INTERNATIONAL STANDARD

IEC 60364-1

Fourth edition
2001-08

Electrical installations of buildings –

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

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International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL INSTALLATIONS OF BUILDINGS –

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

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The 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.

The IEC 60364 series (parts 1 to 6), is currently being restructured, without any technical changes, into a more simple form (see annex C).

According to a unanimous decision by the Committee of Action (CA/1720/RV (2000-03-21)), the restructured parts of IEC 60364 have not been submitted to National Committees for approval.

The text of this fourth edition of IEC 60364-1 is compiled from and replaces

– part 1, third edition (1992),
– part 2-21, first edition (1993), and
– part 3, second edition (1993) and its amendments 1 and 2 (1994 and 1995, respectively).

This publication has been drafted, as close as possible, in accordance with the ISO/IEC Directives, Part 3.

Annexes A, B and C are for information only.

The committee has decided that the contents of this publication will remain unchanged until 2003. At this date, the publication will be

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

INTRODUCTION

This part of IEC 60364 contains the rules for the design and erection of electrical installations so as to provide safety and proper functioning for the use intended.

Clause 13 states the fundamental principles. It does not include detailed technical requirements which may be subject to modifications on account of technical developments.

Parts 1 to 7 of IEC 60364 deal with technical requirements, the observance of which is intended to ensure that electrical installations conform to the fundamental principles of clause 13.

ELECTRICAL INSTALLATIONS OF BUILDINGS –

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

11 Scope[1]

11.1 This part of IEC 60364 applies to electrical installations such as those of:

a) residential premises;
b) commercial premises;
c) public premises;
d) industrial premises;
e) agricultural and horticultural premises;
f) prefabricated buildings;
g) caravans, caravan sites and similar sites;
h) construction sites, exhibitions, fairs and other temporary installations;
i) marinas and pleasure craft.

11.2 It covers:

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

   For a.c., the preferred frequencies which are taken into account in this standard are 50 Hz, 60 Hz and 400 Hz. The use of other frequencies for special purposes is not excluded.

b) circuits, other than the internal wiring of apparatus, operating at voltages exceeding 1 000 V and derived from an installation having a voltage not exceeding 1 000 V a.c., e.g. discharge lighting, electrostatic precipitators;
c) any wiring systems and cables not specifically covered by the standards for appliances;
d) all consumer installations external to buildings;
e) fixed wiring for telecommunications, signalling, control and the like (excluding internal wiring of apparatus);
f) the extension or alteration of the installation and also parts of the existing installation affected by the extension or alteration.

11.3 The standard does not apply to

a) electric traction equipment;
b) electrical equipment of motor vehicles;
c) electrical installations on board ships;
d) electrical installations in aircraft;
e) public street-lightning installations;
f) installations in mines;

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

g) radio interference suppression equipment, except so far as it affects safety of the installation;

h) electric fences;

i) lightning protection of buildings.

NOTE Atmospheric phenomena are covered, however, in so far as effects on the electrical installations are concerned (e.g. with respect to selection of lightning arresters).

11.4 This standard is not intended to apply to:

– systems for distribution of energy to the public, or

– power generation and transmission for such systems.

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

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

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

11.6 An assessment is made of the following characteristics of the installation in accordance with the clauses indicated:

– the purposes for which the installation is intended to be used, its general structure and its supplies (clause 31);

– the external influences to which it is to be exposed (IEC 60364-5-51);

– the compatibility of its equipment (clause 33);

– its maintainability (clause 34).

Those characteristics shall be taken into account in the choice of methods of protection for safety (see IEC 60364-4-41 to IEC 60364-4-44) and the selection and erection of equipment (see IEC 60364-5-51 to IEC 60364-5-55).

NOTE For telecommunications installations, account should be taken of any IEC standards as well as publications of the ITU-T and the ITU-R relevant to the type of installation concerned.

12 (3.2)[2] Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60364. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60364 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(826):1982, *International Electrotechnical Vocabulary – Chapter 826: Electrical installations of buildings*

IEC 60364-4-41:2001, *Electrical installations of buildings – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60364-4-42:2001, *Electrical installations of buildings – Part 4-42: Protection for safety – Protection against thermal effects*

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[2] In this standard, references in brackets refer to the previous numbering system.

IEC 60364-4-43:2001, *Electrical installations of buildings – Part 4-43: Protection for safety – Protection against overcurrent*

IEC 60364-4-44:2001, *Electrical installations of buildings – Part 4-44: Protection for safety – Protection against electromagnetic and voltages disturbances*

IEC 60364-5-51:2001, *Electrical installations of buildings – Part 5-51: Selection and erection of electrical equipment – Common rules*

IEC 60364-5-52:2001, *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* [3]

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

IEC 60446:1999, *Basic and safety principles for man-machine interface, marking and identification – Identification of conductors by colours or numerals*

IEC 60617-11:1996, *Graphical symbols for diagrams – Part 11: Architectural and topographical installation plans and diagrams*

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

13 Fundamental principles

NOTE Where countries not yet having national regulations for electrical installations deem it necessary to establish legal requirements for this purpose, it is recommended that such requirements be limited to fundamental principles which are not subject to frequent modification on account of technical development. The contents of clause 13 may be used as a basis for such legislation.

131 Protection for safety

131.1 General

The requirements stated in this subclause are intended to ensure the safety of persons, livestock and property against dangers and damage which may arise in the reasonable use of electrical installations.

NOTE In electrical installations, two major types of risk exist:

– shock currents;

– excessive temperatures likely to cause burns, fires and other injurious effects.

131.2 Protection against electric shock

131.2.1 Protection against direct contact

Persons and livestock shall be protected against dangers that may arise from contact with live parts of the installation.

[3] To be published.

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 value lower than the shock current.

131.2.2 Protection against indirect contact

Persons and livestock shall be protected against dangers that may arise from contact with exposed-conductive-parts in case of a fault.

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

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

– limiting the fault current which can pass through a body to a value lower than the shock current;

– automatic disconnection of the supply in a determined time on the occurrence of a fault likely to cause a current to flow through a body in contact with exposed-conductive-parts, where the value of that current is equal to or greater than the shock current.

NOTE In connection with the protection against indirect contact, the application of the method of equipotential bonding is one of the important principles for safety.

131.3 Protection against thermal effects

The electrical installation shall be so arranged that there is no risk of ignition of flammable materials due to high temperature or electric arc. In addition, during normal operation of the electrical equipment, there shall be no risk of persons or livestock suffering burns.

131.4 Protection against overcurrent

Persons or 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 live conductors.

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

– automatic disconnection on the occurrence of an overcurrent before this overcurrent attains a dangerous value taking into account its duration;

– limiting the maximum overcurrent to a safe value and duration.

131.5 Protection against fault currents

Conductors, other than live conductors, and any other parts intended to carry a fault current shall be capable of carrying that current without attaining an excessive temperature.

NOTE 1 Particular attention should be given to earth fault currents and leakage current.

NOTE 2 For live conductors, compliance with 131.4 assures their protection against overcurrents caused by faults.

131.6 Protection against overvoltage

131.6.1 Persons or 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.

131.6.2 Persons or livestock shall be protected against injury and property shall be protected against damage as a consequence of any excessive voltages likely to arise due to other causes (e.g. atmospheric phenomena or switching overvoltages).

