# NORME INTERNATIONALE
# INTERNATIONAL STANDARD

**CEI**
**IEC**
**947-7-2**

Première édition
First edition
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## Appareillage à basse tension –

## Partie 7:
Matériels accessoires –
Section 2: Blocs de jonction de conducteurs de protection pour conducteurs en cuivre

## Low-voltage switchgear and controlgear –

## Part 7:
Ancillary equipment –
Section 2: Protective conductor terminal blocks for copper conductors

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- la CEI 617: *Symboles graphiques pour schémas;*

et pour les appareils électromédicaux,

- la CEI 878: *Symboles graphiques pour équipements électriques en pratique médicale.*

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- IEC 878: *Graphical symbols for electromedical equipment in medical practice.*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

# LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

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FOREWORD

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International Standard IEC 947-7-2 has been prepared by sub-committee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

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

| DIS | Report on voting |
|---|---|
| 17B/635/DIS | 17B/699/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.

Annex A forms an integral part of this section of IEC 947-7.

# INTRODUCTION

The provisions of the general rules dealt with in part 1 (IEC 947-1) and the requirements for terminal blocks of part 7-1 (IEC 947-7-1) are applicable to this section of IEC 947-7 where specifically called for.

Clauses and subclauses, tables, figures and appendices of part 1 or part 7-1 thus applicable are identified by reference to part 1 or part 7-1, for example subclause 1.2 of part 1, table IV of part 7-1 or appendix A of part 1.

# LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

## Part 7: Ancillary equipment –

## Section 2: Protective conductor terminal blocks for copper conductors

### 1 General

#### 1.1 *Scope and object*

This section of IEC 947-7 applies to protective conductor terminal blocks with PE function up to 120 mm² (250 MCM) and to protective conductor terminal blocks with PEN function equal to and above 10 mm² (AWG 8) with screw-type or screwless-type clamping units, primarily intended for industrial applications.

Protective conductor terminal blocks are used to form the electrical and mechanical connection between copper conductors and the fixing support.

It is applicable to protective conductor terminal blocks for the connection of round copper conductors with and without special preparation having a cross-section between 0,2 mm² and 120 mm² (AWG 24 and 250 MCM) applied for up to 1 000 V a.c. circuits up to 1 000 Hz and up to 1 500 V d.c. circuits, most commonly in conjunction with terminal blocks according to IEC 947-7-1.

This section does not apply to:

- special construction protective conductors terminal which form an integral part of equipment, being dealt with in the relevant product standard;
- protective conductor terminals requiring the fixing of special devices to the conductors before clamping them into the terminal, for example flat push-on connectors;
- protective conductor terminals requiring twisting of the conductors, for example those with twisted joints;
- protective conductor terminals providing direct contact to the conductors by means of edges or points penetrating the insulation;
- protective conductor terminals which are dealt with in other particular requirements.

#### 1.2 *Normative references*

The following normative documents contain provisions which, through reference in this text, constitute provisions of this section of IEC 947-7. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this section of IEC 947-7 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 50 (826): 1982, *International Electrotechnical Vocabulary (IEV) – Chapter 826: Electrical installations of buildings*

IEC 228: 1978, *Conductors of insulated cables*

IEC 439-1: 1992, *Low-voltage switchgear and controlgear assemblies – Part 1: Type-tested and partially type-tested assemblies*

IEC 715: 1981, *Dimensions of low-voltage switchgear and controlgear – Standardized mounting on rails for mechanical support of electrical devices in switchgear and controlgear installations*

IEC 947-7-1: 1989, *Low-voltage switchgear and controlgear – Part 7: Ancillary equipment – Section One: Terminal blocks for copper conductors*

## 2 Definitions

For the majority of the definitions required in connection with this section of IEC 947-7, see clause 2 of part 1.

For the purpose of this section, the following additional definitions shall apply.

2.1 **protective conductor terminal block**: Device with one or more clamping units for connecting and/or joining protective conductors (PE and PEN conductors) with conducting connection to their supports, which may be designed with screw-type or screwless-type fixing means. Supports are, for example, mounting rails, sheet metal cut-outs, mounting plates, etc.

A protective conductor terminal block can be either partially insulated or not at all. It does not require any operating insulation.

2.2 **partially insulated protective conductor terminal block**: Device which is only insulated against live parts of other devices but not against the support itself.

2.3 **PEN conductor**: An earthed conductor combining the functions of both protective conductor and neutral conductor.

NOTE – The acronym PEN results from the combination of both symbols PE for the protective conductor and N for the neutral conductor [IEV 826-04-06] (see also 2.1.15 of part 1).

## 3 Classification

Distinction is made between various types of protective conductor terminal blocks according to the:

- method of fixing the protective conductor terminal block to the support;
- type of terminal (e.g. screw-type terminals, screwless-type terminals, etc.);
- ability to receive conductors with or without special preparation (e.g. cable lugs);
- terminal assemblies with identical or dissimilar clamping units;
- number of terminals on each terminal assembly;
- service conditions;
- PE or PEN functions.

