Энергия –
Источник

POWER SUPPLIES

SERIES БП, БПМ

Data Sheet

User Manual

ЭИ.82.00.000ПС

www.eni-bbmv.ru **info@en-i.ru**

CONTENTS

Version:
06.08.2018_A6

Data Sheet and User Manual contain the specifications, the rules of operation, and an operating-principle description for БП, БПМ power supplies ("the Units"), as well as information on its acceptance, packaging, and the Manufacturer's warranty.

1 INTENDED USE

1.1 The Units are designed to convert 220 V mains voltage into stabilized DC voltage.

1.2 The Units have 1, 2, 4, or 8 galvanically isolated channels, a short-circuit and overload protection circuit for each channel, as well as power-on and overload LEDs for each channel.

1.3 Galvanic isolation is there to insulate the channels from each other as well as from the mains.

1.4 Table 1 presents the versions of these units. We can manufacture units with different output voltages and load currents on request.

1.5 The Units come in different versions designed for electrical-enclosure, wall, or NS35\7.5 DIN-rail mounting. Dimensions are given in Appendix A.

1.6 In accordance with GOST 14254, the Units have one of the following degrees of protection:

- IP20 for DIN-rail or wall mounting;
- IP30 for enclosure mounting.

1.7 The Units generate no industrial noise.

1.8 In terms of weather resistance, the Units are Category 3.1 NF unit per GOST 15150, Group C3 units per GOST 52931; however, their operating temperature range is limited to -10...+50 °C (except БПМ-1к-24-500-DIN, which can be customized to operate at temperatures ranging from -60 to +50 °C). Category 2 T version per GOST 15150 is available on request.

1.9 It is permissible to expose the Units to:

- sinusoidal vibrations with a frequency of 5 to 25 Hz and an amplitude of up to 0.1 mm (Group L3 per GOST 52931);
- DC and AC magnetic fields with a frequency of (50 ± 1) Hz and a strength of up to 400 A/m;
- relative humidity of 30 to 80 % as long as the temperature is within the operating range.

1.10 The Units are repairable.

1.11 The Manufacturer reserves the right to amend the technical documentation for this Product without prior notice as long as the functionality and purpose are not altered.

2 TECHNICAL SPECIFICATIONS

2.1 The Units are powered by 187...242 V AC mains (120...265 V for БПМ-1к, 2к with load currents of up to 100 mA) with a frequency of 49...51 Hz.

2.2 Main parameters are given in Table 1.

Table 1. Main Parameters of the Units

Rated output voltage, V	Maximum load current per channel, mA	Number of channels	Max. SC current, mA	Max. protection-triggering current, mA	Max. power consumption, V·A	Weight, kg	
						DIN version	01, 01K versions
36	25	1	15	30	2.2	0.10	0.43
		2			4.0	0.10	0.45
		4			6.5	0.65	0.75
		8			13.0	1.00	1.10
	45(50)	1	35	75	3.5	0.10	0.43
		2			6.5	0.10	0.45
		4			13.0	0.65	0.75
		8			26.0	1.00	1.10
	80	1	30	120	5.0	0.10	0.68
		2			9.5	0.10	0.70
		4			21.0	0.65	0.75
	100	1	30	130	6.2	0.10	0.73
		2			12.0	0.10	0.75
	120	1	30	135	11.6	0.63	0.73
		2			16.0	0.65	0.75
24	25	1	15	30	1.6	0.10	0.43
		2			2.6	0.10	0.45
		4			4.5	0.65	0.75
		8			9.0	1.00	1.10
	45(50)	1	35	70	2.5	0.10	0.58
		2			4.5	0.10	0.60
		4			9.0	0.65	0.75
		8			17.5	1.00	1.10
	80	1	30	120	3.7	0.10	0.73
		2			7.0	0.10	0.75
		4			14.0	0.65	0.75
	100	1	30	130	4.5	0.10	0.73
		2			8.5	0.10	0.75
		4			17.5	0.70	0.75
	120	1	30	135	7.1	0.33	0.43
		2			10.0	0.35	0.45
		4			21.0	0.70	0.75
	250	1	38	270	16.0	0.63	0.75
		2			22.0	0.67	0.77