132 Design

132.1 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 131;
– the proper functioning of the electrical installation for the use intended;

The information required as a basis for design is listed in 132.2 to 132.5. The requirements with which the design should comply are stated in 132.6 to 132.12.

132.2 Characteristics of available supply or supplies

132.2.1 Nature of current: a.c. and/or d.c.

132.2.2 Nature and number of conductors:

– For a.c.: phase conductor(s);
  neutral conductor;
  protective conductor.
– For d.c.: conductors equivalent to those listed above.

132.2.3 Values and tolerances:

– voltage and voltage tolerances;
– frequency and frequency tolerances;
– maximum current allowable;
– prospective short-circuit current.

132.2.4 Protective measures inherent in the supply, e.g. earthed (grounded) neutral or mid-wire

132.2.5 Particular requirements of the supply undertaking

132.3 Nature of demand

The number and type of circuits required for lighting, heating, power, control, signalling, telecommunication, etc. are to be determined by:

– location of points of power demand;
– loads to be expected on the various circuits;
– daily and yearly variation of demand;
– any special conditions;
– requirements for control, signalling, telecommunication, etc.

132.4 Emergency supply or supplies

– Source of supply (nature, characteristics).
– Circuits to be supplied by the emergency source.

132.5 Environmental conditions

See IEC 60364-5-51 and IEC 60721.

132.6 Cross-section of conductors

The cross-section of conductors shall be determined according to:

a) their admissible maximum temperature;
b) the admissible voltage drop;
c) the electromechanical stresses likely to occur due to short-circuits;
d) other mechanical stresses to which the conductors can be exposed;
e) the maximum impedance with respect to the functioning of the short-circuit protection.

NOTE The above-listed items concern primarily the safety of electrical installations. Cross-sectional areas greater than those required for safety may be desirable for economic operation.

132.7 Type of wiring and methods of installation

The choice of the type of wiring and the methods of installation depend on:

– the nature of the locations;
– the nature of the walls or other parts of the building supporting the wiring;
– accessibility of wiring to persons and livestock;
– voltage;
– the electromechanical stresses likely to occur due to short-circuits;
– other stresses to which the wiring can be exposed during the erection of the electrical installation or in service.

132.8 Protective equipment

The characteristics of protective equipment shall be determined with respect to their function which may be, e.g.: protection against the effects of:

– overcurrent (overload, short-circuit);
– earth-fault current;
– overvoltage;
– undervoltage and no-voltage.

The protective devices shall operate at values of current, voltage and time which are suitably related to the characteristics of the circuits and to the possibilities of danger.

132.9 Emergency control

Where, in case of danger, there is necessity for immediate interruption of supply, an interrupting device shall be installed in such a way that it can be easily recognized and effectively and rapidly operated.

132.10 Disconnecting devices

Disconnecting devices shall be provided so as to permit disconnection of the electrical installation, circuits or individual items of apparatus as required for maintenance, testing, fault detection or repair.

132.11 Prevention of mutual influence

The electrical installation shall be arranged in such a way that no mutual detrimental influence will occur between the electrical installation and non-electrical installations of the building.

132.12 Accessibility of electrical equipment

The electrical equipment shall be arranged so as to afford as may be necessary:

– sufficient space for the initial installation and later replacement of individual items of electrical equipment;

– accessibility for operation, testing, inspection, maintenance and repair.

133 Selection of electrical equipment

133.1 General

Every item of electrical equipment used in electrical installations shall comply with such IEC standards as are appropriate.

133.2 Characteristics

Every item of electrical equipment selected shall have suitable characteristics appropriate to the values and conditions on which the design of the electrical installation (see clause 132) is based and shall, in particular, fulfil the following requirements.

133.2.1 Voltage

Electrical equipment shall be suitable with respect to the maximum steady voltage (r.m.s. value for a.c.) likely to be applied, as well as overvoltages likely to occur.

NOTE For certain equipment, it may be necessary to take account of the lowest voltage likely to occur.

133.2.2 Current

All electrical equipment shall be selected with respect to the maximum steady current (r.m.s. value for a.c.) which it has to carry in normal service, and with respect to the current likely to be carried in abnormal conditions and the period (e.g. operating time of protective devices, if any) during which it may be expected to flow.

133.2.3 Frequency

If frequency has an influence on the characteristics of electrical equipment, the rated frequency of the equipment shall correspond to the frequency likely to occur in the circuit.

133.2.4 Power

All electrical equipment, which is selected on the basis of its power characteristics, shall be suitable for the duty demanded of the equipment, taking into account the load factor and the normal service conditions.

133.3 Conditions of installation

All electrical equipment shall be selected so as to withstand safely the stresses and the environmental conditions (see 132.5) characteristic of its location and to which it may be exposed. If, however, an item of equipment does not have by design the properties corresponding to its location, it may be used on condition that adequate additional protection is provided as part of the completed electrical installation.

133.4 Prevention of harmful effects

All electrical equipment shall be selected so that it will not cause harmful effects on other equipment or impair the supply during normal service including switching operations. In this context, the factors which can have an influence include

– power factor;
– inrush current;
– asymmetrical load;
– harmonics.

134 Erection and initial verification of electrical installations

134.1 Erection

134.1.1 For the erection of the electrical installation, good workmanship by suitably qualified personnel and the use of proper materials shall be provided for.

134.1.2 The characteristics of the electrical equipment, as determined in accordance with clause 133, shall not be impaired in the process of erection.

134.1.3 Conductors shall be identified in accordance with IEC 60446.

134.1.4 Connections between conductors and between conductors and other electrical equipment shall be made in such a way that safe and reliable contact is ensured.

134.1.5 All electrical equipment shall be installed in such a manner that the designed cooling conditions are not impaired.

134.1.6 All electrical equipment likely to cause high temperatures or electric arcs shall be placed or guarded so as to eliminate the risk of ignition of flammable materials. Where the temperature of any exposed parts of electrical equipment is likely to cause injury to persons, those parts shall be so located or guarded as to prevent accidental contact therewith.

134.2 Initial verification

Electrical installations shall be tested and inspected before being placed in service and after any important modification to verify proper execution of the work in accordance with this standard.

30 Assessment of general characteristics (IEC 60364-3)

31 Purposes, supplies and structure

311 Maximum demand and diversity

311.1 For economic and reliable design of an installation within thermal and voltage drop limits, a determination of maximum demand is essential.

311.2 In determining the maximum demand of an installation, or part thereof, diversity may be taken into account.

NOTE Guidance on the calculation of diversity is under consideration.

312 Types of distribution system

The following characteristics of the distribution system are to be assessed:

– types of systems of live conductors;
– types of system earthing.

312.1 Types of system of live conductors

The following systems of live conductors are taken into account in this standard:

AC systems	DC systems
Single-phase 2-wire	2-wire
Single-phase 3-wire	3-wire
Two-phase 3-wire	
Two-phase 5-wire	
Three-phase 3-wire	
Three-phase 4-wire	

312.2 Types of system earthing

The following types of system earthing are taken into account in this standard.

NOTE 1 Figures 31A to 31E show examples of commonly used three-phase systems. Figures 31F to 31K show examples of commonly used d.c. systems.

