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**SIST EN 3155-001:2016**

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**Aeronavtika - Električni kontakti za uporabo v veznih elementih - 001. del:**  
**Tehnična specifikacija**

Aerospace series - Electrical contacts used in elements of connection - Part 001:  
Technical Specification

Luft- und Raumfahrt - Elektrische Kontakte zur Verwendung in Verbindungselementen -  
Teil 001: Technische Lieferbedingungen

Série aérospatiale - Contacts électriques utilisés dans les organes de connexion - Partie  
001: Spécification technique

**Ta slovenski standard je istoveten z: prEN 3155-001**

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**ICS:**

49.060	Letalska in vesoljska električna oprema in sistemi	Aerospace electric equipment and systems
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**oSIST prEN 3155-001:2023**

**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 3155-001**

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ICS 49.060

English Version

## Aerospace series - Electrical contacts used in elements of connection - Part 001: Technical Specification

Série aérospatiale - Contacts électriques utilisés dans les organes de connexion - Partie 001: Spécification technique

Luft- und Raumfahrt - Elektrische Kontakte zur Verwendung in Verbindungselementen - 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.

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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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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (prEN 3155-001:2023) 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 document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 3155-001:2016.

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

- Update of normative references;
- Introduction of contact size 23 with barrel 22;
- Revision of test 101 and 417 in Table 2;
- Removal of remarks in Table 5, Table 6 and Table 7;
- Introduction of test 418 prior to test 201 in Group 2 of Table 8;
- Removal of tests 221, 222 and 223 and introduction of test 508 in group 2 of Table 11;
- Editorial revision of the document.

<https://standards.iteh.ai/catalog/standards/sist/9356bc79-054b-4524-b392-e6ccccac8e03d/osist-pren-3155-001-2023>

**prEN 3155-001:2023 (E)****1 Scope**

This document specifies:

- the electrical, mechanical, environmental and dimensional characteristics of electrical contacts used in elements of connection, including coaxial, triaxial and quadrax contacts;
- the conditions for qualification, acceptance testing and quality assurance;
- the test programs and groups.

It is applicable to removable crimp contacts, wrap contacts, solder contacts used in connectors or in other elements of electrical connection.

In case of conflict or missing information between the EN 3155-001 and the product standards, the product standard takes precedence.

**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 2083, *Aerospace series - Copper and copper alloys conductors for electrical cables - Product standard*

EN 2242, *Aerospace series - Crimping of electric cables with conductors defined by EN 2083, EN 4434 and EN 2346*

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

EN 2591 (all parts), *Aerospace series — Elements of electrical and optical connection — Test methods*

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

EN 4434, *Aerospace series - Copper or copper alloy lightweight conductors for electrical cables - Product standard (Normal and tight tolerances)*

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

EN ISO 27874, *Metallic and other inorganic coatings - Electrodeposited gold and gold alloy coatings for electrical, electronic and engineering purposes - Specification and test methods (ISO 27874:2008)*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 8843, *Aircraft — Crimp-removable contacts for electrical connectors — Identification system*

IEC 60352-1,<sup>1</sup> *Solderless connections — Part 1: Wrapped connections — General requirements, test methods and practical guidance*

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1 Published by: IEC International Electrotechnical Commission <https://www.iec.ch/>

TR 3198,<sup>2</sup> *Aerospace series — Manufacturers' identification monograms and marks for EN aerospace products*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 2591-100 and the following 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/>

#### 3.1

##### **LSP**

Length of Selective Protection

#### 3.2

##### **point of electrical contact**

position of point of application of the force which provides contact pressure

#### 3.3

##### **contact active area**

part of the contact which allows current to pass between the contact male and female

#### 3.4

##### **contact transition area**

all mechanical liaisons that contribute to electrical performance and which are different from contact active area defined in 3.3

#### 3.5

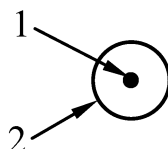
##### **coaxial contact male or female**

assembly of two contacts arranged coaxially enabling the connection of coaxial, shielded or bifilar cables

Note 1 to entry: See Figure 1.

