

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

**Installations électriques des bâtiments –
Partie 5-55: Choix et mise en oeuvre des matériels électriques – Autres matériels**

IEC 60364-5-55:2001

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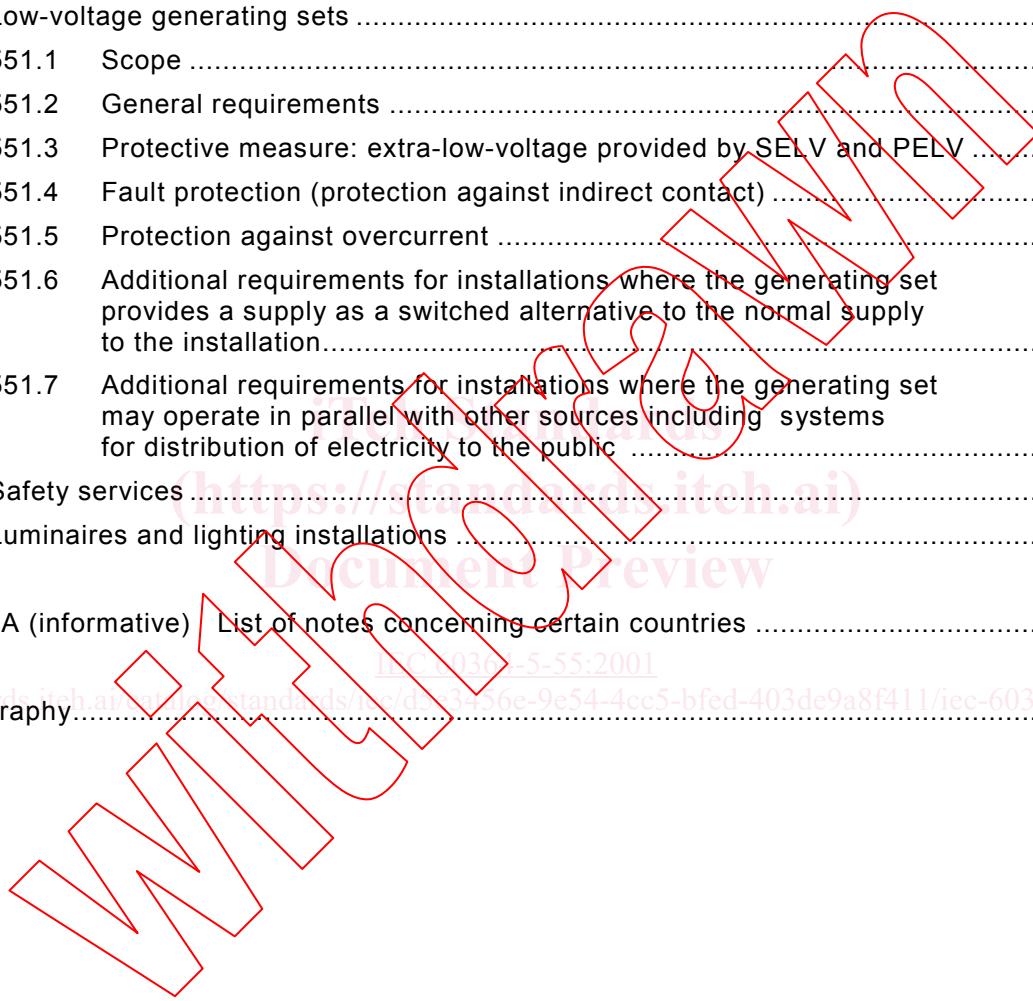
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ELECTRICAL INSTALLATIONS OF BUILDINGS –

Part 5-55: Selection and erection of electrical equipment – Other equipment

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International Standard IEC 60364-5-55 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

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 first edition of IEC 60364-5-55 is compiled from and replaces

- part 5-551, first edition (1994),
- part 5-559, first edition (1999),
- part 5-56, first edition (1980) and its amendment 1 (1998), and
- part 3, second edition (1993), its amendment 1 (1994) and its amendment 2 (1995).

