IEC 60255-27

Edition 2.0 2013-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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

IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-92eb7b60a5d7/iec-60255-27-2013

IEC 60255-27:2013

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2013 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.
If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.
Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

Useful links:

iTeh STANDARD PREVIEW
(standards.iteh.ai)

IEC publications search - www.iec.ch/searchpub

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,…).
It also gives information on projects, replaced and withdrawn publications.

IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-88dd7b60a5d7/iec-60255-27-2013

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Liens utiles:

Recherche de publications CEI - www.iec.ch/searchpub

La recherche avancée vous permet de trouver des publications CEI en utilisant différents critères (numéro de référence, texte, comité d'études,…).
Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

Just Published CEI - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications de la CEI. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (VEI) en ligne.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

IEC 60255-27

Edition 2.0 2013-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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

IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-92eb7b60a5d7/iec-60255-27-2013

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE XD
CODE PRIX

ICS 29.120.70

ISBN 978-2-8322-1161-8

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

CONTENTS

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-92eb7b60a5d7/iec-60255-27-2013

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-92eb7b60a5d7/iec-60255-27-2013

iTeh STANDARD PREVIEW
(standards.iteh.ai)

IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-92e7b60a5d7f/iec-60255-27-2013

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-92eb7b60a5d7/iec-60255-27-2013

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MEASURING RELAYS AND PROTECTION EQUIPMENT –

Part 27: Product safety requirements

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.
2) The formal decisions or agreements of 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 IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-

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

This second edition cancels and replaces the first edition published in 2005. This edition constitutes a technical revision.

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

a) The removal of tables and diagrams which are from other standards and referring instead directly to the source standard.
b) All aspects of IEC 60255-5 have been covered and this standard can be withdrawn.
c) Ambiguity within the standard has been removed.

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

FDIS	Report on voting
95/316/FDIS	95/318/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.

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 publication will remain unchanged until the stability 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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-92eb7b60a5d7/iec-60255-27-2013

INTRODUCTION

In order to demonstrate that the equipment is safe, it was previously necessary to refer to general safety standards such as IEC 61010-1 in addition to IEC 60664-1.

These general safety standards specify requirements for general product types or product families in order to reduce the risk of fire, electric shock or injury to the user. The product types do not include measuring relays and protection equipment. These standards also take into account single-fault conditions.

Reference to all these various standards created confusion due to conflicting requirements, for example, different clearances, creepage distances and test voltages etc., for the same rated voltages.

The aim of this standard is:

- to remove confusion due to conflicting requirements between existing standards;
- to achieve a uniform approach throughout the international industry for measuring relays and protection equipment.

This product safety standard for measuring relays and protection equipment takes the general product safety standards and IEC 60664-1 as the base, defining those issues specific to measuring relays and protection equipment.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-92eb7b60a5d7/iec-60255-27-2013

MEASURING RELAYS AND PROTECTION EQUIPMENT –

Part 27: Product safety requirements

1 Scope

This part of the IEC 60255 series describes the product safety requirements for measuring relays and protection equipment having a rated a.c. voltage up to 1 000 V with a rated frequency up to 65 Hz, or a rated d.c. 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 standard details essential safety requirements to minimize the risk of fire and hazards caused by electric shock or injury to the user.

This standard does not cover the safety requirements of installations. It does cover all the ways in which the equipment may be mounted and used in cubicles, racks and panels, and also retesting. This standard also applies to auxiliary devices such as shunts, series resistors, transformers, etc., that are used in conjunction with measuring relays and protection equipment and are tested together.

Ancillary equipment used in conjunction with measuring relays and protection equipment may need to comply with additional safety requirements.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This standard is intended to describe only product safety requirements; therefore, functional performance of the equipment is not covered.

IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-92eb7b60a5d7/iec-60255-27-2013

Functional safety requirements, including EMC functional safety, are not covered by this standard. Functional safety risk analysis is not within the scope of this product safety standard.

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

The object of this standard is to have a comprehensive standard that covers all aspects of product safety and the related type and routine tests, for measuring relays and protection equipment.

This standard 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;
– external operating temperature range, in accordance with IEC 60255-1;
– maximum external relative humidity 95 %, non-condensing, in accordance with IEC 60255-1;
– supply fluctuations in accordance with IEC 60255-1;
– applicable supply overvoltage category;
– external pollution degree 1 and external pollution degree 2.

The equipment will normally be installed in a restricted access area within a power station, substation or industrial/retail environment. The environmental conditions specified for the equipment in IEC 60255-1 apply. This standard considers the normal environmental

conditions of corrosion caused by humidity but does not cover corrosion by atmospheric pollution.

It is assumed that access to the equipment during installation, maintenance, normal service and decommissioning is restricted to users aware of working procedures necessary to ensure safety.