## 4 Characteristics

### 4.1 *Summary of characteristics*

Subclause 4.1 of part 7-1 applies.

### 4.2 *Type of protective conductor terminal block*

Subclause 4.2 of part 7-1 applies.

### 4.3 *Rated and limiting values*

4.3.1 Void.

4.3.2 *Rated short-time withstand current (of a protective conductor terminal block)*

Subclause 4.3.2 of part 7-1 applies.

4.3.3 *Standard cross-section*

Subclause 4.3.3 of part 7-1 applies.

NOTE – In accordance with the scope of this section, table 1 of part 1 applies only up to 120 mm² (250 MCM).

4.3.4 *Rated cross-section*

Subclause 4.3.4 of part 7-1 applies.

4.3.5 *Rated connecting capacity (of a protective conductor terminal block)*

Subclause 4.3.5 of part 7-1 applies with the following addition to table II.

| Rated cross-section | | Rated connecting capacity | |
|---|---|---|---|
| mm² | AWG/MCM | mm² | AWG/MCM |
| 50 | 0 | 25 – 35 – 50 | 4 – 2 – 0 |
| 70 | 00 | 35 – 50 – 70 | 2 – 0 – 00 |
| 95 | 000 | 50 – 70 – 95 | 0 – 00 – 000 |
| 120 | 250 | 70 – 95 – 120 | 00 – 000 – 250 |

## 5 Product information

### 5.1 *Marking*

A protective conductor terminal block shall be marked in a durable and legible manner with:

a) the name of the manufacturer or a trade mark by which the manufacturer can be readily identified;

b) a type reference permitting to identify it and to get relevant information from the manufacturer or his catalogue;

c) IEC 947-7-2, if the manufacturer claims compliance with this standard;

*Additional information*

The following information shall be marked on the terminal block or contained in the manufacturer's data sheet or on the smallest packing unit.

d) the rated cross-section;

e) the rated connecting capacity if different from table II and for one conductor per terminal as for 7.4.3.1.6 of IEC 439-1;

f) service conditions if different from those of clause 6 below;

g) PE function only if supplied with or intended for use only with steel in the current-carrying path.

NOTE – No marking indicates suitability for use in both PE + PEN functions.

## 6 Normal service, mounting and transport conditions

Clause 6 of part 1 applies.

## 7 Constructional and performance requirements

### 7.1 *Constructional requirements*

Subclause 7.1 of part 1 is amplified as follows:

#### 7.1.1 *Terminals*

The terminals shall permit a reliable connection between the conductor connections and the connections to the support.

The terminals shall be able to withstand the forces that can be applied through the connected conductors and the connected support under the conditions 8.2.1 and 8.2.2 of part 7-1.

#### 7.1.2 *Connection of support*

Protective conductor terminal blocks shall be provided with means that allow them to be securely attached to the corresponding support without risk of galvanic corrosion.

The design of the protective conductor terminal block shall clearly show how the fixation has to be made to ensure the correct conducting connection to the appropriate support.

The clamping connection to the support shall only be released by means of tools.

The test shall be carried out in accordance with 8.2.1 of part 7-1.

NOTE – Further requirements concerning materials and current-carrying parts are under consideration for 7.1.1 and 7.1.2 of part 1. Their application to this section will be subject to further consideration.

7.1.3 *Clearance and creepage distances*

The manufacturer of the protective conductor terminal block shall state in his literature how to obtain the appropriate clearance and creepage distances. The value of the clearance and creepage distances shall be in accordance with IEC 947-7-1.

NOTE – For arrangements containing terminal blocks of various sizes and when using accessories, the clearance and creepage distances should, if necessary, be obtained by using supplementary means in accordance with the manufacturer's instructions.

7.1.4 *Terminal identification and marking*

Subclause 7.1.4 of part 7-1 applies with the following addition:

Any partially insulated protective conductor terminal block shall be coloured green and yellow.

7.1.5 *Resistance of parts in insulating material to abnormal heat, fire and tracking*

Subclause 7.1.5 of part 7-1 applies.

7.1.6 *Connecting capacity*

Subclause 7.1.6 of part 7-1 applies.

7.1.7 *Protective conductor mounting rails*

Mounting rails may be used as protective conductor busbars, provided the values specified in annex A for thermal short-time withstand current and the thermal rated current are not exceeded.

Other types of mounting rails may be used for this purpose, if the values of annex A are comparable.

Annex A gives examples of standardized mounting rails meeting these requirements.

Steel protective conductor busbars are not allowed to be used as a PEN conductor.

NOTE – Special tests are required for protective conductor terminal blocks involving connection of aluminium to copper or aluminium to copper alloy.

In the U.S.A. special requirements apply to terminals involving aluminium to copper or to copper alloy connections.

