ESP32 Configuration Guide

Open your `esp32_firmware.ino` file in Arduino IDE. You need to change the values inside the quotes `""` or the numbers for the following 3 sections.

1. Wi-Fi Settings (Lines 22-23)

Tell the ESP32 which network to connect to.

```
#define WIFI_SSID "My_Home_WiFi"      // Keep the quotes! Case sensitive.
#define WIFI_PASSWORD "supersecret123" // Keep the quotes!
```

- **Tip:** The ESP32 usually only supports **2.4GHz** Wi-Fi. If your router has a separate 5GHz network, do not use that one.

2. Firebase Credentials (Lines 26-27)

Tell the ESP32 which database to write to. You get these from the **Firebase Console** -> **Project Settings**.

```
#define API_KEY "AIzaSyD..."           // Your Web API Key
#define FIREBASE_PROJECT_ID "aqua-track-xyz" // Your Project ID
```

- **Troubleshooting:** Make sure you don't accidentally copy a space at the end of the API Key.

3. Tank Calibration (Lines 30-31)

This is the most important part. You need a **Measuring Tape**.

Variable A: `TANK_HEIGHT_CM`

"How deep is the tank?" Measure from the **tip of the sensor** (where it is mounted on the lid) all the way down to the **bottom of the tank**.

- *Example:* If your tank is 2 meters deep, write `200.0`.

Variable B: `SENSOR_GAP_CM`

"Where is the 100% Full line?" The sensor cannot read anything closer than 20cm (it's blind close up). So, we must set the "100% Full" mark at least 20-25cm away from the sensor.

- *Standard Value:* `25.0` (Recommended for safety).

Code Example:

```
// If your tank is 150cm deep, and you want it to stop filling 25cm from the top:
#define TANK_HEIGHT_CM 150.0
#define SENSOR_GAP_CM 25.0
```

How to Verify Calibration

Once uploaded, open the **Serial Monitor** (Tools > Serial Monitor) and watch the output while moving your hand in front of the sensor.

Scenario	Serial Output Should Be
Hand 25cm away	`Level: 100%` (Tank Full)
Hand at bottom	`Level: 0%` (Tank Empty)
Hand in middle	`Level: ~50%`

If you see negative numbers: Your `TANK_HEIGHT_CM` is set smaller than the actual distance the sensor is reading. Increase the number