

Appliance couplers for household and similar general purposes —

Part 2-4: Couplers dependent on appliance weight for engagement

ICS 29.120.20

National foreword

This British Standard is the UK implementation of EN 60320-2-4:2006+A1:2009. It is identical with IEC 60320-2-4:2005, incorporating amendment 1:2009. It supersedes BS EN 60320-2-4:2006 which is withdrawn.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** **A1**.

The UK participation in its preparation was entrusted by Technical Committee PEL/23, Electrical accessories, to Subcommittee PEL/23/3, Connectors for portable appliances.

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 31 May 2006

© BSI 2010

ISBN 978 0 580 64898 4

Amendments/corrigenda issued since publication

Date	Comments
28 February 2010	Implementation of IEC amendment 1:2009 with CENELEC endorsement A1:2009

**Appliance couplers for household and similar general purposes
Part 2-4: Couplers dependent on appliance weight for engagement
(IEC 60320-2-4:2005)**

Connecteurs pour usages domestiques
et usages généraux analogues
Partie 2-4: Connecteurs à connexion
par gravité
(CEI 60320-2-4:2005)

Gerätesteckvorrichtungen
für den Hausgebrauch
und ähnliche allgemeine Zwecke
Teil 2-4: Gerätesteckvorrichtungen
mit vom Gerätegewicht abhängiger
Kupplung
(IEC 60320-2-4:2005)

This European Standard was approved by CENELEC on 2005-12-01. 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, 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 23G/251/FDIS, future edition 1 of IEC 60320-2-4, prepared by SC 23G, Appliance couplers, of IEC TC 23, Electrical accessories, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60320-2-4 on 2005-12-01.

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) 2006-09-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2008-12-01

This European Standard makes reference to International Standards. Where the International Standard referred to has been endorsed as a European Standard or a home-grown European Standard exists, this European Standard shall be applied instead. Pertinent information can be found on the CENELEC web site.

This Part 2-4 is to be used in conjunction with EN 60320-1:2001, *Appliance couplers for household and similar general purposes, Part 1: General requirements*.

The clauses of this Part 2-4 supplement or modify the corresponding clauses of EN 60320-1. Where a subclause of Part 1 is not mentioned in this Part 2-4, that subclause of EN 60320-1 applies as far as is reasonable. Where this Part 2-4 states "addition", "modification" or "replacement", the relevant text of Part 1 is to be adapted accordingly.

Subclauses, figures or tables which are additional to those in Part 1 are numbered starting from 101. Additional annexes are lettered AA, BB, etc.

Endorsement notice

The text of the International Standard IEC 60320-2-4:2005 was approved by CENELEC as a European Standard without any modification.

Foreword to amendment A1

The text of document 23G/290/CDV, future amendment 1 to IEC 60320-2-4:2005, prepared by SC 23G, Appliance couplers, of IEC TC 23, Electrical accessories, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60320-2-4:2006 on 2009-11-01.

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) 2010-08-01
- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2012-11-01

Endorsement notice

The text of amendment 1:2009 to the International Standard IEC 60320-2-4:2005 was approved by CENELEC as an amendment to the European Standard without any modification.

CONTENTS

1	Scope	4
2	Normative references	4
3	Definitions	5
4	General requirements	6
5	General notes on tests	6
6	Standard ratings	7
7	Classification	7
8	Marking	8
9	Dimensions and compatibility	9
10	Protection against electric shock	10
11	Provision for earthing	10
12	Terminals and terminations	10
13	Construction	10
14	Moisture resistance	11
15	Insulation resistance and electric strength	12
16	Forces necessary to insert and withdraw the connector	13
17	Operation of contacts	14
18	Resistance to heating of appliance couplers for hot conditions or very hot conditions	14
19	Breaking capacity	14
20	Normal operation	15
21	Temperature rise	16
22	Cords and their connection	17
23	Mechanical strength	17
24	Resistance to heat and ageing	18
25	Screws, current-carrying parts and connections	18
26	Creepage distances, clearances and distances through insulation	19
27	Resistance of insulating material to heat, fire and tracking	23
28	Resistance to rusting	24
29	Electromagnetic compatibility (EMC) requirements	24
	Annex AA (normative) Proof tracking test	26
	Annex BB (normative) Needle flame test	27
	Annex CC (normative) Apparatus for the test of Subclause 14.2	28
	Annex ZA (normative) Normative references to international publications with their corresponding European publications	29
	Figure 101 – Examples of clearances	25
	Table 101 – Test voltages	13
	Table 102 – Rated impulse voltage	19
	Table 103 – Minimum clearances	20
	Table 104 – Minimum creepage distances for basic insulation	22

