Draft for Public Comment

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Interested committees:

Title: Draft BS EN 60364-1 Ed.6.0 Low-voltage electrical installations. Part 1: Fundamental principles, assessment of general characteristics, definitions.

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

i) has any issues related to 3rd party IPR, patent or copyright
ii) affects other national standard(s)
iii) requires additional national guidance or information

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex **(e.g. 3.1)**	Paragraph/Figure/ Table/Note	**Type of comment**	**Commend (justification for change) by the MB**	**Proposed change by the MB**	**Secretariat observations on each comment submitted**
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

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64/2349/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER: **IEC 60364-1 ED6**	
DATE OF CIRCULATION: **2018-10-26**	CLOSING DATE FOR COMMENTS: **2019-01-18**
SUPERSEDES DOCUMENTS: **64/2331/RR**	

IEC TC 64 : ELECTRICAL INSTALLATIONS AND PROTECTION AGAINST ELECTRIC SHOCK	
SECRETARIAT: Germany	SECRETARY: Mr Reinhard Pelta
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 99	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 1: Fundamental principles, assessment of general characteristics, 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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9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60364-1 has been prepared by IEC Technical Committee 64: Electrical installations and protection against electric shock.

This fifth edition cancels and replaces the fourth edition, published in 2001. It constitutes a technical revision.

The main changes with respect to the previous edition are:

– in order to complete the scope, the new items external lighting and similar installations, medical locations, mobile or transportable units, photovoltaic power supply units and low-voltage generating sets are added;

– in Clause 131, "Fundamental principles", the list of hazards which may arise in electrical installations is completed; furthermore, a new subclause dealing with protection against voltage disturbances and measures against electromagnetic influences and a new subclause dealing with protection against power supply interruption are added;

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– in Clause 132, "Design", the new subclause "Documentation for the electrical installation" is added;

– in Clause 134, "Erection and verification of electrical installations", the new subclause " periodic verification" is added;

– the former Clause 312, "Types of distribution system" is renamed "Conductor arrangement and system earthing" and, in the relevant subclauses, several new figures are included for better understanding of the different kind of a.c. and d.c. circuits and types of systems and their earthing being applied nowadays in IEC member countries;

– in 33.1, "Compatibility of characteristics", a new item for excessive PE conductor currents is added;

– a new Clause 36, "Continuity of service", is included;

– Annex B is aligned with the second edition of IEC 60050-826:2004.

The text of this standard is based on the following documents:

FDIS	Report on voting
64/1488/FDIS	64/1499/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IEC 60364 consists of the following parts, under the general title *Low-voltage electrical installations:*

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

Part 4: Protection for safety

Part 5: Selection and erection of electrical equipment

Part 6: Verification

Part 7: Requirements for special installations or locations

Part 8: Design consideration

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

The contents of the corrigendum of August 2009 have been included in this copy.

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LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

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

1 Scope [1]

The IEC 60364 series gives the rules for the design, erection, and verification of electrical installations. The rules are intended to provide for the safety of human beings, livestock and property against dangers and damage which may arise in the reasonable use of electrical installations and to provide for the proper functioning of those installations.

The IEC 60364 series applies to any kind of low-voltage electrical installation, except those listed below:

a) electric traction equipment, including rolling stock and signalling equipment;

b) electrical equipment of motor vehicles, except those covered in Part 7;

c) electrical installations on board ships and mobile and fixed offshore platforms;

d) electrical installations in aircraft;

e) public street-lighting installations which are part of the public power grid;

f) installations in mines and quarries;

g) radio interference suppression equipment, except where it affects the safety of the installation;

h) electric fences;

i) external lightning protection systems for buildings (LPS);

NOTE 3 Atmospheric phenomena are covered in IEC 60364-1 but only insofar as effects on the electrical installations are concerned (for example, with respect to selection of surge protective devices).

j) certain aspects of lift installations;

k) electrical equipment of machines.

The IEC 60364 series is not intended to apply to

– systems for distribution of energy to the public, or

– power generation and transmission for such systems.

NOTE 41 Countries wishing to do so may, however, use this standard in whole or in part for that purpose.

[1] The numbering system is explained in Annex A.

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NOTE 52 According to IEC 61936 which provides common rules for the design and the erection of electrical power installations in systems with nominal voltages above 1kV A.C. and nominal frequency up to and including 60 Hz, low- voltage A.C. and D.C. protection and monitoring systems should be in accordance with IEC 60364 series.

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

This applies also to assemblies of electrical equipment complying with the relevant standards.

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

The IEC 60364 series covers:

a) circuits supplied at nominal voltages up to and including 1 000 V AC or 1 500 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.

b) circuits, other than the internal wiring of apparatus, operating at voltages exceeding 1 000 V AC or 1 500 V DC and derived from an installation having a voltage not exceeding 1 000 V AC or 1 500 V DC, for example, discharge lighting, electrostatic precipitators wiring systems and cables not specifically covered by the standards for appliances;

c) all consumer installations external to buildings;

d) fixed wiring for information and communication technology including power supply, signalling, control and the like (excluding internal wiring of apparatus);

e) alterations and/or extensions of the installation

f) parts of the existing installation affected by modifications, extensions or alterations;

g) the design of functional aspects, such as energy efficiency, local production and storage of energy (prosuming).

NOTE 2 The rules of IEC 60364-1 are intended to apply to electrical installations generally but, in certain cases, they may need to be supplemented by the requirements or recommendations of other IEC standards (for example, for installations in explosive gas atmospheres).

