



DPC: 18 / 30374257 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

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Part 001: Technical specification

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Direct tel: **020 8996 7009**
E-mail: csc@bsigroup.com

Introduction

This draft standard is based on European discussions in which the UK has taken an active part. Your comments on this draft are welcome and will assist in the preparation of the consequent British Standard. Comment is particularly welcome on national, legislative or similar deviations that may be necessary.

Even if this draft standard is not approved by the UK, if it receives the necessary support in Europe, the UK will be obliged to publish the official English Language text unchanged as a British Standard and to withdraw any conflicting standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	(7)
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/ Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

ASD/TC

Date: 2017-01

pr XXX-001:2017

ASD/TC

Secretariat:

Aerospace series — Expanded beam termini, fibre optic non physical contact in EN 3645 standard cavities — Part 001: Technical specification

Luft- und Raumfahrt — TBD — Teil 001: Technische Lieferbedingungen

Aerospace series — TBD — Partie 001 : Spécification technique

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Foreword

This document (EN 4869-001:2017) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by xxx, and conflicting national standards shall be withdrawn at the latest by xxx.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This family of connectors is derived from MIL-DTL-38999 series III, with which it is intermateable and interchangeable. It is particularly suitable for use in zones of severe environmental conditions on board aircraft, applying EN 2282.

These connectors are distinguishable from MIL-DTL-38999 by:

- A compatibility with size 8 power and quadrax contacts;
- Self-extinguishing materials;
- Compatibility with reduced diameter cables;
- Additional reinforced fuel resistant insert type;
- Additional insert with grounded cavities.

1 Scope

This European Standard specifies the general characteristics, the conditions for qualification, acceptance and quality assurance, as well as the test programs and groups for threaded ring coupling circular connectors, fire-resistant, intended for use in a temperature range from – 55 °C to 125 °C continuous.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 2267-002, *Aerospace series — Cables, electrical, for general purpose — Operating temperatures between – 55 °C and 260 °C — Part 002: General*

EN 2282, *Aerospace series — Characteristics of aircraft electrical supplies*

EN 2346, *Aerospace series — Fire resistant electrical cables — Dimensions, conductor resistance and mass*

EN 2424, *Aerospace series — Marking of aerospace products*

EN 2591-100 (all parts), *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 3645-002, *Aerospace series — Connectors, electrical, circular, scoop-proof, triple start threaded coupling, operating temperature 175 °C or 200 °C continuous — Part 002: Specification of performance and contact arrangements*

EN 3909, *Aerospace series — Test fluids for electric components and sub-assemblies*

EN 9133, *Aerospace series — Quality management systems — Qualification procedure for aerospace standard parts*

ISO 68-1, *ISO general purpose screw threads — Basic profile — Part 1: Metric screw threads*

ISO 261, *ISO general-purpose metric screw threads — General plan*

ISO 262, *ISO general-purpose metric screw threads — Selected sizes for screws, bolts and nuts*

ISO 965-2, *ISO general purpose metric screw threads — Tolerances — Part 2: Limit of sizes for general purpose external and internal screw threads — Medium quality*

ISO 4524-1, *Metallic coatings — Test methods for electrodeposited gold and gold alloy coatings — Part 1: Determination of coating thickness*

MIL-DTL-38999K, *Connectors, electrical, circular, miniature, high density, quick disconnect (bayonet, threaded, and breech coupling), environment resistant, removable crimp and hermetic solder contacts, general specification for* ¹⁾

¹⁾ Published by: DoD National (US) Mil. Department of Defense <http://www.defenselink.mil/>.

3 Terms and definitions

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

4 Description

4.1 General

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

The pair of connectors is characterized:

- by shell to shell bottoming;
- by its triple threaded and self-locking coupling system;
- by plugs with shielding ring providing protection against radioelectrical interference;
- by the scoop-proof shells.

These connectors use the following contacts:

- | | | |
|---|---|---|
| <ul style="list-style-type: none"> — crimped sizes 22, 20, 16, 12, 10 and 8; — coaxial crimped or soldered sizes 16, 12 and 8; — triaxial crimped or soldered size 8; — quadrax crimped size 8. | } | <p>For arrangements comprising the letter G or Q,
all contacts are grounded to the receptacle
housing</p> |
|---|---|---|

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

The connectors are polarized by means of keyways and keys; polarization shall be obtained before the male contacts enter the insert of the female contacts and before the coupling ring is engaged. The position of the keying arrangement is given in Table 5.

