

# User Instructions

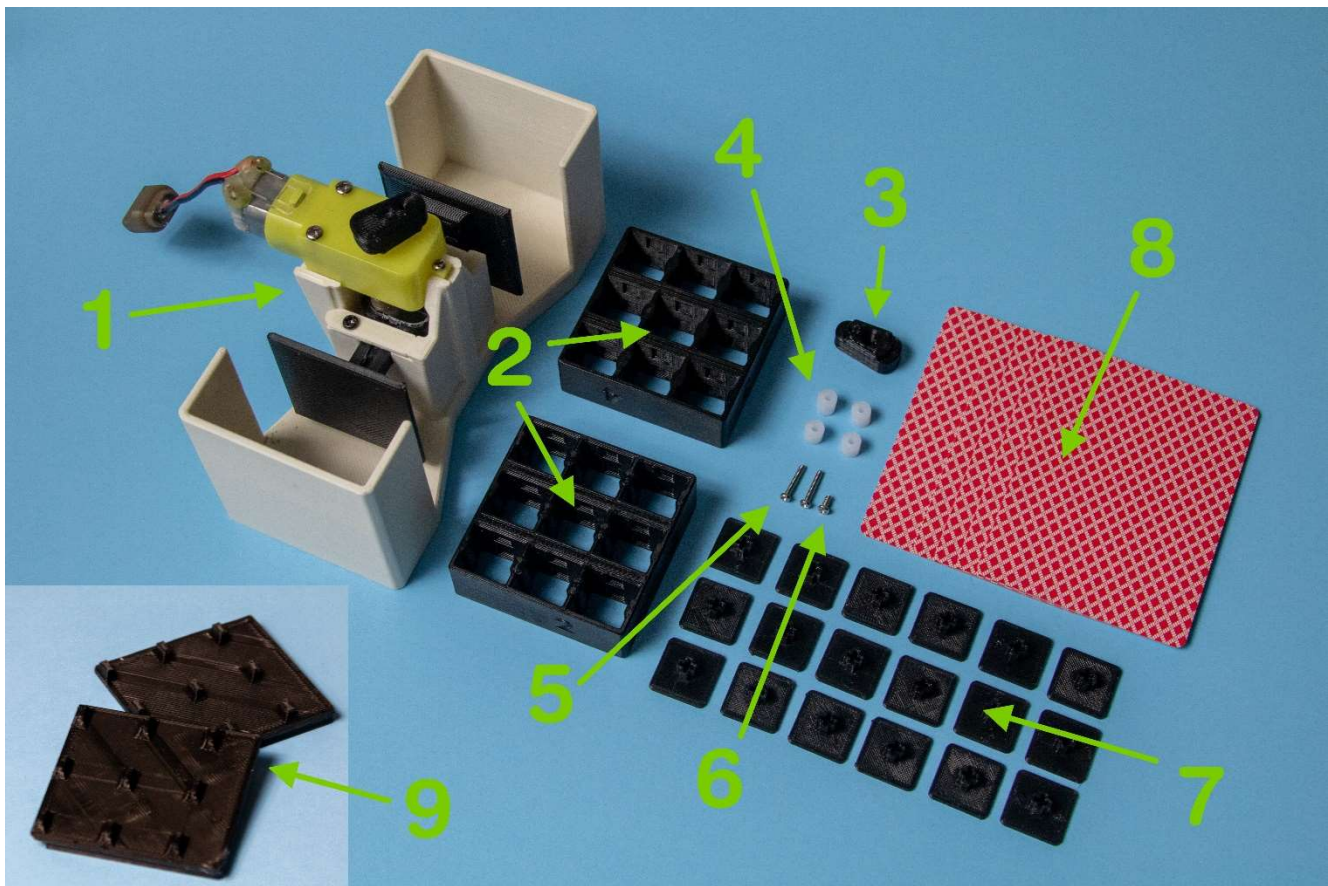
## Switch Break-in Machine



### Feng Studio

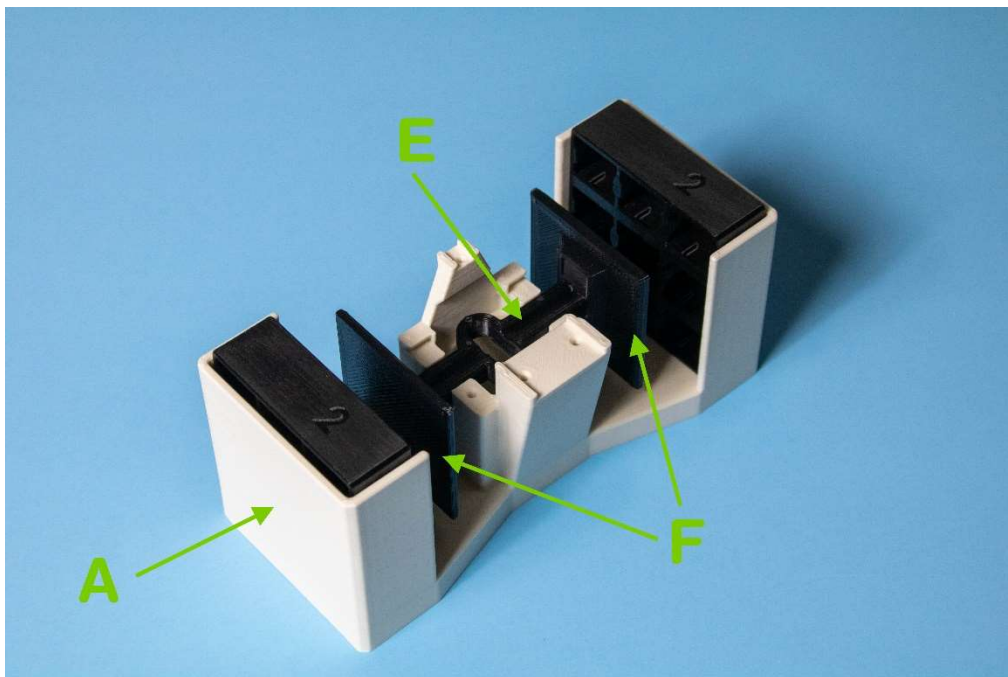
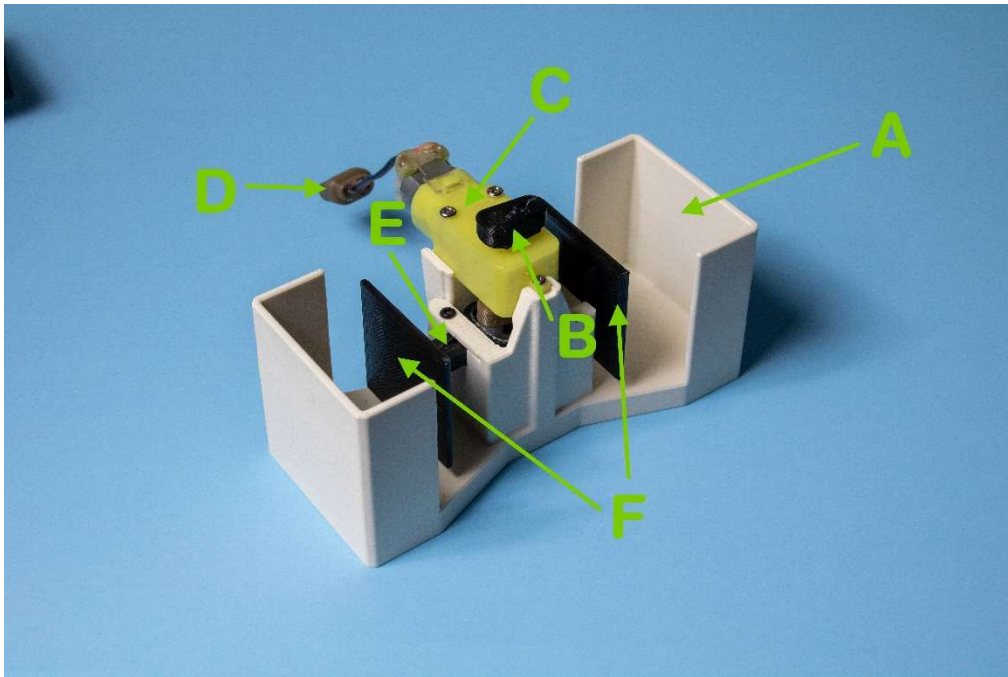
Below are the user instructions for assembling and operating this product. Some variations are to be expected between the provided images and the product on hand.

### Section 1: Parts List



1 - Pre-assembled main body	2 - Plates * 2
3 - Spare wheel	4 - Spare PTFE tubes * 5
5 - Spare pins (M2 * 12mm screws) * 1	6 - Removed
7 - Keycaps * 20	8 - Card spacers * 6
9 - Off center actuation module * 2	

