



Republika e Kosovës
Republika Kosova-Republic of Kosovo
Qeveria-Vlada-Government

Ministria e Tregtisë dhe Industrisë
Ministarstvo Trgovine i Industrije- Ministry of Trade and Industry

Pursuant to article 83 (4) of the Constitution of the Republic of Kosova, subparagraph (ii) paragraph 6.8 of Article 6 and paragraph 3 article 16 of Law No. 02/L-34 "For Metrology", the Minister of Trade and Industry, promulgates the following:

ADMINISTRATIVE DIRECTIVE No. 2009/16

**REGARDING TECHNICAL-METROLOGICAL REQUIREMENTS FOR
ACTIVE ELECTRIC ENERGY ELECTRONIC METERS OF ACCURACY
CLASS 0.2S AND 0.5S**

Article 1
Objective

This directive specifies the technical-metrological requirements which shall met by alternating current active electricity (static) electronic meters of accuracy class 0.2S and 0.5S, which are connected through measurement transformers (hereafter: meters).

Article 2

1. Provisions of this Directive are not applicable to:

- 1.1. Active electric energy meters with reference outputs greater than 600V (three- phase system meters voltage line);
- 1.2. Transmitting meters;
- 1.3. Link-up circuits for transmission of data to meter's register;
- 1.4. Etalon meters.

Article 3

1. For the purposes of this Directive the term meter shall mean:

- 1.1. All meters connected through current measurement transformers;

- 1.2. All meters connected through current and voltage measurement transformers;
- 1.3. All meters designed to measure energy in one direction;
- 1.4. All meters designed to measure energy in both directions;
- 1.5. All meters connected in reference voltage lesser than 600V (voltage between phase lines at three-phase meters).

Article 4

1. Meters may provide energy data:
 - 1.1. Through the digital display or counter;
 - 1.2. Through impulse transmitter;
 - 1.3. Through impulse transmitter for distance measuring;
 - 1.4. An impulse transmitter, as provided for under subparagraph 1.2 and 1.3 of paragraph 1 in this Article, which cannot be adjusted, shall be connected behind an integrator.

Article 5

Technical-metrological requirements

1. Nominal meter current I_n may be 1A, 2A or 5A, and it is determined by nominal secondary current of the current measuring transformer.
2. Maximal current $I_{\max}$ according to the norm is $1.20 I_n$.
3. Exceptionally to provision set out in paragraph 2 of this Article meters may have specific maximal current values $I_{\max}$ of $1.5 I_n$ or $2.0 I_n$.

Article 6

1. Meters may have the reference voltage value U_n of $3 \times 100/3$ V and 3×100 V.
2. Exceptionally to provision set out in paragraph 1 of this Article meters may have other reference voltage values up to 600 V.

Article 7

1. The following requirements shall be met during the meter testing:
 - 1.1. Reference frequency 50 Hz;
 - 1.2. Reference temperature 23°C.

Article 8

During nominal current, reference voltage, reference frequency and reference temperature, self-consumption of other meters' components shall not exceed the values given in Table 1.

Table 1

	Meter supply connected to meter's voltage circuits	Meter supply not connected to meter's voltage circuits
Voltage circuit	2 W i 10 VA	0.5 VA
Current circuit	1 VA	1 VA
Ancillary meter supply	-	10 VA

Article 9

In referent conditions, over the course of time, the insulating part of the meter shall not change its dielectric features to the extent which would significantly influence meter's metrological features.

Article 10

1. Meter's dielectric strength shall be tested in the following work conditions of the meter:

- 1.1. Environment temperature shall be between 15°C and 25°C;
- 1.2. Relative air humidity shall be between 45% and 75%;
- 1.3. Atmospheric pressure shall be between 86 kPa and 106 kPa (860 mbar to 1000 mbar).

Article 11

1. The insulating part of the meter shall, over e period of one minute, endure dielectric testing with a sinusoidal voltage frequency of 50 Hz from an energy supply source of at least 500VA.

