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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: ~~Performance measuring~~ Power metering and monitoring devices (PMD)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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: ~~Performance measuring~~ Power metering and monitoring devices (PMD)

FOREWORD

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This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 61557-12 has been prepared by IEC technical committee 85: Measuring equipment for electrical and electromagnetic quantities.

This second edition cancels and replaces the first edition published in 2007. This edition constitutes a technical revision.

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

a) PMD-A has been withdrawn due the fact these devices are now mainly covered by the IEC 62586 series of standards.
b) Three categories of PMD have been created with a list of minimum required functions for each category.
c) Added a new Annex A explaining the different applications linked to the relevant standards and devices, and another new Annex C about the power factor conventions.

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

FDIS	Report on voting
85/644/FDIS	85/649/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 61557 series, published under the general title *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*, can be found on the IEC website.

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.

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INTRODUCTION

~~As a complement to protection measures, it becomes more and more necessary to measure different electrical parameters, in order to monitor the required performances in energy distribution systems due to:~~

- ~~installation standards evolutions, for instance over current detection is now a new requirement for the neutral conductor due to harmonic content;~~
- ~~technological evolutions (electronic loads, electronic measuring methods, etc.);~~
- ~~end-users needs (cost saving, compliance with aspects of building regulations, etc..);~~
- ~~safety and continuity of service;~~

Energy distribution systems need to guarantee energy efficiency, availability and network performances in order to address the following challenges:

– sustainable development requirements where energy measurement, for instance, is recognised as an essential element of energy management, part of the overall drive to reduce carbon emissions and to improve the commercial efficiency of manufacturing, commercial organizations and public services;

– technological evolutions (electronic loads, electronic measuring methods, etc.);

– end-users needs (cost saving, compliance with aspects of building regulations, etc.) regarding electrical energy management as well as other energies, or fluids. Other functionalities involving several non electrical parameters are often needed in parallel;

– safety and continuity of service;

– evolution of installation standards, for instance over-current detection is now a new requirement for the neutral conductor due to harmonic content.

Monitoring electrical quantities in internal networks allows to address these challenges.

The devices on the current market have different characteristics, which need a common system of references. Therefore there is a need for this document in order to facilitate the choices of the end-users in terms of performance, safety, interpretation of the indications, etc. This document provides a basis by which such devices can be specified and described, and their performance evaluated.

In order to fulfil the requirements of the energy efficiency project, many PMD measuring electrical parameters can also collect data (water, air, gas, temperature…) coming from other sensors or meters inside building or plant areas. In order to be able to transmit all these data to a supervision software it will be relevant to equip the PMD with a communication bus. The supervision software will then manage all the collected data in order to monitor them and produce useful reports for energy usage and consumption analysis.

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: ~~Performance measuring~~ Power metering and monitoring devices (PMD)

1 Scope

This part of IEC 61557 specifies requirements for ~~combined performance measuring~~ power metering and monitoring devices (PMD) that measure and monitor the electrical ~~parameters~~ quantities within electrical distribution systems, and optionally other external signals. These requirements also define the performance in single- and three-phase AC or DC systems having rated voltages up to 1 000 V AC or up to 1 500 V DC.

These devices are fixed ~~installed~~ or portable. They are intended to be used indoors and/or outdoors. ~~This standard is not applicable for:~~

- ~~electricity metering equipment that complies with IEC 62053-21, IEC 62053-22 and IEC 62053-23. Nevertheless, uncertainties defined in this standard for active and reactive energy measurement are derived from those defined in the IEC 62053 standards series.~~
- ~~simple remote relays or simple monitoring relays.~~

~~This standard is intended to be used in conjunction with IEC 61557-1 (unless otherwise specified), which specifies the general requirements for measuring and monitoring equipment, as required in IEC 60364-6.~~

~~The standard does not include the measurement and monitoring of electrical parameters defined in Parts 2 to 9 of IEC 61557 or in IEC 62020.~~

~~Combined performance measuring~~ Power metering and monitoring devices (PMD), as defined in this document, give additional safety information, which aids the verification of the installation and enhances the performance of the distribution systems. ~~For instance, those devices help to check if the level of harmonics is still compliant with the wiring systems as required in IEC 60364-5-52.~~

The ~~combined performance measuring~~ power metering and monitoring devices (PMD) for electrical parameters described in this document are used for general industrial and commercial applications. ~~A PMD-A is a specific PMD complying with requirements of IEC 61000-4-30 class A, which may be used in "power quality assessment" applications.~~

This document does not address functional safety and cyber security aspects.