This consolidated version of IEC 60364-5-55 consists of the first edition (2001), its amendment 1 (2001) [documents 64/1190/FDIS and 64/1201/RVD] and its amendment 2 (2008) [documents 64/1591/CDV and 64/1627RVC].

The technical content is therefore identical to the base edition and its amendments and has been prepared for user convenience.

It bears the edition number 1.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

Annex A is for information only.

The committee has decided that the contents of the base publication and its amendments 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

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ELECTRICAL INSTALLATIONS OF BUILDINGS –

Part 5-55: Selection and erection of electrical equipment – Other equipment

550 Introduction

550.1 Scope

This part of IEC 60364 covers requirements for the selection and erection of low-voltage generating sets and for the selection and erection of luminaires and lighting installations intended to be part of the fixed installation.

550.2 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 60050(195) *International Electrotechnical Vocabulary – Part 195: Earthing and protection against electric shock*

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

IEC 60079 (all parts), *Electrical apparatus for explosive gas atmospheres*

IEC 60245-3, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 3: Heat resistant silicone insulated cables*

IEC 60364-1:2005, *Low-voltage electrical installations – Part 1: Fundamental principles, assessment of general characteristics, definitions*

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

IEC 60364-7-712, *Electrical installations of buildings – Part 7-712: Requirements for special installations or locations – Solar photovoltaic (PV) power supply systems*

IEC 60364-7-717, *Electrical installations of buildings – Part 7-717: Requirements for special installations or locations – Mobile or transportable units*

IEC 60417 (all parts), *Graphical symbols for use on equipment*

IEC 60598 (all parts), *Luminaires*

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

550.3 Definitions

For the purpose of this part of IEC 60364, the following definitions apply:

550.3.1

self-contained battery unit

unit comprising a battery and a charging and testing unit

550.3.2

non-maintained mode

operating mode of electrical equipment, essential for safety services, operating only when the normal supply fails

550.3.3

maintained mode

operating mode of electrical equipment, essential for safety services, operating at all times

550.3.4

safety services

those services in a building which are essential

- for the safety of persons,
- for avoiding damage to the environment or other material

NOTE Examples of safety services include

- emergency (escape) lighting,
- fire pumps,
- fire brigade lifts,
- alarm systems, such as fire alarms, smoke alarms, CO alarms and intruder alarms,
- evacuation systems,
- smoke extraction systems,
- essential medical equipment.

550.3.5

electrical safety source

source intended to maintain the supply to electrical equipment essential for the safety services

550.3.6

electrical supply system for safety services

see IEC 60050(826)

550.3.7

rated operating time of a safety source

operating time for which a safety source is designed under normal operating conditions.

551 Low-voltage generating sets

551.1 Scope

This clause provides requirements for the selection and erection of low-voltage and extra-low voltage generating sets intended to supply, either continuously or occasionally, all or part of the installation. Requirements are also included for installations with the following supply arrangements:

- supply to an installation which is not connected to a system for distribution of electricity to the public;
- supply to an installation as an alternative to a system for distribution of electricity to the public;
- supply to an installation in parallel with a system for distribution of electricity to the public supply;
- appropriate combinations of the above.

This part does not apply to self-contained items of extra-low voltage electrical equipment which incorporate both the source of energy and the energy-using load and for which a specific product standard exists that includes the requirements for electrical safety.

NOTE Requirements of the electricity distributor should be ascertained before a generating set is installed in an installation that is connected to a system for distribution of electricity to the public.

551.1.1 Generating sets with the following power sources are considered:

- combustion engines;
- turbines;
- electric motors;
- photovoltaic cells (IEC 60364-7-712 also applies);
- electrochemical accumulators;
- other suitable sources.

