IEC 62873-3-2

Edition 2.0 2020-11
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Residual current operated circuit-breakers for household and similar use – Part 3-2: Particular requirements for ~~RCDs~~ devices with flat quick-connect terminations

IEC 62873-3-2:2020-11 RLV(en)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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INTERNATIONAL
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 3-2: Particular requirements for ~~RCDs~~ devices with flat quick-connect terminations

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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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 62873-3-2 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 the scope to address other devices in addition to RCDs;
b) Modification of 8.1 so that IEC 62873-3-2 can be referred to by other product standards in addition to those for RCDs;
c) Modification of 9.1 so that IEC 62873-3-2 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/1195/FDIS	23E/1201/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.

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

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INTRODUCTION

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

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

Part 3-2: Particular requirements for ~~RCDs~~ devices with flat quick-connect terminations

1 Scope

This document applies to ~~RCDs~~ devices equipped with flat quick-connect terminations consisting of a male tab ~~(see 3.2)~~ with nominal width 6,3 mm and thickness 0,8 mm, to be used with a mating female connector for connecting electrical copper conductors according to the manufacturer's instructions, for rated currents up to and including 16 A.

NOTE The use of ~~RCDS with~~ flat quick-connect terminations for rated currents up to and including 20 A is accepted in BE, FR, IT, ES, PT and US.

This document cannot be used alone but is intended to be applied together with ~~an RCD product standard (IEC 61008-1 or IEC 61009-1) if an RCD is equipped with flat quick-connect terminations~~ the applicable product standard in which it is referred to.

The connectable electrical copper conductors are flexible, having a cross-sectional area up to and including 4 mm^2, or rigid-stranded, having a cross-sectional area up to and including 2,5 mm^2 (AWG equal to or greater than 12).

This document applies exclusively to ~~RCDs~~ products having male tabs as an integral part of the device.

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

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

~~*IEC 61210, Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements*~~

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
flat quick-connect termination
electrical connection consisting of a male tab (3.2) and a female connector (3.3) which can be pushed into and withdrawn with or without the use of a tool

3.2
male tab
portion of a quick-connect termination which receives the female connector

3.3
female connector
portion of a quick-connect termination which is pushed onto the male tab

3.4
detent
dimple (depression) or hole in the male tab which engages a raised portion on the female connector to provide a latch for the mating parts

4 Classification

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

5 Characteristics of ~~RCDs~~ products

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

6 Marking and other product information

In addition to Clause 6 of the ~~RCD~~ product standard, in which this document is referred to, the following requirements apply.

The following information regarding the female connector ~~according to IEC 61210~~ and the type of conductor to be used shall be given in the manufacturer's instructions:

– manufacturer's name or trademark;
– type reference;
– information on cross-sections of conductors and colour codes of insulated female connectors (see examples in Table 1);
– the use of only silver- or tin-plated copper alloys.

Table 1 – Colour code of female connectors in relationship with the cross-section of the conductor

Cross-section of the conductor		Colour code of the female connector
mm^2	AWG	
1	18	Red
1,5	16	Red or blue
2,5	14	Blue or yellow
4	12	Yellow

7 Standard conditions for operation in service and for installation

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

8 Requirements for construction and operation

8.1 General

~~Clause 8 of the RCD product standard applies, with the following exceptions:~~

~~Subclause 8.1.3 applies, the female connectors being fitted to the male tabs of the RCD.~~

~~Subclause 8.1.5 does not apply.~~

~~In addition, the following requirements apply.~~

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

8.2 Terminals for external conductors

8.2.1 Male tabs and female connectors shall be of a metal having mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use.

NOTE Silver- or tin-plated copper alloys are examples of suitable solutions.

8.2.2 The nominal width of the male tab is 6,3 mm and its thickness is 0,8 mm, applicable to rated currents up to and including 16 A.

NOTE ~~1~~ The use of male tabs and female connectors for rated currents up to and including 20 A is accepted in BE, FR, IT, PT, ES and US.

The dimensions of the male tab shall comply with those specified in Table 2 and in Figure 1, Figure 2, Figure 3 and Figure 4, where the dimensions *A, B, C, D, E, F, J, M, N, P* and *Q* are mandatory.

The dimensions of the female connector which may be fitted on the male tab are given in Figure 5 and in Table 3.