7.2 *Performance requirements*

Subclause 7.2 of part 7-1 applies with the following modification:

7.2.1 *Temperature rise*

When protective conductor terminal blocks for PEN functions are tested in accordance with 8.3.3 of this section, the temperature rise of the terminals shall not exceed 45 K.

7.2.2 *Dielectric properties*

Protective conductor terminal blocks which shall be arranged directly beside terminal blocks in accordance with IEC 947-7-1 shall pass the dielectric test specified in 8.3.1 of this section.

7.2.3 *Rated short-time withstand current*

Protective conductor terminal blocks shall be capable of withstanding three applications of 1 s duration each, the rated short-time withstand current which corresponds to 120 A/mm² of its rated cross-section. The test shall be made in accordance with 8.3.4 of this section.

7.2.4 *Voltage drop*

The potential difference caused by the conductor connection and by the connection to the support of a protective conductor terminal block shall not exceed the values contained in 8.3.3, 8.3.4 and 8.3.5 when measuring in accordance with 8.3.2 of this section.

7.2.5 *Electrical performance after ageing (for screwless type protective conductor terminal blocks only)*

Protective conductor terminal blocks shall be capable of withstanding the ageing test with 192 temperature cycles to be applied in accordance with 8.3.5 of this section.

## 8 Tests

Clause 8 of part 7-1 is applicable and amplified as follows:

8.3 *Verification of electrical characteristics*

The verification of electrical characteristics includes:

- dielectric test (with neighbouring terminal blocks) – see 8.3.1;
- verification of voltage drop – see 8.3.2;
- temperature-rise test (for protective conductor terminal blocks with PEN function) – see 8.3.3;
- short-time withstand current test – see 8.3.4;
- ageing test (for screwless protective conductor terminal blocks) – see 8.3.5.

8.3.1 *Dielectric test*

This test only applies if partially insulated protective conductor terminal blocks are arranged directly beside terminal blocks in accordance with IEC 947-7-1.

NOTE – A test is under consideration.

8.3.2 *Verification of the voltage drop*

This subclaluse is modified as follows:

a) Not applicable.

The verification according to tests b) and d) of part 7-1 of this standard is made on adjacent protective conductor terminal blocks which are wired by conductors of the rated cross-section, as shown in figures 2 and 3.

The protective conductor terminal blocks of test b) are wired by PVC-insulated conductors.

If the protective conductor connection is made to steel supports with a chromated surface, the chromate coat shall be removed at the contact points prior to the connection, except for the short-time withstand current test in accordance with 8.3.4, for which the voltage drop shall be measured only after the test.

The voltage drop is measured on each terminal block as indicated in figure 1. The measurement is made with a d.c. current of 0,1 times values given in part 7-1, tables V or VI for the cross-section of the conductors utilized.

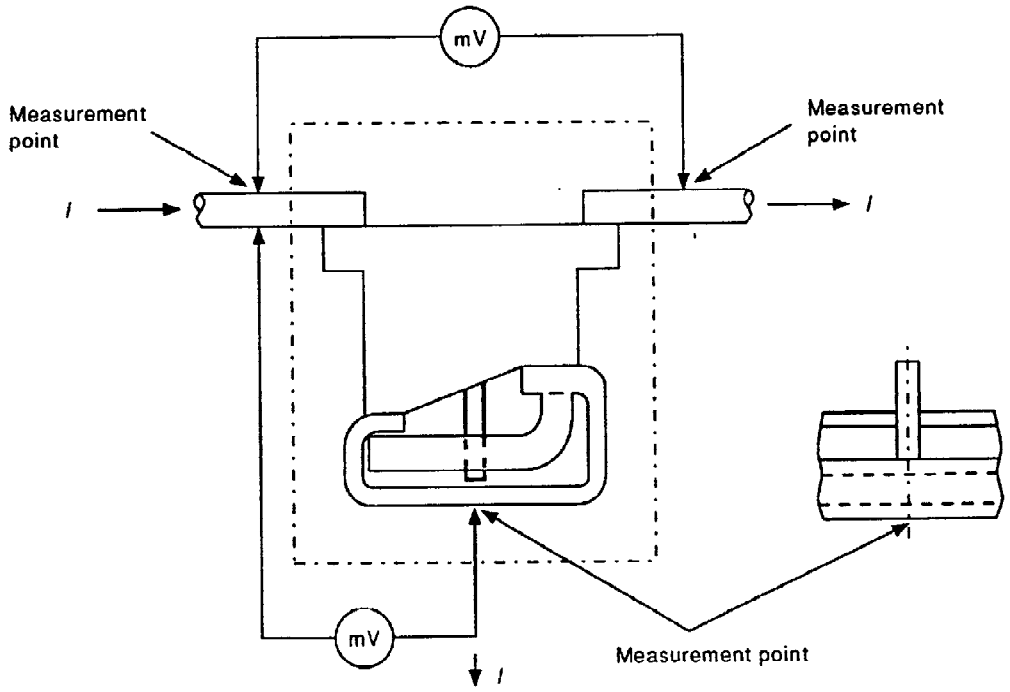


**Figure 1 – Arrangement for the voltage drop test**

Before and after the test, the voltage drop on the terminal blocks for the copper conductors shall not exceed 3,2 mV and the voltage drop for the clamping units to the support shall not exceed 6,4 mV. After the test, the measured value shall not exceed 150 % of the values measured before the test.

