DIY Solar Powered Walking Robot

Clear Illustrated A4 Assembly Manual

Product Overview

This manual guides you through assembling the DIY Solar Powered Walking Robot. Follow the steps carefully and ensure all gears and shafts are correctly aligned for smooth movement.

Parts List (Bill of Materials)

Ensure all parts are available before starting assembly.

Mechanical Parts

- Plate A (2x)
- Plate C (1x)
- Plate G (1x)
- Copper columns (spacers)
- Double-layer gears
- Single gears
- Pinion gear
- Main gear
- Axles
- Shaft sleeves
- Pulley wheels
- Shaft frame
- Optical axis rods
- Foot linkage arms

Electrical Parts

- Solar panel
- Motor
- Motor wires

Fasteners

- Long screws
- Short screws
- Thick screws

Required Tools

- Small Phillips screwdriver
- Flat surface workspace
- Tweezers (optional but recommended)

Assembly Instructions

Step 1 — Install Double-Layer Gear Shaft into Plate A

Instructions: 1. Insert the double-layer gear shaft into Plate A. 2. Align the linear holes correctly. 3. Ensure gears mesh smoothly with no binding.

Important: Maintain smooth rotation after installation.

Illustration:
[Insert Illustration — Step 1: Gear shaft placement into Plate A]

Step 2 — Set Gear and Shaft Sleeve Spacing

Instructions: 1. Install the main gear and pinion gear onto the axle. 2. Add the shaft sleeve onto the axle. 3. Adjust spacing between gear and sleeve.

Required Gap: 0.5–1 mm between gear and sleeve.

Secure: Use thick screws to fix copper columns onto Plate A.

Illustration:
[Insert Illustration — Step 2: Gear spacing measurement]

Step 3 — Install Gear Assemblies

Instructions: 1. Install double-layer gear onto shaft. 2. Install single gear onto the corresponding shaft. 3. Confirm proper gear meshing.

Illustration:
[Insert Illustration — Step 3: Double and single gear placement]

Step 4 — Install Upper and Lower Gear Shaft Pulleys

Instructions: 1. Insert pulley into upper hole. 2. Insert pulley into lower hole. 3. Ensure tight fit.

Installation Depth: Approximately **3 mm** into hole.

Illustration:
[Insert Illustration — Step 4: Pulley insertion depth]

Step 5 — Install Optical Axis Rods

Instructions: 1. Insert rods into pulley holes. 2. Press firmly until secure. 3. Verify alignment.

Illustration:
[Insert Illustration — Step 5: Optical axis installation]

Step 6 — Assemble Foot Linkage (Side One)

Instructions: 1. Connect linkage arms to the pulley. 2. Align linkage joints. 3. Verify smooth pivoting motion.

Illustration:
[Insert Illustration — Step 6: Linkage assembly — side one]

Step 7 — Assemble Foot Linkage (Side Two)

Instructions: 1. Repeat installation on opposite side. 2. Ensure both sides mirror each other.

Critical Alignment: Linkages must be **staggered by 180°**.

Illustration:
[Insert Illustration — Step 7: Linkage mirrored alignment]

Step 8 — Install Axle Sleeves

Instructions: 1. Slide axle sleeves onto shafts. 2. Ensure free rotation.

Illustration:
[Insert Illustration — Step 8: Axle sleeve placement]

Step 9 — Install Shaft Frame onto Plate C

Instructions: 1. Position shaft frame on Plate C. 2. Use long screws to secure. 3. Tighten evenly.

Illustration:
[Insert Illustration — Step 9: Frame attachment]

Step 10 — Insert Components into Center Hole

Instructions: 1. Align center components. 2. Insert into middle hole of plate.

Illustration:
[Insert Illustration — Step 10: Center alignment]

Step 11 — Attach Second Plate A

Instructions: 1. Place second Plate A onto copper columns. 2. Secure with thick screws.

Illustration:
[Insert Illustration — Step 11: Second plate installation]

Step 12 — Attach Plate G

Instructions: 1. Position Plate G. 2. Secure using short screws.

Illustration:
[Insert Illustration — Step 12: Plate G mounting]

Step 13 — Connect Solar Panel and Motor

Instructions: 1. Connect motor wires to solar panel terminals. 2. Confirm secure connection.

Illustration:
[Insert Illustration — Step 13: Electrical wiring]

Operating Instructions

1. Place robot outdoors.

2. Ensure direct sunlight reaches solar panel.
3. Robot should begin walking automatically.

Note: Indoor lighting is insufficient for operation.

Troubleshooting Guide

Robot Does Not Move

Check:

- Shaft sleeve is not too tight
- Gears are correctly meshed
- Linkages move freely
- Solar panel receives direct sunlight

Safety Notes

- Remove protective film from acrylic parts before assembly.
- Do not overtighten screws.
- Keep small parts away from children.

Illustration Development Notes (For Future Vector Drawings)

Each illustration should be:

- Black line vector style
- Minimal shading
- Clear part labeling
- Isometric view where possible
- Suitable for grayscale printing

End of Manual