



BSI Standards Publication

Connectors for electrical and electronic equipment — Product requirements

Part 2-010: Circular connectors — Detail specification for push-pull connectors with 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

National foreword

This Published Document is the UK implementation of IEC PAS 61076-2-010:2020.

The UK participation in its preparation was entrusted to Technical Committee EPL/48, Electromechanical components and mechanical structures for electronic equipment.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2020
Published by BSI Standards Limited 2020

ISBN 978 0 539 13261 8

ICS 31.220.10

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 August 2020.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------



IEC PAS 61076-2-010

Edition 1.0 2020-07

PUBLICLY AVAILABLE SPECIFICATION PRE-STANDARD

**Connectors for electrical and electronic equipment – Product requirements –
Part 2-010: Circular connectors – Detail specification for push-pull connectors
with 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**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.220.10

ISBN 978-2-8322-8549-7

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

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references	8
3 Terms and definitions	10
4 Technical information	10
4.1 System of levels.....	10
4.1.1 Performance levels	10
4.1.2 Compatibility levels, according to IEC 61076-1	10
4.2 Classification into climatic categories.....	11
4.3 Contact terminations	11
4.4 Available connector codings.....	11
4.5 Ratings	12
4.6 Marking.....	12
4.7 Safety aspects	12
5 Dimensional information	12
5.1 General.....	12
5.2 Survey of styles and variants	12
5.2.1 General	12
5.2.2 Fixed connectors	12
5.2.3 Free connectors.....	19
5.3 Interface dimension	28
5.3.1 Outer push-pull locking: male fixed connector side view	28
5.3.2 Outer push-pull locking: female fixed connector side view with details and engage-plane definition for male free cable connectors type 1 and 2	28
5.3.3 Inner push-pull locking: female fixed connector side view and male free connector side view with details for both.....	31
5.4 Gauges	33
6 Characteristics	34
6.1 Classification into climatic category	34
6.2 Electrical characteristics	34
6.2.1 Voltage proof.....	34
6.2.2 Rated voltage – Rated impulse voltage – Pollution degree.....	34
6.2.3 Current-carrying capacity.....	34
6.2.4 Contact resistance	34
6.2.5 Insulation resistance.....	35
6.2.6 Transmission performance.....	35
6.3 Mechanical characteristics	35
6.3.1 Mating interface.....	35
6.3.2 Push-pull locking mechanism.....	36
6.4 Other characteristics	37
6.4.1 Vibration (sinusoidal).....	37
6.4.2 Shock	37
6.4.3 Degree of protection provided by enclosures (IP-code).....	37
7 Test schedule	37
7.1 General.....	37
7.2 Test schedule	38

7.2.1	Test group P – Preliminary	38
7.2.2	Test group AP – Dynamic/climatic	38
7.2.3	Test group BP – Mechanical endurance.....	38
7.2.4	Test group CP – Electrical load	39
7.2.5	Test group DP – Chemical resistivity	39
7.2.6	Test group EP – Connection method tests	39
7.2.7	Test group FP – Electrical transmission requirements.....	39
Annex A (informative) Diameter of the female connector body		40
Bibliography.....		41
Figure 1	– Tube insert, male contacts, mounting without thread (thread on tube) and without outer push-pull locking.....	13
Figure 2	– Fixed connector, male contacts, mounting with thread M12 × 1 and outer push-pull locking, square flange front mounting	14
Figure 3	– Fixed connector, male contacts, mounting with thread M12 × 1 and outer push-pull locking, with wire ends, single hole front mounting thread M16 × 1,5	14
Figure 4	– Fixed connector, male contacts, mounting with thread M12 × 1 and outer push-pull locking, with wire ends, single hole front mounting thread M20 × 1,5	15
Figure 5	– Fixed connector, female contacts, mounting with thread M12 × 1 and outer push-pull locking, with wire ends, single hole front mounting thread M16 × 1,5	15
Figure 6	– Fixed connector, female contacts, mounting with thread M12 × 1 and outer push-pull locking, with wire ends, single hole front mounting thread M20 × 1,5	16
Figure 7	– Fixed connector, female contacts, mounting with thread M12 × 1 and outer push-pull locking, with wire ends, single hole front mounting thread M16 × 1,5 and mounting orientation	16
Figure 8	– Fixed connector, female contacts, mounting with thread M12 × 1 and outer push-pull locking, with wire ends, single hole rear mounting thread M16 × 1,5	17
Figure 9	– Fixed connector, female contacts, mounting with thread M12 × 1 and inner push-pull locking, with wire ends, single hole front mounting thread M16 × 1,5	17
Figure 10	– Fixed connector, female contacts, mounting with thread M12 × 1 and inner push-pull locking, with wire ends, single hole front mounting thread M20 × 1,5	18
Figure 11	– Fixed connector, female contacts, mounting with thread M12 × 1 and inner push-pull locking, with wire ends, single hole front mounting thread M16 × 1,5 and mounting orientation	18
Figure 12	– Fixed connector, female contacts, mounting with thread M12 × 1 and inner push-pull locking, with wire ends, single hole rear mounting thread M16 × 1,5	19
Figure 13	– Rewireable connector, male contacts, straight version, with outer push-pull locking	20
Figure 14	– Rewireable connector, male contacts, angled version, with outer push-pull locking	20
Figure 15	– Non-rewireable connector, male contacts, straight version, with outer push-pull locking.....	21
Figure 16	– Non-rewireable connector, male contacts, angled version, with outer push-pull locking	22
Figure 17	– Rewireable connector, female contacts, straight version, with outer push-pull locking	22
Figure 18	– Rewireable connector, female contacts, angled version, with outer push-pull locking	23
Figure 19	– Non-rewireable connector, female contacts, straight version, with outer push-pull locking.....	24

