

# 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

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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

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## CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references .....	9
3 Terms and definitions .....	11
4 Classification.....	13
4.1 According to the method of construction .....	13
4.2 According to the associated MPD.....	13
4.3 According to the type of assessment means .....	13
4.4 According to the safety means during the assessment.....	14
4.5 According to the connection to FE.....	14
4.6 According to maximum number of reclosing operations .....	14
4.7 According to mechanical interlock between MPD operating means and ARD enabling/disabling system .....	14
5 Characteristics .....	14
5.1 Summary of characteristics.....	14
5.2 Rated quantities .....	14
5.2.1 Rated voltage .....	14
5.2.2 Rated operational voltage ( $U_e$ ).....	15
5.2.3 Rated frequency.....	15
5.2.4 Rated non-operating resistance to earth ( $R_{d0}$ ).....	15
5.2.5 Rated operating resistance to earth ( $R_d$ ) .....	15
5.2.6 Rated non-operating resistance between live parts ( $R_{cc0}$ ).....	15
5.2.7 Rated operating resistance between live parts ( $R_{cc}$ ) .....	16
6 Marking and other product information .....	16
6.1 Standard marking.....	16
6.2 Instructions for assembly and operation .....	17
7 Standard conditions for operation in service.....	18
7.1 General.....	18
7.2 Conditions of installation .....	18
7.3 Pollution degree .....	18
8 Requirements for construction and operation .....	18
8.1 Mechanical design .....	18
8.1.1 General .....	18
8.1.2 Mechanism .....	19
8.1.3 Clearances and creepage distances .....	20
8.1.4 Clearances and creepage distances for electronic circuits connected between live parts or between live parts and the earth.....	20
8.1.5 Screws, current-carrying parts and connections .....	22
8.1.6 Terminals for external conductors .....	22
8.2 Protection against electric shock.....	22
8.3 Dielectric properties and isolating capability.....	23
8.4 Temperature rise.....	23
8.5 Mechanical and electrical endurance .....	23
8.6 Performance at short-circuit currents .....	23
8.7 Resistance to mechanical shock and impact.....	23

8.8	Resistance to heat.....	23
8.9	Resistance to abnormal heat and to fire .....	24
8.10	Operating characteristics.....	24
8.11	Assessment means for ARD according to 4.3.2.....	25
8.11.1	General .....	25
8.11.2	Assessment means operating by limitation of the test voltage .....	25
8.11.3	Assessment means operating by limitation of the test current .....	25
8.12	Safety in blocked condition .....	26
8.13	Test device .....	26
8.14	Ageing .....	26
8.15	Electromagnetic compatibility (EMC).....	26
9	Tests .....	26
9.1	General.....	26
9.2	Test condition .....	26
9.3	Measurement of the reclosing time after the tripping of the MPD .....	27
9.4	Test of indelibility of marking .....	27
9.5	Verification of the non-influence of the ARD on the correct operation of the MPD .....	27
9.5.1	Verification of the operating characteristics of the MPD .....	27
9.5.2	Verification of the impossibility of the activation of the ARD when the MPD has been manually opened.....	28
9.5.3	Verification of the enabling/disabling system of the ARD.....	28
9.5.4	Verification of the maximum number of consecutive reclosings .....	28
9.6	Tests of creepage distances and clearances for electronic circuits (abnormal conditions) .....	29
9.7	Requirements for capacitors, specific resistors and inductors used in electronic circuits .....	32
9.7.1	General .....	32
9.7.2	Capacitors .....	32
9.7.3	Resistors .....	32
9.7.4	Inductors and windings .....	33
9.8	Test of reliability of screws, current-carrying parts and connections .....	33
9.9	Test of reliability of terminals for external conductors.....	33
9.10	Verification of protection against electric shock.....	33
9.11	Test of dielectric properties and isolating capability .....	33
9.12	Temperature rise .....	34
9.13	Verification of the mechanical and electrical endurance – Verification of the reclosing system of the ARD .....	34
9.13.1	General test conditions .....	34
9.13.2	Test procedure .....	34
9.13.3	Condition of the ARD after the test .....	34
9.14	Short-circuit test .....	35
9.14.1	General conditions for short-circuit test.....	35
9.14.2	Test circuit and test quantities .....	35
9.14.3	Test procedure .....	35
9.14.4	Condition of the ARD after the test .....	35
9.15	Resistance to mechanical shock and impact .....	36
9.16	Test of resistance to heat.....	36
9.17	Resistance to abnormal heat and to fire .....	36
9.18	Verification of the operating characteristics.....	36

