

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Electricity metering equipment (a.c.) – Particular requirements –
Part 11: Electromechanical meters for active energy (classes 0,5, 1 and 2)**

**Équipement de comptage de l'électricité (c.a.) – Prescriptions particulières –
Partie 11: Compteurs électromécaniques d'énergie active (classes 0,5, 1 et 2)**

IEC 62053-11:2003

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICITY METERING EQUIPMENT (AC) –
PARTICULAR REQUIREMENTS –****Part 11: Electromechanical meters for active energy
(classes 0,5, 1 and 2)**

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 62053-11 edition 1.1 contains the first edition (2003-01) [documents 13/1287/FDIS and 13/1293/RVD] and its amendment 1 (2016-11) [documents 13/1698/FDIS and 13/1712/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 62053-11 has been prepared by IEC technical committee 13: Equipment for electrical energy measurement and load control.

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

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication 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- withdrawn,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 4 years from the date of publication.

The contents of the corrigendum of March 2018 have been included in this copy.

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

This part of IEC 62053 is to be used with the following relevant parts of the IEC 62052, IEC 62053 and IEC 62059 series, Electricity metering equipment:

IEC 62052-11:2003, *Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 11: Metering equipment*
Amendment 1 (2016)

IEC 62052-31:2015, *Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 31: Product safety requirements and tests*

IEC 62053-21:2003, *Electricity metering equipment (a.c.) – Particular requirements – Part 21: Static meters for active energy (classes 1 and 2)* Replaces particular requirements of IEC 61036: 2000 (2nd edition)

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)* Replaces particular requirements of IEC 60687: 1992 (2nd edition)

IEC 62053-23:2002, *Electricity metering equipment (a.c.) – Particular requirements – Part 23: Static meters for reactive energy (classes 2 and 3)* Replaces particular requirements of IEC 61268: 1995 (1st edition)

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

IEC 62053-61:1998, *Electricity metering equipment (a.c.) – Particular requirements – Part 61: Power consumption and voltage requirements*

IEC 62059-11:2002, *Electricity metering equipment (a.c.) – Dependability – Part 11: General concepts*

IEC 62059-21:2002, *Electricity metering equipment (a.c.) – Dependability – Part 21: Collection of meter dependability data from the field*

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 world-wide. It does not deal with special implementations (such as metering-part and/or displays in separate housings).

This standard is intended to be used in conjunction with IEC 62052-11. When any requirement in this standard concerns an item already covered in IEC 62052-11, the requirements of this standard take precedence over the requirements of IEC 62052-11.

This standard distinguishes:

- between accuracy class index 0,5, accuracy class index 1 and accuracy class index 2 meters;
- between protective class I and protective class II meters;
- between meters for use in networks equipped with or without earth fault neutralizers.

The test levels are regarded as minimum values that provide for the proper functioning of the meter under normal working conditions. For special application, other test levels might be necessary and should be agreed on between the user and the manufacturer.

INTRODUCTION TO AMENDMENT 1

The purpose of this amendment is to identify and remove all safety related requirements and tests of IEC 62053-11:2003 that are replaced and extended by the complete set of requirements and tests in IEC 62052-31:2015.

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ELECTRICITY METERING EQUIPMENT (AC) – PARTICULAR REQUIREMENTS –

Part 11: Electromechanical meters for active energy (classes 0,5, 1 and 2)

1 Scope

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

It applies only to electromechanical watt-hour meters for indoor and outdoor application consisting of a measuring element and register(s) enclosed together in a meter case. It also applies to operation indicator(s) and test output(s). If the meter has a measuring element for more than one type of energy (multi-energy meters), or when other functional elements, like maximum demand indicators, electronic tariff registers, time switches, ripple control receivers, data communication interfaces, etc. are enclosed in the meter case, then the relevant standards for these elements also apply.

It does not apply to:

- watt-hour meters where the voltage across the connection terminals exceeds 600 V (line-to-line voltage for meters for polyphase systems);
- portable meters;
- data interfaces to the register of the meter.

The safety aspect is covered by IEC 62052-31:2015.²⁰⁰³

Regarding acceptance tests, ~~a basic guideline is given in IEC 60514~~ see IEC 62058-11:2008 and IEC 62058-21:2008.

The dependability aspect is covered by the documents of the IEC 62059 series.