2. According to Table 2, the test shall be conducted on an enclosed case meter with closed cover and with bore clamps cover.

Table 2

Test	Meter	Testing voltage	Selected points of testing voltage
A	Meter with protective case	2 kV	a) in the middle, on one side all current and voltage circuits as well as ancillary circuits with reference voltage over 40 V connected together and grounded.
	I	2kV	b) between circuits that are not supposed to be connected with each other during the operating time
B	Meter with insulating protective case II	4kV	a) in the middle, on one side all current and voltage circuits as well as ancillary circuits with reference voltage over 40 V connected together and grounded.
		2kV	b) between circuits that are not supposed operate connected to each other
		-	c) visual viewing of meter's case as required by IEC 62052-11

Article 12

1. The following requirements shall be met during the meter dielectric strength testing:

- 1.1. The meter with a metallic case shall be installed on a flat metallic plate;
- 1.2. The meter case made of insulating material shall be wrapped with a metal cover and installed on a flat metal plate to which are connected all parts of the metal case inside the closed meter;
- 1.3. Current and voltage circuits as well as transmission measuring system circuits shall be connected with each other;
- 1.4. Sinusoidal testing voltage shall be connected between clamps and metal cover, respectively the metal plate, whereas the distance between clamps and metal cover, respectively the metal plate shall be at least 2cm.

Article 13

Dielectric strength between the fastening bolt and its cover shall be tested in compliance with requirements provided for in Article 11 of this Directive and nuts shall be loose allowing for easy opening of clamps, whereas bore cover shall be tightened.

Article 14

When test for meter dielectric strength is repeated, as stipulated under Article 11 of this Directive, the meter shall endure a sinusoidal test voltage which reaches 80% of the value of the testing voltage.

Article 15

Insulation test shall be conducted with an impulse voltage of 7kV, comprised of ten each impulse polarities, and applied within 1.2/50 μ s.

Article 16

1. Meter testing as provided for in this Directive shall mean testing the type of meter and meter testing.

1.1. Testing, as provided for in paragraph 1 of this Article shall be conducted in line with the following requirements:

- 1.1.1. Meter's case shall be closed;
- 1.1.2. Phase order shall match the connection diagram.

2. Voltages and currents shall be identical:

- 2.1. None of phase and linear voltages shall exceed the corresponding average voltage value of $\pm 1\%$;
- 2.2. None of the currents shall exceed the corresponding average voltage value of $\pm 1\%$;
- 2.3. The phase differential between the corresponding current and voltage shall not be greater than 2° for any of the power factors.

3. Voltage and ancillary circuits of meters belonging to accuracy class 0.2S shall be connected to meter's reference voltage at least two hours prior to starting the test.

4. Voltage and ancillary circuits of meters of accuracy class 0.5S shall be connected to meter's reference voltage at least one hour prior to starting the test.

5. Influencing factors shall have a reference value according to the data on Table 3.

Table 3

Influencing factors	Reference values	Allowed deviation for meters of accuracy class	
		0.2 S	0.5 S
Environment temperature	Specified temperature or 23°C ¹⁾	±2°C	±2 °C
Voltage	Reference voltage	±1.0%	±1.0%
Frequency	Reference frequency	±0.3%	±0.3%
Phase order	R-S-T	-	-
Voltage asymmetry	All phases are present	-	-
Wave form	Sinusoidal voltages and currents	Deviation coefficient less than 2%	Deviation coefficient less than 2%
Permanent external magnetic induction	Induction values 0.	-	-
External magnetic induction in 0 reference conditions		Induction value inducing changes lower than ±0.1% in all situations shall be less than 0.02mT ²⁾	

Table explanation:

1. When testing is conducted in temperatures different to reference temperature, including allowed tolerances, the result shall be corrected by changing the corresponding temperature coefficient of the meter.

