SASTEK UYGUNLUK DEĞERLENDİRME HİZMETLERİ A.Ş.

Batı Sitesi Mahallesi Tahsin Kahraman Caddesi No:82
Gersan Sanayi Sitesi 06370 Yenimahalle / Ankara-TÜRKİYE

2014/32/EU MID – B MODÜLÜ / *B MODULE*
AB TİP ÜRÜN ONAY BELGESİ
EU TYPE EXAMINATION CERTIFICATE

Sertifika No: *Certificate Number*	MID-2759-2200033
Bakanlık Belge No: *Government Certificate Number*	MID-2759-2200033
Teknik Düzenleme: *In accordance with*	2014/32/EU – Aktif Enerji Sayaçları (MI-003) *Active Electrical Energy Meters (MI-003)*
Belgenin Verildiği Firma: *Issued to (applicant) company*	NIK-ELEKTRONIKA,LLC
Üretim Yeri Adresi *Manufacturer Address*	13-A Marshala Tymonshenka Str., of. 606 Kyiv 04212, UKRAINE
Ölçüm Cihazı: *Measuring Instrument*	NIK 2300 A...P1.../NIK 2300 A...P6... Üç Fazlı Aktif Elektrik Enerji Sayaçları *NIK 2300 A...P1.../NIK 2300 A...P6... Three Phase Active Electrical Energy Meters*
Geçerlilik: *Valid Until*	27. 09.2032
Onaylanmış Kurum No: *Notified Body Number*	2759
Yayın Tarihi: *Date of Issue*	27. 09.2022

Denizhan ÖZER
Genel Müdür/*General Manager*

1.   REGULATIONS AND STANDARDS USED FOR ASSESSMENTS

This type of instrument has been assessed against the requirements of the appropriate instrument provided in DIRECTIVE 2014/32/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014.

Requirements for the appropriate instrument are listed in Annex I "Essential requirements" and in Annex V "active electrical energy meters (MI-003)".

Marking of meters conforms to EN 50470-1, EN 50470-3, EN 62053-23 and manufacturer's plans. It was determined that the fonts and signs used for marking were arranged in accordance with the manufacturer's plans.

Standards used for assessment:

EN 50470-1:2007 - Electricity metering equipment (a.c.) - Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)

EN 50470-3:2007 Electricity metering equipment (a.c.) - Part 3: Particular requirements - Static meters for active energy (class indexes A, B and C)

IEC 62053-23:2021 Electricity metering equipment - Particular requirements - Part 23: Static meters for reactive energy (classes 2 and 3)

EN 62059-32-1:2012 Electricity metering equipment - Dependability - Part 32-1: Durability - Testing of the stability of metrological characteristics by applying elevated temperature

IEC 60721-3-3:2001 Classification of environmental conditions - Part 3-3: Classification of groups of environmental parameters and their severities - Stationary use at weather protected locations.

IEC 62053-52:2005 Electricity metering equipment (AC). Particular requirements. Part 52: Symbols.

2.   INTRODUCTION OF CERTIFIED PRODUCTS

NIK 2300 XP6T.2X0X.X.XX and **NIK 2300 XP1T.2X0X.X.XX** series; (hereinafter referred to as the meter) has been determined to be designed for the application of bidirectional measurement of electrical active energy.

3.   TECHNICAL PARAMETERS

Technical parameters are given in Table 1.

Parameter, characteristic	Value, description
Accuracy class for measurement of active energy (according to EN 50470-3)	B

Parameter, characteristic	Value, description
Accuracy class for measurement of reactive energy (according to EN 62053-23)	2
Reference voltage U_n, V	220, 230, 240 (subject to version)
Voltage operating range, % of Un	-20 to +15
Starting current Ist, A for active energy	12,5
Starting current Ist, A for reactive energy	15,6
Minimum current Imin, A	0,25
Transient current Itr, A	0,5
Reference current Iref, A	5

Maximum current Imax, A	100, 80 (subject to meter type)
Reference frequency f_{ref}, Hz	50
Meter constant by default (active energy), imp/(kWt·h)	8000
Meter constant by default (reactive energy), imp/(kvar·h)	8000
Power consumption of meter without PLC interface in voltage circuits, less than, V·A (W)	10 (2)
Power consumption of meter with PLC interface in voltage circuits, less than, V·A (W)	20 (5)
Power consumption of meter in current circuits (at Iref), less than, V·A	0,05
The default data rate of the optical port, baud	9600
The number of LCD digits to display basic information	6+2
The maximum allowable voltage at the terminals of the pulse output in the open state, In	30
The maximum allowable current of the output circuit of the pulse output in the closed state, mA	30
The main absolute error of the built-in clock of the meter, s/day	± 0,5
Average failure time, not less than, hours	200 000
Mean lifetime, not less than, years	24
Verification interval, years	10
Working temperature range, °C	-40 to +70
Storage temperature range, °C	-40 to +70
Parameter, characteristic	**Value, description**
Relative humidity at a temperature +30 °C, not more than, %	95
Degree of protection	IP54
Mechanical class	M2
Electromagnetic class	E2
Overall dimensions, less than, mm	296x172x56
Weight, not more, kg	2

TABLE-1

3.1 Versions and Functions of Meters

The versions of the meters and the structure of their marking are given in Table 2,Table 3 and Table 4.