Table 1, part 2

Rated output voltage, V	Maximum load current per channel, mA	Number of channels	Max. SC current, mA	Max. protection-triggering current, mA	Max. power consumption, V·A	Weight, kg	
						DIN version	01, 01K versions
24	300	1	30	315	13.0	0.63	0.73
	120 channel 1к 300 channel 2к	2	30 30	135 315	5.5 13.0	0.65	0.75
	500	1	130	600	22.0	0.67	
18	250	2	30	300	8.5	0.65	0.75
15	120	4	30	135	3.5	0.65	0.75
12	25	1	18	35	0.9	0.10	0.43
		2			1.0	0.10	0.45
		4			2.5	0.65	0.75
		8			4.5	1.00	1.10
	45(50)	1	35	70	1.2	0.10	0.58
		2			2.0	0.10	0.60
		4			4.5	0.65	0.75
		8			9.0	1.00	1.10
	80	1	30	120	2.0	0.10	0.58
		2			3.5	0.10	0.60
		4			7.0	0.65	0.75
	100	1	30	130	2.4	0.10	0.63
		2			4.4	0.10	0.65
		4			9.0	0.65	0.75
	120	1	30	150	3.8	0.38	0.73
		2			5.2	0.40	0.75
		4			10.5	0.65	0.75

2.3 Output-voltage stabilization class 0.2

2.4 Alteration in the output voltage at maximum load current, when induced by within-tolerance alterations in supply voltage, shall not exceed ± 0.2 % of the rated voltage.

2.5 Alteration in the output voltage at maximum load current, when induced by zero-to-maximum load-current alterations, shall not exceed ± 0.2 % of the rated voltage.

2.6 Alteration in the output voltage at maximum load current, when induced by ambient-air temperature changes within the operating range, shall not exceed ± 0.2 % of the rated voltage per 10 °C.

2.7 The Units have overload and short-circuit protection for each channel. For protection-triggering current, see Table 1.

2.8 Ripple output voltage shall not exceed ± 0.2 % of the rated voltage.

2.9 Minimum insulation resistance between the grounding terminal and the supply circuit must equal 40 MOhm at 1.5 kV; minimum

resistance between the grounding terminal and the output circuits must equal 20 MOhm at 250 V.

2.10 Minimum inter-output channel insulation resistance must equal 20 MOhm at 250 V.

3 DESIGNATION FOR ORDERING

Sample designation for ordering:

БПМ	4к	24	100	DIN		360	Т3
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**

where 1 is the name;
- БП is for electrical-enclosure mounting;
- БПМ is for DIN-rail or wall mounting;

2 is the number of channels per Table 1:
- 1к for a single channel;
- 2к for a dual channel;
- 4к for four channels;
- 8к for eight channels;

3 is the output voltage, V (per Table 1);

4 is the maximum load current per channel, mA (per Table 1);

5 is the version:
- DIN for DIN-rail or wall mounting (except БПМ-1к, 2к units with load currents of up to 100 mA);
- DIN-M is for DIN-rail mounting (only БПМ-1к, 2к units with load currents of up to 100 mA);
- 01 is for electrical-enclosure mounting;
- 01К is for electrical-enclosure mounting;

6 is the temperature range (only for БПМ-1к-24-500-DIN):
- 60 for a range from -60 to +50 °C;
- no character for a range from -10 to +50 °C;

7 is for extra runtime (up to 360 hours);

8 is for tropical version.

Notes:
- БП-8к (enclosure-mounted) units have only one version: 01К;
- NS35/7.5 DIN rails available on request.

4 PACKAGING INCLUDES

Package contents must match the list in Table 2.

