

## **Treadmill Assembly Guideline**

This document is a detailed guide for the assembly of the mechanical parts of the treadmill system.

The approximate build time for this setup is 2 hours.

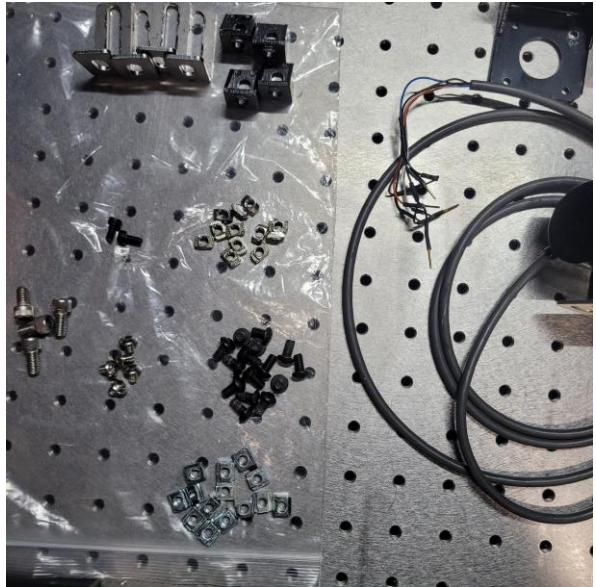
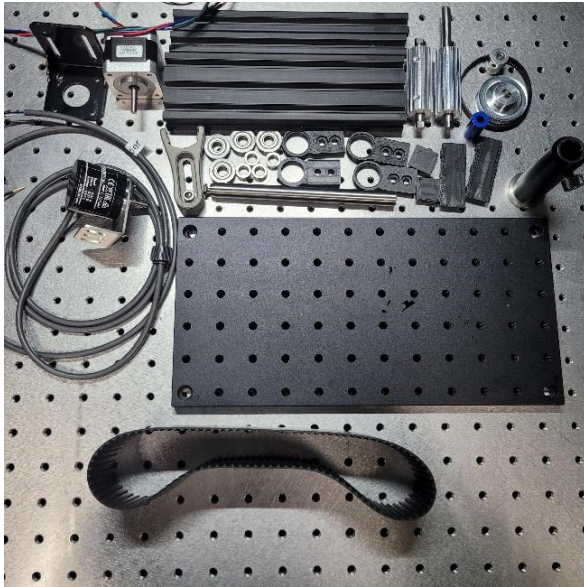
Please refer to the part list for mechanical components for assembly, and you'll also need the following tools:

- 2.5 mm Allen wrench (for M5 hex socket cap screws)
- 1/4-inch Allen wrench (for 1/4"-20 socket bolts)
- 0.05-inch and 1/16-inch Allen wrench (for securing set screws on shafts or pulleys)

Be sure to use the correct wrench size for each bolt and fastener to prevent damage.

# Instructions

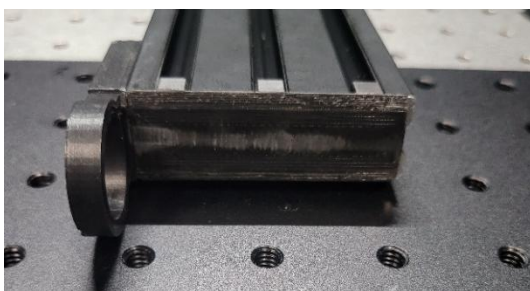
1. Shown here is a photo of all prepared parts. Some parts in the picture may already be pre-assembled, including the Thorlabs components, the encoder frame, and the pulley-rod assemblies.



2. Attach the sidebars (20) to aluminum profile (1) using T-nuts (7) and M5 screws (8). Position the sidebar (20) so that the rear stopper hooks onto the end of the profile.