NIK 2300 | A | X | P1 | | X | . | 2 | X | 0 | X | . | X | . | X | X

		Reference voltage
	1	3x220/380 V
	2	3x230/400 V
	3	3x240/416 V

		Ability to measure energy
	1	In the forward direction
	2	In the forward and reverse direction

		Sensors
	0	Without sensors
	M	The magnetic field sensor is installed
	C	The electromagnetic field sensor is installed
	MC	Magnetic field and electromagnetic field sensors are installed

		Relay availability
	0	Without load control relay
	2	The load control relay is installed

		The first interface availability
	0	The module is not installed
	2	RS-485 interface is installed
	8	PLC interface is installed
	9	PLC G3 interface is installed

		The main interface availability
	2	The meter with optical port and additional sealed function button

	T	Indication of multi-rate meters

		Wiring type
	P1	Direct connection with rated and maximal current 5 (100) A

		Type of the measured energy
	R	Measurement of the reactive energy
A		Measurement of the active energy

TABLE-2

NIK 2300	A	X	P6	X	.	2	X	0	X	.	X	.	X	X

			Reference voltage
	1	3x220/380 V
	2	3x230/400 V
	3	3x240/416 V

		...bility to measure the active energy
1	In the forward direction
2	In the forward and reverse direction

		Sensors
0	Without sensors
M	The magnetic field sensor is installed
C	The electromagnetic field sensor is installed
MC	Magnetic field and electromagnetic field sensors are installed

		Relay availability
0	Without load control relay
2	The load control relay is installed

The first interface availability

0	The module is not installed
2	RS-485 interface is installed
8	PLC interface is installed
9	PLC G3 interface is installed

The main interface availability

2	The meter with optical port and additional sealed function button

T	Indication of multi-rate meters

Wiring type

P6	Direct connection with rated and maximal current 5 (80) A

Type of the measured energy

R	Measurement of the reactive energy
A	Measurement of the active energy

TABLE-3

4.INTERFACE DESCRIPTION

The meters have a main interface (optical port) and one additional interface (depending on the version). The type and availability of the interface are reflected in the version name of the meter, which is indicated on the nameplate and in the passport . The nameplate of the meter contains information about the type of interface in this version of the meter.

Interface	Description
RS-485	Asynchronous interface, for a half-duplex multipoint communication line of the "common bus" type, in which data transmission is carried out by means of differential signals. The interface has galvanic isolation of the communication line. The interface is compatible with the ANSI TIA / EIA-485-A: 1998 standard. Communication speed from 1200 to 19200 baud.
PLC	Interface for data transmission on power lines with a modulated signal. First-generation PLC interface. 1. Marked as "PLC" on the nameplate. 2. Exchange speed up to 150 Kbps. 3. CENELEC-A frequency band (10kHz to 95kHz). 4. DCSK modulation.
(PLC G3)	Interface for data transmission on power lines with a modulated signal. Third generation PLC G3 interface. 1. Marked as "PLC3" or "PLC 3" on the nameplate. 2. Exchange speed up to 150 Kbps. 3. CENELEC-A frequency band (10kHz to 95 kHz). 4. OFDM modulation. ⚠ The PLC and PLC G3 interfaces are not compatible.

TABLE-4

1.   **PROCESSING OF MEASURED VALUES (HARDWARE & SOFTWARE)**

It has been observed that the software integrity is protected by the checksum, which is the relevant part of the programming code.

In case of software change, the manufacturer has to notify the notified body of the new software and version.
The software list is given in Table 6.

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Software version	Checksum	The firmware version displayed on the LCD	Notes (meter version)
EMA341.v.2.10.054.hex	708224EF	A341F2.10	Multi-rate, with PLC or RS485 interface
EMA343.v.2.10.054.hex	0A8697BB	A343F2.10	Multi-rate, with PLC3 interface

TABLE-5

5.1 Display of Measurement Results

   The meter has a built-in backlit LCD display. The screen shows the next data and information.
 -Shows the measured parameter and unit.(A; V; kW; kWh)
 -Indicates the reverse current direction in the first and second measuring element.
 -Indicates that the current strength in the first and second measuring elements is not equal.
 -Indicates that the communication session between the meter and other external devices is in progress.
 -Indicates that the load is cut off for the consumer. (closed load control relay)
 -Indicates whether the meter case and terminal cover are opened.

5.2 Safety and Protection of Meters

It has been observed that the device before the B module certification and conformity assessment is secured as follows:
-It has been observed that the protection against tampering with the meter system is fixed with two screw sealing positions in the meter casing.
-Protection against interference with optical interfaces has been observed to be provided with a screw seal on the cover of the optical port.
- It has been observed that protection against access to the meter terminal is provided by the sealed position of the screw fixing the terminal cover.
Access to the data is only possible through special software after entering the password.
The user password only allows data to be read from the meters. It has been determined that data cannot be written to the meter with the user password.
The operator password allows data to be entered and read.
It has been observed that the meters can only be intervened by the relevant authorized service.

6. ISSUES OUTSIDE THE SCOPE OF THE MID

It has been observed that the counter in question also has a reactive measurement feature.
As a result of the tests, it has been seen that the same model reagent counters, which are outside the scope of MID, are designed in accordance with the relevant standards in terms of bidirectional measurement. It was determined that the counter in question had an RS-485 module. This module is outside the scope of MID.