This document is not applicable for:

– electricity metering equipment that complies with IEC 62053-21, IEC 62053-22, IEC 62053-23 and IEC 62053-24. Nevertheless, uncertainties defined in this document for active and reactive energy measurement are derived from those defined in IEC 62053 (all parts);

– the measurement and monitoring of electrical parameters defined in IEC 61557-2 to IEC 61557-9 and IEC 61557-13 or in IEC 62020;

– power quality instrument (PQI) according IEC 62586 (all parts);

– devices covered by IEC 60051 (all parts) (direct acting analogue electrical measuring instrument).

NOTE 1 Generally such types of devices are used in the following applications or for the following general needs:

– energy management inside the installation, such as facilitating the implementation of documents such as ISO 50001 and IEC 60364-8-1;

– monitoring and/or measurement of electrical parameters ~~that may be required or usual~~;

– measurement and/or monitoring of the quality of energy inside commercial/industrial installations.

NOTE 2 A measuring and monitoring device of electrical parameters usually consists of several functional modules. All or some of the functional modules are combined in one device. Examples of functional modules are ~~mentioned below~~:

– measurement and ~~indication~~ monitoring of several electrical parameters simultaneously;

– energy measurement and/or monitoring, as well as sometimes compliance with aspects of building regulations;

– alarms functions;

– ~~power~~ demand side quality (current and voltage harmonics, over/under voltages, voltage dips and swells, etc.).

NOTE 3 PMD are historically called power meter, power monitor, power monitor device, power energy monitoring device, power analyser, multifunction meter, measuring multifunction equipment, energy meters.

NOTE 4 Metering, measuring and monitoring applications are explained in Annex A.

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 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2: Tests – Tests B: Dry heat*

IEC 60068-2-30, *Environmental testing – Part 2-30 – Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

~~IEC 60364-6, *Low-voltage electrical installations – Part 6: Verification*~~

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

~~IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*~~

~~IEC 61000-4-15, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 15: Flickermeter – Functional and design specifications*~~

IEC 61000-4-30:~~2003~~ 2015, *Electromagnetic compatibility (EMC) – Part 4-30: Testing and measurement techniques – Power quality measurement methods*

~~IEC 61010 (all parts), *Safety requirements for electrical equipment for measurement, control, and laboratory use*~~

IEC 61010-1:~~2001~~ 2010, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*
IEC 61010-1:2010/AMD1:2016

IEC 61010-2-030:2017, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-030: Particular requirements for testing and measuring circuits*

IEC 61326-1:~~2005~~ 2012, *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements*

~~IEC 61557-1:2007, *Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 1: General requirements*~~

~~IEC 62053-21:2003, *Electricity metering equipment (a.c.) – Particular requirements – Part 21: Static meters for active energy (classes 1 and 2)*~~

~~IEC 62053-22:2003, *Electricity metering equipment (a.c.) – Particular Requirements – Part 22: Static meters for active energy (classes 0,2 S and 0,5 S)*~~

~~IEC 62053-23:2003, *Electricity metering equipment (a.c.) – Particular requirements – Part 23: Static meters for reactive energy (classes 2 and 3)*~~

IEC 62053-31:1998, *Electricity metering equipment (a.c.) – Particular requirements – Part 31: Pulse output devices for electromechanical and electronic meters (two wires only)*

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INTERNATIONAL STANDARD

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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)

Sécurité électrique dans les réseaux de distribution basse tension jusqu'à 1 000 V c.a. et 1 500 V c.c. – Dispositifs de contrôle, de mesure ou de surveillance de mesures de protection –
Partie 12: Dispositifs de comptage et de surveillance du réseau électrique (PMD)



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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)

FOREWORD

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International Standard IEC 61557-12 has been prepared by IEC technical committee 85: Measuring equipment for electrical and electromagnetic quantities.

This second edition cancels and replaces the first edition published in 2007. This edition constitutes a technical revision.

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

a) PMD-A has been withdrawn due the fact these devices are now mainly covered by the IEC 62586 series of standards.
b) Three categories of PMD have been created with a list of minimum required functions for each category.

c) Added a new Annex A explaining the different applications linked to the relevant standards and devices, and another new Annex C about the power factor conventions.