3. Attach the sidebar (20) to the opposite corner of the same side of the profile (1).

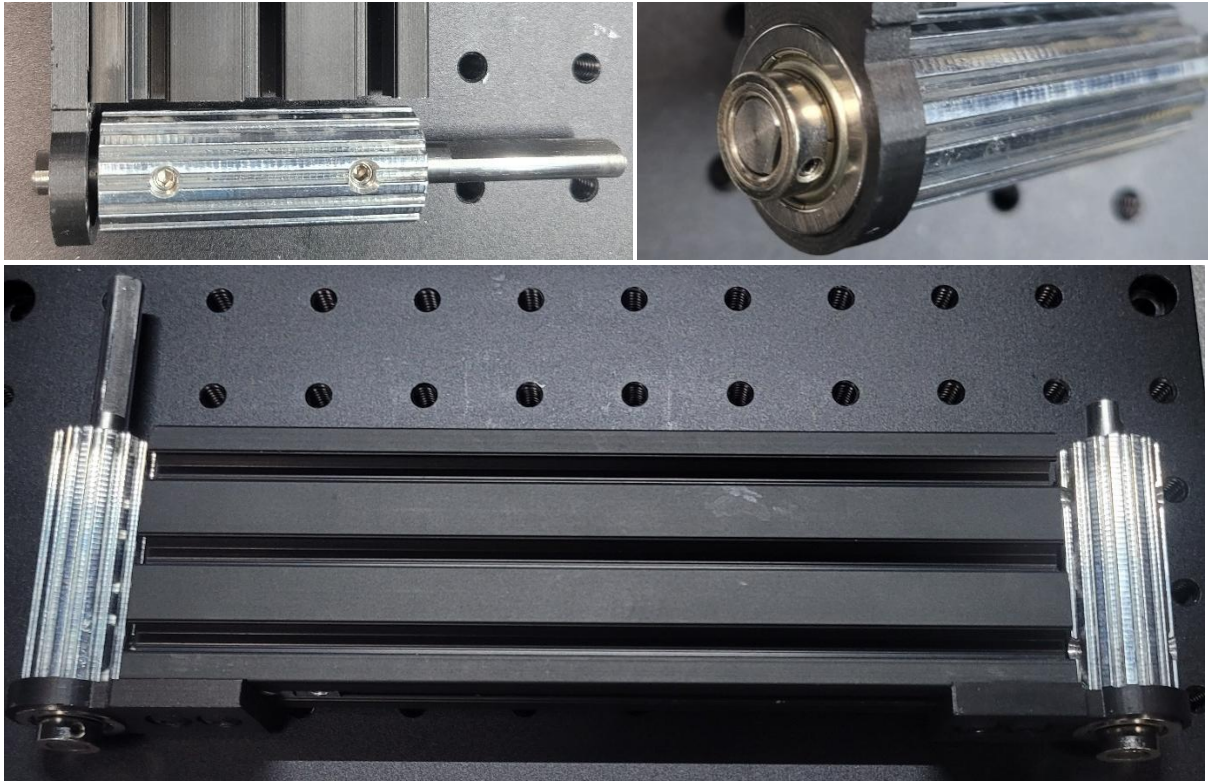
**Note:** Before securing the sidebar, insert two additional T-nuts (7) into the side in advance. In total, six T-nuts should be inserted per side, leaving two T-nuts unused in the middle.



