

Information technology - Data centre facilities and infrastructures - Part 2-2: Power supply and distribution

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

Information technology - Data centre facilities and infrastructures - Part 2-2: Power supply and distribution

Technologie de l'information - Installation et infrastructures
de centres de traitement de données

Informationstechnik - Einrichtungen und Infrastrukturen von
Rechenzentren - Teil 2-2: Stromversorgung

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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European foreword

This document (EN 50600-2-2:2019) has been prepared by CLC/TC 215 “Electrotechnical aspects of telecommunication equipment”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020-04-29
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2022-04-29

This document will supersede EN 50600-2-2:2014.

The following changes have been made:

- a) title modified to emphasize distinction between power supply and power distribution requirements;
- b) Clause 5 updated, in particular subclauses 5.1 regarding the power supply to the data centre and 5.2 on the power distribution within the data centre;
- c) availability requirements in Clause 6 revised and aligned with EN 50600-1:2018 and EN 50600-2-3:2018;
- d) physical security requirements revised, mainly regarding the power distribution in the data centre (see 7.3.2);
- e) granularity level requirements amended (see 8.2 to 8.4);
- f) Annex A removed;
- g) minor technical and editorial improvements to the whole document.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Introduction

The unrestricted access to internet-based information demanded by the information society has led to an exponential growth of both internet traffic and the volume of stored/retrieved data. Data centres are housing and supporting the information technology and network telecommunications equipment for data processing, data storage and data transport. They are required both by network operators (delivering those services to customer premises) and by enterprises within those customer premises.

Data centres usually need to provide modular, scalable and flexible facilities and infrastructures to easily accommodate the rapidly changing requirements of the market. In addition, energy consumption of data centres has become critical both from an environmental point of view (reduction of environmental footprint) and with respect to economical considerations (cost of energy) for the data centre operator.

The implementation of data centres varies in terms of:

- a) purpose (enterprise, co-location, co-hosting or network operator facilities);
- b) security level;
- c) physical size;
- d) accommodation (mobile, temporary and permanent constructions).

The needs of data centres also vary in terms of availability of service, the provision of security and the objectives for energy efficiency. These needs and objectives influence the design of data centres in terms of building construction, power distribution, environmental control, telecommunications cabling and physical security as well as the operation of the data centre. Effective management and operational information is required to monitor achievement of the defined needs and objectives.

Recognizing the substantial resource consumption, particularly of energy, of larger data centres, it is also important to provide tools for the assessment of that consumption both in terms of overall value and of source mix and to provide Key Performance Indicators (KPIs) to evaluate trends and drive performance improvements.

At the time of publication of this European Standard, EN 50600 series is designed as a framework of standards and technical reports covering the design, the operation and management as well as the key performance indicators for energy efficient operation of the data centre.

The EN 50600-2 series defines the requirements for the data centre design.

The EN 50600-3 series defines the requirements for the operation and the management of the data centre.

The EN 50600-4 series defines the key performance indicators for the data centre.

The CLC/TR 50600-99-X Technical Reports cover recommended practices and guidance for specific topics around data centre operation and design.

This series of European Standards specifies requirements and recommendations to support the various parties involved in the design, planning, procurement, integration, installation, operation and maintenance of facilities and infrastructures within data centres. These parties include:

- 1) owners, operators, facility managers, ICT managers, project managers, main contractors;
- 2) consulting engineers, architects, building designers and builders, system and installation designers, auditors, test and commissioning agents;
- 3) facility and infrastructure integrators, suppliers of equipment;
- 4) installers, maintainers.

At the time of publication of this European Standard, EN 50600-2 series comprises the following standards:

EN 50600-2-1: *Information technology — Data centre facilities and infrastructures — Part 2-1: Building construction;*

EN 50600-2-2: *Information technology — Data centre facilities and infrastructures — Part 2-2: Power supply and distribution;*

EN 50600-2-3: *Information technology — Data centre facilities and infrastructures — Part 2-3: Environmental control;*

EN 50600-2-4: *Information technology — Data centre facilities and infrastructures — Part 2-4: Telecommunications cabling infrastructure;*

EN 50600-2-5: *Information technology — Data centre facilities and infrastructures — Part 2-5: Security systems.*

The inter-relationship of the standards and technical reports within the EN 50600 series is shown in Figure 1.

