SLOVENSKI STANDARD
SIST EN 60728-11:2011

01-februar-2011

Nadomešča:
SIST EN 60728-11:2006

Kabelska omrežja za televizijske in zvokovne signale ter interaktivne storitve - 11. del: Varnost

Cable networks for television signals, sound signals and interactive services - Part 11: Safety

Ta slovenski standard je istoveten z: EN 60728-11:2010

ICS:

33.060.40 Kabelski razdelilni sistemi Cabled distribution systems

SIST EN 60728-11:2011 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60728-11

October 2010

ICS 33.060.40

Supersedes EN 60728-11:2005

English version

Cable networks for television signals, sound signals and interactive services - Part 11: Safety

(IEC 60728-11:2010)

Réseaux câblés pour les signaux de télévision, les signaux sonores et les services interactifs - Partie 11: Sécurité (CEI 60728-11:2010)

Kabelnetze für Fernsehsignale, Tonsignale und interaktive Dienste - Teil 11: Sicherheitsanforderungen (IEC 60728-11:2010)

This European Standard was approved by CENELEC on 2010-10-01. 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.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60728-11:2010 E

Foreword

The text of document 100/1679/FDIS, future edition 3 of IEC 60728-11, prepared by IEC TC 100, Audio, video and multimedia systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60728-11 on 2010-10-01.

This European Standard supersedes EN 60728-11:2005.

EN 60728-11:2010 includes the following significant technical changes with respect to EN 60728-11:2005.

– The list of "differences in some countries" was transferred from the "Foreword" to informative Annex D.

– Some new terms and definitions were added.

– All Figures were reworked among other things concerning equipotential bonding and earthing details and were incorporated in the text at the appropriate places.

– Clause 11 "Protection against atmospheric overvoltages and elimination of potential differences" was completely reworked and re-structured taking into account among other things the provisions and requirements of the EN 62305 series on "Lightning protection".

– New informative Annex A on "Earth loop impedance" was added.

– New informative Annex C on "Examples of calculation of risk due to lightning" was added.

– Former Annex B on "Special conditions using IT power line networks" was re-worded and incorporated in Annex ZA as "Special National Condition in Norway".

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)	2011-07-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-10-01

For this European Standard the informative Annex D of IEC 60728-11:2010 shall be disregarded and has been replaced by the informative Annexes ZA, *Special National Conditions*, and ZB, *A deviations*.

Annexes ZA, ZB, and ZC have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60728-11:2010 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 60728-1 NOTE Harmonized as EN 60728-1.

Add the following annexes:

Annex ZA
(normative)

Special national conditions

Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions.

NOTE If it affects harmonization, it forms part of the European Standard.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

Clause Special National Condition

6.2 ZA.1 Norway

The following parts of the standard are not applicable due to Special National Conditions:

- For new and rebuilt coaxial electronic communication networks the outer conductor of the coaxial cable leading into a building shall be galvanic and isolated from the outer conductor of the coaxial cable inside the building;
- Examples of installations inside buildings described in 6.2g, 6.2i, 6.2l and shown in Figure 2, Figure 4, Figure 5 and Figure 7 shall be equipped with a galvanic isolator separating local earth from the cable network distribution lines;
- Galvanic isolators shall withstand the following requirements:
- Applying a 50 Hz AC voltage of 300 V_{RMS} between the input and the output of the outer conductor of the galvanic isolator for a period of not less than 20 min, the leakage current shall not exceed 8 mA_{RMS}. Applying a continues DC voltage of 2 120 V between the input and the output of the outer conductor of the galvanic isolator for a period of not less than 1 min, the leakage current shall not exceed 0,7 mA.

