

**Elektrimõõteseadmed vahelduvvoolule.  
Vastuvõtukontroll. Osa 21: Erinõuded  
elektromehaanilistele aktiivenergiaarvestitele (klassid  
0,5, 1 ja 2 ning klassitähised A ja B)**

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E 62058-21:2008

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<div>E</div> <div>21:2010</div> <div>21:2010</div> <div>S</div> <div>1 08 2010</div> <div>EVS</div> <div>E</div> <div>25 06 2010</div> <div>S</div>	<div>EVS-EN 62058- EN 62058-</div> <div>E</div> <div>E</div> <div>S</div> <div>E</div> <div>E</div> <div>E</div> <div>E</div>	<div>E</div> <div>EVS-EN 62058-21:2010</div> <div>E</div> <div>EN 62058-21:2010</div> <div>E</div> <div>E</div> <div>S</div> <div>1 08 2010</div> <div>E</div> <div>25 06 2010</div> <div>E</div> <div>E</div>
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English version

**Electricity metering equipment (a.c.) -  
Acceptance inspection -  
Part 21: Particular requirements for electromechanical meters for active  
energy (classes 0,5, 1 and 2 and class indexes A and B)  
(IEC 62058-21:2008, modified)**

Equipement de comptage  
de l'électricité (a.c.) -  
Contrôle de réception -  
Partie 21: Exigences particulières  
pour compteurs électromécaniques  
d'énergie active (classes 0,5, 1 et 2  
et indices de classe A et B)  
(CEI 62058-21:2008, modifiée)

Wechselstrom-Elektrizitätszähler -  
Annahmeprüfung -  
Teil 21: Besondere Anforderungen  
an elektromechanische Zähler  
für Wirkenergie (Klassen 0,5, 1 und 2  
und Klassenzeichen A und B)  
(IEC 62058-21:2008, modifiziert)

This European Standard was approved by CENELEC on 2010-06-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

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## Foreword

The text of document 13/1431/FDIS, future edition 1 of IEC 62058-21, prepared by IEC TC 13, Electrical energy measurement, tariff- and load control, was submitted to the IEC-CENELEC parallel vote.

A draft amendment, prepared by the Technical Committee CENELEC TC 13, Equipment for electrical energy measurement and load control, was submitted to the formal vote.

The combined texts were approved by CENELEC as EN 62058-21 on 2010-06-01.

EN 62058-21:2010, together with EN 62058-11:2010, supersedes EN 60514:1995.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

- latest date by which the EN has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 2011-06-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2013-06-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 2004/22/EC. See Annex ZZ.

Annexes ZA and ZZ have been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 62058-11:2008 was approved by CENELEC as a European Standard with agreed common modifications as given below.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

- |                   |      |  |
|-------------------|------|--|
| IEC 62052-11:2003 | NOTE | Harmonized as EN 62052-11:2003 (not modified). |
| IEC 62053-11:2003 | NOTE | Harmonized as EN 62053-11:2003 (not modified). |

## COMMON MODIFICATIONS

### Title

**Replace** the title of EN 62058-21 by the following:

Electricity metering equipment (a.c.) - Acceptance inspection - Part 21: Particular requirements for electromechanical meters for active energy (classes 0,5, 1 and 2 and class indexes A and B)

### Scope

**Add** the following text at the end of Clause 1:

This European standard applies to meters of accuracy classes 0,5, 1 and 2, as well as to meters of class indexes A and B.

## Normative references

Add the following references:

Publication	Year	Title
EN 50470-1	2006	<i>Electricity metering equipment (a.c.) - Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)</i>
EN 50470-2	2006	<i>Electricity metering equipment (a.c.) - Part 2: Particular requirements - Electromechanical meters for active energy (class indexes A and B)</i>

## 4 Test conditions

### 4.2 Reference conditions

Add the following text at the end of 4.2:

For meters of class index A and B, the values in Table 1 and Table 2, specified for meters of class 2 and class 1 apply respectively.

## 5 Inspection procedure

### 5.1 Test to be performed and inspection methods

Add the following text above 5.2:

See also EN 62058-11, 5.5.

### 5.2 Preliminary tests and pre-conditioning

Add the following text above 5.3:

For meters of class indexes A and B, the value of the current shall be  $I_{tr}$ .

### 5.4 Test No. 2: Test of no-load condition

Add the following text after the Note:

The value of the test current for meters of class indexes A and B shall be  $0,01 I_{tr}$ .

