IEC 60038

Edition 7.1 2021-12
CONSOLIDATED VERSION

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

HORIZONTAL PUBLICATION
PUBLICATION HORIZONTALE

IEC standard voltages

Tensions normales de l'IEC

IEC 60038:2009-06+AMD1:2021-12 CSV(en-fr)

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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 of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60038 edition 7.1 contains the seventh edition (2009-06) [documents 8/1260/FDIS and 8/1264/RVD] and its amendment 1 (2021-12) [documents 8/1600/FDIS and 8/1603/RVD].

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 60038 has been prepared by IEC technical committee 8: System aspects for electrical energy supply.

This seventh edition constitutes a technical revision. The significant technical changes are:

– a clarification of the scope;
– the addition of the values of 230 V (50 Hz) and 230/400 V (60 Hz) to Table1;
– the update of Table 1 to take into account the end of the transition period for the values of 230/400 V and 400/690 V;
– the replacement of the utilization voltage range at LV by a reference to the relevant standard and an informative annex;
– the addition of the value of 30 kV to Table 3;
– the replacement of the value of 1 050 kV by 1 100 kV in Table 5.
– co-ordination of Table 1 of IEC 60850:2014 and Table 2 of IEC 60038;
– co-ordination of 60 Hz highest and lowest values with major national 60 Hz standards;
– co-ordination of Annex A with IEC 60364-5-52:2009;
– a new table covering single wire earth return systems for remote areas.

It has the status of a horizontal standard in accordance with IEC Guide 108.

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

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 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.

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.

INTRODUCTION

This publication has been prepared by TC 8, whose scope is to prepare and coordinate, in co-operation with other TC/SCs, the development of international standards and other deliverables with an emphasis on overall system aspects of electricity supply systems and an acceptable balance between the cost and quality for the users of electrical energy. The electricity supply system encompasses transmission and distribution networks and connected user installations (generators and loads including traction systems) with their network interfaces.

IEC STANDARD VOLTAGES

1 Scope

This publication applies to

– ~~a.c.~~ AC transmission, distribution and utilization systems and equipment for use in such systems with standard frequencies 50 Hz and 60 Hz having a nominal voltage above 100 V;

– ~~a.c.~~ AC and ~~d.c.~~ DC traction systems;

– ~~a.c.~~ AC and ~~d.c.~~ DC equipment having nominal voltages below 120 V ~~a.c.~~ AC or below 750 V ~~d.c.~~ DC, the ~~a.c.~~ AC voltages being intended (but not exclusively) for 50 Hz and 60 Hz applications; such equipment covers batteries (from primary or secondary cells), other power supply devices (~~a.c.~~ AC or ~~d.c.~~ DC), electrical equipment (including industrial and communication), and appliances.

This publication does not apply to voltages representing or transmitting signals or measured values.

This publication does not apply to standard voltages of components and parts used within electrical devices or items of equipment.

This publication has the status of a horizontal standard in accordance with IEC Guide 108. As such, this publication specifies standard voltage values which are intended to serve

– as preferential values for the nominal voltage of electrical supply and utilization systems, and

– as maximum, nominal and minimum reference values for both equipment and ~~system design~~ power supply in both electricity supply and utilization systems so that product and power system committees can co-ordinate their documents.

NOTE 1 Two main reasons have led to the values specified in this standard:

The values of nominal voltage (or highest voltage for equipment) specified in this standard are mainly based on the historical development of electrical supply systems throughout the world, since these values turned out to be the most common ones, and have achieved worldwide recognition;

The voltage ranges mentioned in this standard have been recognized to be the most appropriate ones as a basis for design and testing of electrical equipment and systems.

NOTE 2 It is nevertheless the task of system and product standards to define appropriate testing values, testing conditions and acceptance criteria.

NOTE 3 National Committees and individual systems can set values that differ from, but still comply with, the reference values in this document provided the values they set lie between the highest voltage for equipment and the lowest supply or utilization voltages in this document. Such variations can be required due to legacy or rating issues.

NOTE 4 To comply with this documentneither the lowest supply or utilization voltage can be lower than the lowest voltage for equipment.

NOTE 5 Some National committees set different nominal values for supply and utilization.

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: *Electrical installations of buildings – Part 5-52: Selection and erection of electrical equipment – Wiring systems*

3 Terms and definitions

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

For alternating voltages, the voltages stated below are ~~r.m.s.~~ RMS values.

3.1
nominal system voltage
a suitable approximate value of voltage used to designate or identify a system

[IEV 601-01-21, modified]

3.2
highest voltage of a system
(excluding transient or abnormal conditions)
the highest value of operating voltage which occurs under normal operating conditions at any time and at any point on the system

NOTE It excludes transient overvoltages, such as those due to switching operations, and temporary variations of voltage.

[IEV 601-01-23, modified]

3.3
lowest voltage of a system
(excluding transient or abnormal conditions)
the lowest value of operating voltage which occurs under normal operating conditions at any time and at any point on the system

NOTE It excludes transient voltages, such as those due to switching operations, and temporary variations of voltage.

[IEV 601-01-24, modified]

3.4
supply terminals
point in a transmission or distribution network designated as such and contractually fixed, at which electrical energy is exchanged between contractual partners

3.5
supply voltage
the phase-to-phase or phase-to-neutral voltage at the supply terminals

NOTE An equivalent definition is: the line-to-line or line-to-neutral voltage at the supply terminals.

3.6
supply voltage range
the voltage range at the supply terminals

3.7
utilization voltage
the phase-to-phase or phase-to-neutral voltage at the outlets or at the points where utilisation equipment is intended to be connected to the fixed installation

NOTE An equivalent definition is: the line-to-line or line-to-neutral voltage at the outlets or at the points where utilisation equipment is intended to be connected to the fixed installation.