551.1.2 Generating sets with the following electrical characteristics are considered:

- mains-excited and separately excited synchronous generators;
- mains-excited and self-excited asynchronous generators;
- mains-commutated and self-commutated static converters with or without by-pass facilities;
- generating sets with other suitable electrical characteristics.

551.1.3 The use of generating sets for the following purposes is considered:

- supply to permanent installations;
- supply to temporary installations;
- supply to portable equipment which is not connected to a permanent installation;
- supply to mobile units (IEC 60364-7-717 also applies).

551.2 General requirements

551.2.1 The means of excitation and commutation shall be appropriate for the intended use of the generating set and the safety and proper functioning of other sources of supply shall not be impaired by the generating set.

NOTE See 551.7 for particular requirements where the generating set may operate in parallel with a system for the distribution of electricity to the public.

551.2.2 The prospective short-circuit current and prospective earth fault current shall be assessed for each source of supply or combination of sources which can operate independently of other sources or combinations. The short-circuit breaking capacity of protective devices within the installation and, where appropriate, connected to a system for distribution of electricity to the public, shall not be exceeded for any of the intended methods of operation of the sources.

NOTE Attention should be given to the power factor specified for protective devices in the installation.

551.2.3 The capacity and operating characteristics of the generating set shall be such that danger or damage to equipment does not arise after the connection or disconnection of any intended load as a result of the deviation of the voltage or frequency from the intended operating range. Means shall be provided to automatically disconnect such parts of the installation as may be necessary if the capacity of the generating set is exceeded.

NOTE 1 Attention should be given to the size of individual loads as a proportion of the capacity of the generating set and to motor starting currents.

NOTE 2 Attention should be given to the power factor specified for protective devices in the installation.

NOTE 3 The installation of a generating set within an existing building or installation may change the conditions of external influence for the installation (see IEC 60364-1), for example by the introduction of moving parts, parts at high temperature or by the presence of inflammable fluids and noxious gases, etc.

551.2.4 Provision for isolation shall meet the requirements of Clause 537 for each source or combination of sources of supply.

551.3 Protective measure: extra-low-voltage provided by SELV and PELV

551.3.1 Additional requirements for SELV and PELV where the installation is supplied from more than one source

Where a SELV or PELV system may be supplied by more than one source, the requirements of 414.3 of IEC 60364-4-41 shall apply to each source. Where one or more of the sources is earthed, the requirements for PELV systems in 414.4 of IEC 60364-4-41 shall apply.

If one or more of the sources does not meet the requirements of 414.3, the system shall be treated as a FELV system and the requirements of 411.7 of IEC 60364-4-41 shall apply.

551.3.2 Additional requirements where it is necessary to maintain the supply to an extra-low voltage system

Where it is necessary to maintain the supply to an extra-low voltage system following the loss of one or more sources of supply, each source of supply or combination of sources of supply which can operate independently of other sources or combinations shall be capable of supplying the intended load of the extra-low voltage system. Provisions shall be made so that the loss of low-voltage supply to an extra-low voltage source does not lead to danger or damage to other extra-low voltage equipment.

NOTE Such precautions may be necessary in supplies for safety services (see Clause 35 of IEC 60364-1).

551.4 Fault protection (protection against indirect contact)

551.4.1 Fault protection shall be provided for the installation in respect of each source of supply or combination of sources of supply that can operate independently of other sources or combinations of sources.

The fault protective provisions shall be selected or precautions shall be taken to ensure that where fault protective provisions are achieved in different ways within the same installation or part of an installation according to the active sources of supply, no influence shall occur or conditions arise that could impair the effectiveness of the fault protective provisions.

NOTE This might, for example, require the use of a transformer providing electrical separation between parts of the installation using different earthing systems.

551.4.2 The generating set shall be connected so that any provision within the installation for protection by residual current devices in accordance with IEC 60364-4-41 remains effective for every intended combination of sources of supply.

NOTE Connection of live parts of the generator with earth may affect the protective measures.

