

WEATHER STATION / DATA SHEET

SS1000U-02

Smart Ultrasonic Weather Station

Integrated ultrasonic weather station for wind, temperature, humidity, air pressure, noise, particulate matter, light and rainfall monitoring with RS485 Modbus-RTU communication.

Overview

SS1000U-02 is a compact all-in-one weather station designed for environmental monitoring. It can integrate wind speed, wind direction, temperature and humidity, noise, PM2.5/PM10, atmospheric pressure, illumination and rainfall measurement in one device.

The device uses standard Modbus-RTU communication with RS485 output. The communication distance can reach up to 2000 m, enabling data upload to customer monitoring software, PLC configuration screens or secondary development systems.

The optional built-in electronic compass removes orientation requirements during installation; the device only needs to be installed horizontally. This supports mobile applications such as marine vessels and vehicle transport.



0-40 m/s WIND RANGE	RS485 / 4G COMMUNICATION	10-30 VDC POWER SUPPLY	Up to 2000 m RS485 DISTANCE
-------------------------------	------------------------------------	----------------------------------	---------------------------------------

CAPABILITY

Key Advantages & Applications

Key Advantages

- Integrated multi-sensor design for convenient installation.
- Ultrasonic wind measurement with no angle limitation and 360-degree all-direction sensing.
- Noise monitoring with a 30-120 dB range.
- PM2.5 and PM10 simultaneous collection, 0-1000 $\mu\text{g}/\text{m}^3$ range and 1 $\mu\text{g}/\text{m}^3$ resolution.
- Dedicated RS485 circuit for stable long-distance communication.
- Optional electronic compass for orientation-free horizontal installation.

Application Scenarios

- Urban and industrial environmental monitoring.
- Meteorological observation stations and mobile weather monitoring.
- Marine vessels, vehicle transport and other moving platforms.
- Combined temperature, humidity, wind, noise, air quality, pressure, light and rainfall measurement.
- Customer monitoring platforms, PLC screens and secondary development systems.

MEASUREMENT PRINCIPLE

Technical Principle

Wind speed and wind direction are measured using ultrasonic propagation time difference in air. The sensor can also be configured with multiple environmental measurement modules to build an all-in-one station for meteorological and environmental monitoring. Optional electronic compass configuration allows horizontal installation without directional alignment.

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
Output Signal	RS485 and 4G mobile network upload
RS485 Communication Distance	Up to 2000 m
Optional Function	Built-in electronic compass for orientation-free installation
Protection Class	IP54

ENVIRONMENTAL PARAMETERS

Operating Temperature & Accuracy

Item	Specification
Wind speed / direction operating temperature	-40 to +80 °C
Temperature & humidity operating temperature	-40 to +80 °C
Atmospheric pressure operating temperature	-40 to +80 °C
Noise operating temperature	-40 to +80 °C
PM2.5 operating temperature	-20 to +60 °C
CO2 operating temperature	-10 to +60 °C
Illuminance operating temperature	-40 to +80 °C
Total solar radiation operating temperature	-40 to +80 °C
Wind speed accuracy	±0.5 + 2%FS (0-30 m/s, 60%RH, 25 °C)
Wind direction accuracy	±3° (60%RH, 25 °C)
Humidity accuracy	±3%RH (60%RH, 25 °C)
Temperature accuracy	±0.5 °C (25 °C)
Atmospheric pressure accuracy	±0.15 kPa @25 °C, 101 kPa
Noise accuracy	±0.5 dB (reference tone, 94 dB @1 kHz)
PM2.5 accuracy	Counting efficiency: 50%@0.3 μm, 98%@≥0.5 μm; PM2.5: ±3%FS (@100 μg/m³, 25 °C, 50%RH)
CO2 accuracy	±(50 ppm + 3%FS) (25 °C)
Illuminance accuracy	±7% (25 °C)
Total solar radiation accuracy	<±3% @150 W/m²

PERFORMANCE

Range, Stability & Response

Item	Specification
Wind speed range	0-40 m/s; starting wind speed 0.5 m/s
Wind direction range	0-359°
Humidity range	0-99%RH
Temperature range	-40 to +80 °C
Atmospheric pressure range	0-120 kPa
Noise range	30-120 dB
PM10 / PM2.5 range	0-1000 $\mu\text{g}/\text{m}^3$
CO2 range	0-5000 ppm; effective range: 400-5000 ppm
Illuminance range	0-200,000 Lux
Total solar radiation range	0-1800 W/m ²
Long-term stability	Temperature ≤ 0.1 °C/y; Humidity $\leq 1\%$ /y; Atmospheric pressure ≤ 0.1 kPa/y; Noise ≤ 3 dB/y; PM10/PM2.5 $\leq 1\%$ /y; CO2 $\leq 1\%$ /y; Illuminance $\leq 5\%$ /y; Solar radiation $\leq \pm 3\%$ @150 W/m ²
Response time	Wind speed 1 s; Wind direction 1 s; Temperature ≤ 25 s (1 m/s wind speed); Humidity ≤ 8 s (1 m/s wind speed); Atmospheric pressure ≤ 2 s; Noise ≤ 3 s; PM10/PM2.5 ≤ 90 s; CO2 ≤ 90 s; Illuminance ≤ 2 s; Solar radiation ≤ 10 s
Optical rainfall accuracy	Typical accuracy $\pm 5\%$ (source laboratory data)
Optical rainfall resolution	Standard 0.1 mm
Maximum instantaneous rainfall	24 mm/min
Rain-sensing diameter	6 cm

OPTIONAL ELEMENTS

Optional Measurement Elements

Element Group A	Element Group B
Air humidity	Air humidity
Optical rainfall	Illuminance
Wind speed	Noise
Atmospheric pressure	PM2.5
Wind direction	PM10
Total solar radiation	CO2

Note: PM and CO2 cannot be selected simultaneously according to the source document. Final element combination, output mode, housing style and electronic-compass option should be confirmed in the order code before production.

ORDERING INFORMATION

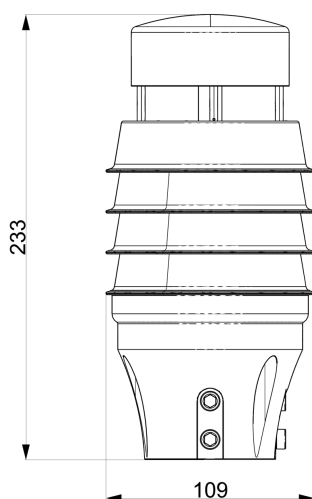
Product Selection

Code	Description
SS-	Company code
1000U-02	Smart ultrasonic integrated weather station
N01-	RS485 interface output
4G-	4G upload mode
3-	Small ultrasonic integrated weather station
3H-	Advanced appearance version
Blank	Without built-in electronic compass
CP	Built-in electronic compass function

MECHANICAL DATA

Mechanical Dimensions

Mechanical Dimensions



Dimension Summary

- -3H: 293 mm high; Ø109 mm body
- -3H with optical rainfall: 295 mm high; Ø109 mm body
- -3HP: 352.3 mm high; Ø108.4 mm body
- -3: 253.10 mm high; Ø108 mm body
- -3H / -3HP options shown in source drawing.

CONTACT / SUPPORT

SpeSense Technologies Inc.

Add: No. 9 Yuhe Road, Guitang Subdistrict, Yuhua District, Changsha City

Tel: +86-15386478166

Email: info@spesense.com

Web: www.spesense.com



WhatsApp / WeChat