SLOVENSKI STANDARD
SIST EN 50171:2022

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Centralni varnostni napajalni sistemi

Central safety power supply systems

Zentrale Sicherheitsstromversorgungssysteme

Systèmes d'alimentation de sécurité à source centrale

Ta slovenski standard je istoveten z: **EN 50171:2021**

ICS:		
29.200	Usmerniki. Pretvorniki. Stabilizirano električno napajanje	Rectifiers. Convertors. Stabilized power supply

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EUROPEAN STANDARD

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English Version

Central safety power supply systems

Systèmes d'alimentation de sécurité à source centrale

Zentrale Sicherheitsstromversorgungssysteme

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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European Committee for Electrotechnical Standardization
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European foreword

This document (EN 50171:2021) has been prepared by CLC/TC 22X “Power electronics”.

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2022-11-15
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2024-11-15

This document supersedes EN 50171:2001 and all of its amendments and corrigenda (if any).

EN 50171:2021 includes the following significant technical changes with respect to EN 50171:2001:

— The scope and the normative references have been updated.

— A new clause, with general safety requirements, has been added.

— A new operation mode "Mode without interruption with an additional control switching device for central switching of the load" has been added.

— EMC requirements have been added.

— Maximum superimposed alternating currents of the battery charger have been defined.

— Further requirements on inverters and converters have been added.

— A new clause "Test systems" has been added.

— A new chapter "Required Information for safe installation and operation of central safety power supply Systems” has been added.

— A new chapter "Tests" has been added.

— A new subclause regarding requirements on parallel battery strings has been added.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a Standardization Request given to CENELEC by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users’ national committee. A complete listing of these bodies can be found on the CENELEC website.

1 Scope

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

Central safety power supply systems are intended to ensure energy supply to emergency escape lighting in the event of normal supply failure and could be suitable for energizing other essential safety equipment, for example:

— electric circuits of automatic fire extinguishing installations;

— paging systems and signalling safety installations;

— smoke extraction equipment;

— carbon monoxide warning systems;

— special safety installations related to specific buildings, e.g. high-risk areas.

The power supply of CPS systems is expected to be dedicated only to the essential safety equipment, and not for other type of loads such as general purpose IT or industrial systems etc.

Combinations of the aforementioned safety equipment types can be used together on the same central safety power supply system providing the availability for safety equipment loads is not impaired. A fault occurring in a circuit is expected to not cause the interruption in any other circuit used to supply essential safety equipment.

Schematic representations of typical central safety power supply equipment are depicted in Clause 4.

Power supply systems for fire alarm equipment that are covered by EN 54 (series) are excluded.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 1838, *Lighting applications - Emergency lighting*

EN 50274, *Low-voltage switchgear and controlgear assemblies - Protection against electric shock - Protection against unintentional direct contact with hazardous live parts*

EN 50525-2-31, *Electric cables - Low voltage energy cables of rated voltages up to and including 450/750 V (U0/U) - Part 2-31: Cables for general applications - Single core non-sheathed cables with thermoplastic PVC insulation*

EN 60038:2011, *CENELEC standard voltages (IEC 60038:2009)*

EN 60051 (series), *Direct acting indicating analogue electrical measuring instruments and their accessories (IEC 60051 series)*

EN 60146-1-1, *Semiconductor converters - General requirements and line commutated converters - Part 1-1: Specification of basic requirements (IEC 60146-1-1)*

EN 60269 (series), *Low-voltage fuses (IEC 60269 series)*

HD 60364-6:2016, *Low-voltage electrical installations - Part 6: Verification (IEC 60364-6:2016)*

HD 60364-5-557, *Low-voltage electrical installations - Part 5-557: Selection and erection of electrical equipment - Auxiliary circuits (IEC 60364-5-55)*

EN 60445, *Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals, conductor terminations and conductors (IEC 60445)*

EN 60598-1:2015, *Luminaires - Part 1: General requirements and tests (IEC 60598-1:2014)*

EN 60622, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Sealed nickel-cadmium prismatic rechargeable single cells (IEC 60622)*

EN 60623, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Vented nickel-cadmium prismatic rechargeable single cells (IEC 60623)*

EN 60721-3-3, *Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 3: Stationary use at weatherprotected locations (IEC 60721-3-3)*

EN 60896-11, *Stationary lead-acid batteries - Part 11: Vented types - General requirements and methods of tests (IEC 60896-11)*

EN 60896-21:2004, *Stationary lead-acid batteries - Part 21: Valve regulated types - Methods of test (IEC 60896-21:2004)*

EN 60896-22, *Stationary lead-acid batteries - Part 22: Valve regulated types - Requirements (IEC 60896-22)*

EN 60947-2, *Low-voltage switchgear and controlgear - Part 2: Circuit-breakers (IEC 60947-2)*

EN 60947-3, *Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units (IEC 60947-3)*

EN 60947-4-1, *Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters (IEC EN 60947-4-1)*

EN 61000-6-2, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments (IEC 61000-6-2)*

EN 61000-6-3, *Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments (IEC 61000-6-3)*

EN 61000-6-4, *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments (IEC 61000-6-4)*

