

THREE-DIMENSIONAL ULTRASOUND ANEMOMETER AND WIND DIRECTION INDICATOR

Introduction

It is a device that measures gas flow velocity using ultrasonic waves. It emits ultrasonic waves into the gas medium and calculates the gas flow rate by measuring the propagation speed of ultrasonic waves in the medium. Featuring non-contact measurement, high accuracy and real-time performance, it is widely used in the field of meteorological observation.

The housing is made of aluminum alloy, which can adapt to harsh measurement environments. It boasts high measurement accuracy, fast response, strong reliability, compact size and light weight, and is widely applicable to wind speed measurement scenarios in meteorology, environmental protection, energy and other fields.

Functions

- 1.Core Measurement:** Supports 3D wind speed (horizontal + vertical directions), wind direction and acoustic temperature measurement.
- 2.High Precision Performance:** Tested and calibrated in a wind tunnel, with measurement accuracy meeting standards to satisfy high-precision monitoring demands.
- 3.Flexible Output:** Equipped with RS-232/RS-485 serial output, with multiple baud rates and formats optional.
- 4.Environmental Adaptability:** Operating temperature ranges from -50°C to +50°C, with excellent weather resistance for various outdoor scenarios.

Structure

Wind Measurement Channel

The open flow channel where the sensor contacts the airflow. It is designed in accordance with fluid dynamics to reduce turbulence interference and improve measurement accuracy.

Reflective Surface

An auxiliary structure matched with the sensor. It is made of high acoustic reflectivity material, and reflects ultrasonic signals at a fixed angle to enhance signal reception strength and improve measurement stability.

IP67

Stable Base

Integrated Sensor

The core functional component of the product. It integrates ultrasonic transceiver modules, and is responsible for collecting and preliminary processing data such as wind speed and wind direction.

Fixed Bracket

The structural component that supports the sensor.

It fixes the sensor assembly through a stable frame structure, and reserves airflow space for the wind measurement channel.

Customizable Material

The main body of the product (such as brackets and base) supports customization of multiple materials.

Suitable materials can be selected according to application scenarios (such as corrosion resistance and lightweight requirements).



Parameters

Item	Parameter Description
Voltage Output	4 voltage output channels, 0 to 5000 mV
Voltage Input	0 to 5000 mV (V1 & V2); 0 to 1000 mV (V3 & V4); Resolution: 1/4000; Accuracy: $\pm 0.1\%$ of full scale
Serial Output	User-programmable; Interface: RS-232 or RS-485; Format: ASCII, ASCII polled, NMEA; Baud rate: 1200, 4800, 9600, 19200, 38400; Output rate: 4 to 32 Hz (user selectable); Units: m/s, cm/s, mph, knots, km/h
Power Requirement	12 V
Operating Temperature	-50 to +50°C

Elements

Item	Parameter Description
Wind Speed	Range: 0 to 40 m/s (0 to 90 mph); Resolution: 0.01 m/s; Threshold: 0.01 m/s; Accuracy: $\pm 1\% \pm 0.05$ m/s (at 30 m/s), $\pm 3\%$ (at 40 m/s)
Wind Direction	Azimuth range: 0 to 360°; Elevation range: $\pm 60^\circ$; Resolution: 0.1°; Accuracy: $\pm 2^\circ$ (at 30 m/s), $\pm 5^\circ$ (at 40 m/s)
Sound Velocity	Speed range: 300 to 360 m/s; Resolution: 0.01 m/s; Accuracy: $\pm 0.1\% \pm 0.05$ m/s (at 30 m/s)
Acoustic Temperature	Range: -50 to 50°C; Resolution: 0.01°C; Accuracy: $\pm 2^\circ$ (at 30 m/s)