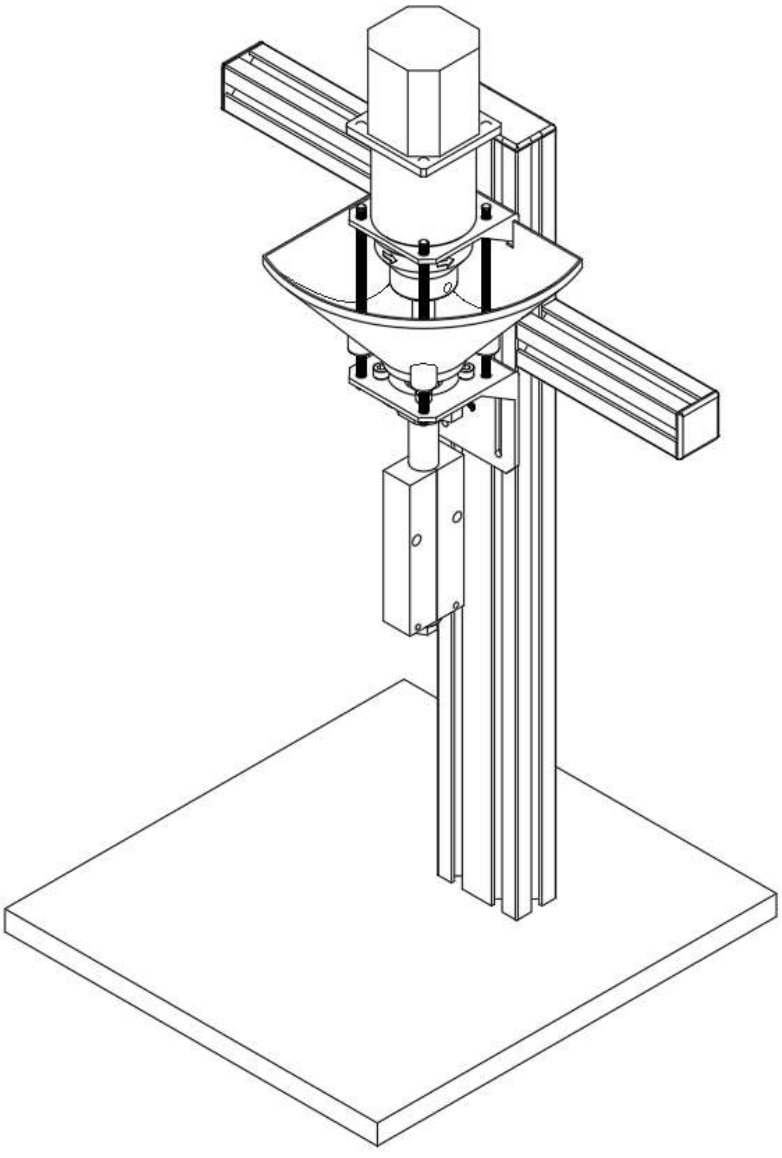
03 Extruder-Drive assembly

Assembly instructions

Original Desktop Filament Extruder E1.7 by ARTME 3D

Version 28.02.2022



Required tools for this assembly section

Phillips screwdriver PH1
Wrench size 8
Torx Schlüssel TX 25
File/Sandpaper

Tools you may need

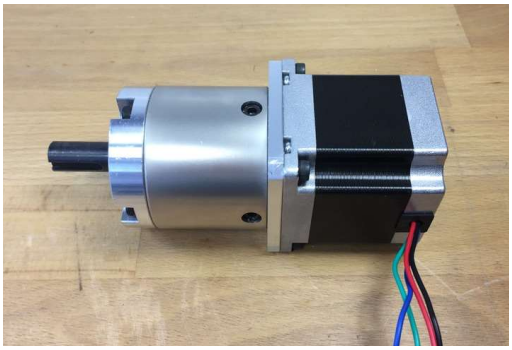
Drilling machine
drill 5,5 mm
Drill bit 12 mm

Overview packages

Package 0: Delivered carton
Package 1: Screws (SC)
Package 2: Spare Parts (SP)
Package 3: Custom Metal Parts (CM)
Package 4: Extruder Barrel (EB)
Package 5: Electronics (EL)
Package 6: Tools (TO)

Step 1:

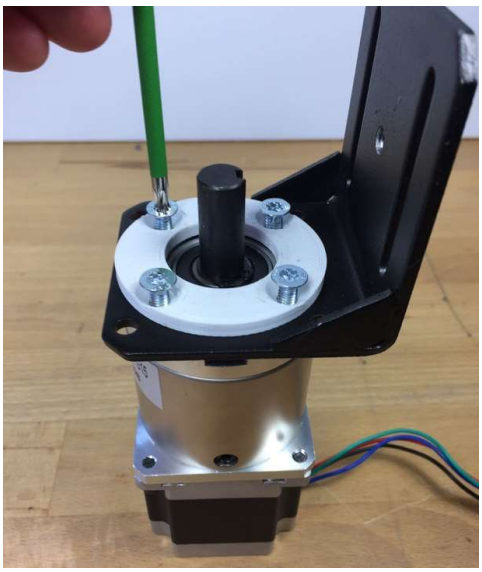
Remove from package 0: 1x stepper motor Nema23 (MO01), x mounting bracket (SP12)
Remove from package 1: 4x countersunk screw M5x15mm (SC06)
3D print: 1x coupling bearing surface (ED01) The bearing surface should be printed with 100% infill.



Step 2:

Tool from package 6: Allen key size 3

Place the mounting bracket on the stepper motor. Alignment see picture. The connection cable of the motor points in the same direction as the mounting bracket. Place the bearing surface on the mounting bracket, see picture. The countersinks point upwards. Screw tight with the countersunk screws. Caution: Do not overtighten the screws. Otherwise the bearing surface will be damaged. The screws should be flush with the surface of the bearing surface.

Step 3:

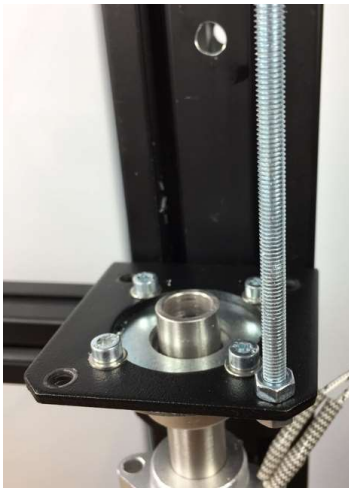
Remove from package 2: 4x threaded rod (SP04)
Remove 4x M5 nut (SC11) from package 2.

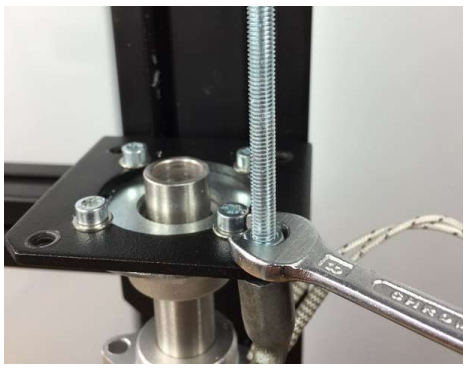
Screw the nuts onto the threaded rods one piece at a time.

Step 4:

Tools from package 6: 8mm tubular socket wrench
Tools: 8mm wrench
Remove from package 1: 4x nut M5 (SC11)

Insert the threaded rods into the holes of the mounting bracket on the extruder tube. Screw a nut onto each from below. Make sure that the threaded rod is approximately flush with the lower nut. To tighten, hold one nut while turning the other. This works best with the tubular socket wrench for the lower nut and a wrench for the upper nut. The nuts must be tight.

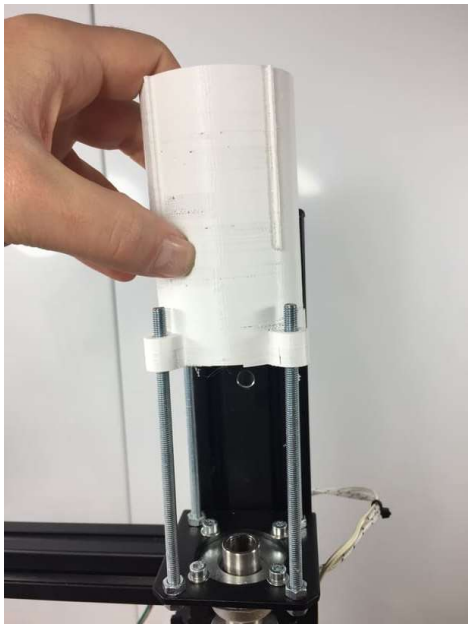


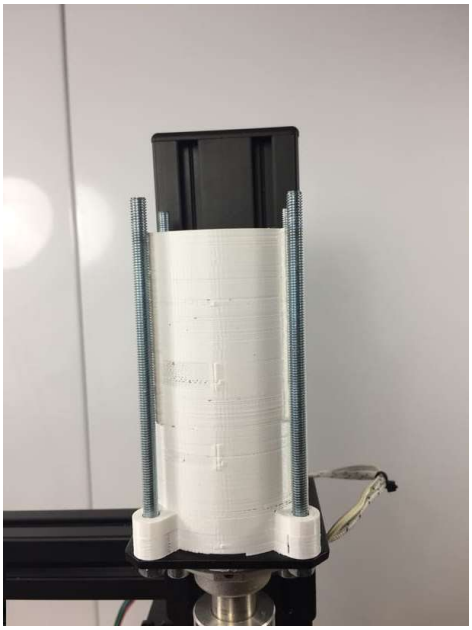


Step 5:

3D Printing: Bending template threaded rods (ED03)

Place the bending template on the threaded rods and push it down.
The bending template must sit flat and level on the mounting bracket.