7. NORMATIVE DOCUMENTS BASED ON CERTIFICATION

 - EMC and Metrological test reports made by ELDAŞ Test Laboratory dated: (26.09.2022)
   Report No: (220902-06)

 - EMC, Metrological and Durability test reports made by UKR Test Center dated (21.12.2021),(20.01.2022),(16.12.2022),
   Report No: (1575-4-2021) , (29/035),(1729-5-2021)

-NIK 2300 User Manual

-NIK 2300 Technical documents

- NIK 2300 WELMEC 7.2 Software Verification Reports
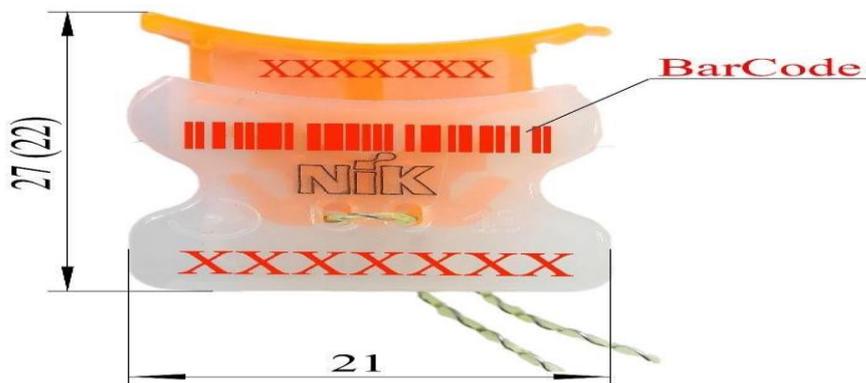
8. MECHANICAL SEALING

Figure 1 Sample of the security seal

Figure 5 shows an example of the Technical Control Unit's security seal. Vertical dimensions: 27 mm - for open seal and 22 mm - for closed seal.

The figure in red shows the positions of the following variables: XXXXXXX - The unique serial number of the seal. BarCode - The barcode of the serial number in EAN8 format. Permanent assignment: "NIK" – registered trademark of the manufacturer.

The dimensions in Figure 4 are given in mm.

9. SOFTWARE SEALING

After software writing into a microcontroller, a manufacturer's programming unit byte-wise compares the contents of the microcontroller memory for their accuracy before the first run and notifies an operator, if errors are detected. A software design includes a unit, which controls the software file integrity in the microcontroller memory. During each meter switching on, the software memory checksum is recalculated; then, the calculation result is compared with the result written in the memory end by an external utility. If these checksums coincide, the calculation result will be zero, and this indicates the integrity of the internal software. If a wrong checksum value is detected during software starting or regular checking, the software shows an error in the register of errors (OBIS 0.0.97.97.0.255) on the meter display. To protect the software from tampering, a mechanism of software reading protection is used, provided by a microcontroller manufacturer. The software automatically switches on the program memory reading protection.

10. LCD SCREEN READING

The meters have a liquid crystal display (hereinafter - LCD) shown in Figure 2.

Figure 2. LCD view of meters
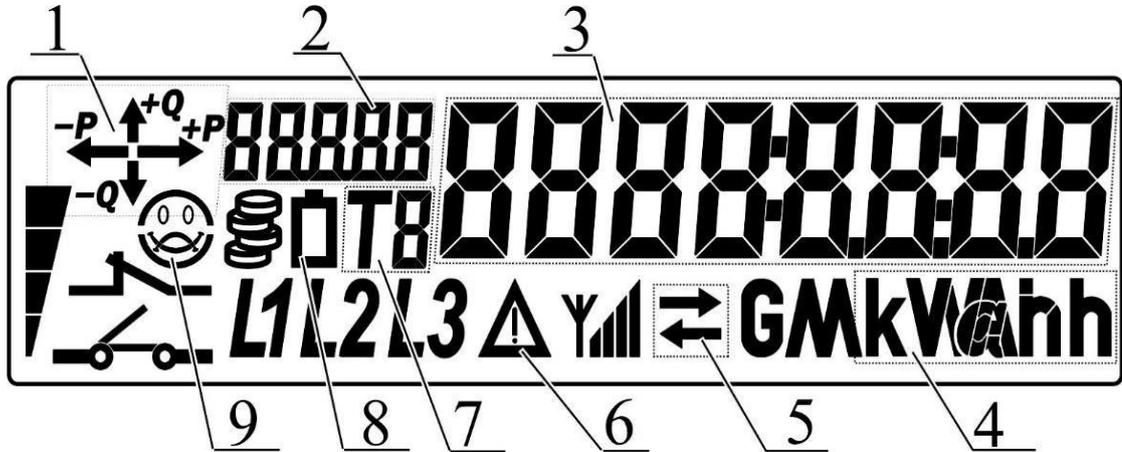
The following elements of the LED are indicated in this Figure 2

1. Group of energy angle quadrant indicators:

   1.1. «⟶+P» active power (A+);

   1.2. «−P⟵» active power (A-);

   1.3. «+Q+P⟶» full power vector in the first quadrant (A+R+);

   1.4. «−P +Q⟵» full power vector in the second quadrant (A-R+);

   1.5. «−P −Q» full power vector in the third quadrant (A-R-);

   1.6. «−Q +P» full power vector in the fourth quadrant (A+R-);

   1.7. «+Q» reactive power (R+);

   1.8. «−Q» reactive power (R-).

2. Group of indication of OBIS-code of the displayed parameter

3. Group to display the value of the measured parameter;

4. Unit of indication group:

   4.1. «A» current in amperes;

   4.2. «V» voltage in volts

   4.3. «kW» active power in kilowatts;

   4.4. «kVar» reactive power in kilovars;

   4.5. «kW h» active energy in kilowatt-hours;

4.6. «**h**» network frequency.

5. Indicator of data exchange through interfaces «⇄»;

6. The indicator of internal error «⚠», flashes when an error occurs, or during the emergency tariff;

7. «**T8**» number of the current rate;

8. Backup battery low charge indicator «▯». If the symbol is displayed, the battery needs to be replaced.

9. Load connection indicator. When the load is disconnected, the symbol ☹, is displayed. When the load is connected, the indicator is not used.

LED symbols not marked in the figure are not used in these meters.

