

BS EN 61534-1:2011+A1:2014



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Powertrack systems

Part 1: General requirements

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National foreword

This British Standard is the UK implementation of EN 61534-1:2011+A1:2014. It is identical to IEC 61534-1:2011, incorporating amendment 1:2014. It supersedes BS EN 61534-1:2011, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee PEL/213, Cable management.

A list of organizations represented on this committee can be obtained on request to its secretary.

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**Powertrack systems -
Part 1: General requirements
(IEC 61534-1:2011)**

Systèmes de conducteurs préfabriqués -
Partie 1: Exigences générales
(CEI 61534-1:2011)

Stromschienensysteme -
Teil 1: Allgemeine Anforderungen
(IEC 61534-1:2011)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 23A/630/FDIS, future edition 2 of IEC 61534-1, prepared by SC 23A, Cable management systems, of IEC TC 23, Electrical accessories, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61534-1 on 2011-06-22.

This European Standard supersedes EN 61534-1:2003.

The main changes from EN 61534-1:2003 are as follows:

- updated normative references (Clause 2);
- changes to the number of samples to be tested (Subclause 5.3);
- inclusion of a short circuit test (New Clause 18);
- changes to external influences (Clause 21).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

- | | | |
|--|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2012-03-22 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2014-06-22 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61534-1:2011 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 60364-4-44:2007	NOTE	Harmonized as HD 60364-4-444:2010 (modified).
IEC 60439-2:2000	NOTE	Harmonized as EN 60439-2:2000 (not modified).
IEC 60570:2003	NOTE	Harmonized as EN 60570:2003 (modified).
IEC 60664-1:2007	NOTE	Harmonized as EN 60664-1:2007 (not modified).

Foreword to amendment A1

The text of document 23A/700A/FDIS, future IEC 61534-1:2011/A1, has been prepared by subcommittee 23A: Cable management systems, of IEC technical committee 23 "Electrical accessories" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61534-1:2011/A1:2014.

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- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-05-04
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-08-04

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC).

Endorsement notice

The text of the International Standard IEC 61534-1:2011/A1:2014 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

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

Publication	Year	Title	EN/HD	Year
IEC 60038 (mod)	2009	IEC standard voltages	EN 60038 ¹	2011
IEC 60060-1	2010	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	2010
IEC 60068-2-52	-	Environmental testing - Part 2: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)	EN 60068-2-52	-
IEC 60068-2-75	-	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	-
IEC 60112	2003	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112	2003
IEC 60127-1	2006	Miniature fuses - Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links	EN 60127-1	2006
IEC 60269-1	2006	Low-voltage fuses - Part 1: General requirements	EN 60269-1	2007
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993
IEC 60695-2-11	2000	Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products	EN 60695-2-11	2001
IEC 60695-10-2	2003	Fire hazard testing - Part 10-2: Abnormal heat - Ball pressure test	EN 60695-10-2	2003
IEC 60695-11-2	2003	Fire hazard testing - Part 11-2: Test flames - 1 kW nominal pre- mixed flame - Apparatus, confirmatory test arrangement and guidance	EN 60695-11-2	2003
IEC 60884-1 + A1	2002 2006	Plugs and socket-outlets for household and similar purposes - Part 1: General requirements	-	-
IEC 60998-1 (mod)	2002	Connecting devices for low-voltage circuits for household and similar purposes - Part 1: General requirements	EN 60998-1	2004

¹ At draft stage

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60998-2-3 (mod)	2002	Connecting devices for low-voltage circuits for household and similar purposes - Part 2-3: Particular requirements for connecting devices as separate entities with insulation-piercing clamping units	EN 60998-2-3	2004
IEC 60999-1	1999	Connecting devices - Electrical copper conductors - Safety requirements for screw-type and screwless-type clamping units - Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm ² up to 35 mm ² (included)	EN 60999-1	2000
IEC 60999-2	2003	Connecting devices - Electrical copper conductors - Safety requirements for screw-type and screwless-type clamping units - Part 2: Particular requirements for clamping units for conductors above 35 mm ² up to 300 mm ² (included)	EN 60999-2	2003
IEC 61032	1997	Protection of persons and equipment by enclosures - Probes for verification	EN 61032	1998
IEC 61210 (mod)	2010	Connecting devices - Flat quick-connect terminations for electrical copper conductors - Safety requirements	EN 61210	2010
IEC 60417	Data-base	Graphical symbols for use on equipment	-	-
ISO 1456	2009	Metallic and other inorganic coatings - Electrodeposited coatings of nickel, nickel plus chromium, copper plus nickel and of copper plus nickel plus chromium	EN ISO 1456	2009
ISO 2081	2008	Metallic and other inorganic coatings - Electroplated coatings of zinc with supplementary treatments on iron or steel	EN ISO 2081	2008
ISO 2093	1986	Electroplated coatings of tin - Specification and test methods	-	-

