

9g Servo Linear Actuator (Ball Bearing)



N7 Cat

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Summary

Prints as one part, some trimming of the raft will be needed but I've added clearances around the gears to reduce...

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Prints as one part, some trimming of the raft will be needed but I've added clearances around the gears to reduce trimming needed there.

The intent of this is to create a relatively low cost / low backlash linear actuator using the common and cheap 9g mini servos. I've included rear and bottom 3 mm x 10 mm screw holes so you can integrate this with your projects. BOM is included in the image, I'll add more details in post once I finish printing. I bought my servos and carbon fiber tube at <https://uangel.aliexpress.com/store/603538> but I think most 9G servos are the same basic dimensions so it should fit others.

I've also included a solid version of the rack in case you don't want to bother with the tube reinforced version.

Quick notes (detailed instructions to follow):

- Gear modulus is 1, pitch diameter of 24 mm, 180 degrees of servo rotation should result in 37.7 mm of linear travel
- The 6mm carbon fiber rod is inserted into the rack then capped off
- Bearing sleeves are snapped over the bearings
- Servo: 9g servo <https://www.aliexpress.com/item/33005962141.html>
- Reinforcement: 6 mm OD 4 mm ID Carbon Fiber Rods <https://www.aliexpress.com/item/32310771446.html>
- Embedded nuts must not be over inserted, they form part of the standoff for the bearing inner race. I can no longer find the M3 X 5.3 X 6 that I used, (old link no longer works - possible substitution M3 X D5 X L6) <https://www.aliexpress.com/item/4000232858343.html>
- The Pinion must be glued to a clipped servo arm (I did this because the servo arms that come with the servos will have better retention against the servo drive gear - trying to friction fit a 3d printed part against a small modulus gear might work but I think this way is better)

Updated 9/7/2020, minor improvement - reduced amount of raft trimming needed by clearing openings for bearings and screws

Updated 9/16/2020, Realized after printing that I forgot to create wiring cutout :P, removed some of the raft trimming needed for bearing sleeves and rack. Added a cylinder for helping with pressing bearing into sleeve. Saved the solid rack as a print package option instead of a separate part. Added a 220mm rack for those using 360 enabled servos that can be cut to size (for this length carbon tube reinforcement is necessary imo)

Post-Printing

Remove all flashing from the parts, I found that broaching the rack against the pinion was a good method to smooth out both sets of gears





