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oSIST prHD 60364-8-81:2025
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Niskonapetostne električne inštalacije - 8-81. del: Funkcionalni vidiki - Energetska učinkovitost

Low-voltage electrical installations - Part 8-81: Functional aspects - Energy efficiency

Installations électriques à basse tension - Partie 8-81: Aspects fonctionnels - Efficacité énergétique

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IEC TC 64 : ELECTRICAL INSTALLATIONS AND PROTECTION AGAINST ELECTRIC SHOCK	
SECRETARIAT: Germany	SECRETARY: Mr Wolfgang Niedenzu
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 2, SC 22G, TC 23, SC 23E, SC 23K, TC 65, TC 69, TC 82, TC 85, TC 120, TC 121, SC 121A, SC 121B, PC 128	HORIZONTAL FUNCTION(S): TC 64 Horizontal Group Energy Efficiency
ASPECTS CONCERNED: Energy Efficiency	
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<p>Attention IEC-CENELEC parallel voting</p> <p>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.</p> <p>The CENELEC members are invited to vote through the CENELEC online voting system.</p>	

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TITLE:

Low-voltage electrical installations - Part 8-81: Functional aspects - Energy efficiency

PROPOSED STABILITY DATE: 2030

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1 CONTENTS

2		
3	FOREWORD.....	5
4	INTRODUCTION.....	7
5	81 Energy Efficiency.....	8
6	81.1 Scope.....	8
7	81.2 Normative references.....	8
8	81.3 Terms and definitions.....	9
9	81.3.1 General.....	9
10	81.3.2 Electrical energy management.....	11
11	81.3.3 Energy measurement.....	11
12	81.3.4 Sectors of activities.....	12
13	81.3.5 Abbreviated terms.....	13
14	81.4 General.....	13
15	81.4.1 Fundamental principles.....	13
16	81.4.2 Energy efficiency assessment for electrical installations.....	14
17	81.5 Sectors of activities.....	14
18	81.6 Design requirements and recommendations.....	15
19	81.6.1 General.....	15
20	81.6.2 Determination of load energy profile.....	15
21	81.6.3 Determination of the transformer and switchboard location with an	
22	optimizing method.....	15
23	81.6.4 HV/LV substation.....	15
24	81.6.5 Losses in the wiring.....	16
25	81.6.6 Efficiency of local production and local storage.....	17
26	81.7 Determination of the zones, usages and meshes.....	17
27	81.7.1 Determining the zones.....	17
28	81.7.2 Determining the usages within the identified zones.....	18
29	81.7.3 Demand response.....	18
30	81.7.4 Determining the meshes.....	19
31	81.7.5 Driving parameters.....	21
32	81.7.6 Impacts on the design of an electrical installation.....	21
33	81.8 Energy efficiency and load management system.....	22
34	81.8.1 General.....	22
35	81.8.2 User specification.....	22
36	81.8.3 Inputs from loads, sensors and forecasts.....	23
37	81.8.4 Inputs from the supplies: energy availability and pricing.....	31
38	81.8.5 Monitoring the performance of the electrical installation.....	31
39	81.8.6 Management of loads through meshes.....	31
40	81.8.7 Multi-supply source management: grid, local electricity production and	
41	storage.....	32
42	81.9 Maintenance and enhancement of the performance of the installation.....	32
43	81.9.1 Methodology.....	32
44	81.9.2 Installation life cycle methodology.....	34
45	81.9.3 Energy efficiency life cycle.....	34
46	81.9.4 Data management.....	35
47	81.9.5 Maintenance.....	35
48	81.10 Parameters for implementation of efficiency measures.....	35

