



Slovenski inštitut za  
kakovost in meroslovje  
Slovenian Institute of  
Quality and Metrology

## ES certifikat o pregledu zasnove / EC Design Examination Certificate

Pregled zasnove merila v skladu s Pravilnikom o merilnih instrumentih /  
Design examination according to EC Directive on Measuring Instruments

**Št. / No.: 14MID004**  
**Sprememba / Modification: M02**

### Ime in naslov proizvajalca / Name and address of the manufacturer :

Proizvajalec / Manufacturer : **MIKROELEKTRONIKA A.D.**  
Naslov / Address : **Blagoja Parovića bb, 78000 Banja Luka, Bosna i Hercegovina**

### Podatki o merilu / Description of the measuring instrument :

Merilo / Measuring instrument: **Trifazni statični multifunkcijski števec električne energije /  
Three-phase static multifunction electricity meter**

Tip / Type: **MET500**  
Referenčne napetosti / Reference voltages: **3x230/400 V**  
Referenčni tokovi / Reference currents: **5 A**  
Nazivni tokovi / Rated currents: **5 A**  
Referenčna frekvenca / Reference frequency: **50 Hz**  
Razred točnosti / Accuracy class: **B, C**

V skladu s Pravilnikom o merilnih instrumentih (UL RS št. 42/2006, 97/2010, 16/2013), poglavje MI-003 – Števci delovne električne energije, dodatek H1, člen 4, je naročnik predložil vlogo, tehnično dokumentacijo in dokazila o ustreznosti zasnove v pregled zasnove merila za zgoraj navedeni proizvod, z namenom, da se preveri ali zasnova proizvoda ustreza zahtevam tega pravilnika. / In accordance with the Directive on Measuring Instruments 2004/22/EC including Amendment 1137/2008, Annex MI-003 – Active Electrical Energy Meters, Annex H1, article 4, the applicant has submitted the application, technical documentation and the supporting evidence for the adequacy of the technical design for the above mentioned measuring instrument for the purpose of design examination. This is to certify, that the design of the measuring instrument meets the provisions laid down in the Directive.

V skladu s Pravilnikom o merilnih instrumentih mora naročnik obvestiti priglašeni organ o vsaki narejeni ali načrtovani spremembi. / In accordance with the above mentioned Directive the applicant has to inform the notified body of any already performed or planned modifications.

Pregledana tehnična mapa se shrani pri priglašnem organu za dobo 10 let po izdelavi zadnjega primerka merila. Na željo naročnika se mapa predmeta po tem obdobju vrne naročniku ali uniči. / The examined technical file will be stored by the notified body for 10 years after the last measuring instrument has been manufactured. On request of the applicant, it will then be returned or destroyed.

### Opomba / Remark:

Ta ES certifikat o pregledu zasnove je sprememba certifikata št. 14MID004M01. /  
This EC Design Examination Certificate modifies Certificate No. 14MID004M01.

Ta ES certifikat o pregledu zasnove velja do 2024-12-12 /  
This EC Design Examination Certificate valid till 2024-12-12

**Certifikat ima prilogo, ki vsebuje 10 strani. / The certificate has an Annex, which includes 10 pages.**

Ljubljana, 2015-07-10



Podpis pooblaščenice osebe / Authorised signature

Alja Pregl

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**Priloga k certifikatu št. / Annex to the Certificate No.: 14MID004**  
**Sprememba / Modification: M02**

**1. Metrological characteristics of the measuring instrument:**

- Reference Voltage : **3x230/400 V**
- Reference Currents: **5 A**
- Rated Currents : **5 A**
- Reference Frequency : **50 Hz**
- Climatic Environments : **from -40 °C to +70 °C,  
non-condensing humidity  
outdoor location**
- Mechanical Environments : **M1**
- Electromagnetic Environments : **E2**
- Software Version : **V034302.0f**
- Accuracy Class : **B (MET500-E34N)  
C (MET500-E34P)**

