SLOVENSKI STANDARD
SIST EN 50110-1:2013

01-maj-2013

Nadomešča:
SIST EN 50110-1:2007

Obratovanje električnih inštalacij - 1. del: Splošne zahteve

Operation of electrical installations - Part 1: General requirements

Betrieb von elektrischen Anlagen - Teil 1: Allgemeine Anforderungen

Exploitation des installations électriques - Partie 1: Exigences générales

Ta slovenski standard je istoveten z: EN 50110-1:2013

ICS:

29.240.01	Omrežja za prenos in distribucijo električne energije na splošno	Power transmission and distribution networks in general

SIST EN 50110-1:2013 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50110-1

March 2013

ICS 29.240.01

Supersedes EN 50110-1:2004

English version

Operation of electrical installations - Part 1: General requirements

Exploitation des installations électriques - Partie 1: Exigences générales

Betrieb von elektrischen Anlagen - Teil 1: Allgemeine Anforderungen

This European Standard was approved by CENELEC on 2013-02-11. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey 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 50110-1:2013 E

Contents

Page

Foreword

This document (EN 50110-1:2013) has been prepared by CLC/BTTF 62-3 "Operation of electrical installations".

The following dates are fixed:

– latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-02-11
– latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2016-02-11

This document supersedes EN 50110-1:2004.

EN 50110-1:2013 includes the following significant technical changes with respect to EN 50110-1:2004:

– improvement of the definitions of persons responsible and level of responsibility;

– addition of a clause on emergency arrangements;

– addition of example of level of responsibility in Annex B;

– addition of a clause on arc hazard in Annex B;

– addition of a clause on emergency arrangements in Annex B;

– update of the normative references and of the Bibliography.

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.

Introduction

There are many national laws, standards and internal rules dealing with the matters coming within the scope of EN 50110 and these practices have been taken as a basis for this work.

EN 50110 consists of two parts:

– Part 1 of EN 50110 contains minimum requirements valid for all CENELEC countries and some additional informative annexes dealing with safe working on, with, or near electrical installations;

– Part 2 of EN 50110 consists of a set of normative annexes (one per country) which either specify the present safety requirements or give the national supplements to these minimum requirements.

This concept is still believed to be a decisive step to the gradual alignment in Europe of the safety levels associated with the operation of, work activity on, with, or near electrical installations. This document acknowledges the present different national requirements for safety. The intention is, over the course of time, to create a common level of safety.

Even the best rules and procedures are of no value unless all persons working on, with, or near electrical installations are thoroughly conversant with them and with all legal requirements and comply strictly with them.

1 Scope

This European Standard is applicable to all operation of and work activity on, with, or near electrical installations. These are electrical installations operating at voltage levels from and including extra-low voltage up to and including high voltage.

This latter term includes those levels referred to as medium and extra-high voltage.

These electrical installations are designed for the generation, transmission, conversion, distribution and use of electrical power. Some of these electrical installations are permanent and fixed, such as a distribution installation in a factory or office complex, others are temporary, such as on construction sites and others are mobile or capable of being moved either whilst energised or whilst not energised nor charged. Examples are electrically driven excavating machines in quarries or open-cast coal sites.

This European Standard sets out the requirements for the safe operation of and work activity on, with, or near these electrical installations. The requirements apply to all operational, working and maintenance procedures. They apply to all non-electrical work activities such as building work near to overhead lines or underground cables as well as electrical work activities, when there is a risk of electrical danger.

This European Standard does not apply to ordinary persons when using installations and equipment, provided that the installations and equipment comply with relevant standards and are designed and installed for use by ordinary persons.

This European Standard has not been developed specifically to apply to the electrical installations listed below. However, if there are no other rules or procedures, the principles of this European Standard could be applied to them

- on any aircraft and hovercraft moving under its own power; (these are subject to International Aviation laws which take precedence over national laws in these situations);
- on any sea going ship moving under its own power, or under the direction of the master, (these are subject to International Marine laws which take precedence over national laws in these situations);
- electronic telecommunications and information systems;
- electronic instrumentation, control and automation systems;
- at coal or other mines;
- on off-shore installations subject to International Marine laws;
- on vehicles;
- on electric traction systems;
- on experimental electrical research work.

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.

