



Module for measuring electrical network parameters MIPS220

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 Measuring Module "MIPS220" (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 designed to operate as part of the Jcom-IoT production monitoring system and is designed for continuous operation.

Main functional capabilities of the MIPS220 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 through programs at "Element-MIPS220 manager" locally or remotely via RS485 interface;

Device MIPS220 is being installed on DIN-rack. The overall dimensions of the MIPS device are shown in Figure 1.

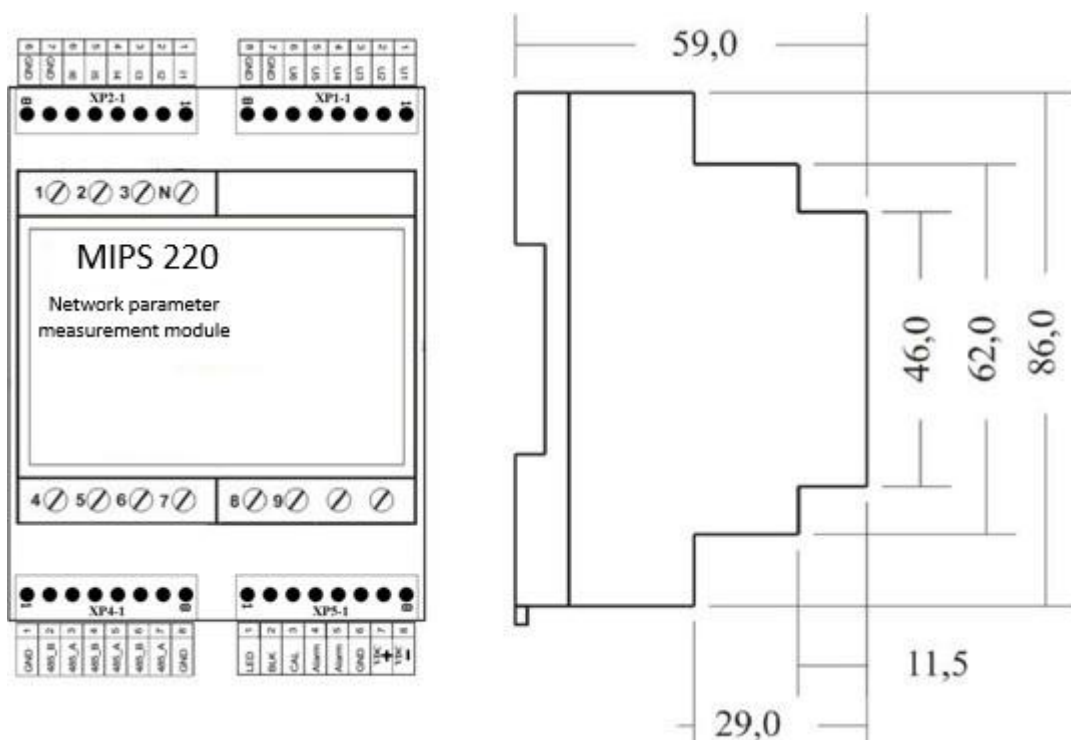


Figure 1

2. Technical specifications

The main technical characteristics are presented in Table 1.

Parameter	Meaning
Device supply voltage: on contacts XP5-1 (contacts 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 root mean square currents by current transformers	0.1...75A
Serial data transfer rate	9600 bps.
Power consumption of the device	no more than 7 W

2.12 Mounting on a 35mm DIN rail. Free positioning.

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

- ambient air temperature 0°C..+60 °C;
- air humidity at +25 °C (30..80)%;
- atmospheric pressure (84..100) kPa.

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

2.15 The overall dimensions are shown in Figure 1.

3. Device pin assignment

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 entrance	6
RS-485 XP4 (1-8)	in/out	RS-485 data	8
XP5(4-5) relay	Out	Relay output - reaction to an 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. Device description

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-measuring systems, can be used to monitor the parameters of electrical installations, in technical diagnostic equipment, for the integrated automation of energy facilities, and in other areas of industry where multichannel measurements and monitoring 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 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 Data Collection and Transmission Controller (DCC) "PUMA" or PC with RS485 converter.

5. Device operation

5.1 Operating restrictions

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

above 60°C. There should be no sudden 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 begin working with the meter, please read this Operating Manual.

5.2.2 After receiving the measuring device, perform an external inspection to ensure 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 paragraphs 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 8

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 meter 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 use, ensure the COM port settings are correct and the RS485 interface address is set correctly (default address = 02).

5.2.7.1 Turn on the power supply of the meter and run the "Element Manager MIPS220" program on the PC.

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 line voltage. The "Work" LED on the meter should light.

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 (e.g., Get_Data) from the "Element Manager MIPS220" program. The presence of any response to the request will indicate the functionality of the RS485 interface.

