
Varnost močnostnih transformatorjev, napajalnikov, reaktorjev in podobnih izdelkov – 2-1. del: Posebne zahteve za ločilne transformatorje in napajalnike z ločilnimi transformatorji za splošno rabo

Safety of power transformers, power supplies, reactors and similar products – Part 2-1: Particular requirements for separating transformers and power supplies incorporating separating transformers for general applications

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96/225/CDV

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SIST EN 61558-2-1:2007

Title : IEC 61558-2-1 Ed.2: Safety of power transformers, power supplies, reactors and similar products Part 2-1 Particular requirements for separating transformers and power supplies incorporating separating transformers for general applications

Introductory note

This part 2-1 of IEC 61558 applies to stationary and portable, single-phase and polyphase, air-cooled (natural or forced) independent and associated separating transformers, having a rated supply voltage not exceeding 1000 V a.c., a rated supply and internal operating frequency not exceeding 500 Hz.

Table with 2 columns: ATTENTION CDV soumis en parallèle au vote (CEI) et à l'enquête (CENELEC), ATTENTION Parallel IEC CDV/CENELEC Enquiry

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**SAFETY OF POWER TRANSFORMERS, POWER SUPPLIES,
REACTORS AND SIMILAR PRODUCTS**

**Part 2-1: Particular requirements for separating transformers and power
supplies incorporating separating transformers
for general applications**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 61558-2-1 has been prepared by technical committee 96: Small power transformers, reactors and power supply units and similar products.

Future standards in this series will carry the new title as cited above. Titles of existing standards in this series will be updated at the time of the next revision.

It has the status of a group safety publication in accordance with IEC Guide 104: The preparation of safety publications and the use of basic safety publications and group safety publications (1997).

The text of this standard is based on the following documents:

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

This part 2 is intended to be used in conjunction with the latest Edition of IEC 60558-1 and its amendments. It is based on the second edition of that standard.

This part 2 supplements or modifies the corresponding clauses in IEC 61558-1, so as to convert that publication into the IEC standard: *Particular requirements* for separating transformers and power supplies incorporating separating transformers for general applications

This standard replace Edition 1

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

In this standard, the following print types are used:

- requirements proper: in roman type;
- *test specifications: in italic type;*
- explanatory matter: in smaller roman type.

In the text of the standard the words in **bold** are defined in clause 3.

Subclauses which are additional to those in part 1 are numbered starting from 101; supplementary annexes are entitled AA, BB, etc.

The committee has decided that this publication remains valid until 2009-12.

At this date, in accordance with the committee's decision, the publication will be

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY OF POWER TRANSFORMERS, POWER SUPPLIES,
REACTORS AND SIMILAR PRODUCTS****Part 2-1: Particular requirements for separating transformers and power
supplies incorporating separating transformers
for general applications****1. Scope***Replacement:*

This International standard deals with safety aspects such as electrical, thermal and mechanical safety of separating transformers and power supplies incorporating separating transformers.

This standard is applicable to transformers and power supplies incorporating electronic circuits. This standard is not applicable to external circuits and their components intended to be connected to the input and output terminals or socket-outlets of the transformers and power supplies.

This part 2-1 of IEC 61558 applies to **stationary** or **portable**, single-phase or polyphase, air-cooled (natural or forced) **independent** and **associated separating transformers and power supplies**, having a **rated supply voltage** not exceeding 1000 V a.c., a **rated supply and internal operating frequency** not exceeding 500 Hz, and a **rated output** not exceeding:

- 1 kVA for single-phase transformers;
- 5 kVA for polyphase transformers.

This standard is also applicable to **separating transformers** without limitation of the **rated output** subject to an agreement between the purchaser and the supplier.

This standard is applicable to **dry-type transformers**. The windings may be encapsulated or non-encapsulated.

The **no-load output voltage** or the **rated output voltage** does not exceed 1000 V a.c. or 1415 V ripple-free d.c.

For **independent separating transformers** the **no-load output voltage** is not less than 50 V a.c. or 120 V ripple free d.c.

Transformers covered by this standard are used only in applications where double or reinforced insulation between circuits is not required by the installation rules or by the appliance specification.

NOTE 1 – Normally, the transformers are intended to be **associated** with equipment to provide voltages different from the supply voltage for the functional requirement of the equipment. The protection against electric shock may be provided (or completed) by other features of the equipment, such as the **body**. Parts of **output circuits** may be connected to the **input circuit** or to protective earth.

This standard is applicable to transformers associated with specific equipment, to the extent decided upon by the relevant IEC technical committees.

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This standard is applicable to transformers associated with specific equipment, to the extent decided upon by the relevant IEC technical committees.

2 Normative references

This clause of part 1 is applicable.

3 Definitions

This clause of part 1 is applicable.