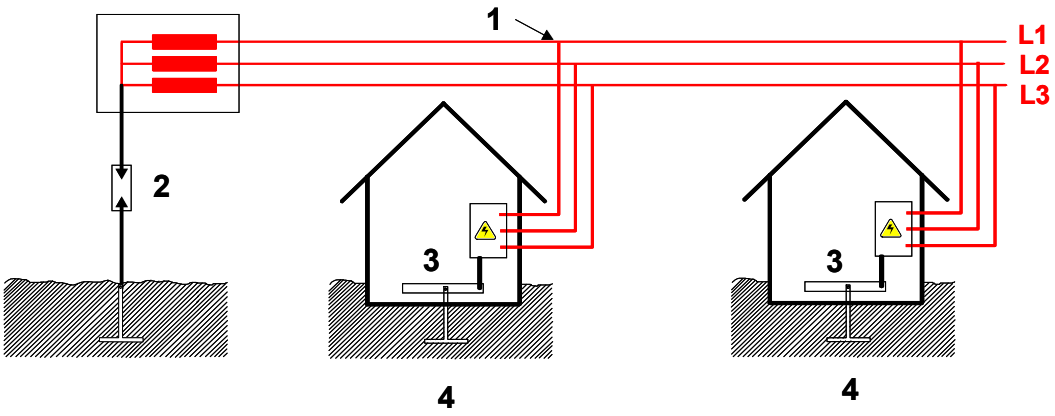
It shall not be possible to touch metallic parts of the galvanic isolator when connected.

6.3 ZA.2 Norway

ZA.2.1 Justification

In most parts of Norway, the AC mains power are built as an IT- or TT-network with a line-to-line voltage of 230 V (see Figure ZA.1).

These types of networks have no N-conductor, and the AC mains power is supplied to the equipment from two of the three line conductors (IEC 60950-1:2005, Annex V).



1 AC power distribution, IT system, line-to-line voltage 230 V	**2** Voltage limiter
3 Equipotential bonding bar	**4** Earth electrode

Figure ZA.1 – IT power distribution system in Norway

For a cable network covering an area with this type of power supply networks, special initiative should be taken to ensure that safety in the cable network is maintained. The following equipotential bonding arrangements described will provide necessary safety in such a network.

ZA.2.2 Equipotential bonding mechanism for cable networks

ZA.2.2.1 Installations in the vicinity of transformer stations

Any earth electrode in a cable network shall preferably be located at a minimum distance of 20 m from the nearest earth electrode in a high-power transformer station (high to mains voltage) (see Figure ZA.2 and ITU-T K.8 or EN 50174-3).

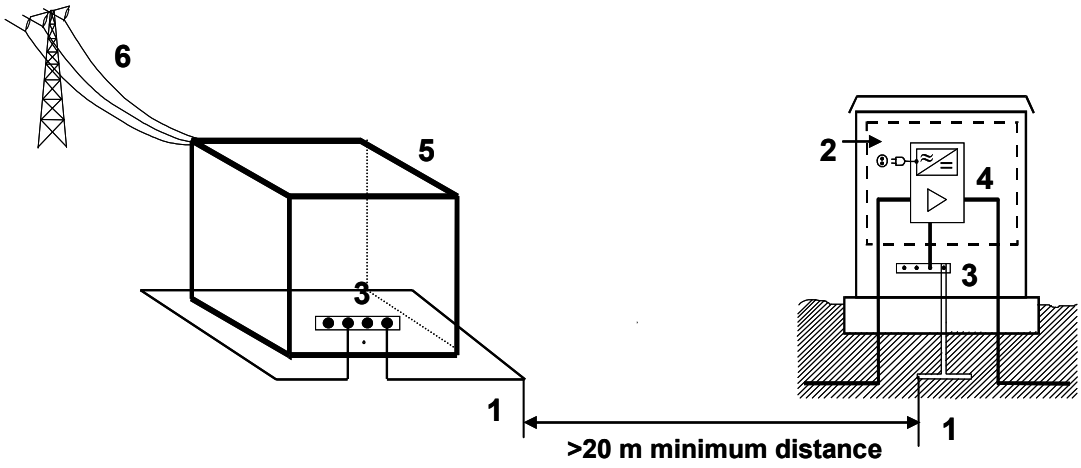
If the above-mentioned distance is less than 20 m, all equipment in the cable network shall be electrically isolated from local earth by mounting the equipment within a non-metallic enclosure, as shown in Figure ZA.3. Mains powered equipment with local power feeding should not be used in this case.

