

Connectors for electronic equipment —

**Part 2-101: Circular connectors —
Detail specification for circular
connectors M8 with screw- or
snap-locking, M12 with screw-locking
for low voltage applications**

ICS 31.220.10

National foreword

This British Standard is the UK implementation of EN 61076-2-101:2003+A1:2006. It is identical with IEC 61076-2-101:2003, incorporating amendment 1:2006. It supersedes BS EN 61076-2-101:2003 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by **A1**.

The UK participation in its preparation was entrusted by Technical Committee EPL/48, Electromechanical components and mechanical structures for electronic equipment, to Subcommittee EPL/48/2, Connectors for electronic equipment.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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

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

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 9 February 2004

© BSI 2008

ISBN 978 0 580 61847 5

Amendments/corrigenda issued since publication

Date	Comments
30 June 2008	Implementation of IEC amendment 1:2006 with CENELEC endorsement A1:2006

**Connectors for electronic equipment
Part 2-101: Circular connectors –
Detail specification for circular connectors
M8 with screw- or snap-locking,
M12 with screw-locking for low voltage applications
(IEC 61076-2-101:2003)**

Connecteurs pour équipements
électroniques
Partie 2-101: Connecteurs circulaires -
Spécification particulière pour
les connecteurs circulaires M8 à vis
ou à encliquetage, M12 à vis
pour applications basse tension
(CEI 61076-2-101:2003)

Steckverbinder für elektronische
Einrichtungen
Teil 2-101: Rundsteckverbinder -
Bauartspezifikation für
Rundsteckverbinder M8 mit Schraub-
oder Rastverriegelung und M12
mit Schraubverriegelung für
Niederspannungsanwendungen
(IEC 61076-2-101:2003)

This European Standard was approved by CENELEC on 2003-12-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 48B/1362/FDIS, future edition 1 of IEC 61076-2-101, prepared by SC 48B, Connectors, of IEC TC 48, Electromechanical components and mechanical structures for electronic equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61076-2-101 on 2003-12-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2004-09-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2006-12-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annex A is informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61076-2-101:2003 was approved by CENELEC as a European Standard without any modification.

Foreword to amendment A1

The text of document 48B/1591/FDIS, future amendment 1 to IEC 61076-2-101:2003, prepared by SC 48B, Connectors, of IEC TC 48, Electromechanical components and mechanical structures for electronic equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 61076-2-101:2003 on 2006-02-01.

The following dates were fixed:

- latest date by which the amendment has to be
implemented at national level by publication of
an identical national standard or by endorsement (dop) 2006-11-01
- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2009-02-01

Endorsement notice

The text of amendment 1:2006 to the International Standard IEC 61076-2-101:2003 was approved by CENELEC as an amendment to the European Standard without any modification.

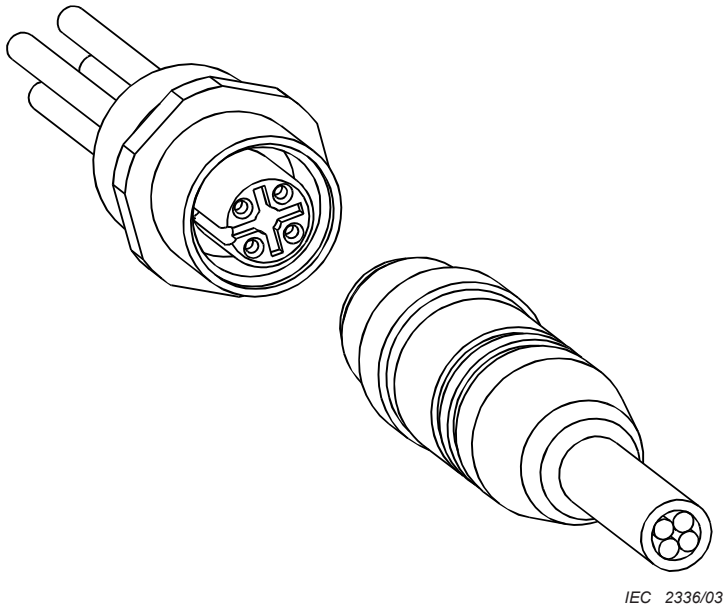
CONTENTS

1	General information	7
1.1	Scope.....	7
1.2	Recommended method of termination	7
1.3	Ratings and characteristics	7
1.4	Normative references	8
1.5	Marking	8
1.6	IEC Type designation	9
1.7	Ordering information.....	10
2	Technical information	10
2.1	Definitions	10
2.2	Survey of styles and variants.....	10
3	Dimensions	28
3.1	General	28
3.2	Interface dimensions	29
3.3	Engagement (mating) information.....	34
3.4	Gauges	36
4	Characteristics	37
4.1	Climatic category.....	37
4.2	Electrical	37
4.3	Mechanical	39
5	Test schedule	40
5.1	General	40
5.2	Test schedule.....	43
	Annex A (informative) Steel conduit thread, sizes	50
	Annex B (informative) Diameter of the female connector body	52
	Annex ZA (normative) Normative references to international publications with their corresponding European publications	53
	Figure 1 – Tube insert mounting without thread, male contacts	11
	Figure 2 – Tube insert mounting with thread M12x1, male contacts.....	11
	Figure 3 – Fixed connector, square flange front mounting, male contacts	12
	Figure 4 – Fixed connector, with wire ends, single hole mounting Pg9, male contacts.....	13
	Figure 5 – Fixed connector, with wire ends, single hole mounting Pg13,5, male contacts	13
	Figure 6 – Fixed connector with wire ends, single hole mounting Pg9, keyway orientation, male contacts	14
	Figure 7 – Fixed connector, with wire ends, single hole rear mounting Pg13,5, keyway orientation, male contacts	14
	Figure 8 – Fixed connector, with wire ends, single hole mounting Pg9, female contacts.....	15
	Figure 9 – Fixed connector, with wire ends, single hole mounting Pg13,5, female contacts ...	15
	Figure 10 – Fixed connector, with wire ends, single hole rear mounting Pg9 keyway orientation, female contacts	16

