Robot Assembly Guide

Step-by-step instructions for building your precision robotics system

Parts Identification

1 Differential Gear Assembly

Complex planetary gear system with internal differential mechanism. Features precision-machined gears for smooth power distribution between output shafts.

Function:	Power Distribution
Material:	Aluminum Alloy
Key Feature:	Planetary Gear System

2 Main Drive Shaft

Precision-turned shaft with integrated mounting flanges and hexagonal drive interface. Designed for high torque transmission.

Function:	Power Transmission
Interface:	Hexagonal Drive
Bearings:	Integrated Flanges

3 Motor Mount Assembly

L-shaped mounting bracket with integrated motor housing. Features precision alignment holes and reinforced construction.

Function:	Motor Support
Design:	L-Bracket Configuration
Features:	Precision Holes

4 Base Plate (Plexi)

Multi-hole mounting plate providing flexible component positioning. Strategic hole pattern allows for various configurations.

Function:	Main Chassis
Material:	Acrylic (Plexi)

5 Shaft Bearing Block

Precision bearing housing with mounting tabs. Provides stable rotational support for drive shafts.

Function:	Shaft Support
Design:	Bearing Housing
Mounting:	Bolt-Down Tabs

6 Structural Rail

Aluminum extrusion rail for structural support and component mounting. Provides rigid framework connection.

Function:	Structural Support
Profile:	T-Slot Extrusion
End Cap:	Threaded Insert

Pattern:	Multi-Hole Grid

7 Motor Housing

Cylindrical motor enclosure with integrated mounting flange. Provides protection and precise motor positioning.

Function:	Motor Protection
Material:	Anodized Aluminum
Mounting:	4-Bolt Flange

Tools Required

- Allen Key Set
- Adjustable Wrench
- Square/Level
- Precision Ruler

Assembly Instructions

1 Prepare the Base Plate

Start by positioning the **Base Plate (Plexi)** on a clean, flat work surface. This perforated plate will serve as the main chassis for your robot assembly. The strategic hole pattern allows for precise component positioning.

Pro Tip: Orient the base plate so the larger hole clusters are positioned where you'll mount the heavier components (motor and differential

assembly).

2 Install Motor Housing

Mount the **Motor Housing** to the base plate using the 4-bolt flange pattern. Ensure the motor shaft opening is properly aligned with your drive system layout. The red anodized finish indicates the motor mounting side.

⚠ **Critical:** Verify motor housing orientation before final tightening. The motor output shaft must align with the differential input.

3 Position Differential Assembly

Install the **Differential Gear Assembly** in the designated position on the base plate. This complex planetary gear system requires precise alignment with both the motor output and the main drive shaft.

💡 **Assembly Tip:** The differential housing contains delicate internal gears. Handle with care and avoid applying excessive force during positioning.

4 Install Drive Shaft System

Insert the **Main Drive Shaft** through the differential assembly. The hexagonal interface end connects to the motor coupling, while the opposite end extends to the output mechanism. Ensure smooth rotation without binding.

5 Add Bearing Support

Mount the **Shaft Bearing Block** to provide additional support for the drive shaft. This precision bearing housing eliminates shaft deflection and ensures smooth operation under load.

6 Install Motor Mount

Attach the **Motor Mount Assembly** to the system. This L-shaped bracket provides rigid motor support and precise alignment with the drive train. The integrated housing ensures proper motor positioning.

7 Add Structural Rail

Install the **Structural Rail** to provide additional framework rigidity. This aluminum extrusion connects key mounting points and prevents flex during operation. The threaded end cap allows for fine positioning adjustments.

8 Final System Integration

Complete the assembly by verifying all connections, checking shaft alignment, and ensuring smooth operation of the differential mechanism. Test rotate all moving parts by hand to confirm proper assembly.

✅ **Quality Check:** All shafts should rotate smoothly without binding. The differential should operate freely, and motor housing should be rigidly mounted.

Assembly Complete!

Your precision robotics drive system is now ready for integration with your robot platform. The combined Ackermann steering and differential gear system will provide superior control and maneuverability.