SLOVENSKI STANDARD
SIST EN 50550:2011

01-april-2011

Močnostna frekvenčna prenapetostna zaščitna naprava za gospodinjsko in podobno uporabo (POP)

Power frequency overvoltage protective device for household and similar applications (POP)

Schutzeinrichtung gegen netzfrequente Überspannungen für Hausinstallationen und für ähnliche Anwendungen

SIST Preview
(https://ecommerce.sist.si)

Dispositif de protection contre les surtensions à fréquence industrielle pour les applications domestiques et analogues

SIST EN 50550:2011
https://ecommerce.sist.si/catalog/standards/sist/b28b283f-8c5a-4c8a-bd3e-93aaea7af11e/sist-en-50550-2011
SIST EN 50550:2011
https://ecommerce.sist.si/catalog/standards/sist/b28b283f-8c5a-4c8a-bd3e-93aaea7af11e/sist-en-50550-2011

Ta slovenski standard je istoveten z: **EN 50550:2011**

ICS:

29.120.50	Varovalke in druga medtokovna zaščita	Fuses and other overcurrent protection devices

SIST EN 50550:2011 **en**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

SIST EN 50550:2011

SIST Preview
(https://ecommerce.sist.si)

SIST EN 50550:2011
https://ecommerce.sist.si/catalog/standards/sist/b28b283f-8c5a-4c8a-bd3e-93aaea7af11e/sist-en-50550-2011

SIST EN 50550:2011

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50550

February 2011

ICS 29.120.50

English version

Power frequency overvoltage protective device for household and similar applications (POP)

Dispositif de protection contre les surtensions à fréquence industrielle pour les applications domestiques et analogues

Schutzeinrichtung gegen netzfrequente Überspannungen für Hausinstallationen und für ähnliche Anwendungen

This European Standard was approved by CENELEC on 2011-01-17. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

SIST Preview (https://ecommerce.sist.si) SIST EN 50550:2011

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

© 2011 CENELEC - All rights of exploitation in any form and by any means reserved worldwide for CENELEC members.

Ref. No. EN 50550:2011 E

SIST EN 50550:2011

Foreword

This European Standard was prepared by the CENELEC BTTF 128-1, Power frequency overvoltage protective device for household and similar applications.

It was submitted to the formal vote and was approved by CENELEC as EN 50550 on 2011-01-15.

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 are proposed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2012-01-15
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2014-01-15

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 2004/108/EC. See Annex ZZ.

SIST Preview
(https://ecommerce.sist.si)

SIST EN 50550:2011
https://ecommerce.sist.si/catalog/standards/sist/b28b283f-8c5a-4c8a-bd3e-93aaea7af11e/sist-en-50550-2011

SIST EN 50550:2011

Contents

1 Scope **5**

2 Normative references **6**

3 Terms and definitions **7**

4 Classification **8**

4.1 According to the method of construction 8
4.2 According to the main protective device 8
4.3 According to the range of ambient air temperature (only for POP according to 4.2.2 and 4.2.3) 8
4.4 According to the number of monitored line to neutral conductor voltages 8

5 Characteristics **9**

5.1 Summary of characteristics 9
5.2 Limit values of the break times and non-actuating times 9

6 Marking and other product information **9**

6.1 Standard marking 9
6.2 Additional marking 10

7 Standard conditions for operation in service **11**

7.1 General 11
7.2 Conditions of installation 11
7.3 Pollution degree 11

8 Requirements for construction and operation **11**

8.1 Mechanical design 11
8.2 Protection against electric shock 16
8.3 Dielectric properties and isolating capability 16
8.4 Temperature rise 16
8.5 Operating characteristic 16
8.6 Mechanical and electrical endurance 16
8.7 Performance at short-circuit currents 17
8.8 Resistance to mechanical shock and impact 17
8.9 Resistance to heat 17
8.10 Resistance to abnormal heat and to fire 17
8.11 Ageing of electronic components 17
8.12 Behaviour at low ambient air temperature 18
8.13 Electromagnetic compatibility 18
8.14 Safety performance of overstressed POPs 18

