



Understanding the Limitation of a Battery Monitoring Systems High Resistance Alarm Threshold

The High Resistance Alarm Threshold on any battery monitoring system is subject to the relatively wide variances in internal resistance on any given battery model.

Two important facts about batteries:

1. Batteries can vary from the manufacturers' published internal resistance by more than 15% +/-.
2. Individual batteries should also be replaced when the internal resistance for that particular battery has risen by 20% from it's initial reading at installation.

The following table is an example of the required High Resistance Alarm threshold setting on a battery monitoring system. The threshold is normally set 20% above the battery with the highest resistance readings in the string in order to avoid nuisance alarms from a battery monitoring system. This example uses a battery with a specified internal resistance of 1.0 Milliohms.

	Initial Internal Resistance	20% Rise in Internal Resistance	Monitoring System High Resistance Alarm Threshold	% of Internal Resistance Rise at Alarm Threshold
15% Above Spec.	1.15 mΩ	1.38 mΩ	1.38 mΩ	20%
At Spec.	1.00 mΩ	1.20 mΩ	1.38 mΩ	38%
15% Below Spec.	0.85 mΩ	1.02 mΩ	1.38 mΩ	62%

Therefore a battery that starts with an internal resistance 15% below the manufacturers' published specification will exceed the recommended replacement threshold by a factor of 3X before the alarm threshold is met.

A high resistance battery could open and fail when placed under load, resulting in a UPS load loss. See the Data Power Monitoring Whitepaper SIRR Whitepaper (Sudden Impedance/Resistance Rise) for more information on how individual batteries can cause a load loss in these scenarios. <http://www.datapowermonitoring.com/dpmc/whitepapers.html>

As a solution, Data Power Monitoring recommends diligent weekly trending of each individual battery's voltage and internal resistance in order to protect the reliability of the battery string and prevent a load loss.