

DIN EN 3646-001



ICS 49.060

Einsprüche bis 2024-06-12
Vorgesehen als Ersatz für
DIN EN 3646-001:2016-03

Entwurf

**Luft- und Raumfahrt –
Elektrische Rundsteckverbinder mit Bajonettkupplung,
Betriebstemperatur 175 °C oder 200 °C konstant –
Teil 001: Technische Lieferbedingungen;
Englische Fassung prEN 3646-001:2024**

Aerospace series –

Connectors, electrical, circular, bayonet coupling, operating temperature 175 °C or 200 °C continuous –

Part 001: Technical specification;

English version prEN 3646-001:2024

Série aérospatiale –

Connecteurs électriques circulaires à accouplement par baïonnettes, température d'utilisation 175 °C ou 200 °C continu –

Partie 001: Spécification technique;

Version anglaise prEN 3646-001:2024

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Dieser Entwurf mit Erscheinungsdatum 2024-04-12 wird der Öffentlichkeit zur Prüfung und Stellungnahme vorgelegt.

Weil das beabsichtigte Dokument von der vorliegenden Fassung abweichen kann, ist die Anwendung dieses Entwurfs besonders zu vereinbaren.

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- oder in Papierform an den DIN-Normenausschuss Luft- und Raumfahrt (NL), 10772 Berlin oder Am DIN-Platz, Burggrafenstr. 6, 10787 Berlin.

Es wird gebeten, mit den Kommentaren zu diesem Entwurf jegliche relevanten Patentrechte, die bekannt sind, mitzuteilen und unterstützende Dokumentationen zur Verfügung zu stellen.

Gesamtumfang 57 Seiten

DIN-Normenausschuss Luft- und Raumfahrt (NL)

Nationales Vorwort

Der Verband der Europäischen Luft-, Raumfahrt- und Verteidigungsindustrie – Normung (ASD-STAN) ist vom Europäischen Komitee für Normung (CEN) für zuständig erklärt worden, Europäische Normen (EN) für das Gebiet der Luft- und Raumfahrt auszuarbeiten. Durch die Vereinbarung vom 3. Oktober 1986 wurde ASD Assoziierte Organisation (ASB) des CEN.

Das vorliegende Dokument (prEN 3646-001:2024) wurde von ASD-STAN, Fachbereich Elektrotechnik, unter Mitwirkung deutscher Experten des DIN-Normenausschusses Luft- und Raumfahrt (NL) erarbeitet.

Das zuständige deutsche Normungsgremium ist der Arbeitsausschuss NA 131-04-03 AA „Elektrische Verbindungselemente“ im DIN-Normenausschuss Luft- und Raumfahrt (NL).

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Ein zweiter Norm-Entwurf wird nur die Deutsche Fassung der veröffentlichten ASD-STAN prEN enthalten. Es wird darauf hingewiesen, dass auf Grund der Verfahrensweise zur Normenerstellung bei ASD-STAN der zweite Norm-Entwurf ausschließlich der redaktionellen Prüfung der deutschen Sprachfassung dienen wird.

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Aktuelle Informationen zu diesem Dokument können über die Internetseiten von DIN (www.din.de) durch eine Suche nach der Dokumentennummer aufgerufen werden.

Änderungen

Gegenüber DIN EN 3646-001:2016-03 wurden folgende Änderungen vorgenommen:

- a) normative Verweisungen aktualisiert;
- b) Angaben zu Führungsnuten und -nasen in Bild 3 ersetzt;
- c) Dokument redaktionell überarbeitet.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 3646-001

March 2024

ICS 49.060

Will supersede EN 3646-001:2015

English Version

Aerospace series - Connectors, electrical, circular, bayonet
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mit Bajonettkupplung, Betriebstemperatur 175 °C oder
200 °C konstant - Teil 001: Technische
Lieferbedingungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ASD-STAN.

If this draft becomes a European Standard, CEN 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.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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European foreword

This document (prEN 3646-001:2024) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 3646-001:2015.

The main changes compared to the previous edition are as follows:

- normative references updated;
- key and keyway quotation replaced in Figure 3;
- editorial revision of the document.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

Introduction

This family of connectors is derived from MIL-DTL-26482, series 2, the NAS 1599 bayonet connector with which it is intermateable and which uses AS-39029 for the contacts. It is particularly suitable for use on aircraft applying EN 2282.

These connectors are distinguishable from MIL-DTL-26482 and NAS 1599 by:

- being of a lower mass;
- having reduced dimensions;
- accepting smaller cables.