Note 2 to entry: Male coaxial contact where the outer contact is male; the central contact(s) may be male or female.

Note 3 to entry: Female coaxial contact where the outer contact is female; the central contact(s) may be male or female.



#### **Key**

- 1 Centre contact
- 2 Outer contact

**Figure 1 — Coupling face of coaxial contact male or female**

<sup>2</sup> Published as ASD-STAN Technical Report at the date of publication of this European Standard. <http://www.asd-stan.org/>

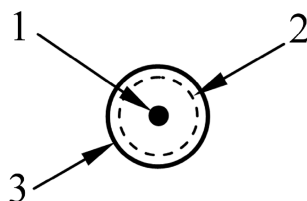
**prEN 3155-001:2023 (E)****3.6****triaxial contacts male or female**

assembly of three contacts arranged coaxially, enabling the connection of shielded triaxial or bifilar cables

Note 1 to entry: See Figure 2.

Note 2 to entry: Male triaxial contact where the outer contact is male; the central contact(s) may be male or female.

Note 3 to entry: Female triaxial contact where the outer contact is female; the central contact(s) may be male or female.

**Key**

- 1 Centre contact
- 2 Intermediate contact
- 3 Outer contact

**Figure 2 — Coupling face of triaxial contacts male or female**

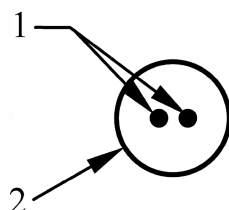
**3.7****bifilar contact (twinax)**

assembly of three contacts, two of which are parallel, the third being peripheral to these, enabling the connection of shielded bifilar cables

Note 1 to entry: See Figure 3.

Note 2 to entry: Male twinax contact where the outer contact is male; the central contacts may be male or female.

Note 3 to entry: Female twinax contact where the outer contact is female; the central contacts may be male or female.

**Key**

- 1 Twin parallel contacts
- 2 Outer contact

**Figure 3 — Coupling face of bifilar contact (twinax)**

**3.8****quadrax contact**

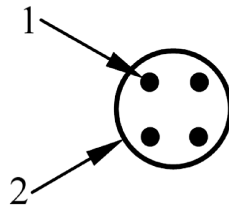
assembly of five contacts, four of which are parallel, the fifth being peripheral to these, enabling the connection of shielded quadrax cables



Note 1 to entry: See Figure 4.

Note 2 to entry: Male quadrax contact where the outer contact is male; the central contacts may be male or female.

Note 3 to entry: Female quadrax contact where the outer contact is female; the central contacts may be male or female.



#### Key

- 1 Four parallel contacts
- 2 Outer contact

**Figure 4 — Coupling face of quadrax contact**

## 4 Conditions of use

### 4.1 Types of contact

The contact specified shall be one of the following types:

- Type A: Removable contact for general application;
- Type B: Non-removable contact, See Note;
- Type C: Removable contact for thermocouple;
- Type D: Removable contact with screening feature (including the coaxial contacts, triaxial contacts and bifilar contacts). These have no characteristic impedance and are therefore not recommended for use at high frequency;
- Type E: Removable contact with screening feature, including coaxial, triaxial, bifilar and quadrax contacts. These have matched impedance.

NOTE Type B contacts are specified in the connector specifications.

### 4.2 Temperature classes

The contacts specified shall be from one of the classes specified below:

- class P: maximum operating temperature 125 °C;
- class R: maximum operating temperature 150 °C;
- class S: maximum operating temperature 200 °C;
- class T: maximum operating temperature 260 °C;
- class U: maximum operating temperature 350 °C.

The minimum operating temperature shall be –65 °C, unless otherwise specified in the product standard.

**prEN 3155-001:2023 (E)****4.3 Permissible wires and cables**

**4.3.1** The conductors which are acceptable in the crimping barrels and the coding by means of colour bands are specified in ISO 8843. The contact detail specification shall state the acceptable conductors for each size of contact.