Before any work on the installation is started, measurements shall be carried out to reveal if there are any hazardous voltages between local earth and the earth for the cable network.

The safety sign "Warning about hazardous electrical voltage"  according to sign 7.4 of ISO 3864-1:2002 shall be attached to the non-metallic enclosure.

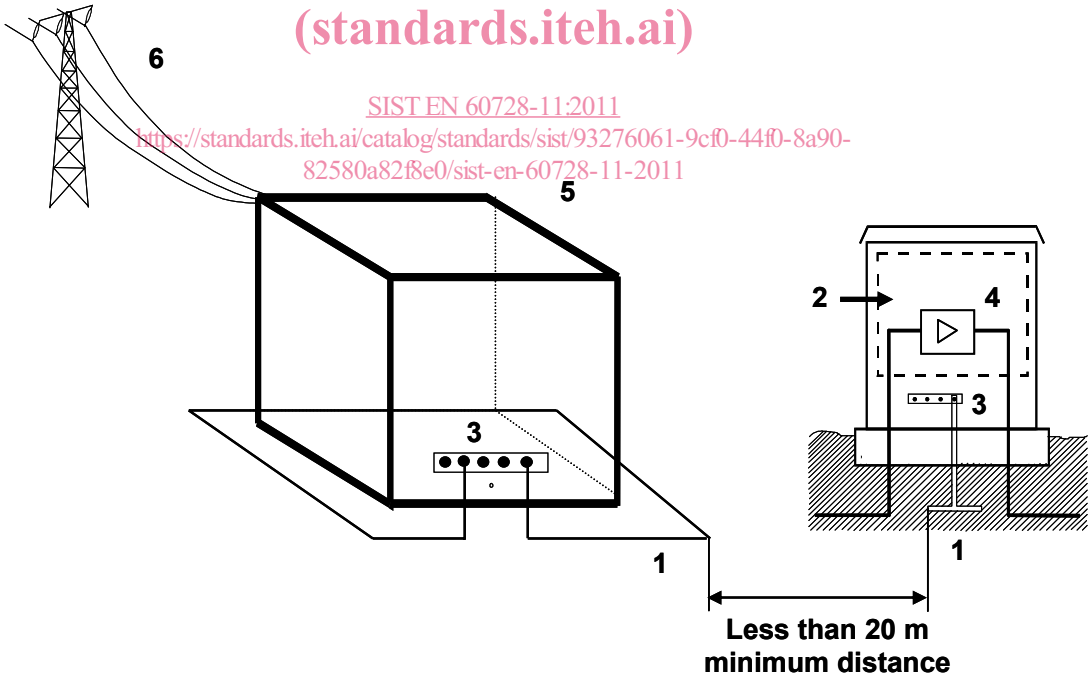
ZA.2.2.2 Cabinets for cable networks located near cabinets/ installations for mains

Cabinets for cable networks placed together with cabinets for mains power distributions should preferably be placed at a minimum of 2 m apart. If the distance is closer than 2 m, a common earth electrode between the cabinets shall be used. Examples of such installations are shown in Figure ZA.4, Figure ZA.5, Figure ZA.6 and Figure ZA.7.



