TUTORIAL ON OUR LEAD-ACID BATTERIES, BATTERY CHARGERS, CHARGING, RUN TIMES, AND DEEP DISCHARGE

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Our Valve-Regulated Lead-Acid (VRLA) Batteries

We almost exclusively sell batteries manufactured by PowerSonic (PS); a company specializing in the design and manufacture of rechargeable batteries. Founded in 1970, Power-Sonic has become a leading global supplier of sealed lead-acid batteries, lithium-ion batteries, and other battery-related products. They serve a wide range of industries with headquarters in the United States and manufacturing facilities in Asia. PowerSonic is known for producing high-quality batteries with a focus on reliability and performance and that is why we almost exclusively sell PowerSonic batteries with our traps.

Technical Characteristics of the PS Series of General-Purpose VRLA Batteries

The PS VRLA Series— Is a line of general purpose VRLA (valve regulated lead-acid) batteries. Many of the PS batteries are VdS approved.

Sealed construction— The unique construction and sealing techniques of the PowerSonic (PS) battery guarantee leakproof operation in any position with no adverse effect to capacity or service life. It is not recommended to operate continuously inverted orientation. PS batteries are rugged with an impact resistant ABS case and cover flame retardant to UL94:HB and UL94:V0.

Electrolyte Suspension System— All PS batteries utilize an electrolyte suspension system consisting of a high porosity, glass fiber material which in conjunction with plates, totally absorb and contain the electrolyte. This technology is known as Absorbent Glass Mat (AGM). No silica gels or any other contaminants are used.

Gas Generation— PS batteries incorporate a built-in design that controls gas generation and induces recombination of more than 99% of gases generated during float usage.

Maintenance Free Operation— There is no need to check specific gravity of the electrolyte or add water to PS batteries during their service life. In fact, there is no provision for this type of maintenance.

Low Pressure Valve Regulated System— All PS batteries are equipped with safety release valves, designed to operate between 2 and 5 psi and automatically reseal. Hence, there is never an excessive accumulation of gas within the battery.

Heavy Duty Grids— Heavy duty lead calcium tin alloy grids provide an extra margin of performance and service life in either float or cyclic applications, even after repeated over discharges.

Cyclic Service Life— More that 200 discharge/recharge cycles can be realized from PS batteries, *dependent primarily on the average depth of discharge, storage and charging conditions*. Our regulated and fully automatic chargers described below are excellent for promoting battery life through controlled recharging.

Operating Temperature— Yuasa PS Batteries may be operated over a broad range of ambient temperatures.

Deep Discharge Recovery— PS batteries can often recover their capacities even after repeated deep discharges— *it depends on how deep was the over discharge and the length of time before attempting to recharge.*

Self Discharge and Shelf Life— The self discharge rate of the PS series at room temperature is approximately 3% of rated capacity per month.

EUROBAT Classification: — 3 to 5 years 'Standard Commercial' and 10/12 years 'Long Life'.

Our Mains Chargers

We supply several related chargers that are very easy to use. All of the units have an internal computer-on-a-chip that makes possible the exact performance required for lead-acid batteries, whether they are manually filled or sealed electrolyte. There are no switches to set. All battery chargers are fully regulated and automatic; continuously shorting the battery leads will not harm the chargers. The 6- and 12-volt lead acid battery chargers (PN 2.92-6-90-240 and PN 2.70, respectively) are both fully regulated and can automatically charge our lead acid batteries; the input voltage is 90-240 VAC, 50/60 Hz so they can be operated in virtually every country of the world. The six and twelve volt chargers outputs 3 and 5 amps per hour, respectively. They both have a two-speed cooling fan and three LEDs to indicate power on/off, bulk charging, tapering charging, and fully charged. All units are fuse protected.

Estimating the time required to charge and run times

Estimated charging times— One ampere (Amp) equals 1,000 milli-amperes (mAmps). The miniature incandescent traps such as the Model 512 or the Model 1012 consume about 0.25 Amps per hour when running (fan and light bulb together). Total consumption for a 10-hour night of trapping would draw down a battery about 2.5 Amps (i.e., 10 hrs * 0.25 Amps/hr = 2.5 Amps). This discharge would take about one hour to replenish: 1.2 * (2.5 Amps consumed / **3.0** Amps per hour charging rate) = **1**.0 hour**.** The 1.2 term reflects the fact that there is some inefficiency in charging, some of the charger's 3.0 Amps per hour output does not go into the battery as stored electrons, but as heat.

The blacklight traps consume about twice as much electricity per hour, therefore, associated charging times would be twice as long.

