IEC 60603-7-71

Edition 1.0 2010-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Connectors for electronic equipment – Part 7-71: Detail specification for 8-way, shielded, free and fixed connectors, for data transmission with frequencies up to 1 000 MHz

Connecteurs pour équipements électroniques – Partie 7-71: Spécification particulière pour les fiches et les embases blindées à 8 voies pour la transmission de données à des fréquences jusqu'à 1 000 MHz

IEC 60603-7-71:2010

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CONNECTORS FOR ELECTRONIC EQUIPMENT –

Part 7-71: Detail specification for 8-way, shielded, free and fixed connectors, for data transmission with frequencies up to 1 000 MHz

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International Standard IEC 60603-7-71 has been prepared by subcommittee 48B: Connectors, of IEC technical committee 48: Electromechanical components and mechanical structures for electronic equipment.

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

FDIS	Report on voting
48B/2173/FDIS	48B/2199/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 web site 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- withdrawn,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
- amended.

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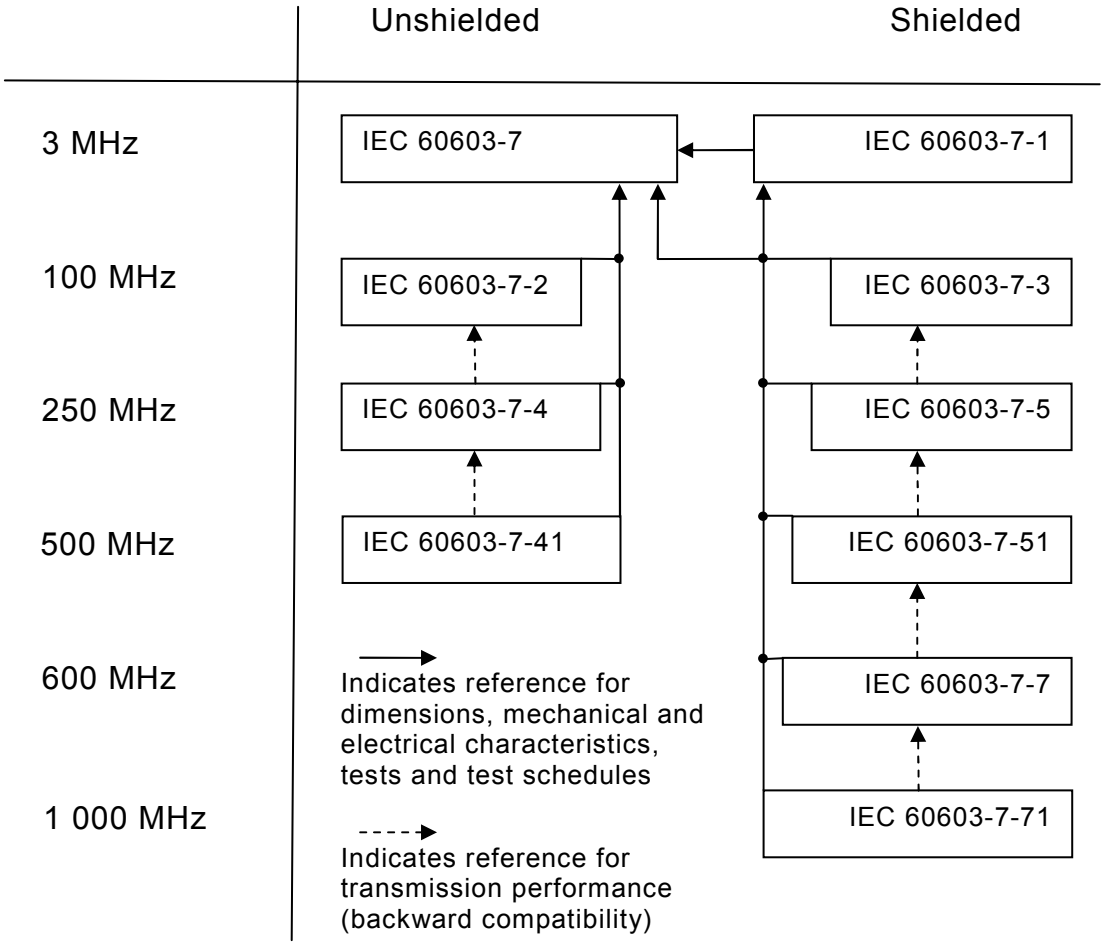
INTRODUCTION

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 shows the interrelation of the documents:



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CONNECTORS FOR ELECTRONIC EQUIPMENT –

Part 7-71: Detail specification for 8-way, shielded, free and fixed connectors, for data transmission with frequencies up to 1 000 MHz

1 General

1.1 Scope

This part of IEC 60603 covers 8-way, shielded, free and fixed connectors, references dimensional, mechanical, electrical and environmental characteristics and tests in IEC 60603-7, and specifies electrical transmission requirements, including power sum alien (exogenous) crosstalk, for frequencies up to 1 000 MHz.

These connectors are typically used as category 7_A connectors in class F_A cabling systems specified in ISO/IEC 11801.

These connectors are intermateable and interoperable with other IEC 60603-7 series connectors as defined in Clause 2 of IEC 60603-7-1 and IEC 60603-7-7.

