Application note

Testing the WindSensor P2546D-OPR

The WindSensor P2546D-OPR Cup Anemometer has an open collector transistor output with the switching frequency proportional to the wind speed. A control circuit inside the P2546D-OPR causes the output transistor to repetitively open (turn off) and close (turn on) when rotating the cup rotor. By using a pull-up resistor and measure the output voltage, it is possible to test if the output is working properly.

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

When testing in the laboratory the cup anemometer must be connected to a power supply using a pull-up resistor. A digital multimeter must be used for measuring the output voltage of the cup anemometer. A test circuit for the laboratory test is shown in figure 1. When testing on-site a pull-up resistor is already installed and the connected datalogger provides the supply voltage.

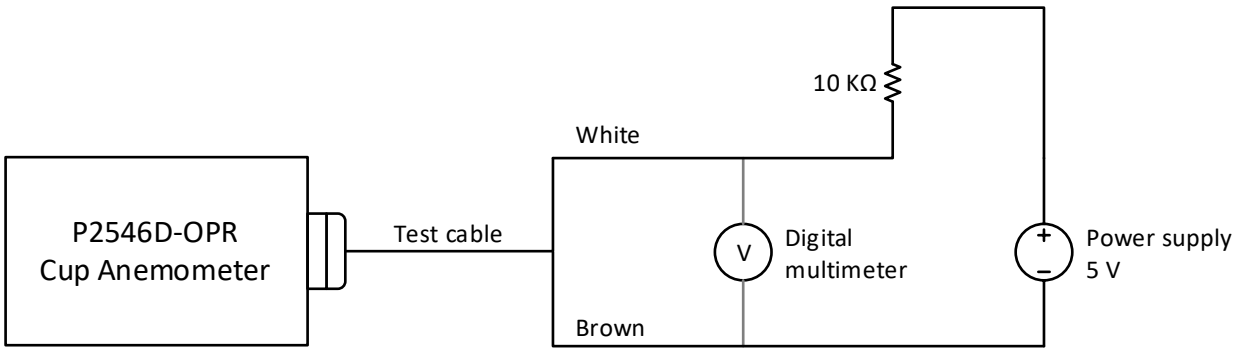

Figure 1: P2546D-OPR laboratory test circuit.

Method 1: Laboratory test with the cup anemometer rotated by hand:

1. Connect a test cable with free ends to the cup anemometer.
2. Set the digital multimeter into DC voltage mode typically identified by a V ⎓ symbol on the measurement selector.
3. Connect the cup anemometer to the power supply through a 10 KΩ resistor as shown in figure 1. Set the output voltage of the power supply to 5 V.
4. Connect the ground terminal on the digital multimeter (typically labeled COM) to the brown wire and the voltage terminal on the digital multimeter (typically labeled V) to the white wire from the cup anemometer.
5. Slowly rotate the cup rotor while monitoring the voltage reading on the digital multimeter. Check that the voltage reading fluctuates at different voltage levels between low level (0 V) and high level (4.5 to 5 V). Faster rotation of the cup rotor will show an average voltage reading of approx. 2.5 on the digital multimeter.

Figure 2

Digital multimeter showing approx. 0 V with the internal transistor closed (turned on).

Figure 3

Digital multimeter showing approx. 5 V with the internal transistor open (turned off).

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

1. Identify the terminals used for the cup anemometer on the data logger. Make sure the data logger is powered on and provides supply for the cup anemometer through a pull-up (or pull-down) resistor. Data loggers typically provides a supply voltage of 5 – 24 V.
2. Set the digital multimeter into DC voltage mode typically identified by a V ⎓ symbol on the measurement selector.
3. If possible, check the voltage on the pull-up resistor or the supply voltage for the data logger.
4. Connect the multimeter to the cup anemometer terminals identified on the data logger.
5. In low wind speed conditions check that the voltage reading on the digital multimeter fluctuates at different voltage levels between low level (0 V) and high level (4.5 to 24 V) determined by the pull-up resistor and supply voltage. In high wind speed conditions check that the voltage reading on the digital multimeter shows an average voltage somewhere in between the expected low level and expected high level.

Figure 4

In very low wind speed conditions, the digital multimeter will change between low level (0 V) and high level (4.5 to 24 V).

Figure 5

In high wind speed conditions, the voltage change will happen more frequently resulting in an average voltage value shown, in this case 2.2 V.