NOTE 2 The codes used have the following meanings:

First letter – Relationship of the power system to earth:

T = direct connection of one point to earth;

I = all live parts isolated from earth, or one point connected to earth through an impedance.

Second letter – Relationship of the exposed-conductive-parts of the installation to earth:

T = direct electrical connection of exposed-conductive-parts to earth, independently of the earthing of any point of the power system;

N = direct electrical connection of the exposed-conductive-parts to the earthed point of the power system (in a.c. systems, the earthed point of the power system is normally the neutral point or, if a neutral point is not available, a phase conductor).

Subsequent letter(s) (if any) – Arrangement of neutral and protective conductors:

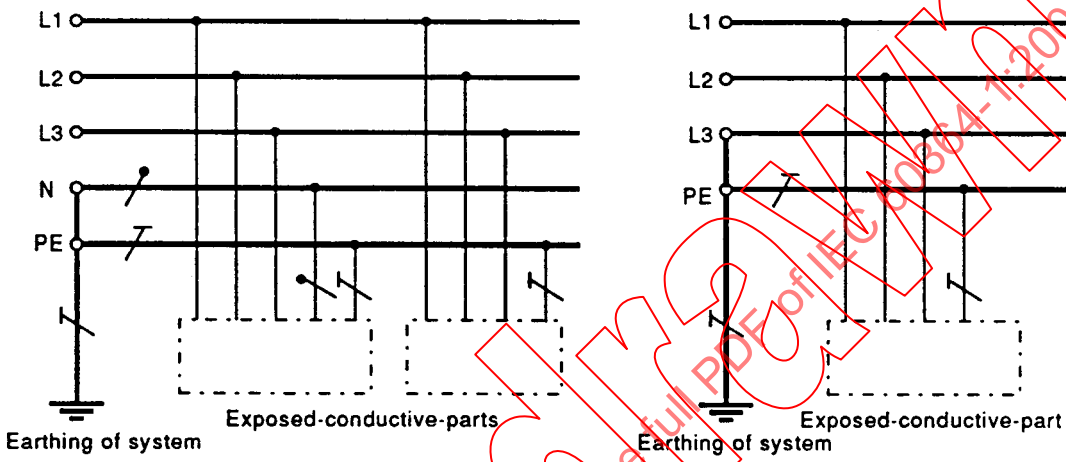
S = protective function provided by a conductor separate from the neutral or from the earthed line (or in a.c. systems, earthed phase) conductor.

C = neutral and protective functions combined an a single conductor (PEN conductor).

312.2.1 TN systems

TN power systems have one point directly earthed, the exposed-conductive-parts of the installation being connected to that point by protective conductors. Three types of TN system are considered according to the arrangement of neutral and protective conductors, as follows:

– TN-S system: in which throughout the system, a separate protective conductor is used;
– TN-C-S system: in which neutral and protective functions are combined in a single conductor in a part of the system;
– TN-C system: in which neutral and protective functions are combined in a single conductor throughout the system.



Separate neutral and protective conductors throughout the system

Separate earthed phase conductor and protective conductors throughout the system

NOTE For symbols, see explanation after figure 31C.

Figure 31A – TN-S system

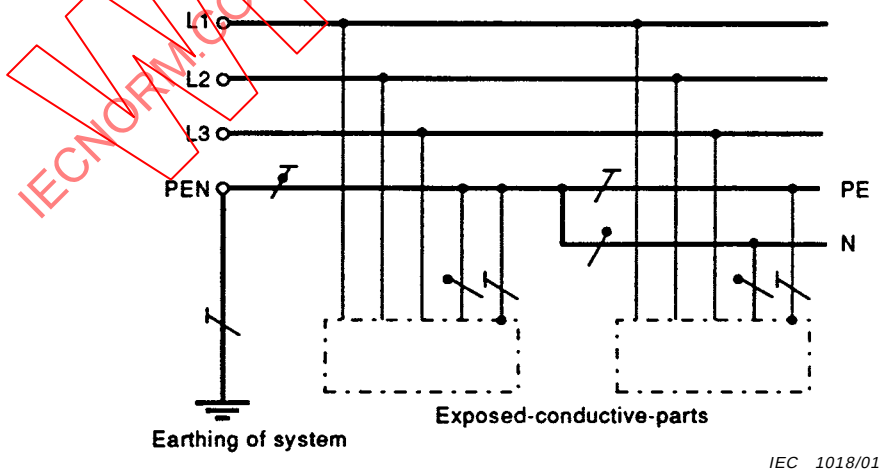


Figure 31B – TN-C-S system – Neutral and protective functions combined in a single conductor in a part of the system

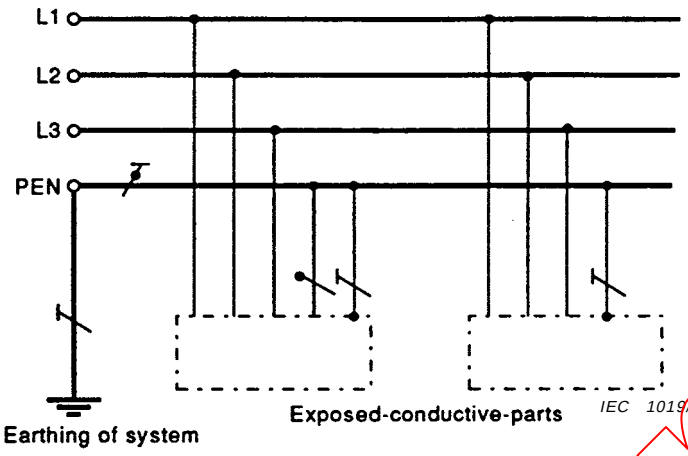
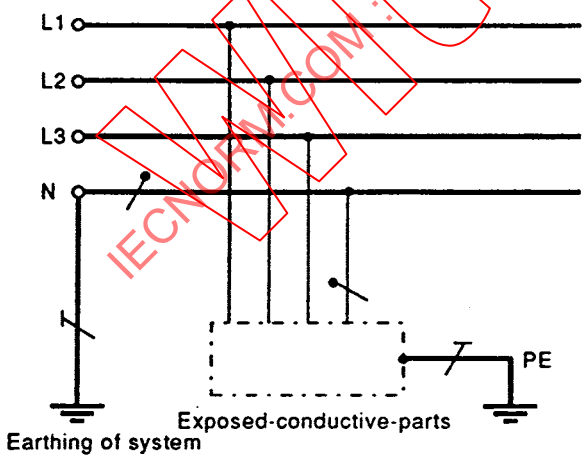


Figure 31C – TN-C system – Neutral and protective functions combined in a single conductor throughout the system

Explanation of symbols for figures 31A, 31B, 31C, 31D and 31E according to IEC 60617-11	
	Neutral conductor (N)
	Protective conductor (PE)
	Combined protective and neutral conductor (PEN)

312.2.2 TT system

The TT power system has one point directly earthed, the exposed-conductive-parts of the installation being connected to earth electrodes electrically independent of the earth electrodes of the power system.



