



DRAFT TANZANIA STANDARD

(Draft for comments only)

Connectors for electrical and electronic equipment - Part 6: Detail specification for 2-way and 4-way (data/power), shielded, free and fixed connectors for power and data transmission with frequencies up to 600 MHz

TANZANIA BUREAU OF STANDARDS

1 National Foreword

This draft Tanzania Standard is being prepared by the Telecommunications and Information Technology Technical Committee, under the supervision of the Electrotechnical divisional standards committee (EDC)

This draft Tanzania Standard is an adoption of the International Standard **IEC 63171-6:2020** *Connectors for electrical and electronic equipment - Part 6: Detail specification for 2-way and 4-way (data/power), shielded, free and fixed connectors for power and data transmission with frequencies up to 600 MHz*, Which has been prepared by the International Electrotechnical Commission

2 Terminology and conventions

Some terminologies and certain conventions are not identical with those used in Tanzania standards; attention is drawn especially to the following: -

- 1) The comma has been used as a decimal marker for metric dimensions. In Tanzania Standards, it is current practice to use “full point” on the baseline as the decimal marker.
- 2) Where the words “International Standard(s)” appear, referring to this standard they should read “Tanzania Standard(s)”.

CONTENTS

FOREWORD	5
1 Scope	8
2 Normative references	8
3 Terms and definitions	10
4 Common features and typical connector pair	11
4.1 Systems of levels – Compatibility levels	11
4.1.1 Performance level	11
4.1.2 Compatibility levels	11
4.2 Classification into climatic categories	11
4.3 Clearance and creepage distances	11
4.4 Current carrying capacity	11
4.5 Marking	11
4.6 Dimensional information	11
4.6.1 General	11
4.6.2 Isometric view and common features – Connector styles	11
4.6.3 Overall and mating dimensions by style	13
5 Characteristics	27
5.1 General	27
5.2 Classification into climatic category	27
5.3 Electrical characteristics	28
5.3.1 Creepage and clearance distances	28
5.3.2 Voltage proof	28
5.3.3 Voltage rating	28
5.3.4 Current-carrying capacity	28
5.3.5 Contact and shield resistance	30
5.3.6 Input to output DC resistance	30
5.3.7 Input to output DC resistance unbalanced	30
5.3.8 Insulation resistance	31
5.3.9 Impedance	31
5.4 Not used	31
5.5 Transmission performance	31
5.5.1 General	31
5.5.2 Insertion loss	31
5.5.3 Return loss	31
5.5.4 Propagation delay	31
5.5.5 Transverse conversion loss	31
5.5.6 Transverse conversion transfer loss	32
5.5.7 Transfer impedance	32
5.5.8 Coupling attenuation	32
5.5.9 Power sum alien (exogenous) NEXT	32
5.5.10 Power sum alien (exogenous) FEXT	32
5.6 Pin and pair grouping assignment	33
5.6.1 2-way data/power connector (see Figure 26)	33
5.6.2 4-way data/power M8 connector (see Figure 27)	33
5.7 Mechanical characteristics	34
5.7.1 Mechanical operation	34
5.7.2 Effectiveness of connector coupling devices	34

5.7.3	Insertion and withdrawal forces	35
5.7.4	Polarizing method	35
5.7.5	Vibration resistance	35
5.7.6	Mechanical shock resistance	35
5.7.7	IP degree of protection	36
6	Tests and test schedule	36
6.1	General	36
6.2	Test procedures and measuring methods	36
6.3	Mounting of specimens	36
6.3.1	General	36
6.3.2	Arrangement for contact resistance measurement	37
6.3.3	Arrangement for dynamic stress tests	37
6.3.4	Wiring of specimens	38
6.4	Test schedules	38
6.4.1	Basic (minimum) test schedule	38
6.4.2	Full test schedule	38
	Bibliography	48
	Figure 1 – Style 2J-L, overall dimensions	13
	Figure 2 – Style 2J-L, mating dimensions	14
	Figure 3 – Style 2P-L, overall dimensions	15
	Figure 4 – Style 2P-L, mating dimensions	16
	Figure 5 – Style 6J-S8, overall dimensions	17
	Figure 6 – Style 6J-S8, mating dimensions	17
	Figure 7 – Style 6P-S8, overall dimensions	18
	Figure 8 – Styles 6J-P8 or 6J-M8, overall dimensions	19
	Figure 9 – Style 6J-P8, size 8 push pull jack, mating dimensions	19
	Figure 10 – Style 6J-M8, M8 thread jack, mating dimensions	20
	Figure 11 – Styles 6P-P8, overall dimensions	21
	Figure 12 – Style 6P-M8, overall dimensions, field attachable version (top), non field attachable version (bottom)	21
	Figure 13 – Style 6P-M8, mating dimensions	22
	Figure 14 – Styles 6J-P12, 6J-M12, 6J-C12, overall dimensions	22
	Figure 15 – Styles 6J-C12, 6J-P12 and 6J-M12, mating dimensions	23
	Figure 16 – Style 6P-M12, overall dimensions	24
	Figure 17 – Style 6P-P12, overall dimensions	24
	Figure 18 – Style 6J-M8C, overall dimensions	25
	Figure 19 – Styles 6J-M8C, 6P-M8CI, mating dimensions	25
	Figure 20 – Style 6J-M8CI, overall dimensions	26
	Figure 21 – Styles 6J-M8CI, 6P-M8C, mating dimensions	26
	Figure 22 – Style 6P-M8C, overall dimensions	27
	Figure 23 – Style 6P-M8CI, overall dimensions	27
	Figure 24 – Derating diagram for the Ø 0,5 mm data pins of the 2-way and 4-way connectors	29
	Figure 25 – Derating diagram for the Ø 1 mm power pins of the 4-way connector	30
	Figure 26 – Connector pin assignment for 2-way free connector, front view	33

