
Električni pribor - Prenosne naprave na preostali (diferenčni) tok brez vgrajene nadtokovne zaščite za uporabo v gospodinjstvu in za podobno uporabo (IEC 61540:1997 + A1:1998, spremenjen) (vsebuje popravek AC:2003)

Electrical accessories - Portable residual current devices without integral overcurrent protection for household and similar use (PRCDs)

Elektrisches Installationsmaterial - Ortsveränderliche Fehlerstrom-Schutzeinrichtungen ohne eingebauten Überstromschutz für Hausinstallationen und für ähnliche Anwendungen (PRCDs)

Petit appareillage - Dispositifs différentiels mobiles sans dispositif de protection contre les surintensités incorporé pour usages domestiques et analogues (PCDM)

Ta slovenski standard je istoveten z: HD 639 S1:2002

ICS:

29.120.50	Varovalke in druga medtokovna zaščita	Fuses and other overcurrent protection devices
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HARMONIZATION DOCUMENT
DOCUMENT D'HARMONISATION
HARMONISIERUNGSDOKUMENT

HD 639 S1

March 2002

ICS 29.120.60

English version

**Electrical accessories –
Portable residual current devices
without integral overcurrent protection
for household and similar use (PRCDs)
(IEC 61540:1997 + A1:1998, modified)**

Petit appareillage –
Dispositifs différentiels mobiles sans
dispositif de protection contre les
surintensités incorporé pour usages
domestiques et analogues (PCDM)
(CEI 61540:1997 + A1:1998, modifiée)

Elektrisches Installationsmaterial –
Ortsveränderliche Fehlerstrom-
Schutzeinrichtungen ohne eingebauten
Überstromschutz für Hausinstallationen
und für ähnliche Anwendungen (PRCDs)
(IEC 61540:1997 + A1:1998, modifiziert)

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This Harmonization Document was approved by CENELEC on 2001-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document on a national level.

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

This Harmonization Document exists in three official versions (English, French, German).

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, 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

After publication of IEC 61540:1997, Portable residual current devices without integral overcurrent protection for household and similar use (PRCDs), the Secretariat Enquiry CLC/TC 23E(SEC)64 was launched. The comments of the national committees were considered at the 14th meeting of CLC/TC 23E, where it was decided to ask the CENELEC Technical Board for permission to prepare common modifications in the form of a Harmonization Document (HD), a European Standard (EN) being not possible because the requirements related to the plug and socket-outlet parts of PRCDs make reference to national standards.

This decision was approved by in July 1999 by the 100 BT, who recalled that the HD can only be included in the list of publications ensuring compliance with the 73/23/EEC directive (see BT decisions D100/076 and D100/077).

A draft containing common modifications to the text of IEC 61540:1997 and its amendment 1:1998 was submitted to the formal vote and was approved by CENELEC as HD 639 S1 on 2001-07-01.

The following dates were fixed:

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|--|-------|------------|
| – latest date by which the existence of the HD has to be announced at national level | (doa) | 2001-12-31 |
| – latest date by which the HD has to be implemented at national level by publication of a harmonized national standard or by endorsement | (dop) | 2002-10-01 |
| – latest date by which the national standards conflicting with the HD have to be withdrawn | (dow) | 2005-06-01 |

Annexes designated "normative" are part of the body of the standard.

In this standard, annexes A, B, C, D, ZA and ZB are normative.

Annexes ZA and ZB have been added by CENELEC.

In this standard, the following print types are used:

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

Endorsement notice

The text of the International Standard IEC 61540:1997 and its amendment 1:1998 was approved by CENELEC as a Harmonization Document with agreed common modifications as given below.

COMMON MODIFICATIONS

Contents

Add under annexes:

- D List of tests, additional test sequences and numbers of samples for verification of compliance of PRCDs with the requirements of electromagnetic compatibility EMC)
- ZA Normative references to international publications with their corresponding European publications
- ZB Special national conditions

1 Scope

Delete in the first paragraph ", or for rated current not exceeding 32 A for rated voltages not exceeding 130 V a.c. to earth".

Replace the 4th paragraph by:

"The plug and socket-outlet parts shall comply with the relevant national standard(s)."

Change in note 1 "IEC 61008-1" by "EN 61008-1".