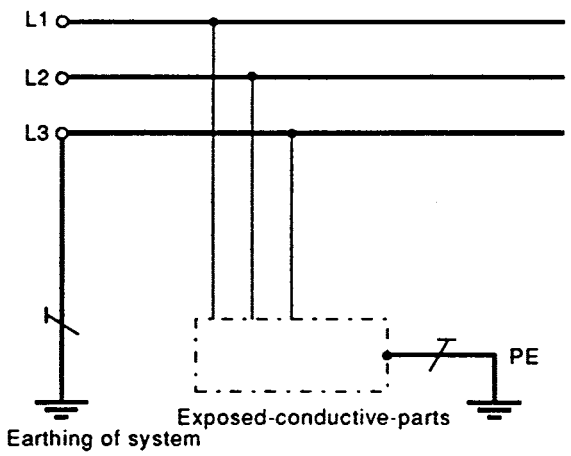
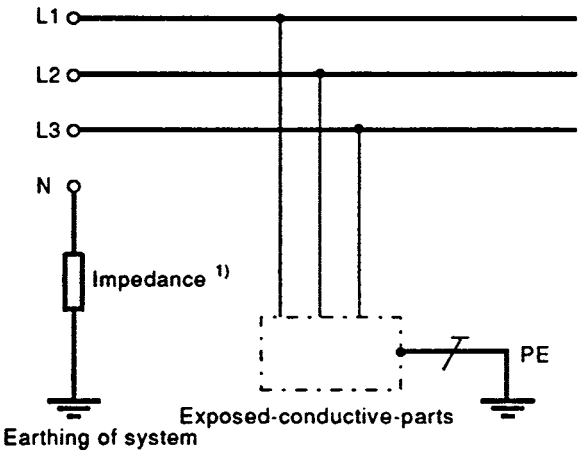
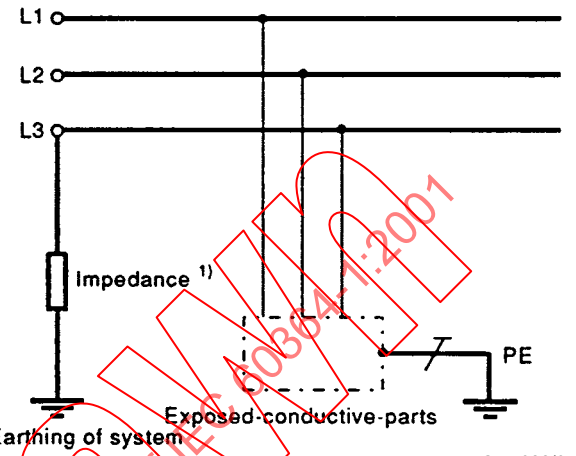


Figure 31D – TT system

312.2.3 IT system

The IT power system has all live parts isolated from earth or one point connected to earth through an impedance, the exposed-conductive-parts of the electrical installation being earthed independently or collectively or to the earthing of the system (see 413.1.5 of IEC 60364-4-41).





1) The system may be isolated from earth. The neutral may or may not be distributed.

Figure 31E – IT system

312.2.4 DC systems

Type of system earthing for direct current (d.c.) systems.

NOTE In earthed d.c. systems electromechanical corrosion should be considered.

Where the following figures 31F to 31K show earthing of a specific pole of a two-wire d.c. system, the decision whether to earth the positive or the negative pole shall be based upon operational circumstances or other considerations.

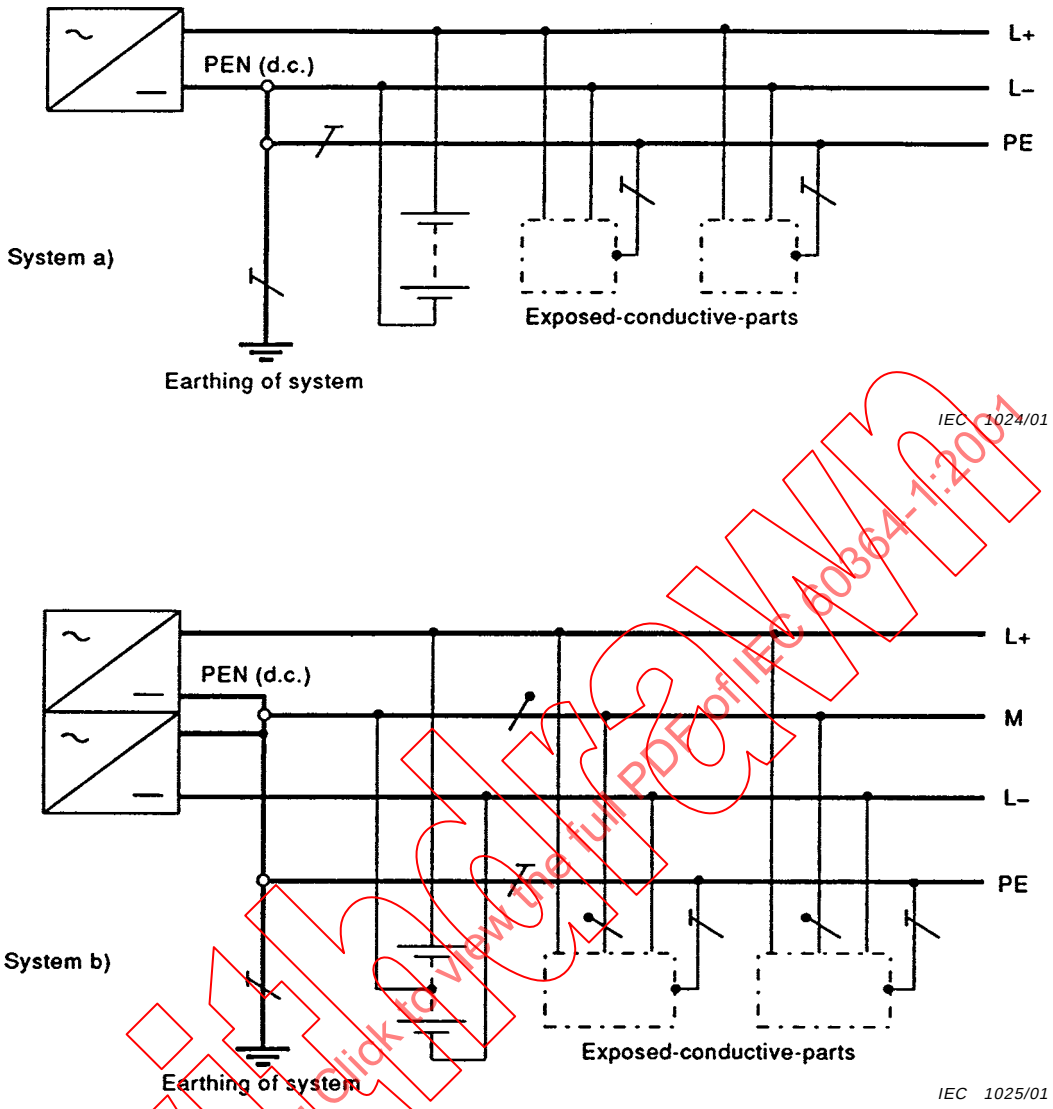


Figure 31F – TN-S d.c. system

The earthed line conductor (for example L–) in system a) or the earthed mid-wire conductor, M, in system b) are separated from the protective conductor throughout the system.