### 5.5 Test No. 3: Starting

Add the following text and table after Table 6:

For meters of class index A and B, instead of the values of Table 6, the values of Table Z1 apply:

**Table Z1 – Value of current for starting test for meters of class index A and B**

Meters for	Meters of class index		Power factor
	A	B	
Direct connection	$0,05 I_{tr}$	$0,04 I_{tr}$	1
Connection through current transformers	$0,06 I_{tr}$	$0,04 I_{tr}$	1

### 5.6 Tests No. 4...9: Accuracy tests

Add the following text and tables after Table 7:

For meters of class index A and B, instead of the values of the values of Table 7, the values of Table Z2 apply:

**Table Z2 – Accuracy test points and limits of errors for meters of class index A and B**

Test No.	Value of current for direct connected and transformer operated meters	Power factor	Applicable for meter type	Load (in case of polyphase meters)	Percentage error limits for for meters of class index	
					A	B
4	$I_{\min}$	1	Single- and polyphase	Balanced	$\pm 2,5$	$\pm 1,5$
5	$10 I_{tr}$	1	Single- and polyphase	Balanced	$\pm 2,0$	$\pm 1,0$
6	$10 I_{tr}$	0,5	Single- and polyphase	Balanced	$\pm 2,0$	$\pm 1,0$
7	$10 I_{tr}$	1	Polyphase	Single phase <sup>a</sup>	$\pm 3,0$	$\pm 2,0$
8	$10 I_{tr}$	1	Polyphase	Single phase <sup>b</sup>	$\pm 3,0$	$\pm 2,0$
9	$I_{\max}$	1	Single- and polyphase	Balanced	$\pm 2,0$	$\pm 1,0$
<sup>a</sup> The meter shall be supplied with three phase symmetrical voltage. The current shall be applied to any of the phases. <sup>b</sup> The meter shall be supplied with three phase symmetrical voltage. The current shall be applied to a phase different from the phase in test 7.						

The values of Table Z2 are taken from EN 50470-2, Table 4 and Table 5, Percentage error limits at reference conditions.

To ensure that the requirements of EN 50470-2, Table 8, Maximum Permissible Error (MPE), are also met, and with this the essential requirements of the MID are met, the actual percentage error limits to be used during conformity assessment shall be established using the method described below.

For each test point, the values of variation of percentage error due to temperature, voltage and frequency variation, established during type testing, shall be subtracted from the MPE using the formula:

$$e_{\text{calc}}(I, \cos \varphi) = \sqrt{MPE^2 - \delta_{\text{Type}}^2(T, I, \cos \varphi) - \delta_{\text{Type}}^2(U, I, \cos \varphi) - \delta_{\text{Type}}^2(f, I, \cos \varphi)}$$

where:

$e_{\text{calc}}(I, \cos \varphi)$  is the value of calculated limit of percentage error under reference conditions;

$MPE$  is the value of maximum permissible error taken from EN 50470-2, Table 8, for the given test point;

$\delta_{\text{Type}}(T, I, \cos \varphi)$  is the value of the variation of percentage error due to variation of temperature, established during type testing;

$\delta_{\text{Type}}(U, I, \cos \varphi)$  is the value of the variation of percentage error due to variation of voltage, established during type testing;

$\delta_{\text{Type}}(f, I, \cos \varphi)$  is the value of the variation of percentage error due to variation of frequency, established during type testing.

The actual limit of percentage error to be applied for each test point shall be the lesser of the value shown in Table Z1, and the value  $e_{\text{calc}}(I, \cos \varphi)$  calculated as described above.

An eventual correction of the percentage error limits, due to uncertainty of the measurement of percentage error as described in 4.3, also applies.

During manufacturing, the values of the variation of percentage error due to temperature, voltage and frequency variation shall be established in adequate intervals to ensure that they are essentially same as established during type testing.

**EXAMPLE:**

A meter of class index A, manufactured for the temperature range of 5 °C to 30 °C is tested.

The columns of Table Z3 show the following:

- column 1: the number of test, as identified in Table Z1;
- column 2: the values of the mpe, taken from EN 50470-2, Table 8;
- column 3: the values of temperature variation, established during the type test;
- column 4: the values of voltage variation, established during the type test;
- column 5: the values of frequency variation, established during the type test;
- column 6: the calculated values of percentage error limits;
- column 7: the percentage error limits taken from Table Z2.