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INTRODUCTION

Particular requirements for specific types of powertrack systems will be specified in the relevant parts 2 of IEC 61534.

For a specific type of powertrack system the requirements of Part 1 of the standard are to be considered, together with the particular requirements of the appropriate Part 2, which will supplement or modify some of the corresponding clauses in Part 1 to provide the complete requirements for that type of system.

Part 1 shall apply unless supplemented or modified by an appropriate Part 2.

POWERTRACK SYSTEMS –

Part 1: General requirements

1 Scope

1.1 This part of IEC 61534 specifies general requirements and tests for powertrack (PT) systems with a rated voltage not exceeding 277 V a.c. single phase, or 480 V a.c. two or three phase [A₁] 50 Hz or 60 Hz [A₁] with a rated current not exceeding 63 A. These systems are used for distributing electricity in household, commercial and industrial premises.

1.2 Powertrack systems, according to this standard, are intended for use under the following conditions:

- an ambient temperature in the range –5 °C to + 40 °C, the average value over a 24 h period not exceeding 35 °C;
- a situation not subject to a source of heat likely to raise temperatures above the limits specified above;
- an altitude not exceeding 2000 m above sea level;
- an atmosphere not subject to excessive pollution by smoke, chemical fumes, prolonged periods of high humidity or other abnormal conditions.

In locations where special conditions prevail, as in ships, vehicles and the like and in hazardous locations, for instance, where explosions are liable to occur, special constructions may be necessary.

This standard does not apply to

- cable trunking systems and cable ducting systems covered by IEC 61084 [8] ¹;
- busbar trunking systems covered by IEC 60439-2 [5];
- electrical supply track systems for luminaires covered by IEC 60570 [6].

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 60038:2009, *IEC standard voltages*

IEC 60060-1:2010, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60068-2-52, *Environmental testing – Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium, chloride solution)*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

¹ Figures in square brackets refer to the bibliography.

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60127-1:2006, *Miniature fuses – Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links*

IEC 60269-1:2006, *Low-voltage fuses – Part 1: General requirements*

IEC 60417, *Graphical symbols for use on equipment*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)* ²

IEC 60695-2-11:2000, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods-Glow-wire flammability test methods for end-products*

IEC 60695-11-2:2003, *Fire hazard testing – Part 11-2: Test flames – 1 kW nominal pre-mixed flame – Apparatus, confirmatory test arrangement and guidance*

IEC 60695-10-2:2003, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test*

IEC 60884-1:2002, *Plugs and socket outlets for household and similar purposes – Part 1: General requirements*
Amendment 1 (2006)³

IEC 60998-1:2002, *Connecting devices for low-voltage circuits for household and similar purposes – Part 1: General requirements*

IEC 60998-2-3:2002, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-3: Particular requirements for connecting devices as separate entities with insulation piercing clamping units*

IEC 60999-1:1999, *Connecting devices – Electrical copper conductors - Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)*

IEC 60999-2:2003, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 2: Particular requirements for clamping units for conductors above 35 mm² up to 300 mm² (included)*

IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61210:2010, *Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements*

ISO 1456:2009, *Metallic and other inorganic coatings – Electrodeposited coatings of nickel, nickel plus chromium, copper plus nickel and of copper plus nickel plus chromium*

ISO 2081:2008, *Metallic and other inorganic coatings – Electroplated coatings of zinc with supplementary treatments on iron or steel*

ISO 2093:1986, *Electroplated coatings of tin – Specification and test methods*

² There exists a consolidated edition 2.1 (2001) that includes IEC 60529 (1989) and its Amendment 1 (1999).