**Percentage error due to variation of the voltage, frequency and temperature:**

$$\text{Influence Factor: } IF = \sqrt{\delta_T^2(T, I, \cos\varphi) + \delta_U^2(U, I, \cos\varphi) + \delta_f^2(f, I, \cos\varphi)}$$

Direct connected polyphase meter with balanced loads:

**Reference voltage: Uref = 3x230/400 V, f = 50 Hz, I<sub>max</sub> = 60 A (MET500-E34N)**

I	I [A]	PF	IF [%]
Active energy – reception			
I <sub>min</sub>	0.25	1	0,25
I <sub>tr</sub>	0.5	1	0,23
I <sub>tr</sub>	0.5	0.5L	0,30
I <sub>tr</sub>	0.5	0.8C	0,38
I <sub>ref</sub>	5	1	0,39
I <sub>ref</sub>	5	0.5L	0,42
I <sub>ref</sub>	5	0.8C	0,39
I <sub>max</sub>	60	1	0,41
I <sub>max</sub>	60	0.5L	0,45
I <sub>max</sub>	60	0.8C	0,44





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Direct connected polyphase meter carrying single phase load, balanced voltage supplied to voltage circuits:

Reference voltage:  $U_{ref} = 3 \times 230/400 \text{ V}$ ,  $f = 50 \text{ Hz}$ ,  $I_{max} = 60 \text{ A}$  (MET500-E34N)

I	I [A]	PF	IF [%]
Active energy – reception			
I <sub>tr</sub>	0.5	L1 PF = 1	0,15
I <sub>tr</sub>	0.5	L1 PF = 0.5L	0,24
I <sub>tr</sub>	0.5	L2 PF = 1	0,19
I <sub>tr</sub>	0.5	L2 PF = 0.5L	0,15
I <sub>tr</sub>	0.5	L3 PF = 1	0,30
I <sub>tr</sub>	0.5	L3 PF = 0.5L	0,55
I <sub>ref</sub>	5	L1 PF = 1	0,30
I <sub>ref</sub>	5	L1 PF = 0.5L	0,18
I <sub>ref</sub>	5	L2 PF = 1	0,41
I <sub>ref</sub>	5	L2 PF = 0.5L	0,42
I <sub>ref</sub>	5	L3 PF = 1	0,26
I <sub>ref</sub>	5	L3 PF = 0.5L	0,36
I <sub>max</sub>	60	L1 PF = 1	0,32
I <sub>max</sub>	60	L1 PF = 0.5L	0,30
I <sub>max</sub>	60	L2 PF = 1	0,54
I <sub>max</sub>	60	L2 PF = 0.5L	0,49
I <sub>max</sub>	60	L3 PF = 1	0,59
I <sub>max</sub>	60	L3 PF = 0.5L	0,68



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Direct connected polyphase meter with balanced loads:

Reference voltage:  $U_{ref} = 3 \times 230/400$  V,  $f = 50$  Hz,  $I_{max} = 100$  A (MET500-E34N)

I	I [A]	PF	IF [%]
Active energy – reception			
$I_{min}$	0.25	1	0,39
$I_{tr}$	0.5	1	0,32
$I_{tr}$	0.5	0.5L	0,33
$I_{tr}$	0.5	0.8C	0,39
$I_{ref}$	5	1	0,29
$I_{ref}$	5	0.5L	0,31
$I_{ref}$	5	0.8C	0,37
$I_{max}$	100	1	0,45
$I_{max}$	100	0.5L	0,50
$I_{max}$	100	0.8C	0,33
Active energy – generation			
$I_{min}$	0.25	1	0,26
$I_{tr}$	0.5	1	0,21
$I_{tr}$	0.5	0.5L	0,28
$I_{tr}$	0.5	0.8C	0,26
$I_{ref}$	5	1	0,21
$I_{ref}$	5	0.5L	0,24
$I_{ref}$	5	0.8C	0,27
$I_{max}$	100	1	0,27
$I_{max}$	100	0.5L	0,23
$I_{max}$	100	0.8C	0,23



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Direct connected polyphase meter carrying single phase load, balanced voltage supplied to voltage circuits:

Reference voltage:  $U_{ref} = 3 \times 230/400 \text{ V}$ ,  $f = 50 \text{ Hz}$ ,  $I_{max} = 100 \text{ A}$  (MET500-E34N)

I	I [A]	PF	IF [%]
Active energy – reception			
I <sub>tr</sub>	0.5	L1 PF = 1	0,15
I <sub>tr</sub>	0.5	L1 PF = 0.5L	0,24
I <sub>tr</sub>	0.5	L2 PF = 1	0,19
I <sub>tr</sub>	0.5	L2 PF = 0.5L	0,15
I <sub>tr</sub>	0.5	L3 PF = 1	0,30
I <sub>tr</sub>	0.5	L3 PF = 0.5L	0,55
I <sub>ref</sub>	5	L1 PF = 1	0,17
I <sub>ref</sub>	5	L1 PF = 0.5L	0,18
I <sub>ref</sub>	5	L2 PF = 1	0,41
I <sub>ref</sub>	5	L2 PF = 0.5L	0,42
I <sub>ref</sub>	5	L3 PF = 1	0,26
I <sub>ref</sub>	5	L3 PF = 0.5L	0,36
I <sub>max</sub>	100	L1 PF = 1	0,32
I <sub>max</sub>	100	L1 PF = 0.5L	0,30
I <sub>max</sub>	100	L2 PF = 1	0,54
I <sub>max</sub>	100	L2 PF = 0.5L	0,49
I <sub>max</sub>	100	L3 PF = 1	0,59
I <sub>max</sub>	100	L3 PF = 0.5L	0,68



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Transformer operated polyphase meter with balanced loads:

Reference voltage:  $U_{ref} = 3 \times 230/400 \text{ V}$ ,  $f = 50 \text{ Hz}$ ,  $I_{max} = 6 \text{ A}$  (MET500-E34P)

I	I [A]	PF	IF [%]
Active energy – reception			
I <sub>min</sub>	0.05	1	0,006
I <sub>tr</sub>	0.25	1	0,005
I <sub>tr</sub>	0.25	0.5L	0,008
I <sub>tr</sub>	0.25	0.8C	0,009
I <sub>ref</sub>	5	1	0,008
I <sub>ref</sub>	5	0.5L	0,007
I <sub>ref</sub>	5	0.8C	0,007
I <sub>max</sub>	6	1	0,008
I <sub>max</sub>	6	0.5L	0,013
I <sub>max</sub>	6	0.8C	0,012
Active energy – generation			
I <sub>min</sub>	0.05	1	0,013
I <sub>tr</sub>	0.25	1	0,007
I <sub>tr</sub>	0.25	0.5L	0,007
I <sub>tr</sub>	0.25	0.8C	0,004
I <sub>ref</sub>	5	1	0,005
I <sub>ref</sub>	5	0.5L	0,010
I <sub>ref</sub>	5	0.8C	0,012
I <sub>max</sub>	6	1	0,008
I <sub>max</sub>	6	0.5L	0,008
I <sub>max</sub>	6	0.8C	0,013





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1.1. Three-phase static multifunction electricity meter MET500