**Table Z3 – Example for determining the percentage error limits to be applied**

Test No.	MPE	$\delta_{\text{Type}}(T, I, \cos \varphi)$	$\delta_{\text{Type}}(U, I, \cos \varphi)$	$\delta_{\text{Type}}(f, I, \cos \varphi)$	$e_{\text{calc}}(I, \cos \varphi)$	$e(I, \cos \varphi)$
4	$\pm 3,5$	+ 0,5	- 0,2	+ 0,1	$\pm 3,46$	$\pm 2,5$
5	$\pm 3,5$	+ 0,3	- 0,2	+ 0,1	$\pm 3,48$	$\pm 2,0$
6	$\pm 3,5$	+ 0,5	- 0,2	+ 0,1	$\pm 3,46$	$\pm 2,0$
7	$\pm 4,0$	+ 0,4	- 0,2	+ 0,1	$\pm 3,97$	$\pm 3,0$
8	$\pm 4,0$	+ 0,4	- 0,2	+ 0,1	$\pm 3,97$	$\pm 3,0$
9	$\pm 3,5$	+ 0,3	- 0,2	+ 0,1	$\pm 3,48$	$\pm 2,0$

As the values of  $e(I, \cos \varphi)$ , taken from Table Z2 are smaller than the values  $e_{\text{calc}}(I, \cos \varphi)$  calculated from the MPE taking into account the values of variation of percentage error due to temperature, voltage and frequency variation, established during type testing, the values  $e(I, \cos \varphi)$  of Table Z2 shall be used.

If the meter is intended for a wider temperature range, then the calculation has to be performed for each temperature range, and the smallest percentage error limits – out of all the calculated values  $e_{\text{calc}}(I, \cos \varphi)$  and the values  $e(I, \cos \varphi)$  of Table Z2 – shall be used.

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## **Annex ZA**

(normative)

### **Normative references to international publications with their corresponding European publications**

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62058-11	2008	Electricity metering equipment (AC) - Acceptance inspection - Part 11: General acceptance inspection methods	EN 62058-11	2010
ISO/IEC Guide 98	1995	Guide to the expression of uncertainty in measurement (GUM)	-	-

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## **Annex ZZ** (informative)

### **Coverage of Essential Requirements of the EC Directives**

This European Standard has been prepared under the mandate M/374 given to CENELEC by the European Commission and within its scope, the standard covers methods for statistical verification of conformity with the metrological requirements in connection the Modules F, D and H1.

EN 62058-11 specifies sampling plans, schemes and systems for lot-by-lot inspection by attributes or variables. In addition, a test procedure for 100 % inspection is specified, that can be used if the lot size is too small for sampling inspection or when sampling inspection has to be discontinued.

Considering the Part 11, EN 62058-21 specifies particular requirements for electromechanical electricity meters, including the tests to be performed, the sampling plans applicable and the performance criteria.

Table ZZ.1 provides the relationship between the Essential requirements of the MID and the stipulations of the EN 62058 series.

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directives concerned.

**WARNING:** Other requirements and other EC Directives may be applicable to the products falling within the scope of this standard.

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**Table ZZ.1 – Relationship between the Essential requirements of the MID and the stipulations of the relevant standards**

MID Annex I		Subject	EN 62058-11	EN 62058-21	EN 62058-31
		NOTE The text in this column is for orientation. For the full text see the MID.			
1		Allowable Errors			
	1.1	Under rated operating conditions and in the absence of disturbance	–	5.6 Accuracy tests, Table Z2 5.7 Verification of the register	5.6 Accuracy tests, Table Z2 5.7 Verification of the register
	1.2	Under rated operating conditions and in the presence of disturbance	–	–	–
	1.3	Climatic, mechanical and EM environment and other influence quantities to be specified by the manufacturer	–	–	–
	1.3.1	Climatic environments, upper and lower temperature limit	–	–	–
	1.3.2	Mechanical environments, vibration and shock	–	–	–
	1.3.3	Electromagnetic environments, unless otherwise laid down in the appropriate instrument-specific annexes.	–	–	–
	1.3.4	Other influence quantities	–	–	–
	1.4	Carrying out the tests	–	–	–
	1.4.1	Basic rules for testing and determination of errors	–	5.6, Accuracy test	5.6, Accuracy test
	1.4.2	Ambient humidity	–	–	–
2		Reproducibility	–	–	–
3		Repeatability	–	4.3	4.3
4		Discrimination and Sensitivity	–	–	–
5		Durability	–	–	–
6		Reliability	–	–	–
7		Suitability		5.3 AC voltage test	5.3 AC voltage test
	7.1	No feature likely to facilitate fraudulent use, possibilities for unintentional misuse minimal	–	–	–
	7.2	Suitable for intended use under practical working conditions, no unreasonable demand of the user	–	–	–

