DATA CONCENTRATION UNIT
KC-02
USER MANUAL
AAIIIX.431295.018 UM

Content

This user manual (hereinafter referred to as UM) applies to all versions of the data collection unit KC-02. The manual is designed to familiarize with the internal structure of the unit, the algorithm of its operation, maintenance, storage, and transportation conditions.

1. Description of the unit and the principle of its operation

1.1. Purpose of the product

A data concentration unit (hereinafter referred to as the unit), is designed for the remote collection, storage, and transmission to the server of data from devices that are equipped with appropriate interfaces.

The unit is designed for installation indoors with an explosion-proof environment that does not contain conductive dust, corrosive gases, and vapors in concentrations that destroy metals and insulation.

1.2. Specifications

The main technical characteristics are shown in Table 1.

Table 1. Main technical characteristics

Name of the characteristic	Value
Internal flash memory, MB	512
Type of internal flash memory	ONFI NAND
RAM size, MB	512
CPU type	ARM Cortex-A5
CPU frequency, MHz	536
GSM modem operating ranges, MHz	900/1800
Communication class	B
Compliance with the standard GSM / GPRS UMTS / HSPA	 Class 4 (2 W for EGSM900) Class 1 (1 W for DCS1800) Class 4 (0.13 W for WCDMA)
Operating supply voltage U_{nom}, V	~3x230 / 400
Voltage range from a single-phase network, V	from 143 to 275
Voltage range from a three-phase network, V	from 143 to 275
Power consumption, W.	not more 20
Rated network frequency, Hz	50
Temperature range, °C: work storage	 from minus 25 to plus 70 from minus 45 to plus 80
Level of protection	IP54
Relative air humidity at a temperature of plus 30 ºC, %	not more 95
Weight, kg	not more 2

The unit is made of ignition-resistant material.

The design of the unit housing provides for the possibility of its sealing. Locations for seals, dimensions, and installation dimensions are listed in Annex A.

1.3. Structure and principle of operation

The unit includes:

- processor board;
- motherboard;
- main power supply;

– backup power source;
– communication interfaces according to performances (see Table 2).

Table 2. Execution of the unit KC-02.UVW.X

Position	Description and possible meanings
KC-02	Unit type
U	Interface 3: 0–not installed 2–RS-485 (on the main board)
V	Interface 4: 0–not installed 7–PLC G3 BAND 2 8–PLC G3 BAND 1 Y–PLC (DCSK) 9–I / O module (4 inputs, 2 outputs)
W	Interface 5: 0–not installed 7–PLC G3 BAND 2 8–PLC G3 BAND 1 Y–PLC (DCSK)
X	GSM: 0–not installed 1–GPRS 2–3G / GPRS

The basic version of the unit includes installed and connected interfaces:

- RS-485–1 pc.;
- USB–2 pcs.;
- Ethernet–2 pcs.

A description of the unit interfaces is given in Table 3.

Table 3. Description of interfaces

Interface	Description
RS-485	The standard for data transmission by the two-wire half-duplex multipoint serial communication channel. Data transmission is carried out using differential signals. The interface has galvanic isolation.
PLC	Interface for data transmission via power lines.
GSM	To communicate with the unit, you need to obtain a SIM card with a static IP address from a GSM provider. The unit software does not work with SIM cards with a dynamic IP address.
Ethernet	Data transmission interface in the local network with a speed of 10/100 Mbit / s via a standard protocol.
USB	USB interface for external connection

	storage devices and I / O devices. Device-specific support depends on the drivers installed.
Cons.	Interface for connecting a console cable to configure the unit

Data collection takes place during surveys. Surveys procedure for downloading to the database (reading) data from various devices. Reading is performed by using PLC technology or a direct connection to the RS-485 interface.

Communication with the server is done using GSM technology or via a wired Ethernet connection.

Server management (startup and installation) is performed using Linux Services Manager.

You can connect to the unit Ethernet connection or through the console port on its board. The unit is configured after connecting to it using a remote access client (such as PuTTY) installed on the user's personal computer.

The console port connection is used, in particular, for the initial configuration of the unit.

You must have administrator rights to make changes to the unit configuration. Access to the unit is protected by a password and log-in. For advice on configuring the unit, contact the manufacturer's support service. Errors in making changes to the configuration of the unit can cause incorrect operation of the unit, loss of accumulated data, and complete inoperability of the unit.