The shapes of the various parts may deviate from those given in the figures, provided that the specified dimensions are not influenced and the test requirements are complied with (for example: corrugated tabs, folded tabs, etc).

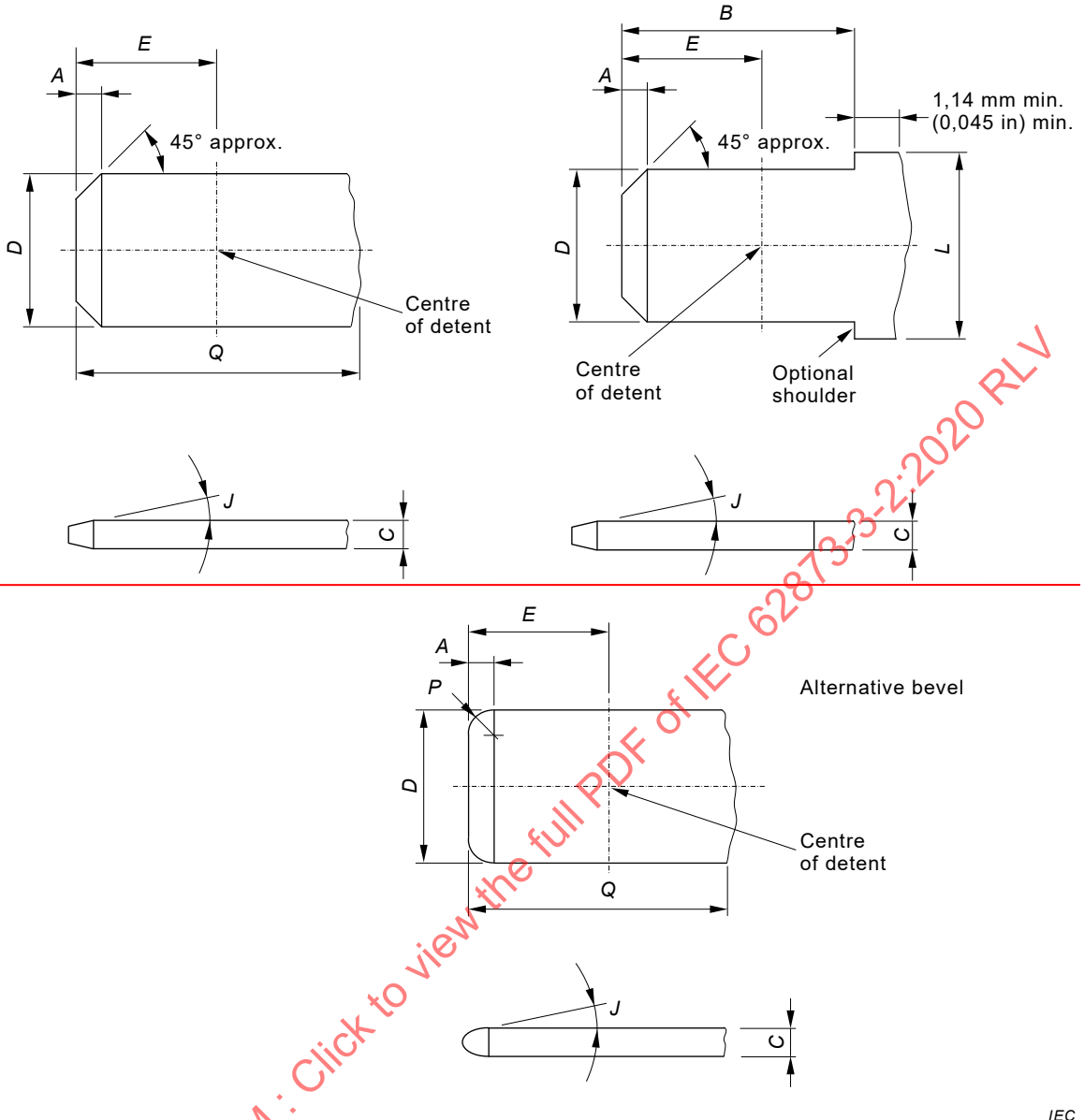
Compliance is checked by inspection and by measurement.

