Why does my extruder click but nothing comes out?

Asked 3D Content Team
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Abstract. A blockage makes the motor skip steps. Check for a nozzle clog, then first layer height, heat creep, speed (8 to 12 mm³/s on an all-metal hotend) and the gears.

Keywords: pla, petg, slicer-settings

1 Why does my extruder click but nothing comes out?

Something downstream is blocking the filament, so the extruder motor skips steps and clicks. Check six causes in this order: a clogged nozzle, a first layer too close to the bed, heat creep, printing faster than the hotend can melt (8 to 12 mm³/s on a standard all-metal hotend), dirty or badly tensioned gears, and a tangled spool.

1.1 The number

Work down the table and stop at the first check that fails. PLA is polylactic acid, PETG is glycol-modified PET and TPU is thermoplastic polyurethane.

The checks and figures come from Prusa Research's extruder noises, clogged nozzle, under-extrusion, heat creep, max volumetric speed, idler tension and tangled filament articles, and from Bambu Lab's filament-not-extruding, clog, volumetric speed and A1 first layer pages.

1.2 Why is my extruder clicking?

The motor is hitting its force limit. Prusa explains that the stepper "is having to suddenly exert more force than a specific preset threshold" and jumps back one or more steps to relieve the pressure. Each jump is a click. As it repeats, the gears grind a notch into the filament until they cannot grip it at all.

Anything that adds resistance can trigger it: a plug in the nozzle, plastic softened above the melt zone, a nozzle pressed against the bed, or more filament per second than the hotend can melt. Bambu Lab adds that pushing past the melt limit raises hotend pressure "dramatically," which can itself clog the nozzle and wear the gears.

1.3 How fast is too fast for my hotend?

Volumetric speed is layer height times line width times print speed. Bambu Lab's example: a 0.2 mm layer and 0.45 mm line at 200 mm/s is 18 mm³/s. Prusa's typical ceilings by material are 12 to 20 mm³/s for PLA, 8 to 15 mm³/s for PETG, 10 to

Table 1. The number

Cause	How it shows	The check	Makers' figure
1. Clogged nozzle	Nothing comes out even when you load by hand	Heat the nozzle and push PLA through by hand	Bambu Lab: 220 °C; a long, smooth strand that drops straight down means the nozzle and gears are fine. Prusa: 260 °C after PLA, 280 °C after PETG
2. First layer too close	Clicks on the first layer, but the purge line comes out fine	Rerun bed leveling or first layer calibration	No gap figure; Bambu Lab says a nozzle "nearly touching or scraping" the plate extrudes little to no filament
3. Heat creep	Prints fine, then stops mid-print in a warm room or enclosure	Read the room or chamber temperature; feel for a jam above the nozzle	Prusa: room above 35 °C, or 30 °C for some filaments. Bambu Lab: PLA, PETG and TPU in an enclosed X1 or P1S
4. Too fast or too cold	Clicks on infill and fast moves, quiet when slowed	Turn the speed down from the printer screen and listen	Prusa: standard all-metal hotend 8 to 12 mm³/s, Nextruder 15 to 20 mm³/s. Bambu Lab: 25 mm³/s for PLA Basic on the H2S
5. Gears dirty, worn or wrongly tensioned	Bite marks or a flattened strand; plastic dust on the gears	Clean the gears and set the idler screw	Prusa MK3S: idler screw flush to 0.5 to 1 mm proud, unloaded. CORE One and MK4: screw tips level with the front of the idler nut
6. Tangled spool or snagged feed path	Spool stops turning and the strand pulls tight	Unwind a few loops by hand; open the extruder and inspect the PTFE tube	No figure; Prusa lists a knotted spool and a jammed PTFE (polytetrafluoroethylene) tube as causes