8.3.3 *Temperature-rise test*

This test is only applicable for protective conductor terminal blocks with PEN function equal to and above 10 mm² rated cross-section. To this effect, the thermal rated current values allotted to the rail profiles in annex A are to be seen as limit values.

Steel supports are not permissible. The test circuit shall be located horizontally as shown in figures 2 and 3 on a wooden surface (e.g. tabletop or floor). The conductors shall lie freely on the surface.

The test shall be made with PVC-insulated conductors according to IEC 228 having the rated cross-section.

The conductor connection and the connection to the support, shall be made with the torque value shown in part 1, table IV, or a higher value specified by the manufacturer.

The minimum conductor length L shall be 1 m for the cross-section up to and including 10 mm² (AWG 8) and 2 m for larger cross-sections.

The conductors shall be rigid/stranded.

Two different test groups are to be provided:

a) Five insulated protective conductor terminal blocks shall be arranged adjacently without support (see figure 2); the temperature shall be measured on the middle protective conductor terminal block.

b) Five protective conductor terminal blocks shall be arranged adjacently on their support (see figure 3), the two outer protective conductor terminal blocks being linked through their support. The temperature shall be measured on the two outer terminal blocks.

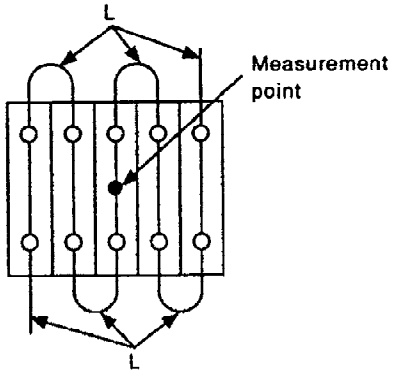


**Figure 2 – Arrangement for the temperature-rise test for the first test group**

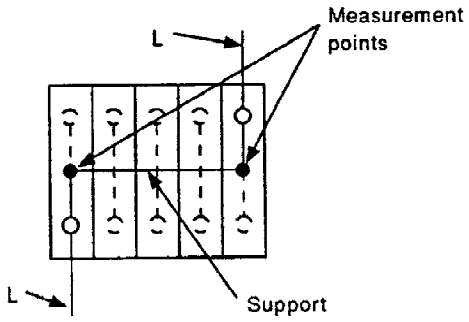


**Figure 3 – Arrangement for the temperature-rise test for the second test group**

The test is made with an a.c. single-phase current as specified in part 7-1, tables V and VI according to the rated cross-section and is continued until constant temperature is reached. A deviation of less than 1 K between any two of three consecutive readings made at an interval of 5 min is considered as a constant temperature.

The temperature rise shall not exceed the limit value of 7.2 of part 7-1.

At the end of the test, after cooling to ambient air temperature, the protective conductor terminal block shall be capable of passing the voltage drop test according to 8.3.2 with measurement points in accordance with figure 1.

8.3.4 *Short-time withstand current test*

The purpose of this test is to verify the ability to withstand a thermal shock.

The test is carried out on a protective conductor terminal block, which is installed on its support according to the manufacturer's instructions and wired with a stranded conductor of the rated cross-section.

The conductor connection and the connection to the support shall be made with the torque value given in part 1, table IV or a higher value specified by the manufacturer. The value and duration of the test current shall be in accordance with 7.2.3.

The maximum short-time withstand currents allocated to the rail profile in annex A shall be considered as limit values.

The test current is applied once through the current parts 1-1 and 2-2 in accordance with figure 4.

A pause of 6 min minimum shall be allowed between the current surges.

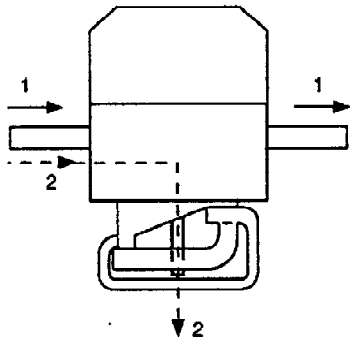


**Figure 4 – Arrangement for the thermal short-circuit test**

At the end of the test, no damage shall have occurred to any part of the protective conductor terminal block that may impair further use.

After cooling to room temperature and without any change to the arrangement, the protective conductor terminal blocks shall pass the voltage drop test with measurement points as indicated in figure 1. The voltage drop for the clamping units to the support shall not exceed 6,4 mV.

