SLOVENSKI STANDARD
SIST EN 50274:2002

01-september-2002

Sestavi nizkonapetostnih stikalnih in krmilnih naprav - Zaščita pred električnim udarom - Zaščita pred nenamernim neposrednim stikom z nevarnimi deli pod napetostjo (vsebuje popravek AC:2009)

Low-voltage switchgear and controlgear assemblies - Protection against electric shock - Protection against unintentional direct contact with hazardous live parts

Niederspannungs-Schaltgerätekombinationen - Schutz gegen elektrischen Schlag - Schutz gegen unabsichtliches direktes Berühren gefährlicher aktiver Teile

Ensembles d'appareillage à basse tension - Protection contre les chocs électriques - Protection contre le contact direct involontaire avec des parties actives dangereuses

Ta slovenski standard je istoveten z: **EN 50274:2002**

ICS:

13.260	Varstvo pred električnim udarom. Delo pod napetostjo	Protection against electric shock. Live working
29.130.20	Nizkonapetostne stikalne in krmilne naprave	Low voltage switchgear and controlgear

SIST EN 50274:2002 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50274

April 2002

ICS 29.120.60

Incorporates corrigendum July 2009

English version

Low-voltage switchgear and controlgear assemblies - Protection against electric shock - Protection against unintentional direct contact with hazardous live parts

Ensembles d'appareillage à basse tension - Protection contre les chocs électriques - Protection contre le contact direct involontaire avec des parties actives dangereuses

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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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Ref. No. EN 50274:2002 E

Foreword

This European Standard has been prepared by WG 3 of Technical Committee CENELEC TC 17D, Low-voltage switchgear and controlgear assemblies. It is intended as a complementary document to EN 60439-1. EN 60439-1 does not address in detail the issue of protection of skilled and instructed persons from electric shock when they are required to gain access into the assembly to manually operated devices. The intent of this standard is to provide additional requirements for the protection of these persons against electric shock.

The text of the draft has been submitted to the formal vote and was approved by CENELEC as EN 50274 on 2002-02-01.

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)	2003-02-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2005-02-01

Annexes designated "informative" are given for information only.
In this standard, annex A is informative.

The contents of the corrigendum of July 2009 have been included in this copy.

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Introduction

Within the European Community there are a number of Directives which impact upon electrical equipment including switchgear and controlgear assemblies with regard to the health and safety of the users and others when at work. The Framework Directive (89/391/EEC) on Health and Safety sets out in article 6 - General Obligations on Employers. These include a set of criteria to be observed. This listing is in a preferred order, and in the case of switchgear and controlgear assemblies and their operation, the intent can be summarised as follows.

a) Remove the danger - in the case of assemblies where access inside for the operation of certain devices is required, this can be achieved by either isolating the assembly before entry is permitted or ensuring that the degree of protection of these devices and the accessible surrounding areas is not less than IPXXB according to EN 60529. For assemblies located in areas set apart with access restricted to skilled and instructed persons the assembly can be isolated before access is permitted or the operating device has a degree of protection of not less than IPXXB according to EN 60529.

   Or if this is not possible

b) Separate the person from the danger by means of screens, barriers or obstacles.

   This standard sets out requirements according to b) for assemblies where the measures for the protection of persons as set out in a) above cannot be achieved.

   Or if this is not possible

c) Provide personal protective equipment to ensure the health and safety of the person – this is a measure of last resort and is not considered suitable for these assemblies.

In addition, the requirements set out in both the Low Voltage Directive (73/23/EEC) and the use of Work Equipment Directive (89/655/EEC) together with both of their Amending Directives (93/68/EEC and 95/63/EEC) need to be observed. The particular article of the LVD to be considered is article 2 together with clauses 1 and 2 of annex 1.

Within the use of Work Equipment Directive, article 3 is particularly relevant to the design and construction of switchgear and controlgear assemblies. Controls of any description should be sited in locations such that when they are actuated, the operator is not exposed to any danger nor risks to health.

The preferred approach is to ensure that the assembly has a degree of protection not less than IPXXB at the operating faces. Alternatively, the assembly should be designed and constructed so that the controls are set apart in a safe location within the assembly where there are no hazardous live parts. It should be noted that the Basic Safety Publication (EN 61140) sets a minimum level of protection against electric shock of IPXXB for equipment.

1 Scope

This standard applies to low-voltage switchgear and controlgear assemblies with a rated voltage not exceeding AC 1 000 V or DC 1 500 V. It sets out the requirements for the provision of additional features to provide protection against electric shock from direct contact with hazardous live parts only for skilled and instructed persons when they are required to manually actuate devices within the assembly and where a level of protection for the operating face of not less than IPXXB cannot be achieved. These devices are those only accessible via a door or cover requiring a key or tool to open it or in an assembly located in an area set apart and where the access to that area is restricted solely to skilled or instructed persons.

