SLOVENSKI STANDARD
SIST EN 50171:2002

01-maj-2002

Central power supply systems

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Zentrale Stromversorgungssysteme

Systèmes d'alimentation à source centrale

Ta slovenski standard je istoveten z: **EN 50171:2001**

ICS:

29.200	Usmerniki. Pretvorniki. Stabilizirano elektriļ no napajanje	Rectifiers. Convertors. Stabilized power supply

SIST EN 50171:2002 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50171

May 2001

ICS 29.240.00

English version

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Systèmes d'alimentation à source centrale

Zentrale Stromversorgungssysteme

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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.

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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 50171:2001 E

Foreword

This European Standard was prepared by the CENELEC BTTF 62-8, emergency lighting systems.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50171 on 2000-08-01.

This European Standard is intended to replace, in part, national Standards relating to Central Power Supply Systems. For Emergency Lighting systems it should be read in conjunction with the standards being produced by CENELEC BTTF 62-8 and EN 1838, Emergency lighting.

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) 2001-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2003-08-01

Contents

1 Scope

This European Standard specifies the general requirements for central power supply systems for an independent energy supply to essential safety equipment. This standard covers systems permanently connected to AC. supply voltages not exceeding 1 000 V and that use batteries as the alternative power source.

The central power supplies are intended to energise emergency escape lighting in the case of failure of the normal supply, and maybe suitable for energising other essential safety equipment for example:

- electrical circuits of automatic fire extinguishing installations;
- paging systems and signalling safety installations;
- smoke extraction equipment;
- carbon monoxide warning systems;
- specific safety installations related to specific buildings e.g. high-risk areas.

Schematic representations of typical central power supply equipment are depicted in clause 4. When a UPS system is used to feed these essential safety systems, it must comply with EN 50091-1 and its relevant parts, and the additional requirements of this standard.

The power supply system for fire alarms covered by EN 54 are excluded.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 1838	Lighting applications - Emergency lighting
EN 50091-1-1	Uninterruptible power systems (UPS) -- Part 1-1: General and safety requirements for UPS used in operator access areas
EN 50091-1-2	Uninterruptible power systems (UPS) – Part 1-2: General and safety requirements for UPS used in restricted access locations
EN 50272-2	Safety requirements for secondary batteries and battery installations – Part 2: Stationary batteries
EN 60051 (series)	Direct acting indicating analogue electrical measuring instruments and their accessories
EN 60146-1-1	Semiconductor convertors – General requirements and line commutated convertors – Part 1-1: Specifications of basic requirements
EN 60285	Alkaline secondary cells and batteries - Sealed nickel-cadmium cylindrical rechargeable single cells
EN 60417 (series)	Graphical symbols for use on equipment

EN 60598-1	Luminaires – Part 1: General requirements and tests (IEC 60598-1, mod.)
EN 60598-2-22	Luminaires – Part 2-22: Particular requirements - Luminaires for emergency lighting (IEC 60598-2-22, mod.)
EN 60622	Sealed nickel-cadmium prismatic rechargeable cells
EN 60623	Vented nickel-cadmium prismatic rechargeable single cells
EN 60896-1	Stationary lead-acid batteries - General requirements and methods of test – Part 1: Vented types
EN 60896-2	Stationary lead-acid batteries - General requirements and methods of test – Part 2: Valve regulated types
EN 60898	Circuit breakers for overcurrent protection for household and similar protection (IEC 60898, mod.)
EN 60947-2	Low-voltage switchgear and controlgear – Part 2: Circuit-breakers
EN 60947-4-1	Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters
EN 61032:1998	Protection of persons and equipment by enclosures - Probes for verification
EN 61558-2-6	Safety of power transformers, power supply units and similar – Part 2-6: Particular requirements for safety isolating transformers for general use
HD 21 (series)	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V
HD 472 S1	Nominal voltages for low-voltage public electricity supply systems (IEC 60238:1983, mod.)