49	81.10.1	General	35
50	81.10.2	Efficiency measures	35
51	81.11	Energy efficiency actions	40
52	Annex A (informative)	Determination of transformer and switchboard location	42
53	A.1	Barycentre method.....	42
54	A.2	Total load barycentre	45
55	A.2.1	General	45
56	A.2.2	Sub-distribution board locations.....	46
57	A.2.3	Iterative process	46
58	A.3	Method of average route length	46
59	A.4	Minimum Energy Moment Method	49
60	A.4.1	General	49
61	A.4.2	Calculation of Load Center Coordinates.....	49
62	A.4.3	Minimum Total Energy Moment and Minimum Average Load Distance of the System	50
63			
64	A.4.4	Example	50
65	A.4.5	Principle Derivation	51
66	Annex B (normative)	Method to assess the energy efficiency of an electrical installation.....	54
67			
68	B.1	General.....	54
69	B.2	Electrical installation efficiency classes.....	54
70	B.3	Determination of the electrical installation efficiency class	54
71	B.3.1	General	54
72	B.3.2	Industrial, commercial buildings and infrastructures	55
73	B.3.3	Residential	70
74	Annex C (informative)	List of notes concerning certain countries	77
75	Bibliography.....		78
76			
77	Figure 1 – Energy efficiency and load management system overview		22
78	Figure 2 – Electrical distribution scheme.....		25
79	Figure 3 – Example of measurement equipment selection in an installation		28
80	Figure 4 – Iterative process for electrical energy efficiency management		33
81	Figure A.1 – Example 1: floor plan of production plant with the planned loads and calculated barycentre.....		44
82			
83	Figure A.2 – Example 2: barycentre calculated		45
84	Figure A.3 – Example of location of the barycentre in an industrial building		46
85	Figure A.4 – Example of location of the barycentre using the average route length method		48
86			
87	Figure A.5 – Example of location using the minimum Total Energy Moment and Minimum Average Load Distance of the System.....		50
88			
89	Figure A.6 – relationship between the system's total energy moment and the system's minimum energy moment.....		53
90			
91	Figure B.1 – Level of efficiency of the electrical installation efficiency classes		54
92			
93	Table 1 – Measurement applications.....		24
94	Table 2 – Overview of the needs for power metering and monitoring.....		25
95	Table 3 – Process for electrical energy efficiency management and responsibilities.....		33

96	Table A.1 – Cable length for supply of DB.....	47
97	Table B.1 – Electrical installation efficiency classes	55
98	Table B.2 – Energy efficiency measures	56
99	Table B.3 – Determination of energy consumption: coverage	57
100	Table B.4 – Main substation: consumption	57
101	Table B.5 – Main substation: location	58
102	Table B.6 – Method of average route length.....	58
103	Table B.7 – Voltage drop	59
104	Table B.8 – Efficiency of transformer	60
105	Table B.9 – Efficiency of fixed installed current using equipment	60
106	Table B.10 – Zone	61
107	Table B.11 – Usage	61
108	Table B.12 – Demand response: coverage.....	62
109	Table B.13 – Demand response: duration	62
110	Table B.14 – Meshes	62
111	Table B.15 – Measurement by usages	63
112	Table B.16 – Occupancy coverage.....	64
113	Table B.17 – Occupancy measurement.....	64
114	Table B.18 – Energy management system (EEMS)	64
115	Table B.19 – HVAC control	65
116	Table B.20 – Lighting control	65
117	Table B.21 – Performance maintenance process	66
118	Table B.22 – Frequency of the performance verification process.....	66
119	Table B.23 – Data management.....	66
120	Table B.24 – Working point of transformer	67
121	Table B.25 – Presence of continuous monitoring for large energy using systems	67
122	Table B.26 – Power factor.....	68
123	Table B.27 – THD _U	68
124	Table B.28 – THD _I	69
125	Table B.29 – Renewable energy	69
126	Table B.30 – Electrical energy storage.....	70
127	Table B.31 – Energy efficiency measures parameters	70
128	Table B.32 – Determination of energy consumption	71
129	Table B.33 – Zones.....	72
130	Table B.34 – Demand response coverage.....	72
131	Table B.35 – Meshes	73
132	Table B.36 – HVAC control	73
133	Table B.37 – Lighting control	74
134	Table B.38 – Measurement by usages	74
135	Table B.39 – Renewable energy	75
136	Table B.40 – Electrical energy storage.....	75
137	Table B.41 – Degree of self-sufficiency.....	76

139

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LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

143

144

Part 8-81: Functional aspects - Energy efficiency

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FOREWORD

149 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising
150 all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international
151 co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and
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185 International Standard IEC 60364-8-81 has been prepared by IEC technical committee 64:
186 Electrical installations and protection against electric shock.

187 This first edition cancels and replaces the second edition of IEC 60364-8-1 published in 2019.
188 This edition constitutes a technical revision.

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

191 a) Numbering for allowing parts 7 to amend this document;

192 b) Alignment of the definitions with IEC 826;

193 c) Introduction of minimum energy moment method in the Annex A;

194 d) Improvements in Annex B;

195 The text of this International Standard is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

196
197 Full information on the voting for its approval can be found in the report on voting indicated in
198 the above table.

199 The language used for the development of this International Standard is English.

200 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in
201 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available
202 at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are
203 described in greater detail at www.iec.ch/publications.

