

Report on voltage fluctuations and how the battery percentage should be measured

Battery percentage measurement without the motors running

An input related to the battery level can be taken from the I/O pin 1. Using analogRead() we can measure the values.

| Value from the analogRead() = X | Voltage of the battery = Y |
|---------------------------------|----------------------------|
| 1226 | 3.81 |
| 1242 | 3.87 |
| 1260 | 3.92 |
| 1275 | 3.97 |
| 1355 | 4.22 |

These data have a Pearson correlation of 0.999746. Hence these data are highly correlated.

$$Y = -0.04828 + 3.15058 \cdot (10^{-3})X$$

Readings can be mapped out to real voltages using this equation.

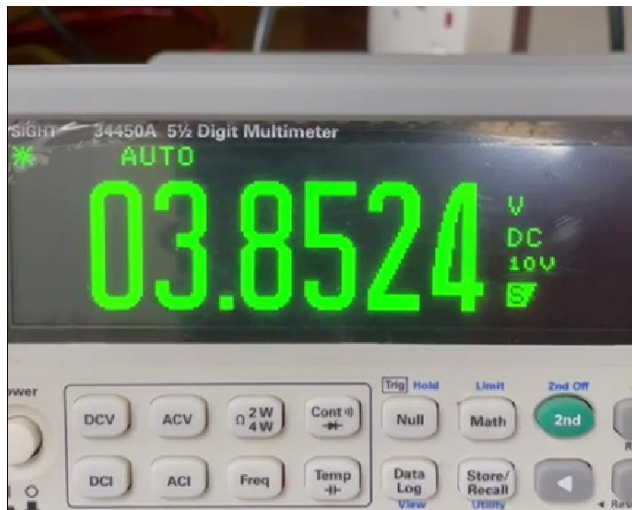
Battery percentage measurement when the motors are running

When the motors are running a noise is generated in the reading.

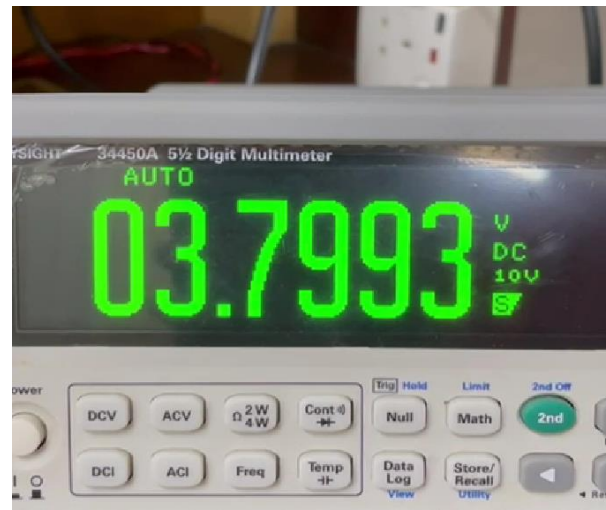


A periodic wave with a frequency of 1kHz is formed. This noise can be filtered by using a LPF with a cutoff frequency less than 1kHz.

When the motors start running a sudden voltage drop is occurred in the reading.



(Before motors run)



(When motors are running)

This drop varies with the real battery voltage (voltage before the motor runs).