

AG WATT-HOUR METERS
NIK 2100 AP2T
USER MANUAL ААНХ.411152.025

Kyiv – 2016

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Introduction

This User Manual (hereinafter referred to as UM) covers NIK 2100 AP2T multi-tariff watt-hour meters.

UM describes operation of meters, their intended use, maintenance, inspection, storage and transportation.

The meters shall be maintained by specially trained personnel, having at least III group electrical safety competency certificates for units up to 1000 V.

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1. Description of meters and their functioning

1.1 Application of meters

NIK 2100 AP2T (tariff) watt-hour meters are intended for measuring of active electric power, instantaneous power, voltage and current values as well as organization of multi-tariff metering in single-phase utility and other circuits.

The meters shall be installed in premises with explosion-proof environment, without current-conducting dust, corrosive gases or vapors in concentrations causing metal and insulation destruction - environmental class 3 according to GOST 15150.

The meters can be used in automated electrical power metering systems (UEPMS).

Acceding to their climatic effect resistance, the meters are included into group 4 of GOST 22261 with extended temperature and humidity range. Acceding to their mechanical stability, the meters are included into group 2 of GOST 22261.

The rated voltage of the meters depends on their version.

Designation of the meters during their ordering and in documents related to other products, where they can be used, shall include meter name, its code and meter version code according to Tables 1.1 hereof: "NIK 2100 AP2T.1000.C.11 watt-hour meter".

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Table 1.1 – Meter designation structure

NIK 2100														
A	P2	T	.	1	0	0	0	.	C	.	1	1		
													Voltage	
													1	220 V
													Power direction	
													1	Active power import
													C	
													Available optical port interface	
													1	Installed
													T	Tariff
Mains connection diagram														
P2	Direct connection 5(60)A													
Measured power														
A	Active power													

1.2 Technical data

The meters correspond to DSTU EN 62053-21, DSTU EN 62052-11, DSTU EN 50470-1, DSTU EN 50470-3.

Overall and installation dimensions of meters are provided in Appendix A. Connection diagram of meters is provided in Appendix B.

Basic parameters of meters:

- Accuracy class – 1 acc. to DSTU EN 62053-21, DSTU EN 62052-11;
- Accuracy class – B acc. to DSTU EN 50470-1, DSTU EN 50470-3;
- Start current, I_{st} , – 0.0125 A;
- Minimum current, I_{min} , – 0.25 A;
- Transient current, I_{tr} – 0.5 A;
- Reference current, I_{ref} – 5 A;
- Maximum current – 60 A;
- Rated voltage – 220, 230, 240 V (depending on the version);
- Maximum voltage – 253 V;
- Minimum voltage – 143 V;
- Meter constant – 6400 p/kW·h;
- Rated frequency – 50 Hz;
- Verification interval – max. 16 years.

The active power consumption at the normal temperature, rated frequency and rated voltage does not exceed 1 W for each voltage circuit of the meter.

At the normal temperature, rated frequency and rated voltage, the full power consumption of each voltage circuit of the meter does not exceed 2 V·A, or 8 V·A (depending on the version). At the normal temperature, rated frequency and rated current, the full power consumption of current circuit of the meter does not exceed 0.2 B·A.

The meters are equipped with electronic display, which shows electric power values immediately in kW·h. This electronic display has six decimal places before point and two decimal places after point.

The set operational temperature range is -40 to +70 °C. The limit operational temperature range is -40 to +70 °C. The relative humidity shall not exceed 90% at 30 °C.

The relative humidity limit at 30 °C – max. 95%.

Atmospheric pressure: 70 to 106.7 kPa.

Meter weight – max. 1 kg.

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Meter shunt running. Upon no current in the current circuit and voltage value 1.15 of rated voltage, the main transmitting device generates max.1 pulse within min. 9.5 min.

Sensitivity. The meters switch n and continue to register values upon current ≥ 12.5 mA (2.75 W).