Change note 3 to a normative text.

Replace note 3 by "NOTE 3 Void".

Delete, in note 4, "Australia and in".

2 Normative references

Delete the text of this clause and add the following note:

NOTE Normative references to international publications with their corresponding European publications are given in annex ZA (normative).

3 Definitions

Delete the last sentence of the fourth paragraph "The use of the... IEC 60884-1".

3.1.6 Delete the text in brackets at the end of the subclause.

3.2.4.10.2 Delete the definition of U_y and replace by "Void".

4 Classification

4.4.2 Delete "(under consideration)".

5 Characteristics of PRCDs

5.3.1 **Delete** "and 120 V".

Delete the note.

5.3.2 **Delete** the two last lines of Table 1.

5.3.3 **Delete** "0,006 A -".

5.3.6 **Delete** "and 60 Hz".

5.3.7 **Delete** "10 I_n or" and "whichever is the higher".

5.3.8 **Delete** "10 I_n or" and "whichever is the higher".

Table 2 **Add**, in the title "(in s)" after "break time".

Replace "250 A" by "250 A *)".

Move the note below the table.

Add the following asterisk in the last line of the table:

*) For $\Delta m = 250$ A the test will be made only during the test of 9.11.2.3 with measurement of the break time. For $\Delta m > 250$ A the test will be made only during the test of 9.9.2.2.

5.4.1 **Replace** in the second line "IEC 60364" by "HD 384".

5.4.2 **Add**, at the end of the first paragraph: "This value shall be equal to or higher than 1500 A."

5.4.3 **Add**, at the end of the first paragraph: "This value shall be equal to or higher than 1500 A."

6 Marking and other product information

6.1 **Delete** in item d) "and 60 Hz".

Replace in the 7th paragraph "PRCD itself" by "RCD part".

Add after the 9th paragraph:

"When an indicating means, separate from the operating means, is used, the symbol "I" or the colour red shall be used to indicate the closed position."

Replace the 13th paragraph by:

"If the test button is the only means for the opening operation **and** is not used for the closing operation, it shall still be marked T. In this case the colour red may be used."

Add after the 13th paragraph:

"Where the closing, opening and test functions are combined in one button it shall be marked T and the colour red shall not be used for that button."

Table 3 **Delete** in the second column, second line: "2)" and "7)"

Replace in the second line, first column "1)" and "6)" by "1) 2) 6) "

Replace in note 6 "under consideration" by "- 35 °C to 60 °C".

Delete note 7.

8 Requirements for construction and operation

8.1 **Delete** the note.

8.1.1.1 **Replace** the text by "*Compliance is checked by inspections and the tests of the relevant national standard.*".

8.1.1.3 **Replace** the last paragraph by "*Compliance is checked by the tests of 9.8.*"

Add at the end:

"The operation of the earthing contacts for the plug and the socket-outlet portions shall in addition comply with the relevant national standard."

8.1.1.4 **Replace** the text by "*Compliance is checked by the tests of the relevant national standard.*".

8.1.1.5.5 **Replace** the last paragraph by "*Compliance is checked by inspection and by the tests of 9.10*"

8.1.1.5.6 **Replace** the last paragraph by "*Compliance is checked by verification of the requirements, if any, of the relevant national standard.*"

8.1.1.5.8 **Replace** in the first line "and 4.1.4.1" by ", 4.1.4.1 and 4.1.4.3 (if equipped with terminals)".

8.1.1.5.9 **Replace** in the first line "and 4.1.4.1" by ", 4.1.4.1 and 4.1.4.3 (if equipped with terminals)".

8.1.1.5.10 **Replace** the first paragraph by:

"Terminals of PRCDs according to 4.1.3.1, 4.1.4.1 and 4.1.4.3 (if equipped with terminals) shall be so located or shielded that they are unlikely to create a dangerous situation in normal use."

8.1.1.5.11 **Replace** in the first line "and 4.1.4.1" by ", 4.1.4.1 and 4.1.4.3 (if equipped with terminals)".

8.1.1.5.16 **Delete** the text of the subclause and **replace** by "Void".

8.1.1.5.17 **Replace** in the second paragraph "totally enclosed" by "protected to the degree declared by the manufacturer".