1 Scope

This document specifies the general characteristics, the conditions for qualification, acceptance and quality assurance, as well as the test programmes and groups for bayonet coupling circular connectors, intended for use in an operating temperature range of –65 °C to 175 °C or 200 °C continuous according to the class and models.

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.

EN 2266-002, *Aerospace series - Cables, electrical, for general purpose - Operating temperatures between -55 °C and 200 °C - Part 002: General*

EN 2591,¹ *Aerospace series — Elements of electrical and optical connection — Test methods*

EN 2591-100, *Aerospace series — Elements of electrical and optical connection — Test methods — Part 100: General*

EN 3197, *Aerospace series - Design and installation of aircraft electrical and optical interconnection systems*

EN 3646-002, *Aerospace series - Connectors, electrical, circular, bayonet coupling, operating temperature 175 °C or 200 °C continuous - Part 002: Specification of performance and contact arrangements*

EN 9133, *Aerospace series - Quality Management Systems - Qualification Procedure for Aerospace Standard Products*

ISO 263, *ISO inch screw threads — General plan and selection for screws, bolts and nuts — Diameter range 0,06 to 6 in*

ISO 27874, *Metallic and other inorganic coatings — Electrodeposited gold and gold alloy coatings for electrical, electronic and engineering purposes — Specification and test methods*

MIL-HDBK-454, *General guidelines for electronic equipment*²

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 2591-100 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

¹ All parts quoted in this standard.

² Published by: DEFENSE LOGISTICS AGENCY DLA Land and Maritime (US), <https://landandmaritimeapps.dla.mil/Programs/MilSpec/DocSearch.aspx>.

4 Description

4.1 General

Different variants of materials, housings and contact arrangements are provided according to the models depending on the service conditions.

These connectors use crimp or solder contacts of size 20, size 16 and size 12.

The receptacles and plugs contain either male contacts or female contacts.

The contacts fitted in the model Y receptacles are exclusively of the male non-removable solder type.

The connectors are polarized by means of keyways and keys. When all the male contacts are in place, polarization is obtained by different angular positions of the insulator in relation to the main slot or locking key and shall occur before the coupling ring can carry out its function.

The visual check of coupling is obtained by viewing the locking pins through the inspection holes in the coupling ring of the plug.

4.2 Receptacle

The receptacle may be attached by:

- square flange;
- nut, with sealing by O-ring at the attachment;
- round soldered or brazed flange for model Y connectors.

The receptacle contains five keyways in which the keys of the plug engage. The main keyway is fixed and is wider than the others. Polarization is ensured by the different angular positions of the inserts.

4.3 Plug

The plug contains five keys which engage in the keyways of the receptacle. The main key is wider than the others. Polarization is ensured by the different angular position of the inserts.

The coupling ring permanently fitted on the plug enables the connectors to be coupled and uncoupled. The internal guides of the coupling ring may be treated with a suitable lubricant compatible with the performance required in this standard.

The plug of models RS and WS is fitted with a grounding spring device ensuring electrical continuity between the coupled connector housings.

4.4 Materials and surface treatment

4.4.1 General

When different metals are in close contact, adequate protection against corrosion shall be used for the electromotive force of the cell not to exceed 0,25 V according to EN 3197.

4.4.2 Housings

The material of the housing for the connectors and for the fittings may either be passivated stainless steel or light alloy protected against corrosion by nickel, black anodized or cadmium plating according to EN 3646-002.

4.4.3 Contacts

Unless otherwise specified, the contacts shall be in ferrous alloy for models Y and in copper alloy for the other models.

They shall be gold-plated on an appropriate undercoat. Selective protection is authorized provided that it is sufficient to ensure that performance is respected.

Measurement of the thickness of the protective treatment shall be carried out in accordance with ISO 27874.

4.4.4 Non-metallic materials

The materials used for insert, seals and grommets shall have a hardness and mechanical and electrical characteristics consistent with the required use.

5 Design

5.1 Housings

The connector housings shall be in one unit. At the rear of the connector housing there shall be either three teeth at 120° intervals or teeth around the entire periphery. These teeth shall accommodate cable outlets or other fittings. The receptacle shall furthermore be fitted with an O-ring seal for sealing the coupled housings.

Receptacles for attachment by nut shall contain an O-ring seal. The nut shall have holes for the passage of locking wire.

The threads shall conform to ISO 263.

The coupling ring shall be designed so that the male and female contacts engage when it is turned clockwise and disengaged when it is turned counter-clockwise. The coupling ring shall be knurled.

