IEC 60603-7-1

Edition 3.0 2011-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Connecteurs pour équipements électroniques –
Partie 7-1: Spécification particulière pour les fiches et les embases écrantées à 8 voies

IEC 60603-7-1:2011

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CONNECTORS FOR ELECTRONIC EQUIPMENT –

Part 7-1: Detail specification for 8-way, shielded, free and fixed connectors

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60603-7-1 has been prepared by subcommittee 48B: Connectors, of IEC technical committee 48: Electromechanical components and mechanical structures for electronic equipment.

This third edition cancels and replaces the second edition, published in 2009, and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

1) the correction, or inclusion, of technical references;
2) the harmonization of terminology with other parts of the IEC 60603-7 series and other referenced documents;
3) the modification of screen dimensions so as to include connectors on the market;

4) the inclusion of two new test groups (EP and FP) that provides the necessary cascading and references to other parts of the IEC 60603-7 series, and satisfies the requirements of ISO/IEC 11801 to enable correct referencing.

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

CDV	Report on voting
48B/2163/CDV	48B/2209/RVC

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.

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.

INTRODUCTION

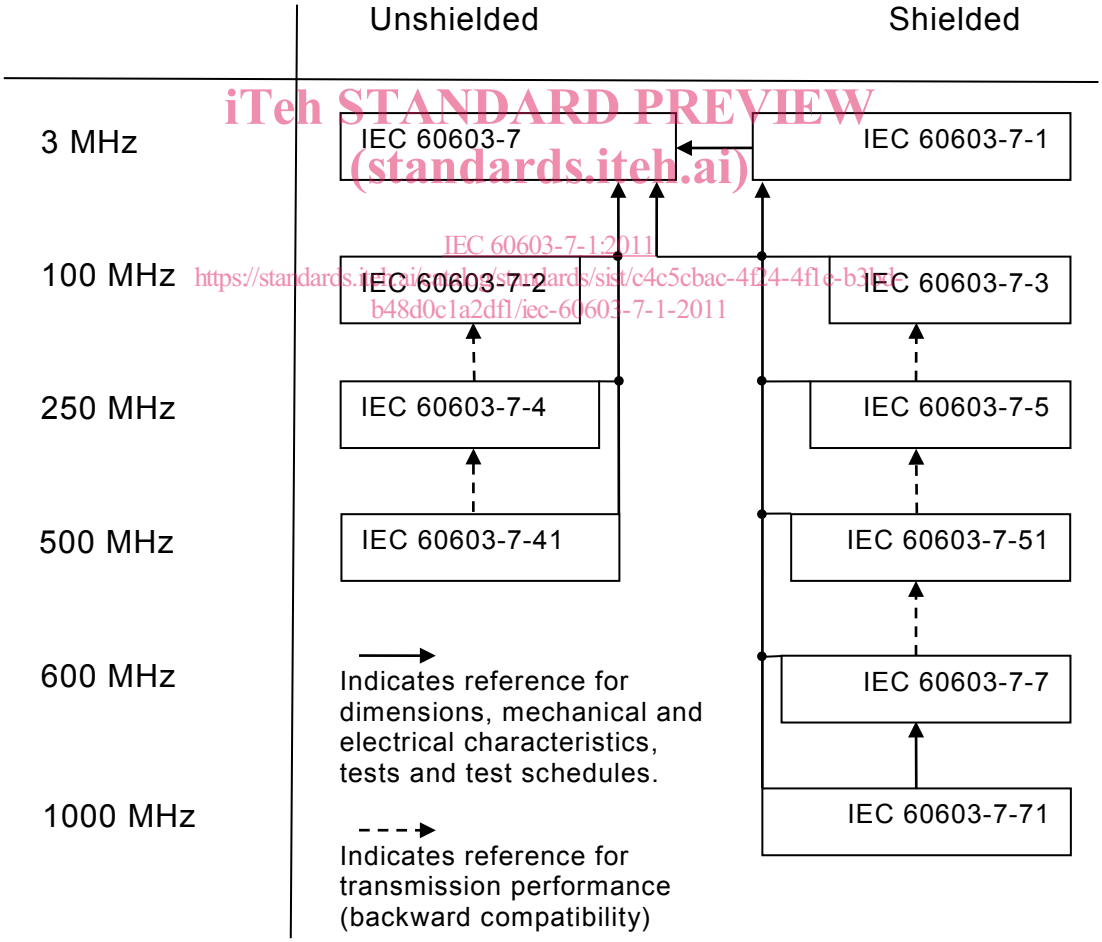
Applications have emerged which require the use of the interface described in IEC 60603-7 with certain performance specifications at higher frequencies. Therefore, a series of detail specifications have been issued in the past few years in support of these new applications. In order to improve readability and ease of maintenance, IEC subcommittee 48B (SC 48B) decided to rearrange and restructure these existing documents.

