

## Solar Charge Regulators for 12V AGM/Gel Batteries

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### Why Your AGM/Gel Battery Needs Special Protection

Ever wondered why AGM batteries die prematurely in solar setups? The culprit's often improper charging. These valves-regulated lead-acid (VRLA) batteries require precise voltage control - 14.4V-14.6V for absorption, 13.6V-13.8V for float. Exceed by just 0.5V, and you'll lose 18% of battery lifespan according to C&D Technologies' 2024 study.

### Battery Chemistry Decoded: AGM vs Gel

While both use recombinant technology, gel batteries suspend electrolyte in silica gel, requiring lower charging currents. AGM's fiberglass mat construction allows faster charging but demands tighter voltage tolerance. A Nigerian solar farm used standard controllers on gel batteries in 2023. Within 8 months, 40% capacity loss occurred due to electrolyte stratification.

Parameter	AGM	Gel
Max Charge Current	30% C20	20% C20
Equalization Voltage	Not Required	15V (Controlled)

### MPPT vs PWM: Which Regulator Wins?

Modern Maximum Power Point Tracking (MPPT) controllers achieve 93-97% efficiency versus PWM's 60-80%. But wait - Victron Energy's 2025 field tests show PWM outperforms MPPT in small-scale (

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