- The visual check of coupling is obtained by masking of a red colour band on the receptacle.

4.2 Receptacle

The receptacle housing may be attached:

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

4.3 Plug

The coupling ring is permanently fitted to the plug and allows coupling and uncoupling of the connectors. The lanyard release version may also be uncoupled by pulling on the lanyard.

The plug is fitted with a self-locking mechanism and a grounding spring device ensuring electrical continuity between the coupled connector housings.

An anti-decoupling device shall be provided to maintain complete coupling.

4.4 Materials and surface treatment

4.4.1 General

When dissimilar 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 (see EN 3197).

4.4.2 Housing

The material of the housings for the connectors and fittings may be either aluminium alloy, passivated stainless steel or composite. Aluminium alloy and composite shall be plated as defined by the class (composite coupling rings and Hex nut may be unplated) (see EN 3645-002).

4.4.3 Contacts

Unless otherwise specified, the non-removable contacts shall be in copper alloy.

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

Measurement of the thickness of the protective plating shall be effected in accordance with ISO 4524-1.

For removable contacts, see EN 3645-002.

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 one-piece. They shall contain teeth at the rear over their entire periphery and shall accommodate the rear accessories. The receptacle shall be fitted with a seal for sealing the coupled housings.

Jam-nut receptacles shall contain an O-ring seal. The nut shall have holes for the passage of locking wire.

During coupling the grounding spring shall be engaged a minimum of 1,02 mm in the receptacle before the contacts engage.

Except for the triple start threads, which shall conform to standard MIL-STD-1373, threads shall conform to standards ISO 68-1, ISO 261, ISO 262 and ISO 965-2.

The coupling ring shall be designed so that the male and female contacts engage when it is turned in a clockwise direction and disengage when turned anticlockwise. The coupling threads may have a lubricant applied during manufacture.

Full locking of the connectors shall occur at about 360°. On completion of tightening of the coupling ring, mechanical contact shall exist between the receptacle and plug housings. A red band shall be located on the receptacle so as to be visible when unmated and fully covered when completely mated.

The receptacle has five keyways which engage with corresponding keys on the plug. The major key is fixed and is wider than the others. Polarization is ensured by the different positions which the minor keys may take. The position of the insert is fixed relative to the major key.

A blue-coloured band indicating that the crimped contacts of the connectors are rear-releasable shall be provided:

- in front of the flange on square flange receptacles;
- on the flange of jam-nut receptacles;
- on the coupling ring of plugs.

This band shall be positioned so that at least one is visible when the connectors are fitted and when they are mated or unmated. Hermetic receptacles do not require blue colour band.

5.2 Inserts

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 3645-002 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. Fitting and removal of the contacts shall be from the rear with the tools specified in the contact product standards.

Contact position identification shall be permanent and contrasted on the front face of the insert or the interfacial seal and on the rear face of the grommet as indicated in 6.6.

The marking shall not be recessed or raised on the surfaces providing a seal.

6 Definition drawings and masses

6.1 General

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

6.2 Receptacle mating dimensions

Refer to EN 3645-001

6.3 Plug mating dimensions

Refer to EN 3645-001

6.4 Receptacle and plug polarization

Refer to EN 3645-001

6.5 Dimensions of the rear part of the connectors

Refer to EN 3645-001

6.6 Contact arrangements

The contact arrangements selected for expanded beam termini size 16 and size 12 is issued from EN 3645-001