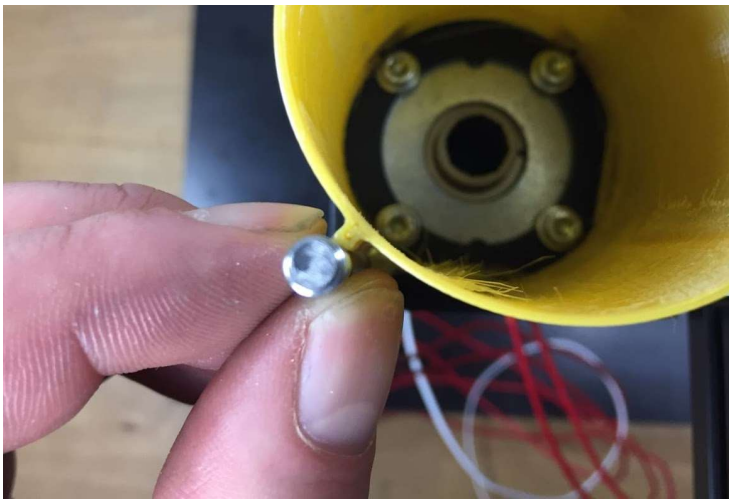


Step 6:

Now check whether the threaded rods are parallel to the four protruding edges on the bending template. If not, bend them to shape by hand. Parallel to the template means that the gap between the threaded rod and the edge on the template is the same over the entire length.

Step 7:

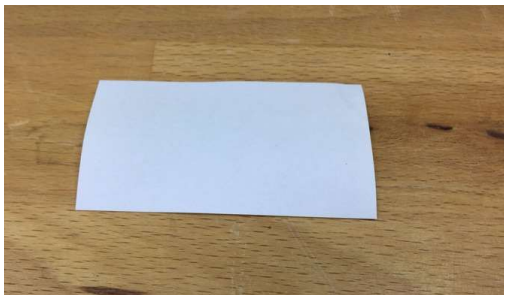
When you look at the threaded rod from above, it must be centered on the protruding edge of the bending template. Bend the threaded rod to shape by hand. Repeat these two steps until all threaded rods are parallel and centered to the protruding edges of the bending template. Make sure that the template lies flat on the mounting bracket the entire time. Then remove the template again.

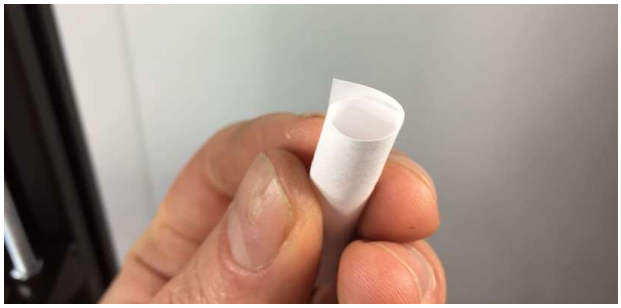


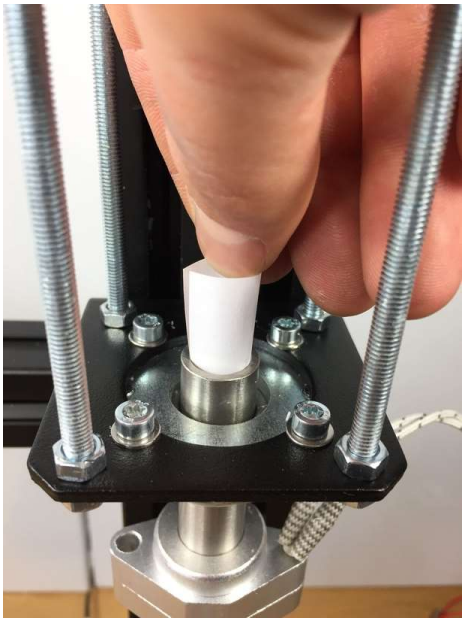
Step 8:

Other material:
1x sheet of paper
1x scissors

Cut a piece of paper. (approx. 70x36mm). Roll the paper into a tube. (Roll the long edge so that the tube is about 70mm long). Push the tube into the extruder tube and leave a piece protruding.