1.4. Unit indication

Indications (LEDs) are located in the area of the fiber on the top panel of the unit. LED captions are printed on the unit board (see Figure 1). The description of indication bodies and ways of indication by them of events in the unit is given in Table 4.

Table 4. Indication description

Name	Description	Method of indicating events
Network	Unit power indication (red LED)	Illuminated –the main power is supplied to the unit or the unit is running on battery power. Does not illuminate– unit is not powered.
Error	Error indication (red LED)	Illuminated – internal unit error.
Mode	Operating mode indication (green LED)	Illuminated continuously– normal mode. Blinks 2 times per second – folding the unit. Blinks 3 times per second – download unit.
GSM	Indication of GSM modem activity (blue LED)	Does not blink – the modem is disabled. Blinked (64 ms On / 800 ms Off) – modem in the network search mode. Blinked (64 ms On / 3000 ms Off) – the modem is registered on the network. Blinked (64 ms On / 300 ms Off) – modem in PPP session mode.
Tx	PLC data transmission indication	Blinked – there is a data transfer.
Rx	PLC data reception indication	Blinked – PLC data is being received.

1.5. Marking

Possible designationsindicated on the unit board are shown in Figure 1. and described in Table 5.

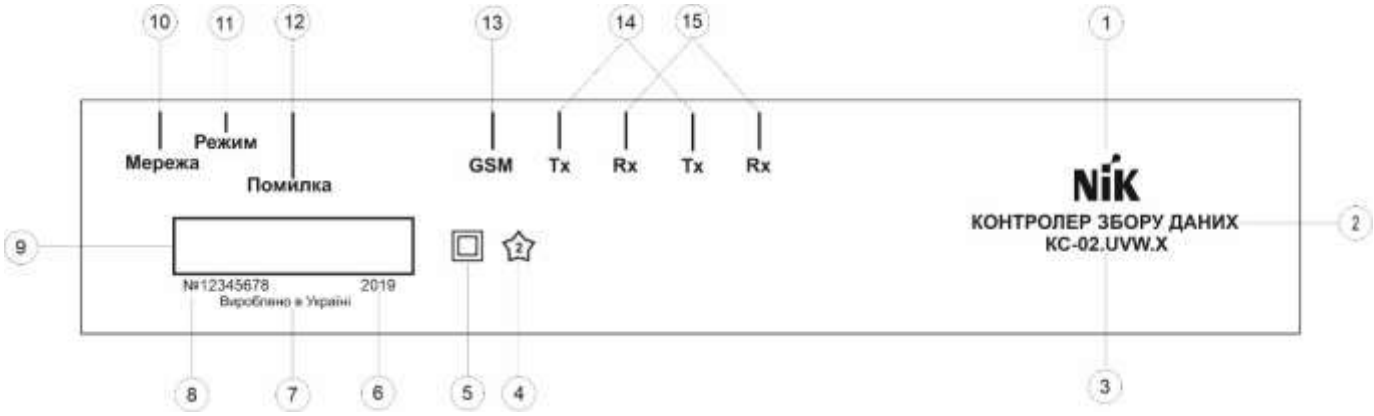


Figure 1. Shield

Table 5. Markings on the shield

Position	Description
1	Manufacturer's logo
2	The name of the unit
3	Designation according to executions (see Table 2)
4	Insulation test voltage, kV
5	Class II insulation protection of the unit
6	Year of manufacture of the unit
7	Country of the unit manufacturer
8	Factory number of the unit
9	Bar code
10	Chain – power indicator
11	Regime – mode indicator
12	Error – error indicator
13	GSM – GSM-modem operation indicator
14	Tx–PLC data transmission
15	Rx–PLC data reception

