Sun Urja Energy Solution

A Complete Solar Solutions

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Datasheet & Installation Guide

Wind Speed Sensor [WS 102]

MODEL

WS 102

DATASHEET

Introduction

Wind Speed Sensor is designed with rugged components stand up to hurricane-force wind yet is sensitive to a light breeze. It includes sealed bearings for long life. The range and accuracy specifications have been verified in wind-tunnel tests. In areas where icing of the anemometer is a problem, drip rings deflect water from the joint between moving parts.

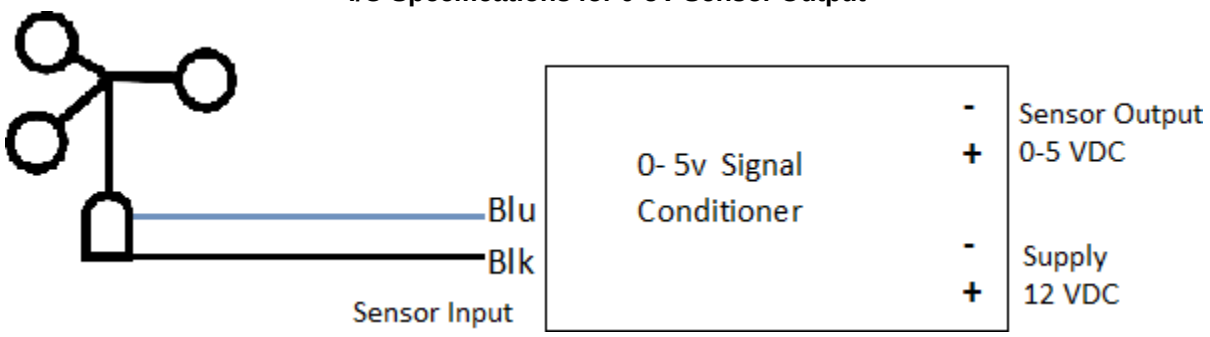
Theory of Operation

The sensor's cup assembly consists of three cups mounted on a cup assembly hub. A shaft, which rotates on precision-sealed ball bearings, connects the cup assembly to a magnet assembly. When the shaft is rotated, the turning magnet assembly causes a reed switch to close. It closes twice for every rotation of the shaft. The pulses produced by this closure is counted by the connected electronics.

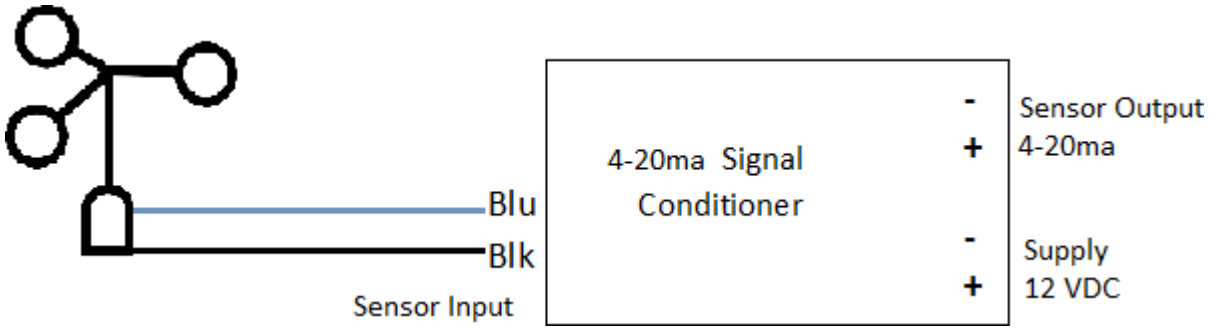
Specifications

Sensor Type	Three cups
Material	Control Head UV-resistant ABS
Wind Cups	Polycarbonate
Range	0 to 250 km/hr
Startup wind speed	0.5 m/s or 1.8 km/hr
Accuracy	± 5%
Output A, B, C, D are 4 different models	A. 0 – 5 VDC B. 4 – 20 mA C. MODBUS RTU-RS485 D. Pulse, 62 Hz = 250 km/hr
Dimensions	3 cup dia. 15 cm
Operating Temperature	- 40 ~ 75 ° C
Potential lead	Two wires
Sensor Cable Length	2m

I/O Specifications for 0-5V Sensor Output



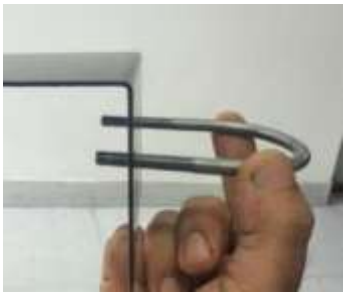
I/O Specifications for 4-20ma Sensor Output



INSTALLATION

Guidelines

The wind speed sensor comes in three different parts. We have the sensor body, the anemometer cup wheel and an Allen key to mount the cup wheel on the sensor body. There are different ways to mount the sensor.