Figure 11 – Fixed connector, with wire ends, single hole rear mounting Pg13,5, keyway orientation, female contacts.....	16
Figure 12 – Rewireable connector, straight version, with locking nut, male contacts	17
Figure 13 – Rewireable connector, straight version, with locking nut, female contacts	18
Figure 14 – Rewireable connector, right angled version, with locking nut, male contacts.....	19
Figure 15 – Rewireable connector, right angled version, with locking nut, female contacts...	19
Figure 16 – Non-rewireable connector, straight version, with locking nut, male contacts	20
Figure 17 – Non-rewireable connector, straight version, with locking nut, female contacts	20
Figure 18 – Non-rewireable connector, right angled version, with locking nut, male contacts	21
Figure 19 – Non-rewireable connector, right angled version, with locking nut, female contacts	21
Figure 20 – Tube insert, mounting long version, male contacts dip solder	22
Figure 21 – Tube insert, mounting short version, male contacts dip solder	22
Figure 22 – Fixed connector with wire ends, single hole rear mounting, male contacts.....	23
Figure 23 – Fixed connector with wire ends, single hole rear mounting, female contacts.....	23
Figure 24 – Rewireable connector, straight version, with locking nut, male contacts	24
Figure 25 – Rewireable connector, straight version, with locking nut, female contacts	24
Figure 26 – Rewireable connector, right angled version, with locking nut, male contacts.....	25
Figure 27 – Rewireable connector, right angled version, with locking nut, female contacts....	25
Figure 28 – Non-rewireable connector, straight version, snap locking, male contacts.....	26
Figure 29 – Non-rewireable connector, straight version, snap locking, female contacts.....	26
Figure 30 – Non-rewireable connector, angled version, snap locking, female contacts	26
Figure 31 – Non-rewireable connector, straight version, with locking nut, male contacts	27
Figure 32 – Non-rewireable connector, straight version, with locking nut, female contacts	27
Figure 33 – Non-rewireable connector, angled version, with locking nut, male contacts	28
Figure 34 – Non-rewireable connector, angled version with locking nut, female contacts	28
Figure 35 – Type D – Front view of connectors	29
Figure 36 – Type D – Contact marking of connectors	31
Figure 37 – Type E – Front view of connectors	32
Figure 38 – Type E – Contact marking of connectors	33
Figure 39 – Engagement (mating) information.....	34
Figure 40 – Gauge dimensions	37
Figure 41 – Contact resistance arrangement.....	41
Figure 42 – Dynamic stress test arrangement	42
Figure A.1 – Dimensions Pg thread.....	50
Figure B.1 – Diameter of the female connector body	52

Table 1 – Styles of fixed connectors type D	10
Table 2 – Styles of free connectors type D	17
Table 3 – Styles of fixed connectors type E	22
Table 4 – Styles of free connectors type E	24
Table 5 – Dimensions of connectors type D in mated and locked position	35
Table 6 – Dimensions of connectors type E in mated and locked position	36
Table 7 – Gauges	37
Table 8 – Climatic Category	37
Table 9 – Rated voltage – Impulse voltage – Pollution degree connectors type D	38
Table 10 – Rated voltage – Impulse voltage – Pollution degree connectors type E	38
Table 11 – Voltage proof connectors type D	38
Table 12 – Voltage proof connectors type E	39
Table 13 – Number of mechanical operations	40
Table 14 – Insertion and withdrawal forces	40
Table 15 – Number of test specimens	41
Table 16 – Test group P	43
Table 17 – Test group AP	44
Table 18 – Test group BP	46
Table 19 – Test group CP	47
Table 20 – Test group DP	47
Table 21 – Test group EP	48
Table 22 – Test group FP	49
Table A.1 – Dimensions	51

**CONNECTORS FOR ELECTRONIC EQUIPMENT –
Part 2-101: Circular connectors –
Detail specification for circular connectors M8
with screw- or snap-locking, M12 with screw-locking
for low voltage applications**

INTERNATIONAL ELECTROTECHNICAL COMMISSION	IEC 61076-2-101
IEC SC 48B – Connectors	
ELECTRONIC COMPONENTS in accordance with IEC 61076-1	Blank detail specification IEC 61076-2-001
 IEC 2336/03	Circular connectors M8/Ø8 mm 3 and 4 poles M12 2 to 8 poles Pin and socket connectors Rewireable – Non-rewireable
	Free cable connectors Straight and right angle connectors Fixed connectors Flange mounting Single hole mounting Pin sockets
	Assessment level: B, G
Information on the availability of components qualified to this detail specification is given in the qualified products list.	