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 referenced documents are indispensable for the application 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 60512-1-100, *Connectors for electronic equipment – Tests and measurements – Part 1-100: General – Applicable publications*

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

IEC 60512-27-100:2009, *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 60603-7:2008, *Connectors for electronic equipment – Part 7: Detail specification for 8-way, unshielded, free and fixed connectors*

IEC 60603-7-1:2009, *Connectors for electronic equipment – Part 7: Detail specification for 8-way, shielded, free and fixed connectors*

IEC 60603-7-7:2006, *Connectors for electronic equipment – Part 7-7: Detail specification for 8-way, shielded, free and fixed connectors, for data transmissions with frequencies up to 600 MHz*

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

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2 Terms and definitions

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

2.1
backward compatibility
the backward compatibility requirement ensures that a free or fixed connector which is in compliance with this standard, mated with a fixed or free connector in compliance with any lower frequency IEC 60603-7 series connector, fully complies with the requirements of the lower frequency IEC 60603-7 series connector.

3 Common features and isometric view

See Clause 3 of IEC 60603-7-1 and IEC 60603-7-7 for dimensions, views and requirements.

4 Cable terminations and internal connections – Fixed and free connectors

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

5 Gauges

The gauges as defined by Clause 5 of IEC 60603-7, IEC 60603-7-1 and IEC 60603-7-7 shall apply.

6 Characteristics

6.1 General

Connectors according to IEC 60603-7-71 shall also conform to all relevant requirements specified by IEC 60603-7-1 as well as those specified by IEC 60603-7-7.

6.2 Pin and pair grouping assignment

The pin and pair grouping assignment of 6.2 of IEC 60603-7-7 applies.

6.3 Classification into climatic category

Connectors according to IEC 60603-7-71 are classified in the same climatic categories as defined by IEC 60603-7.

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6.4 Electrical characteristics

Connectors according to IEC 60603-7-71 shall also conform to the electrical characteristics specified by IEC 60603-7-1. In addition, the transfer impedance of IEC 60603-7-71 connectors shall meet the following requirements:

Conditions:

IEC 60512-26-100, Test 26e

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

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

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

where f is the frequency in MHz.

6.5 Transmission characteristics

6.5.1 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 60512-27-100 from 1 MHz to 500 MHz (for the IEC 60603-7-1 interface), and a future standard from 1 MHz to 1 000 MHz (for the IEC 60603-7-71 interface). Compliance to this standard in respect to the power sum alien (exogenous) crosstalk is determined according to specific test methods described in IEC 60512-25-9 (for the IEC 60603-7-1 and IEC 60603-7-71 interfaces). For the IEC 60603-7-71 interface the power sum alien (exogeneous) crosstalk requirements of IEC 60603-7-51 are met by design.

Transmission performance with respect to backward compatibility shall be demonstrated by testing the fixed connectors with the full range of free connectors described in future IEC 60512-27-100 (for the IEC 60603-7-1 interface) and a future IEC standard (for the IEC 60603-7-71 interface), and IEC 60512-25-9.

All transmission performance requirements apply between the reference planes specified in future IEC 60512-27-100.

NOTE In the following sub clauses f is the frequency expressed in MHz.

6.5.2 Insertion loss

Conditions:

IEC 60512-27-100 Test 27a for the IEC 60603-7-1 interface

Mated connectors

All pairs, see IEC 60603-7-51

For the IEC 60603-7-71 interface see the relevant clause in IEC 60603-7-7.

Mated connectors

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

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

6.5.3 Return loss

Conditions:

IEC 60512-27-100 Test 27b for the IEC 60603-7-1 interface

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Mated connectors

All pairs, see IEC 60603-7-51.

For the IEC 60603-7-71 interface see the relevant clause in IEC 60603-7-7.

Mated connectors

All pairs ≥ 68-20log (*f*) dB from 1 MHz to 1 000 MHz.

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

Whenever the formula results in a value less than 10 dB, the requirement shall revert to 10 dB.

6.5.4 Propagation delay

All pairs ≤ 2,5 ns from 1 MHz to 500 MHz, (for the IEC 60603-7-1 interface) and from 1 MHz to 1 000 MHz (for the IEC 60603-7-71 interface).

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

6.5.5 Delay skew

All pair combinations: ≤ 1,25 ns

NOTE This characteristic is calculated from the individual propagation delay measurements and, as with propagation delay (6.5.4), it is assumed that connectors comply by design.

6.5.6 NEXT

Conditions:

IEC 60512-27-100 test 27c for the IEC 60603-7-1 interface

Mated connectors

All pair combinations, see IEC 60603-7-51.

For the IEC 60603-7-71 interface see the relevant clause in IEC 60603-7-7.

Mated connectors,

All pair combinations: ≥116,3 -20log (f) dB from 1 MHz to 600 MHz.

All pair combinations: ≥ 60,73-40log (f/600) dB from 600 MHz to 1 000 MHz.

Whenever the formula results in a value greater than 75 dB, the requirement shall revert to 75 dB.

6.5.7 Power sum NEXT (for information only)

Conditions:

For the IEC 60603-7-1 interface

Mated connectors

All pairs, see IEC 60603-7-51.

For the IEC 60603-7-71 interface

Mated connectors,

$$PS\ \ NEXT_k = -10\log \sum_{i=1, i\neq k}^{n} 10^{\frac{-NEXT_{ik}}{10}}$$

All pairs: ≥113,3 -20log (f) dB from 1 MHz to 600 MHz.

All pairs: ≥57,73-40log (f/600) dB from 600 MHz to 1 000 MHz.

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