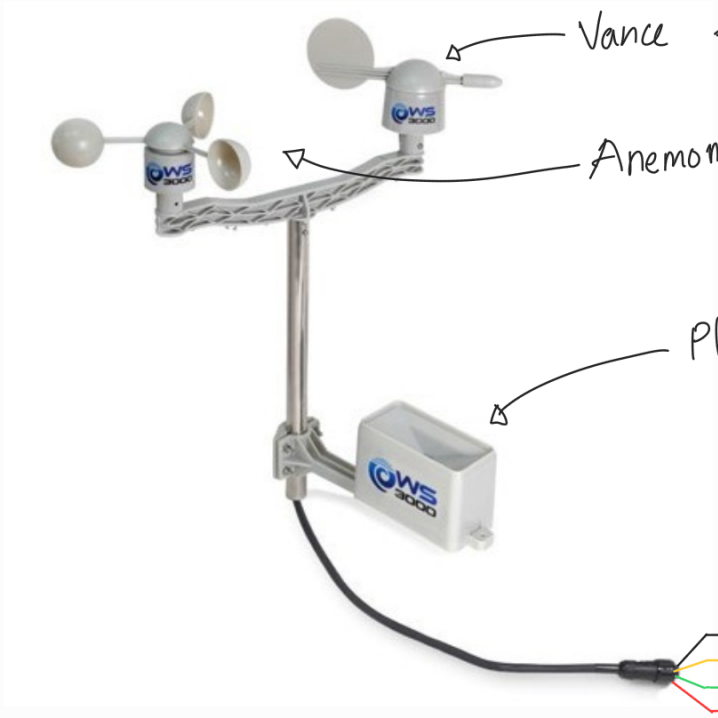
Weather Station WS-3000 Proble



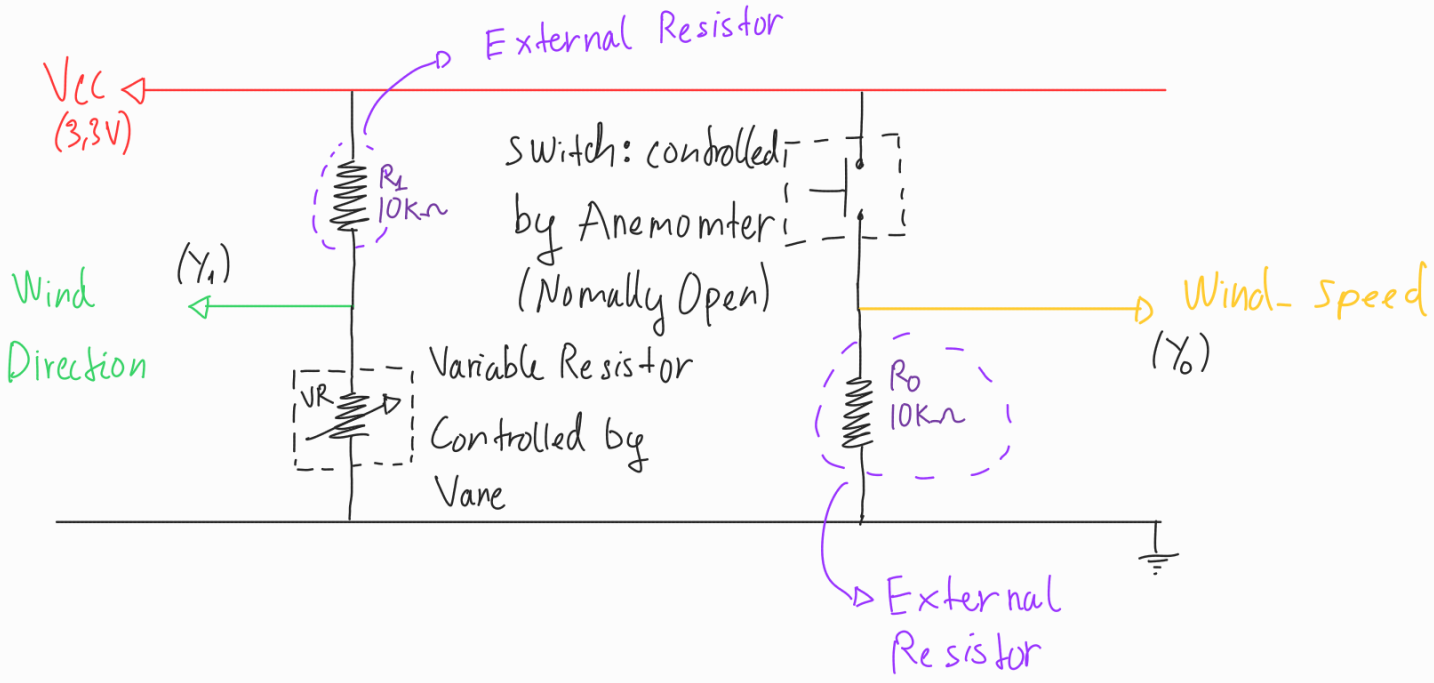
Resistance range : 0,688 → 120 (kΩ)

Max accuracy : 22,5°

Sensitivity : 2,4 km/h / turn = 0,667 m/s/turn.

