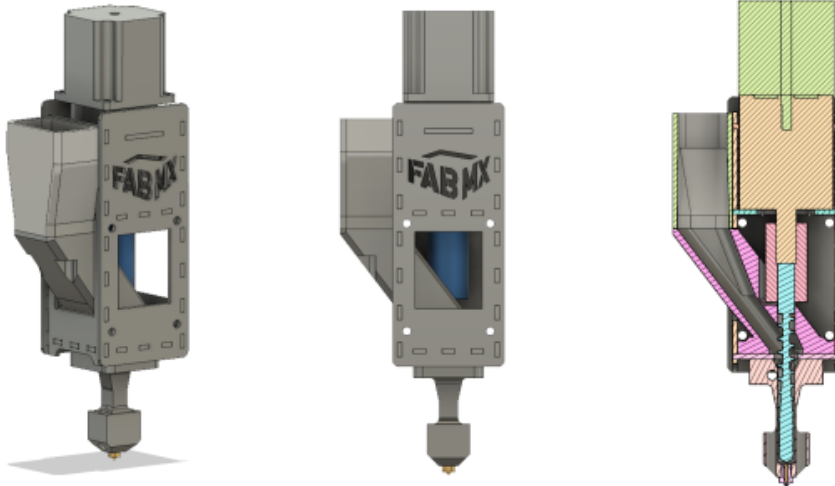# FabMX Pellet Extruder

Status: version 3.1, beta testing

View 3D CAD file: https://wikifactory.com/+fabmxteam/fabmx/file/PelletExtruder/Version3.1/PelletExtruderv3.1.step

Github repository: https://github.com/ProjectFabMX/FabMX_Extruder

BOM

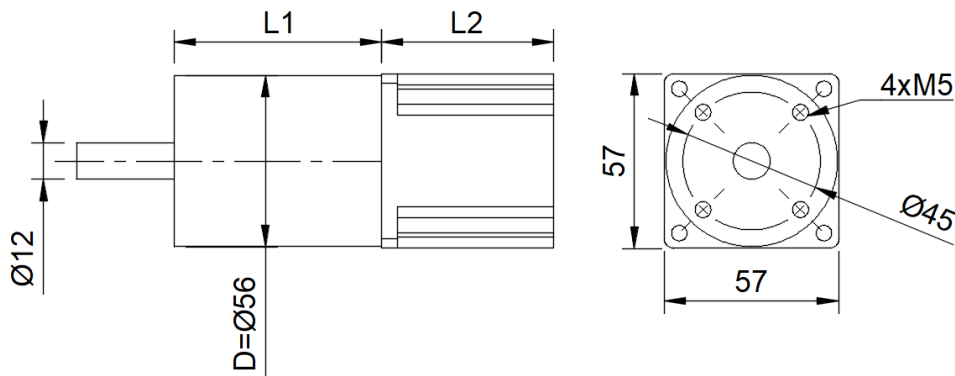| Item	Amount	Description	Source of supply	Comment
Extruder Screw	1	extruder screw	custom part, steel, drawing/parameters	
Extruder Barrel	1	includes mount and water cooling channels	custom part, steel, see step file	
Nozzle	1	standard 3D printer nozzle, type E3D V6 1.75mm; optionally hardened	e.g. https://e3d-online.com/products/v6-nozzles?variant=40924117598267	Typical nozzle diameters are 0.4 or 0.6mm
NEMA 23 Stepper Motor with gear box	1	see notes below		
Shaft Coupler	1	rigid shaft coupler 10mm to 12mm, D=max30, L=40	e.g. https://www.dold-mechatronik.de/Wellenkupplung-starr-D30L40-1000-1200mm https://www.aliexpress.com/item/32845730754.html	do not use flexible couplers, they cannot take axial load
Heating cartridge	2	40W, 24V, 6mm x 30mm		
Metal Cage	1	several laser cut aluminum parts	custom parts, aluminum 3mm, laser-cutting folder on github	
Pellet Inlet	1		custom part, PLA/resin, 3d printed, see github	
Pellet Tank	1		custom part, PLA/resin, 3d printed, see github	
Temperature Sensor	1	standard thermistor for use with 3d printer controller board (e.g. 100K NTC)		
M5x110	4	steel screw		
M3x8	4			
M3x20	2			
M3 brass insert	6		e.g. https://cnckitchen.store/products/gewindeeinsatz-threaded-insert-m3-standard-100-stk-pcs	
Pneumatic fitting G1/8"	2	Fitting G1/8" for 4 or 6mm tubing	e.g. Festo QSML-1/8-4-100	for water cooling
Closing plug G1/8"	1	Closing plug G1/8" hex socket	e.g. https://www.landefeld.de/artikel/en/closing-plug-hexagon-socket-g-18-brass/VS%2018%20MS%20OB	

To run the extruder you will also need a water chiller for cooling. Alternatively, just use a water pump and a water reservoir (>3 liters)

We are currently mainly using PolyMIM materials, as these feedstocks can be debindered easily in a water bath.

Motor/Gearbox

The extruder uses a NEMA23 stepper motor with gear box. It needs to have the following specs:
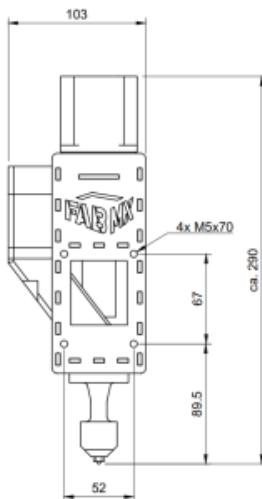
Motor/Gear Size

- The gear box needs to have 4 M5 threaded holes for mounting, lying on a circle d=45mm
- The gearbox shaft should have a diameter of d=12mm. Use a different coupler if the shaft has a different diameter
- The gearbox diameter should be D=56mm or smaller
- The length of the motor and gearbox are noncritical for the design. Typical sizes are L1=60mm and L2=56mm
- The gear ratio should be in the range of 1:15 to 1:47. A gear ratio of 1:28 seems to be a good compromise, but is hard to get

Sources of supply:

- https://de.aliexpress.com/item/1005003850399817.html
- https://www.omc-stepperonline.com/nema-23-stepper-motor-bipolar-l-56mm-w-gear-ratio-15-1-planetary-gearbox-23hs22-2804s-pg15
- https://www.omc-stepperonline.com/nema-23-stepper-motor-bipolar-l-56mm-w-gear-ratio-47-1-planetary-gearbox-23hs22-2804s-pg47

Size/Mounting Holes