# SLOVENSKI STANDARD

# SIST EN 62310-1:2006

marec 2006

**Sistemi s statičnim prenosom (STS) – 1. del: Splošne in varnostne zahteve (IEC 62310-1:2005)**

Static transfer systems (STS) - Part 1: General and safety requirements (IEC 62310-1:2005)



ICS 29.240.99

Referenčna številka
SIST EN 62310-1:2006(en)

EUROPEAN STANDARD **EN 62310-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM April 2005

ICS 29.240.99

English version

# Static transfer systems (STS)
# Part 1: General and safety requirements
(IEC 62310-1:2005)

Systèmes de transfert statique (STS)
Partie 1: Exigences générales et règles de sécurité
(CEI 62310-1:2005)

Statische Transferschalter (STS)
Teil 1: Allgemeine und Sicherheitsanforderungen
(IEC 62310-1:2005)



This European Standard was approved by CENELEC on 2005-03-01. 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**



Ref. No. EN 62310-1:2005 E

## Foreword

The text of document 22H/66/FDIS, future edition 1 of IEC 62310-1, prepared by SC 22H, Uninterruptible power systems (UPS), of IEC TC 22, Power electronic systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62310-1 on 2005-03-01.

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) | 2005-12-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2008-03-01 |

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 62310-1:2005 was approved by CENELEC as a European Standard without any modification.



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



| | | |
|---|---|---|
| IEC 60947-6-1 | NOTE | Harmonized as EN 60947-6-1:1991 (not modified). |
| IEC 61032 | NOTE | Harmonized as EN 61032:1998 (not modified). |
| IEC 61140 | NOTE | Harmonized as EN 61140:2002 (not modified). |
| IEC 62040 | NOTE | Harmonized in EN 62040 series (modified). |
| IEC 62040-1-1 | NOTE | Harmonized as EN 62040-1-1:2003 (not modified). |
| IEC 62040-1-2 | NOTE | Harmonized as EN 62040-1-2:2003 (not modified). |
| IEC 62040-3 | NOTE | Harmonized as EN 62040-3:2001 (modified). |

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## Annex ZA
(normative)

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

The following referenced documents are indispensable for the application 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 Where an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60060-1<br>+ corr. March | 1989<br>1990 | High-voltage test techniques<br>Part 1: General definitions and test requirements | HD 588.1 S1 | 1991 |
| IEC 60073 | - [1)] | Basic and safety principles for man-machine interface, marking and identification - Coding principles for indicators and actuators | EN 60073 | 2002 [2)] |
| IEC/TR 60083 | - [1)] | Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC | - | - |
| IEC 60085 | - [1)] | Electrical insulation - Thermal classification | EN 60085 | 2004 [2)] |
| IEC 60112 | - [1)] | Method for the determination of the proof and the comparative tracking indices of solid insulating materials | EN 60112 | 2003 [2)] |
| IEC 60364-5-54 | - [1)] | Electrical installations of buildings<br>Part 5-54: Selection and erection of electrical equipment - Earthing arrangements, protective conductors and protective bonding conductors | - | - |
| IEC 60364-7-707 | - [1)] | Part 7: Requirements for special installations or locations -- Section 707: Earthing requirements for the installations of data processing equipment | - | - |
| IEC 60417 | database | Graphical symbols for use on equipment | - | - |
| IEC 60529 | 1989 | Degrees of protection provided by enclosures (IP Code) | EN 60529<br>+ corr. May | 1991<br>1993 |



1) Undated reference.