2. Testing shall be conducted as follows:

2.1. For one-phase meters, from error detection, first, the meter shall be connected normally to the main conductor bores and subsequently through a reverse connection in voltage and current circuit bores. Half of the difference between two error values shall be the value of the error differential. Given that the external field phase is unknown, testing shall be conducted on current φ 0.05 In with power coefficient $\cos \varphi = 1$ and 0.1 In with power coefficient $\cos \varphi = 0.5$;

2.2. On three phase meters, are conducted three measurements on current 0.05In with power coefficient $\cos \varphi = 1$, and during each measurement, current and voltage circuits shall be engaged and for each different measurement dephasing shall be equal to 120° whereas the order of phases shall not change. The value of the error margin is the differential between maximal error value and average error value.

Article 17

1. Meters shall not produce outgoing impulses, respectively they shall not register the energy in open current circuits (no load condition) and in voltage circuits connected to reference voltage value of 115%.
2. The shortest testing time shall be Δt :

$$\Delta t \geq \frac{900 \times 10^6}{k m U_n I_{\max}} (\text{min}) \text{ for meters of accuracy class 0.2S}$$

Where:

k - meter's constant (imp/kWh)

k -number of meter's measurement elements

U_n -reference voltage (V)

$I_{\max}$ -maximal current of the meter (A)

3. During the time of this test the meter's testing output signal shall produce one impulse.

Article 18

1. Meters shall start producing output impulses and constantly measure energy load and current which shall not exceed the value $0.001 I_n$ with a power coefficient $\cos \varphi = 1$.
2. When the meter is constructed to measure energy in two directions, the initial testing, as stipulated in paragraph 1 shall be performed for each of the directions.

Article 19

1. When testing the meter, the allowed error values under requirements stipulated in article 16 of this Directive are as follows:
 - 1.1. For one phase and three phase meters with equivalent load, values of allowed errors are given in Table 4;
 - 1.2. For three phase meters with one phase load and three phase symmetric voltages, values of allowed errors are given in Table 5.

Table 4

Current values (A)	Power coefficient $\cos \varphi$	Allowed errors (%) for meters with accuracy class	
		0.2 S	0.5 S
$0.01 I_n \leq I < 0.05 I_n$	1	± 0.4	± 1.0
$0.05 I_n \leq I \leq I_{max}$	1	± 0.2	± 0.5
$0.02 I_n \leq I < I_n$	0.5, ind.	± 0.5	± 1.0
	0.8 kap.	± 0.5	± 1.0
$0.01 I_n \leq I \leq I_{max}$	0.5, ind.	± 0.3	± 0.6
	0.8 kap.	± 0.3	± 0.6
By user special request	0.25, ind.	± 0.5	± 1.0
$0.1 I_n \leq I \leq I_{max}$	0.5 kap.	± 0.5	± 1.0

Table 5

Current values (A)	Power coefficient $\cos \varphi$	Allowed errors (%) for meters with accuracy class	
		0.2 S	0.5 S
	1	± 0.3	± 0.6
$0,1 I_n \leq I \leq I_{max}$	0,5 ind	± 0.3	± 1.0

Article 20

When testing the meter's constant, energy measurement report showed on the digital display and the impulses produced by the impulse transmitter (Led-Diode) are verified.

Article 21

Testing procedure for the type of meter shall be conducted based on the standards IEC 62052-11 and IEC 62053-22 and as stipulated in the provisions of this Directive.

Article 22

1. When setting the error differential percentage value induced by alteration of an influencing component, the values of all influencing components shall satisfy all requirements provided for in article 16 of this Directive.

2. The influencing factors, which are taken into consideration when determining reference conditions, on the basis of which meter testing is conducted as well as for determining error differential percentage induced by their alteration, are the following: environment temperature, ancillary circuits voltage, measuring circuits voltage, frequency, wave form, external magnetic induction and phase order.

3. Error differential percentage induced by the alteration of the influencing factors as provided for in paragraph 2 of this article is determined only during the test of the

type of meter.

Article 23

1. The average temperature coefficient shall be determined for the temperature band of 20K, during which the temperature error margin $\pm 10K$ shall be determined from the temperature that will have its average coefficient determined.
2. Temperature band of 20K shall be between 0°C to 40°C.
3. Values of average temperature coefficient are given in Table 6.

