

BS EN 61850-3:2014



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Communication networks and systems for power utility automation

Part 3: General requirements

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National foreword

This British Standard is the UK implementation of EN 61850-3:2014. It is identical to IEC 61850-3:2013. It supersedes BS EN 61850-3:2002 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PEL/57, Power systems management and associated information exchange.

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Réseaux et systèmes de communication pour
l'automatisation des systèmes électriques - Partie 3:
Exigences générales
(CEI 61850-3:2013)

Kommunikationsnetze und -systeme für die
Automatisierung in der elektrischen Energieversorgung -
Teil 3: Allgemeine Anforderungen
(IEC 61850-3:2013)

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Foreword

The text of document 57/1391/FDIS, future edition 2 of IEC 61850-3, prepared by IEC/TC 57 "Power systems management and associated information exchange" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61850-3:2014.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-10-18
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-01-16

This document supersedes EN 61850-3:2002.

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Endorsement notice

The text of the International Standard IEC 61850-3:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60127-1	NOTE Harmonized as EN 60127-1.
IEC 60255-27:2005	NOTE Harmonized as EN 60255-27:2005 (not modified).
IEC 60297-3-101	NOTE Harmonized as EN 60297-3-101.
IEC 60721-3-3	NOTE Harmonized as EN 60721-3-3.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
CISPR 22	2008	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55022 + AC:2011 ¹⁾	2010 2011
CISPR 24 + corr. June	2010 2011	Information technology equipment - Immunity characteristics - Limits and methods of measurement	EN 55024	2010
EN 60068-2-1	2007	Environmental testing - Part 2-1: Tests - Test A: Cold		
IEC 60068-2-2	2007	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	2007
IEC 60068-2-14	2009	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	2009
IEC 60068-2-30	2005	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	2005
IEC 60068-2-78	2001	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78 ²⁾	2001
IEC 60255-21-1		Electrical relays - Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment - Section 1: Vibration tests (sinusoidal)	EN 60255-21-1	
IEC 60255-21-2		Electrical relays - Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment - Section 2: Shock and bump tests	EN 60255-21-2	
IEC 60255-21-3		Electrical relays - Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment - Section 3: Seismic tests	EN 60255-21-3	
IEC 60255-27	2013	Measuring relays and protection equipment - Part 27: Product safety requirements	EN 60255-27	2014

¹⁾ EN 55022 is superseded by EN 50561-1:2013, which is based on .

²⁾ EN 60068-2-78 is superseded by EN 60068-2-78:2013, which is based on IEC 60068-2-78:2012.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60417	data base		HD 243 S12 ³⁾ 4)	1995
IEC 60529		Degrees of protection provided by enclosures - (IP Code)		-
IEC 60664-1		Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	
IEC 60695-11-10		Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	
IEC 60825-1		Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1	
IEC 60990	1999	Methods of measurement of touch current and protective conductor current	EN 60990	1999
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
IEC 61000-4-3	2008	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test		
IEC 61000-4-4 + corr. June	2004 2007	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4 ⁵⁾	2004
IEC 61000-4-5 + corr. October	2005 2009	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2006
IEC 61000-4-6	2008	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6 ⁶⁾	2009
IEC 61000-4-8	2001	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test		
IEC 61000-4-11	2004	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	2004
IEC 61000-4-16	2002	Electromagnetic compatibility (EMC) - Part 4-16: Testing and measurement techniques - Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz		

³⁾ HD 243 S12 includes supplement(s) M to K to IEC 60417.

⁴⁾ HD 243 S12 is superseded by EN 60417-2:1999, which is based on IEC 60417-2:1998.

⁵⁾ EN 61000-4-4 is superseded by EN 61000-4-4:2012, which is based on IEC 61000-4-4:2012.

