

# INTERNATIONAL STANDARD

**Residual current operated circuit-breakers for household and similar use –  
Part 3-1: Particular requirements for devices with screwless-type terminals for  
external copper conductors**

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INTERNATIONAL  
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COMMISSION

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## CONTENTS

FOREWORD .....	3
INTRODUCTION .....	5
1 Scope .....	6
2 Normative references .....	6
3 Terms and definitions .....	6
4 Classification .....	7
5 Characteristics of devices .....	7
6 Marking and other product information .....	7
7 Standard conditions for operation in service and for installation .....	8
8 Requirements for construction and operation .....	8
8.1 General .....	8
8.2 Connection and disconnection of conductors .....	8
8.3 Dimensions of conductors .....	8
8.4 Connectable cross-sectional areas .....	9
8.5 Insertion and withdrawal of conductors .....	9
8.6 Design and construction of terminals .....	9
8.7 Resistance to ageing .....	10
9 Tests .....	10
9.1 General .....	10
9.2 Test of reliability of screwless-type terminals .....	10
9.2.1 Reliability of screwless system .....	10
9.2.2 Test of reliability of connection .....	11
9.3 Tests of reliability of terminals for external conductors .....	11
9.3.1 Mechanical strength .....	11
9.3.2 Cycling test .....	11
Bibliography .....	15
Figure 1 – Connecting samples .....	12
Figure 2 – Examples of screwless-type terminals .....	14
Table 1 – Conductors and their theoretical diameters .....	9
Table 2 – Cross-sections of copper conductors connectable to screwless-type terminals .....	9
Table 3 – Pull forces .....	11
Table 4 – Test copper conductors corresponding to the rated currents .....	12

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**RESIDUAL CURRENT OPERATED CIRCUIT-BREAKERS  
FOR HOUSEHOLD AND SIMILAR USE –****Part 3-1: Particular requirements for devices with  
screwless-type terminals for external copper conductors**

## FOREWORD

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International Standard IEC 62873-3-1 has been prepared by subcommittee 23E: Circuit-breakers and similar equipment for household use, of IEC technical committee 23: Electrical accessories.

This second edition cancels and replaces the first edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Modification of scope to cover screwless-type terminals up to 40 A;
- b) Modification of scope to address other devices in addition to RCDs;
- c) Modification of Table 1 to cover rated currents up to 40 A;

- d) Modification of 8.1 so that IEC 62873-3-1 can be referred to by other product standards in addition to those for RCDs;
- e) Modification of 9.1 so that IEC 62873-3-1 can be referred to by other product standards in addition to those for RCDs.

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

FDIS	Report on voting
23E/1190/FDIS	23E/1200/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 is intended to be referred to by a product standard of subcommittee IEC SC23E (e.g. from the IEC 61008 series, IEC 61009 series, IEC 62606, and IEC 63052).

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

A list of all parts of the IEC 62873 series, published under the general title *Residual current operated circuit-breakers for household and similar use*, can be found on the IEC website.

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.

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## INTRODUCTION

This document is part of the series described in the outline document IEC 62873-1.

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# RESIDUAL CURRENT OPERATED CIRCUIT-BREAKERS FOR HOUSEHOLD AND SIMILAR USE –

## Part 3-1: Particular requirements for devices with screwless-type terminals for external copper conductors

### 1 Scope

This document applies to devices equipped with screwless-type terminals for current not exceeding 40 A, primarily suitable for connecting unprepared copper conductors of cross-section up to 10 mm<sup>2</sup>.

This document cannot be used alone but is intended to be applied together with the applicable product standard in which it is referred to.

NOTE 1 In CZ, DK, NL, PO and CH, the upper limit of current for use of screwless-type terminals is 16 A.

NOTE 2 In JP, the upper limit of current for use of screwless-type terminals is 30 A.

NOTE 3 The manufacturer can declare in its documentation specific conditions permitting the use of prepared conductors.

In this document, screwless-type terminals are referred to as terminals, and copper conductors are referred to as conductors.

### 2 Normative references

[IEC 62873-3-1:2020](https://standards.iteh.ai/catalog/standards/sist/978dda6f-393b-4b75-9c55-74e8ed8224f9/iec-62873-3-1-2020)

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

### 3 Terms and definitions

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

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

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

#### 3.1

##### clamping unit

part of the terminal necessary for mechanical clamping and electrical connection of the conductors including parts necessary to ensure correct contact pressure



### 3.2

#### **universal terminal**

terminal for the connection and disconnection of all types of conductors (rigid and flexible)

Note 1 to entry: In the following countries, only universal screwless-type terminals are accepted: AT, BE, CN, DK, DE, ES, FR, IT, PT, SE and CH.

### 3.3

#### **non-universal terminal**

terminal for the connection and disconnection of a certain kind of conductor only (e.g. rigid-solid conductors only or rigid-[solid or stranded] conductors only)

### 3.4

#### **push-wire terminal**

non-universal terminal (see 3.3) in which the connection is made by pushing in rigid (solid or stranded) conductors

### 3.5

#### **unprepared conductor**

conductor which has been cut and the insulation of which has been removed for insertion into a terminal

Note 1 to entry: A conductor the shape of which is arranged for introduction into a terminal or the strands of which are twisted to consolidate the end is considered as an unprepared conductor.

