



SLOVENSKI STANDARD

SIST EN 60898:1995

01-avgust-1995

Circuit-breakers for overcurrent protection for household and similar installations (IEC 898:1987 + Corrigendum 1988-05 + A2:1990 + A3:1990 + Corrigendum 1990-08, modified)

Circuit-breakers for overcurrent protection for household and similar installations

Leitungsschutzschalter für den Haushalt und ähnliche Anwendungen

iTeh STANDARD PREVIEW

(standards.iteh.ai)
Disjoncteurs pour installations domestiques et analogues pour la protection contre les surintensités

[SIST EN 60898:1995](https://standards.iteh.ai/catalog/standards/sist/5c0792cc-384b-4c33-a86f-8cc10cc6136/sist-en-60898-1995)

Ta slovenski standard je istoveten z: EN 60898:1991/A11:1994

ICS:

29.120.50

Varovalke in druga medtokovna zaščita

Fuses and other overcurrent protection devices

SIST EN 60898:1995

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 60898:1995](#)

<https://standards.iteh.ai/catalog/standards/sist/5c0792cc-384b-4c33-a86f-8cbc16ce6136/sist-en-60898-1995>

EUROPEAN STANDARD

EN 60898

NORME EUROPEENNE

EUROPÄISCHE NORM

July 1991

UDC 621.316.57:64.06-83:614.8

Descriptors: Electrical installation LT, household electrical equipment, overcurrent circuit-breaker, characteristic, construction, test

ENGLISH VERSION

CIRCUIT-BREAKERS FOR OVERCURRENT PROTECTION
FOR HOUSEHOLD AND SIMILAR INSTALLATIONS
(IEC 898:1987 + corrigendum May 1988 +
A2:1989 + A3:1990 + corrigendum August 1990)

Disjoncteurs pour installations
domestiques et analogues pour la
protection contre les surintensités
(CEI 898:1987 + corrigendum mai 1988 +
A2:1989 + A3:1990 + corrigendum
août 1990)

Leitungsschutzschalter für
den Haushalt und ähnliche
Anwendungen
(IEC 898:1987 + Corrigendum Mai 1988 +
A2:1989 + A3:1990 + Corrigendum
Augustus 1990)

STANDARD PREVIEW
(standards.iteh.ai)

This European Standard was approved by CENELEC on 1990-03-05.
CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations
which stipulate the conditions for giving this European Standard the status of
a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards
may be obtained on application to the Central Secretariat or to any CENELEC member.

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.

CENELEC members are the national electrotechnical committees of Austria, Belgium,
Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg,
Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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 CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 898:1987 + corrigendum May 1988 and its amendments 2:1989 and 3:1990 + corrigendum August 1990, could be accepted without textual changes, has shown that some CENELEC common modifications were necessary for the acceptance as European Standard.

The reference document, together with the common modifications prepared by the CENELEC Technical Committee TC 23E, was submitted to the CENELEC members for formal vote.

The text of the draft was approved by CENELEC as EN 60898 on 5th March 1990.

The following dates were fixed:

- latest date of publication of
an identical national standard (dop) 1992-04-01
- latest date of withdrawal of
conflicting national standards (dow) 1994-07-01

For products which have complied with the relevant national standard before 1994-07-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1999-07-01.

<https://standards.iteh.ai/catalog/standards/sist/5c0792cc-384b-4c33-a86f-8cbc16cc6136/sist-en-60898-1995>

Additional annexes have been called Annex ZA, ZB and ZC. The annex designated "normative" is part of the body of the standard. The annex designated "informative" is given only for information. In this standard, annexe ZC is informative.

Note 1: The technical content of amendment 2 and 3 to IEC was submitted to the voting procedure as prAM 1, prAM 2, prAM 3 and prAM 4 to prEN 60898 and has been incorporated in EN 60898 as common modifications.

Note 2: Where the term "explanation" is used it covers all explanatory matter shown in smaller roman type in IEC 898.

Endorsement notice

The text of the International Standard IEC 898:1987 + corrigendum May 1988 and its amendments 2:1989 and 3:1990 + corrigendum August 1990, was approved by CENELEC as a European Standard with agreed common modifications as given below.