Basic nominal error δ_e of meters caused by current changing upon active load does not exceed the following limits:

$$\delta_e = \pm 1.5 \% \text{ at } 0.05 \cdot I_{RTD} \leq I < 0.1 \cdot I_{RTD}, \quad \cos \varphi = 1.0 \quad (1.1)$$

$$\delta_e = \pm 1.0 \% \text{ at } 0.1 \cdot I_{RTD} \leq I \leq I_{MAX}, \quad \cos \varphi = 1.0 \quad (1.2)$$

Upon inductive load:

$$\delta_e = \pm 1.5 \% \text{ at } 0.1 \cdot I_{RTD} \leq I < 0.2 \cdot I_{RTD}, \quad \cos \varphi = 0.5 \quad (1.3)$$

$$\delta_e = \pm 1.0 \% \text{ at } 0.2 \cdot I_{RTD} \leq I \leq I_{MAX}, \quad \cos \varphi = 0.5 \quad (1.4)$$

Upon capacitive load:

$$\delta_e = \pm 1.5 \% \text{ at } 0.1 \cdot I_{RTD} \leq I < 0.2 \cdot I_{RTD}, \quad \cos \varphi = 0.8 \quad (1.5)$$

$$\delta_e = \pm 1.0 \% \text{ at } 0.2 \cdot I_{RTD} \leq I \leq I_{MAX}, \quad \cos \varphi = 0.8 \quad (1.6)$$

Where I – actual current value, A;

I_{RTD} - rated current value;

I_{MAX} - maximum current value;

$\cos \varphi$ - power factor.

The complementary meter error upon voltage changes on inputs does not exceed limits provided in Table 1.2. Upon mains voltage under $0.65 U_{RTD}$, the power measuring error can vary within +10 to -100%.

Table 1.2

Current values	Power factor, $\cos \varphi$	Error changing limits, %, upon input voltage	
		0.9 U_{RTD} to 1.1 U_{RTD}	0.65 U_{RTD} to 0.9 U_{RTD} , 1.1 U_{RTD} to 1.2 U_{RTD}
I_{RTD}	1.0	± 0.7	± 2.1
	0,5 (upon inductive load)	± 1.0	± 3.0

The complementary meter error caused by voltage changes 47.5 to 52.5 Hz, does not exceed limits provided in Table 1.3.

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Input voltage,% or rated value	Current value	Power factor, cos φ	Error changing limits,%
100	I _{RTD}	1.0	± 0.8
		0.5 (upon inductive load)	± 1.0

The complementary meter error upon available DC component in AC circuit does not exceed $\pm 3\%$.

The meters can resist exposure of permanent magnetic field generated by a permanent magnet with section min. 5.0 cm² and pole magnetic density min 300 mT.

The meters can resist exposure of external magnetic field with magnetic density min 100 mT generated by current frequency equal to the mains frequency.

The meters are not sensitive to electrostatic discharges and flashovers.

The meters are not sensitive to high-frequency electromagnetic fields.

Reliability index. The meters shall have mean figures related to the mean time between failures, taking into account maintenance – at least 200 000 h.

The mean figures related to the mean time between failures are determined for 1.2.7 - 1.2.11.

The mean life cycle of the meters shall be at least 30 years.

Meter case protection grade against solid subjects and water penetration: IP 54 (according to GOST 14254).

Orig. inv.	Sign. i Date	nst. of inv. no.	Dupl. inv. no.	Sign. i Date	The meters are not sensitive to high frequency electromagnetic fields. Reliability index. The meters shall have mean figures related to the mean time between failures, taking into account maintenance – at least 200 000 h. The mean figures related to the mean time between failures are determined for 1.2.7 - 1.2.11. The mean life cycle of the meters shall be at least 30 years. Meter case protection grade against solid subjects and water penetration: IP 54 (according to GOST 14254).
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Upon customer's request, the meters with available interface or radio channel can include load control relay, magnetic field sensor, or electromagnetic sensor.

