IEC 60603-7-82

Edition 1.0 2016-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Connectors for electronic equipment – Part 7-82: Detail specification for 8-way, 12 contacts, shielded, free and fixed connectors, for data transmission with frequencies up to 2 000 MHz

Connecteurs pour équipements électroniques – Partie 7-82: Spécification particulière pour les fiches et les embases écrantées à 8 voies et 12 contacts pour la transmission de données à des fréquences jusqu'à 2 000 MHz

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CONNECTORS FOR ELECTRONIC EQUIPMENT –

Part 7-82: Detail specification for 8-way, 12 contacts, shielded, free and fixed connectors, for data transmission with frequencies up to 2 000 MHz

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International Standard IEC 60603-7-82 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 standard is based on the following documents:

FDIS	Report on voting
48B/2497/FDIS	48B/2510/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.

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

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A list of all parts of the IEC 60603 series, under the general title *Connectors for electronic equipment*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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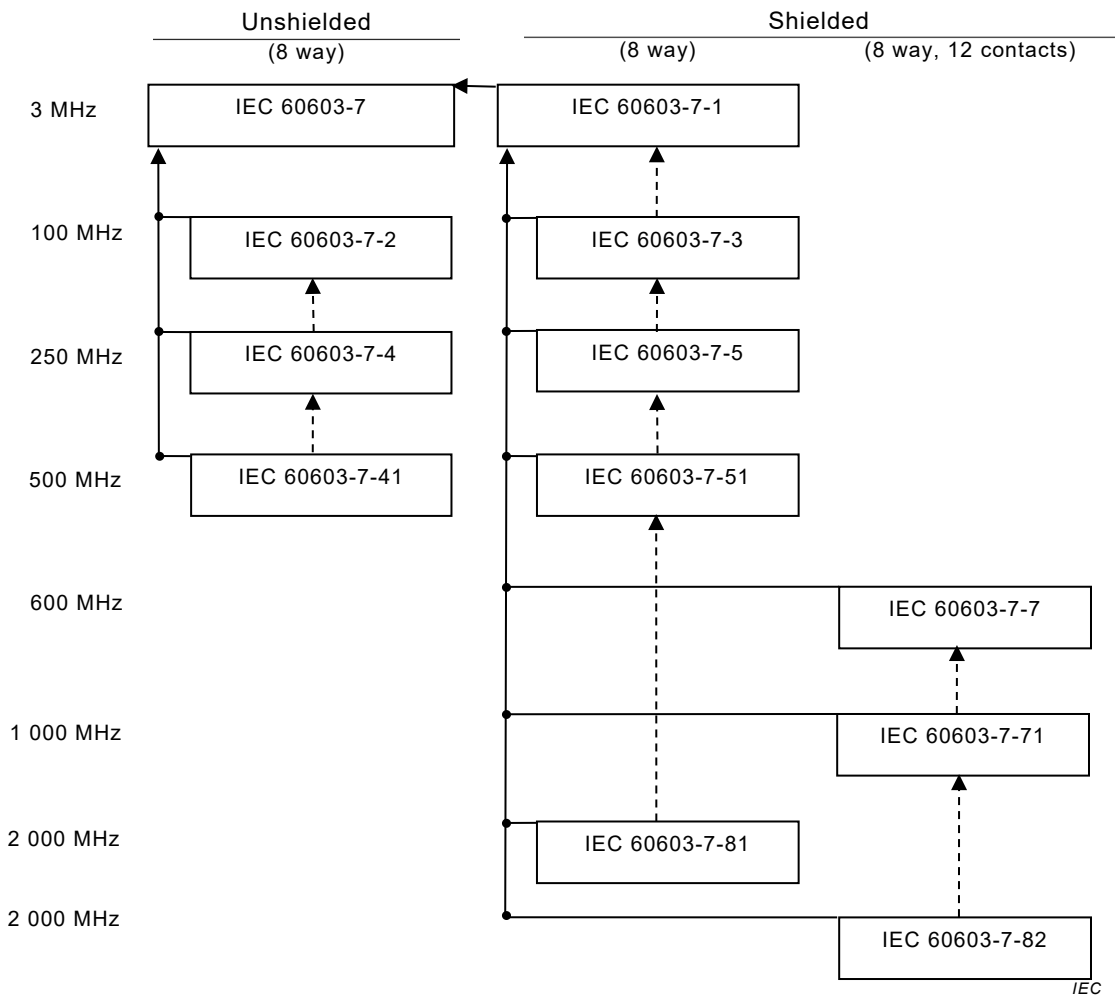
INTRODUCTION

