PowerFlow
APPLICATION NOTE
PRODUCTS AND INFORMATION FOR POWER PROFESSIONALS

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Why use impedance testing for batteries?

Impedance testing basically views the cells in a bank of batteries as resistors in a series connection. The higher the impedance of a cell, the less current it can generate (when voltage is applied). Impedance is just AC resistance. Impedance includes terms for inductance, capacitance, and frequency, but at a constant frequency, this term becomes a constant. Changes in measured impedance are then due to actual differences in the internal impedance of a cell and not due to changes in frequency. By applying an AC current signal into a cell or across the entire bank and measuring the AC voltage drop, impedance can be calculated using Ohm's Law, Z=V/i.

There is a strong correlation between battery capacity and impedance that can be shown by carrying out an internal ohmic test. As capacity decreases, impedance increases. Internal impedance can find weak cells in a battery bank with extremely high confidence levels. In fact, the Electric Power Research Institute (EPRI) conducted a study for four years on approximately 30,000 cells comparing the value of internal ohmic testing including impedance to battery capacity. The study determined that impedance is an excellent tool for filling in the gaps in load tests while simultaneously decreasing battery backup risks. In other words, it reduces the cost of battery maintenance and reduces risk.

Impedance tests have an excellent ability to find weak cells and can greatly reduce the frequency of performing discharge tests. By decreasing the frequency of discharge tests, battery maintenance costs are reduced. Note that in order to get a better correlation between capacity and impedance, it is recommended that an impedance test is performed directed preceding a discharge test.

Megger's BITE2P Battery Impedance Test Equipment

Battery Impedance Test Equipment

Megger's battery impedance test equipment (BITE2 and BITE2P with printer) measures the impedance and DC voltage for lead-acid and nickel-cadmium batteries up to 7000 Ah. Testing is done on-line with no required outage and no discharge. Impedance values are calculated automatically. The units store up to 2,000 readings (up to 300 tests.) The Miniature Battery Impedance Test Equipment (MBITE) operatives in the same manner, but is designed for batteries less than 2,500 Ah. All units come with ProActiv Battery Maintenance Database Tool.

Managing Battery Results

Proper battery management is a critical part of ensuring that stationary batteries have the capacity needed when called upon. Test results must be cataloged and trended in order to schedule the proper maintenance and replacement. Obviously, the goal is to ensure battery performance without unnecessary expenditures for maintenance and replacement. Megger's ProActiv battery database management software organizes battery information and test results, as well as performs data and trending analysis to help you manage your batteries more efficiently than ever.

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