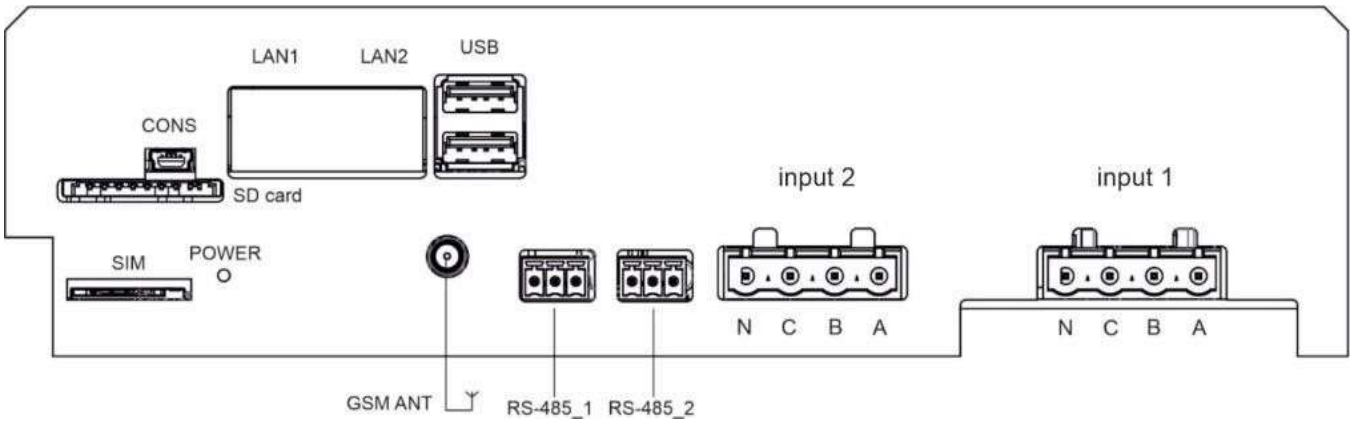


Figure 2. Connectors panel

Figure 2 shows the rear panel of the unit with all possible connectors, which are described in

Table 6.

Table 6. Connectors description

Name	Description
CONS	Console cable connection
LAN1, LAN2	Ethernet module
USB	USB cable connection
SD card	SD card slot
SIM	SIM card slot
POWER	Power button
GSM ANT	GSM antenna connection
RS-485_1, RS-485_2	Connection of RS-485 interfaces
Input 1 Input 2	Connection of PLC modules

1.6. Operating conditions

Relative humidity, ambient temperature during operation and storage of the unit are shown in Table 1.

External mechanical conditions correspond to class M1 according to GOST 17516.1-90.

The unit is protected from unauthorized access by means of sealing screws and seals.

1.7. Completeness

Each connector rotates in an air-bubble film and is placed in an individual corrugated cardboard package.

The delivery set is shown in Table 7.

Table 7. Delivery set

Name	Number
Unit of data collection KC-02	1 pc.
Remote GSM antenna (according to versions)	1 pc.
Input seal	5 pcs.
Mini USB cable	1.8 m
Passport	1 copy
Packaging	1 pc.

1.8. Installation of the unit

Installation, dismantling, opening and marking must be performed by authorized companies and persons with the third or higher group according to the rules of safe operation of users' electrical installations.

The mains must be de-energized before connecting the unit.

The unit shall be connected to a single-phase or three-phase AC mains in accordance with Annex B. All screws shall be tightened with a 3 N·m slotted screwdriver.

The unit must only be connected to the mains via a circuit breaker with a rated current of 2 A and a tripping type B. The circuit breaker must be located in an easily accessible place.

Connect the unit to the mains with a cable with a cross-section of at least 1.5 mm^2.

It is not allowed to supply power to the unit using filters!

2. Maintenance

When used correctly, the unit is maintenance-free. However, the unit contains a rechargeable battery that has a limited service life. If there are signs of battery wear, contact a service center. The operation of repair and replacement of the battery is carried out in the service center.

3. Safety instructions

The unit meets the requirements of GOST 22261-94 for operational safety.

According to the method of protection of a person from electric shock, the unit corresponds to class I in accordance with DSTU IEC 62053-21.

Insulation between all circuits of current, voltage, "earth" on the one hand and the outputs of the interfaces, on the other hand, lasts for 1 minute. test voltage 2 kV (rms value) frequency (50 ± 2.5) Hz.

The unit complies with GOST 12.1.004-91 on fire safety requirements.

4. Transportation and storage

Prior to use, the unit must be stored indoors in the manufacturer's packaging. The room temperature can range from plus 5°With up to plus 40°C, relative humidity–not more than 80% at a temperature of 25°C. The room must not contain harmful fumes and gases.