IEC 60603-7 is the base specification of the whole series. Subsequent specifications do not duplicate information given in the base document, but list only additional requirements. For complete specification regarding a component of a higher number document all lower numbered documents shall be considered as well. The following diagram (Figure 1) shows the interrelation of the documents:



Key

→ Indicates reference for dimensions, mechanical and electrical characteristics, tests and test schedules

- - - → Indicates reference for transmission performance (backward compatibility)

Figure 1 – Diagram of the interrelation of the documents

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CONNECTORS FOR ELECTRONIC EQUIPMENT –

Part 7-82: Detail specification for 8-way, 12 contacts, shielded, free and fixed connectors, for data transmission with frequencies up to 2 000 MHz

1 Scope

This part of IEC 60603 covers 8-way, 12 contacts, shielded, free and fixed connectors, references dimensional, mechanical, electrical and environmental characteristics and tests in IEC 60603-7-7, and specifies electrical transmission requirements, including power sum alien (exogenous) crosstalk, for frequencies up to 2 000 MHz.

These connectors are typically used as “category 8.2” connectors in “class II” cabling systems specified in ISO/IEC TR 11801-9901 and specified in ISO/IEC 11801-1[1].

These connectors are intermateable and interoperable with other IEC 60603-7 series connectors, i.e. as defined in IEC 60603-7-7 and IEC 60603-7-1.

These connectors are backward compatible with other IEC 60603-7 series connectors.

NOTE Transmission performance categories: in this IEC standard, the term “category”, when used in reference to transmission performance, refers to those categories defined by ISO/IEC 11801-1.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60512-25-9, *Connectors for electronic equipment – Tests and measurements – Part 25-9: Signal integrity tests – Test 25i: Alien crosstalk*

IEC 60512-26-100:2008, *Connectors for electronic equipment – Tests and measurements – Part 26-100: Measurement setup, test and reference arrangements and measurements for connectors according to IEC 60603-7 – Tests 26a to 26g*
IEC 60512-26-100:2008/AMD1:2011

IEC 60512-27-100, *Connectors for electronic equipment – Tests and measurements – Part 27-100: Signal integrity tests up to 500 MHz on IEC 60603-7 series connectors – Tests 27a to 27g*

IEC 60512-28-100, *Connectors for electronic equipment – Tests and measurements – Part 28-100: Signal integrity tests for 1 000 MHz and up, for IEC 60603-7 series connectors – Tests 28a to 28g*[2]

IEC 60603-7:2008, *Connectors for electronic equipment – Part 7: Detail specification for 8-way, unshielded, free and fixed connectors*

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1 Under consideration.

2 The tests include frequencies up to 2 000 MHz.

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IEC 60603-7-1:2011, *Connectors for electronic equipment – Part 7-1: Detail specification for 8-way, shielded, free and fixed connectors*

IEC 60603-7-7:2010, *Connectors for electronic equipment – Part 7-7: Detail specification for 8-way, shielded, free and fixed connectors, for data transmission with frequencies up to 600 MHz*

IEC 61156 (all parts), *Multicore and symmetrical pair/quad cables for digital communications*

IEC 62153-4-15, *Metallic communication cable test methods – Part 4-15: Electromagnetic compatibility (EMC) – Test method for measuring transfer impedance and screening attenuation – or coupling attenuation with triaxial cell*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in Clause 2 of IEC 60603-7:2008, apply as well as the following.

3.1
backward compatibility
set of requirements which ensure that a free or fixed connector which is in compliance with this standard, when mated with a fixed or free connector in compliance with a lower frequency IEC 60603-7 series connector, fully complies with the transmission performance requirements of the lower frequency IEC 60603-7 series connector

Note 1 to entry: The complete specification of the categories and the backward compatibility system for the IEC 60603-7 series connectors, when used in standard balanced cabling systems, is specified in referenced ISO/IEC 11801-1.

[SOURCE: IEC 60603-7-81:2015, 3.1, modified – The definition has been updated, and the additional reference to Clause 3 of IEC 60603-7-1:2011 has been deleted.]

3.2
crosstalk loss
near-end-crosstalk (NEXT) and far-end-crosstalk (FEXT), commonly referred to as crosstalk loss, are the specific transmission characteristics associated with the reverse and forward crosstalk coupling attenuation between two pairs

4 Common features and isometric view

See Clause 3 of IEC 60603-7-7:2010 for dimensions, views and requirements.

5 Cable terminations and internal connections – Fixed and free connectors

See Clause 4 of IEC 60603-7-7:2010 for cable termination and internal connections types.

6 Gauges

The gauges as defined by IEC 60603-7 and IEC 60603-7-7 shall apply.