The cable outlets shall compress the connector grommets without distorting it.

5.2 Inserts

The insert carrying the male and female contacts shall be in hard material and have a cross section and radii such that no cracks, flaking or breaks can occur in normal operation.

The insert for contacts shall be non-removable; it shall be mechanically held in the housing. Sealing shall be provided between the housing and insert.

The front face of the insert shall be such that sealing is ensured when the connectors are coupled. The interfacial seal of the insert of the male contacts shall be bonded on the hard insert.

The grommet shall permit sealing for all cable diameters indicated in EN 3646-002 and shall not be removable.

The mechanical contacts retention system shall be integrated in the hard insert.

The design of non-hermetic connectors shall permit individual installation of the contacts without removal of the insert or grommet. Insertion and removal of the contacts shall be from the rear, with the tools specified in the contact product standards.

6 Definition drawings and masses

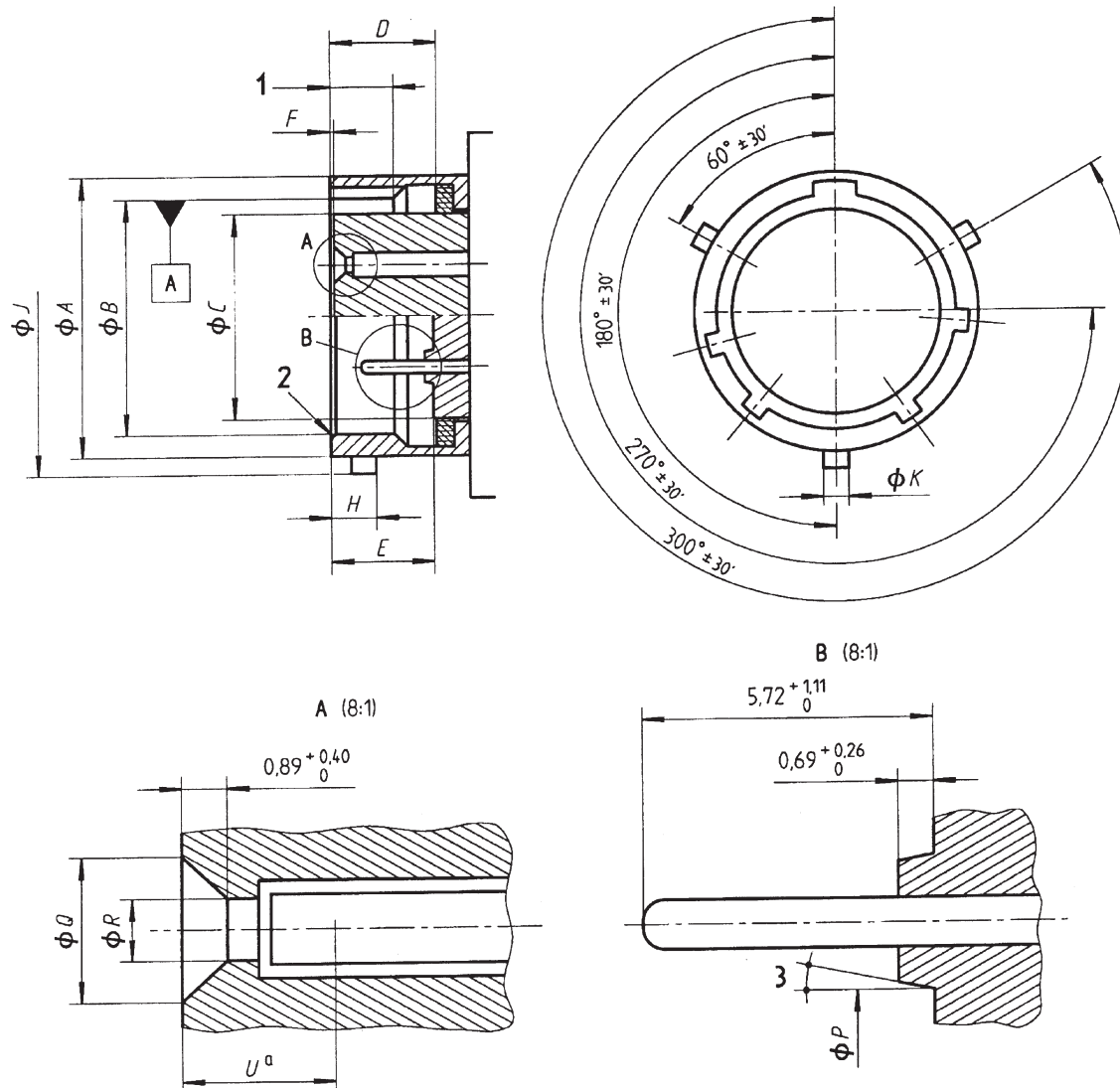
6.1 General

The general dimensions and the masses of receptacles, plugs and protective covers are specified in the product standards.