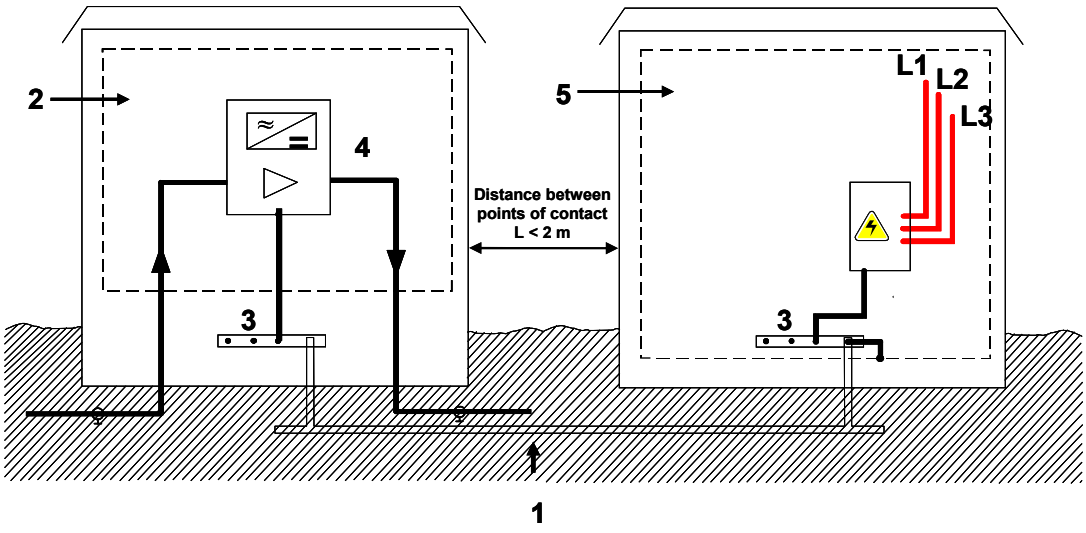
1 Earth electrode	2 Non-metallic enclosure
3 Equipotential bonding bar	4 Mains supplied equipment
5 Transforming station	6 High-voltage power transmission system

Figure ZA.2 – Example of installations located farther than 20 m away from a transforming station



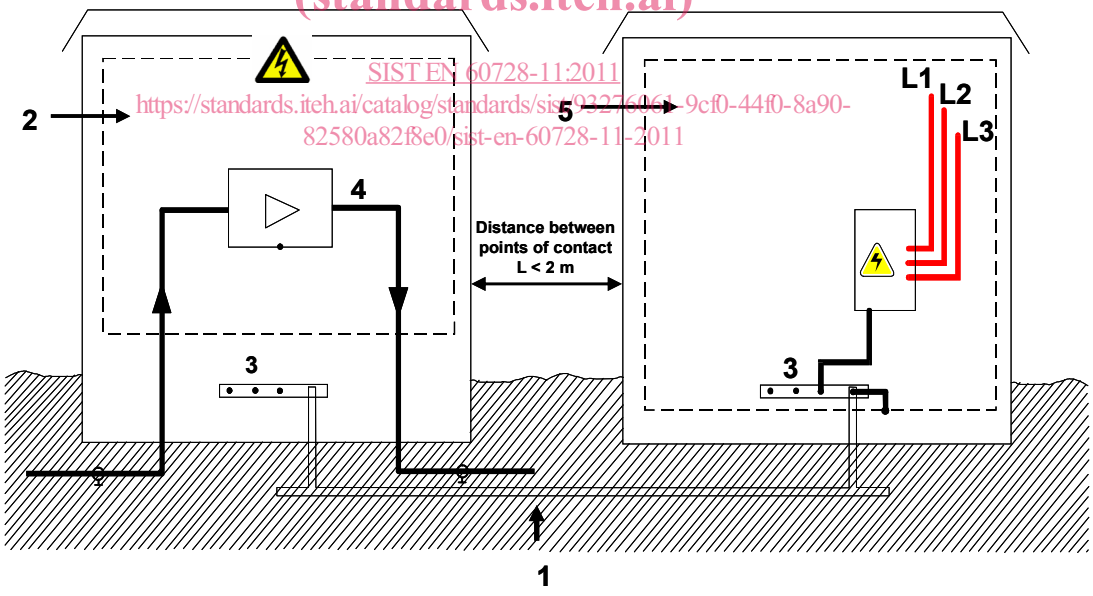
1 Earth electrode	2 Non-metallic enclosure
3 Equipotential bonding bar	4 Remotely supplied equipment
5 Transforming station	6 High-voltage power transmission system

Figure ZA.3 – Example of installations located closer than 20m from a transforming station



