



The Original R.E.P Ratchet Wrench - 1/4" Hex Bit Ratchet Wrench Tool and FIDGET TOY!!!



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Summary

This is the R.E.P Ratchet, a Pocket Sized 1/4" Hex Bit Driver Ratchet Tool. It can be used as a nozzle change too!!!



0.98 hrs



17 pcs



0.20 mm



0.40 mm



PLA



10 g



Prusa
MK3/S/S+

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screwdrivers

allenkey

allenwrench

hexwrench

durable

hexscrewdrivertool

ratchetmechanism

fidgetclicker

ratchettool

nozzlewrench

ratchetwrench

Hello.

This is the R.E.P Ratchet tool.

It stand for Rapid Prototyped, Exposed Design & Pocket Sized Hex Driver Bit Ratchet Tool.

This is a fast and practical, printed ratcheting 1/4" hex driver!!!

It is HEAVY DUTY and tested, with an Anti-Self-Destructive Design.

No Glue needed! No Fasteners Needed!

The 'Main Print File' for the R.E.P Ratchet Tool is set to print in under an hour and was used to print all the test models before offering the final design.

This project has a purpose, to have a pocket-sized hex driver tool, that can be on your keychain/keyring, yet strong enough to tighten or loosen fasteners easier than using a screwdriver, while printing in under an hour, using normal print settings.

Project Features:

1. High quality design that has been printed, tested and proven multiple times.
2. Print in under an hour with normal print settings.
3. Optimally orientated Main Print File for fastest and best results.
4. Original design inspired by a 1909 Tool Patent that had a unique yet simple ratchet design, which I redesigned, tested, and innovated to be used with the material and method of manufacturing we love: 3D printing/Additive Manufacturing. Special considerations were taken due to 3D prints having layer lines and different directional strengths compared to other manufacturing process. What works for metal with traditional manufacturing methods does not work with 3D printing most of the time.
5. Popular and appreciated model. As I have shared it with many colleagues, makers, and hobbyists to use, evaluate and offer feedback.
6. Like my other models, I design, test, and use what I create before sharing so that you, the end user, the custom, doesn't experience

any unforeseen issues, and I always take on feedback to improve my designs.

7. Assembly could not be easier, just simply push down the main ratchet arm and push in the spindle, then release. Your good to go. The design of the spindle has also been updated with arrows for easy orientation of parts during assembly. Including, all the illustrations I have developed to help identify the project parts and for ease of assembly and use.

The Design:

- The R.E.P Ratchet uses standard Hex driver bits and adapters to do the job it was designed to do; tighten and loosen fasteners like nuts, bolts, screws, with hex bits like screwdrivers, sockets, Allen/Hex bits and more.
- The Spindle part is designed to engage with the Main Body in the direction of the indicator arrows, turning the driver bit installed in the direction of the arrows. Spin the Main Body of the tool in the opposite direction of the arrows, and the spindle will be stationary, while the Main Body ratchets around the Spindle freely.
- Reversible Design. Want to engage the ratchet mechanism in the opposite direction you're using it in that moment, well, flip the orientation of the R.E.P Ratchet around by 180 degrees along its longest axis, and you can use the tool in the opposite direction.
- The R.E.P Ratchet can be attached to a set of keyrings or hung on a hook with its open frame design. It comes in two designs; Main and Alternate, with the alternate model having the keyring mounting hole surrounded by the frame for a more secure fix to a set of keys or lanyard. Both designs have been tested thoroughly.
- Three spindle tolerances available. With how many different filament material types and brands that can be used with this model, and with all the variances in the driver bits this tool takes, along with how many different printers it can be fabricated with, there are going to be tolerances of varying degrees. This is why there are 3 identical spindle models, but with different tolerances, along with helpful indicators on the models for tolerance identification.

Original Tolerance Spindle = Normal hex outline around HEX bit input.

Tighter Tolerance Spindle = Hex outline with 3 separate indents on outline around HEX bit input.

Max Tightness Tolerance Spindle = Hex outline with 6 separate indents on outline around HEX bit input (looks like a star)

- Heavy Duty and Anti-Self-Destructive (A.S.D) design. Through vigorous testing, the design has shown to be anti-self-destructive, as it will separate the main body from the spindle if the torque becomes too much for the mechanism to handle, in a controlled manner, and

not destroy or damage itself in a way that would prevent it from working again. The ratchet spring arm of the tool will move out of the spindle and allow the spindle to slide out. At most, the outer edge of the ratchet spring arm will be slightly damaged, but this section has not importance in the tool's operation.

