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INTERNATIONAL STANDARD

**Electromagnetic compatibility (EMC) -
Part 4-30: Testing and measurement techniques - Power quality measurement
methods**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Electromagnetic compatibility (EMC) -
Part 4-30: Testing and measurement techniques -
Power quality measurement methods**

FOREWORD

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IEC 61000 4-30 has been prepared by subcommittee 77A: EMC – Low- frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility. It is an International Standard.

It forms part 4-30 of IEC 61000. It has the status of a basic EMC publication in accordance with IEC Guide 107.

This fourth edition cancels and replaces the third edition published in 2015. This edition constitutes a technical revision.

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

- a) IEC 61000-4-30:2015/AMD1:2021 and IEC 61000-4-30:2015/COR1:2016 were included.
- b) The measurement method for rapid voltage changes (RVC) has been corrected and extended.
- c) The measurement method for voltage events has been updated and extended.
- d) Annex C was divided into 2 parts:
 - 1) Annex C: The measurement method from IEC 61000-4-7:2002 and IEC 61000-4-7:2002/AMD1:2008, Annex B for conducted emissions in the 2 kHz to 9 kHz range has been separated.
 - 2) Annex D: A new measurement method for conducted emissions in the 9 kHz to 150 kHz range has been added.
- e) Annex D (underdeviation and overdeviation parameters) was removed.
- f) Annex E (Class B) was removed.

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

Draft	Report on voting
77A/1253/FDIS	77A/1268/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 61000 series, published under the general title *Electromagnetic compatibility (EMC)*, can be found on the IEC website.

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, or
- revised.

The content of the corrigendum 1 (2026-07) has been included in this copy.

INTRODUCTION

IEC 61000 is published in separate parts according to the following structure:

Part 1: General

- General considerations (introduction, fundamental principles)
- Definitions, terminology

Part 2: Environment

- Description of the environment
- Classification of the environment
- Compatibility levels

Part 3: Limits

- Emission limits
- Immunity limits (in so far as they do not fall under the responsibility of the product committees)

Part 4: Testing and measurement techniques

- Measurement techniques
- Testing techniques

Part 5: Installation and mitigation guidelines

- Installation guidelines
- Mitigation methods and devices

Part 6: Generic standards

Part 9: Miscellaneous

Each part is further subdivided into several parts, published either as International Standards or as Technical Specifications or Technical Reports, some of which have already been published as sections. Others will be published with the part number followed by a dash and completed by a second number identifying the subdivision (example: IEC 61000-6-1).

INTRODUCTION to Corrigendum 1

During the final editing of the text for IEC 61000-4-30:2025 (Edition 4), some characters and mathematical expressions were corrupted due to the use of different text editor versions.

As a result, some subclauses include missing characters which may lead to confusion or wrong interpretation of the measurement method associated to some power quality parameters.

This corrigendum is intended to restore the missing characters, to harmonize the notation of the mathematical expressions along the subclauses, and to fix minor typos, grammar errors, and erroneous references between clauses or to other documents.

1 Scope

This part of IEC 61000-4 defines the methods for measurement and interpretation of results for power quality parameters in AC power supply systems with a declared fundamental frequency of 50 Hz or 60 Hz.

Measurement methods are described for each relevant parameter in terms that give reliable and repeatable results, regardless of the method's implementation. This document addresses measurement methods for in-situ measurements.

This document covers two classes of measurement methods (Class A and Class S). The classes of measurement are specified in Clause 4.

NOTE 1 In this document, "A" stands for "advanced" and "S" stands for "surveys".

Measurement of parameters covered by this document is limited to conducted phenomena in power systems. The power quality parameters considered in this document are power frequency, magnitude of the supply voltage, flicker, supply voltage dips and swells, voltage interruptions, transient voltages, supply voltage unbalance, voltage harmonics and interharmonics, rapid voltage changes, mains communicating system (MCS) voltages, magnitude of current, harmonic currents, interharmonic currents and current unbalance.

Emissions in the 2 kHz to 150 kHz range are considered in Annex C and Annex D.

Depending on the purpose of the measurement, all or a subset of the phenomena on this list can be measured.

NOTE 2 Test methods for verifying compliance with this document can be found in IEC 62586-2.

NOTE 3 The effects of transducers inserted between the power system and the instrument are acknowledged but not addressed in detail in this document. Guidance about effects of transducers can be found IEC TR 61869-103.

