SLOVENSKI STANDARD
oSIST prHD 60364-1:2024

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Nizkonapetostne električne inštalacije - 1. del: Temeljna načela, ocena splošnih karakteristik, definicije

Low-voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions

Errichten von Niederspannungsanlagen - Teil 1: Allgemeine Grundsätze, Bestimmungen allgemeiner Merkmale, Begriffe

Installations électriques à basse tension - Partie 1: Principes fondamentaux, détermination des caractéristiques générales, définitions

Ta slovenski standard je istoveten z: **prHD 60364-1:2024**

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COMMITTEE DRAFT FOR VOTE (CDV)

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IEC TC 64 : ELECTRICAL INSTALLATIONS AND PROTECTION AGAINST ELECTRIC SHOCK

SECRETARIAT: Germany	SECRETARY: Mr Wolfgang Niedenzu
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 8,SC 8B,TC 9,TC 17,TC 18,TC 20,TC 22,SC 22E,SC 22G,SC 22H,TC 23,SC 23B,SC 23E,SC 23H,SC 23K,TC 32,SC 32B,TC 34,SC 37A,TC 61,TC 69,TC 73,TC 81,TC 82,TC 85,TC 95,TC 99,TC 108,TC 109,PC 118,TC 120,TC 121,SC 121A,SC 121B,PC 128,SyC LVDC	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
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TITLE:

Low-voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions

PROPOSED STABILITY DATE: 2030

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 1: Fundamental principles, assessment of general characteristics and definitions

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

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IEC 60364-1 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock. It is an International Standard.

This sixth edition cancels and replaces the fifth edition published in 2005. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) the entire document has been restructured and numbered in accordance with the directives but preceded with the part number, i.e. 1.1, 1.2 etc.;

b) the scope has been expanded to include new areas of application and has been restructured;

c) in 1.5.2.2.2, the topic of safety services and standby electric supply systems has been added;

d) in 1.5.2.14, the topic of energy efficiency has been included;

e) in 1.5.2.15, the topic of prosumer electrical installations has been included;

f) in 1.5.3.5, the requirement for an equivalent safety level for the use of new materials and innovations for which no product standards exist yet has been added. This must be verified by a risk assessment;

g) in 1.5.4.3, the requirement for the effectiveness of protective measures for people and livestock safety shall be maintained during the entire lifetime of the installation has been added. This should be done by periodic verification;

h) Table 3 shows the symbol for the newly introduced "system-referencing conductor (SRC)";

i) the number of figures showing the type of earth connection in AC and DC systems is limited to those which are most commonly employed. Some figures have been added for DC systems;

j) Introduction of **Error! Reference source not found.** which relates the list of content of IEC 6 0364-1:2005 and the clauses of this document.

The text of this International Standard is based on the following documents:

Draft	Report on voting
64/XX/FDIS	64/XX/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 60364 series, published under the general title *Low-voltage electrical installations*, can be found on the IEC website.

The reader's attention is drawn to the fact that Annex B lists all of the “in-some-country” clauses on differing practices of a less permanent nature relating to the subject of this standard.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 1: Fundamental principles, assessment of general characteristics and definitions

1.1 Scope

1.1.1 Scope of this document

This part of IEC 60364 defines the scope and objective of the IEC 60364 series and specifies the fundamental safety requirements for an electrical installation.

This document addresses the fundamental principles, assessment of general characteristics and definitions of low-voltage electrical installations.

1.1.2 Scope of the IEC 60364 series

The International Standards of the IEC 60364 series specify the rules for the design, erection, and verification of low-voltage electrical installations. The rules are provided for the safety of human beings (persons), livestock and property against dangers and damage which can arise from the intended use of low-voltage electrical installations and for the proper functioning of those installations.

EXAMPLES: A non-comprehensive list of electrical installations or systems includes:

- residential premises;
- commercial premises;
- public premises;
- industrial premises;
- agricultural and horticultural premises;
- prefabricated buildings;
- caravans, caravan sites and similar sites;
- construction sites, exhibitions, fairs and other installations for temporary purposes;
- marinas;
- external lighting and similar installations;
- medical locations;
- mobile or transportable units;
- photovoltaic systems;
- stationary secondary batteries;
- low-voltage generating sets;
- temporary connected batteries (e.g. EV).

NOTE 1 "Premises" covers the land and all facilities including buildings belonging to it.

The International Standards of the IEC 60364 series covers

– circuits supplied at nominal voltages up to and including 1000 V AC or 1500 V DC; for AC, the preferred frequencies which are taken into account in this standard are 50 Hz and 60 Hz. The use of other frequencies is not excluded.

– circuits, other than the internal wiring of apparatus, operating at voltages exceeding 1000 V AC or 1500 V DC and derived from an installation having a nominal voltage not exceeding 1000 V AC or 1500 V DC, for example, discharge lighting, electrostatic precipitators;

– fixed wiring for information and communication technology (ICT), signalling, etc., including installation and support of fibre optic cables;

– Wiring systems and cables not specifically covered by the standards for appliances.

