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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Requirements for automatic reclosing devices (ARDs) for circuit-breakers, RCBOs and RCCBs for household and similar uses

Exigences pour les dispositifs à refermeture automatique (DRA) pour disjoncteurs, ID et DD, pour usages domestiques et analogues

IEC 63024:2017-12(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

REQUIREMENTS FOR AUTOMATIC RECLOSING DEVICES (ARDs) FOR CIRCUIT-BREAKERS, RCBOs AND RCCBs FOR HOUSEHOLD AND SIMILAR USES

FOREWORD

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International Standard IEC 63024 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 International Standard is based on the following documents:

FDIS	Report on voting
23E/1037/FDIS	23E/1038/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.

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- withdrawn,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.

INTRODUCTION

Automatic reclosing devices (ARDs) are intended to reclose circuit-breakers, RCBOs, and RCCBs after tripping in order to re-establish continuity of service.

REQUIREMENTS FOR AUTOMATIC RECLOSING DEVICES (ARDs) FOR CIRCUIT-BREAKERS, RCBOs AND RCCBs FOR HOUSEHOLD AND SIMILAR USES

1 Scope

This International Standard applies to automatic reclosing devices (ARDs) for household and similar uses, for rated voltage not exceeding 440 V AC, and which are intended to be used in combination with circuit-breakers, RCCBs and RCBOs, and designed either for factory assembly or for assembly on site.

These devices are intended to reclose main protective devices (MPDs) such as circuit-breakers complying with IEC 60898-1 and/or IEC 60898-2, RCCBs complying with IEC 61008-1 and/or IEC 62423, and RCBOs complying with IEC 61009-1 and/or IEC 62423 after tripping of those devices in order to re-establish continuity of service.

This document includes the following types of ARDs:

– ARDs with assessment means, reclosing only if both the prospective line current and the prospective earth-fault current do not exceed given values;
– ARDs with assessment means, reclosing only if the prospective line current does not exceed a given value;
– ARDs with assessment means, reclosing only if the prospective earth-fault current does not exceed a given value;
– ARDs that recloses without any assessment.

NOTE 1 Installation rules define the condition of use of each of the products and the types.

NOTE 2 The assessment cannot substitute the verifications required by IEC 60364-6.

NOTE 3 The requirements and tests for the assessment function in IT systems are under consideration.

This document does not apply to ARDs with multiple settings adjustable by means accessible to the user in normal service.

Devices covered by this document are intended to be suitable for operation by uninstructed persons without the need for maintenance.

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 60065:2014, *Audio, video and similar electronic apparatus – Safety requirements*

IEC 60384 (all parts), *Fixed capacitors for use in electronic equipment*

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

IEC 60664-3, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60898-1:2015, *Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations – Part 1: Circuit-breakers for a.c. operation*

IEC 60898-2:2016, *Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations – Part 2: Circuit-breakers for AC and DC operation*

IEC 60947-5-1, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

IEC 60950-1, *Information technology equipment – Safety – Part 1: General requirements*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

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

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-16, *Electromagnetic compatibility (EMC) – Part 4-16: Testing and measurement techniques – Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz*

IEC 61008-1:2010, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 1: General rules*
IEC 61008-1:2010/AMD1:2012
IEC 61008-1:2010/AMD2:2013

IEC 61009-1:2010, *Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) – Part 1: General rules*
IEC 61009-1:2010/AMD1:2012
IEC 61009-1:2010/AMD2:2013

IEC 61189-2, *Test methods for electrical materials, printed boards and other interconnection structures and assemblies – Part 2: Test methods for materials for interconnection structures*

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 61558 (all parts), *Safety of transformers, reactors, power supply units and combinations thereof*

IEC 62019, *Electrical accessories – Circuit-breakers and similar equipment for household use – Auxiliary contact units*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60898-1, IEC 62873-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
actuator
part of the actuating system to which an external force is applied when the ARD is installed as in normal use

Note 1 to entry: Only the actuator may take the form of a handle, knob, push-button, roller, plunger, etc.

