
Električne inštalacije zgradb – 5-53. del: Izbira in namestitvev električne opreme – Ločevanje, stikanje in krmiljenje

Electrical installations of buildings - Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST IEC 60364-5-53:2006/A1:2006](https://standards.iteh.ai/catalog/standards/sist/1b611936-8167-46a4-bde7-46c5a2150fe9/sist-iec-60364-5-53-2006-a1-2006)

<https://standards.iteh.ai/catalog/standards/sist/1b611936-8167-46a4-bde7-46c5a2150fe9/sist-iec-60364-5-53-2006-a1-2006>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST IEC 60364-5-53:2006/A1:2006

<https://standards.iteh.ai/catalog/standards/sist/1b611936-8167-46a4-bde7-46c5a2150fe9/sist-iec-60364-5-53-2006-a1-2006>

NORME
INTERNATIONALE
INTERNATIONAL
STANDARD

CEI
IEC

60364-5-53

Troisième édition
Third edition
2001-08

Installations électriques des bâtiments –

**Partie 5-53:
Choix et mise en œuvre des matériels électriques –
Sectionnement, coupure et commande**

iTeh STANDARD PREVIEW
Electrical installations of buildings –
(standards.iteh.ai)

Part 5-53:
Selection and erection of electrical equipment –
Isolation, switching and control

© IEC 2001 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
Telefax: +41 22 919 0300

e-mail: inmail@iec.ch

3, rue de Varembe Geneva, Switzerland
IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE

U

Pour prix, voir catalogue en vigueur
For price, see current catalogue

CONTENTS

FOREWORD	5
530 Introduction	7
530.1 Scope	7
530.2 Normative references	7
530.3 (530) General and common requirements	9
531 Devices for protection against indirect contact by automatic disconnection of supply.....	9
531.1 Overcurrent protective devices	9
531.2 Residual current protective devices	11
531.3 Insulation monitoring devices.....	13
532 Devices for protection against thermal effects.....	13
533 Devices for protection against overcurrent.....	13
533.1 General requirements	13
533.2 Selection of devices for protection of wiring systems against overloads	15
533.3 Selection of devices for protection of wiring systems against short circuits	15
534 Devices for protection against electromagnetic and voltage disturbances	15
534.1 (534) Devices for protection against overvoltage	15
534.2 Erection of surge protective devices in building installations.....	15
534.3 (535) Devices for protection against undervoltage	21
535 (539) Co-ordination of various protective devices	21
535.1 (539.1) Discrimination between overcurrent protective devices	21
535.2 (539.2) Association of residual current protective devices with overcurrent protective devices.....	21
535.3 (539.3) Discrimination between residual current protective devices.....	21
536 (46) Isolation and switching	23
536.0 (460) Introduction	23
536.1 (461) General	23
536.2 (462) Isolation	23
536.3 (463) Switching off for mechanical maintenance	27
536.4 (464) Emergency switching.....	29
536.5 (465) Functional switching (control)	33
Annex A (informative) Installation of surge protective devices in TN-systems	37
Annex B (informative) Installation of surge protective devices in TT-systems	39
Annex C (informative) Installation of surge protective devices in IT-systems	43
Annex D (informative) IEC 60364 – Parts 1 to 6: Restructuring.....	45
Bibliography	53
Figure A.1 – SPDs in TN-systems	37
Figure B.1 – SPDs on the load side of RCD.....	39
Figure B.2 – SPDs on the supply side of RCD	41
Figure C.1 – SPDs on the load side of RCD	43
Table 53A – Impulse-withstand voltage as a function of the nominal voltage	25
Table D.1 – Relationship between restructured and original parts.....	45
Table D.2 – Relationship between new and old clause numbering	49

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL INSTALLATIONS OF BUILDINGS –**Part 5-53: Selection and erection of electrical equipment –
Isolation, switching and control**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60364-5-53 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

The IEC 60364 series (parts 1 to 6), is currently being restructured, without any technical changes, into a more simple form (see annex D).

According to a unanimous decision by the Committee of Action (CA/1720/RV (2000-03-21)), the restructured parts of IEC 60364 have not been submitted to National Committees for approval.

The text of this third edition of IEC 60364-5-53 is compiled from and replaces

- IEC 60364-5-53, second edition (1994) and its corrigendum 1 (1996),
- IEC 60364-5-534, first edition (1997),
- IEC 60364-5-537, first edition (1981) and its amendment 1 (1989) and
- IEC 60364-4-46, first edition (1981).

