IEC 62053-22

Edition 2.0 2020-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electricity metering equipment – Particular requirements –
Part 22: Static meters for AC active energy (classes 0,1S, 0,2S and 0,5S)

Équipement de comptage de l'électricité – Exigences particulières –
Partie 22: Compteurs statiques d'énergie active en courant alternatif
(classes 0,1 S, 0,2 S et 0,5 S)

IEC 62053-22:2020-06(en-fr)

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 17.220.20

ISBN 978-2-8322-8439-1

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICITY METERING EQUIPMENT – PARTICULAR REQUIREMENTS –

Part 22: Static meters for AC active energy (classes 0,1 S, 0,2 S and 0,5 S)

FOREWORD

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International Standard IEC 62053-22 has been prepared by IEC technical committee 13: Electrical energy measurement and control.

This second edition cancels and replaces the first edition published in 2003 and its amendment 1: 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition: see Annex B.

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

FDIS	Report on voting
13/1806A/FDIS	13/1814/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 62053 series, published under the general title *Electricity metering equipment – Particular requirements*, 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- withdrawn,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.

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 2 years from the date of publication.

INTRODUCTION

This part of IEC 62053 is to be used with relevant parts of the IEC 62052, IEC 62058 and IEC 62059 series, *Electricity metering equipment*, and with the IEC 62055 series, *Electricity metering – Payment systems*:

IEC 62052-11:2020,	*Electricity metering equipment – General requirements, tests and test conditions – Part 11: Metering equipment*
IEC 62052-31:2015,	*Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 31: Product safety requirements and tests*
IEC 62053-11:2003,	*Electricity metering equipment (AC) – Particular requirements – Part 11: Electromechanical meters for active energy (classes 0,5, 1 and 2)*
IEC 62053-21:2020,	*Electricity metering equipment – Particular requirements – Part 21: Static meters for AC active energy (classes 0,5, 1 and 2)*
IEC 62053-23:2020,	*Electricity metering equipment – Particular requirements – Part 23: Static meters for reactive energy (classes 2 and 3)*
IEC 62053-24:2020,	*Electricity metering equipment – Particular requirements – Part 24: Static meters for fundamental component reactive energy (classes 0,5 S, 1S, 1, 2 and 3)*
IEC 62055-31:2005,	*Electricity metering – Payment systems – Part 31: Particular requirements – Static payment meters for active energy (classes 1 and 2)*
IEC 62057-1: –	*Test equipment, techniques and procedures for electrical energy meters – Part 1: Stationary Meter Test Units (MTU)*
IEC 62058-11:2008,	*Electricity metering equipment (AC) – Acceptance inspection - –Part 11: General acceptance inspection methods*
IEC 62058-21:2008,	*Electricity metering equipment (AC) – Acceptance inspection – Part 21: Particular requirements for electromechanical meters for active energy (classes 0,5, 1 and 2)*
IEC 62058-31:2008,	*Electricity metering equipment (AC) – Acceptance inspection – Part 31: Particular requirements for static meters for active energy (classes 0,2 S, 0,5 S, 1 and 2)*
IEC 62059-11:2002,	*Electricity metering equipment – Dependability – Part 11: General concepts*
IEC 62059-21:2002,	*Electricity metering equipment – Dependability – Part 21: Collection of meter dependability data from the field*
IEC 62059-32-1:2011,	*Electricity metering equipment – Dependability – Part 32-1: Durability – Testing of the stability of metrological characteristics by applying elevated temperature*

This part is a standard for type testing electricity meters. It covers the particular requirements for meters, being used indoors and outdoors in large quantities worldwide. It does not deal with special implementations (such as metering-part and/or displays in separate housings).

This document is intended to be used in conjunction with IEC 62052-11:2020 and with IEC 62052-31:2015. When any requirement in this document concerns an item already covered in IEC 62052-11:2020 or in IEC 62052-31:2015, the requirements of this document take precedence over the requirements of IEC 62052-11:2020 or of IEC 62052-31:2015.

The test levels are regarded as minimum values that provide for the proper functioning of the meter under normal working conditions. For special applications, additional test levels might be necessary and are subject to an agreement between the manufacturer and the purchaser.

ELECTRICITY METERING EQUIPMENT – PARTICULAR REQUIREMENTS –

Part 22: Static meters for AC active energy (classes 0,1 S, 0,2 S and 0,5 S)

1 Scope

This part of IEC 62053 applies only to transformer operated static watt-hour meters of accuracy classes 0,1 S, 0,2 S and 0,5 S for the measurement of alternating current electrical active energy in 50 Hz or 60 Hz networks and it applies to their type tests only.

NOTE 1 For other general requirements, such as safety, dependability, etc., see the relevant IEC 62052 or IEC 62059 standards.

This document applies to electricity metering equipment designed to:

- measure and control electrical energy on electrical networks (mains) with voltage up to 1 000 V;

NOTE 2 For AC electricity meters, the voltage mentioned above is the line-to-neutral voltage derived from nominal voltages. See IEC 62052-31:2015, Table 7.