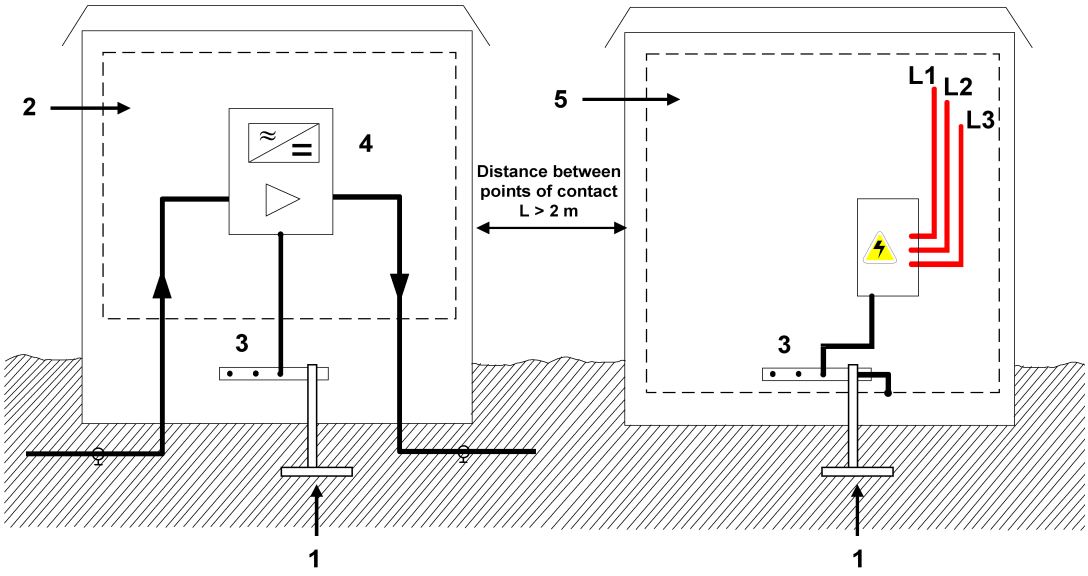
1 Common earth electrode	2 Non-metallic enclosure
3 Equipotential bonding bar	4 Mains supplied equipment
5 Metallic enclosure	

Figure ZA.4 – Example of cabinets for cable network with locally fed equipment and mains placed less than 2 m apart



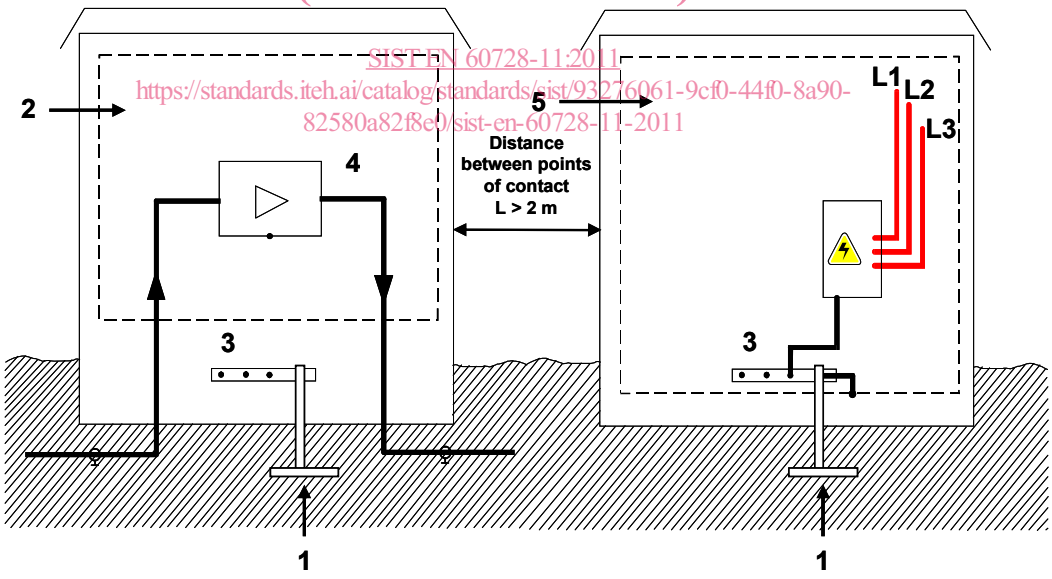
1 Common earth electrode	2 Non-metallic enclosure
3 Equipotential bonding bar	4 Remotely supplied equipment
5 Metallic enclosure	

