MIPS-220V(AC) Controller for measuring power supply parameters

USER MANUAL

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This manual contains information on the purpose, technical characteristics, installation procedure and safe operation of the Electrical Network Parameter Measurement Module “MIPS220” ASNB.468266.023 (hereinafter referred to as the meter or device) and is intended for service personnel.

1. Purpose of the device

The device “Network Parameter Measurement Module” MIPS220 (hereinafter referred to as the meter) is a means of automating the monitoring process.

Provides separate measurement of network parameters across three channels (phases).

The device is intended for operation as part of the monitoring system manufactured by Jcom-iot LLC and is designed for continuous operation.

Main functional capabilities of the MIPS 220 “JCOM-IOT” device:

- monitoring current network parameters via RS485 interface;
- measurement of active, reactive and apparent power;
- voltage and current measurement;
- frequency/period measurement;
- interface with transformer current sensors;
- solid state relay for signaling the occurrence of a programmed event;
- opportunity configuration devices throughprogram “Element ManagerMIPS220” locally or remotely via RS485 interface;

The MIPS220 device is mounted on a DIN rail. The overall dimensions of the MIPS device are shown in Figure 1.

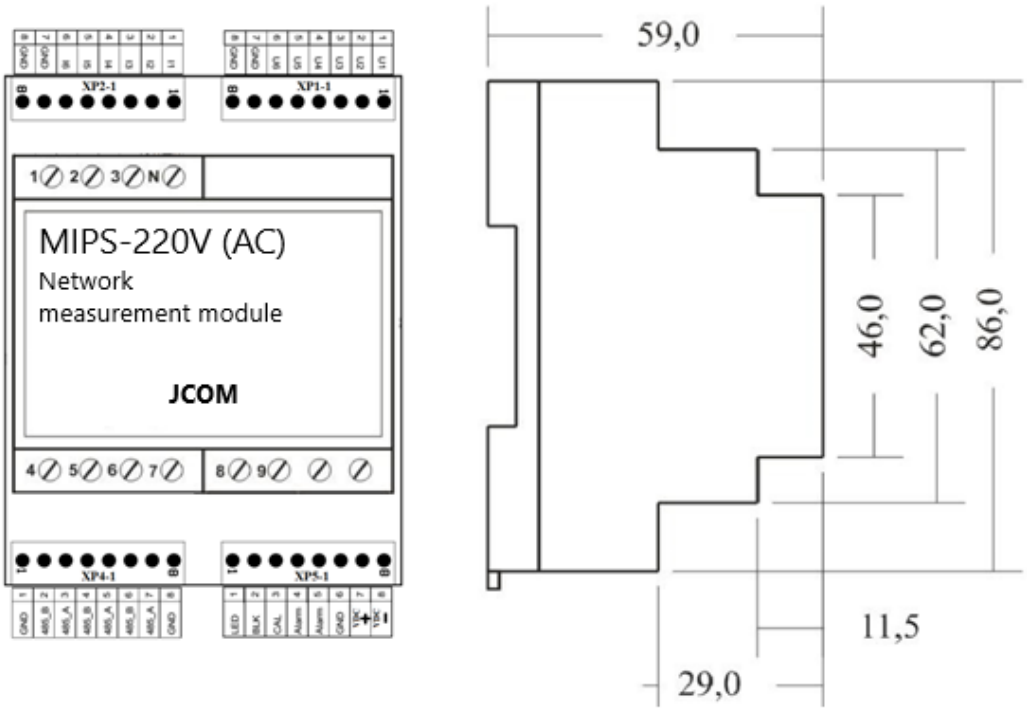

Figure 1

2. Technical specifications

The main technical characteristics are presented in Table 1.

Parameter	**meaning**
Device supply voltage: on contacts XP5-1 (contact 7,8)	+12...+72V
Interface type	RS485 With galvanic isolation.
Maximum root mean square (RMS) voltage at the input of the network voltage measurement channels (inputs 1-3) relative to the neutral wire	355 V
Maximum allowable input voltage for current channels (inputs 4-9)	0.5 V
Range of measured RMS currents by current transformers	0.1...75A
Serial interface data transfer rate	9600 bps.
Power consumption of the device	no more than 7 W

2.12 Mounting on a 35mm DIN rail. The position in space is arbitrary.

2.13 The device provides the specified parameters under the following environmental conditions:

- ambient air temperature 0^{O}C..+60 OC;
- air humidity at +25 OC (30..80)%;
- atmospheric pressure (84..100) kPa.