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

FDIS	Report on voting
85/644/FDIS	85/649/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 61557 series, published under the general title *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*, can be found on the IEC website.

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

Energy distribution systems need to guarantee energy efficiency, availability and network performances in order to address the following challenges:

– sustainable development requirements where energy measurement, for instance, is recognised as an essential element of energy management, part of the overall drive to reduce carbon emissions and to improve the commercial efficiency of manufacturing, commercial organizations and public services;

– technological evolutions (electronic loads, electronic measuring methods, etc.);

– end-users needs (cost saving, compliance with aspects of building regulations, etc.) regarding electrical energy management as well as other energies, or fluids. Other functionalities involving several non electrical parameters are often needed in parallel;

– safety and continuity of service;

– evolution of installation standards, for instance over-current detection is now a new requirement for the neutral conductor due to harmonic content.

Monitoring electrical quantities in internal networks allows to address these challenges.

The devices on the current market have different characteristics, which need a common system of references. Therefore there is a need for this document in order to facilitate the choices of the end-users in terms of performance, safety, interpretation of the indications, etc. This document provides a basis by which such devices can be specified and described, and their performance evaluated.

In order to fulfil the requirements of the energy efficiency project, many PMD measuring electrical parameters can also collect data (water, air, gas, temperature…) coming from other sensors or meters inside building or plant areas. In order to be able to transmit all these data to a supervision software it will be relevant to equip the PMD with a communication bus. The supervision software will then manage all the collected data in order to monitor them and produce useful reports for energy usage and consumption analysis.

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)

1 Scope

This part of IEC 61557 specifies requirements for power metering and monitoring devices (PMD) that measure and monitor the electrical quantities within electrical distribution systems, and optionally other external signals. These requirements also define the performance in single- and three-phase AC or DC systems having rated voltages up to 1 000 V AC or up to 1 500 V DC.

These devices are fixed or portable. They are intended to be used indoors and/or outdoors.

Power metering and monitoring devices (PMD), as defined in this document, give additional safety information, which aids the verification of the installation and enhances the performance of the distribution systems.

The power metering and monitoring devices (PMD) for electrical parameters described in this document are used for general industrial and commercial applications.

This document does not address functional safety and cyber security aspects.

This document is not applicable for:

– electricity metering equipment that complies with IEC 62053-21, IEC 62053-22, IEC 62053-23 and IEC 62053-24. Nevertheless, uncertainties defined in this document for active and reactive energy measurement are derived from those defined in IEC 62053 (all parts);
– the measurement and monitoring of electrical parameters defined in IEC 61557-2 to IEC 61557-9 and IEC 61557-13 or in IEC 62020;
– power quality instrument (PQI) according IEC 62586 (all parts);
– devices covered by IEC 60051 (all parts) (direct acting analogue electrical measuring instrument).

NOTE 1 Generally such types of devices are used in the following applications or for the following general needs:

– energy management inside the installation, such as facilitating the implementation of documents such as ISO 50001 and IEC 60364-8-1;
– monitoring and/or measurement of electrical parameters;
– measurement and/or monitoring of the quality of energy inside commercial/industrial installations.

NOTE 2 A measuring and monitoring device of electrical parameters usually consists of several functional modules. All or some of the functional modules are combined in one device. Examples of functional modules are:

– measurement and monitoring of several electrical parameters simultaneously;
– energy measurement and/or monitoring, as well as sometimes compliance with aspects of building regulations;
– alarms functions;
– demand side quality (current and voltage harmonics, over/under voltages, voltage dips and swells, etc.).

NOTE 3 PMD are historically called power meter, power monitor, power monitor device, power energy monitoring device, power analyser, multifunction meter, measuring multifunction equipment, energy meters.

NOTE 4 Metering, measuring and monitoring applications are explained in Annex A.

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 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2: Tests – Tests B: Dry heat*

IEC 60068-2-30, *Environmental testing – Part 2-30 – Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 61000-4-30:2015, *Electromagnetic compatibility (EMC) – Part 4-30: Testing and measurement techniques – Power quality measurement methods*

IEC 61010-1:2010, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*
IEC 61010-1:2010/AMD1:2016

IEC 61010-2-030:2017, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-030: Particular requirements for testing and measuring circuits*

IEC 61326-1:2012, *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements*

IEC 62053-31:1998, *Electricity metering equipment (a.c.) – Particular requirements – Part 31: Pulse output devices for electromechanical and electronic meters (two wires only)*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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SÉCURITÉ ÉLECTRIQUE DANS LES RÉSEAUX DE DISTRIBUTION BASSE TENSION JUSQU'À 1 000 V c.a. ET 1 500 V c.c. – DISPOSITIFS DE CONTRÔLE, DE MESURE OU DE SURVEILLANCE DE MESURES DE PROTECTION –

Partie 12: Dispositifs de comptage et de surveillance du réseau électrique (PMD)

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La Norme internationale IEC 61557-12 a été établie par le comité d'études 85 de l'IEC: Équipement de mesure des grandeurs électriques et électromagnétiques.

