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Edition 1.1 2016-11
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INTERNATIONAL STANDARD

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

Equipement de comptage de l'électricité (c.a.) – Prescriptions particulières – Partie 22: Compteurs statiques d'énergie active (classes 0,2 S et 0,5 S)

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IEC 62053-22:2003-01+AMD1:2016-01 CSV(en-fr)

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ELECTRICITY METERING EQUIPMENT (AC) – PARTICULAR REQUIREMENTS –

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

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

IEC 62053-22 edition 1.1 contains the first edition (2003-01) [documents 13/1283/FDIS and 13/1290/RVD] and its amendment 1 (2016-11) [documents 13/1701A/FDIS and 13/1715/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.

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International Standard IEC 62053-22 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

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- withdrawn,
- replaced by a revised edition, or
- amended.

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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.

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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 62053-11:2003, *Electricity metering equipment (a.c.) – Particular requirements – Part 11: Electromechanical meters for active energy (classes 0,5, 1 and 2)* Replaces particular requirements of IEC 60521: 1988 (2nd edition)

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 62053-23:2003, *Electricity metering equipment (AC) – Particular requirements – Part 23: Static meters for reactive energy (classes 2 and 3)*
Amendment 1 (2016)

IEC 62053-24:2014, *Electricity metering equipment (a.c.) - Particular requirements - Part 24: Static meters for reactive energy at fundamental frequency (classes 0,5 S, 1S and 1)*
Amendment 1 (2016)

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. 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 0,2 S and accuracy class index 0,5 S meters;

– between protective class I and protective class II meters;

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– 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 62053-22:2003 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 22: Static meters for active energy (classes 0,2 S and 0,5 S)

1 Scope

This part of IEC 62053 applies only to newly manufactured static watt-hour meters of accuracy classes 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.

It applies only to transformer-operated static watt-hour meters for indoor 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.

NOTE IEC 60044-1 describes transformers having a measuring range of 0,01 I_n to 1,2 I_n, or of 0,05 I_n to 1,5 I_n, or of 0,05 I_n to 2 I_n and transformers having a measuring range of 0,01 I_n to 1,2 I_n for accuracy classes 0,2 S and 0,5 S. As the measuring ranges of a meter and its associated transformers have to be matched and as only transformers of classes 0,2 S and 0,5 S have the accuracy required to operate the meters of this standard, the measuring range of the meter will be 0,01 I_n to 1,2 I_n.

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 and meters for outdoor use;
– data interfaces to the register of the meter;
– reference meters.

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

The safety aspect is covered by IEC 62052-31:2015.

Regarding acceptance tests, see IEC 62058-11:2008 and IEC 62058-31:2008.

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 60044-1:1996, *Instrument transformers – Part 1: Current transformers*

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

IEC 62052-11:~~2002~~ 2003, *Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 11: Metering equipment*
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IEC 62052-31:2015, *Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 31: Product safety requirements and tests*

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

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

The requirements of IEC 62052-11 apply.

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 circuits 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 %.

The active and apparent power consumption taken at reference temperature and reference frequency, by each voltage circuit at reference voltage and by each current circuit at rated current, shall not exceed the values shown in Table 1.

Table 1 – Power consumption including the power supply

	Power supply connected to the voltage circuits	Power supply not connected to the voltage circuits
Voltage circuit	2 W and 10 VA	0,5 VA
Current circuit	1 VA	1 VA
Auxiliary power supply	–	10 VA
NOTE 1 In order to match voltage and current transformers to meters, the meter manufacturer should state whether the burden is inductive or capacitive. NOTE 2 The above figures are mean values. Switching power supplies with peak power values in excess of these specified values are permitted, but it should be ensured that the rating of associated voltage transformers is adequate. NOTE 3 For multifunctional meters see IEC 62053-61.		

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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 at rated current and unity power factor shall not exceed 0,05 %.

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

After the application of the short-time overcurrent with the voltage maintained at the terminals, the meter shall be allowed to return to the initial temperature with the voltage circuit(s) energized (about 1 h).

