

Product Manual

1. Product Information 产品信息

Product Name : [LDO Galileo 2 Extruder]

Model : [G2E rotation_distance: 47.088 gear_ratio: 9:1]

2. Warnings & Safety 安全与警告

- **Hardware Kit, Self-Printed Parts Required:**

Please note that this kit does not include printed components; you will need to print the required extruder housing yourself.

- **Motor Gear Installation is Critical:**

When assembling the stepper motor, ensure the gears mesh correctly. The manual warns that misaligning the motor by even one tooth can cause issues.

- **Note the "Floating" Motor Design:**

The G2E features a "floating" motor design. If you install a cable strain relief, be sure to leave sufficient slack in the cables to avoid tension issues caused by pulling.

- **Check PTFE Tube Length:**

The length of the PTFE tube connecting the extruder and the hotend must be appropriate. Users have reported that tubes that are too short can lead to feeding problems.

- **Configuration Parameters Must Be Accurate:**

In Klipper, please use the officially recommended configuration values:

rotation_distance: 47.088

gear_ratio: 9:1

The motor running current is recommended to be set to 0.6A.

- **Troubleshooting Extruder "Slipping":**

If you hear clicking sounds or experience extrusion slipping, first check for nozzle clogs or whether the hotend flow rate has reached its limit. These issues are typically more likely than faults within the extruder itself.

3. Installation Steps(安装步骤)

3.1 Gearbox Assembly **Inspect Planetary Gears:**

- Some users have reported issues with planetary gear bearings rotating unevenly or spinning within the gear housing. Before installation, carefully check that all gears rotate smoothly.
- **Planetary Gear Installation:** The G2E utilizes a design with a 9-tooth sun gear and three planetary gears. Since 9 is divisible by 3, this ensures an even load distribution across the gears.
- **Critical Tip:** When installing the stepper motor, ensure the gears mesh correctly. The manual specifically warns that misaligning the motor by even a single tooth can cause significant issues.

3.2 Extruder Body Assembly **Install Drive Gear:**

- The G2E is equipped with a large-diameter (16mm) drive gear, paired with bearings to minimize extrusion artifacts caused by gear meshing.
- **Tension Adjustment:** Adjust the spring pressure using the tension adjustment screw. It is recommended to initially adjust it until the filament is held securely, then fine-tune based on actual printing performance.
- **Note:** Some users have reported that if the screw at the bottom of the tension arm is overtightened, or if the 3D-printed ABS parts deform due to heat, gaps may form between the gears gripping the filament, leading to extrusion problems.

3.3 Installation on Stealthburner

- The G2E is designed specifically for the Stealthburner and can directly replace the Clockwork 2. Ensure all screws are tightened securely but not overtightened.

4. Wiring and Configuration(接线与配置)

4.1 Wiring and Configuration

- Motor Wiring The G2E uses a custom 9-tooth stepper motor; the wiring method is identical to that of standard stepper motors.
- Connecting to Toolboards: If using toolboards such as the BTT SB2209 or LDO Nitehawk, please note:
 - If the motor fails to work on the toolboard but functions correctly when connected to the mainboard, you may need to invert the "enable" pin or add a "!" to invert the direction in the configuration.
 - Use a multimeter to verify that wire pairings are correct.

4.2 Klipper Configuration Below are the standard Klipper configuration

parameters for the G2E:

```
[extruder]
step_pin:                # Set according to your actual wiring
dir_pin:                 # Set according to your actual wiring
enable_pin:              # Set according to your actual wiring
rotation_distance: 47.088 # Standard G2E rotation distance
gear_ratio: 9:1          # G2E gear ratio
microsteps: 16           # Microstep setting
full_steps_per_rotation: 200 # Standard stepper motor
nozzle_diameter: 0.4      # Modify based on your actual nozzle
filament_diameter: 1.750
max_extrude_only_distance: 100.0
max_extrude_cross_section: 50.0

[tmc2209 extruder]       # If using a TMC2209 driver
run_current: 0.6         # Recommended running current for G2E
```

Configuration Notes:

- **rotation_distance: 47.088** – This is the standard rotation distance value for the G2E; do not attempt to adjust it via measurement or estimation.
- **gear_ratio: 9:1** – Reflects the 9:1 planetary gearbox ratio of the G2E.
- **microsteps: 16** – A common microstep setting; adjust if necessary based on your specific needs.
- **run_current: 0.6** – The recommended running current for the G2E motor.

5. Troubleshooting and Debugging(调试与故障排除)

Troubleshooting and Debugging

5.1 Incorrect Extrusion Direction If the extruder rotates in reverse (pulling filament out instead of pushing it in), add an exclamation mark "!" before the `dir_pin` parameter. For example:

```
dir_pin: !PBx
```

5.2 Extrusion Slipping or Unusual Noises If you hear clicking sounds or experience extrusion slipping:

- **Check for Nozzle Clogs:** This is the most common cause. Cleaning the nozzle or replacing it with a new one usually resolves the issue.
- **Check Tension Adjustment:** If the tension is too loose, it will cause slipping; if it is too tight, it can lead to gear wear or cause the motor to struggle.
- **Check Hotend Flow Rate:** Ensure your print speed does not exceed the maximum flow capacity of your hotend (limits vary by hotend model).

5.3 Motor Skipping Steps or Not Working

- Ensure the motor is connected correctly and that wire pairings are accurate.
- Verify the driver voltage and current settings.
- If using a toolboard, confirm that the toolboard is receiving power properly.

5.4 Cable Management When combining the LDO Nitehawk toolboard with the G2E, note that the standard Clockwork 2 cable strain relief is **not compatible**. You will need to print a dedicated G2E cable strain relief. For example, searching for "Galileo 2 + LDO Nitehawk" on Printables will yield relevant models.