8.2.3 Male tabs shall be securely retained.

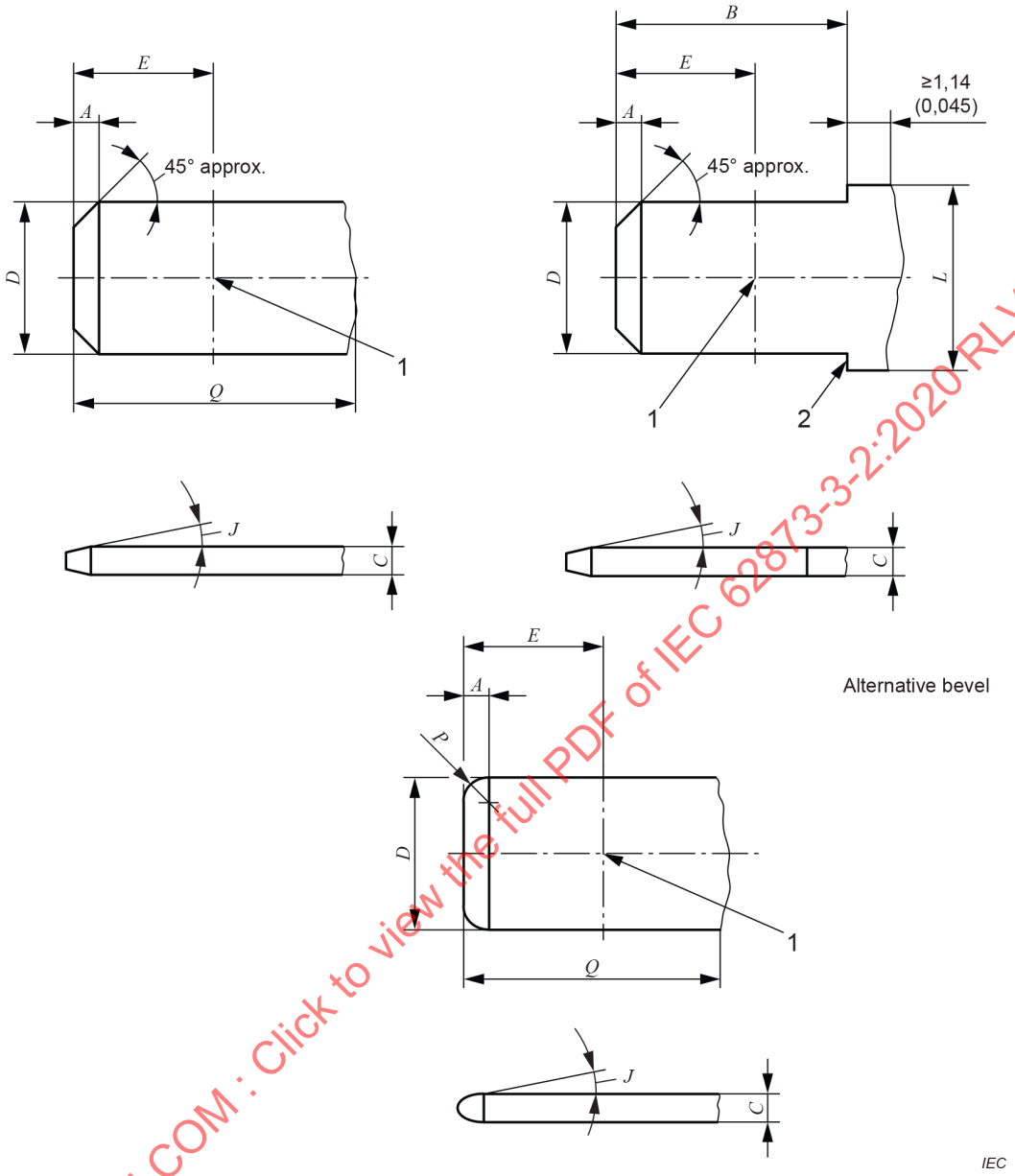
Compliance is checked by the mechanical overload test of 9.2.