11.   LABEL INFORMATION

It has been observed that the quality of texts and symbols provides clear images throughout the meter's lifetime.
It has been determined that the marking is made in Ukrainian or in the language specified in the supply contract.
It has been observed that offset printing or marking is done in a way that does not impair quality.

An example of the NIK 2300 ...P1... meter is shown in Figure 3
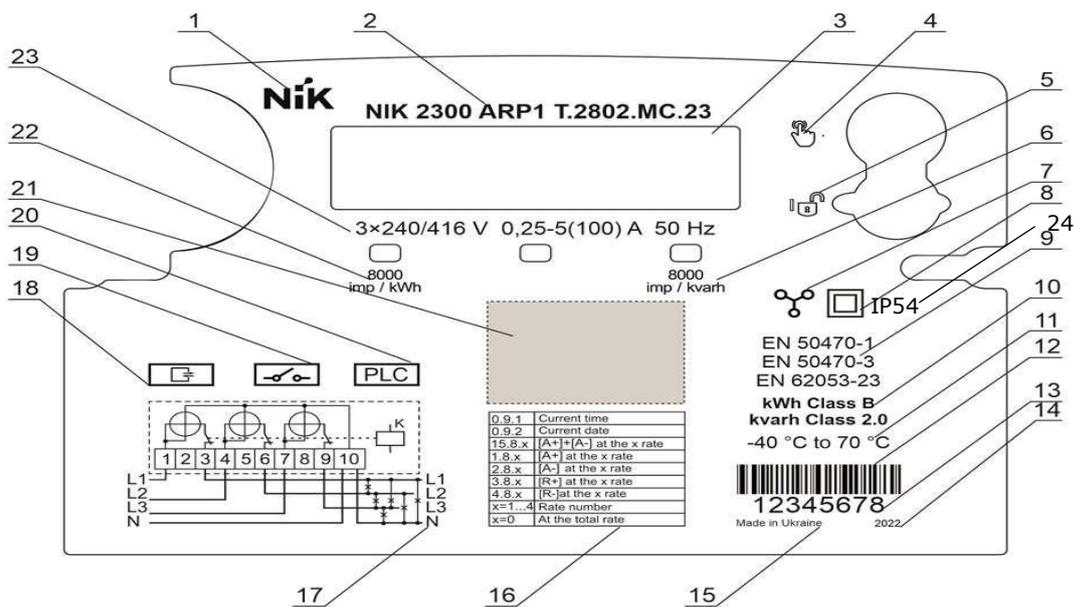
Figure 3

1. Registered trademark;

2. Symbol of meter version;

3. The window for the electronic display of the meter;

4. Marking of the "View" button;

5. Marking of the function button;

6. Marking of the indicator of measurement of reactive energy (metering constant of the main test output of the meter for the measurement of reactive energy);

7. Symbol of the number of measuring elements;

8. Symbol of protection class II;

9. Standards that the meter complies with, including standards for accuracy classes for measuring active and reactive energies;

10. Accuracy classes of the meter;

11. Operating temperature range;

12. Place for meter barcode;

13. Factory number according to the numbering system of the manufacturer;

14. Year of manufacture of the meter;

15. The inscription "Made in Ukraine";

16. Table of OBIS codes;

17. Wiring diagram of the meter;

18. Symbol of the presence of an optical port;

19. Symbol of the presence of the load control relay

20. Symbol of the presence and type of the first additional interface;

21. Area for conformity assessment mark, additional metrological marking, and additional information at the request of meter owners;

22. Marking of the active energy measurement indicator (metering constant of test electrical output of the meter for the measurement of active energy);