**4.3.2** The type of cable, coaxial, triaxial, etc. shall be specified in the product standard.

**5 Design and description****5.1 Design****5.1.1 General**

This document covers male and female contacts of all types and technologies: cylindrical or rectangular entry contacts, flat contacts of the blade type, etc., stamped, formed or machined contacts.

Stamped and formed technology for body contact are not allowed.

**5.1.2 Mating end of female contact, cylindrical contacts**

Unless otherwise stated in the product standard, the mating end of female contacts from size 08 to 24, shall be of the restricted entry type and shall not permit the introduction of a gauge which has a diameter 0,13 mm greater than the maximum diameter of the male contact.

**5.1.3 Mating end of male contacts, cylindrical contacts**

Unless otherwise stated in the product standard, the mating end of the male contacts shall be approximately spherical. A flat is permitted at the end; its dimensions are given in Table 1.

[oSIST prEN 3155-001:2023](https://standards.iteh.ai/catalog/standards/sist/9356bc79-054b-4524-b392-e6ccccac8e03d/osist-pren-3155-001-2023)

<https://standards.iteh.ai/catalog/standards/sist/9356bc79-054b-4524-b392-e6ccccac8e03d/osist-pren-3155-001-2023>

**Table 1 — Gauge dimensions for male contact**

Contact size	Pin active area contact diameter mm	Diameter of flat at the mating end mm	Contact size	Pin active area Contact diameter mm	Diameter of flat at the mating end mm
28 <sup>a</sup>	0,394 0,368	0,19 max.	14	2,01 1,96	0,99 0,61
26 <sup>a</sup>	0,521 0,495	0,25 max.	12	2,41 2,36	1,57 1,19
24 <sup>a</sup>	0,65 0,62	0,30 max.	10	3,20 3,15	2,08 1,57
23	0,705 0,659	0,30 max.	8	3,63 3,58	2,18 1,68
22	0,775 0,750	0,35 max.	6	4,55 4,50	2,44 1,93
20	1,04 0,99	0,51 0,13	4	5,74 5,69	2,79 2,29
16	1,61 1,56	0,81 0,43	—	—	—

<sup>a</sup> Inner contact of type D or type E.

#### 5.1.4 Solder buckets

The buckets shall be designed so that during soft soldering operations, the liquid solder cannot run towards the end of the contact.

#### 5.1.5 Crimp barrels

Barrels shall be designed to accept the range of permissible conductors according to ISO 8843, EN 2083 and EN 4434.

The use of a reducing sleeve is not recommended; this remains the responsibility of the user and shall be subject to acceptance by the relevant OEMs.

#### 5.1.6 Terminations for wrapped connections

The terminations for wrapped connections shall comply with IEC 60352-1.

#### 5.1.7 Surface roughness (see EN ISO 21920-1)

The surface roughness after coating in the male contact zone shall not exceed  $R_a = 0,8 \mu\text{m}$  (or N6); in the other zones, it shall not exceed  $R_a = 1,6 \mu\text{m}$  (or N7).

#### 5.1.8 Engagement sequence

The engagement sequence for coaxial and quadrax contacts shall be outer contact, then inner contacts. Unless otherwise specified in the product standard, the engagement sequence for triaxial contacts shall be: outer contact, intermediate contact, centre contact.

**prEN 3155-001:2023 (E)****5.2 Materials**

The materials used in the manufacture of contacts shall be consistent with those indicated in the definition document. When dissimilar metals are in close contact, the electromotive force of the galvanic couple shall not exceed 0,25 V, see EN 3197.

**5.3 Metallic protective plating****5.3.1 General**

Except contact type C contact.

The protective coating may be either uniform over the entire surface of the contact, or it may be selective. The entire contact shall have a nickel undercoat and gold overcoat, with the exception of fittings or retaining features such as springs or spring clips which shall be made of a corrosion resisting material.