551.4.3 Protection by automatic disconnection of supply

551.4.3.1 General

Where the protective measure automatic disconnection of supply is used for protection against electric shock, the requirements of Clause 411 of IEC 60364-4-41 apply, except as modified for the particular cases given in 551.4.3.2 or 551.4.3.3.

551.4.3.2 Additional requirements for installations where the generating set provides a supply as a switched alternative to the normal supply to the installation

Protection by automatic disconnection of supply shall not rely upon the connection to the earthed point of the distribution system when the generator is operating as a switched alternative. A suitable means of earthing shall be provided.

551.4.3.3 Additional requirements for installations incorporating static converters

551.4.3.3.1 Where fault protection for parts of the installation supplied by the static converter relies upon the automatic closure of the by-pass switch and the operation of protective devices on the supply side of the by-pass switch is not within the time required by Clause 411 of IEC 60364-4-41, supplementary equipotential bonding shall be provided between simultaneously accessible exposed-conductive-parts and extraneous-conductive-parts on the load side of the static converter in accordance with 415.2 of IEC 60364-4-41.

The resistance of supplementary equipotential bonding conductors required between simultaneously accessible conductive parts shall fulfill the following condition:

$$R \leq \frac{50 \text{ V}}{I_a}$$

where

I_a is the maximum earth fault current which can be supplied by the static converter alone for a period of up to 5 s.

NOTE Where such equipment is intended to operate in parallel with a system for distribution of electricity to the public, the requirements of 551.7 also apply.

551.4.3.3.2 Precautions shall be taken or equipment shall be selected so that the correct operation of protective devices is not impaired by d.c. currents generated by a static converter or by the presence of filters.

551.4.3.3.3 A means of isolation shall be installed on both sides of a static converter.

This requirement does not apply on the power source side of a static converter which is integrated in the same enclosure as the power source.

551.5 Protection against overcurrent

551.5.1 Where overcurrent protection of the generating set is required, it shall be located as near as practicable to the generator terminals.

NOTE The contribution to the prospective short-circuit current by a generating set may be time-dependent and may be much less than the contribution made by a system where the source is a mv/lv transformer.

551.5.2 Where a generating set is intended to operate in parallel with another source of supply, including a supply from a system for distribution of electricity to the public, or where two or more generating sets may operate in parallel, harmonic currents shall be limited so that the thermal rating of conductors is not exceeded.

The effects of harmonic currents may be limited as follows:

- the selection of generating sets with compensated windings;
- the provision of a suitable impedance in the connection to generator star points;
- the provision of switches which interrupt the circuit but which are interlocked so that at all times fault protection is not impaired;
- the provision of filtering equipment;
- other suitable means.

NOTE 1 Consideration should be given to the maximum voltage which may be produced across an impedance connected to limit harmonics.

NOTE 2 Monitoring equipment complying with IEC 61557-12 provides information on level of disturbances resulting from the presence of harmonics.

551.6 Additional requirements for installations where the generating set provides a supply as a switched alternative to the normal supply to the installation

551.6.1 Precautions complying with the relevant requirements of IEC 60364-5-53 for isolation shall be taken, so that the generator cannot operate in parallel with the public supply system for distribution of electricity to the public. Suitable precautions may include:

- an electrical, mechanical or electro-mechanical interlock between the operating mechanisms or control circuits of the change-over switching devices;
- a system of locks with a single transferable key;
- a three-position, break-before-make, change-over switch;
- an automatic change-over switching device with a suitable interlock;
- other means providing equivalent security of operation.

NOTE Isolation should include supplies to the control circuits of the generator.

551.6.2 For TN-S systems where the neutral is not switched, any residual current device shall be positioned to avoid incorrect operation due to the existence of any parallel neutral-earth path.

NOTE 1 It may be desirable in TN systems to disconnect the neutral of the installation from the neutral or PEN of the system for distribution of electricity to the public to avoid disturbances such as induced voltage surges caused by lightning.

NOTE 2 See also 444.4.7 of IEC 60364-4-44.