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2 Normative references

The following referenced documents are indispensable for the application 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 60038, *IEC standard voltages*

IEC 60050(691), *International Electrotechnical Vocabulary (IEV) – Chapter 691: Tariffs for electricity*

IEC 60050-826, *International Electrotechnical Vocabulary (IEV) – Part 826: Electrical installations*

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60364-4-42, *Electrical installations of buildings – Part 4-42: Protection for safety – Protection against thermal effects*

IEC 60364-4-43, *Electrical installations of buildings – Part 4-43: Protection for safety – Protection against overcurrent*

IEC 60364-4-44, *Electrical installations of buildings – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

IEC 60364-5-51, *Electrical installations of buildings – Part 5-51: Selection and erection of electrical equipment – Common rules*

IEC 60364-5-52, *Electrical installations of buildings – Part 5-52: Selection and erection of electrical equipment – Wiring systems*

IEC 60364-5-53:2001, *Electrical installations of buildings – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control*

IEC 60364-5-54, *Electrical installations of buildings – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements, protective conductors and protective bonding conductors*

IEC 60364-5-55:2001, *Electrical installations of buildings – Part 5-55: Selection and erection of electrical equipment – Other equipment*

IEC 60445, *Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals and of terminations of certain designated conductors, including general rules for an alphanumeric system*

IEC 60446, *Basic and safety principles for man-machine interface, marking and identification – Identification of conductors by colours or numerals*

IEC 60617-DB:2001[2], *Graphical symbols for diagrams*

IEC 60721 (all parts), *Classification of environmental conditions*

[2] "DB" refers to the IEC on-line database.

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3 Terms and definition

11 Fundamental principles

11.1 General

This clause contains basic requirements. In other parts of this standard (see Table A.2), more detailed requirements may be given.

11.2 Protection for safety

11.2.1 General

The requirements stated in 11.2.2 to 11.2.7 are intended to provide for the safety of persons, livestock and property against dangers and damage which may arise in the reasonable use of electrical installations under all operating conditions. The requirements to provide for the safety of livestock are applicable in locations intended for them.

NOTE In electrical installations, the following hazards may arise:

- shock currents;
- excessive temperatures likely to cause burns, fires and other injurious effects;
- ignition of a potentially explosive atmosphere;
- undervoltages, overvoltages and electromagnetic influences likely to cause or result in injury or damage;
- power supply interruptions and/or interruption of safety services;
- arcing, likely to cause fire, burns or blinding effects, excessive pressure, and/or toxic gases;
- mechanical movement of electrically activated equipment.

11.2.2 Protection against electric shock

11.2.2.1 Basic protection

Protection shall be provided against dangers that may arise from contact with live parts of the installation by persons or livestock.

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

– preventing a current from passing through the body of any person or any livestock;

– limiting the current which can pass through a body to a non-hazardous value.

11.2.2.2 Fault protection

Protection shall be provided against dangers that may arise from contact with exposed-conductive-parts of the installation by persons or livestock.

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

- preventing a current resulting from a fault from passing through the body of any person or any livestock;
- limiting the magnitude of a current resulting from a fault, which can pass through a body, to a non-hazardous value;

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– limiting the duration of a current resulting from a fault, which can pass through a body, to a non-hazardous time period.

11.2.2.3 Additional Protection

Protection shall be provided in the event of failure of the provision for basic protection and/or the provision for fault protection, or carelessness by users.

11.2.3 Protection against thermal effects

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

EXAMPLES: Thermal effects can be the following:

- Combustion,
- degradation of materials
- Electric arcing
- Burns resulting from high temperatures

11.2.4 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 any overcurrents likely to arise in conductors.

Protection can be achieved by limiting the overcurrent to a safe value or duration.

11.2.5 Protection against fault currents

Fault currents flowing in conductors or other parts shall not cause excessive temperatures in those conductors or parts.

Human beings and livestock shall be protected against injury and property shall be protected against damage due to electromechanical stresses caused by any fault currents flowing in conductors or any other parts.

NOTE Particular attention should be given to PE conductor and earthing conductor currents.

11.2.6 Protection against voltage disturbances and measures against electromagnetic influences

11.2.6.1 Persons 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.

11.2.6.2 Persons 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.

NOTE For protection against direct lightning strikes, see IEC 62305 series.

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11.2.6.3 Persons and livestock shall be protected against injury and property shall be protected against damage as a consequence of undervoltage and any subsequent voltage recovery.

11.2.6.4 The installation shall have an adequate level of immunity against electromagnetic disturbances so as to function correctly in the specified environment. The installation design shall take into consideration the anticipated electromagnetic emissions, generated by the installation or the installed equipment, which shall be suitable for the current-using equipment used with, or connected to, the installation.

11.2.7 Protection against power supply interruption

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

12 Design

12.1 General

For the design of the electrical installation, the following factors shall be taken into account to provide

- the protection of persons, livestock and property in accordance with Clause 11;
- the proper functioning of the electrical installation for the intended use.

The information required as a basis for design is listed in 12.2 to 12.5. The requirements with which the design shall comply are stated in 12.6 to 12.12.

12.2 Characteristics of available supply or supplies

Relevant information regarding the characteristics of the power supply or supplies is necessary to design a safe installation according to IEC 60364 series. Information on the characteristics of the available supply or supplies shall be determined by calculation, measurement or enquiry (e.g. from the network operator, manufacturer). If the network operator changes the characteristics of the power supply this may affect the safety of the installation.

The following characteristics for each supply shall be considered to show conformity.

a. Nature of current: AC and/or DC

b. Function of conductors:

- for AC:
  - line conductor(s);
  - neutral conductor;
  - protective conductor.
- for DC:
  - line conductor(s);
  - midpoint conductor;
  - protective conductor.

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