CLAUSE N°	Common Modification
Contents	The text of the Contents is replaced by the following: CONTENTS (page numbers not given) Foreword Preface Clause 1. General 2. Definitions 3. Classification 4. Characteristics of circuit-breakers 5. Marking and other product information 6. Standard conditions for operation in service 7. Requirements for construction and operation 8. Tests 8.1 Type tests and routine tests 8.2 Test conditions 8.3 Indelibility of marking 8.4 Reliability of screws, current-carrying parts and connections 8.5 Reliability of terminals for external conductors 8.6 Protection against electric shock 8.7 Dielectric properties 8.8 Temperature rise and power loss 8.9 28-day test 8.10 Tripping characteristics 8.11 Mechanical and electrical endurance 8.12 Short-circuit 8.13 Resistance to mechanical shock and impact 8.14 Resistance to heat 8.15 Resistance to abnormal heat and to fire 8.16 Resistance to rusting

Figures

Annex A - Determination of short circuit power factor

Annex B - Determination of clearances and creepage distances

Annex C - Test sequences and number of samples to be submitted for certification purposes

Annex D - Coordination of circuit-breakers with separate fuses associated in the same circuit

Annex E - Special requirements for auxiliary circuits for safety extra-low voltage

Annex F - Examples of terminals

Annex G - Void

Annex H - Arrangement for the detection of the emission of ionized gases during short circuit tests

Annex ZA - Classification of circuit-breakers into energy limiting classes

Annex ZB - Guide for the selection of circuit-breakers with reference to their rated voltage.

1.1

The first dashed text of the 5th paragraph is replaced by:

" - Circuit-breakers specifically intended to protect motors",

The following explanation is added at the end of the subclause: (standards.iteh.ai)

"Recommendations for the dimensional coordination between enclosures and circuit-breakers for mounting on rail according to EN 50 022 or equivalent means are under consideration".
<http://standards.iteh.ai/catalog/standards/sist/en-60898-1995/16cc6136/sist-en-60898-1995>2.2.15
(New)

The following new subclause is added:

"2.2.15 Routine test

A test to which each individual device is subjected during or after manufacture to ascertain whether it complies with certain criteria."

2.3.11

The explanation is deleted.

2.5.8.1

Explanation 2 is deleted

2.5.14.1

The following sentence is added to Note 2: "In the case of breaking of short-circuit currents the time-current characteristics do not give adequate information".

2.5.14.2

The following sentence is added to Note 2: "In the case of breaking of short-circuit currents the time-current characteristics do not give adequate information".

- 3.6 The words "Under consideration" are replaced by "Circuit-breakers of B-type and C-type, having rated current up to and including 32A and having short-circuit breaking capacity of 3 000 A, 6 000 A and 10 000 A, may be classified according to the limits within which their I²t characteristics lie, measured according to 8.12.6, in accordance with Annex ZA".
- 4.3.1 The title and the text of the subclause are replaced by:
- "Standard values of rated voltage
Standard values of rated voltage are:
230V, for single-pole and two-pole circuit-breakers,
230/400 V, for single-pole circuit-breakers,
400 V, for two-pole, three-pole and four-pole circuit-breakers.
- For the time being the values 240 V, 240/415 V and 415 V respectively are also standard values.
- Note 1 Wherever in this standard there is a reference to 230 V, 230/400 V or 400 V they may be read as 240 V, 240/415 V or 415 V respectively.
- 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.
- Note 2 - In IEC Publication 38 the voltage values of 230 and 230/400 V have been standardized.
These values should progressively replace the values of 220 V, 240 V, 220/380 V and 240/415 V.
- Note 3 - Circuit breakers complying with the requirements of this standard may be used in IT systems, as described in HD 384 - 3
- Note 4 - In Annex ZB information is given on the selection of circuit-breakers with reference to their rated voltage and to the circuits in which they may be installed
- 4.3.2 In the second line the value "8 A" is deleted.

4.3.4.1

The explanation following Table I is deleted.
Asterisk "*" is added, in Table I, after 1 500 A.
The following foot-note is added after Table I:

** Only for circuit-breakers incorporated or associated with and in the immediate vicinity of socket-outlets or switches for household and similar applications."

4.3.4.2

The title and the text of the subclause are replaced by:

"Standard values above 10 000 A up to and including 25 000 A

For values above 10 000 A up to and including 25 000 A the standard values are:

15 000, 20 000 and 25 000 A

The corresponding ranges of power factor are given in subclause 8.12.5."

4.3.5

In table II the last line is replaced by:

"D above $10 I_n$ and including $20 I_n$."

5.

The 3rd line of the first paragraph is replaced by:

"b) type designation, catalogue number or other identification number,"
http://standards.sist/5c0792cc-384b-4c33-a86f-8cbc16cc6136/sist-en-60898-1995

The 4th line of the first paragraph is replaced by:

"c) rated voltage with the symbol ~,"

The 9th line of the first paragraph is replaced by:

"f) rated short-circuit capacity, in amperes, within a rectangle, without indicating the unit symbol,"

The following item is added at the end of the first paragraph:

"i) energy limiting class, in accordance with Annex ZA, if applied,"

The text of the 14th and 15th lines of pages 35 is replaced by:

"the manufacturer shall publish in his literature the I²t characteristic (see subclause 2.5.13). In addition, if circuit-breakers are classified according to subclause 3.6, they shall be marked accordingly."