8.3.5 *Ageing test (only for screwless-type protective conductor terminal blocks)*

For the test of the screwless-type clamping units for copper conductors, five protective conductor terminal blocks insulated against one another shall be arranged without support (see figure 2).

The mininum length of the conductor bridges shall be 300 mm.

If the connection to the support is also made screwless, five further protective conductor terminal blocks are arranged adjacently on their support (see figure 3).

The test is made with heat-resistant insulated or non-insulated conductors having the rated cross-section.

The protective conductor terminal blocks already submitted to the verification of the voltage drop according to 8.3.2 are placed in a heating cabinet, which is initially kept at a temperature of (20 ± 2) °C.

The whole test arrangement, including the conductors, shall not be moved until all the voltage drop tests have been completed.

For the protective conductor terminal blocks, intended for use under "normal service conditions" (maximum 40 °C), the temperature in the heating cabinet is increased to 85 °C.

For protective conductor terminal blocks for which the manufacturer specifies "maximum service conditions above 40 °C", the temperature in the heating cabinet is increased to the temperature specified by the manufacturer plus 45 K.

The temperature is maintained within ± 5 °C of this value for approximately 10 min.

The protective conductor terminal blocks are then cooled down to a temperature of approximately 30 °C, forced cooling being allowed; they are kept at this temperature for approximately 10 min and, if necessary for measuring the voltage drop, allowed to cool down further to a temperature of (20 ± 5) °C.

As a guide value for the heating and cooling rate of the heating cabinet approximately 1,5 °C/min shall be taken as a basis.

The voltage drop in the protective conductor terminal blocks is also determined according to 8.3.2 after each of the 24 temperature cycles and, after the 192 temperature cycles have been completed, each time at a temperature of (20 ± 5)°C.

In no case the voltage drop at the clamping units for the copper conductors shall exceed 4,8 mV or 1,5 times the value measured after the 24th cycle, whichever is the lower.

At the clamping units to the support 9,6 mV or 1,5 times the value measured after the 24th cycle shall not be exceeded, whichever is the lower.

If one of the protective conductor terminal blocks does not withstand the test, the test is repeated on a second set of protective conductor terminal blocks all of which shall then comply with the repeated test.

After this test, a visual inspection shall show no changes impairing further use as cracks, deformations or the like.

Furthermore, the pull-out test according to 8.2.2.2 of part 7-1 applies.

8.4 *Fire hazard test*

Under consideration.

# Annex A
(normative)

## Maximum short-time withstand currents allocated to the rail profile

| Rail profile | Material | Equivalent E-Cu cross-section mm² | Short-time withstand current 1 s kA | Thermal rated current of a PEN busbar A |
|---|---|---|---|---|
| "Top hat" rail | Steel | 10 | 1,2 | — |
| IEC 715/TH 15 – 5,5 | Copper[1)] | 25 | 3 | 101 |
| | Aluminium[1)] | 16 | 1,92 | 76 |
| G-type rail | Steel | 35 | 4,2 | — |
| IEC 715/G32 | Copper[1)] | 120 | 14,4 | 269 |
| | Aluminium[1)] | 70 | 8,4 | 192 |
| "Top hat" rail | Steel | 16 | 1,92 | — |
| IEC 715/TH 35-7,5 | Copper[1)] | 50 | 6 | 150 |
| | Aluminium[1)] | 35 | 4,2 | 125 |
| "Top hat" rail | Steel | 50 | 6 | — |
| IEC 715/TH 35-15 | Copper[1)] | 150 | 18 | 309 |
| | Aluminium[1)] | 95 | 11,4 | 232 |

[1)] Copper or aluminium alloys selected by the manufacturer of the terminal block assembly to achieve the values in the table.

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- ☐ for quality assessment
- ☐ for certification
- ☐ for general information
- ☐ for design purposes
- ☐ for testing
- ☐ other . . . . . .

5.
This standard will be used in conjunction with (check as many as apply):

- ☐ IEC
- ☐ ISO
- ☐ corporate
- ☐ other (published by . . . . . )
- ☐ other (published by . . . . . )
- ☐ other (published by . . . . . )

6.
This standard meets my needs (check one):

- ☐ not at all
- ☐ almost
- ☐ fairly well
- ☐ exactly

7.
Please rate the standard in the following areas as (1) bad, (2) below average, (3) average, (4) above average, (5) exceptional (0) not applicable:

- ☐ clearly written
- ☐ logically arranged
- ☐ information given by tables
- ☐ illustrations
- ☐ technical information

8.
I would like to know how I can legally reproduce this standard for:

- ☐ internal use
- ☐ sales information
- ☐ product demonstration
- ☐ other . . . . . .