- have all functional elements, including add-on modules, enclosed in, or forming a single meter case with exception of indicating displays;
- operate with integrated or detached indicating displays, or without an indicating display;
- be installed in a specified matching socket or rack;
- optionally, provide additional functions other than those for measurement of electrical energy.

NOTE 3 Modern electricity meters typically contain additional functions such as measurement of voltage magnitude, current magnitude, power, frequency, power factor, etc.; measurement of power quality parameters; load control functions; delivery, time, test, accounting, recording functions; data communication interfaces and associated data security functions. The relevant standards for these functions may apply in addition to the requirements of this document. However, the requirements for such functions are outside the scope of this document.

NOTE 4 Product requirements for power metering and monitoring devices (PMDs) and measurement functions such as voltage magnitude, current magnitude, power, frequency, etc., are covered in IEC 61557-12. However, devices compliant with IEC 61557-12 are not intended to be used as billing meters unless they are also compliant with the IEC 62052-11:2020 and one or more relevant IEC 62053-xx accuracy class standards.

NOTE 5 Product requirements for power quality instruments (PQIs) are covered in IEC 62586-1. Requirements for power quality measurement techniques (functions) are covered in IEC 61000-4-30. Requirements for testing of the power quality measurement functions are covered in IEC 62586-2.

This document does not apply to:

- meters for which the voltage line-to-neutral derived from nominal voltages exceeds 1 000 V;
- meters intended for connection with low power instrument transformers (LPITs as defined in the IEC 61869 series) when tested without such transformers;
- metering systems comprising multiple devices physically remote from one another.
- portable meters;

NOTE 6 Portable meters are meters that are not permanently connected.

- meters used in rolling stock, vehicles, ships and airplanes;
- laboratory and meter test equipment;
- reference standard meters;
- data interfaces to the register of the meter;

- matching sockets or racks used for installation of electricity metering equipment;
- any additional functions provided in electrical energy meters.

This document does not cover measures for the detection and prevention of fraudulent attempts to compromise a meter's performance (tampering).

NOTE 7 Nevertheless, specific tampering detection and prevention requirements, and test methods, as relevant for a particular market are subject to the agreement between the manufacturer and the purchaser.

NOTE 8 Specifying requirements and test methods for fraud detection and prevention would be counterproductive, as such specifications would provide guidance for potential fraudsters.

NOTE 9 There are many types of meter tampering reported from various markets; therefore, designing meters to detect and prevent all types of tampering could lead to unjustified increase in costs of meter design, verification and validation.

NOTE 10 Billing systems, such as, smart metering systems, are capable of detecting irregular consumption patterns and irregular network losses which enable discovery of suspected meter tampering.

NOTE 11 For transformer operated meters paired with current transformers (CTs) according to IEC 61869-2:

– the standard CT measuring range is specified from 0,05 I_n to I_{max} for accuracy classes 0,1, 0,2, 0,5 and 1 and these CTs are used for meters of class 0,5, 1 and 2 according to IEC 62053-21;
– the special CT measuring range is specified from 0,01 I_n to I_{max} for accuracy classes 0,2 S and 0,5 S and these CTs are used for meters of class 0,1 S, 0,2 S and 0,5 S according to this document;
– combinations of standard CTs and meters of class 0,1 S, 0,2 S and 0,5 S are subject to an agreement between manufacturers and purchasers.

NOTE 12 This document does not specify emission requirements, these are specified in IEC 62052-11:2020, 9.3.14.

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 62052-11:2020, *Electricity metering equipment – General requirements, tests and test conditions – Part 11: Metering equipment*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62052-11:2020 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia website: http://www.electropedia.org
- ISO Online Browsing Platform website: http://www.iso.org/obp

4 Standard electrical values

4.1 Voltages

The values given in IEC 62052-11:2020 apply.

4.2 Currents

4.2.1 Nominal currents

The values given in IEC 62052-11:2020 apply.

4.2.2 Starting current

The requirements and acceptance criteria of IEC 62052-11:2020 apply (see Table 1).

Table 1 – Starting current

Meters for	Class of meter			Power factor
	0,1 S	0,2 S	0,5 S	cos φ
Connection through current transformers	0,001 I_n	0,001 I_n	0,001 I_n	1

4.2.3 Minimum current

The requirements and acceptance criteria of IEC 62052-11:2020 apply (see Table 2).

Table 2 – Minimum current

Meters for	Minimum current I_{min} classes 0,1 S, 0,2 S, 0,5 S
Connection through current transformers	0,01 I_n

4.2.4 Maximum current

The requirements and acceptance criteria of IEC 62052-11:2020 apply.

4.3 Frequencies

The values given in IEC 62052-11:2020 apply.

4.4 Power consumption

The requirements, test conditions and procedures, and acceptance criteria of IEC 62052-11:2020 apply.

5 Construction requirements

The requirements, test conditions and procedures, and acceptance criteria of IEC 62052-11:2020 apply.

6 Meter marking and documentation

The requirements of IEC 62052-11:2020 apply.

7 Accuracy requirements

7.1 General test conditions

The test conditions of IEC 62052-11:2020 apply.

7.2 Methods of accuracy verification

The requirements, test conditions and procedures, and acceptance criteria of IEC 62052-11:2020 apply.