

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Measuring relays and protection equipment –
Part 27: Product safety requirements**

**Relais de mesure et dispositifs de protection –
Partie 27: Exigences de sécurité des produits**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MEASURING RELAYS AND PROTECTION EQUIPMENT –**Part 27: Product safety requirements**

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IEC 60255-27 has been prepared by IEC technical committee 95: Measuring relays and protection equipment. It is an International Standard.

This third edition cancels and replaces the second edition published in 2013. This edition constitutes a technical revision.

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

- a) conflicting statements removed;
- b) scope clarified and statement added that all clauses of the standard are required not just type tests;
- c) terminology, definitions and documentation requirements aligned with IEC 60255-1;
- d) alignment with IEC 61010-1, e.g. HLV definitions;
- e) ingress protection clarified;
- f) dielectric and impulse tests added to mechanical and environmental test requirements;

- g) insulation resistance requirements updated for alignment with other product safety standards;
- h) sample testing removed;
- i) short time limiting thermal overload added;
- j) resistance to mechanical stress added;
- k) low-power voltage and current transformer ports added;
- l) Annex C tables updated to align with base standards;
- m) Annex D voltage dependent resistors and radio transmitters added;
- n) Annex G for risk assessment added.

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

Draft	Report on voting
95/516/FDIS	95/526/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 60255 series, published under the general title *Measuring relays and protection equipment*, can be found on the IEC website.

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,
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- amended.

INTRODUCTION

This document specifies the safety requirements that are generally applicable to all equipment within its scope. These requirements may be supplemented by general product safety standards and IEC 60664-1.

iTeh STANDARD PREVIEW
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[IEC 60255-27:2023](https://standards.iteh.ai/catalog/standards/sist/494d3715-df13-4e42-b6e2-6c05a649f04c/iec-60255-27-2023)

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MEASURING RELAYS AND PROTECTION EQUIPMENT –

Part 27: Product safety requirements

1 Scope

This part of IEC 60255 specifies the product safety requirements for measuring relays and protection equipment having a rated AC voltage up to 1 000 V, or a rated DC voltage up to 1 500 V. Above these limits, IEC 60664-1 is applicable for the determination of clearance, creepage distance and withstand test voltage.

This document specifies essential safety requirements to minimize the risk of fire and hazards caused by electric shock or injury to the user and property. This document specifies only product safety requirements; functional performance of the equipment is not covered.

This document covers all the ways in which the equipment can be mounted and used in cabinets, racks and panels. This document also applies to auxiliary devices such as shunts, series resistors, transformers, auxiliary control panels, display devices, etc., that are used in conjunction with measuring relays and protection equipment and are tested together.

It is possible that ancillary equipment such as network switches used in conjunction with measuring relays and protection equipment needs to comply with additional safety requirements.

This document does not specify the implementation of individual equipment, circuits and components.

This document applies to equipment designed to be safe at least under the following environmental conditions:

- indoor use;
- altitude up to 2 000 m, in accordance with IEC 60255-1;
- rated ambient temperature range, in accordance with IEC 60255-1;
- maximum external relative humidity, in accordance with IEC 60255-1;
- operating range of auxiliary energizing voltage in accordance with IEC 60255-1;
- applicable overvoltage category;
- applicable pollution degree of the intended environment (pollution degree 2 in most cases).

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 60085, *Electrical insulation – Thermal evaluation and designation*

IEC 60127-1, *Miniature fuses – Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links*

IEC 60255-1, *Measuring relays and protection equipment – Part 1: Common requirements*

IEC 60255-26, *Measuring relays and protection equipment – Part 26: Electromagnetic compatibility requirements*

IEC 60352-1, *Solderless connections – Part 1: Wrapped connections – General requirements, test methods and practical guidance*

IEC 60352-2, *Solderless connections – Part 2: Crimped connections – General requirements, test methods and practical guidance*

IEC 60417, *Graphical symbols for use on equipment*. Available at: <http://www.graphical-symbols.info/equipment>

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests*

IEC 60664-3, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC TS 60695-2-20, *Fire hazard testing – Part 2-20: Glowing/hot-wire based test methods – Hot-wire coil test method – Apparatus, test method and guidance*

