# User Guide

## Introduction

The outdoor weather station can connect to various RS485 sensors, including temperature and humidity, wind speed, wind direction, rainfall, solar radiation, $CO_2$ , noise, PM, barometric pressure, soil temperature and moisture, soil EC, and soil pH. Sensor combinations can be customized according to user requirements.The pole is made of galvanized steel pipe, providing excellent resistance to rain, rust, and corrosion for long-term durability. It can be equipped with a solar panel and battery for outdoor measurement without the need for an external power supply. An optional large LED display screen offers clear, real-time data visualization.

## Applications

This product is suitable for outdoor air quality monitoring, greenhouse environments, and construction site dust monitoring and other scenarios.

## Features

● Flexible sensor configuration

● Weatherproof and corrosion-resistant for long-lasting use

## Specification

| Specification | |
|---|---|
| Model | UB-WS-A1 |
| Pole Height | 1.5 m / 2 m / Customizable |
| Pole Diameter | 76 mm / 114 mm |
| Pole Material | Galvanized Steel Pipe |
| Installation Method | Adjustable Cross Arm |

## Plug-in Pole Assembly Method

a.  Prepare Components

Lay out all pole sections and check for any damage.

b.  Install Base

Fix the base securely to the ground using expansion bolts or a ground cage. Ensure it's level.

c.  Insert Pole Sections

Insert each section into the one below it vertically. Align properly to avoid bending.

d.  Secure Connections

Align the screw holes in the upper and lower sections and fix with bolts.

e.  Final Inspection

Check vertical alignment and connection tightness. Add support if needed.
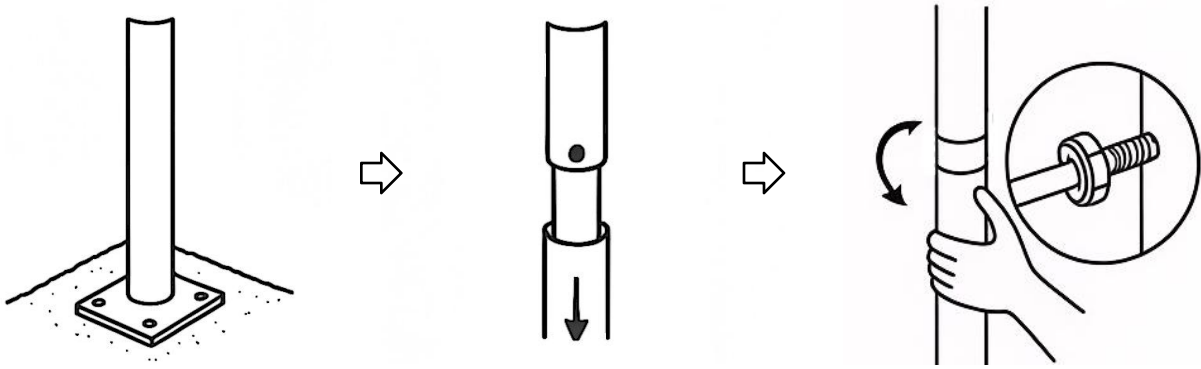
## Installation Method

| Method | Applicable Scenarios | Advantages |
|---|---|---|
| Expansion Bolts | Hardened surfaces (concrete, stone slabs) | Quick installation, low cost |
| Ground Cage | Loose soil or large poles | Strong wind resistance, long service life |

- **Expansion Bolt Installation**

  f.  Positioning and Marking

    Use a level to determine the pole position. Mark the bolt hole positions, ensuring proper alignment at multiple points.

  g.  Drilling

    Use a drill bit 2–4 mm larger than the bolt diameter (e.g., use a 16 mm bit for M12 bolts).
    Drill depth should be 1.5 times the bolt length. Keep the drill perpendicular to the surface.

  h.  Hole Cleaning

    Thoroughly remove debris from the hole. (Residual dust can reduce anchoring strength by 60%.)

  i.  Inserting the Bolt

    Leave the nut on to prevent the bolt from falling apart. Insert the complete expansion bolt into the hole. Slightly tighten the nut (2–3 turns) to initiate sleeve expansion.

  j.  Fixing the Pole

    Remove the nut, place the pole base over the bolt, add a washer, and tighten with a torque wrench. Avoid over-tightening to prevent cracking of the surface.
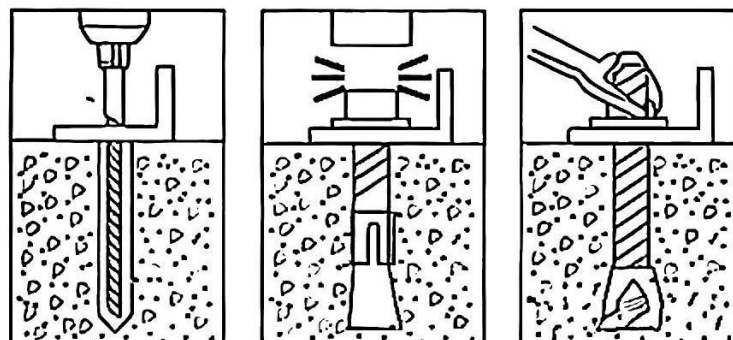


- **Ground Cage (Anchor Cage) Installation**

  a. Excavation

    Dig a foundation pit according to design specifications. Depth should consider soil type and cage

length.

    b. Placing the Ground Cage

       Insert the cage, use a level to adjust verticality, and place crushed stone at the bottom for leveling.

    c. Initial Fixation

       Use bolts to connect the cage to the embedded parts in the ground. Ensure it is stable and does not wobble.

    d. Pouring Concrete

       Pour concrete until the ground cage is fully covered. Use a vibrator to eliminate air gaps.

    e. Final Adjustment

       Recheck vertical alignment before the concrete sets. Remove temporary supports after curing.



## Note

1. Before installation, ensure that the base is properly secured by pre-embedding an anchor cage or installing anchor bolts in advance.

2. Route sensor cables inside the pole to prevent exposure to direct sunlight and damage by birds.

3. Mount the GPRS antenna on the outside of the waterproof enclosure to ensure stable signal reception.

4. If using a solar panel, make sure there are no surrounding obstructions. Position the panel facing south at a 45° angle to the ground.

## Optional

1. LED Display: Must support RS485 communication and comply with the specified protocol format.

2. Solar Power Supply: It is recommended that the solar panel provide at least 40 W / 18 V. The battery system should use a ternary lithium battery with a capacity of at least 20 Ah and an output of DC 12 V, min 2 A. The output interface should be DC5521 for connection to GS1 series devices.