Figure 20 – Non-rewireable connector, female contacts, angled version, with outer push-pull locking 25

Figure 21 – Rewireable connector, male contacts, straight version, with inner push-pull locking 25

Figure 22 – Rewireable connector, male contacts, angled version, with inner push-pull locking 26

Figure 23 – Non-rewireable connector, male contacts, straight version, with inner push-pull locking 27

Figure 24 – Non-rewireable connector, male contacts, angled version, with inner push-pull locking 27

Figure 25 – Outer push-pull locking: male fixed connector side view 28

Figure 26 – Outer push-pull locking: female fixed connector side view with details and engage-plane definition for male free cable connector 30

Figure 27 – Inner push-pull-locking: female fixed connector side view and male free connector side view with details for both 32

Figure A.1 – Diameter of the female connector body 40

Table 1 – Available connector codings 11

Table 2 – Styles of fixed connectors 13

Table 3 – Styles of free connectors 19

Table 4 – Dimensions of style JM-OP, Figure 13 20

Table 5 – Dimensions of style KM-OP, Figure 14 21

Table 6 – Dimensions of style LM-OP, Figure 15 21

Table 7 – Dimensions of style MM-OP, Figure 16 22

Table 8 – Dimensions of style JF-OP, Figure 17 23

Table 9 – Dimensions of style KF-OP, Figure 18 23

Table 10 – Dimensions of style LF-OP, Figure 19 24

Table 11 – Dimensions of style MF-OP, Figure 20 25

Table 12 – Dimensions of style JM-IP, Figure 21 26

Table 13 – Dimensions of style KM-IP, Figure 22 26

Table 14 – Dimensions of style LM-IP, Figure 23 27

Table 15 – Dimensions of style MM-OP, Figure 24 27

Table 16 – Dimensions of fixed connector with push-pull housing and male contacts 28

Table 17 – Dimensions for Figure 17 30

Table 18 – Dimensions for Figure 27 33

Table 19 – Climatic category 34

Table 20 – Insertion and withdrawal forces for the locking mechanism 36

Table 21 – Number of test specimens 38

Table 22 – Test group BP 39

Table A.1 – Diameter of the female connector body, dimension X 40

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT –
PRODUCT REQUIREMENTS –****Part 2-010: Circular connectors – Detail specification for push-pull
connectors with 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**

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.

A PAS is an intermediate specification made available to the public and needing a lower level of consensus than an International Standard to be approved by vote (simple majority).