³ There exists a consolidated edition 3.1 (2006) that includes IEC 60884-1 (2002) and its Amendment 1 (2006).

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

powertrack system

PT system

assembly of system components including a powertrack by which accessories may be connected to an electrical supply at one or more points (pre-determined or otherwise) along the powertrack

3.2

system component

part specifically designed for the PT system which may or may not incorporate an accessory

3.3

powertrack

system component which is a generally linear assembly of spaced and supported busbars providing electrical connection of accessories

NOTE A powertrack may also provide mechanical support for accessories.

3.4

busbar

main current carrying conductor(s) to which for example one or more tap-off units, accessories or electrical system components may be connected

3.5

accessory

electrical device complying with its own standard and associated with or incorporated in the PT system

3.6

rewireable accessory

accessory so constructed that a cable can be fitted or replaced using a tool

3.7

non-rewirable system component

system component so constructed that it forms a complete unit with the cable after connection and assembly by the manufacturer of the system component

3.8

connector

device which provides the electrical connection and possibly the mechanical connection of powertracks

3.9

supply connector

device enabling the supply wiring to be connected to the powertrack

3.10

live parts

conductor or conductive part intended to be energized in normal operation, including a neutral conductor, but by convention not a PEN conductor

[IEC 60050-195:1998, 195-02-19, modified] [2]

3.11

rated voltage, rated current

value assigned to a PT system by the manufacturer and to which operation and performance characteristics are referred

3.12

clamping unit

part(s) of a terminal necessary for the mechanical clamping and the electrical connection of the conductor(s) including the parts which are necessary to ensure the correct contact pressure

3.13

termination

part of a PT system to which a conductor(s) is attached providing a non-reusable connection

3.14

terminal

part of the PT system composed of one or more clamping unit(s) to which a conductor(s) is attached providing a reusable connection

3.15

insulation piercing connecting device

IPCD

connecting device for the connection and possible disconnection of one conductor or the interconnection of two or more conductors, the connection being made by piercing, boring through, cutting through, removing, displacing or making ineffective in some other manner the insulation of the conductor(s) without previous stripping

NOTE The removal of the sheath of the cable, if necessary, is not considered as a previous stripping.

3.16

flat quick-connect termination

electrical connection consisting of a male tab and a female connector which can be inserted and withdrawn with or without the use of a tool

3.17

plug

accessory intended for connection to a flexible cable intended for frequent manual engagement with a socket outlet

3.18

socket-outlet

accessory having a set of contacts designed to engage with the pins of a corresponding plug and which may have terminals or terminations for the connection of conductors

3.19

fuse-link

part of the fuse including the fuse-element(s) and intended to be replaced after the fuse has operated

3.20

type test

test of one or more PT systems made to a certain design to show that design meets certain specifications

[IEC 60050-151:2001, 151-16-16, modified] [1]

3.21

routine test

test to which each PT system is subjected during or after manufacture to ascertain whether it complies with the relevant requirements of this standard

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

NOTE The routine test is specified in Annex G.

3.22

dummy track

device for maintaining visual appearance and mechanical integrity which may be with or without current carrying parts

3.23

tap-off unit

system component intended for infrequent manual engagement with the busbars directly or indirectly via a tap-off outlet

3.24

tap-off outlet

aperture into which the tap-off unit engages

3.25

clearance

shortest distance in air between two conductive parts

3.26

creepage distance

shortest distance along the surface of the insulating material between two conductive parts

[IEC 60050-151:2001, 151-15-50]

3.27

overvoltage

voltage having a peak value exceeding the corresponding peak value of maximum steady-state voltage at normal operating conditions

3.28

transient overvoltage

short duration overvoltage of a few milliseconds or less, oscillatory or non-oscillatory, usually highly damped

[IEC 60050-604:1987, 604-03-13]

3.29

overvoltage category

numeral defining a transient overvoltage condition

3.30

rated impulse withstand voltage

highest peak value of impulse voltage of prescribed form and polarity assigned by the manufacturer and which does not cause breakdown of insulation under specified conditions

3.31

rated insulation voltage

r.m.s. withstand voltage value assigned by the manufacturer to the PT system or to a part of it, characterising the specified (long term) withstand capability of its insulation