6.2 Receptacle mating dimensions

The mating dimensions of receptacles are shown in Figure 1 and details A and B as well as in Table 1, Table 2 and Table 3.

Dimensions and tolerances in millimetres



Key

- 1 shells 08 to 18: 5 min.
shells 20 to 24: 6 min.
- 2 radius or chamfer 0,2 mm to 0,381 mm
- 3 7°30' to 11°30'
- a position of point of electrical contact

Figure 1 — Receptacle

Table 1 — Receptacle — Mating dimensions

Housing size	<i>A</i> +0,02 −0,13	<i>B</i> +0,13 −0,02	<i>C</i> max.	<i>D</i>	<i>E</i>	<i>F</i>	<i>H</i> ±0,18	<i>J</i> 0 −0,4	<i>K</i> +0,15 −0,05
08	12,02	9,19	7,24	8,38 8,00	8,50 8,10	0,56 0,20	3,55	14,30	1,98
10	14,99	12,44	10,21					17,27	
12	19,05	15,41	13,11					21,82	
14	22,23	18,59	16,28					24,99	
16	25,40	21,76	19,46					28,14	
18	28,58	24,43	21,72					31,32	
20	31,75	27,61	24,89	9,98 9,60	10,10 9,70	2,13 1,78	4,38	34,49	
22	34,93	30,78	28,07					37,67	
24	38,10	33,96	31,22					40,89	3,18

Table 2 — Details A and B

Contact size	<i>P</i>	<i>Q</i>	<i>R</i>	<i>U</i> max.
20	2,29	2,44	1,50	3,68
	2,13 ^a	2,34 ^a		
	2,84	3,00	1,24	
	2,69	2,89		
16	3,66	3,81	2,06	3,94
	3,50	3,71	1,80	
12	5,18	5,33	2,84	
	5,03	5,23	2,59	
^a See Table 3.				

