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Edition 1.0 2019-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Connectors for electrical and electronic equipment – Tests and measurements – Part 99-002: Endurance test schedules – Test 99b: Test schedule for unmating under electrical load

Connecteurs pour équipements électriques et électroniques – Essais et mesures – Partie 99-002: Programmes d'essais d'endurance – Essai 99b: Programme d'essai pour le désaccouplement sous charge électrique

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CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –

Part 99-002: Endurance test schedules – Test 99b: Test schedule for unmating under electrical load

FOREWORD

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International Standard IEC 60512-99-002 has been prepared by subcommittee 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
48B/2703/FDIS	48B/2725/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

A list of all parts in the IEC 60512 series, published under the general title *Connectors for electrical and electronic equipment – Tests and measurements*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
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CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –

Part 99-002: Endurance test schedules – Test 99b: Test schedule for unmating under electrical load

1 Scope

This part of IEC 60512 is used for testing connectors within the scope of SC 48B that are used in twisted pair communication cabling with remote power, such as ISO/IEC 11801 Class D (or better), balanced cabling in support of IEEE Std 802.3bt™, (PoE Plus – Power over Ethernet Plus).

The object of this document is to detail a test schedule to determine the ability of pairs of connectors to withstand a sequence of tests with a total of 100 engagements and separations. The electrical current is passed through the connectors during the separation (unmating) step only, in accordance with IEC 60512-9-3.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60512-1-1, *Connectors for electronic equipment – Tests and measurements – Part 1-1: General examination – Test 1a: Visual examination*

IEC 60512-2-1, *Connectors for electronic equipment – Tests and measurements – Part 2-1: Electrical continuity and contact resistance tests – Test 2a: Contact resistance – Millivolt level method*

IEC 60512-3-1, *Connectors for electronic equipment – Tests and measurements – Part 3-1: Insulation tests – Test 3a: Insulation resistance*

IEC 60512-4-1, *Connectors for electronic equipment – Tests and measurements – Part 4-1: Voltage stress tests – Test 4a: Voltage proof*

IEC 60512-9-3:2011, *Connectors for electronic equipment – Tests and measurements – Part 9-3: Endurance tests – Test 9c: Mechanical operation (engaging and separating) with electrical load*

IEC 60512-11-7, *Connectors for electronic equipment – Tests and measurements – Part 11-7: Climatic tests – Test 11g: Flowing mixed gas corrosion test*

IEC 60512-99-001, *Connectors for electronic equipment – Tests and measurements – Part 99-001: Test schedule for engaging and separating connectors under electrical load – Test 99a: Connectors used in twisted pair communication cabling with remote power*

ISO/IEC 11801(all parts): *Information technology – Generic cabling for customer premises*

ISO/IEC TS 29125: 2017, *Information technology – Telecommunications cabling requirements for remote powering of terminal equipment*

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TIA-568-A:1995, *Commercial building telecommunications cabling standard*

TIA-568-B.2:2001, *Commercial building telecommunications cabling standard, Part 2: Balanced twisted-pair cabling components*

TIA TSB-184-A:2017, *Guidelines for supporting power delivery over balanced twisted-pair cabling*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

4 General

An application-specific current and the associated open circuit voltage are specified, that correspond with the current and voltage of the supported application. This test schedule is suitable for verification of separating of connectors under PoE Plus load conditions; although it is a misuse of the connector, it may occur in practice.

As it is recognized that not all connectors will see these currents and voltage, this test schedule is regarded as an optional test, not normative for all connectors.

5 Preparation of specimens

Each specimen shall consist of a mated connector pair with its terminations. Specimens shall be conformant to their relevant IEC connector standard. Each free connector shall be terminated with 3 m (max.) of the maximum conductor size cable for which it is intended to be terminated, according to the appropriate IEC standard(s). A printed circuit board may be used for the fixed connectors, so as not to influence the test results. Fixed connectors may alternatively be terminated as the free ones. For each specimen, all of the circuits shall be wired in parallel as given in IEC 60512-9-3, (see Figure 1).

