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BSI Standards Publication

# Residual current operated circuit-breakers for household and similar use

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

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## National foreword

This British Standard is the UK implementation of IEC 62873-3-2:2016.

The UK participation in its preparation was entrusted by Technical Committee PEL/23, Electrical accessories, to Subcommittee PEL/23/1, Circuit breakers and similar equipment for household use.

A list of organizations represented on this committee can be obtained on request to its secretary.

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# INTERNATIONAL STANDARD

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

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

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

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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.

The text of this standard is based on the following documents:

| FDIS | Report on voting |
|---|---|
| 23E/965/FDIS | 23E/983/RVD |

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

This publication 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 publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication 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- withdrawn,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

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 with flat quick-connect terminations

## 1 Scope

This part of IEC 62873 applies to RCDs 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 part of IEC 62873 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 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 part of IEC 62873 applies exclusively to RCDs having male tabs as an integral part of the device.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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.

**3.1**
**flat quick-connect termination**
electrical connection consisting of a male tab and a female connector 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 applies.

## 5 Characteristics of RCDs

Clause 5 of the RCD product standard applies.

## 6 Marking and other product information

In addition to Clause 6 of the RCD product standard, 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 trade mark;
– type reference;
– information on cross-sections of conductors and colour codes of insulated female connectors (see examples in Table 1 below);
– 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 $mm^2$ | Colour code of the female connector |
|---|---|
| 1 | Red |
| 1,5 | Red or blue |
| 2,5 | Blue or yellow |
| 4 | Yellow |

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

Clause 7 of the RCD product standard 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.

## 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 the thickness 0,8 mm, applicable to rated currents up to and including 16 A.

NOTE 1 The use 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).

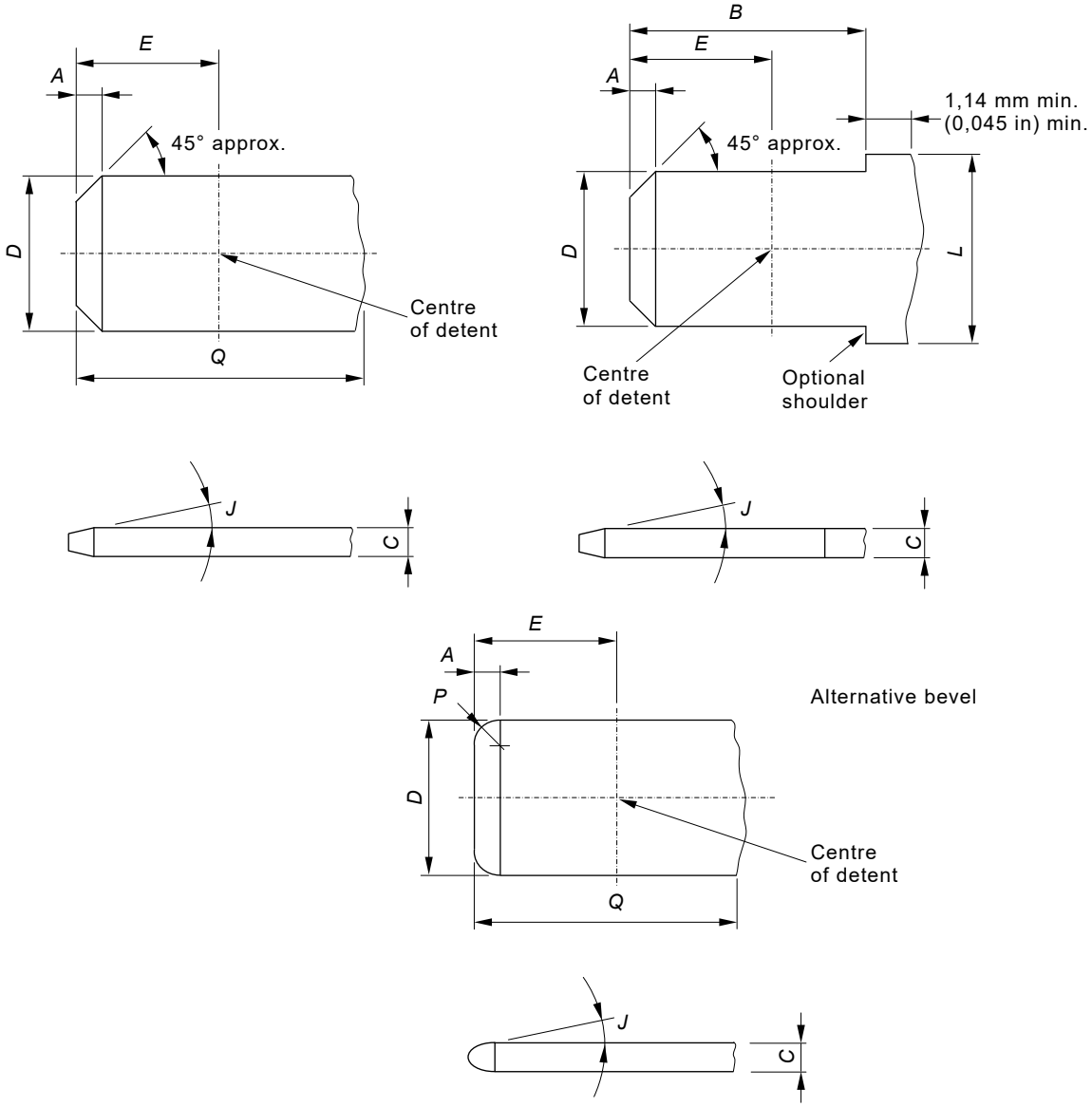
*Compliance is checked by inspection and by measurement.*