IEC PAS 61076-2-010 has been processed by subcommittee 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft PAS	Report on voting
48B/2796/DPAS	48B/2817/RVDPAS

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

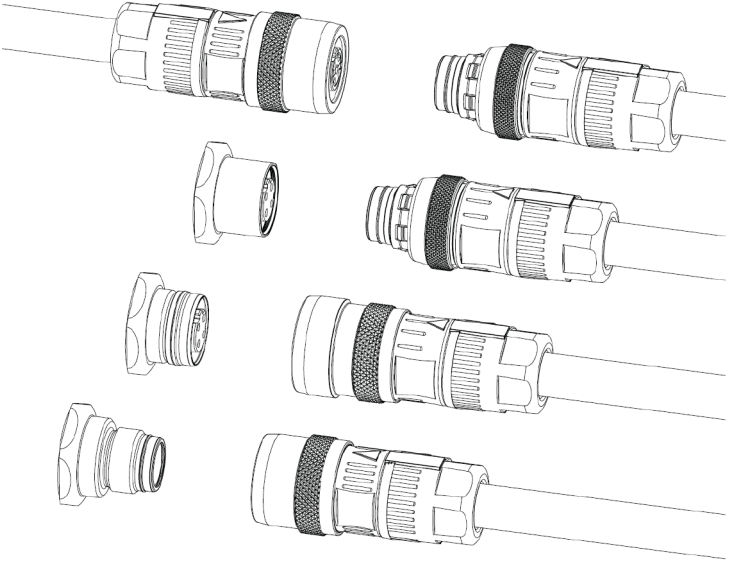
An International Standard is under preparation by IEC SC48B, to be published as IEC 61076-2-010 (if approved). This PAS will be withdrawn upon publication of the International Standard.

A list of all parts in the IEC 61076 series, published under the general title *Connectors for electrical and electronic equipment – Product requirements*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

This PAS shall remain valid for an initial maximum period of 2 years starting from the publication date. The validity may be extended for a single period up to a maximum of 2 years, at the end of which it shall be published as another type of normative document, or shall be withdrawn.

INTRODUCTION

<p>IEC SC 48B – Electrical connectors</p> <p>Specification available from: IEC General secretariat or from the addresses shown on the inside cover.</p>	<p>IEC PAS 61076-2-010 Ed. 1</p>
<p>ELECTRONIC COMPONENTS</p> <p>DETAIL SPECIFICATION in accordance with IEC 61076-1</p>	
 <p style="text-align: right; font-size: small;">IEC</p>	<p>Circular M12 connectors with push-pull locking for power, signal and data transmission</p> <p>Fixed connectors with male and female contacts, mateable with M12 screw or push-pull plugs</p> <p>Free cable connectors with male or female contacts with push-pull or screw locking</p> <p>Rewireable – Non-rewireable</p> <p>Fixed connectors, with front, rear or single hole mounting</p> <p>Straight and right-angled free cable connectors</p>

CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – PRODUCT REQUIREMENTS –

Part 2-010: Circular connectors – Detail specification for push-pull connectors with 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

1 Scope

This part of IEC 61076 specifies circular connectors with a push-pull locking mechanism of a size derived from and thus being compatible with M12 screw-locking connectors (free connectors with screw-locking according to IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 or IEC 61076-2-113 are compatible to push-pull fixed interfaces according to this document) and with mating interfaces according to IEC 61076-2-101, IEC 61076-2-109, IEC 61076-2-111 or IEC 61076-2-113.

NOTE 1 M12 is the dimension of the thread of the screw-locking mechanism of circular connectors with M12 screw-locking.

This document covers both

- 1) power connectors with current ratings up to 16 A and voltage ratings up to 630 V, typically used for power supply and power applications in industrial premises, and
- 2) connectors for data and signal transmission with frequencies up to 500 MHz.

These connectors consist of both, fixed and free connectors, either rewirable or non-rewirable, with M12 push-pull locking as explained above. Male connectors have round contacts from $\varnothing 0,6$ mm up to $\varnothing 1,5$ mm. In addition, the push-pull mechanisms consist of two different push-pull designs:

- a) An outer push-pull for male and female fixed connector, where the locking groove is placed onto the outer cylindrical surface of the housing. The outer push-pull for female fixed connectors is made for two different types of male connectors. It has locking means for both types on its outer surface.

NOTE 2 For design and dimensions, see 5.3.1 and 5.3.2.

- b) An inner push-pull for female fixed connectors, where the locking means are placed onto the inner cylindrical surface of the housing.

NOTE 3 For design and dimensions, see 5.3.3.

The different codings provided by IEC 61076-2 and mentioned within this document, prevent the mating of accordingly coded male or female connectors to any other similarly sized interfaces, covered by other standards and the cross-mating between the different codings provided by IEC 61076-2.

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.