Table 1.4

Designation	Quantity
Watt-hour meter (version according to the order)	1 pcs.
Data sheet AAIIX.411152.025	1 pcs.
User manual AAIIX.411152.025	1 pcs.
Software**	1 pcs.
Consumer package	1 pcs.
* Can be sent upon customer's request ** According to the supply agreement	

Active electric power is measured by analog-digital conversion of electrical signals incoming from primary current and voltage transducers to the input of the integrated analog to digital converter (ADC) of the microcontroller, which converts signals into the digital code. The microcontroller calculates root-mean-square values for current, voltage, power, as well as active power values, totally and per tariff.

1.4.1.2 To store data in the meters, the non-volatile memory is used. Measured electric power values and meter parameters are stored in the memory. The measured electric power values and meter parameters shall be stored at least 10 years without voltage on meter voltage terminals.

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1.4.1.3 The eight-segment electronic display with additional elements (depending on the version) is used in the meters.

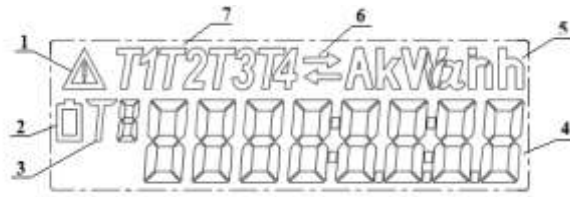


Figure 1.2

Figure 1.2 shows the electronic display layout. Its elements are as follows:

- 1 – Alarm, which is displayed upon failure or emergency tariff;
- 2 – if this symbol flashes – the battery shall be replaced;
- 3 – number of viewed tariff is displayed (1 to 4).
- 4 – displayed data;
- 5 – measuring units of displayed data: **A** – current, A, **V** – voltage, V, **kW** – active power, kW, **kWh** – active power, kW-h;
- 6 – if this symbol is displayed or flashing – the meter is communicating via optical port or radio channel;
- 7 – current tariff number is displayed (1 to 4).

1.4.2 The View button in the front panel of the meter is intended for switching of measured and calculated values (hereinafter referred to as windows), displayed on the electronic display.

The meters include microcontroller-integrated and quartz-crystal-resonator-stabilized real time clock counting years, months, week days, hours, minutes and seconds. Clock data are used for tariff program execution, generation of mean power integration periods and registration of events using temporary marking. The clock has a feature allowing the time switching to winter and summer time. The time switching can be carried out automatically or according to the date installed manually during parameterization

The meter includes a temperature sensor decreasing of the dependence of the clock error on the ambient temperature. The lithium battery 10 (Fig. 1.1) provides continuous work of the integrated clock upon mains disconnection. The meter microcontroller is switched to power-saving mode upon absent mains voltage; in this case, the meter is powered by the lithium battery. In this mode, only internal meter clock is functioning. After power recovery, lithium battery power is not used.

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Under emergency conditions, without mains voltage, the meter can operate at least 6 years.

To power the meters, a power supply unit is used, which converts the rectified input voltage into voltage required for powering of all meter assemblies and units.

The consumer load can be switched off via interface or radio channel in meter versions with load control relay. The relay is also switched off, if set values of maximum permissible power or maximum permissible voltage are reached, upon exceeding of which the consumer load is switched off.

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1.5 Parameterization of meters

During parameterization, meter configuration constants are entered into the meter EEPROM.

The parameterization includes two steps:

- Manufacturer's parameterization;
- Customer's parameterization.

1.5.1.1 During the factory (manufacturer's) parameterization, serial number and constants rewired for functioning of the meter and extension modules are stored in the meters memory. Constants shall not be change during the meters' service life (See Table 1.5.1). The factory parameterization can be carried out by manufacturer only.

Table 1.5.1

Parameter	Value
Baud rate	
For radio	38400 baud
channel for	9600 baud
Time out	120 s
PAN-ID*	2100
Channel no.*	11
Time out of automatic address recovery *	300 s
Time out of network scanning*	70 s
Radio channel output power *	+ 3 dBm without amplifier +17 dBm with amplifier
Barcode	Meter barcode is entered
Meter no. In the system	A unique number is generated based on the barcode
* Only for meter versions with radio channel	

1.5.1.2 During the customer's parameterization constants, which adapt the meter to the local operation conditions are written into the meter memory via optical port. Constants written into the meter memory are provided Table 1.5. The customer's parameterization can be carried out by a power supply or an authorized organization using the special software. Password entering is required for the parameterization.