Table 2 – Dimensions of tabs

Nominal size mm		Dimension										
		A	*B* minimum	*C*	*D*	*E*	*F*	*J*	*M*	*N*	*P*	*Q* minimum
6,3 × 0,8	Dimple	1,0		0,84	6,40	4,1	2,0	12°	2,5	2,0	1,8	
		0,7	7,8	0,77	6,20	3,6	1,6	8°	2,2	1,8	0,7	8,9
	Hole	1,0		0,84	6,40	4,7	2,0	12°			1,8	
		0,5	7,8	0,77	6,20	4,3	1,6	8°			0,7	8,9
NOTE 1 For the dimensions *A* to *Q*, refer to Figure 1 to Figure 4.												
NOTE 2 Where two values are shown in one column, they give the maximum and the minimum dimensions.												



Dimensions in millimetre (in brackets inches)



Key

1 Centre of detent

2 Optional shoulder

Bevel A of 45° need not be a straight line if it is within the confines shown.

Dimension L is not specified and may vary by the application (for example fixing).

Dimension C of tabs may be produced from more than one layer of material provided that the resulting tab complies in all respects with the requirements of this document. A radius on the longitudinal edge of the tab is permissible.

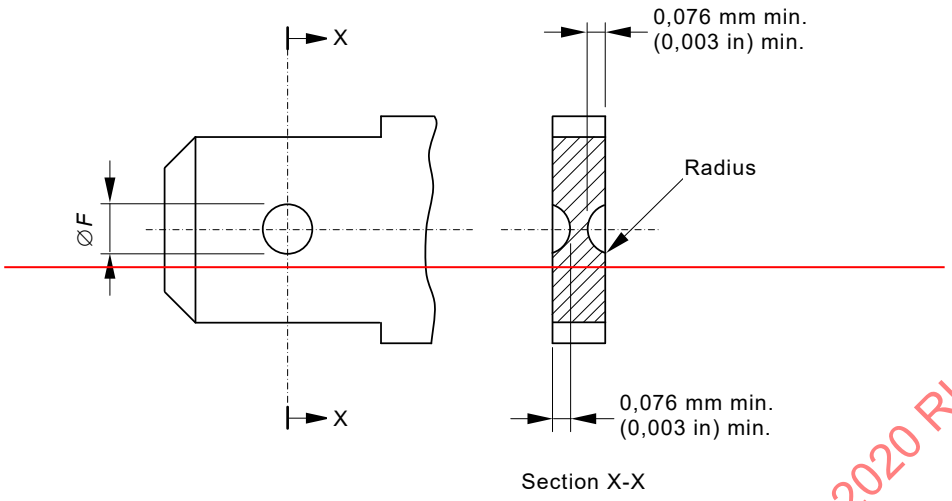
The thickness C of the male tab may vary beyond Q or beyond B + 1,14 mm (0,045 in).

All portions of the tabs are flat and free of burrs or raised plateaus, except that there may be a raised plateau over the stock thickness of 0,025 mm (0,001 in) per side, in an area defined by a line surrounding the detent and distant from it by 1,3 mm (0,051 in).

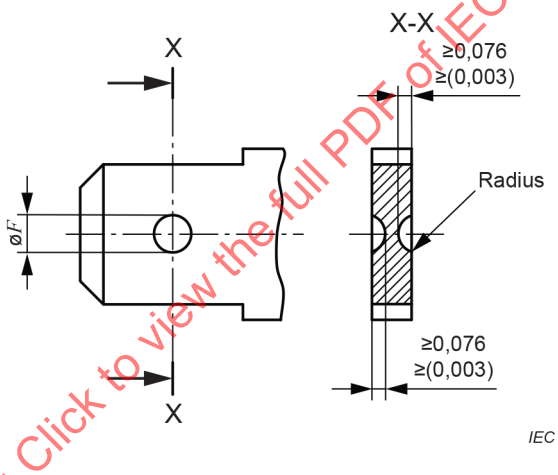
For detent and hole dimensions, see Figure 2, Figure 3 and Figure 4.

NOTE The sketches are not intended to govern the design except with regard to the dimensions shown.

