

PG22 Short – Compact Handgun - R1.5



The PG22 Short is built to be a relatively safe and practical attempt at a 3D printed firearm. Printed in PLA, the PG22 uses a steel barrel, increasing strength where it matters. Though it has no provisions for autoloading, it does automatically eject spent cartridges, greatly decreasing reload time. This is meant as a proof of concept of incorporating key metal parts into an otherwise plastic gun.

Disclaimer

Please read and understand this manual fully before attempting assembly.

This product is not print-in-place. This design requires skilled machining and assembly of additional components for complete assembly. You will need a rotary tool with cutoff wheel at minimum. These plans are intended for educational purposes only and assembly is at your own risk.

The PG22 Short Blowback ONLY works with .22 short cartridges. 22lr will not feed in this design, nor should it be attempted as it will be too much energy for the slide mass / plastic strength.

These plans are provided as-is. They should be treated as a novelty, and nothing more. These files are not an actual gun, they are CAD files depicting design of a handgun. They require skill and knowledge to make into a functional object.

You are responsible for knowing the laws regarding firearms where you live. Before building, please read up on all applicable gun laws and decide for yourself whether or not you can legally build this where you live.

Required Parts

- [M3 x 20mm Screws and Nuts](#)
- [M3 x 4mm Set Screw / Grub Screw](#)
- 22 Caliber Rifled Barrel Liner - 5/16" OD - <https://www.gunpartscorp.com/products/588180>
- [3mm Guide Rod / Pins](#)
- [Compression Spring - Music Wire 0.30" OD, 0.035" Wire Size, 0.722" Compressed Length, 1.38" Free Length, 10.9 lbs/in Spring Rate](#)
- [Firing Pin \(1/16" Drill Bit\)](#)
- 2x Trigger Springs (Ballpoint Pen Springs)

Features:

- Quick to load – Automatic Ejection
- Shallow Grip angle (To fit on smaller beds, more compact.)
- Important parts are easily replaceable. The breech face should be the only part to experience wear, and is easy to reprint.
- Cheap. Assembly uses mostly off-the-shelf components.

Print Settings

General Settings

- Nozzle: 0.4mm
- Print Height: 0.3mm
- Material: High-Quality PLA – Do not use ABS, the impact strength is lower. PETG may work.
- Print with the insides of the frame touching build plate.
- Slicer: Confirmed to print correctly on Cura 3.6 and 4.0
- Print in the orientations shown below



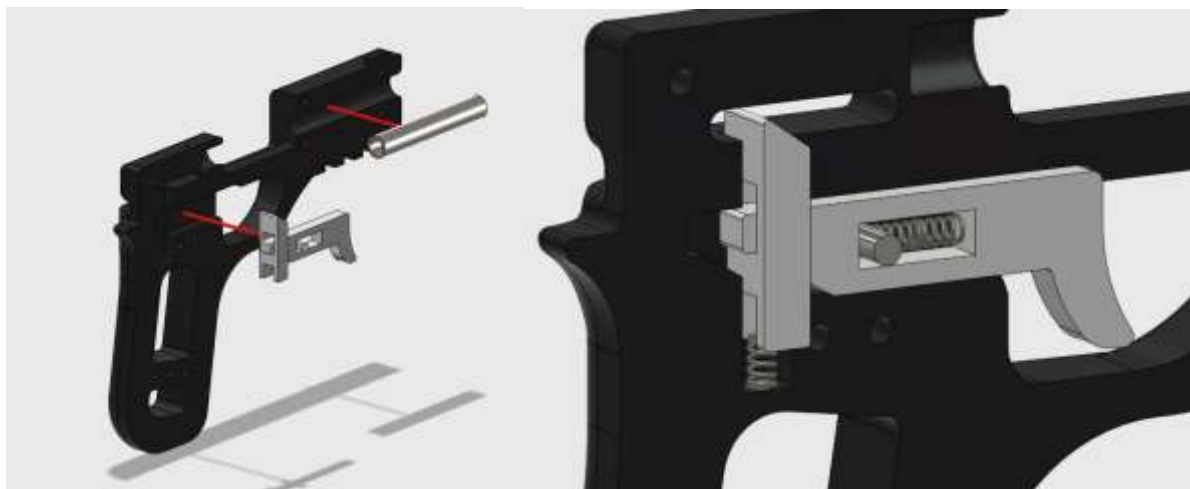
Print Settings

- Infill
 - Print all parts 100% Infill
- Supports
 - Placement: Touching Build Plate
 - Support Angle: 50 Degrees
 - Pattern: Zig-Zag
 - Density: 20-25%
 - Print Frame with a large brim! This was the easiest way I found to prevent the frame from warping. You'd rather have to cut off some plastic than have a gun that doesn't shoot straight. A heated build plate is required. I recommend an enclosure.
- Notes
 - Don't try to print too fast, you want it to be good. Even when using PLA, it helps to build in a warmer environment for strong layer adhesion. I put my printer inside a roll-top desk while printing.
 - The area behind the breech face is critical as it takes a large amount of force.
 - Clean and sand all edges of prints. Polish any mating surfaces or moving parts.
 - If available, use plastic-safe grease on all moving parts. It will ease trigger pull & wear.