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7 Characteristics

7.1 General

Connectors according to this standard shall also conform to all relevant requirements specified by IEC 60603-7-7 and IEC 60603-7-1.

7.2 Pin and pair grouping assignment

The relevant pin and pair grouping assignment of IEC 60603-7-7, IEC 60603-7-1 and IEC 60603-7 apply.

The complete specification for the pin and pair numbering and grouping assignments, for the IEC 60603-7 series connectors used in balanced cabling systems is specified in ISO/IEC 11801-1.

7.3 Classification into climatic category

Connectors according to this standard are classified in the same climatic categories as defined by IEC 60603-7.

7.4 Electrical characteristics

Connectors according to this standard shall also conform to the electrical characteristics specified by IEC 60603-7-7 and IEC 60603-7-1. In addition, the transfer impedance Z_t of connectors according to this standard shall meet the following requirements:

Transfer impedance, Z_t

Conditions:

IEC 60512-26-100, Test 26e

Mated connectors, terminated with each cable construction type intended to be allowed for these connectors.

All types: $\leq 0{,}05 f^{0{,}3}$ Ω from 1 MHz to 10 MHz

All types: $\leq 0{,}01 f$ Ω from 10 MHz to 80 MHz

where f is the frequency in MHz.

7.5 Transmission characteristics

7.5.1 General

Compliance to this standard in respect to transmission characteristics, is determined according to specific test methods described in test group EP, see Table 1. The interoperability of connectors compliant to this standard shall be demonstrated by testing the fixed connectors with the full range of free connectors according to IEC 60512-28-100.

For the connectors compliant to this standard:

- their interoperability with the IEC 60603-7-7 interface shall be demonstrated by testing the fixed connectors with the full range of free connectors, according to IEC 60512-28-100, from 1 MHz to 2 000 MHz.
- their interoperability with the IEC 60603-7-1 interface shall be demonstrated by testing the fixed connectors with the full range of free connectors, according to IEC 60512-27-100 from 1 MHz to 500 MHz.

Compliance to these transmission performance requirements applies to the separated pairs of contacts, which are the alternative contacts specified in IEC 60603-7-7, i.e. contact pairs 1-2, 7-8, 3’-6’, 4’-5’. The transmission performance requirements specified herein do not apply to

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the non-separated pairs of contacts, which are specified in IEC 60603-7 and IEC 60603-7-1, i.e. contact pairs 3-6, 4-5. In the case of crosstalk requirements, these apply between the combinations of separated pairs of contacts.

Compliance to this standard in respect to the alien (exogenous) crosstalk is determined according to IEC 60512-25-9. Insofar as the connectors according to this standard are shielded, power sum alien (exogenous) crosstalk requirements of this standard are assumed to be met, if the requirements for coupling attenuation are met.

All transmission performance requirements apply between the reference planes specified in IEC 60512-28-100.

In the following subclauses f is the frequency expressed in MHz.

7.5.2 Insertion loss

Conditions:

Test 28a of IEC 60512-28-100 shall be tested according to the contact assignment defined in IEC 60603-7-7 (separated pairs).

Mated connectors

All pairs: $\leq 0{,}02 \sqrt{(f)}$ dB from 1 MHz to 1 000 MHz.

All pairs: $\leq 0{,}02 \sqrt{(f)} + 0{,}000\,5\,(f - 1\,000)$ dB from 1 000 MHz to 2 000 MHz.

Whenever the formula results in a value less than 0,1 dB, the requirement shall revert to 0,1 dB.

7.5.3 Return loss

Conditions:

Test 28b of IEC 60512-28-100 shall be tested according to the contact assignment defined in IEC 60603-7-7 (separated pairs).

Mated connectors

All pairs: $\geq 72 - 20 \log_{10}(f)$ dB from 1 MHz to 2 000 MHz.

Whenever the requirement results in a value less than 12 dB, the requirement shall revert to 12 dB.

Whenever the requirement results in a value greater than 30 dB, the requirement shall revert to 30 dB.

7.5.4 Propagation delay

Shall be tested according to the contact assignment defined in IEC 60603-7-7 (separated pairs).

Mated connectors

All pairs: ≤2,5 ns from 1 MHz to 2 000 MHz.

Propagation delay test does not need to be performed, since it is assumed that connectors comply by design.

7.5.5 Delay skew

Shall be tested according to the contact assignment defined in IEC 60603-7-7 (separated pairs).

Mated connectors

All pair combinations: ≤1,25 ns from 1 MHz to 2 000 MHz.

Delay Skew is calculated from the individual propagation delay measurements and, as with propagation delay (7.5.4), it is assumed that connectors comply by design.

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