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Edition 5.1 2017-03

CONSOLIDATED VERSION

VERSION CONSOLIDÉE



GROUP SAFETY PUBLICATION
PUBLICATION GROUPEE DE SÉCURITÉ

**Low-voltage electrical installations –
Part 4-41: Protection for safety – Protection against electric shock**

**Installations électriques à basse tension –
Partie 4-41: Protection pour assurer la sécurité – Protection contre les chocs
électriques**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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IEC 60364-4-41

Edition 5.1 2017-03

REDLINE VERSION

VERSION REDLINE



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Part 4-41: Protection for safety – Protection against electric shock**

**Installations électriques à basse tension –
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électriques**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 4-41: Protection for safety – Protection against electric shock

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, Publicly Available Specifications (PAS) 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.
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This Consolidated version is not an official IEC Standard and has been prepared for user convenience. Only the current versions of the standard and its amendment(s) are to be considered the official documents.

This Consolidated version of IEC 60364-4-41 bears the edition number 5.1. It consists of the fifth edition (2005-12) [documents 64/1489/FDIS and 64/1500/RVD] and its amendment 1 (2017-03) [documents 64/2147/FDIS and 64/2151/RVD]. The technical content is identical to the base edition and its amendment.

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 60364-4-41 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

This fifth edition constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

- adoption of IEC 61140 terminology;
- layout rationalized on basis of complete protective measures (i.e. appropriate practical combinations of protective provision in normal service (direct contact protection) and protective provision in case of a fault (indirect contact protection);
- requirements of 471 and 481, which were included in the fourth edition have been rationalized
- disconnection requirements for TT systems clarified;
- IT systems considered more fully;
- requirements in certain cases for additional protection of socket-outlets by means of a 30 mA RCD, where the protective measure is automatic disconnection of supply.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

It has the status of a group safety publication in accordance with IEC Guide 104.

The Part 4 series comprises the following parts under the general title *Low-voltage electrical installations*:

Part 4-41: Protection for safety – Protection against electric shock

Part 4-42: Protection for safety – Protection against thermal effects

Part 4-43: Protection for safety – Protection against overcurrent

Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances

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

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

The contents of the corrigendum of February 2018 have been included in this copy.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

410 Introduction

This Part 4-41 of IEC 60364 deals with protection against electric shock as applied to electrical installations. It is based on IEC 61140 which is a basic safety standard that applies to the protection of persons and livestock. IEC 61140 is intended to give fundamental principles and requirements that are common to electrical installations and equipment or are necessary for their co-ordination.

The fundamental rule of protection against electric shock, according to IEC 61140, is that hazardous-live-parts must not be accessible and accessible conductive parts must not be hazardous live, neither under normal conditions nor under single fault conditions.

According to 4.2 of IEC 61140, protection under normal conditions is provided by basic protective provisions and protection under single fault conditions is provided by fault protective provisions. Alternatively, protection against electric shock is provided by an enhanced protective provision, which provides protection under normal conditions and under single fault conditions.

This standard has the status of a group safety publication (GSP) for protection against electric shock.

In the fourth edition of IEC 60364 (2001):

- protection under normal conditions (now designated basic protection) was referred to as protection against direct contact and
- protection under fault conditions (now designated fault protection) was referred to as protection against indirect contact.

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 4-41: Protection for safety – Protection against electric shock

410.1 Scope

Part 4-41 of IEC 60364 specifies essential requirements regarding protection against electric shock, including basic protection (protection against direct contact) and fault protection (protection against indirect contact) of persons and livestock. It deals also with the application and co-ordination of these requirements in relation to external influences.

Requirements are also given for the application of additional protection in certain cases.

410.2 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.

IEC 60364-5-52, *Low-voltage electrical installations – of buildings* – Part 5-52: Selection and erection of electrical equipment – Wiring systems⁴⁾

IEC 60364-5-54, *Electrical installations of buildings* – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements, protective conductors and protective bonding conductors

IEC 60364-6, *Low-voltage electrical installations* – Part 6: Verification ²⁾

~~IEC 60439-1, Low-voltage switchgear and controlgear assemblies – Part 1: Type-tested and partially type-tested assemblies~~

IEC 60449, *Voltage bands for electrical installations of buildings*

IEC 60614 (all parts), *Conduits for electrical installations* – Specification

IEC 61084 (all parts), *Cable trunking and ducting systems for electrical installations*

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

IEC 61386 (all parts), *Conduit systems for electrical installations*

IEC 61439 (all parts), *Low-voltage switchgear and controlgear assemblies*

IEC 61558-2-6, *Safety of power transformers, power supply units and similar* – Part 2-6: Particular requirements for safety isolating transformers for general use

IEC 62477-1, *Safety requirements for power electronic converter systems and equipment* – Part 1: General

⁴⁾ ~~A new edition is currently under consideration.~~

²⁾ To be published.