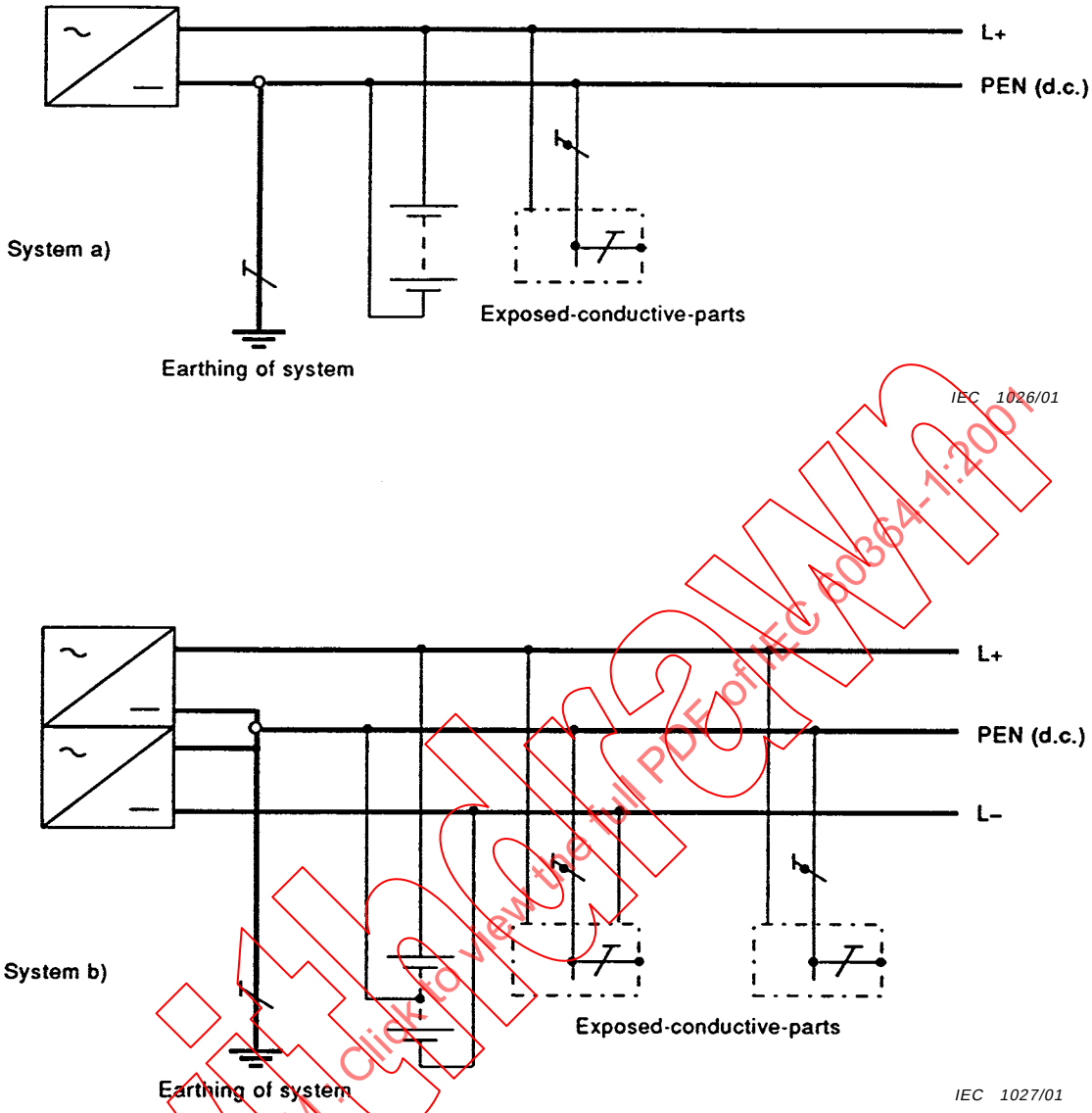


Figure 31G – TN-C d.c. system

The functions of the earthed line conductor (for example L–) in system a) and protective conductor are combined in one single conductor PEN (d.c.) throughout the system, or the earthed mid-wire conductor, M, in system b) and protective conductor are combined in one single conductor PEN (d.c.) throughout the system.

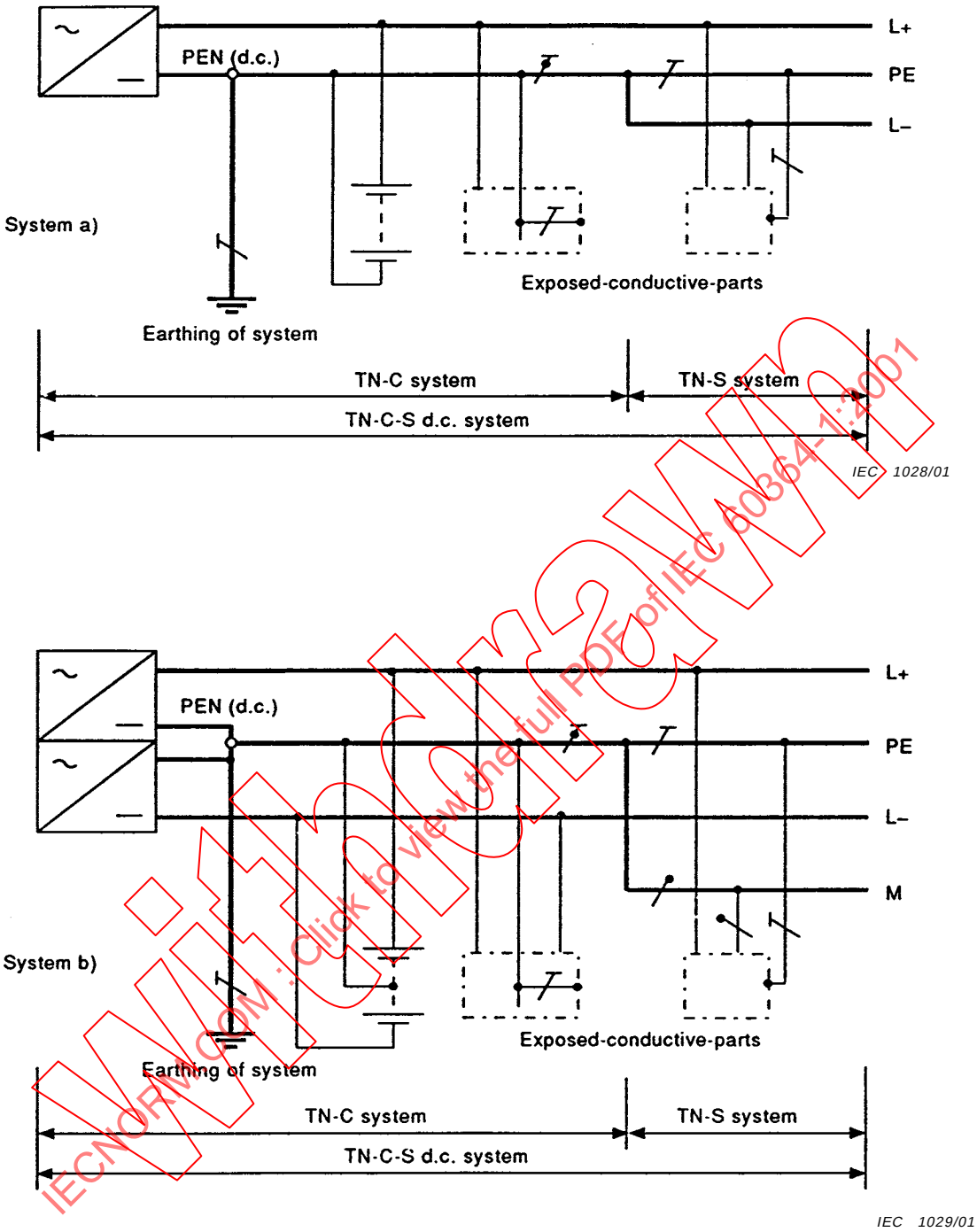
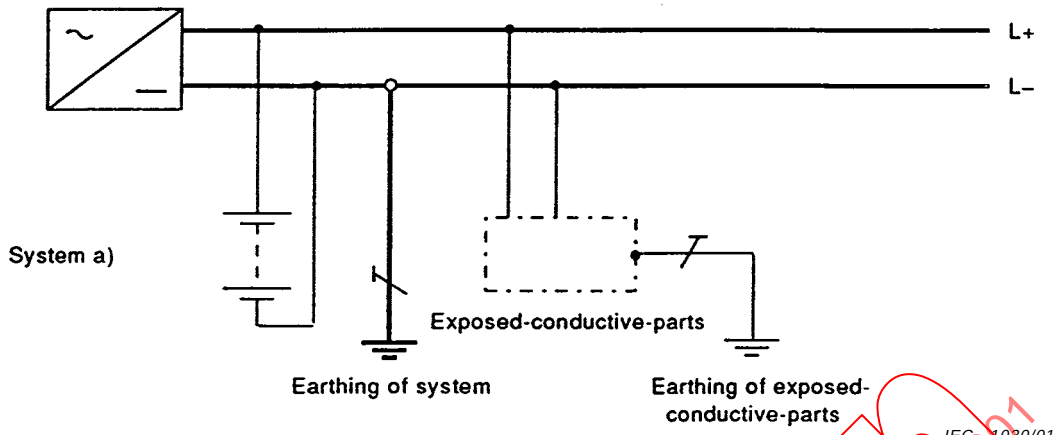