Figure ZA.5 – Example of cabinets for cable network with remotely fed equipment and mains placed less than 2 m apart



1 Earth electrode	2 Non-metallic enclosure
3 Equipotential bonding bar	4 Mains supplied equipment
5 Metallic enclosure	

Figure ZA.6 – Example of cabinets for cable network with locally fed equipment and mains placed more than 2 m apart

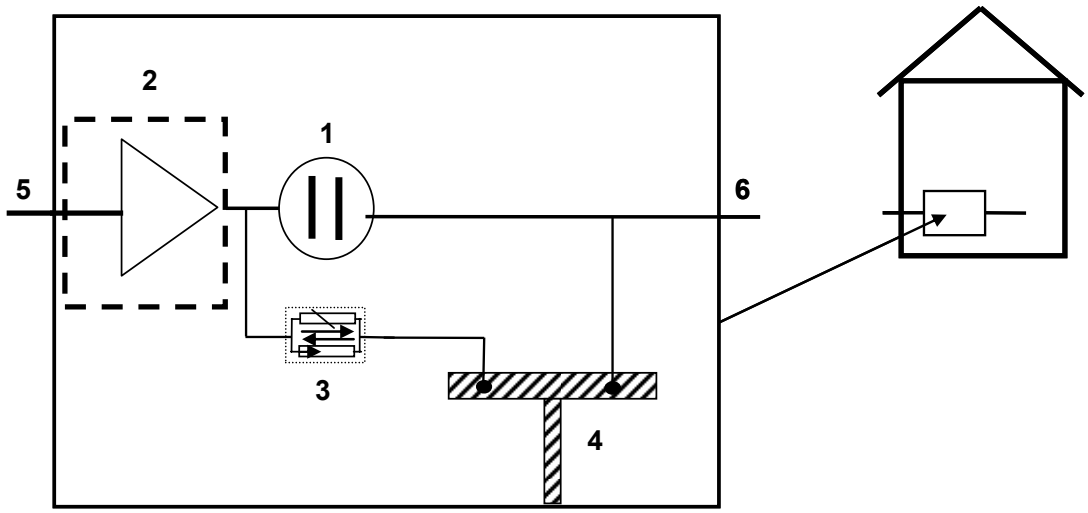


1 Earth electrode	2 Non-metallic enclosure
3 Equipotential bonding bar	4 Remotely supplied equipment
5 Metallic enclosure	

Figure ZA.7 – Example of cabinets for cable network with remotely fed equipment and mains placed more than 2m apart

ZA.2.3 Use of galvanic isolation in a cable network with remote power-feeding

When using galvanic isolation in cable networks with remote power feeding, the amplifier shall be placed in front of the galvanic isolator as shown in Figure ZA.8.



1 Galvanic isolator	2 Non-metallic enclosure
3 Voltage dependent protection device	4 Common earth electrode
5 CATV system	6 House internal cable-TV network

Figure ZA.8 – Example of an installation placing the amplifier in front of the galvanic isolator

A voltage dependent protective device is recommended in order to protect the galvanic isolator from transient voltages.

The amplifier shall be electrically isolated from the local electrical earth. In case the amplifier is mounted close to either local electrical earth or installations connected to local electrical earth, the amplifier shall be placed in such a way that it is not possible to physically touch both the amplifier and the installation without having to remove a cover or other safety arrangements. The covers and amplifiers shall be labelled with the safety sign given under ZA.2.2.1. The covers used shall be designed in such a way that they can only be removed using a key or a special tool.

ZA.2.4 Use of voltage dependent protective device in a cable network.

Network, property and health shall be protected against failure in isolation between infrastructures with different levels of voltage and other unwanted high voltages caused by any kind of high voltage distribution networks or atmospheric discharges.