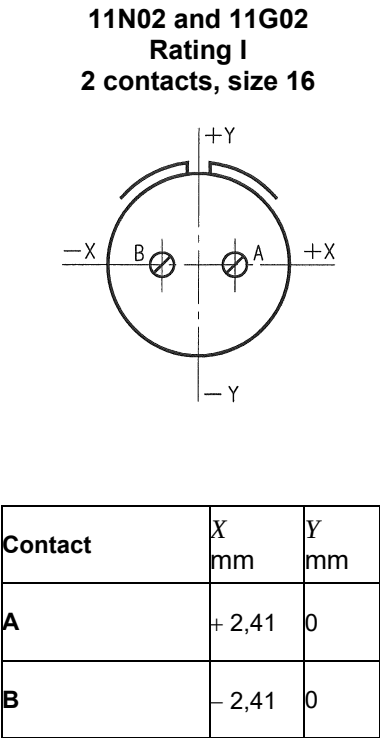


Figure 1

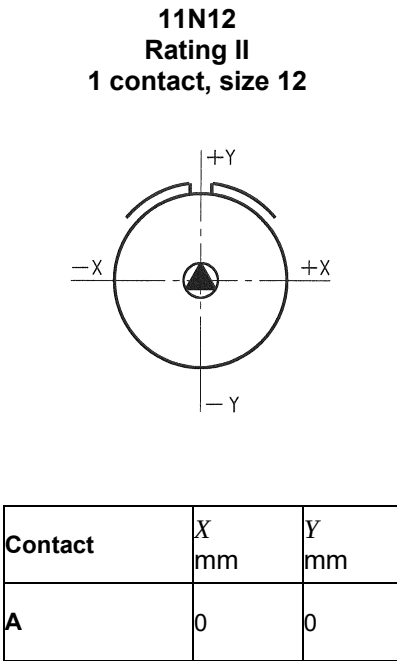
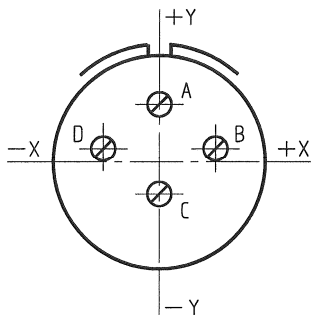


Figure 2

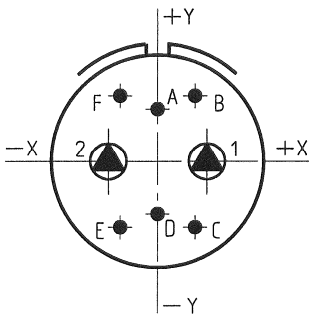
13N04 and 13G04
Rating I
4 contacts, size 16



Contact	X mm	Y mm
A	0	+ 3,81
B	+ 3,71	+ 0,89
C	0	- 2,11
D	- 3,71	+ 0,89

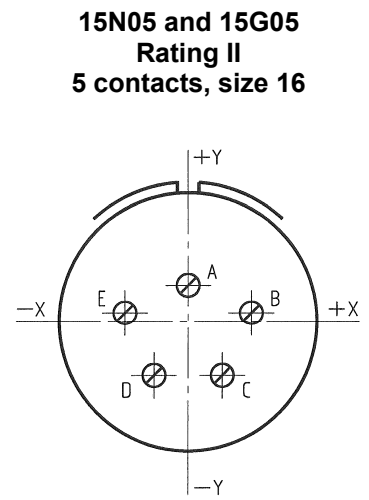
Figure 3

13N26
Rating M
2 contacts, size 12
6 contacts, size 22



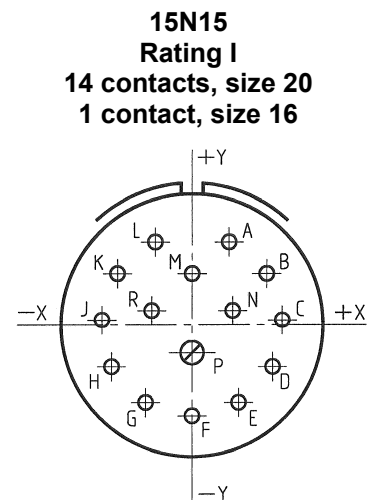
Contact	X mm	Y mm
A	0	+ 3,47
B	+ 2,47	+ 4,34
C	+ 2,47	- 4,34
D	0	- 3,47
E	- 2,47	- 4,34
F	- 2,47	+ 4,34
1	+ 3,25	0
2	- 3,25	0

Figure 4



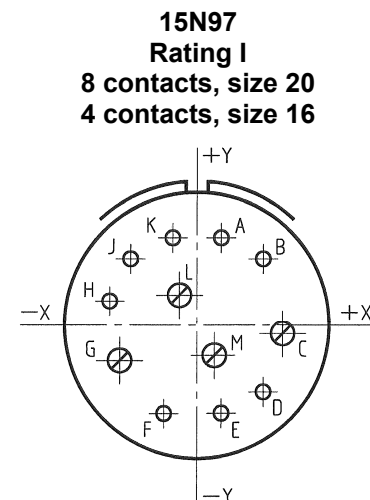
Contact	X mm	Y mm
A	0	+ 2,54
B	+ 4,42	+ 0,61
C	+ 2,39	- 3,76
D	- 2,39	- 3,76
E	- 4,42	+ 0,61