EN 50191, *Erection and operation of electrical test equipment*

EN 61219, *Live working – Earthing or earthing and short-circuiting equipment using lances as short-circuiting device – Lance earthing (IEC 61219)*

EN 61230, *Live working – Portable equipment for earthing or earthing and short-circuiting (IEC 61230)*

EN 61243 (all parts), *Live working – Voltage detectors (IEC 61243, all parts)*

EN 61472, *Live working - Minimum approach distances for a.c. systems in the voltage range 72,5 kV to 800 kV – A method of calculation (IEC 61472)*

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

EN 62271-102, *High-voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches (IEC 62271-102)*

IEC 60050 (all parts), *International Electrotechnical Vocabulary* (available at www.electropedia.org)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050 and the following apply.

NOTE The terms and definitions from IEC 60050 are available online at www.electropedia.org. See also “Electropedia” or “Glossary” on www.iec.ch website.

3.1 General

3.1.1
electrical installation
all the electrical equipment that is used for the generation, transmission, conversion, distribution and use of electrical energy

Note 1 to entry: It includes energy sources such as batteries, capacitors and all other sources of stored electrical energy.

[SOURCE: IEC 60050-651:1999, IEV 651-01-04 modified]

3.1.2
operation
all activities including *work activities* necessary to permit the *electrical installation* to function

Note 1 to entry: These activities include such matters as switching, controlling, monitoring verification of the electrical installation, inspection and maintenance. These activities include both electrical and non-electrical work.

[SOURCE: IEC 60050-651:1999, IEV 651-01-05 modified]

3.1.3
risk
combination of the probability and the degree of the possible injury or damage to health of a person exposed to a hazard or to hazards

[SOURCE: IEC 60050-651:1999, IEV 651-01-31 modified]

3.1.4
electrical hazard
source of possible injury or damage to health in presence of electrical energy from an *electrical installation*

[SOURCE: IEC 60050-651:1999, IEV 651-01-30 modified]

3.1.5
electrical danger
risk of injury from an electrical origin

3.1.6
electrical injury
death or personal injury from electric shock, electric burn, arcing, or from fire or explosion initiated by electrical energy caused by any *operation* of an *electrical installation*

[SOURCE: IEC 60050-651:1999, IEV 651-01-32 modified]

3.2 Personnel, organisation and communication

3.2.1
person responsible for an electrical installation
nominated person with the overall responsibility to ensure the safe *operation* of the *electrical installation* by setting rules and organisation or framework

Note 1 to entry: This person can be the owner, employer, proprietor or a delegated person.

Note 2 to entry: Some of these duties can be delegated to others as required. For large or complex electrical installations or networks, the duties can be delegated for parts of the installations or the network (see 4.3).

Note 3 to entry: See Figure B.1, classification **a)**.

3.2.2
nominated person in control of an electrical installation during work activities
person who is responsible during work activities for the safe *operation* of the *electrical installation*

Note 1 to entry: This person has to judge the possible effects of the work activities on the electrical installation or parts of it which are in his responsibility and the effects of the electrical installation on persons carrying out the work activities. Some of these duties can be delegated to others as required (see 4.3).

Note 2 to entry: See Figure B.1, classification **b).**

3.2.3
nominated person in control of a work activity
person nominated with the ultimate responsibility for the *work activity at work location*

Note 1 to entry: Some of these duties can be delegated to others as required (see 4.3).

Note 2 to entry: See Figure B.1, classification **c).**

[SOURCE: IEC 60050-651:1999, IEV 651-01-36 modified]

3.2.4
skilled person (electrically)
person with relevant education, knowledge and experience to enable him or her to analyse risks and to avoid hazards which electricity could create

[SOURCE: IEC 60050-826:2004, IEV 826-18-01 modified]

3.2.5
instructed person
person adequately advised by a *skilled person* to enable him or her to avoid dangers which electricity may create

[SOURCE: IEC 60050-826:2004, IEV 826-18-02 modified]

3.2.6
ordinary person
person who is neither a *skilled person* nor an *instructed person*

[SOURCE: IEC 60050-826:2004, IEV 826-18-03]

3.2.7
notification
messages or instructions which are either verbal or in writing associated with *operation* of *any electrical installation*

3.3 Working zone

3.3.1
work location
site(s), place(s) or area(s) where a *work activity* is to be, is being, or has been carried out

[SOURCE: IEC 60050-651:1999, IEV 651-01-08 modified]

3.3.2
live working zone
space around live parts in which the insulation level to prevent electrical danger is not assured when reaching into or entering it without protective measures

Note 1 to entry: The outer limit of the live working zone is denoted as the distance D_L (see Figures 1 and 2).