3 Definitions

For the purpose of this standard, the following definitions apply:

3.1
automatic transfer switching device (ATSD)
a device arranged to connect the emergency supply automatically to the essential safety equipment circuit(s) on failure of the normal supply or to transfer the load from the normal supply to the battery

3.2
battery charger
the part of the equipment that provides the charge to the battery from the normal supply

3.3
inverter
a device for the conversion of direct current (DC) to alternating current (AC)

3.4
changeover mode
a mode in which the emergency power supply source kept on standby where in cases of failure of the normal supply the emergency power supply is automatically transferred to the essential safety equipment

3.5
converter
a device for changing the voltage of a direct current supply

3.6
mode without interruption
a mode in which the emergency power supply source operates in parallel to the normal supply, it is connected to the load and supplies power without interruption when the normal supply fails

3.7
control switch device (CSD)
a device arranged to automatically supply one or several circuits from the emergency power source on failure of the normal supply. This device may be manually controlled as required by the application standard

3.8
deep discharge protection device
a device to protect the battery against deep discharge

3.9
rated supply voltage (mains input)
the supply voltage or voltages assigned to the equipment by the manufacturer for the specified operating condition of the equipment

3.10
rated output current (of a system)
the current, in amperes, of a system supplied at nominal voltage

3.11
normal supply
that source of electrical energy used to provide normal power supply

3.12
rated duration of the system
the designed period of time during which the load can be supplied whilst the system stays within specified voltage limits

3.13
nominal battery voltage
the suitable approximate value of voltage used to designate or identify a system calculated on the basis of 2 V per cell for lead acid cells and 1,2 V per cell for nickel cadmium cells

3.14
nominal system voltage
the declared output voltage of a centrally supplied emergency power system

3.15
minimum voltage
voltage of the supply at the end of rated duration

3.16
earth leakage indication
a device to indicate a leakage to earth from either pole of the battery or load circuit only when connected to the battery

3.17
mains failure indication
a device to indicate a failure of the normal supply

3.18
phase or final circuit failure detector
a device which monitors the normal supply to separate circuits or phases providing normal power supply and which automatically initiates the emergency power supply on failure of the normal supply to any of the monitored circuits

3.19
central power supply system (CPS-System)
a central power supply system which supplies the required emergency power to essential safety equipment without any restriction in power output

3.20
low power supply system (LPS-System)
a central power supply system with a limitation of the power output of the system at 500 W for 3 H or 1 500 W for 1 H duration

3.21
equipment input power
the power rating of the power supply equipment for connection to the mains

3.22
essential safety equipment
devices required by the relevant authority to protect people in the event of a hazard

4 Types of central power supply systems

In order to comply with the different operating requirements of the essential safety equipment, various types of central power supply systems are necessary.

This clause describes the basic types and their essential characteristics.

In general two different modes of power supply are defined, i.e. the changeover mode and the mode without interruption. The main difference is the response (changeover) time. In the changeover mode, the response time shall be no more than 0,5 s whilst in the mode without interruption, the supply is permanent so, by its nature, there is no response time.

The load, the level of discharge and the capacity of the battery determine the rated duration in the case of a power failure. Where the load requires an AC supply an inverter is included in the circuit. Where a DC supply is required a converter circuit is included.

4.1 Changeover mode

In this case the essential safety equipment is supplied directly from the system (see Figure 1). Where the load voltage differs from the system voltage, an isolating transformer is used for supply matching.

In the event of power failure, the voltage monitor in the automatic transfer-switching device (ATSD) switches over the supply to the battery. Controlled battery chargers provides charging and float charging of the battery.

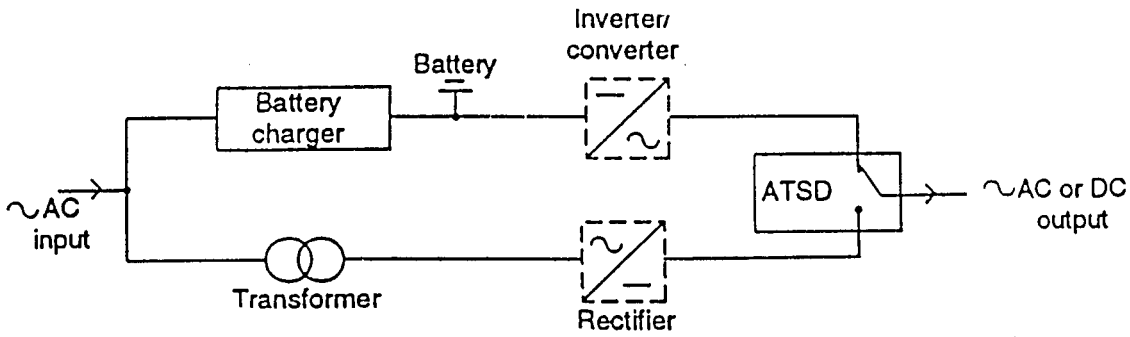

Figure 1

4.2 Mode without interruption

In this case the charger supplies the essential safety equipment and the controlled charging and/or float charging of the battery (see Figure 2).

