SLOVENSKI STANDARD
SIST EN 50600-2-2:2014

01-maj-2014

Informacijska tehnologija - Naprave in infrastruktura podatkovnega centra - 2-2. del: Distribucija električne energije

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

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

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ICS:

29.240.01	Omrežja za prenos in distribucijo električne energije na splošno	Power transmission and distribution networks in general
35.110	Omreževanje	Networking

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

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

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CENELEC

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

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Foreword

This document (EN 50600-2-2:2014) 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)	2015-01-06
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2015-01-06

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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 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 carbon 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 and physical security. Effective management and operational information is required to monitor achievement of the defined needs and objectives.

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, facility managers, ICT managers, project managers, main contractors;

2) consultants, architects, building designers and builders, system and installation designers;

3) facility and infrastructure integrators, suppliers of equipment;

4) installers, maintainers.

At the time of publication of this European Standard, EN 50600 series will comprise the following standards:

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

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 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*;

EN 50600-2-6: *Information technology — Data centre facilities and infrastructures — Part 2-6: Management and operational information*.

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

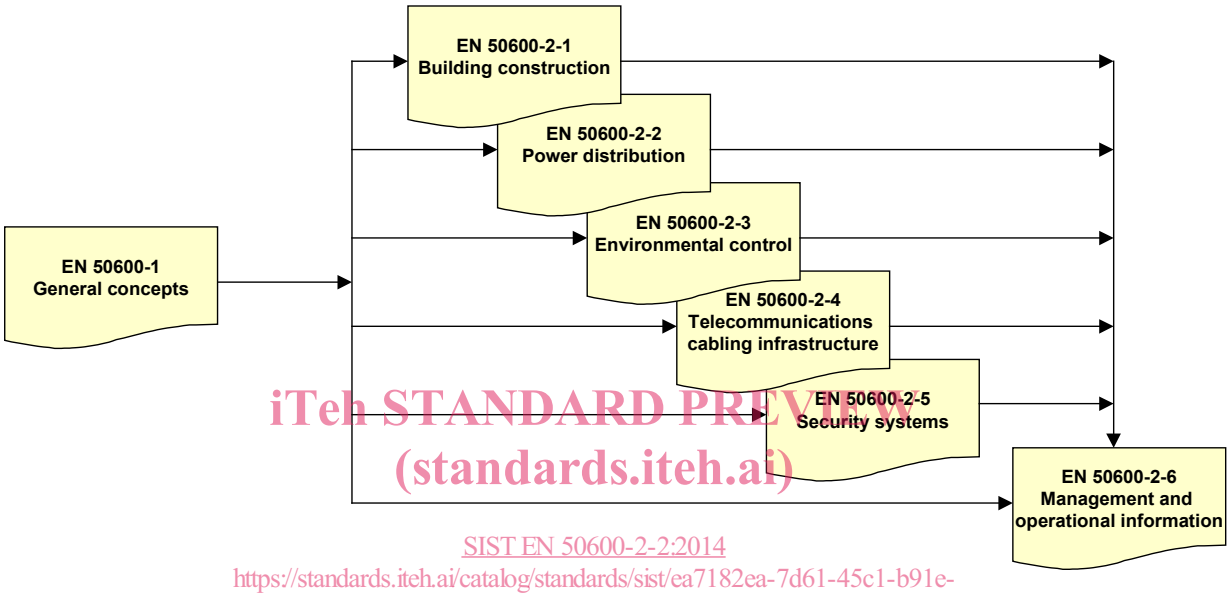

Figure 1 — Schematic relationship between the EN 50600 standards

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.

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 50600-2-6 (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.

1 Scope

This European Standard 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 European Standard specifies requirements and recommendations for the following:

a) power supplies to data centres;

b) power distribution systems within data centres;

c) facilities for both normal and emergency lighting;

d) equipotential bonding and earthing;

e) lightning protection;

f) devices for the measurement of the power consumption 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 may 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, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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, *Application of equipotential bonding and earthing in buildings with information technology equipment*

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

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

EN 50600-2-3 [1)], *Information technology – Data centre facilities and infrastructures – Part 2-3: Environmental control*

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1) Draft for formal vote under preparation.