IEC 60364-4-41:2005+AMD1:2017 CSV – 7 –

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IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

INSTALLATIONS ÉLECTRIQUES À BASSE TENSION –

Partie 4-41: Protection pour assurer la sécurité – Protection contre les chocs électriques

AVANT-PROPOS

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Cette version consolidée de l'IEC 60364-4-41 porte le numéro d'édition 5.1. Elle comprend la cinquième édition (2005-12) [documents 64/1489/FDIS et 64/1500/RVD] et son amendement 1 (2017-03) [documents 64/2147/FDIS et 64/2151/RVD]. Le contenu technique est identique à celui de l'édition de base et à son amendement.

Dans cette version Redline, une ligne verticale dans la marge indique où le contenu technique est modifié par l'amendement 1. Les ajouts sont en vert, les suppressions sont en rouge, barrées. Une version Finale avec toutes les modifications acceptées est disponible dans cette publication.

La Norme internationale IEC 60364-4-41 a été établie par le comité d'études 64 de l'IEC: Installations électriques et protection contre les chocs électriques.

Cette cinquième édition constitue une révision technique.

Les principaux changements par rapport à l'édition précédente sont listés ci-dessous:

- adoption de la terminologie de l'IEC 61140;
- présentation se fondant sur les mesures complètes de protection (par exemple associations pratiques de dispositions de protection en fonctionnement normal (protection contre les contacts directs) et dispositions de protection en cas de défaut (protection contre les contacts indirects);
- exigences revues de 471 et de 481 inclus dans la quatrième édition;
- exigences de coupure en schéma TT clarifiées;
- schéma IT reconsidéré;
- exigences dans certains cas de protection complémentaire des socles de prise de courant par DDR 30 mA si la mesure de protection par coupure automatique de l'alimentation est requise.

Cette publication a été rédigée selon les Directives ISO/IEC, Partie 2.

Elle a le statut de publication groupée de sécurité en accord avec le Guide IEC 104.

La série de la Partie 4 comprend les parties suivantes sous le titre général *Installations électriques à basse tension*:

- Partie 4-41: Protection pour assurer la sécurité – Protection contre les chocs électriques
- Partie 4-42: Protection pour assurer la sécurité – Protection contre les effets thermiques
- Partie 4-43: Protection pour assurer la sécurité – Protection contre les surintensités
- Partie 4-44: Protection pour assurer la sécurité – Protection contre les perturbations de tension et les perturbations électromagnétiques

Le comité a décidé que le contenu de la publication de base et de son amendement ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives à la publication recherchée. A cette date, la publication sera

- reconduite,
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Le contenu du corrigendum de février 2018 a été pris en considération dans cet exemplaire.

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410 Introduction

La présente Partie 4-41 de l'IEC 60364 traite de la protection contre les chocs électriques dans les installations électriques. Elle se fonde sur l'IEC 61140 qui est une norme fondamentale de sécurité applicable à la protection des personnes et des animaux domestiques. L'IEC 61140 est destinée à donner les principes et exigences essentiels communs aux installations et matériels nécessaires à leur coordination.

La règle essentielle pour la protection contre les chocs électriques, telle que définie dans l'IEC 61140, est que les parties actives dangereuses ne soient pas accessibles et que les parties conductrices accessibles ne soient pas dangereuses, tant dans des conditions normales que dans des conditions de défaut simple.

Conformément à 4.2 de l'IEC 61140, la protection en fonctionnement normal est assurée par des dispositions de protection principale et la protection en cas de défaut est assurée par des dispositions de protection en cas de défaut. En alternative, la protection contre les chocs électriques est assurée par une disposition de protection renforcée assurant la protection en fonctionnement normal et en cas de défaut.

La présente norme a le statut de norme de sécurité pour la protection contre les chocs électriques.

Dans la quatrième édition de l'IEC 60364 (2001):

- la protection en fonctionnement normal (appelée désormais protection principale) se référait à la protection contre les contacts directs, et
- la protection dans des conditions de défaut (appelée maintenant protection en cas de défaut) se référait à la protection contre les contacts indirects.

INSTALLATIONS ÉLECTRIQUES À BASSE TENSION –

Partie 4-41: Protection pour assurer la sécurité – Protection contre les chocs électriques

410.1 Domaine d'application

La Partie 4-41 de l'IEC 60364 spécifie des exigences essentielles relatives à la protection contre les chocs électriques comprenant la protection principale (protection en fonctionnement normal) et la protection en cas de défaut (protection dans des conditions de défaut) des personnes et des animaux domestiques. Elle traite de l'application et de la coordination de ces exigences en liaison avec les conditions des influences externes.

Les exigences relatives à la protection complémentaire sont données dans certains cas.

