



Climate in Africa Weather Station Operation Manual



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1. Introduction

The **Climate in Africa Meteorological Station** is a state-of-the-art meteorological data monitoring and gathering system, developed and launched by **Space in Africa** to enhance weather and climate observation across the continent. This station has been designed to provide accurate, real-time environmental data to support scientific research, weather forecasting, disaster management, and climate change monitoring.

The system is meticulously engineered in compliance with the **World Meteorological Organization (WMO) technical regulations, standards, and best practices** to ensure high precision, reliability, and consistency in data collection. It integrates cutting-edge sensors and instruments to measure and capture a wide range of meteorological and atmospheric parameters, including:

- **Air Temperature** – Measuring ambient temperature for weather analysis and forecasting.
- **Air Relative Humidity** – Monitoring moisture levels in the air, crucial for understanding weather patterns.
- **Atmospheric Pressure** – Providing insights into changing weather conditions.
- **Precipitation** – Measuring rainfall and other forms of precipitation for hydrological studies.
- **Solar Irradiance** – Tracking sunlight exposure, which is essential for solar energy assessments.
- **Air Quality Parameters:**
 - ★ **Carbon Monoxide (CO)** – Monitoring harmful gases from combustion sources.
 - ★ **Nitrogen Dioxide (NO₂)** – Measuring pollutants that contribute to air quality degradation.
 - ★ **Carbon Dioxide (CO₂)** – Assessing greenhouse gas levels affecting climate change.
 - ★ **Particulate Matter (PM_{2.5} & PM₁₀)** – Tracking fine airborne particles that impact human health.
- **Wind Speed & Direction** – Analyzing airflow patterns to support meteorological and energy applications.

➤ **Soil Conditions:**

Soil Moisture – Monitoring water content in the soil for agricultural and environmental studies.

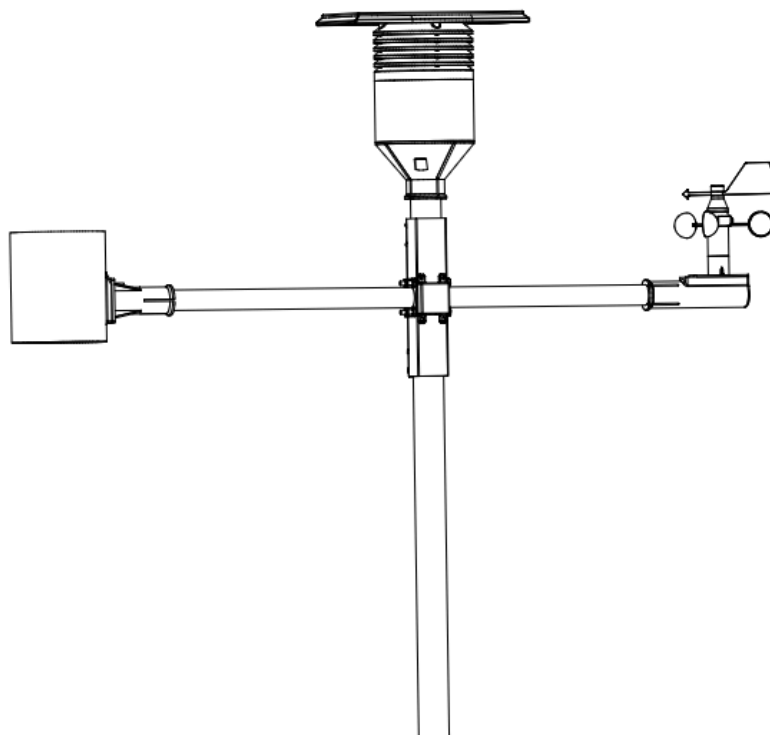
★ **Soil Temperature** – Measuring subsurface temperatures to support crop and ecosystem monitoring.

This manual serves as a **comprehensive guide** to assist users with the **installation, operation, maintenance, and troubleshooting** of the meteorological station. It is structured into clearly defined sections, ensuring that each step of the setup process is easy to follow, even for first-time users.

