

## SLOVENSKI STANDARD SIST EN 62271-102:2002

01-september-2002

BUXca Yý U.

**SIST EN 60129:1995** 

SIST EN 60129:1995/A2:2001

**SIST EN 61129:1995** 

SIST EN 61129:1995/A1:2001

SIST EN 61259:1995

High-voltage switchgear and controlgear - Part 102: High-voltage alternating current disconnectors and earthing switches

### iTeh STANDARD PREVIEW

High-voltage switchgear and controlgear a Part 102: Alternating current disconnectors and earthing switches

SIST EN 62271-102:2002

Hochspannungs-Schaltgeräte - 102: Wechselstrom-Trennschalter und - Erdungsschalter

Appareillage à haute tension -- Partie 102: Sectionneurs et sectionneurs de terre à courant alternatif

Ta slovenski standard je istoveten z: EN 62271-102:2002

ICS:

29.130.10 Visokonapetostne stikalne in High voltage switchgear and

krmilne naprave controlgear

SIST EN 62271-102:2002 en

SIST EN 62271-102:2002

# iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>SIST EN 62271-102:2002</u> https://standards.iteh.ai/catalog/standards/sist/a6fd1f3e-1e40-4de1-b075-d3967c6deb61/sist-en-62271-102-2002

### **EUROPEAN STANDARD**

### EN 62271-102

NORME EUROPÉENNE

**EUROPÄISCHE NORM** 

July 2002

ICS 29.130.10;29.130.99

Supersedes EN 60129:1994 + A1:1994 + A2:1996; EN 61129:1994 + A1:1995 and EN 61259:1994

English version

High-voltage switchgear and controlgear Part 102: High-voltage alternating current disconnectors and earthing switches

(IEC 62271-102:2001 + corrigendum 2002)

Appareillage à haute tension Partie 102: Sectionneurs et sectionneurs de terre à courant alternatif haute tension (CEI 62271-102:2001 Hochspannungs-Schaltgeräte
Teil 102: Hochspannungs-WechselstromTrennschalter und -Erdungsschalter
(IEC 62271-102:2001

+ corrigendum 2002) Teh STANDARD Pt Corrigendum 2002)

(standards.iteh.ai)

<u>SIST EN 62271-102:2002</u> https://standards.iteh.ai/catalog/standards/sist/a6fd1f3e-1e40-4de1-b075-d3967c6deb61/sist-en-62271-102-2002

This European Standard was approved by CENELEC on 2002-03-05. 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

## **CENELEC**

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

- 2 -

#### **Foreword**

The text of document 17A/617/FDIS, future edition 1 of IEC 62271-102, prepared by SC 17A, High-voltage switchgear and controlgear, of IEC TC 17, Switchgear and controlgear, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62271-102 on 2002-03-05.

This European Standard supersedes the European Standards EN 60129:1994 + A1:1994 + A2:1996 , EN 61129:1994 + A1:1995 and EN 61259:1994.

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) 2005-03-01

This European Standard is to be used in conjunction with EN 60694:1996 to which it refers and which is applicable, unless otherwise specified. In order to simplify the indication of corresponding requirements, the same numbering of clauses and subclauses is used as in EN 60694. Additional subclauses are numbered from 101.

Annexes designated "normative" are part of the body of the standard. Annexes designated "informative" are given for information only. In this standard, annexes A, B, C, E, F and ZA are normative and annex D is informative. Annex ZA has been added by CENELEC.

The numbering of the standards falling under the responsibility of IEC/SC 17A and IEC/SC 17B will apply the following principle tips://standards.iteh.ai/catalog/standards/sist/a6fd1f3e-1e40-4de1-b075-d3967c6deb61/sist-en-62271-102-2002

- a) Common standards prepared by SC 17A and SC 17C will start with IEC 62271-001;
- b) Standards of SC 17A will start with IEC 62271-100;
- c) Standards of SC 17C will start with IEC 62271-200;
- d) Guides prepared by SC 17A and SC 17C will start with IEC 62271-300.

