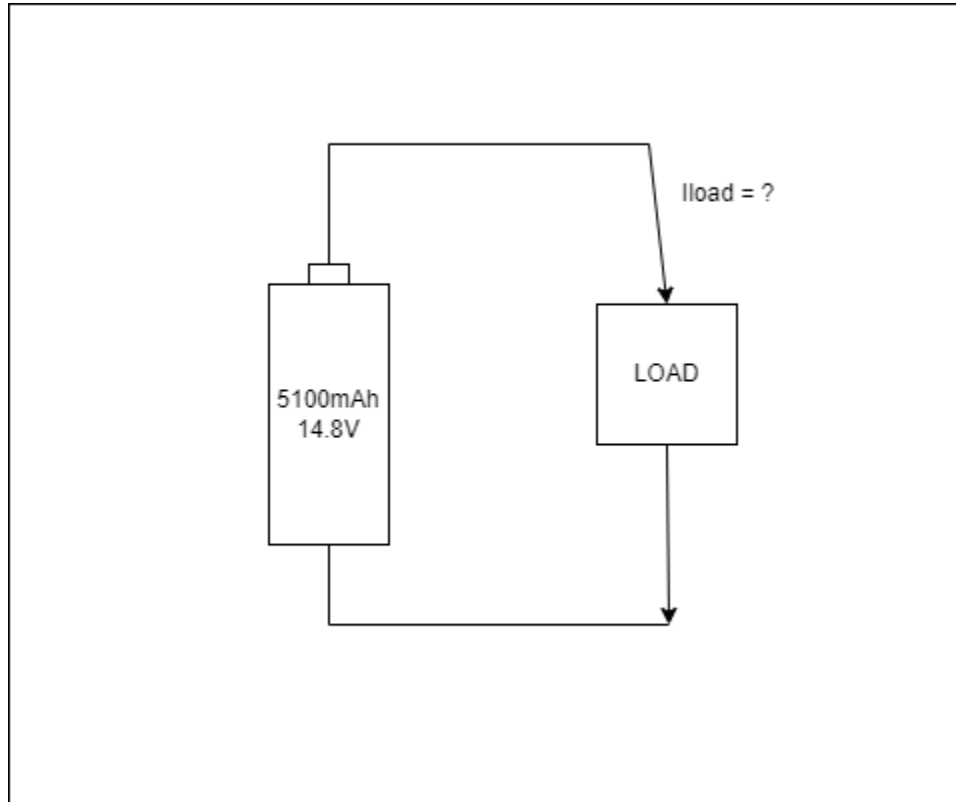


# Robot Battery Life

This document aims to calculate an estimated lifetime for the battery fitted on our robot



Our battery has a capacity of 5100 mAh and a nominal voltage of 14.8V. By calculating the current consumed by a load connected to the battery's terminals, an estimated lifetime can be derived with a simple division. For that, we need to calculate an average worst case load current. By defining the worst case scenario as one where all power converters output max power , the total power output would be  $12 \cdot 6 + 5 \cdot 6 + 7.4 \cdot 4 = 131.6 \text{ W}$  .

Considering the efficiency of all converters to be 0.9, the total power output from the battery is approximately  $131.6 / 0.9 = 146.22 \text{ W}$  . With an added security coefficient of 20%, the result is 175.46W. Assuming that the battery's voltage remains at 14.8V no matter what (which is not the case...) , the total load current about the battery's terminals is  $175.46 / 14.8 = 11.85 \text{ A}$  .

We can now calculate the lifetime using the previously calculated value and the battery's capacity. Lifetime =  $5.1 \text{ Ah} / 11.85 \text{ A} = 25.82 \text{ minutes}$  .