

Charge Controller

Used in: Battery systems

AKA: Controller, regulator, CC

What It Is: A device for regulating and optimizing battery charging

What It Ain't: The quarter-ton monster your spouse hired to control your credit card spending

Any device that charges batteries should use electronics to limit charging once the batteries approach full. The charge-limiting electronics can be stand-alone or included as part of the device. Your car alternator/regulator, cell phone charger, and laptop charger are all examples of devices that use electronics to control charging. Overcharging batteries can lead to decreased life, and even fire and explosions in some cases. That may sound exciting, but believe me, only on TV.

Charge controllers are a common component in battery-based RE systems. There are two basic types of charge controllers—series and shunt. Series controllers basically disconnect the charging source from the batteries when they're fully charged. Shunt or load controllers divert excess energy to secondary, nonpriority appliances or "dump loads," such as electric water heaters or air heaters, once the batteries are full.

Solar-electric panels can be partially or fully disconnected from the batteries and not be damaged. In fact, this is the most common form of regulation in battery-based solar-electric systems. As the batteries reach a full state of charge, the controller gradually turns off the array, tapering off the charge rate. Many modern solar charge controllers include maximum power point tracking (MPPT) circuitry that also optimizes the amount of energy that goes into the battery.

Most wind generators and hydroelectric turbines will be damaged if disconnected from the batteries while running. The batteries electrically load the turbine and help limit how fast it spins. In these systems, a shunt-type charge controller is used to divert excess energy to a dump load when the batteries are fully charged.

For more information on charge controller basics, check out "What is a Charge Controller?" by Windy Dankoff in *HP72*, page 68.

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Charge controllers limit the amount of energy that charging sources deliver to the batteries as they get full.