The following table provides an overview of the relationship between the old and the new numbering of standards falling under the responsibility of CLC/TC 17A and CLC/TC 17C.

IEC 62271/ EN 62271	High-voltage switchgear and controlgear –		Number of previous standard, if any	
Part	Orignal title	IEC	EN/HD	
1	Common specifications	60694; 60517	EN 60694; EN 60517	
100	High-voltage alternating circuit-breakers	60056	HD 348, mod.	
101	Synthetic testing of high-voltage alternating current circuit-breakers	60427	EN 60427	
102	Alternating current disconnectors and earthing switches	60129	EN 60129	
103	Switches for rated voltages above1 kV and less than 52 kV	60265-1	EN 60265-1	
104	High-voltage switches for rated voltages of 52 kV and above	60265-2	EN 60265-2	
105	High-voltage alternating current switch-fuse combinations	60420	EN 60420	
106	High-voltage alternating current contactors and contactor-based motor-starters	60470	EN 60470	
107	High-voltage alternating current switchgear-fuse combinations	New		
108	Switchgear having combined functions	New		
200	A.Cmetal enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV T A N D A R D P R V I R V	60298	EN 60298	
201	A.Cinsulation -enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 38 kytandards.iteh.al	60466		
202	High-voltage/low-voltage prefabricated substations	61330	EN 61330	
203	Gas-insulated metal-enclosed switchgear for rated voltages of 72,5 kV and above https://standards.iteh.ai/catalog/standards/sist/a6fd1ße-1e40-4de1-b075-	60517; 61259	EN 60517; EN 61259	
204	Rigid high-voltage gas-insulated transmission lines for rated voltages of 72,5 kV and above	61640		
300	Guide for seismic qualification of high-voltage alternating current circuit-breakers	61166	EN 61166	
301	High-voltage alternating current circuit-breakers - Inductive load switching	61233		
302	High-voltage alternating current circuit-breakers - Guide for short-circuit and switching test procedures for metal-enclosed and dead tank circuit-breakers	61633		
303	High-voltage switchgear and controlgear - Use and handling of sulphur hexafluoride (SF <sub>6</sub> ) in high-voltage switchgear and controlgear	61634		
304	Additional requirements for enclosed switchgear and controlgear from 1 kV to 72,5 kV to be used in severe climatic conditions	60932		
305	Cable connections for gas-insulated metal-enclosed switchgear for rated voltages of 72,5 kV and above - Fluid-filled and extruded insulation cables - Fluid-filled and dry type cable-terminations	60859		
306	Direct connection between power transformers and gas-insulated metal-enclosed switchgear for rated voltages of 72,5 kV and above	61639		
307	High-voltage switchgear and controlgear - The use of electronic and associated technologies in auxiliary equipment of switchgear and controlgear	62063		
308	High-voltage alternating current circuit-breakers - Guide for asymmetrical short-circuit breaking test duty T100a	62215		

EN 62271-102:2002

- 4 -

#### **Endorsement notice**

The text of the International Standard IEC 62271-102:2001 and its corrigendum April 2002 was approved by CENELEC as a European Standard without any modification.

iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>SIST EN 62271-102:2002</u> https://standards.iteh.ai/catalog/standards/sist/a6fd1f3e-1e40-4de1-b075-d3967c6deb61/sist-en-62271-102-2002

### Annex ZA

(normative)