This publication has been drafted, as close as possible, in accordance with the ISO/IEC Directives, Part 3.

Annexes A, B, C and D are for information only.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

ELECTRICAL INSTALLATIONS OF BUILDINGS –

Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control

530 Introduction

530.1 Scope

This part of IEC 60364 deals with general requirements for isolation, switching and control and with the requirements for selection and erection of the devices provided to fulfil such functions.

530.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60364. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60364 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60269-3:1987, *Low-voltage fuses – Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications)*

IEC 60364-4-41:2001, *Electrical installations of buildings – IEC 60364-4-41: Protection for safety – Protection against electric shock*

IEC 60364-4-42:2001, *Electrical installations of buildings – Part 4-42: Protection for safety – Protection against thermal effects*

IEC 60364-4-43:2001, *Electrical installations of buildings – Part 4-43: Protection for safety – Protection against overcurrent*

IEC 60364-4-44:2001, *Electrical installations of buildings – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

IEC 60364-6-61:2001, *Electrical installations of buildings – Part 6-61: Verification – Initial verification*

IEC 60364-7-705:1984, *Electrical installations of buildings – Part 7: Requirements for special installations or locations – Section 705: Electrical installations of agricultural and horticultural premises*

IEC 60664-1:1992, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 61008-1:1996, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 1: General rules*

IEC 61009:1996, *Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) Part 1: General rules*

IEC 61024-1:1990, *Protection of structures against lightning – Part 1: General principles*

IEC 61312-1:1995, *Protection against lightning electromagnetic impulse – Part 1: General principles*

IEC 61643-1:1998, *Surge-protective device connected to low-voltage power distribution systems – Part 1: Performance requirements and testing methods*

IEC 61643-12, *Surge-protective device connected to low-voltage power distribution systems – Part 1: Performance requirements and testing methods*¹

530.3 (530) General and common requirements

This part of IEC 60364 shall provide compliance with the measures of protection for safety, the requirements for proper functioning for intended use of the installation, and the requirements appropriate to the external influences foreseen. Every item of equipment shall be selected and erected so as to allow compliance with the rules stated in the following clauses of this part and the relevant rules in other parts of this standard.

The requirements of this part are supplementary to the common rules given in IEC 60364-5-51.

530.3.1 (530.1) The moving contacts of all poles of multipole devices shall be so coupled mechanically that they make and break substantially together, except that contacts solely intended for the neutral may close before and open after the other contacts.

530.3.2 (530.2) Except as provided in 536.2.2.7, in multiphase circuits, single-pole devices shall not be inserted in the neutral conductor.

In single-phase circuits single-pole devices shall not be inserted in the neutral conductor, unless a residual current device complying with the rules of 413.1 of IEC 60364-4-41 is provided on the supply side.

530.3.3 (530.3) Devices embodying more than one function shall comply with all the requirements of this part appropriate to each separate function.

531 Devices for protection against indirect contact by automatic disconnection of supply

531.1 Overcurrent protective devices

531.1.1 TN systems

In TN systems overcurrent protective devices shall be selected and erected according to the conditions specified in 434.2 and 431 and in 533.3 for devices for protection against short-circuit, and shall satisfy the requirements of 413.1.3.3.

531.1.2 TT systems

Under consideration.

531.1.3 IT systems

Where exposed-conductive-parts are interconnected, overcurrent protective devices for protection in the event of a second fault shall comply with 531.1.1 taking into account the requirements of 413.1.5.5 of IEC 60364-4-41.

¹ To be published.

531.2 Residual current protective devices

531.2.1 General conditions of installation

Residual current protective devices in d.c. systems shall be specially designed for detection of d.c. residual currents, and to break circuit currents under normal conditions and fault conditions.

531.2.1.1 A residual current protective device shall ensure the disconnection of all live conductors in the circuit protected. In TN-S systems, the neutral need not be disconnected if the supply conditions are such that the neutral conductor can be considered to be reliably at earth potential.

NOTE The conditions for verification that the neutral conductor is reliably at earth potential are under consideration.

531.2.1.2 No protective conductor shall pass through the magnetic circuit of a residual current protective device.

531.2.1.3 Residual current protective devices shall be so selected, and the electrical circuits so subdivided, that any earth-leakage current which may be expected to occur during normal operation of the connected load(s) will be unlikely to cause unnecessary tripping of the device.

NOTE Residual current protective devices may operate at any value of residual current in excess of 50 % of the rated operating current.

531.2.1.4 Influence of d.c. components

Under consideration.