Table 2. Package Contents

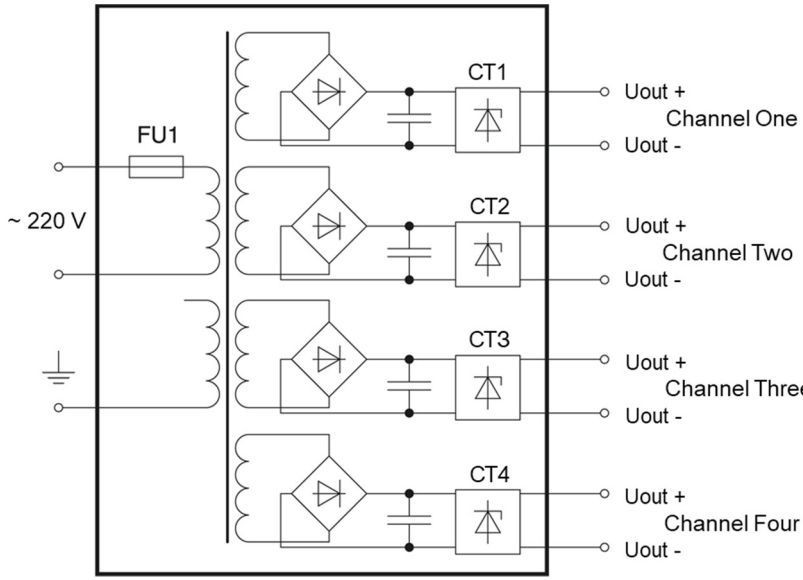
Name	Designation	Number	Note
Power supply	ЭИ.82.00.000 ЭИ.199.00.000 ЭИ.201.00.000 ЭИ.202.00.000 ЭИ.203.00.000 ЭИ.204.00.000 ЭИ.205.00.000	1	as ordered
Data Sheet User Manual	ЭИ.82.00.000ПС	1	
Socket	2РМ14КПН4Г1В1	1	for versions: -01, -01К
DIN rail	NS35\7,5	m	as ordered

5 DESIGN AND OPERATING PRINCIPLE

5.1 A Unit consists of: a step-down transformer; one, two, four, or eight galvanically isolated channels, each equipped with a rectifier, an output-voltage ripple-reducing filter, and a linear regulator with electronic overload protection. Functional diagram is shown in Figure 1.

5.2 Electronic protection circuits are designed to protect the supply from overloads and short-circuits when running. Units switch back to normal operation automatically as soon as overloads or short-circuits are eliminated.

5.3 The front panel features power-on and normal-operation LEDs for each channel. LEDs on means channel-output voltage is within normal range; LEDs off signalizes a channel failure or overload.



CT1, CT2, CT3, CT4 are linear voltage regulators

Figure 1. Unit Functional Diagram

6 SAFETY MEASURES

6.1 To be allowed to operate the Unit, a person must receive a safety briefing for ≤ 1,000 V units and study this Data Sheet and User Manual.

6.3 In terms of electric-shock protection, the barrier is a Class III unit per GOST 12.2.007.0.

6.3 Load the units only when powered off.

6.4. The Units must be connected to a ground circuit.

7 INSTALLATION

7.1 In the winter, the Unit must be unboxed in a heated room only; before unboxing, the box must be kept in such a heated room for at least 8 hours.

7.2 Before mounting, the Units must be visually inspected. Verify that conformity of markings and make sure there are no dents or other visible mechanical damage to the enclosure.

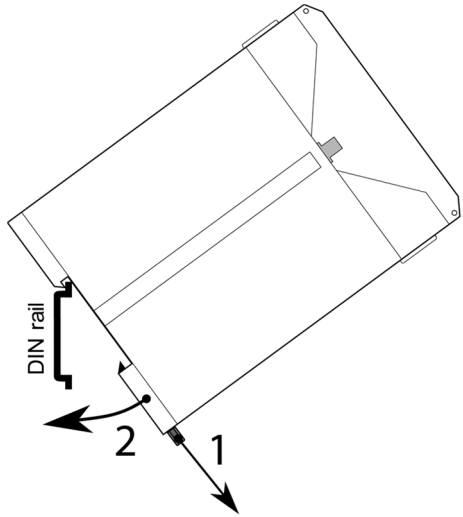
7.3 The Units are mountable in an enclosure, on a DIN rail, or wall-mounted depending on the version. The installation location must be easily accessible for mounting, dismounting, and maintenance.

7.4 Notches in the enclosures for mounting 01 and 01K units must be arranged as shown in Appendix A.

7.5 DIN units are mounted on DIN rails by a special latch as shown in Figure 2, or wall-mounted (except БПМ-1к, 2к-DIN-M) as shown in Figure 3.