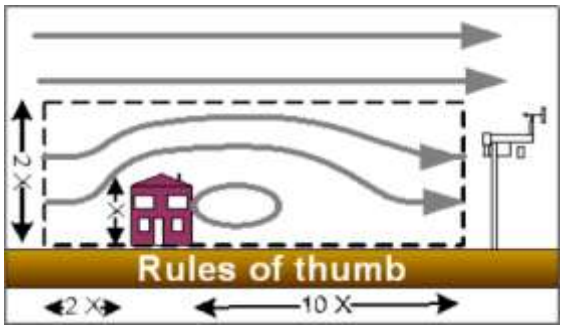
Tools and Materials Needed

Please make sure you have all the necessary material as mentioned below:

- Wire cutters and stripper
- Multi meter
- Screwdriver
- Electrical tapes to cover the wire
- Cable ties
- Adjustable Wrench
- Allen wrench (Supplied with sensor)

Location Recommendation

In order to report accurate weather information, you must take care in deciding where to place your weather station. The process of deciding how and where to install your weather station is called "Siting". Siting is the single most important factor in ensuring accurate readings. In fact, siting influences the accuracy of weather readings much more than the quality of the weather instruments themselves.



When selecting your mounting system, take into consideration that you will occasionally need to access the anemometer for preventive maintenance. Use the following guidelines to determine the best location for mounting the wind speed sensor

- Allow sufficient clearance for the wind sensor.
- Install the anemometer in a location where wind flow is

unobstructed by trees and nearby buildings.

- **Rule of Thumb-** Near a building, mount the sensors outside the zone of influence. Horizontally this extends roughly twice the height of the building upstream and ten times downstream. Vertically it extends to about twice the height of the structure

If the requirement is to measure the true local conditions

- Mount the sensor so that the wind cups are at least 7 feet (2.1 m) above obstructions such as trees or buildings that may obstruct wind flow
- Mount the sensor as the highest object for 50 feet in all directions.

Mounting

The Anemometer can be mounted using the three holes in the bottom mounting plates. This allows mounting on any flat LEVEL surface**.**

Caution:
To prevent damaging the wind cups properly mount the sensor/bracket combination on the mast before fitting the wind cup-unit whenever possible.

Note: Do not lubricate the force bearings

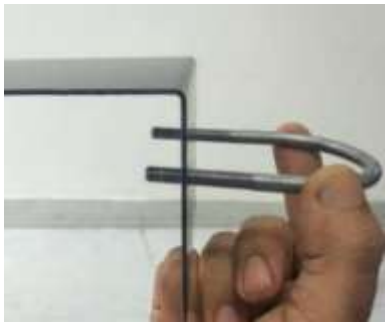
Orientation: The Anemometer should be mounted with its axis as close to vertical as possible to provide for the best measurement of horizontal wind movement

Steps for Mounting:

1. With the supplied U-bolt, the sensor suite can be mounted on a pole or rod
2. While holding the mounting base of the sensor suite against the pole, place the two ends of the U-bolt around the pole and through the two holes in the C-shaped bracket on the base.
3. Gently slide the wind cup assembly down onto the anemometer's stainless-steel shaft
4. Use the allen wrench provided to tighten the set screw slightly on the side of the wind cups.

NOTE: DO NOT PUT EXCESS PRESSURE ON THE ALLEN WRENCH AS THIS CAN DAMAGE THE SENSOR PERMANENTLY

5. Spin the wind cups. If they do not spin freely, loosen the set screw, then retighten the set screw.
6. Repeat above step until the wind cups spin freely
7. When the sensor is properly oriented, tighten the hex nuts with a wrench.



Local Testing: Spinning the anemometer cup assembly will produce a series of pulses. To verify sensor output, monitor this signal with either a translator module, data logger or an ohmmeter.

Caution
Do not Open the sensor bottom. This can permanently damage the sensor and void warranty.

Guidelines for Securing Cables

- To prevent fraying or cutting of cables, secure them so they will not whip about in the wind.
- Secure cable to a metal pole using cable ties or by wrapping tape around both the cables and the pole.
- Place clips or ties every 3' – 5' (1 – 1.6 m).

Example Installations

- If using Modbus sensor then the Wind speed Sensor is factory calibrated.
- If using analog output senor then use the following info to calibrate:
    - **Output**: 0 - 5 V_{DC} (0 to 250 km/hr)
    - **Wind Speed** in km/hr = 50*Sensor Output voltage (in Volt)

    - **Output:** 4-20mA (0 to 250 km/hr)
    - **Wind Speed** in km/hr = 15.625*(Output in mA - 4)

If the cable length is insufficient for the installation, additional cable can be added to the existing cable. If this is done, an accuracy de-rating factor must be added to the overall wind speed accuracy of this sensor.

It is highly recommended that the calibration be checked annually