

Safety of household and similar electrical appliances —

Part 2-76: Particular requirements for electric fence energizers

The European Standard EN 60335-2-76:1999, with the incorporation of amendment A1:2001, has the status of a British Standard

ICS 65.040.10

National foreword

This British Standard is the official English language version of EN 60335-2-76:1999, including amendment A1:2001. It was derived by CENELEC from IEC 60335-2-76, including amendment 1:1997. It supersedes BS EN 61011:1993, BS EN 61011-1:1993, BS EN 61011-2:1993 and their amendments which will be withdrawn on 2006-08-01.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by tags [C] [C].

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] [A1]. 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 CPL/61/8, Farm Equipment, to Subcommittee CPL/61/8/1, Electric Fences, which has the responsibility to:

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Summary of pages

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Safety of household and similar electrical appliances — Part 2: Particular requirements for electric fence energizers

(includes amendment A1:2001)

(IEC 60335-2-76:1997 + A1:1999, modified)

Sécurité des appareils électrodomestiques et
analogues —
Partie 2: Règles particulières pour les
électrificateurs de clôture
inclut l'amendement A1:2001
(CEI 60335-2-76:1997 + A1:1999, modifiée)

Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke —
Teil 2: Besondere Anforderungen für
Elektrozaungeräte
(enthält Änderung A1:2001)
(IEC 60335-2-76:1997 + A1:1999, modifiziert)

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CENELEC

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

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Foreword

The text of document 61H/96/FDIS, future first edition of IEC 60335-2-76 prepared by SC 61H of the IEC Technical Committee 61, was submitted to the IEC-CENELEC parallel vote in December 1996. The results of the vote were discussed during the Fehraltorf meeting of CENELEC TC 61 in October 1997 when it was decided to submit a modified draft for EN 60335-2-76 to the formal vote (3MV).

This draft was circulated in February 1999 and was approved by CENELEC as EN 60335-2-76 on 1999-08-01.

The following dates are applicable:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2000-08-01
- date on which national standards conflicting with the EN have to be withdrawn (dow) 2006-08-01

This standard has to be used in conjunction with EN 60335-1, Safety of household and similar electrical appliances, Part 1: General requirements. It was established on the basis of the 1994 edition of that standard. Amendments and revisions of part 1 have also to be taken into account and the dates when such changes become applicable will be stated in the relevant amendment or revision of part 1.

This part 2 supplements or modifies the corresponding clauses of EN 60335-1, so as to convert it into the European Standard: Safety requirements for electric fence energizers.

When a particular subclause of part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. When this standard states "addition", "modification" or "replacement", the relevant text of part 1 is to be adapted accordingly.

Subclauses, figures and tables which are additional to those in part 1 are numbered starting with 101. Annexes which are additional to those in part 1 are lettered AA, BB, etc.

There are no special national conditions causing a deviation from this European Standard, other than those listed in annex ZA to EN 60335-1.

The following additional difference exists in some countries:

— 6.101: Only energy limited energizers are allowed (Austria, Denmark, France, Germany, Netherlands, Norway, and Switzerland).

NOTE - The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in small roman type.

Words in **bold** in the text are defined in clause 2. When a definition of part 1 concerns an adjective, the adjective and the associated noun are also in bold.

Foreword to amendment A1

The text of amendment 1:1999 to IEC 60335-2-76:1997, prepared by SC 61H of the IEC Technical Committee 61, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A1 to EN 60335-2-76 on 2000-08-01.

During the Brussels meeting of CENELEC TC 61 in October 2000, it was decided to modify the text of the amendment in view of the common modifications in the European Standard. As a consequence, amendment A1:2000 to EN 60335-2-76:1999 was withdrawn and a new draft submitted to the formal vote (2MV).

This draft was circulated in March 2001 and was approved by CENELEC as amendment A1 to EN 60335-2-76 on 2001-09-01.

The following dates are applicable:

- latest date by which the amendment has to be implemented at the national level by publication of an identical national standard or by endorsement (dop) 2002-09-01
- date on which national standards conflicting with the amendment have to be withdrawn (dow) 2006-08-01

EN 60335-2-76: replaces EN 60335:1992, EN 61011-1:1992, EN 61011-2:1992 and their amendments.

This amendment supplements or modifies the corresponding clauses of EN 60335-2-76:1999.

As a consequence of endorsing amendment 1:1999 to IEC 60335-2-76, the common modifications in EN 60335-2-76 are replaced by new common modifications.

There are no special national conditions causing a deviation from this amendment.

There are no national deviations from this amendment.

p NOTE In this document p is used in the margin to indicate instructions for preparing the printed version.

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SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – Part 2-76: Particular requirements for electric fence energizers

1 Scope

This clause of part 1 is replaced by:

This standard deals with the safety of **electric fence energizers**, the **rated voltage** of which is not more than 250 V and by means of which fence wires in agricultural, feral animal control and security fences may be electrified or monitored.