Clip the servo arm
to fit the pinion

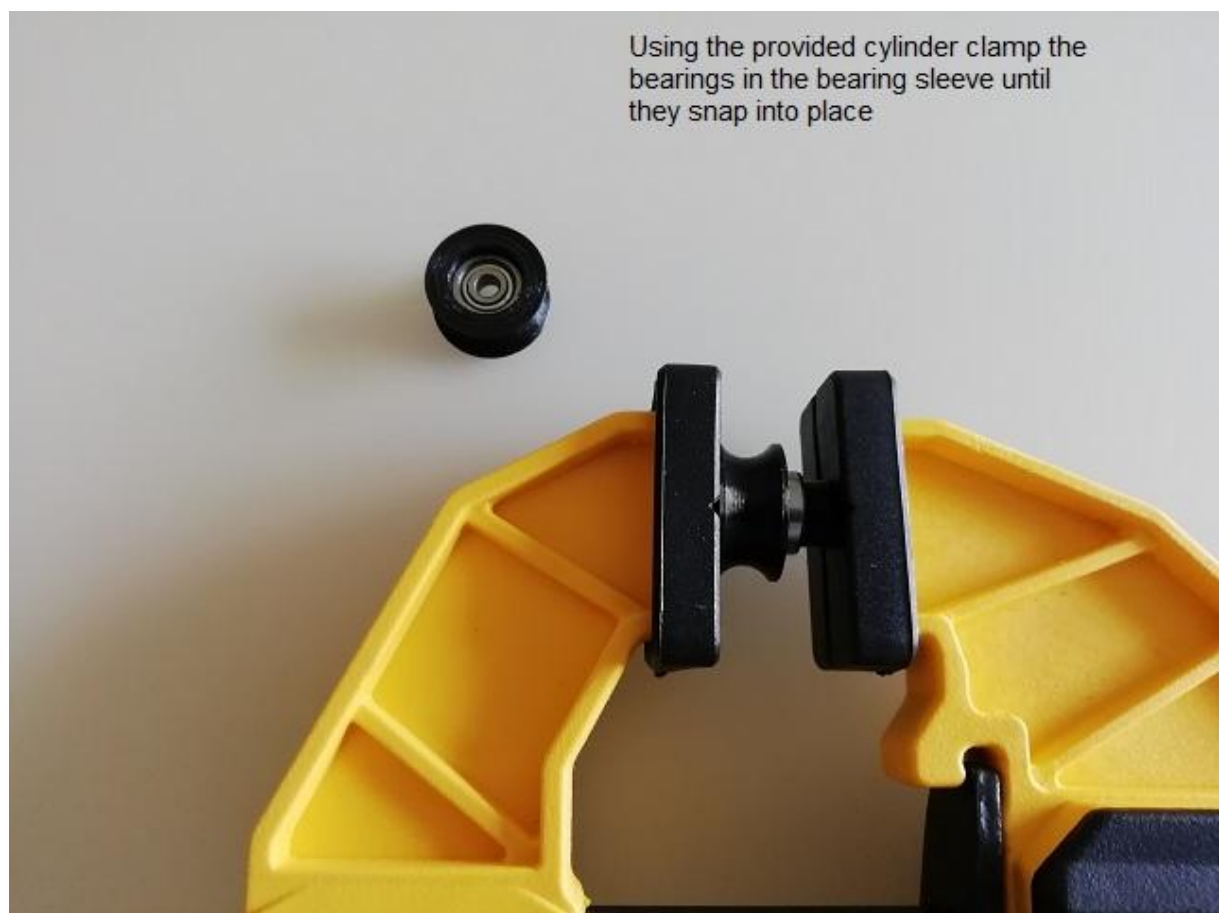


Glue the clipped
servo arm to the
pinion using gorilla
glue or superglue

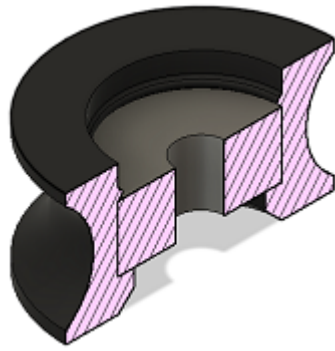




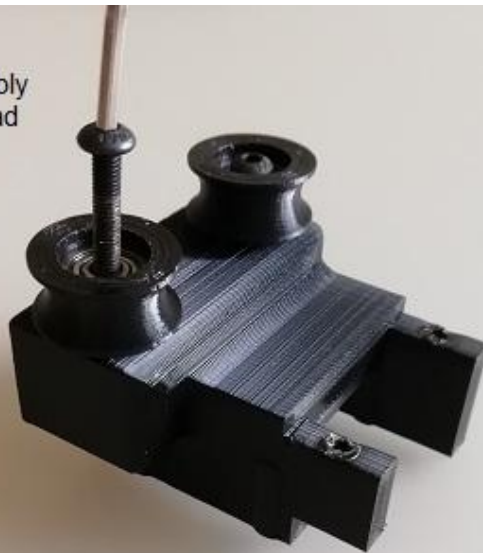
Once tube is fully
inserted cap both
ends



Using the provided cylinder clamp the
bearings in the bearing sleeve until
they snap into place