Assembly after Printing

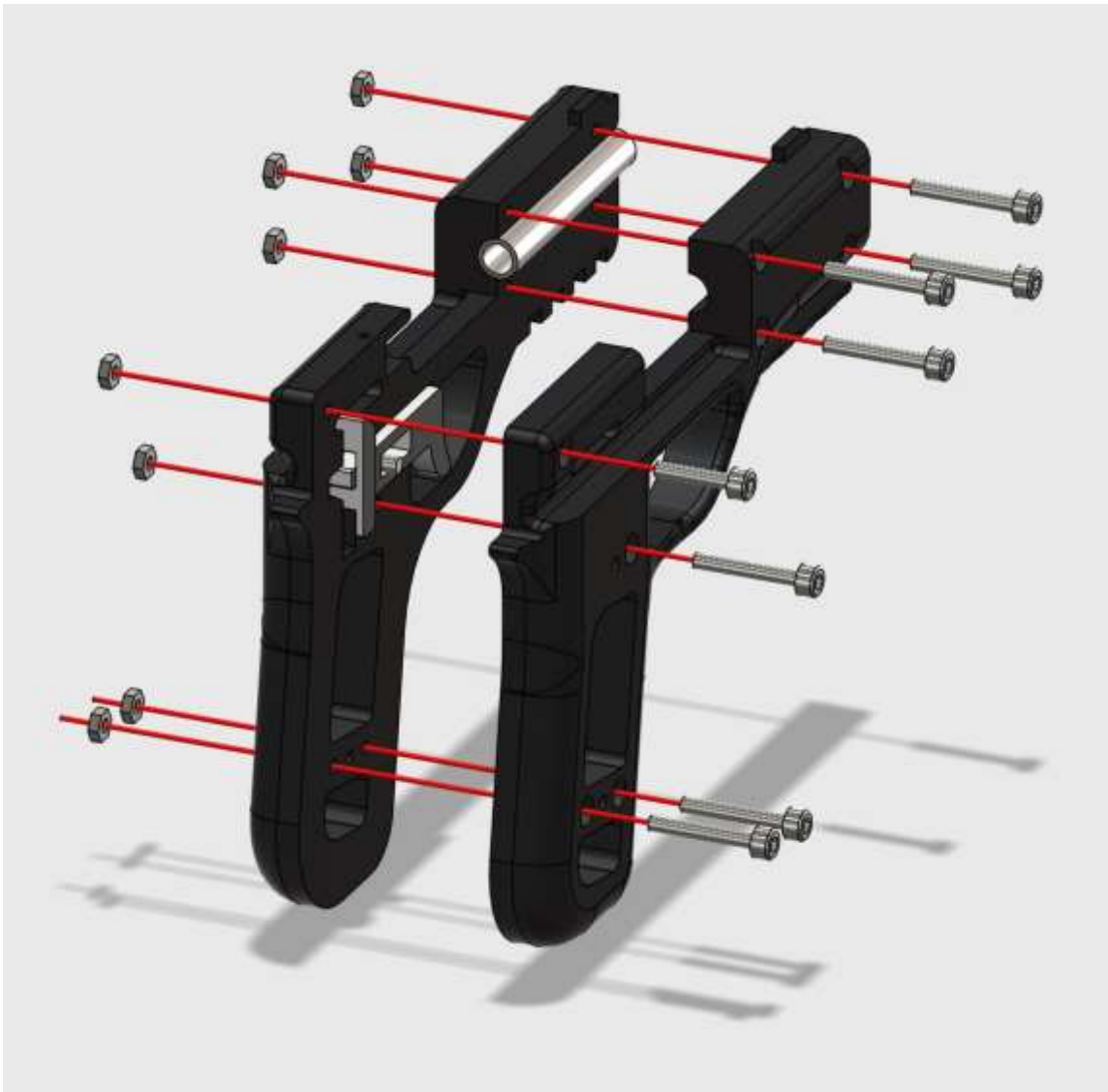
Trigger Assembly & Barrel

- Trigger channels print with supports, and may have bits that droop. You will need to smooth this area. Careful work with a soldering iron can smooth this out into a perfectly flat surface.
- Trigger assembly can use small ballpoint pen springs. Use grease on all moving parts.
- Cut a length of 3mm rod to 10mm length. Use as the crosspin behind trigger.
- Cut barrel liner to 54mm, and ream a 12mm chamber for 22 shorts. Install barrel in frame.
- Ensure chamber of barrel is aligned with plastic. This is critical for proper headspacing.