Conditions of transportation and storage of the unit in the transport packaging of the manufacturer meet the conditions 3 according to GOST 15150.

The unit can be transported in covered railway cars, transported by road with protection from rain and snow, water transport, as well as transported in sealed heating compartments of aircraft.

Transportation must be carried out in accordance with the rules of carriage applicable to each mode of transport.

The unit in the transport container is resistant to the action of transport shaking at the number of shocks from 80 to 120 per minute with an acceleration of 30 m / s^2.

Annex A

Overall and installation dimensions and sealing locations.

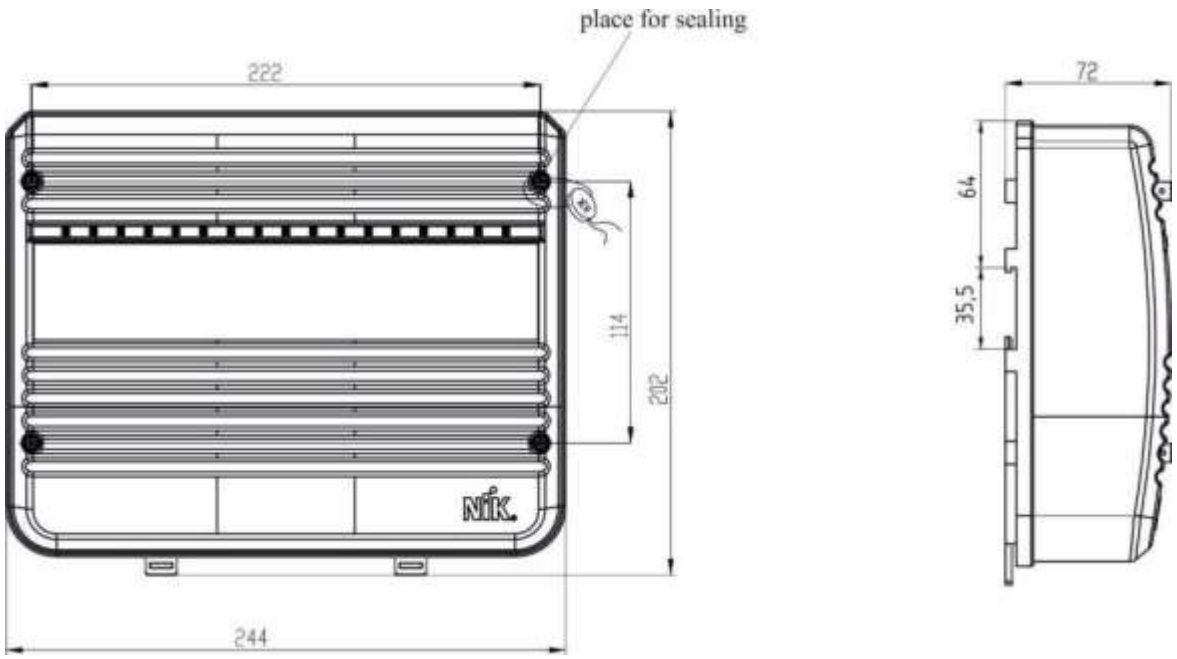


Figure A. 1. Overall and installation dimensions.

Annex B

Unit connection diagrams.

Figure B.1. Scheme of connection of the unit to a single-phase network

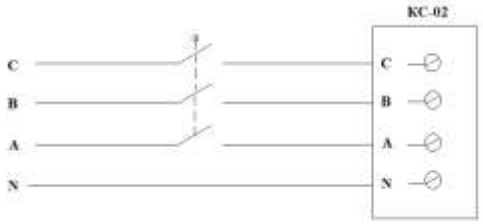


Figure B.2. Scheme of connection of the unit to the three-phase network.

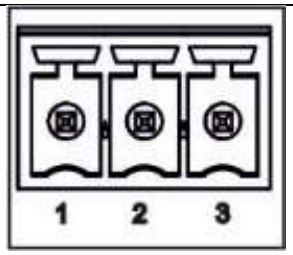
	Name	Description
	1 - RS-485 A	RS-485_1 communication interface, RS-485_2
	2 - RS-485 B	
	3 - RS-485 GND	

Figure B.3. RS-485 interface connection.