SLOVENSKI STANDARD
oSIST prEN 50171:2019

01-april-2019

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: **prEN 50171:2019**

ICS:

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

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Central safety power supply systems

Systèmes d'alimentation à source centrale

Zentrale Sicherheitsstromversorgungssysteme

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2019-04-26.

It has been drawn up by CLC/TC 22X.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC in three official versions (English, French, German).
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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 50171:2019) has been prepared by CLC/TC 22X “Power electronics”.

This document is currently submitted to the Enquiry.

The following dates are proposed:

• latest date by which the existence of this document has to be announced at national level	(doa)	dor + 6 months
• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	dor + 12 months
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	dor + 36 months (to be confirmed or modified when voting)

This document will supersede EN 50171:2001.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

1 Scope

This document specifies the general requirements for central power supply systems for an independent energy supply to essential safety equipment. This standard 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 may 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 should 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 are permitted 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 should 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 50272-2:2001, *Safety requirements for secondary batteries and battery installations - Part 2: Stationary batteries*

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*

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*

HD 60364-6:2007, *Low voltage electrical installations - Part 6: Verification*

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

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*

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*

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

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

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

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*

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

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

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

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

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

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*

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*

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*

EN 61951-1, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Portable sealed rechargeable single cells – Part 1: Nickel-cadmium (IEC 61951-1)*

EN 62034:2012, *Automatic test systems for battery powered emergency escape lighting*

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*

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 http://www.electropedia.org/

• ISO Online browsing platform: available at http://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. This device may 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 without any restriction in 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)

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

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.

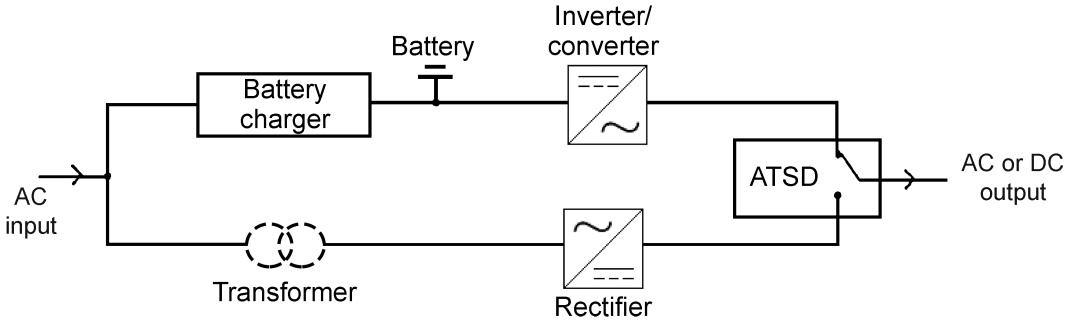
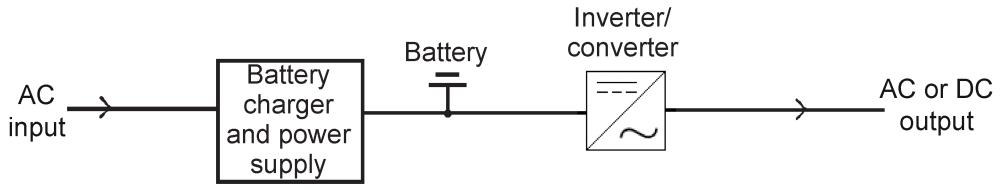


Figure 1

4.3 Mode without interruption

When in the mode without interruption, the battery charger shall be able to energize the essential safety equipment and to ensure the charging and/or float charging of the battery (see Figure 2 and Figure 3).



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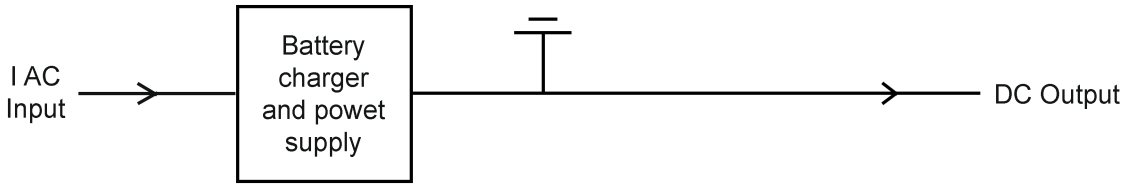
253 **Figure 2**



254

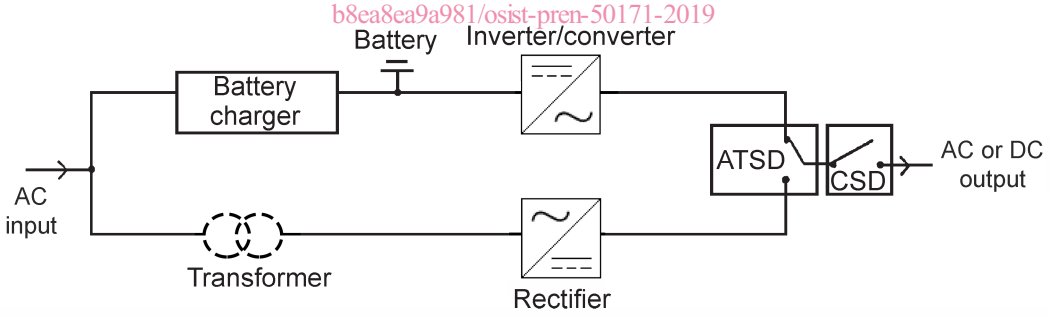
255 **Figure 3**

256 In the event of mains failure the battery shall take over the power supply to load without interruption, and the
257 battery shall be adequately rated to maintain the output voltage within limits compatible with the safety
258 equipment connected to the load.

259 **4.4 Changeover mode with an additional control switching device for central switching of**
260 **the load**

261 In addition to the devices detailed in 4.2, the equipment includes a control switch device(s) (CSD) which is
262 (are) activated automatically or manually and is (are) dependent upon normal supply being available. For
263 this, it shall be ensured that the emergency power supply is effective throughout the time required for
264 operation. (See Figure 4.)

265 A number of control switch devices may be used to switch sections of the load.



266

267 **Figure 4**

268 **4.5 Changeover mode with additional control switching device for partial switching of the**
269 **load**

270 In addition to the devices detailed in 4.2, the equipment includes a control switching device for the section-
271 wise switching of the loads which is activated by the normal supply (see 4.4).

272 However, deviating from the design specified in 4.4, part of the load is energised continuously (see Figure 5).