Replace in the third paragraph "totally enclosed" by "protected to the degree of protection declared by the manufacturer".

Add at the end of the third paragraph: "This may be achieved by means of a captive lid."

Replace the last paragraph by "*Compliance is checked by inspection and by the tests of the relevant clauses of EN 60529 or the relevant clauses, if any, of the national standard.*"

Delete the note.

8.1.1.5.18 **Delete** the last part of the sentence from "and that any failure during...".

Add: "*Compliance is checked by the test of 9.6.*"

Delete the note.

8.1.1.5.19 **Replace** the second paragraph by "*Compliance is checked by the tests of 9.8 and 9.28.*"

Delete the note.

8.1.1.5.20 **Delete** the text of the subclause and **replace** by "Void".

8.1.1.6.2 **Replace** "IEC 60227 or IEC 60245" by "HD 21 or HD 22".

Replace, in the last paragraph, "*IEC 60227 or IEC 60245, as applicable*" by "*HD 21, HD 22 or the relevant national standard*".

- Table 4** **Delete** in the first column "130/" (3 times).
Delete the two last rows.
- 8.1.2** **Move** in the 5th paragraph the last sentence "The test device may be used for this purpose." after the first sentence.
Add at the end of the 8th paragraph "It shall not be possible for the indicator to show the "off" state when the contacts are in the closed position."
Add after the 9th paragraph, the following new paragraph:
"Where the closing, opening and test functions are combined in the same button, separate indicating means shall be provided."
Delete note 2.
Replace the last paragraph but two by "The operating means shall be securely fixed and it shall not be possible to remove them without the use of a tool."
- 8.1.3** **Replace** in the first paragraph "IEC 60884-1" by "the relevant national standard".
- Table 5** **Delete** note 4 and the reference thereto in column 2.
- Table 6** **Delete** the two last lines and the note.
- 8.1.7** **Replace** "26.5 of IEC 60884-1" by "the relevant national standard".
- 8.2.1** **Delete** the note.
- 8.2.1.1** **Delete** the text of the subclause and **replace** by "Void".
- 8.2.1.2** **Add** "NOTE In Switzerland shutters are not mandatory."
Replace the last paragraph by "Compliance is checked by inspection and by the test of the relevant national standards."
- 8.2.1.3** **Delete** the text of the subclause and **replace** by "Void".
- 8.2.1.4** **Delete** in the first paragraph "(see also note of 8.2.1.1)".
- Table 7** **Add** in the first column, third line, after "(body)", the caption "¹⁾"
Replace everywhere in the third column "IEC 60529" by "EN 60529."
Add in the third column, after "9.6.1" and "9.6.2" respectively, the caption "²⁾"
Add at the bottom of the table:
"1) Excluding entry holes intended for earth and live contacts.
2) These tests are replaced by the requirements of the national standards, if any."
- 8.18** **Replace** the text of the subclause by:
"PRCDs shall not cause excessive electromagnetic disturbances and their function shall not be unduly affected by electromagnetic phenomena likely to occur in normal use."
Compliance is checked by the tests of annex D.

Add the following new subclause:

"8.19 *Behaviour of PRCDs at the limits of the ambient air temperature*

PRCDs according to 4.4.1 and 4.4.2 shall operate reliably at their limits of the ambient air temperature.

Compliance is checked by the tests of 9.9.4."

9 Tests

Table 10 **Delete** the two last lines and the note.

Table 12 **Delete** the three last lines.

9.6 **Add** the following paragraph:

"For plug and socket portions, tests shall be performed in accordance with the relevant national standard. The tests below apply to all other portions of the PRCD."

9.6.1 **Delete** the 3rd, 8th and last paragraphs.

9.6.2 **Delete** the text of the subclause and **replace** by "Void".

9.6.3 **Delete** the text of the subclause and **replace** by "Void".

9.6.4 **Delete** "1,5 times rated current or" and ", whichever is the greater,".

9.6.5 **Replace** the text of the subclause by

"Compliance is checked by the tests of the relevant national standard for plugs and socket outlets."