MID Annex I		Subject	EN 62058-11	EN 62058-21	EN 62058-31
	7.3	Errors of a utility measuring instrument at flows or currents outside the controlled range not unduly biased.	—	—	—
	7.4	When the measurand is constant over time, the measuring instrument shall be insensitive to small fluctuations of the value of the measurand, or shall take appropriate action.	N.A.	N.A.	N.A.
	7.5	Robust and materials of construction suitable for the intended use conditions.	—	—	—
	7.6	Designed so as to allow the control of the measuring tasks after the instrument has been placed on the market and put into use. Software that is critical for the metrological characteristics identifiable. Metrological characteristics not inadmissibly influenced by the associated software.	—	—	—
8		Protection against corruption	—	—	—
	8.1	Metrological characteristics not influenced in any inadmissible way by the connection to it of another device, by any feature of the connected device itself or by any remote device that communicates with the measuring instrument.	—	—	—
	8.2	Hardware component critical for metrological characteristics designed so that it can be secured. Security measures to provide evidence of an intervention.	—	—	—
	8.3	Software that is critical for metrological characteristics shall be identified as such and shall be secured.  Software identification. Evidence of an intervention available for a reasonable period of time.	—	—	—
	8.4	Measurement data, critical software and metrologically important parameters stored or transmitted adequately protected against accidental or intentional corruption.	—	—	—
	8.5	For utility measuring instruments the display of the total quantity supplied or the displays from which the total quantity supplied can be derived, whole or partial reference to which is the basis for payment, shall not be able to be reset during use.	—	—	—

MID Annex I		Subject	EN 62058-11	EN 62058-21	EN 62058-31
9		Information to be borne by and to accompany the instrument	—	—	—
	9.1	<p>Shall bear the following inscriptions:</p> <ul style="list-style-type: none"> <li>- manufacturers mark or name;</li> <li>- information in respect of accuracy.</li> </ul> <p>When applicable:</p> <ul style="list-style-type: none"> <li>- information in respect of the conditions of use;</li> <li>- measuring capacity;</li> <li>- measuring range;</li> <li>- identity marking;</li> <li>- number of the EC-type examination certificate or the EC design examination certificate;</li> <li>- information whether or not additional devices providing metrological results comply with the provisions of this Directive on legal metrological control.</li> </ul>	—	5.2	5.2
	9.2	For too small instruments, marking on packaging and in any accompanying documents	N.A.	N.A.	N.A.
	9.3	<p>Accompanying information on</p> <ul style="list-style-type: none"> <li>- operation</li> </ul> <p>and where relevant</p> <ul style="list-style-type: none"> <li>- rated operating conditions;</li> <li>- mechanical and electromagnetic environment classes;</li> <li>- the upper and lower temperature limit, whether condensation is possible or not, open or closed location;</li> <li>- instructions for installation, maintenance, repairs, permissible adjustments;</li> <li>- instructions for correct operation and any special conditions of use;</li> <li>- conditions for compatibility with interfaces, sub-assemblies or measuring instruments.</li> </ul>	—	—	—
	9.4	Utility meters do not require individual instruction manuals.	—	—	—
	9.5	Decimal scale interval	—	—	—
	9.6	Material measure	N.A.	N.A.	N.A.
	9.7	Units of measurement and symbols in accordance with Community legislation	—	—	—
	9.8	Marks and inscriptions clear, non-erasable, unambiguous and non-transferable.	—	—	—