⁶⁾ EN 61000-4-6 is superseded by EN 61000-4-6:2014, which is based on IEC 61000-4-6:2013.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-4-17	2009	Electromagnetic compatibility (EMC) - Part 4-17: Testing and measurement techniques - Ripple on d.c. input power port immunity test	-	-
IEC 61000-4-18	2006	Electromagnetic compatibility (EMC) - Part 4-18: Testing and measurement techniques - Damped oscillatory wave immunity test	EN 61000-4-18 + corr. September	2007 2007
IEC 61000-4-29	2000	Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests	EN 61000-4-29	2000
IEC 61010-1 + corr. May	2010 2011	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements	EN 61010-1	2010
IEC 61180-1	1992	High-voltage test techniques for low-voltage equipment - Part 1: Definitions, test and procedure requirements	EN 61180-1	1994
IEC 61180-2		High-voltage test techniques for low-voltage equipment - Part 2: Test equipment	EN 61180-2	
IEC/TS 61850-2	2003	Communication networks and systems in substations - Part 2: Glossary		
IEC 61850	(Series)	Communication networks and systems in substations - Part 6: Configuration description language for communication in electrical substations related to IEDs	EN 61850	(Series)
IEC 62271-1		High-voltage switchgear and controlgear - Part 1: Common specifications	EN 62271-1	
IEEE 1613	2009	IEEE Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Electric Power Substations		
ISO 780	1997	Packaging - Pictorial marking for handling of goods	EN ISO 780	1999
ISO 7000		Graphical symbols for use on equipment - Registered symbols		
ISO 9772		Cellular plastics - Determination of horizontal burning characteristics of small specimens subjected to a small flame		

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COMMUNICATION NETWORKS AND SYSTEMS FOR POWER UTILITY AUTOMATION –

Part 3: General requirements

1 Scope

This part of IEC 61850 defines the general requirements, mainly regarding construction, design and environmental conditions for utility communication and automation IEDs and systems in power plant and substation environments. These general requirements are in line with requirements for IEDs used in similar environments, for example measuring relays and protection equipment.

When communication or automation IEDs are an integral part of another device in the power plant or substation, then the environmental requirements for the device itself apply to the communications equipment.

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 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-78:2001, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

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

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

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 60255-27:2013, *Measuring relays and protection equipment – Part 27: Product safety requirements*

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

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

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

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 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2008, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:2004, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2005, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6:2008, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8:2001, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-4-16:2002, *Electromagnetic compatibility (EMC) – Part 4-16: Testing and measurement techniques – Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz*

IEC 61000-4-17:2009, *Electromagnetic compatibility (EMC) – Part 4-17: Testing and measurement techniques – Ripple on d.c. input power port immunity test*

IEC 61000-4-18:2006, *Electromagnetic compatibility (EMC) – Part 4-18: Testing and measurement techniques – Damped oscillatory wave immunity test*

IEC 61000-4-29:2000, *Electromagnetic compatibility (EMC) – Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests*

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

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*

IEC 61850 (all parts), *Communication networks and systems in substations*

IEC/TS 61850-2:2003, *Communication networks and systems in substations – Part 2: Glossary*

IEC 62271-1, *High-voltage switchgear and controlgear – Part 1: Common specifications*

CISPR 22:2008, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*

CISPR 24:2010, *Information technology equipment – Immunity characteristics – Limits and methods of measurement*

ISO 780:1997, *Packaging – Pictorial marking for handling of goods*

ISO 7000, *Graphical symbols for use on equipment – Registered symbols*. Available from <http://www.graphical-symbols.info/equipment>

ISO 9772, *Cellular plastics – Determination of horizontal burning characteristics of small specimens subjected to a small flame*

IEEE 1613:2009, *IEEE standard environmental and testing requirements for communications networking devices installed in electric power substations*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61850-2, as well as the following, apply.

3.1.1

accessible part

part which can be touched in normal operational use with a standard rigid or jointed test finger as specified in IEC 60529

Note 1 to entry: Accessible in normal operational use applies mainly to the front of the equipment only, for the purposes of this standard.

Note 2 to entry: A communication circuit/network, which may be connected and taken outside of 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 be PEB, PELV, SELV or equivalent.

[SOURCE: IEC 60050-442:1998, 442-01-15, modified — Notes 1 and 2 to entry have been added.]

3.1.2

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 far more than double or reinforced insulation are not considered to be adjacent.