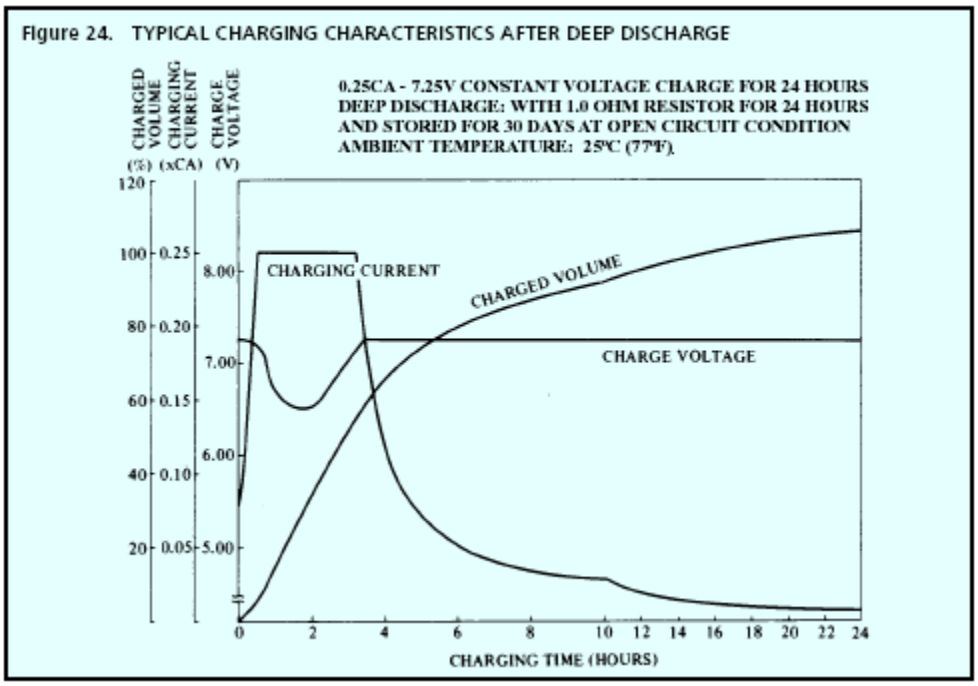
Calculating estimated run times

The maximum run time for a trap may be calculated by taking 75% of the battery's AmpHr rating divided by the traps current (Amps) consumption. For the Model 512 and a 12 AmpHr battery, the calculation is:

0.75 * (12.0 Amps per fully-charged battery / 0.25 Amps per hr consumption by the trap) = 30 hours. The 0.75 figure is to limit the discharge to a safe level.

Note, as the battery ages and undergoes charge/discharge cycles, its AmpHr capacity when fully charged declines until finally the battery must be replaced. Cool storage prolongs battery life.

*Recovery Charge After D**eep Discharge***



When a battery has been subjected to deep discharge (commonly referred to as over-discharge), the amount of electricity which has been discharged is actually 1.5 to 2.0 times as great as the rated capacity of the battery. Consequently, a battery which has been over-discharged requires a longer charging period than normal. Please note, as shown in Figure 24 below, that as a result of internal resistance, charging current accepted by an over-discharged PS battery during the initial stage of charging will be quite small, but will increase rapidly over the initial 30 minutes (approximate) until internal resistance has been overcome, and normal, full recovery charging characteristics resume.

In view of the above, consideration should be given to the fact that if the charging method used is constant voltage in which the charger employs current sensing for either state of charge indication or for reducing voltage (a two step charger), during the initial stage of charging an over-discharged battery the charger may give a false “full charge”

indication, or may initiate charge at a float voltage. Quite often, an over-discharged battery cannot be recharged, it is ruined.

PLEASE TAKE CARE TO NOT DEEP DISCHARGE YOUR BATTERIES. Often these batteries cannot be recharged and are not covered by warrantee.

Maximum Run Time for a Battery/Trap Combination

Maximum run time may be calculated by taking 75% of the battery's Amp. Hr. rating divided by the current consumption of the trap. For example, the Model 512 is a 6-volt trap with a current consumption of 0.25 Amps/hr. Using our 6 V and 12 Amp. Hr. battery (Model2.30), the calculation is:

$$0.75 * (12 \text{ Amps} / 0.32 \text{ Amps. per hr.}) = 28.1 \text{ hrs.}$$

So, you could run this trap and battery combination for 3 trap nights of 9-10 hrs. each without having to worry about battery deep discharge. Note battery life is a function of many factors, but the frequency and depth of deep discharging (≥ 75% of rated capacity) will shorten battery life. Note, as the battery ages and undergoes charge/discharge cycles, its Amp. Hr. capacity when fully charged declines until finally the battery must be replaced. Cool storage prolongs battery life.