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IEEE Guide for Application and Management of Stationary Batteries Used in Cycling Service

IEEE Power and Energy Society

Sponsored by the
Energy Storage and Stationary Battery Committee

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(Revision of IEEE Std 1660-2008)

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Abstract: Information on the differences between stationary standby and stationary cycling applications and appropriate battery management strategies in cycling operations is covered in this guide. While the primary emphasis is on lead-acid batteries, information is also provided on alternative and emerging storage technologies. The management of battery systems in stationary standby service is covered in other IEEE documents and is beyond the scope of this guide.

Keywords: battery cycling, battery maintenance, battery operation, IEEE 1660™, standby battery, stationary battery

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Introduction

This introduction is not part of IEEE Std 1660-2018, IEEE Guide for Application and Management of Stationary Batteries Used in Cycling Service.

The term "stationary battery" tends to conjure up many interpretations among power engineers, depending on one's perspectives on battery energy storage. A stationary battery can be operated in two basic modes: 1) standby (or float) and 2) cycling applications including primary-power batteries (i.e., off-grid hybrid power sources), or distributed energy resources applications. Many standards developed for standby applications do not apply to cycling applications, and vice versa, but many users are unaware of the differences between standby and cycling battery operation and maintenance requirements. The purpose of this guide is to differentiate between these two applications and increase awareness of why and how to manage them differently. The guide is primarily informational and is not intended to provide specific recommendations for battery management in cycling applications. The targeted users are the owners, maintainers, and designers of battery systems used in stationary applications.

Some cycling applications, particularly those in grid-connected systems, are still emerging, and detailed operational and maintenance procedures are still being developed. The information on photovoltaic applications in this guide can be used as an example of a cycling application where this material has been formalized.

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IEEE Guide for Application and Management of Stationary Batteries Used in Cycling Service

1. Overview

1.1 Scope

This guide provides information on the differences between stationary standby and stationary cycling applications and appropriate battery management strategies in cycling operations. While the primary emphasis is on lead-acid batteries, information is also provided on alternative and emerging storage technologies. The management of battery systems in stationary standby service is covered in other IEEE documents and is beyond the scope of this guide.

1.2 Purpose

This guide provides assistance to users of stationary battery systems in determining appropriate battery management strategies in cycling applications. Specifically, the guide addresses the primary similarities and differences in battery design and operation for standby versus cycling applications.

2. Normative references

This document does not require any normative references.

3. Definitions, acronyms, and abbreviations

3.1 Definitions

For the purposes of this document, the following terms and definitions apply. IEEE Std 1881, Standard Glossary of Stationary Battery Terminology [B14], should be consulted for the primary definition of terms not otherwise uniquely defined in this document.[1] The *IEEE Standards Dictionary Online* should be consulted for terms not defined in this clause.[2]

coulombic efficiency (battery): The ratio of the ampere-hour output from the battery to the ampere-hour input required to restore the initial state of charge.

[1]The numbers in brackets correspond to those of the bibliography in Annex A.
[2]*IEEE Standards Dictionary Online* is available at: http://dictionary.ieee.org.