Temperature Effect

Temperature Affects the Battery Capacity

Temperature affects the battery capacity. Usually, the higher the temperature is, the larger the discharge capacity. During discharging time, if the temperature is not 25℃ , it needs to convert the measured capacity C_t to 25℃ normal capacity C_{25} according to the following formula.

$$C_{25}=\frac{C_t}{1+K(t-25)}$$

In the formula: t is the discharging ambient temperature, K is temperature coefficient. In the 10hr capacity experiment, K=0.006/℃ and 3hr capacity experiment, K=0.008/℃ , 1hr capacity experiment, K=0.01/℃.

Float charge characteristic: Float charge voltage should choose the manufactory recommendatory voltage value. And the float charge voltage value should make corresponding adjustment according to the ambient temperature. When the switch power has temperature equalization function, but has not sensor or temperature auto-equalization function, VRLA battery float charge voltage with different temperature should make corresponding adjustment according to the following table.

Table 3 Float Charge Voltage under Different Ambient Temperature

Ambient temperature (℃)	Float charge voltage (about V±0.01V/cell)
0~10	2.28
11~15	2.26
16~25	2.23
26~30	2.22
31~40	2.19

Temperature Impacts on the Battery Life

The battery has the longest service life and the best performance if the environment temperature is kept at 24~25℃. When the temperature is lower than 25℃, the charging efficiency and performance of the batteries will decrease. Vice versa, if the temperature is higher than 25℃, the service life of the batteries will be shortened. The reference data are listed below:

Table 4 Effect of Temperature on the Battery Service Life

Battery mean temperature	Service life decreasing rate(%)
25℃	0
30℃	30
35℃	50
40℃	66
45℃	75
50℃	83

The expected floating charging service life is around 15 years. But if the actual mean temperature of the batteries is around 35℃, then the expected floating charging service life is only 7.5 years.

Sealed Lead Acid Battery

Operation and Maintenance Manual