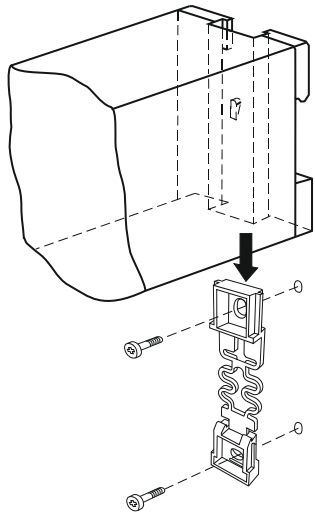
7.6 External connections must be mounted in accordance with the wiring diagrams given in Appendix B.

7.7 Connect the Units by a screwdriver for 0.6x2.8 sockets (7810-0966 per GOST 17199-88). Screw-tightening torque must be equal to 0.5 N·m.



1 release the latch;
2 mount the Unit on the DIN rail, fasten the latch.

Figure 2. DIN-Rail Mounting



1 remove the latch from the Unit;
2 fix the latch onto the wall;
3 mount the Unit on the latch.

Figure 3. Wall Mounting

8 GETTING STARTED

8.1 Before powering on a unit, make sure it is installed and mounted as specified in sections 6, 7 hereof.

8.2 Supply mains voltage. When powered on, channel LEDs light up to indicate normal output voltage. Units are now ready for use.

8.3 The unit-using company must periodically checkup the condition of units at its own discretion.

8.4 Checkups include:

- visual inspection;
- health check.

8.5 Visual inspection must verify:

- the presence of markings;
- the absence of breakages in, or damage to, connection-line insulation;
- whether cables are connected reliably;
- the absence of breakages in grounding wires;
- whether the grounding is fixed firmly;
- whether the unit is clean;
- the absence of dents and apparent mechanical damage to the enclosure;
- the integrity of channel-status LEDs.

8.6 Damaged or faulty units must not be used.

8.7 Units rejected by visual inspection are subject to no further checkup.

8.8 Health checks are carried out according to the diagram given in Appendix B at ambient-air temperatures ranging from 20 to 30 °C.

8.9 To verify the output-channel capacity:

- use the autotransformer T to set a supply voltage at 215...225 V. Control supply voltage by the voltmeter V1;
- adjust the resistance at R1 to maximize the load current (maximum load current depends on the version, see Table 1). Control load current by the ammeter A2;
- use the voltmeter V2 to measure the output voltage at maximum load current;
- maximum permissible output-voltage deviation from the rated voltage is ± 0.2 % (applies to each channel, see Table 1);
- check the rest of channels similarly.

Attention! During checkup, all the channel outputs not involved in the checkup at the moment should be receiving their specific loads to maximize the channel current.

8.10 Check the operating supply-voltage range:

- use the T autotransformer to set the supply voltage at 187 V. Control supply voltage by the voltmeter V1;
- adjust the resistance at R1 to maximize the load current (maximum load current depends on the version, see Table 1). Control load current by the ammeter A2;
- use the voltmeter V2 to measure the output voltage at maximum load current;
- without adjusting R1, use the autotransformer T to set the supply voltage at 242 V. Control supply voltage by the voltmeter V1;
- use the voltmeter V2 to measure the output voltage at maximum load current;
- calculate how the altered supply voltage affects the output voltage as follows (1):

$$\Delta U = (U_{out.1} - U_{out.2}) / U_{out} \cdot 100\ \% \qquad (1)$$

where $U_{out.1}$ is the measured output-voltage at 187 V supply voltage, V;

$U_{out.2}$ is the measured output-voltage at 242 V supply voltage, V;

U_{out} is the rated output voltage, V, see Table 1;

- ΔU must not exceed ± 0.2 %.

Attention! During checkup, all the channel outputs not involved in the checkup at the moment should be receiving their specific loads to maximize the channel current.

9 MARKING AND SEALING

9.1 The Units are marked in accordance with GOST 18620-86; the marking contains the following:

- Unit name;
- connector designations;
- supply voltage;
- mains frequency;
- output voltage;

— maximum output current;
— stabilization class;
— operating temperature range;
— year of manufacture;
— ordinal number of the Unit (per the Manufacturer's numbering system).

9.2 01 and 01K units are sealed on the front panel atop the upper-right screw; DIN units are sealed at the junction of the front panel with the enclosure by sticking a warranty sticker with the Manufacturer's logo.