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Table 1.5

Parameter	Value	
	default	permissible
Optical port baud rate: For optical port For radio channel	9600 baud 38400 baud	Not subject to changing Not subject to
Disconnection time out upon optical port disabling	120 c	30 to 250 s
User's password Operator's password	1111111111111111 2222222222222222	0 to 16 characters 0 to 16 characters
Parameters of switching to summer/winter time	Automatic switching	- automatic switching - switching on specified month and day; - no switching
Channel no.*	11 to 26	11
Time out of automatic address recovery*	30 to 3600 s	60 s
Time out of network scanning*	30 to 3600 s	30 s
Radio channel output power: * - without amplifier - with amplifier	-30 to +3 dBm -12 to +17 dBm	+3 dBm +17 dBm
Data: - street name, up to 25 characters - house number, up to 8 characters - apartment number, up to 4 characters - additional data	0 to 25 characters 0 to 8 characters 0 to 4 characters 0 to 20 characters	— — — —

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Table 1.5 (continued)

Parameter	Value	
	default	permissible
Parameters of switching to summer/winter time	Automatic switching	- automatic switching - switching on specified month and day; - no switching
Number of tariffs	3	1 to 4
Number of week profiles	3	1 to 10
Number of tariff seasons	5	1 to 12
Number of day profiles	3	1 to 16
Holydays	0	0 to 30
Threshold power value; upon exceeding these value, the load control relay is switched off **	0 to 65535 W	—
Threshold voltage value; upon exceeding these value, the load control relay is switched off **	0 to 65535 V	—
* Only for meter versions with radio channel ** Only for meter versions with load control relay		

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The tariff program analyses data of the meter internal real-time clock and compares them with tariff season changing data set during the meter parameterization.

The week profile determines a certain sequence of day profiles use during the calendar week, including an additional holiday. Up to 10 week profiles can be used in the meter.

Lists of holidays. Up to 30 holiday dates can be stored in the meter memory. Holiday date format is - month - day.

Tariff registers. The metered power data are written into corresponding registers in the meter memory.

1.6.8 The emergency tariff, which is switched on after tariff system or internal meter clock value, is indicated by Alarm symbol and tariff number (Figure 1.3)



Figure 1.3

1.6.8.1 If the emergency tariff is displayed on the electronic display after the meter installation, set meter parameters or Яprecise time. The tariff parameterization and clock setting shall be carried out by the power supply or the authorized organization.

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Upon customer's request, the meter case sealed screws can be fixed using epoxy resin.

1.7.1.1 The user's password allows only data reading. Data writing is impossible.

1.7.2 Depending on their version, the meters can include magnetic field sensors. After unauthorized tampering attempt using electromagnetic field with intensity exceeding 10 V/m at 80 to 200 MHz during 3 s, text “Radio” will be periodically shown on the electronic display. The text “Radio” can be reset by the power supply organization only.

The meter marking shall correspond to GOST 25372, DSTU EN 62053-21, DSTU EN 62052-11, DSTU EN 50470-1, DSTU EN 50470-3, and manufacturer's drawings.

- meter designation according to Table 1.1 hereof;
- accuracy class 1 according to DSTU EN 62053-21, DSTU EN 62052-11;
- accuracy class B according to DSTU EN 50470-1, DSTU EN 50470-3;
- rated and maximum current;
- power performance indicator “6400 imp / kW • h”;
- manufacturer’s trade mark;
- manufacturing year;
- type approval symbol according to DSTU 3400;
- double square  for II protection grade meters in the insulating enclosure;
- test insulation voltage according to GOST 23217;
- optical port availability IR//;
- text “Made in UKRAINE”:

- upon customer's request, other data can be specified (e. g., bar code).