Figure 27 – Connector pin assignment for 4-way M8 connector, front view	33
Figure 28 – Contact resistance arrangement.....	37
Figure 29 – Arrangement for vibration and mechanical shock tests.....	38
Table 1 – Connector styles	12
Table 2 – Geometrical position of planes	23
Table 3 – Climatic category	28
Table 4 – Current ratings of connectors.....	29
Table 5 – 2-way connector signal pin assignment	33
Table 6 – 4-way M8 connector signal pin assignment.....	34
Table 7 – Preferred values for the number of mating cycles	34
Table 8 – Preferred values for the pull-out force	35
Table 9 – Test group P	39
Table 10 – Test group AP	39
Table 11 – Test group BP	41
Table 12 – Test group CP	43
Table 13 – Test group DP	44
Table 14 – Test group EP	45
Table 15 – Test group FP	46
Table 16 – Test group GP	47

Draft for Stakeholders' Comments Only

INTERNATIONAL ELECTROTECHNICAL COMMISSION

CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT –**Part 6: Detail specification for 2-way and 4-way (data/power),
shielded, free and fixed connectors for power and data
transmission with frequencies up to 600 MHz**

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This International Standard IEC 63171-6 has been prepared by subcommittee 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment.

This second edition cancels and replaces the first edition published in 2020. This edition constitutes a technical revision.

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

- a) Mating conditions changed, see Figure 2, Figure 4, Figure 13, Figure 15, Figure 19 and Figure 21.
- b) Voltage proof requirement added, 2 250 V DC, see 5.7.2.
- c) Mechanical shock requirement added, see 5.7.6 (the requirement itself already was specified indirectly by Ed1 due to the specification of the test EP3 of Table 14 which is still identical to Ed1).

d) Styles added, 6P-M8CI and 6J-M8CI, see Table 1.

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

FDIS	Report on voting
48B/2907/FDIS	48B/2917/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

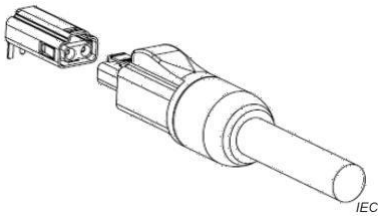
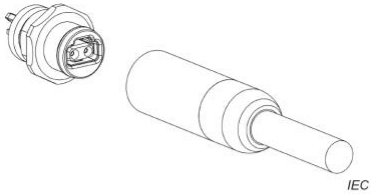
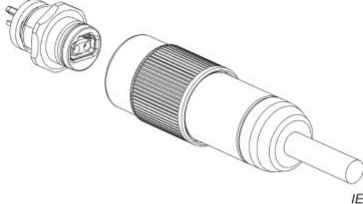
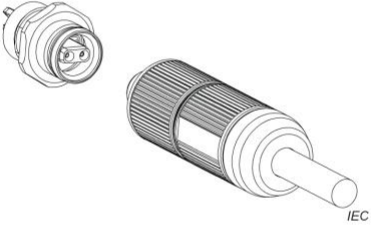
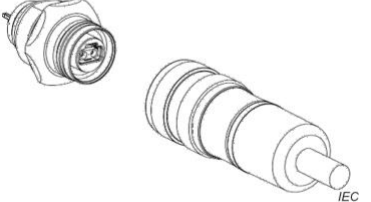
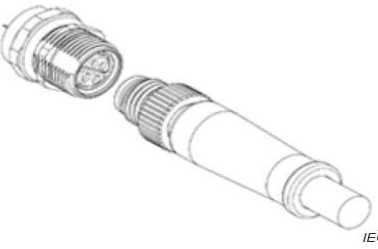
The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 63171 series, published under the general title *Connectors for electrical and electronic equipment*, 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IEC SC 48B – Electrical connectors Specification available from: IEC General secretariat or from the addresses shown on the inside cover.	IEC 63171-6 Ed. 2
DETAIL SPECIFICATION in accordance with IEC 61076-1	
	2-way data IP20, latch locking
	2-way data IP65/IP67, snap-in locking
	2-way data IP65/IP67, push-pull locking
	2-way data IP65/IP67, M8 screw locking
	2-way data IP65/IP67, M12 screw locking or push-pull locking (or both)
	4-way (2 power + 2 data) IP65/IP67, M8 screw locking

CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT –

Part 6: Detail specification for 2-way and 4-way (data/power), shielded, free and fixed connectors for power and data transmission with frequencies up to 600 MHz

1 Scope

This document covers 2-way and 4-way (data/power), shielded, free and fixed connectors for data transmission with frequencies up to 600 MHz and specifies the common dimensions, mechanical, electrical and transmission characteristics and environmental requirements as well as test specifications.