2.14 The weight of the device is no more than 0.25 kg.

2.15 Overall dimensions are shown in Figure 1.

3. Assignment of device pins

The type and purpose of the device terminals are shown in Table 2. The designations in the table correspond to the designations in Figure 1.

Table 2

Output name	Output type	Purpose of the output	Number of pins
VDC+	**In**	Powering the device	1
VDC-	**In**	Powering the device	1
XP1(1-6)	**In**	Backup Inputs	6
XP2(1-6)	**In**	Backup input	6
RS-485 XP4 (1-8)	**in/out**	RS-485 data	8
XP5(4-5) relay	**Out**	Relay output - reaction to the event that has occurred	2
XP5(1)LED	**Out**	Discrete indication output	1
XP5(2)BLK	**In**	SPI lock in calibration mode	1
XP5(1)CAL	**In**	Setting the calibration mode - reserved	1
1	**In**	AC mains voltage input, phase A	1
2	**In**	AC mains voltage input, phase B	1
3	**In**	AC mains voltage input, phase C	1
N	**In**	Neutral wire voltage input of the network	1
4...5	**In**	Low voltage input of phase A current channel voltage from external current transformers (CTs)	1
6…7	**In**	Low voltage input of phase B current channel voltage from external current transformers (CT)	1
8…9	**In**	Low voltage input of phase C current channel voltage from external current transformers (CTs)	1

4. Description of the device

The meters are intended for use in three-wire and four-wire electrical networks with three-phase alternating current and a frequency of 50 Hz.

Measuring devices, both autonomously and as part of information and measuring systems, can be used to monitor electrical parameters installations, intechnical diagnostic equipment, for complex automation of energy facilities and in other areas of industry where multichannel measurements and control of the following parameters are required:

- effective values of phase voltages and phase currents of four-wire networks;
- network frequencies;
- active, reactive and apparent power of the load phases;
- total active power, total reactive power, total apparent power.

The measurement results of all parameters are issued upon request in digital form via the RS-485 interface after receiving a special Get_Data command from the master device.

The master device can be the PUMA Data Collection and Transmission Controller (DCT) or a PC with an RS485 converter.

5. Operation of the device

5.1 Operating Limitations

5.1.1 The meter is not intended for use in aggressive or explosive environments.

5.1.2 When operating the meter, it should not be exposed to temperature

over 60 °C. There should be no sharp temperature fluctuations in the room, and there should be no sources of strong electric fields near the installation sites.

5.2 Preparing the device for use

5.2.1 Before you start working with the meter, you must read this Operating Manual.

5.2.2 After receiving the measuring device, perform an external inspection to ensure that there is no visible mechanical damage:

– Device 1 pc.;

– Current transformers (not included)

5.2.3 In case of transportation or long-term storage of the meter in conditions different from normal, keep it in normal climatic conditions for 1 hour.

5.2.4 Check that the output parameters of the AC signal source correspond to the parameters of the input signal circuit of the meter; the parameters of the power source correspond to the parameters of the power supply circuit of the meter.

5.2.5 Assemble the circuit according to Figure A2 of Appendix A for a 4-wire connection circuit if the parameters are being checked, or according to points 5.3.2 -5.3.5 if the standard switching is performed during normal operation.
Current measurement is performed using additional current transformers, which are connected to the corresponding inputs of the device.

IAP, IAM, IBP, IBM, ICP, ICM (contacts 4-9) taking into account the beginning of the current transformer winding.

5.2.6 All external power connections to the measuring device contacts should be made using installation wires with a cross-section of 1.5-2.5 mm2, and signal connections should be made using a wire of 0.5-1.5 mm2.