410.2 Références normatives

Les documents de référence suivants sont indispensables pour l'application du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60364-5-52, *Installations électriques ~~des bâtiments~~ à basse tension* – Partie 5-52: Choix et mise en œuvre des matériels électriques – Canalisations¹⁾

IEC 60364-5-54, *Installations électriques des bâtiments* – Partie 5-54: Choix et mise en œuvre des matériels électriques – Mise à la terre, conducteurs de protection et conducteurs d'équipotentialité de protection

IEC 60364-6, *Installations électriques à basse tension* – Partie 6: Vérifications²⁾

~~IEC 60439-1, Ensembles d'appareillage à basse tension – Partie 1: Ensembles de série et ensembles dérivés de série~~

IEC 60449, *Domaines de tensions des installations électriques des bâtiments*

IEC 60614 (toutes les parties), *Conduits pour installations électriques – Spécifications*

IEC 61084 (toutes les parties), *Systèmes de goulottes et de conduits profilés pour installations électriques*

IEC 61140, *Protection contre les chocs électriques – Aspects communs aux installations et aux matériels*

IEC 61386 (toutes les parties), *Systèmes de conduits pour installations électriques*

IEC 61439 (toutes les parties), *Ensembles d'appareillage à basse tension*

IEC 61558-2-6, *Sécurité des transformateurs, blocs d'alimentation et analogues* – Partie 2-6: Règles particulières pour les transformateurs de sécurité pour usage général

¹⁾ ~~Une nouvelle édition est actuellement à l'étude.~~

²⁾ A publier.

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IEC 62477-1, *Exigences de sécurité applicables aux systèmes et matériels électroniques de conversion de puissance – Partie 1: Généralités*

IEC Guide 104, *Elaboration des publications de sécurité et utilisation des publications fondamentales de sécurité et publications groupées de sécurité*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 4-41: Protection for safety – Protection against electric shock

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, Publicly Available Specifications (PAS) 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.
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DISCLAIMER

This Consolidated version is not an official IEC Standard and has been prepared for user convenience. Only the current versions of the standard and its amendment(s) are to be considered the official documents.

This Consolidated version of IEC 60364-4-41 bears the edition number 5.1. It consists of the fifth edition (2005-12) [documents 64/1489/FDIS and 64/1500/RVD] and its amendment 1 (2017-03) [documents 64/2147/FDIS and 64/2151/RVD]. The technical content is identical to the base edition and its amendment.

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

International Standard IEC 60364-4-41 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

This fifth edition constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

- adoption of IEC 61140 terminology;
- layout rationalized on basis of complete protective measures (i.e. appropriate practical combinations of protective provision in normal service (direct contact protection) and protective provision in case of a fault (indirect contact protection);
- requirements of 471 and 481, which were included in the fourth edition have been rationalized
- disconnection requirements for TT systems clarified;
- IT systems considered more fully;
- requirements in certain cases for additional protection of socket-outlets by means of a 30 mA RCD, where the protective measure is automatic disconnection of supply.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

It has the status of a group safety publication in accordance with IEC Guide 104.

The Part 4 series comprises the following parts under the general title *Low-voltage electrical installations*:

Part 4-41: Protection for safety – Protection against electric shock

Part 4-42: Protection for safety – Protection against thermal effects

Part 4-43: Protection for safety – Protection against overcurrent

Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances

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

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

The contents of the corrigendum of February 2018 have been included in this copy.

410 Introduction

This Part 4-41 of IEC 60364 deals with protection against electric shock as applied to electrical installations. It is based on IEC 61140 which is a basic safety standard that applies to the protection of persons and livestock. IEC 61140 is intended to give fundamental principles and requirements that are common to electrical installations and equipment or are necessary for their co-ordination.

The fundamental rule of protection against electric shock, according to IEC 61140, is that hazardous-live-parts must not be accessible and accessible conductive parts must not be hazardous live, neither under normal conditions nor under single fault conditions.

According to 4.2 of IEC 61140, protection under normal conditions is provided by basic protective provisions and protection under single fault conditions is provided by fault protective provisions. Alternatively, protection against electric shock is provided by an enhanced protective provision, which provides protection under normal conditions and under single fault conditions.

This standard has the status of a group safety publication (GSP) for protection against electric shock.

In the fourth edition of IEC 60364 (2001):

- protection under normal conditions (now designated basic protection) was referred to as protection against direct contact and
- protection under fault conditions (now designated fault protection) was referred to as protection against indirect contact.

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 4-41: Protection for safety – Protection against electric shock

410.1 Scope

Part 4-41 of IEC 60364 specifies essential requirements regarding protection against electric shock, including basic protection (protection against direct contact) and fault protection (protection against indirect contact) of persons and livestock. It deals also with the application and co-ordination of these requirements in relation to external influences.

Requirements are also given for the application of additional protection in certain cases.

410.2 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.

IEC 60364-5-52, *Low-voltage electrical installations – Part 5-52: Selection and erection of electrical equipment – Wiring systems*

IEC 60364-5-54, *Electrical installations of buildings – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements, protective conductors and protective bonding conductors*

IEC 60364-6, *Low-voltage electrical installations – Part 6: Verification* ¹⁾

IEC 60449, *Voltage bands for electrical installations of buildings*

IEC 60614 (all parts), *Conduits for electrical installations – Specification*

IEC 61084 (all parts), *Cable trunking and ducting systems for electrical installations*

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

IEC 61386 (all parts), *Conduit systems for electrical installations*

IEC 61439 (all parts), *Low-voltage switchgear and controlgear assemblies*

IEC 61558-2-6, *Safety of power transformers, power supply units and similar – Part 2-6: Particular requirements for safety isolating transformers for general use*

IEC 62477-1, *Safety requirements for power electronic converter systems and equipment – Part 1: General*

IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

1) To be published.