## Section 2: Parts Diagram



A: Main body

B: Top handle

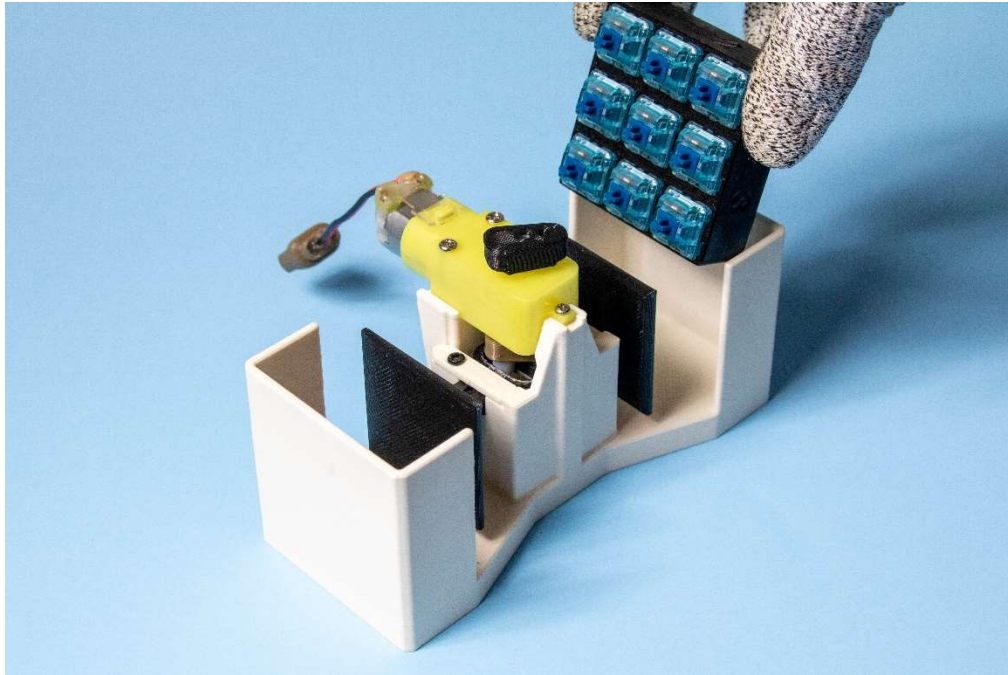
C: Gear box

D: Female USB type-c port

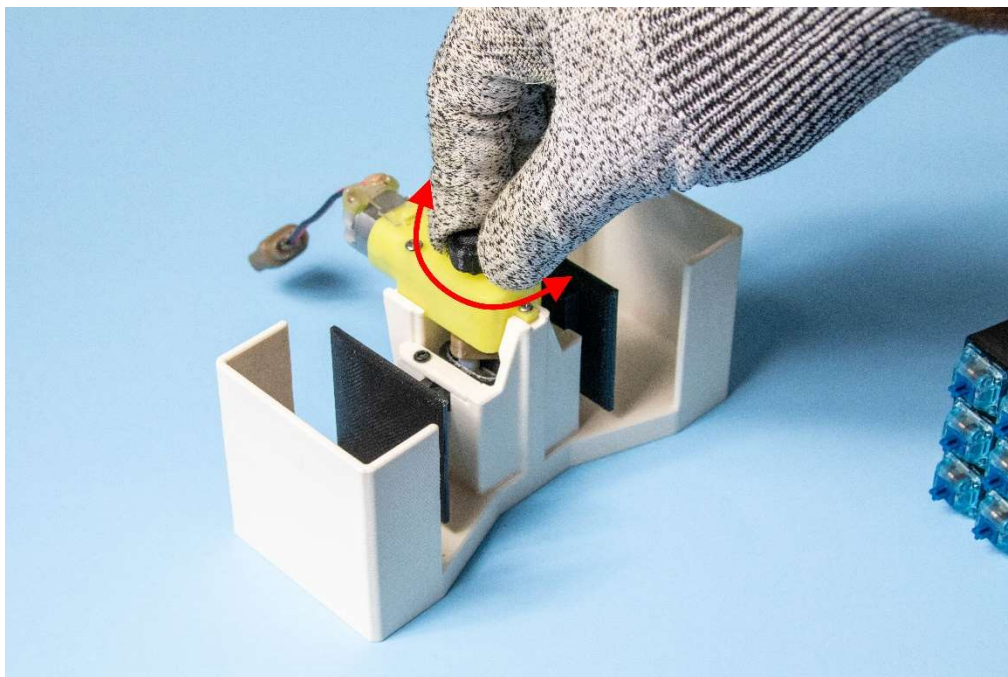
E: Pusher

F: Pusher plate

## \*Section 3: General Operation

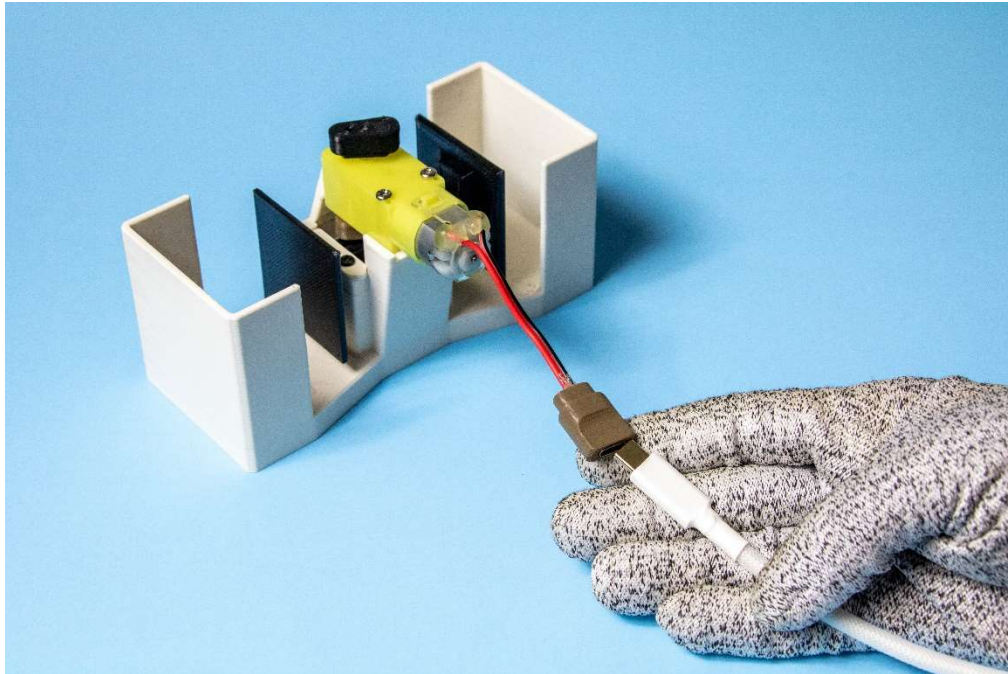


The switch plate is inserted through the top of the machine. The product will function with 1 or 2 plates.

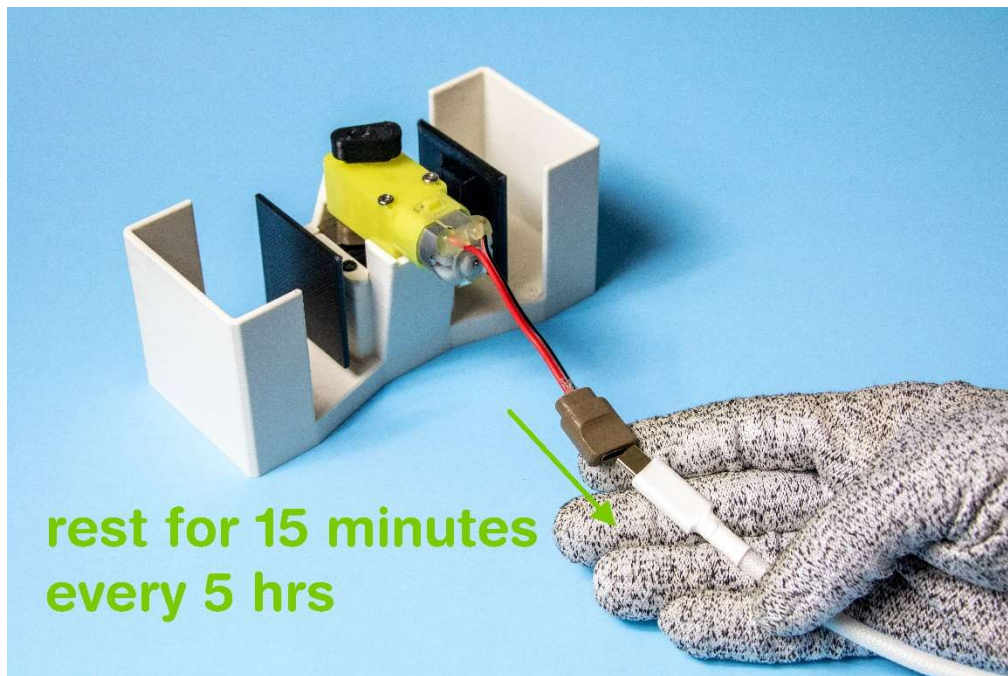


The top handle can be rotated to move the pusher plates when inserting the switch plate. When inserting the right plate, rotate the handle to move the pusher to the left most position. The opposite applies for the left plate. Rotate the handle **SLOWLY** and **ONLY WHEN NEEDED** to avoid wearing down the gears. The gear box is not designed to be rotated manually.

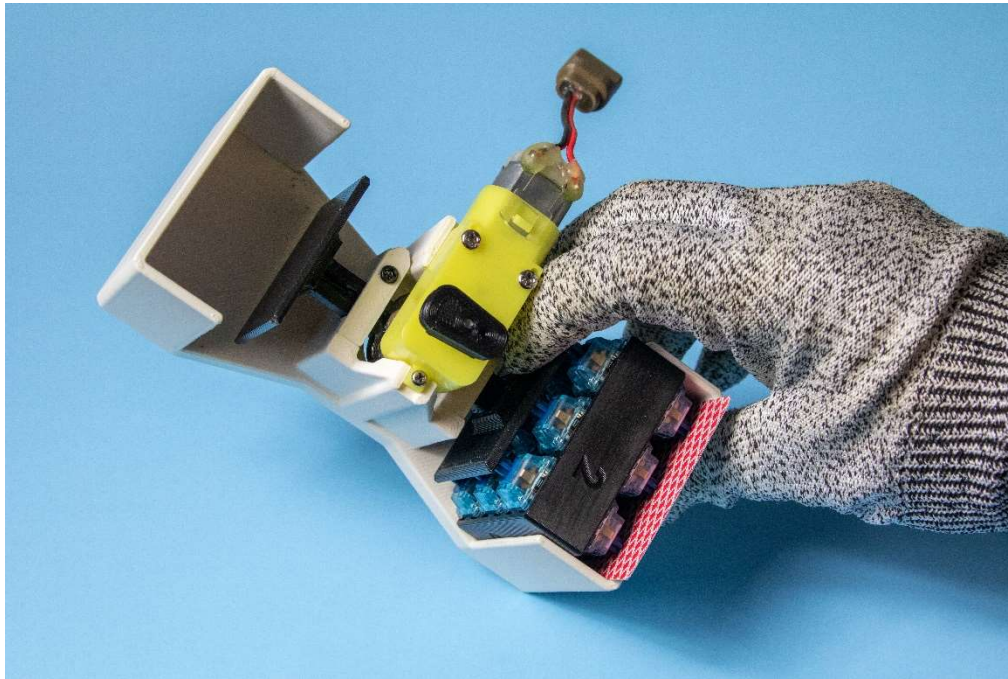
\*Section 3: General Operation applies for both mode A and B.