This part of IEC 60603-7 contains only the necessary information regarding the shield of the connector and is designed to be used as a base document for all shielded connectors in the IEC 60603-7 series.

For further information regarding the IEC 60603-7 style connectors, reference is made to the unshielded base document IEC 60603-7.

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.

The following illustration shows the structure of the IEC 60603-7 series:



CONNECTORS FOR ELECTRONIC EQUIPMENT –

Part 7-1: Detail specification for 8-way, shielded, free and fixed connectors

1 General

1.1 Scope

This part of IEC 60603-7 covers 8-way shielded free and fixed connectors. It specifies the dimensions, mechanical, electrical and environmental characteristics and tests, in relation to the shield, additional to those in IEC 60603-7.

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

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 60068-2-38, *Environmental testing – Part 2-38: Tests – Test Z/AD: Composite temperature/ humidity cyclic test*

IEC 60512 (all parts), *Connectors for electronic equipment – Tests and measurements*

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

IEC 60512-1-100, *Connectors for electronic equipment – Tests and measurements – Part 1-100: General – Applicable publications*

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

IEC 60603-7.2008, *Connectors for electronic equipment – Part 7: Detail specification for 8-way, unshielded, free and fixed connectors*

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 62153-4-12, *Metallic communication cable test methods – Part 4-12: Electromagnetic compatibility (EMC) – Coupling attenuation or screening attenuation of connecting hardware – Absorbing clamp method*

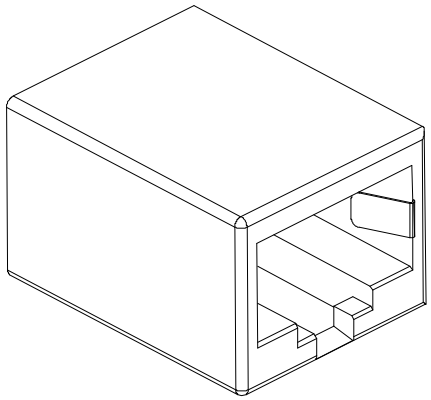
ISO 1302, *Geometrical Product Specifications (GPS) – Indication of surface texture in technical product documentation*

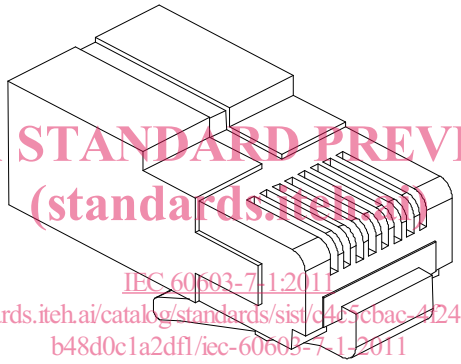
2 Terms and definitions

For the purposes of this document, the terms and definitions in Clause 2 of IEC 60603-7:2008 applies.

3 Common features and isometric view

3.1 Isometric view





IEC 086/05

Figure 1 – Isometric view

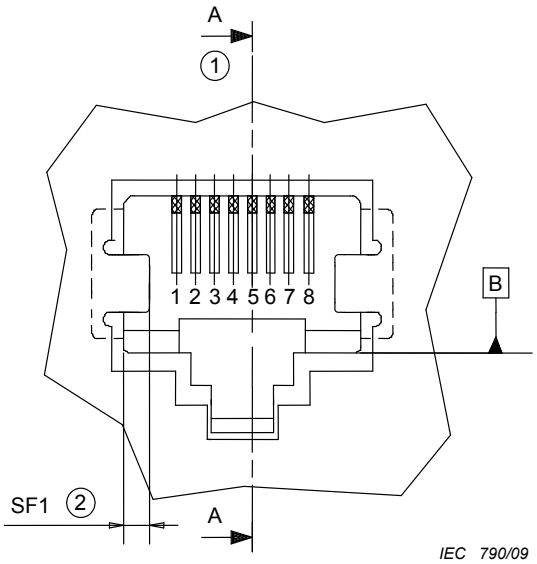
3.2 Mating information

3.2.1 General

Dimensions are given in millimetres. Drawings are shown in third-angle projections. The shape of connectors may deviate from those shapes given in Figures 1 to 3 as long as the dimensions specified are not influenced.

