

task_5ztn80yw2uibcsxr_with_calculation

Student Group

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Exercise E7 Conversions: Battery

2. How long is a lead-acid battery with 10 kWh of energy supplied by a 100 W power source for the calculated time?

Result

$$\begin{aligned} t &= 200'000 \sim \{\text{min}\} \end{aligned}$$

There are additional losses:

$$\begin{aligned} W &= 10 \sim \{\text{kWh}\} \quad \&= 10'000 \sim \{\text{Wh}\} \\ t &= \frac{W}{P} = \frac{10'000 \sim \{\text{Wh}\}}{100 \sim \{\text{W}\}} = 100 \sim \{\text{h}\} = 4 \sim \{\text{days}\} \end{aligned}$$

200'000 (in min) quad = 100 (in days)

- The battery has an internal resistance. Depending on the current the battery provides, this leads to internal losses.
- The internal resistance of the battery depends on the state of charge (SoC) of the battery.
- The wires also add additional losses to the system.

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