**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*** min. | ***C*** | ***D*** | ***E*** | ***F*** | ***J*** | ***M*** | ***N*** | ***P*** | ***Q*** min. |
| 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. | | | | | | | | | | | | |




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).

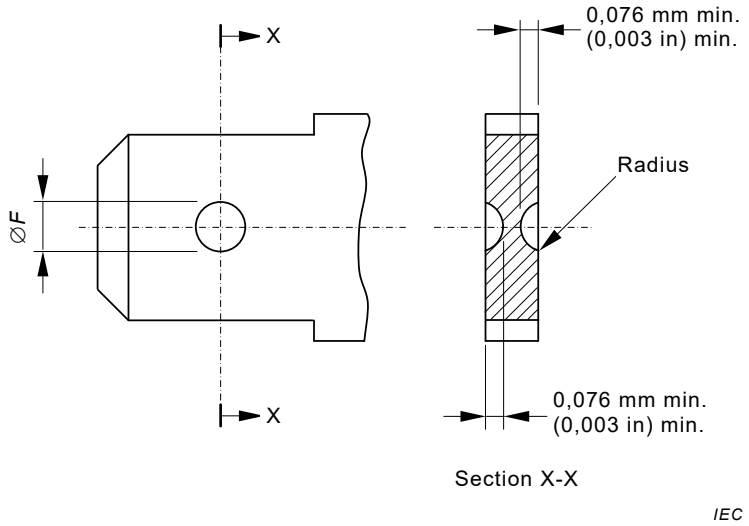
Dimension *C* of tabs may be produced from more than one layer of material provided that the resulting tab complies in all respects with the requirements of this standard. A radius on the longitudinal edge of the tab is permissible.

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).

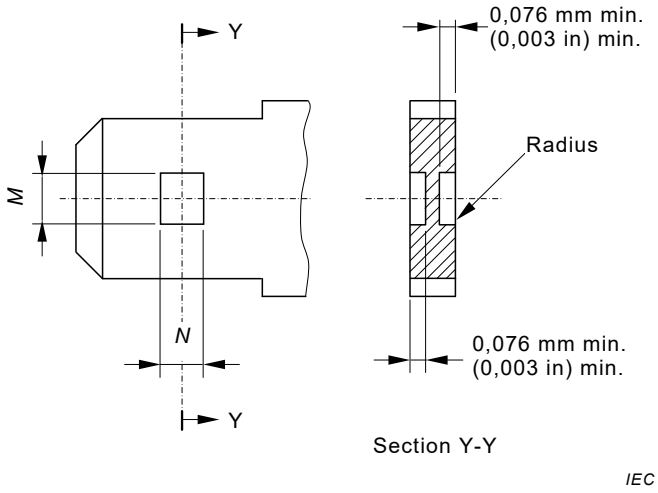
NOTE The sketches are not intended to govern the design except with regard to the dimensions shown.