9.7.2.a) **Add** at the end of the sentence **"excluding the PE circuit"**

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9.7.2.b) **Add** before note 1: [cd27bd452528/sist-hd-639-s1-2003](https://standards.iteh.ai/catalog/standards/sist/48e30b66-2ae1-4c38-b7e7-cd27bd452528/sist-hd-639-s1-2003)

"For this purpose, samples specially prepared by the manufacturer shall be submitted to this test."

Change the note 1 to normative text.

9.7.2.c) **Renumber** note 2 to note 1.

9.7.2.d) **Renumber** note 3 to note 2.

9.7.3 **Delete** in the first paragraph ", *the electronic components, if any, being disconnected for the test*".

Add at the end of the 6th paragraph ", *electronic components, if any, being disconnected for the tests b) and c)*".

9.7.4 **Replace** the text of the subclause by:

"No additional insulation or dielectric tests are carried out between primary and secondary circuits of the detection transformer."

9.8.1 **Replace** the last paragraph by:

"The fixed socket-outlets used for the test shall comply with the relevant requirements of the national standards."

9.8.3 **Add** in the first sentence after "the PRCD" the wording "...in a first test and in a second test through the protective earth path only".

9.9 Delete the note.

9.9.2.1 Add a third paragraph:

"The test is then repeated with test switches S_1 and S_3 in the closed position, S_2 being open."

9.9.2.2 a) Add at the end the following sentence *"For PRCDs with $I_{\Delta n} = 250$ A the test with 250 A is carried out only during 9.11.2.3."*

9.9.2.2b) Delete, in the note: "the USA and in".

9.9.3 Add the following note:

"NOTE Preheating may be carried out at reduced voltage, auxiliary or electronic circuits being connected to their rated operating voltage. See Figure 23."

9.9.4.1 Replace the title by "For all PRCDs".

Replace the text of the note by "Preheating may be carried out at reduced voltage, auxiliary or electronic circuits being connected to their normal rated voltage. See Figure 23."

9.9.4.2 Replace "Under consideration" by:

"The PRCDs, connected as for normal use, are brought into a suitable test chamber with an ambient air temperature of $+ 23$ °C \pm 2 °C and a relative humidity of 93 % \pm 3 %. The volume ratio of the test chamber to the test samples shall be greater than 50.

The PRCDs are in the ON-position without load.

Within 6 h the ambient air temperature is reduced to $- 25$ °C \pm 2 °C without any supply of humidity and is kept at this value for 6 h. Within the next 6 h the temperature is increased to $+ 23$ °C \pm 2 °C and the relative humidity is increased to 93 % \pm 3 %.

These values are again kept for 6 h (end of first cycle).

This cycle (see Figure 27) is performed five times. During these cycles the PRCDs shall not trip.

Immediately after the last 6 h period at $- 25$ °C \pm 2 °C a residual current is passed through any one pole of each PRCD.

The PRCD shall trip within 0,3 s

- *at an alternating residual current of $1,25 I_{\Delta n}$ and*
- *at a pulsating residual current (one-way rectification, $\alpha = 0^\circ$ el) of $1,25 \times 1,4 I_{\Delta n}$ for PRCDs with rated residual current of 30 mA and $1,25 \times 2 I_{\Delta n}$ for PRCDs with rated residual current of 10 mA"*

9.10.1 Replace the whole text of the subclause by:

"The plug and socket-outlet parts of the PRCD are tested according to the relevant clauses of the national standards.

For PRCDs depending on the line voltage, a specially prepared sample may be necessary for the test of its incorporated plug.

The tests to check compliance with regard to 8.1.1.5.2, which are described in 9.12 and 9.26 are made after the tests of this subclause."

9.10.2.3 Replace the last but one paragraph by:

"Under the test condition of 9.9.2.3, the PRCD shall trip with a test current of $1,125 I_{\Delta n}$. One test only is made with measurement of break time, which shall not exceed the value specified in Table 2 at $I_{\Delta n}$."

9.11.2.1 a) **Replace** the first and the second line by:

a) *Test circuits*

Figures 10a) and 10b) give the diagrams of the circuits to be used for the tests.

Replace the 14th paragraph by:

"For the purpose of verifying the minimum let-through energy I^2t value and minimum peak current I_p to be withstood by the PRCD, either a silver wire using the test apparatus shown in Figure 20 or a fuse shall be used."