The overall dimensions and the design of the signal contacts of connectors according to this standard shall conform to all relevant requirements specified by IEC 60603-7.

3.2.2 Fixed connector

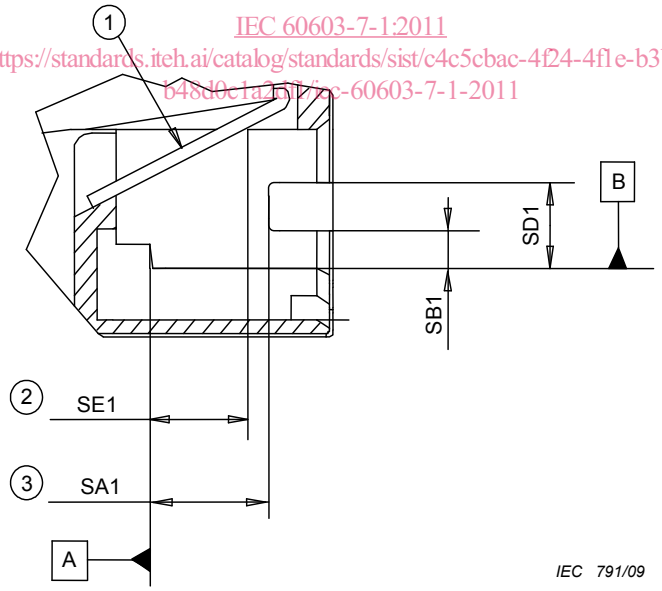


Key

1 section A-A: see Figure 2b

2 distance between wall of the fixed connector and the contact area of the shield contact SF1 applies on both sides of the connector

Figure 2a – View of contact zone



Key

1 contacts shown at rest

2 maximum forward extension of contacts below surface AC1 (see IEC 60603-7) to avoid contact with shields of free connectors. Applies in the mated state

3 dimension to point of shield mating contact

Figure 2b – View of contact zone, section A-A

NOTE Dimensions for Figure 2 are given in Table 1.

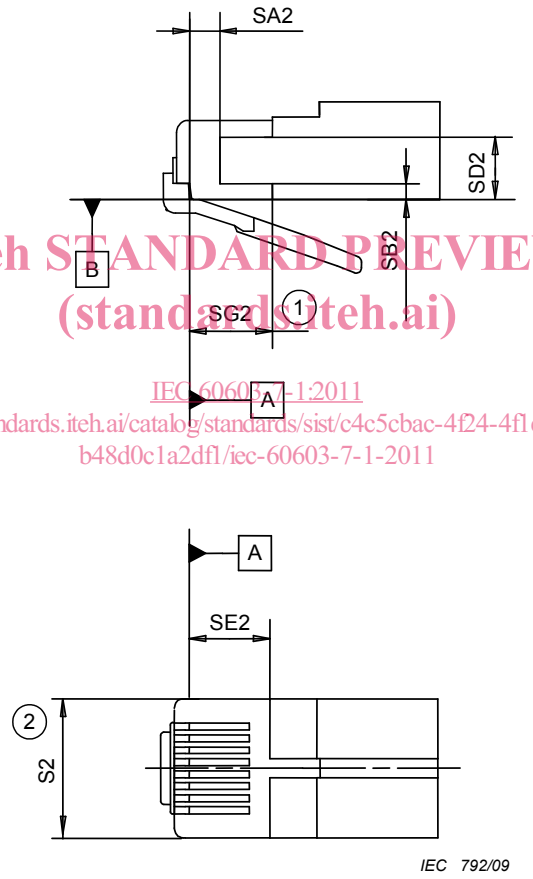
Figure 2 – Fixed connector details

Table 1 – Dimensions for Figure 2

Letter	Maximum mm	Minimum mm	Nominal (ref) mm
SA1		5,31	
SB1		2,16	
SD1	4,90		
SE1	5,80		
SF1		a	

a Care shall be taken that all shield contacts of the fixed connector always make contact with the shield contacts of the free connector in the worst case condition to ensure reliable performance.

3.2.3 Free connector



Key

1 SG2 refers to foremost extension of the shield on the bottom surface of the free connector

2 the dimension S2 (see IEC 60603-7) applies to both plastic housing and shield

NOTE Dimensions for Figure 3 are given in Table 2.