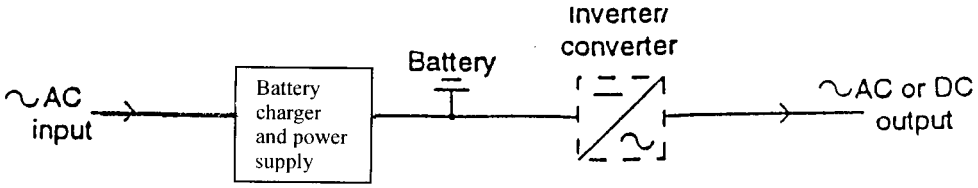

Figure 2

In the event of a power failure, the battery connected in parallel takes over the power supply to the load without interruption.

4.3 Changeover mode with additional control switching device for central switching of the load

In addition to the devices detailed in 4.1, the equipment includes a control switch device (s) (C.S.D.) which is automatically or manually activated and is dependent upon normal supply being available. This device ensures the emergency power supply is not isolated at any material time (see Figure 3).

NOTE A number of control switch devices may by used to switch sections of the load.

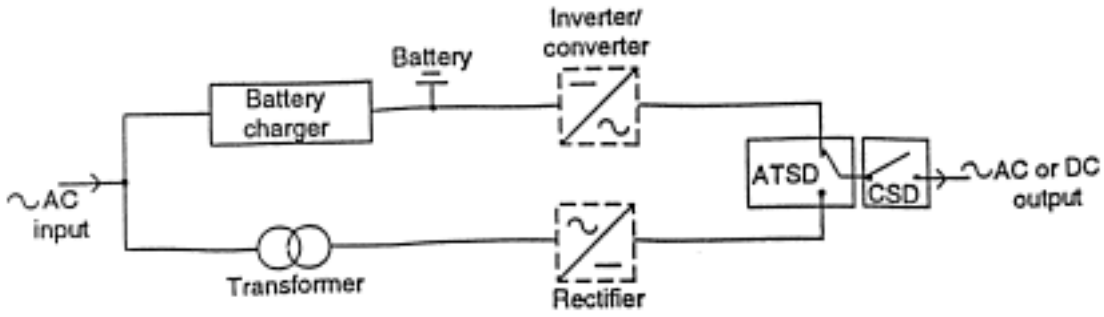

Figure 3

4.4 Changeover mode with additional control switching device for partial switching of the load

In addition to the devices details in 4.1., the equipment includes a control switching device for partial switching of the load activated by the normal supply (see 4.3).

In variation to the concept defined in 4.3, part of the load is continuously supplied (see Figure 4).

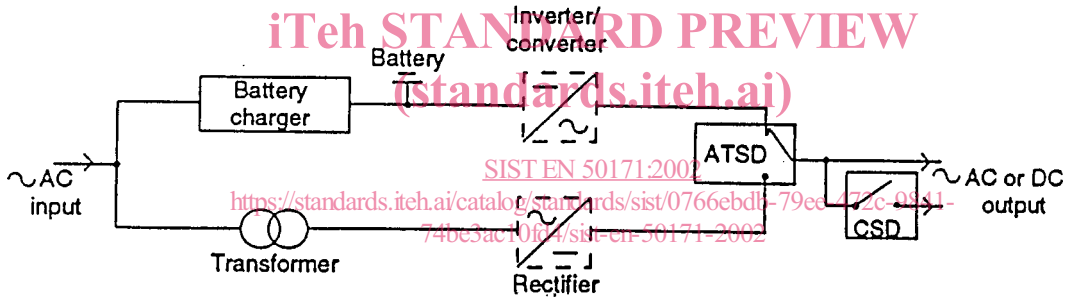

Figure 4

4.5 Non-maintained changeover mode

In this case the essential safety equipment is supplied only in the event of normal supply failure. The system differs from that defined in 4.2 by using control switch device(s) (see Figure 5).

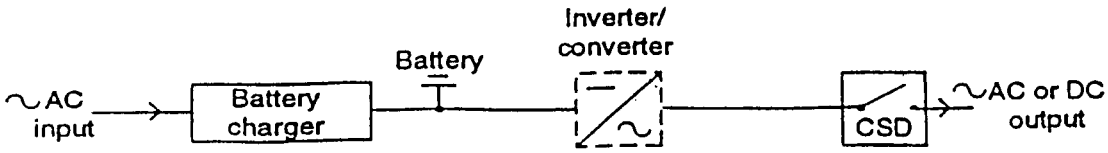

Figure 5