[SOURCE: IEC 60255-27:2013, 3.2]

3.1.3**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 60255-27:2013, 3.3]

3.1.4**automation****automation system**

use of control systems and information technologies to reduce the need for human work in the production, transportation and distribution of energy

3.1.5**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 60050-826:2004, 826-12-23, modified — Note 1 to entry has been added.]

3.1.6**basic insulation**

insulation of hazardous live parts which provides basic protection

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

[SOURCE: IEC 60050-826:2004, 826-12-14]

3.1.7**bounding surface**

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

[SOURCE: IEC 60255-27:2013, 3.6]

3.1.8**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

[SOURCE: IEC 60255-27:2013, 3.7]

3.1.9**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, permissible to connect an earth/ground conductor to Class II equipment for functional (for example, EMC) purposes.

[SOURCE: IEC 60255-27:2013, 3.8]

3.1.10

class III equipment

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

[SOURCE: IEC 60255-27:2013, 3.9]

3.1.11

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

[SOURCE: IEC 60255-27:2013, 3.10]

3.1.12

comparative tracking index

CTI

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

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

3.1.13

communication circuit

communication 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.

[SOURCE: IEC 60255-27:2013, 3.12]

3.1.14

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 — "or between a conductive part and the bounding surface (accessible part) of the equipment, measured along the surface of insulation" has been added.]

3.1.15

direct contact

electrical contact of persons with live parts

[SOURCE: IEC 60050-826:2004, 826-03-05, modified — "or animals" has been deleted.]

3.1.16

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 60050-195:1998, 195-06-08, modified — Note 1 to entry has been added.]

3.1.17

ELV

extra low voltage

non-primary circuits complying with the following under normal operational conditions:

- not exceeding 33 V r.m.s. a.c. or 70 V d.c. i.e. ELV voltage limits, and
- separated from HLV by at least basic insulation

EXAMPLE 1 Non-primary circuits.

EXAMPLE 2 Analogue/digital inputs and outputs, complying with ELV voltage limits.

EXAMPLE 3 Connections to ELV terminations of other products.

Note 1 to entry: ELV circuits should not be accessible under normal operational conditions.

[SOURCE: IEC 60255-27:2013, Table A.1]

3.1.18

enclosure

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

[SOURCE: IEC 60050-195:1998, 195-02-35]

3.1.19

equipment

single apparatus or set of devices or apparatuses, or a set of main devices of an installation, or all devices necessary to perform a specific task

Note 1 to entry: Examples of equipment are a power transformer, the equipment of a substation, measuring equipment.

Note 2 to entry: For the purpose of this standard, equipment is utility communication and automation equipment.

[SOURCE: IEC 60050-151:2001, 151-11-25, modified — Note 2 to entry has been added.]

3.1.20

equipment under test

EUT

equipment submitted to a test, including any accessories, unless otherwise specified

3.1.21

exposed conductive part

conductive part of electrical equipment, which is accessible and which is not normally live, but which may become live under a single-fault condition

Note 1 to entry: For equipment which is not enclosed, the frame, the fixing devices, etc., may form the exposed conductive parts.

Note 2 to entry: For equipment which is enclosed, the conductive parts which are accessible when the equipment is mounted in its normal position of use, including those of its fixing surface, form the exposed conductive parts.

[SOURCE: IEC 60050-826:2004, 826-12-10, modified — Notes 1 and 2 to entry have been added.]

3.1.22

fire enclosure

part of the equipment intended to minimize the spread of fire or flames from within

[SOURCE: IEC 60255-27:2013, 3.19]

3.1.23

functional earthing

functional grounding, en US

earthing a point or points in a system or in an installation or in equipment, for purposes other than electrical safety

[SOURCE: IEC 60050-195, Amendment 1:2001, 195-01-13]

3.1.24

functional insulation

insulation between conductive parts, necessary for the proper functioning of the equipment

[SOURCE: IEC 60050-195:1998, 195-02-41]

3.1.25

hazardous energy level

available power level of 240 VA or more, having a duration of 60 s or more, or a stored energy level of 20 J or more (for example, from one or more capacitors), at a potential of 2 V or more

[SOURCE: IEC 60255-27:2013, 3.22]

3.1.26

hazardous live part

live part at a voltage exceeding 33 V a.c. or 70 V d.c.