APPLIANCE COUPLERS FOR HOUSEHOLD AND SIMILAR GENERAL PURPOSES –

Part 2-4: Couplers dependent on appliance weight for engagement

1 Scope

This clause of IEC 60320-1 is replaced as follows:

This standard is applicable to two-pole appliance couplers for a.c. only, with or without earthing contact, with a rated voltage not exceeding 250 V and a rated current not exceeding 16 A, for household and similar general purposes and intended for incorporation or integration within electric appliances or other electric equipment of multi-part construction for 50 Hz or 60 Hz supply which depend on the weight of the appliance to ensure correct engagement.

NOTE 1 Appliance couplers complying with this standard are suitable for use in appliances which are used in an ambient temperature not normally exceeding 25 °C but occasionally reaching 35 °C. However the ambient temperature surrounding the appliance coupler may exceed these figures and is to be declared by the manufacturer. It is possible that the maximum working ambient temperature for the appliance inlet and for the connector may be different.

A1 NOTE 2 Appliance couplers dependent on appliance weight for engagement may be subject to spillage of liquid in normal use. They are classified according to whether protection against liquid spillage is provided, when installed in accordance with the manufacturer's installation instructions. **A1**

NOTE 3 If appliance inlets according to this standard are used with appliances or other equipment which may be subject to spillage of liquid affecting the appliance inlet when the functioning part of the appliance or equipment is seated on its power base, then protection against moisture is to be provided by the equipment.

NOTE 4 References to standard sheets within IEC 60320-1 do not apply to appliance couplers dependent on appliance weight for engagement.

NOTE 5 Special constructions may be required:

- in locations where special conditions may prevail, for example, in ships, vehicles and the like;
- in hazardous locations, for example, where explosions are likely to occur.

2 Normative references

This clause of IEC 60320-1 applies with the following additions:

A1 IEC/TR 60083, *Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60320-1, *Appliance couplers for household and similar general purposes – Part 1: General requirements* **A1**

IEC 60320-2-2, *Appliance couplers for household and similar general purposes – Part 2-2: Interconnection couplers for household and similar equipment*

IEC 60320-2-3, *Appliance couplers for household and similar general purposes – Part 2-3: Appliance couplers with a degree of protection higher than IPX0*

A1 IEC 60335-1, *Household and similar electrical appliances – Safety – Part 1: General requirements*

IEC 60664-1, *Insulation coordination for equipment within low voltage systems – Part 1: Principles, requirements and tests* **A1**

IEC 60695-11-5, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60695-11-10, *Fire hazard testing, – Part 11-10: Test flames, – 50 W horizontal and vertical flame test methods*

Ⓐ IEC 60730 (all parts), *Automatic electrical controls for household and similar use* Ⓐ

IEC 61032, *Protection of persons and equipment by enclosures – Probes for verification*

Ⓐ IEC 61058-1, *Switches for appliances – Part 1: General requirements* Ⓐ

ISO 9772, *Cellular plastics – Determination of horizontal burning characteristics of small specimens subjected to a small flame*

3 Definitions

This clause of IEC 60320-1 applies with the following additions:

3.101

weight-engaged coupler

coupler that relies on the weight of the functioning part of the appliance, in which it is incorporated or integrated, to ensure correct engagement

NOTE The weight-engaged coupler is used in an appliance which is in two parts, for supplying the part that performs the function of the appliance (the functioning part) from the power base which is connected to the power supply.

3.102

weight-engaged connector

component part of the weight-engaged coupler which carries the power connections, and engages with the corresponding appliance inlet.

3.103

weight-engaged appliance inlet

component part of a weight-engaged coupler intended for integration or incorporation in the functioning part of the appliance

3.104

rewirable weight-engaged connector

weight-engaged connector so constructed that the supply cord can be replaced

NOTE 1 The method of attachment of the supply cord, when installed in accordance with the manufacturer's installation instructions, is classified according to type X or type Y attachment requirements of the appliance standards.

NOTE 2 The requirements for type X or Type Y attachment methods are given in IEC 60335-1.