For **optimal performance and accuracy**, we strongly recommend reading the entire manual before beginning the installation process. This will ensure that all procedures are correctly followed, reducing the likelihood of errors and enhancing the efficiency of the setup.

By following this guide, users can maximize the functionality of the meteorological station, ensuring seamless data collection and integration into climate monitoring and weather forecasting efforts

2. Features



- 1) Control & Sensor Enclosure
- 2) Windvane
- 3) Wind Cups
- 4) Cup Anemometer
- 5) Rain Gauge
- 6) Mounting Rod
- 7) Solar Panel
- 8)

3. Contents

Quantity	Item
1	Control & Sensor Enclosure
1	Cup Anemometer
1	Wind Vane
1	Rain Gauge
1	Soil Sensor (Optional)
2	Wing Mounting Rod
2	Mounting Brackets
1	Operation Manual

4. Start Guide

The Start Guide provides the prerequisite for the installation. Unpack the meteorological station from the package, inspect the components for correlation with the list of content above. Then place the components on a flat surface, widespread for easy reach while installing.

Basic tools required for the assembly are:

1. A smartphone with Compass installed,
2. Internet access,
3. Screw drivers,
4. A step stool for optimized view.

5. Installation and Setup Guide

5.1 Selecting the station location

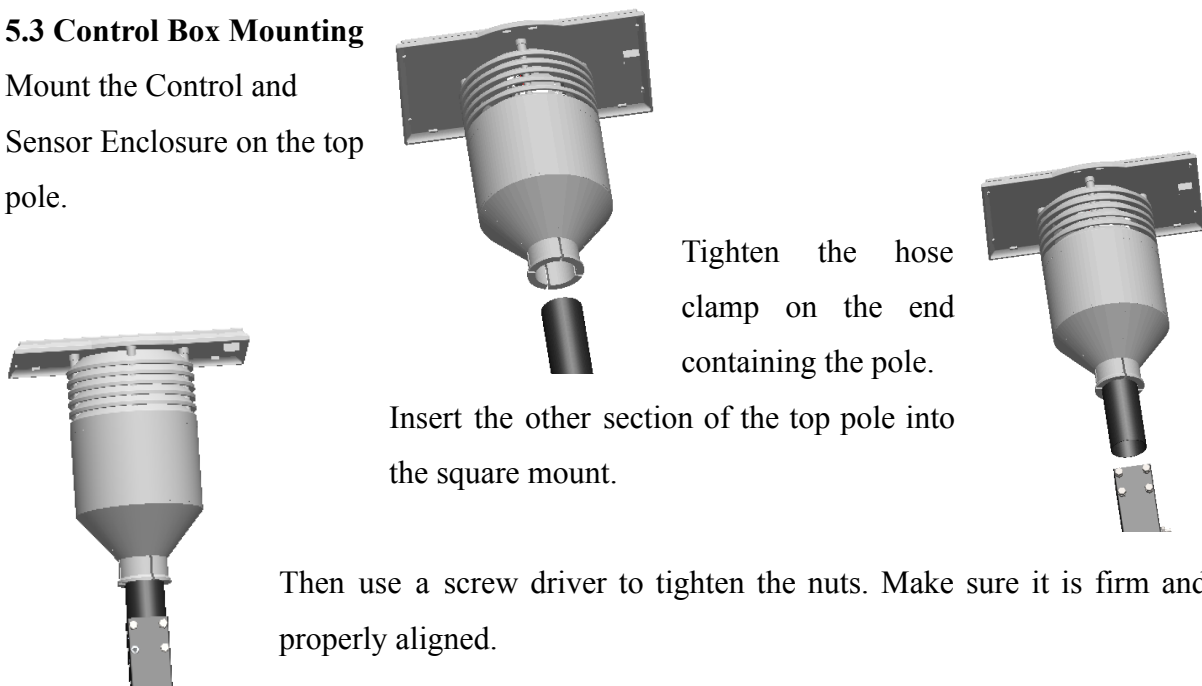
Installing the meteorological station generally requires a minimum distance of 15m on all sides away from any high building, structure, roof, or ground. The station should be positioned 1.5 meters above the ground level on a strong platform. To prevent wind obstacles and the transfer of radiant heat from nearby structures and buildings on the station.