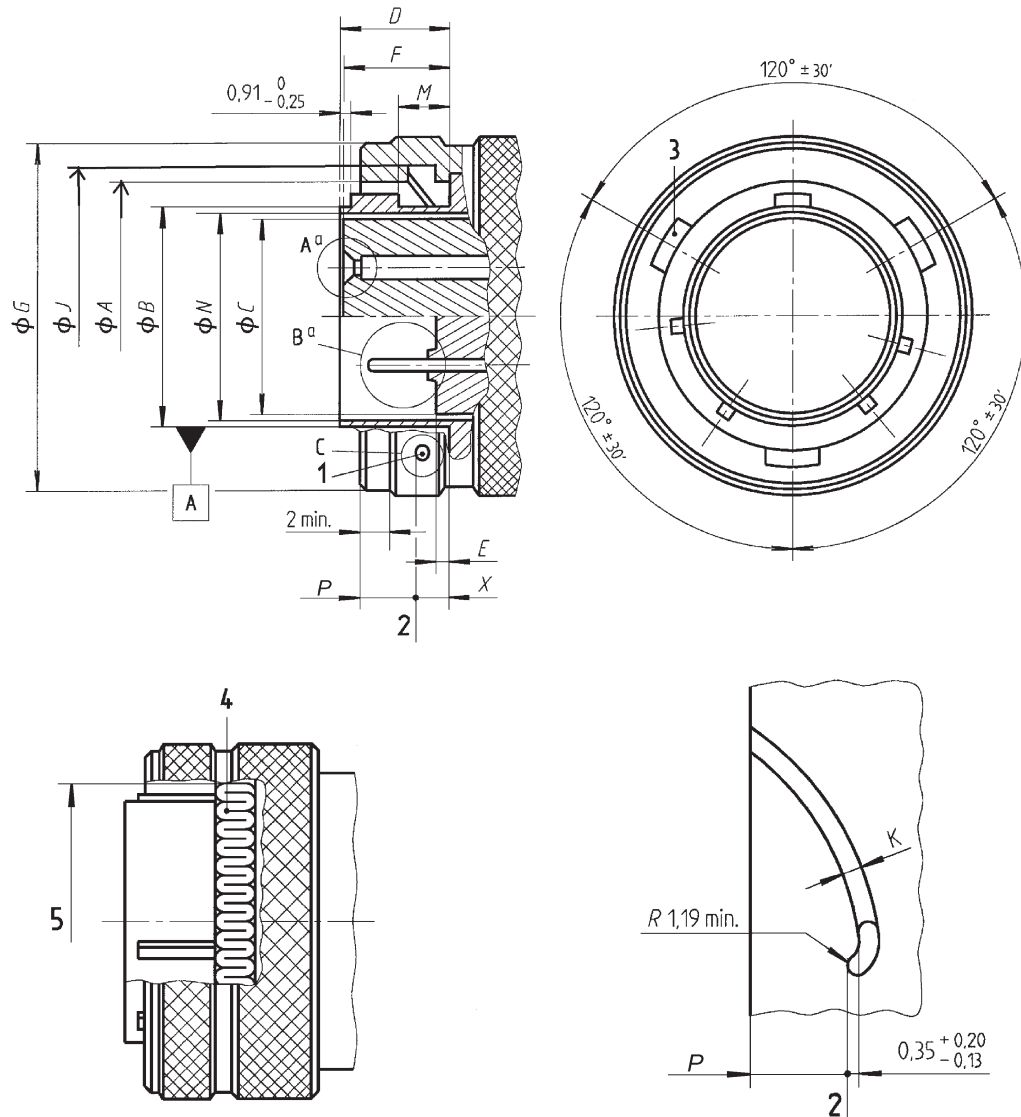
Table 3 — Reduced contact cavities

Housing size and contact arrangements	Reduced contact cavities
8 – 33	A, B, C
8 – 3A or 8 – 98	A, B, C
12 – 10	C, G
14 – 12	A, B, C, D, E, F, G, H
14 – 19	B, D, F, H, K, M
16 – 26	A, B, C, D, E, F, G, H, J, K, L, M, N, P, R
18 – 32	A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T
22 – 41	A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, V, W, X, Y

6.3 Plug mating dimensions

The mating dimensions of plugs are shown in Figure 2 and Figure 3 and in Table 4 and Table 5.

Dimensions and tolerances in millimetres



Key

- 1 Three mated connectors holes (design optional)
- 2 Reference. Locking point of the coupling ring.
- 3 Three bayonet grooves equally spaced within 0,13 with three holes equally spaced within 0,25 for visual inspection of coupling (see detail C).
- 4 Spring ground ring shall have at least six fingers per 25,4 mm of length.
- 5 Diameter L over spring finger
- C Coupling ring bayonet groove detail
- a See Figure 1.

NOTE Diameter C is applicable to female insulators only.

Figure 2 — Plug

Table 4 — Plug — Mating dimensions

Housing size	A <div>+0,10 −0,05</div>	B <div>+0,05 −0,10</div>	C max.	D	E	F	G max.	J <div>+0,13 −0,15</div>	K <div>+0,39 −0,04</div>	L min.	M max.	N min.	P max.	X ±0,51
08	12,24	9,04	7,24	9,22 9,00	1,12 0,68	9,02 8,56	16,72	14,63	2,30	9,37	4,75	7,42	4,45	2,87
10	15,32	12,29	10,21				19,79	17,70		12,62		10,39		
12	19,35	15,14	13,11				23,70	22,12		15,60		13,28		
14	22,50	18,31	16,28				27,40	25,27		18,77		16,46		
16	25,68	21,49	19,46				30,53	28,44		21,95		19,61		
18	28,88	24,03	21,72				33,30	31,62		24,61		21,89		
20	32,03	27,20	24,89	10,78 10,56	2,70 2,26	10,59 10,13	37,45	34,79	3,50	27,79	5,54	25,07	4,75	3,86
22	35,20	30,38	28,07				40,45	37,97		30,96		28,22		
24	38,38	33,55	31,22				43,40	41,25		34,14		31,42	4,45	

6.4 Receptacle and plug polarization

According to Figure 3, Figure 4 and Figure 5 and Table 5 and Table 6.

