TUTORIAL ON BATTERIES, BATTERY CHARGERS, CHARGING, RUN TIMES, AND DEEP DISCHARGE

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Our Batteries

We almost exclusively sell batteries manufactured by Yuasa. Founded in 1918, they began development of the maintenance free sealed lead acid battery in 1958. Today's NP Series is the culmination of over seven decades of battery manufacturing experience. High energy density, sealed leak proof construction, excellent performance in either float or cyclic applications and long service life combine to make the Yuasa NP Series the most reliable and versatile maintenance free rechargeable sealed lead acid batteries available.

Technical characteristics

Sealed construction— The unique construction and sealing techniques of the NP battery guarantee leakproof operation in any position with no adverse effect to capacity or service life.

Electrolyte Suspension System— All NP 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. No silica gels or any other contaminants are used.

Gas Generation— NP 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 NP batteries during float service life. In fact, there is no provision for this type of maintenance.

Low Pressure Valve Regulated System— All NP 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 Yuasa NP 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 NP Batteries may be operated over a broad range of ambient temperatures.

Deep Discharge Recovery— NP 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 NP series at room temperature is approximately 3% of rated capacity per month.

Our 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, sealed electrolyte, or Gell-cells. There are no switches to set. All battery chargers are fully regulated and automatic; continuously shorting the battery leads will not harm the chargers.

Table of our chargers with part numbers, input voltage, an indication of the battery they are used to charge, the per battery charge rate, and the number of batteries a single charger can charge simultaneously.

Part no.	Input voltage (AC)	Battery voltage	Charge rate	Batteries charged
2.90-6V-110	110 AC	6 DC	1.5 Amps/hr	1
2.88-6V-110	110 AC	6 DC	3.0 Amps/hr	2
2.90-12V-110	110 AC	12 DC	1.5 Amps/hr	1
2.88-12V-110	110 AC	12 DC	3.0 Amps/hr	2
2.90-6V-220	220 AC	6 DC	1.5 Amps/hr	1
2.88-6V-220	220 AC	6 DC	3.0 Amps/hr	2
2.90-12V-220	220 AC	12 DC	1.5 Amps/hr	1
2.88-12V-220	220 AC	12 DC	3.0 Amps/hr	2

Specification of part numbers

The units beginning with part numbers of 2.90 all charge one battery at a time at a maximum rate of 1.5 Amps per hour. The units beginning with 2.88 are essentially two identical and completely independent chargers in a single package; each provides a maximum of 1.5 Amps per hour to each battery. These are used to charge two batteries at once- each battery would be charged according to its condition and charge state. The leads on these units can be attached to a single large battery (at least 20 Amp-hr rating) and charge at the combined rate of 3.0 Amps/ hr.

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 drawn down a battery about 2.5 Amps (i.e., 10 hrs * 0.25 Amps/hr = 2.5 Amps). These chargers would take about 2 hours to recharge such a battery.

1.2 * (2.5 Amps consumed / 1.5 Amps per hour charging rate) = 2.0 hours

The 1.2 term reflects the fact that there is some inefficiency in charging, some of the charger's 1.5 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.

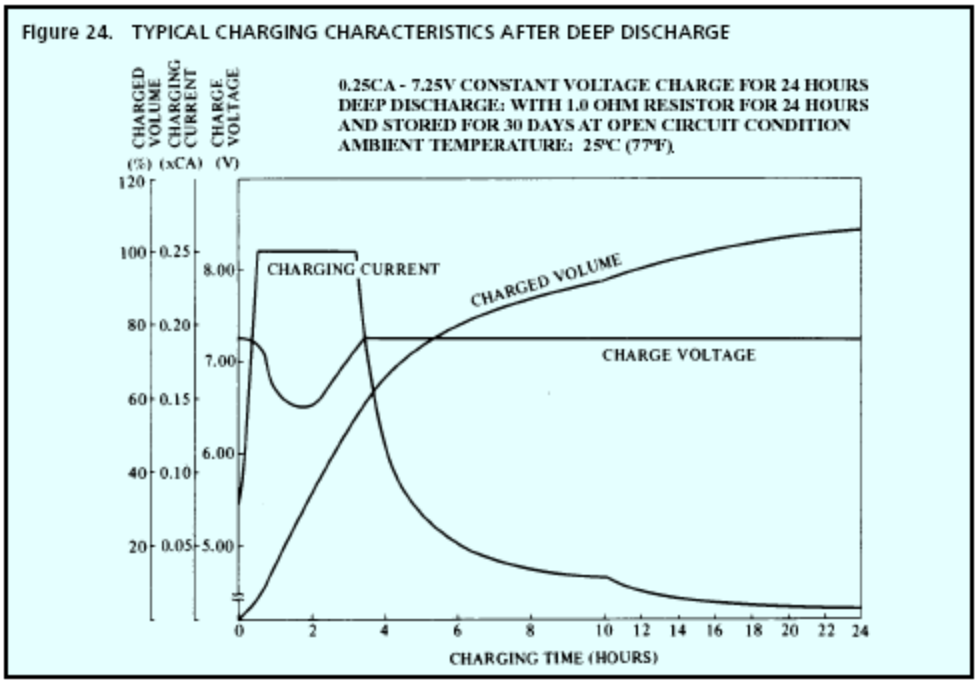
Calculating estimated run times

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 10 AmpHr battery, the calculation is:

0.75 * (10.0Amps per fully-charged battery / 0.25 Amps per hr consumption by the trap) = 30 hours

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 Deep 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 NP 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 calculated by taking 75% of the battery's AmpHr rating divided by the traps current consumption. For the Model 512 and a 10 AmpHr battery, the calculation is:

0.75 * (10.0Amps / 0.32 Amps per hr) = 23.4 hrs.

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.