Figure 1 – Dimensions of male tabs

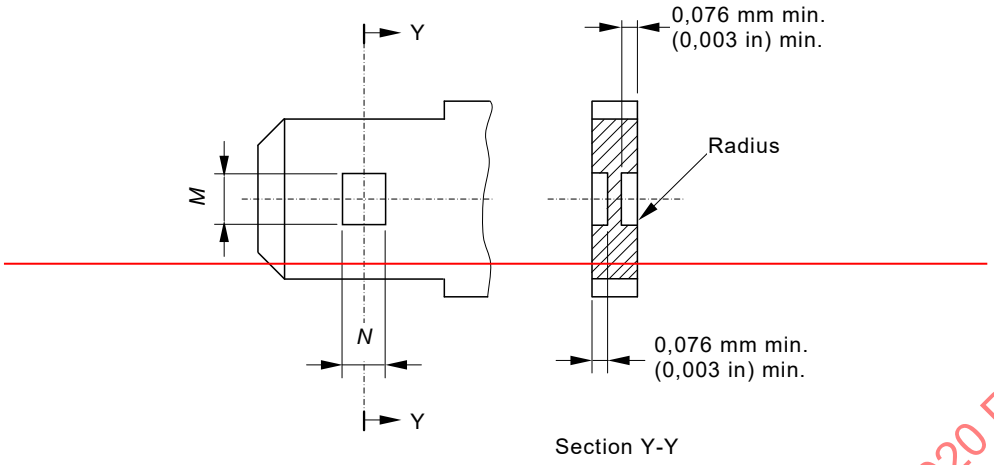


Dimensions in millimetre(in brackets inches)

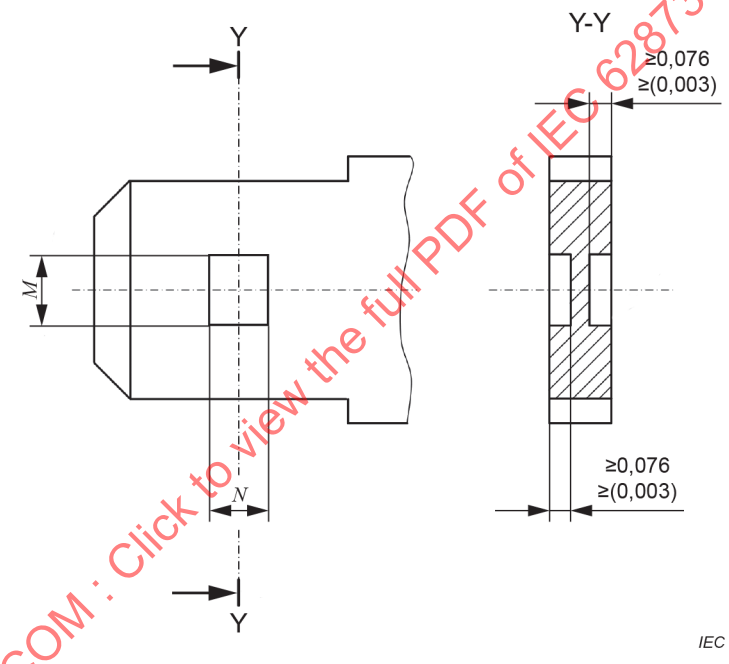


Detent shall be located within 0,076 mm (0,003 in) of the centre-line of the tab.

Figure 2 – Dimensions of round dimple detents (see Figure 1)

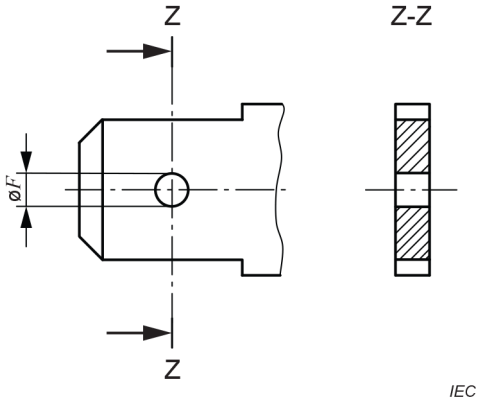


Dimensions in millimetre (in brackets inches)