[SOURCE: IEC 60050-826:2004, 826-12-13, modified — The voltage values have been provided.]

3.1.27

HLV

hazardous live voltage

normal operational condition voltage which exceeds 33 V a.c. or 70 V d.c.

[SOURCE: IEC 60255-27:2013, 3.23]

3.1.28

HBF class foamed material

foamed material tested in the thinnest significant thickness used and classified HBF according to ISO 9772

[SOURCE: IEC 60255-27:2005, 3.27]

3.1.29

HB40 class material

material tested in the thinnest significant thickness used and classified HB40 according to IEC 60695-11-10

[SOURCE: IEC 60255-27:2013, 3.25]

3.1.30**HB75 class material**

material tested in the thinnest significant thickness used and classified HB75 according to IEC 60695-11-10

[SOURCE: IEC 60255-27:2013, 3.26]

3.1.31**high-integrity**

high-integrity part or component is considered not to become defective in such a manner as to cause a risk of hazard within the sense of this standard

Note 1 to entry: A high-integrity part or component is considered as not subject to failure when a single-fault condition is applied.

[SOURCE: IEC 60255-27:2013, 3.27]

3.1.32**limited-energy circuit**

circuit that meets all the criteria given in 7.12 of IEC 60255-27:2013

[SOURCE: IEC 60255-27:2013, 3.28]

3.1.33**live part**

conductor or conductive part intended to be energized in normal operational use, including a neutral conductor

Note 1 to entry: This concept does not necessarily imply a risk of electric shock.

[SOURCE: IEC 60050-195:1998, 195-02-19, modified — "but by convention not a PEN conductor or PEM conductor or PEL conductor" has been deleted.]

3.1.34**micro-environment**

ambient conditions which immediately surround the clearance and creepage distance under consideration excluding self-produced pollution resulting from normal operation of the accessory

Note 1 to entry: The micro-environment of the creepage distance or clearance and not the environment of the equipment determines the effect on the insulation.

[IEC 60050-442:1998, 442-01-29, modified — Note 1 to entry has been modified.]

3.1.35**non-primary circuit**

circuit electrically isolated from the a.c. or d.c. supply and from external VTs and CTs

[SOURCE: IEC 60255-27:2013, 3.32]

3.1.36**normal operational use**

equipment installed and operated under normal operational conditions, with all covers and protective measures in place

[SOURCE: IEC 60255-27:2013, 3.33]

3.1.37

overvoltage category

number defining a transient overvoltage condition

Note 1 to entry: Overvoltage categories I, II, III are used.

Note 2 to entry: See Clause A.1 of IEC 60255-27:2013 for overvoltage category details.

[SOURCE: IEC 60255-27:2013, 3.35]

3.1.38

PEB circuit

protective equipotential bonding circuit

non-primary circuits complying with ELV voltage limits and the following conditions:

- basic protection against electric shock is provided by basic insulation separating HLV from PEB circuits; and
- for fault protection, PEB circuits and accessible conductive parts, shall be bonded to the protective conductor terminal and shall comply with clause 6.6.5, which will prevent hazardous live voltages in PEB circuits

EXAMPLE 1 Analogue/digital inputs and outputs which may be connected direct to communication networks or circuits.

EXAMPLE 2 PEB ports which are suitable for connection to PEB ports of other products.

Note 1 to entry: See IEC 60255-27:2013, Figure A.3.

Note 2 to entry: PEB circuits may be accessible and are safe to touch under both normal operational and single-fault conditions.

Note 3 to entry: PEB circuits may be considered as protective earthed circuits or earthed accessible parts for the purposes of IEC 60255-27:2013, Table A.2.

3.1.39

PELV circuit

protective extra low voltage circuit

non-primary circuits complying with ELV voltage limits and the following conditions:

- PELV circuits shall be separated from HLV by reinforced/double insulation; and
- PELV circuits may be connected to functional earth, the protective (earth) conductor, or have provision for an earth connection

EXAMPLE 1 Analogue/digital inputs and outputs which may be connected directly to communication networks or circuits.

EXAMPLE 2 PELV ports which are suitable for connection to PELV ports of other products.