Figure 5



Contact	X mm	Y mm
A	+ 2,54	+ 5,72
B	+ 5,13	+ 3,56
C	+ 6,20	+ 0,36
D	+ 5,54	- 2,87
E	+ 3,20	- 5,31
F	0	- 6,22
G	- 3,20	- 5,31
H	- 5,54	- 2,87
J	- 6,20	+ 0,36
K	- 5,13	+ 3,56
L	- 2,54	+ 5,72
M	0	+ 3,56
N	+ 2,79	+ 1,02
P	0	- 1,96
R	- 2,79	+ 1,02

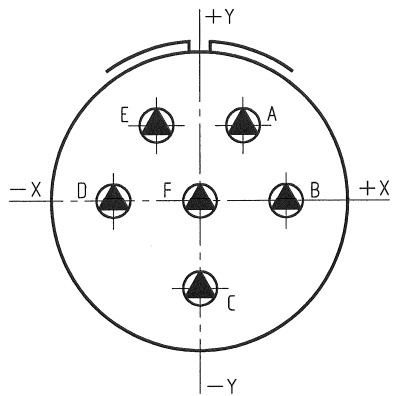
Figure 6



Contact	X mm	Y mm
A	+ 1,65	+ 5,94
B	+ 4,52	+ 4,52
C	+ 5,84	- 0,58
D	+ 4,52	- 4,52
E	+ 1,65	- 5,94
F	- 2,26	- 5,97
G	- 5,26	- 2,41
H	- 5,94	+ 1,65
J	- 4,52	+ 4,52
K	- 1,65	+ 5,94
L	- 1,19	+ 2,06
M	+ 1,19	- 2,06

Figure 7

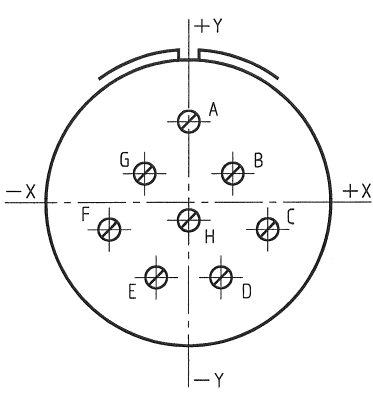
17N06 and 17G06
Rating I
6 contacts, size 12



Contact	X mm	Y mm
A	+ 3,07	+ 5,31
B	+ 6,12	0
C	0	- 6,12
D	- 6,12	0
E	- 3,07	+ 5,31
F	0	0

Figure 8

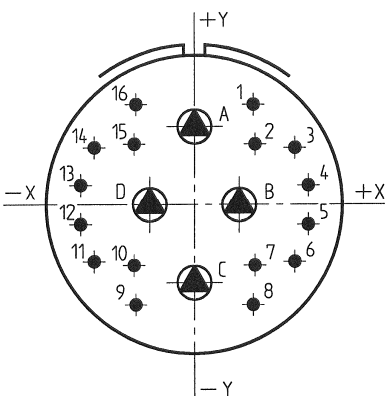
17N08 and 17G08
Rating II
8 contacts, size 16



Contact	X mm	Y mm
A	0	+ 5,99
B	+ 3,25	+ 2,18
C	+ 5,84	- 1,98
D	+ 2,39	- 5,49
E	- 2,39	- 5,49
F	- 5,84	- 1,98
G	- 3,25	+ 2,18
H	0	- 1,32

Figure 9

17N20
Rating M
4 contacts, size 12
16 contacts, size 22



Contact	X mm	Y mm
A	0	+ 5,51
B	+ 3,18	0
C	0	- 5,51
D	- 3,18	0
1	+ 4,17	+ 7,06
2	+ 4,29	+ 4,29
3	+ 7,11	+ 4,04
4	+ 8,05	+ 1,40
5	+ 8,05	- 1,40
6	+ 7,11	- 4,04
7	+ 4,29	- 4,29
8	+ 4,17	- 7,06
9	- 4,17	- 7,06
10	- 4,29	- 4,29
11	- 7,11	- 4,04
12	- 8,05	- 1,40
13	- 8,05	+ 1,40
14	- 7,11	+ 4,04
15	- 4,29	+ 4,29
16	- 4,17	+ 7,06

Figure 10