WINDSENSOR
reducing uncertainty

Application note

Testing the WindSensor P2546C-OPR

The output of the WindSensor P2546C-OPR Cup Anemometer is a low-level ac signal with the output frequency proportional to the wind speed. A coil inside the P2546C-OPR generates the sinusoidal ac signal when exposed to the magnetic field of magnets mounted on the rotating shaft. By measuring the resistance of the coil in standstill and/or measuring the generated ac signal while rotating the cup rotor, it is possible to test if the internal circuit is working properly.

Two different test methods has been specified depending on whether the cup anemometer is accessible and in standstill (laboratory test) or the cup anemometer is installed on site and rotated by the wind (site test).

A digital multimeter must be used for measuring the output resistance or the generated ac signal from the cup anemometer.

Method 1: Laboratory test with the cup anemometer in standstill:

1 Connect a cable with free ends to the cup anemometer.

2 Set the digital multimeter into resistance mode typically identified by a Ω symbol on the measurement selector.

3 Connect the brown wire from the cup anemometer to the ground terminal on the digital multimeter (typically labeled COM) and the white wire from the cup anemometer to the resistance terminal on the digital multimeter (typically labeled Ω).

4 Check that the resistance reading on the digital multimeter is 650 Ω ± 50 Ω. Make sure the cup rotor is not rotated while connected to the multimeter. Figure 1 shows the digital multimeter display with the cup anemometer in standstill.

Figure 1

Digital multimeter showing a coil resistance of 684 Ω with the cup anemometer in standstill.

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Method 2: Site test with the cup anemometer rotated by the wind:

1   Disconnect the cup anemometer terminals from the datalogger.

2   Set the digital multimeter into ac voltage mode typically identified by a V or V ̃ symbol on the measurement selector.

3   Connect the brown wire from the cup anemometer to the ground terminal on the digital multimeter (typically labeled COM) and the white wire from the cup anemometer to the ac voltage terminal on the digital multimeter (typically labeled V).

4   Check that the ac voltage reading on the digital multimeter is changing with the wind speed. The sensitivity of the cup anemometer is approx. 0.14 Vrms/m/s corresponding to an ac voltage of approx. 1.4 Vrms at a wind speed of 10 m/s. Figure 2 shows the digital multimeter display at a wind speed of approx. 3.2 m/s.

Figure 2

Digital multimeter showing an AC voltage of 0.449 V_{rms} at a wind speed of approx. 3.2 m/s.