Step 9:

Remove from package 3:
1x extruder screw (CM02.2)

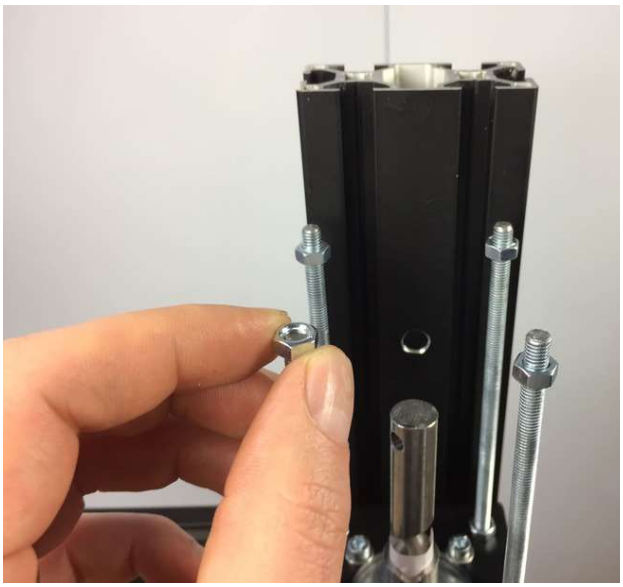
(The extruder screw of the latest generation looks slightly different, but the assembly is identical). Push the extruder screw through the paper tube into the extruder tube. Make sure that the paper is not pushed too far into the tube. If the screw is stuck and can not be pushed in, you can replace the piece of paper with baking paper. This material is thinner than paper. If that doesn't fit either, leave the paper out.

Step 10:

Remove from package 1: 4x nut M5 (SC11)
3D print: 1x assembly aid (ED06)

Screw another four nuts onto the threaded rods. Attach the mounting aid as shown in the picture. Place it on the bottom of the nut on the mounting bracket of the extruder

tube and on the top of the loose nut. Turn the loose nut so that the top edge is exactly flush with the mounting aid. This is done on all four nuts.Take your time and measure accurately. Here it is important that all nuts have the same distance to the mounting angle of the extruder tube. Otherwise, the extruder screw may not be aligned exactly parallel to the extruder tube and could produce abrasion.



Step 11:

Remove from package 1:
4x nut M5 (SC11)

Place the stepper motor with mounting bracket on the threaded rods. The angle points backwards to the aluminum profile. Caution: During this procedure, it may happen that the nuts turn again. If in doubt, measure again with the mounting aid whether all nuts are at the same height. Screw four more nuts onto the ends of the threaded rods and tighten them.

Step 12:

Remove from package 1:
1x wing screw (SC19)

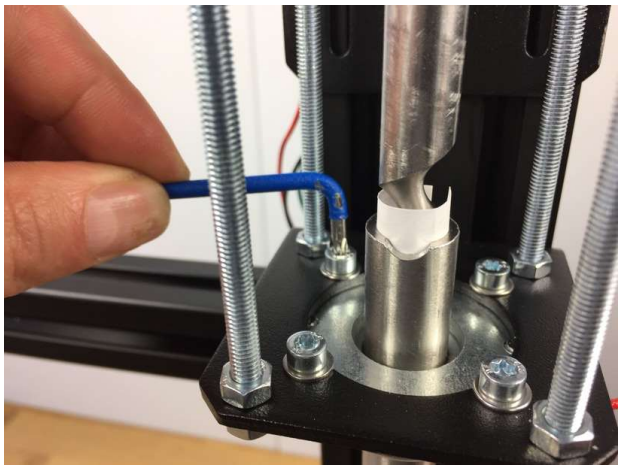
Insert the wing screw from behind into the upper hole in the aluminum profile and screw the mounting bracket of the motor tight. If you do not hit the thread in the mounting bracket at first go, it may be necessary to loosen the lower wing screw again and move the mounting bracket back and forth until they hit. Then hand-tighten both wing screws again.