The meter shall be able to carry for 0,5 s a current equal to 20 I_{max} with a relative tolerance of +0 % to –10 %.

7.3 Influence of self-heating

The variation of error due to self-heating shall not exceed the values given in Table 2.

Table 2 – Variations due to self-heating

Value of current	Power factor	Limits of variations in percentage error for meters of class	
		0,2 S	0,5 S
I_{max}	1	0,1	0,2
	0,5 inductive	0,1	0,2

The test shall be carried out as follows: after the voltage circuits have been energized at reference voltage for at least 2 h without any current in the current circuits, the maximum current shall be applied to the current circuits. The meter error shall be measured at unity power factor immediately after the current is applied and then at intervals short enough to allow a correct drawing to be made of the curve of error variation as a function of time. The test shall be carried out for at least 1 h, and in any event until the variation of error during 20 min does not exceed 0,05 %.

The same test shall then be carried out at 0,5 (inductive) power factor.

~~The cable to be used for energizing the meter shall have a length of 1 m and a cross-section of between 1,5 mm^2 and 2,5 mm^2.~~

Test cables shall be as specified in IEC 62052-31:2015, 4.3.2.11.

7.4 AC voltage test

~~The a.c. voltage test shall be carried out in accordance with Table 3.~~

~~The test voltage shall be substantially sinusoidal, having a frequency between 45 Hz and 65 Hz, and applied for 1 min. The power source shall be capable of supplying at least 500 VA.~~

~~During the tests relative to earth, the auxiliary circuits with reference voltage equal to or below 40 V shall be connected to earth.~~

~~All these tests shall be carried out with the case closed and the cover and terminal covers in place.~~

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~~During this test no flashover, disruptive discharge or puncture shall occur.~~

~~**Table 3 – AC voltage tests**~~

~~Test~~	~~Applicable to~~	~~Test voltage r.m.s~~	~~Points of application of the test voltage~~
~~A~~	~~Protective class I meters~~	~~2 kV~~	~~a) Between, on the one hand, all the current and voltage circuits as well as the auxiliary circuits whose reference voltage is over 40 V, connected together, and, on the other hand, earth.~~
		~~2 kV~~	~~b) Between circuits not intended to be connected together in service.~~
~~B~~	~~Protective class II meters~~	~~4 kV~~	~~a) Between, on the one hand, all the current and voltage circuits as well as the auxiliary circuits whose reference voltage is over 40 V, connected together, and, on the other hand, earth.~~
		~~2 kV~~	~~b) Between circuits not intended to be connected together in service.~~
		~~–~~	~~c) A visual inspection for compliance with the conditions of 5.7 of IEC 62052-11.~~

IEC 62052-31:2015, 6.10.4.3.4 applies.

8 Accuracy requirements

Tests and test conditions given in IEC 62052-11 apply.

8.1 Limits of error due to variation of the current

When the meter is under the reference conditions given in 8.5, the percentage errors shall not exceed the limits for the relevant accuracy class given in Tables 4 and 5.

If the meter is designed for the measurement of energy in both directions, the values in Table 4 and Table 5 shall apply for each direction.

Table 4 – Percentage error limits
(single-phase meters and polyphase meters with balanced loads)

Value of current	Power factor	Percentage error limits for meters of class	
		0,2 S	0,5 S
$0{,}01\ I_n \le I < 0{,}05\ I_n$	1	±0,4	±1,0
$0{,}05\ I_n \le I \le I_{max}$	1	±0,2	±0,5
$0{,}02\ I_n \le I < 0{,}1\ I_n$	0,5 inductive	±0,5	±1,0
	0,8 capacitive	±0,5	±1,0
$0{,}1\ I_n \le I \le I_{max}$	0,5 inductive	±0,3	±0,6
	0,8 capacitive	±0,3	±0,6
When specially requested by the user: from $0{,}1\ I_n \le I \le I_{max}$	0,25 inductive	±0,5	±1,0
	0,5 capacitive	±0,5	±1,0

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