IEC 60364-7-716

Edition 1.0 2023-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Low-voltage electrical installations – Part 7-716: Requirements for special installations or locations – ELV DC power distribution over information and communications technology (ICT) cable infrastructure

Installations électriques à basse tension – Partie 7-716: Exigences pour les installations et emplacements spéciaux – Distribution de l'alimentation en courant continu TBT sur l'infrastructure de câbles des technologies de l'information et de la communication (TIC)

IEC 60364-7-716:2023-08(en-fr)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, …). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

IEC 60364-7-716

Edition 1.0 2023-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Low-voltage electrical installations –
Part 7-716: Requirements for special installations or locations – ELV DC power distribution over information and communications technology (ICT) cable infrastructure

Installations électriques à basse tension –
Partie 7-716: Exigences pour les installations et emplacements spéciaux – Distribution de l'alimentation en courant continu TBT sur l'infrastructure de câbles des technologies de l'information et de la communication (TIC)

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.020, 91.140.50

ISBN 978-2-8322-7358-6

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 7-716: Requirements for special installations or locations – ELV DC power distribution over information and communications technology (ICT) cable infrastructure

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.
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, IEC 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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
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.

IEC 60364-7-716 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
64/2617/FDIS	64/2637/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 60364 series, published under the general title *Low-voltage electrical installations*, can be found on the IEC website.

The reader's attention is drawn to the fact that Annex A lists all of the "in-some-country" clauses on differing practices of a less permanent nature relating to the subject of this document.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

INTRODUCTION

For the purpose of this part of IEC 60364 (IEC 60364-7-716) the requirements of the general Parts 1 to 6 and Part 8 of IEC 60364 apply.

The IEC 60364-7-7XX parts of IEC 60364 contain particular requirements for special installations or locations which are based on the requirements of the general parts of IEC 60364 (IEC 60364-1 to IEC 60364-6 and IEC 60364-8). These IEC 60364-7-7XX parts are considered in conjunction with the requirements of the general parts.

The particular requirements of this part of IEC 60364 supplement, modify or replace certain of the requirements of the general parts of IEC 60364 being valid at the time of publication of this part. The absence of reference to the exclusion of a part or a clause of a general part means that the corresponding clauses of the general part are applicable (undated references).

Requirements of other 7XX parts being relevant for installations covered by this part also apply, and circuits serving such parts are limited by the requirements of those 7XX parts.

The clause numbering of this part follows the pattern and corresponding references of IEC 60364. The numbers following the particular number of this part are those of the corresponding parts, or clauses of the other parts of the IEC 60364 series, valid at the time of publication of this part, as indicated in the normative references of this document (dated references).

If requirements or explanations additional to those of the other parts of the IEC 60364 series are necessary, the numbering of such items appears as 716.101, 716.102, 716.103, etc.

In the case where new or amended general parts with modified numbering were published after this part was issued, it is possible that the clause numbers referring to a general part in this Part 716 will no longer align with the latest edition of the general part. Dated references should be observed.

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 7-716: Requirements for special installations or locations – ELV DC power distribution over information and communications technology (ICT) cable infrastructure

716 ELV DC power distribution over information and communications technology (ICT) cable infrastructure

716.1 Scope

This part of IEC 60364 specifies requirements in electrical installations for the distribution of ELV DC power using balanced, information technology cables and accessories primarily designed for data transmission, as specified in terms of a category within the channels of ISO/IEC 11801-1 using power sourcing equipment in accordance with IEC 62368-3.

Requirements are included for the design, erection, and verification of telecommunications infrastructure for the purpose of both telecommunications and distribution of ELV DC power. In addition, requirements are included for use of existing telecommunications infrastructure for distribution of ELV DC power.

The power delivery systems include, but are not restricted to, the Power over Ethernet systems specified by IEEE 802.3.

This document does not apply to the use of cables and accessories within the core and access networks for example private branch exchange (PBX).