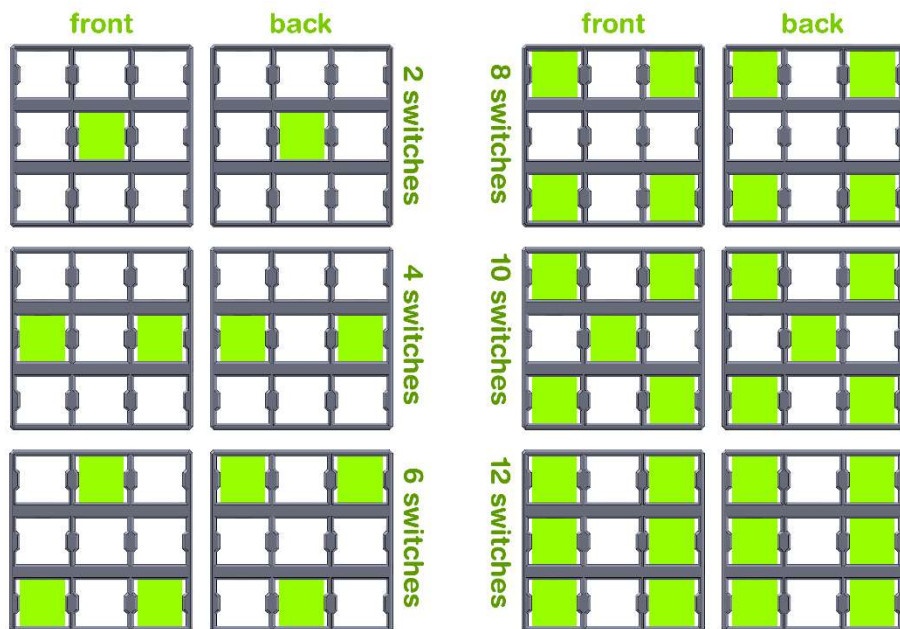
A standard 5V USB wall plug is recommended, along with any USB type-c cable. Simply plug or unplug the cable into the connector to turn the machine on or off. The user can also choose to use power banks or computer USB ports to provide power.



To prevent overheating and potential fire hazards, please DO NOT leave the product operating unattended. It is also highly recommended to pause the machine for ~15min after operating for 5hrs. This is to allow for the motor to cool down and to increase longevity of the product.



Card stock spacers are placed on the inner side of the main body. The purpose of spacers is to fill in empty spaces to ensure that the switches bottom out properly. Only insert spacers when machine is turned off. Rotate the top handle to the left/right most position while switches are installed to ensure there are no empty gaps.

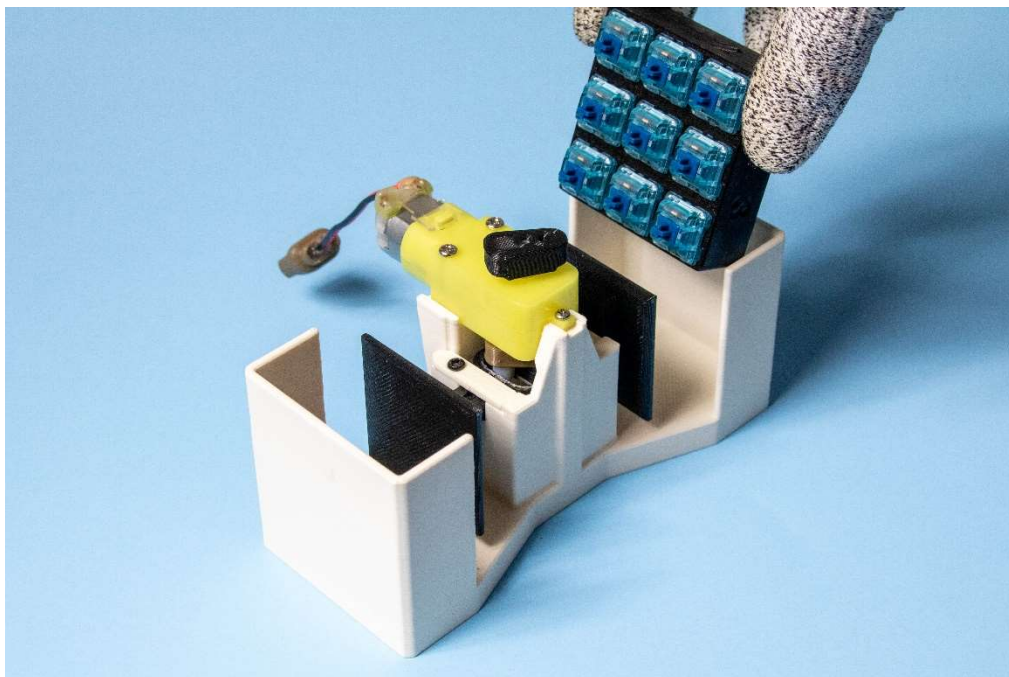


When operating in mode A with less than 18 switches on a plate, space out the switches evenly to ensure an even amount of pressure is applied to each switch. A minimum of 2 switches is needed on a plate.

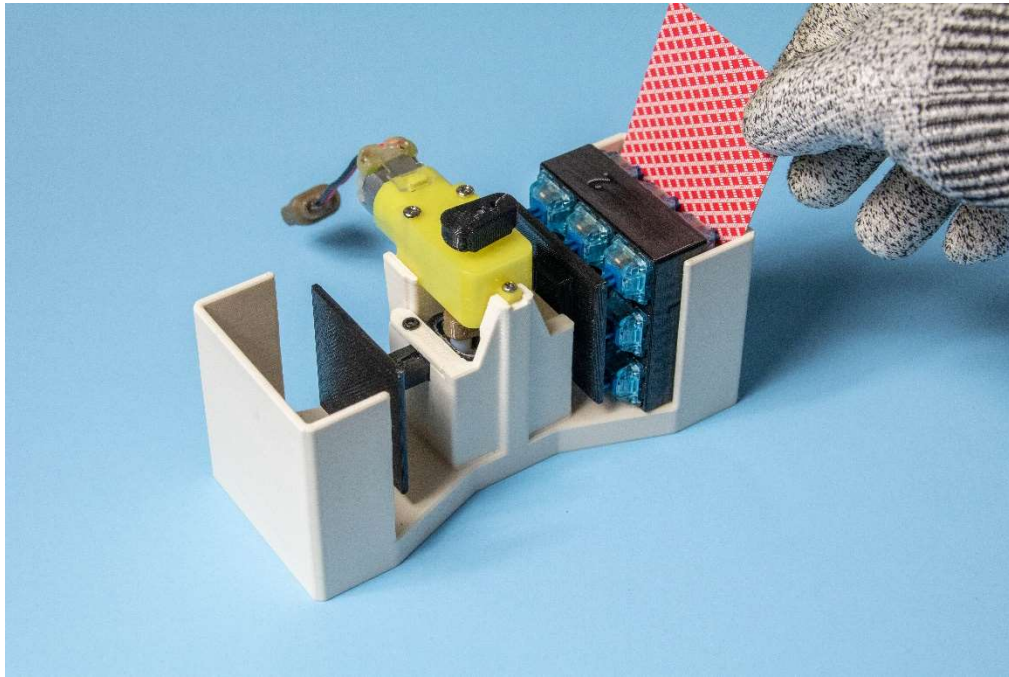
## Section 4: Mode A – Collinear Actuations



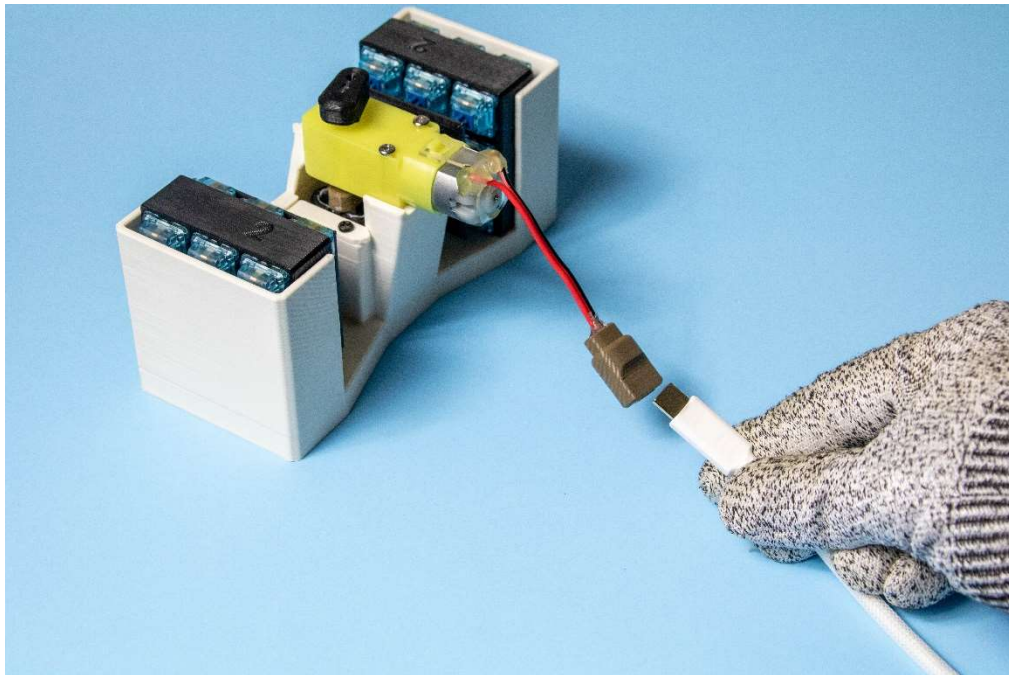
Step 1: Install switches into **both sides** of the switch plate(s) (18 max on each).



Step 2: Insert switch plate(s) in any orientation. Switch plate orientation does not affect break-in process in Mode A.



Step 3: Insert card stock spacers between the outer switches and main body if needed. A small space needs to be left in order to prevent jamming.

