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EUROPEAN STANDARD

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NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2020

ICS 29.080.10; 29.240.20

Supersedes HD 474 S1:1986 and all of its amendments  
and corrigenda (if any)

English Version

**Ball and socket couplings of string insulator units - Dimensions  
(IEC 60120:2020)**Assemblages à rotule des éléments de chaînes d'isolateurs  
- Dimensions  
(IEC 60120:2020)To be completed  
(IEC 60120:2020)

This European Standard was approved by CENELEC on 2020-08-26. 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.

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

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

**EN IEC 60120:2020 (E)****European foreword**

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60305	NOTE	Harmonized as EN 60305
IEC 60383-1	NOTE	Harmonized as EN 60383-1
IEC 60433	NOTE	Harmonized as EN 60433
IEC 61325	NOTE	Harmonized as EN 61325

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-471	2007	International Electrotechnical Vocabulary - Part 471: Insulators	-	-
IEC 60372	-	Locking devices for ball and socket couplings of string insulator units Dimensions and tests	-	-

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IEC 60120

Edition 4.0 2020-07

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

Ball and socket couplings of string insulator units – Dimensions

Assemblages à rotule des éléments de chaînes d'isolateurs – Dimensions

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**BALL AND SOCKET COUPLINGS OF STRING  
INSULATOR UNITS – DIMENSIONS**

## 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.
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International Standard IEC 60120 has been prepared by IEC technical committee 36: Insulators.

This fourth edition cancels and replaces the third edition published in 1984. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Two new designated size of couplings, 36 and 40 were introduced;
- b) According to the results of the questionnaire(36/424/Q), the relevant content of the 28B W-clip was deleted;
- c) The  $Q_{min}$  column in Table C.1 was deleted;
- d) Annex A is informative, Annex B is normative, Annex C is informative.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
36/486/FDIS	36/492/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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## BALL AND SOCKET COUPLINGS OF STRING INSULATOR UNITS – DIMENSIONS

### 1 Scope

The object of this international standard is to define the dimensions of a series of standard ball and socket couplings using the standard locking devices (see IEC 60372) in order to permit the assembly of insulators or metal fittings supplied by different manufacturers.

This document applies to string insulator units of the cap and pin and long rod types and their associated metal fittings.

For the pin ball and the socket, dimensions apply to the finished product after any surface treatment.

Extreme positions of the pin ball in the socket are given in Annex A.

Typical examples of gauges for checking the dimensions of pin balls and sockets are given in Annex B.

NOTE Only the dimensions necessary for assembly are dealt with in this standard. Properties of material and working loads are not specified. The co-ordination of dimensions with strength classes is specified in IEC 60305 and IEC 60433.

### 2 Normative references

[SIST EN IEC 60120:2020](https://standards.iteh.ai/catalog/standards/sist/e315c71e-0352-4f3d-8563-6f8430167af/sist-en-iec-60120-2020)

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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.

IEC 60050-471:2007, *International Electrotechnical Vocabulary (IEV) – Part 471: Insulators*

IEC 60372, *Locking devices for ball and socket couplings of string insulator units – Dimensions and tests*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 60050-471, some of which are reproduced below for ease of reference, apply.

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

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

#### 3.1

##### **ball and socket coupling**

coupling consisting of a ball, a socket and a locking device, and providing flexibility

[SOURCE: IEC 60050-471:2007, 471-03-11]

### 3.2

#### **string insulator unit**

cap and pin insulator or long rod insulator of which end fitting are suitable for flexible attachment to other similar insulator units or to connecting accessories

[SOURCE: IEC 60050-471:2007, 471-03-08]

## 4 Designated size of coupling

This document includes eight standard ball and socket couplings designated by the nominal pin diameters in millimetres. Each designated size of coupling is defined by the dimensions of the pin ball, of the socket, of the hook-on "GO" gauge, of the lower part of the insulator and of the corresponding locking device.

NOTE Dimensions of twin-balled pins for coupling of two sockets are stated in Clause 13. Dimensions of the hole for the locking devices are stated in Clause 14 and Clause 15.

## 5 Pin ball

The pin ball shall conform to the dimensions specified in Clause 10. The main dimensions governing the shape of the pin ball are  $h_1$ ,  $d_2$ ,  $r_1$  and  $r_2$ . Dimension  $r_3$  is given for guidance because its accurate value may be obtained only by the drawing. In addition, the shank diameter  $d_1$ , must not exceed the specified values within a length equal to  $H_3$  of the corresponding worn hook-on "GO" gauge (see Clause 12).

## 6 Socket

The socket interior shall conform to the dimensions specified in Clause 11, which also specifies the thickness of the locking device.

The 16 mm designated size of coupling according to Clause 11 includes two alternative sockets. There is only one type of pin ball fit for it, but the corresponding locking device should be used. That is, the 16A socket should be matched with the 16A locking device, the 16B socket should be matched with the 16B locking device.

NOTE Sockets according to the clause mentioned are shown with flat bottoms. Sockets with rounded bottoms with radii of curvature not less than the dimensions  $r_2$  of the pin balls can also be used. In this case, the dimensions  $R_5$  have to be correspondingly decreased.

## 7 Hook-on "GO" gauge

The external dimensions of the socket have not been laid down. However, the socket shall permit acceptance of the hook-on "GO" gauge according to Clause 12.

## 8 Lower part of the insulator

The shape of the lower part of the insulator shall be such that assembly with the socket of maximum external dimensions according to Clause 7 will always be possible.

## 9 Locking device

The locking device, i. e. a split-pin or W-clip, shall be designed for locking the minimum-size pin ball in the maximum size socket. This requirement is fulfilled if the locking devices standardized in IEC 60372 are used.