Dimensions and tolerances in millimetres

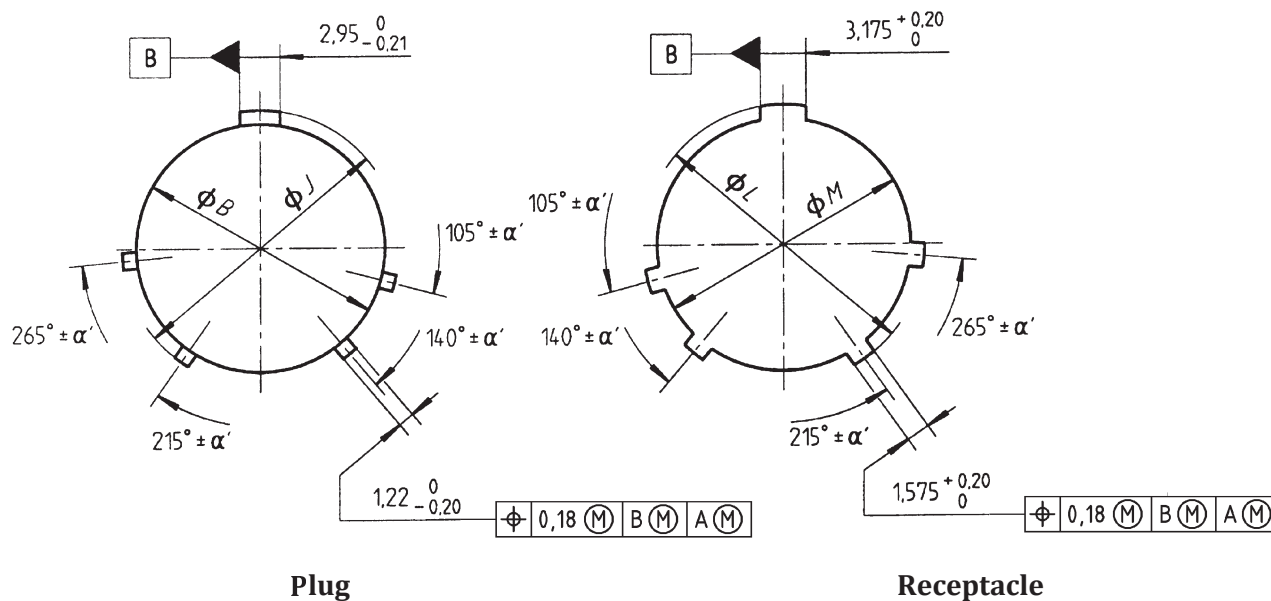


Figure 3 — Polarization

Table 5 — Polarization dimensions

Housing size	B +0,05 -0,10	J +0,08 -0,20	L +0,13 -0,15	M +0,13 -0,02	α
08	9,04	10,16	10,46	9,19	30'
10	12,29	13,41	13,71	12,44	
12	15,14	17,19	17,50	15,41	
14	18,31	20,37	20,67	18,59	
16	21,49	23,54	23,85	21,76	
18	24,03	26,08	26,39	24,43	25'
20	27,20	29,26	29,56	27,61	22'
22	30,38	32,43	32,74	30,78	20'
24	33,55	35,61	35,91	33,96	