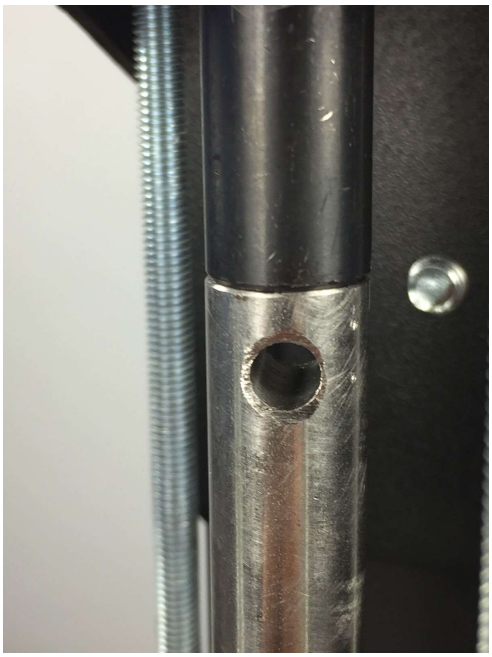
Step 13:

Tool from package 6: allen key size 3

Now check how the extruder screw and the shaft of the motor are aligned. See pictures. Pull the extruder screw up until it abuts the motor shaft. If the extruder screw and motor shaft are not aligned, adjust as follows. By moving the adapter disk and extruder tube, you can easily change the position of the extruder screw. The 4 cap screws at the top and the two cap screws on the shaft holder below the mounting bracket must be loose for this purpose. When the extruder screw and the shaft of the motor are in line, tighten the cap screws of the adapter disk and the shaft

holder. Check again to make sure that the alignment still fits. Repeat until alignment is good with screws tightened. See pictures.

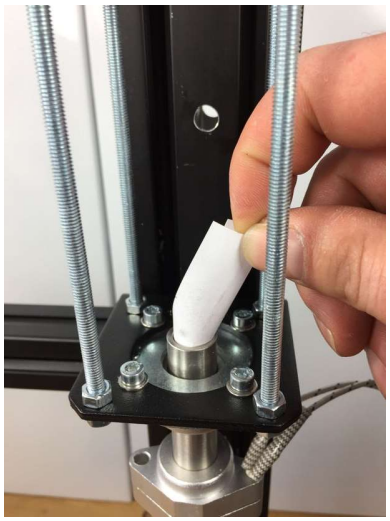


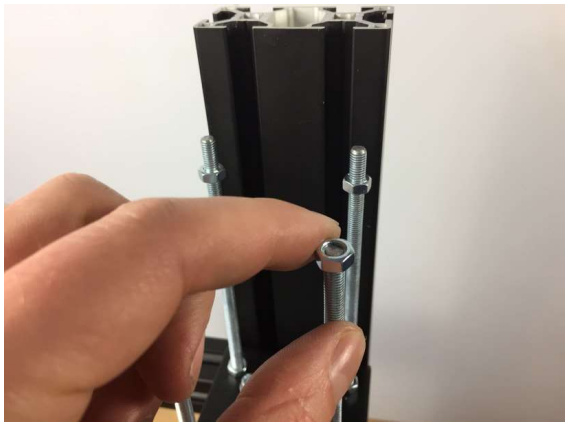


Step 14:

Tool: Wrench 8mm

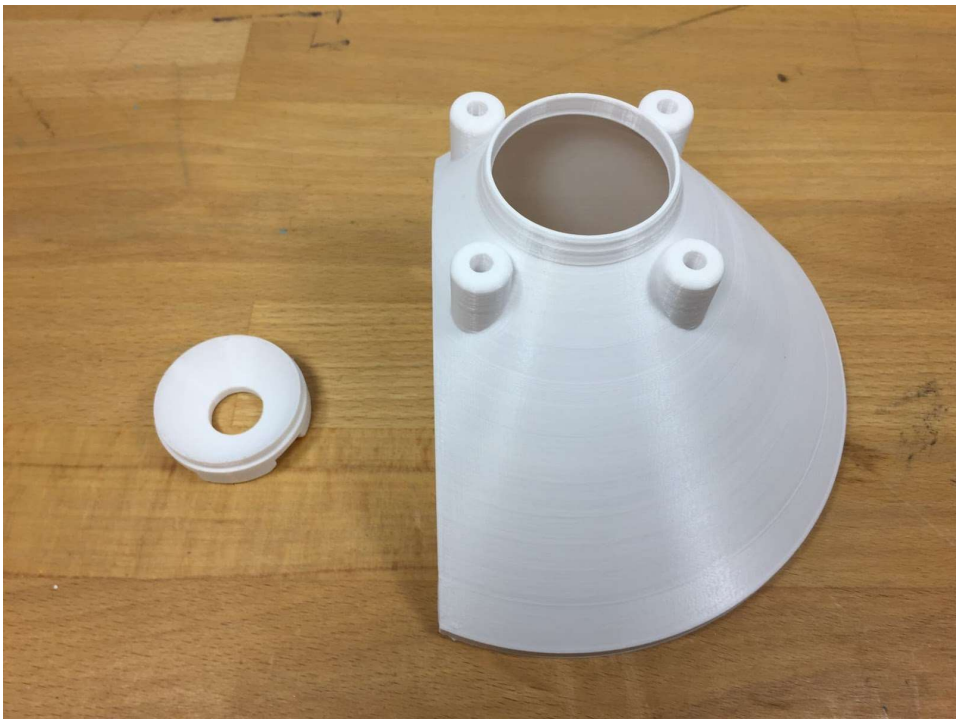
Now the motor can be removed again. To do this, loosen the upper nuts again and remove them. Loosen the wing screw again and remove it. Remove the motor. Pull out the extruder screw. Remove the piece of paper. Remove the four nuts on the threaded rods.