NOTE 1 – Examples of **electric fence energizers** coming within the scope of this standard are:

- **mains-operated energizers**;
- **battery-operated electric fence energizers suitable for connection to the mains**, as shown in figure 101;
- **electric fence energizers** operated by non-rechargeable batteries either incorporated or separate.

This standard does not in general take into account

- the use of appliances by young children or infirm persons without supervision;
- playing with appliances by young children.

NOTE 2 – Attention is drawn to the fact that

- for appliances intended to be used on board ships or aircraft, additional requirements may be necessary;
- for appliances intended to be used in tropical countries special requirements may be necessary;
- in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

NOTE 3 – This standard does not apply to

- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
- separate battery chargers (IEC 60335-2-29);
- electric fishing machines (IEC 60335-2-86);
- electric animal-stunning equipment (IEC 60335-2-87);
- appliances for medical purposes (IEC 60601).

2 Definitions

This clause of part 1 is applicable except as follows.

2.2.1 Addition:

For **type D energizers**, the **rated voltage** of the **energizer** is the **rated voltage for battery supply**.

2.2.6 Addition:

For **battery-operated electric fence energizers not for connection to the mains**, it is the average input current assigned to the **energizer** by the manufacturer.

2.2.9 Replacement:

normal operation: Operation of the appliance under the following conditions: the **electric fence energizer** is operated as in normal use when connected to the supply, with no load connected to the output terminals.

 Text deleted 

2.9.3 Addition:

It also includes terminals for the connection of the battery and other metal parts in a battery compartment which become accessible when replacing batteries even with the aid of a **tool**.

2.9.4 Replacement:

live part: Conductive part which may cause an electric shock.

2.101 electric fence energizer: Appliance which is intended to deliver periodically voltage impulses to a **fence** connected to it.

NOTE – **Electric fence energizers** are hereinafter also referred to as **energizers**.

2.102 mains-operated energizer: Energizer designed for direct connection to the mains.

2.103 battery-operated energizer suitable for connection to the mains: Energizer

- operated by batteries and having, or being designed for connection to, facilities for charging these batteries from the mains, or
- designed for operation from the mains and from batteries.

2.104 type A energizer: Battery-operated energizer suitable for connection to the mains consisting of an impulse generating circuit, a battery charging circuit and a battery, the impulse generating circuit being connected to the mains or the battery when the **energizer** is in operation.

NOTE – **Type A energizers** are shown schematically in figure 101.

2.105 type B energizer: Battery-operated energizer suitable for connection to the mains consisting of an impulse generating circuit, a battery charging circuit and a battery, the impulse generating circuit being connected to the battery and disconnected from the battery charging circuit and the mains when the **energizer** is in operation. For recharging the battery the impulse generating circuit is disconnected and rendered inoperable.

NOTE – **Type B energizers** are shown schematically in figure 101.

2.106 type C energizer: Battery-operated energizer suitable for connection to the mains consisting of an impulse generating circuit and a battery, the impulse generating circuit being connected to the mains or the battery when the **energizer** is in operation, and where it is necessary to remove the battery to recharge it using a separate **battery charger** or, in the case of a non-rechargeable battery, to replace it with a new battery.

NOTE – **Type C energizers** are shown schematically in figure 101.

2.107 type D energizer: Battery-operated energizer suitable for connection to the mains consisting of an impulse generating circuit and a battery, the impulse generating circuit being connected to the battery when the **energizer** is in operation and the **energizer** or the battery being connected to a separate **battery charger** for recharging the battery.

NOTE – **Type D energizers** are shown schematically in figure 101.

2.108 battery-operated energizer: **Energizer** deriving its energy solely from batteries or other sources of energy and not designed for connection to the mains.

2.109 battery charger: Appliance to be connected to the mains and intended for charging one or more batteries.

2.110 fence: Barrier for animals or for security purposes, comprising one or more conductors, such as metal wires, rods or rails.

2.111 fence circuit: All conductive parts or components within an **energizer**, which are connected or intended to be connected galvanically to the output terminals.

2.112 earth electrode: Metal structure that is driven into the ground near an **energizer** and connected electrically to the output earth terminal of the **energizer**, and that is independent of other earthing arrangements.

2.113 prospective peak voltage: Peak output voltage of the impulse generator specified in clause 14 that would be obtained with the **energizer** not connected to the test circuit.

2.114 rated voltage for battery supply: Voltage for battery supply, for **types A, B, C and D energizers**, assigned to the **energizer** by the manufacturer.

2.115 rated voltage range for battery supply: Voltage range for battery supply, for **types A, B, C and D energizers**, assigned to the **energizer** by the manufacturer, expressed by its lower and upper limits.

2.116 impulse duration: Duration of that part of the impulse which contains 95 % of the overall energy and is the shortest interval of integration of $P(t)$ that gives 95 % of the integration of $P(t)$ over the total impulse.

NOTE – $I(t)$ is the impulse current as a function of time.

2.117 output current: RMS value of the output current per impulse calculated over the **impulse duration**.

 Text deleted 

3 General requirement

This clause of part 1 is applicable.

4 General conditions for the tests

This clause of part 1 is applicable except as follows.