1 General information

Throughout this detail specification dimensions are in mm.

1.1 Scope

This part of IEC 61076 describes circular connectors for use in industrial control circuits devices like switchgear and controlgear. These connectors consist of fixed and free connectors either rewirable or non-rewirable, M8 with screw-locking or Ø 8 mm with snap-locking, M12 with screw-locking.

Male connectors have round contacts Ø 0,8 mm and Ø 1,0 mm.

A1 It also applies to 4 pole M12 circular connectors with integrated codings (i.e. D-coding) for use in industrial environments at frequencies of 100 MHz and beyond like Industrial Ethernet (see Note 1), to 5 pole M12 circular connectors with an integrated coding (B-coding) for use in industrial environments in fieldbuses like Profibus DP and Interbus, and to a 5-pole M12 circular connectors with an integrated coding (P-coding) for use in low voltage applications as a 4 + PE interface, with a centre contact dedicated to PE as a first make last break contact (see Note 2).

The B, D and P-codings prevent the mating of these coded male or female connectors to any other interfaces and cross mating between B, D, and P-coding.

NOTE 1 D-codings for other applications/frequency ranges are under consideration.

NOTE 2 Ratings and characteristics for the 4+PE versions (P-coding) and Profibus DP/ Interbus (B-coding) are the same as for 5 pole version. **A1**

1.2 Recommended method of termination

The contact terminations shall be of the following types: screw, crimp, solder, insulation piercing or insulation displacement.

1.2.1 Number of contacts or contact cavities

Connectors type D	M12	2 to 8 contacts
Connectors type E	M8/ Ø 8 mm	3 and 4 contacts

1.3 Ratings and characteristics

Rated voltage:	Connectors type D:	2 to 4 poles	250 V AC/DC
		5 poles	60 V AC/DC
		6 to 8 poles	30 V AC/DC
Current rating:	Type D	2 to 5 poles	= 4 A
		6 to 8 poles	= 2 A
	Type E	3 poles	= 3 A
		4 poles	= 3 A
Insulation resistance:	> 10 ⁸ Ω		
Climatic category:	see 4.1 and Table 8		
Contact spacing:	see Clause 3		

Information on the availability of components or manufacturer who have components qualified to this detail specification is given in the qualified products list.

1.4 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 60050-581, *International Electrotechnical Vocabulary – Electromechanical components for electronic equipment*

IEC 60068-1:1988, *Environmental testing – Part 1: General and guidance*
Amendment 1 (1992)

IEC 60352 (all parts), *Solderless connections*

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

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

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)*

IEC 60664-1:1992, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60998-2-1, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-1: Particular requirements for connecting devices as separate entities with screw-type clamping units*

IEC 60999 (all parts), *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units*

IEC 61076-1:1995, *Connectors with assessed quality, for use in d.c., low frequency analogue and in digital high speed data applications – Part 1: Generic specification*
Amendment 1 (1996)

IEC 61076-2, *Connectors for use in d.c., low-frequency analogue and digital high speed data applications – Part 2: Circular connectors with assessed quality – Sectional specification*

IEC 61076-2-001, *Connectors for electronic equipment – Part 2-001: Circular connectors – Blank detail specification*