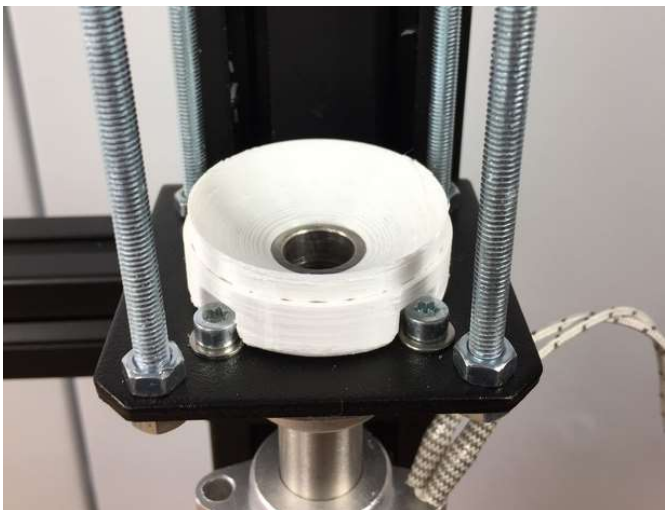
Step 15:

3D printing:
1x feed zone (ED04, print at least in PETG, ASA or ABS if possible).
1x funnel part1 (ED05)
Rework the parts after printing. E.g. remove brim. If some threads were pulled during printing (stringing/oozing) remove them. The inner surface of the funnel must be clean and smooth.



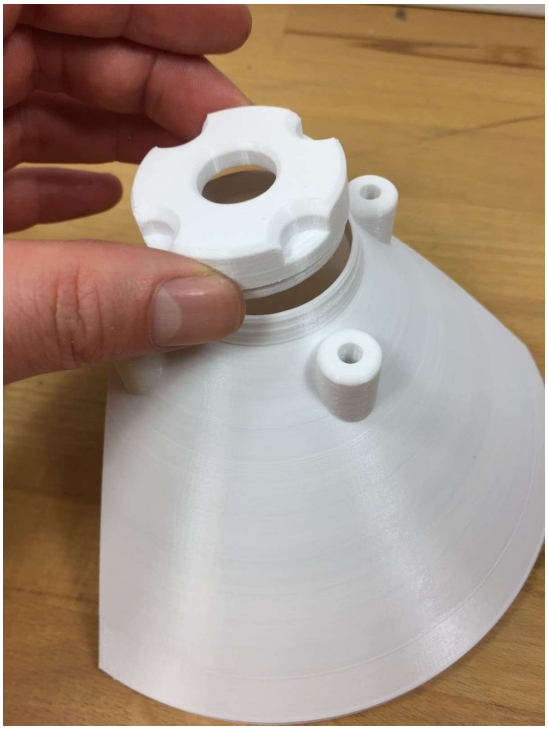
Step 16:

Place the feed zone on the extruder tube. See picture. Check that the edge of the extruder tube is flush with the edge of the feed zone. If the feed zone is slightly too high, the bottom surface can be ground down so that the edges fit. (See next page for picture)



Step 17:

Remove the feed zone again and place it on the opening of the funnel and press it tight. If it does not fit, grind/file the edge of the feed zone a little.
Pay attention to the alignment. The four semicircular recesses on the feed zone must be aligned with the four holes on the hopper.