3.32

basic protection

protection against electric shock under fault-free conditions

[IEC 60050-195:1998, 195-06-01]

3.33

fault protection

protection against electric shock under single fault conditions (for example, failure of basic insulation)

[IEC 60050-195:1998, 195-06-02, modified]

3.34

functional insulation

insulation between live parts which is necessary only for the proper functioning of the PT system

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

3.35

basic insulation

insulation of live parts which provides basic protection against electric shock

[IEC 60050-195:1998, 195-06-06, modified]

3.36

supplementary insulation

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

[IEC 60050-195:1998, 195-06-07, modified]

3.37

double insulation

insulation comprising both basic insulation and supplementary insulation

[IEC 60050-195:1998, 195-06-08]

3.38

reinforced insulation

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

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

3.39

solid insulation

insulation material, not gaseous or liquid, interposed between two conductive parts

3.40

pollution

contamination by foreign matter, solid, liquid, or gaseous that can result in a reduction of electric surface resistivity

3.41

pollution degree

numeral characterising the expected pollution of the micro-environment

3.42

micro-environment

immediate environment of the insulation which particularly influences the dimensioning of creepage distances

3.43

macro-environment

environment of the room or other location in which the equipment is installed or used

3.44

ordinary person

person who is neither a skilled person nor an instructed person

[IEC 60050-195:1998, 195-04-03]

3.45

(electrically) skilled person

person with relevant education and experience to enable him or her to avoid dangers and to prevent risks which electricity may create

[IEC 60050-195:1998, 195-04-01, modified]

3.46

(electrically) instructed person

person adequately advised or supervised by skilled persons to enable him or her to avoid dangers and to prevent risks which electricity may create

[IEC 60050-195:1998, 195-04-02, modified]

3.47

entry membrane

component or an integral part of a PT system used to protect the cable and which may be used to support the cable, conduit or ducting or trunking at the point of entry

NOTE It may also provide ingress protection.

3.48

special purpose tool

tool which is unlikely to be readily available in a normal household, for example, a key for a three-angle headed screw

3.49

exposed-conductive-parts

conductive part of equipment which can be touched and which is not normally live, but which can become live when basic insulation fails

[IEC 60050-195:1998, 195-06-10]

NOTE A conductive part of electrical equipment which can only become live through contact with an exposed-conductive-part which has become live is not considered to be an exposed-conductive-part itself.

3.50

hazardous-live-part

live part which, under certain conditions can give a harmful electric shock

3.51

rated conditional short-circuit current (I_{cc}) of a circuit of a PT system

value of prospective short-circuit current, declared by the PT system manufacturer, that can be withstood for the total operating time (clearing time) of the short-circuit protective device (SCPD) under specified conditions

NOTE 1 The test conditions are specified in 18.2 and 18.4.

NOTE 2 For a.c., the rated conditional short-circuit current is expressed by the r.m.s. value of the a.c. component.

NOTE 3 The short-circuit protective device may either form an integral part of the PT system or be a separate unit.

3.52 short time withstand current

I_{cw}

the current that a circuit or a switching device in the closed position can carry during a specified short time under prescribed conditions of use and behaviour

[CEI 60050-441:1984, 441-17-17]

3.53 noiseless (clean) earth

combined protective and functional earth conductor in which the level of conducted or induced interference from external sources does not produce an unacceptable incidence of malfunction in the data processing or similar equipment to which it is connected. The susceptibility in terms of amplitude/frequency characteristics varies depending on the type of equipment.

3.54

dry-treatment of floor

process for cleaning and/or care by which the floor is treated without liquids or with only a small quantity of liquid such that no pools or soaking of the floor covering occurs

EXAMPLE Sweeping with a broom or carpet-sweeper, vacuum cleaning, brushing, cleaning with a dry cleaning powder, dry shampoo treatment, wet shampooing of carpets, treatment with cleaning litter (liquid chemical cleaning agent on a solid material used as carrier, e.g. soaked sawdust, damp cloth, etc.).

3.55 wet-treatment of floor

process for cleaning and/or care by which the floor is treated with liquid agents such that pools of liquid, or soaking of the floor covering for a brief period of time, cannot be excluded

EXAMPLE Wet scrubbing, manual or mechanical wiping. 