10 PACKAGING

10.1 Unit packaging ensures its safety during transport.

10.2 The Unit and its operational documents are contained in a plastic bag. The bag is placed in a corrugated-cardboard box. Free space in the box is filled with corrugated cardboard or bubble wrap.

10.3 Corrugated-cardboard boxes with units are placed in Type IV boxes per GOST 5959 or GOST 9142. Free space in between boxes is filled with corrugated cardboard or bubble wrap.

10.4 When transporting to the Far North or to some difficult-to-reach areas, the units must be packed in corrugated-cardboard boxes then in Type III-1 boxes per GOST 2991 or Type IV per GOST 5959 if shipped in containers.

10.5 Box insides are lined with a water-proof material to protect from dust and water.

10.6 Gross weight must not exceed 35 kg.

10.7 Pursuant to GOST 14192, the transport container must bear indelibly-painted additional information labels and handling signs with the following meanings: Fragile, Caution, Top, Protect from Moisture

10.8 Units must be packaged in closed well-aired rooms with outside temperatures of 15 to 40 ºC at a relative humidity of up to 80 %.

11 TRANSPORT AND STORAGE

11.1 Unless unboxed, the Units are transportable by any mode of transport, including air carriage in heated pressurized compartments; transport is subject to all the effective transport-specific regulations.

11.2 Transport conditions must be compliant with Condition Group 5, GOST 15150.

11.3 Unit storage for transport must be compliant with Condition Group 5, GOST 15150.

12 DISPOSAL

12.1 The Units are non-hazardous for human life and health or for the environment during and after its service life.

12.2 The Units contain no precious metals.

12.3 The Units must be disposed of by the user organization in due compliance with all the regulations effective in the area.

13 ACCEPTANCE CERTIFICATE

Power supply, series_____

_____

serial number _____ is compliant with specifications per TU 4276-001-2160758-2004 and is therefore found ready for service.

Date of issue _____.

L.S.

QA Team representative _____ / _____ /.
(signature, surname)

The Unit has run for an additional _____ hours.

14 CERTIFICATE OF PACKAGING

Power supply, series_____

_____

serial number _____ is packed in full compliance with the effective design documentation.

Date of packing _____.

Packed by _____ / _____ /.
(signature, surname)

15 MANUFACTURER'S WARRANTY

15.1 The Manufacturer guarantees the Units' proper operation for 36 months since the day of commissioning provided that the actual transportation, storage, and operating conditions are in line with the conditions herein specified.

15.2 Warranty storage period is 6 months since the date of manufacture. Excess storage is deduced from the warranty period.

15.3 Date of commissioning _____.

15.4 Position, surname, and signature of the officer witnessing the verification of the Unit's condition and its commissioning: _____.

16 COMPLAINT HANDLING

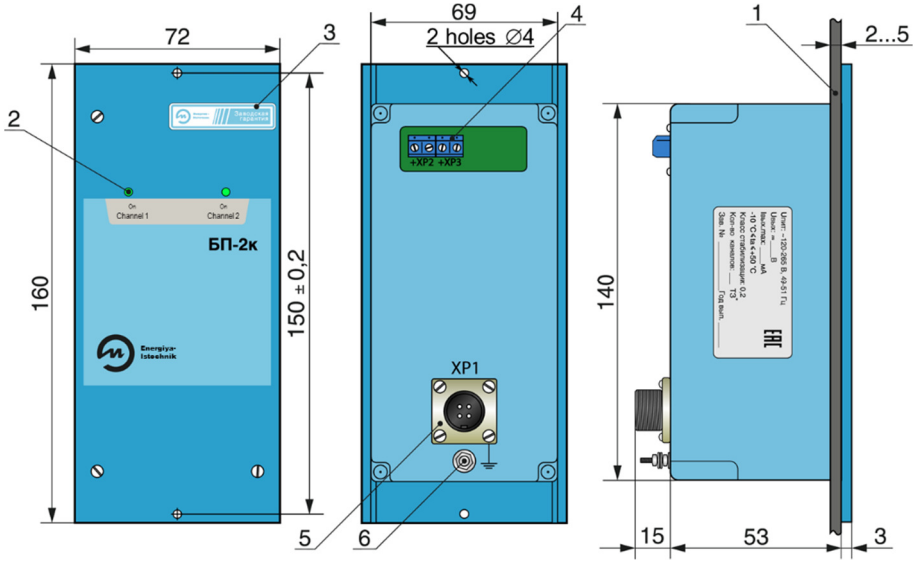
16.1 Complaints about units that have been found non-compliant with the TU specifications during its warranty period or warranty storage period shall be submitted to the Manufacturer.