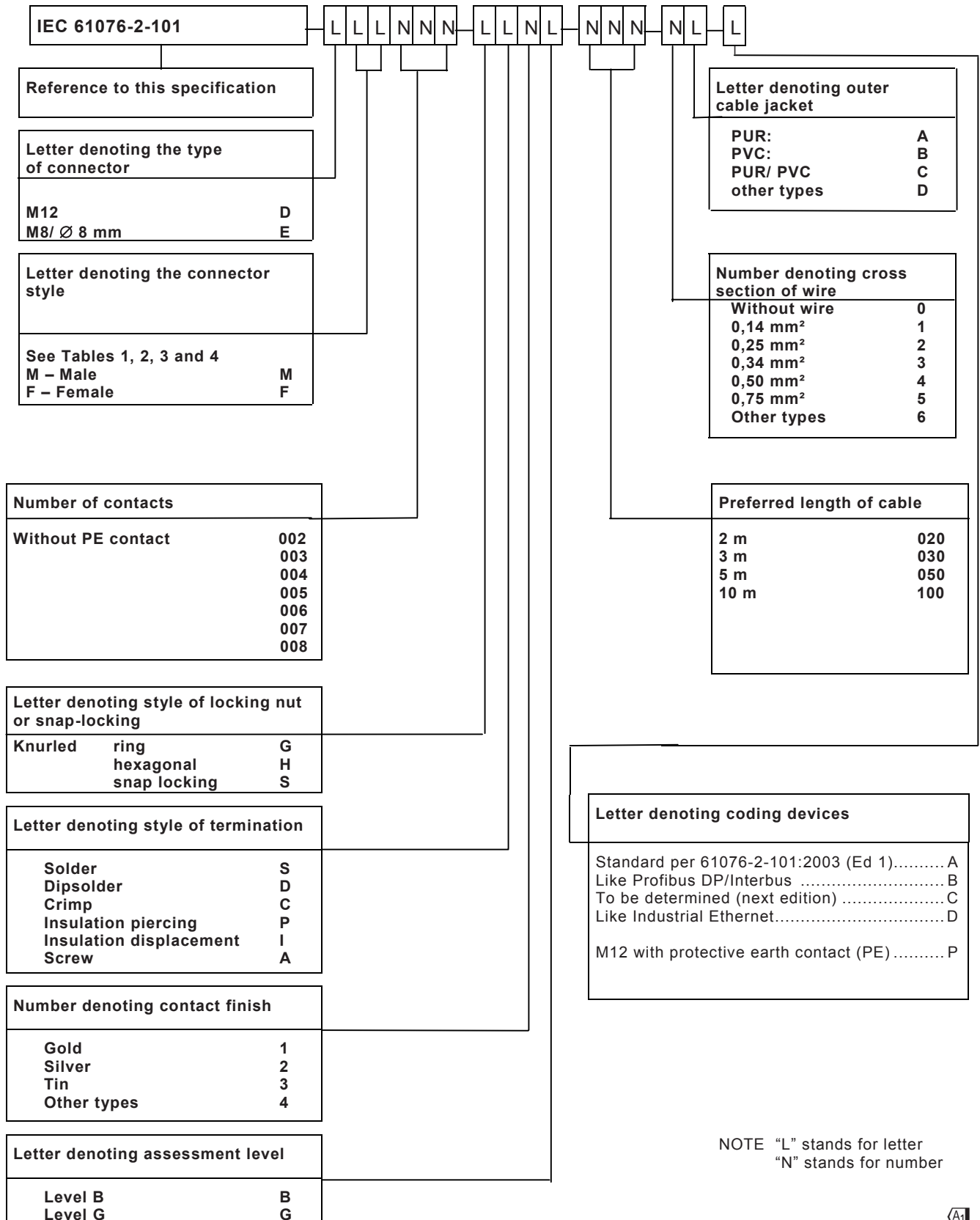
ISO 1302, *Geometrical Product Specifications (GPS) – Indication of surface texture in technical product documentation*

1.5 Marking

The marking of the connector and the package shall be in accordance with 2.6 of IEC 61076-2.

1.6 IEC Type designation

A1



A1

1.7 Ordering information

For ordering connectors to this detail specification, the type designation described in 1.6 shall be used.

A₁ EXAMPLE 1

non-rewireable free connector.
DMF 004 – G1B – 020 – 3A – D

Free connector M12 Style MF, non-rewireable, right angled version with female contacts, 4 poles, with knurled ring, gold contact finish, assessment level B, cable length 2,0 m, cross section of wire 0,34 mm², PUR cable jacket, D-coding.

EXAMPLE 2

rewireable free connector.
DKM 004 – GC3B – D

Free connector M12 Style KM, rewireable, right angled version with female contacts, with 4 poles, with knurled ring, crimp terminals, tin contact finish, assessment level B, D-coding. **A₁**

2 Technical information

Dimensions in mm.

2.1 Definitions

For the purposes of this part of IEC 61076, the terms and definitions given in IEC 581 apply.

2.2 Survey of styles and variants

2.2.1 Fixed connectors type D

Type D denotes M12 connectors. For interface dimensions, see 3.2.1.

Table 1 – Styles of fixed connectors type D

Style	Description
AM	Tube insert mounting without thread, male contacts
BM	Tube insert mounting with thread M12x1, male contacts
DM	Fixed connector, square flange front mounting, male contacts
EM	Fixed connector, with wire ends, single hole mounting Pg9, ¹⁾ , male contacts
FM	Fixed connector, with wire ends, single hole mounting Pg13,5, ¹⁾ , male contacts
GM	Fixed connector, with wire ends, single hole mounting Pg9, ¹⁾ , keyway orientation, male contacts
HM	Fixed connector, with wire ends, single hole rear mounting Pg13,5, ¹⁾ , keyway orientation, male contacts
EF	Fixed connector, with wire ends, single hole mounting Pg9, ¹⁾ , female contacts
FF	Fixed connector, with wire ends, single hole mounting Pg13,5, ¹⁾ , female contacts
GF	Fixed connector, with wire ends, single hole rear mounting Pg9, ¹⁾ , keyway orientation, female contacts
HF	Fixed connector, with wire ends, single hole rear mounting Pg13,5, ¹⁾ , keyway orientation, female contacts
¹⁾ For Pg dimensions, see Annex A.	

