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Visokonapetostne stikalne in krmilne naprave - 102. del: Ločilna stikala za izmenični tok in ozemljitvena stikala

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

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

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

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SECRETARIAT: Sweden	SECRETARY: Mr Anne Bosma
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 17C	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
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TITLE:

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

**Part 102: Alternating current disconnectors
and earthing switches**

FOREWORD

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This second edition cancels and replaces the first edition published in 2001, Amendment 1:2011 and Amendment 2:2013. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- New numbering according to IEC 17/1025/RQ to harmonize with ISO/IEC Directives, Part 2, and IEEE Std. C37.100.1;
- The scope has been extended to cover all indoor and outdoor installations. Consideration of switching devices having disconnecting and/or earthing switch functionalities, apart from other functions, are also covered by this standard;
- Ratings have been moved from the Annexes B, C and E to Clause 5;
- New rating values for bus-transfer current and bus-transfer voltage have been assigned;

- 384 – New class of mechanical endurance for earthing switches has been added (M1);
- 385 – Rated values of electrical endurance for earthing switches have been replaced by
386 classification of short-circuit making capability for earthing switches;
- 387 – New subclause with ratings for ice-coating has been added;
- 388 – New subclause with classification of bus-charging switching capability has been added;
- 389 – New withstand requirements for interlocking devices have been added;
- 390 – The way to comply with the requirements of the isolating distance of disconnectors has
391 been modified;
- 392 – Design and construction requirements for position indicating devices have been modified,
393 aligning the requirements for position indication and signaling;
- 394 – The value of operating force has been changed;
- 395 – The test procedures and validation criteria have been revised and modified where
396 necessary;
- 397 – Requirements for applied voltage during single-phase test on non-simultaneous closing
398 earthing switches have been changed;
- 399 – Non-verifiable requirements have been deleted;
- 400 – A new subclause has been added for testing mechanical interlocking devices;
- 401 – The high and low temperature test is mandatory if the temperature limits for the service
402 conditions of the apparatus (defined by the manufacturer) are above +40°C or below -5°C,
403 and a more detailed testing procedure is given;
- 404 – The testing procedure to verify the proper functioning of the position indicating device
405 allows a more practicable testing for every technology used;
- 406 – A new Annex B has been added with title: “Informative guidelines about current switching
407 capability of disconnectors and earthing switches”;
- 408 – A new Annex C has been added with title: “Normative requirements of tolerances on test
409 quantities for type tests”;
- 410 – A new Annex E has been added with title: “Informative guidelines for the extension of
411 validity of type tests”.

412 This standard should be read in conjunction with IEC 62271-1, edition 2.0, published in 2017,
413 to which it refers and which is applicable, unless otherwise specified. In order to simplify the
414 indication of corresponding requirements, the same numbering of clauses and subclauses,
415 except Annexes, is used as in IEC 62271-1. Additional subclauses are numbered from 101.

416 The committee has decided that the contents of the base publication and its amendments will
417 remain unchanged until the stability date indicated on the IEC web site under
418 "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the
419 publication will be

- 420 • reconfirmed,
- 421 • withdrawn,
- 422 • replaced by a revised edition, or
- 423 • amended.

424

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426

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –**Part 102: Alternating current disconnectors and earthing switches****1 Scope**

This part of IEC 62271 applies to alternating current disconnectors and earthing switches, designed for indoor and outdoor installations for nominal voltages above 1 000 V and for service frequencies up to and including 60 Hz.

It also applies to the operating devices of these disconnectors and earthing switches and their auxiliary equipment.

Additional requirements for disconnectors and earthing switches in enclosed switchgear and controlgear are given in IEC 62271-200, IEC 62271-201 and IEC 62271-203.

NOTE Disconnectors in which the fuse forms an integral part are not covered by this standard.

This standard is also applicable to switching devices having disconnecting and/or earthing functionalities apart from other functions, such as high-speed earthing switch, circuit-breaker and switch-disconnector.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60060-1:2010, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60071-2, *Insulation co-ordination – Part 2: Application guide*

IEC 60137, *Insulating bushings for alternating voltages above 1 000 V*

IEC 60270, *High-voltage test techniques – Partial discharge measurements*

IEC 60529:2013, *Degrees of protection provided by enclosures (IP Code)*

IEC 60865-1, *Short-circuit currents – Calculation of effects – Part 1: Definitions and calculation methods*

IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

IEC 62271-1:2017, *High-voltage switchgear and controlgear – Part 1: Common specifications*

IEC 62271-100:2012, *High-voltage switchgear and controlgear – Part 100: Alternating current circuit-breakers*

IEC 62271-101:2012, *High-voltage switchgear and controlgear – Part 101: Synthetic testing*

464 IEC 62271-200:2011, *High-voltage switchgear and controlgear – Part 200: A.C. metal-*
465 *enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including*
466 *52 kV*

467 IEC 62271-201:2014, *High-voltage switchgear and controlgear – Part 201: AC insulation-*
468 *enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including*
469 *52 kV*

