

**NÕUDED MIKROGENERAATORJAAMADE
ÜHENDAMISEKS RÖÖBITI AVALIKE MADALPINGELISTE
JAOTUSVÕRKUDEGA**

**Requirements for micro-generating plants to be
connected in parallel with public low-voltage
distribution networks**

EESTI STANDARDI EESSÕNA**NATIONAL FOREWORD**

See Eesti standard EVS-EN 50438:2013 sisaldab Euroopa standardi EN 50438:2013 ingliskeelset teksti.	This Estonian standard EVS-EN 50438:2013 consists of the English text of the European standard EN 50438:2013.
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Requirements for micro-generating plants to be connected in parallel with public low-voltage distribution networks

Exigences pour les installations de micro-génération destinées à être raccordées en parallèle avec les réseaux publics de distribution à basse tension

Anforderungen für den Anschluss von Klein-Generatoren an das öffentliche Niederspannungsnetz

This European Standard was approved by CENELEC on 2013-11-04. 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.

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Foreword

This document (EN 50438:2013) has been prepared by CLC/TC 8X "System aspects of electrical energy supply".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-11-04
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2016-11-04

This document supersedes EN 50438:2007.

EN 50438:2013 includes the following significant technical changes with respect to EN 50438:2007:

- introduction of a power reduction capability in case of over-frequency;
- introduction of reactive power capability
- update of national protection parameters settings in Annex A;
- modification of tests for the verification of interface protections (voltage and frequency);
- modification of the test for islanding detection;
- addition of a test for direct current injection.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

This European Standard relates to both future European Network Codes and current technical market needs. Its purpose is to give detailed description of functions to be implemented in products and methods to verify the compliance of the products.

This European Standard is also intended to serve as a technical reference for the definition of national requirements where European Network Codes requirements allow flexible implementation, e.g. settings for power response to over frequency.

CLC/TC 8X plans to review the Standard periodically, in order to ensure its compatibility with the evolution of the legal framework.

1 Scope

This European Standard specifies technical requirements for the protection functions and the operational capabilities of micro-generating plants, designed for operation in parallel with public low-voltage distribution networks.

This European Standard applies irrespective of the micro-generating plants' primary source of energy, where micro-generation refers to equipment with nominal currents up to and including 16 A per phase, single or multi phase 230/400 V or multi phase 230 V (phase-to-phase nominal voltage).

For practical reasons, this European Standard refers to the distribution system operator in case settings have to be defined and/or provided, even when these settings are to be defined and/or provided by another actor according to national and European legal framework.

NOTE 1 This includes European network codes and their national implementation, as well as further national regulations.

NOTE 2 Further national requirements especially for the connection to the grid and the operation of the micro-generator can apply as long as they are not in conflict with this EN.

In some countries, this document may be applied to generators with higher nominal currents used mostly in domestic and small commercial installations. These countries are listed in Annex G.

The provisions of this European Standard are not intended to ensure by themselves the safety of DSO personnel or their contracted parties.

The following aspects are included in the scope:

- all micro-generation technologies are applicable.

The following aspects are excluded from the scope:

- multiple units that for one installation, in aggregate, exceed 16 A;
- issues of revenue rebalancing, metering or other commercial matters;
- requirements related to the primary energy source e.g. matters related to gas fired generator units;
- island operation of generating plants, both intentional and unintentional, where no part of the public distribution network is involved;
- active front ends of drives feeding energy back into the distribution network for short duration.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50110 (all parts), *Operation of electrical installations*

EN 50160, *Voltage characteristics of electricity supplied by public electricity networks*

HD 60364 (all parts), *Low-voltage electrical installations (IEC 60364 series)*

EN 61000-3-2:2006, *Electromagnetic compatibility (EMC) — Part 3-2: Limits — Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) (IEC 61000-3-2:2005)*

EN 61000-3-3, *Electromagnetic compatibility (EMC) — Part 3-3: Limits — Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection (IEC 61000-3-3)*

EN 61000-4-30, *Electromagnetic compatibility (EMC) — Part 4-30: Testing and measurement techniques — Power quality measurement methods (IEC 61000-4-30)*

EN 61000-6-1, *Electromagnetic compatibility (EMC) — Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments (IEC 61000-6-1)*

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

HD 60364-5-551, *Low-voltage electrical installations — Part 5-55: Selection and erection of electrical equipment — Other equipment — Clause 551: Low-voltage generating sets (IEC 60364-5-55:2001/A2:2008 (CLAUSE 551))*

IEC 60255-127, *Measuring relays and protection equipment — Part 127: Functional requirements for over/under voltage protection*

3 Terms and definitions

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

3.1

active factor

ratio of the active power to the apparent power, for a two-terminal element or a two-terminal circuit under sinusoidal conditions

Note 1 to entry: In a three phase system this is referring to the positive sequence.

Note 2 to entry: The active factor is equal to the cosine of the displacement angle.

3.2

cogeneration

combined heat and power

CHP

combined generation of electricity and heat by an energy conversion system and the concurrent use of the electric and thermal energy from the conversion system

Note 1 to entry: In the context of small-scale generation this concept is sometimes referred to as “micro-CHP”.

3.3

commissioning

process of putting into operation a micro-generator, apparatus, equipment, building, or facility

3.4

decommissioning

process of removing a micro-generator, apparatus, equipment, building, or facility from operation

3.5

disconnection

separation of the active parts of the micro-generator from the network with mechanical contacts providing at least the equivalent of basic insulation

Note 1 to entry: Passive components like filters, auxiliary power supply to the micro-generator and sense lines can remain connected.

Note 2 to entry: For the design of basic insulation all voltage sources will be considered.

3.6

displacement angle

phase difference angle under sinusoidal conditions, phase difference between the voltage applied to a linear two-terminal element or two-terminal circuit and the electric current in the element or circuit

Note 1 to entry: In a three phase system this is referring to the positive sequence.

Note 2 to entry: The cosine of the displacement angle is the active factor.

3.7

LV distribution network

low voltage part of the electric power system used for the transfer of electricity within an area of consumption to consumers