This product safety standard takes precedence over general standards for matters of safety.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050 (all parts), *International Electrotechnical Vocabulary* (available at <http://www.electropedia.org>

IEC 60085, *Electrical insulation – Thermal evaluation and designation*

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

IEC 60255-21-1, *Electrical relays – Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment – Section One: Vibration tests (sinusoidal)*

IEC 60255-21-2, *Electrical relays – Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment – Section Two: Shock and bump tests*

IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07bc-2254-4481-b7b1-92eb7b60a5d7/iec-60255-27-2013

IEC 60255-21-3, *Electrical relays – Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment – Section 3: Seismic tests*

IEC 60255-26:2013, *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)*
Amendment 1:1999[1]

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60664-3:2003, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*
Amendment 1:2010

1 There exists a consolidated Edition 2.1 (2001) that includes Edition 2.0 and its Amendment 1.

IEC/TS 60695-2-20[2], *Fire hazard testing – Part 2-20: Glowing/hot-wire based test methods – Hot-wire coil ignitability – 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*

IEC 60990:1999, *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 61032, *Protection of persons and equipment by enclosures – Probes for verification*

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

IEC 61180-1:1992, *High-voltage test techniques for low-voltage equipment – Part 1: Definitions, test and procedure requirements*

IEC 61180-2, *High-voltage test techniques for low-voltage equipment – Part 2: Test equipment*

iTeh STANDARD PREVIEW

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

(standards.iteh.ai)

ISO 7000, *Graphical symbols for use on equipment – Index and synopsis.* Available at: http://www.graphical-symbols.info/equipment

IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-92eb7b60a5d7/iec-60255-27-2013

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60664-1 and IEC 60050-151-448 as well as the following apply.

3.1
accessible part
part which can be touched under normal conditions with a standard rigid or jointed test finger as specified in 3.5.1 of IEC 61010-1:2010

Note 1 to entry: A communication circuit/network, which may be connected and taken outside the cubicle housing the equipment, or on the front of the panel without the need to open a cover or flap to access it, should be considered to be accessible, i.e. should it be PEB, PELV, SELV or equivalent.

[SOURCE: IEC 60050:1998, 442.01.15, modified – More details about the test finger and the note to entry has been added.]

3.2
adjacent circuits
electric circuits which are separated from the considered circuit by the necessary basic or double/reinforced insulation

Note 1 to entry: Circuits which are separated by more than double or reinforced insulation are not considered to be adjacent.

---

2 Edition 3.0 currently under preparation.

3.3
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 60050:2000, 441.11.13, modified – "switching device or fuse" has been replaced by "equipment" and a second note to entry has been added.]

3.4
barrier
electrically protective barrier
part providing protection against direct contact from any usual direction of access

Note 1 to entry: Barriers may provide protection against the spread of fire (see Clause 7).

[SOURCE: IEC 60050:2004, 826.12.23]

3.5
basic insulation
insulation of hazardous live parts to provide basic protection

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Note 1 to entry: This concept does not apply to insulation used exclusively for functional purposes.

[SOURCE: IEC 60050:2004, 826.12.14, modified – the word "which" is replaced by "to".]

IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-92eb7b60a5d7/iec-60255-27-2013

3.6
bounding surface
outer surface of the equipment case, considered as though metal foil were pressed into contact with accessible surfaces of insulating material

3.7
class I equipment
equipment with basic insulation as provision for basic protection against electric shock and protective bonding as provision for fault protection, such that conductive parts on the outside of the equipment case, cannot become live in the event of a failure of the basic insulation

3.8
class II equipment
equipment with

- basic insulation as provision for basic protection against electric shock, and
- supplementary insulation as provision for fault protection; or
- in which basic protection and fault protection are provided by reinforced insulation

Note 1 to entry: There should be no provision for a protective conductor or reliance upon installation conditions for safety purposes. It is, however, possible to connect an earth conductor to Class II equipment for functional (for example, EMC) purposes.

[SOURCE: IEC 60050:2008, 851.15.11, modified – The phrase "against electrical shock" and a note to entry have been added while the reference to IEC 61140:2001, 7.3 has been omitted.]

3.9
class III equipment
equipment, or parts of equipment, in which protection against electric shock relies upon supply from SELV or PELV circuits and in which hazardous voltages are not generated

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
CTI
comparative tracking index
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 60050:2010, 212.11.59]

3.12
communication circuit/network
circuit/network for receiving and/or transmitting, digital or analogue signals

Note 1 to entry: It may communicate with other circuits via optical, magnetic or electromagnetic radiation means, or metallic connections.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.13
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

IEC 60255-27:2013
https://standards.iteh.ai/catalog/standards/sist/e89a07be-2234-4461-b7b1-92eb7b60a5d7/iec-60255-27-2013

[SOURCE: IEC 60050:2001, 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.]

3.14
direct contact
electrical contact of persons with live parts

[SOURCE: IEC 60050:2004, 826.03.05, modified – The words "or animals" have been omitted.]

3.15
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 60050:1998, 195.06.08, modified – The note to entry has been added.]

3.16
ELV
extra low voltage
SEE: Table A.1

3.17
enclosure
housing affording the type and degree of protection suitable for the intended application