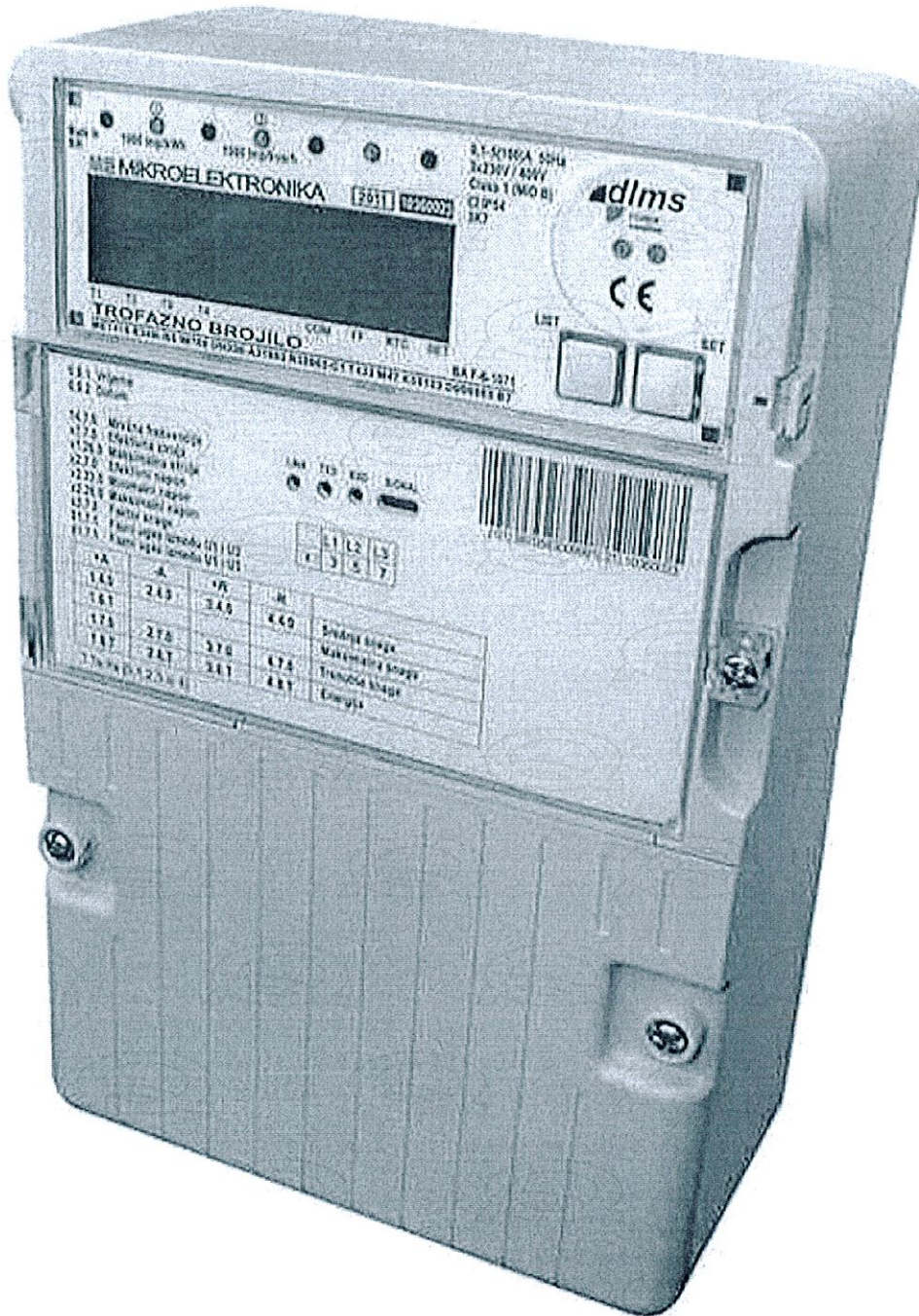


Figure 1: View of MET500 Three-phase static multifunction electricity meter



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1.2. Front plate

TMUX    ①    DIS    ②    ALARM  
 Made in BiH    1000 Imp/kWh    DISCONNECTOR    1000 Imp/kvarh    0,25-5(60)A 50Hz  
 3x230V / 400V  
 Class 1 (MIDB)   

   2014    12000017    IP54 3K7

T1 T2 T3 T4 M1 M2 M3 M4 ERR RTC SET  
**THREE PHASE ELECTRONIC METER** BA F-6-1107  
 MET500-E34N-I05 IM060 UN230-A31015 R32063-C1 T437 M47 K1030214 L4 D020807 B7

LIST    SET

0.9.1 Time       XXXX XXMIDXXX  
0.9.2 Date

L1	L2	L3	Li	
31.4.0	51.4.0	71.4.0		Average Current
31.7.0	51.7.0	71.7.0	90.7.0	Current
32.7.0	52.7.0	72.7.0		Voltage
32.24.0	52.24.0	72.24.0		Average Voltage