2.2.1.1 Style AM

Dimensions in mm

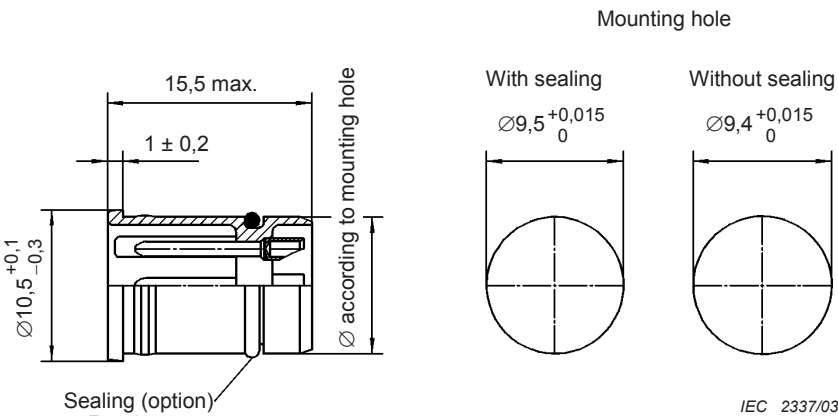


Figure 1 – Tube insert mounting without thread, male contacts

2.2.1.2 Style BM

Dimensions in mm

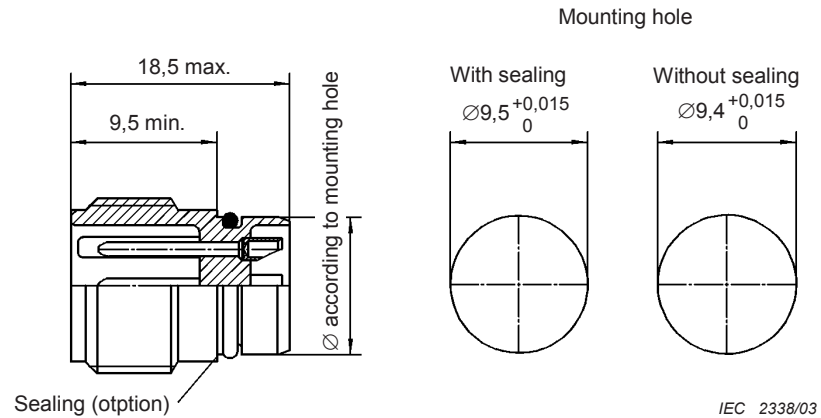
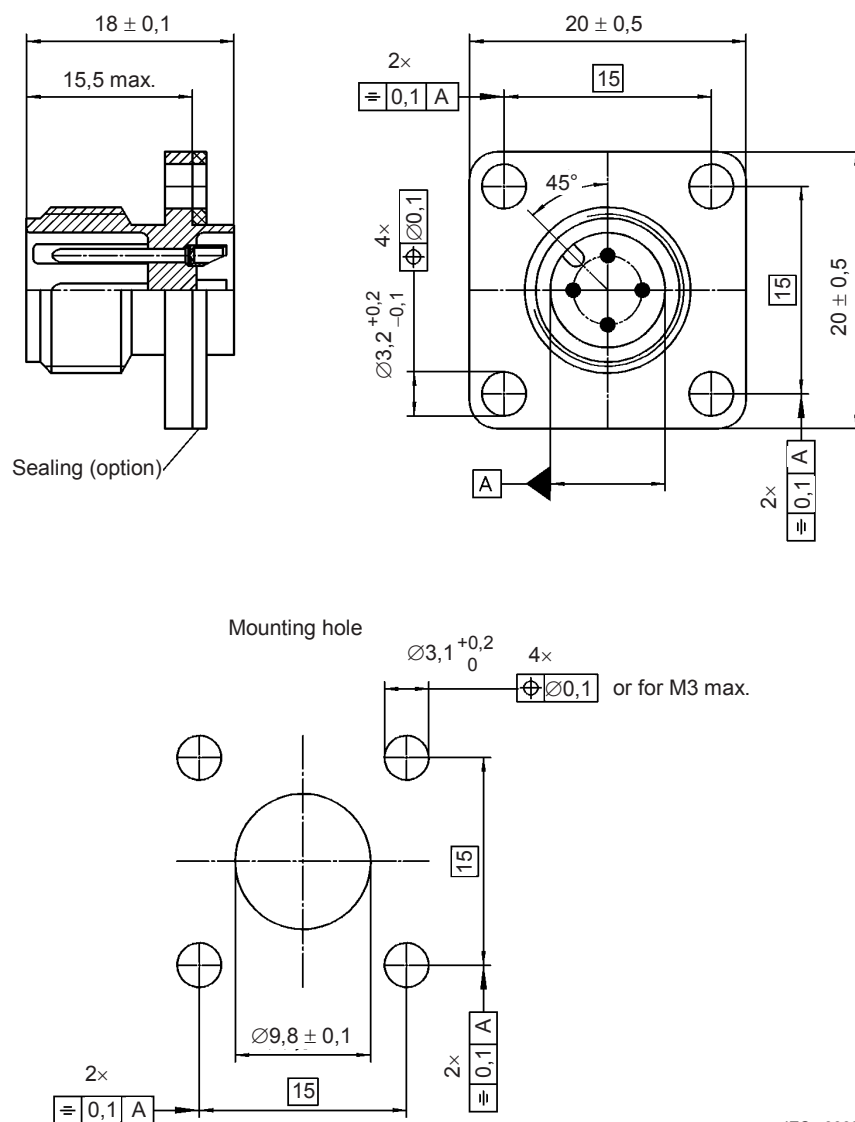