4. Insert the 2060 profile covers (22).

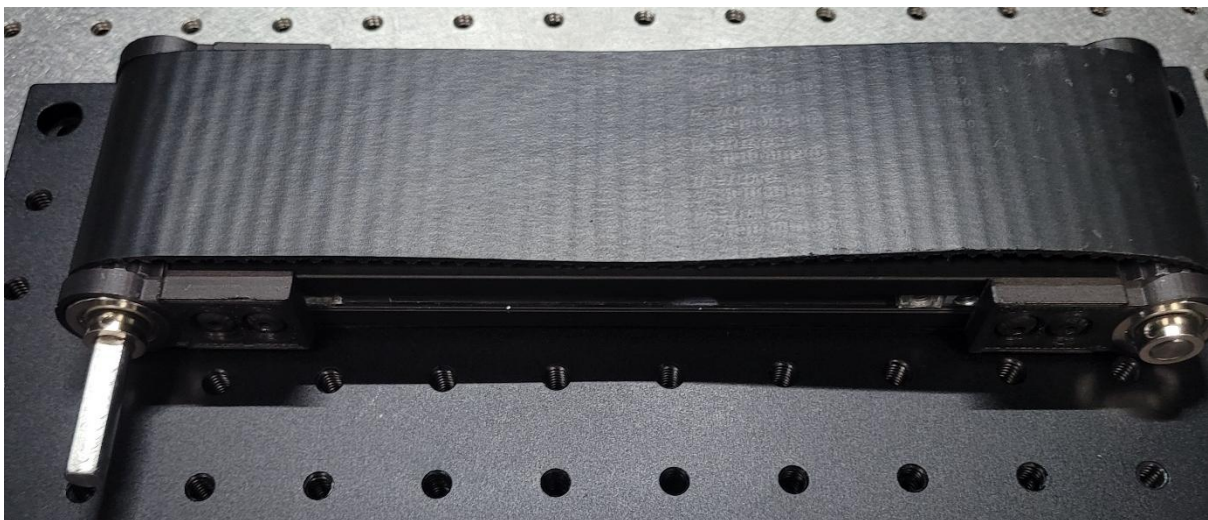
5. Insert the assembled pulley (16) and shafts (17, 18) into ball bearings (3). Secure each shaft with a shaft collar (4).

**Note:** Shafts do not protrude beyond the shaft collars.



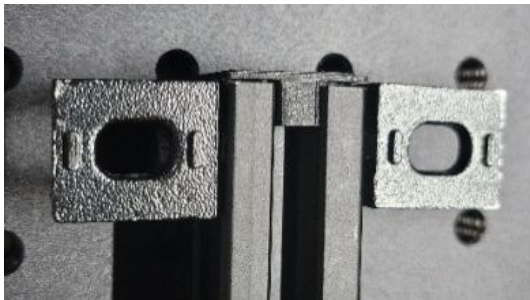
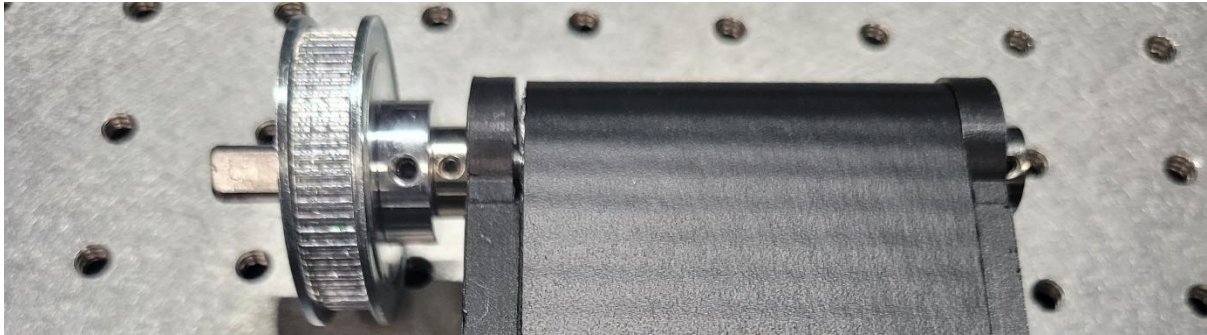
6. Fit the timing belt (19) onto the teeth of the pulley (16). Attach the sidebars to the opposite side of the profile in the same way as in Steps 2–5.