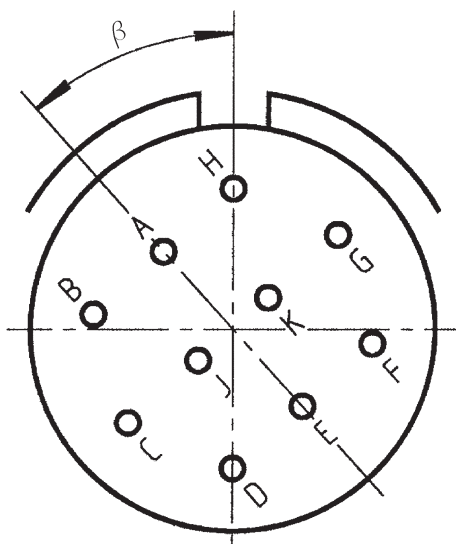


Figure 4 — Front face view female insulator

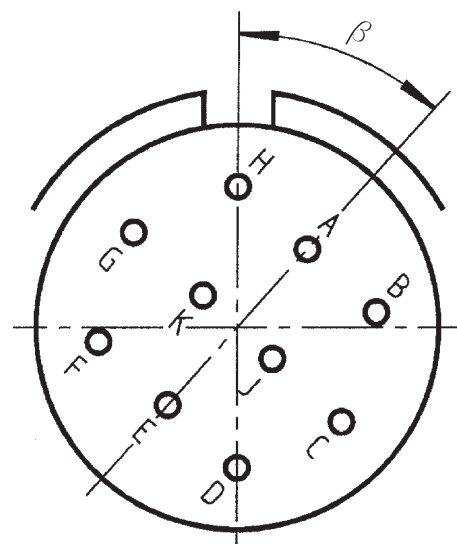


Figure 5 — Front face view male insulator

Table 6 — Polarization of contacts

Housing size and contact arrangements	Rating see Table 9 test EN 2591-207		Size and number of contacts			Polarization (β)				
	I	II	20	16	12	Polarization code				
08-3A or 8-98	X		3			0	60	210	—	—
08-33	X		3			0	90	—	—	—
10-02		X	2			0	—	—	—	—
10-06	X		6			0	90	—	—	—
12-03		X		3		0	—	—	180	—
12-08	X		8			0	90	112	203	292
12-10	X		10			0	60	155	270	295
14-04	X				4	0	45	—	—	—
14-05		X		5		0	40	92	184	273
14-12	X		8	4		0	43	90	—	—
14-15	X		14	1		0	17	110	155	234
14-19	X		19			0	30	165	315	—
16-08		X		8		0	54	152	180	331
16-21	X		16	5		0	—	—	—	—
16-23	X		22	1		0	158	270	—	—
16-26	X		26			0	60	—	275	338
18-08	X				8	0	180	—	—	—
18-11	X			11		0	62	119	241	340
18-32	X		32			0	85	138	222	265
20-16		X		16		0	238	318	333	347
20-34	X		26	8		0	—	—	—	—
20-39	X		37	2		0	63	144	252	333
20-41	X		41			0	45	126	225	—
22-12	X				12	0	—	—	—	6
22-21		X		21		0	16	135	175	349
22-36	X		36			0	72	144	216	288
22-41	X		27	14		0	39	135	264	—
22-55	X		55			0	30	142	226	314
24-19		X			19	0	30	165	315	—
24-31	X			31		0	90	225	255	—
24-61	X		61			0	90	180	270	324

6.5 Dimensions of the rear part

6.5.1 Model with three teeth

The dimensions of the rear part of receptacles and plugs for models with three teeth with threads for mounting cable outlets are shown in Figure 6 and in Table 7.

The centre-line of one of the three teeth shall be diametrically opposite to the centre-line of the master keyway.