9 Tests **18**

9.1 General 18
9.2 Test condition 19
9.3 Verification of the influence of the POP on the correct operation of the main protective device 19
9.4 Test of dielectric properties 21
9.5 Temperature rise 21
9.6 Verification of the operating characteristics 21
9.7 Verification of the mechanical and electrical endurance 23
9.8 Tests of creepage distances and clearances for electronic circuits (abnormal conditions) 24
9.9 Requirements for capacitors and specific resistors and inductors used in electronic circuits 27
9.10 Electromagnetic compatibility 28
9.11 Test of safety performance of overstressed POPs 32
9.12 Test of reliability of screws, current-carrying parts and connections 32
9.13 Test of reliability of terminals for external conductors 32
9.14 Verification of protection against electric shock 32
9.15 Verification of resistance to mechanical shock and impact 33
9.16 Test of resistance to heat 33
9.17 Resistance to abnormal heat and to fire 33
9.18 Verification of the correct operation at low ambient air temperatures for RCDs for use at temperatures between -25 °C and +40 °C 33

SIST Preview
(https://ecommerce.sist.si)
SIST EN 50550:2011
https://ecommerce.sist.si/catalog/standards/sist/e7e2283f-8c5a-4c8a-bd3e-93aaea7af11e/sist-en-50550-2011

SIST EN 50550:2011

Annex A (normative) **Test sequences** **36**
Annex B (normative) **Determination of clearances and creepage distances** **37**
Annex C (informative) **Examples of terminal designs** **39**
Annex D (normative) **Number of samples for full test procedure** **42**
Annex ZZ (informative) **Coverage of Essential Requirements of EC Directives** **44**
Bibliography **45**

Figures

Figure 1 – Minimum creepage distances and clearances measured in millimetres 34
Figure 2 – Minimum creepage distances and clearances as a function of peak value of operating voltage 35
Figure B.1 – Illustrations of the application of creepage distances 38
Figure C.1 – Examples of pillar terminals 39
Figure C.2 – Examples of screw terminals and stud terminals 40
Figure C.3 – Examples of saddle terminals 41
Figure C.4 – Examples of lug terminals 41

Tables

Table 1 – Limit values of break times and non-actuating times 9
Table 2 – Minimum clearances and creepage distances 13
Table 3 – Maximum permissible temperatures under abnormal conditions 26
Table 4 – Low frequency immunity test conditions 29
Table 5 – High frequency immunity test conditions 30
Table 6 – Test conditions for electrostatic discharges 31
Table 7 – Emissions test conditions 31
Table A.1 – Test sequences 36
Table D.1 – Number of samples for full test procedure 42
Table D.2 – Additional tests for POP already fully tested together with one kind of main protective device 43

SIST Preview
(https://ecommerce.sist.si)
SIST EN 50550:2011
https://ecommerce.sist.si/catalog/standards/sist/b28b2851-8c5a-4c8a-bd5e-93aaea7af11c/sist-en-50550-2011

SIST EN 50550:2011

1 Scope

This European Standard applies to power frequency overvoltage protection devices (hereafter referred to as “POP”) for household and similar uses, with a rated frequency of 50 Hz, a rated voltage 230 V a.c. (between phase and neutral), intended to be used in combination with a main protective device being either a CB in compliance with EN 60898-1 or EN 60898-2, a RCCB in compliance with EN 61008-1 or a RCBO in compliance with EN 61009-1.

NOTE 1 Requirements for POPs in combination with switching devices other than a main protective device, or a POP integrated in a MPD, are under consideration.

NOTE 2 Requirements for POP with functional earth connection regarding temporary overvoltage withstand are under consideration.

NOTE 3 A POP is not a protective device to be used for automatic disconnection of the supply in the meaning of HD 60364-4-41.

They are intended for use in an environment with pollution degree 2 and overvoltage category III.

They can be designed for factory assembly or for assembly on site.

These devices are intended to mitigate the effects of power frequency overvoltages between phase and neutral conductor (e.g. caused by loss of neutral conductor in the three phase supply upstream the POP) for downstream equipment by actuating the main protective device when an overvoltage between phase and neutral is detected.