Depending on the voltages time span, all voltages with local earth as a reference shall be limited according to following values:

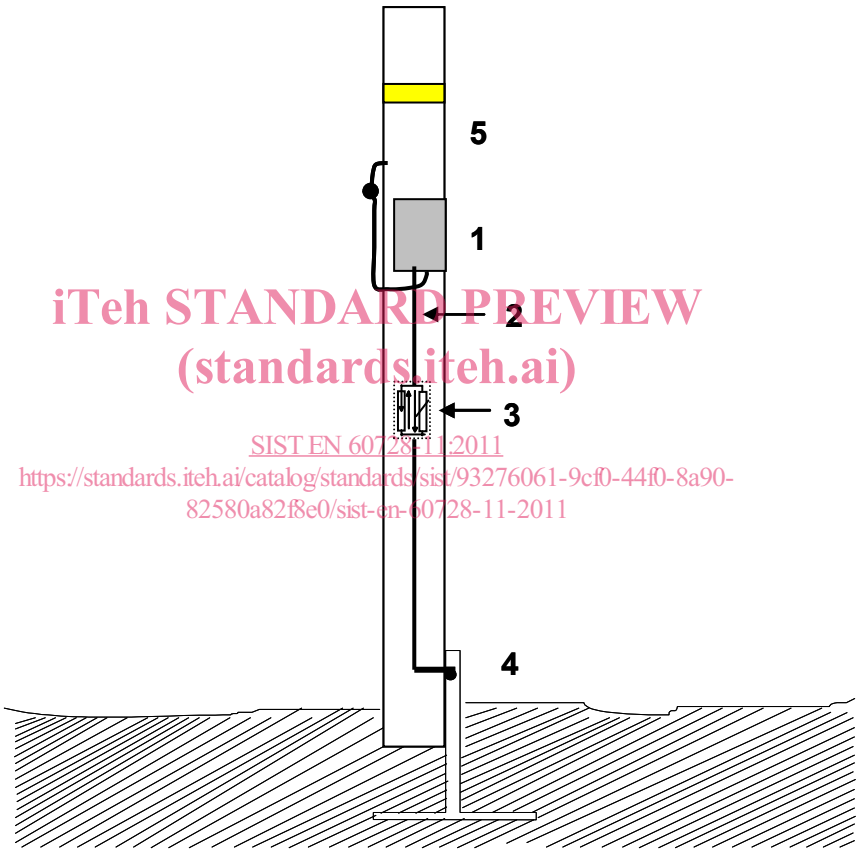
0 to 200 ms	1 030 V
201 to 350 ms	780 V
351 to 500 ms	650 V
501 to 1 000 ms	430 V
1 001 to 2 000 ms	300 V
2 001 to 3 000 ms	250 V

3 001 to 5 000 ms	200 V
5 001 to 10 000 ms	150 V
More than 10 000 ms	60 V

In Norway, network installations with no mains supplied equipment are usually installed isolated from local earth due to difficult ground conditions. When calculations show that the voltage level will rise above 650 V, measures must be taken to reduce the voltage level. This can be done by connecting a voltage dependent device between the network installation and local earth. The voltage dependent device must not connect the installations to local earth in case of a short circuit in mains power.

This implies a safe threshold voltage of 420 V.

Examples of protections using a voltage depending device are shown in Figure 3 and Figure ZA.9.



1 Amplifier / passive equipment	2 Equipotential bonding conductor
3 Voltage dependent protection device	4 Common earth electrode
5 Pylon	

Figure ZA.9 – Example of protection using a voltage depending device on network installations on poles

12.3 ZA.3 Finland

The required wind pressure value is 700 N/m^2 for buildings up to 30 m.

Annex ZB
(informative)

A-deviations

A-deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CENELEC national member.

This European Standard falls under Directive 2006/95/EC.

NOTE (from CEN/CENELEC IR Part 2:2002 , 2.17) Where standards fall under EC Directives, it is the view of the Commission of the European Communities (OJ No C 59, 1982-03-09) that the effect of the decision of the Court of Justice in case 815/79 Cremonini/Vrankovich (European Court Reports 1980, p. 3583) is that compliance with A-deviations is no longer mandatory and that the free movement of products complying with such a standard should not be restricted except under the safeguard procedure provided for in the relevant Directive.