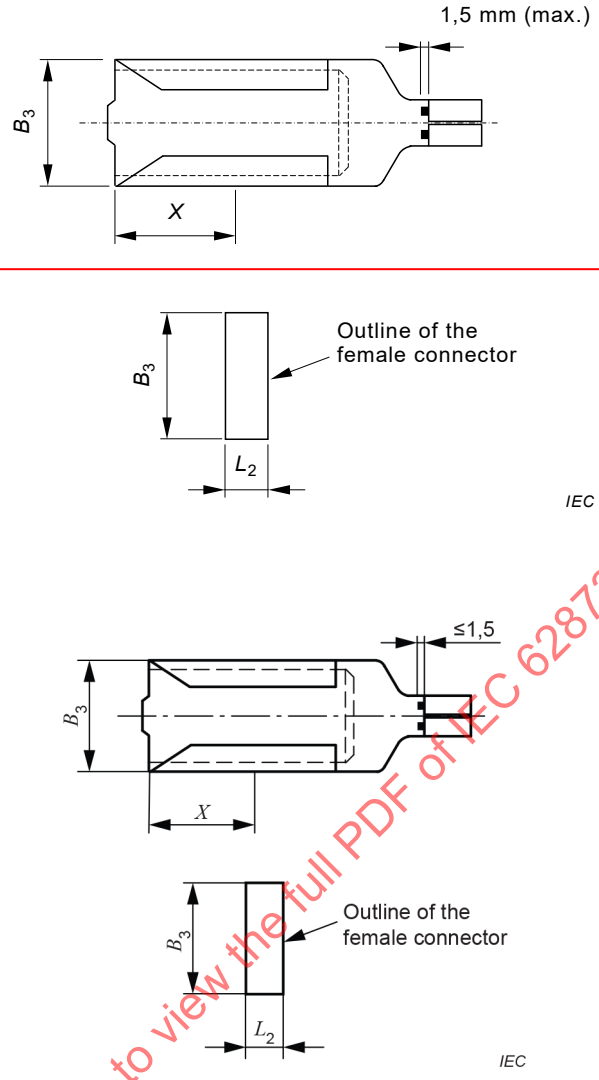
Detent shall be located within 0,13 mm (0,005 in) of the centre-line of the tab.

Figure 3 – Dimensions of rectangular dimple detents (see Figure 1)



Detent shall be located within 0,076 mm (0,003 in) of the centre-line of the tab.

Figure 4 – Dimensions of hole detents



Dimensions B_3 and L_2 are mandatory.

Female connectors should be so designed that undue insertion of the conductor into the crimping area is visible or prevented by a stop in order to avoid any interference between the conductor and a fully inserted tab.

~~NOTE 1~~ For determining female connector dimensions different from B_3 and L_2, it is necessary to refer to the tab dimensions in order to ensure that in the most onerous conditions, the engagement (and detent, if fitted) between tab and female connector is correct.

NOTE ~~2~~ 1 If a detent is provided, the dimension X is at the manufacturer's discretion in order to meet the requirements of the performance clauses.

NOTE ~~3~~ 2 The sketches are not intended to govern the design, except as regards the dimensions shown.

Figure 5 – Dimensions of female connectors

Table 3 – Dimensions of female connectors

Tab size mm	Dimensions of female connector mm	
	B_3 max.	L_2 max.
6,3 × 0,8	7,80	3,50

9 Tests

9.1 General

~~Clause 9 of the RCD product standard applies, with the exception of 9.5.~~

The requirements of Clause 9 of this document apply in addition to Clause 9 of the product standard, in which this document is referred to.

9.2 Mechanical overload force

This test is done on 10 terminals of ~~RCDs~~ products, mounted as in normal use when wiring takes place.

The axial push force, and successively the axial pull force specified in Table 4, are gradually applied to the male tab integrated in the ~~RCD~~ product, with a suitable test apparatus. The axial force, equal to that shown in Table 4, is applied smoothly and once only with a suitable test apparatus for a period of 1 min.

Table 4 – ~~Overload test forces~~ Retention force

Push N	Pull N
96	88

No damage which could impair further use shall occur to the tab or to the ~~RCD~~ product in which the tab is integrated.

~~Add the following text to 9.8.3 of the RCD product standard:~~

9.3 Additional requirements for temperature rise

This Subclause 9.3 provides additional requirements and test conditions for temperature-rise tests for terminals in the relevant product standard.

Fine-wire thermocouples shall be placed in such a way as not to influence the contact or the connection area. An example of placement is shown in Figure 6.