# Normative references to international publications with their corresponding European publications

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).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	EN/HD	<u>Year</u>
IEC 60137	1995	Insulated bushings for alternating voltages above 1 kV	EN 60137	1996
IEC 60265-1	1998	High-voltage switches Part 1: Switches for rated voltages above 1 kV and less than 52 kV	EN 60265-1	1998
IEC 60265-2 + corr. February	19 <mark>88</mark> 1990	Part 2: High-voltage switches for rated voltages of 52 kV and above	EN 60265-2	1993
IEC 60298	1990 https://str	A.C. metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV and arcatalog standards six a full Be-1e40-4c	EN 60298 <sup>1)</sup> + A11	1996 1999
IEC 60466	1987	A.C. insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 38 kV	-	-
IEC 60517	1990	Gas-insulated metal-enclosed switchgear for rated voltages of 72,5 kV and above	EN 60517 <sup>2)</sup> + A11	1996 1999
IEC 60694	1996	Common specifications for high-voltage switchgear and controlgear standards	EN 60694 + corr. May	1996 1999
IEC 60865-1	1993	Short-circuit currents – Calculation of effects Part 1: Definitions and calculation methods	-	-
ISO 2768-1	1989	General tolerances Part 1: Tolerances for linear and angular dimensions without individual tolerance indications	EN 22768-1	1993

<sup>1)</sup> EN 60298 includes corrigendum April 1995 and A1:1994 to IEC 60298:1990.

<sup>2)</sup> EN 60517 includes corrigendum April 1995 and A1:1994 to IEC 60517:1990.

SIST EN 62271-102:2002

# iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>SIST EN 62271-102:2002</u> https://standards.iteh.ai/catalog/standards/sist/a6fd1f3e-1e40-4de1-b075-d3967c6deb61/sist-en-62271-102-2002

# NORME INTERNATIONALE INTERNATIONAL STANDARD

CEI IEC 62271-102

> Première édition First edition 2001-12

Appareillage à haute tension -

Partie 102: Sectionneurs et sectionneurs de terre à courant alternatif

### iTeh STANDARD PREVIEW

High-voltage switch gear and controlgear -

Part 102:SIST EN 62271-102:2002

Alternating current disconnectors and earthing switches

© IEC 2003 Droits de reproduction réservés — Copyright - all rights reserved

Aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'éditeur.

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



CODE PRIX PRICE CODE



### CONTENTS

FO	REWOR	D	13
1	Genera	ıl	21
	1.1	Scope	
	1.2	Normative references	
2		and special service conditions	
3		ons	
J		General terms	
	3.1 3.2		
	3.2	Assemblies of switchgear and controlgear  Parts of assemblies	
	3.4	Switching devices	
	_	Parts of switching devices	
	3.5 3.6	•	
	3.7	Operation	
4		S	
4	•		
	4.1	Rated voltage $(U_r)$	
	4.2	Rated insulation level	
	4.3	Rated frequency (f <sub>r</sub> )	37
	4.4		
	4.5	Rated short-time withstand current (1/2).iteh.ai	
	4.6	Rated peak withstand current (I <sub>p</sub> )	
	4.7	Rated duration of short-circuit (v <sub>k</sub> )2271.102.2002	39
	4.8	Rated supply voltage of closing and opening devices and of auxiliary and control circuits $(U_a)$ d3967c6deb61/sist-en-62271-102-2002	39
	4.9	Rated supply frequency of closing and opening devices and of auxiliary circuits	39
	4.10	Rated pressure of compressed gas supply for insulation and/or operation	39
	4.101	Rated short-circuit making current	39
	4.102	Rated contact zone	39
	4.103	Rated mechanical terminal load	41
	4.104	Rated values of the bus-transfer current switching capability of disconnectors	43
	4.105	Rated values of the induced current switching capability of earthing switches	45
	4.106	Rated values of mechanical endurance for disconnectors and earthing switches	45
	4.107	Rated values of electrical endurance for earthing switches	45
5	Design	and construction	
	5.1	Requirements for liquids in disconnectors and earthing switches	45
	5.2	Requirements for gases in disconnectors and earthing switches	
	5.3	Earthing of disconnectors and earthing switches	
	5.4	Auxiliary and control equipment	
	5.5	Dependent power operation	
	5.6	Stored energy operation	
	5.7	Independent manual operation	

