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IEEE Standard for Power Electronics Open System Interfaces in Zonal Electrical Distribution Systems Rated Above 100 kW

IEEE Industry Applications Society

Developed by the
Petroleum and Chemical Industry Committee

IEEE Std 1826™-2020
(Revision of IEEE Std 1826-2012)

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Petroleum and Chemical Industry Committee
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IEEE SA Standards Board

Abstract: Open system interfaces for high power electronics equipment used in zonal electrical distribution systems rated above 100 kW are identified in this standard. The required power, monitoring, information exchange, control, and protection interfaces are based on technological maturity, accepted practices, and allowances for future technology insertions. Also, rigorous assessment mechanisms, interface control management, and proactive conformance testing that shall be used to verify and validate open systems to enable plug-and-play operability independently of the components' origin are defined.

Airports, hospitals, major data processing centers (especially those using uninterruptible power supply), broadcast systems, and maritime vessels and platforms are applications covered by this standard. Existing terrestrial utility power systems that do not yet contain the electronic power interfaces and high-speed communication networks that are essential to use this standard shall be upgraded by its application.

Keywords: IEEE 1826™, open system interfaces, PEEB, plug-and-play, power electronics, power electronics building blocks, quality of service, verification and validation, zonal electrical distribution system

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Introduction

This introduction is not part of IEEE Std 1826-2020, IEEE Standard for Power Electronics Open System Interfaces in Zonal Electrical Distribution Systems Rated Above 100 kW.

This standard defines how openness of system should be verified and validated through rigorous assessment mechanisms, interface control management, and proactive conformance testing to enable plug-and-play operability independently of components origin. Interfaces are grouped by functions, and are based on technological maturity, accepted practices, and allowances for future technology insertions in zonal electrical distribution systems rated above 100 kW.

This standard applies to electrical power distribution systems in airports, hospitals, major data processing centers (especially those using uninterruptible power supply), broadcast systems, and maritime vessels and platforms. Existing terrestrial power systems generally do not yet contain the electronic power interfaces and high-speed communication networks that are essential to use of this standard; however, it shall be applied to upgrade these legacy systems. Furthermore, this standard may be useful for evolving applications such as microgrids, distributed energy resources island systems, and innovative smart grid systems.

Contents

IEEE Standard for Power Electronics Open System Interfaces in Zonal Electrical Distribution Systems Rated Above 100 kW

1. Overview

1.1 Scope

This standard identifies open system interfaces for high power electronics equipment used in zonal electrical distribution systems rated above 100 kW. Interfaces are grouped into key and non-key interfaces and are based on technological maturity, accepted practices, and allowances for future technology insertions. This standard defines how openness of system should be verified and validated through rigorous assessment mechanisms, interface control management, and proactive conformance testing to enable plug-and-play operability independently of the components origin. It also formulates specific interface requirements for open zonal electrical distribution systems on ships and platforms.

1.2 Purpose

The purpose of this document is to provide a uniform standard for high-power electronics open system interfaces in zonal electrical distribution systems rated above 100 kW. The stated specifications and requirements are universally applied to maintain total power system performance and efficiency under changing mission and loads conditions. They are sufficient for most industrial and commercial installations, including ships and platforms.

1.3 Application and limitations

A zonal electrical distribution system (ZEDS) consists of power system elements serving a group of loads and is part of a larger power system. ZEDS plus the loads it serves comprise a zone. ZEDS has a limited number of power and control interfaces with the larger encompassing system and has the property that faults within the zone do not propagate outside the zonal boundaries.

This standard is intended to apply in cases where power electronics are the interface between the zones. This standard applies to ZEDS employing power electronics and the loads served by the ZEDS aggregate to at least 100 kW. Possible applications include airports, hospitals, major data processing centers (especially those using uninterruptible power supply), broadcast systems, and maritime vessels and platforms.