

Quick Start Guide

This guide walks you through the essential steps to safely install, power on, and control your robotic arm using the built-in Web App. It is written for first-time users and focuses on clarity and quick setup.

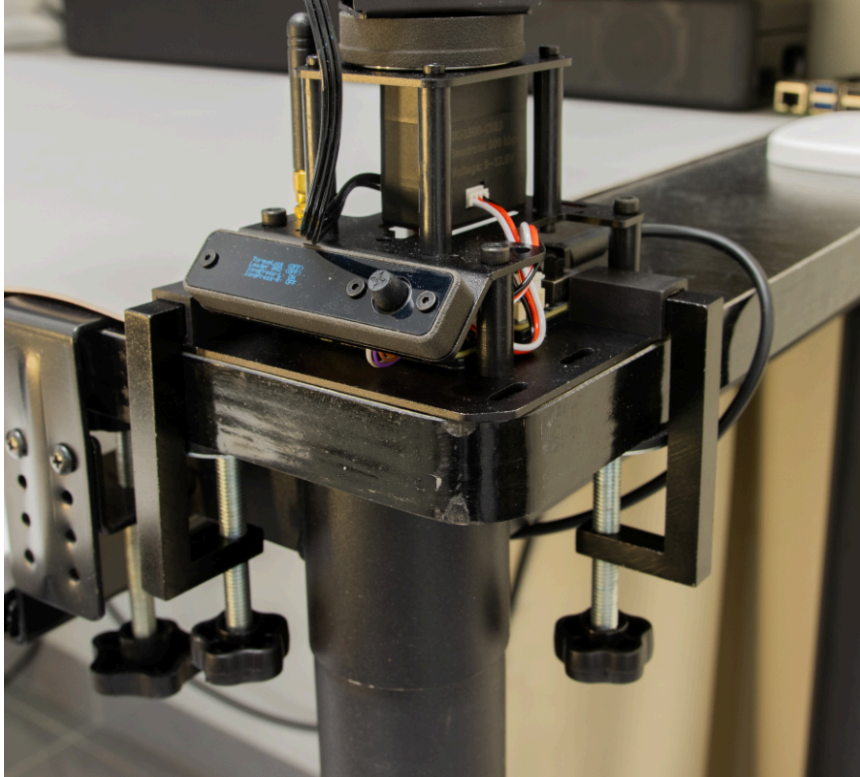
1. Mounting the Robotic Arm

The robotic arm shifts its center of gravity during motion. If it is placed loosely on a table, it may tip over during operation. For safety, **always secure the arm before powering it on**, and **keep children and fragile objects away from the working area**.

1.1 Mounting on a Desktop

Your standard kit includes two G-clamps for table installation.

- The clamps support table thicknesses from **7–50 mm**.
- Ensure the table edge has enough lip for the clamp to grip.
- For best stability, place the two clamps as far apart as possible.