NOTE 4 To mitigate means in this context that the POP will provide protection in most cases of power frequency overvoltages.

NOTE 5 Protection in case of overvoltage between phases is under consideration. In case of phase to phase electrical supply system with rated voltage between phases 230 V a.c. and no neutral conductor, one line monitored POP in compliance to this standard can be used according to manufacturer’s instruction.

(https://ecommerce.sist.si)

The POP does not impair the protective function of the main protective device.

This European Standard does not apply for protection against common mode over voltages.

https://ecommerce.sist.si/catalog/standards/sist/b28b283f-8c5a-4c8a-bd3e-93aaea7af11e/sist-en-50550-2011

This European Standard does not apply to surge protective devices.

This European Standard states:

– the definitions of terms used for POP (Clause 3);

– the classification of POP (Clause 4);

– the characteristics of POP (Clause 5);

– the preferred values of the operating and influencing quantities (Clause 5);

– the marking and information to be provided for POP (Clause 6);

– the standard conditions for installation and operation in service (Clause 7);

– the requirements for construction and operation (Clause 8);

– the list of minimum requirements to be tested (Clause 9).

SIST EN 50550:2011

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.

EN 50160:2010	Voltage characteristics of electricity supplied by public electricity networks
EN 55014-1:2006 + A1:2009	Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission (CISPR 14-1:2005 + A1:2008)
EN 55022:2010	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement (CISPR 22:2008, mod.)
EN 60065:2002 + corr. Aug. 2007	Audio, video and similar electronic apparatus – Safety requirements (IEC 60065:2001, mod.)
EN 60384-14	Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains (IEC 60384-14)
EN 60664-1:2007	Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests (IEC 60664-1:2007)
EN 60664-3	Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution (IEC 60664-3)
EN 60898-1:2003 + corr. Feb. 2004 + A1:2004 + A11:2005 + A12:2008	Electrical accessories – Circuit breakers for overcurrent protection for household and similar installations – Part 1: Circuit-breakers for a.c. operation (IEC 60898-1:2002, mod. + A1:2002, mod.)
EN 60898-2:2006	Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations – Part 2: Circuit-breakers for a.c. and d.c. operation (IEC 60898-2:2000, mod. + A1:2003, mod.)
EN 60998-2-3	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 60998-2-3)
EN 61000 series	Electromagnetic compatibility (EMC) (IEC 61000 series)
EN 61008 series	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) (IEC 61008 series)
EN 61008-1:2004 + A11:2007 + A12:2009	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) – Part 1: General rules (IEC 61008-1:1996, mod. + A1:2002, mod.)
EN 61009 series	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) (IEC 61009 series)
EN 61009-1:2004 + corr. Jul. 2006 + A11:2008 + A12:2009 + A13:2009	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) – Part 1: General rules (IEC 61009-1:1996, mod. + A1:2002, mod. + corrigendum May 2003)

SIST Preview
(Generated on 2012-10-15 09:57:39)
SIST EN 50550:2011
https://ecommerce.sist.si/catalog/standards/sist/b28b283f-8c5a-4c8a-bd3e-93aaea7af11e/sist-en-50550-2011

SIST EN 50550:2011

EN 61543:1995 + corr. Dec. 1997 + A11:2003 + corr. May. 2004 + A12:2005 + A2:2006	Residual current-operated protective devices (RCDs) for household and similar use – Electromagnetic compatibility (IEC 61543:1995 + A2:2005)
EN 61558-1	Safety of power transformers, power supplies, reactors and similar products – Part 1: General requirements and tests (IEC 61558-1)
EN 61558-2 series	Safety of power transformers, power supplies, reactors and similar products – Part 2-X: Particular requirements and tests (IEC 61558-2 series)
EN ISO 306	Plastics – Thermoplastic materials – Determination of Vicat softening temperature (VST) (ISO 306:2004)
EN 61249-2 series	Base materials for printed circuits – Part 2: Specifications

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 60898-1:2003, EN 61008-1:2004, EN 61009-1:2004 and the following apply.