4.2 Modification:

Replace the test specification by the following:

*The tests are made on two **energizers** as delivered, one being subjected to all the tests with the exception of that of clause 18, and the other to the tests of clause 5 and clause 18. However, the tests of clauses 22 to 28 may be made on separate samples.*

*For **types A and C energizers**, an additional sample is required for the test of clause 18.*

Addition:

NOTE – Where **electronic circuits**, **electronic components** or other devices are normally encapsulated, specially prepared samples may be needed for the tests of 19.11 and 19.101.

4.3 Addition:

*If any **electronic component** has been damaged during the tests of clause 14, the tests of clause 19 are made twice, once before and once after the damaged **electronic components** have been replaced by new **electronic components**.*

4.5 Addition:

*The **energizer** is mounted in a normal position such that the deviation from the position for which it is designed does not exceed 15°. However, if the **energizer** is provided with means for adjustment to the normal position, such as a spirit level, the **energizer** shall be adjusted to within $\pm 2^\circ$ of the normal position.*

*The earthing terminal of the **fence circuit** is connected to earth. However, if there is no indication as to which of the output terminals is to be connected to earth, the terminal which gives the most unfavourable result is earthed.*

4.8.1 Addition:

*For **types A, B, C and D energizers** where the terminals for the connection of the battery have no indication of polarity, application of the more unfavourable polarity of the voltage source replacing the battery.*

*For **battery-operated energizers** where the supply terminals for the connection of the battery have no indication of polarity, application of the more unfavourable polarity.*

*For **mains-operated energizers** and **battery-operated energizers suitable for connection to the mains**, the reference source impedance of the mains supply shall be $0,4 \Omega + j0,25 \Omega$.*

4.101 *Unless otherwise specified, all **energizers** are tested as **motor-operated appliances**.*

5 Output characteristics

5.101 The **energizer** output characteristics shall be such that

- the impulse repetition rate shall not exceed 1 Hz;
- the **impulse duration** of the impulse in the 500 Ω component of the **standard load** shall not exceed 10 ms;
- **Text deleted** the energy/impulse in the 500 Ω components of the **standard load** shall not exceed 5 J;

Text deleted

*Compliance is checked by measurement when the **energizer** is supplied with the voltage in 11.5, the **energizer** being operated under conditions of **normal operation** but with the **standard load** connected to its output terminals. When measuring the impulse repetition rate the **standard load** is not connected.*

The measurements are made using a measuring arrangement with an input impedance consisting of a non-inductive resistance of not less than 1 M Ω in parallel with a capacitance of not more than 100 pF.

5.102 If the **energizer** is provided with more than one **fence circuit**, the output characteristics shall be within the limits specified in 5.101 for any possible connection of the **fence circuits**.

The impulses for the individual sets of output terminals shall be synchronized and

- the **impulse duration** shall not exceed the value specified in 5.101,
- the impulse repetition rate shall not exceed the value specified in 5.101,

for any possible combination of individual impulses.

Compliance is checked by the measurements specified in 5.101.

5.103 For **types A** and **B energizers** which have terminals for the connection of the battery, the no-load d.c. output voltage shall not exceed 42,4 V.

*Compliance is checked by measuring the no-load d.c. output voltage appearing at the terminals for the connection of the battery when the **energizer** is connected for mains supply and is supplied at **rated voltage**.*

5.104 The peak value of the output voltage, U_0 , shall be measured and recorded to enable the tests and measurements of 14.102, 14.103, 14.104, 16.3 and 29.1 to be carried out.

Compliance is checked by the following test.

*The peak value of the output voltage is measured, using the measuring arrangement described in 5.101 with the **energizer** supplied with the voltage in 11.5 under conditions of **normal operation**, but with a load connected to the output terminals consisting of a capacitor having a capacitance which can be varied between 0 nF and 200 nF in steps of approximately 10 nF.*

6 Classification

This clause of part 1 is applicable except as follows.

6.1 Replacement:

Mains-operated energizers and battery-operated energizers suitable for connection to the mains shall be class II with respect to protection against electric shock.

Compliance is checked by inspection and by the relevant tests.

6.2 Replacement:

Energizers shall be of at least IPX4 construction.

Compliance is checked by inspection and by the relevant tests.

☐ Text deleted ☐

7 Marking and instructions

This clause of part 1 is applicable except as follows.

7.1 Addition:

Energizers shall be marked with the words "Read full instructions before use".

Types A, B and C energizers shall be marked with the **rated voltage for battery supply** or **rated voltage range for battery supply**, in volts.

Battery-operated energizers shall be marked with the substance of the following "WARNING – Do not connect to mains-operated equipment".

☐☐ ☐ **Energizers** ☐ which are marked with a maximum energy/impulse exceeding 5 J shall also be marked with the corresponding load resistance at which maximum energy/impulse is obtained. ☐☐

7.6 Addition:



.....output (**Fence**)



.....output (**Earth**)

The symbols for output (**Fence**) and output (**Earth**) shall be in accordance with symbols 5036 and 5017 of IEC 60417 respectively.