16.2 Defect remedy shall be the Manufacturer's responsibility.

16.3 Complaints about units, the defects whereof have been caused by improper transportation, operation, or storage, shall be rejected.

Manufacturer: **Energiya-Istochnik LLC**
Russia, 454138 Chelyabinsk,
290 Prospekt Pobedy, Office 112,
phone/fax: +7 (351) 749-93-60,
+7 (351) 742-44-47, 749-93-55,
http://www.eni-bbmv.ru,
E-Mail: info@en-i.ru

APPENDIX A
Dimensions of the Units



1 is an electrical enclosure;
2 are channel-status LEDs;
3 is the warranty label;
4 are DG301-5.0-02P terminal blocks for connecting output voltage;
5 is a 2РМ14Б4Ш1В1 connector for supplying mains voltage;
6 is the ground bolt.

Figure A.1. Dimensions of БП-1к, 2к, 4к Units (01 Version)

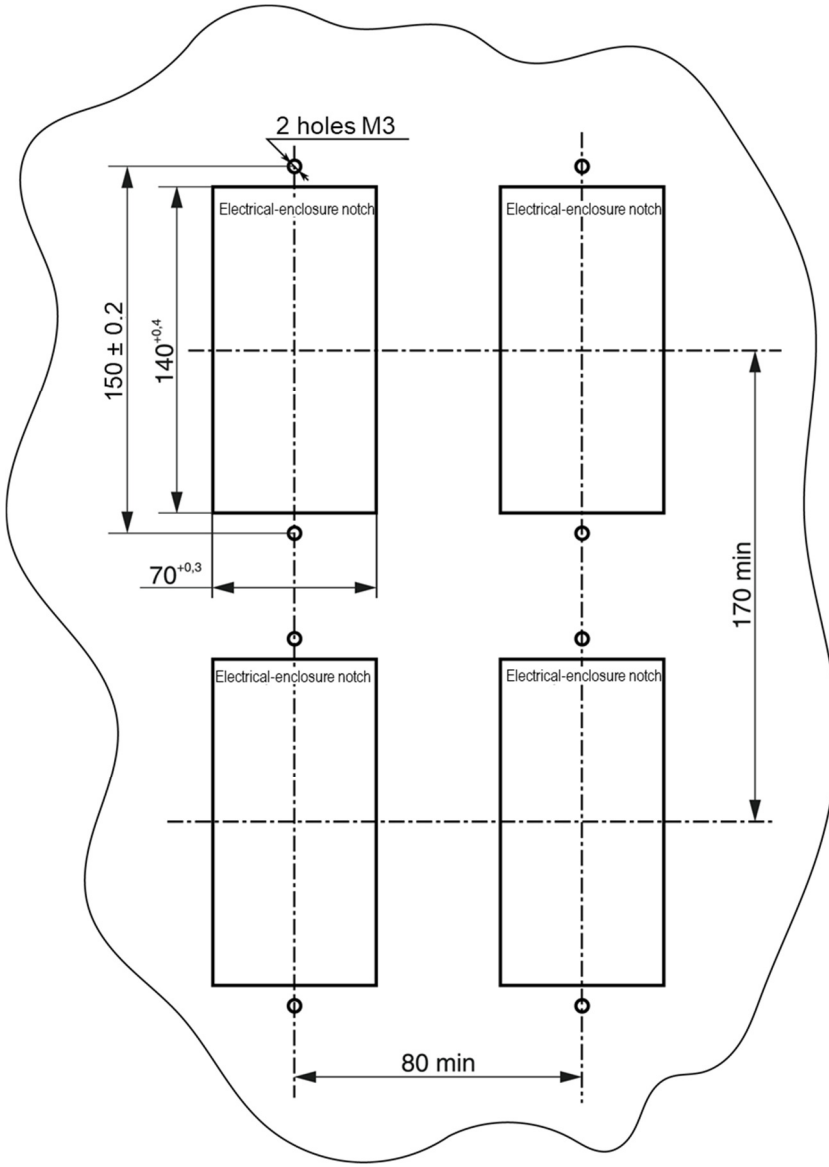
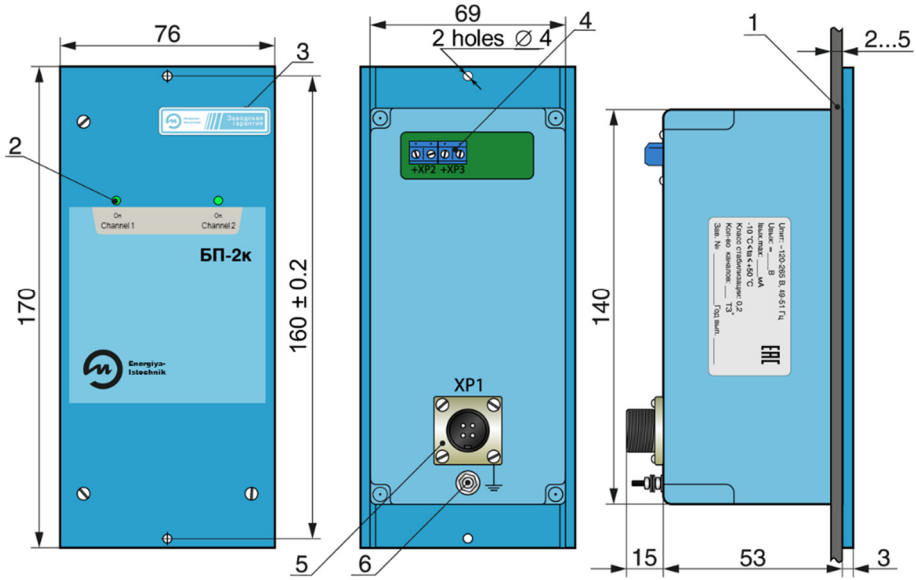
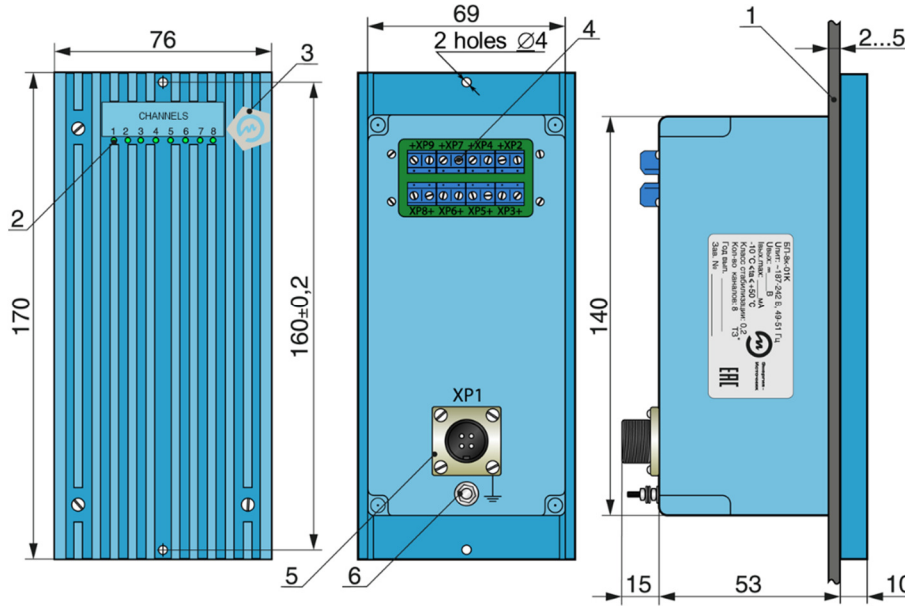


Figure A.2. Arrangement of Notches in the Electrical Enclosure (01 Version)



1 is an electrical enclosure;
2 are channel-status LEDs;
3 is the warranty label;
4 are DG301-5.0-02P terminal blocks for connecting output voltage;
5 is a 2РМ14Б4Ш1В1 connector for supplying mains voltage;
6 is the ground bolt.