716.2 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 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*
IEC 60364-4-41:2005/AMD1:2017

IEC 60364-4-43:2008, *Low-voltage electrical installations – Part 4-43: Protection for safety - Protection against overcurrent*

IEC 60364-5-52:2009, *Low-voltage electrical installations – Part 5-52: Selection and erection of electrical equipment – Wiring systems*

IEC 60512-9-3, *Connectors for electronic equipment – Tests and measurements – Part 9-3: Endurance tests – Test 9c: Mechanical operation (engaging and separating) with electrical load*

IEC 61156 (all parts), *Multicore and symmetrical pair/quad cables for digital communications*

ISO/IEC 11801-1:2017, *Information technology – Generic cabling for customer premises – Part 1: General requirements*
ISO/IEC 11801-1:2017/COR1:2018

716.3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

716.3.1
balanced cable
cable consisting of one or more metallic symmetrical cable elements (twisted pairs or quads)

[SOURCE: ISO/IEC 11801-1:2017, 3.1.12]

716.3.2
core network
functional elements (equipment and infrastructure) that enable communication between operator sites and network data centres

716.3.3
access network
functional elements (equipment and infrastructure) that enable communication between the core network and a customer network

716.3.4
connecting hardware
device or combination of devices used to connect cables or cable elements

716.4 Protection for safety

716.41 Protection against electric shock

716.410.3 General requirements

716.410.3.3

Only the following protective measures shall be applied:

– extra-low voltage (SELV and PELV) systems (Clause 414).

716.414.1.1

Replace the second paragraph by:

This protective measure SELV requires the following:

– limitation of the voltage to 60 V ripple free DC in dry locations and 15 V ripple free DC in all other locations, and
– protective separation system from all circuits other than SELV and PELV circuits, and basic insulation between the SELV system and other SELV or PELV systems, and
– for SELV systems, basic insulation between the SELV system and earth.

This protective measure PELV requires the following:

– limitation of the voltage to 60 V ripple free DC in dry locations and 15 V ripple free DC in all other locations, and

– protective separation system from all circuits other than SELV and PELV circuits, and basic insulation between the PELV system and other SELV or PELV systems.

NOTE 1 Where PELV is used, mitigation measures can be required to limit the sharing of LV fault currents in accordance with ISO/IEC 30129 and IEC TR 61000-5-2. Exposed-conductive-parts of ELV DC power equipment (such as PoE switches or converters) can be connected by a protective conductor to the main earthing terminal.

NOTE 2 The screen/shielding of the communications cabling provides functional earthing and it is not suitable for limiting the sharing of LV fault currents.

NOTE 3 The protective measure PELV is particularly appropriate where functional equipotential bonding is used as an EMC mitigation measure, for example where many power sourcing circuits and equipment are installed in the same location, or where equipment is linked together from several buildings.

716.414.3.1

Add the following text:

*"*and IEC 61558-2-16*"*

716.414.3.4

Replace the first paragraph, retaining Note 1 and Note 2 which remain unchanged, by:

Certain electronic devices complying with appropriate standards where provisions have been taken in order to ensure that, even in the case of an internal fault, the voltage at the outgoing terminals cannot exceed the values specified in 414.1.1.

716.43 Protection against overcurrent

716.433 Protection against overload current

716.433.1 Coordination between conductors and overload protective devices

716.433.1.101 Protection against overcurrent

Limitation of current in accordance with IEC 62368-3:2017, 5.3.1 is recognized as a suitable means of protecting against overcurrent.

716.52 Selection and erection of electrical equipment – Wiring systems

716.521 Types of wiring system

716.521.101

Information technology cables used for the distribution of DC power shall comply with Category 5, Category 6, Category 6_A, Category 7, Category 7_A, Category 8.1 or Category 8.2 as defined in ISO/IEC 11801-1 by reference to the specifications given in IEC 61156 (all parts).

716.523 Current-carrying capacities

716.523.1.101

ISO/IEC 11801-1 specifies the minimum DC current carrying capacity in any conductor temperature up to 60 °C. Cables listed in 716.521.101 fulfil at least this operating temperature.

NOTE 1 Any temperature rise of the data cables due to the load current they carry, or other causes, will increase the attenuation and insertion loss of the installed cabling. Thus the performance of information transmission channels can be degraded.

NOTE 2 Guidance on the effect of the number of loaded conductors, in a multi-cable bundle, on the temperature rise of the cables is given in ISO/IEC TS 29125 and requirements and recommendations in relation to planning and installation of such cable bundles are provided in ISO/IEC 14763-2.

716.523.2.101

The load current (design current) in any conductor shall not exceed 750 mA.

716.526 Electrical connections

716.526.101

The connecting hardware used for data cables used to distribute DC power shall comply with ISO/IEC 11801-1 and support a continuous operating current of 750 mA per contact.

Where connected equipment can be separated under load, the connecting hardware shall meet the requirements of the endurance test specified in IEC 60512-9-3 at the appropriate disconnection load. Also the anticipated number of separations in operation shall not exceed the value specified in the endurance test for the disconnection load.

NOTE Testing of the mating and de-mating of connectors at currents below this maximum value can be found in IEC 60512-9-3, IEC 60512-99-001 and IEC 60512-99-002.