**Note:** Position the sidebar precisely using the rear stopper as a reference. This ensures proper belt parallelism.

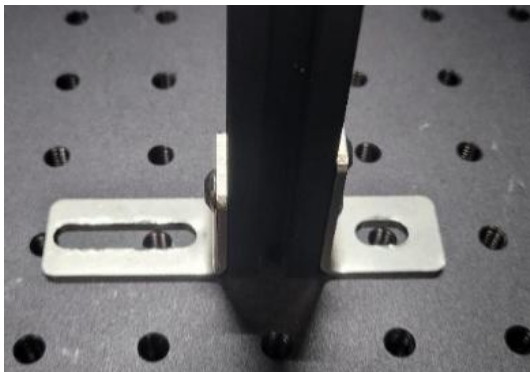




7. Attach the GT2 60T pulley (11) to the rod (18) as shown in the reference photo.

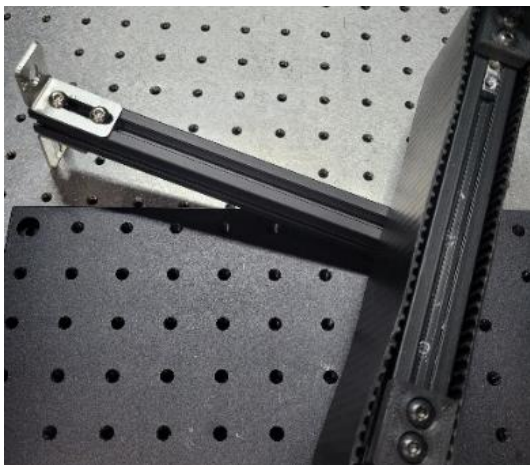


8. Insert 2020 profile covers (21) on top of 2020 aluminum profile (2). Attach corner bracket (6) as shown in the reference photo.



9. Attach the 2020 Corner Bracket (9) to the bottom end of the 2020 aluminum profile as shown in the reference photo.

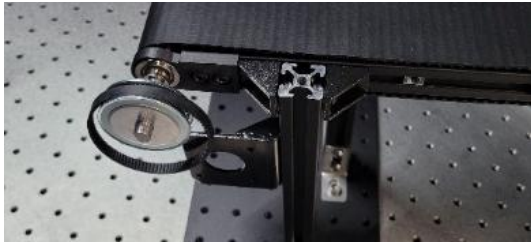
**Note:** The wider surface of the bracket must face outward to ensure overall structural stability.



10. Connect the assembly from Step 7 with the structure from Step 9.

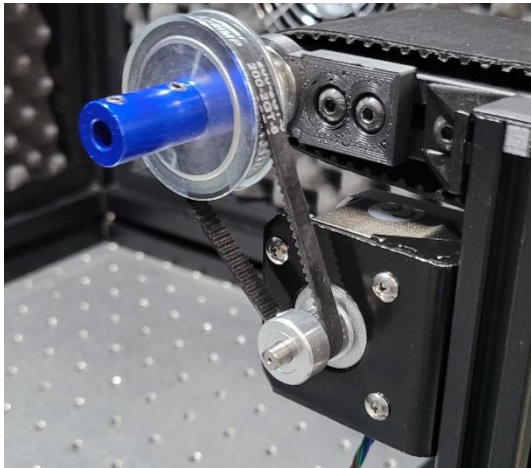
**Note:** The position can be flexibly adjusted. However, on the side where the pulley is located, make sure to leave space for the motor connection and consider the length of the timing belt (11) when deciding the mounting position.

**Note:** Ensure both sides are mounted at the same height to maintain horizontal balance.



**11.** Attach the motor mount bracket (14) to an appropriate height as shown in the reference photo. At this point, hook the timing belt onto the GT2 60T pulley.

**Note:** The mounting height should be adjusted depending on the position of the profile.



**12.** Attach the GT2 20T pulley (11) to the stepper motor (12), then assemble the motor to the motor bracket in Step 11. Hook the timing belt onto the 20T pulley as well.

**Note:** You can rotate the 60T pulley by hand to check for proper belt alignment and tension. If the belt is too tight, it may slip; if too loose, the pulley may spin without moving the belt. Adjust to an optimal tension.

**13.** Attach the shaft coupler (5) to the shaft, on the outer side of the 60T pulley (11).

**14.** Mount the encoder (13) onto the optical post (23). Then connect this post to the post holder (24), base adapter (25), and clamping fork (26) to form a complete support assembly.

**15.** Adjust the height of the encoder assembly from Step 14 and align it to connect with the remaining components installed in Step 13. Ensure the shaft coupler and encoder shaft are correctly inserted and securely tightened.

**16.** Check the overall horizontal alignment.