5.2 Mounting the Meteorological Station Pole

- i. **Ground Base:** The mounting structure requires a solid ground foundation, preferably concrete. Dig the ground with a depth of 2 to 3 feet, prepare the concrete and place the base of the station pole in the hole and fill with the concrete.
- ii. **Pole Attachment:** if mounting to an existing structure, ensure the stability of the structure is optimal and the height is as specified. Then use the brackets or clamps to secure the pole to the structure. Make use of a level to avoid tilting.

5.3 Control Box Mounting

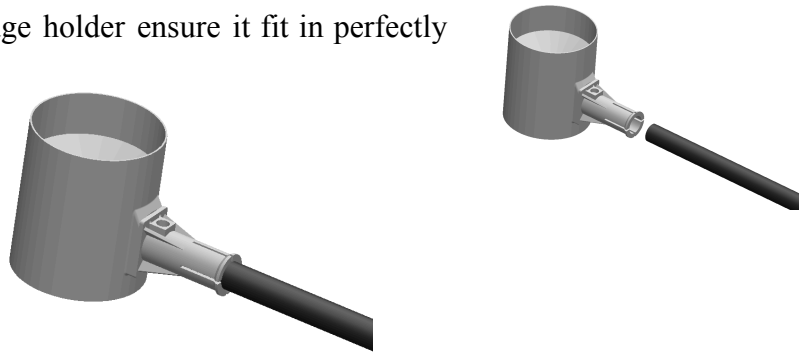
Mount the Control and Sensor Enclosure on the top pole.



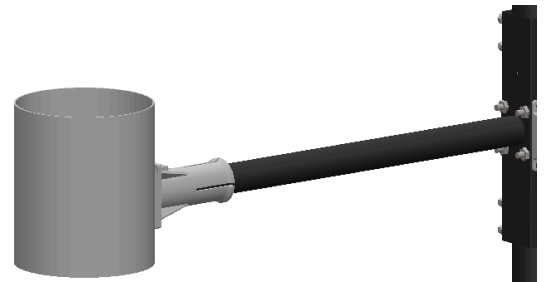
5.4 Rain Gauge Setup and Alignment

Insert one of the rods into the rain gauge holder ensure it fit in perfectly well

Tighten the Hose Clamp on the ends.



Set the connected rain gauge holder, rod and bracket to the mounting pole as shown in the right figure.



- i. **Level the Holder:** Use the bubble level on the rain gauge holder to ensure a balanced level.

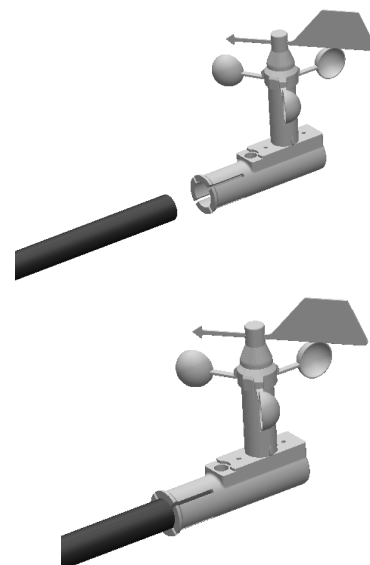


5.5 Wind Vane Setup and Alignment

- i. **Wind vane Connection**

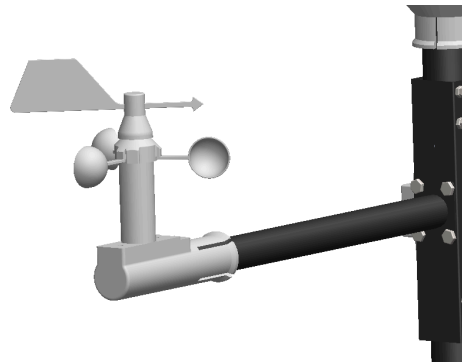
Push the rod into the hole space at the side of the wind vane.