A-deviations in an EFTA-country are valid instead of the relevant provisions of the European Standard in that country until they have been removed.

Clause	Deviation

9 ZB.1 France

(Arrêté interministériel, 2 April 1991)

This regulation specifies, among many other parameters, the minimum distance between electric supply wires (isolated and not isolated, low-voltage and high-voltage) and any other installation (e.g. buildings, antennas, telecommunication lines, etc.).

The main clauses of this regulation which concern the cable networks are Clauses 12, 25, 26, 33, 33bis, 38, 49, 51, 52 and 63.

Clause 9 of this standard specifies distances of 10 mm (indoors) and 20 mm (outdoors) and this is not sufficient to cover overhead cables. As an example, the minimum distance between an overhead telecommunication line and an overhead low-voltage (up to 1 kV) electricity supply line shall be 1 m (Clause 33). This distance may be reduced under specified conditions (Clauses 51, 52 and 63).

This regulation specifies also the minimum distance from high-voltage lines. This distance varies from 1 m to 4 m depending on the voltage, on the isolation of the cable and on the location (built-up area or not) (Clauses 33 and 63)

10.1 ZB.2 United Kingdom

In the UK the use of fully isolated system outlets is obligatory under the terms of the cable operating licence.

11 ZB.3 France

(NF C 15100 - Décret n° 84-74 du 26 janvier 1984 modifié)

The use of TT distribution systems with 300 mA differential switching is not compatible with the interconnection of the earthing of two different buildings.

Annex ZC
(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
-	-	Electrical installations of buildings - Protection against electromagnetic interferences (EMI) in installations of buildings	R 064-004	-
-	-	Coaxial cables	EN 50117	Series
-	-	Lightning Protection Components (LPC) - Part 1: Requirements for connection components	EN 50164-1	-
-	-	Lightning Protection Components (LPC) - Part 2: Requirements for conductors and earth electrodes	EN 50164-2	-
-	-	Information technology - Cabling installation - Part 2: Installation planning and practices inside buildings	EN 50174-2	-
-	-	Application of equipotential bonding and earthing in buildings with information technology equipment	EN 50310	-
IEC 60065 (mod)	2001	Audio, video and similar electronic apparatus - Safety requirements	EN 60065 + corr. August + A11	2002 2007 2008
IEC 60364	Series	Electrical installations of buildings	-	-
IEC 60364-1	-	Low-voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions	HD 60364-1	-
IEC 60364-5-52	-	Low-voltage electrical installations - Part 5-52: Selection and erection of electrical equipment - Wiring systems	HD 60364-5-52	-
IEC 60364-5-54		Electrical installations of buildings - Part 5-54: Selection and erection of electrical equipment - Earthing arrangements, protective conductors and protective bonding conductors	HD 60364-5-54	-
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	-	-
IEC 60617	-	Graphical symbols for diagrams	-	-
IEC 60825-1	-	Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1	2007

Publication	Year	Title	EN/HD	Year
IEC 60825-2	-	Safety of laser products - Part 2: Safety of optical fibre communication systems (OFCS)	EN 60825-2	-
IEC 60950-1 (mod)	2005	Information technology equipment - Safety - Part 1: General requirements	EN 60950-1 + A11	2006 2009
IEC 60990	-	Methods of measurement of touch current and protective conductor current	EN 60990	-
IEC 61140	2001	Protection against electric shock - Common aspects for installation and equipment	EN 61140	2002
IEC 62305	Series	Protection against lightning	EN 62305	Series
IEC 62305-2	2006	Protection against lightning - Part 2: Risk management	EN 62305-2 + corr. November	2006 2006
IEC 62305-3 (mod)	2006	Protection against lightning - Part 3: Physical damage to structures and life hazard	EN 62305-3 + corr. September + corr. November + A11	2006 2008 2006 2009
IEC 62305-4	-	Protection against lightning - Part 4: Electrical and electronic systems within structures	EN 62305-4	-
ISO 3864-1	2002	Graphical symbols - Safety colours and safety signs - Part 1: Design principles for safety signs in workplaces and public areas		-

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