stick the M3x16 screws all the way through from the top, going through the dove tail rail, the main stabilizer bar and the ground plane. Push the M3 nuts in from the bottom and tighten all screws.

Step 2: Slide the M6 nut all the way into the cavity in the moving part of the vice. It is a tight fit by design, so you may have to clean out the print a bit upfront to make it go in.

Step 3: Slide the moving part on the rail. It should slide without too much force. If it does not, use a bit of sand paper to clean out your parts a bit.

Step 4: Put the M6x60 hex head screw into the hand knob from the rounded side, slide it all the way through and make sure the hex head sits well into the hex cavity of the knob.

Step 5: Press the lid into the hand knob. That is a very tight fit, so it will definitely not need any glue. You may need a vise or a hammer to get it all the way in. Once it sits flat with the surface of the knob, the screw will be completely secured and should not have any play (not a problem if there is some play, but ideally it sits very tight in the knob).

Step 6: Stick the M6 screw through the hole in the static part and into the nut that is imbedded in the moving part. Turn the screw a bit to catch the nut.

Option B, using only 3D printed parts

All you need in addition to the printed parts are

- The printed screw 6x70mm, published here: <https://www.prusaprinters.org/prints/65687>
- The printed female thread insert, also published here: <https://www.prusaprinters.org/prints/65687>
- The slightly changed thumb knob, also published here: <https://www.prusaprinters.org/prints/65687>
- A few drops of super glue that work for the material that you have chosen

Step 1: Align the L shaped part with the bottom plate based on the through holes. Glue both parts together. Then align the dove tail on the L shaped part and glue it on.

Step 2: Slide the female thread insert into the cavity in the moving part of the vice. It is a tight fit by design, so you may have to clean out the print a bit upfront to make it go in. The longer side from the hole needs to face outwards.

Step 3: Slide the moving part on the rail. It should slide without too much force. If it does not, use a bit of sand paper to clean out your parts a bit.

Step 4: Put the printed screw into the hand knob from the rounded side, slide it all the way through and make sure the head sits well into the cavity of the knob. You may want to glue it in, but that is not really needed.

Step 5: Press the lid into the hand knob. That is a very tight fit, so it will definitely not need any glue. You may need a vise or a hammer to get it all the way in. Once it sits flat with the surface of the knob, the screw will be completely secured and should not have any play (not a problem if there is some play, but ideally it sits very tight in the knob).

Step 6: Stick the spindle assembly through the hole in the static part and into the insert that is imbedded in the moving part. Turn the screw a bit to catch the nut.

Getting the needed metal parts (if you opt for using metal parts)

All needed parts are well standardized screws and nuts. They should be relatively easy to acquire. In Europe simply go for the M6 screw and nut, in the countries that use the imperial measurement system, go for a

quarter inch screw and nut. In the second case you need to use two parts from the upgrade kit to make things fit: <https://www.prusaprinters.org/prints/149876>

For those of you that have troubles to get the metric screws and nuts, I'd like to mention that there is a 3D printing enthusiast in the UK, that offers a set of all needed metal parts on his Ebay page. I am not affiliated with him in any way, but I appreciate his efforts to serve the community with this offer: <https://www.ebay.co.uk/itm/383986887950>

Have fun everyone, I hope this design is helpful for you. Let me state here that in times like these, we all need to take care for ourselves and for others. We, the population of this planet, will defeat this pandemic. The point is we need to limit our losses as good as we can, until we are there!

Model files

	Original model files	6 files
	vice-moving-block-v20_v026.stl	
	vice-thumb-knob-v20_v016.stl	
	vice-dove-tail-rail-v20_v011.stl	
	vice-base-jaw-v20_v027.stl	
	vice-groundplate-v20_028.stl	



vice-thumb-knob-lid-v20-_v016.stl



Adaptations from users

1 file



vice_plate-for-fiber-laser.stl

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