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 60050-161:1990, *International Electrotechnical Vocabulary (IEV) - Part 161: Electromagnetic compatibility*

IEC 60050-161:1990/AMD9:2019

IEC 61000-2-4:2024, *Electromagnetic compatibility (EMC) - Part 2-4: Environment - Compatibility levels in power distribution systems in industrial locations for low-frequency conducted disturbances*

IEC 61000-4-7:2002, *Electromagnetic compatibility (EMC) - Part 4-7: Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto*

IEC 61000-4-7:2002/AMD1:2008

IEC 61000-4-15:2010, *Electromagnetic compatibility (EMC) - Part 4-15: Testing and measurement techniques - Flickermeter - Functional and design specifications*

IEC 62586-2, *Power quality measurement in power supply systems - Part 2: Functional tests and uncertainty requirements*

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IEC 60050-103:2009/AMD1:2017

IEC 60050-161:1990, *International Electrotechnical Vocabulary (IEV) - Part 161: Electromagnetic compatibility*

IEC 60050-161:1990/AMD9:2019

IEC 60050-311, *International Electrotechnical Vocabulary (IEV) - Part 311: General terms relating to measurements*

IEC 60255-24:2013 / IEEE C37.111-2013, *Measuring relays and protection equipment - Part 24: Common format for transient data exchange (COMTRADE) for power systems*

IEC 62586-1, *Power quality measurement in power supply systems - Part 1: Power quality instruments (PQI)*

IEC 61000-2-2:2002, *Electromagnetic compatibility (EMC) - Part 2-2: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

IEC 61000-2-2:2002/AMD1:2017

IEC 61000-2-2:2002/AMD2:2018

IEC TR 61000-2-8, *Electromagnetic compatibility (EMC) - Part 2-8: Environment - Voltage dips and short interruptions on public electric power supply systems with statistical measurement results*

IEC 61000-2-12, *Electromagnetic compatibility (EMC) - Part 2-12: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public medium-voltage power supply systems*

IEC 61000-3-3:2021, *Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection*

IEC TR 61000-3-6:2008, *Electromagnetic compatibility (EMC) - Part 3-6: Limits - Assessment of emission limits for the connection of distorting installations to MV, HV and EHV power systems*

IEC TR 61000-3-7:2008, *Electromagnetic compatibility (EMC) - Part 3-7: Limits - Assessment of emission limits for the connection of fluctuating installations to MV, HV and EHV power systems*

IEC 61000-3-8, *Electromagnetic compatibility (EMC) - Part 3: Limits - Section 8: Signalling on low-voltage electrical installations - Emission levels, frequency bands and electromagnetic disturbance levels*

IEC TR 61000-3-13:2008, *Electromagnetic compatibility (EMC) - Part 3-13: Limits - Assessment of emission limits for the connection of unbalanced installations to MV, HV and EHV power systems*

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test*

IEC 61000-4-19, *Electromagnetic compatibility (EMC) - Part 4-19: Testing and measurement techniques - tests for immunity to conducted, differential mode disturbances and signalling in the frequency range 2 kHz to 150 kHz at a.c. power ports*

IEC 61000-6-3:2020, *Electromagnetic compatibility (EMC)- Part 6-3: Generic standards - Emission standard for equipment in residential environments*

IEC 61010-1, *Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements*

IEC 61010-2-030, *Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-030: Particular requirements for testing and measuring circuits*

IEC 61010-2-032, *Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-032: Particular requirements for hand-held current clamps for electrical measurement and test*

IEC 61180 (all parts), *High-voltage test techniques for low voltage equipment*

IEC 61557-12:2018, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC - Equipment for testing, measuring or monitoring of protective measures - Part 12: Power metering and monitoring devices (PMD)*
IEC 61557-12:2018/AMD1:2021

IEC 61869 (all parts), *Instrument transformers*

IEC 61869-2:2012, *Instrument transformers - Part 2: Additional requirements for current transformers*

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IEC 62428:2008, *Electric power engineering - Modal components in three-phase a.c. systems - Quantities and transformations*

IEC GUIDE 107, *Electromagnetic compatibility - Guide to the drafting of electromagnetic compatibility publications*

ISO/IEC Guide 99:2007, *International vocabulary of metrology - Basic and general concepts and associated terms (VIM)*

CISPR 16-1-1:2019, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus*

CISPR 16-2-1:2014, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements*
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CISPR TR 16-3:2020, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 3: CISPR technical reports*

EN 50160:2022, *Voltage characteristics of electricity supplied by public distribution systems*

IEEE 1159-2019, *IEEE Recommended Practice for Monitoring Electric Power Quality*

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OIML V 2-200:2012: *International Vocabulary of Metrology - Basic and General Concepts and associated terms (VIM)*

Recommendation ITU-R TF.686-3:2013: *Glossary and definitions of time and frequency terms*