Cette deuxième édition annule et remplace la première édition parue en 2007. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) Suppression des PMD-A du fait que ces dispositifs sont à présent largement couverts par la série de normes IEC 62586.

b) Création de trois catégories de PMD accompagnées d'une liste des fonctions minimales exigées pour chacune des catégories.

c) Ajout d'une nouvelle Annexe A décrivant les différentes applications associées aux normes et dispositifs correspondants et d'une autre nouvelle Annexe C portant sur les conventions du facteur de puissance.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
85/644/FDIS	85/649/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 61557, publiées sous le titre général *Sécurité électrique dans les réseaux de distribution basse tension jusqu'à 1 000 V c.a. et 1 500 V c.c. – Dispositifs de contrôle, de mesure ou de surveillance de mesures de protection*, peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous «http://webstore.iec.ch» dans les données relatives au document recherché. À cette date, le document sera

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INTRODUCTION

Les réseaux de distribution d'énergie ont besoin de garantir l'efficacité énergétique, la disponibilité en énergie et les performances de réseau afin de faire face aux défis suivants:

– exigences de développement durable pour lesquelles le mesurage de l'énergie, par exemple, est reconnu comme un élément essentiel de la gestion énergétique, faisant partie de l'effort global pour réduire les émissions de gaz carbonique et pour améliorer le rendement commercial des organismes de fabrication, des organisations commerciales et des services publics;

– évolutions technologiques (charges électroniques, méthodes de mesure électroniques, etc.);

– besoins des utilisateurs finaux (économies de coûts, conformité aux aspects de la réglementation des constructions, etc.) par rapport à la gestion de l'énergie électrique ainsi que d'autres énergies, ou fluides. D'autres fonctionnalités impliquant plusieurs paramètres non électriques sont souvent nécessaires parallèlement;

– sécurité et continuité du service;

– évolutions des normes d'installation, par exemple la détection des surintensités est à présent une nouvelle exigence pour le conducteur de neutre en raison du contenu harmonique.

La surveillance des grandeurs électriques dans les réseaux internes permet de relever ces défis.

Les dispositifs sur le marché actuel ont différentes caractéristiques, qui nécessitent un système de références commun. Par conséquent, l'élaboration du présent document est nécessaire afin de faciliter les choix des utilisateurs finaux en matière de performances, de sécurité, d'interprétation des indications, etc. Le présent document fournit une base à la spécification et à la description de tels dispositifs ainsi qu'à l'évaluation de leurs performances.

Pour répondre aux exigences du projet d'efficacité énergétique, un bon nombre de dispositifs de comptage et de surveillance du réseau électrique (PMD [1]) chargés de mesurer les paramètres électriques peuvent aussi collecter des données (eau, air, gaz, température…) à partir d'autres capteurs ou compteurs situés à l'intérieur des bâtiments ou des zones d'implantation d'usines. Il est nécessaire d'équiper les PMD d'un bus de communication pour qu'ils soient en mesure de transmettre l'ensemble de ces données à un logiciel de surveillance. Le logiciel de surveillance traite toutes les données collectées en vue de les surveiller et de générer des rapports utiles à l'analyse de l'utilisation et de la consommation d'énergie.

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1 PMD = *power metering and monitoring device*,

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Partie 12: Dispositifs de comptage et de surveillance du réseau électrique (PMD)

1 Domaine d'application

La présente partie de l'IEC 61557 spécifie des exigences relatives aux dispositifs de comptage et de surveillance du réseau électrique (PMD) qui mesurent et surveillent les grandeurs électriques dans les réseaux de distribution électrique et, facultativement, d'autres signaux externes. Ces exigences définissent également les performances dans les réseaux alternatifs ou continus monophasés et triphasés ayant des tensions assignées inférieures ou égales à 1 000 V en courant alternatif ou inférieures ou égales à 1 500 V en courant continu.