NOTE 1 This 63171- 6 document is not fully harmonized with the content and structure of IEC 63171. There are several specifications in both documents which are overlapping. In any case the provisions within this document prevail.

NOTE 2 The connectors are intended to be used for single-pair Ethernet (SPE) according to the following IEEE Standards: 10BaseT1 (IEEE 802.3cg), 100Base-T1 (IEEE 802.3bw), 1000Base-T1 (IEEE 802.3bp), and optionally with Power over Data line (PoDL) power supply according to IEEE 802.3bu.

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 60050-581, *International Electrotechnical Vocabulary (IEV) – Part 581: Electromechanical components for electronic equipment*

IEC 60068-1, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

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

IEC 60352 (all parts), *Solderless connections*

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

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

IEC 60512-1-2, *Connectors for electronic equipment – Tests and measurements – Part 1-2: General examination – Test 1b: Examination of dimension and mass*

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 60512-2-5, *Connectors for electronic equipment – Tests and measurements – Part 2-5: Electrical continuity and contact resistance tests – Test 2e: Contact disturbance*

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 60512-5-2, *Connectors for electronic equipment – Tests and measurements – Part 5-2: Current-carrying capacity tests – Test 5b: Current-temperature derating*

IEC 60512-6-3, *Connectors for electronic equipment – Tests and measurements – Part 6-3: Dynamic stress tests – Test 6c: Shock*

IEC 60512-6-4, *Connectors for electronic equipment – Tests and measurements – Part 6-4: Dynamic stress tests – Test 6d: Vibration (sinusoidal)*

IEC 60512-9-1, *Connectors for electronic equipment – Tests and measurements – Part 9-1: Endurance tests – Test 9a: Mechanical operation*

IEC 60512-9-2, *Connectors for electronic equipment – Tests and measurements – Part 9-2: Endurance tests – Test 9b: Electrical load and temperature*

IEC 60512-11-3, *Connectors for electronic equipment – Tests and measurements – Part 11-3: Climatic tests – Test 11c: Damp heat, steady state*

IEC 60512-11-4, *Connectors for electronic equipment – Tests and measurements – Part 11-4: Climatic tests – Test 11d: Rapid change of temperature*

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

IEC 60512-11-9, *Connectors for electronic equipment – Tests and measurements – Part 11-9: Climatic tests – Test 11i: Dry heat*

IEC 60512-11-10, *Connectors for electronic equipment – Tests and measurements – Part 11-9: Climatic tests – Test 11j: Cold*

IEC 60512-11-12, *Connectors for electronic equipment – Tests and measurements – Part 11-12: Climatic tests – Test 11m: Damp heat, cyclic*

IEC 60512-13-2, *Connectors for electronic equipment – Tests and measurements – Part 13-2: Mechanical operation tests – Test 13b: Insertion and withdrawal forces*

IEC 60512-13-5, *Connectors for electronic equipment – Tests and measurements – Part 13-5: Mechanical operation tests – Test 13e: Polarizing and keying method*

IEC 60512-15-6, *Connectors for electronic equipment – Tests and measurements – Part 15-6: Connector tests (mechanical) – Test 15f: Effectiveness of connector coupling devices*

IEC 60512-25-7, *Connectors for electronic equipment – Tests and measurements – Part 25-7: Test 25g – Impedance, reflection coefficient, and voltage standing wave ratio (VSWR)*

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

IEC 60512-26-100, *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 60512-28-100, *Connectors for electrical and electronic equipment – Tests and measurements – Part 28-100: Signal integrity tests up to 2 000 MHz – Tests 28a to 28g*

IEC 60529, *Degrees of protection provided by enclosures (IP code)*

IEC 60603-7:2020, *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 61076-1:2006, *Connectors for electronic equipment – Product requirements – Part 1: Generic specification*

IEC 61076-2-010, *Connectors for electrical and electronic equipment – Product requirements – Part 2-010: Circular connectors – Detail specification for connectors with outer or inner push-pull locking mechanism, based on mating interfaces according to IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 and IEC 61076-2-113*

IEC 61076-2-101: *Connectors for electronic equipment – Product requirements – Part 2-101: Circular connectors – Detail specification for M12 connectors with screw-locking*

IEC 61076-3, *Connectors for electronic equipment – Product requirements – Part 3: Rectangular connectors – Sectional specification*

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

IEC 61984, *Connectors – Safety requirements and tests*

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*

IEC 63171:2021, *Connectors for electrical and electronic equipment – Shielded or unshielded free and fixed connectors for balanced single-pair data transmission with current-carrying capacity – General requirements and tests*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-581, IEC 61076-1, IEC 61076-3 and IEC 60512-1 apply.

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/ob>

Draft for Stakeholders' Comments Only