

Battery Health Impedance or Voltage Measurements Why Impedance is Proper Method

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When UPS/Battery users realize predictive battery health monitoring would benefit them, they are presented systems which do voltage based monitoring and/or impedance based monitoring. Users are rarely well versed in technical aspects of battery health monitoring. They benefit from outside expertise to present facts to base a selection decision. Below are photos of the same battery tested via voltage and impedance. Battery monitoring, properly installed, reads both the battery and the adjacent battery cable. This is done by attaching the test leads to every positive battery post. Thus the test equipment reads the battery, its cable and the connection integrity itself all the way to the next positive battery post.



12.47 VDC, 8.5 m-ohm, bolt in place



12.47 VDC, 30.5 m-ohm, bolt missing

This battery and cable reads 12.47 volts DC in both photos. It is off charge and a nominal 12 volt battery. By voltage this battery and connection would be determined healthy. This battery and cable read 8.5 m-ohm in the left photo and 30.5 m-ohm on the right photo. The only difference is that the bolt has been removed from the battery in the right photo. By voltage it reads fine, by impedance it is shouting something is wrong. In this case it is a bad connection. In general when a battery has its impedance rise 30% it is recommended to be changed out. That means if a battery when new reads 8.5 m-ohm, a future reading of 11.05 would mean it should be changed out. Only impedance monitoring can determine this.

Granted, the above is an extreme condition but one which shows the weakness of using voltage only to determine battery health. In actuality, voltages of batteries can change within a few tenths

of a volt and be of no concern. Rising impedance is of concern. Higher impedance reduces charging current and as such a high impedance battery can adversely affect all the other batteries in series with it by blocking charge current. Voltage only testing as seen above can miss a failing battery as this example shows.

We have been involved with batteries for 30 years and battery health testing for 18 years. The systems we use measure voltage and impedance so either method is covered. However experience has proven impedance is the early (and sometimes only) indicator of battery health.

Battery health monitoring is a significant investment of paramount importance to UPS uptime. Beware of systems that do only the easy part of monitoring. Any voltmeter could monitor voltage. Sophisticated equipment completes the full job by measuring impedance where milli-ohms of difference are meaningful.

For more information on battery monitoring please feel free to contact us at 904-880-0118.