[SIST IEC 60364-5-53:2006/A1:2006](https://standards.iteh.ai/catalog/standards/sist/1b611936-8167-46a4-bde7-40c3a11961c9/sist/iec-60364-5-53-2006-a1-2006)

<https://standards.iteh.ai/catalog/standards/sist/1b611936-8167-46a4-bde7-40c3a11961c9/sist/iec-60364-5-53-2006-a1-2006>

531.2.1.5 The use of a residual current protective device associated with circuits not having a protective conductor, even if the rated operating residual current does not exceed 30 mA, shall not be considered as a measure sufficient for protection against indirect contact.

531.2.2 Selection of devices according to their method of application

531.2.2.1 Residual current protective devices may or may not have an auxiliary source, taking into account the requirements of 531.2.2.2.

NOTE The auxiliary source may be the supply system.

531.2.2.2 The use of residual current protective devices with an auxiliary source not operating automatically in the case of failure of the auxiliary source is permitted only if one of the two following conditions is fulfilled:

- protection against indirect contact according to 413.1 of IEC 60364-4-41 is ensured even in the case of failure of the auxiliary supply;
- the devices are installed in installations operated, tested and inspected by instructed persons (BA4) or skilled persons (BA5).

531.2.3 TN systems

If for certain equipment or for certain parts of the installation, one or more of the conditions stated in 413.1.3 cannot be satisfied, those parts may be protected by a residual current protective device. In this case, exposed-conductive-parts need not be connected to the TN earthing system protective conductor, provided that they are connected to an earth electrode affording a resistance appropriate to the operating current of the residual current protective device. The circuit thus protected is to be treated as a TT system and 413.1.4 applies.

If, however, no separate earth electrode exists, connection of the exposed-conductive-parts to the protective conductor needs to be made on the source side of the residual current protective device.

531.2.4 TT systems

If an installation is protected by a single residual current protective device, this shall be placed at the origin of the installation, unless the part of the installation between the origin and the device complies with the requirement for protection by the use of class II equipment or equivalent insulation (see 413.2).

NOTE Where there is more than one origin, this requirement applies to each origin.

531.2.5 IT systems

Where protection is provided by a residual current protective device, and disconnection following a first fault is not envisaged, the residual non-operating current of the device shall be at least equal to the current which circulates on the first fault to earth of negligible impedance affecting a phase conductor.

531.3 Insulation monitoring devices

NOTE Insulation monitoring devices may operate with an appropriate response time.

An insulation monitoring device provided in accordance with 413.1.5.4 is a device continuously monitoring the insulation of an electrical installation. It is intended to indicate a significant reduction in the insulation level of the installation to allow the cause of this reduction to be found before the occurrence of a second fault, and thus avoid disconnection of the supply.

Accordingly, it is set at a value below that specified in 612.3 of IEC 60364-6-61 appropriate to the installation concerned.

Insulation monitoring devices shall be so designed or installed that it shall be possible to modify the setting only by the use of a key or a tool.

532 Devices for protection against thermal effects

Under consideration.

NOTE Pending this consideration, reference should be made to 422.3.10 of IEC 60364-4-42 and 705.422 of IEC 60364-7-705.

533 Devices for protection against overcurrent

533.1 General requirements

533.1.1 Fuse bases using screw-in fuses shall be connected so that the centre contact is on the supply side of the fuse base.

533.1.2 Fuse bases for plug-in fuse carriers shall be arranged so as to exclude the possibility of the fuse carrier making contact between conductive parts belonging to two adjacent fuse bases.

533.1.3 Fuses having fuse-links likely to be removed or placed by persons other than instructed (BA4) or skilled persons (BA5), shall be of a type which complies with the safety requirements of IEC 60269-3.

Fuses or combination units having fuse-links likely to be removed and replaced only by instructed persons (BA4) or skilled persons (BA5), shall be installed in such a manner that it is ensured that the fuse-links can be removed or placed without unintentional contact with live parts.

533.1.4 Where circuit-breakers may be operated by persons other than instructed persons (BA4) or skilled persons (BA5), they shall be so designed or installed that it shall not be possible to modify the setting of the calibration of their overcurrent releases without a deliberate act involving the use of a key or tool, and resulting in a visible indication of their setting or calibration.

533.2 Selection of devices for protection of wiring systems against overloads

The nominal current (or current setting) of the protective device shall be chosen in accordance with 433.1.

NOTE In certain cases, to avoid unintentional operation, the peak current values of the loads have to be taken into consideration.

