IEC 62606

Edition 1.0 2013-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

General requirements for arc fault detection devices

Exigences générales des dispositifs pour la détection de défaut d'arcs

IEC 62606:2013

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE
CODE PRIX XH

ICS 29.120; 29.120.50

ISBN 978-2-8322-0900-4

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

GENERAL REQUIREMENTS FOR ARC FAULT DETECTION DEVICES

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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International Standard IEC 62606 has been prepared by subcommittee 23E: Circuit-breakers and similar equipment for household use, of IEC technical committee 23: Electrical accessories.

The text of this standard is based on the following documents:

FDIS	Report on voting
23E/785/FDIS	23E/797/RVD

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

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

In this standard, the following print types are used:

- *compliance statements: in italic type.*

The committee has decided that the contents of this publication 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 November 2013 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.

INTRODUCTION

This International Standard aims to provide necessary requirements and testing procedures for devices to be installed by skilled people in households and similar uses to mitigate the risk of igniting an electrical fire downstream of the device.

Residual Current Devices (RCDs) are recognised as efficient to reduce the risk of fire by detection of leakage current and arcing to ground as a consequence of tracking currents within an electrical installation. However, RCDs as fuses or circuit-breakers are not able to reduce the risk of electrical fire due to series or parallel arcing between live conductors.

During a series arc fault, there is no leakage to ground therefore RCDs cannot detect such a fault. Moreover, the impedance of the series arc fault reduces the load current, which will keep the current below the tripping threshold of the circuit-breaker and the fuse. In the case of a parallel arc between phase and neutral conductor, the current is only limited by the impedance of the installation. In the worst cases of sporadic arcs, the conventional circuit breakers were not designed for that purpose.

Experience and information available confirmed that the r.m.s. current value of an earth fault current caused by an arcing fault, which is able to ignite a fire, is not limited to the rated power supply frequency of 50/60 Hz, but may contain a much higher frequency spectrum that is not taken into account for the testing of RCDs.

It has been recognised that the risk of igniting a fire within an electrical installation can also be a consequence of an overvoltage due to a broken neutral in a three phase installation.

This standard covers devices designed to be installed in a distribution board at the origin of one or several final circuits of a fixed installation.

GENERAL REQUIREMENTS FOR ARC FAULT DETECTION DEVICES

1 Scope

This International Standard applies to arc fault detection devices (AFDD) for household and similar uses in a.c. circuits.

NOTE 1 In the USA, Arc Fault Circuit Interrupters (AFCI) are considered similar to AFDDs.

An AFDD is designed by the manufacturer:

– either as a single device having opening means able to open the protected circuit in specified conditions; or

– as a single device integrating a protective device; or

– as a separate unit, according to Annex D assembled on site with a declared protective device.

The integrated protection device is either a circuit-breaker in accordance with IEC 60898-1 or an RCD in accordance with IEC 61008-1, IEC 61009-1 or IEC 62423.

These devices are intended to mitigate the risk of fire in final circuits of a fixed installation due to the effect of arc fault currents that pose a risk of fire ignition under certain conditions if the arcing persists.

Protection against fire ignition due to overvoltage due to a broken neutral within a three phase installation to be included in this type of equipment as an additional option is under consideration in 9.22.

NOTE 2 Tracking current leads to arcing and therefore may ignite fire.

This International Standard applies to devices performing simultaneously the detection and discrimination of arcing current with regards to fire hazards and defines operating criteria under specified conditions for the opening of the circuit when the arcing current exceeds the limit values given in this standard.

AFDDs complying with this standard, with the exception of those with an uninterrupted neutral, are suitable for use in IT systems.

The maximum rated voltage is 240 V a.c. AFDDs, according to this standard, are supplied either between line and neutral or between two lines.

The maximum rated current (I_n) is 63 A a.c.

AFDDs energised from batteries or a circuit other than the protected circuit are not covered by this standard.

AFDDs provide isolation, they are intended to be operated by uninstructed persons and do not require maintenance.

Particular requirements may be necessary for:

– AFDDs incorporated in or intended only for association with plugs and socket-outlets or with appliance couplers for household or similar general purposes;

– AFDDs intended to be used at frequencies other than 50 Hz or 60 Hz.

NOTE 3 For AFDDs incorporated in, or intended only for socket-outlets the requirements of this standard can be used, as far as applicable, in conjunction with the requirements of IEC 60884-1 or the national requirements of the country where the product is placed on the market.

NOTE 4 In the UK, the plug part and the socket-outlet part(s) need not comply with any IEC 60884-1 requirements. In the UK, the plug part shall comply with BS 1363-1 and the socket-outlet part(s) shall comply with BS 1363-2.

Special precautions (e.g. surge protective devices) may be necessary when excessive overvoltages are likely to occur on the supply side.

The requirements of this standard apply for standard conditions of temperature and environment. They are applicable to AFDDs intended for use in an environment with pollution degree 2. Additional requirements may be necessary for devices used in locations having more severe environmental conditions.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 + 12 h cycle)*

IEC 60068-3-4:2001, *Environmental testing – Part 3-4: Supporting documentation and guidance – Damp heat tests*

IEC 60364 (all parts), *Low-voltage electrical installations*

IEC 60364-4-44:2007, *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

IEC 60417, *Graphical symbols for use on equipment*, available from: <http://www.graphical-symbols.info/equipment>

IEC 60479 (all parts), *Effects of current on human beings and livestock*

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

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60695-2-10:2000, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC/TR 60755, *General requirements for residual current operated protective devices*

IEC 60898-1:2002, *Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations – Part 1: Circuit-breakers for a.c. operation*

IEC 61008-1:2010, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 1: General rules*

IEC 61009-1:2010, *Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) – Part 1: General rules*