204 The committee has decided that the contents of this document will remain unchanged until the
205 stability date indicated on the IEC website under webstore.iec.ch in the data related to the
206 specific document. At this date, the document will be

- 207 • reconfirmed,
- 208 • withdrawn,
- 209 • replaced by a revised edition, or
- 210 • amended.

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INTRODUCTION

213

214 The optimization of electrical energy usage can be facilitated by appropriate design and
 215 installation considerations. An electrical installation can provide the required level of service
 216 and safety for the lowest electrical consumption. This is considered by designers as a general
 217 requirement of their design procedures in order to establish the best use of electrical energy.
 218 In addition to the many parameters taken into account in the design of electrical installations,
 219 more importance is nowadays focused on reducing losses within the system and its use. The
 220 design of the whole installation has therefore to take into account inputs from users, suppliers
 221 and utilities.

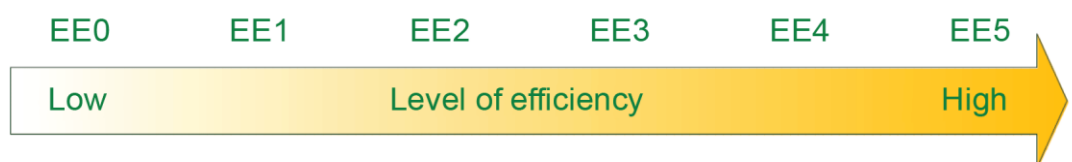
222 It is important that this document covers existing electrical installations in buildings, in addition
 223 to new installations. It is in the refurbishment of existing buildings that significant overall
 224 improvements in energy efficiency can be achieved.

225 The optimization of the use of electricity is based on energy efficiency management which is
 226 based on the price of electricity, electrical consumption and real-time adaptation. Efficiency is
 227 checked by measurement during the whole life of the electrical installation. This helps identify
 228 opportunities for any improvements and corrections. Improvements and corrections may be
 229 implemented by redesign or equipment replacement. The aim is to provide a design for an
 230 efficient electrical installation which allows an energy management process to suit the user's
 231 needs, and in accordance with an acceptable investment. This document first introduces the
 232 different measures to ensure an energy efficient installation based on kWh saving. It then
 233 provides guidance on giving priority to the measures depending on the return of investment; i.e.
 234 the saving of electrical energy and reducing of electrical power costs divided by the amount of
 235 investment.

236 This document is intended to provide requirements and recommendations for the electrical part
 237 of the energy management system addressed by ISO 50001.

238 It introduces requirements, recommendations and methods for the design and the energy
 239 efficiency assessment of an electrical installation within the framework of an energy efficiency
 240 management approach in order to get the best permanent functionally equivalent service for
 241 the lowest electrical energy consumption and the most acceptable energy availability and
 242 economic balance.

243 The assessment method described in Annex B based on the electrical energy efficiency of the
 244 installation allows a classification of energy efficiency installation according to the following
 245 levels:



246

247 NOTE Account can be taken, if appropriate, of induced works (civil works, compartmentalization) and the necessity
 248 to expect, or not, the modifiability of the installation.

249 This document introduces requirements and recommendations to design the adequate
 250 installation in order to give the ability to improve the management of the energy performance
 251 of the installation by the tenant/user or for example the energy manager.

252 All requirements and recommendations of this part of IEC 60364 enhance the requirements
 253 contained in Parts 1 to 8 of the IEC 60364 series.

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 8-81: Functional aspects - Energy efficiency

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81 Energy Efficiency

81.1 Scope

262 This part of IEC 60364 provides additional requirements, measures and recommendations for
263 the design, erection, operation and verification of all types of low voltage electrical installation
264 including local production and storage of energy for optimizing the overall efficient use of
265 electricity.

266 It introduces requirements, recommendations and methods for the design and the energy
267 efficiency (EE) assessment of an electrical installation within the framework of an energy
268 efficiency management approach in order to get the best permanent functionally equivalent
269 service for the lowest electrical energy consumption and the most acceptable energy availability
270 and economic balance.

271 These requirements, recommendations and methods apply, within the scope of the IEC 60364
272 (all parts), for new installations and modification of existing installations.

273 This document is applicable to the electrical installation of a building or system and does not
274 apply to products. The energy efficiency of products and their operational requirements are
275 covered by the relevant product standards.

276 Where another standard provides specific requirements for a particular system or installation
277 application (e.g. manufacturing system covered by ISO 20140 (all parts)), those requirements
278 may supersede this document.