5.2.7.6 By changing the input signal (load) parameters and sending the Get_Data command to read the data, verify the meter's operation by monitoring the corresponding parameters for correct changes. The "Operation" LED should flash when 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 meter contacts according to the connection diagram (Figure A2, Appendix A). When connecting, follow the recommendations in section 5.2.5.

If fewer than three phases are connected, channel B takes priority when connecting, as it is also used as the 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 meter 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 Puma KSPDI, interface inputs A and B (contacts 3 and 2) of the XP4-1 connector of the meter (MIPS220) are used.

5.3.6 Apply power and then the input signal to the meter. The green "Operation" LED on the meter's front panel should light.

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

5.3.8 Subsequently, the meter's operation can be controlled in the system via the RS485 interface. Remotely, the meter's functionality can be assessed by the presence of a response to commands. If no commands are received, the meter performs cyclic measurements and sets the required output parameters in accordance with the selected settings. If necessary, events selected for relay activation are triggered.

6. Maintenance

6.1 Security measures

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

6.1.2 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, no maintenance work is required.

7. Storage and transportation rules

7.1 Climatic conditions for 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 mmHg).

7.2 The devices can be transported by all types of transport (in covered wagons, closed vehicles, containers).

7.3 Devices should be stored only in the manufacturer's packaging in heated rooms at temperatures ranging from 0°C to +60°C and relative humidity no more than 80%. Storage areas must be free of aggressive impurities (such as acid or alkali vapors) that could 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 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, or if the device was repaired by a person who is not authorized to perform repairs and maintenance.