SIGNAL    LINK    RXD    TXD

(01) 3870583002367(21) 12000017

+A	-A	+A + -A	+A - -A	+R	-R	R	R <sub>II</sub>	R <sub>III</sub>	R <sub>IV</sub>	
1.4.0	2.4.0			3.4.0	4.4.0					Average Demand
1.6.T	2.6.T			3.6.T	4.6.T					Maximum Demand
1.7.0	2.7.0	15.7.0		3.7.0	4.7.0					Power
1.8.T	2.8.T	15.8.0	16.8.0	3.8.T	4.8.T	5.8.0	6.8.0	7.8.0	8.8.0	Energy
1.24.0		15.24.0								Sliding Demand

Constant for the electrical output: 500 imp/kWh and 500 imp/kvarh    T: Tariff [0-total,1,2,3 or 4]    981664

Figure 2: Front plate of MET500





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**1.3. Essential parts**

- 1.3.1. Measurement system is described in 1551-233-MET500 Technical description (Tehnički opis), Rev A, 14.07.2014, Chapter 7.
- 1.3.2. Printed circuit boards are described in documents the following documents:
- 1078-981867 (module MET500-SB-V13 for MET500-E34N),
  - 1078-981905 (module MET500-SB-V13 for MET500-E34P),
  - 1078-981869 (module MET500-MB-V09 for MET500-E34N - 60 A version),
  - 1078-981869\_A (module MET500-MB-V09 for MET500-E34N - 100 A version),
  - 1078-981903 (module MET500-MB-V09 for MET500-E34P),
  - 1078-981939 (module MET500-MB-V10 for MET500-E34N - 60 A version),
  - 1078-981939\_A (module MET500-MB-V10 for MET500-E34N - 100 A version),
  - 1078-981946 (module MET500-MB-V10 for MET500-E34P),
  - 1078-981866 (module MET500-IB-V05 for MET500-E34N),
  - 1078-981904 (module MET500-IB-V05 for MET500-E34P).
- 1.3.3. The front plate bears the complete, well legible, legally required information as mentioned in the regulations on the energy meters. An example of the markings is shown in paragraph 1.2.

**1.4. Essential characteristics**

- 1.4.1. See paragraph 1 and the characteristics mentioned below.
- 1.4.2. Approved meter type: MET500  
A complete type designation is given in the document 1551-233-MET500 Technical description (Tehnički opis), Rev A, 14.07.2014, Chapter 11.
- 1.4.3. Frequency: 50 Hz
- 1.4.4. Meter constant:
- |  |               |
|--|---------------|
| 1.000 impulses/kWh (optical output)    | (MET500-E34N) |
| 10.000 impulses/kWh (optical output)   | (MET500-E34P) |
| 500 impulses/kWh (electrical output)   | (MET500-E34N) |
| 5.000 impulses/kWh (electrical output) | (MET500-E34P) |
- 1.4.5. Number of registers: List of registers is given in the 1551-233-MET500 Technical description (Tehnički opis), Rev A, 14.07.2014, Chapter 5.1 and 10.
- 1.4.6. Error register: Information is given in the 1551-233-MET500 Technical description (Tehnički opis), Rev A, 14.07.2014, Chapter 5.11.
- 1.4.7. Exported energy: The meter is capable of measuring energy in two directions and has two types of measurements ('+A' with return stop, '-A' with return stop). Import and export energy are presented in separate registers.
- 1.4.8. Software specification (refer to WELMEC guide 7.2):

Identification number of the Core	Remarks
MET500: V034302.0f	All changes to the software will lead to an increment of the version number. This is assured by the Quality Management System of the manufacturer. The software checksum can be displayed on LCD or sent as part of sequence via the optical communications ports.
CHKSUM number: <b>02.0f</b>	



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- 1.4.8.1. Software type: P  
1.4.8.2. Software functions: Extensions L and T

**1.5. Conditional parts**

1.5.1. Terminals block

The connections for the current cables on the terminals block allow a cable cross-section up to:

- 16 mm<sup>2</sup> (main terminals) for MET500-E34P,
- 35 mm<sup>2</sup> (main terminals) for MET500-E34N,

and up to 1,5 mm<sup>2</sup> (auxiliary terminals). The cables are each fastened to the terminals with M4 screws in case of MET500-E34P, or with M8 screws in case of MET500-E34N.