4 General requirements

This clause of part 1 is applicable.

5 General notes on tests

This clause of part 1 is applicable.

6 Ratings

Replacement:

6.1 The **rated output** shall not exceed 1.000 V a.c. or 1415 V ripple-free d.c. and for independent separating transformers shall exceed 50 V a.c. or 120 V d.c.

6.2 The **rated output** shall not exceed 1 kVA for single-phase transformers, 5 kVA for poly phase transformers except for **separating transformers** subject to an agreement between the purchaser and the supplier.

6.3 The **rated supply and internal operating frequency** shall not exceed 500 Hz.

6.4 The **rated supply voltage** shall not exceed 1.000 V a.c.

Compliance with the requirements of 6.1, 6.2, 6.3 and 6.4 is checked by inspection of the marking.

7 Classification

This clause of part 1 is applicable.

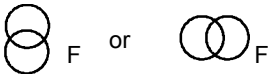





8 Marking and other information

This clause of part 1 is applicable except as follows:

8.1 h) *Replacement:*

The transformers shall be marked with one of the graphical symbols shown in 8.11;

8.11 *Addition:*

Graphical symbol	Title and description	Reference number in IEC 60417
 or 	Fail-safe separating transformer	Awaiting – To be introduced by Secretary
 or 	Non-short-circuit-proof separating transformer	5223
 or 	Short-circuit-proof separating transformer (inherently or non-inherently)	5220

9 Protection against electric shock

This clause of part 1 is applicable.

10 Change of input voltage setting

This clause of part 1 is applicable.

11 Output voltage and output current under load

This clause of part 1 is applicable.

12 No-load output voltage

This clause of part 1 is applicable except as follows:

Addition:

12.101 The no-load output voltage shall not exceed 1.000 V a.c. or 1415 V ripple-free d.c. ... This limitation applies even when independent output windings not intended for interconnection, are connected in series.

12.102 The difference between the **no-load output voltage** and the **output voltage** under load shall not be excessive.

The difference between the **no-load output voltage** measured in this clause and the output voltage under load measured during the test of clause 11, expressed as a percentage of the latter voltage, shall not exceed the values shown in table 101.

NOTE –The ratio is defined as follows:

$$\frac{U_{\text{no-load}} - U_{\text{load}}}{U_{\text{load}}} \times 100 (\%)$$

Table 101 – Output voltage deviation

Type of transformer Rated output VA	Ratio between no-load output voltage and output voltage under load %
Inherently short-circuit-proof transformers:	
– up to and including 63 VA	100
– over 63 VA up to and including 630 VA	50
– over 630 VA	20
Other transformers:	
– up to and including 10 VA	100
– over 10 VA up to and including 25 VA	50
– over 25 VA up to and including 63 VA	20
– over 63 VA up to and including 250 VA	15
– over 250 VA up to and including 630 VA	10
– over 630 VA	5

Compliance with the requirements of 12.101 and 12.102 is checked by measuring **the no-load output voltage** when at ambient temperature, the transformer is connected to the **rated supply voltage** at **rated supply frequency**.

13 Short-circuit voltage

This clause of part 1 is applicable.

14 Heating

This clause of part 1 is applicable.

15 Short-circuit and overload protection

This clause of part 1 is applicable.

16 Mechanical strength

This clause of part 1 is applicable.

17 Protection against harmful ingress of dust, solid objects and moisture

This clause of part 1 is applicable.

18 Insulation resistance and dielectric strength and leakage current

19 Construction

This clause of part 1 is applicable except as follows:

Replace 19.1 of part 1 by the following:

19.1 The **input** and **output circuits** shall be electrically separated from each other, and the construction shall be such that there is no possibility of any connection between these circuits, either directly or indirectly, via other metals parts, except by deliberate action.

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Compliance is checked by inspection and measurements, taking clauses 18 and 26 into consideration.

19.1.1 The insulation between **input** and **output winding(s)** shall consist of at least **basic insulation**.

In addition, the following applies:

- for **class I transformers**, the insulation between the **input windings** and the **body**, and between the **output windings** and the **body**, shall consist of **basic insulation**;
- for **class II transformers**, the insulation between the **input windings** and the **body**, and between the **output windings** and the **body**, shall consist of double or reinforced insulation.

19.1.2 For transformers with intermediate conductive part (e.g. the iron core) not connected to the **body** and located between the **input** and **output windings**, the insulation between the intermediate conductive part and the **input windings** or between the intermediate conductive part and the **output windings** shall consist of at least **basic insulation**.

NOTE – An intermediate conductive part not separated from the input or output windings or the body by at least basic insulation, is considered to be connected to the relevant part(s).

In addition, the following applies:

- for **class I transformers**, the insulation between the input and **output windings** via the intermediate conductive part shall consist of **basic insulation**;