

MADALPINGELISED ELEKTRIPAIGALDISED. OSA 8-2:
TOOTEVTARBIJATE MADALPINGELISED
ELEKTRIPAIGALDISED

Low-voltage electrical installations - Part 8-2:
Prosumer's low-voltage electrical installations

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-HD 60364-8-2:2019 sisaldab Euroopa standardi HD 60364-8-2:2018 ingliskeelset teksti.	This Estonian standard EVS-HD 60364-8-2:2019 consists of the English text of the European standard HD 60364-8-2:2018.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 23.11.2018.	Date of Availability of the European standard is 23.11.2018.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 91.140.50

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

ICS 91.140.50

English Version

**Low-voltage electrical installations - Part 8-2: Prosumer's low-voltage electrical installations
(IEC 60364-8-2:2018)**

Installations électriques à basse tension - Partie 8-2:
Installations électriques à basse tension du prosommateur
(IEC 60364-8-2:2018)

Errichten von Niederspannungsanlagen - Teil 8-2:
Kombinierte Erzeugungs-/Verbrauchsanlagen
(IEC 60364-8-2:2018)

This Harmonization Document was approved by CENELEC on 2018-11-14. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document at national level.

Up-to-date lists and bibliographical references concerning such national implementations may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This Harmonization Document exists in three official versions (English, French, German).

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

European foreword

The text of document 64/2298/FDIS, future edition 1 of IEC 60364-8-2, prepared by IEC/TC 64 "Electrical installations and protection against electric shock" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as HD 60364-8-2:2018.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-08-14
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-11-14

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.

Endorsement notice

The text of the International Standard IEC 60364-8-2:2018 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60364 (series)	NOTE	Harmonized as HD 60364 (series)
IEC 60364-5-51:2005	NOTE	Harmonized as HD 60364-5-51:2009 (modified)

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60364-4-41 (mod)	2005	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock	HD 60364-4-41	2007
+ A1	2017		-	-
-	-		+ A11	2017
IEC 60364-4-43 (mod)	2008	Low-voltage electrical installations - Part 4-43: Protection for safety - Protection against overcurrent	HD 60364-4-43	2010
IEC 60364-5-53	2001	Electrical installations of buildings - Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control	-	-
+ A1 (mod)	2002		HD 60364-5-534	2008
+ A2 (mod)	2015		HD 60364-5-534	2016
IEC 60364-5-55 (mod)	2011	Electrical installations of buildings - Part 5-55: Selection and erection of electrical equipment - Other equipment	HD 60364-5-559	2012
-	-		+ A11	2017
+ A1	2012		HD 60364-5-557	2013
-	-		+ A11	2016
+ A2	2016		-	-
IEC 60364-7-712 -		Electrical installations of buildings - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems	HD 60364-7-712 -	
IEC 60364-8-1 (mod)	2014	Low-voltage electrical installations - Part 8-1: Energy efficiency	HD 60364-8-1	2015

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references	8
3 Terms and definitions	9
4 Interaction of smart grid and PEI	11
4.1 Main objectives	11
4.2 Safety	11
4.3 Proper functioning.....	11
4.4 Implementation of PEI.....	11
5 PEI concept.....	11
6 Types of PEI.....	13
6.1 General.....	13
6.2 Operating modes	13
6.3 Individual PEI.....	13
6.4 Collective PEI	14
6.5 Shared PEI	17
7 Electrical energy management system (EEMS).....	20
7.1 General.....	20
7.2 Architecture of EEMS.....	20
8 Technical issues	21
8.1 Safety issues	21
8.1.1 Protection against electric shock	21
8.1.2 Protection against overcurrent.....	25
8.1.3 Outage of the public network	26
8.1.4 Protection against transient overvoltages	27
8.2 Interaction with the public network	27
8.3 Energy storage	27
8.4 Design for flexibility of load and generators (demand/response).....	27
8.5 Electric vehicle charging	27
8.6 Selectivity between current protective devices	27
Annex A (informative) Objectives and concept of PEI.....	29
Annex B (informative) Operating modes.....	30
B.1 Operating modes for individual PEI	30
B.1.1 Direct feeding mode.....	30
B.1.2 Island mode.....	30
B.1.3 Reverse feeding mode	31
B.2 Operating modes for collective PEI	32
B.2.1 Direct feeding mode.....	32
B.2.2 Island mode.....	34
B.2.3 Reverse feeding mode	36
B.3 Operating modes for shared PEI	37
B.3.1 Direct feeding mode.....	37
B.3.2 Island mode.....	39
B.3.3 Reverse feeding mode	41