Speed range : 0 → 240 km/h

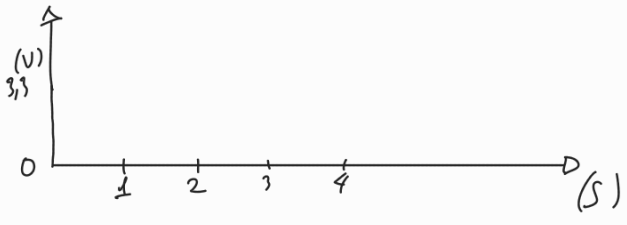
Weather Station WS-3000 Proble – Pinout



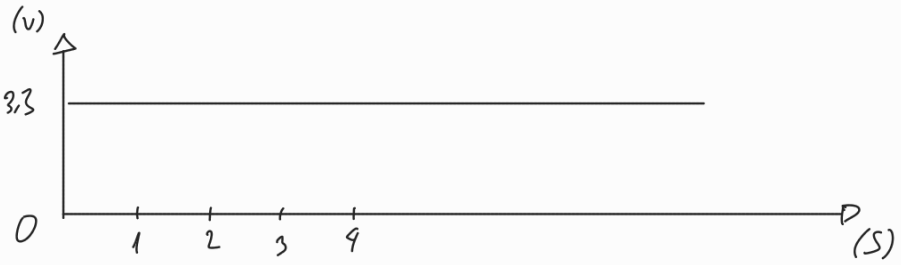
Determine Wind Speed

Waveform of Y_0:

No wind:

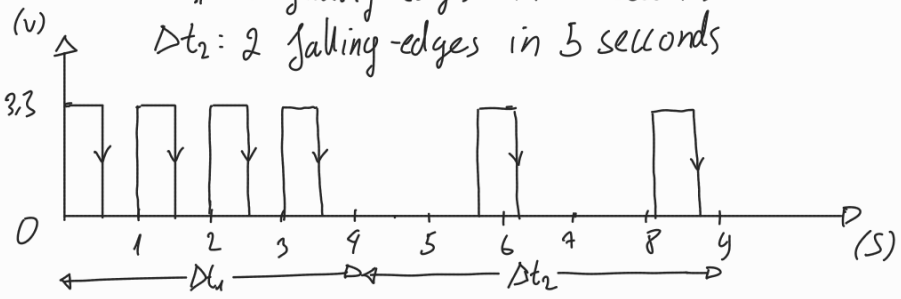


No wind :



Δt_1: 4 falling-edges in 4 seconds
Δt_2: 2 falling-edges in 5 seconds

Has wind :



Wind speed (Avg)

Δt_1 : $0,667 \cdot \frac{4}{4} = 0,667$ (m/s)

Δt_2 : $0,667 \cdot \frac{2}{5} = 0,2668$ (m/s)

Determine wind direction

The equation of output Y_1 is :

$$Y_1 = \frac{VR \cdot 10^3}{10 \cdot 10^3 + VR \cdot 10^3} \cdot 3,3 \quad (V)$$

$$\longrightarrow \quad Y_1 = \frac{VR}{10 + VR} \cdot 3,3 \ (V) = \frac{VR}{10+VR} \cdot 1024 \quad (\text{ADC's unit})$$

Based on the datasheet of WS-3000, we can calc Y_1 corresponding to each angle. Suppose that ADC in ESP32 has ADC's resolution is 10 bits. Hence :

Angle°	R(KΩ)	Y_1 (mV)	ADC ($= \frac{Y_1}{3,3} \cdot 1023$)	
0	33	2532	786	
22,5	6,57	1308	406	
45	8,2	1487	461	
67,5	0,891	270	84	$\Delta = 9$ ADC's unit
90	1	300	93	

$\Delta = 28$ ADC's unit

112,5	0,688	212	65
135	2,2	595	185
157,5	1,41	407	126
180	3,9	926	287
202,5	3,14	789	244
225	16	2030	630
247,5	14,12	1931	599
270	120	3046	945
292,5	42,12	2666	827
315	64,9	2859	887
337,5	21,8	2262	702

1 (ADC's unit) = 0,0032258 (V)

= 3,23 (mV)

Since, a number of ADC's unit between $67,5^\circ$ and 90° is the most minimum in the table. Thus, the accepted accuracy in ADC's unit is ± 4 ($\pm$ 13 mV)