Tighten the side when the rod has entered freely.
Ensure the wind vane spins freely.



- ii. **Rod Connection:** Push one end of the rod into the wind sensor component holder and the other end into one mounting bracket.

Tighten the Hose Clamp on the ends of the rod.



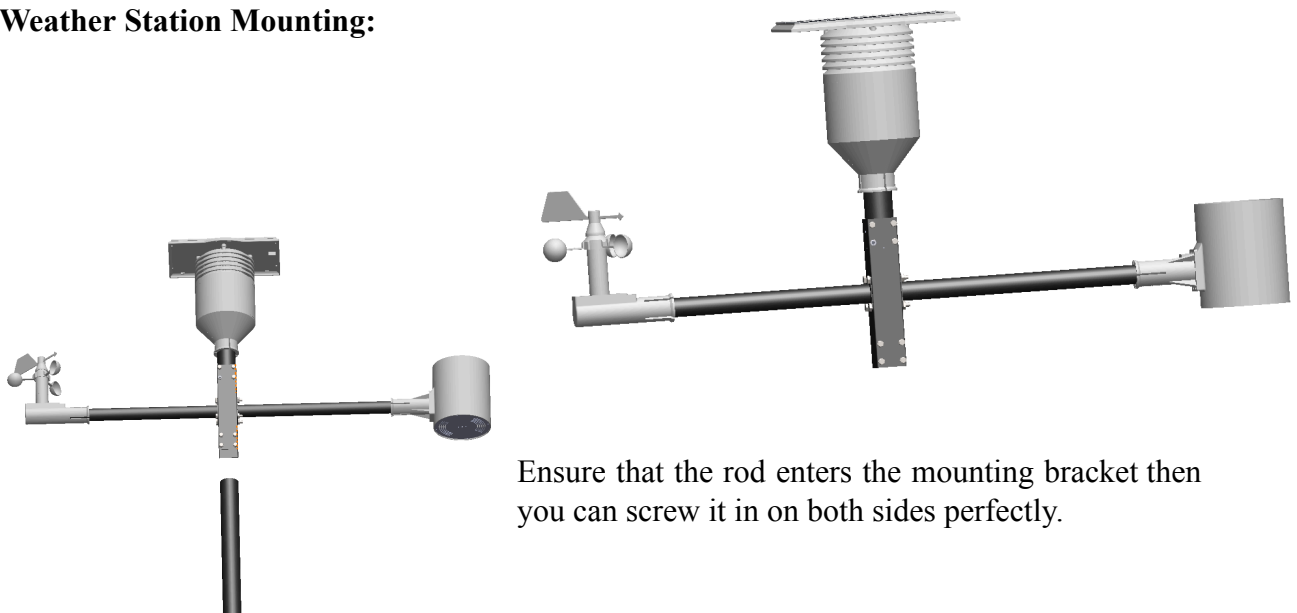
- iii. **Level the Holder:** Use the bubble level on the wine vane holder to ensure a balanced level.



- iv. **Level the Wind Sensor:** Use the bubble level on the wind sensor component to ensure a balanced level above. Then position the wind vane arrow to face the **actual North** using a compass (on your smartphone) so that the directions on the wind vane match the correct location.

NOTE: Error will be introduced in the wind direction data if the wind vane is not positioned correctly during installation.

Weather Station Mounting:



Final Weather Station Outlook



NOTE: Ensure all the items are properly fixed in the appropriate dedicated place indicated above. Make sure you do a second checking of all the devices again to ensure everything is perfectly aligned.