Figure 2 – Tube insert mounting with thread M12x1, male contacts

2.2.1.3 Style DM

Dimensions in mm



IEC 2339/03

Figure 3 – Fixed connector, square flange front mounting, male contacts

2.2.1.4 **Style EM**

Dimensions in mm

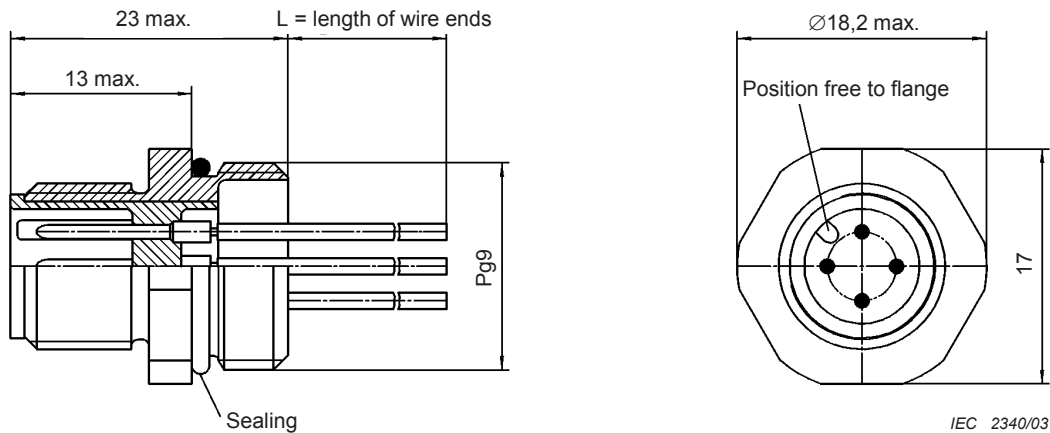


Figure 4 – Fixed connector, with wire ends, single hole mounting Pg9, male contacts

2.2.1.5 **Style FM**

Dimensions in mm

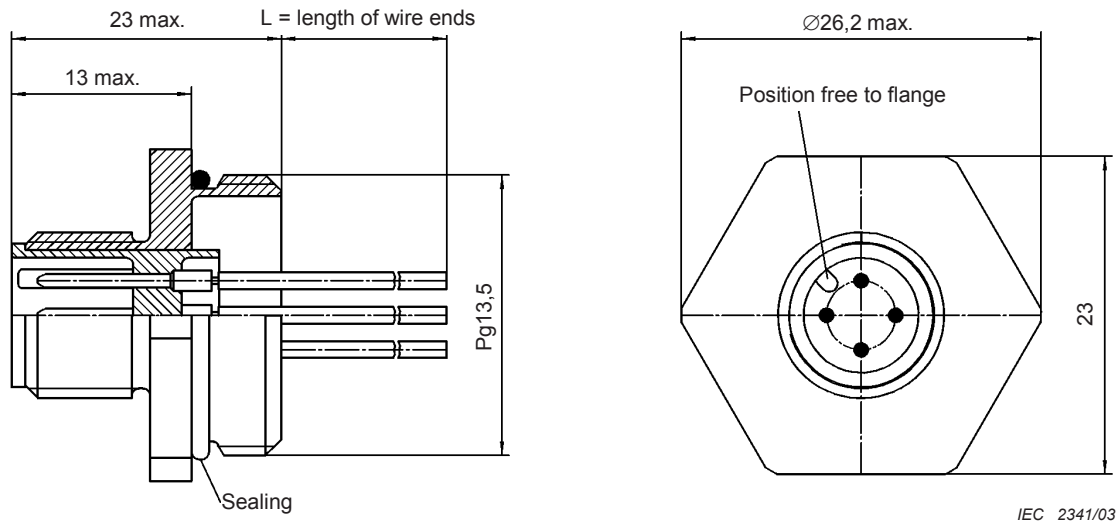


Figure 5 – Fixed connector, with wire ends, single hole mounting Pg13,5, male contacts

2.2.1.6 Style GM

Dimensions in mm

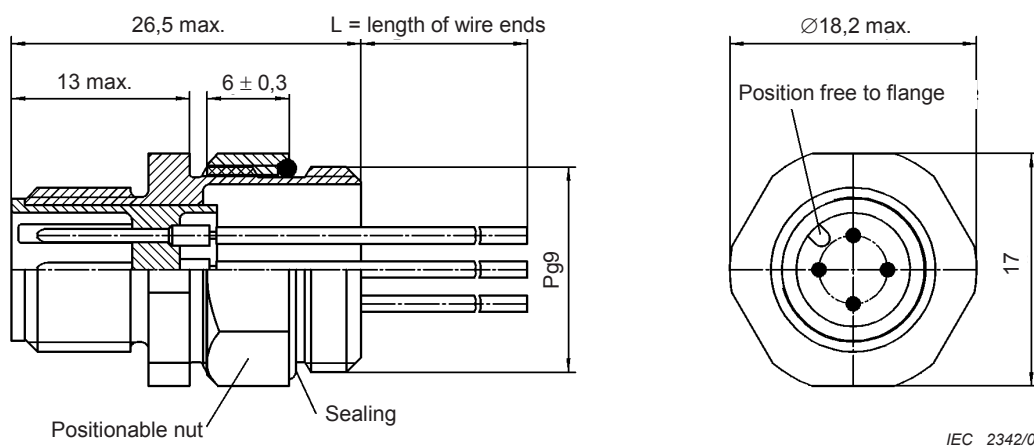


Figure 6 – Fixed connector with wire ends, single hole mounting Pg9, keyway orientation, male contacts