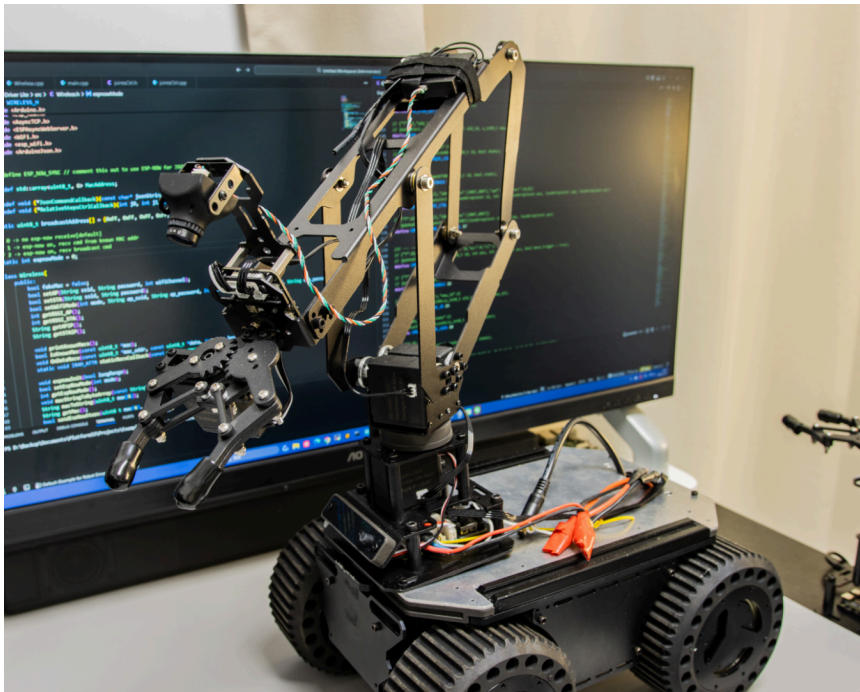
1.2 Mounting on a Mobile Platform

The arm provides several structural mounting points so you can integrate it into mobile robots or custom projects.

For integration examples and mounting dimensions, refer to the document **“Integrating Into Your Own Project.”**



(Sample customer integrations)



1.3 Safety Notes

- Keep the arm's working range clear of people—especially children—and fragile items.
 - Monitor the robot while operating; avoid long-term joint stalls or collisions.
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2. Powering the Arm

2.1 Before Power-On

Check Cable Routing

When powered on, the arm automatically moves to its calibrated home position. Ensure cables are not tangled or stretched to avoid damage.

Check the Surroundings

If the arm has previously been configured with:

- an automation script,
- ESP-NOW synchronized control,
- devices on the same LAN sending HTTP/WebSocket commands,

...the arm may begin moving automatically at startup.

Verify the workspace is clear before powering on.

Check the Power Supply

The standard kit includes a **12 V / 3 A DC5521 power adapter**.

If using your own supply, ensure:

- Voltage: **9–12.6 V**
- Current: **≥ 3 A**
- 3-cell Li-ion/LiPo battery packs are supported.

2.2 Power-On Procedure

- Connect the power adapter and switch the driver board to **ON**.

The servos and controller will only receive power when this switch is enabled.

- If using **USB only**, the board will still boot regardless of switch position, but USB power is insufficient for operating the arm.

USB mode is for **development and debugging only**.