6.2

The words in brackets, at the end of the first line, are deleted.

- 7.11 The word "External" is deleted in the first line.
The last line is replaced by the following:
"Compliance is checked:
- for external parts made of insulating material, by the test of subclause 8.15.

- for all other parts made of insulating material, by the test sequences, no additional test being required."
- 7.13 (new) Power loss
Circuit-breakers must not have excessive power loss.
Compliance is checked according to subclause 8.8.5.
- 8.1 The title of the subclause is replaced by:
"Type test and routine tests".
- 8.1.1 The second line is deleted.
The title and the contents of Table VII are replaced by
"Table VII (Void)"
- 8.1.2 In the first line the words "For certification purposes," are deleted.
- 8.1.3 (New) The following subclause 8.1.3 is added:
"8.1.3 Routine tests
The characteristics of a circuit-breaker shall be verified by routine tests or through measures which fulfil the same purpose.
Such routine tests comprise the following:
a) checking of the time-current characteristic. This shall be made:
- by verifying one point of the time-current characteristic at any convenient value of current (less than the minimum instantaneous tripping value), and
- by checking the instantaneous tripping.

b) checking of clearances between live parts which are separated when the circuit-breaker is in the open position."
- 8.2 The explanation after Table VIII is deleted.
- 8.3 The explanation is deleted.
- 8.5.2 The explanation is replaced by:
"Conductors are considered to be unduly damaged if the show both deep and sharp indentations."

- 8.6 The second sentence of the 6th paragraph is replaced by:
"This finger is applied to all places where yielding of insulating material could impair the safety of the circuit-breaker; in the case of knock-outs it is applied with a force of 10 N."
- 8.7.2 The second sentence of the first paragraph is replaced by:
"Following this treatment, and after a delay period under normal conditions of temperature and humidity of between 30 min and 60 min, the insulation resistance is measured 5 s after application of a d.c. voltage of approximately 500 V, consecutively as follows:"
- 8.7.4 The title of the subclause is replaced by:
"Dielectric strength of auxiliary and control circuits"
The following new paragraph is added at the end of the subclause:
iTeh STANDARD PREVIEW
"Control circuits are submitted to the same tests as auxiliary circuits." **(standards.iteh.ai)**
- 8.8.5 (New) The following subclause is added:
<https://standards.iteh.ai/catalog/standards/sist/5c0792cc-384b-4c33-a86f-185712760898/60898-1995>
"8.8.5 Measurement of power loss"
An a.c. current equal to I_n , with a supply voltage value not less than 30 V, is passed through each pole of the circuit-breaker.
The power loss per pole, calculated on the basis of the voltage drop measured under steady state conditions between the relevant terminals, shall not exceed the values given in Table XIA.
Note: - The voltage drop measurement may be made during the temperature-rise test, provided that the test conditions of subclause 8.8.5 are fulfilled.

Table XIA
Maximum power losses per pole

Range of rated current I_n (A)	Maximum power loss per pole (W)
$I_n \leq 10$	3
$10 < I_n \leq 16$	3.5
$16 < I_n \leq 25$	4.5
$25 < I_n \leq 32$	6
$32 < I_n \leq 40$	7.5
$40 < I_n \leq 50$	9
$50 < I_n \leq 63$	13
$63 < I_n \leq 125$	under consideration

- 8.10 The following paragraph is added:
"if the test is made in a test chamber, it shall be made in still air; the volume of the test chamber shall be such as not to affect the test results."
- 8.10.1.1 Both "Int" and "It" are replaced by " I_n "
- 8.10.2 The following sentence is added:
"The tests are made with a substantially resistive circuit."
- 8.10.2.3 The text of the fourth line is replaced by:
"A current equal to $20 I_n$ is then passed through all poles, again starting from cold."
- 8.10.4 "Int" is replaced by " I_n "
- 8.11.1 The last but one paragraph is replaced by:
"For single-pole circuit-breakers rated 230/400 V the test shall be made at 230 V".