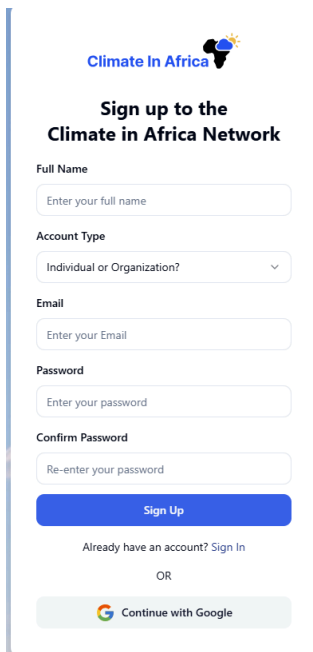
6. Device Onboarding Procedure

6.1 Start Device

- i. Ensure to follow the steps outlined in the Installation and Setup Guide stated above before starting the device.
- ii. Ensure all components are securely connected, then power on the device.

6.2 Account Sign Up

- i. Open your browser and navigate to app.climateinafrica.com/sign-up.
- ii. Complete the registration form with your details and click **Sign Up**.
- iii. A verification link will be sent to the email address you provided during sign-up. Check your inbox and click the link to verify your account.



The sign-up form for the Climate In Africa Network includes the following fields and options:

- Full Name:** A text input field with the placeholder "Enter your full name".
- Account Type:** A dropdown menu with the option "Individual or Organization?".
- Email:** A text input field with the placeholder "Enter your Email".
- Password:** A text input field with the placeholder "Enter your password".
- Confirm Password:** A text input field with the placeholder "Re-enter your password".
- Sign Up:** A blue button.
- Already have an account? Sign In:** A link.
- OR:** A separator.
- Continue with Google:** A button with the Google logo.

Figure 1

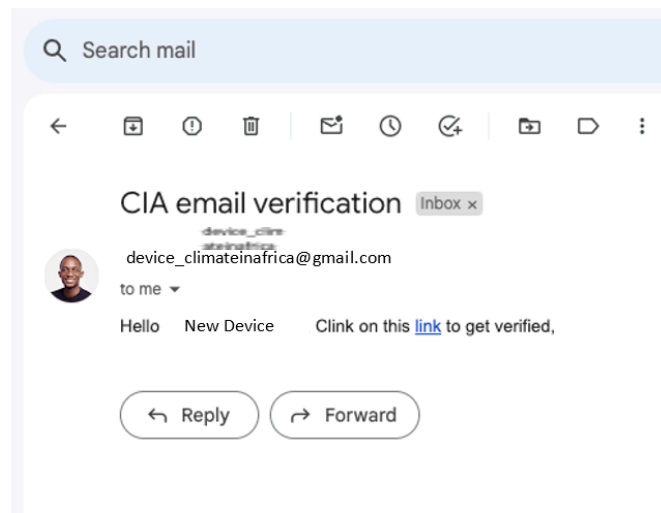
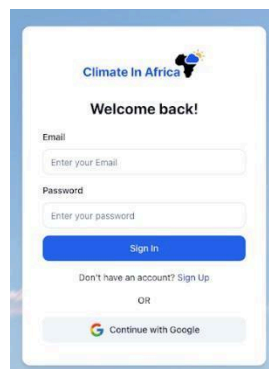


Figure 2

6.3 Account Log-In

- After verifying your email, go to app.climateinfrica.com/sign-in.
- Enter your credentials to log in.



The log-in form for Climate In Africa includes the following fields and options:

- Welcome back!**
- Email:** A text input field with the placeholder "Enter your Email".
- Password:** A text input field with the placeholder "Enter your password".
- Sign In:** A blue button.
- Don't have an account? Sign Up:** A link.
- OR:** A separator.
- Continue with Google:** A button with the Google logo.

6.4 Add Device

- As a first-time user, you will be prompted to add a device. Click **Add Device**.
- Enter your Device ID, which is located on the device body. After entering the Device ID, you will be directed to your dashboard.

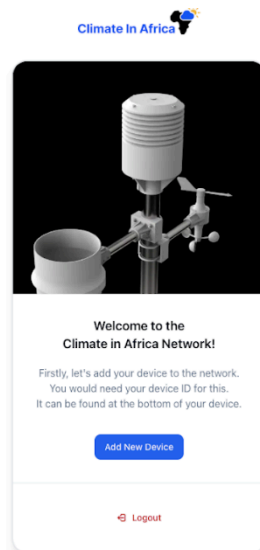


Figure 1

Figure 2 (the entry field)

6.5 Finalization

- i. The activation process may take a few minutes. Once completed, your device will be fully operational.
- ii. You can now explore and use all the features provided by your device.