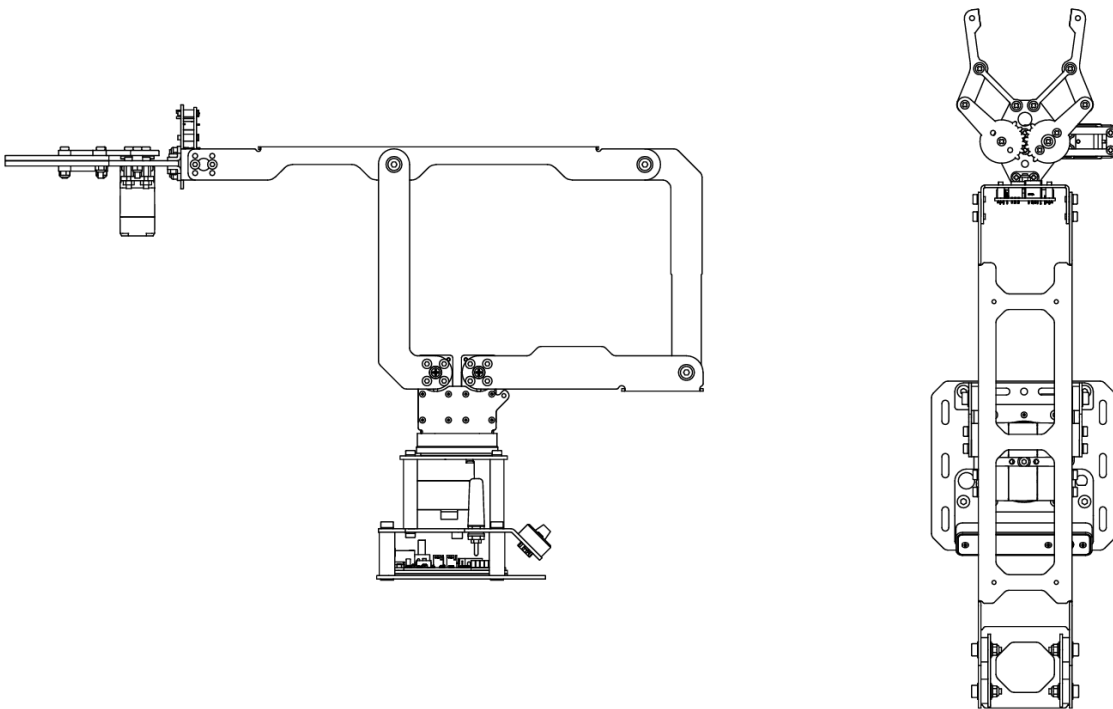
Startup Indicators

- **Buzzer beep** → firmware running
- **OLED lights up** → system booted
- **RGB indicator flashes once** → bus communication OK
- The arm then slowly moves to its saved calibration pose.

If the startup pose is incorrect and the RGB LED remains **solid yellow**, the calibration data may be missing (e.g., flashed firmware clearing memory).

Refer to **“FAQ & Troubleshooting – Mid-Point Calibration”** to recalibrate.

Standard home pose:



3. Web App Control

The robotic arm includes a built-in Web App.

No installation is required—simply connect via a phone or PC browser.

Connecting

1. Connect to the Device Hotspot (AP Mode)

After powering on, the controller broadcasts a Wi-Fi hotspot:

- **SSID:** Robot
- **Password:** 12345678

You may see “No Internet Access”—this is normal.

2. Open the Control Page

1. Open a browser (Chrome / Edge / Safari / Firefox recommended)
2. Enter:

192.168.4.1

You will see the Web App homepage.

The screenshot displays the Lygion Web App interface on a dark background. It is divided into four main sections:

- DEVICE INFORMATION:** Shows 'Uptime: 71', 'Current Baud Rate: 500000', and 'MAC: FC:01:2C:DA:5F:FC'.
- ARM FPV CTRL:** Features a grid of buttons for 'Reach' (R+, R-), 'Base' (B+, B-), 'Z-Axis' (Z+, Z-), and 'Gripper' (Open, Grab), along with a large 'INIT' button.
- ARM CART CTRL:** Similar to the FPV section, with buttons for 'X-Axis' (X+, X-), 'Y-Axis' (Y+, Y-), 'Z-Axis' (Z+, Z-), 'Gripper' (Open, Grab), and an 'INIT' button.
- WIFI SETTINGS:** Includes input fields for 'AP_SSID' (pre-filled with 'Robot') and 'AP_PWD' (pre-filled with '12345678'). Below this, it shows 'STA STATUS:' and 'Lygion IP:192.168.0.103'. At the bottom are empty input fields for 'STA_SSID' and 'STA_PWD', and a 'SET WIFI' button.

3. Connecting to Your Home/Office Wi-Fi (STA Mode)

- Open **Wi-Fi Settings** in the Web App
- Enter router SSID and password
- After successful connection, the router assigns an IP
- This IP will appear on the OLED at next boot
- Devices on the same LAN can now directly access the Web App via that IP

3.1 Web App Components

3.1.1 Device Info



This section displays real-time system status:

- **Uptime** — increases every second while communication is healthy
- **Current Baud Rate** — serial bus speed used by arm servos (500K for LinkArm_LT)
- **MAC Address** — required for ESP-NOW communication; globally unique identifier

3.1.2 Wi-Fi Configuration



The ESP32-S3 supports AP and STA simultaneously.

