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**Električni pribor - Odklopniki za nadtokovno zaščito za gospodinjstvo in podobne inštalacije - 2. del: Odklopniki za izmenično in enosmerno napetost (IEC 60898- 2:2000 + A1:2003, spremenjen)**

**(istoveten EN 60898-2:2006)**

Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Part 2: Circuit-breakers for a.c. and d.c. operation (IEC 60898-2:2000 + A1:2003, modified)

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English version

**Electrical accessories –  
Circuit-breakers for overcurrent protection  
for household and similar installations  
Part 2: Circuit-breakers for a.c. and d.c. operation  
(IEC 60898-2:2000 + A1:2003, modified)**

Petit appareillage électrique –  
Disjoncteurs pour la protection contre les  
surintensités pour installations  
domestiques et analogues  
Partie 2: Disjoncteurs pour le  
fonctionnement en courant alternatif  
et en courant continu  
(CEI 60898-2:2000 + A1:2003, modifiée)

Elektrisches Installationsmaterial –  
Leitungsschutzschalter  
für Hausinstallationen und  
ähnliche Zwecke  
Teil 2: Leitungsschutzschalter  
für Wechsel- und Gleichstrom  
(AC und DC)  
(IEC 60898-2:2000 + A1:2003, modifiziert)

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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# CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

## Foreword

The text of the International Standard IEC 60898-2:2000 + A1:2003, together with common modifications prepared by the Technical Committee CENELEC TC 23E, Circuit breakers and similar devices for household and similar applications, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60898-2 on 2005-06-01.

This European Standard supersedes EN 60898-2:2001.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2007-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2010-06-01

In this European Standard the common modifications to the International Standard are indicated by a vertical line in the left margin of the text.

This Part 2 is to be used in conjunction with EN 60898-1:2003 + corrigendum February 2004 + A1:2004.

When a particular subclause of Part 1 is not mentioned in this Part 2, that subclause applies as far as is reasonable. Where this Part 2 states "addition", "modification" or "replacement", the relevant text of Part 1 is to be adapted accordingly.

In this standard, the following print types are used:

- requirements: roman type;
- *test specifications*: italic type;
- notes: smaller roman type.

## 1 Scope and object

This clause of Part 1 is applicable except as follows:

*Addition at the end of the first paragraph:*

This standard gives additional requirements for single- and two-pole circuit-breakers which, in addition to the above characteristics, are suitable for operation with direct current, and have a rated d.c. voltage not exceeding 220 V for single-pole and 440 V for two-pole circuit-breakers, a rated current not exceeding 125 A and a rated d.c. short-circuit capacity not exceeding 10 000 A.

NOTE This standard applies to circuit-breakers able to make and break both a.c. current and d.c. current.

*Delete the last two paragraphs.*

## 2 Normative references

This clause of Part 1 applies.

## 3 Definitions

Clause 3 of Part 1 applies with the following modification:

*Addition:*

### 3.5.10.3

#### time constant

the rise time  $T = L/R$  (ms) of a prospective direct current to reach a value of 0,63 times the maximum peak current

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## 4 Classification

Clause 4 of Part 1 applies with the following modifications:

### 4.1 According to the number of poles

*Replacement:*

- single-pole circuit-breakers;
- two-pole circuit-breakers with two protected poles.

### 4.5 According to the instantaneous tripping current (see 3.5.17)

*Delete D-Type.*

*Addition:*

### 4.7 According to the time constant

- Circuit-breakers suitable for d.c. circuits with a time constant of  $T \leq 4$  ms.
- Circuit-breakers suitable for d.c. circuits with a time constant of  $T \leq 15$  ms.

NOTE It is assumed that short-circuit currents of 1 500 A are not exceeded in installations in which, due to the loads connected, time constants in normal service up to 15 ms can occur. Where higher short-circuit currents may occur, the time constant of  $T = 4$  ms is considered sufficient.

## 5 Characteristics of circuit-breakers

Clause 5 of Part 1 applies with the following modification:

### 5.3.1 Standard values of rated voltage

*Replacement:*

The standard values of rated voltages are given in Table 1.

Examples of connections of circuit-breakers in d.c. systems are given in Figure 18.