Annex C (informative) Interaction with the public network	43
C.1 General.....	43
C.2 National grid codes compliance with active and reactive power control	43
C.3 Voltage control.....	43
C.4 Frequency control	43
C.5 Load shedding programme.....	43
Annex D (informative) Architecture of PEI	44
D.1 Architecture of individual PEI	44
D.2 Architecture of collective PEI	44
D.3 Architecture of shared PEI	46
Annex E (informative) List of notes concerning certain countries.....	47
Bibliography.....	48
 Figure 1 – Example of prosumer's low-voltage electrical installation	12
Figure 2 – Example of electrical design of individual PEI	14
Figure 3 – Example of electrical design of collective PEI using DSO distribution system	14
Figure 4 – Example of electrical design of collective PEI with distribution system within PEI	15
Figure 5 – Example of electrical design of collective PEI with distribution system within PEI in parallel with DSO distribution system.....	16
Figure 6 – Example of electrical design of shared PEI using DSO distribution system	17
Figure 7 – Example of electrical design of shared PEI with distribution system within PEI....	18
Figure 8 – Example of electrical design of shared PEI with distribution system within PEI in parallel with DSO distribution system.....	19
Figure 9 – Connection to the local earthing arrangement (TN, TT and IT system)	23
Figure 10 – Estimation of the minimum earth fault current according to the operating mode (connected and island)	24
Figure 11 – Example of double short-circuit protection for the same circuit	26
Figure 12 – Example of selectivity with various power supplies	28
Figure B.1 – Example of electrical design of individual PEI operating in direct feeding mode	30
Figure B.2 – Example of electrical design of individual PEI operating in island mode	31
Figure B.3 – Example of electrical design of individual PEI operating in reverse feeding mode	32
Figure B.4 – Example of electrical design of collective PEI operating in direct feeding mode with one single electrical installation.....	33
Figure B.5 – Example of electrical design of collective PEI operating in direct feeding mode with several electrical installations	34
Figure B.6 – Example of electrical design of collective PEI operating in island mode with one single electrical installation	35
Figure B.7 – Example of electrical design of collective PEI operating in island mode with several electrical installations	35
Figure B.8 – Example of electrical design of collective PEI operating in reverse feeding mode with one single electrical installation	36
Figure B.9 – Example of electrical design of collective PEI operating in reverse feeding mode with several electrical installations	37
Figure B.10 – Example of electrical design of shared PEI operating in direct feeding mode with one single electrical installation.....	38

Figure B.11 – Example of electrical design of shared PEI operating in direct feeding mode with several electrical installations	39
Figure B.12 – Example of electrical design of shared PEI operating in island mode with one single electrical installation	40
Figure B.13 – Example of electrical design of shared PEI operating in island mode with several electrical installations	41
Figure B.14 – Example of electrical design of shared PEI operating in reverse feeding mode	42
Figure D.1 – Example of type of architecture of individual PEI	44
Figure D.2 – Example of type of architecture of collective PEI	45
Figure D.3 – Example of type of architecture of shared PEI	46

This document is a preview generated by EVS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 8-2: Prosumer's low-voltage electrical installations

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.

International Standard IEC 60364-8-2 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

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

FDIS	Report on voting
64/2298/FDIS	64/2335/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60364 series, published under the general title *Low-voltage electrical installations*, can be found on the IEC website.

The reader's attention is drawn to the fact that Annex E lists all of the “in-some-country” clauses on differing practices of a less permanent nature relating to the subject of this standard.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Historically, utilities were managing the public transmission and distribution network from the point of view of having a central production adapted to demand variation, a top-down energy flow, a production/consumption balance done by integrated utility companies and with rather passive users.

The following key factors are pushing the public electricity network to change:

- the increasing number of electronic devices used daily and the growing needs as well as future needs (e.g. charging electric vehicles) will result in the structural growing of electricity consumption;
- the mediated pressure on climate change results in pressure on CO₂ emissions reduction;
- the electricity market is also quickly changing due mainly to its unbundling and deregulation, and to the greater number of intermittent renewable energy sources (global and local);
- users' expectations are also evolving as a result of an increasing need for better public networks reliability and quality, the search for better economic performance and the willingness to pro-actively manage their energy;
- technological evolution should also be considered as information and communication technology (ICT) is affordable and new energy storage solutions are emerging.

All stakeholders directly involved in the electricity generation, transmission, distribution and consumption have new expectations:

- customers are willing to reduce electrical energy costs in order to meet environment targets (renewable energy, energy efficiency) but also wish to benefit from the quality of electricity supply;
- suppliers wish to limit customer churn rate with price and service management;
- producers expect to maximize their yield of assets, to optimize their investments and to take profit from energy trading;
- the aggregator wants to create conditions suitable for new market emergence;
- the transmission system operator (TSO) aspires to a robust transmission public network and to meet regulation objectives (price and level of services), while the distribution system operator (DSO) wants to meet regulation objectives (price and level of services), to reduce costs by productivity (including meter) and to have a flexible network;
- finally, governments and regulators are willing to create a competitive and sustainable energy market.

The objective of this document is to ensure that the low-voltage electrical installation is compatible with the current and future ways to deliver safely and functionally the electrical energy to current-using equipment either from the public network or from other local sources. This document is not intended to influence all stakeholders of electricity supply on how the electrical energy should be sold and delivered.