

# How to measure the self-consumption current of the battery cabinet





## Overview

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How to measure battery self-discharge?

A powerful tool is presented to directly measure battery self-discharge. Precise self-discharge currents are measured with a high resolution of  $0.25 \mu\text{A}$ . Experimental investigation of the method is done based on temperature and SoC. Arrhenius analysis of self-discharge provides chemical insights to the LiB cells.

What happens if a battery has a different self-discharge rate?

Varying self-discharge rates between cells in a battery pack can result in voltage imbalances between the cells and a shorter battery pack life (Zheng et al., 2020). Self-discharge rates vary depending on the cell chemistry, capacity, electrode geometry, electrolyte formulation, impurities, and temperature.

How does a BMS measure a battery pack?

Generally, a BMS measures bidirectional battery pack current both in charging mode and discharging mode. A method called Coulomb counting uses these measured currents to calculate the SoC and SoH of the battery pack. The magnitude of currents during charging and discharging modes could be drastically different by one or two orders of magnitude.

What is the shunt range for EV battery pack current measurements?

For EV BMS battery pack current measurements, shunts range anywhere from  $25 \mu\Omega$  to  $100 \mu\Omega$ . One of the most established ways to accomplish highly accurate shunt-based current measurements with a wide dynamic range is to use a high-resolution delta-sigma ( $\Delta\Sigma$ ) ADC.



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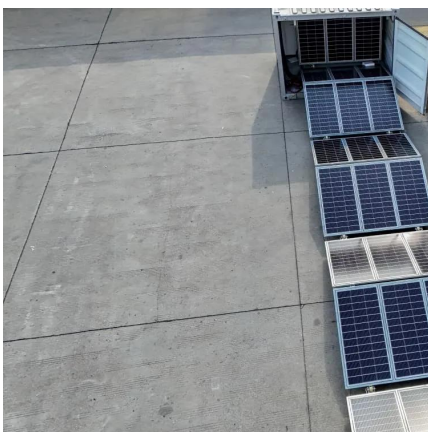


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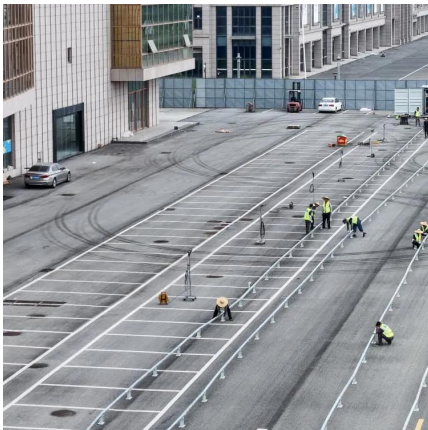
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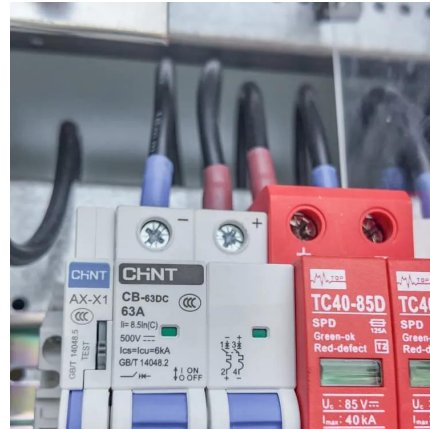
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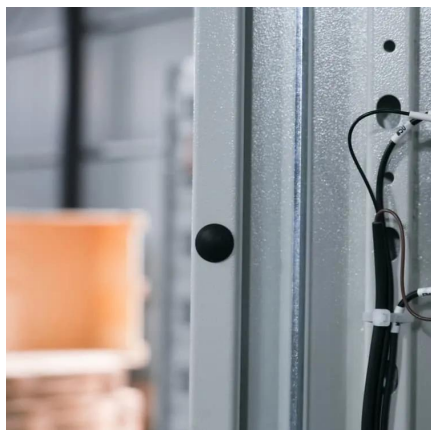


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