

WEATHER STATION / DATA SHEET

SS1000U-03

Ultrasonic Integrated Weather Station

Integrated ultrasonic weather station for environmental monitoring, combining wind, air quality, meteorological and optical measurements with RS485 / Modbus-RTU communication.

Overview

SS1000U-03 is an integrated weather station designed for environmental detection. It combines wind speed, wind direction, temperature and humidity, noise, PM2.5 and PM10, CO2, atmospheric pressure and illumination measurement in one compact platform.

The device uses the standard Modbus-RTU communication protocol and RS485 output. Communication distance can reach up to 2000 m, allowing data upload to monitoring software or PLC configuration screens, and supporting secondary development.

The optional built-in electronic compass removes directional installation requirements. The device only needs to be installed horizontally, making it suitable for mobile applications such as marine vessels and vehicle transportation.



0-40 m/s WIND RANGE	RS485 / 4G COMMUNICATION	10-30 VDC POWER SUPPLY	Wind / T&H / PM / CO2 / Light SENSOR SUITE
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CAPABILITY

Key Advantages & Applications

Key Advantages

- Integrated multi-sensor design for convenient installation.
- Ultrasonic wind measurement with zero-wind operation and 360-degree omnidirectional sensing.
- Precise noise collection with a 30-120 dB measuring range.
- Simultaneous PM2.5 and PM10 acquisition with 0-1000 $\mu\text{g}/\text{m}^3$ range and 1 $\mu\text{g}/\text{m}^3$ resolution.
- Stable RS485 communication circuit with optional built-in electronic compass.

Application Scenarios

- Environmental monitoring stations.
- Marine vessels and vehicle-mounted mobile monitoring.
- Industrial parks and smart-city monitoring systems.
- PLC / SCADA data acquisition through RS485 / Modbus-RTU.
- Sites requiring combined weather, air-quality and light monitoring.

MEASUREMENT PRINCIPLE

Technical Principle

The instrument uses ultrasonic propagation time difference in air to measure wind speed and direction. The integrated structure combines multiple environmental sensors, enabling real-time monitoring of meteorological and air-quality parameters. Data can be transmitted through RS485 using the standard Modbus-RTU protocol or uploaded through optional 4G communication.

SYSTEM DATA

General Specifications

Item	Specification
Default Power Supply	10-30 VDC
Maximum Power Consumption	RS485: 1.2 W; 4G: 1.5 W
Communication Protocol	Standard Modbus-RTU protocol
Output Signal	RS485; optional 4G transmission via mobile network
Communication Distance	Up to 2000 m through RS485 communication
Protection Class	IP54
Compass Option	Optional built-in electronic compass; horizontal installation without direction requirement

MEASUREMENT

Measurement Range & Resolution

Parameter	Range	Resolution
Wind speed	0-40 m/s; starting wind speed 0.5 m/s	—
Wind direction	0-359°	—
Relative humidity	0-99%RH	—
Temperature	-40°C to +80°C	—
Atmospheric pressure	0-120 kPa	—
Noise	30-120 dB	—
PM2.5 / PM10	0-1000 $\mu\text{g}/\text{m}^3$	1 $\mu\text{g}/\text{m}^3$
CO2	0-5000 ppm; effective range 400-5000 ppm	—
Illuminance	0-200,000 Lux	—
Total solar radiation	0-1800 W/m ²	—
Optical rainfall	Instantaneous rainfall up to 24 mm/min; sensing diameter 6 cm	Standard 0.1 mm

ACCURACY

Measurement Accuracy

Parameter	Accuracy
Wind speed	$\pm 0.5 + 2\%FS$ (0-20 m/s, 60%RH, 25°C)
Wind direction	$\pm 3^\circ$ (60%RH, 25°C)
Humidity	$\pm 3\%RH$ (60%RH, 25°C)
Temperature	$\pm 0.5^\circ\text{C}$ (25°C)
Atmospheric pressure	$\pm 0.15\text{ kPa}$ @25°C, 101 kPa
Noise	$\pm 0.5\text{ dB}$ (reference tone, 94 dB @1 kHz)