2) Valid edition at date of issue.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60664-1<br>+ A1<br>+ A2 | 1992<br>2000<br>2002 | Insulation coordination for equipment within low-voltage systems<br>Part 1: Principles, requirements and tests | EN 60664-1 | 2003 |
| IEC 60664-3 | 2003 | Part 3: Use of coating, potting or moulding for protection against pollution | EN 60664-3 | 2003 |
| IEC 60730-1 (mod)<br><br>A1 (mod) | 1999<br><br>2003 | Automatic electrical controls for household and similar use<br>Part 1: General requirements | EN 60730-1<br>A11<br>A12<br>A1<br>A13<br>A14 | 2000<br>2002<br>2003<br>2004<br>2004<br>2005 |
| IEC/TR 60755 | - [1] | General requirements for residual current operated protective devices | - | - |
| IEC 60950-1 (mod) | 2001 | Information technology equipment - Safety<br>Part 1: General requirements | EN 60950-1 | 2001 |
| IEC 61008-1 (mod) | - [1] | Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's)<br>Part 1: General rules | EN 61008-1 | 2004 [2] |
| IEC 61009-1 (mod) | - [1] | Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's)<br>Part 1: General rules | EN 61009-1 | 2004 [2] |
| IEC 62103 | 2003 | Electronic equipment for use in power installations | - | - |
| IEC 62310-2 | - [3] | Static Transfer Systems (STS)<br>Part 2: Electromagnetic Compatibility (EMC) requirements | - | - |
| ISO 3864-1 | 2002 | Graphical symbols - Safety colours and safety signs<br>Part 1: Design principles for safety signs in workplaces and public areas | - | - |
| ISO 7000 | 2004 | Graphical symbols for use on equipment - Index and synopsis | - | - |



3) To be published.

# NORME INTERNATIONALE

# INTERNATIONAL STANDARD

**CEI**
**IEC**
**62310-1**

Première édition
First edition
2005-03

## Systèmes de transfert statique (STS) –

## Partie 1:
## Exigences générales et règles de sécurité



## Static transfer systems (STS) –

## Part 1:
## General and safety requirements





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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE XA

*Pour prix, voir catalogue en vigueur*
*For price, see current catalogue*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

# STATIC TRANSFER SYSTEMS (STS) –

# Part 1: General and safety requirements

## 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 62310-1 has been prepared by subcommittee 22H: Uninterruptible Power Systems (UPS), of IEC technical committee 22: Power electronic systems and equipment.

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

| FDIS | Report on voting |
|---|---|
| 22H/66/FDIS | 22H/67/RVD |

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

The French version of this standard has not been voted upon.

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

IEC 62310 consists of the following parts, under the general title *Static transfer systems (STS):*

Part 1: General and safety requirements

Part 2: Electromagnetic Compatibility (EMC) requirements[1]

Part 3: Method of specifying the performance and test requirements[2]

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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



1 To be published.

2 Under consideration.

# STATIC TRANSFER SYSTEMS (STS) –

# Part 1: General and safety requirements

## 1 Scope

IEC 62310 consists of three parts and applies to free standing a.c. static transfer systems (STS) intended to ensure the continuity of power to load by automatically or manually controlled transfer, with or without interruption, from two or several a.c. independent sources.

This part of IEC 62310 concerns general and safety requirements. See future IEC 62310-2 for electromagnetic compatibility (EMC) and futureIEC 62310-3 for the method of specifying performance and test requirements.

This part of IEC 62310 is intended to reduce the risk of fire, electric shock, or injury to persons from installed equipment subject to installing, operating, and maintaining the equipment in the manner prescribed by the manufacturer.

This part of IEC 62310 includes requirements for the switching elements, their control and protective elements, where applicable. This part of IEC 62310 also includes information for the overall integration of the STS and its accessories into the a.c. power distribution system.



Components or devices necessary for the operation/control/protection/isolation (e.g. circuit-breakers, fuses, transformers, etc.) of a STS should comply with the requirements of the relevant IEC standards and are not covered by this part of IEC 62310.



This standard applies to systems up to 1 000 V (a.c. value) which are intended to be used in single phase or phase-phase or three phase applications.

This standard does not apply to:

– devices for d.c. source switching;

– static transfer system using only electromechanical switching devices intended to be used in emergency power systems with interruption of the supply to the load during transfer. This equipment is covered by IEC 60947-6-1;

– the automatic switching devices integrated into UPS covered by IEC 62040 series.