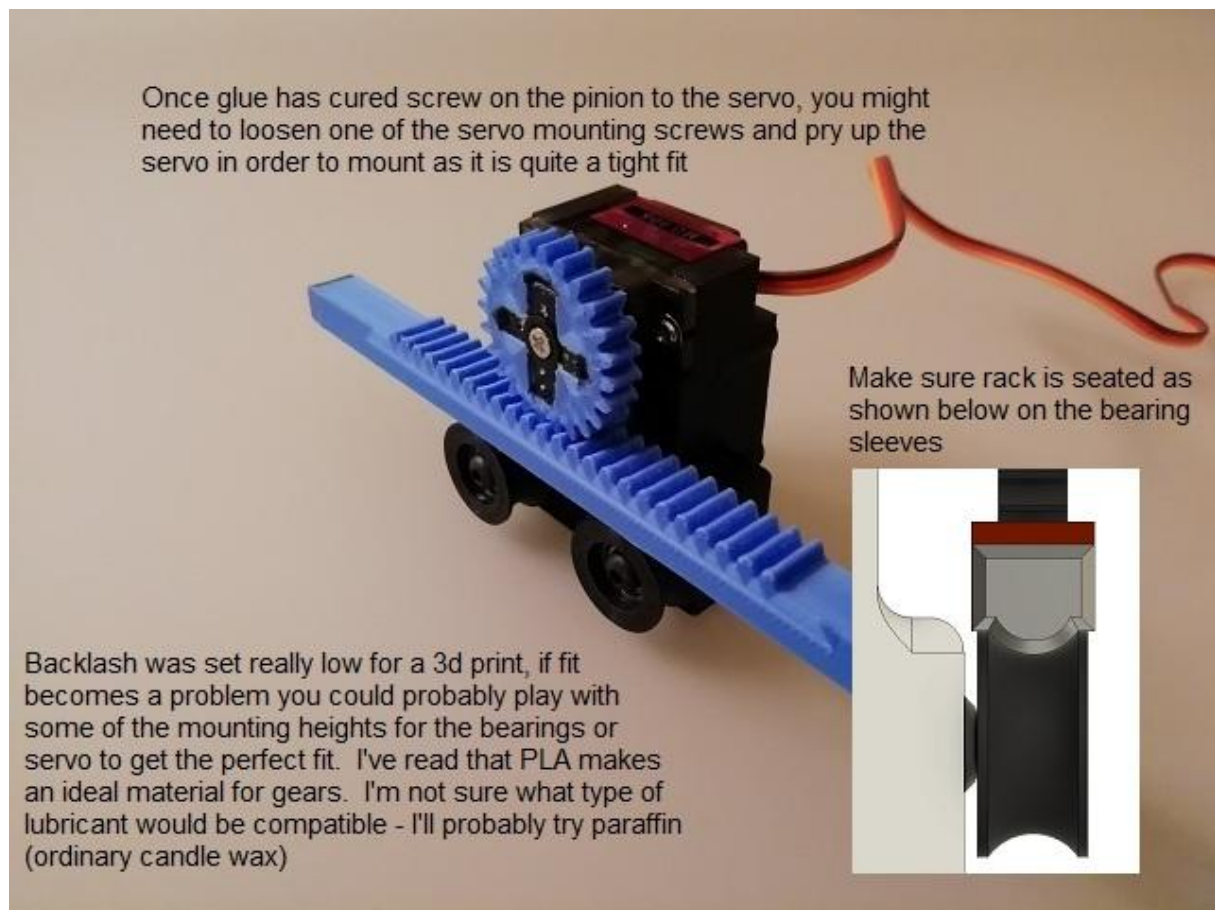


Screw in bearing assembly
using M3 X 20 button head
or flat head screws



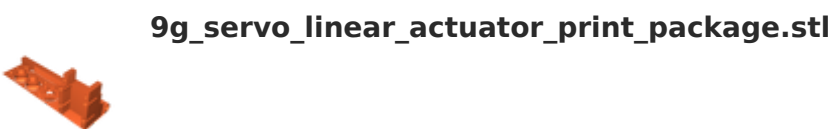
Screw on servo, if
part starts to
crack use a
soldering iron on
low heat to heat
the screw before
inserting





Category: Robotics

Model files



[Find source .stl files on Thingiverse.com](#)

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