SLOVENSKI STANDARD
oSIST prHD 60364-8-81:2025

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Nizkonapetostne 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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COMMITTEE DRAFT FOR VOTE (CDV)

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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	
☒ 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.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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TITLE:

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

PROPOSED STABILITY DATE: 2030

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 8-81: Functional aspects - Energy efficiency

FOREWORD

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International Standard IEC 60364-8-81 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

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

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

a) Numbering for allowing parts 7 to amend this document;
b) Alignment of the definitions with IEV 826;
c) Introduction of minimum energy moment method in the Annex A;

d) Improvements in Annex B;

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

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

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

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

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

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

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

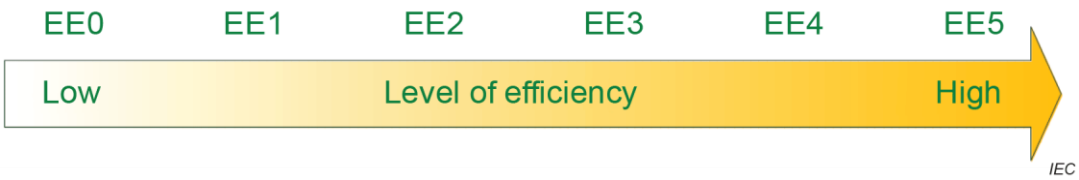
It is important that this document covers existing electrical installations in buildings, in addition to new installations. It is in the refurbishment of existing buildings that significant overall improvements in energy efficiency can be achieved.

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

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

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

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



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

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

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

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 8-81: Functional aspects - Energy efficiency

81 Energy Efficiency

81.1 Scope

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

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

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

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

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

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

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

81.2 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.

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

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

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

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

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

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

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

81.3 Terms and definitions

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

ISO and IEC maintain terminology 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

81.3.1 General

81.3.1.1
zone
area (or surface) defining a part of an installation

Note 1 to entry: Examples of a zone can be a kitchen of 20 m^2 or a storage area of 500 m^2.

81.3.1.2
current-using equipment
electric equipment intended to convert electric energy into another form of energy, for example light, heat, mechanical energy

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

81.3.1.3
electrical installation
assembly of associated electric equipment having co-ordinated characteristics to fulfil specific purposes

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

81.3.1.4
usage
type of application for which electricity is used

EXAMPLE Lighting, heating.

81.3.1.5
load energy profile
figure representing the energy consumption (Y-axis) within a period of time (X-axis) based on measurements for a mesh or a group of meshes

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

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

81.3.1.7
electrical energy efficiency
EEE
optimized usage of electrical energy

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

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

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

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

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

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

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

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

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

81.3.1.11
electrical installation efficiency class
defined level of energy efficiency for an electrical installation

Note 1 to entry: See Annex B.

81.3.1.12
driving parameter
external factors that affect energy efficiency

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

81.3.1.13
barycentre method
procedure to optimize the position of energy source(s) and loads in consideration of energy efficiency

81.3.1.14
EE assessment
process to determine the electrical installation efficiency class of an installation

81.3.2 Electrical energy management

81.3.2.1
electrical energy management system
EEMS
system monitoring, operating, controlling and managing energy resources and loads of the installations

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

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

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

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

81.3.3 Energy measurement

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

81.3.3.2
monitoring
continuing procedure for the collection and assessment of pertinent information, including measurements, for the purpose of identifying deviations and determining the effectiveness of the plans and procedures

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

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

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

81.3.3.4
billing
process that allows energy suppliers or their representatives to invoice their customers according to a defined contract

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

81.3.3.5
sub-billing
process that allows the property manager to allocate an energy invoice from the energy supplier and charges as appropriate to specific tenants

81.3.3.6
cost allocation
process that allows a facility manager to account for energy costs from internal cost centres that consume energy

EXAMPLE Process line, test and inspection, administration.

81.3.3.7
estimation
process of judging one or more values that can be attributed to a quantity

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

81.3.3.8
forecast
estimate of the expected value of a parameter at a given future date

81.3.3.9
total harmonic distortion of the voltage wave
THD_U
ratio of the RMS value of the harmonic content of an alternating quantity (voltage) to the RMS value of the fundamental component of the quantity (voltage)

81.3.3.10
total harmonic distortion of the current wave
THD_I
ratio of the RMS value of the harmonic content of an alternating quantity (current) to the RMS value of the fundamental component of the quantity (current)

81.3.3.11
Degree day
A unit used to determine the heating requirements of buildings, representing a fall of one degree below a specified average outdoor temperature (usually 18°C) for one day

81.3.4 Sectors of activities

81.3.4.1
residential installations
premises designed and constructed for private habitation and including associated areas

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

81.3.4.2
commercial installations
premises designed and constructed for commercial operations

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

81.3.4.3
industrial installations
premises designed and constructed for manufacturing and processing operations

EXAMPLE Factories, workshops.