Table 6

Current values (A)	Power coefficient $\cos \phi$	Average temperature coefficient (%/K) for meters of accuracy class	
		0.2 S	0.5 S
$0.05 I_n \leq I \leq I_{max}$	1	0.01	0.03
$0.1 I_n \leq I \leq I_{max}$	0.5 ind	0.02	0.05

Article 24

Error differential in percentage induced by the alteration of several influencing factors are given in Table 7.

Table 7

Alteration of influencing factors according to reference conditions	Current values during uniform load (A)	Power coefficient $\cos \phi$	Allowed errors (%) for meters with accuracy class	
			0.2 s	0.5 s
Voltage $\pm 10\%$ ^{1) 2)}	$0.05 I_n \leq I \leq I_{max}$	1	0.1	0.2
	$0.1 I_n \leq I \leq I_{max}$	0.5 ind	0.2	0.4
Frequency $\pm 2\%$ ²⁾	$0.05 I_n \leq I \leq I_{max}$	1	0.1	0.2
	$0.1 I_n \leq I \leq I_{max}$	0.5 ind	0.1	0.2
Voltage asymmetry ³⁾	I_n	1	0.5	1.0
Reverse phase order	$0.1 I_n$	1	0.05	0.1
Permanent external magnetic induction ⁴⁾	I_n	1	2.0	2.0
External magnetic induction in $0.5mT$ ⁵⁾	I_n	1	0.5	1.0
High frequency electromagnetic field	I_n	1	1.0	2.0
Ancillary circuit magnetic field	$0.01 I_n$	1	0.05	0.1

1. For voltage fields ranging from -20% to -10% and from +10% to +15% the margins of error differential in percentage are triple values given in the table. For voltage field below the value of 0.8 Un the meter's error margin may fall between +10% and-100%.
2. Recommended testing point for voltage error differential and frequency error differential is In.
3. A three phase meter with three measuring systems shall, according to Table 7, measure and register within the alteration margins of the influencing factors even in cases when one of the phases is missing.
 - 3.1. At a three phase meter with four conductors connected to one or two phases;
 - 3.2. At a three phase meter with three conductors connected to one of the three phases.
4. Permanent magnetic induction can be achieved when using an electromagnet supplied with one directional current.
 - 4.1. These magnetic fields are created throughout the meter's surface, which is placed on its normal operating position;
 - 4.2. The value of the magnetic-motor force which shall apply is 100 ampere windings.
5. External source magnetic induction of 0.5mT produced by the current the frequency of which is equal to voltage frequency of the testing meter and during inappropriate condition of phases and directions shall not induce a meter's error differential that would exceed the values given in the Table. Magnetic induction is produced by placing the meter between a circular bobbin with crosscut diameter of 1m and small radial thickness in rapport to its diameter as well as with 400 ampere windings.
6. When such devise is located inside the meter's case it shall be supplied intermittently, i.e. an electromagnet with multiple tariff register.

Article 25

1. Short-time current overload influence (short circuiting) shall be tested in this manner:
 - 1.1. A testing circuit for a practical short circuit test shall have no inductivity;
 - 1.2. The meter shall endure the short circuit current from $20I_{\max}$ within the time interval of 0.5s;
 - 1.3. Meters shall revert to initial temperature when voltage circuits are supplied with reference voltage for the duration of one hour;
 - 1.4. After the test, the error differential in percentage with nominal current I_n and power coefficient $\cos \varphi=1$ shall not be greater than 0.05%.

Article 26

1. Self-heating influence shall be tested in the following ways:
 - 1.1. For open current circuits, voltage circuits shall be connected to reference voltage at least two hours prior to initiating the test;
 - 1.2. Meters shall be loaded with maximal current $I_{\max}$ with power coefficient $\cos \varphi=1$, and the meters' error margins are determined immediately after applying the load;
 - 1.3. Testing shall last at least one hour, and the error differential in percentage shall not be smaller than 0.05% during each 20 minutes;
 - 1.4. The same test is conducted with a power coefficient $\cos \varphi = 0.5$;
 - 1.5. Error differential induced by self-heating shall not exceed the values provided in Table 8.

