What does it mean to be a battery eliminator?

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In response to many questions on this topic; most folks are asking about how a battery charger can call itself a battery eliminator and yet not perform like a battery? This is a great question unfortunately the terminology "battery eliminator" is not as precise as it could be. Much like "duck sauce" is not made from ducks, "lobster sauce "has no lobster in it or as the late George Carlin would say; "Why do we park on a drive way and drive on a parkway?" certain phrases are not always completely precise but their meaning needs to be understood just the same.

For battery chargers we have a few assumptions, first the battery charger is there to charge the battery and operate the steady loads when the AC is on. If the charger were to operate the switchgear during an electrical outage it then becomes the same as a battery. Therefore, if it were a battery why call it a battery eliminator? We could just call the charger the battery too; confusing? Not really! We must all agree that a battery charger is a battery charger and a battery is a battery! *(Sigmund Freud would like that.)*

Although certain applications may find it practical to use the charger to operate switchgear this would not cause us to consider offering "switchgear operating curves" for our chargers. This effort would involve an added feature that we would neither be able to control nor predict performance. While it is true that in certain cases these unusual performances may occur, we would not provide that as part of our operating capability because there is no specific standard that determines how this works with consistency or repeatability.

The battery charger will operate as a power supply up to its current limit rating within the confines of both the slow start circuit used to protect the load and battery while operating within a step change rate that occurs within 200ms and 500ms. *(See NEMA PE5, Section 5.10)* We do not offer "switchgear use" curves to predict this because the battery capacitive reactance, resistances, load characteristics, and a host of other issues affect this performance.

Remember, in any battery/charger scenario the battery controls the bus voltage and the charger provides the current to maintain that voltage. What is sometimes requested of us is for the charger alone to operate switchgear, based on calculating a defined current performance with an unpredictable bus voltage in order to determine how much current I can get for how long? There is no equation to solve for this repeatedly or consistently because of the many variables involved.

Further issues exist when trying to operate an inductive device whose true current demands are not always readily available. Those solenoid devices used to operate switchgear can demand very large up front currents that the batteries will deliver but the charger cannot. These currents are not always clearly stated in the switchgear specifications and have been recorded to be as much as 10 times or more of the device's plate rating. The charger is limited to its current limit as the maximum output current available and initially when current limit is achieved the full voltage may not be available, further detracting from this as a viable and saleable possibility.

When exploring the issues of Constant Loads vs. Transient Loads the controls put onto a battery charger are very important features. If a utility type battery charger is not properly regulated it would go into overvoltage and or overcurrent either of which could harm a battery or load. Therefore, if the charger could accommodate the potential wild swings that a battery can perform then the charger could damage the battery because you need to include the fact that an increasing voltage is also possible from the charger.

The battery starts discharging at OCV (open circuit voltage) without any external energy source while the charger has the AC input to draw from. When a battery outputs, it outputs current, while the voltage trails off but a charger and or power supply that is not regulated would then output currents such that the voltage could exceed normal. The utility battery charger has what is known as a rectangular output making it uniquely qualified to use current to control voltage by means of regulation. The battery just outputs current while the voltage decays. These are two very different ways of operating.

Considering all the possible variables, we cannot provide a table to determine switchgear operation using only a battery charger. Said ability is fraught with downsides and will only cause problems in the long run. If a specifier believes that a certain charger will operate their switchgear then it must remain with the specifier to determine.

We have no way of testing, calculating, or determining all the possible variables that may or may not allow switchgear to operate off a battery charger without a battery connected. Unless the AC is on and the operating load falls within the confines of our advertised ability, where the desired current demand coupled with a slow start capability that includes step changes to occur within 200ms to 500ms up to but not exceeding our current limit level of 110% of rating, we cannot assure you that for this scenario switchgear will operate without a battery connected.

In the final analysis, the term battery eliminator just means that the charger may operate as a regulated power supply without the battery connected with the output ripple not exceeding the NEMA PE5 standards for amplitude. I hope this helps clear up some of these questions. However, if you still have more questions please let us know.