On the internal surface of the meter terminal plate cover, a label with the meter connection diagram is applied. The meter connection diagrams are provided in Appendix B.

Fonts and symbols used for marking shall correspond to GOST 26.020 and manufacturer's drawings.

The quality of texts and symbols shall ensure their readability during the meter service life.

1.8.1 The consumer package marking shall correspond to manufacturer's drawings and contain the following data:

- Manufacturer's trade mark;
- Name and designation of the meters;
- Packing year;
- QC mark;
- Re-preservation year and month (if required);
- QC mark;
- Packer's signature;

The marking shall be applied on a label fastened on the consumer package or immediately on the package.

The transport package marking shall correspond to GOST 14192, agreement provisions and manufacturer's drawings.

A typographical label with handling symbols “HANDLE WITH CARE “, “KEEP DRY”, and “TOP” and a label with main, additional and informational texts according to GOST 14192 shall be applied on the transport package.

The transport package labels shall be placed according to GOST 14192.

The marking language shall be Ukrainian or language specified in the supply agreement.

Alternative marking is possible upon customer's request and corresponding provision in the supply agreement.

1.9 Packing

The meters, service and shipping documentation shall be packed according to the manufacturer's drawings. Shipping type – small light-duty truck shipping.

The meter consumer packages are made of cardboard according to the manufacturer's drawings.

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The transport package marking shall correspond to GOST 14192, agreement provisions and manufacturer's drawings. A typographical label with handling symbols "HANDLE WITH CARE ", "KEEP DRY", and "TOP" and a label with main, additional and informational texts according to GOST 14192 shall be applied on the transport package. The transport package labels shall be placed according to GOST 14192. The marking language shall be Ukrainian or language specified in the supply agreement. Alternative marking is possible upon customer's request and corresponding provision in the supply agreement. 1.9 Packing The meters, service and shipping documentation shall be packed according to the manufacturer's drawings. Shipping type – small light-duty truck shipping. The meter consumer packages are made of cardboard according to the manufacturer's drawings.					
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One meter together with service documentation is packed into package.

The consumer packaging with the packaged meter is wrapped with the adhesive tape. The packing list sticker is applied on the top of the consumer packaging.

Other packaging is possible upon customer's request and corresponding supply agreement provisions.

The meters in the consumer packaging are put into transport packaging. According to the manufacturer's drawings, max. 20 meters are packed into each transport package.

The box also contains shipping documentation, including packing list with the following data:

- Name and designation of the meters;
- Quantity of meters;
- Packing data;
- Packer's signature;
- QC mark;

Overall dimensions of the transport packaging shall not exceed

450 mm x 610 mm x 960 mm.

Net weight, max. 24 kg.

Gross weight, max. 48 kg.

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2 Intended use

2.1 Operational restrictions

Operational restrictions are provided in Table 2.1

Table 2.1

Parameter	Value
Input voltage range, V	143 to 253
Current operational range, A	0.0125 to 60
Maximum permissible voltage on open test output terminals, V	30
Maximum permissible current of closed test output circuit, mA	30
Operational temperature range, °C	-40 to +70
Limit operational temperature range, °C	-40 to +70
Range of relative humidity fluctuations (at +30 °C), %	0 to 95
Range of atmospheric pressure fluctuations, kPa	70 to 106.7

Note – At the temperature under 30 ° C data on electronic display will be switched every minute.

2.2 Preparation for use and installation procedure

2.2.1 The meters shall be mounted, dismounted, repacked and marked by specially authorized organizations and persons only, according to current electrical units mounting guidelines.

2.2.2 CR 2032 3V lithium battery is used for meter clock powering. The battery can be replaced by the power supply or the authorized organization only.

2.2.3 To replace the battery, do as follows:

- loose the sealing screw and remove the optical port cover and the battery case;
- take the old battery out of the case using a screwdriver and install the new one observing its polarity; then reinstall the battery case into the meter. If symbol 2 (See Figure 1.2) is continuously displayed on the electronic display after battery replacing, a discharged battery is installed or the battery polarity is not observed;

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- Set current date and time via meter optical port, interface or radio channel;
- Close the meter optical port, tighten the sealing screw and seal the meter.