[SOURCE: IEC 60050-651:1999, IEV 651-01-06 modified]

3.3.3
vicinity zone
limited space outside the *live working zone*

Note 1 to entry: The outer limit of the vicinity zone is denoted as the distance D_V (see Figures 1 and 2).

[SOURCE: IEC 60050-651:1999, IEV 651-01-07 modified]

3.4 Working

3.4.1
work activity
any form of *electrical* or *non-electrical work* where there is the possibility of an *electrical hazard*

3.4.2
electrical work
work on, with or near an *electrical installation* such as testing and measurement, repairing, replacing, modifying, extending, erecting, maintaining and inspecting

[SOURCE: IEC 60050-651:1999, IEV 651-01-12 modified]

3.4.3
non-electrical work
work near to an *electrical installation* such as construction, excavation, cleaning, painting, etc.

[SOURCE: IEC 60050-651:1999, IEV 651-01-13 modified]

3.4.4
live working
all work in which a worker deliberately makes contact with live parts or reaches into the *live working zone* with either parts of his or her body or with tools, equipment or devices being handled

Note 1 to entry: At low voltage, live working is carried out by the worker, when making contact with bare live parts. At high voltage, live working is carried out by the worker, when entering the live working zone, regardless of whether contact is made with bare live parts or not.

[SOURCE: IEC 60050-651:1999, IEV 651-01-01 modified]

3.4.5
working in the vicinity of live parts
all *work activity* in which a worker with part of his or her body, with a tool or with any other object enters into the *vicinity zone* without encroaching into the *live working zone*

[SOURCE: IEC 60050-651:1999, IEV 651-01-02 modified]

3.4.6
isolate
disconnect completely a device or circuit from other devices and circuits by creating a physical separation able to withstand the anticipated voltage differences between the device or circuit and other circuits

[SOURCE: IEC 60050-151:2001, IEV 151-15-37 modified]

3.4.7
dead
at or about zero voltage that is without voltage and/or charge present

[SOURCE: IEC 60050-651:1999, IEV 651-01-15 modified]

3.4.8
dead working
work activity on *electrical installations*, which are neither live nor charged, carried out after having taken all measures to prevent *electrical danger*

3.4.9
authorisation
formal approval in writing or instruction

3.4.10
permission to start work
direct instruction to the workers at *work location* to commence work after all safety measures are taken

3.5 Protective devices

3.5.1
screen
any device, which may be insulated or not, which is used to prevent approach to any equipment or part of *electrical installation* which presents *electrical danger*

[SOURCE: IEC 60050-651:1999, IEV 651-01-29 modified]

3.5.2
barrier
part providing protection against direct contact from any usual direction of access

[SOURCE: IEC 60050-826:2004, IEV 826-12-23]

3.5.3
insulating covering
rigid or flexible cover made of insulating material used to cover live and/or unenergised parts and/or adjacent parts in order to prevent accidental contact

3.5.4
enclosure
part providing protection of equipment against certain external influences and, in any direction, protection against direct contact

3.5.5
voltage detector
portable device used to detect reliably the presence or the absence of the operating voltage and used to verify that the installation is ready for earthing

Note 1 to entry: These devices are generally described as either capacitive types or resistive types.

[SOURCE: IEC 60050-651:1999, IEV 651-10-04]

3.5.6
portable equipment for earthing and short-circuiting
equipment that is portable and is manually connected with insulating component(s) to parts of an electrical installation for earthing and short-circuiting purposes

Note 1 to entry: This equipment comprises earthing components, short-circuiting components and one or more insulating components, for instance earthing sticks.

[SOURCE: IEC 60050-651:1999, IEV 651-14-01]

3.6 Nominal voltages

3.6.1
extra-low voltage
ELV
normally not exceeding 50 V alternating current (a.c.) or 120 V ripple free direct current (d.c.) whether between conductors or to earth

Note 1 to entry: This includes SELV, PELV and FELV (see HD 60364-4-41).

[SOURCE: IEC 60050-826:2004, IEV 826-12-30 modified]

3.6.2
low voltage
LV
normally not exceeding 1 000 V a.c. or 1 500 V d.c.

[SOURCE: IEC 60050-151:2001, IEV 151-15-03 modified]

3.6.3
high voltage
HV
normally exceeding 1 000 V a.c. or 1 500 V d.c.

4 Basic principles

4.1 Safe operation

Before carrying out any operation on an electrical installation an assessment of the electrical risks shall be made. This assessment shall specify how the operation shall be carried out and what safety measures and precautions are to be implemented to ensure safety.