470 IEC 62271-203:2011, *High-voltage switchgear and controlgear – Part 203: Gas-insulated*
471 *metal-enclosed switchgear for rated voltages above 52 kV*

472 IEC/TR 62271-305, *High-voltage switchgear and controlgear – Part 305: Capacitive current*
473 *switching capability of air-insulated disconnectors for rated voltages above 52 kV*

474 ISO 2768-1, *General tolerances – Part 1: Tolerances for linear and angular dimensions*
475 *without individual tolerance indications*

476 **3 Terms and definitions**

477 For the purposes of this document, the terms and definitions given in IEC 60050-151,
478 IEC 60050-441, IEC 60050-471, IEC 60050-604, IEC 60050-614, IEC 60050-1 and
479 IEC 62271-1 and the following apply.

480 ISO and IEC maintain terminological databases for use in standardization at the following
481 addresses:

- 482 • IEC Electropedia: available at <http://www.electropedia.org/>
- 483 • ISO Online browsing platform: available at <http://www.iso.org/obp>

484 **3.1 General terms and definitions**

485 **3.1.101**

486 **indoor switchgear and controlgear**

487 switchgear and controlgear designed solely for installation within a building or other housing,
488 where the switchgear and controlgear is protected against wind, rain, snow, abnormal dirt
489 deposits, abnormal condensation, ice and hoar frost

490 [SOURCE: IEC 60050-441:2000, 441-11-04]

491 **3.1.102**

492 **outdoor switchgear and controlgear**

493 switchgear and controlgear suitable for installation in the open air, i.e. capable of withstanding
494 wind, rain, snow, dirt deposits, condensation, ice and hoar frost

495 [SOURCE: IEC 60050-441:2000, 441-11-05]

496 **3.1.103**

497 **user**

498 person or legal entity using the disconnectors or earthing switches

499 Note 1 to entry This may include the purchaser (for example an electricity supplier), but it may also include the
500 contracting company, the staff responsible for erection of installation, the maintenance or operating staff or
501 anybody else temporarily or permanently responsible for the disconnector, earthing switch or electrical installation,
502 or even the operation of the switchgear.

503 **3.2 Assemblies of switchgear and controlgear**

504 **3.2.1**

505 **test object**

506 equipment needed to represent the specimen for a particular type test.

507 [SOURCE: IEC 62271-1:2017, 3.2.1, modified – “switchgear and controlgear” replaced by
508 “specimen”]

509 3.3 Parts of assemblies

510 Clause 3.3 of IEC 62271-1:2017 is applicable.

511 3.4 Switching devices

512 3.4.101

513 **disconnecter**

514 mechanical switching device which provides, in the open position, an isolating distance in
515 accordance with specified requirements

516 Note 1 to entry A disconnecter is capable of opening and closing a circuit when either negligible current is broken
517 or made, or when no significant change in the voltage across the terminals of each of the poles of the disconnecter
518 occurs. It is also capable of carrying currents under normal circuit conditions and carrying for a specified time
519 currents under abnormal conditions such as those of short-circuit.

520 Note 2 to entry "Negligible current" implies currents such as the capacitive currents of bushings, busbars,
521 connections, very short lengths of cable, currents of permanently connected grading impedances of circuit-
522 breakers and currents of voltage transformers and dividers (see also IEC/TR 62271-305). For $U_r \leq 420$ kV, a
523 current not exceeding 0,5 A is a negligible current for the purpose of this definition; for $U_r > 420$ kV and currents
524 exceeding 0,5 A, the manufacturer should be consulted. "No significant change in voltage" refers to such
525 applications as the by-passing of induction voltage regulators or circuit-breakers and bus transfer.

526 [SOURCE: IEC 60050-441:2000, 441-11-05, modified – Note 2 to entry has been added]

527 3.4.102

528 **divided support disconnecter (or earthing switch)**

529 disconnecter (or earthing switch) in which the fixed and moving contacts of each pole are not
530 supported by a common base or frame

531 Note 1 to entry A typical example is the pantograph or semi-pantograph disconnecter.

532 [SOURCE: IEC 60050-441:2000, 441-14-06(07), modified – The term “earthing switch” in
533 English version is completed with “divided support” and the term “disconnecter” substituted by
534 “earthing switch” at Note 1 to entry when appropriate – Note 2 to entry deleted]

535 3.4.103

536 **centre-break disconnecter**

537 disconnecter in which both contacts of each pole are movable and engage at a point
538 substantially midway between their supports

539 Note 1 to entry This term applies to high-voltage disconnecters only.

540 [SOURCE: IEC 60050-441:2000, 441-14-08]

541 3.4.104

542 **double-break disconnecter**

543 disconnecter that opens a circuit at two points

544 [SOURCE: IEC 60050-441:2000, 441-14-09]

545 3.4.105

546 **resistor fitted disconnecter**

547 disconnecter fitted with resistor in series or in parallel to the switching contacts in order to
548 mitigate the very fast transient overvoltage (VFTO) during both opening and closing operation
549 in metal-enclosed gas-insulated switchgear