- It is pocket sized and can fit within the footprint of a deck of playing cards.
- Designed and tested to be printed in PLA or PETG, which is some of the most cost-effective filament materials we use, has been printed in Nylon and other speciality filaments, with not much additional advantages due to the innovation of the design optimising one of the weakest 3D filaments, PLA.
- Bonus Feature: It is a fidget toy/spinner and can be assembled to spin freely in any direction of for the ratchet to engage in a specific direction, depending on the orientation of the spindle in the main body.

BEHIND THE DESIGN:

I am a secondary/high school Metal, Timber, Engineering and Design & Technology teacher in Australia. I have recently started our school's new maker space and got some awesome Prusa Mk3S+ printers. While thinking about what projects to utilise the printers for my students with, I remembered we needed several screw drivers for each of our classroom for the students metal and wood projects, but buying that many screw drivers is expensive, and they are not the easiest tool for year 7 and 8 to use, especially difficult for my students with physical limitations. So, I thought...LETS DESIGN AND 3D PRINT SOMETHING!!!

While researching for tools, ratchet drivers came into focus, so I 3D printed some, and were disappointed in their performance, as they were snapping after one lesson of use. So, I looked up ratcheting mechanisms and came across an old patent.

The design for this tool was inspired by a century old patent for a large, industrial ratcheting tool. I took the basic parts and shrunk them down to be 3D printed in an hour and durable enough to withstand constant use, while fitting in your pocket and is only made from 2 parts.

This was achieved by main prototypes being produced and tested. I tested them by constantly ratcheting the spindle of my design in a jig with a drill at 10 revolutions per second for 30 minutes and torturing the ratchet while the bit was held in place in a vice attached to a work bench.

Many of the prototypes lasted, but only two were performing above the rest and met the design requirements I set out at the start.

Extra Details:

Personally, for the way my students abuse these, I printed my school use ones for school with a 50% infill, 1.2mm wall thickness and 1.2mm top and bottom layer thickness, adding an extra 5 minutes roughly for each ratchet assembly.

However, the ready to print files provided are what is use for my personal R.E.P Ratchets and gifts to friends and family and are good enough for many people and were the original settings used in all testing.

UPDATE:

1. I have added arrows to a new spindle update that helps when orientating the spindle in the main body. If the arrows on the spindle match with direction of the arrow on the main body, then the spindle is in the right orientation and will engage and ratchet as designed. If you get it orientated the wrong way...nothing bad will happen, the spindle will just spin freely, and you get a non-ratcheting fidget toy/spinner.
2. I have two tolerance models for the updated spindles. There are images in the print gallery to guide you in telling which one is which as well as the STL files being labelled appropriately. The original hex tolerance has a standard hex shape around the hex bit input, while the tighter hex tolerance model has 3 indicators/indents around the hex shape of the hex bit input. This update came about as some people were having their hex driver bits sliding out easily. this may be a result of how many variables there are with different filament out in the world, thus a solution has been offered.
3. GCODE files have been provided for every variant of the two main body designs and the updated spindle designs, including two pre-sliced files for printing both updated spindle types by themselves with colour change near the start and near the end of the print, so that the arrow can be highlighted if you choose to do so.

Hope you enjoy your new favourite tool, I know my students, colleges, family, friends, and myself do.

BONUS: It makes a great fidget spinner/toy, can be used to change your nozzles and makes a great gift.

Helpful video of the R.E.P Ratchet on YouTube:

<https://www.youtube.com/watch?v=hnixjelzmo&t=121s>

NOW AVAILABLE:

R.E.P RATCHET XL!!! it is 200% bigger, and a little bit better.

Print Download Page:

<https://www.prusaprinters.org/prints/89537-extra-large-rep-ratchet>

Enjoy.

Model files



UPDATED STL.Files (DOWNLOAD & USE THESE)

13 files



main_file-full-assembly-for-rep-ratchet-tool-with.stl

☐ USE THIS AS YOUR MAIN FULL ASSEMBLY PRINT FILE



main-body-for-rep-ratchet-tool.stl



alternate-body-for-rep-ratchet-tool.stl



original-design-spindle-with-original-tolerances-.stl



updated-spindle-with-tighter-hex-tolerances-for-r.stl



updated-spindle-with-max-tightness-in-hex-toleran.stl



updated-spindle-with-original-hex-tolerances-for-.stl



remix_allowed_blank_updated_-spindle_remixes_for_.stl



full-assembly-for-rep-ratchet-tool-with-updated-s.stl



full-assembly-for-rep-ratchet-tool-with-updated-s.stl



alternate-full-assembly-for-rep-ratchet-tool-with.stl



alternate-full-assembly-for-rep-ratchet-tool-with.stl



alternate-full-assembly-for-rep-ratchet-tool-with.stl



Old Uploaded STL. Files (Still Usable)