NOTE For STS intended to be used in vehicles, onboard ships or aircraft, in tropical countries, for emergency power systems (such as those used for health care facilities, fire fighting, emergency rescue, etc.), or on elevations greater than 1 000 m, different requirements may be necessary.

## 2 Normative references

The following referenced documents are indispensable for the application 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 60060-1:1989, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60073, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indicators and actuators*

IEC 60083, *Plugs and socket-outlets for domestic and similar general use, standardised in member countries of IEC*

IEC 60085, *Electrical insulation – Thermal classification*

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

IEC 60364-5-54, *Electrical installations of buildings – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements, protective conductors and protective bonding conductors*

IEC 60364-7-707, *Electrical installations of building – Part 7: Requirements for special installations or locations – Section 707: Earthing requirements for the installation of data processing equipment*



IEC 60417-DB:2002[3], *Graphical symbols for use on equipment*



IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:1992, *Insulation co-ordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests* [4]
Amendment 1 (2000)
Amendment 2 (2002)

IEC 60664-3:2003, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60730-1:1999, *Automatic electrical controls for household and similar use – Part 1: General requirements* [5]
Amendment 1 (2003)

IEC 60755, *General requirements for residual current operated protective devices*

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[3] "DB" refers to the IEC on-line database.

[4] A consolidated edition 1.2 exists including IEC 60664-1:1992 and its Amendments 1 (2000) and 2 (2002).

[5] A consolidated edition 3.1 exists including IEC 60730-1:1999 and its Amendment 1 (2003).

IEC 60950-1:2001, *Information technology equipment – Safety – Part 1: General requirements*

IEC 61008-1, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 1: General rules*

IEC 61009-1, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCBOs) – Part 1: General rules*

IEC 62103:2003, *Electronic equipment for use in power installations*

IEC 62310-2, ___ *Static transfer systems (STS) – Part 2: Electromagnetic Compatibility (EMC) requirements*[6]

ISO 3864-1:2002, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs in workplaces and public areas*

ISO 7000:2004, *Graphical symbols for use on equipment – Index and synopsis*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1 General definitions



**3.1.1**
**transfer switch**
switching equipment consisting of one or more switches used to transfer power from one source to another



**3.1.2**
**static transfer system**
**STS**
system that transfers a load, by static means, between a preferred source and an alternate source

NOTE 1 The transfer may be automatic and/or manual.

NOTE 2 The transfer may be with or without interruption.

**3.1.3**
**electronic (power) switch**
operative unit for electronic power switching comprising at least one controllable valve device

[IEV 551-13-01]

**3.1.4**
**line commutated electronic switch**
electronic switch where the commutating voltage is supplied by the line

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[6] To be published.

**3.1.5**
**maintenance by-pass**
power path designed to allow isolation of an appropriate section or sections of a STS for safety during maintenance and/or to maintain continuity of load power

**3.1.6**
**redundant system**
addition of functional units or groups of functional units in a system to enhance the continuity of power to the load

**3.1.7**
**STS input power**
power supplied to STS and bypass, if any, which can be either the preferred source or the alternate source

**3.1.8**
**alternate source**
source used as alternate power supply of the load when the preferred source fails or is out of tolerance or is switched off for maintenance

**3.1.9**
**preferred source**
source used as normal power supply to the load, usually set by the operator



**3.1.10**
**linear load**
load where the current drawn from the supply is defined by the relationship:



$$I = U/Z$$

where

$I$ is the load current;

$U$ is the supply voltage;

$Z$ is the constant load impedance.

**3.1.11**
**non linear load**
load where the parameter $Z$ (load impedance) is no longer a constant but is a variable dependent on other parameters, such as voltage or time

**3.1.12**
**power failure**
any variation in power source deemed to cause unacceptable performance of the load equipment

**3.1.13**
**normal mode of STS operation**
when the load is supplied by the preferred source or the alternate source via the electronic (power) switches

**3.1.14**
**by-pass mode**
when the load is supplied via the maintenance by-pass isolation switch