EN 50600-2-4 [2)], *Information technology – Data centre facilities and infrastructures – Part 2-4: Telecommunications cabling infrastructure*

EN 50600-2-5 [3)], *Information technology – Data centre facilities and infrastructures – Part 2-5: Security systems*

EN 60044-1:1999, *Instrument transformers – Part 1: Current transformers (IEC 60044-1:1996, modified)*

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 (IEC 61000-2-4:2002)*

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

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

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 (IEC 62305-4)*

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

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.

3.1.1
active power
real power
product of r.m.s. voltage, r.m.s. current and power factor (expressed as W)

3.1.2
additional supply
backup supply
power supply that provides power in the event of failure of primary and/or secondary supply

3.1.3
apparent power
product of r.m.s. voltage and r.m.s current (expressed as VA)

3.1.4
capacitive load
load that is capacitive, so that the alternating current is out of phase with and leads the voltage

3.1.5
catenary
wire hung at a specific tension between supporting structures of power cabling

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2) Circulated for CENELEC enquiry.

3) Draft for CENELEC enquiry under preparation.

3.1.6
diverse route
alternative, separate, pathway intended to provide adequate segregation from another pathway, in order to provide resilient service provision in the event of physical damage to one of the pathways

3.1.7
emergency power off
designated device to provide emergency switching which disconnects power from one or more data centre facilities, infrastructures or spaces

Note 1 to entry: The configuration and function of emergency power off devices may be subject to national or local regulations.

3.1.8
fire compartment
discrete zone designed to contain a fire within that zone

3.1.9
high voltage
voltage whose nominal r.m.s. value is 36 kV < U_n ≤ 150 kV

Note 1 to entry: Because of existing network structures, in some countries the boundary between MV and HV can be different.

[SOURCE: EN 50160:2010, 3.7]

3.1.10
inductive load
load that is inductive, so that the alternating current is out of phase with and lags behind the voltage

3.1.11
information technology equipment
equipment providing data storage, processing and transport services together with equipment dedicated to providing direct connection to core and/or access networks

3.1.12
IT load
electrical consumption of all the information technology equipment measured at its input terminals including all on-board integrated power supplies and cooling fans

3.1.13
load factor
ratio of the average load to the peak load over a period of time

3.1.14
locally protected supply provision
sockets which continue to deliver power to connected equipment for a defined period following failure of power supply and distribution equipment by means of a battery supply or UPS adjacent to, or co-located with, those sockets (e.g. emergency lighting)

3.1.15
low voltage
voltage whose nominal r.m.s. value is U_n ≤ 1 kV

[SOURCE: EN 50160:2010, 3.9]

3.1.16
mechanical cooling load
electrical consumption of all the plant and components used to provide environmental control within the data centre, generally comprising compressors, controls, fans, pumps and humidifiers

3.1.17
medium voltage
voltage whose nominal r.m.s. value is 1 kV < U_n ≤ 36 kV

Note 1 to entry: Because of existing network structures, in some countries the boundary between MV and HV can be different.

[SOURCE: EN 50160:2010, 3.11]

3.1.18
pathway
defined route for cables between termination points

[SOURCE: EN 50174-1:2009/A1:2011, 3.1.26]

3.1.19
power factor
under periodic conditions, ratio of the absolute value of the active power P to the apparent power S: $\lambda = |P|/S$

Note 1 to entry: The ratio of the active (real) power flowing to the load to the apparent power (as a result of the capacitive or inductive nature of the load) and is a dimensionless number between 0 and 1.

[SOURCE: IEC 60050-131:2002, 131-11-46, modified]

3.1.20
protected supply provision
no break protected supply provision
sockets which continue to deliver power to connected equipment for a defined period following failure of power supply and distribution equipment

3.1.21
primary distribution equipment
equipment which is required to manage, control and convert incoming power supplies (primary, secondary and, where appropriate, additional) in a form suitable for distribution by secondary distribution equipment

3.1.22
primary supply
principal power supply that provides power to the data centre under normal operating conditions

3.1.23
resistive load
load in which the alternating current is in phase with the voltage

Note 1 to entry: The total reactance is zero.

3.1.24
secondary distribution equipment
equipment which is required to manage, control and distribute the power provided by the primary distribution equipment to the short-break and unprotected sockets within the data centre and to the tertiary distribution equipment

Note 1 to entry: The power supply may be single-phase AC, three-phase AC or DC. If there is a change from 3-phase to 1-phase supply, this is generally achieved at the secondary distribution equipment that is served directly from the primary distribution equipment.