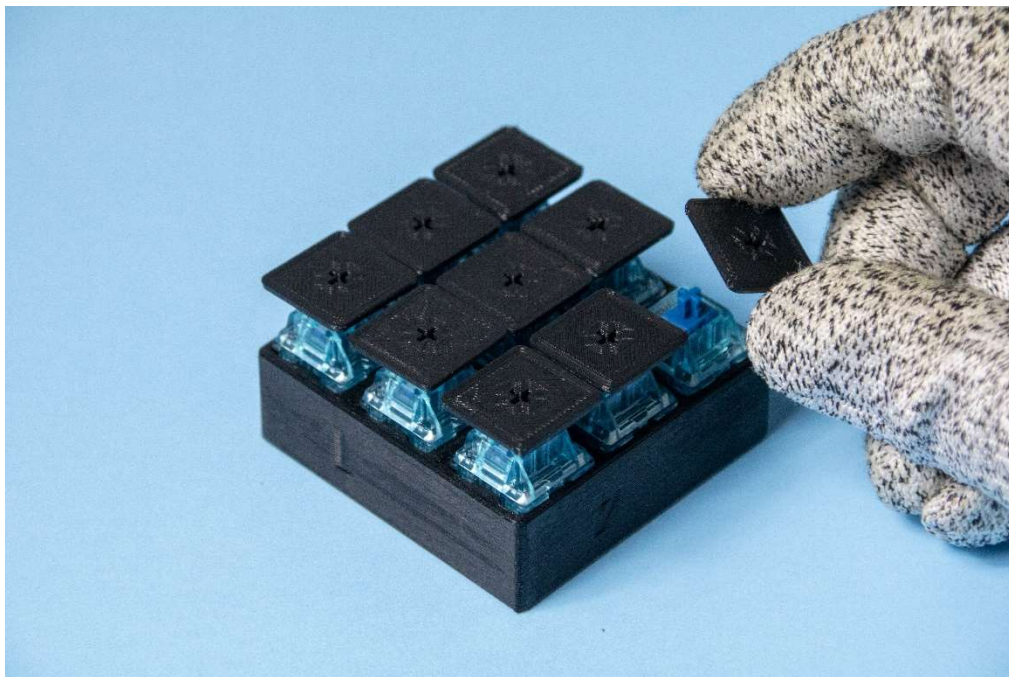


Step 4: Simply plug in the machine to start. To achieve consistency, it is recommended to break in switches by amount of time (min, hrs, etc).

## Section 5: Mode B – Off-center Actuations

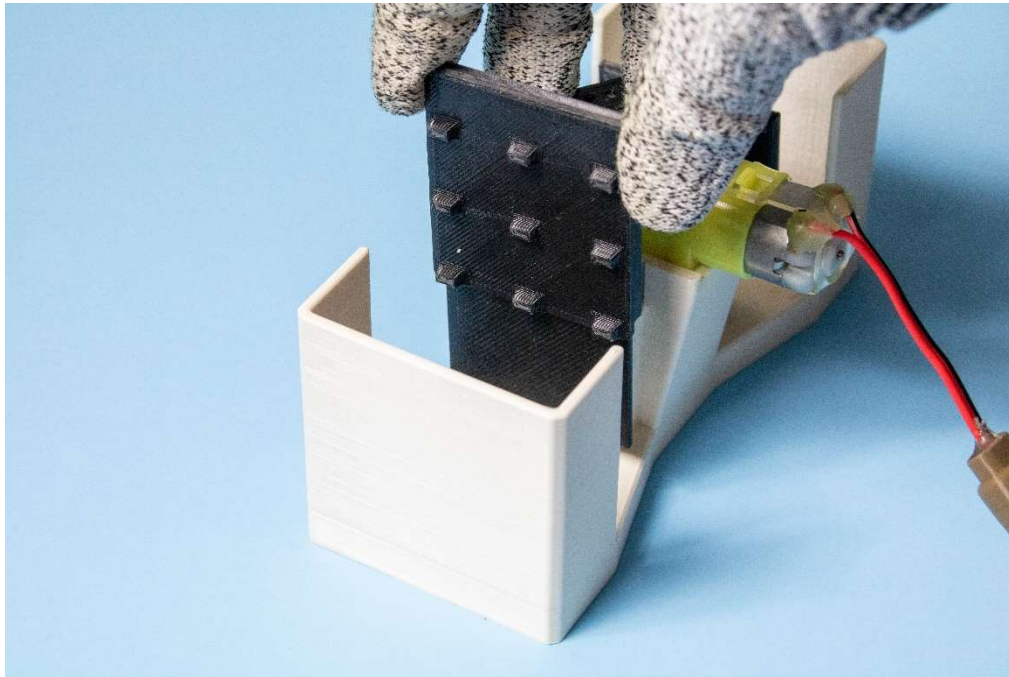


Step 1: Insert switches into only one side of the switch plate(s) (9 max on each).

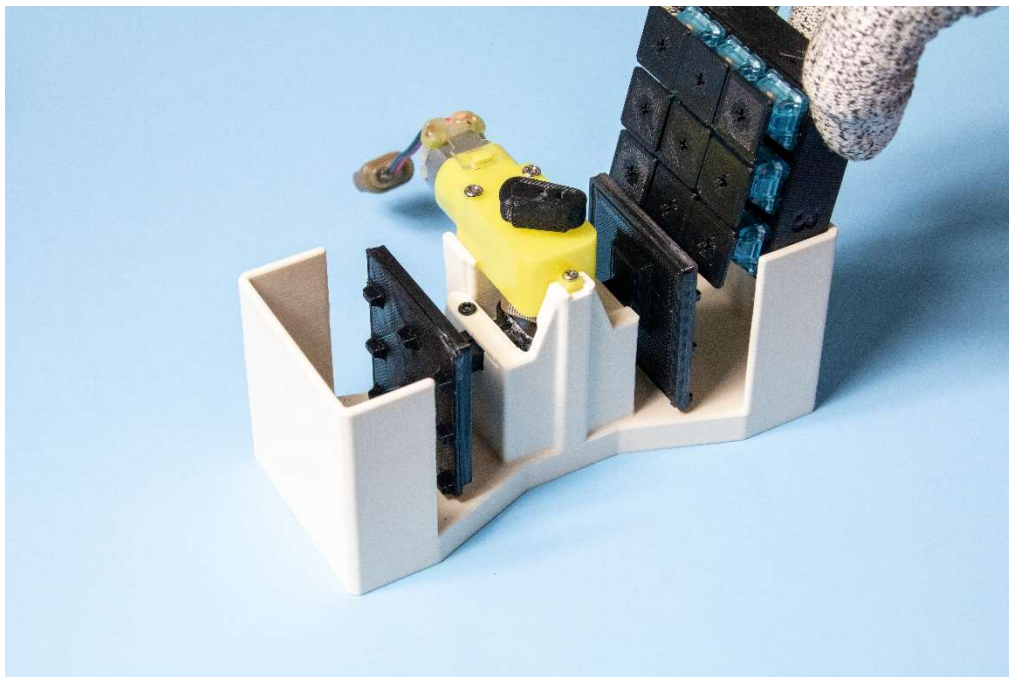


Step 2: Insert keycaps onto all switches.

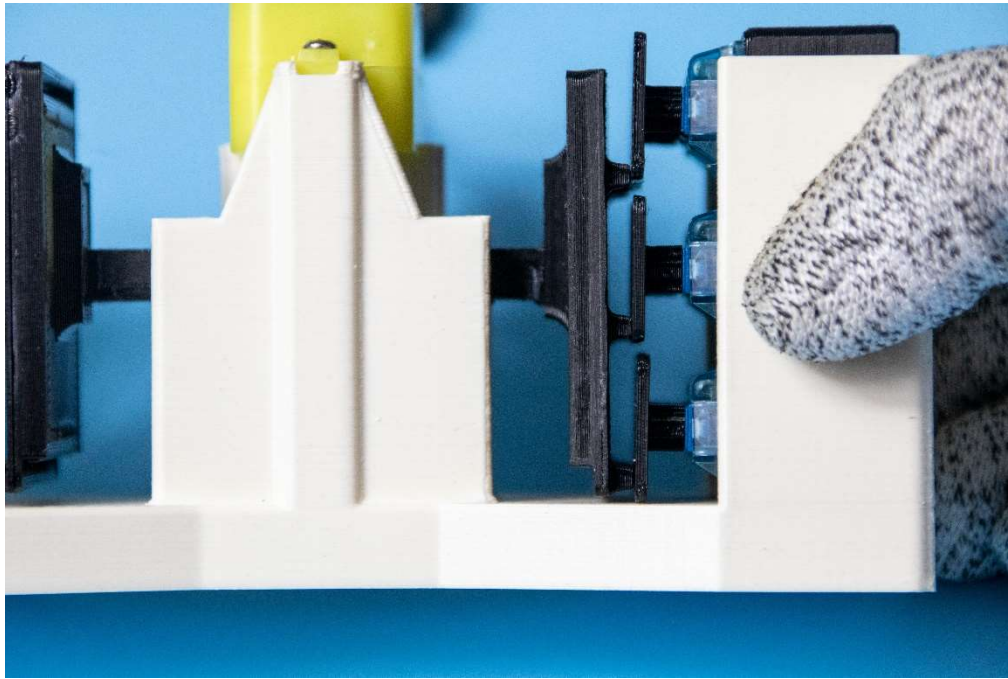




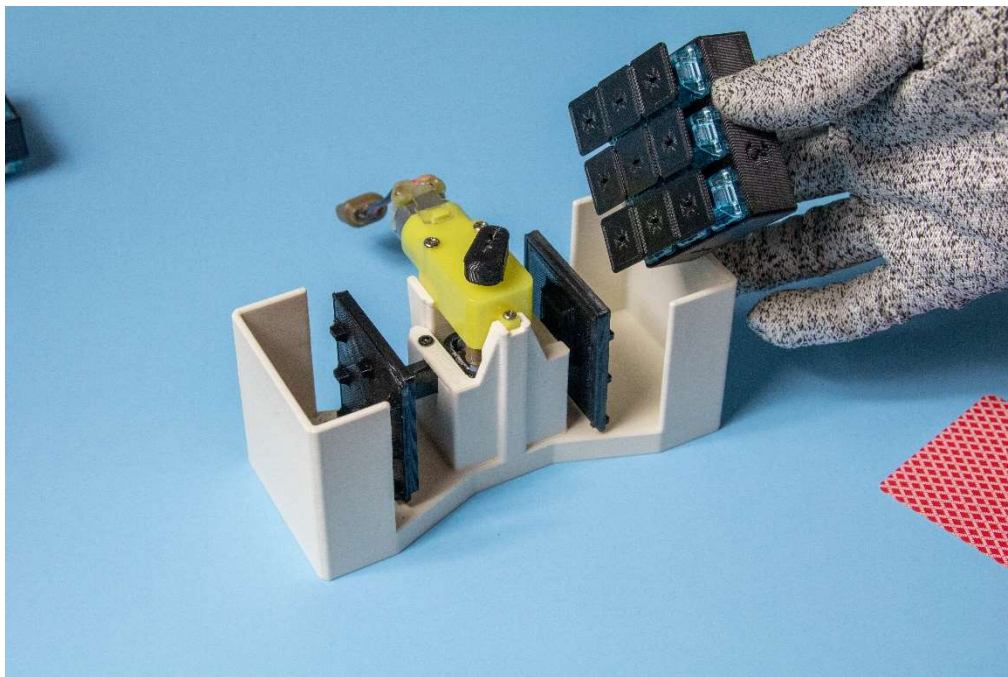
Step 3: Insert off-center actuation module onto the pusher plate by orienting the clip opening downwards, and sliding it on from the top.