Parameter	Accuracy
PM2.5	Counting efficiency: 50% @0.3 μ m, 98% @ $\geq$ 0.5 μ m; PM2.5 accuracy $\pm$ 3%FS (@100 μ g/m ³ , 25°C, 50%RH)
CO2	$\pm$ (50 ppm + 3%FS) at 25°C
Illuminance	$\pm$ 7% at 25°C
Total solar radiation	$<\pm$ 3% @150 W/m ²
Optical rainfall	Typical accuracy $\pm$ 5% (laboratory data)

OPERATING CONDITIONS

Operating Temperature & Response

Parameter	Specification
Wind speed / direction	Sensor operating temperature: -20°C to +70°C; transmitter component operating temperature: -40°C to +70°C
Temperature and humidity element	-40°C to +80°C
Atmospheric pressure element	-40°C to +80°C
Noise element	-40°C to +80°C
PM2.5 element	-20°C to +60°C
CO2 element	-10°C to +60°C
Illuminance element	-40°C to +80°C
Total solar radiation element	-40°C to +80°C
Wind speed / direction response	1 s / 1 s
Temperature / humidity response	$\leq$ 25 s / $\leq$ 8 s at 1 m/s wind speed
Pressure / noise response	$\leq$ 2 s / $\leq$ 3 s
PM2.5 / PM10 response	$\leq$ 90 s
CO2 response	$\leq$ 180 s
Illuminance / total solar radiation response	$\leq$ 2 s / $\leq$ 10 s

STABILITY

Long-Term Stability

Parameter	Stability
Temperature	$\leq$ 0.1°C/year
Humidity	$\leq$ 1%/year
Atmospheric pressure	-0.1 kPa/year
Noise	$\leq$ 3 dB/year
PM2.5 / PM10	$\leq$ 1%/year
CO2	$\leq$ 1%/year

Parameter	Stability
Illuminance	≤5%/year
Total solar radiation	≤±3% @150 W/m ²

CONFIGURATION

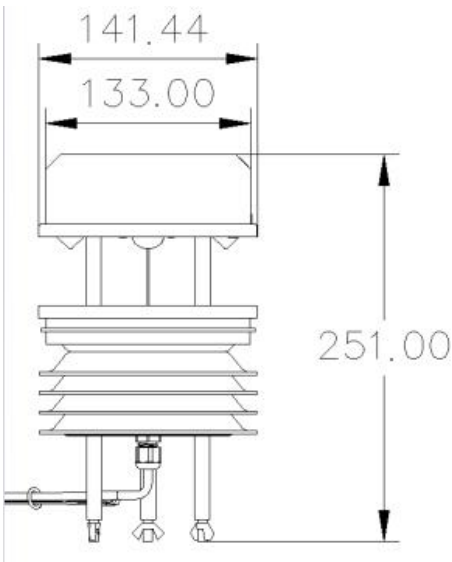
Product Selection

Code	Description
SS	Company code
1000U-03	Ultrasonic integrated weather station
N01	RS485 interface output
4G	4G upload mode
1	Housing
1H	Advanced appearance
1HS	Tunnel version; does not support built-in electronic compass option
Blank	Without built-in electronic compass
CP	Built-in electronic compass function

MECHANICAL DATA

Dimensions

Mechanical Dimensions



Dimension Summary

- -1H: 251 mm high; maximum width 141.44 mm (housing width 133.00 mm)
- -1H with optical rainfall module: 322 mm high; 141.00 mm maximum width
- -1: 256 mm high; 141.00 mm maximum width
- All dimensions are shown in millimeters.
- Select the mechanical configuration according to housing and optical-rainfall requirements.

CONTACT / SUPPORT

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