Frame Halves

- Press fit all nuts into the left half of the frame. You may need to thread screws into the nuts, and use a hammer to drive them in.
- Use M3 x 20mm screws to close the halves of the frame, with top-rear screw being 14mm.
- Once closed, ensure the trigger assembly operates freely.



Left Slide Assembly

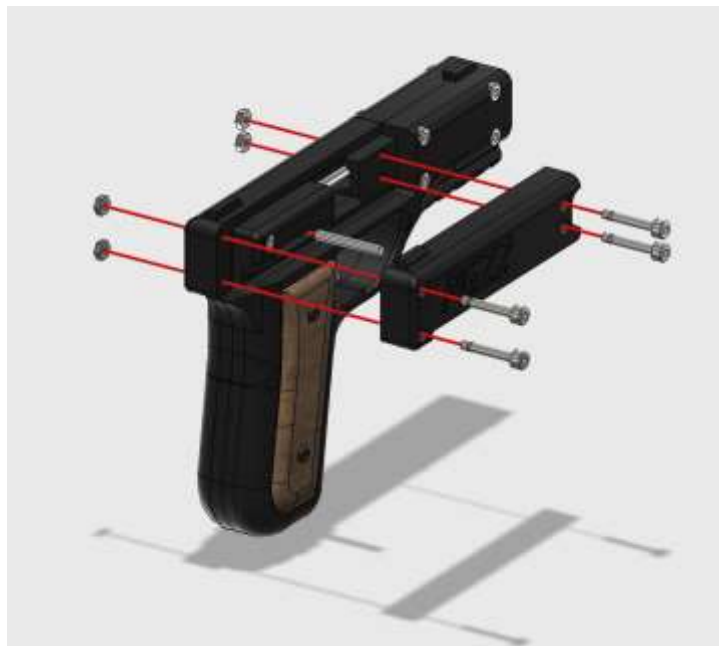
- Coat all sliding surfaces with plastic-safe grease.
- Compress spring between the frame and slide.
- Use an M3 grub screw through the top of the slide and frame pin it in the rear position.
- **Guide Rod:** Cut a length of 3mm rod to 54-55mm. Chamfer an end to a 45 degree angle.
- **Firing Pin:** Cut a length of 1/16" drill bit to 8.5mm or 9mm. Chamfer the tip to a small rounded point.
- Install greased guide rod through the barrel into the breech face until it goes no further. Rotate the chamfered edge to face the right side of the gun.
- Insert the firing pin into the breech face, leaving room for a bolt to thread through behind it.





- Note the orientation and shape of the guide rod and firing pin. The guide rod must angle as shown above in order to force casings to eject on the right. Due to the offset position of the guide rod, the gun cannot be configured to eject on the opposite side.
- Finish threading the M3 grub screw into the frame until it is tight against the guide rod. This will prevent the guide rod from backing out or spinning. (you may need to grind a flat spot onto the guide rod for best grip). Carefully close the slide.
- **Slide / Trigger Catch:** Cut a length of 3mm rod to 23mm.
- Place the Slide Catch into the slot on the frame, and into its recessed hole in the slide. Apply plastic-safe grease to all sliding surfaces. Screw the right half of the slide into the left side, making sure the Slide Catch falls into the right half of the slide. Do not force.
- **Note!** You may need to try different firing pin lengths, depending on the fit of the gun. Too long, and you risk case ruptures. Too short, and the gun may misfire. Once you find a good length, glue can be used to set it permanently.

Additionally, a small layer of JB weld can be used on the breech face to add strength and smooth out print layers. This should be a thin layer, not to exceed the depth of the recessed area.



Grips and Final Touches

- Use M3 Screws to attach the grips. Maximum screw length is 12mm.
- Test the gun by dry firing it. Ensure the slide locks open securely. It should never release without pulling the trigger.
- **TEST FIRE THE GUN REMOTELY. Find a clamp or secure the gun, and fire with a string.**



Safety

- Inspect the condition of the gun during and after each session of usage. Discard any parts which show excessive wear.
- The gun is designed with an extremely large ejection port to vent gasses in the event of a case rupture. I have ruptured cases during prototyping, with no injuries or ill effects. Always wear safety glasses and ear protection when firing. You do not want ear or eye damage from vented gases in the case of cartridge failures.

Legality

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