

Interface Circuits for NRG Direction Vanes

Introduction

NRG's model 200P and IceFree™ model HVE Wind Direction sensors are potentiometer sensors. This Application Note gives you additional information on how to use these sensors on non-NRG data acquisition systems.

Output Signal

The output signal of the direction sensor is a ratiometric voltage developed across the potentiometer's 10 K Ohm element. The typical interface circuit develops a DC voltage signal by applying a DC "excitation" voltage across the potentiometer, and sensing the voltage at the wiper.

Deadband Compensation

Since the potentiometer is circular, there is a small "deadband" region between the two ends of the potentiometer. This deadband is a maximum of 8 degrees wide for the Model 200P. By adding 100 Ohm resistors between the excitation and the potentiometer, and between signal common and the potentiometer, the potentiometer range is reduced slightly to compensate for the sensor deadband. At the same time, these resistors prevent direct short circuits in the event of a field wiring problem.

Sensing Circuits

Similarly, the 1 K ohm series resistor shown in the wiper lead prevents short circuits from causing over-current damage to the potentiometer. If the sensing circuit has an input impedance greater than 1 K, the additional resistor is not needed.

The 270 k Ohm pull-down resistor is desirable to make sure that the input reads North when the wiper is in the deadband, and is open circuited. A large value prevents the pull-down from affecting the readings.

The sensing circuit should have some low pass filtering to reject noise. A simple R-C filter is very effective, since the signal is DC. For most data acquisition systems, an amplifier is desirable to buffer the sensor signal from the any loading in the data acquisition system.