In the case of a cyclic load, the values of I_n and I_2 shall be chosen on the basis of values of I_B and I_Z for the thermally equivalent constant load

where

I_B is the current for which the circuit is designed;

I_Z is the continuous current-carrying capacity of the cable;

I_n is the nominal current of the protective device;

I_2 is the current ensuring effective operation of the protective device.

533.3 Selection of devices for protection of wiring systems against short circuits

The application of the rules of part 4-43 for short-circuit duration up to 5 s shall take into account minimum and maximum short-circuit conditions.

Where the standard covering a protective device specifies both a rated service short-circuit breaking capacity, and a rated ultimate short-circuit breaking capacity, it is permissible to select the protective device on the basis of the ultimate short-circuit breaking capacity for the maximum short-circuit conditions. Operational circumstances may, however, make it desirable to select the protective device on the service short-circuit breaking capacity, e.g. where a protective device is placed at the origin of the installation.

534 Devices for protection against electromagnetic and voltage disturbances

534.1 (534) Devices for protection against overvoltage

534.1.1 General

This clause contains provisions for the application of voltage limitation to obtain an insulation coordination according to IEC 60364-4-43 and IEC 60664-1.

This clause gives the requirements for the erection and selection of surge protective devices of installations of buildings to obtain a limitation of transient overvoltages of atmospheric origin transmitted by the supply distribution system and against switching overvoltages generated by the equipment within the installation.

534.2 Erection of surge protective devices in building installations

534.2.1 When required or otherwise specified in accordance with IEC 60364-4-44, surge protective devices shall be installed near the origin of the installation or in the main distribution assembly, closest to the origin of the installation.

NOTE 1 In some cases, in order to obtain complete protection of the installation, additional surge protective devices, which are not considered in this part, may be necessary.

NOTE 2 Surge protective devices located elsewhere in the installation may also provide sufficient protection.

534.2.2 When required or otherwise specified in accordance with IEC 60364-4-44, surge protective devices shall be installed (see also annexes A, B and C):

- if the neutral conductor is earthed at or near the origin of the installation or if there is no neutral conductor:
 - between unearthed line conductors and either the main earthing terminal or the main protective conductor bar, whichever route is shorter;
- if the neutral conductor is not earthed at or near the origin of the installation:
 - between each line conductor and either the main earthing terminal or the main protective conductor bar, and
 - between the neutral conductor and either the main earthing terminal or the protective conductor bar, whichever route is shorter. (As an alternative, see figure B.2.)

NOTE 1 If a line conductor is earthed, it is considered to be equivalent to a neutral conductor.

NOTE 2 In TT and TN systems, this requirement does not exclude a supplementary differential mode protection.

534.2.3 Selection of surge protective devices (SPDs)

534.2.3.1 The maximum continuous operating voltage U_C of SPDs shall be not less than the maximum actual continuous voltage between the terminals of the SPD.

In TT systems, according to figure B.1, U_C shall be at least $1,5 U_0$.

In TN systems and TT systems, according to figure B.2, U_C shall be at least $1,1 U_0$.

In IT systems, U_C shall be at least as high as the line-to-line voltage U .

NOTE 1 U_0 is the line to neutral voltage of the low voltage system.

NOTE 2 In extended IT systems, higher values of U_C may be necessary.

534.2.3.2 The surge protective devices and its series protective means shall withstand safely the temporary overvoltages (see IEC 60364-4-44).

534.2.3.3 The surge protective devices shall comply with IEC 61643-1, additional information regarding selection and application should be found in IEC 61643-12.

534.2.3.4 If the surge protective device is installed at the origin of an electrical installation supplied by the public distribution system, the rated discharge current shall not be less than 5 kA.

NOTE 1 More severe conditions of exposure may lead to the choice of an higher value.

NOTE 2 In presence of a lightning protection system, the discharge current will be substantially higher and an assessment will lead to the choice of a higher rated discharge current for the SPD. For further information refer to IEC 61643-12.

534.2.3.5 The protection level of the SPD shall be chosen according to 443.3.2 of IEC 60364-4-44.

NOTE 1 The surge withstand level of some equipment may also need to be taken into account.

NOTE 2 Additional SPDs may be necessary closer to sensitive equipment, if not already included in the equipment.

534.2.3.6 The possible cascading of SPDs in the installation shall be taken into account. The SPD manufacturers shall provide in their documentation the measures to be taken to facilitate their mutual coordination, in particular for the SPDs of a protective level different from that provided at the origin of the electrical installation and intended to protect current-using equipment incorporating sensitive electronic circuits.