APPENDIX A

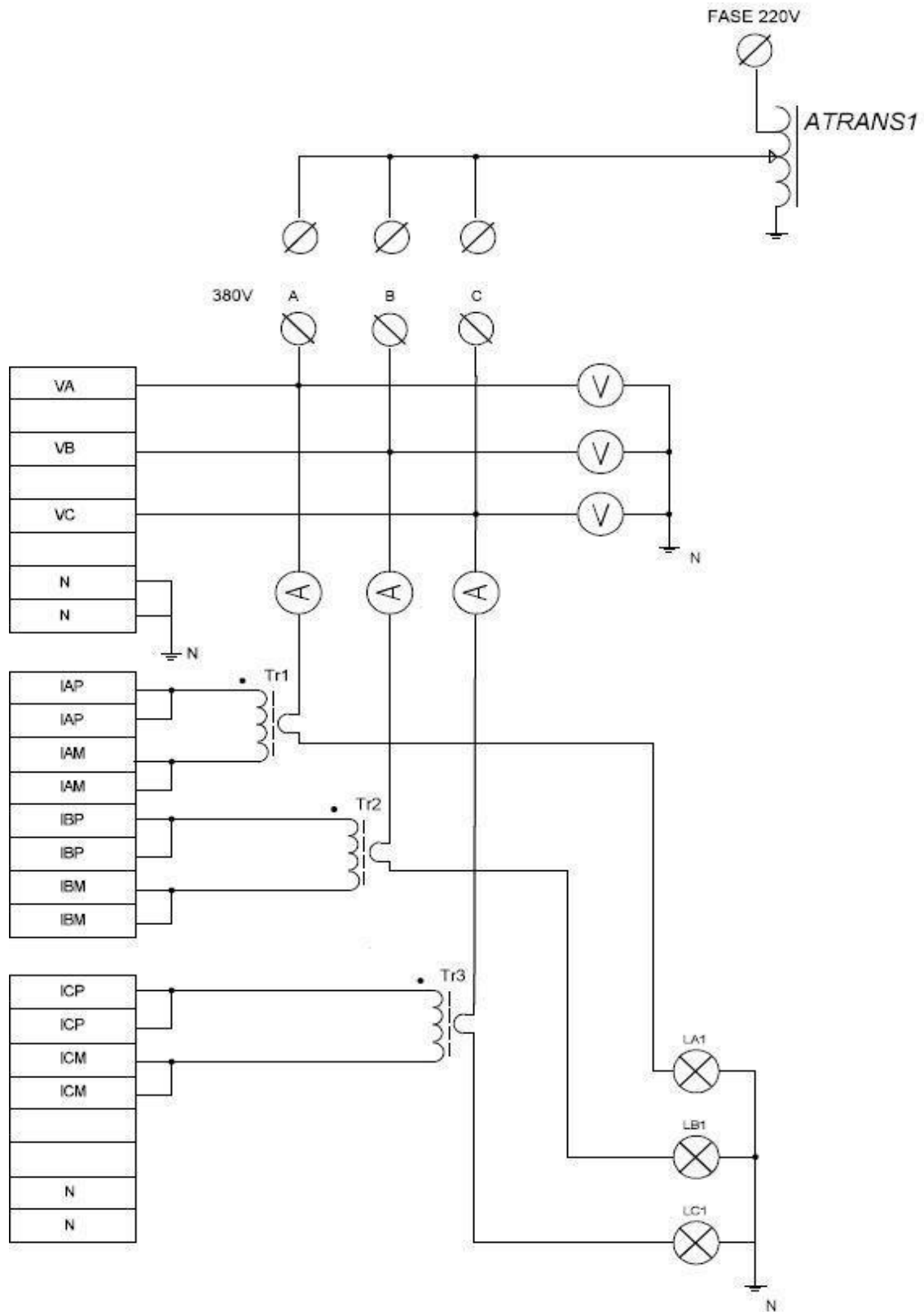


Figure A1. Connection diagram of the meter during verification

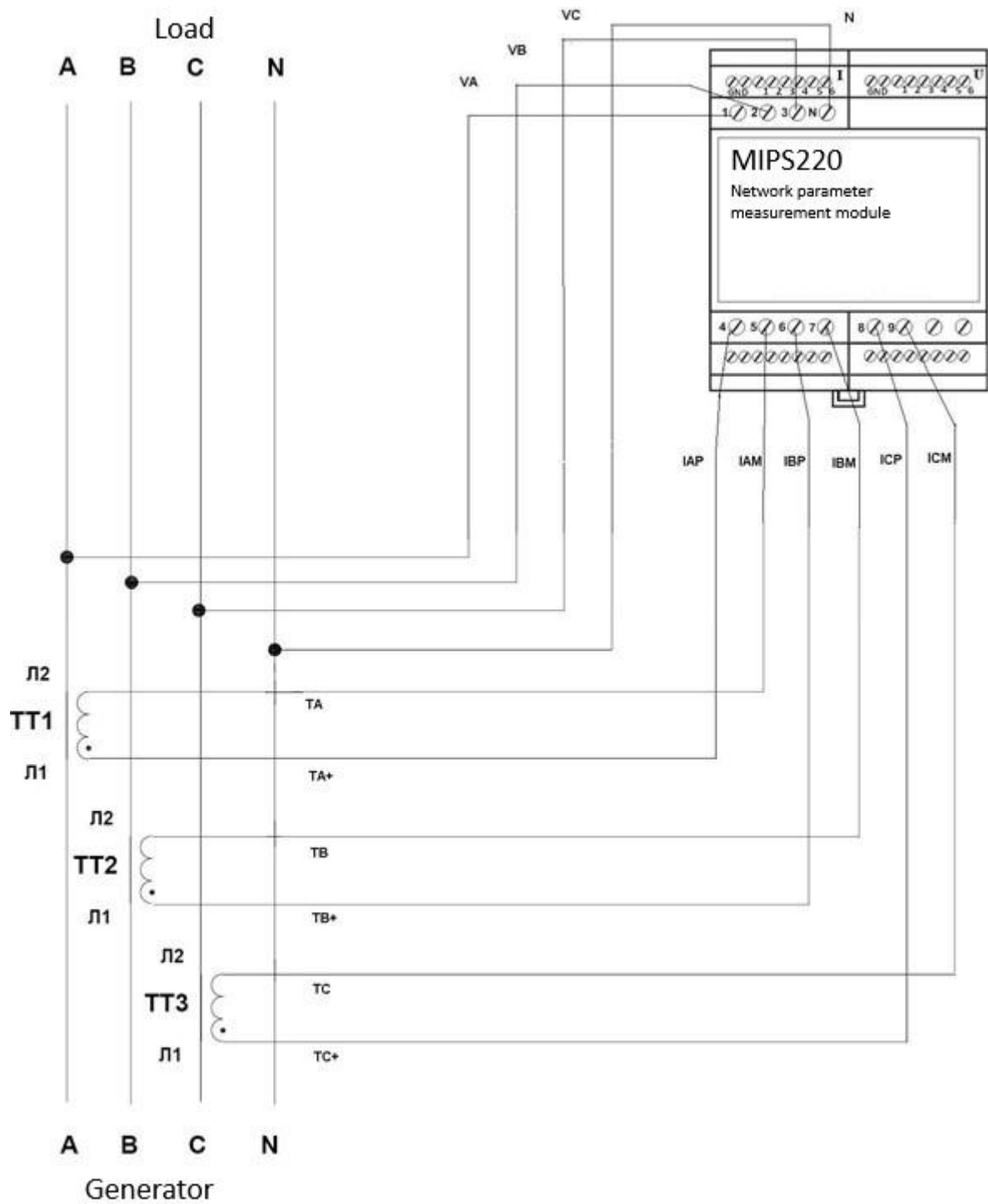


Figure A2. Connection diagram of the meter using a four-wire circuit with three current transformers.