	5.8	Operation of releases	47
	5.9	Low- and high-pressure interlocking and monitoring devices	47
	5.10	Nameplates	47
	5.11	Interlocking devices	49
	5.12	Position indication	49
	5.13	Degree of protection by enclosures	49
	5.14	Creepage distances	51
	5.15	Gas and vacuum tightness	51
	5.16	Liquid tightness	51
	5.17	Flammability	51
	5.18	Electromagnetic compatibility (EMC)	51
	5.101	Special requirements for earthing switches	51
	5.102	Requirements in respect of the isolating distance of disconnectors	51
	5.103	Mechanical strength	53
	5.104	Operation of disconnectors and earthing switches— Position of the movable contact system and its indicating and signalling devices	53
	5.105	Maximum force required for manual operation	55
	5.106	Dimensional tolerances	55
6	Type t	ests	57
	6.1	General	57
	6.2	Dielectric tests.h.S.T.A.N.D.A.R.D. P.R.E.V.IE.W.	59
	6.3	Radio interference voltage (riv) test	63
	6.4	Radio interference voltage (riv) test	
	6.5	Temperature-rise tests	63
	6.6	Short-time withstand current and peak withstand current tests	63
	6.7	Verification of the protection b61/sist-en-62271-102-2002	69
	6.8	Tightness tests	69
	6.9	Electromagnetic compatibility tests (EMC)	69
	6.101	Test to prove the short-circuit making performance of earthing switches	69
	6.102	Operating and mechanical endurance tests	71
	6.103	Operation under severe ice conditions	79
	6.104	Operation at the temperature limits	83
	6.105	Test to verify the proper functioning of the position indicating device	85
	6.106	Bus-transfer current switching tests	85
	6.107	Induced current switching tests	85
	6.108	Bus-charging switching tests	85
7	Routin	e tests	85
	7.1	Dielectric test on the main circuit	85
	7.2	Dielectric test on auxiliary and control circuits	87
	7.3	Measurement of the resistance of the main circuit	87
	7.4	Tightness test	87
	7.5	Design and visual checks	87
	7.101	Mechanical operating tests	87

8	Guide	to the selection of disconnectors and earthing switches	89
	8.101	General	89
	8.102	Selection of rated values for normal service conditions	89
9	Inform	ation to be given with enquiries, tenders and orders	95
	9.101	Information to be given with enquiries and orders	95
	9.102	Information to be given with tenders	99
10	Rules	for transport, storage, installation, operation and maintenance	101
	10.1	Conditions during transport, storage and installation	101
	10.2	Installation	
	10.3	Operation	101
	10.4	Maintenance	103
11	Safety		103
	11.1	Electrical aspects	103
	11.2	Mechanical aspects	
	11.3	Thermal aspects	103
	11.4	Operation aspects	103
۸	aav A (m	powerstive). Decime and testing of position indicating devices	447
Anı	`	normative) Design and testing of position indicating devices	
	A.1	General	
	A.2	Normal and special service conditions	117
	A.3	Definitions	11/
	A.4		
	A.5	Design and construction	119
	A.6 A.7	Type tests  https://standards.iteh.ai/catalog/standards/sist/a6fd1f3e-1e40-4de1-b075-  Routine tests  d3967c6deb61/sist-en-62271-102-2002	119
		d396/c6deb61/sist-en-622/1-102-2002	
Anı	nex B (r	normative) Bus-transfer current switching by disconnectors	127
	B.1	General	127
	B.2	Normal and special service conditions	127
	B.3	Definitions	127
	B.4	Ratings	129
	B.5	Design and construction	129
	B.6	Type tests	131
Anı	nex C (r	normative) Induced current switching by earthing switches	141
	C.1	General	141
	C.2	Normal and special service conditions	
	C.3	Definitions	
	C.4	Ratings	
	C.5	Design and construction	
	C.6	Type tests	
		nformative) Test voltage for the most disadvantageous dielectric position	
ot a	an earth	iing switch during operation (temporary approach)	161

