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General safety requirements for residual current operated protective devices

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

GENERAL SAFETY REQUIREMENTS FOR RESIDUAL CURRENT OPERATED PROTECTIVE 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 60755 has been prepared by subcommittee 23E: Circuit breakers and similar equipment for household use, of IEC technical committee 23: Electrical accessories.

This first edition cancels and replaces IEC TR 60755 published in 2008 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC TR 60755:

- a) restructure of the document, as a Group Safety Publication, in compliance with Guide 104;
- b) introduction of classification for type F RCDs;
- c) introduction of Clause 9 for tests of RCDs (operating characteristics, electrical endurance, behaviour in short-circuit conditions, trip-free mechanism, test device, surges, reliability, EMC).

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

| FDIS | Report on voting |
|---------------|------------------|
| 23E/1035/FDIS | 23E/1036/RVD |

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

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

It has the status of a group safety publication in accordance with IEC Guide 104.

The following differing practices of a less permanent nature exist in the countries indicated below:

- 5.3.3: 0,015 A, 0,05 A and 0,2 A are also considered standard values (Korea and Japan);
- 5.3.12: 1 000 A, 2 000 A, 2 500 A, 7 500 A and 9 000 A are also considered preferred values (Korea and Japan);
- 8.1.1.1: multiple settings are not allowed (Australia, Germany, Denmark, the UK and Switzerland);
- 8.1.2: the colours red and green are not used for contact position indication (US).

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://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.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

IEC 60755 has been prepared as a Group Safety Publication by subcommittee 23E in accordance with its Group Safety Function for residual current devices. It is intended for use by technical committees in the preparation of standards for residual current unit, function or devices when it is intended to provide protective measures according to IEC 60364 (all parts).

There are two basic conditions of protection against the risk of electric shock: fault protection (indirect contact) and basic protection (direct contact).

Fault protection implies that the device is used to prevent dangerous voltages persisting on accessible installation metalworks, which are earthed but become live under earth fault conditions.

Under such conditions, the risk arises not from the user making direct contact with a live conductive part, but making contact with earthed metalwork, which itself is in contact with a live conductive part.

The primary or basic function of residual current devices is to provide fault protection. However, where devices have an adequate sensitivity (i.e. units having operating residual currents not exceeding 30 mA), they provide the additional benefit of people (and livestock) protection to a user making direct contact with a live conductive part where other methods of protection failed.

The operating characteristics given in this document are therefore based on requirements, which themselves are based on the information contained in IEC 60479-1 and IEC 60479-2.

Residual current devices having rated residual operating currents not exceeding 300 mA also provide protection against the risk of fire resulting from earth fault currents which can exist for lengthy periods without operating the overcurrent protective device.

GENERAL SAFETY REQUIREMENTS FOR RESIDUAL CURRENT OPERATED PROTECTIVE DEVICES

1 Scope

This document provides general minimum requirements, recommendations and information for the drafting of standards on residual current operated protective devices (hereinafter referred to as residual current devices, "RCDs"). It applies to any device providing residual current protection intended primarily for protection against electric shock hazard.

NOTE 1 Residual current monitors (RCMs) according to IEC 62020, whose purpose is to monitor an electrical installation and not to provide protection, are not covered by this document and cannot be considered similar or equivalent to RCDs.

NOTE 2 RCDs for DC supply system are under consideration.

NOTE 3 For the relationship between this document and the RCD product standards, see Annex D.

This document is primarily intended to be used as a reference for drafting product safety standard for devices identified as "RCD" or "residual current device" either for general use or incorporated or embedded in equipment.

This document is also intended to be used as a reference for defining the design requirements and the applicable testing procedure for an RCD incorporated or embedded in an equipment.

This group safety publication is primarily intended for use by technical Committees in the preparation of standards in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51. It is not intended for use by manufacturers or certification bodies.

One of the responsibilities of a technical committee is, wherever applicable, to make use of group safety publications in the preparation of its publications. The requirements, test methods or test conditions of this group safety publication will not apply unless specifically referred to or included in the relevant publications.

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 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60060-2, *High-voltage test techniques – Part 2: Measuring systems*

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

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

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

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

IEC 60417, *Graphical symbols for use on equipment* (available at <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, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 61000-6-1, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity standard for residential, commercial and light-industrial environments*

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

IEC 61000-6-3, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments*

IEC 61000-6-4, *Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments*

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61543:1995, *Residual current-operated protective devices (RCDs) for household and similar use – Electromagnetic compatibility*

IEC 61543:1995/AMD1:2004

IEC 61543:1995/AMD2:2005

IEC 62873-2, *Residual current operated circuit-breakers for household and similar use – Part 2: Residual current devices (RCDs) – Vocabulary*

IEC GUIDE 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

ISO/IEC Guide 51, *Safety aspects – Guidelines for their inclusion in standards*

CISPR 14-1, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*