9.18.1	General .....	36
9.18.2	Verification of the reclosing subordinated to the measurements of the resistance to earth .....	36
9.18.3	Verification of the reclosing subordinated to the measurements of the resistance between live parts.....	37
9.18.4	Verification of the influence of the distributed capacities in the installation on the operating characteristic .....	37
9.18.5	Verification of the maximum current in FE under normal condition .....	37
9.19	Verification of the safety during the assessment .....	38
9.19.1	Verification of the limitation of the voltage .....	38
9.19.2	Verification of the limitation of the test current .....	38
9.19.3	Verification of the safety in blocked condition .....	38
9.20	Verification of the operation of the test device at the limits of rated voltage.....	39
9.21	Verification of ageing .....	39
9.22	Electromagnetic compatibility.....	39
9.22.1	General .....	39
9.22.2	Low-frequency electromagnetic phenomena .....	39
9.22.3	High-frequency immunity .....	40
9.22.4	Electrostatic discharges.....	41
9.22.5	Electromagnetic emission of ARDs .....	41
9.22.6	Performance criteria .....	41
Annex A (informative)	Classification of ARDs according to 4.3.1 .....	48
Annex B (informative)	Classification of ARDs according to 4.3.2.1 a) and/or 4.3.2.2 a) .....	49
Annex C (informative)	Classification of ARDs according to 4.3.2.1 b) and/or 4.3.2.2 b) .....	50
Annex D (normative)	Test sequences and number of samples to be submitted for verification of conformity.....	51
Bibliography	.....	54
Figure 1	– Minimum creepage distances and clearances measured .....	42
Figure 2	– Minimum creepage distances and clearances as a function of peak value of operating voltage .....	43
Figure 3	– Verification of the reclosing subordinated to the measurements of the resistance to earth for ARD without functional earthing (9.18.2 a), 9.18.2 b) and 9.19.2) .....	44
Figure 4	– Verification of the reclosing subordinated to the measurements of the resistance to earth for ARD with functional earthing (9.18.2 a), 9.18.2 b) and 9.19.2) .....	45
Figure 5	– Verification of the reclosing subordinated to the measurements of the resistance between live parts (9.18.3 a) and 9.18.3 b)) .....	46
Figure 6	– Test circuit for the verification of the maximum current in FE under normal condition .....	47
Figure A.1	– Classification of ARDs according to 4.3.1.....	48
Figure B.1	– Classification of ARDs according to 4.3.2.1 a) and/or 4.3.2.2 a).....	49
Figure C.1	– Classification of ARDs according to 4.3.2.1 b) and/or 4.3.2.2 b).....	50
Table 1	– Minimum admissible $R_d$ values .....	15
Table 2	– Minimum clearances and creepage distances .....	21
Table 3	– Behaviour of the ARD in enable condition .....	25
Table 4	– Maximum permissible temperatures under abnormal conditions .....	31
Table 5	– Low frequency immunity test conditions .....	40

Table 6 – High-frequency immunity test conditions .....	40
Table 7 – Test conditions for electrostatic discharges .....	41
Table D.1 – Test sequences .....	51
Table D.2 – Number of samples for full test procedure .....	52
Table D.3 – Additional tests for ARD already fully tested together with one kind of MPD .....	53

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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

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## INTRODUCTION

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

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# 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.