Ces dispositifs sont fixes ou portables. Ils sont destinés à être utilisés à l'intérieur et/ou à l'extérieur.

Les dispositifs de comptage et de surveillance du réseau électrique (PMD) tels que définis dans le présent document donnent des informations supplémentaires sur la sécurité, ce qui facilite la vérification de l'installation et augmente les performances des réseaux de distribution.

Les dispositifs de comptage et de surveillance du réseau électrique (PMD) relatifs aux paramètres électriques décrits dans le présent document sont utilisés pour des applications industrielles et commerciales générales.

Le présent document ne traite pas des aspects liés à la sécurité fonctionnelle et à la cybersécurité.

Le présent document n'est pas applicable:

– aux appareils de comptage d'électricité conformes à l'IEC 62053-21, à l'IEC 62053-22, à l'IEC 62053-23 et à l'IEC 62053-24. Néanmoins, les incertitudes définies dans le présent document pour le mesurage de l'énergie active et réactive sont tirées de celles définies dans l'IEC 62053 (toutes les parties);
– au mesurage et à la surveillance des paramètres électriques définis dans l'IEC 61557-2 à l'IEC 61557-9 et dans l'IEC 61557-13 ou dans l'IEC 62020;
– aux instruments de qualité de l'alimentation (PQI – *power quality instrument*) conformes à l'IEC 62586 (toutes les parties);
– aux dispositifs relevant des domaines d'application de l'IEC 60051(toutes les parties) (appareils de mesure électriques analogique à action directe).

NOTE 1 Ces types de dispositifs sont généralement utilisés dans les applications ou pour les besoins généraux suivants:

– gestion énergétique à l'intérieur de l'installation, y compris la facilitation de la mise en œuvre des documents tels que l'ISO 50001 et l'IEC 60364-8-1;
– surveillance et/ou mesurage des paramètres électriques;
– mesurage et/ou surveillance de la qualité de l'énergie à l'intérieur des installations commerciales ou industrielles.

NOTE 2 Un dispositif de mesure et de surveillance des paramètres électriques se compose généralement de plusieurs modules fonctionnels. Tous les modules fonctionnels ou une partie de ces modules sont combinés en un dispositif. Exemples de modules fonctionnels:

– mesurage et surveillance de plusieurs paramètres électriques simultanément;

– mesurage et/ou surveillance de l'énergie ainsi que, parfois, conformité à la réglementation des constructions;

– fonctions d'alarmes;

– qualité du côté consommation d'énergie (harmoniques de courant et de tension, surtensions/sous-tensions, creux de tension et surtensions temporaires, etc.).

NOTE 3 Les PMD sont traditionnellement appelés wattmètres, contrôleurs de puissance, dispositifs de contrôle de la puissance, dispositifs de surveillance de l'énergie électrique, analyseurs de puissance, compteurs multifonctions, équipements de mesure multifonctions, compteurs d'énergie.

NOTE 4 Les applications de comptage, de mesure et de surveillance sont expliquées à l'Annexe A.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60068-2-1, *Essais d'environnement – Partie 2-1: Essais – Essai A: Froid*

IEC 60068-2-2, *Essais d'environnement – Partie 2-2: Essais – Essai B: Chaleur sèche*

IEC 60068-2-30, *Essais d'environnement – Partie 2-30: Essais – Essai Db: Essai cyclique de chaleur humide (cycle de 12 h + 12 h)*

IEC 60529, *Degrés de protection procurés par les enveloppes (Code IP)*

IEC 61000-4-30:2015, *Compatibilité électromagnétique (CEM) – Partie 4-30: Techniques d'essai et de mesure – Méthodes de mesure de la qualité de l'alimentation*

IEC 61010-1:2010, *Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire – Partie 1: Exigences générales*
IEC 61010-1:2010/AMD1:2016

IEC 61010-2-030:2017, *Exigences de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire – Partie 2-030: Exigences particulières pour les appareils équipés de circuits d'essai ou de mesure*

IEC 61326-1:2012, *Matériel électrique de mesure, de commande et de laboratoire – Exigences relatives à la CEM – Partie 1: Exigences générales*

IEC 62053-31:1998, *Équipement de comptage de l'électricité (c.a.) – Prescriptions particulières – Partie 31: Dispositifs de sortie d'impulsions pour compteurs électromécaniques et électroniques (seulement deux fils)*