Figure 3 – Free connector view

Table 2 – Dimensions for Figure 3

Letter	Maximum mm	Minimum mm	Nominal (ref) mm
SA2	4,22		
SB2	1,66		
SD2		4,95	
SE2		6,85	
SG2		[a]	

[a] It is recommended that dimension SG2 is 6,85 mm minimum. When this dimension is less than 6,85 mm and the free connector is mated with an IEC 60603-7-7 or IEC 60603-7-71 fixed connector, utilizing switch option 1, there is a possibility that signal conductors 3',4',5',6' of the fixed connector may make contact with the shield of this free connector.

4 Cable terminations and internal connections – Fixed and free connectors

4.1 Internal connections

Internal connections of the shield shall conform to Clause 4 of IEC 60603-7:2008.

4.2 Cable termination

The connector shall be compliant with the full test schedule in 7.7.2 for all possible variations of terminations, for example each cable shield construction type the connector is intended to be used for.

5 Gauges

There are no shield specific dimensional gauges for IEC 60603-7-1 connectors. For overall dimensions, the gauges as defined by Clause 5 of IEC 60603-7:2008 shall apply.

6 Characteristics

6.1 General

Compliance to the test schedules is intended to ensure the reliability of all performance parameters, over the range of operating climatic conditions. Stable and compliant contact resistance is a good indication of the stability of shield performance.

The characteristics of the signal contacts of connectors according IEC 60603-7-1 shall conform to all relevant requirements specified by IEC 60603-7.

6.2 Pin and pair grouping assignment

The pin and pair grouping assignment of 6.2 of IEC 60603-7:2008 applies.

6.3 Classification into climatic category

Connectors according to IEC 60603-7-1 are classified in the same climatic categories as defined by IEC 60603-7.

6.4 Electrical characteristics

6.4.1 Creepage and clearance distances

Insulation coordination is not required for this connector; therefore, the creepage and clearance distances in IEC 60664-1 are reduced and covered by overall performance requirements.

Therefore, the creepage and clearance distances in Table 3 are given as operating characteristics of mated connectors.

In practice, reductions in creepage or clearance distances may occur due to the conductive pattern of the printed board or the wiring used, and shall duly be taken into account.

Table 3 – Creepage and clearance distances

Minimum distance between contacts and shield or chassis	
Creepage	**Clearance**
mm	mm
1,40	0,51

6.4.2 Voltage proof

Conditions:

IEC 60512, Test 4a, Method A

Standard atmospheric conditions

Mated connectors

All variants: 1 500 V d.c. or a.c. peak, contact to shield

6.4.3 Current-carrying capacity

The current carrying capacity of the shield shall be two times the current carrying capacity of the signal contacts as specified by Clause 6 of IEC 60603-7:2008.

6.4.4 Initial contact resistance – Interface only (separable fixed and free contact)

Conditions:

IEC 60512, Test 2a

Mated connectors

Shield contact: 20 mΩ maximum

6.4.5 Input to output d.c. resistance

Conditions:

IEC 60512, Test 2a

Mated connectors

Connection points: Cable termination to cable termination

Shield: 100 mΩ maximum

6.4.6 Input to output d.c. resistance unbalance

Not applicable to shield contacts.

6.4.7 Initial insulation resistance

Conditions:

IEC 60512, Test 3a

Method A

Mated connectors

Test voltage: 100 V d.c.

Between all signal contact together and shield: 500 MΩ minimum

6.4.8 Transfer impedance

Conditions:

IEC 60512-26-100, Test 26e

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

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

$\leq 0{,}02 f$ Ω from 10 MHz to 80 MHz

where f is the frequency in MHz

6.4.9 Coupling attenuation

Conditions:

According to IEC 62153-4-12

Mated connectors

All types: ≥45 dB from 30 MHz to 100 MHz

≥85 – 20log(f) dB from 100 MHz to 1 000 MHz

where f is the frequency in MHz

NOTE Coupling attenuation is assumed to be fulfilled when transverse conversion loss and transverse conversion transfer loss are met on the full bandwidth.

6.5 Mechanical

6.5.1 Mechanical operation

The mechanical operation specification of 6.6 of IEC 60603-7:2008 applies.

6.5.2 Insertion and withdrawal forces

Conditions:

IEC 60512, Test 13b

Speed: 10 mm/s maximum

All types, insertion and withdrawal: 30 N maximum

7 Tests and test schedule

7.1 General

See 7.1 of IEC 60603-7:2008.