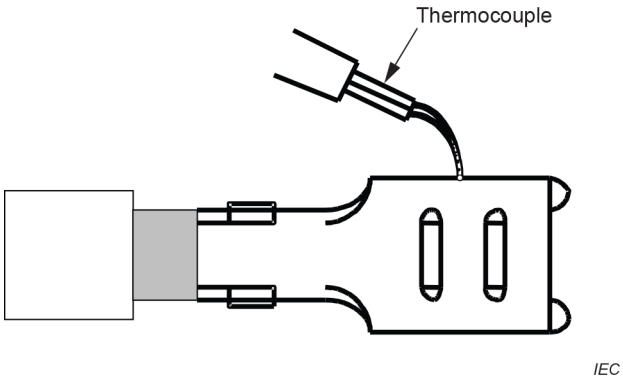


Figure 6 – Example of position of the thermocouple for measurement of the temperature rise

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IEC 60050-442, *International Electrotechnical Vocabulary – Part 442: Electrical accessories* (available at www.electropedia.org)

IEC 60228:2004, *Conductors of insulated cables*

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

IEC 60998-1, *Connecting devices for low-voltage circuits for household and similar purposes – Part 1: General requirements*

IEC 60998-2-2, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-2: Particular requirements for connecting devices as separate entities with screwless-type clamping units*

IEC 60999 (all parts), *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units*

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 61210, *Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements*

IEC 62020-1:2020, *Electrical accessories – Residual current monitors (RCMs) – Part 1: RCMs for household and similar uses*

IEC 62606:2013, *General requirements for arc fault detection devices*
IEC 62606:2013/AMD1:2017

IEC 62873-1, *Residual current operated circuit-breakers for household and similar use – Part 1: Outline of blocks and modules for residual current device standards*

IEC 63052, *Power frequency overvoltage protective devices (POPs) for household and similar applications*

ASTM B 172-17, *Standard Specification for Rope-Lay-Stranded Copper Conductors Having Bunch-Stranded Members, for Electrical Conductors*

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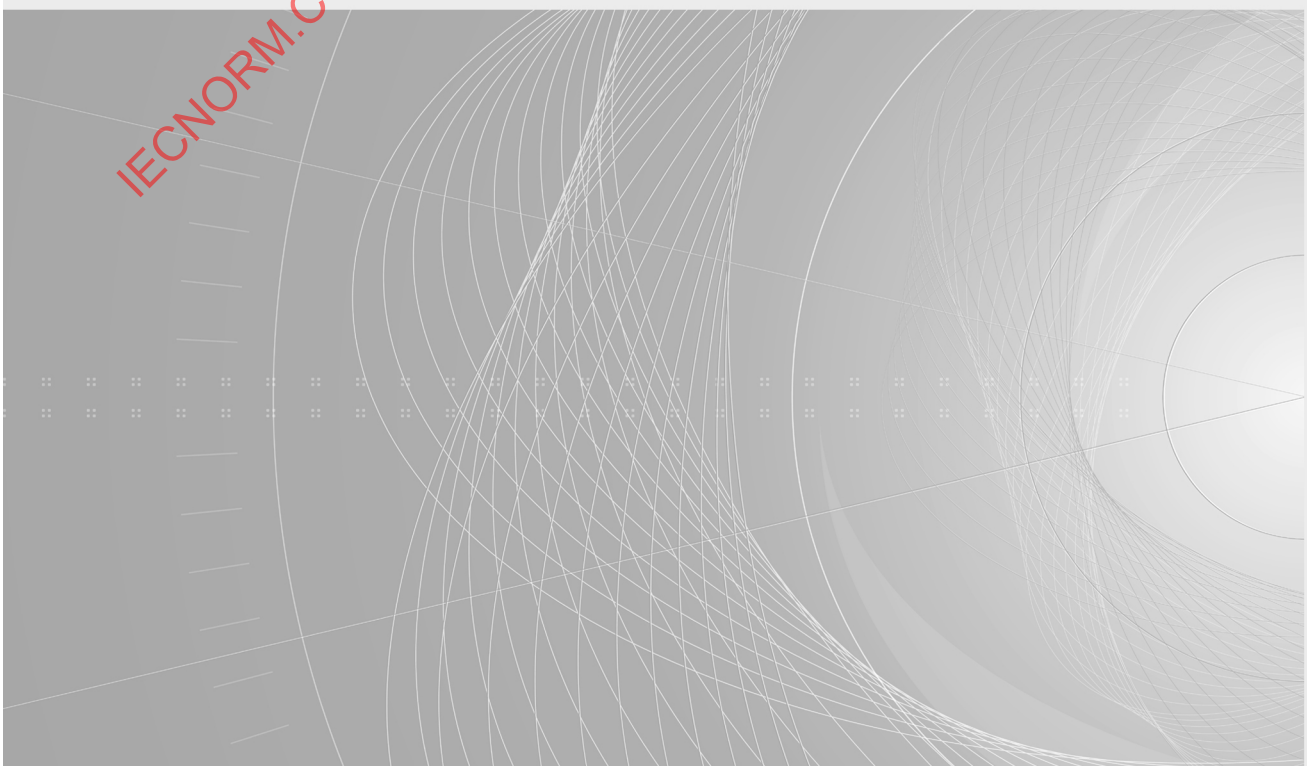