23. Main technical characteristics (reference voltage, reference and maximum current, reference frequency).

24. International Protection Rating Notes:

    1. Inscriptions on the nameplate may be made in other languages at the request of the customer.

    2. Additional elements may be applied to the nameplate at the request of the customer.

    3. Depending on the design of the meter, the list of elements on the nameplate may change compared to the figures.

    4. It is allowed to change the relative position of the elements and their dimensions on the nameplate when changing its geometry or meter casing and for other production reasons.
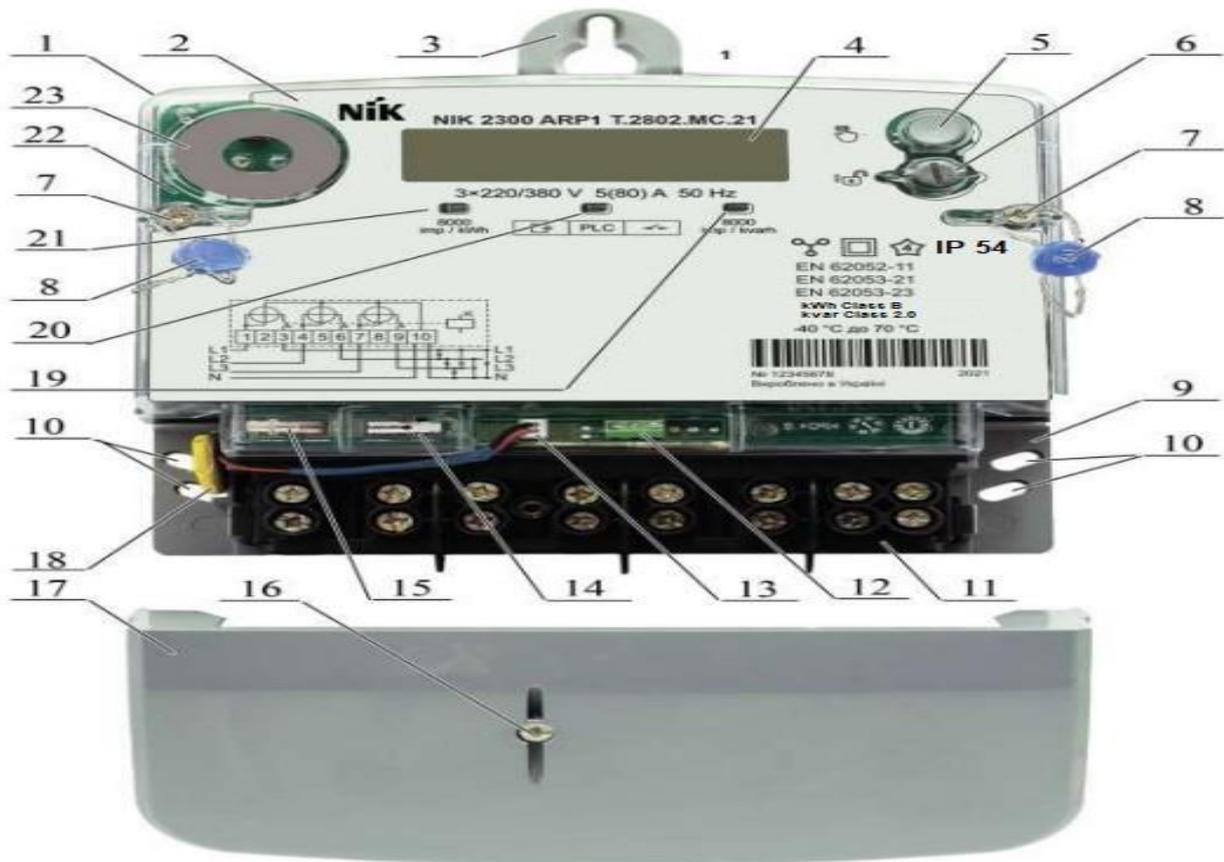
12. OVERVIEW OF THE METER

Figure 4

1. The casing of the meter;
2. Nameplate of the meter;
3. Clamp for fastening of the meter;
4. Electronic display of the meter;
5. "View" button;
6. Function button;
7. Sealing screws of the casing;
8. Seals;
9. The base of the meter;
10. Holes in the base for mounting the meter;
11. Clamp unit;
12. Contacts of the main test output of the meter;
13. External backup battery connector;
14. Sensor for opening the cover of the clamps;
15. The sensor of opening of a cover of the meter;
16. Sealing screw of the cover of clamps;
17. Cover of clamps;
18. External backup battery;
19. LED indicator for reactive energy measurement;
20. LED indicator of exchange via PLC or PLC G3 interfaces;
21. LED indicator of active energy measurement;
22. Printed circuit board with electronic components;