Delete the 2nd sentence of the 16th paragraph "For higher rated currents, ... and 1,5 kA".

Replace in the last paragraph "device T" by "device So".

9.11.2.1 e) **Replace** in the second paragraph "connections C" by "connections G2".

9.11.2.1 g) **Replace** in the second and third paragraphs "switch T" by "switch So".

9.11.2.1 i) **Replace** the last but one paragraph by:

"Under the test condition of 9.9.2.2.a), the PRCD shall trip with a test current of 1,125 $I_{\Delta n}$. One test only is made with measurement of break time which shall not exceed the value specified in Table 2 at $I_{\Delta n}$."

9.11.2.2 a) **Add** at the end of the second paragraph, after "SCPD", the words "(see Figure 10a)."

9.11.2.3 a) **Add** at the end of the first paragraph, after "residual current", the words "through the earth path of the PRCD (see Figure 10b)".

Delete in the third paragraph, after "supply", the word "voltage".

9.11.2.4 a) **Add** at the end of the first paragraph under 1), after "SCPD", the words "(see Figure 10a)".

9.11.2.4 b) **Add** at the end of the first paragraph under 1), after "SCPD", the words "(see Figure 10a)".

9.11.2.4 c) **Replace** the first and second paragraphs under 1) by:

"The PRCD shall be connected according to Figure 10b.

The test at 500 A is performed on one pole and the test at $I_{\Delta c}$ is performed on the other pole except for polarized systems where both tests are performed on the phase pole."

9.11.3 **Replace** "clause 20 of IEC 60884-1" by "the relevant tests of the applicable national standard."

9.12.1 **Replace** the first paragraph by:

"The samples are tested in a tumbling barrel as specified in the national standards, an example being shown in Figure 11."

Add in the fifth paragraph after "3 mm thick" the words "or on a wooden plate, according to the national standard,".

Replace in the second dashed paragraph "also fails to comply with the requirements of 9.1 and 10.3 of IEC 60884-1" by "and fails to comply with the relevant national standards for socket outlets."

9.12.3 **Replace** the text by "Plug pins provided with insulating sleeves are tested according to the relevant clauses of the national standard."

9.12.4 **Replace** the text after the first paragraph by "Compliance is checked according to the relevant clauses of the national standard."

9.12.5 Replace the fifth paragraph by:

"For PRCDs classified according to 4.1.1, the test shall be performed without cord at - 5 °C."

Add at the beginning of the 6th paragraph: "Immediately after having been taken out of the chamber, the sample....".

Replace the last but one paragraph by:

"If applicable, the PRCD shall operate when a residual current of 1,125 I_{Δn} is applied to one pole chosen at random, with measurement of the break time which shall not exceed the value specified in Table 2 at I_{Δn}."

9.13.1 Replace the last but one paragraph by:

"Under the test condition of 9.9.2.2.a), the PRCD shall trip with a test current of 1,125 I_{Δn}. One test only is made with measurement of break time which shall not exceed the value specified in Table 2 at I_{Δn}."

9.14.2 Replace the text by "The plug or plug portion with pins provided with insulating sleeves is tested according to the relevant clauses of the national standard."**9.17.1.2** Add at the end of the fourth paragraph: "at a residual current equal to 1,125 I_{Δn}".**9.20** Replace, in note 1, "surge" by "source".

Add after the 10th paragraph a new note:

"NOTE 4 Surge suppressing devices or other electronic components may affect the calibration of the shape of the impulses. In such case a special sample where they have been disconnected may be used for calibration purposes (calibration may depend on the internal resistance of the device incorporated)."

9.21.2 Replace the second paragraph by:

"The circuit is successively calibrated at the values of I_{Δn}, 2I_{Δn} and 5I_{Δn} each value been multiplied by

- 1,4 for PRCDs with I_{Δn} = 0,03 A,
- 2 for PRCDs with I_{Δn} = 0,01 A."

9.22.1.5 Replace the text by:

"Under the test condition of 9.9.2.3, the PRCD shall trip with a test current of 1,125 I_{Δn}. One test only is made with measurement of break time which shall not exceed the value specified in Table 2 at I_{Δn}."