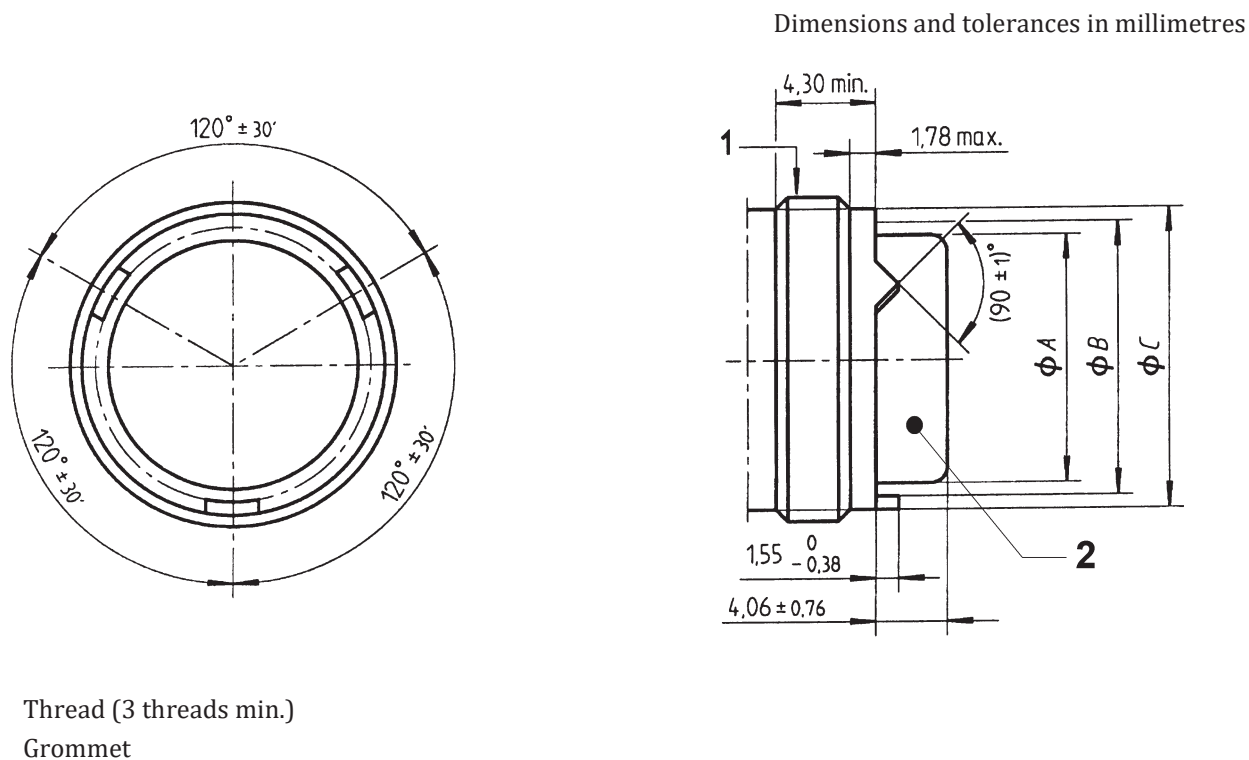
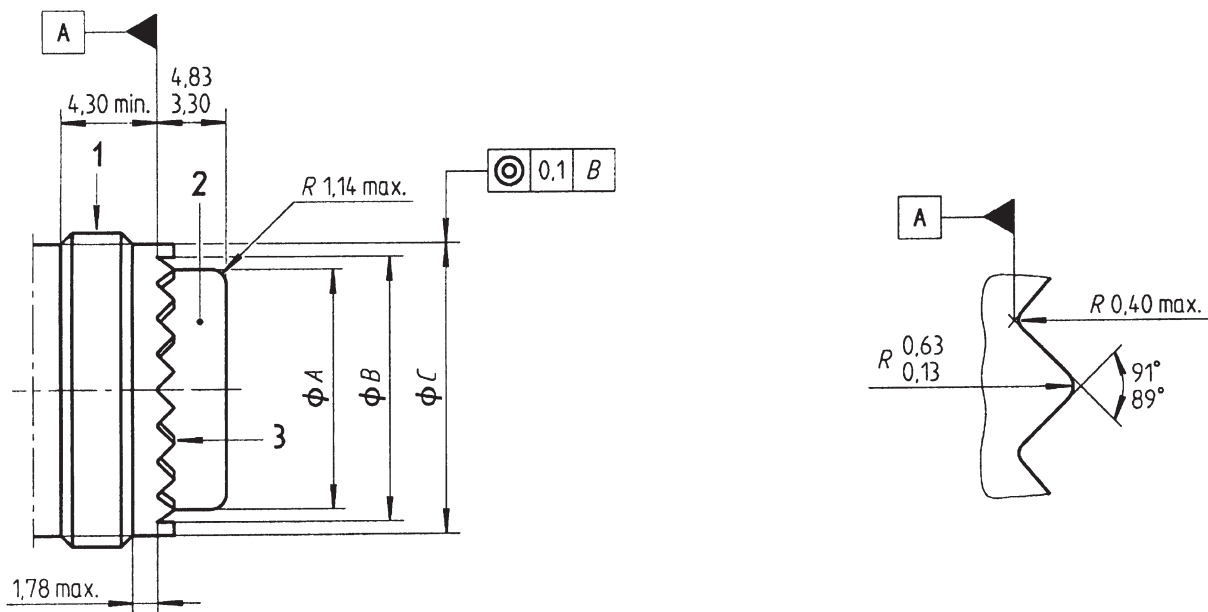


Figure 6 — Rear part

6.5.2 Model with teeth over the entire periphery

The dimensions of the rear part of receptacles and plugs for model with teeth over the entire periphery with threads for mounting cable outlets are shown in Figure 7 and in Table 7.



Key

- 1 Thread (3 threads min.)
- 2 Grommet
- 3 N: number of teeth

Figure 7 — Rear part

Table 7 — Rear part dimensions

Housing size	<i>A</i> max.	<i>B</i> min.	<i>C</i> max.	Thread ^a	<i>N</i> teeth	Angular tolerance of axes α
08	7,75	9,40	11,10	0,5000-20 UNEF-2A	12	±3
10	10,29	12,62	14,53	0,6250-24 UNEF-2A	15	
12	13,48	15,57	17,45	0,7500-20 UNEF-2A	21	
14	16,89	18,75	20,62	0,8750-20 UNEF-2A	24	±2
16	20,07	21,92	23,80	1,0000-20 UNEF-2A	30	
18	22,07	23,34	25,20	1,0625-18 UNEF-2A	33	
20	25,25	26,52	28,37	1,1875-18 UNEF-2A	36	±1
22	28,42	29,69	31,55	1,3125-18 UNEF-2A	39	
24	31,60	32,87	34,72	1,4375-18 UNEF-2A	42	

^a According to ISO 263.