Table 8

Current values (A)	Power coefficient $\cos \varphi$	Error differential margins (%) for meters of accuracy class	
		0.2 S	0.5 S
$I_{\max}$	1	0.1	0.2
	0.5 ind	0.1	0.2

Article 27

1. When during the testing of the type of meter it is ascertained that several or all of the measuring results range outside of allowed error margins provided in Tables 4 and 5 as stipulated in article 19 of this Directive, the displacement of the abscissa axis parallel to itself shall be conducted for the following values:
 - 1.1. 0.1% for meters of accuracy class 0.2S;
 - 1.2. 0.2% for meters of accuracy class 0.5S.
2. If all measurement results remain within the limits of allowed errors based on the data in Tables 4 and 5 as provided for under Article 19 of this Directive the meter is in proper condition.

Article 28

1. The meter's inscription plate containing information, signs and symbols shall be affixed on a conspicuous spot.
2. Inscriptions and signs shall be written in the official language and shall be durable and legible in normal operating conditions of the meter.

Article 29

1. The inscription plate shall contain the following information:
 - 1.1. Name and designation or manufacturer's sign and place of production;
 - 1.2. Sign of the factory of the type of meter;
 - 1.3. Sign of the type of meter (sign of the number of phases and conductors or proper graphic symbol);
 - 1.4. Serial number of the meter and year of production. If the serial number is written on the plate attached to the cover than this number shall also be indicated on the meter's case or entered on the meter's memory;
 - 1.5. Reference voltage U_n in V (i.e. $3 \times 100/\sqrt{3}$ V);
 - 1.6. The data on the secondary current of the current measurement transformer to which the meter is connected (i.e. 5(5) A or /5 A);
 - 1.7. The data on meter's nominal and maximal current may be found on the sign indicating the type of meter;
 - 1.8. Reference frequency in Hz (i.e. 50Hz);
 - 1.9. Meter's constant in imp/Kwh, respectively imp/MWh;
 - 1.10. Accuracy class (i.e. »0.2S«);
 - 1.11. Official sign of the measurement device;
 - 1.12. Signs of measurement units »KWh« or »MWh« on the counter plate or between the basic data of the meter;
 - 1.13. Sign »square inside the square« for meters with class II protective insulating case;
 - 1.14. Connection diagram or the number of the connection diagram;
 - 1.15. The constant of the impulse transmitter for distance measuring; (Wh/imp, kwh/imp).
2. The data on impulses of the impulse transmitter for distance measuring:
 - 2.1. The impulse length interval and impulse rest interval;
 - 2.2. Impulse voltage;
 - 2.3. Circuit powers are directly delivered from the impulse transmitter (i.e. 80 ms, 100V, 1A).
3. The data on ancillary circuits voltage if these circuits are not connected with the meter's voltage circuits (i.e. $U_p = 3 \times 100$ V, $U_p = 100$ V).
4. Inscription »reverse registration not allowed« or proper symbol for meters equipped to prevent reverse registration.
5. The sign for meters designed to measure energy in both directions.
6. Clamps on the meter's connection bore shall be marked with numbers in connecting bores based on the standard connection.

Article 30

Transformer meter with a secondary counter shall have a separate inscription plate, in which may be written data about measurement transformers and transformers constant, which, when multiplied by the number displayed on the counter provides the energy value on the primary section of the measurement transformer.

Article 31

The data on the impulses of the impulse transmitter for distance measurement may be included on a separate inscription plate, which may be attached to the meter's case cover.

Article 32

In situations when the value of the number on the counter's plate is large this value shall be indicated by the multiplying sign and decade system numbers (i.e. x100, x1000 etc).

Article 33

Entry into force

This Administrative Directive shall enter into force on the day when the Minister of the Ministry of Trade and Industry signs it.

Prishtinë, 30.06. 2009

Minister of Trade and Industry
Lutfi ZHARKU