9.22.2 Replace in the second paragraph "For each pole, a single core cable," by "A flexible cord,".

Replace the last paragraph by:

"Under the test condition of 9.9.2.3, the PRCD shall trip with a test current of 1,125 I_{Δn}. One test only is made with measurement of break time which shall not exceed the value specified in Table 2 at I_{Δn}."

9.23 b) Replace the last paragraph by:

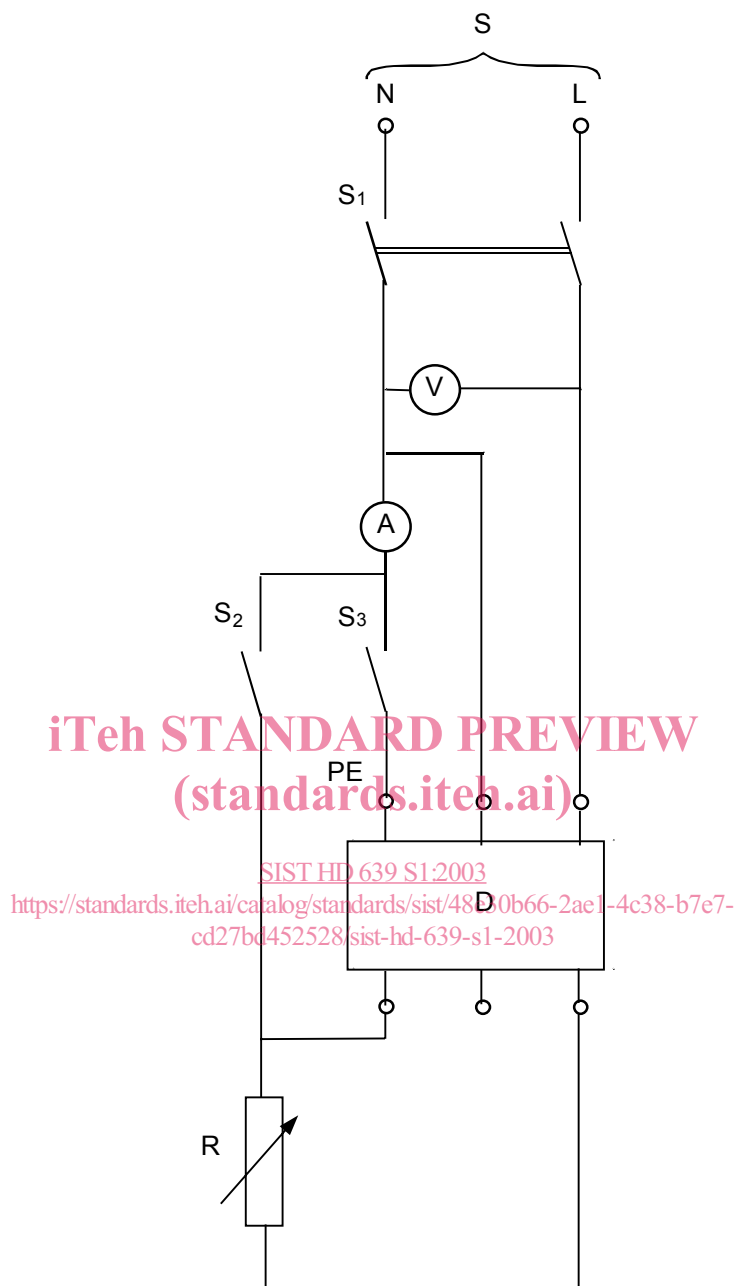
"Under the test condition of 9.9.2.3, the PRCD shall trip with a test current of 1,125 I_{Δn}. One test only is made with measurement of break time which shall not exceed the value specified in Table 2 at I_{Δn}."

- 9.25** **Replace** the text by:
"*Compliance is checked according to the relevant clause(s) of the national standard.*"
- 9.26** **Replace** the text by:
"*Compliance is checked according to the relevant clause(s) of the national standard.*"
- 9.28** **Replace** in the first paragraph "equipment" by "PRCD".
Replace in the last paragraph "0,25 Nm" by "*the value given in the national standard.*"
- Table 17** **Delete** the two last rows and the note.
- Figures**
- Figures 4, 5 and 6** **Replace** by new figures 4, 5 and 6.
- Figures 7, 8 and 9** **Delete**
- Figure 10** **Replace** by Figures 10a and 10b
- Figures 12, 13 and 15** **Delete**
- Figure 27** **Add** the new figure.