The International Standards of the IEC 60364 series applies to:

- alterations or extensions of the installation, or both;
- parts of the existing installation affected by modifications, extensions or alterations;
- the design of functional aspects, such as energy efficiency, local production and storage of energy (prosuming).

The International Standards of the IEC 60364 series applies to any kind of low-voltage electrical installation or system, except:

a) electric traction equipment, including rolling stock and signalling equipment;
b) electrical circuits and equipment for automotive purposes within motor vehicles;
c) electrical installations of ships and of mobile and fixed offshore units;
d) electrical installations in aircraft;
e) public street-lighting installations which are part of the public electric power network;
f) installations in mines and quarries.

Electrical equipment is dealt with only in so far as its selection and application in the installation are concerned.

The International Standards of the IEC 60364 series does not apply to the selection and erection of the following electrical equipment:

i) radio interference suppression equipment, except where it affects the safety of the installation;
ii) electric fences;
iii) external lightning protection systems for buildings (LPS);

NOTE 2 Atmospheric phenomena are covered in IEC 60364-1 but only in so far as effects on the electrical installations are concerned (for example, with respect to selection of surge protective devices).

iv) electrical equipment of machines.

The International Standards of the IEC 60364 series is not intended to apply to low-voltage public distribution networks.

1.2 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.

IEC 60050-195, *International Electrotechnical Vocabulary (IEV) – Part 195: Earthing and protection against electric shock,* available at http://www.electropedia.org

IEC 60050-826, *International Electrotechnical Vocabulary (IEV) – Part 826: Electrical installations,* available at http://www.electropedia.org

1.3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-195 and IEC 60050-826 and the following apply.

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

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

1.3.1
diversity
prospective simultaneous demand of a group of electrical loads

1.3.2
generating set
equipment converting non-electrical energy into electrical energy

1.4 Structure of the IEC 60364 series

The IEC 60364 series consists of six main parts:

- IEC 60364-1 "Fundamental principles, assessment of general characteristics and definitions"

  This document defines the scope and objective of the IEC 60364 series and specifies the fundamental safety requirements for an electrical installation.

- IEC 60364-4 series "Protection for safety"

  These documents specify the functional requirements for protection, taking into account the fundamental safety requirements given in this document.

- IEC 60364-5 series "Selection and erection of equipment"

  These documents specify requirements for the selection and erection of electrical equipment to fulfil the functional safety requirements of the IEC 60364-4 series and the fundamental safety requirements given in this document.

- IEC 60364-6 "Verification"

  This document specifies the requirements for verification and testing to show compliance with the requirements of the other parts of the IEC 60364 series. Requirements for reporting the verifications and testing are also given.

- IEC 60364-7 series "Requirements for special installations or locations"

  These documents specify specific requirements for special installations or locations. These requirements either modify, replace or complement the requirements of the other parts of the IEC 60364 series.

- IEC 60364-8 series "Functional aspects"

  These documents specify requirements related to functional aspects only. However, these requirements can impact the safety requirements of the other parts of the IEC 60364 series.

Annex A gives additional information on the structure.

1.5 Fundamental principles

1.5.1 Protection for safety

1.5.1.1 General

The requirements stated in 1.5.1.2 to 1.5.2.8 are intended to provide for the safety of human beings, livestock and property against dangers and damage which can arise from the intended use of an electrical installation, including its connected current using equipment, under all operating conditions. The requirements to provide for the safety of livestock are applicable in locations intended for them.

NOTE In electrical installations, hazards that can arise include:
– electric shock;
– excessive temperatures likely to cause burns, fires and other harmful effects;
– ignition of a potentially explosive atmosphere;
– undervoltages, overvoltages and electromagnetic influences likely to cause or result in injury or damage;
– power supply interruptions or interruption of safety services;
– arcing likely to cause fire, burns or blinding effects, excessive pressure, or toxic gases;
– mechanical movement of electrically activated equipment.

1.5.1.2 Protection against electric shock

1.5.1.2.1 Basic protection

Protection shall be provided against dangers to human beings and livestock that can arise from contact with live parts.

This protection may be achieved by one of the following methods:

– preventing a current from passing through the body of a human being or livestock;
– limiting the current which can pass through a body to a non-hazardous value.

1.5.1.2.2 Fault protection

Protection shall be provided against dangers to human beings and livestock that can arise from contact with exposed-conductive-parts.

This protection may be achieved by one, or a combination, of the following methods:

– preventing a current resulting from a fault from passing through the body of a human being or livestock;
– limiting the magnitude of a current resulting from a fault, which can pass through a body of a human being or livestock, to a non-hazardous value;
– limiting the duration of a current resulting from a fault, which can pass through a body of a human being or livestock, to a non-hazardous time period.

1.5.1.2.3 Additional protection

In certain cases, further protection of human beings and livestock is necessary, and additional protection shall then be provided.

