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Shunt-connected active correction devices (ACD)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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IEC 63497 has been prepared by subcommittee 22E: Stabilized power supplies of IEC technical committee 22: Power electronic systems and equipment. It is an International Standard.

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

Draft	Report on voting
22E/301/FDIS	22E/306/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.

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– revised.

INTRODUCTION

Loads with non-linear behaviour, causing power quality issues, are increasingly frequent in all industrial, commercial and residential installations, and their percentage in overall electrical consumption is growing steadily.

This type of loads can be found in

– industrial equipment (welding machines, arc and induction furnaces, battery chargers, rectifiers like electrolysers, etc.),
– variable speed drives (VSD) for AC or DC motors,
– uninterruptible power supplies, and
– electric vehicle charging system.

In power systems, when non-linear loads are connected, they generate harmonics, whose effects are described in IEC TS 63191. The major consequences of harmonics are the increase of the RMS current in the different circuits and the deterioration of the supply voltage quality. The negative impact can remain un-noticed, but economical results can be compromised:

– increased overloading on the electrical system, thereby limiting usable capacity;
– increased energy losses;
– increased risks of outage;
– overheating of equipment and cables in installation leading to reduction of equipment lifetime;
– perturbation of some electronic systems.

Figure 1 and Figure 2 present typical current waveforms for single-phase and three-phase non-linear loads respectively, measured by devices such as power metering and monitoring devices (PMD) compliant to IEC 61557-12 or power quality instruments (PQI) compliant to IEC 62586-1.

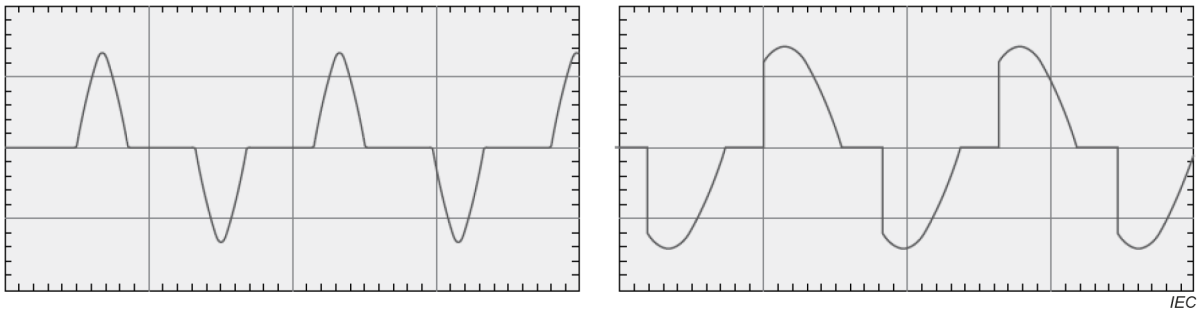

Figure 1 – Typical current waveforms for single-phase non-linear loads

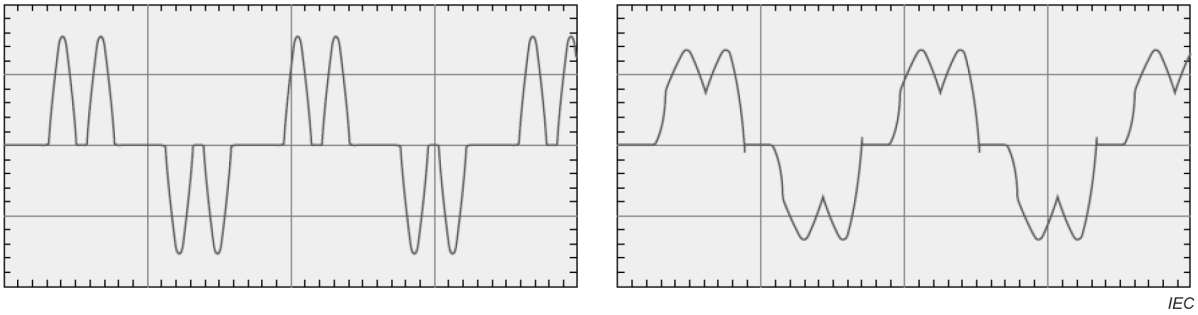

Figure 2 – Typical current waveforms for three-phase non-linear loads

A shunt-connected active correction device is used in parallel with the load to minimize these distortions, in order to obtain an approximately sinusoidal waveform.