	as-insulated and/or metal-enclosed switchgear	163
E.1	General	
E.2	Normal and special service conditions	
E.3	Definitions	
E.4	Ratings	165
E.5	Design and construction	165
E.6	Type tests	167
E.7	Routine tests	169
E.8	Guide to the selection of disconnectors and earthing switches	171
E.9	Information to be given with enquiries, tenders and orders	
E.10	Rules for transport, storage, installation, operation and maintenance	171
	normative) Gas-insulated metal-enclosed switchgear for rated voltages 72,5 kV e – Requirements for switching of bus-charging currents by disconnectors	173
F.1	General	173
F.2	Normal and special service conditions	173
F.3	Definitions	173
F.6	Type tests	175
,	iTeh STANDARD PREVIEW	400
Figure 1 -	- Fixed contact parallel to support - Fixed contact (as indicated in figure 8) perpendicular to support	103
Figure 2 -	<ul> <li>Fixed contact (as indicated in figure 8) perpendicular to support</li> </ul>	105
Figure 3 -	- Three-phase test arrangement for disconnectors and earthing switches with	405
Figure 4 -	ages below 52 kV	
Figure 5 - switches)	- Single-phase test arrangement for divided support disconnectors (earthing with a vertical isolating distance with rated voltages of 52 kV and above to vith flexible conductors	
switches)	- Single-phase test arrangement for divided support disconnectors (earthing with a vertical isolating distance with rated voltages of 52 kV and above to vith rigid conductors	111
	- Example of the application of rated mechanical terminal loads to a two-sconnector	113
	- Example of the application of rated mechanical terminal loads to a oh disconnector	115
Figure A.	1 – Position indicating device	125
Figure B.	1 – Test circuits for bus-transfer current making and breaking tests	139
	1 – Test circuit for electromagnetically induced current making and breaking	157
	2 – Test circuits for electrostatically induced current making and breaking tests	
•	I – Test circuit for test duty 1	
•	2 – Typical voltage waveform (Including VFT and FT components)	
•	3 – Test circuit for test duty 2	
_		
rigule F.4	F-Test circuit for test duty 3	I Ø 3

conductors	41
Table 2 – Recommended contact zones for "fixed" contacts supported by rigid conductors	41
Table 3 – Recommended static mechanical terminal loads	43
Table 3a – Classification of disconnectors for mechanical endurance	45
Table 4 – Nameplate information	49
Table 5 – Power frequency 1 min withstand voltages	61
Table 6 – Power frequency voltage tests	87
Table B.1 – Rated bus-transfer voltages for disconnectors	129
Table C.1 – Standardized values of rated induced currents and voltages for earthing switches	145
Table C.2 – Standardized values of recovery voltages for electromagnetically induced current breaking tests	151
Table C.3 – Test circuit capacitances ( $C_1$ values) for electrostatically induced current making and breaking tests	153
Table F.1 – Test voltages for making and breaking tests	177
Table F.2 – Specified bus-charging currents	185
Table F.3 – Specified number of tests	185
iTeh STANDARD PREVIEW	

SIST EN 62271-102:2002

(standards.iteh.ai)

https://standards.iteh.ai/catalog/standards/sist/a6fd1f3e-1e40-4de1-b075-d3967c6deb61/sist-en-62271-102-2002

### INTERNATIONAL ELECTROTECHNICAL COMMISSION

#### HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR -

# Part 102: Alternating current disconnectors and earthing switches

#### **FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end-user.
- 4) In order to promote international uniformity, EC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to/indicate its approval and cannot be responsible for any equipment declared to be in conformity with an TEC Publication. TEC Publication 1.02-2002
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62271-102 has been prepared by subcommittee 17A: High-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

This first edition cancels and replaces the third edition of IEC 60129 published in 1984, amendment 1 (1992) and amendment 2 (1996) and constitutes a technical revision. In addition, it replaces IEC 61128, IEC 61129 and IEC 61259, which are hereby withdrawn and cancelled. A reference table is provided at the end of this foreword.

This bilingual version (2003-08) replaces the English version.

The text of this standard is based on the following documents:

FDIS	Report on voting
17A/617/FDIS	17A/619/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.