Note 1 to entry: See IEC 60255-27:2013, Figure A.2.

Note 2 to entry: PELV circuits may be accessible and are safe to touch under both normal operational and single-fault conditions.

3.1.40

pollution

any addition of foreign matter, solid, liquid or gaseous that can produce a permanent reduction of dielectric strength or surface resistivity of the insulation

Note 1 to entry: Ionized gases of a temporary nature are not considered to be a pollution.

[SOURCE: IEC 60050-442:1998, 442-01-28]

3.1.41

pollution degree

number characterizing the expected pollution of the micro-environment

[SOURCE: IEC 60255-27:2013, 3.39]

3.1.42

pollution degree 1

normally no pollution or only dry, non-conductive pollution occurs. The pollution has no influence

[SOURCE: IEC 60255-27:2013, 3.40]

3.1.43

pollution degree 2

normally only non-conductive pollution occurs except that occasionally a temporary conductivity caused by condensation is to be expected

[SOURCE: IEC 60255-27:2013, 3.41]

3.1.44

pollution degree 3

normally conductive pollution, or dry non-conductive pollution occurs, which becomes conductive, due to condensation which is to be expected

[SOURCE: IEC 60255-27:2013, 3.42]

3.1.45

pollution degree 4

normally the pollution generates persistent conductivity caused by conductive dust or by rain or snow

[SOURCE: IEC 60255-27:2013, 3.43]

3.1.46

primary circuit

circuit connected direct to the a.c. or d.c. supply input. Equipment circuits connected to VTs or CTs are also classed as primary circuits

Note 1 to entry: See IEC 60255-27:2013, Annex B.

Note 2 to entry: Measuring relay circuits supplied from an external a.c. or d.c. power supply, complying with ELV circuit requirements, as in IEC 60255-27:2013, Table A.1, may be treated as non-primary circuits, providing that any transients or impulse voltages on the supply output do not exceed the requirements of Figure 2 of IEC 61010-1:2010.

[SOURCE: IEC 60255-27:2013, 3.44]

3.1.47

product family

range of products based on a common hardware and/or software platform

[SOURCE: IEC 60255-1:2009, 3.17]

3.1.48

protective bonding

electrical connection of exposed conductive parts or of protective screening to provide electrical continuity by means of connection to an external protective conductor which is securely returned to earth/ground

[SOURCE: IEC 60255-27:2013, 3.45]

3.1.49

protective bonding resistance

impedance between the protective conductor terminal and a conductive part required to be connected to the protective conductor

[SOURCE: IEC 60255-27:2013, 3.46]

3.1.50

protective conductor

conductor provided for purposes of safety, for example, protection against electric shock, by electrically connecting any of the following parts:

- main earthing terminal;
- exposed conductive parts;
- earth electrode;
- earthed point of the source or artificial neutral

[SOURCE: IEC 60050-195:1998, 195-02-09, modified — "by electrically connecting any of the following parts: main earthing terminal, accessible conductive parts, earth electrode, earthed point of the source or artificial neutral" has been added.]

3.1.51

protective earthing

protective grounding, en US

earthing of a point in equipment for protection against electric shock in case of a fault

[SOURCE: IEC 60255-27:2013, 3.48]

3.1.52

protective impedance

impedance connected between live parts and exposed conductive parts, of such value that the current, in normal use and under likely fault conditions in the equipment, is limited to a safe value, and which is so constructed that the reliability is maintained throughout the life of the equipment

Note 1 to entry: A protective impedance should withstand the dielectric voltage withstand test for double insulation, and its choice should take account of its predominated failure mode.

[SOURCE: IEC 60050-442:1998, 442-04-24, modified — the term "electronic switch" has been replaced by "equipment" and Note 1 to entry has been added.]