1 Scope

This document, which is a product standard, is intended to specify the EMC, performance and safety requirements of shunt-connected active correction devices (ACD) with rated system voltages not exceeding 1 000 V AC or 1 500 V DC.

These devices can be either cord or permanently connected. They can be movable, stationary, or fixed devices.

An ACD includes both a static VAR generator (SVG) and an active harmonic filter (AHF).

The primary function of a shunt connected ACD is to do one or more of the following:

– active harmonic filtering;
– reactive power compensation;
– unbalanced load compensation.

Additional functions of a shunt-connected ACD, not addressed by this document, can be the following:

– flicker compensation;
– interharmonic component filtering.

In case of hybrid devices, combining a passive harmonic filter and an ACD, this document covers only the active part.

This document does not cover

– active mitigation functions part of another device (variable speed drive, uninterruptible power supply, dynamic voltage restorer, etc.),
– switched power capacitors,
– switched inductors,
– passive harmonic filters,
– energy storage converters, and
– series-connected active correction devices.

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 60364-1, *Low-voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, and definitions*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests*

IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments*

Bibliography

IEC 60050-131, *International Electrotechnical Vocabulary (IEV) - Part 131: Circuit theory*

IEC 60050-421, *International Electrotechnical Vocabulary (IEV) - Part 421: Power transformers and reactors*, available at www.electropedia.org

IEC 60050-442, *International Electrotechnical Vocabulary (IEV) - Part 442: Electrical accessorie*s, available at www.electropedia.org

IEC 60050-448, *International Electrotechnical Vocabulary (IEV) - Part 448: Power system protection,* available at www.electropedia.org

IEC 60050-551, *International Electrotechnical Vocabulary (IEV) - Part 551: Power electronics,* available at www.electropedia.org

IEC 60050-551-20, *International Electrotechnical Vocabulary (IEV) - Part 551: Power electronics,* available at www.electropedia.org

IEC 60050-614, *International Electrotechnical Vocabulary (IEV) - Part 614: Generation, transmission and distribution of electricity - Operation,* available at www.electropedia.org

IEC 60050-845, *International Electrotechnical Vocabulary (IEV) - Part 845: Lighting,* available at www.electropedia.org

IEC 60050-903, *International Electrotechnical Vocabulary (IEV) - Part 903: Risk assessment*, available at www.electropedia.org

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, *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 61000-4-13:2002, *Electromagnetic compatibility (EMC) - Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests*

IEC 61000-4-30:2025, *Electromagnetic compatibility (EMC) - Part 4-30: Testing and measurement techniques - Power quality measurement methods*

IEC 61557-12, *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 61800-3, *Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods for PDS and machine tools*

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

IEC TS 62749, *Assessment of power quality - Characteristics of electricity supplied by public networks*

IEC TS 62786-1:2023, *Distributed energy resources connection with the grid - Part 1: General requirements*

IEC TS 63191, *Demand-side power quality management*

IEC TR 63213:2019, *Power measurement applications within electrical distribution networks and electrical installations*

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

IEEE 519:2022, *IEEE Standard for Harmonic Control in Electric Power Systems*

EN 50160, *Voltage characteristics of electricity supplied by public electricity networks*

Engineering recommendation G5, issue 5, 2020, *Harmonic voltage distortion and the connection of harmonic sources and/or resonant plant to transmission systems and distribution networks in the United Kingdom*, Energy Networks Association

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