[SOURCE: IEC 60050-442:1998, 442-01-26]

### 3.6

#### **low-current terminal**

terminal intended to connect a conductor to a device capable of supplying a voltage signal and/or a current not exceeding 300 mA to the device

Note 1 to entry: This does not apply to special terminal constructions intended to connect to flat or other multiwire cables by performing one "clamping action" only for more than one wire (e.g. bus connections).

## 4 Classification

Clause 4 of the product standard, in which this document is referred to, applies.

## 5 Characteristics of devices

Clause 5 of the product standard, in which this document is referred to, applies.

## 6 Marking and other product information

In addition to Clause 6 of the product standard, in which this document is referred to, the following markings apply:

Universal terminals:

- no marking.

Non-universal terminals:

- terminals declared for rigid-solid conductors shall be marked with the letters "sol";
- terminals declared for rigid (solid and stranded) conductors shall be marked with the letter "r";

- terminals declared for flexible conductors shall be marked with the letter "f".

The markings shall appear on the device or, if the space available is not sufficient, on the smallest package unit or in technical information.

An appropriate marking indicating the length of insulation to be removed before insertion of the conductor into the terminal shall be shown on the product.

The manufacturer shall also provide information, in its literature, on the maximum number of conductors which may be clamped.

## 7 Standard conditions for operation in service and for installation

Clause 7 of the product standard, in which this document is referred to, applies.

## 8 Requirements for construction and operation

### 8.1 General

The requirements of Clause 8 of this document apply in addition to Clause 8 of the product standard, in which this document is referred to.

Compliance is checked by inspection and by the tests of 9.2 and 9.3 of this document.

For low-current terminals, no significant current flow is expected in normal service. Therefore, the tests of 9.3.2 are not performed.

### 8.2 Connection and disconnection of conductors

The connection and disconnection of conductors shall be made:

- by the use of a general-purpose tool or by a convenient device integral with the terminal to open it and to assist the insertion or the withdrawal of the conductors (e.g. for universal terminals);

or, for rigid conductors:

- by simple insertion. For the disconnection of the conductors, an operation other than a pull on the conductor shall be necessary (e.g. for push-wire terminals).

Universal terminals shall accept rigid (solid or stranded) and flexible unprepared conductors. They may also accept prepared conductors according to the manufacturer's declaration.

Non-universal terminals shall accept the types of conductors declared by the manufacturer.

Compliance is checked by inspection and by the tests of 9.2 and 9.3 of this document.

### 8.3 Dimensions of conductors

The dimensions of conductors are given in Table 1.

The ability to connect these conductors shall be checked by the tests of 9.2 and 9.3 of this document.

**Table 1 – Conductors and their theoretical diameters**

Metric					AWG				
Rigid			Flexible		Rigid			Flexible	
	Solid	Stranded				Solid <sup>a</sup>	Class B stranded <sup>a</sup>		Classes I, K, M, stranded <sup>b</sup>
mm <sup>2</sup>	∅ mm	∅ mm	mm <sup>2</sup>	∅ mm	gauge	∅ mm	∅ mm	gauge	∅ mm
1,0	1,2	1,4	1,0	1,5	18	1,07	1,23	18	1,28
1,5	1,5	1,7	1,5	1,8	16	1,35	1,55	16	1,60
2,5	1,9	2,2	2,5	2,4	14	1,71	1,95	14	2,08
4,0	2,4	2,7	4,0	3,0	12	2,15	2,45	12	2,70
6,0	2,9	3,3	6,0	3,9	10	2,72	3,09	10	3,36
10,0	3,7	4,2	10,0	5,1	8	3,43	3,89	8	4,32

NOTE Diameters of the largest rigid and flexible conductors are based on Table C.1 of IEC 60228:2004, and, for AWG conductors, on ASTM B 172-17.

<sup>a</sup> Nominal diameter + 5 %.

<sup>b</sup> Largest diameter + 5 % for any of the three classes I, K and M.

#### 8.4 Connectable cross-sectional areas

The nominal cross-sections to be clamped are defined in Table 2.

**Table 2 – Cross-sections of copper conductors connectable to screwless-type terminals**

Rated current A	Nominal cross-sections to be clamped mm <sup>2</sup>
Low-current terminals	To be declared by the manufacturer
Up to and including 13	1 up to and including 2,5
Above 13 up to and including 20	1,5 up to and including 4
Above 20 up to and including 25	1,5 up to and including 6 <sup>a</sup>
Above 25 up to and including 32	2,5 up to and including 6 <sup>a</sup>
Above 32 up to and including 40	4 up to and including 10

<sup>a</sup> For terminals with two connections per pole, the maximum value is 4 mm<sup>2</sup>. Two conductors in parallel (also known as ring circuits) are used in some countries.

Compliance is checked by inspection and by the tests of 9.2 and 9.3 of this document.

#### 8.5 Insertion and withdrawal of conductors

The insertion and withdrawal of the conductors shall be carried out in accordance with the manufacturer's instructions.

Compliance is checked by inspection.

#### 8.6 Design and construction of terminals

Terminals shall be so designed and constructed that:

- each conductor is clamped individually;