9.
In what medium of standard does your organization maintain most of its standards (check one):

- ☐ paper
- ☐ microfilm/microfiche
- ☐ mag tape
- ☐ CD ROM
- ☐ floppy disk
- ☐ on line

9A.
If your organization currently maintains part or all of its standards collection in electronic media please indicate the format(s).

- ☐ raster image
- ☐ full text

10.
In what medium does your organization intend to maintain its standards collection in the future (check all that apply):

- ☐ paper
- ☐ microfilm/microfiche
- ☐ mag tape
- ☐ CD ROM
- ☐ floppy disk
- ☐ on line

10A.
For electronic media which format will be chosen (check one):

- ☐ raster image
- ☐ full text

11.
My organization is in the following sector (e.g. engineering, manufacturing)

. . . . . .

12.
Does your organization have a standards library:

- ☐ Yes
- ☐ No

13.
If you said yes to 12 then how many volumes:

. . . . . .

14.
Which standards organizations published the standards in your library (e.g. ISO, DIN, ANSI, BSI, etc.):

. . . . . .

15.
My organization supports the standards-making process by (check as many as apply):

- ☐ buying standards
- ☐ using standards
- ☐ membership in standards organizations
- ☐ serving on standards development committees
- ☐ other . . . . . .

16.
My organization uses (check one):

- ☐ French text only
- ☐ English text only
- ☐ Both English/French text

17.
Other comments:

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

18.
Please give us information about you and your company

name: . . . . . .

job title: . . . . . .

company: . . . . . .

address: . . . . . .

. . . . . .

. . . . . .

. . . . . .

No. employees at your location: . . . . . .

turnover/sales: . . . . . .

## Publications de la CEI préparées par le Comité d'Etudes n° 17

56 (1987) Disjoncteurs à courant alternatif à haute tension.
Amendement 1 (1992).
Amendement 2 (1995).

129 (1984) Sectionneurs et sectionneurs de terre à courant alternatif.
Amendement 1 (1992).

158: – Appareillage de commande à basse tension.

158-2 (1982) Deuxième partie: Contacteurs à semiconducteurs (contacteurs statiques).

158-3 (1985) Troisième partie: Prescriptions complémentaires pour conducteurs sujets à certification.

265: – Interrupteurs à haute tension.

265-1 (1983) Première partie: Interrupteurs à haute tension pour tensions assignées supérieures à 1 kV et inférieures à 52 kV.
Modification n° 1 (1984).
Amendement 2 (1994).

265-2 (1988) Deuxième partie: Interrupteurs à haute tension de tension assignée égale ou supérieure à 52 kV.
Amendement 1 (1994).

298 (1990) Appareillage sous enveloppe métallique pour courant alternatif de tensions assignées supérieures à 1 kV et inférieures ou égales à 52 kV.
Amendement 1 (1994).

420 (1990) Combinés interrupteurs-fusibles à haute tension pour courant alternatif.

427 (1989) Essais synthétiques des disjoncteurs à courant alternatif à haute tension.
Amendement 1 (1992).
Amendement 2 (1995).

439: – Ensembles d'appareillages à basse tension.

439-1 (1992) Première partie: Ensembles de série et ensembles dérivés de série.

439-2 (1987) Deuxième partie: Règles particulières pour les canalisations préfabriquées.
Amendement n° 1 (1991).

439-3 (1990) Troisième partie: Règles particulières pour ensembles d'appareillage BT destinés à être installés en des lieux accessibles à des personnes non qualifiées pendant leur utilisation – Tableaux de répartition.
Amendement 1 (1993).

439-4 (1990) Quatrième partie: Règles particulières pour ensembles de chantier (EC).

466 (1987) Appareillage sous enveloppe isolante pour courant alternatif de tension assignée supérieure à 1 kV et inférieure ou égale à 38 kV.
Amendement 1 (1994).

470 (1974) Contacteurs haute tension à courant alternatif.
Modification n° 1 (1975).

517 (1990) Appareillage sous enveloppe métallique à isolation gazeuse de tension assignée égale ou supérieure à 72,5 kV.
Amendement 1 (1994).

518 (1975) Normalisation dimensionnelle des bornes de l'appareillage à haute tension.

632: – Démarreurs de moteurs à haute tension.

632-1 (1978) Première partie: Démarreurs directs (sous pleine tension) en courant alternatif.

694 (1980) Clauses communes pour les normes de l'appareillage à haute tension.
Modification n° 1 (1985).
Amendement n° 2 (1993).

*(suite)*

## IEC publications prepared by Technical Committee No. 17

56 (1987) High-voltage alternating-current circuit breakers.
Amendment 1 (1992).
Amendment 2 (1995).

129 (1984) Alternating current disconnectors (isolators) and earthing switches.
Amendment 1 (1992).

158: – Low-voltage controlgear.

158-2 (1982) Part 2: Semiconductor contactors (solid state contactors).

158-3 (1985) Part 3: Additional requirements for contactors subject to certification.