23. Optical port interface

13. GENERAL DIMENSIONS AND CONNECTION DIAGRAMS OF METERS
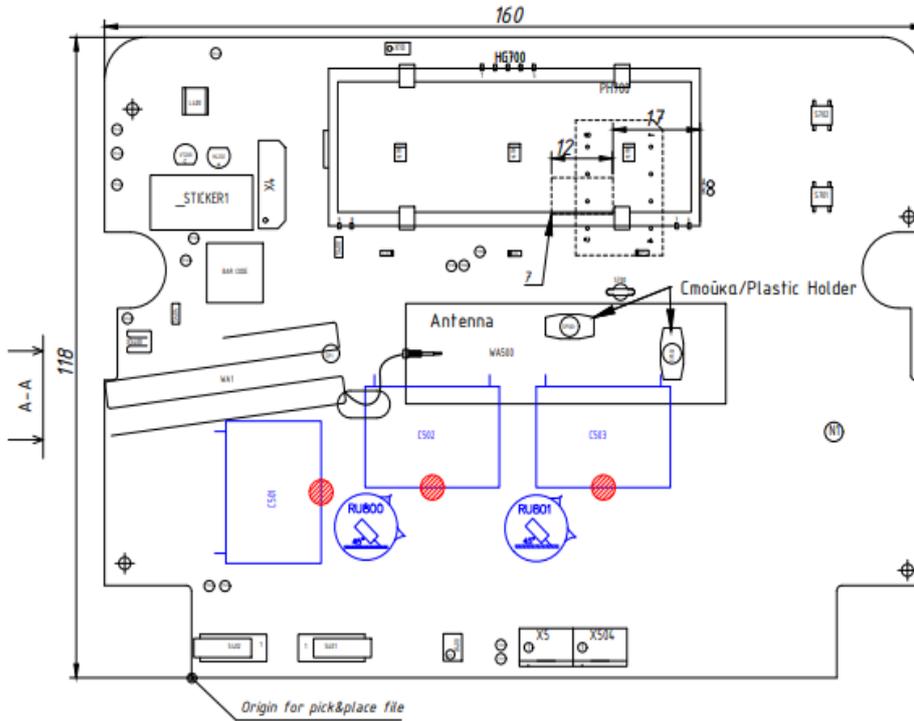
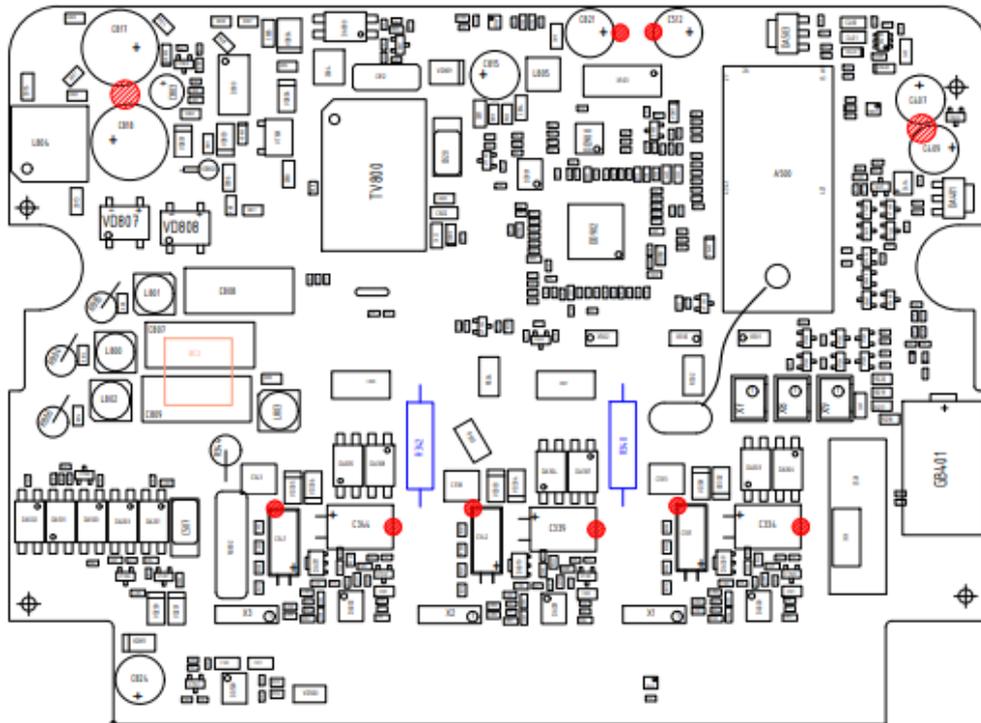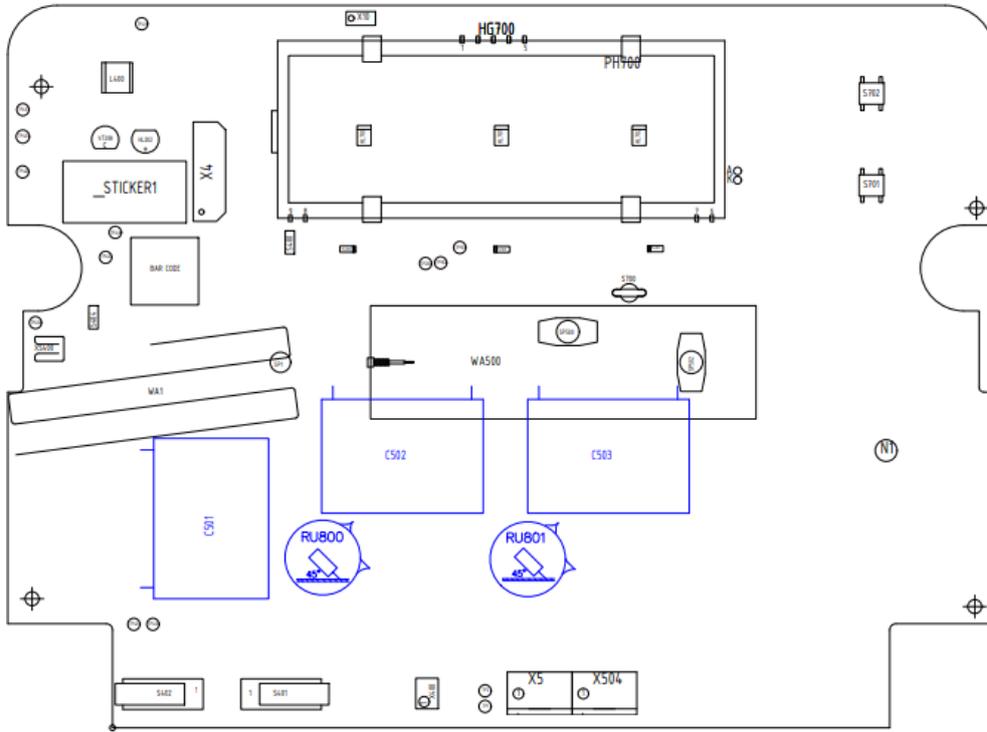The