

## Ample Power Company

# Miscellaneous Problems

---

### Leaks in Sealed Batteries

Sealed batteries normally operate at slight positive pressure. They are fitted with overpressure valves which operate should the battery be overcharged. Defective valves are possible, and a valve can open under an overcharge and not reclose. This failure is usually recorded by a fine white powder that exits through the valve and is deposited on the case.

The positive and negative posts are sealed around their exit from the case. Loss of this seal can cause the battery to dry out and become worthless. Loss of a seal around the post usually turns the post black. If there is any doubt about the seals, brush a little soapy water around the post and then push on the battery cases. If any bubbles appear, return the battery to your dealer.

### Big Alternators . . . Small Batteries

A customer reports that after installing a large frame alternator in place of the small frame unit that he had been using with a Smart Alternator Regulator, SAR, the SAR began acting strange. During the absorption cycle, the voltage kept declining on the battery. Since that never used to happen with his small frame alternator, what could have gone wrong?

Nothing . . . the SAR uses battery temperature sensors. If a battery is charged so fast that temperature starts to build up, then the SAR reduces the absorption voltage. As a minimum, temperature compensation prolongs battery life. Without temperature compensation, a hot battery can go into thermal runaway. Thermal runaway works like this . . . the hotter the battery gets, the more current it accepts, heating it further. Soon, the battery will be boiling hot, spewing acid steam. It may even blow the case apart.

It's our opinion that high performance charging without battery temperature sensing is a lurking time bomb. We have witnessed thermal runaway once when we induced it pur-

posely by removing temperature sensors during a fast charge. The batteries were 6-Volt liquid electrolyte units in series. Thermal runaway may not happen in the Northwest where most regulator testing takes place. It may not happen until battery usage is heavy, such as during an ocean passage. If Murphy's law is applicable, it will happen to you a long way from help. Does your performance regulator have battery temperature sensing?

### Killing a High Output Alternator

Alternators spin a rotor inside the stator windings. The rotor is an electromagnet. The strength of the magnetic field that it produces is directly proportional to the *magnetic permeance* of the rotor material. Permeance is temperature sensitive, and a very high temperature can permanently reduce it to the point where it is no longer effective. A slipping belt will overheat the rotor shaft, and eventually, the rotor magnetic material will cease to function.

Most high output alternators come with nylon lock nuts on the output studs. They help prevent loose connections. When a loose connection does develop, it acts as an arc welder, generating lots of heat. Eventually, the stud melts, and the wire drops away. If it falls against the engine, and you're not protected with a fuse prepare for a fire!

High output alternators need to be connected with large wires. The wires are usually quite stiff, so as the engine vibrates, the wire applies twisting torque to the nylon lock nut and may eventually loosen it. To avoid such problems, use fine stranded and flexible wires. Welding cable works well for this. A long service loop should also be left so that the wire can move with the engine vibrations. Naturally, it is good practice to check the alternator connections on a regular basis. A second nut on the output stud is a wise safety measure.