**Figure 1 – Dimensions of male tabs**



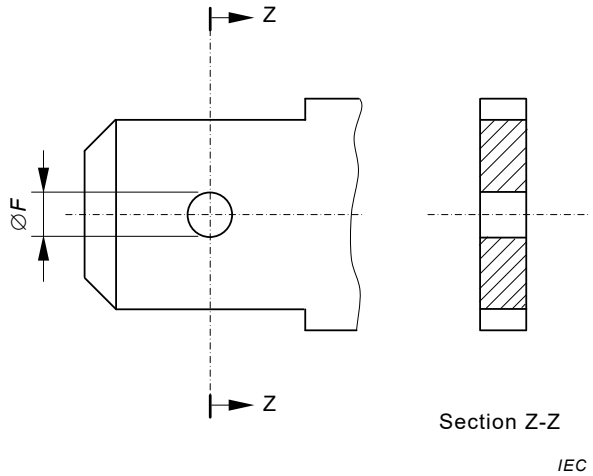

Detent shall be located within 0,076 mm (0,003 in) of the centre-line of the tab.

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



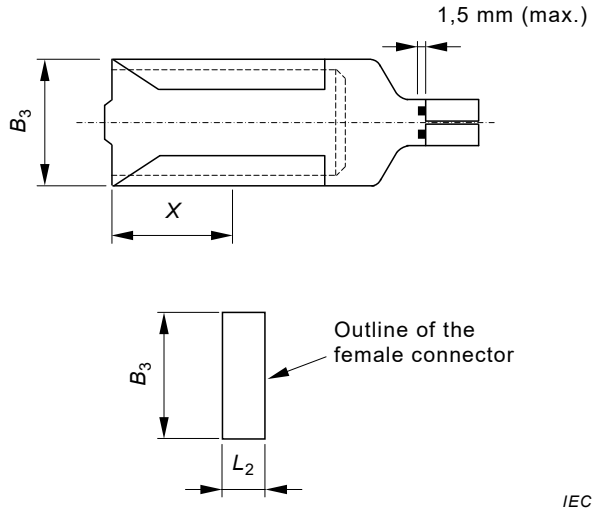

Detent shall be located within 0,13 mm (0,005 in) of the centre-line of the tab.

**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 If a detent is provided, the dimension $X$ is at manufacturer's discretion in order to meet the requirements of the performance clauses.

NOTE 3 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.

### 9.2 Mechanical overload-force

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

The axial push force, and successively the axial pull force specified in the following Table 4, are gradually applied to the male tab integrated in the RCD, once only with a suitable test apparatus.

**Table 4 – Overload test forces**

| Push | Pull |
|---|---|
| N | N |
| 96 | 88 |

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

Add the following text to 9.8.3 of the RCD 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.

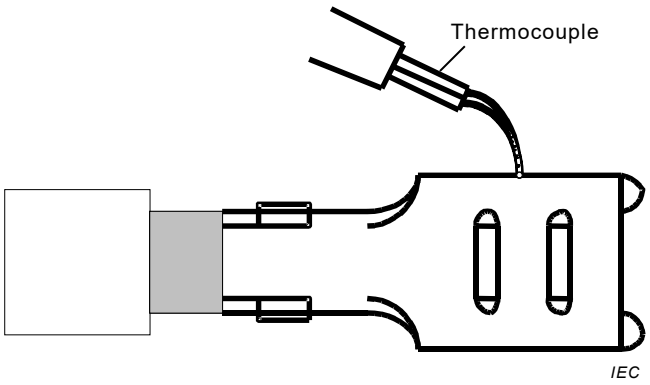



**Figure 6 – Example of position of the thermocouple for measurement of the temperature-rise**

## Bibliography

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*

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