[SOURCE: IEC 60050-441:1984, 441-15-22, modified – Adapted for ARDs]

3.2
assessment
<method based on a limited test current> type of assessment carried out by means of a non-hazardous current injected into the disconnected part of the installation

Note 1 to entry: The limit values of currents are specified in 8.11.3.

3.3
assessment
<method based on a limited test voltage> type of assessment carried out by means of a non-hazardous voltage applied to the disconnected part of the installation

Note 1 to entry: The limit values of voltage are specified in 8.11.2.

3.4
automatic reclosing
automatic reclosing function
function intended to cause the main protective device (MPD) to reclose, under specified conditions, after tripping

3.5
automatic reclosing device
ARD
device intended to produce the automatic reclosing of the MPD to which it is associated

3.6
blocked condition
condition of the ARD for which the MPD is tripped and the ARD shall not reclose it automatically

Note 1 to entry: This condition can be removed only by manual reset operation according to the manufacturer's instructions.

3.7
consecutive reclosing operations
number of consecutive reclosing operations that leads the ARD in blocked condition within a period of time

3.8
disabled, adj
condition of the ARD for which an automatic reclosing function is de-activated and the MPD can never be automatically reclosed

3.9
earth-fault current
current flowing to earth due to an insulation fault

[SOURCE: IEC 60050-442:1998, 442-01-23]

3.10
enabled, adj
condition of the ARD for which an automatic reclosing function is activated

3.11
functional earth
FE
wire or terminal intended to be connected to the PE so as to provide a reference point to the ARD for assessment means

Note 1 to entry: This note applies to the French language only.

3.12
main protective device
MPD
device to which the ARD is intended to be associated and that will be reclosed by the ARD

Note 1 to entry: The MPD is a circuit-breaker (IEC 60898-1 and/or IEC 60898-2), an RCCB (IEC 61008-1 and IEC 62423) or an RCBO (IEC 61009-1 and IEC 62423).

3.13
non-operating resistance between live parts
value of resistance between live parts, below which the automatic reclosing of the MPD is not permitted under specified conditions

3.14
non-operating resistance to earth
value of resistance between live parts and earth below which the automatic reclosing of the MPD is not permitted under specified conditions

3.15
operating resistance between live parts
value of resistance between live parts above which the automatic reclosing of the MPD is permitted under specified conditions

3.16
operating resistance to earth
value of resistance between live parts and earth above which the automatic reclosing of the MPD is permitted under specified conditions

3.17
prospective current
current that would flow in the circuit if each pole of the switching device or the fuse were replaced by a conductor of negligible impedance

[SOURCE: IEC 60050-441:1984, 441-17-01, modified – In the title, “(of a circuit and with respect to a switching device or a fuse)” has been removed as well as the Note 1 to entry.]

3.18
prospective line current assessment
assessment of the current likely to flow through each phase and neutral of the MPD after reclosing

3.19
prospective residual current assessment
assessment of the current likely to flow through the MPD to earth after reclosing the MPD

3.20
reset time
period of time after which the ARD resets the counting of the consecutive reclosing operations

3.21
tripped condition
condition of ARDs for which the MPD has tripped and may be reclosed automatically under specified conditions

4 Classification

4.1 According to the method of construction

4.1.1 ARD assembled in factory by the manufacturer.

NOTE This also includes built-in devices.

4.1.2 ARD assembled on site.

4.2 According to the associated MPD

4.2.1 ARD for circuit-breakers.

4.2.2 ARD for RCCBs.

4.2.3 ARD for RCBOs.

NOTE The same ARD can be designed for more than one MPD.

4.3 According to the type of assessment means

4.3.1 ARD without assessment means (see Annex A).

4.3.2 ARD with assessment means.

4.3.2.1 ARD with means of assessment of the prospective residual current:

a) operation blocked after assessment of an excessive residual current in the installation (see Annex B);
b) remains in tripped condition after the assessment of an excessive residual current in the installation (see Annex C).

4.3.2.2 ARD with means of assessment of the prospective line current:

a) operation blocked after assessment of an overcurrent in the installation (see Annex B);
b) remains in tripped condition after the assessment of an overcurrent in the installation (see Annex C).

NOTE 1 The behaviour according to 4.3.2.1 b) and 4.3.2.2 b) is defined in the manufacturer's instructions.