279 This document does not specifically provide requirements for building automation systems.
280 Contribution of building automation systems to improve energy efficiency of the installation is
281 considered.

282 This group energy efficiency publication is primarily intended to be used as an energy efficiency
283 standard for the low voltage electrical installations mentioned in Clause 1, but is also intended
284 to be used by technical committees in the preparation of standards, in accordance with the
285 principles laid down in IEC Guide 118.

81.2 Normative references

287 The following documents are referred to in the text in such a way that some or all of their content
288 constitutes requirements of this document. For dated references, only the edition cited applies.
289 For undated references, the latest edition of the referenced document (including any
290 amendments) applies.

291 IEC 60688, *Electrical measuring transducers for converting AC and DC electrical quantities to*
292 *analogue or digital*

293 IEC 61557-12:2018, *Electrical safety in low voltage distribution systems up to 1 000 V AC and*
294 *1 500 V DC - Equipment for testing, measuring or monitoring of protective measures - Part 12:*
295 *Power metering and monitoring devices (PMD)*

296 IEC 61869-2, *Instrument transformers – Part 2: Additional requirements for current*
297 *transformers*

298 IEC 62053-21, *Electricity metering equipment (a.c.) – Particular requirements – Part 21: Static*
299 *meters for active energy (classes 1 and 2)*

300 IEC 62053-22, *Electricity metering equipment (a.c.) – Particular requirements – Part 22: Static*
301 *meters for active energy (classes 0,2 S and 0,5 S)*

302 IEC 62974-1, *Monitoring and measuring systems used for data collection, gathering and*
303 *analysis – Part 1: Device requirements*

304 IEC Guide 118, *Inclusion of energy efficiency aspects in electrotechnical publications*

305 **81.3 Terms and definitions**

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

307 ISO and IEC maintain terminology databases for use in standardization at the following
308 addresses:

- 309 • IEC Electropedia: available at <https://www.electropedia.org/>
- 310 • ISO Online browsing platform: available at <https://www.iso.org/obp>

311 **81.3.1 General**

312 **81.3.1.1**

313 **zone**

314 area (or surface) defining a part of an installation

315 Note 1 to entry: Examples of a zone can be a kitchen of 20 m² or a storage area of 500 m².

316 **81.3.1.2**

317 **current-using equipment**

318 electric equipment intended to convert electric energy into another form of energy, for example
319 light, heat, mechanical energy

320 [SOURCE: IEC 60050-826:2004, 826-16-02]

321 **81.3.1.3**

322 **electrical installation**

323 assembly of associated electric equipment having co-ordinated characteristics to fulfil specific
324 purposes

325 [SOURCE: IEC 60050-826:2004, 826-10-01]

326 **81.3.1.4**

327 **usage**

328 type of application for which electricity is used

329 EXAMPLE Lighting, heating.

330 **81.3.1.5**

331 **load energy profile**

332 figure representing the energy consumption (Y-axis) within a period of time (X-axis) based on
333 measurements for a mesh or a group of meshes

334 EXAMPLE Hourly consumption of energy for a period of a week.

335 **81.3.1.6**
336 **power demand profile**
337 figure representing the power demand (Y-axis) for a given integration period within a period of
338 time (X-axis) based on measurements for a mesh or a group of meshes

339 **81.3.1.7**
340 **electrical energy efficiency**
341 **EEE**
342 optimized usage of electrical energy

343 Note 1 to entry: The optimization includes both technical, economic and environmental aspects.

344 [SOURCE: IEC 60050-826:2022, 826-19-01]

345

346 **81.3.1.8**
347 **mesh**
348 one or more circuits of the electrical installation for one or more zones including one or more
349 services supplying a group of electrical equipment for the purpose of electrical energy efficiency

350 **81.3.1.9**
351 **active electrical energy efficiency measures**
352 operational measure(s) either manually or automatically controlled for optimizing the energy
353 usage of the electrical installation

354 EXAMPLE Thermostat control, occupancy lighting control, building optimization control systems.

355 [SOURCE: IEC 60050-826:2022, 826-19-02, modified – EXAMPLE has been added]

356 **81.3.1.10**
357 **passive electrical energy efficiency measures**
358 measures for optimizing the energy usage of the electrical installation by selection and erection
359 of electrical equipment other than control equipment

360 EXAMPLE Selection and location of transformer, cross section of cables, routing of wiring system, sub-division of
361 circuits.