4 General requirements

4.1 PT systems shall be so designed and constructed that in normal use their performance is reliable and without unreasonable hazard to the user or the surroundings.

4.2 Compliance is checked by all relevant tests according to this standard and the appropriate part 2.

4.3 Accessories associated with or incorporated in a system component shall and need only comply with the relevant standard for that accessory if any.

5 General notes on tests

5.1 Tests according to this standard are type tests.

5.2 Unless otherwise specified in this standard, the samples shall be tested as delivered under normal or simulated conditions of use, at an ambient temperature of $(20 \pm 5) ^\circ\text{C}$. The samples used for the tests shall be representative of normal production in respect of all details which may affect the test results. Unless otherwise specified, samples shall be assembled and mounted in accordance with the manufacturer's instructions. Samples of non-rewireable system components shall be supplied with an appropriate flexible cable which shall be at least 1 m long.

5.3 Thirteen samples shall be subjected to inspection and tests in the following order of clauses.

Number of samples	Clause number				
3	8	9	10 (15) ^b	11	14 (10/ 11.1/ 11.3/15.3) ^b
1 ^a	14.1 (10/ 11.1/ 11.3/15.3) ^b				
3	12	13	16	17	21 (15.4) ^b
1 ^d	18 ^c (11.3.1,15.4) ^b ; ([10.2, 10.3, 16.3] ^e) ^b				
3	19				
1	20.1				
1	20.2				
^a For the cold test.					
^b The clauses in parenthesis indicate tests that are referenced from the preceding main test clause.					
^c The short circuit tests shall be performed on a new sample.					
^d The tests may be carried out on one sample or each test may be carried out on a new sample at the manufacturer's discretion.					
^e Tests required only in case of doubt.					

Unless otherwise specified, a sample means an individual component, a powertrack not less than 1 m in length, or a combination typifying the system as a whole.

5.4 Unless otherwise specified, three samples shall be subjected to the tests. The requirements are satisfied if all samples meet the test requirements. If any of the samples fails to satisfy the test requirements due to an assembly or manufacturing fault then that test and any preceding test which may have influenced the results shall be repeated and any subsequent tests in the sequence shall be applied to another full set of samples. All of the new set of samples shall comply with the requirements.

6 Ratings

PT systems shall have

- a rated voltage not exceeding 480 V a.c., and
- a rated current not exceeding 63 A.

7 Classification

PT systems and/or system components shall be classified as follows:

7.1 According to resistance to impact for installation and application.

7.1.1 PT system for light impact: 1 J

7.1.2 PT system for medium impact: 2 J

7.1.3 PT system for heavy impact: 5 J

7.1.4 PT system for very heavy impact: 20 J

7.2 According to whether the tap-off units are intended to be connected and disconnected with the system energised and/or their load connected.

7.2.1 Tap-off units not intended to be connected or disconnected when the system is energised.

7.2.2 Tap-off units intended to be connected or disconnected when the system is energised but without a load connected.

7.2.2.1 By ordinary person, skilled person or instructed person.

7.2.2.2 By skilled person or instructed person.

7.2.3 Tap-off units intended to be connected or disconnected when the system is energised and with a load connected.

7.3 According to degrees of protection provided by enclosures according to IEC 60529.

7.3.1 According to protection against ingress of solid foreign objects.

7.3.2 According to protection against ingress of water.

7.4 According to degree of pollution

7.4.1 Pollution degree 1

7.4.2 Pollution degree 2

7.4.3 Pollution degree 3

NOTE 1 Details for the pollution degrees are given in Annex D.

NOTE 2 A PT system suitable for use in a particular situation may be used in a less polluted situation.

7.5 According to the rated impulse withstand voltage:

330 V, 500 V, 1 500 V, 2 500 V, 4000 V.

NOTE The relationship between rated impulse withstand voltage, rated voltage and overvoltage category is given in Annex C.

8 Marking and documentation

8.1 Each system component shall be marked with

- a) the name or trademark of the manufacturer or responsible vendor;
- b) product identification which may comprise, for example, a colour, a catalogue number, a symbol.

In the case where the PT system is supplied as an assembly then only the assembly need be marked, and this shall not be on easily removable parts.

