SLOVENSKI STANDARD
SIST EN 50110-1:2007

01-januar-2007

Nadomeģļ a:
SIST EN 50110-1:1999

Upravljanje z elektriļ nimi inģtalacijami

Operation of electrical installations

Betrieb von elektrischen Anlagen

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Exploitation des installations électriques

Ta slovenski standard je istoveten z: EN 50110-1:2004

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ICS:

29.240.01	Omreģja za prenos in distribucijo elektriļ ne energije na sploģno	Power transmission and distribution networks in general

SIST EN 50110-1:2007 **en**

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

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EUROPEAN STANDARD **EN 50110-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM November 2004

ICS 29.240.00 Supersedes EN 50110-1:1996

English version

Operation of electrical installations

Exploitation des installations électriques Betrieb von elektrischen Anlagen

This European Standard was approved by CENELEC on 2004-07-01. 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.

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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.

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.

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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

This European Standard was prepared by the CENELEC BTTF 62-3 "Operation of electrical installations".

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50110-1 on 2004-07-01.

This European Standard supersedes EN 50110-1:1996.

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)	2005-07-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2007-07-01

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Introduction

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

The standard consists of two parts. The first part of EN 50110 contains minimum requirements valid for all CENELEC countries and some additional informative annexes dealing with safe working. The second part of EN 50110 consists of a set of normative annexes (one per country) which specify either 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.

EN 50110-1:1996 has been in use now for more than 7 years.

This new edition now integrates the feed-back from those countries which have used this standard.

In those countries with national regulations, all the provisions included in those regulations shall prevail over those indicated in this standard, as far as conflicting aspects are concerned.

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1 Scope

This 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 energized or whilst not energized nor charged. Examples are electrically driven excavating machines in quarries or open-cast coal sites.

This 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 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 standard has not been developed specifically to apply to the electrical installations listed below.

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However, if there are no other rules or procedures, the principles of this standard should be applied to them

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– 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);

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– 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 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 50191	2000	Erection and operation of electrical test equipment
EN 60529	1991	Degree of protection provided by enclosures (IP Code) (IEC 60529:1989)
EN 61472	2004	Live working - Minimum approach distances for a.c. systems in the voltage range 72,5 kV to 800 kV - A method of calculation (IEC 61472:2004)

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HD 384	series	Electrical installations of buildings (IEC 60364 series, mod.)
HD 637 S1	1999	Power installations exceeding 1 kV a.c.
IEC 60050-151	2001	International Electrotechnical Vocabulary Chapter 151: Electrical and magnetic devices
IEC 60050-601	1985	International Electrotechnical Vocabulary Chapter 601: Generation, transmission and distribution of electricity – General
IEC 60050-604	1987	International Electrotechnical Vocabulary Chapter 604: Generation, transmission and distribution of electricity – Operation
IEC 60050-826	1982	International Electrotechnical Vocabulary Chapter 826: Electrical installations of buildings

3 Definitions

For the purposes of this standard, the following definitions apply. Refer to the International Electrotechnical Vocabulary for other terms not defined below.

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3.1 General

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3.1.1
electrical installation
includes all the electrical equipment which provides for the generation, transmission, conversion, distribution and use of electrical energy. It includes energy sources such as batteries, capacitors and all other sources of stored electrical energy

3.1.2
operation
all activities including work activities necessary to permit the electrical installation to function. These activities include such matters as switching, controlling, monitoring and maintenance as well as both electrical and non-electrical work

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

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

3.1.5
electrical danger
risk of injury from an electrical installation

3.1.6
injury (electrical)
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

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3.2 Personnel, organization and communication

3.2.1
nominated person in control of a work activity
nominated person with ultimate responsibility for the work activity. Some of these duties can be delegated to others as required

3.2.2
nominated person in control of an electrical installation
nominated person with ultimate responsibility for the operation of the electrical installation. Some of these duties can be delegated to others as required

3.2.3
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

[IEV 195/4/1, modified]

3.2.4
instructed person
person adequately advised by skilled persons to enable him or her to avoid dangers which electricity may create

[IEV 826-09-02, modified]

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3.2.5
ordinary person
person who is neither a skilled person nor an instructed person

[IEV 826-09-03]

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3.2.6
notification
mess000ages 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

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 (see Figures 1 and 2)

[IEV 651-01-06, modified]

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

3.3.3
vicinity zone
limited space outside the live working zone (see Figures 1 and 2)

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

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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

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

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

[IEV 651-01-01, modified]

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

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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

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3.4.6
isolate
to 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

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

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

3.5 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

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

[IEV 826-03-13]

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3.5.3
insulating covering
rigid or flexible cover made of insulating material used to cover live and/or unenergized 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

[IEV 826-03-12]

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, this includes SELV, PELV and FELV (see HD 384.4.41 S2, section 411)

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

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

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4 Basic principles

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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.

4.2 Personnel

The responsibilities placed upon persons for the safety of those engaged in a work activity and those who are or may be affected by the work activity shall be in accordance with national legislation.

All personnel involved in a work activity on, with, or near an electrical installation shall be instructed in the safety requirements, safety rules and company instructions applicable to their work. These instructions shall be repeated during the course of the work where the work activity is of long duration or is complex. The personnel involved shall be required to comply with these requirements, rules and instructions.

Personnel shall wear clothing suitable for the locations and conditions where they are working. This could include the use of close-fitting clothing or additional PPE (personal protective equipment).

Before any work activity is started and during that work activity, the nominated person in control of that work activity shall ensure that all relevant requirements, rules and instructions are complied with.

The nominated person in control of the work activity shall instruct all persons engaged upon the work activities of all reasonably foreseeable dangers that are not immediately apparent to them.

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No person shall undertake any work activity where technical knowledge or experience is needed to prevent electrical danger or injury, unless that person has such technical knowledge or experience, or is under such supervision as is necessary for the work undertaken.

National legislation can set out the minimum age and the criteria for competence of persons.

Where there are no national requirements for competence, the following criteria shall be used in assessing the competence of persons:

– knowledge of electricity;
– experience of electrical work;
– understanding of the installation to be worked on and practical experience of that work;
– understanding the hazards which can arise during the work and the precautions to be observed;
– ability to recognize at all times whether it is safe to continue working.

The complexity of the work activity shall be assessed before the activity starts such that the appropriate choice of skilled, instructed, or ordinary person is made for carrying out the work activity.

4.3 Organization

Each electrical installation shall be placed under the responsibility of a person, the nominated person in control of the electrical installation.

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Where two or more installations come together, it is essential that there are formal arrangements for consultation and cooperation between the nominated persons in control of each of those installations to ensure safety.

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Access to all places where ordinary persons are exposed to electrical hazards shall be regulated. The method of regulation and control of access shall be the responsibility of the nominated person in control of the installation and shall comply with any national requirements.

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Each work activity shall be the responsibility of the nominated person in control of the work activity. Where the work activity is subdivided it may be necessary to nominate a person to be responsible for the safety of each subdivision, all under the responsibility of one coordinating person.

The nominated person in control of the work activity and the nominated person in control of the electrical installation shall agree both the arrangements of the electrical system to allow the work to take place and a description of the work activity on, with or near the electrical installation before any changes to the arrangements of the electrical installation are made or work takes place.

The nominated person in control of the work activity and the nominated person in control of the electrical installation can be one and the same person.

Where the work activity is complex, the preparation shall be made in a written form.

A skilled person can specify how the work shall be carried out safely

a) in non-complex installations or non-complex parts of installations under clearly understood or non-complex circumstances, and

b) where non-complex work activities are to take place, or

c) in maintenance work, which is done according to agreed procedures.