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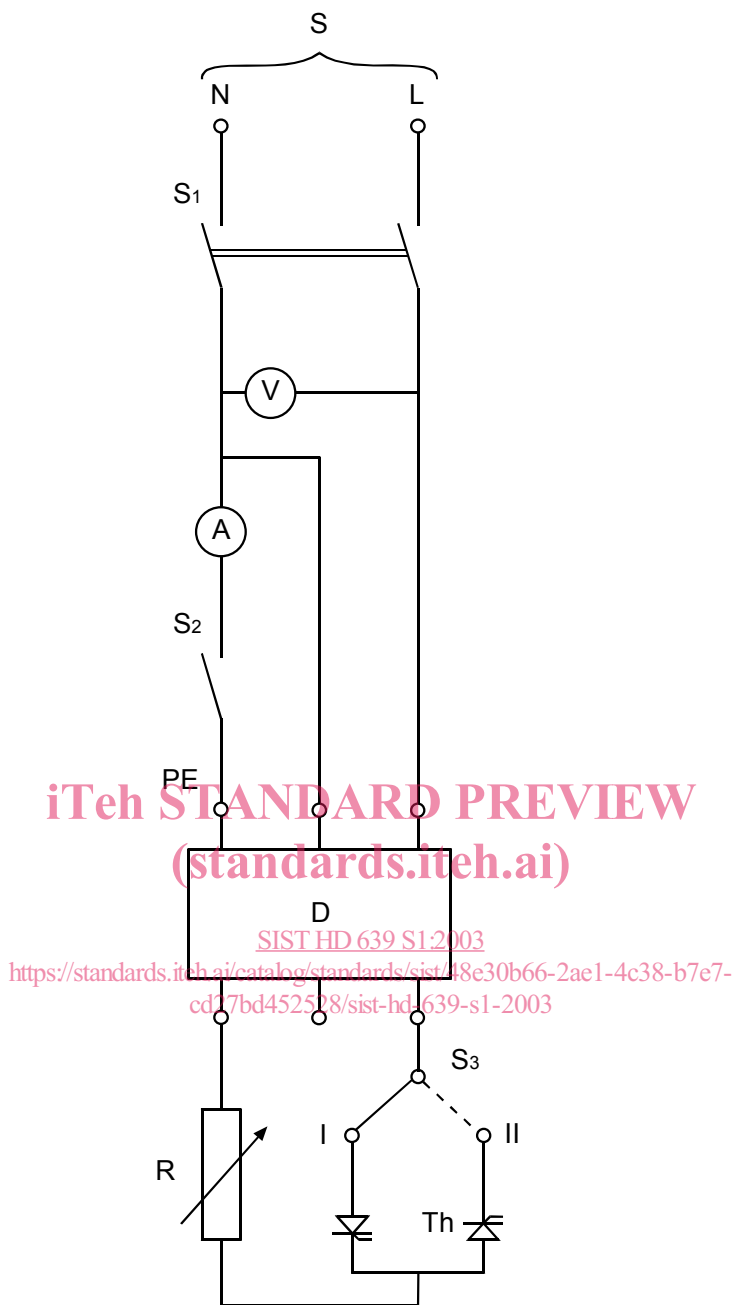
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Key

D	PRCD under test
S	Supply
V	Voltmeter
A	Ammeter
S ₁	Two-pole switch
S ₂ , S ₃	Single-pole switches
R	Variable resistor
PE	Earth path of the PRCD

Figure 4 – Test circuit for verification of
- operating characteristic (9.9)
- trip-free mechanism (9.15)
- behaviour in case of failure of the line voltage (9.17) for PRCDs functionally dependent on the line voltage



Key

D	PRCD under test
S	Supply
V	Voltmeter
A	Ammeter (measuring r.m.s. values)
S ₁	Two-pole switch
S ₂	Single-pole switch
S ₃	One-pole two way switch
R	Variable resistor
Th	Thyristor
PE	Earth path of the PRCD

Figure 5 – Test circuit for the verification of the correct operation of PRCDs, in the case of residual pulsating direct currents