This standard does not apply to

– manually operated devices and their locations where access is available to ordinary persons,

– low-voltage switchgear and controlgear assemblies where the operating voltage does not exceed AC 50 V or DC 120 V and there is protective separation, in accordance with EN 61140, between these circuits and any other circuits,

NOTE Voltages generated by means of auto-transformers, potentiometers, semiconductor components etc. do NOT meet these requirements.

– low-voltage switchgear and controlgear assemblies where protection of persons is provided by limitation of steady-state touch current or charge in accordance with EN 61140.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies (including amendments).

EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

EN 61032, *Protection of persons and equipment by enclosures – Probes for verification (IEC 61032)*

EN 61140, *Protection against electric shock – Common aspects for installation and equipment (IEC 61140)*

IEC 60050-195, *International Electrotechnical Vocabulary – Part 195: Earthing and protection against electric shock*

IEC 60050-826, *International Electrotechnical Vocabulary – Part 826: Electrical installations of buildings*

3 Definitions

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

3.1
low-voltage switchgear and controlgear assembly (ASSEMBLY)
a combination of one or more low-voltage switching devices together with associated control, measuring, signalling, protective, regulating equipment, etc., completely assembled under the responsibility of the manufacturer with all internal electrical and mechanical interconnections and structural parts

3.2
hazardous live part
live part which, under certain conditions, can give a harmful electric shock [IEV 195-06-05]

3.3
operating device
actuator (e.g. pushbutton, toggle) and replaceable warning or protective device (e.g. screw plug fuse, flashing light) which serves to operate, protect or indicate the operating status of an equipment or installation

3.4
protection against unintentional direct contact
protection of skilled and/or instructed persons against unintentional direct contact of hazardous live parts

NOTE Hazardous live parts are protected so as to prevent unintentional direct contact with fingers, hands, arms or other parts of the body of an operator while actuating operating devices.

3.5
space of protection
space designated in an assembly where skilled and/or instructed persons can activate the operating devices without danger; defined by the base area around the operating device and by the access area in front of the operator

NOTE Space of protection is shown in Figure 2.

3.6
base area
area limiting the operating space at the side of the operating device

NOTE Base area is shown in Figure 3.

3.7
access area
area limiting the operating space at the operator's side

NOTE Access area is shown in Figures 3, 4 and 5.

3.8
finger protection
protection against access to hazardous live parts with a finger

3.9
back of the hand protection
protection against access to hazardous live parts with the back of a hand

3.10
obstacle
a part preventing unintentional direct contact, but not preventing direct contact by deliberate action [IEV 826-03-14]

3.11
mounting height
distance between the standing area of the operator and the mid point of the actuation

3.12
operating outline
envelope defined by all positions of motion and rest of the operating device

3.13
(electrically) skilled person
person with relevant education and experience to enable him or her to perceive risks and to avoid hazards which electricity can create [IEV 195-04-01]

3.14
(electrically) instructed person
person adequately advised or supervised by electrically skilled persons to enable him or her to perceive risks and to avoid hazards which electricity can create [IEV 195-04-02]

4 Requirements

4.1 General requirements

The operating devices shall be designed and positioned in such a way that they can be reached and actuated without unintentional direct contact of hazardous live parts.

4.2 Positioning of operating devices

The positioning of operating devices shall allow activation in a standing or kneeling position.

The permissible area for locating of operating devices is shown in Figure 1.

The permissible area for locating can be extended in exceptional cases, if a suitable safe standing area can be provided.

Subject to agreement between the manufacturer and user, alternative arrangements for the location of operating devices can be specified provided there is a suitable safe standing area.

4.3 Measures

The required protection shall be ensured by one of the following measures, or their combination as appropriate:

– functional design of the equipment to be mounted in the operating space;

– distances between operating devices and hazardous live parts;

– obstacles protected against unintentional displacement or removal.

Precautions against intentional contact are not required.

4.4 Space of protection

Hazardous live parts located at least partially in the operating space shall have a degree of protection of not less than IPXXA (back of the hand protected), but see 4.5.

The position and the dimensions of the operating space depend on the geometrical characteristics, location and type of the operating devices as well as the service position of the operator ("standing" or "kneeling", see Figure 2).

The allocation of the base area (see Figures 3 and 4) to an operating device, depends on the type of activation and the size of the operating device.

The access area depends on the service position of the operator (see Figure 2). The nominal distance between the base area and the access area is taken as 500 mm.

The minimum/maximum height of the base area shall be as follows (see Figure 2):

kneeling position: 200 mm / 1 200 mm

standing position: 800 mm / 1 800 mm and
above 1 800 mm up to 2 000 mm with reduced mounting depth

In case of access to operating devices being located on the side wall of the assembly, the operating space is limited to 300 mm x 300 mm (see Figure 5). Other restrictions of the operating space shall meet the requirements of 4.5 and 4.6.

4.5 Base area

The base area shall have a back of the hand protection and shall have a part with finger protection in the immediate vicinity of the operating device (see Figures 3, 4 and 5).