2.2.4 The meter shall be installed in premises corresponding to 1.2.7-1.2.11.

2.2.5 Deenergize the mains before the meter installation. Then take the meter out of its packaging and check mechanical damages, integrity of seals and availability of data sheet.

2.2.6 Fix the meter in a metering point using three clamps or install it on the DIN rail. For meters installed on the DIN rail, the console is not used. For overall and installation dimensions, see Figure A.1 in Appendix A.

2.2.7 Connect the meter according to the diagram provided on the terminal plate cover and in Appendix B. Use screwdriver (1mm tip) for all screws and tighten the screws hard, with torque at least 3 N·m.

2.2.8 Energize the meter and ensure that electronic display indicates the normal meter operation; otherwise, correct the connection or replace the meter.

2.2.9 Meter operation indicator

2.2.9.1 To show operation modes, optical indicator for metering of the active “6400 imp/kW·h” is installed in the meter. The indicator flashes proportionally to the power consumption and is switched synchronously to the test output. Besides, additional symbols described in 1.4.1.3 are displayed.

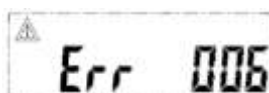
2.2.9.2 If a failure occurs during the meter operation, a window containing error and its code is displayed on the LCD. The error code contains three symbols; the sample window is shown in Figure 2.2:



Earth error



Reverse error in any channel



Clock failure error

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Tariff system parameterization error



Electromagnetic field effect

Figure 2.2

For all other versions, upon meter failure, symbols shown in Figure 1.2.1 are shown on the LCD.

2.2.9.3 If symbol 2 in Figure 1.2 or in Figure 1.2.1 is displayed on the LCD, the meter battery shall be replaced. The battery replacement procedure is described in 2.2.2. The battery shall be replaced by the power supply or the authorized organization only.

If symbol 1 in Figure 1.2 or symbol 11 in Figure 1.3 is displayed on the LCD, an internal error occurred in the meter and the meter shall be repaired.

After powering meter terminals, check indicators operation, fasten the terminal cover with the screw, lead a thread through a special groove in the cover and opening in the screw head and seal the meter.

2.3 Use of the meter

During operation, the meter meters active electric power, with accrued total.

The load power consumption is indicated by the optical indicator “6400 imp/kW•h” on the front panel of the meter.

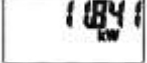
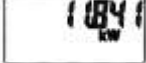
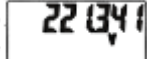
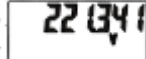
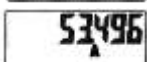
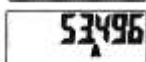
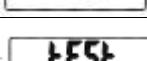
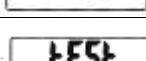
The test outputs are based on optically separated electronic switches. The limit permissible voltage of an open switch shall be at least 30 V, and the limit permissible current of a closed switch – at least 30 mA.

2.4 Data reading

Data stored in the meter memory or calculated based on measuring data can be read visually on the electronic display or via optical port.

After meter powering, depending on parameters, windows containing data (See Table 2.2) are consequently generated in the meter memory. After the meter powering, all LCD segments light up for a short period. All data are displayed during 10 seconds. The window data type is set during the meter parameterization.

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Item	Data type	Sample	
		Electronic display (Figure 1.2)	Electronic display (Figure 1.3)
1	Active power value, total for all tariffs, kW-h		
2	Active power value, for the first tariff, kW-h		
3	Active power value, for the second tariff, kW-h		
4	Active power value, for the third tariff, kW-h		
5	Active power value, for the fourth tariff, kW-h		
6	Instantaneous power value, kW		
7	Instantaneous voltage value, V		
8	Instantaneous current value, A		
9	Test window for clock rate checking (only after terminal cover removal)		

2.4.4 To read the data via optical port or radio channel, an optical head or a radio modem and the software are required. After the meter connection, you can:

- Read or change the meter tariff model;
- Read values of each type of metered power per each tariff and totally for all tariffs within last day or month;
- Read number of events occurred in the meter and last 15 or d0 (depending on an event) dates of each event (case removal, terminal cover removal, meter clock setting, parameterization, voltage increasing and decreasing, wrong password entering);
- Correct meter clock;
- Read all metered values;
- Read or change settings of the optical port or radio channel;
- Change access password;
- Change number and sequence of windows appearance on the electric display.