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

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IEC 60990:2016, *Methods of measurement of touch current and protective conductor current*

IEC 61010-1:2010, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*

IEC 61010-1:2010/AMD1:2016

IEC 61032, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61051-2:2021, *Varistors for use in electronic equipment – Part 2: Sectional specification for surge suppression varistors*

IEC 61180, *High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment*

IEC 61869-6, *Instrument transformers – Part 6: Additional general requirements for low-power instrument transformers*

IEC 61869-10, *Instrument transformers – Part 10: Additional requirements for low-power passive current transformers*

IEC 61869-11, *Instrument transformers – Part 11: Additional requirements for low-power passive voltage transformers*

IEC 62151, *Safety of equipment electrically connected to a telecommunication network*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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>

3.1

accessible conductive part

conductive part of electrical equipment touchable under normal use

3.2

accessible part

part which can be touched under normal use with a standard rigid or jointed test finger as specified in 6.2 of IEC 61010-1:2010 and IEC 61010-1:2010/AMD1:2016

Note 1 to entry: Circuits intended to be connected to an external accessible circuit are considered as accessible conductive parts, for example wired network ports.

3.3

adjacent circuit

independent circuit

electric circuit which is separated from the considered circuit by applicable insulation

3.4

ambient temperature

ambient air temperature

temperature, determined under prescribed conditions, of the air surrounding the complete equipment

Note 1 to entry: For equipment installed inside an enclosure, it is the temperature of the air outside the enclosure.

Note 2 to entry: The ambient temperature is measured at half the distance from any neighbouring equipment, but not more than 300 mm distance from the equipment case, at middle height of the equipment, protected from direct heat radiation from the equipment.

[SOURCE: IEC 60050-441:1984, 441-11-13, modified – The preferred term "ambient temperature" has been added. In the definition and Note 1 to entry, "switching device or fuse" has been replaced by "equipment". Note 2 to entry has been added.]

3.5

barrier

electrically protective barrier

part providing protection against direct contact from any usual direction of access that is firmly secured in place in such a way that it can only be removed by the use of a tool

[SOURCE: IEC 60050-826:2004, 826-12-23, modified – The preferred term "barrier" has been added. At the end of the definition, "that is firmly secured in place in such a way that it can only be removed by the use of a tool" has been added.]

3.6

basic insulation

insulation of hazardous-live-parts to provide basic protection

[SOURCE: IEC 60050-826:2004, 826-12-14, modified – In the definition, "which provides" has been replaced by "to provide" and the Note has been removed.]

3.7**basic protection**

protection against electric shock under normal conditions

[SOURCE: IEC 60050-195:2021, 195-06-01]

3.8**bounding surface**

outer surface of the equipment case

3.9**cabinet**

free-standing and self-supporting enclosure for housing electrical and/or electronic equipment

Note 1 to entry: A cabinet is usually fitted with doors and/or side panels, which may or may not be removable.

[SOURCE: IEC 60050-581:2008, 581-25-02]

3.10**clearance**

shortest distance, measured in air, between two conductive parts, or between a conductive part and the outer bounding surface of the equipment, whether conductive or not

3.11**comparative tracking index****CTI**

numerical value of the maximum voltage in volts which a material can withstand without tracking and without a persistent flame occurring under specified test conditions

[SOURCE: IEC 60050-212:2010, 212-11-59]

3.12**creepage distance**

shortest distance along the surface of a solid insulating material between two conductive parts, or between a conductive part and the bounding surface (accessible part) of the equipment, measured along the surface of insulation

[SOURCE: IEC 60050-151:2001, 151-15-50, modified – The phrase ", or between a conductive part and the bounding surface (accessible part) of the equipment, measured along the surface of insulation" has been added.]

3.13**direct contact**

electric contact of persons with live parts

[SOURCE: IEC 60050-826:2004, 826-12-03, modified – In the definition, the words "or animals" have been omitted.]

3.14**double insulation**

insulation comprising both basic insulation and supplementary insulation

Note 1 to entry: Basic and supplementary insulation are separate, each designed for basic protection against electric shock.

[SOURCE: IEC 60050-195:2021, 195-06-08, modified – The note to entry has been added.]