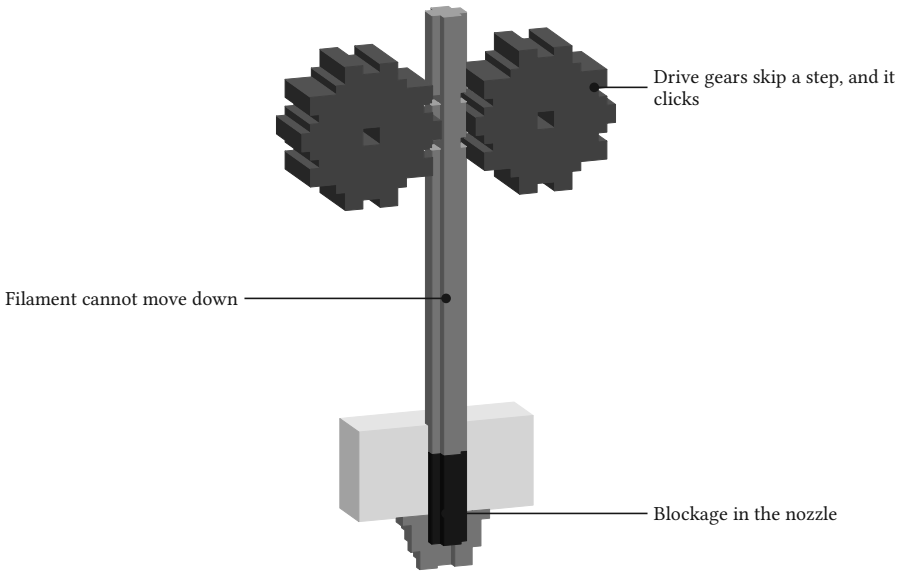


Figure 1. When something downstream blocks the filament, the extruder motor hits its force limit and jumps back a step, and each jump is a click.

16 mm³/s for ABS (acrylonitrile butadiene styrene) and ASA (acrylonitrile styrene acrylate), and 2 to 5 mm³/s for TPU. The lower of the hotend and the material limits wins. Prusa names extruder clicking as a sign the setting is too high.

On a printer with a non-geared extruder, Polymaker says to keep print speed under 100 times the nozzle diameter, so 40 mm/s for a 0.4 mm nozzle. Raising nozzle temperature 5 to 15 °C (Prusa) or 5 to 10 °C (Bambu Lab) buys some headroom, unless the cause is heat creep.

1.4 Why is my 3D printer nozzle not extruding when the extruder is silent?

Then the gears are not pushing hard enough to skip. Bambu Lab's list for X1 and P1 printers includes a nozzle temperature set too low, a filament sensor jammed by dust and a filament cutter stuck in the path. A failed extruder motor is rare. Prusa describes the end of a long clicking spell: the gears grind through the filament until they can no longer grab it. On the A1, a spring or end cap refitted the wrong way round after an extruder rebuild leaves the gear unable to grip.

1.5 How to check it on your own print

- **Split the nozzle from the gears.** If the hand-pushed PLA comes out short and rough, Bambu Lab removes the extruder and pushes PLA straight into the hotend at 220 °C. Smooth flow there means the gears are at fault. If nothing flows, clear the clog with the steps on the unclog a nozzle page.
- **Spin the gear by hand.** With the extruder removed, Bambu Lab says the yellow gear should spin "without feeling any restriction." Clear old plastic from the teeth with a pin or the tip of a pair of pliers, as Prusa does.
- **Check the motor.** On X1 and P1 printers, Bambu Lab tests it by tapping load and trying to stop the spinning gear with a gloved hand. If it stops easily, the motor may be faulty.
- **Check the hotend seat.** Prusa wants a 0.5 mm gap between the nozzle and the heater block. On the A1, Bambu Lab retightens the 4 small M2×6 screws on the back of the heater assembly when the nozzle drops toward the bed.
- **Cool the enclosure.** For heat creep, Bambu Lab opens the front door or top cover and Prusa lowers the bed 5 to 10 °C. The full fix is on the heat creep page.
- **Loosen for TPU.** Prusa sets idler screws looser than standard for flexible filament. Polymaker warns that too much tension flattens the strand, while too little lets it slip.

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