265: – High-voltage switches.

265-1 (1983) Part 1: High-voltage switches for rated voltages above 1 kV and less than 52 kV.
Amendment No. 1 (1984).
Amendment 2 (1994).

265-2 (1988) Part 2: High-voltage switches for rated voltages of 52 kV and above.
Amendment 1 (1994).

298 (1990) A.C. metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV.
Amendment 1 (1994).

420 (1990) High-voltage alternating current switch-fuse combinations.

427 (1989) Synthetic testing of high-voltage alternating current circuit-breakers.
Amendment 1 (1992).
Amendment 2 (1995).

439: – Low-voltage switchgear and controlgear assemblies.

439-1 (1992) Part 1: Type-tested and partially type-tested assemblies.

439-2 (1987) Part 2: Particular requirements for busbar trunking systems (busways).
Amendment No. 1 (1991).

439-3 (1990) Part 3: Particular requirements for low-voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use – Distribution boards.
Amendment 1 (1993).

439-4 (1990) Part 4: Particular requirements for assemblies for construction sites (ACS).

466 (1987) A.C. insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 38 kV.
Amendment 1 (1994).

470 (1974) High-voltage alternating current contactors.
Amendment No. 1 (1975)

517 (1990) Gas-insulated metal-enclosed switchgear for rated voltages of 72,5 kV and above.
Amendment 1(1994).

518 (1975) Dimensional standardization of terminals for high-voltage switchgear and controlgear.

632: – High-voltage motor starters.

632-1 (1978) Part 1: Direct-on-line (full voltage) a.c. starters.

694 (1980) Common clauses for high-voltage switchgear and controlgear standards.
Amendment No. 1 (1985).
Amendment No. 2 (1993).

*(continued)*

## Publications de la CEI préparées par le Comité d'Etudes n° 17 *(suite)*

715 (1981) Dimensions de l'appareillage à basse tension. Montage normalisé sur profilés-supports pour le support mécanique des appareils électriques dans les installations d'appareillage à basse tension.
Amendement 1 (1995).

859 (1986) Raccordement de câbles pour appareillage sous enveloppe métallique à isolation gazeuse pour tension assignée égale ou supérieure à 72,5 kV.

890 (1987) Méthode de détermination par extrapolation des échauffements pour les ensembles d'appareillage à basse tension dérivés de série (EDS).
Amendement 1 (1995).

932 (1988) Spécifications complémentaires pour l'appareillage sous enveloppe de 1 kV à 72,5 kV destiné à être utilisé dans des conditions climatiques sévères.

947: – Appareillage à basse tension.

947-1 (1988) Première partie: Règles générales.
Amendement 3 (1995).

947-2 (1989) Deuxième partie: Disjoncteurs.
Amendement 1 (1992).
Amendement 2 (1993).

947-3 (1990) Troisième partie: Interrupteurs, sectionneurs, interrupteurs-sectionneurs et combinés-fusibles.
Amendement 1 (1994).

947-4-1 (1990) Quatrième partie: Contacteurs et démarreurs de moteurs – Section un: Contacteurs et démarreurs électromécaniques.
Amendement 1 (1994).

947-5-1 (1990) Cinquième partie: Appareils et éléments de commutation pour circuits de commande – Section un: Appareils électromécaniques pour circuits de commande.
Amendement 1 (1994).

947-5-2 (1992) Partie 5: Appareils et éléments de commutation pour circuits de commande – Section 2: Détecteurs de proximité.
Amendement 1 (1994).
Amendement 2 (1995).

947-6-1 (1989) Sixième partie: Matériels à fonctions multiples – Section un: Matériels de connexion de transfert automatique.
Amendement 1 (1994).

947-6-2 (1992) Section deux: Appareils (ou matériel) de connexion de commande de protection (ACP).

947-7-1 (1989) Septième partie: Matériels accessoires – Section un: Blocs de jonction pour conducteurs en cuivre.

947-7-2 (1995) Section 2: Blocs de jonction de conducteurs de protection pour conducteurs en cuivre.

999:– Dispositifs de connexion – Prescriptions de sécurité pour les organes de serrage à vis et sans vis pour conducteurs électriques en cuivre.

999-1 (1990) Partie 1: Prescriptions générales et prescriptions particulières pour conducteurs de 0,5 $mm^2$ à 35 $mm^2$ (inclus).

999-2 (1995) Prescriptions pour conducteurs de 35 $mm^2$ à 300 $mm^2$.

1095 (1992) Contacteurs électromécaniques pour usages domestiques et analogues.

1117 (1992) Méthode pour déterminer la tenue aux courts-circuits des ensembles d'appareillage dérivés de série (EDS).

*(suite)*

## IEC publications prepared by Technical Committee No. 17 *(continued)*

715 (1981) Dimensions of low-voltage switchgear and controlgear. Standardized mounting on rails for mechanical support of electrical devices in switchgear and controlgear installations.
Amendment 1 (1995).