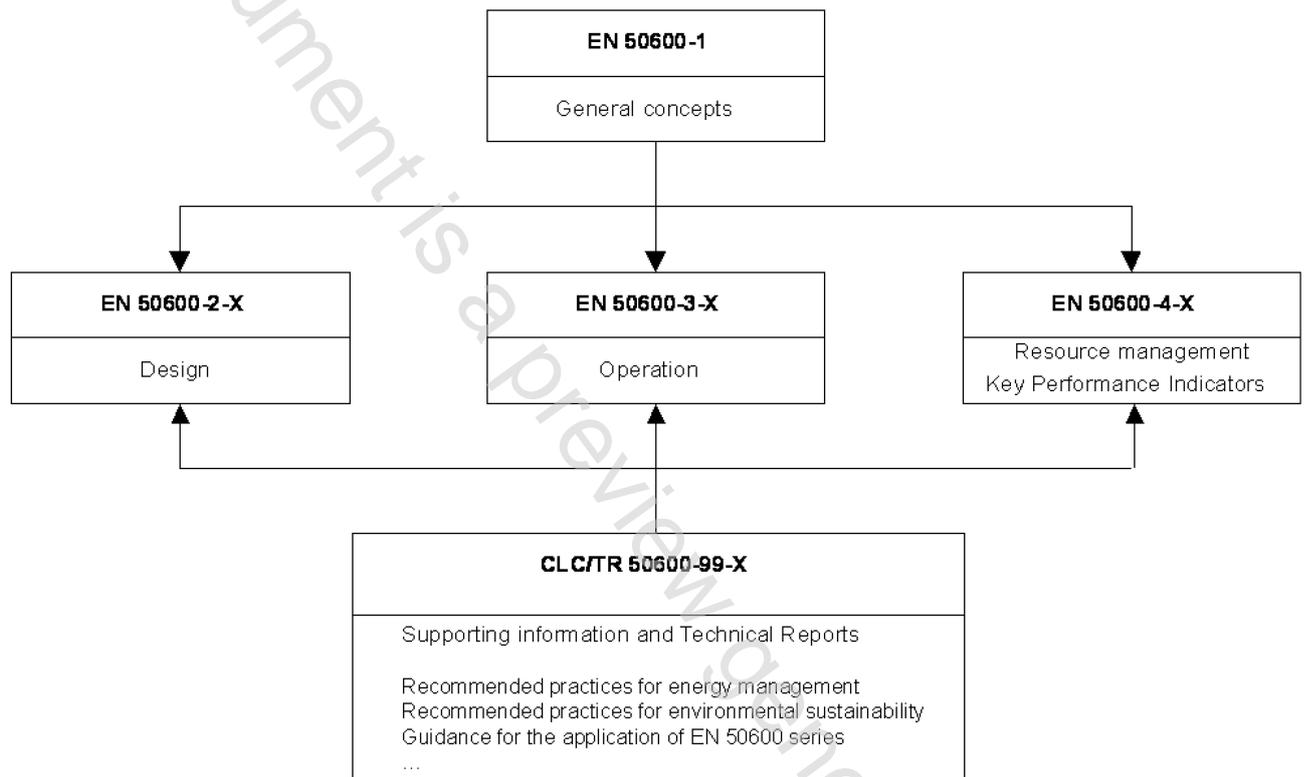


Figure 1 — Schematic relationship between the EN 50600 standard

EN 50600-2-X standards specify requirements and recommendations for particular facilities and infrastructures to support the relevant classification for “availability”, “physical security” and “energy efficiency enablement” selected from EN 50600-1.

EN 50600-3-X documents specify requirements and recommendations for data centre operations, processes and management.

EN 50600-4-X documents specify requirements and recommendations for key performance indicators (KPIs) used to assess and improve the resource usage efficiency and effectiveness, respectively, of a data centre.

This European Standard addresses facilities and infrastructures for power supplies to, and power distribution within, data centres together with the interfaces for monitoring the performance of those facilities and infrastructures in line with EN 50600-3 series and EN 50600-4 series standards (in accordance with the requirements of EN 50600-1). The line diagrams used in certain Figures are not intended to replace the more familiar electrical circuit diagrams associated with power supply and distribution systems which are included where relevant.