dimensions in Figure 6 are given in mm.
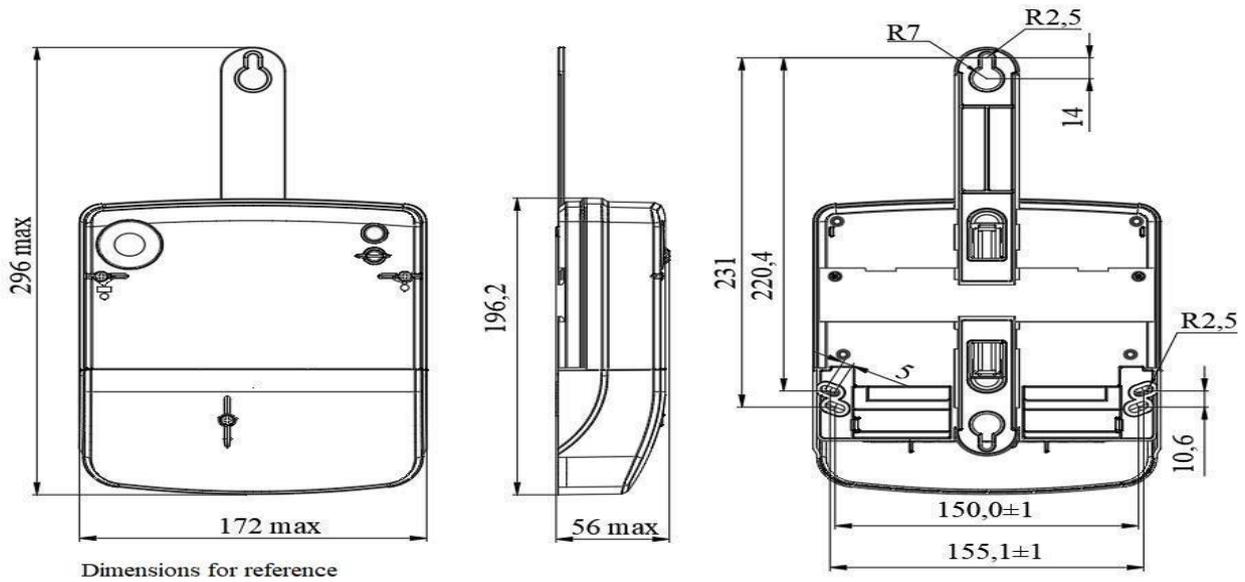
Figure 5
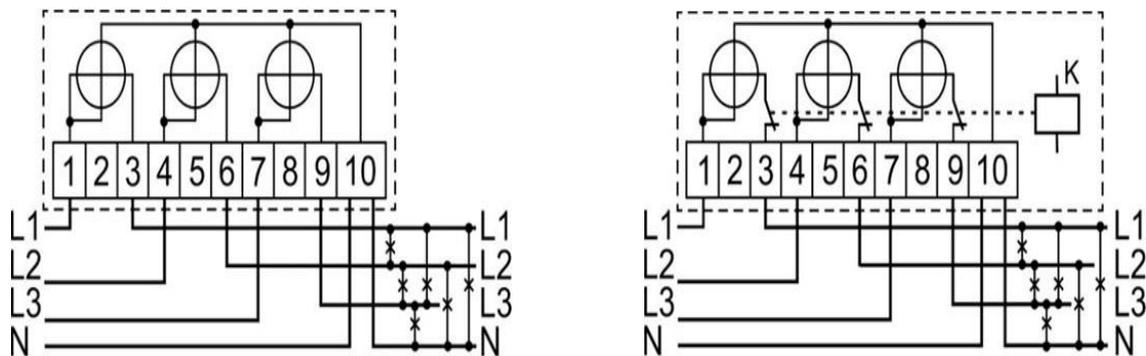
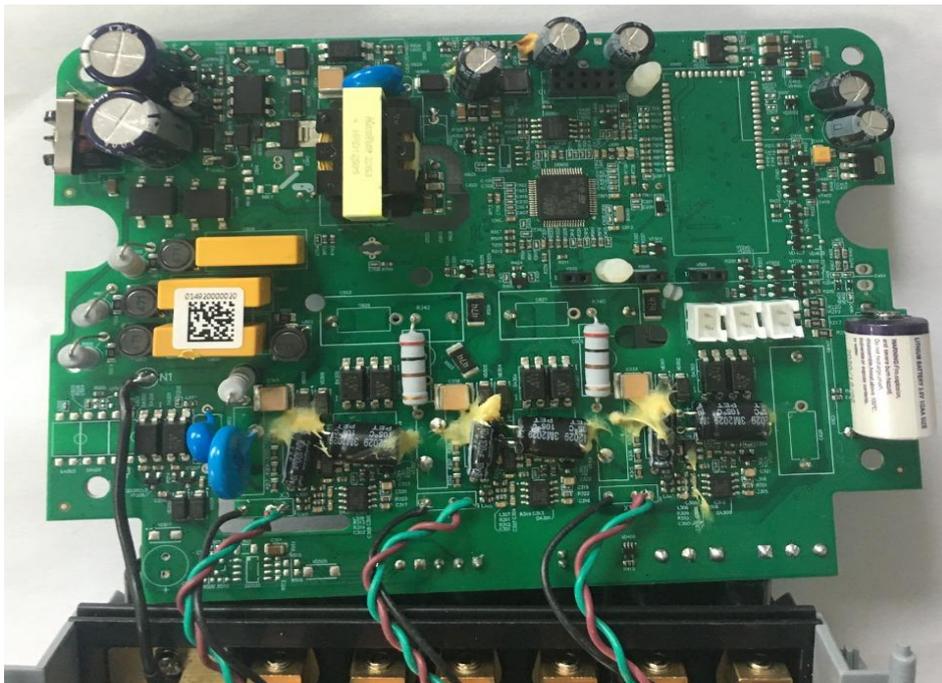
Figure 6