5 files



rep-ratchet-tool-alternate-body-repositioned-keycha... .stl

☐ Old Uploaded STL. File (Still Usable, But for best results, use the updated files)



rep-ratchet-tool-main-body.stl

☐ Old Uploaded STL. File (Still Usable, But for best results, use the updated files)



rep-ratchet-tool-original-alternate-full-assembly.stl

☐ Old Uploaded STL. File (Still Usable, But for best results, use the updated files)



rep-ratchet-tool-original-full-assembly.stl

☐ Old Uploaded STL. File (Still Usable, But for best results, use the updated files)



rep-ratchet-tool-original-spindle.stl

☐ Old Uploaded STL. File (Still Usable, But for best results, use the updated files)

Print files



main_print_file-full-assembly-for-rep-ratchet-t.gcode

PLA 0.40 mm 0.20 mm 0.98 hrs 10 g Prusa MK3/S/S+



print-file-for-main-body-for-rep-ratchet-tool_0.gcode

PLA 0.40 mm 0.20 mm 0.60 hrs 7 g Prusa MK3/S/S+



print-file-for-alternate-body-for-rep-ratchet-t.gcode

PLA 0.40 mm 0.20 mm 0.65 hrs 7 g Prusa MK3/S/S+



2xcolourchange-fo-updated-spindle-with-original.gcode

PLA 0.40 mm 0.20 mm 0.41 hrs 3 g Prusa MK3/S/S+



2xcolourchnage-for-updated-spindle-with-tighter.gcode

PLA 0.40 mm 0.20 mm 0.41 hrs 3 g Prusa MK3/S/S+



2xcolourchange-for-updated-spindle-with-max-tig.gcode

🌀 PLA 📏 0.40 mm 📐 0.20 mm ⌚ 0.41 hrs ⚖️ 3 g 📄 Prusa MK3/S/S+



print-file-for-updated-spindle-with-max-tightne.gcode

🌀 PLA 📏 0.40 mm 📐 0.20 mm ⌚ 0.41 hrs ⚖️ 3 g 📄 Prusa MK3/S/S+



print-file-for-updated-spindle-with-tighter-hex.gcode

🌀 PLA 📏 0.40 mm 📐 0.20 mm ⌚ 0.41 hrs ⚖️ 3 g 📄 Prusa MK3/S/S+



print-file-for-updated-spindle-with-original-he.gcode

🌀 PLA 📏 0.40 mm 📐 0.20 mm ⌚ 0.41 hrs ⚖️ 3 g 📄 Prusa MK3/S/S+



print-file-for-full-assembly-for-rep-ratchet-to.gcode

🌀 PLA 📏 0.40 mm 📐 0.20 mm ⌚ 0.96 hrs ⚖️ 9 g 📄 Prusa MK3/S/S+



print-file-for-full-assembly-for-rep-ratchet-to.gcode

🌀 PLA 📏 0.40 mm 📐 0.20 mm ⌚ 0.94 hrs ⚖️ 9 g 📄 Prusa MK3/S/S+



print-file-for-full-assembly-for-rep-ratchet-to.gcode

🌀 PLA 📏 0.40 mm 📐 0.20 mm ⌚ 0.96 hrs ⚖️ 10 g 📄 Prusa MK3/S/S+



print-file-for-alternate-full-assembly-for-rep-.gcode

🌀 PLA 📏 0.40 mm 📐 0.20 mm ⌚ 1.00 hrs ⚖️ 10 g 📄 Prusa MK3/S/S+



print-file-for-alternate-full-assembly-for-rep-.gcode

🌀 PLA 📏 0.40 mm 📐 0.20 mm ⌚ 1.00 hrs ⚖️ 10 g 📄 Prusa MK3/S/S+



print-file-for-alternate-full-assembly-for-rep-.gcode

PLA 0.40 mm 0.20 mm 1.00 hrs 10 g Prusa MK3/S/S+



print-file-for-alternate-full-assembly-for-rep-.gcode

PLA 0.40 mm 0.20 mm 0.99 hrs 10 g Prusa MK3/S/S+



print-file-for-original-design-spindle-with-ori.gcode

PLA 0.40 mm 0.20 mm 0.40 hrs 3 g Prusa MK3/S/S+

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