1.5.1.3 Protection against thermal effects

The electrical installation shall be arranged so that human beings, livestock, property and the environment adjacent to the electrical equipment are protected against harmful thermal effects caused by the electrical equipment.

EXAMPLE Thermal effects can be the following:
– combustion;
– degradation of materials;
– electric arcing;
– burns resulting from high temperatures.

1.5.1.4 Protection against overcurrent

Human beings and livestock shall be protected against injury, and property shall be protected against damage due to excessive temperatures or electromechanical stresses caused by overcurrent likely to arise in conductors.

Protection may be achieved by limiting overcurrent to a safe value or duration, or both.

1.5.1.5 Protection against fault current

Human beings and livestock shall be protected against injury, and property shall be protected against damage caused by fault current.

Protection may be achieved by limiting fault current to a safe value or duration, or both.

1.5.1.6 Protection against voltage disturbances

Human beings and livestock shall be protected against injury, and property shall be protected against any harmful effects, as a consequence of a fault between live parts of circuits supplied at different voltages.

Human beings and livestock shall be protected against injury, and property shall be protected against damage, as a consequence of overvoltages such as those originating from atmospheric events or from switching.

Human beings and livestock shall be protected against injury, and property shall be protected against damage, as a consequence of undervoltage and any subsequent voltage recovery.

1.5.1.7 Protection against power supply interruptions

Where danger or damage is foreseen to arise due to an interruption of power supply, suitable provisions shall be made in the installation or installed equipment.

1.5.1.8 Protection against the effects of electromagnetic interference

The installation shall have an adequate level of immunity against electromagnetic disturbances.

Consideration shall be given to any anticipated electromagnetic emission generated by the installation or installed equipment.

1.5.2 Design

1.5.2.1 General

For the design of the electrical installation, the following shall be taken into account:

– the protection of human beings, livestock and property in accordance with 1.5.1;
– the proper functioning of the electrical installation for the intended use;
– the foreseeable future needs (e.g. increased capacity, energy storage possibilities).

The information required as a basis for design is listed in 1.5.2.2 to 1.5.2.5. The requirements with which the design shall comply are stated in 1.5.2.6 to 1.5.2.13. Other aspects to be considered are given in 1.5.2.14 to 1.5.2.19.

The electrical installations shall be designed so that the operation of a device or the insertion of an external connection cannot intentionally create a fault.

1.5.2.2 Power supplies

1.5.2.2.1 Characteristics of power supplies

In order to design a safe installation, relevant characteristics of the power supply or power supplies are required. The characteristics of a power supply shall be determined by calculation, measurement or enquiry (e.g. from the distribution system operator, manufacturer). Changes to the characteristics of a power supply can affect the safety of the installation.

EXAMPLE A supply can be a network, generators, power convertor equipment, inverters, transformers.

The following characteristics, as applicable, shall be determined:

a) nature of current: alternating current or direct current, or both;
b) function of conductors:
    - for alternating current:

394 – line conductor(s);
395 – neutral conductor;
396 – mid-point conductor;
397 – protective conductor;
398 • for direct current:
399 – line conductor(s);
400 – mid-point conductor;
401 – protective conductor;

402 The function of some conductors may be combined in a single conductor.

403 c) the presence of galvanic separation;
404 d) values and tolerances:
405 • voltage and voltage tolerances;
406 • voltage interruptions, voltage fluctuations and voltage dips;
407 • frequency and frequency tolerances;
408 • maximum allowable current;
409 • prospective short-circuit currents;

410 NOTE 1 For voltages and frequencies, see IEC 60038.

411 e) protective provisions inherent in the power supply;
412 f) bi-directional energy flow;
413 g) particular requirements of the operator of the supply network, e.g. distribution system
414 operator (DSO).

415 NOTE 2 In some countries, a DSO is also referred to as a distribution network operator (DNO).

416 **1.5.2.2.2 Electrical supply systems for safety services and standby electric supply**
417 **systems**

418 Where the provision of safety services or a standby system are required, the characteristics of
419 the sources of the power supply for these systems shall be assessed separately. Such supplies
420 shall have adequate capacity, reliability and rating and appropriate change over time for the
421 operation specified.

422 NOTE 1 Safety services can be required by the authorities concerned with fire precautions and other conditions for
423 emergency evacuation of the premises, or by the person specifying the installation.

424 NOTE 2 Standby supplies can be required by the person specify the installation.

425 Where there is an electrical supply system for safety services or a standby electric supply
426 system, all of the following shall be determined:

427 – source of power supply (nature, characteristics);
428 – circuits to be supplied by the electric source for safety services;
429 – circuits to be supplied by the standby electric source.

430 **1.5.2.3 Nature of demand**

431 The demand of the installation shall be determined to facilitate an energy-efficient, economic,
432 reliable and safe design.

433 Based on the demand, the number and type of circuits required shall be determined by:

434 – location of points of power demand;