Note - The meters calculate values of each power type accurate to three decimal places; the electronic display shows values accurate to two decimal places (the third place is not displayed), that is why:

- the value of each type of cumulative power for all tariffs, displayed on the meter LCD (TΣs), can differ from the total power value $W_{\Sigma t}$, calculated by formula (2.1) by max. 0.04 (2.2).

$$T\Sigma t = T1 + T2 + T3 + T4 \quad (2.1)$$

$$T\Sigma s - T\Sigma t \leq 0.04 \quad (2.2)$$

where T1, T2, T3, T4 - power values displayed on the meter LCD for the first, second, third and fourth tariff correspondingly.

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3 Maintenance

4 General

3.1.1 Upon following operation conditions rules, the meters shall be maintained every 16 years.

The maintenance includes verification, repair and calibration of the meter.

The verification procedure shall be carried out by Ukrmetteststandart.

Repair and calibration procedures shall be carried out at the manufacturer's facilities.

According to its operational safety, the meter corresponds to GOST 22261.

According to method of human protection against electric shock, the meter corresponds to class II of DSTU EN 62053-21, DSTU EN 62052-11, DSTU EN 50470-1, DSTU EN 50470-3.

The insulation between all current circuits, voltage circuits and earth can resist 1 min. test voltage 4 kW (root-mean-square value) (50 ± 2.5) Hz.

The resistance of insulation between the case and electrical circuits is at least:

- 20 MΩ – upon normal conditions;
- 7 MΩ – upon ambient temperature (30±2) °C and relative humidity 90 %.

The meter is fireproof. Its fire safety corresponds to GOST 12.1.004-91.

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5 Storage

4.1 The meters shall be stored indoors, at customer’s (supplier’s) warehouse according to GOST 22261-94.

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5 Transportation

5.1 Transportation and storage conditions and requirements related to the meters in original transporting package correspond to conditions 3 of GOST 15150.

Shipping type – small LTL.

5.2 The meters can be transported in covered train cars, by rain-and-snow-protected road vehicles, waterborne vehicles and in airtight sealed aircraft compartments.

The meters shall be transported according to current carriage rules for each transportation mode.

5.3 The meters in the transportation packaging are resistant to ambient temperature impacts - 45 to +70°C, ambient relative humidity impact to 95% at 30°C and atmospheric pressure 70 to 106.7 kPa (537 to 800 mm Hg).

5.4 The meters in the transportation packaging are resistant to transport shocks of 80 to 120 shocks/minute with 30 m/s² acceleration.

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6 Manufacturer's warranty

6.1 For the meters supplied within Ukraine, the manufacturer guarantees their correspondence to DSTU EN 62053-21, DSTU EN 62052-11, DSTU EN 50470-1, DSTU EN 50470-3 upon consumer's observance of operation, storage and installation conditions provided hereby.

6.2 The guaranteed service life of the meters is 5 years after their sale. If the sale date mark is not available, the guaranteed service life is measured beginning from their manufacturing date.

6.3 For export supplies, the manufacturer guarantees the quality of the meters and their correspondence to the operation manual within 5 years after meters' crossing the State Ukrainian border upon consumer's observance of operation and storage conditions provided hereby and upon untouched manufacturer's sealing.

6.4 After meters' failure or their incompliance with this operation manual within the guaranteed service life, the meters shall be repaired by an organization authorized to warranty repair or replaced by the manufacturer.

