NEW STRATEGY FOR RECHARGING PHOTOVOLTAIC LEAD ACID BATTERIES

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Abstract :

The lead acid batteries used in the photovoltaic systems are subjected to penalizing operating conditions. The recharge is badly controlled since it is dependent on the weather conditions in particular. This condition involve unusual degradations of the active material compared to more traditional applications like the starting batteries, and consequently, a shorter life time.

The management of the recharge of the photovoltaic lead acid batteries seems to be a major issue for the optimization of their life time. Today, the strategies of management are generally based on high and low voltage thresholds (High Voltage Disconnect and Low Voltage Disconnect) which are limiting the system in a voltage domain acceptable for the battery and for the user. However, and in spite of the addition of reconnection thresholds (High Reconnect Voltage and Low Voltage Reconnect), this kind of management appears unable to guarantee one optimal lifespan.

More complex methods of end of recharge as complements of recharge using current pulses called PWM (Pulse Width Modulation) are increasingly widespread today. Many parameters are flexible (frequency of pulses application, cyclic ratio, voltage threshold for beginning the PWM phase ...) but no reliable data is available today in the literature.

The study which follows enabled us to optimize these various parameters (under well defined operating conditions) and proved that PWM management presents real benefit compared to a simple management by voltage thresholds.