



SLOVENSKI STANDARD

oSIST prEN IEC 62040-1:2025

01-september-2025

Sistemi z neprekinjenim napajanjem (UPS) - 1. del: Varnostne zahteve

Uninterruptible power systems (UPS) - Part 1: Safety requirements

Unterbrechungsfreie Stromversorgungssysteme (USV) - Teil 1:
Sicherheitsanforderungen

Alimentations sans interruption (ASI) - Partie 1: Exigences de sécurité

Ta slovenski standard je istoveten z: prEN IEC 62040-1:2025

ICS:

29.200

Usmerniki. Pretvorniki.
Stabilizirano električno
napajanje

Rectifiers. Convertors.
Stabilized power supply

oSIST prEN IEC 62040-1:2025

en,fr,de



22H/338/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: IEC 62040-1 ED3	
DATE OF CIRCULATION: 2025-07-11	CLOSING DATE FOR VOTING: 2025-10-03
SUPERSEDES DOCUMENTS: 22H/329/CD, 22H/337A/CC	

IEC SC 22H : UNINTERRUPTIBLE POWER SYSTEMS (UPS)	
SECRETARIAT: France	SECRETARY: Mr Miao-Xin WANG
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 22, SC 22E, SC 22G, SC 121B	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED: Safety	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:
Uninterruptible power systems (UPS) - Part 1: Safety requirements

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

Copyright © 2025 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

CONTENTS

1	FOREWORD.....	4
2	INTRODUCTION.....	7
3	1 Scope.....	8
4	2 Normative references	9
5	3 Terms and definitions	9
6	4 Protection against hazards	16
7	4.2 Single fault conditions and abnormal operating conditions	16
8	4.3 Short-circuit and overload protection.....	16
9	4.3.1 General	16
10	4.3.2 Input short-circuit withstand strength and output short-circuit current ability... 17	
11	4.3.101 AC input current	18
12	4.3.102 Transformer protection	18
13	4.3.103 Protection of the <i>energy storage device</i>	19
14	4.3.104 Unsynchronised load transfer	19
15	4.4 Protection against electric shock.....	19
16	4.4.3 Means for basic protection (protection against direct contact)	20
17	4.4.9 Capacitor discharge.....	23
18	4.5.2 <i>Service access areas</i>	23
19	4.6.5 Limited power sources	25
20	4.8 <i>UPS</i> with multiple sources of supply	25
21	4.8.101 Backfeed protection	25
22	4.9 Protection against environmental stresses	26
23	4.10 Protection against excessive acoustic noise hazards	26
24	4.101 <i>UPS</i> isolation and disconnect devices	26
25	4.101.1 Emergency switching (disconnect) device	26
26	4.101.2 Normal disconnect devices	27
27	4.102 <i>Battery energy storage devices</i>	27
28	4.102.1 General	27
29	4.102.2 Accessibility and maintainability.....	28
30	4.102.3 Distance between battery cells	28
31	4.102.4 Case insulation.....	28
32	4.102.5 Electrolyte spillage	28
33	4.102.6 Ventilation and hydrogen concentration (lead acid and nickel cadmium batteries)	28
34	4.102.7 Charging voltages.....	29
35	4.102.8 Additional requirements for lithium ion batteries.....	29
36	4.103 <i>UPS</i> connection to telecommunication networks	29