1.5.2. Housing

The meter has a housing resistant to the penetration of dust, water IP54 and to the UV light. The housing is made of self-extinguishing isolative material.

1.5.3. Terminals cover

The meter has a separated terminals cover, made of self-extinguishing UV stabilized isolative material.

1.5.4. Data display

The quantity of measured energy is presented by means of a liquid crystal display (LCD). The list of the displayed signals and alarms is given in the 1551-233-MET500 Technical description (Tehnički opis), Rev A, 14.07.2014, Chapter 4.5.

1.5.5. Communication interface

Meter supports the following communication interfaces: IC port, MBus, RS232, RS485, Radio modem, Ethernet, PLC, GSM and GPRS. Meter supports encrypting of data transmission between user and AMR center. For further information see 1551-233-MET500 Technical description (Tehnički opis), Rev A, 14.07.2014, Chapter 2 and 8.

**1.6. Conditional characteristics**

- 1.6.1. Maximum current: 60 A (MET500-E34N-I05 IM060)  
100 A (MET500-E34N-I05 IM100)  
6 A (MET500-E34P-I05 IM006)

**1.7. Non-essential parts**

1.7.1. Inputs and outputs

Meter supports two relay outputs. For further information see 1551-233-MET500 Technical description (Tehnički opis), Rev A, 14.07.2014, Chapter 5.8.2.

1.7.2. Bi-stable disconnecter

Meter MET500-E34N has integrated bi-stable disconnecter. For further information see 1551-233-MET500 Technical description (Tehnički opis), Rev A, 14.07.2014, Chapter 5.8.1.

**2. Measures required for ensuring the integrity of the measuring instrument:**

- Sealing: 1551-233-MET500 Technical description (Tehnički opis), Rev A, 14.07.2014, Chapter 3.2.





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- The meter is sealed with two seals: first wire seal for upper cover of the housing (sealed by manufacturer) to prevent access to internal electronics of the electricity meter and second wire seal for lower cover of the housing (sealed by electrical distribution company) to prevent access to terminals of the electricity meter. The housing cannot be opened without visible mechanical deterioration.
- The MET500 meters are equipped with a terminal cover opening detector and a meter cover opening detector. The meter registers if and when the terminal or meter covers were opened in a special memory location (see 1551-233-MET500 Technical description (Tehnički opis), Rev A, 14.07.2014, Chapter 5.5 and 5.12).
- The MET500 meters are equipped with a detector of external magnetic field. Events are recorded in the special memory location (see 1551-233-MET500 Technical description (Tehnički opis), Rev A, 14.07.2014, Chapter 5.5 and 5.12).

**3. Information on other elements necessary to identify the measuring instrument and to check its visual external conformity to the design:**

- All information on other elements necessary to identify the measuring instrument and to check its visual external conformity to the design are presented in the document 1551-233-MET500 Technical description (Tehnički opis), Rev A, 14.07.2014.

**4. Information to verify the characteristics of manufactured measuring instruments (if necessary):**

- Manufacturer provides a software tool "µMETER" which allows reading of all data and configuration of the registers of the meter. To use the "µMETER" a personal computer is needed.

**5. Assessment of compliance with the essential requirements stated in Annex I and specific requirements stated in Annex MI-003 of the Directive on Measuring Instruments 2004/22/EC:**

- The measuring instrument fulfills the above-mentioned requirements.
- The use of harmonized standards (EN 50470-1 and EN 50470-3) is appropriate and a presumption of conformity is established.
- The content of the technical file is in conformity with the above-mentioned requirements.

**Modifications stated in this certificate:**

- New versions of printed circuit boards are added to the certificate.

The documentation is kept in the technical file No.:

**14TF004**

**Examined by**



  
Mag. Matjaž Lindič

Stran / Page: 10 (10)