Three functional areas are specified with their minimum gold plating thickness requirements as follows:

- Crimping area;
- Transition area;
- Active area;
- See description in paragraph from 5.3.2 to 5.3.4.

**5.3.2 Crimping area**

Crimping area shall be protected as follows:

Inside barrel: EN ISO 27874 Ni 0,76  $\mu\text{m}$  min./Au(99,0) 0,1  $\mu\text{m}$  minimum in crimping area (from the extremity of the crimp barrel to the inspection hole).

Inside barrel: EN ISO 27874 Ni 0,76  $\mu\text{m}$  min./Au(99,0) 0,05  $\mu\text{m}$  minimum after inspection hole up to the bottom of the drilled barrel.

Outside barrel: EN ISO 27874 Ni 0,76  $\mu\text{m}$  min./Au(99,0) 0,1  $\mu\text{m}$  minimum in crimping area.

**5.3.3 Transition area**

Transition area are specified in 3.4 and Figure 7 and shall be protected as follows:

EN ISO 27874 Ni 1,25  $\mu\text{m}$  min./Au(99,0) 0,2  $\mu\text{m}$  minimum (or 0,1  $\mu\text{m}$  on each side of interfaces).

**5.3.4 Active area**

Active areas are specified in 3.3 and Figure 5, Figure 6 and shall be protected as follows:

EN ISO 27874 Ni 1,25  $\mu\text{m}$  min./Au(99,0) 0,8  $\mu\text{m}$  minimum.

As specified in the product standards, the gold plating on contact for the LSP areas shall be in accordance with the above requirements. In the other zones, the thickness of the protections is generally not specified, but the minimum shall be as per 5.3.1.1 and 5.3.1.2.

A change in colour of the gold plating is not a reason for rejection excepted in active areas [see Figure 5b), key 4, male active area] and X [see Figure 5c), key 6, female active area].

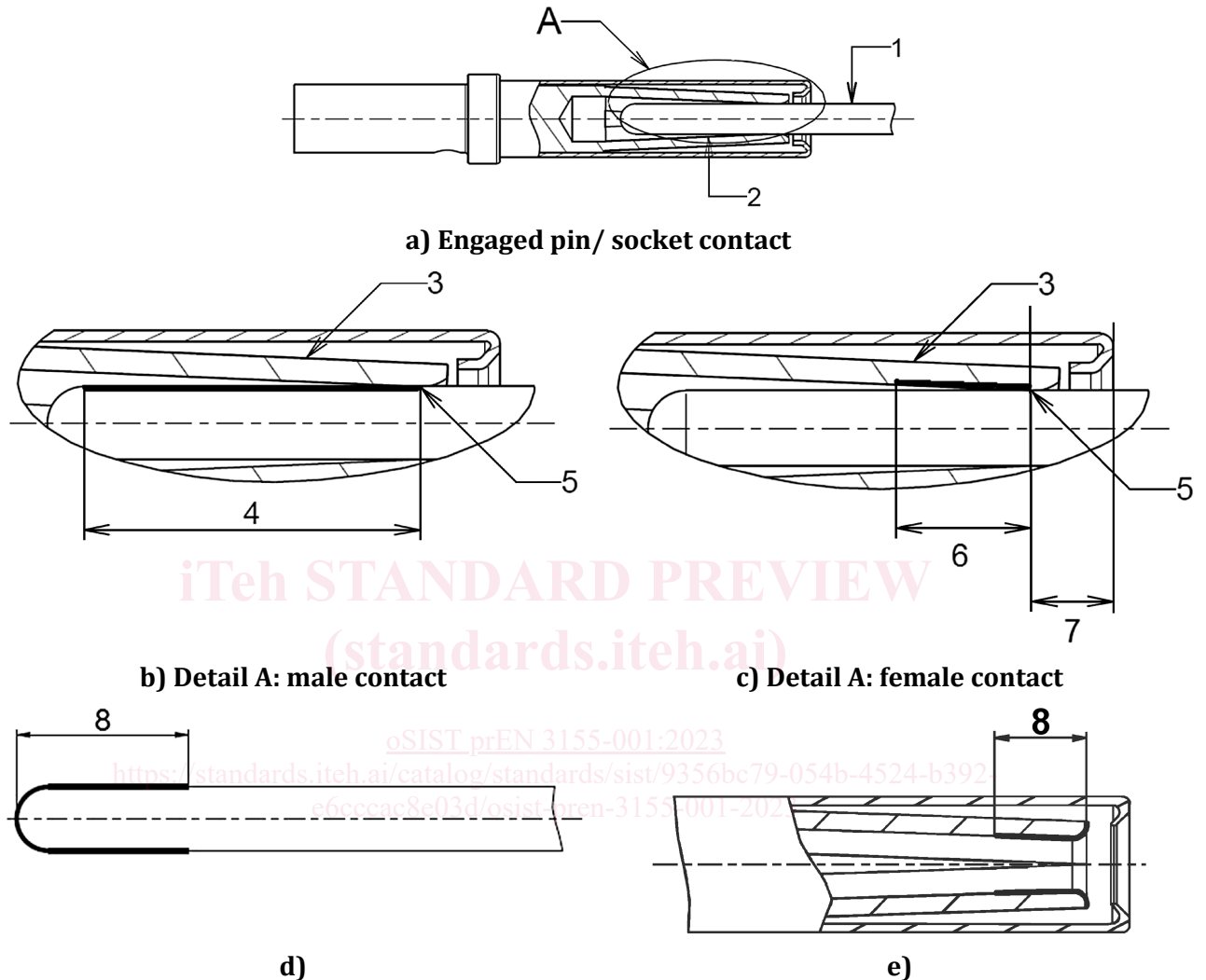
The gold plating thickness shall be sufficient to fulfil the performances required in this specification. However, and unless otherwise specified in the product standard, it shall never be lower than 0,8  $\mu\text{m}$ .