5.2.7 The meters are supplied pre-configured and calibrated at the factory. Before starting work, make sure that the COM port settings correspond and the RS485 interface address is set correctly (default address = 02)

5.2.7.1 Turn on the power supply of the measuring device and run the program “Element Manager” on the PC. **MIPS220”**

5.2.7.2 In the “Address” window, select the connection diagram and set the required address of the meter.

5.2.7.3 In the “Port” window, select the COM port number.

5.2.7.4 Apply the measured network voltage. The “Work” LED on the meter should light up.

5.2.7.5 Check the functionality of the RS485 channel between the PC (master) and the measuring device

(slave) by sending a test command (for example Get_Data) from the program “Element-manager MIPS220”. The presence of any response to the request will indicate the functionality of the RS485 interface.

5.2.7.6 By changing the parameters of the input signal (load) and sending the Get_Data data reading command, make sure that the meter is functioning by monitoring the correctness of the change in the corresponding parameters. At the same time, the “Work” LED should blink at the moment the command is sent.

5.3 Using the device

5.3.1 All installation and operation work must be carried out in compliance with current regulations that ensure the safe maintenance and operation of electrical installations.

5.3.2 Install the device housing on the DIN rail.

5.3.3 Check that the output parameters of the AC signal source correspond to the parameters of the input signal circuit of the meter; the parameters of the power source correspond to the parameters of the power supply circuit of the meter.

5.3.4 Make all necessary external connections to the corresponding contacts of the meter according to the connection diagram (Figure A2 Appendix A). When connecting, take into account the recommendations of paragraph 5.2.5.

If less than 3 phases are connected, then channel B has priority when connecting, since it is additionally used as a source of the measured frequency required for all calculations. In other words, channel B must always be connected.

5.3.5 The pinout of the connectors is shown in Figure 1. Connection via RS-485:

Option 1 To connect the measuring device to a PC via a two-wire RS-485 interface, connect the computer's COM port (via an RS232–RS485 interface converter) to interface inputs A and B (contacts 5 and 4) of the XP4-1 connector.

Option 2 To connect the meter with the KSPDI "Puma", interface inputs A and B (contacts 3 and 2) of the XP4-1 connector of the meter (MIPS220) are used.

5.3.6 Apply the supply voltage and then the input signal to the meter. The green "Work" LED on the front panel of the meter should light up.

5.3.7 Send the Get_Data data reading command to the meter, or via the Element Manager program. The green "Work" LED on the front panel should blink.

5.3.8 In the future, control the operation of the measuring device in the system via the RS485 interface. Remotely, the serviceability of the measuring device can be judged by the presence of a response to commands. If no commands are received, the measuring device performs cyclic measurements and sets the required values of the output parameters in accordance with the selected settings. If necessary, the events selected for the relay to operate are processed.

6. Maintenance

6.1 Security measures

6.1.1 Maintenance work on the meters must be performed by qualified personnel who are familiar with the structure and operation of the meter within the scope of this Operation Manual.

6.1.2 When installing and operating the device, it is necessary to follow the "Rules for the Operation of Consumer Electrical Installations" approved by the Ministry of Energy of Russia on 13.01.2003 and inter-industry rules for labor protection. The room in which the device is installed must meet the requirements set out in the "Rules for the Installation of Electrical Installations" (Glavgosenergonadzor of Russia, Moscow, 1998).

6.1.3 Do not make external connections without disconnecting the meter from the input signal source and from the power source.

6.2 Maintenance Procedure

6.2.1 Maintenance of measuring instruments consists of compliance with the rules of operation, storage and transportation, systematic monitoring of correct operation, regular preventive inspection, periodic verification and
troubleshooting any problems that arise.

6.2.2 During operation of the unit during its service life, routine maintenance is not required.

7. Storage and transportation rules

7.1 The climatic conditions of transportation must meet the following conditions: ambient air temperature from minus 20°C to plus 50°C;
relative air humidity up to 98% at 25 °C;

atmospheric pressure from 84.0 to 107.0 kPa (from 630 to 800 mm Hg).

7.2 The devices can be transported by all types of transport (in covered wagons, closed vehicles, containers) in accordance with the “Rules for the Transportation of Goods” (Transport Publishing House, 1983).

7.3 The devices must be stored only in the manufacturer's packaging in heated rooms at an air temperature of 0°C to +60°C and a relative air humidity of no more than 80%. The storage rooms must not contain aggressive impurities (acid vapors, alkalis) that cause corrosion.

8. Manufacturer's (supplier's) warranties

8.1 The manufacturer guarantees that the device complies with technical specifications, subject to the conditions of transportation, storage, installation and operation.

