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Recommendations for dimensional co-ordination between enclosures and built devices for rail fixing for household and similar installations

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CENELEC

R023-001

REPORT

August 1995

English version

**Recommendations for dimensional co-ordination between
enclosures and built-in devices for rail fixing for
household and similar installations**

This CENELEC Report has been prepared by the Technical Committee CENELEC TC 23E, Circuit breakers and similar devices for household and similar applications. It was approved by CENELEC on 1995-03-06.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This Technical Report was prepared by the Technical Committee CENELEC TC 23E, Circuit breakers and similar devices for household and similar applications. It has been drawn up on the basis of the decisions taken by TC 23E at their 9th meeting on November 8th and 9th, 1994, where the document CLC/TC23E (Sec)38 and the relevant comments of the National Committees were examined.

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1 Scope

The purpose of the document is to give recommendations of the co-ordination of dimensions between enclosures and built-in devices for rail fixing for household or similar installations by listing the principal overall and related mounting dimensions, the rated current of a single device not exceeding 125 A. Examples of these devices are: mcb's, rcd's switches, fuse-systems, indicating lamps, relays, socket outlets, timing switches, etc.

Compliance with this document does not preclude the need for compliance with other relevant specifications.

This document needs not apply to type tested and partially type tested assemblies which are covered by other specifications. The means of fixing envisaged in this document are mounting rails. Other possible means of fixing may be used but are not covered by these recommendations.

NOTE:

The only criterion chosen in this document for co-ordination of dimensions has been the geometry of the devices. When selecting the enclosure, other criteria should be taken into account, e.g. the rated current of the devices.

2 Definitions

For the purpose of this recommendation the following definitions apply:

2.1 Module (m) is a basic single block.

2.2 Device is a modular block that is not intended to be split into independent units.

3. Mounting rails

The mounting rails used shall be of the 35 mm "Top hat" type according to EN 50022 or an equivalent mounting means, obtained e.g. by moulding or pressing.

NOTE:

Other types of mounting rails may be used but are not necessarily covered by these recommendations.

Recommendations for dimensional co-ordination of devices designed to be fixed on two mounting rails are under consideration. Examples are given in the annex A.

4 Dimensions of devices relevant to mounting

The principal dimensions necessary to co-ordinate the built-in devices with the enclosures are given in figure 1.

4.1 Width "l"

The width of a device shall be

$$l = n \cdot (m_0^{+0,5}) \text{ mm}$$

where

$n = 0,5$ or 1 or $1,5$ or 2 or $2,5$ or 3 or $3,5$ or $4 \dots$
 $m = 12,5$ or $17,5$ mm

NOTE: The preferred value for future designs is: $m = 17,5$ mm

4.2 Height of a given device "h"

h_1 and h_2 of a given device (see figure 1a) need not to be equal.

$h_{1\max}$ or $h_{2\max}$, whichever is the greater, shall be chosen from the series
45 - 55 - 75 - 100 - 125 mm

NOTE 1:

The maximum height ($h_1 + h_2$) must not exceed twice the values chosen.

NOTE 2:

The means for fixing or removing the device to and from the rail are not taken into account.

4.3 Height of front projection "d" (see figure 1a)

Up to and including a value h_1 or h_2 , whichever is the greater, of 45 mm the height d of the front projections shall be $45 \pm 0,5$ mm.

For values of h_1 or h_2 greater than 45 mm the front projection "d" shall have one of the following values: 45 mm and 80 mm, with a tolerance of ± 0.5 mm.

NOTE:

The preferred value for future designs is $d = 45$ mm

4.4 Depth dimensions q_1 , q_2 and q_3 (see figure 1a)

The depth dimensions are given in table 1

Table 1: Depth dimensions

q_{1max} (mm)	q_{2min} (mm)	$q_{3max}^{2)}$ (mm)
44 ¹⁾	50 ³⁾	55
		60
		70
		92,5
55	57	70
		92,5
64	66	80
		100
76	84	100
1) Preferred value		
2) Where more than one value of q_{3max} is shown for a value of q_{1max} and q_{2min} ; the appropriate value is a function of the design "family" of the device.		
3) Preferred value of $q_{2min} = 52$ mm		

5 Distance Y between parallel mounting rails (see figure 1b)

The distance Y between centre lines of parallel rails shall be

$$Y = X \cdot 25 \text{ mm}$$

where

$$X = 4 \text{ or } 5 \text{ or } 6 \text{ or } \dots$$

The tolerance shall not exceed $\pm 0,5$ mm for $Y \leq 125$ mm ($X \leq 5$) and $\pm 1,0$ mm for $Y > 125$ ($X > 5$).

For boards or panels with 3 or more rows the cumulative tolerance shall not exceed ± 2 mm.

NOTE 1:

Multiplier 4 is intended for boards or panels containing rows made up exclusively of accessories, indicator lights, fuses etc. For rows containing switching devices the minimum value is 5.

NOTE 2:

The distance from the highest and lowest rail to the top or bottom face respectively of the board is not considered.

NOTE 3:

It is the responsibility of the manufacturer of the board to choose the appropriate Y-value(s).

NOTE 4:

In a given board values of Y different from each other may be used.

6 Clearances and creepage distances

The clearances and creepage distances between live parts and accessible metal parts shall correspond to those given in the relevant product standards.

7 Relevant mounting dimensions (see figure 1b)7.1 General rules for mounting dimensions

7.1.1 The general rules for the co-ordination of overall dimensions q and related mounting dimensions p are

$$p_1^{1)} \geq q_1$$

$$p_2^{2)} \leq q_2$$

$$p_3 \geq q_3$$

NOTE 1:

$p_1 \geq 47,5$ mm for new designs of $q_{1\max} = 44$ mm

NOTE 2:

$p_2 \leq 51$ mm for new designs of $q_2 \geq 52$ mm

where:

- p_2 applies only at the edges of the window, and.

- p_3 includes the maximum projection of the operating means or the rim of a recess for the operating means, and is to apply to the window area only.

This requirement may be disregarded in the case of devices which can only be operated by hand and circuit-breakers with trip-free release, provided that the ON and OFF positions of the operating means, if any, lie within p_3 .

7.1.2 To meet the requirements for reinforced insulation the following requirements shall apply to the devices (see figure 1a):

- $q_{1\max} - q_0 \geq 3$ mm for future designs (to take into account metal front barriers) and $a > 3$ mm;

or

- if a is less or equal than 3 mm and the distance B is less than 6 mm a shoulder is needed on the device for the front barrier at a distance of $(q_{1\max} + 3^{+0.5})$ mm. The width of this shoulder shall be between 2,5 mm and 5 mm.

7.2 Window openings (see figure 1b)

The height f of the opening for the window is obtained from the relationship:

$$(d + 1) < f < (d+2)$$

where d is the nominal value of the height of the front projection (see 4.3).

In order to obtain the degree of protection prescribed by the wiring rules appropriate measures shall be taken, e.g. use of blanking pieces.

NOTE:

In EN 60439-3 a minimum degree of protection by the enclosure of IP 2XC is required for low voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access.

7.3 Strength of front barriers and/or doors

Yielding of front barriers and/or doors as a result of external pressure shall be limited either by the mechanical strength of the material or by suitable shoulder (see 7.1.2).

The requirements of the appropriate product standard, if any, shall apply.

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