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IEEE Recommended Practice for the Design and Application of Power Electronics in Electrical Power Systems

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IEEE Std 1662™-2016
(Revision of
IEEE Std 1662-2008)

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Petroleum and Chemical Industry Committee
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IEEE Power Electronics Society

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IEEE-SA Standards Board

Abstract: Recommendations and requirements for the design and applications of power electronics in land-based (onshore) and marine (offshore) electrical power systems are provided in this standard. A wide range of power electronics equipment with aggregated power ratings at and above 100 kW with voltages equal or less than 52 kV (ac) or (dc) is covered. Existing engineering practices, analytical methods, and performance characteristics are described. Applicable international and local standards are referenced with appropriate guidance to provide users of the standard with correct criteria for design, testing, and maintenance necessary for reliable operation of integrated power systems.

Keywords: IEEE 1662™, integrated power systems, PEBB, power electronic building blocks, power electronics

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Introduction

This introduction is not part of IEEE Std 1662-2016, IEEE Recommended Practice for the Design and Application of Power Electronics in Electrical Power Systems.

This revision of IEEE Std 1662-2008 provides recommendations and requirements for the design and applications of power electronics in land-based and marine electrical power systems. It covers a wide range of power electronics equipment with aggregated power ratings at and above 100 kW with voltages equal or less than 52 kV (ac) or (dc). It describes existing engineering practices, analytical methods, and performance characteristics. Applicable international and local standards are referenced with guidance to provide users of this standard with correct criteria for analysis, design, testing, and maintenance of power electronics and reliable integration of power electronics in electrical power systems.

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IEEE Recommended Practice for the Design and Application of Power Electronics in Electrical Power Systems

1. Overview

1.1 Scope

This document summarizes current electrical engineering methods and design practices for applying power electronics (PE) in electrical power distribution and conversion systems from a common frame of reference for reliable integrated electrical power systems. It recommends PE equipment requirements, necessary power system analytical studies, PE design analysis and testing, and certification and inspection procedures.

1.2 Purpose

The purpose of this document is to recommend a methodology for analysis and specifications parameters of PE equipment for electrical power systems. It analyzes the impact of power electronics building blocks (PEBBs) or integrated power systems (IPSs) on size, life cycle cost, weight, fuel efficiency, and risk reduction of implementation.

1.3 Limitations

This standard is applicable to design and applications of PE equipment with aggregated power ratings at and above 100 kW in land-based and marine electrical power systems with voltages equal or less than 52 kV (ac) or (dc).

1.4 Equipment covered by this standard

Some of the equipment is very specific to the power distribution system. Other equipment is the end-use equipment that uses electrical power to perform its function. Examples of equipment covered in this standard are as follows:

— Inverters

— Rectifiers

— Converters: dc to dc, dc to ac, frequency, cyclo-, and others