

## WIND SENSOR / DATA SHEET

# SS103U-02

## Ultrasonic Wind Speed & Direction Sensor

All-solid-state ultrasonic anemometer for simultaneous wind speed and wind direction measurement, designed for all-weather environmental and infrastructure monitoring.

### Overview

SS103U-02 uses the ultrasonic time-difference method to measure wind speed and wind direction without moving mechanical components.

Its all-solid-state stainless-steel structure supports high measurement accuracy, stable performance and long service life while eliminating routine on-site calibration associated with mechanical anemometers.

The sensor is designed for continuous all-weather operation and supports RS485, 0–5 V DC and 4–20 mA output configurations.



|                                     |                                          |                                 |                                         |
|-------------------------------------|------------------------------------------|---------------------------------|-----------------------------------------|
| <b>0–70 m/s</b><br>WIND SPEED RANGE | <b>±2°</b><br>WIND DIRECTION<br>ACCURACY | <b>IP66</b><br>PROTECTION CLASS | <b>RS485 / ANALOG</b><br>OUTPUT OPTIONS |
|-------------------------------------|------------------------------------------|---------------------------------|-----------------------------------------|

## CAPABILITY

## Key Advantages & Applications

### Key Advantages

- No start-up wind speed limitation and no directional angle limitation.
- Multiple ultrasonic probes transmit and receive signals in real time for efficient measurement.
- High accuracy, wide measuring range, low power consumption and strong anti-interference capability.
- No routine calibration required; suitable for continuous all-weather operation.
- Automatic high-power heating supports operation under extreme low-temperature conditions.

### Application Scenarios

- Urban and meteorological monitoring
- Wind-power applications
- Bridges, tunnels, subways, airports and ports
- Marine vessels, islands, mountains and remote areas
- Mining, fan manufacturing, ventilation and exhaust systems

## MEASUREMENT PRINCIPLE

## Technical Principle

Ultrasonic probes transmit and receive acoustic pulses across the measurement space. Wind changes the pulse transit time along different paths; the internal electronics calculate the resulting time differences to determine wind speed and wind direction in real time. Because the sensor has no rotating measurement mechanism, it avoids the wear and start-up limitations of conventional mechanical anemometers.

## PERFORMANCE

# Technical Specifications

| Item                         | Specification                                                                         |
|------------------------------|---------------------------------------------------------------------------------------|
| Measurement Principle        | Ultrasonic time-difference measurement                                                |
| Wind Speed Range             | 0–60 m/s or 0–70 m/s                                                                  |
| Wind Speed Resolution        | 0.1 m/s                                                                               |
| Wind Speed Accuracy          | $\pm 0.3$ m/s or $\pm 3\%$ (0–30 m/s), or $\pm 5\%$ (30–70 m/s), whichever is greater |
| Wind Speed Response Time     | 1 s                                                                                   |
| Wind Direction Range         | 0–360°                                                                                |
| Wind Direction Resolution    | 0.1°                                                                                  |
| Wind Direction Accuracy      | $\pm 2^\circ$                                                                         |
| Wind Direction Response Time | 1 s                                                                                   |
| Power Supply                 | DC 9–24 V                                                                             |
| Operating Environment        | –20°C to +60°C; 0–95% RH                                                              |
| Protection / Material        | IP66; stainless steel                                                                 |

## OUTPUT CONFIGURATIONS

# Signal & Communication Options

| Option         | Description                                                            |
|----------------|------------------------------------------------------------------------|
| RS485 Output   | RS485 communication interface output with standard Modbus-RTU protocol |
| 0–5 V Output   | 0–5 V DC output configuration                                          |
| 4–20 mA Output | 4–20 mA current output configuration                                   |

## ELECTRICAL CONNECTION

# Interface Definitions

| Output | Pin | Definition                             | Line Color |
|--------|-----|----------------------------------------|------------|
| RS485  | A   | Positive supply voltage (+24 V)        | Red        |
| RS485  | B   | RS485_A                                | Green      |
| RS485  | C   | Negative supply voltage                | Black      |
| RS485  | D   | RS485_B                                | White      |
| Analog | A   | Positive supply voltage (+24 V)        | Red        |
| Analog | B   | Wind speed 0–5 V or 4–20 mA output     | Green      |
| Analog | C   | Negative supply voltage                | Black      |
| Analog | D   | Wind direction 0–5 V or 4–20 mA output | White      |

Cable definitions may differ from the delivered configuration; confirm the latest product manual or supplied cable before commissioning.

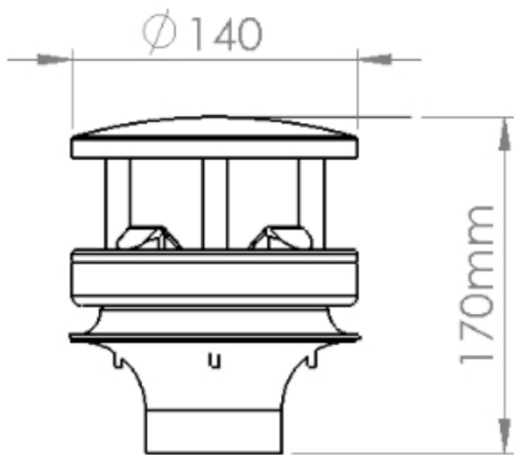
## ORDERING INFORMATION

# Configuration Codes

| Field / Code              | Meaning                                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Base model / SS103U-02    | SpeSense ultrasonic wind speed & direction sensor                                                                                |
| Output / power – 1        | 4–20 mA / 24 V DC                                                                                                                |
| Output / power – 2        | 0–5 V DC / 24 V DC                                                                                                               |
| Output / power – 6        | RS485 output / 24 V DC                                                                                                           |
| Electrical connection – 3 | Aviation plug                                                                                                                    |
| Extended function – 1     | Standard type                                                                                                                    |
| Precision – 7             | Wind speed: $\pm 0.3$ m/s or $\pm 3\%$ (0–30 m/s), or $\pm 5\%$ (30–70 m/s), whichever is greater; wind direction: $\pm 2^\circ$ |
| Measurement unit – M / D  | M: wind speed in m/s; D: wind direction angle in degrees                                                                         |

## MECHANICAL DATA

# Mechanical Dimensions & Connections

|                                                                                                                            |                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Source Dimension Drawing</b></p>  | <p><b>Mechanical Data</b></p> <ul style="list-style-type: none"> <li>• Overall diameter: <math>\varnothing 140</math> mm</li> <li>• Overall height: 170 mm</li> <li>• Housing material: Stainless steel</li> <li>• Protection class: IP66</li> </ul> |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## INSTALLATION & USE

# Installation & Application Notes

| Item                 | Source Guidance                                                                                                                                              |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power & Installation | Normal current: <35 mA at 12 V DC. Heating current: 0.6–1 A. Compact integrated installation supports remote, solar-powered and battery-powered deployments. |

| Item                             | Source Guidance                                                                                                                                                        |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Environmental Suitability</b> | Designed for continuous outdoor service. Automatic heating of the ultrasonic emission / reflection covers supports operation under extreme low-temperature conditions. |

*Note: Cable/thread color definitions are for reference only. Confirm the latest product manual or supplied cable definition before installation.*

## CONTACT / SUPPORT

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