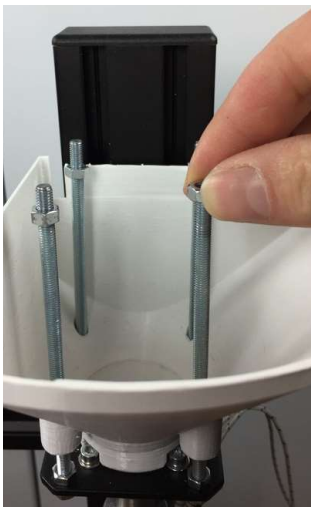


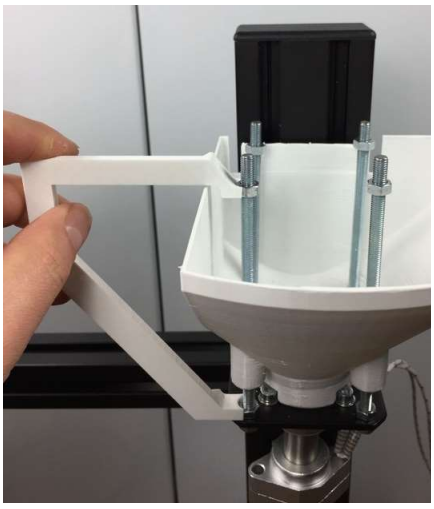
Step 18:

Place the funnel on the threaded rods and slide it down. See picture for alignment. If the threaded rods do not fit well into the corresponding holes in the funnel, you can drill them out with the (5.5mm drill bit).

Step 19:

Screw four nuts back onto the threaded rods. Align the height of the nuts again with the assembly aid. Again, be very careful.

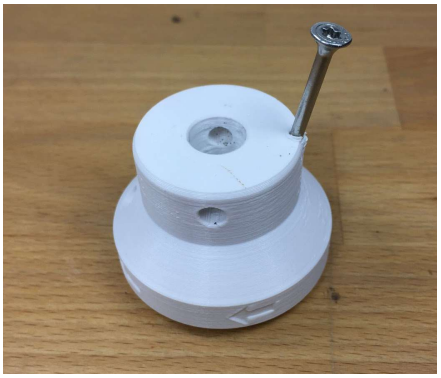




Step 20:

3D print: 1x coupling (ED02)
Remove from package 1: 1x wood screw 4x60 (SC17)
Remove from package 2: 1x thrust bearing (SP13)
Tool: Torx key TX 25

Screw the screw into the small hole in the coupling. The screw must still protrude approx. 35 to 36 mm from the coupling. Remove the bands on the axial bearing. Remove the bands on the thrust bearing. The axial bearing should be greased or oiled. If you use grease, its consistency should not be too firm, rather soft. If you use oil, it should not be too thin, rather thick. If you do not have lubrication on hand, you can make up for it after about 50 hours of operation. Then insert the bearing into the recess in the coupling.

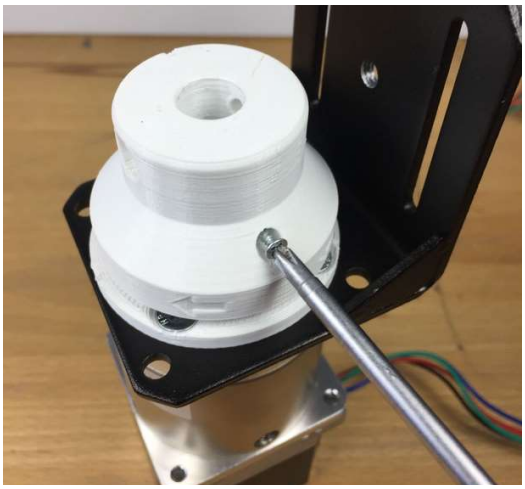


Step 21:

Remove from package 1: 1x wood screw 2.5x12mm (SC01)
Remove from package 2: 1x feather key (SP03)
Tool: Phillips screwdriver PH1

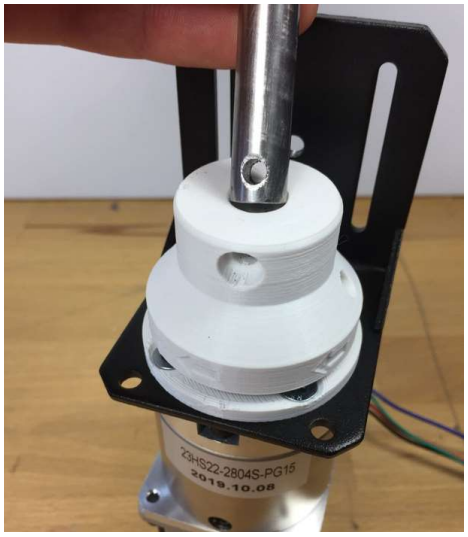
Place the feather key in the recess on the motor shaft. The motor shaft can be rotated with hands or pliers in the de-energized state if the alignment is unfavorable. Align the coupling so that the key and the keyway in the coupling are opposite each

other. Place the coupling on the motor shaft. If the hole in the coupling is too tight, it can be drilled out with a 12mm drill bit or reworked with a file/sandpaper. Screw the bolt into the small hole on the side of the coupling and tighten only slightly. This is only to prevent the coupling from slipping away during assembly. Make sure that the thrust bearing rests flat before tightening the screw.