Figure 31H – TN-C-S d.c. system

The functions of the earthed line conductor (for example L–) in system a) and protective conductor are combined in one single conductor PEN (d.c.) in parts of the system, or the earthed mid-wire conductor, M, in system b) and protective conductor are combined in one single conductor PEN (d.c.) in parts of the system.



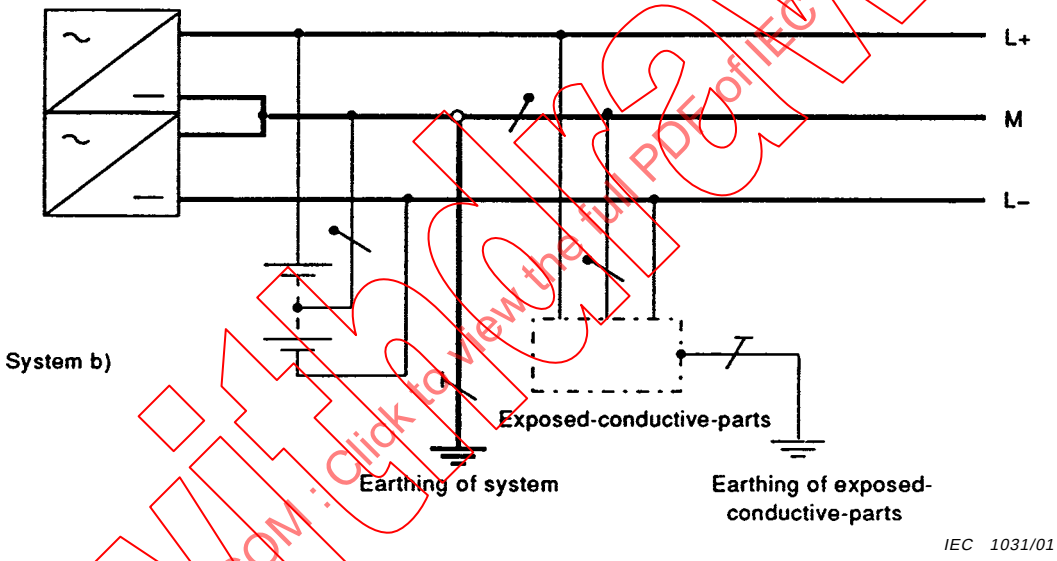
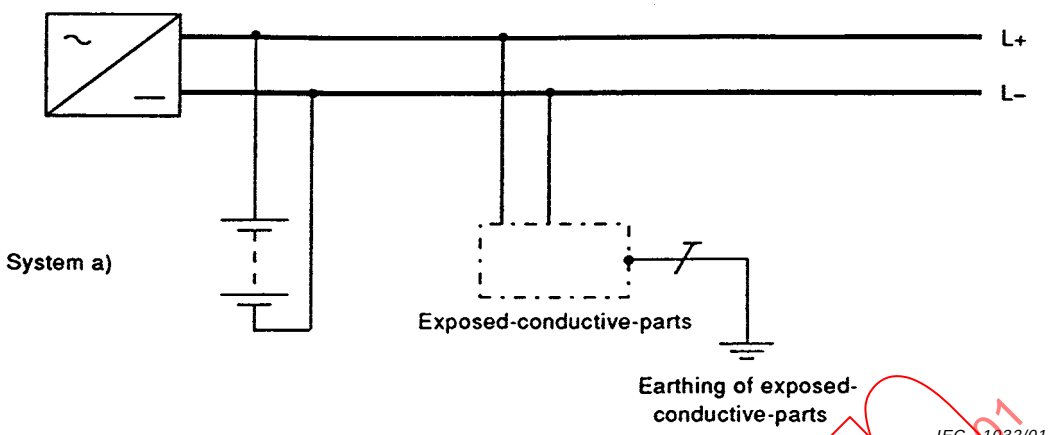