2 Normative references

The following referenced documents are indispensable for the application 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 60514:1975, Acceptance inspection of Class 2 alternating-current watt-hour meters~~

~~IEC 60736:1982, Testing equipment for electrical energy meters~~

IEC 62052-11:2003, *Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 11: Metering equipment*
Amendment 1 (2016)

IEC 62052-31:2015, *Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 31: Product safety requirements and tests*

3 Terms and definitions

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

4 Standard electrical values

The values given in IEC 62052-11 apply.

5 Mechanical requirements

In addition to the mechanical requirements in IEC 62052-11, electromechanical meters shall fulfil the following requirements.

5.1 General

The case of an electromechanical watt-hour meter shall be so constructed that, if mounted according to the manufacturer's instructions, the meter shall not deviate by more than $0,5^\circ$ in all directions from its vertical position (see also note 2 of Table 11).

5.2 Register (counting mechanism)

The register may be of the drum or the pointer type.

In drum-type registers, the principal unit in which the register records shall be marked adjacent to the set of drums.

In this type of register, only the last drum, i.e. the drum on the extreme right, may be continuously movable.

In pointer-type registers, the unit in which the register records shall be marked adjacent to the units dial in the form: 1 kWh/div, or 1 MWh/div, and the decimal multiples may be marked adjacent to the other dials. For example, in a meter registering in terms of kilowatthours, the units dial shall be marked: 1 kWh/div and, adjacent to the other dials to the left of the units dial, shall be marked: 10 – 100 – 1 000, etc.

5.3 Direction of rotation and marking of the rotor

The edge of the rotor nearest to an observer viewing a meter from the front shall move from left to right for positive registration. The direction of rotation shall be marked by a clearly visible arrow.

The edge and/or upper surface of the disk shall carry an easily visible mark to facilitate revolution counting. Other marks may be added for stroboscopic or other tests, but such marks shall be so placed as not to interfere with the use of the main visible mark for photoelectric revolution counting.

6 Climatic conditions

The conditions given in IEC 62052-11 apply.

7 Electrical requirements

In addition to the electrical requirements in IEC 62052-11, meters shall fulfil the following requirements.

7.1 Power consumption

The power consumption in the voltage and current circuit shall be determined at reference conditions given in 8.5 by any suitable method. The overall maximum error of the measurement of the power consumption shall not exceed 5 %.

7.1.1 Voltage circuits

The active and apparent power consumption in each voltage circuit of a meter at reference voltage, reference temperature and reference frequency shall not exceed the values shown in Table 1.

Table 1 – Power consumption in voltage circuits

Meters	Class of meter	
	0,5 and 1	2
Single-phase and polyphase	3 W and 12 VA	2 W and 10 VA
NOTE In order to match voltage transformers to meters, the meter manufacturer should state whether the burden is inductive or capacitive (for transformer operated meters only).		

7.1.2 Current circuits

The apparent power taken by each current circuit of a direct connected meter at basic current, reference frequency and reference temperature shall not exceed the values shown in Table 2.

The apparent power taken by each current circuit of a meter connected through a current transformer shall not exceed the value shown in Table 2 at a current value that equals the rated secondary current of the corresponding transformer, at reference temperature and reference frequency of the meter.

Table 2 – Power consumption in current circuits

Meters	Basic current I_b	Class of meter		
		0,5	1	2
Single-phase and polyphase	<30 A	6,0 VA	4,0 VA	2,5 VA
	≥30 A	10,0 VA	6,0 VA	4,0 VA
NOTE 1 The rated secondary current is the value of the secondary current indicated on the current transformer, on which the performance of the transformer is based. Standard values of maximum secondary current are 120%, 150 % and 200 % of the rated secondary current.				
NOTE 2 In order to match current transformers to meters, the meter manufacturer should state whether the burden is inductive or capacitive (for transformer operated meters only).				

7.2 Influence of short-time overcurrents

Short-time overcurrents shall not damage the meter. The meter shall perform correctly when back to its initial working condition and the variation of error shall not exceed the values shown in Table 3. The meter shall be allowed to return to the initial temperature with the voltage circuit(s) energized (about 1 h).

The test circuit shall be practically non-inductive and the test shall be performed for polyphase meters phase-by-phase.

a) Meter for direct connection

The meter shall be able to carry an impulse current whose peak value equals $50 I_{max}$ with a relative tolerance of + 0 % to –10 % (or 7 000 A, whichever is less) and which remains