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RESIDUAL CURRENT OPERATED CIRCUIT-BREAKERS FOR HOUSEHOLD AND SIMILAR USE –

Part 3-2: Particular requirements for devices with flat quick-connect terminations

1 Scope

This document applies to devices equipped with flat quick-connect terminations consisting of a male tab with nominal width 6,3 mm and thickness 0,8 mm, to be used with a mating female connector for connecting electrical copper conductors according to the manufacturer's instructions, for rated currents up to and including 16 A.

NOTE The use of flat quick-connect terminations for rated currents up to and including 20 A is accepted in BE, FR, IT, ES, PT and US.

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

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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
flat quick-connect termination
electrical connection consisting of a male tab (3.2) and a female connector (3.3) which can be pushed into and withdrawn with or without the use of a tool

3.2
male tab
portion of a quick-connect termination which receives the female connector

3.3
female connector
portion of a quick-connect termination which is pushed onto the male tab

3.4
detent
dimple (depression) or hole in the male tab which engages a raised portion on the female connector to provide a latch for the mating parts

4 Classification

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

5 Characteristics of products

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 requirements apply.

The following information regarding the female connector and the type of conductor to be used shall be given in the manufacturer's instructions:

– manufacturer's name or trademark;
– type reference;
– information on cross-sections of conductors and colour codes of insulated female connectors (see examples in Table 1);
– the use of only silver- or tin-plated copper alloys.

Table 1 – Colour code of female connectors in relationship with the cross-section of the conductor

Cross-section of the conductor		Colour code of the female connector
mm^2	AWG	
1	18	Red
1,5	16	Red or blue
2,5	14	Blue or yellow
4	12	Yellow

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 applicable subclauses of Clause 8 of the product standard, in which this document is referred to.

8.2 Terminals for external conductors

8.2.1 Male tabs and female connectors shall be of a metal having mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use.

NOTE Silver- or tin-plated copper alloys are examples of suitable solutions.

8.2.2 The nominal width of the male tab is 6,3 mm and its thickness is 0,8 mm, applicable to rated currents up to and including 16 A.

NOTE The use of male tabs and female connectors for rated currents up to and including 20 A is accepted in BE, FR, IT, PT, ES and US.

The dimensions of the male tab shall comply with those specified in Table 2 and in Figure 1, Figure 2, Figure 3 and Figure 4, where the dimensions *A, B, C, D, E, F, J, M, N, P* and *Q* are mandatory.

The dimensions of the female connector which may be fitted on the male tab are given in Figure 5 and in Table 3.

The shapes of the various parts may deviate from those given in the figures, provided that the specified dimensions are not influenced and the test requirements are complied with (for example: corrugated tabs, folded tabs, etc).

Compliance is checked by inspection and by measurement.

8.2.3 Male tabs shall be securely retained.

Compliance is checked by the mechanical overload test of 9.2.

Table 2 – Dimensions of tabs

Nominal size mm		Dimension										
		A	*B* minimum	*C*	*D*	*E*	*F*	*J*	*M*	*N*	*P*	*Q* minimum
6,3 × 0,8	Dimple	1,0		0,84	6,40	4,1	2,0	12°	2,5	2,0	1,8	
		0,7	7,8	0,77	6,20	3,6	1,6	8°	2,2	1,8	0,7	8,9
	Hole	1,0		0,84	6,40	4,7	2,0	12°			1,8	
		0,5	7,8	0,77	6,20	4,3	1,6	8°			0,7	8,9

NOTE 1 For the dimensions *A* to *Q*, refer to Figure 1 to Figure 4.

NOTE 2 Where two values are shown in one column, they give the maximum and the minimum dimensions.