6.5 Upon damaged manufacturer's security seal, or mechanically damaged base, case, terminal plate, powerful heating evidences on the plate or upon non-observed operation requirements specified herein, the meters lose the warranty and shall be repaired at the consumer's expense.

6.6 The manufacturer is not responsible for the meters, which fail due to the wrong connection.

6.7 Post-warranty repairs shall be carried out by an organization authorized to repairs or by the manufacturer under a separate agreement.

6.8 The guaranteed storage life is 1 year after the meter's shipping date.

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Appendix A
(mandatory)

Overall and installation dimensions

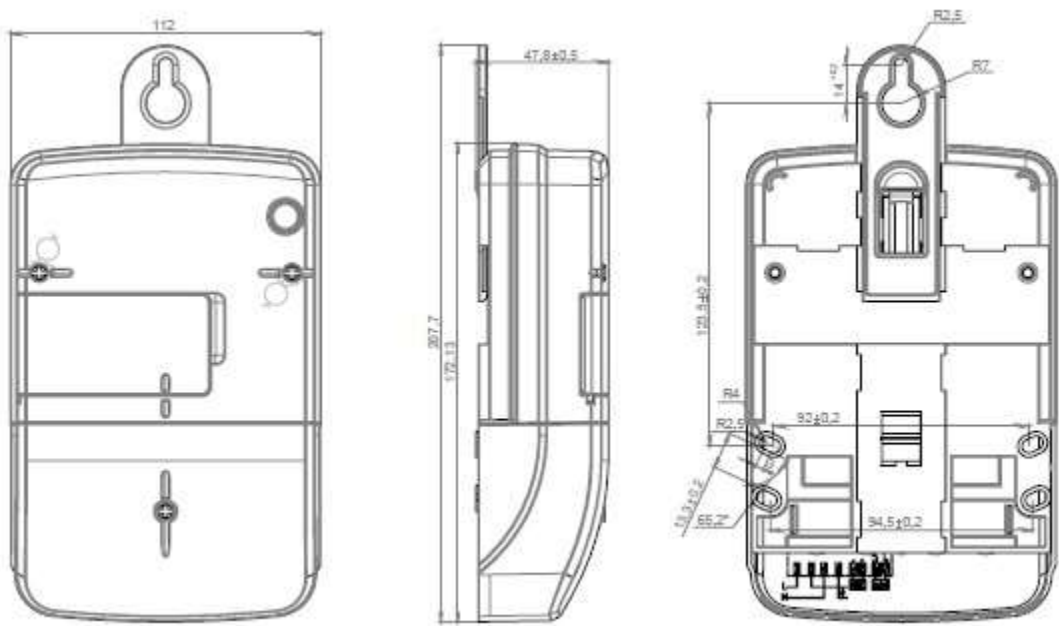


Figure A.1 – Overall and installation dimensions

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Meter connection diagram

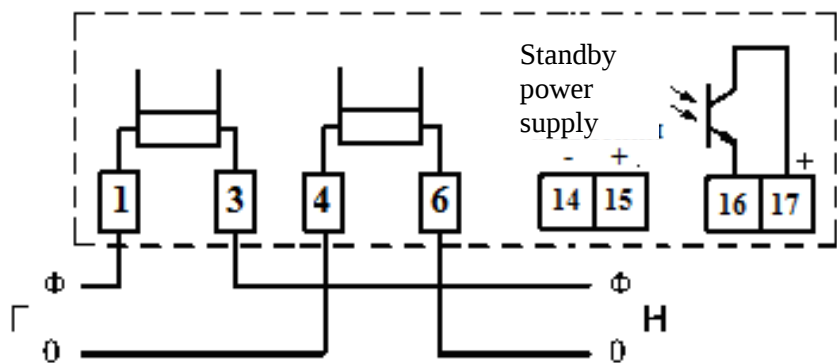


Figure B.1 – Connection diagram for NIK 2102-0X.EXCT, NIK 2102-0X.EXCT1, NIK 2102-0X.EXCT2, NIK 2102-0X.EXCT2 meters

Note – 16 and 17 – are test output terminals used during meter verifications.

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