7. Glossary of Terms

Term	Definition
Accuracy	Accuracy is defined as the ability of a measurement to match the actual value of the quantity being measured.
Air Temperature	Air temperature refers to the temperature of the surrounding air, which determines the heat flow between the human body and the environment.
Atmospheric Pressure	Atmospheric pressure is the pressure exerted by the atmosphere on the earth and is measured in Pascal (Pa).
Hectopascals (hPa)	Hectopascal is a unit of pressure equal to a millibar (1 hPa = 1 mb).
PM2.5	PM2.5 describes fine inhalable particles, with diameters that are generally 2.5 micrometres and smaller.
PM10	PM2.5 describes fine inhalable particles, with diameters that are generally 10 micrometres and smaller.
PPM	Parts per million (ppm) is the number of units of mass of a contaminant per million units of total mass. It is a way to measure concentrations of gases.

Precipitation	Precipitation is water released from clouds in the form of rain, freezing rain, sleet, snow, or hail.
Rain Gauge	A rain gauge is a meteorological instrument to measure the precipitating rain in each amount of time per unit area.
Relative Humidity	Relative Humidity is a measure of the actual amount of water vapor in the air compared to the total amount of vapor that can exist in the air at its current temperature.
Resolution	Resolution is the smallest interval measurable by an instrument.
Soil Moisture	Soil moisture is the water content of the soil which can be expressed in terms of volume or weight.
Solar Irradiance	Solar irradiance is measurement of how much solar power is being received per square meter of a given surface area. Measured in watts per square meter (W/m ²).
µg/m ³	A concentration of 1 µg/m ³ means that one cubic metre of air contains one microgram (10 ⁻⁶ grams) of pollutant.
VWC	VWC is the ratio of water volume to soil volume. A numerical measure of soil moisture.
Wind Vane	Wind vane is an instrument that measures the direction from which the wind is blowing.

8. Technical Specifications

Measuring Element	Range	Resolution	Accuracy	Unit
Air Temperature	-40°C ~ +80°C	0.1°C	±0.5°C	°C
Relative Humidity	0 ~ 100%RH	0.1%RH	±2%RH (Max ±5%RH)	
Atmospheric Pressure	300hPa ~ 1100hPa	0.01hPa	±0.15hPa	hPa
Wind Direction	0 ~ 359°	1°	±2°	°(Degree)
Wind Speed	0 ~ 75m/s	0.5m/s	±0.5m/s	m/s
Precipitation	0 ~ 250mm/hr	0.2mm	±0.05mm	mm/hr
PM 2.5	0.0 ~ 999.9µg/m ³	0.3µm	Max (± 15% & ±10µg/m ³)	µg/m ³
PM 10	0.0 ~ 999.9µg/m ³	0.3µm	Max (± 15% & ±10µg/m ³)	µg/m ³
Solar Irradiance	0 ~ 2000Wm ⁻²	1Wm ⁻²	±5% of Reading	Wm ⁻²
CO	0 ~ 1000ppm (2000ppm extendable)	1ppm	≤1ppm	ppm
CO ₂	400ppm ~ 5000ppm	1ppm	± (50ppm + 5% of Reading)	ppm
NO ₂	0.05ppm ~ 10ppm	0.25ppm		ppm
Soil Moisture	0 ~ 100% VWC	1.% VWC	±4% VWC	%
Soil Temperature	-55°C ~ +125°	0.25°C	±0.5°C	°C
CH ₄				ppm
Noise				db

8.1. Measurement Specifications

8.2 Power Consumption

9. Power Supply

- Solar Panel: DC18V 2A
- Battery: 12.6V 4A Li-Ion Battery

10. Maintenance

11. Troubleshooting Guide

If you encounter any issues during this process, please refer to the Troubleshooting section of the manual or contact our support team at support@climateinafrica.com.