**Table 1 – Standard values of rated voltage**

Circuit-breakers	AC		DC <sup>a</sup>	
	AC circuit supplying the circuit-breaker	Rated voltage a.c.	Rated voltage d.c.	DC wiring examples
Single-pole	Single phase (phase to neutral or phase to phase)	230 V	220 V	Figure 18a
	Single phase (phase to neutral) or three-phase, using 3 single-pole circuit-breakers (3-wire or 4-wire)	(230/400) V	220 V	
Two-pole	Single phase (phase to phase)	400 V	(220/440) V	Figures 18b, 18c, 18d

Applicable for d.c. voltages:  
<sup>a</sup> The rated voltage per pole shall not exceed 220 V d.c.  
 Applicable for a.c. voltages:  
 NOTE 1 In IEC 60038 the network voltage value of (230/400) V has been standardized. This value should progressively supersede the values of (220/380) V and (240/415) V.  
 NOTE 2 Wherever in this standard there is a reference to 230 V or 400 V, it may be read as 220 V or 240 V, and 380 V or 415 V respectively.  
 NOTE 3 Circuit-breakers complying with the requirements of this standard may be used in IT systems.

Two-pole circuit breakers rated 230 V may have one or two protected poles.

Two-pole circuit breakers rated 400 V shall have two protected poles.

Three-pole circuit breakers shall have three protected poles.

Four-pole circuit breakers may have three or four protected poles.

The manufacturer shall declare in his literature the minimum voltage for which the circuit-breaker is designed.

*Relevant tests are under consideration.*

**5.3.5 Standard ranges of instantaneous tripping**

Replacement of Table 2:

**Table 2 – Ranges of instantaneous tripping**

Type	Ranges for a.c.	Ranges for d.c.
<b>B</b>	Above 3 $I_n$ up to and including 5 $I_n$	Above 4 $I_n$ up to and including 7 $I_n$
<b>C</b>	Above 5 $I_n$ up to and including 10 $I_n$	Above 7 $I_n$ up to and including 15 $I_n$

**6 Marking and other product information**

Clause 6 of Part 1 applies with the following modifications:

**6.1 Standard marking**

Replacement:

- c) rated a.c. voltage with the symbol ~ and rated d.c. voltage with the symbol  $\text{---}$ ;
- d) rated current without symbol "A", preceded by the symbol of instantaneous tripping (B or C), for example B 16;
- f) rated short-circuit capacity for a.c. and d.c. in amperes in one rectangle, without the symbol A, if valid for both a.c. and d.c. (see example 1 below). If the rated short-circuit capacity is different for a.c. and d.c. this shall be indicated in two adjacent rectangles, without the symbol A, with the symbol ~ near the rectangle containing the a.c. value and with the symbol  $\text{---}$  near the rectangle containing the d.c. value (see example 2 below);

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Addition:

- l) time constant T15 within a rectangle, if applicable, associated with the marking for the short-circuit capacity at the time constant of 15 ms (see example 3 below).

Replacement of the first paragraph after l):

If, for small devices, the space available does not allow all the above data to be marked, at least the information under c) and d) shall be marked and visible when the circuit-breaker is installed.

The information under a), b), c), f), g) and j) may be marked on the side or on the back of the device and be visible only before the device is installed.

Alternatively, the information under g) may be on the inside of any cover which has to be removed in order to connect the supply wires. Any remaining information not marked shall be given in the manufacturer's literature.

EXAMPLE 1	<table border="1" style="display: inline-table;"><tr><td>6 000</td></tr></table>	6 000	
6 000			
EXAMPLE 2	<table border="1" style="display: inline-table;"><tr><td>10 000</td></tr></table> ~ <table border="1" style="display: inline-table;"><tr><td>6 000</td></tr></table> $\text{---}$	10 000	6 000
10 000			
6 000			
EXAMPLE 3	<table border="1" style="display: inline-table;"><tr><td>1 500</td><td>T15</td></tr></table>	1 500	T15
1 500	T15		

The terminals shall be marked with + or – if necessary. Additionally, arrows indicating the direction of the current are allowed.

### 6.3 Guidance table for marking

Replacement:

Marking and other product information Each circuit-breaker shall be marked in a durable manner with all or, for small apparatus, part of the following data:		Markings may be on the circuit-breaker itself			Product information in catalogue
		If, for small devices the space available does not allow all the above data to be marked, at least this information shall be marked and <b>visible</b> when the device is installed.	This information may be marked on the <b>side</b> or on the back of the device and be visible only before the device is installed.	Alternatively the information may be on the inside of any <b>cover</b> which has to be removed in order to connect the supply wires.	Any remaining information not marked shall be given in the manufacturer's <b>catalogues</b> .
a)	manufacturer's name or trademark		X		
b)	type designation, catalogue number or serial number		X		
c)	rated a.c. voltage with the symbol ~ and rated d.c. voltage with the symbol — — —	X			
d)	rated current without symbol "A" preceded by the symbol of overcurrent instantaneous tripping (B or C), for example B 16	X			
e)	rated frequency if the circuit-breaker is designed only for one frequency (see 5.3.3)				X
f)	rated short-circuit capacity for a.c. and d.c. in amperes in one rectangle, without the symbol A, if valid for both a.c. and d.c. (see example 1 in 6.1). If the rated short-circuit capacity is different for a.c. and d.c. this shall be indicated in two adjacent rectangles, without the symbol A, with the symbol ~ near the rectangle containing the a.c. value and with the symbol — — — near the rectangle containing the d.c. value (see example 2 in 6.1)		X <sup>a</sup>		
g)	wiring diagram, unless the correct mode of connection is evident		X	X	
h)	reference calibration temperature, if different from 30 °C				X
i)	the degree of protection (only if different from IP20)				X
j)	energy limiting class (e.g. 3) in a square in accordance with Annex ZA, if applied		X <sup>a</sup>		
k)	breaking capacity on one pole of multipole circuit-breakers in case of short-circuit to earth $I_{cn1}$				X
l)	time constant T15 within a rectangle, if applicable, associated with the marking for the short-circuit capacity at the time constant of 15 ms (see example 3 in 6.1)				
	the position of use (symbol according to EN 60051), if necessary		X		
	indication of the terminal for the neutral with "N"		X		
	additional marking of performance to other standards		X		
<sup>a</sup> $I_{cn}$ and the energy limiting class, if applied, shall be both on the device and combined together.					



## 7 Standard conditions for operation in service

Clause 7 of Part 1 applies.

## 8 Requirements for construction and operation

Clause 8 of Part 1 applies with the following modifications:

### 8.1.3 Clearances and creepage distances (see annex B)

Addition of the following note 4 to Table 4:

NOTE 4 The values given for 230 V, 230/400V and 400 V a.c., are also valid for 220 V and 440 V d.c.

### 8.6.1 Standard time-current zone

Replacement:

Table 7 – Time-current operating characteristics

Test	Type	Test current a.c.	Test current d.c.	Initial condition	Limits of tripping or non-tripping time	Result to be obtained	Remarks
a	B, C	1,13 $I_n$		Cold*	$t \geq 1 \text{ h}$ ( $I_n \leq 63 \text{ A}$ ) $t \geq 2 \text{ h}$ ( $I_n > 63 \text{ A}$ )	No tripping	
b	B, C	1,45 $I_n$		Immediately following test a	$t < 1 \text{ h}$ ( $I_n \leq 63 \text{ A}$ ) $t < 2 \text{ h}$ ( $I_n > 63 \text{ A}$ )	Tripping	Current steadily increased within 5 s
c	B, C	2,55 $I_n$		Cold*	$1 \text{ s} < t < 60 \text{ s}$ ( $I_n \leq 32 \text{ A}$ ) $1 \text{ s} < t < 120 \text{ s}$ ( $I_n > 32 \text{ A}$ )	Tripping	
d	B C	3 $I_n$ 5 $I_n$	4 $I_n$ 7 $I_n$	Cold*	$0,1 < t < 45 \text{ s}$ ( $I_n \leq 32 \text{ A}$ ) $0,1 < t < 90 \text{ s}$ ( $I_n > 32 \text{ A}$ ) $0,1 < t < 15 \text{ s}$ ( $I_n \leq 32 \text{ A}$ ) $0,1 < t < 30 \text{ s}$ ( $I_n > 32 \text{ A}$ )	Tripping	Current established by closing an auxiliary switch
e	B C	5 $I_n$ 10 $I_n$	7 $I_n$ 15 $I_n$	Cold*	$t < 0,1 \text{ s}$	Tripping	Current established by closing an auxiliary switch

\* The term "cold" means without previous loading, at the reference calibration temperature.

### 8.8 Performance at short-circuit currents

Replacement of the third paragraph:

It is required that circuit-breakers be able to make and to break any value of current up to and including the value corresponding to the rated short-circuit capacity at rated frequency, at a power-frequency recovery voltage equal to 105 % ( $\pm 5$  %) of the rated operational voltage and at any power factor not less or any time constant not greater than the appropriate limit of the range stated in 9.12.5; it is also required that the corresponding values of  $I^2t$  lie below the  $I^2t$  characteristic (see 3.5.13).