362 [SOURCE: IEC 60050-826:2022, 826-19-03, modified – EXAMPLE has been added]

363 **81.3.1.11**
364 **electrical installation efficiency class**
365 defined level of energy efficiency for an electrical installation

366 Note 1 to entry: See Annex B.

367 **81.3.1.12**
368 **driving parameter**
369 external factors that affect energy efficiency

370 EXAMPLE Regulation, environmental conditions, occupancy, energy prices and management requirements, mode
371 of operation, duty cycle, load curves, state, operating, parameters, indoor temperature, lighting levels, production
372 volume.

373 **81.3.1.13**
374 **barycentre method**
375 procedure to optimize the position of energy source(s) and loads in consideration of energy
376 efficiency

377 **81.3.1.14**
378 **EE assessment**
379 process to determine the electrical installation efficiency class of an installation

380 **81.3.2 Electrical energy management**

381 **81.3.2.1**
382 **electrical energy management system**
383 **EEMS**
384 system monitoring, operating, controlling and managing energy resources and loads of the
385 installations

386 **81.3.2.2**
387 **load shedding**
388 method(s) of optimizing demand by controlling the electrical loads for variable periods of time

389 **81.3.2.3**
390 **demand response**
391 changes in electric usage by end-user customers from their normal consumption patterns in
392 response to changes in the price of electricity over time, or to incentive payments designed to
393 induce lower electricity use at times of high wholesale market prices or when system reliability
394 is jeopardized

395 **81.3.2.4**
396 **user interface**
397 means that allow the user to monitor and/or control the electrical installation, locally or remotely

398 EXAMPLE Visual or audible signal, local display, remote display, push button.

399 **81.3.3 Energy measurement**

400 **81.3.3.1**
401 **measurement**
402 process of obtaining value(s) that can be attributed to a quantity

403 **81.3.3.2**
404 **monitoring**
405 continuing procedure for the collection and assessment of pertinent information, including
406 measurements, for the purpose of identifying deviations and determining the effectiveness of
407 the plans and procedures

408 [SOURCE: IEC 60050-881:1983, 881-16-02, modified — Addition of “identifying deviations and”
409 deletion of “for radiation protection”.]

410 **81.3.3.3**
411 **power metering and monitoring device**
412 **PMD**
413 combination in one or more devices of several functional modules dedicated to metering and
414 monitoring electrical parameters in energy distribution systems or electrical installations, used
415 for applications such as energy efficiency, power monitoring and network performance

416 Note 1 to entry: This note applies to the French language only.

417 **81.3.3.4**
418 **billing**
419 process that allows energy suppliers or their representatives to invoice their customers
420 according to a defined contract

421 Note 1 to entry: These applications can be covered by international standards, regulations such as MID in Europe
422 or NMI in Australia, and/or utility specifications.

423 **81.3.3.5**424 **sub-billing**

425 process that allows the property manager to allocate an energy invoice from the energy supplier
426 and charges as appropriate to specific tenants

427 **81.3.3.6**428 **cost allocation**

429 process that allows a facility manager to account for energy costs from internal cost centres
430 that consume energy

431 EXAMPLE Process line, test and inspection, administration.

432 **81.3.3.7**433 **estimation**

434 process of judging one or more values that can be attributed to a quantity

435 Note 1 to entry: Estimation by a competent person can provide data of a reasonable accuracy.

436 **81.3.3.8**437 **forecast**

438 estimate of the expected value of a parameter at a given future date

439 **81.3.3.9**440 **total harmonic distortion of the voltage wave**441 **THD_U**

442 ratio of the RMS value of the harmonic content of an alternating quantity (voltage) to the RMS
443 value of the fundamental component of the quantity (voltage)

444 **81.3.3.10**445 **total harmonic distortion of the current wave**446 **THD_I**

447 ratio of the RMS value of the harmonic content of an alternating quantity (current) to the RMS
448 value of the fundamental component of the quantity (current)

449 **81.3.3.11**450 **Degree day**

451 A unit used to determine the heating requirements of buildings, representing a fall of one degree
452 below a specified average outdoor temperature (usually 18°C) for one day

453 **81.3.4 Sectors of activities**454 **81.3.4.1**455 **residential installations**

456 premises designed and constructed for private habitation and including associated areas

457 Note 1 to entry: Associated areas include common areas, garages, gardens, pools.

458 **81.3.4.2**459 **commercial installations**

460 premises designed and constructed for commercial operations

461 EXAMPLE Offices, retail, distribution centres, public buildings, banks, hotels, hospitals, schools.

462 **81.3.4.3**463 **industrial installations**

464 premises designed and constructed for manufacturing and processing operations

465 EXAMPLE Factories, workshops.