EN 61032:1998, *Protection of persons and equipment by enclosures - Probes for verification (IEC 61032:1997)*

EN 61439-1:2011, *Low-voltage switchgear and controlgear assemblies - Part 1: General rules (IEC 61439-1:2011)*

EN 61558-2-4, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V - Part 2-4: Particular requirements and tests for isolating transformers and power supply units incorporating isolating transformers (IEC 61558-2-4)*

EN 61558-2-6, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V - Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers (IEC 61558-2-6)*

EN 61558-2-16, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V - Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units (IEC 61558-2-16)*

EN 61951-1, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Secondary sealed cells and batteries for portable applications - Part 1: Nickel-cadmium (IEC 61951-1)*

EN 62040-1, *Uninterruptible power systems (UPS) - Part 1: General and safety requirements for UPS (IEC 62040-1)*

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

EN IEC 62485-2:2018, *Safety requirements for secondary batteries and battery installations - Part 2: Stationary batteries (IEC 62485-2:2010)*

EN 82079-1, *Preparation of instructions for use - Structuring, content and presentation - Part 1: General principles and detailed requirements*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
automatic transfer switching device
ATSD
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
part of the equipment that provides the charge to the battery from the normal supply

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

3.4
changeover mode
mode in which the emergency power supply source is kept on standby and will, in the event of a failure of the normal supply, automatically be transferred to the essential safety equipment

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

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

3.7
control switch device
CSD
device intended to automatically supply one or several circuits from the emergency power source on failure of the normal supply; and which could be manually controlled as required by the application standard

Note 1 to entry: A CSD can be located inside or outside of the CPS

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

3.9
rated supply voltage
<mains input> supply voltage or supply voltages assigned to the equipment by the manufacturer for the specified operating conditions of the equipment

3.10
rated output current
<of a system> current, in amperes, supplied by a system at nominal voltage

3.11
normal supply
source of electrical energy that is intended to provide normal power supply

3.12
rated operating time
design period of time during which the load can be supplied whilst the system stays within specified voltage limits during mains failure

3.13
nominal battery voltage
suitable approximate voltage value of a system calculated using 2 V per cell for lead acid cells and 1,2 V per cell for nickel cadmium cells

3.14
nominal system voltage
specified output voltage of a central safety power supply system

3.15
minimum voltage
voltage of the central safety power supply system at the end of the rated operating time

3.16
earth fault indication
device to indicate earth faults from either pole of the battery or from a load circuit if connected to the battery

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

3.18
central safety power supply system
CPS system
central power supply system which supplies the required power to essential safety equipment with any rated power output

3.19
low power safety supply system
LPS system
central power supply system where the power output is limited to 500 W for a duration of 3 h or to 1 500 W for a duration of 1 h

3.20
essential safety equipment
devices required by the relevant authority to protect people in the event of a hazard

3.21
central inverter
inverter which supplies the total number of essential safety equipment circuit(s) connected to a CPS or LPS

3.22
group inverter
inverter which supplies a part of the essential safety equipment installation, where the load connected to the inverter is limited to a single circuit

3.23
expert for safety power supply systems
electrically skilled person with the relevant education to enable him or her, to install and to test a safety power supply system and to ensure the functional capability of it, by consideration of the relevant standards, building codes and manufacturer documentation

4 Operating modes of central safety power supply systems

4.1 General provisions

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

This clause describes the basic modes of operation of central safety power supply systems and their essential characteristics.

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

The load, the level of discharge and the capacity of the battery determine the rated operating time in the case of a power failure. For application cases where the load requires an AC supply, an inverter shall be used. For application cases where a DC supply is required, a direct current adjusted to the load shall be supplied.

4.2 Changeover mode

In the changeover mode, the essential safety equipment shall be fed directly by normal supply (see Figure 1). When the load voltage differs from the normal supply voltage, an isolating transformer shall be used for supply matching. In the event of a mains power failure, the voltage monitor in the automatic transfer switching device (ATSD) shall transfer the supply to the battery. A controlled battery charger shall be provided for charging and float charging of the battery.

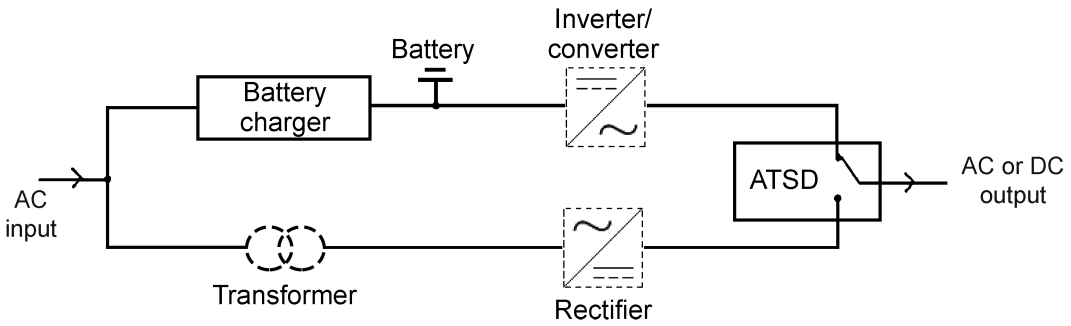

Figure 1