8.2 The warranty period for the operation of the device is set at 1 year, counting from the date of transfer of the device into operation.

8.3 During the warranty period of the device, the manufacturer has the right to supervise the correct operation of the complex in order to improve the quality and efficiency of operation.

8.4 Device components that fail during the warranty period are subject to replacement or repair by the manufacturer at the manufacturer's expense.

8.5 The user loses the right to free repairs during the warranty period in the event of broken seals, mechanical damage by the user, if the device was repaired by a person who does not have the right to perform repairs and maintenance.

APPENDIX A

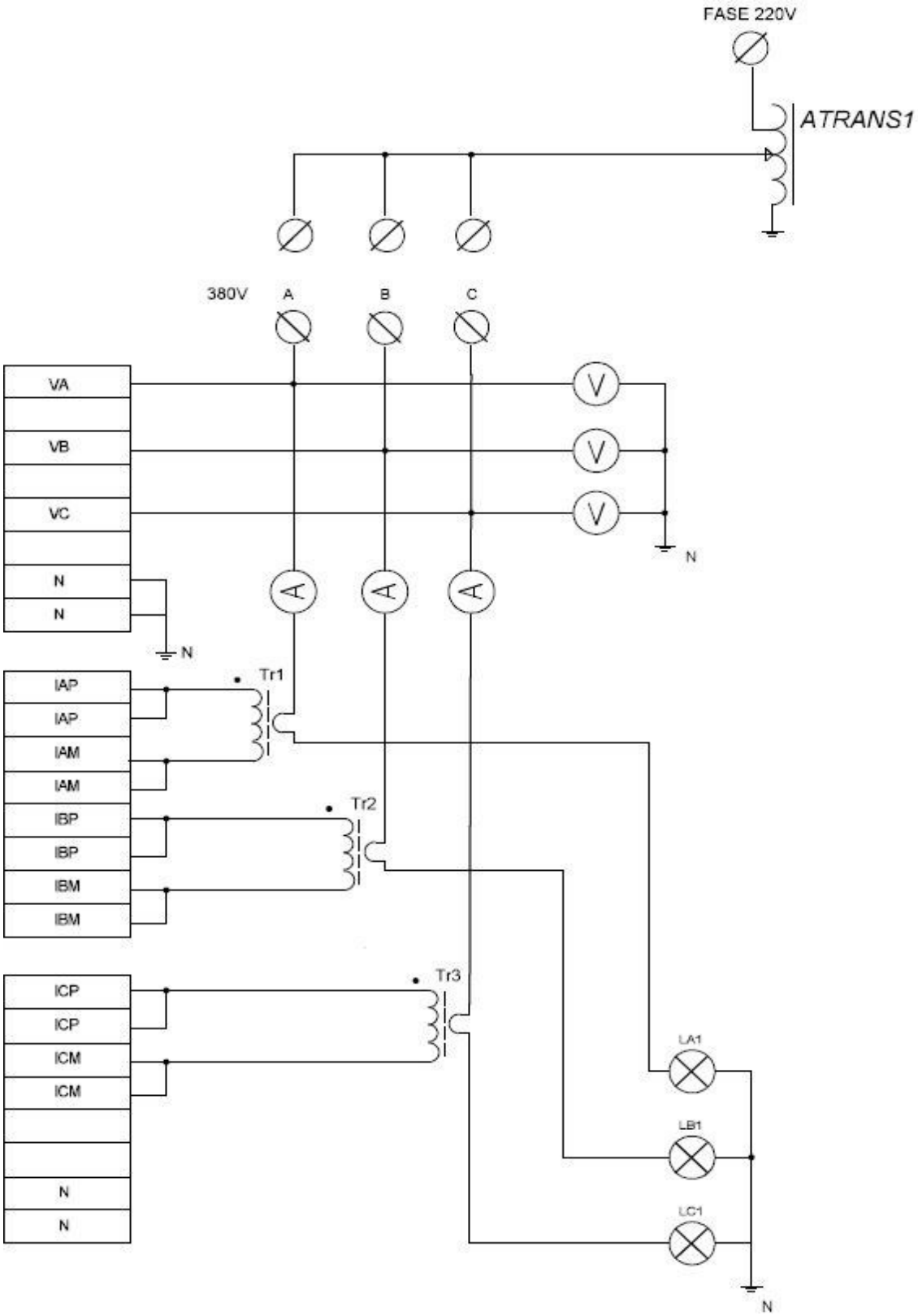

Figure A1. Connection diagram of the measuring device during verification

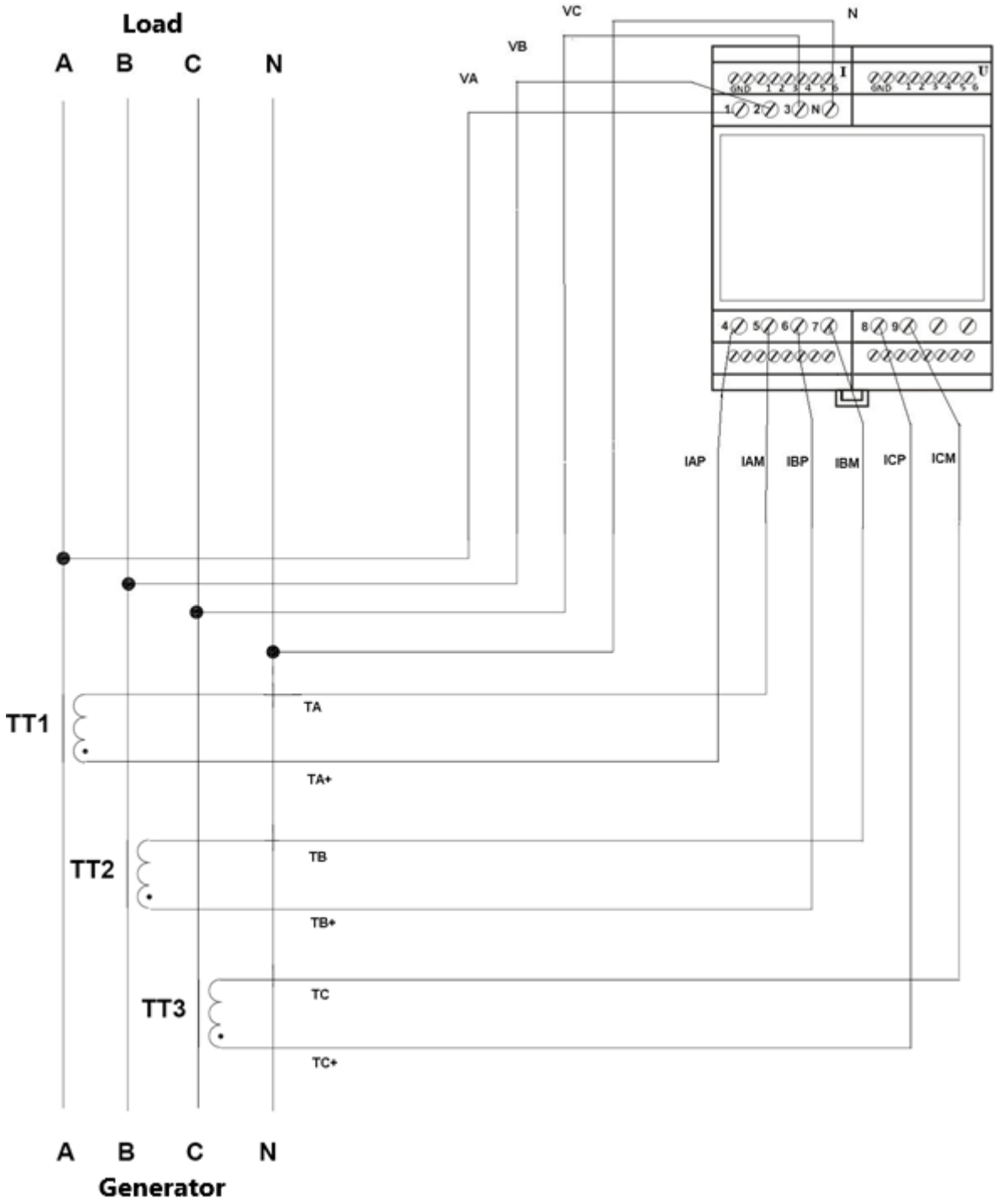

Figure A2. Four-wire connection diagram of the measuring device using three current transformers.