- 8.11.2 The second paragraph is deleted.
At the end of the subclause, the following new paragraphs are added:
- "The circuit-breaker shall be operated in a normal condition of use. Care shall be taken that:
- the test apparatus does not damage the circuit-breaker under test,
 - the free movement of the operating means of the circuit-breaker under test is not impeded, and
 - the speed of the operating means of the test apparatus is not unduly affected by the operating means of the circuit-breaker under test.
- In case of circuit-breakers with dependent manual operation, the circuit-breaker shall be operated with an operating speed, during actuation, of $0.1 \text{ m/s} \pm 25\%$, this speed being measured when and where the operating means of the test apparatus touches the actuator; for rotary knobs the angular velocity shall correspond substantially to the above conditions, referred to the speed of the operating means (at its extremities) of the circuit breaker under test".
- 8.11.3 The last paragraph is replaced by:
- "Moreover, the circuit-breaker shall comply with the test of subclause 8.10.1.2 and shall withstand the dielectric strength test according to subclause 8.7.3, but at 900 V and without previous humidity treatment."
- 8.12.2 The fourth paragraph is replaced by:
- "For single-pole circuit-breakers rated 230/400V, the power frequency recovery voltage shall be 105% of 230 V, except for the tests of subclauses 8.12.11.4.2, item d) and 8.12.11.4.3, item b), for which it shall be 105% of 400 V."
- 8.12.4 In the second dashed text "(Figure 4)" is replaced by "(Figures 4a and 4b)"
In the fifth dashed text: "in Figures 3 and 4" is replaced by "in Figures 3 and 4a".
In the sixth dashed text: "in Figure 5 and 6" is replaced by "in Figures 4b, 5 and 6".
- 8.12.8 In letter a) the words "and estimated as indicated in Fig. 7, page 112" are deleted.

8.12.9

Subclause 8.12.9 is replaced by the following:

"8.12.9: Condition of the circuit-breaker for test

The circuit-breakers shall be tested in free air according to subclause 8.12.9.1, unless they are designed for use only in enclosures specified by the manufacturer or they are intended for use in individual enclosures only, in which cases they shall be tested according to subclause 8.12.9.2 or, with the agreement of the manufacturer, to subclause 8.12.9.1. A circuit-breaker tested according to subclause 8.12.9.1 need not be tested according to subclause 8.12.9.2.

Note: An individual enclosure is an enclosure designed to accept one device only.

"8.12.9.1 Test in free air

The circuit-breaker under test is mounted as shown in appendix H, Figure H1.

The polyethylene foil and the barrier of insulating material specified in appendix H are placed as shown in figure H1 for opening (O) operations only.

The grid(s) (specified in appendix H) shall be so positioned that the bulk of the emitted ionized gases passes through the grid(s). The grid(s) shall be placed in the most unfavourable position(s).

Note: If the position of the vents is not obvious, or if there are no vents, appropriate information should be provided by the manufacturer.

The grid circuit(s) (see Figure H3) shall be connected to the points B and C according to the test circuit diagrams of Figure 3 to 6; for the test of single-pole circuit-breakers having a rated voltage of 230/400 V the grid circuit(s) shall, however, be connected between phases, to the points B and C' according to the test circuit diagram of Figure 3.

The resistor R' shall have a resistance of 1.5 Ω . The copper wire F' (see Figure H3) shall have a length of 50 mm and a diameter of 0.12 mm for circuit-breakers having a rated voltage of 230 V or 0.16 mm for circuit-breakers having a rated voltage of 400 or 230/400 V.

For test currents up to and including 1500 A, the distance "a" shall be 35 mm.

For higher short-circuit currents up to I_{cn} , the distance "a" may be increased and/or additional barriers or insulating means may be fitted, as stated by the manufacturer; "a", if increased, shall be chosen from the series 40 - 45 - 50 - 55 mm."

"8.12.9.2 Test in enclosures

The grid and the barrier of insulating material shown in figure H1 are omitted. The test shall be performed with the circuit-breaker placed in an enclosure having the most unfavourable configuration, under the most unfavourable conditions.

Note: This means that if other circuit-breakers (or other devices) are normally fitted in the direction(s) where the grid(s) would be placed, they should be fitted there. These circuit-breakers (or other devices) should be energized as in normal use but via F' and R' as defined in subclause 8.12.9.1, and connected as shown in figures 3, 4a, 4b, 5, or 6, as relevant.

In accordance with the manufacturer's instructions, barriers or other means, of adequate clearances, may be necessary to prevent ionized gases from affecting the installation. The polyethylene foils as described in Annex H is placed as shown in Figure H1 at a distance of 10 mm from the operating means, for 0 operations only."

8.12.10

At the end of the last paragraph: "no blowing of the fuse F." is replaced by "no melting of the fuse F and, if applicable, of the fuse F'."

8.12.11.3

The first sentence of the last but one paragraph is replaced by:

"The sequence of operations shall be as specified in subclause 8.12.11.2, except for single-pole circuit-breakers rated 230/400V."

8.12.11.4.2

The first paragraph of item d) is replaced by:

"For single-pole circuit-breakers rated 230/400 V an additional set of three samples is tested in a circuit according to Figure 5."

The third paragraph of item d) is deleted.

The title of Table XVII is replaced by "Test procedure for lcs in the case of three-phase test for single-pole circuit-breakers rated 230/400 V".

8.12.11.4.3

The first paragraph of item b) is replaced by:

"For single-pole circuit-breakers rated 230/400 V an additional set of four samples is tested in a circuit according to Figure 5."

The third paragraph of item b) is deleted.