Step 22:

Insert the shaft of the extruder screw into the coupling and align it so that the bore in the coupling and the screw match. The shaft should slide in relatively easily. If not, the bore must be reworked with a 12mm drill bit or a file.



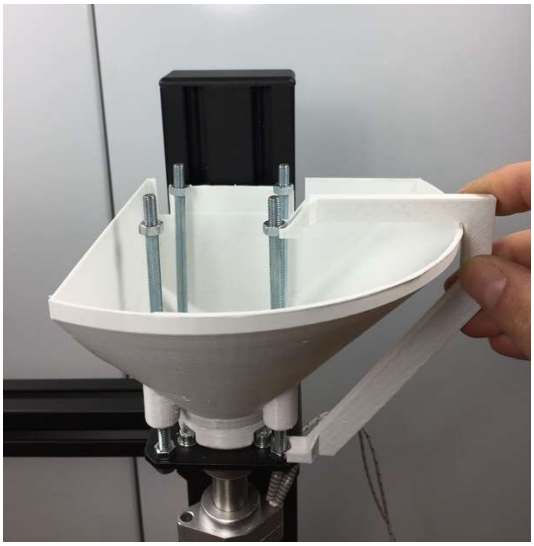
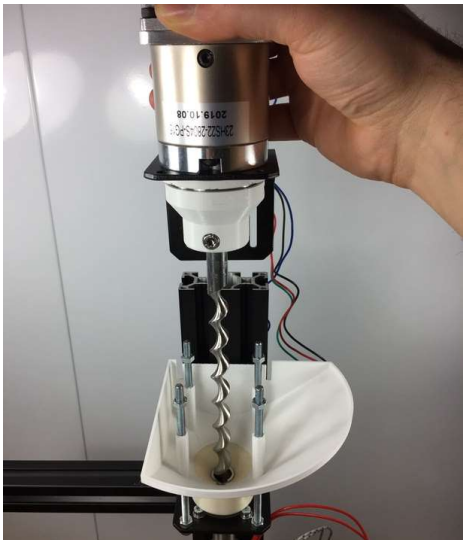
Step 23:

Remove from package 1: 1x cap head screw M5x30 (SC07).

Fasten the extruder screw with the cap head screw. To do this, insert/turn the screw into the lateral hole with the counterbore/indentation. If the screw is a little loose, this is not a problem, it cannot fall out during operation.

Step 24:

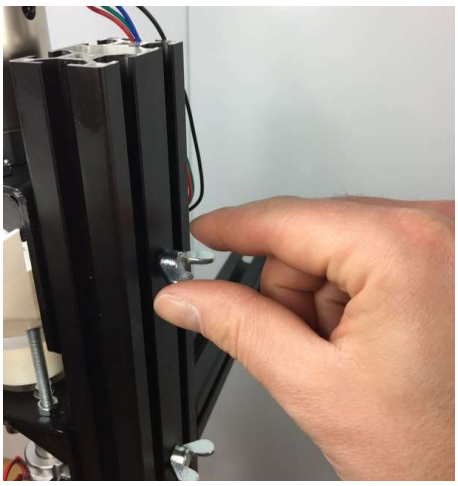
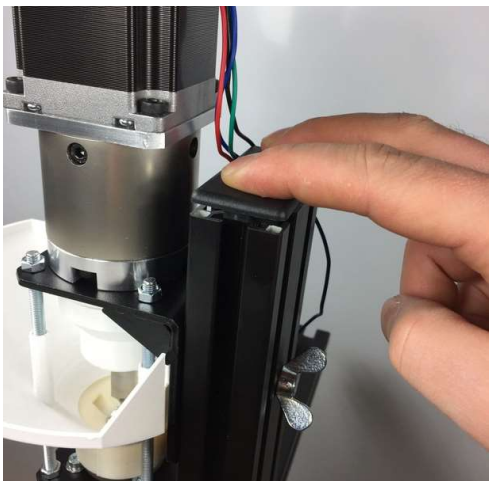
Tool: wrench 8mm
Check the height of the nuts again. Mount the motor with the extruder screw. To do this, slide the extruder screw into the extruder tube and place the motor on the threaded rods. Put on four nuts again. Tighten the nuts.


Step 25:

Remove from package 2: 1x cover cap 30x60 (SP02).

Reinsert the wing screw from behind and tighten the mounting bracket of the motor.put the cap on the aluminum profile. Some pressure may be necessary. In case of doubt use light hammer blows. (Picture see next page)

Done:

Now continue with the assembly instructions "04-Electronics assembly".