

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Sensing devices for non-intrusive load monitoring (NILM) systems

Dispositifs de détection pour les systèmes de surveillance non intrusive de la charge (NILM)



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

Sensing devices for non-intrusive load monitoring (NILM) systems

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

Draft	Report on voting
85/933/CDV	85/953/RVC

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.

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INTRODUCTION

Non-intrusive load monitoring (NILM), or non-intrusive appliance and load monitoring (NIALM), is a process for providing estimated energy usage, for example by type of use (heating, cooling, etc.) or type of appliance (microwave, etc.) based on load signatures at a single point in the installation.

NILM systems can be used to survey the specific uses of electrical power in homes, buildings or industrial areas (see Figure 1).

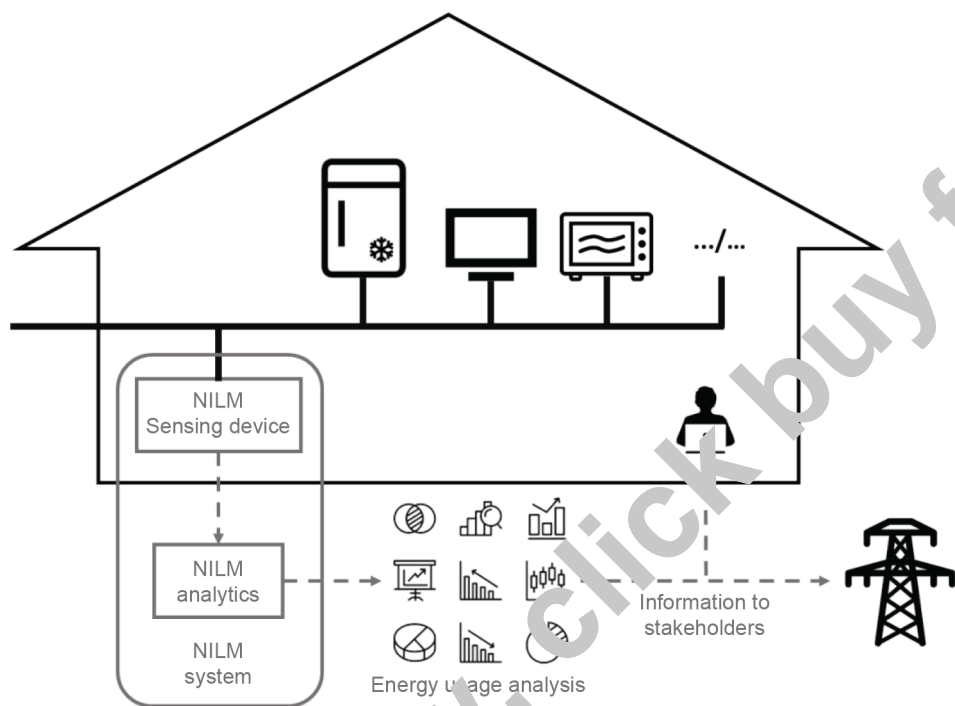


Figure 1 – Principle of non-intrusive load monitoring (NILM)

At the moment, NILM systems are essentially used in AC distribution networks, but DC networks are not excluded.

1 Scope

This document provides a classification of NILM sensing devices for use in NILM systems, according to the state of the art of NILM technologies.

The classification of NILM analytics and NILM systems, as well as performance indicators for NILM systems, can be considered in the future.

NILM systems produce estimated disaggregation into energy usages. When accurate measurement and analysis of energy consumption or other electrical parameters, or both, are necessary (e.g. for monitoring the electrical installation), systems based on standardized measuring devices (e.g. power metering and monitoring devices (PMDs), power quality instruments (PQIs) or meters) are used.

NOTE Standardized measuring devices have guaranteed accuracy over a specified range and have limited deviations in presence of influence quantities (temperature, frequency deviations...) in addition to safety and constructional requirements. See Annex C for more information.

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 61010-1, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*

3 Terms, definitions and abbreviated terms

3.1 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/>
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3.1.1

electrical parameter

electrical quantity to be measured or estimated

EXAMPLE RMS value of current, RMS value of voltage, active power, reactive power, harmonics, power quality related parameters, etc.

3.1.2

estimated value

value of an electrical parameter (e.g. current, power, energy related to a specific usage) produced by a NILM sensing device or a NILM system

Note 1 to entry: Estimated values are typically less accurate than values measured with standardized measuring devices (e.g. PMD, PQI, meters).