MID Annex I		Subject	EN 62058-11	EN 62058-21	EN 62058-31
10		Indication of result	—	—	—
	10.1	Display or hard copy	N.A.	N.A.	N.A.
	10.2	Indication of result clear and unambiguous. Easy reading.	N.A.	N.A.	N.A.
	10.3	Hard copy easily legible and not erasable	N.A.	N.A.	N.A.
	10.4	Direct sales trading transactions	N.A.	N.A.	N.A.
	10.5	Fitted with a metrologically controlled display accessible without tools to the consumer.  The reading of this display is the measurement result that serves as the basis for the price to pay.	5.7 Verification of the register	5.7 Verification of the register	5.7 Verification of the register
11		Further processing of data to conclude the trading transaction	N.A.	N.A.	N.A.
	11.1	Durable record of the measurement result (other than utility meter)	N.A.	N.A.	N.A.
	11.2	Durable proof of the measurement result	N.A.	N.A.	N.A.
12		Conformity evaluation Designed so as to allow ready evaluation of its conformity with the appropriate requirements of this Directive.	—	—	—
Annex MI-003		ACTIVE ELECTRICAL ENERGY METERS			
1		Accuracy	—	—	—
2		Rated operating conditions	—	—	—
3		MPEs		5.6 Accuracy tests, Table Z2 5.7 Verification of the register	5.6 Accuracy tests, Table Z2 5.7 Verification of the register
4		Permissible effect of disturbances	—	—	—
	4.1	General – Special EM environment	—	—	—
	4.2	Effect of disturbances of long duration	—	—	—
		Reversed phase sequence	—	—	—
		Voltage unbalance (only applicable to polyphase meters)	—	—	—
		Harmonic contents in the current circuits	—	—	—
		DC and harmonics in the current circuit	—	—	—
		Fast transient bursts	—	—	—

MID Annex I		Subject	EN 62058-11	EN 62058-21	EN 62058-31
		Magnetic fields	—	—	—
		HF (radiated RF) electromagnetic field;	—	—	—
		Conducted disturbances introduced by radio-frequency fields	—	—	—
		Oscillatory waves immunity	—	—	—
	4.3	Permissible effect of transient electromagnetic phenomena	—	—	—
	4.3.1	Behavior during and immediately after a disturbance Recovery Critical change value	—	—	—
	4.3.2	Critical change value for overcurrent	—	—	—
5		Suitability			
	5.1	Measurement error below the rated operating voltage	—	—	—
	5.2	Display of total energy - sufficient number of digits - not resettable during use	—	—	—
	5.3	Retain energy register reading for 4 months	—	—	—
	5.4	Running with no load	—	5.4 Test of no-load condition	5.4 Test of no-load condition
	5.5	Starting	—	5.5 Starting, Table Z1	5.5 Starting, Table Z1
6		Units	—	—	—
7		Putting into use	—	—	—
		CONFORMITY ASSESSMENT B + F or B + D or H1.	Specifies 100% testing and sampling inspection methods to support modules F, D and H1	—	—

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## INTRODUCTION

This standard together with IEC 62058-11 cancels and replaces IEC 60514, *Acceptance inspection of class 2 alternating-current watt-hour meters*, which was a Technical Report.



# ELECTRICITY METERING EQUIPMENT (AC) – ACCEPTANCE INSPECTION –

## Part 21: Particular requirements for electromechanical meters for active energy (classes 0,5, 1 and 2)

### 1 Scope

This part of IEC 62058 specifies particular requirements for acceptance inspection of newly manufactured direct connected or transformer operated electromechanical meters for active energy (classes 0,5, 1 and 2) delivered in lots in quantities above 50. The method of acceptance of smaller lots should be agreed upon by the manufacturer and the customer.

The process described herein is primarily intended for acceptance inspection between the manufacturer and the purchaser.

NOTE It can also be used for other purposes, for example to support initial verification.

### 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 62058-11:2008, *Electricity metering equipment (a.c.) – Acceptance inspection – Part 11: General acceptance inspection methods*

ISO/IEC GUIDE 98: 1995, *Guide to the Expression of Uncertainty in Measurement*

### 3 Terms, definitions, symbols and abbreviations

For the purposes of this document, the terms, definitions, symbols and abbreviations of IEC 62058-11 apply.

### 4 Test conditions

#### 4.1 Place of inspection

Subclause 5.15 of IEC 62058-11 applies.

#### 4.2 Reference conditions

The tests shall be carried out under the following conditions:

**Table 1 – Voltage and current unbalance for polyphase meters**

Condition	Class of meter		
	0,5	1	2
Each of the voltages between phase and neutral and between any two phases shall not differ from the average corresponding voltage by more than	$\pm 0,5 \%$	$\pm 1 \%$	$\pm 1 \%$