14. ELECTRONIC CARD CIRCUIT

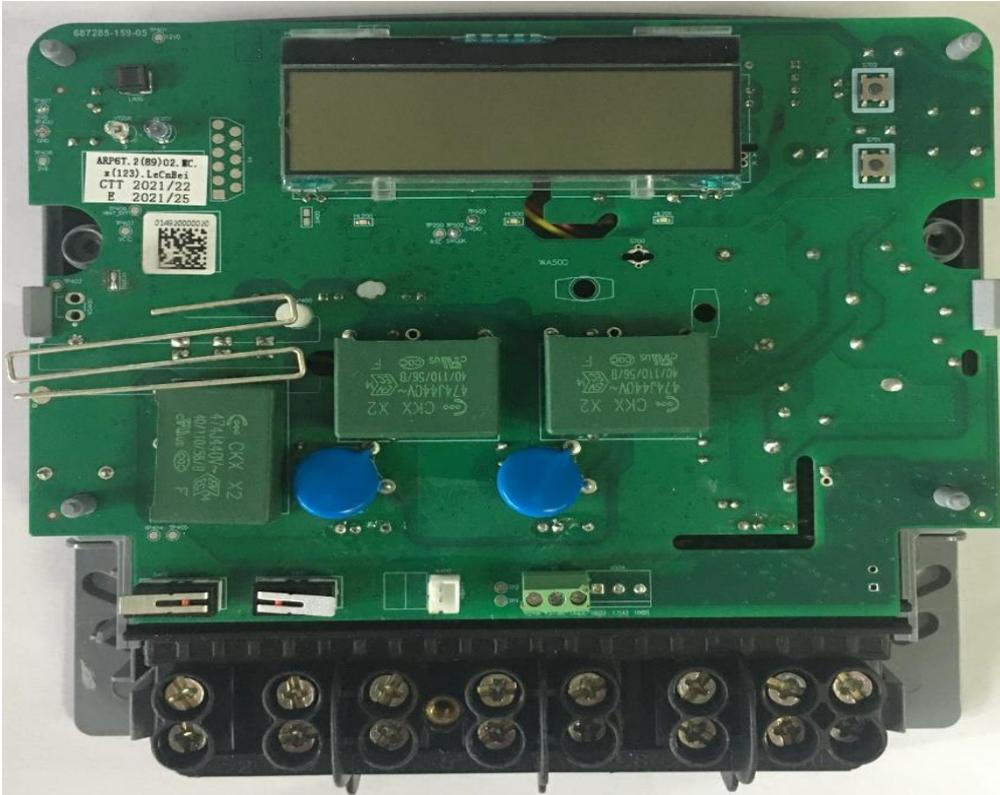Electronic Card Circuit Figure 7
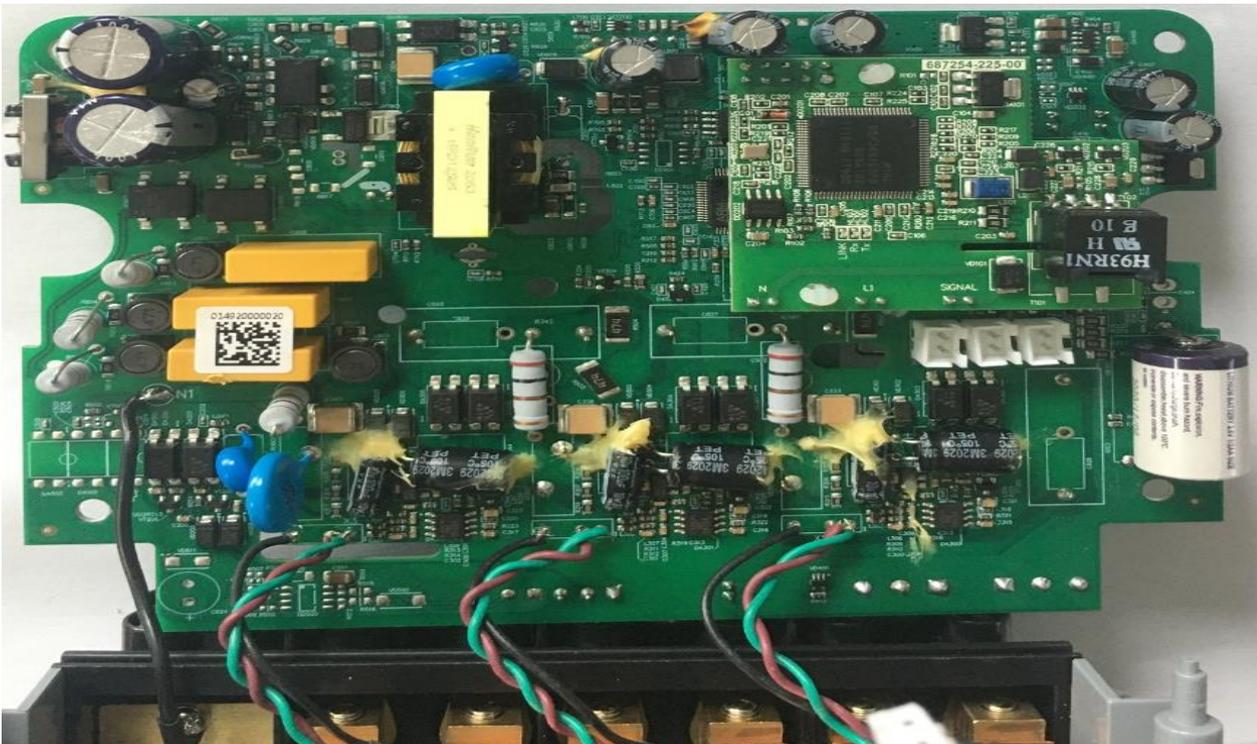

Electronic Card Circuit Figure 8

Electronic Card Circuit Figure 9

Electronic Card Circuit Figure 10

Electronic Card Circuit Figure 11

Electronic Card Circuit Figure 12

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				Таблиця (Table) 1	
Позначення Designation	Найменування виконання Name of the variant	Висота HG700 H, мм Height HG700 H, mm	Поліестерова плівка Polyester tape 12x10mm		Примітка Note
ААШХ.687285.159-00	ARP6T.2202.MC.x(123) LeCnBei	11	–		тамподрук, підсвітка на платі+підставка
ААШХ.687285.159-01	ARP6T.2502.MC.x(123) LeCnBei	11	–		тамподрук, підсвітка на платі+підставка
ААШХ.687285.159-02	ARP6T.2(89)02.MC.x(123) LeCnBei	11	–		тамподрук, підсвітка на платі+підставка
ААШХ.687285.159-03	ARPxT.2200.M.x(123) LeCnBei	11	–		тамподрук, підсвітка на платі+підставка

Table-6

KONTROL
Sefa KÖKSAL
Teknik Uzman
Tarih:27.09.2022