This European Standard is intended for use by and collaboration between architects, building designers and builders, system and installation designers.

This series of European Standards does not address the selection of information technology and network telecommunications equipment, software and associated configuration issues.

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1 Scope

This document addresses power supplies to, and power distribution within, data centres based upon the criteria and classifications for “availability”, “physical security” and “energy efficiency enablement” within EN 50600-1.

This document specifies requirements and recommendations for the following:

- a) power supplies to data centres;
- b) power distribution systems to all equipment within data centres;
- c) telecommunications infrastructure bonding;
- d) lightning protection;
- e) devices for the measurement of the power consumption and power quality characteristics at points along the power distribution system and their integration within management tools.

Safety and electromagnetic compatibility (EMC) requirements are outside the scope of this European Standard and are covered by other standards and regulations. However, information given in this European Standard can be of assistance in meeting these standards and regulations.

Conformance of data centres to the present document is covered in Clause 4.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13160 (all parts), *Leak detection systems*

EN 50160:2010, *Voltage characteristics of electricity supplied by public electricity networks*

EN 50174-2, *Information technology - Cabling installation - Part 2: Installation planning and practices inside buildings*

EN 50174-3, *Information technology - Cabling installation - Part 3: Installation planning and practices outside buildings*

EN 50310, *Telecommunications bonding networks for buildings and other structures*

EN 50600-1, *Information technology - Data centre facilities and infrastructures - Part 1: General concepts*

EN 50600-2-3, *Information technology - Data centre facilities and infrastructures - Part 2-3: Environmental control*

EN 50600-2-5, *Information technology - Data centre facilities and infrastructures - Part 2-5: Security systems*

EN 60076-11, *Power transformers - Part 11: Dry-type transformers*

EN 60947 (all parts), *Low-voltage switchgear and controlgear (IEC 60947, all parts)*

EN 61000-2-4:2002, *Electromagnetic compatibility (EMC) - Part 2-4: Environment - Compatibility levels in industrial plants for low-frequency conducted disturbances*

EN 61439 (all parts), *Low-voltage switchgear and controlgear assemblies (IEC 61439, all parts)*

EN 61557-12:2008, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. - Equipment for testing, measuring or monitoring of protective measures - Part 12: Performance measuring and monitoring devices (PMD)*

EN 61869-2:2012, *Instrument transformers - Part 2: Additional requirements for current transformers*

EN 62040 (all parts), *Uninterruptible power systems (UPS) (IEC 62040, all parts)*

EN 62053-21:2003, *Electricity metering equipment (a.c.) - Particular requirements - Part 21: Static meters for active energy (classes 1 and 2)*

EN 62053-22:2003, *Electricity metering equipment (a.c.) - Particular requirements - Part 22: Static meters for active energy (classes 0,2 S and 0,5 S)*

EN 62271-200:2012, *High-voltage switchgear and controlgear. Part 200. AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

EN 62305 (all parts), *Protection against lightning (IEC 62305, all parts)*

EN 62305-4, *Protection against lightning - Part 4: Electrical and electronic systems within structures*

EN 62586-1:2017, *Power quality measurement in power supply systems – Part 1: Power quality instruments (PQI)*

EN 62586-2:2017, *Power quality measurement in power supply systems – Part 2: Functional tests and uncertainty requirements*

EN 62974-1, *Monitoring and measuring systems used for data collection, gathering and analysis - Part 1: Device requirements*

EN 88528-11, *Reciprocating internal combustion engine driven alternating current generating sets - Part 11: Rotary uninterruptible power systems - Performance requirements and test methods*

HD 60364 (all parts), *Low-voltage electrical installations*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50600-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1

active power

under periodic conditions, mean value, taken over one period T , of the instantaneous power p

$$P = \frac{1}{T} \int_0^T p dt$$

Note 1 to entry: Under sinusoidal conditions, the active power is the real part of the complex power \underline{S} , thus $P = \text{Re } \underline{S}$.

Note 2 to entry: The coherent SI unit for active power is watt, W.

[SOURCE: IEC 60050-131:2002, 131-11-42]