3.105

type X attachment

method of attachment of the supply cord such that it can easily be replaced

NOTE The supply cord may be specially prepared and only available from the manufacturer or its service agent. A specially prepared cord may include a part of the appliance.

1) A consolidated edition (1.2) exists containing IEC 60664-1:1992 and its Amendment 1 (2000) and Amendment 2 (2002).

3.106

type Y attachment

method of attachment of the supply cord such that any replacement is intended to be made by the manufacturer, its service agent or similar qualified person

3.107

type Z attachment

method of attachment of the supply cord such that it cannot be replaced without breaking or destroying the appliance

4 General requirements

This clause of IEC 60320-1 applies.

5 General notes on tests

This clause of IEC 60320-1 applies amended as follows:

5.2 Replacement:

The specimens are tested as delivered and under normal conditions of use, in accordance with the installation instructions of the manufacturer; they are tested with a.c. at 50 Hz or 60 Hz.

Non-rewirable weight-engaged connectors shall be submitted with a cord at least 1 m long.

- A1** For those clauses requiring the tests to be carried out on weight-engaged connectors and weight-engaged appliance inlets installed in accordance with the manufacturer's instructions, representative appliances or appliance parts shall be supplied. **A1**

5.5 Replacement:

For weight-engaged appliance inlets three specimens are required, to be subjected to the tests specified.

For weight-engaged connectors six specimens are required:

- set 1 of three specimens is subjected to the tests specified, with the exception of those of Clauses 14, 15, 16, 19, 20 and 21, and of 24.2;
- A1** – set 2 of three specimens is subjected to the tests of Clauses 14, 15, 16, 19, 20, 21 and 25.101 (including the repetition of Clause 16).

For weight-engaged connectors which are declared as providing protection against liquid spillage, three additional specimens are required, which are subjected to the test of 14.2. **A1**

For weight-engaged connectors of elastomeric or thermoplastic material, two additional specimens are required which are subjected to the tests of 24.2.1 or 24.2.2, whichever is applicable.

For non rewirable weight-engaged connectors with indicators, three additional specimens with one pole of the indicator disconnected are required for the tests of Clause 15.

6 Standard ratings

This clause of IEC 60320-1 is replaced as follows

6.1 The standard rated voltage is 250 V. Other rated voltages may be declared by the manufacturer provided they do not exceed 250 V.

6.2 The rated current shall be declared by the manufacturer. A coupler may have different current ratings dependent on use within specified applications. The rated current shall not in any case exceed 16 A.

Compliance with the requirements of 6.1 and 6.2 is checked by visual inspection of the marking or the manufacturer's instructions for installation and use.

7 Classification

This clause of IEC 60320-1 applies amended as follows:

7.1 *Replacement:*

7.1 Weight-engaged couplers are classified:

A1 **7.1.1** According to whether or not protection against liquid spillage is provided when the connector is installed according to the manufacturer's instructions. **A1**

7.1.2 According to type of equipment to be connected:

- appliance couplers for class I equipment;
- appliance couplers for class II equipment.

NOTE For a description of the classes, see IEC 61140

7.1.3 According to whether or not the coupler is intended to be engaged and disengaged with current flowing.

7.1.4 According to the maximum ambient working temperature of the coupler.

NOTE The maximum ambient working temperature of the connector and appliance inlet may be different.

7.1.5 According to the number of cycles to be performed in the test of Clause 20.
Preferred values are:

- 7.1.5.1** 100 000
- 7.1.5.2** 60 000
- 7.1.5.3** 30 000
- 7.1.5.4** 20 000
- 7.1.5.5** 10 000
- 7.1.5.6** 6 000

NOTE Different numbers of endurance cycles may be declared for different current ratings of the same coupler.

A1 A cycle is two strokes as defined in Clause 19; that is one connection followed by one disconnection.

7.1.6 The following information is recorded to cover required tests.

7.1.6.1 According to the specified minimum cross-sectional area of cord.

7.1.6.2 According to the maximum allowable terminal temperature rise.

7.1.6.3 According to the maximum allowable termination temperature rise.

7.1.6.4 According to the maximum allowable contact temperature rise.

7.1.6.5 According to the minimum appliance weight required for correct engagement.

7.1.6.6 According to the minimum base weight required for correct disengagement. **A1**

- A1** 7.1.6.7 According to maximum pin temperature at the base of the pins of the corresponding appliance inlet:
- appliance couplers for cold conditions (pin temperature not exceeding 70 °C);
 - appliance couplers for hot conditions (pin temperature not exceeding 120 °C);
 - appliance couplers for very hot conditions (pin temperature not exceeding 155 °C).