Step 4: Insert switch plate(s) with the keycaps facing the pusher, the 9 protrusions on the off-center actuation module should line up with the bottom edge of the keycaps. Insert spacers on the underside of the switch plate if needed.

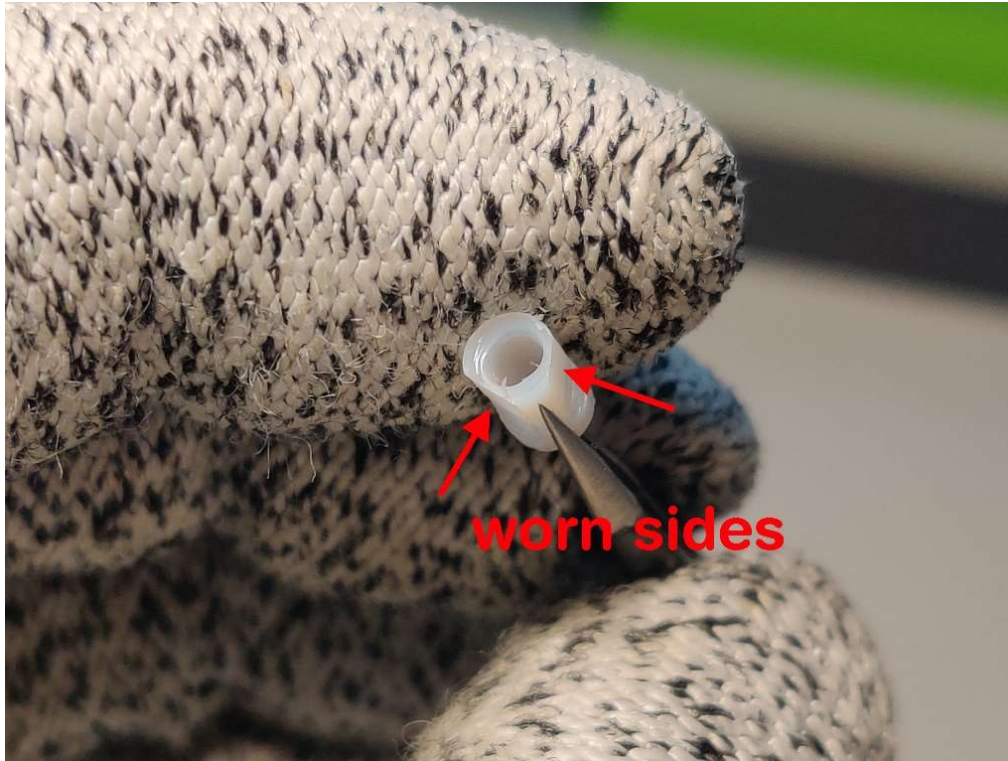


At this point, the user's machine should look like the image above. Once turned on, the pusher will apply a force to the side of the keycaps, resulting in more friction towards the bottom side.

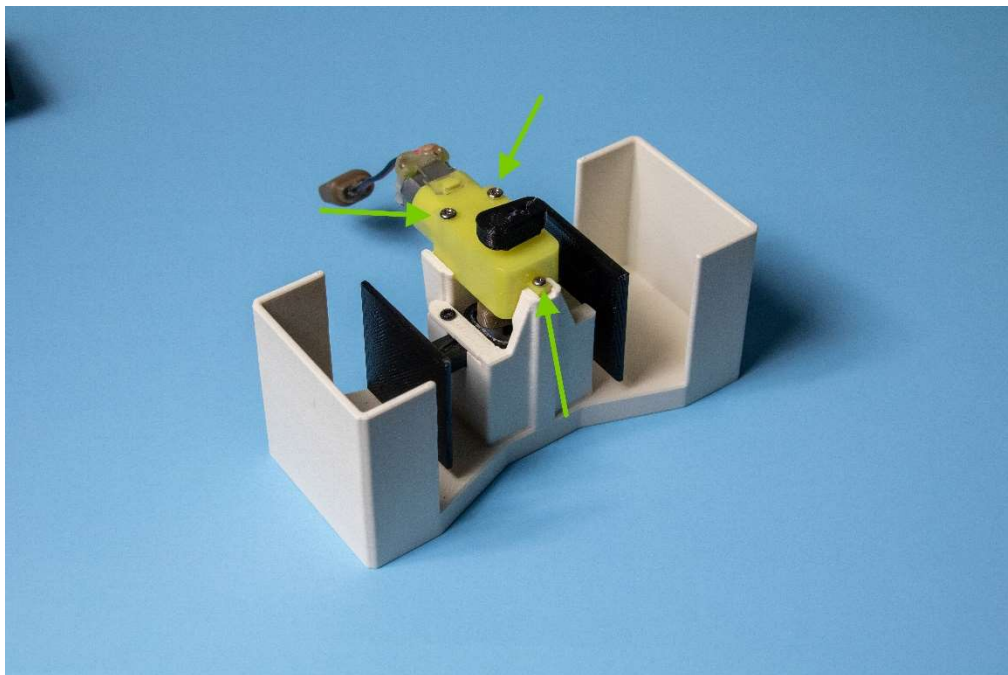


Step 5: Turn on the machine, the pusher will break in only one side of the switch. In order to break in the other three sides, rotate the switch plate 90 degrees after one side is finished. Please take notes on which side(s) has been broken in. 4 sides are labeled with numbers. For consistent results, break in each side for the same amounts of time.

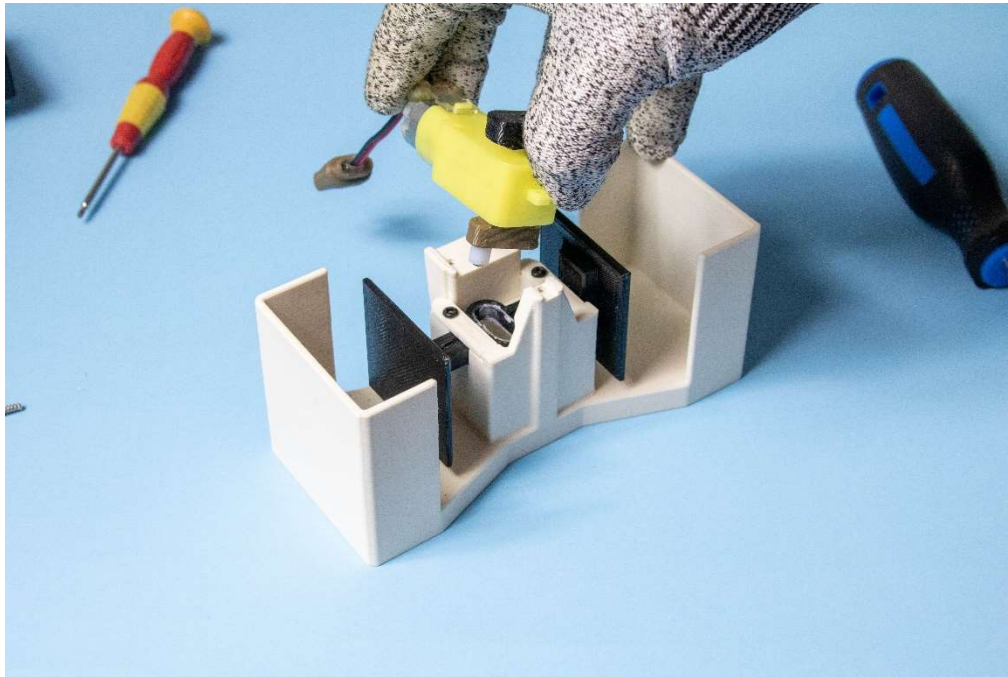
## Section 6: Replacing the PTFE tube



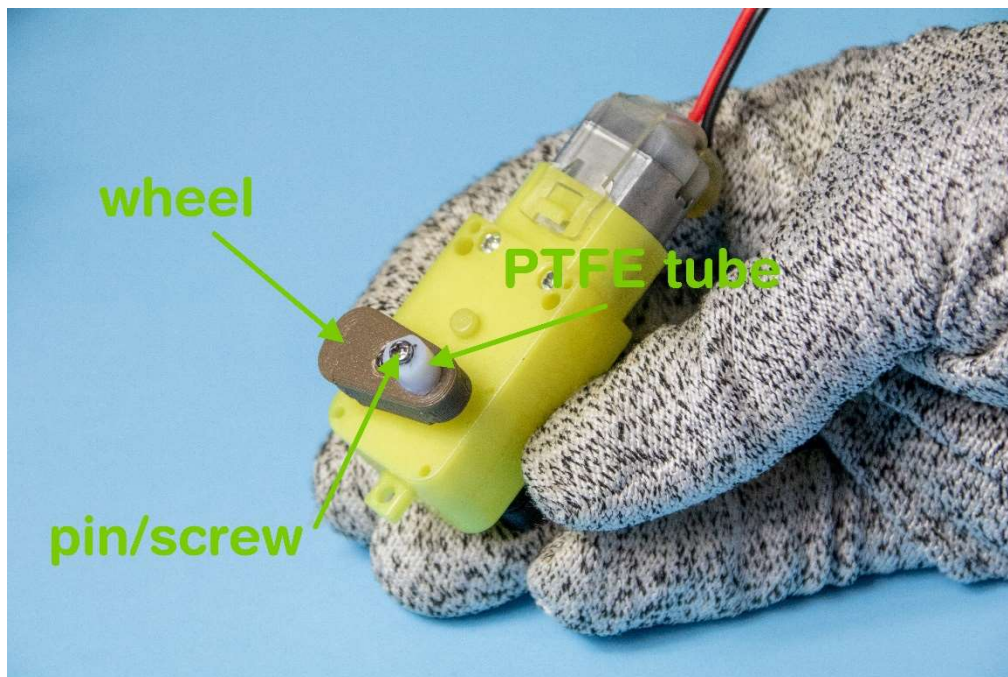
As the machine operates, the PTFE tube on the pin for the scotch yoke will wear out and side(s) will become thinner as the material grinds away. The tube will need to be replaced when the thinnest point is  $<0.5\text{mm}$  thick.



Step 1: Unscrew the 3 screws indicated in the picture above. Do so slowly to avoid stripping the plastic.