3.1
power frequency overvoltage
increase of the voltage at the rated frequency in the electrical supply system, above a specified threshold

SIST Preview
(https://ecommerce.sist.si)

3.2
Power frequency Overvoltage Protective device
POP
device intended to mitigate the effects of power frequency overvoltages between phase and neutral conductor (e.g. caused by loss of neutral conductor in the three phase supply upstream the POP) for downstream equipment

SIST EN 50550:2011
https://standards.iteh.ai/catalog/standards/sist/b2882831-8c5a-4c8a-bd3e-93aaca7af1fe/sist-en-50550-2011

NOTE One line monitored POP can be used also to mitigate the effects of power frequency overvoltages between two phase's conductors in phase to phase electrical supply system.

3.3
main protective device
device to which the POP is intended to be associated, directly or through a release unit, with and that trips under specified conditions

NOTE The main protective device is a circuit breaker (EN 60898-1 or EN 60898-2) or a RCCB (EN 61008-1) or a RCBO (EN 61009-1).

3.4
actuating voltage
U_a
voltage values, measured between phase and neutral conductor, for which POP device shall actuate the main protective device

3.5
release unit
device mechanically connected to a main protective device, which releases the holding means and permits the automatic opening of the main protective device

SIST EN 50550:2011

3.6
POP assembly
combination of the POP device assembled as for normal use with the main protective device and release unit, if any

NOTE The main protective device is a circuit breaker (EN 60898-1 or EN 60898-2) or a RCCB (EN 61008-1) or a RCBO (EN 61009-1).

3.7
break time
t_B
time that elapses between the instant when the overvoltage is suddenly attained, and the instant when the MPD associated to the POP has switched off the circuit

NOTE For POP assembly.

3.8
non-actuating time
t_{0A}
maximum delay during which a given overvoltage can be applied to the POP without causing it to operate

4 Classification

4.1 According to the method of construction

4.1.1 POP assembled to the main protective device in factory by the manufacturer;

4.1.2 POP to be coupled by mechanical means on site with the main protective device;

4.1.3 POP to be assembled on site with the release unit associated or integrated to the main protective device.

SIST Preview
(https://ecommerce.sist.si)

4.2 According to the main protective device

SIST EN 50550:2011
https://ecommerce.sist.si/catalog/standards/sist/b28b283f-8c5a-4c8a-bd3e-93aaea7af11e/sist-en-50550-2011

4.2.1 POP for circuit breakers;

4.2.2 POP for RCBOs;

4.2.3 POP for RCCBs.

NOTE The same POP may be designed for more than one main protective device.

4.3 According to the range of ambient air temperature (only for POP according to 4.2.2 and 4.2.3)

4.3.1 POP for use at ambient air temperatures between - 5 °C and + 40 °C.

4.3.2 POP for use at ambient air temperatures between - 25 °C and + 40 °C.

NOTE Only applicable if at least one MPD to be assembled to the POP is suitable for this temperature range.

4.4 According to the number of monitored line to neutral conductor voltages

4.4.1 1 monitored line to neutral conductor voltages;

4.4.2 3 monitored lines to neutral conductor voltages.

SIST EN 50550:2011

NOTE POP according to classification 4.4.1 can be used to monitor voltage between two phases in phase to phase electrical supply system with rated voltage 230 V according to the instruction sheets accompanying the product. In this case, the voltage is not monitored between line and neutral but between two lines.

5 Characteristics

5.1 Summary of characteristics

The characteristics of the standard of the main protective device and the followings apply:

– protection against external influences;

– method of mounting;

– method of connection;

– value of rated operational voltage;

– value of rated frequency;

– limit values of break times and non actuating times;

– range of ambient air temperature.

5.2 Limit values of the break times and non-actuating times

The limit values of break time (see 3.7) and non-actuating time (see 3.8) for the POP are given in Table 1.