3.1.53

protective screening

protective shielding, en US

separation of electric circuits and/or conductors from hazardous live parts by an electrically protective screen connected to the protective equipotential bonding system and intended to provide protection against electric shock

[SOURCE: IEC 60050-195, Amendment 1:2001, 195-06-18]

3.1.54

protective separation

separation of one electric circuit from another by means of

- double insulation, or
- basic insulation and electrically protective screening, or
- reinforced insulation

[SOURCE: IEC 60255-27:2013, 3.51]

3.1.55

rated impulse voltage

impulse voltage value assigned by the manufacturer to the equipment or to a part of it, characterizing the specified withstand capability of its insulation against transient overvoltages and to which clearances are referred

[SOURCE: IEC 60255-27:2013, 3.52]

3.1.56

rated insulation voltage

RIV

voltage value assigned by the manufacturer to the equipment, or to a part of it, characterizing the specified (long-term) withstand capability of its insulation and to which dielectric voltage tests and creepage distances are referred

Note 1 to entry: The rated insulation voltage is not necessarily equal to the rated voltage of equipment which is primarily related to functional performance.

Note 2 to entry: The rated insulation voltage refers to the insulation between electric circuits.

Note 3 to entry: For clearances and solid insulation the peak value of the voltage occurring across the insulation or clearance is the determining value for the rated insulation voltage. For creepage distances, the r.m.s. or d.c. value is the determining value.

[SOURCE: IEC 60255-27:2013, 3.53]

3.1.57

rated voltage

value of voltage assigned by the manufacturer, for a specified operating condition of a component, device or equipment

Note 1 to entry: Equipment may have more than one rated voltage value or may have a rated voltage range.

[SOURCE: IEC 60255-27:2013, 3.54]

3.1.58

reinforced insulation

insulation of hazardous live parts which provides a degree of protection against electric shock equivalent to double insulation

Note 1 to entry: Reinforced insulation may comprise several layers which cannot be tested singly as basic insulation or supplementary insulation.

[SOURCE: IEC 60050-195:1998, 195-06-09]

3.1.59

restricted access area

area accessible only to electrically skilled persons and electrically instructed persons with the proper authorization and knowledge of any safety hazards

Note 1 to entry: These areas include closed switch plants, distribution plants, switchgear cells, transformer cells, distribution systems in metal-sheet enclosures or in other closed installations.

[SOURCE: IEC 60050-195:1998, 195-04-04, modified — "and knowledge of any safety hazards" and Note 1 to entry have been added.]

3.1.60

routine test

conformity test made on each individual item during or after manufacture

[SOURCE: IEC 60050-151:2001, 151-16-17]

3.1.61

screen

shield, en US

conductive part that encloses or separates electric circuits and/or conductors

[SOURCE: IEC 60255-27:2013, 3.59]

3.1.62

SELV circuit

separated/safety extra low voltage circuit

non-primary circuits complying with ELV voltage limits and the following conditions:

- separated from HLV by reinforced/double insulation, and
- there shall be no provision for an earth connection

EXAMPLE 1 Analogue/digital inputs and outputs which may be connected direct to unearthed communication networks or circuits.

EXAMPLE 2 SELV ports which are suitable for connection to SELV ports of other products.

Note 1 to entry: See IEC 60255-27:2013, Figure A.1.

Note 2 to entry: SELV circuits may be accessible and are safe to touch under both normal operational and single-fault conditions.

Note 3 to entry: Connection of an earth to a SELV circuit is not permitted; for example, connection to an earthed cable screen or earthed communication circuit is not permitted. Where this is required, the circuit definition should change in accordance with IEC 60255-27:2013, Figure A.2 (PELV).

3.1.63

supplementary insulation

independent insulation applied in addition to basic insulation in order to provide protection against electric shock in the event of a failure of basic insulation

[SOURCE: IEC 60050-195:1998, 195-06-07, modified — "for fault protection" has been replaced by "in order to provide protection against electric shock in the event of a failure of basic insulation".]

3.1.64

tracking

progressive degradation of the surface of a solid insulating material by local discharges to form conducting or partially conducting paths

Note 1 to entry: Tracking usually occurs due to surface contamination.

[SOURCE: IEC 60050-212:2010, 212-11-56]

3.1.65

type test

test of one or more devices made to a given design, to check if these devices comply with the requirements of the standard concerned

[SOURCE: IEC 60050-851:2008, 851-12-05]

3.1.66

user

personnel with the appropriate training and experience necessary to be aware of hazards to which they are exposed when operating the equipment in a restricted access area and of measures to minimize the danger to themselves and other persons