IEC CDV 62040-1 © IEC 2025

44	5	Test requirements.....	29
45	5.1.7	Test overview	29
46	5.2.3	Electrical tests	34
47	5.2.4	Abnormal operation and simulated faults tests	37
48	6	Information and marking requirements	45
49	6.1	General.....	45
50	6.3.101	Guidance on UPS installation	47
51	6.4.3	Labels, signs, symbols and signals	47
52	6.5	Supplementary information	49
53	6.5.2	Capacitor discharge	49
54	6.5.101	Battery information for maintenance	49
55		Annexes	51
56	Annex AA (informative)	Minimum and maximum cross-section of copper cables suitable for connection to terminals for external cables	52
58	Annex BB (informative)	Comparison of limits of working voltage	53
59	Annex CC (normative)	Ventilation of lead-acid battery compartments	55
60	CC.1	General	55
61	CC.2	Normal conditions.....	55
62	CC.3	Blocked conditions.....	57
63	Annex DD (informative)	Guidance for disconnection of batteries during shipment.....	58
64	DD.1	Applicable products	58
65	DD.2	Battery disconnection.....	58
66	DD.3	Package labelling/markings.....	58
67	DD.4	Damage inspection	59
68	DD.5	The importance of safe handling procedures.....	59
69	Annex EE (informative)	Short-time withstand current test procedure – Guidance and typical values.....	60
71	EE.1	General	60
72	EE.2	Test set up.....	62
73	EE.3	Calibration of the test circuit.....	62
74	EE.4	Test procedure	63
75	EE.5	Test verification criteria.....	63
76	Annex FF (informative)	Maximum heating effect in transformer tests	64
77	FF.1	Determination of <i>maximum input current</i>	64
78	FF.2	Overload test procedure.....	65
79	Annex GG (normative)	Requirements for the mounting means of rack-mounted equipment	66
81	GG.1	General	66
82	GG.2	Mechanical strength test, variable force	66
83	GG.3	Mechanical strength test, 250 N force, including end stops.....	67
84	GG.4	Compliance	67
85		Bibliography.....	68
86			
87		Figure 101 – Examples of design of openings preventing vertical access	18

IEC CDV 62040-1 © IEC 2025

88	Figure 102 – Test circuit for load-induced change of reference potential – Single-phase	
89	output	35
90	Figure 103 – Test circuit for load-induced change of reference potential – Three-phase	
91	output	35
92	Figure DD.1 – Example of precautionary labels for products shipped with the	
93	battery disconnected	56
94	Figure DD.2 – Example of precautionary label for products shipped with the	
95	battery connected	57
96	Figure EE.1 – 3-wire test circuit for <i>UPS</i> short-time withstand current	59
97	Figure EE.2 – 4-wire test circuit for <i>UPS</i> short-time withstand current	60
98	Figure EE.3 – 2-wire test circuit for single phase <i>UPS</i> short-time withstand current...	60
99		
100	Table 1 – Alphabetical list of terms	7
101	Table 101 – <i>UPS</i> AC input port configuration	15
102	Table 5 – Limits for access of touch current	19
103	Table 102 – Overvoltage categories	20
104	Table 103 – Maximum temperature limits for magnetic components during <i>stored</i>	
105	<i>energy mode</i> of operation	22
106	Table 23 – Test overview	28
107	Table 32 – AC short-time withstand current test, minimum <i>UPS</i> requirements	39
108	Table 104 – Temperature limits for transformer windings	40
109	Maximum temperature °C	40
110	Table 33– Environmental tests	42
111	Table 40 – Marking location	43
112	Table AA.1 – Cable cross-sections	50
113	Table BB.1 – Comparison of limits of working voltage	51
114	Table FF.1 – Test steps	62

115

116

-INTERNATIONAL ELECTROTECHNICAL COMMISSION

UNINTERRUPTIBLE POWER SYSTEMS (UPS) –

Part 1: 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.
 - 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
 - 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
 - 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
 - 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
 - 6) All users should ensure that they have the latest edition of this publication.
 - 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
 - 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
 - 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.
- IEC 62040-1 has been prepared by subcommittee 22H: Uninterruptible power systems (UPS), of IEC technical committee 22: Power electronic systems and equipment.

This third edition cancels and replaces the second edition published in 2017, Amendment 1:2021 and Amendment 2:2022. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) the reference document has been changed from IEC 62477-1:2012 to IEC 62477-1:2022;
- b) clauses 4.4.7.1.7, 4.4.7.2.2, 4.4.7.7, 4.6.5, 4.7, 4.8.101, 4.10 and 4.11.101 in Edition 2 considered in IEC 62477-1:2022;
- c) protective bonding has been reinstated from Edition 1 in 4.4.4.2.101;
- d) AC input current updated in 4.3.101;