2.2.1.7 Style HM

Dimensions in mm

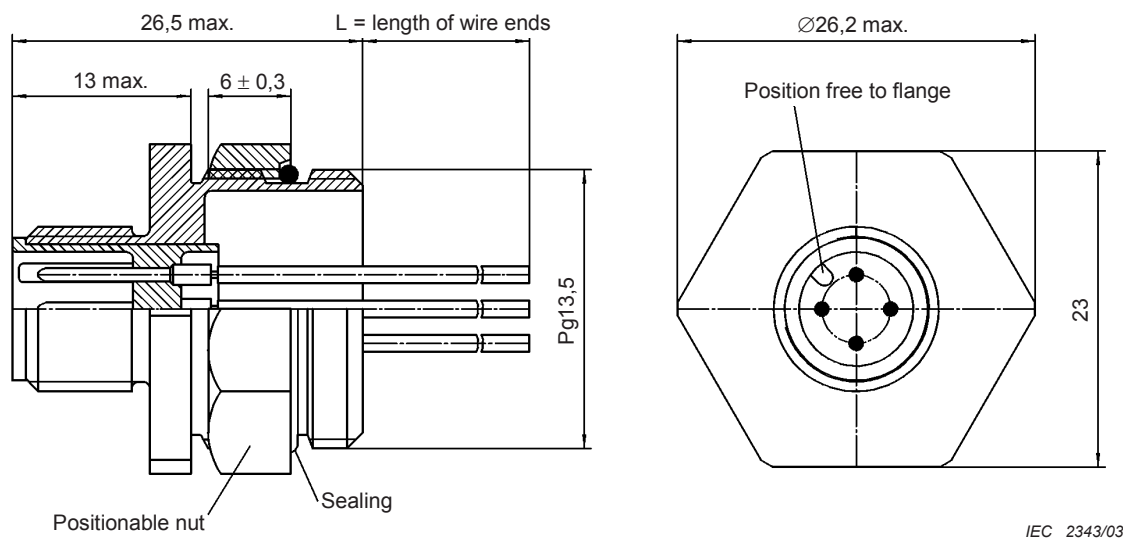


Figure 7 – Fixed connector, with wire ends, single hole rear mounting Pg13,5, keyway orientation, male contacts

2.2.1.8 Style EF

Dimensions in mm

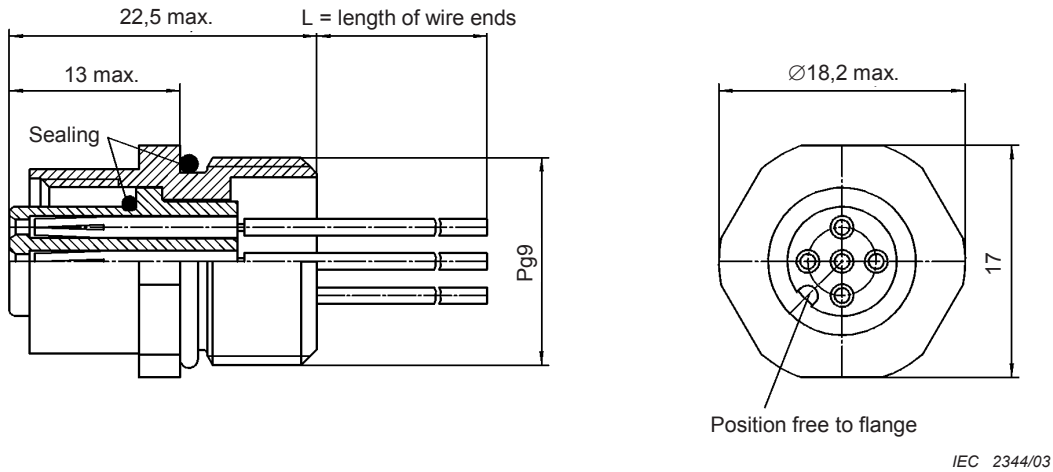


Figure 8 – Fixed connector, with wire ends, single hole mounting Pg9, female contacts