859 (1986) Cable connections for gas-insulated metal-enclosed switchgear for rated voltages of 72,5 kV and above.

890 (1987) A method of temperature-rise assessment by extrapolation for partially type-tested assemblies (PTTA) of low-voltage switchgear and controlgear.
Amendment 1 (1995).

932 (1988) Additional requirements for enclosed switchgear and controlgear from 1 kV to 72,5 kV to be used in severe climatic conditions.

947: – Low-voltage switchgear and controlgear.

947-1 (1988) Part 1: General rules.
Amendment 3 (1995).

947-2 (1989) Part 2: Circuit-breakers.
Amendment 1 (1992).
Amendment 2 (1993).

947-3 (1990) Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units.
Amendment 1 (1994).

947-4-1 (1990) Part 4: Contactors and motor-starters – Section One: Electromechanical contactors and motor-starters.
Amendment 1 (1994).

947-5-1 (1990) Part 5: Control circuit devices and switching elements – Section One: Electromechanical control circuit devices.
Amendment 1 (1994).

947-5-2 (1992) Part 5: Control circuit devices and switching elements – Section 2: Proximity switches.
Amendment 1 (1994).
Amendment 2 (1995).

947-6-1 (1989) Part 6: Multiple function equipment – Section One: Automatic transfer switching equipment.
Amendment 1 (1994).

947-6-2 (1992) Section Two: Control and protective switching devices (or equipment) (CPS).

947-7-1 (1989) Part 7: Ancillary equipment – Section One: Terminal blocks for copper conductors.

947-7-2 (1995) Section 2: Protective conductor terminal blocks for copper conductors.

999:– Connecting devices – Safety requirements for screw-type and screwless-type clamping units for electrical copper conductors.

999-1 (1990) Part 1: General requirements and particular requirements for conductors from 0,5 $mm^2$ to 35 $mm^2$ (included).

999-2 (1995) Part 2: Particular requirements for conductors from 35 $mm^2$ to 300 $mm^2$.

1095 (1992) Electromechanical contactors for household and similar purposes.

1117 (1992) A method for assessing the short-circuit withstand strength of partially type-tested assemblies (PTTA).

*(continued)*

## Publications de la CEI préparées par le Comité d'Etudes n° 17 *(suite)*

| | |
|---|---|
| 1128 (1992) | Sectionneurs à courant alternatif. Transfert de barres par les sectionneurs.<br>Amendement 1 (1994). |
| 1129 (1992) | Sectionneurs de terre à courant alternatif. Etablissement et coupure de courants induits.<br>Amendement 1 (1994). |
| 1166 (1993) | Disjoncteurs à courant alternatif à haute tension – Guide pour la qualification sismique des disjoncteurs à courant alternatif à haute tension. |
| 1208 (1992) | Disjoncteurs à courant alternatif à haute tension – Guide pour la maintenance. |
| 1233 (1994) | Disjoncteurs haute tension à courant alternatif – Etablissement et coupure de charge inductive. |
| 1259 (1994) | Appareillage sous enveloppe métallique à isolation gazeuse de tension assignée égale ou supérieure à 72,5 kV – Prescriptions pour l'établissement et la coupure de courants de jeux de barres à vide par les sectionneurs. |
| 1633 (1995) | Disjoncteurs à courant alternatif à haute tension – Guide pour la procédure d'essai d'établissement et de coupure de courants de court-circuit et de courants de charge pour les disjoncteurs sous enveloppe métallique et à cuve mise à la terre. |
| 1634 (1995) | Appareillage à haute tension – Utilisation et manipulation de gaz hexafluorure de soufre ($SF_6$) dans l'appareillage à haute tension. |

## IEC publications prepared by Technical Committee No. 17 *(continued)*

| | |
|---|---|
| 1128 (1992) | Alternating current disconnectors. Bus-transfer current switching.<br>Amendment 1 (1994). |
| 1129 (1992) | Alternating current earthing switches. Induced current switching.<br>Amendment 1 (1994). |
| 1166 (1993) | High-voltage alternating current circuit-breakers – Guide for seismic qualification of high-voltage alternating current circuit breakers. |
| 1208 (1992) | High-voltage alternating current circuit-breakers – Guide for maintenance. |
| 1233 (1994) | High-voltage alternating current circuit-breakers – Inductive load switching. |
| 1259 (1994) | Gas-insulated metal-enclosed switchgear for rated voltages 72,5 kV and above – Requirements for switching of bus-charging currents by disconnectors. |
| 1633 (1995) | High-voltage alternating current circuit-breakers – Guide for short-circuit and switching test procedures for metal-enclosed and dead tank circuit-breakers. |
| 1634 (1995) | High-voltage switchgear and controlgear – Use and handling of sulphur hexafluoride ($SF_6$) in high-voltage switchgear and controlgear. |

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