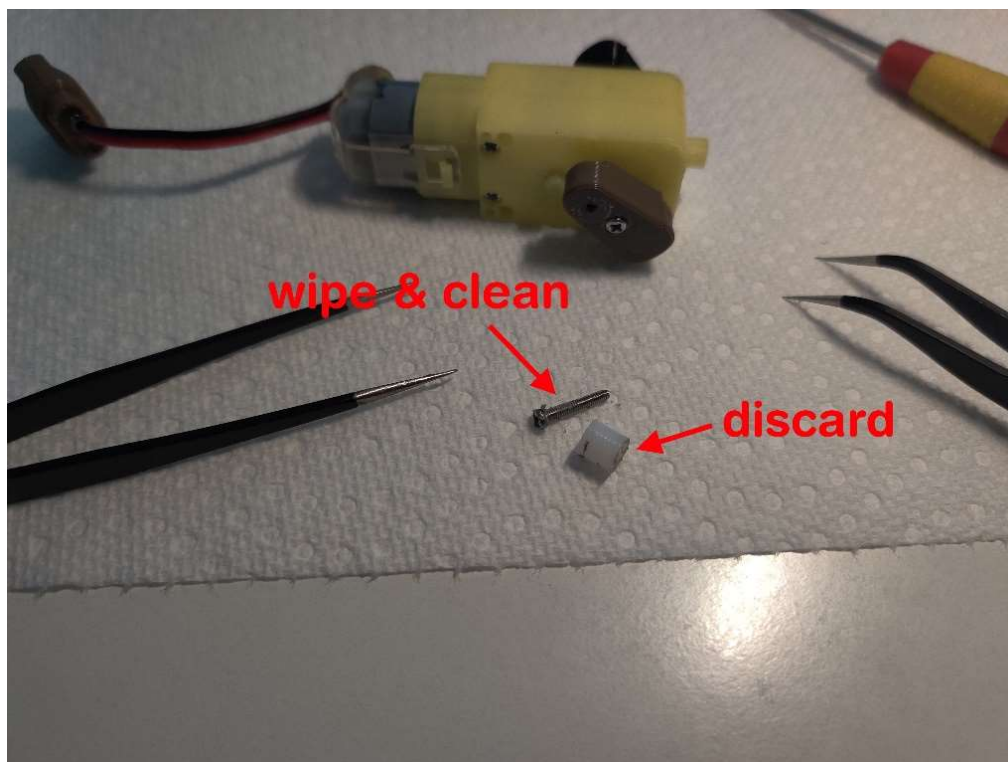
Step 2: Lift up the entire gear box assembly, including the top handle and the power cable. The pusher assembly should still remain in place.



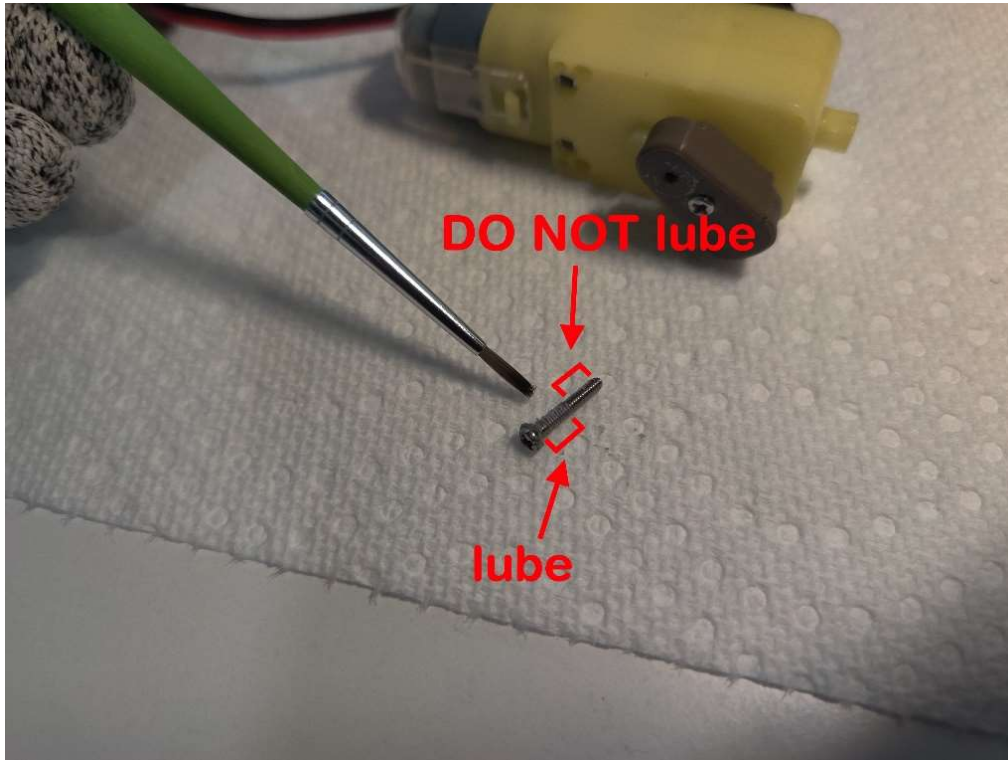
Step 3: Flip the gear box assembly, exposing a wheel, screw (this is the pin) and a PTFE tube surrounding it.



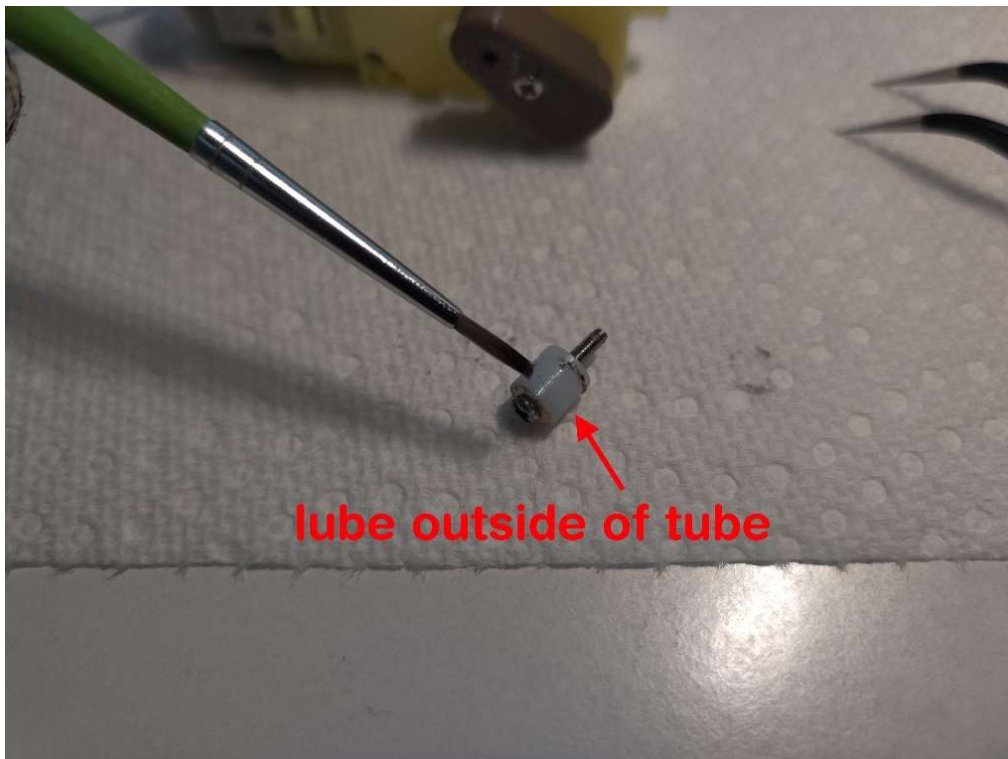
Step 4: Unscrew the screw indicated in the picture above and pull out the pin & PTFE tube. Verify if the PTFE tube needs to be replaced by measuring the thickness of the thinnest point. If so, proceed to the next step.



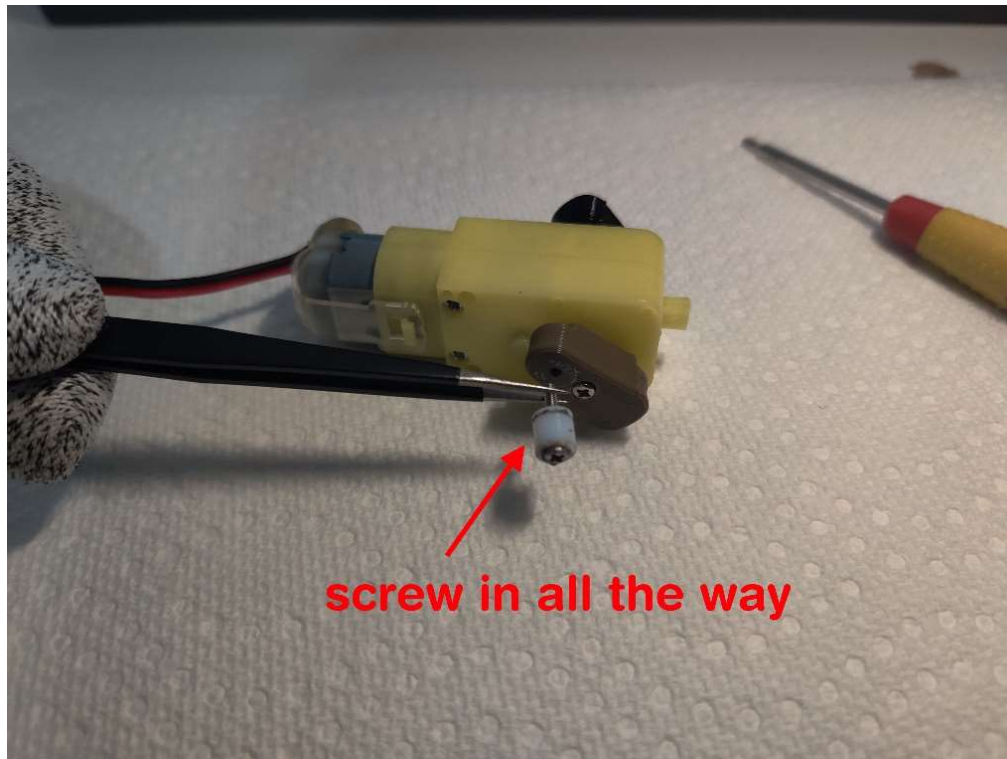
Step 5: Remove the PTFE tube from the screw, discard the tube and wipe the screw to get rid of any remaining lubricants and/or plastic bits.