It is a supplier responsibility to define the right gold thickness to meet the performances tests required in this technical specification if the 0,8  $\mu\text{m}$  minimum are not sufficient to pass the expected requirements.

### 5.3.5 All other areas

All other areas shall be protected as follows:

EN ISO 27874 Ni 0,76  $\mu\text{m}$  min./Au(99,0) 0,1  $\mu\text{m}$  minimum.

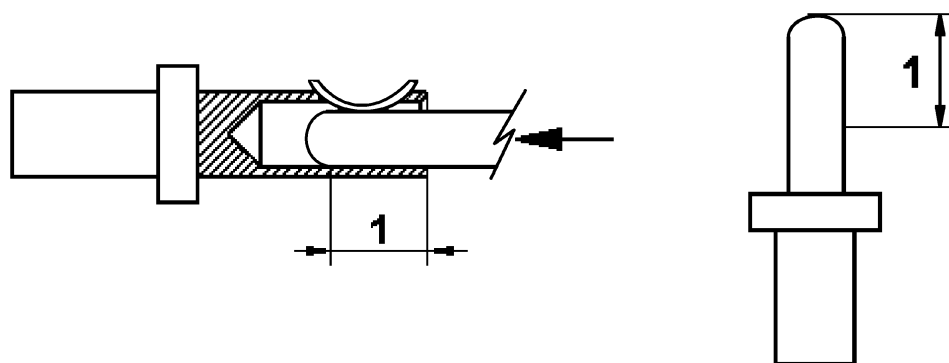


#### Key

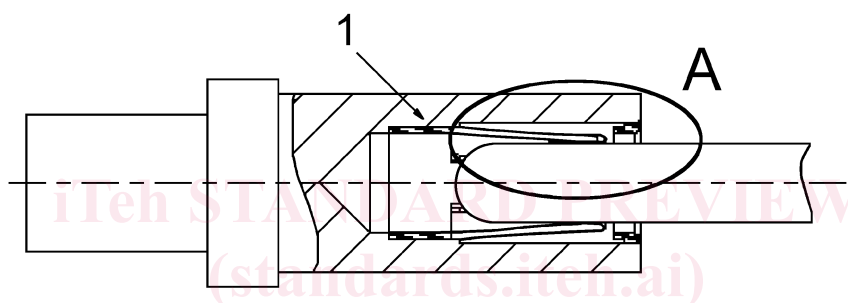
- 1 Male contact with maximum diameter
- 2 Pressure element
- 3 Engagement of contacts (given in connector technical specification)
- 4 Male active area (Y) see product standard
- 5 First point of electrical contact (Point at which a square ended minimum gauge pin of the same basic diameter as the mating contact first engages the female contact spring member)
- 6 Female active area (X = 1 mm length min. of gold plating)
- 7 Position of the first point and the maximum length of electrical contact (Point at which a square ended minimum gauge pin of the same basic diameter as the mating contact first engages the female contact spring member as specified in the contact product standard)
- 8 Length of Selective Protection "LSP" which shall include the length of the Key 4 (for male) or 6 (for female) and the radius/chamfer at the extremity

**Figure 5 — Contact with integrated pressure element**

prEN 3155-001:2023 (E)

**Key**

1 Contact active area X = contact active area Y

**Figure 6 — Female contact with separate pressure elements****Key**

1 Electrical contact transition area

NOTE See Figure 5 for Detail A.

**Figure 7 — Contact with separate pressure element**

For contact types D and E.

Inner contact and outer contact bodies according to Figure 5, Figure 6 and applicable standard products.

**6 Dimensions and mass**

The dimensions of the contacts and their mass are specified in the product standard.

**7 Operation**

The tools for connecting and installing the contacts are specified in the product standard.

**8 Tests**

Tests shall be in accordance with Table 2.

Table 2 — Qualification tests

EN 2591-	Test	Details																	
101	Visual examination	<p>Initial examination: before and after wiring</p> <p>Details to be examined and documented:</p> <ul style="list-style-type: none"> <li>— identification of materials in accordance with definition document;</li> <li>— identification;</li> <li>— aspect before and after wiring (No breaking strand at the rear of the barrel);</li> <li>— marking;</li> <li>— surface roughness in accordance with 5.1.7.</li> </ul> <p>For crimped terminations, after wiring, the crimp joint shall be examined (10 times magnification) for cracking exposing the base metal, except type C contact.</p> <p>Intermediate and final examination:</p> <p>Details to be examined and documented:</p> <ul style="list-style-type: none"> <li>— gold plating shall be present at electrical contact point and transition area.</li> </ul> <p>There shall be no crack, burr, peeling or blister.</p> <p>No breaking strand at the rear of the barrel.</p> <p>No displacement (rotation is accepted without disassembly) of the hood on body socket contact.</p>																	
102	Examination of dimensions and mass	In accordance with the product standard.																	
201	Contact resistance - low level — Types A, D and E contacts	<p>Applicable to type A contacts of size 20 and smaller and to types D and E contacts.</p> <p>Unless otherwise specified in the product standard, the contact resistance shall not exceed the maximum values given below (in mΩ).</p>																	
		<table border="1" data-bbox="919 1599 1422 1912"> <thead> <tr> <th rowspan="2">Contact size</th> <th colspan="2">Type A</th> </tr> <tr> <th>Initially</th> <th>After tests</th> </tr> </thead> <tbody> <tr> <td>≤ 24</td> <td>— a</td> <td>— a</td> </tr> <tr> <td>23</td> <td>8</td> <td>11</td> </tr> <tr> <td>22</td> <td>8</td> <td>11</td> </tr> <tr> <td>20</td> <td>5</td> <td>7</td> </tr> </tbody> </table> <p>a To be specified in the product standard.</p>	Contact size	Type A		Initially	After tests	≤ 24	— a	— a	23	8	11	22	8	11	20	5	7
Contact size	Type A																		
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