Figure 31J – TT d.c. system



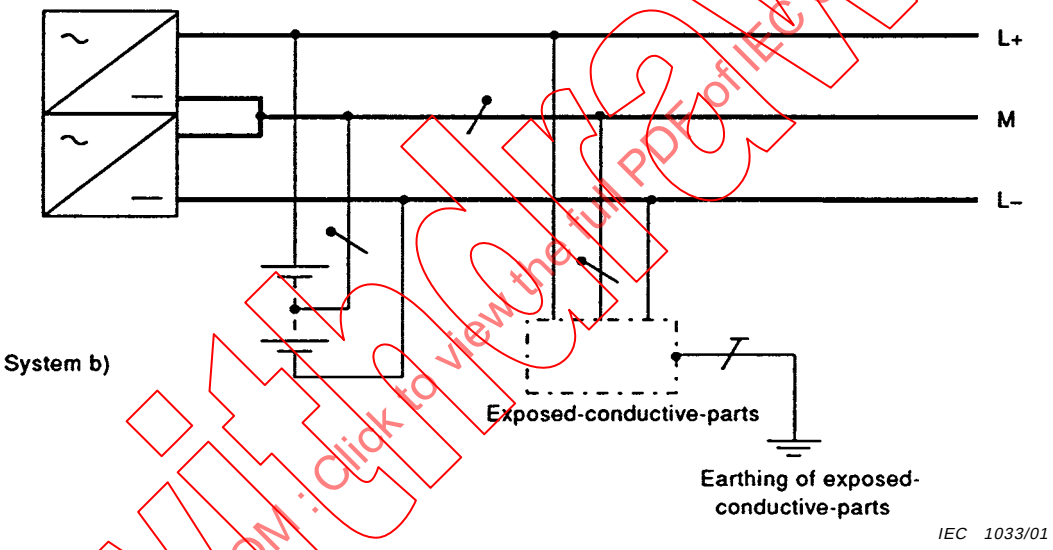


Figure 31K – IT d.c. system

313 Supplies

313.1 General

313.1.1 The following characteristics of the available supply or supplies shall be assessed:

– nature of current and frequency;
– nominal voltage(s);
– prospective short-circuit current at the supply intake point;
– suitability for the requirements of the installation, including the maximum demand.

313.1.2 These characteristics shall be ascertained for an external supply and shall be determined for a private source. These requirements are equally applicable to main supplies and to safety services and standby supplies.

313.2 Supplies for safety services and standby systems

Where the provision of safety services is specified by the authorities concerned with fire precautions and other conditions for emergency evacuation of the premises, and/or where the provision of standby supplies is required by the person specifying the installation, the characteristics of the sources of supply for safety services and/or standby systems shall be separately assessed. Such supplies shall have adequate capacity, reliability and rating and appropriate change-over time for the operation specified.

For further requirements for supplies for safety services see clause 35 hereafter and clause 556 of IEC 60364-5-55. For standby systems there are no particular requirements in this standard.

314 Division of installation

314.1 Every installation shall be divided into several circuits, as necessary, to:

– avoid danger and minimize inconvenience in the event of a fault;
– facilitate safe inspection, testing, and maintenance (see also IEC 60364-5-53);
– take account of danger that might arise from the failure of a single circuit such as a lighting circuit.

314.2 Separate distribution circuits shall be provided for parts of the installation which need to be separately controlled, in such a way that those circuits are not affected by failure of other circuits.

33 Compatibility

33.1 Compatibility of characteristics

(330.1) An assessment shall be made of any characteristics of equipment likely to have harmful effects upon other electrical equipment or other services or likely to impair the supply. Those characteristics include, for example:

– transient overvoltages;
– rapidly fluctuating loads;
– starting currents;
– harmonic currents;
– d.c. feedback;
– high-frequency oscillations;
– earth leakage currents;
– necessity for additional connections to earth.

33.2 Electromagnetic compatibility

All electrical equipment shall meet the appropriate electromagnetic compatibility (EMC) requirements, and shall be in accordance with the relevant EMC standards.

Consideration shall be given by the planner and designer of the electrical installations to measures reducing the effect of induced overvoltages and EMI.

Measures are given in IEC 60364-4-44.

34 Maintainability

340.1 An assessment shall be made of the frequency and quality of maintenance the installation can reasonably be expected to receive during its intended life. Where an authority is to be responsible for the operation of the installation, that authority shall be consulted. Those characteristics are to be taken into account in applying the requirements of parts 4 to 6 of IEC 60364 so that, having regard to the frequency and quality of maintenance expected

– any periodic inspection and testing, maintenance and repairs likely to be necessary during the intended life can be readily and safely carried out; and
– the effectiveness of the protective measures for safety during the intended life is ensured; and
– the reliability of equipment for proper functioning of the installation is appropriate to the intended life.

340.2 (Further requirements are under consideration.)

35 Safety services

351 General

NOTE The need for safety services and their nature are frequently regulated by statutory authorities whose requirements have to be observed.

The following sources for safety services are recognized:

– storage batteries;
– primary cells;
– generator sets independent of the normal supply;
– a separate feeder of the supply network effectively independent of the normal feeder (see 556.4.4 of IEC 60364-5-55).

Annex A
(informative)

Numbering system and plan of IEC 60364

Table A.1 – Numbering system of IEC 60364

Arabic numerals only are used (except for tables and figures, see below). The various divisions and subdivisions of the publication are identified as follows:		**Examples**
Parts	Sequentially by a single number (one or two digits)	41
Clauses	Sequentially within each part by the part number followed by a single number, with no points	413
Subclauses	Sequentially within each clause followed by a point and then the subclause number	413.5
Further subclauses (if necessary)	Sequentially within each subclause by a further point and subclause number	542.1.1
Unnumbered subclauses	Where introductory or general clauses appear before the start of a given clause, zeros are used in the positions normally occupied by the clause numbers	400.1
Tables and figures	By the part number in which they appear, followed alphabetically by a capital letter	Table 41A

Table A.2 – Plan of IEC 60364: Electrical installations of buildings

Part Nos	Title
Part 1	**Fundamental principles, assessment of general characteristics, definitions**
11	Scope
12	Normative references
13	Fundamental principles
30	Assessment of general characteristics
31	Purposes, supplies and structure
33	Compatibility
34	Maintainability
35	Safety services
Annex A	Numbering system and plan of IEC 60364
Annex B	Definitions
Annex C	IEC 60364 to parts 1-6: Restructuring
Part 4	**Protection for safety**
Part 4-41	Protection against electric shock (protection against direct and indirect contact)
Part 4-42	Protection against thermal effects (of equipment during normal operation)
Part 4-43	Protection against overcurrent (for conductors and cables)
Part 4-44	Protection against voltages disturbances and electromagnetic disturbances
Part 5	**Selection and erection of electrical equipment**
Part 5-51	Common rules (e.g. principles for selection and erection)
Part 5-52	Wiring systems
Part 5-53	Isolation, switching and control
Part 5-54	Earthing arrangements
Part 5-55	Other equipment
Part 6	**Verification and testing**
Part 6-61	Initial verification

Part Nos	Title
Part 7	**Requirements for special installations or locations**
NOTE Part 7 deviates from parts 1 to 6 in that it is divided into clauses in order to have more than nine clauses available for these additional regulations.	
Part 7-701	Location containing a bath tub or shower basin
Part 7-702	Swimming pools
Part 7-703	Location containing sauna heaters
Part 7-704	Construction and demolition site installation
Part 7-705	Electrical installations of agricultural and horticultural premises
Part 7-706	Restrictive conducting locations
Part 7-707	Earthing requirements for the installation of data processing equipment
Part 7-708	Electrical installations in caravan parks and caravans
Part 7-709	Electrical installations in marinas and pleasure craft
Part 7-710	Medical locations and associated areas
Part 7-711	Electrical installations in exhibitions, shows, stands and funfairs
Part 7-712	Allocated to PV-Systems
Part 7-713	Furniture
Part 7-714	External lighting installations
Part 7-715	Extra-low-voltage lighting installations

Annex B
(informative)