2.2.1.9 Style FF

Dimensions in mm

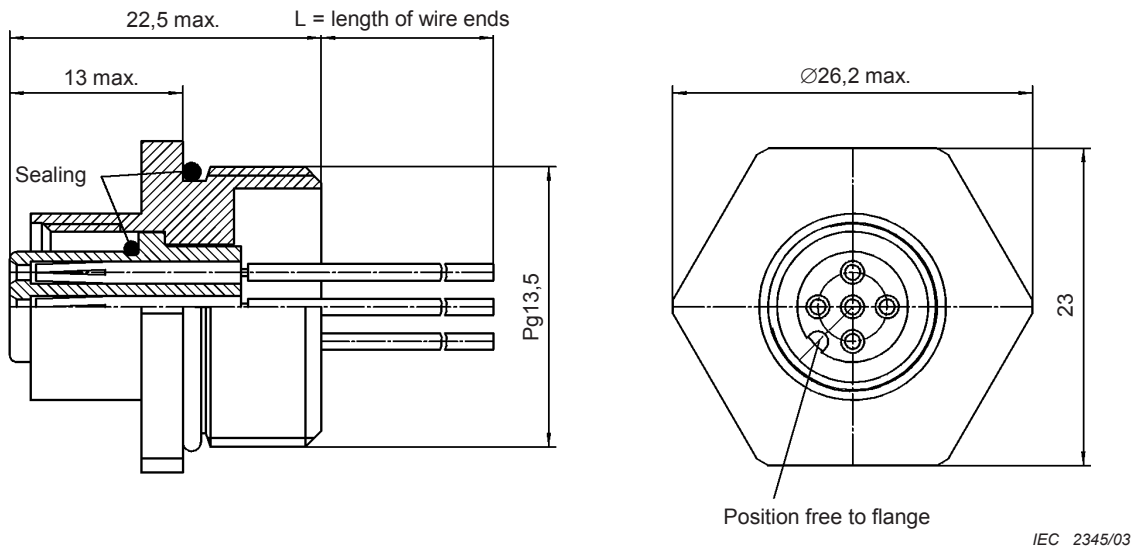


Figure 9 – Fixed connector, with wire ends, single hole mounting Pg13,5, female contacts

2.2.1.10 Style GF

Dimensions in mm

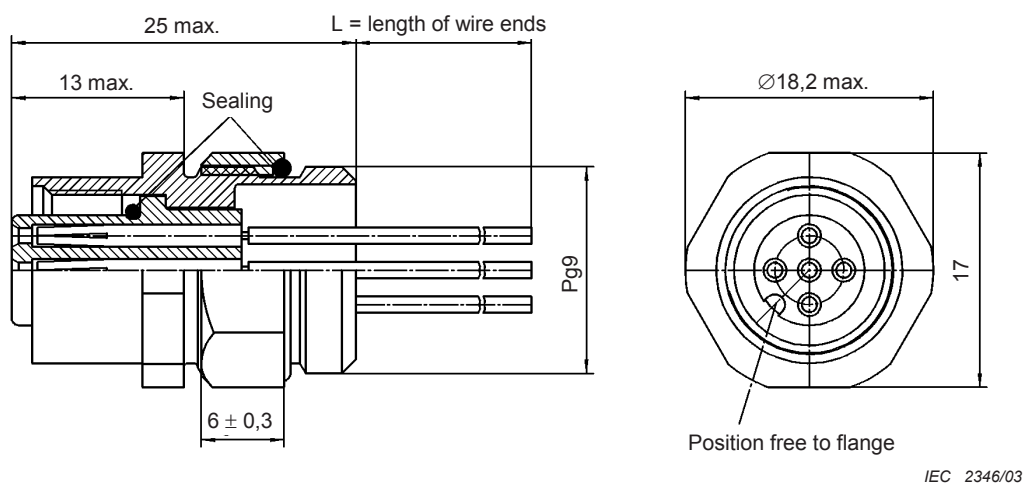


Figure 10 – Fixed connector, with wire ends, single hole rear mounting Pg9
keyway orientation, female contacts

2.2.1.11 Style HF

Dimensions in mm

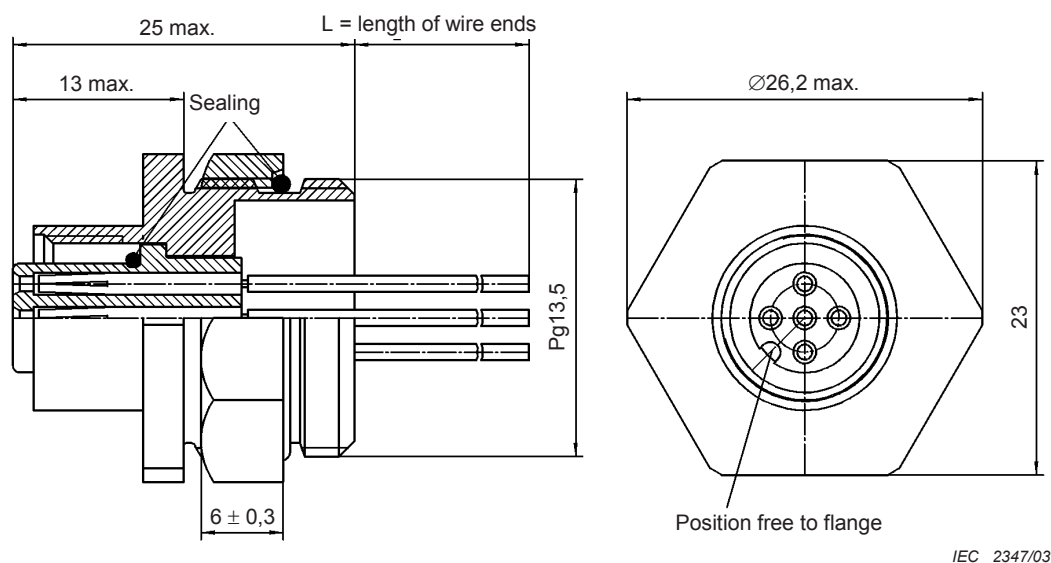


Figure 11 – Fixed connector, with wire ends, single hole rear mounting Pg13,5,
keyway orientation, female contacts