Where it is not possible to mark a component due to its size, then it will be sufficient to mark the smallest package unit according to 8.1.

Compliance is checked by inspection.

8.2 In addition to 8.1 the powertrack, tap-off units and supply connectors shall be marked with

- a) rated voltage in volt,
- b) rated current in ampere,
- c) nature of supply e.g. 50Hz, 60 Hz.

If symbols are used, they shall be in accordance with 8.7.

Compliance is checked by inspection.

8.3 Line, neutral and earth terminals for external conductors shall be marked using the symbols in accordance with 8.7; alternatively these marks can be placed adjacent to the terminal.

Compliance is checked by inspection.

8.4 If necessary for correct installation, for example for screwless type or insulation piercing terminals, the following information shall be given by marking adjacent to terminals:

- connection and disconnection procedure;
- cross-sectional areas and types of connectable conductors.

NOTE Type of connectable conductors could include solid, stranded, flexible, copper or aluminium.

Alternatively the information may be given on the smallest package unit or in the manufacturer's installation instructions.

In addition, the location of protective devices such as fuses, circuit breakers and residual current devices which are not visible after installation shall be marked in their vicinity with the appropriate symbol or text which shall be visible after installation. In the case of fuses or other protective devices which can be replaced without the use of a tool, the appropriate current shall also be marked and if necessary, the appropriate voltage.

Compliance is checked by inspection.

8.5 The manufacturer or responsible vendor shall provide documentation giving the information necessary for the proper and safe installation and use of the PT system for

- system components of the PT system;
- the purpose of the system components and their assemblies;
- the classification of the PT system according to Clause 7;
- guidance to reach the declared performance;
- guidance regarding periodic inspection and/or maintenance where required;
- static loading characteristics (see 14.3), if any;
- the short-circuit performance in accordance with 18.3.
- maximum and minimum cross-sectional areas of cables that the supply terminals are able to accommodate.

Compliance is checked by inspection.

8.6 Information according to 8.1, 8.2, 8.3, 8.4 and 8.5 which is provided with the smallest package unit or in the manufacturer's installation instructions shall be in the form of

illustrations and/or in a language which is acceptable to the country in which the PT system is intended to be installed.

Compliance is checked by inspection.

8.7 Symbols

Ampere	A
Volt	V
Hertz	Hz
Alternating current	~ [IEC 60417-5032 (2002-10)] or a.c.
Line	L, or, in the case of more than one, L1, L2, L3, etc.
Neutral	N
Protective earth	 [IEC 60417-5019 (2006-08)]
Noiseless (clean) earth	
Fuse	 [IEC 60417-5016 (2002-10)]

IP code according to IEC 60529 IPXX

For the marking of rated current and rated voltage, figures may be used alone. The figure for the rated current shall be placed before or above that for the rated voltage and separated from the latter by a line. If the symbol for the nature of supply is used, it shall be placed next to the marking for rated current and rated voltage.

For example 10 A 250 V ~ or 10/250 ~ or $\frac{10}{250}$ ~

Compliance is checked by inspection.

8.8 Marking on the product shall be easily legible and durable.

The marking according to 8.2, 8.3 and 8.4 shall not be placed on easily removable parts and screws or washers.

Compliance is checked by inspection, using normal or corrected vision, without additional magnification and by rubbing the marking by hand for 15 s with a piece of  cotton  cloth soaked with water and again for 15 s with a piece of cloth soaked with petroleum spirit  or 95+% n-hexane .

After the test the marking shall be legible. Labels shall not be easily removable and shall not have curled.

NOTE 1 Petroleum spirit is defined as the aliphatic solvent hexane with a content of aromatics of maximum 0,1 % volume, a kauri butanol value of 29, initial boiling point 65 °C, a dry point of 69 °C and a density of approximately 0,68 g/cm³.

NOTE 2 Marking on the product may be applied, for example, by moulding, pressing, engraving, printing, adhesive labels or waterslide transfers.

NOTE 3 The durability of marking made by engraving, moulding or pressing is deemed to comply with the requirements without testing.

 NOTE 4 95+% n-hexane (Chemical Abstracts Service Registry Number, CAS RN, 110-54-3) is available from a variety of chemical suppliers as a high pressure liquid chromatography (HPLC) solvent. 