

INTERNATIONAL STANDARD

**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**





THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2021 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC online collection - oc.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 18 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.



IEC 63171-6

Edition 2.0 2021-10

INTERNATIONAL STANDARD

**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**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.220.10

ISBN 978-2-8322-1030-7

Warning! Make sure that you obtained this publication from an authorized distributor.

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

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.