- **AP_SSID / AP_PWD**: hotspot name and password for direct connection

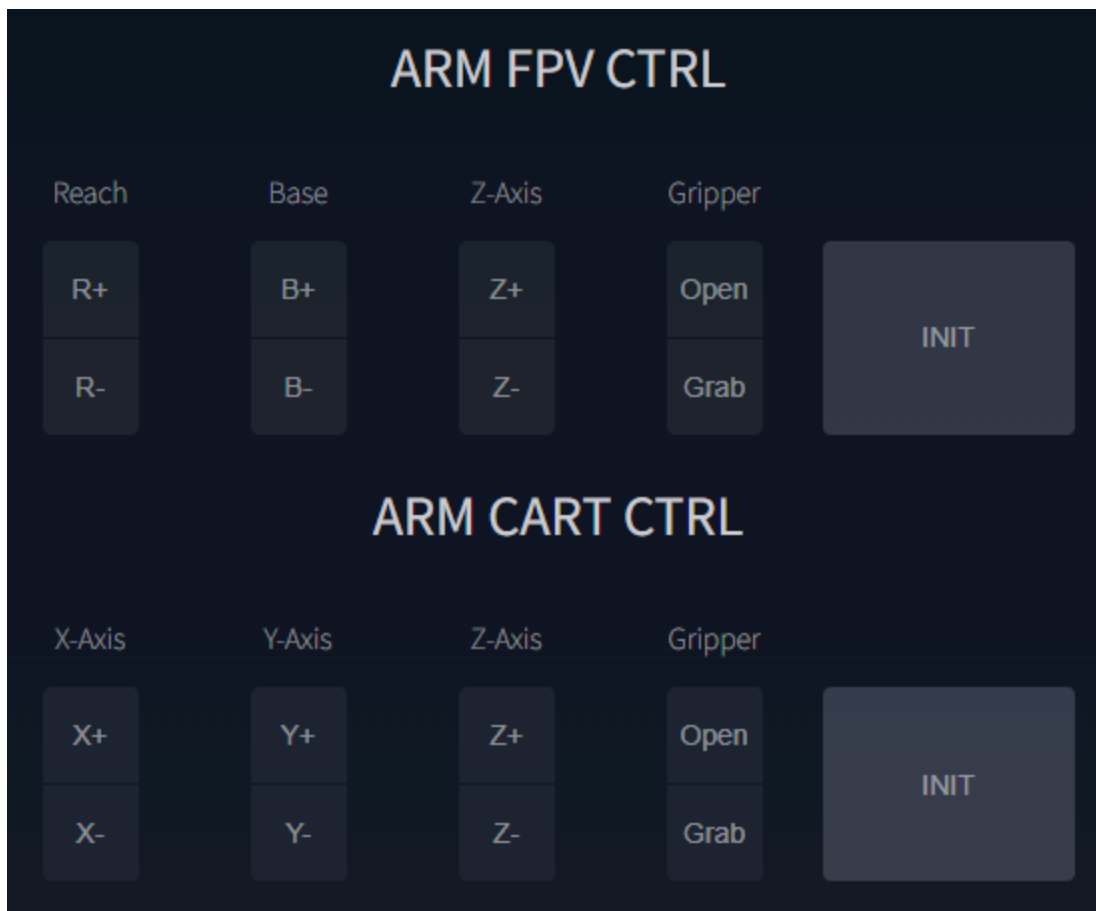
- The Web UI always shows the default values (Robot / 12345678) even if you change them—this is intentional for security.
- Actual AP credentials appear on the **OLED at startup only**.
- **STA_STATUS**: displays router connection status and assigned IP
- **STA_SSID / STA_PWD**: enter your router credentials, then click **SET WIFI**

Once connected to your router:

- Use the assigned IP to access the Web App
- Your phone/PC remains online normally
- This is the recommended mode for long-term use

3.1.3 Robotic Arm Control

The control panel provides two operation modes:



A. FPV (Polar-Style) Control

Designed for "first-person view" when using a camera mounted above the arm.

Buttons send continuous motion commands while held down and stop when released.

- **Reach (R+/R-)**

Extend/retract the end-effector horizontally (with inverse kinematics)

- **Base Rotation (B+/B-)**

Rotate the base left/right

- **Z-Axis (Z+/Z-)**

Move the end-effector up/down (with IK)

- **Gripper (Open / Grab)**

Open or close the gripper

B. Cartesian XYZ Control

Uses a right-handed coordinate system:

- **+X:** forward
- **+Y:** left
- **+Z:** upward

Each axis provides IK-based movement:

- **X+, X-:** move forward/backward
 - **Y+, Y-:** move left/right
 - **Z+, Z-:** move up/down
 - **Gripper:** open/close
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INIT Button

Returns the arm to its default home position.

Tip:

Avoid rapidly switching between FPV controls and Cartesian controls.

For smoother operation, stay within one control mode during continuous motion.