NOTE Temperature rise limits apply to both the inlet and connector, and can be specified separately if required. **A1**

7.2 This subclause of IEC 60320-1 does not apply.

NOTE The notes at the end of this subclause in IEC 60320-1 are also not applicable.

8 Marking

This clause of IEC 60320-1 applies amended as follows:

8.1 Replacement:

Weight-engaged connectors shall be marked with the name, trademark or identification mark of the maker or of the responsible vendor and a type reference.

8.2 Replacement:

Weight-engaged appliance inlets shall be marked with the name, trademark or identification mark of the maker or of the responsible vendor and a type reference.

8.5 This subclause of IEC 60320-1 does not apply.

8.6 Replacement:

In rewirable, non-reversible weight-engaged connectors, terminals shall be indicated as follows:

earthing terminal:	the symbol	
neutral terminal:	the letter	N

In non-rewirable, non-reversible weight-engaged connectors, no marking of contacts is necessary, but cores shall be connected as specified in 22.1.

Appliance inlets, other than those integrated or incorporated in an appliance or equipment, for use with connectors according to this subclause, shall have terminal markings to correspond with this subclause.

The marking symbol or letters shall not be placed on screws, removable washers or other removable parts.

NOTE The requirement concerning the marking of terminals and the connection of conductors has been introduced to take account of those countries who already require a polarized supply system with regard to a possible future introduction of a unified plug and socket-outlet system, which will be to a great extent a polarized system. It is recommended to take this requirement into account already now in countries which at present have no polarized plug and socket-outlet system.

Rewirable connectors shall be supplied with the following instructions:

- (1) a diagram illustrating the method of connection of the conductors, in particular the (excess) length of the earthing conductor and the operation of the cord anchorage;
- (2) a full-scale diagram showing the length of sleeving and insulation to be stripped back;
- (3) the sizes and types of cords suitable.
- (4) the type of attachment for connector and inlet.

NOTE 1 It is essential that the connection of the earthing conductor is shown in an instructive way, preferably with sketches.

NOTE 2 These instructions need not follow connectors supplied directly to an equipment manufacturer.

NOTE 3 In order to comply with the National Electrical Code of the United States the neutral terminal must be either white in colour, or labelled "white". One way of accomplishing this is to nickel plate the neutral terminal and to leave the other terminal(s) unplated.

Additional subclause:

8.101

- A1** Instructions for installation and use shall be supplied with weight-engaged appliance couplers. These instructions shall contain the information necessary to ensure compliance with this standard and shall contain the classifications declared by the manufacturer according to Clause 7.

For weight-engaged couplers intended to be exclusively delivered to the equipment manufacturer, the instruction sheet may be replaced by a leaflet, letter, or drawing, etc. It is not necessary for each coupler to be accompanied by such a document. **A1**

9 Dimensions and compatibility

This clause of IEC 60320-1 applies amended as follows:

9.1 Replacement:

Weight-engaged appliance couplers may take any form appropriate to their function, but shall comply with the requirements of this standard as far as applicable.

9.2 This subclause of IEC 60320-1 does not apply.

9.3 Replacement:

It shall not be possible to make improper connections between weight-engaged connectors and weight-engaged appliance inlets when installed in accordance with the manufacturer's instructions. In those constructions where the design is such that transient single-pole connections occur as the weight-engaged connector is placed into and withdrawn from the appliance inlet during normal use, then such transient single-pole connections are allowed.

Weight-engaged couplers shall not allow improper connections with plugs or portable socket outlets complying with IEC 60083.

Weight-engaged couplers shall not allow improper connections with connectors or appliance inlets complying with the standard sheets of IEC 60320-1, IEC 60320-2-2 or IEC 60320-2-3.

Compliance is checked by examination and reference to the manufacturer's declarations.

NOTE "Improper connections" include single-pole connection and other connections which do not comply with the requirements concerning protection against electric shock.

If in doubt, reference should be made to the appropriate appliance standards regarding the requirements for weight-engaged connectors and appliance inlets.

9.4 Replacement:

It shall not be possible to engage connectors for class II equipment with appliance inlets for class I equipment.

Compliance is checked by inspection.

9.5 Note 1 of this subclause is not applicable.

9.6 This subclause of IEC 60320-1 does not apply.