6 Test circuit requirements

6.1 General

The values for the circuit components and the details of the test circuit, referenced in IEC 60512-9-3, shall be as shown in Figure 1.

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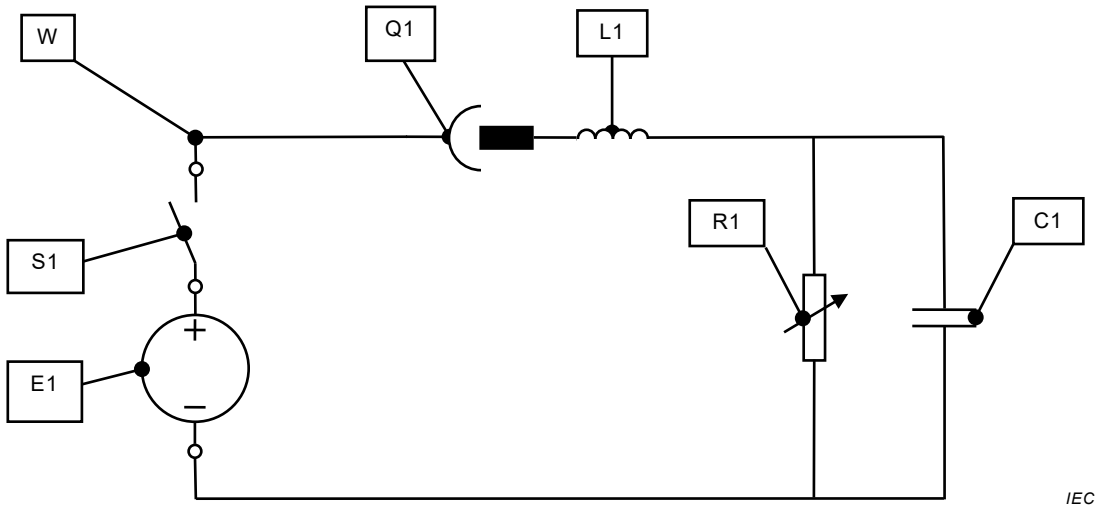

Key

W	Cables in accordance with 5
Q1	Connector under test
L1	Inductor L = 100 µH
R1	Variable resistor (e.g. 50 Ω to 300 Ω)
C1	Capacitor 5 µF
E1	Voltage source
S1	Switch

Figure 1 – Test circuit details

NOTE Only one circuit of the connector under test, as referenced in IEC 60512-9-3, is shown for clarity. Items W, Q1, L1, R1 and C1 are replicated for each circuit of the connector. Item E1 may be single or multiple.

Each circuit of the specimen may be wired in parallel with the other circuits of the specimen, and all circuits of each specimen shall operate simultaneously. The variable resistor(s) shall be used to adjust the current(s) to the specified value.

6.2 Voltage and current

ISO/IEC TS 29125 specifies a maximum current as shown in Table 1 and an open circuit voltage of 55 V DC. The test current has been set to 2,0 A because a maximum of 4 contact pairs can be connected in parallel. In the highly probable case that one contact is separated after all others, this contact will carry this 2,0 A just before disconnecting.

As the resistive load is likely to rise due to heating and due to wear of contacts in the connector under test, care should be placed in keeping the value of test current within the specified tolerance range e.g. by means of a suitable feedback control circuit acting on the value of the variable resistor. See Annex A (informative) for further guidance.

The test procedures for Type 1 and Type 2 are defined in IEC 60512-99-001. For Type 3 and Type 4 the variable resistor(s) shall be set so that the electrical current in each circuit (mated contacts) of the specimen is 2,0 A $^{+0,05}_{0}$. When the specimen is unmated, the open circuit voltage, in all circuits, shall be 55 V DC $^{+1}_{0}$ V DC. When the specimen is mated, the open circuit voltage, in all circuits, shall be 0 V DC by operating the switch, S1, before each connector engagement (mating).

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