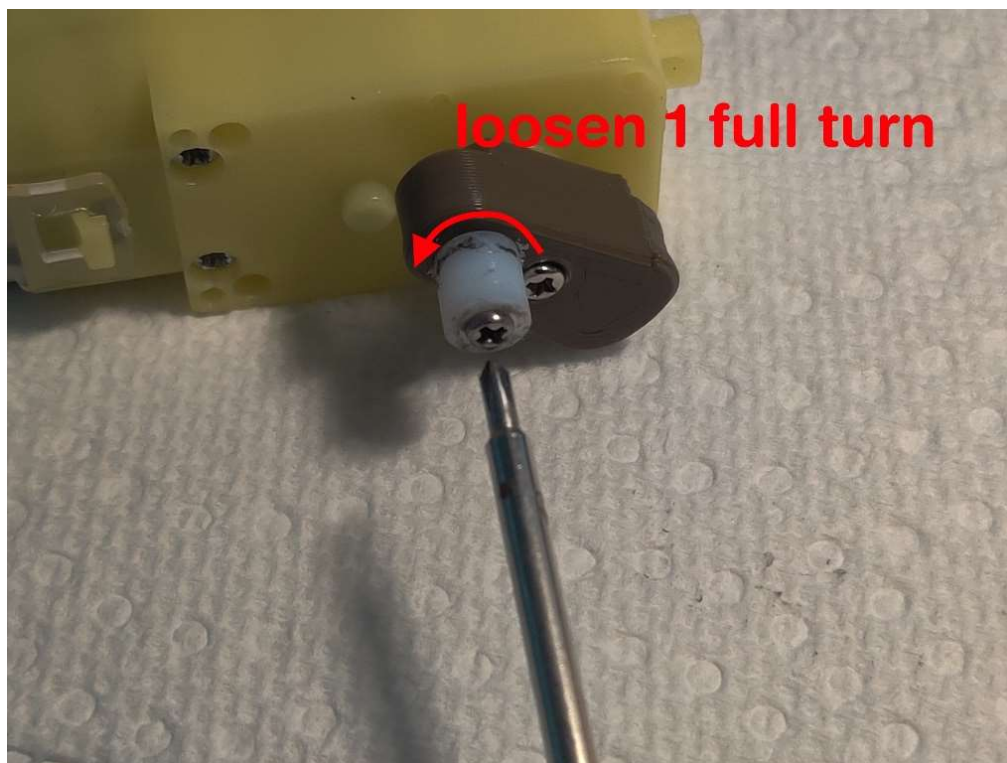
Step 6: Apply a thin coat of grease to the screw, DO NOT apply it to the part where the screw screws into the wheel. This can be any form of grease (krytox, tribosis, dielectric, etc), thicker is better.



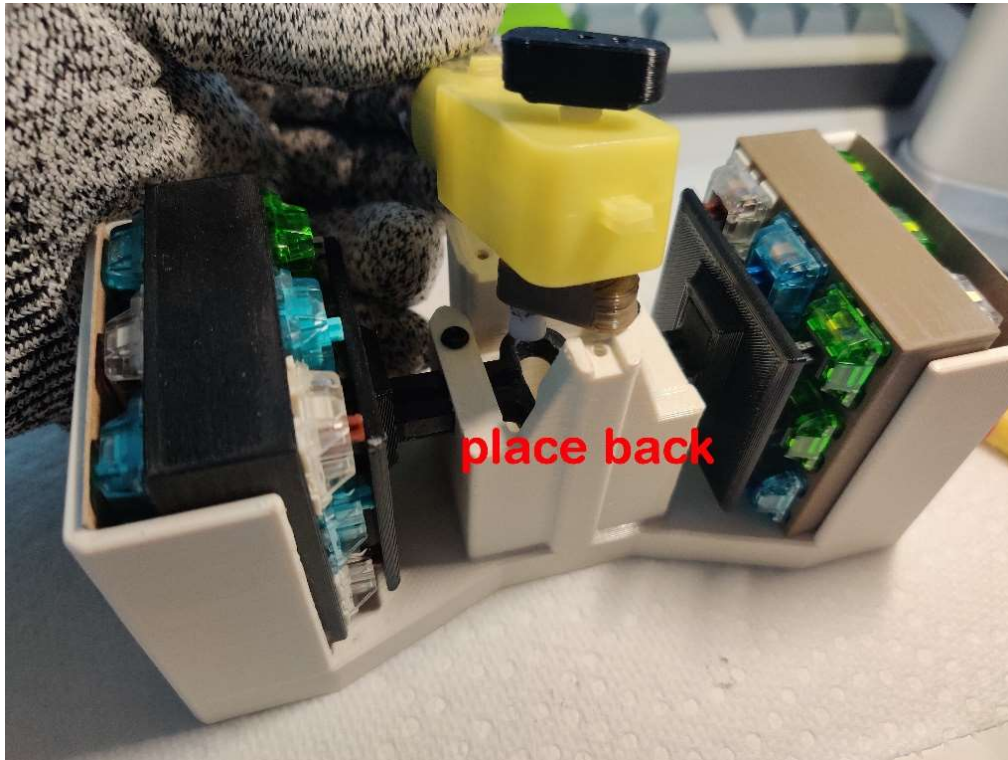
Step 7: Attach a new PTFE tube and lubricate the exterior of the tube with grease.



Step 8: Screw in the PTFE tube and pin assembly back onto the wheel so that the wheel does not spin freely when touched (the screw does NOT tighten all the way), do so slowly to avoid stripping the plastic.



Step 9: Loosen the screw by 360 degrees (1 full turn counterclockwise) so that the tube is allowed to spin freely.



Step 10: Place the gear box assembly back onto the main body, make sure to line up the pin with the slot on the pusher.



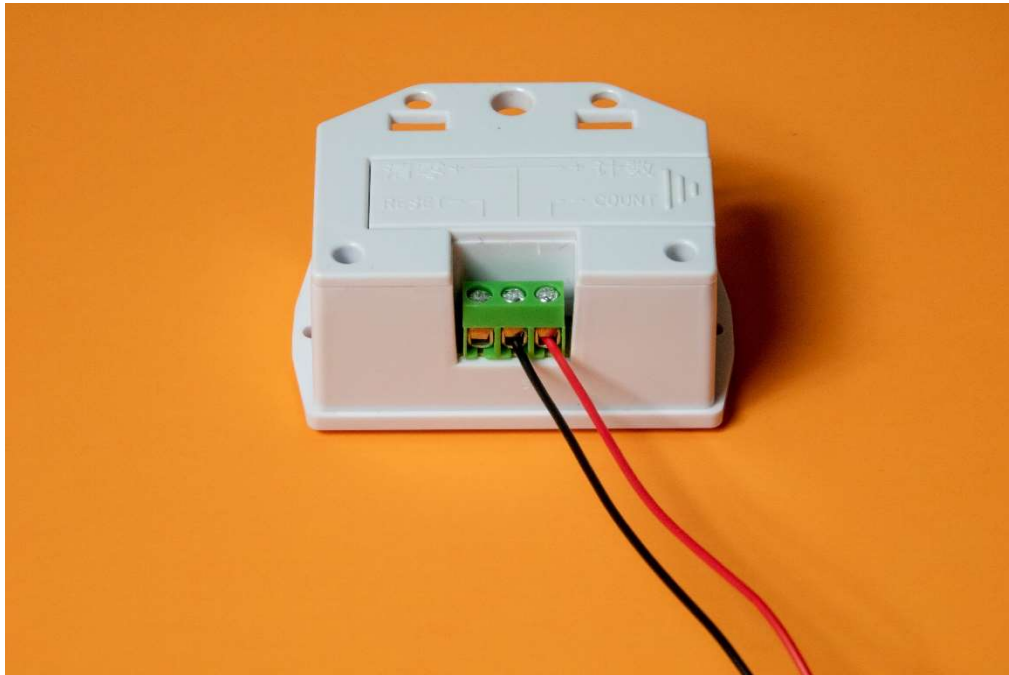
Step 11: Reattach the 3 screws that was removed in step 1.