SIST Preview
(https://ecommerce.sist.si)

Table 1 – Limit values of break times and non-actuating times

	Standard values of break time and non-actuating time at a voltage (U_a) equal to				
	255 V	**275 V**	**300 V**	**350 V**	**400 V**
Maximum break time	No tripping	15 s	5 s	0,75 s	0,20 s
Minimum non-actuating time		3 s	1 s	0,25 s	0,07 s

SIST EN 50550:2011
https://ecommerce.sist.si/catalog/standards/sist/b28b283f-8c5a-4c8a-bd3e-93aaea7af11e/sist-en-50550-2011

6 Marking and other product information

6.1 Standard marking

In general, each POP shall be marked in a durable manner with all the following data:

a) manufacturer’s name or trade mark;

b) type designation, catalogue number or serial number;

c) rated voltage with the symbol ~;

d) POP or EN 50550;

SIST EN 50550:2011

e) protection degree (only if different from IP20).

NOTE For POP classified according to 4.1.1, marking according to item d) is sufficient.

Moreover the following markings shall be placed on the products or in the instruction sheets accompanying the product:

f) the type designation and catalogue number of the main protective device for the POP intended to be associated with;

g) assembling method and wiring;

h) instructions for checking operation after assembly to verify the mechanical operation of the main protective device in case of devices according to classification 4.1.2;

i) range of the ambient air temperature;

j) for the devices classified according to 4.1.2 and 4.1.3, information about the needs to take into consideration the range of the ambient air temperature of the main protective device.

Information on how to reach the isolation of the installation shall be given; such information shall be given in the instruction sheet accompanying the product.

The information under a), b), c) and d) shall be visible when the POP is installed.

The information under i) shall not be visible when the POP is assembled with the MPD.

SIST Preview
(https://ecommerce.sist.si)

Marking shall be indelible, easily legible and not be placed on screws, washers or other removable parts.

Compliance is checked by inspection and by the test of 9.3.5.

SIST EN 50550:2011
https://standards.iteh.ai/catalog/standards/sist/0286283f-8c5a-4c8a-bd3e-93aaca7af1fe/sist-en-50550-2011

With the POP assembled and enabled, the visible marking, required by the reference standard of the main protective device, shall be visible.

6.2 Additional marking

For POP classified according to 4.1.1, additional marking to other standards (EN or IEC or other) is allowed under the following conditions:

– the POP shall comply with all the requirements of the additional standard;

– the relevant standard to which the additional marking refers shall be indicated adjacent to this marking and shall be clearly differentiated or separated from the standard marking according to 6.1.

Compliance is checked by inspection and by carrying out all the test sequences required by the relevant standard. Equivalent or less severe test sequences need not be repeated.

SIST EN 50550:2011

7 Standard conditions for operation in service

7.1 General

The POP complying with this European Standard shall be capable of operating under the standard conditions given by the relevant MPD standard(s).

7.2 Conditions of installation

POP shall be installed in accordance with the manufacturer's instructions.

POP according to 4.1.2 and 4.1.3 shall only be installed together with the main protective device declared by the manufacturer.

7.3 Pollution degree

POP according to this European Standard are intended for environment with pollution degree 2, i.e.: normally, only non-conductive pollution occurs; occasionally, however, a temporary conductivity caused by condensation may be expected.

8 Requirements for construction and operation

NOTE For test purposes the association of the POP and the MPD will be referred hereafter as POP assembly.

8.1 Mechanical design

SIST Preview
(https://ecommerce.sist.si)

8.1.1 General

POP shall be so designed and constructed that, in normal use, their performance is reliable and without danger to the user or surrounding.

SIST EN 50550:2011
https://ecommerce.sist.si/catalog/standards/sist/b28b283f-8e5a-4e8a-bd3e-93aaea7af11e/sist-en-50550-2011

The POP, the release unit, if any, and the main protective device shall be of the same manufacturer or trademark.

Compliance is checked by inspection and carrying out all the relevant tests specified.

The POP shall be constructed according to one of the methods of classification 4.1.

Compliance is checked by inspection.

When the main protective device is a CB it shall complied with EN 60898-1 or EN 60898-2.

When the main protective device is a RCD it shall comply either with EN 61008 series for RCCB or EN 61009 series for RCBO.

Compliance is checked according to the relevant standards.

POP shall be assembled only with main protective devices having the same rated frequency.

POP shall be assembled only with main protective devices having a higher or equal range of ambient air temperature (see 4.3).

The protective conductor of the installation shall not become live when the POP is operating.