

ADC8000 Intelligent Battery Charger Platform

Battery Deep Discharge Protection

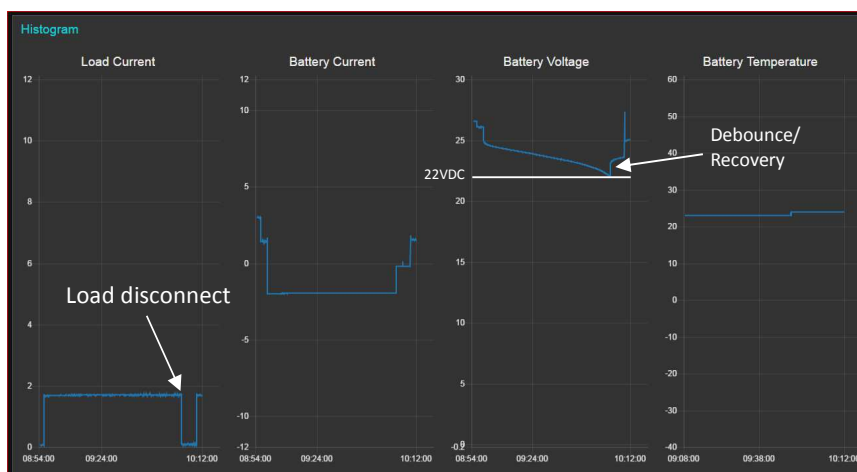
A fully discharged battery is in most vulnerable condition for permanent damage. Lead acid batteries generate sulfation crystals to lead plates during discharge. This is normal behaviour and cause no harm as sulfation crystals are dissolved during charging. If batteries are deep cycled and discharge state is prolonged, soft and soluble sulfation can transform to hard sulfation. Hard sulfation cause permanent damage to battery as sulfation crystals reduce battery's active material. To prevent hard sulfation, discharging must be interrupted before battery is fully depleted. A deep discharge protection disconnects load from battery and keeps battery in safe operation mode.

Adjustable Deep Discharge Protection

Every application has different characteristics regarding battery use. Some require high power for short period of time whereas some use small power but for need long backup time. Battery impedance is temperature dependent and applications with high power need different deep discharge levels compared to low power applications.

A typical application load has constant power. As batteries are discharged, terminal voltage drops. A constant power load compensates drop in voltage with higher current demand. Higher current cause larger voltage drop in battery internal impedance and a vicious cycle is ready. Therefore deep discharge protection threshold must be adjusted per application needs. A high power load at low temperatures requires lower deep discharge thresholds compared to low power application in high temperature.

ADC8000 has fully adjustable deep discharge protection integrated in the unit. Level where deep discharge protection is engaged can be adjusted for best performance and battery health.



Picture: Deep discharge protection in action .

ADC8000 deep discharge protection is insensitive for battery terminal voltage debounce after deep discharge load disconnect. High load current disconnect cause battery terminal voltage to recover. Deep discharge protections with fixed voltage hysteresis can start oscillate between deep discharge state and normal operation. ADC8000 maintains deep discharge condition until AC supply voltage becomes available.