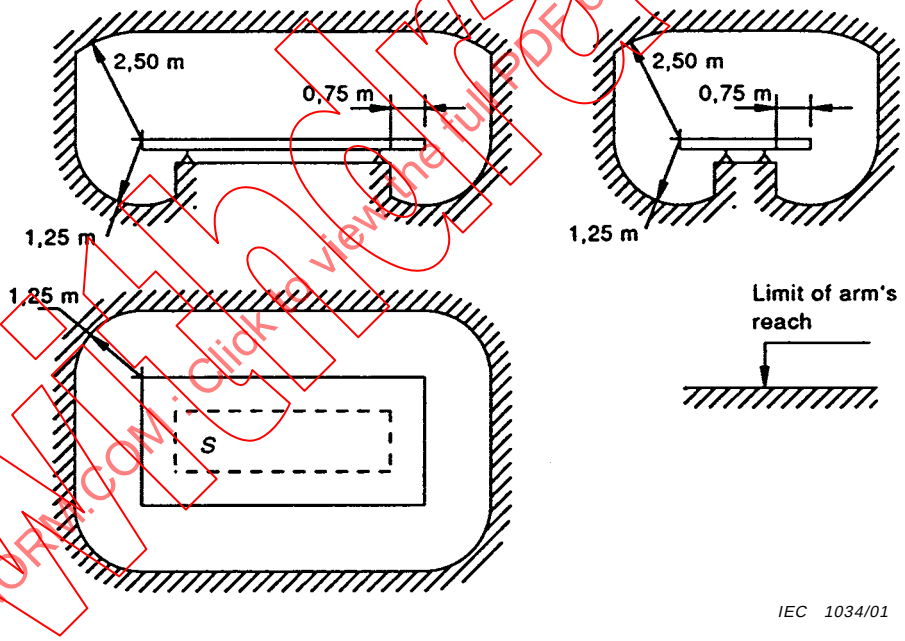
Definitions – Guide to general terms

B.1.0 (21.0) Scope

This guide is applicable to electrical installations of buildings. It contains explanatory notes on terms used in IEC 60364, listed in sections 01 to 08 of IEC 60050(826). The notes are intended to facilitate the application of terms.

	Term	Note
B.1.1 (21.1)	Characteristics of installations (section 01)	
B.1.1.1 (21.1.1)	*origin of an electrical installation; Service entrance* (USA) (826-01-03)	An electrical installation may have more than one origin
B.1.1.2 (21.1.2)	*neutral conductor* (symbol N) (826-01-03)	The neutral point (of a polyphase system) is defined in IEV 601-02-22 as follows: "Common point of the *n*-windings in a star-connected power transformer or earthing transformer, in a substation." In certain instances, and under specified conditions, the functions of neutral conductor and protective conductor may be combined in a single conductor (see definition of PEN conductor (826-04-06)
B.1.1.3 (21.1.3)	*ambient temperature* (826-01-04)	It is assumed that the ambient temperature includes the effects of all other equipment installed in the same location. The ambient temperature to be considered for the equipment is the temperature at the place where the equipment is to be installed resulting from the influence of all other equipment and heat sources in the same location, when operating, not taking into account the thermal contribution of the equipment to be installed
B.1.1.4 (21.1.4)	*(supply system for) safety services; emergency power systems* (USA) (826-01-05)	Safety services are often a statutory requirement in premises open to the public, in very high buildings and in certain industrial premises
B.1.1.5 (21.1.5)	*standby supply system* (826-01-06)	Standby supplies are necessary, for example, to avoid interruption of continuous industrial processes or data processing
B.1.2 (21.2)	Voltages (section 02)	
B.1.2.1 (21.2.1)	*nominal voltage (of an installation)* (826-02-01)	Transient overvoltages, due for example to switching operations, and temporary variations in the voltage due to abnormal conditions, such as faults in the supply system, are ignored
B.1.3 (21.3)	Electric shock (section 03)	
B.1.3.1 (21.3.1)	*extraneous-conductive-parts* (826-03-03)	Extraneous-conductive-parts may be – metallic parts of the building structure; – metal pipe systems for gas, water, heating, etc.; – non-insulating floors and walls

	Term	Note
B.1.3.2 (21.3.2)	*simultaneously accessible parts* (826-03-10)	In the context of protection against direct contact, a live part may be accessible with – another live part; or – an exposed-conductive-part; or – an extraneous-conductive-part; or – a protective conductor. The following may constitute simultaneously accessible parts in the context of protection against indirect contact: – exposed-conductive-parts; – extraneous-conductive-parts; – protective conductors. In relation to the definition of IEV 826-03-10, it should be noted that the word 'touched' signifies any contact with any part of the body (hand, foot, head, etc.)
B.1.3.3 (21.3.3)	*arm's reach* (826-03-11)	This space is by convention limited as shown in figure B.1 (21a)



S = surface expected to be occupied by persons

Figure B.1 (21a) – Zone of arm's reach

B.1.4 (21.4)	Earthing (section 04)	
B.1.4.1 (21.4.1)	*earth;* *ground* (USA) (826-04-01)	In the proximity of earth electrodes the potential may not be zero
B.1.4.2 (21.4.2)	*earthing conductor;* *grounding electrode conductor* (USA) (826-04-07)	The non-insulated parts of earthing conductors which are buried in the ground are regarded as forming part of the earth electrode
B.1.4.3 (21.4.3)	*equipotential bonding* (826-04-09)	Distinction is made between – the main equipotential bonding; – supplementary equipotential bonding; – earth-free equipotential bonding. Supplementary equipotential bonding is also known as local bonding
B.1.5 (21.5)	Electrical circuits (section 05)	
B.1.5.1 (21.5.1)	*(electrical) circuit (of an installation)* (826-05-01)	A circuit comprises live conductors, protective conductors (if any) and associated switchgear, controlgear and accessories. A protective conductor may be common to several circuits
B.1.5.2 (21.5.2)	*design current (of a circuit)* (826-05-04)	The design current is determined taking into account diversity. When conditions are variable, the design current is the continuous current which would bring the circuit components to the same temperature. This current is denoted I_B
B.1.5.3 (21.5.3)	*(continuous) current-carrying capacity (of a conductor);* *ampacity* (USA) (826-05-05)	This current is denoted I_Z
B.1.5.4 (21.5.4)	*overcurrent* (826-05-06)	An overcurrent may or may not have harmful effects, depending on its magnitude and duration. Overcurrents may be the result of overloads in current-using equipment or faults such as short-circuits or earth faults
B.1.5.5 (21.5.5)	*conventional operating current (of a protective device)* (826-05-09)	The conventional operating current is greater than the rated current or current setting of the device, and the conventional time varies according to the type and rated current of the protective device. For fuses this current is called the "conventional fusing current". For circuit-breakers this current is called the "conventional operating current"
B.1.7 (21.7)	Other equipment (section 07)	
B.1.7.1 (21.7.1)	*hand-held equipment* (826-07-05)	This means equipment whose functioning relies on constant manual support or guidance
B.1.7.2 (21.7.2)	*stationary equipment* (826-07-06)	Example: The value of this mass is 18 kg in IEC standards relating to household appliances
B.1.8 (21.8)	Isolation and switching (section 08)	
B.1.8.1 (21.8.1)	*isolation* (826-08-01)	The function of isolation contributes to provide the safety of personnel prior to the execution of work, repairs, fault location or the replacement of equipment