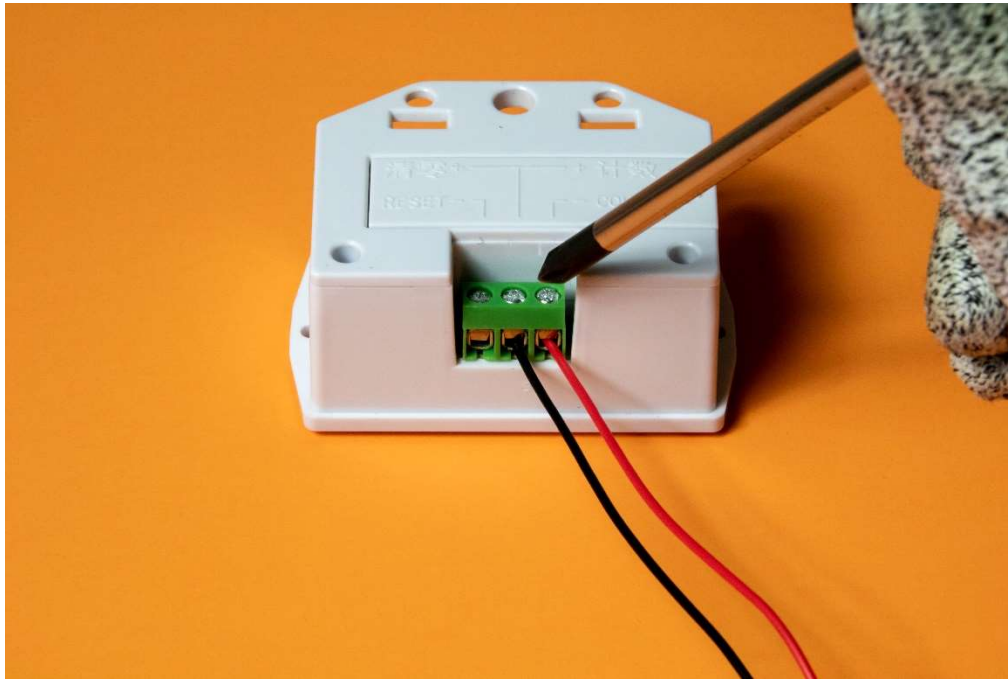
## Section 7: Actuation Counter



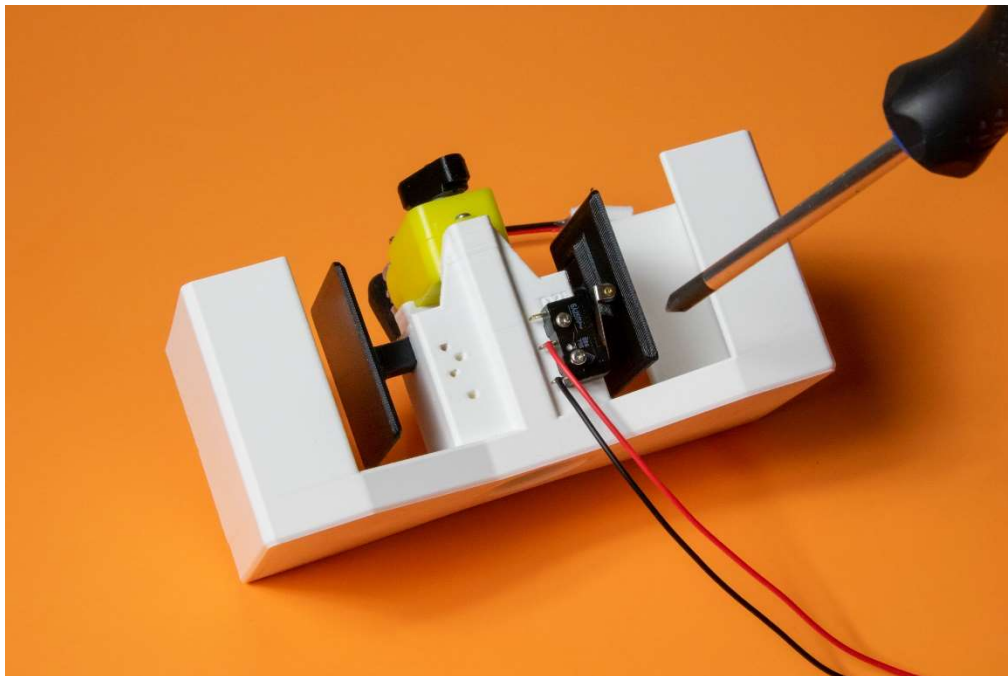
Step 1: Flip the counter so the back side is facing up.



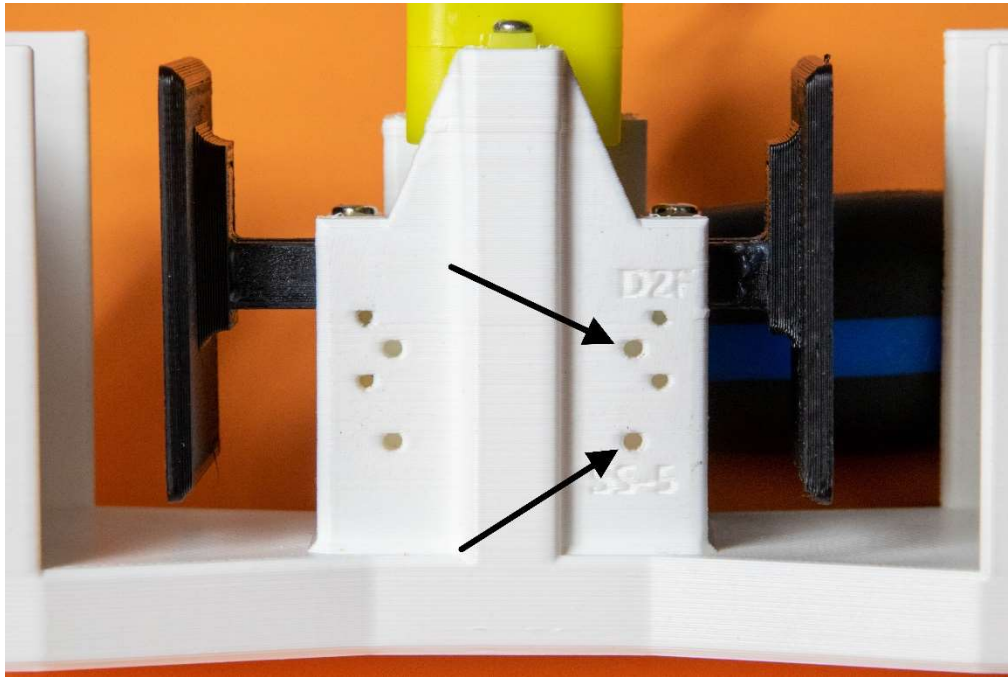
Step 2: Insert the 2 wires into the right and middle slots, the order of the wires does not matter. Make sure the screws are loose if you are unable to insert the wires.



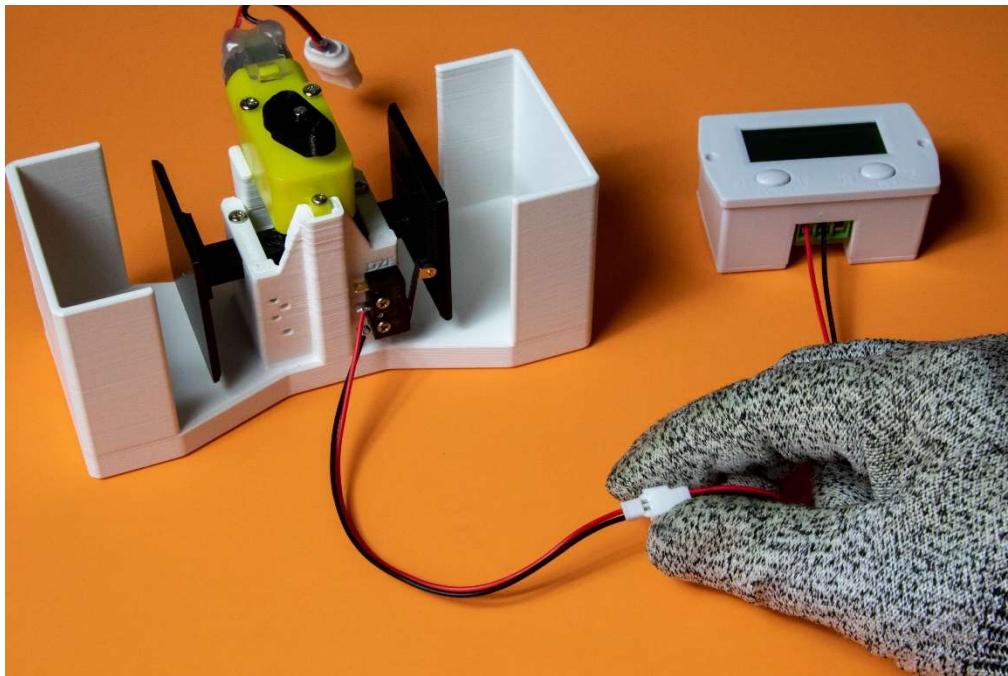
Step 3: Tighten the two screws and make sure the wires are secure.



Step 4: Hold the switch onto the main body of the machine so that the holes line up and that the wheel is facing up. Screw in the two screws.



Step 4 (continued): These 2 holes are used to attach the switch.



Step 5: Connect the two wires with the white connector, the pins only go in one way.



Step 6: Remove the battery compartment cover.



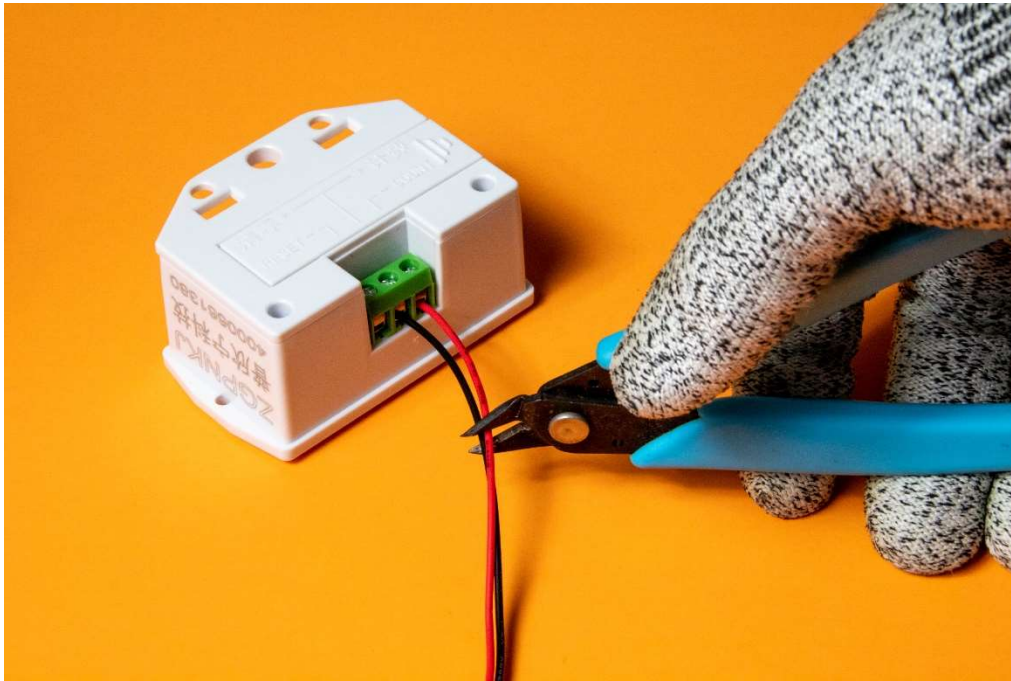
Step 7: Insert a AA battery (1.5v) and put the cover back in place.



Step 8: Long press the POWER button (left) to turn on/off the counter. The current count will be saved when the counter is shut off.



Step 9: Long press the RESET button to reset the counter, the counter resets itself after the count reaches 1,000,000.



Step 10 (OPTIONAL): Cut the wire if you feel the wire is too long, please note this process is not reversible unless you choose to solder on another section.

If your machine does not have the compatible holes, do the following:

Step 1: Hold the switch in place by hand in the position shown in the pictures above

Step 2: Turn on the machine to test, the counter should go up by 1 after every actuation

Step 3: If the test is successful, mark the position of the switch by tracing its outline with a pencil

Step 4: Apply some hot glue and glue the switch in place, hot glue can be removed if you wish to try again

# Changelog

## v1.1

- Modified Section 6, fig 1, step 4, 8

## V1.2

- Modified Section 4, step 1
- Modified Section 1
  - o Changed # of PTFE tubes from 4 => 5
  - o Changed # of Keycaps from 18 => 20
  - o Changed # of spare pins from 2 => 1
  - o Removed spare wheel screws
- Added section 7

## V1.3

- Added section 8: actuation counter
- Modified image for section 7
- Adjusted spelling & capitalization

## V1.4

- Removed section 7 and made it its own document
- Renamed section 8 to 7 to compensate for deleted section