Figure A.3. Dimensions of БП-1к, 2к, 4к Units (01K Version)



1 is an electrical enclosure;
2 are channel-status LEDs;
3 is the warranty label;
4 are DG301-5.0-02P terminal blocks for connecting output voltage;
5 is a 2РМ14Б4Ш1В1 connector for supplying mains voltage;
6 is the ground bolt.

Figure A.4. Dimensions of БП-8к Units
(01K Version)

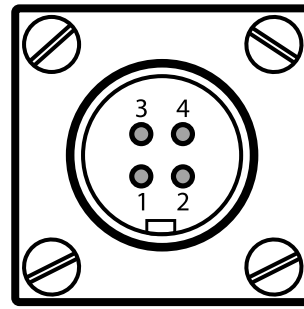


Figure A.5. Pin Numbering of XP1 Connectors for Supply Voltage
(01, 01K Versions)

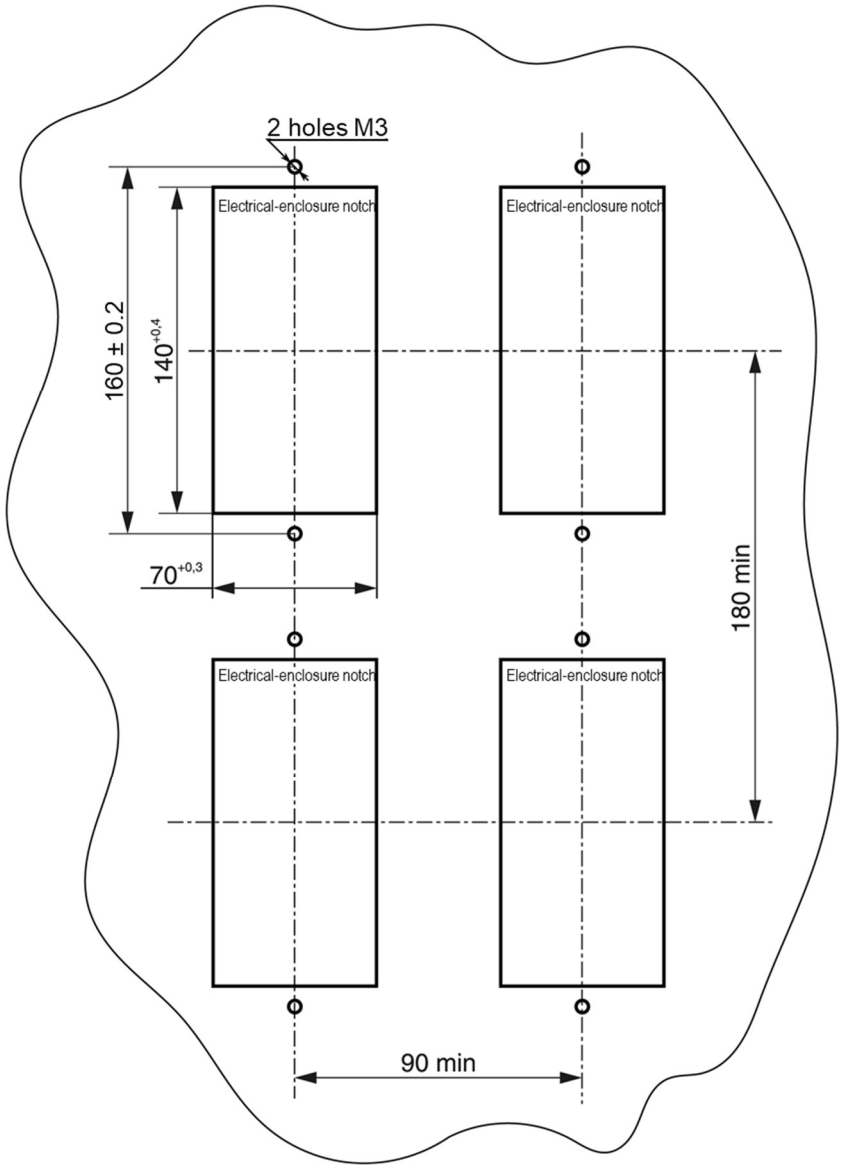


Figure A.6. Arrangement of Notches in the Electrical Enclosure (01P Version)

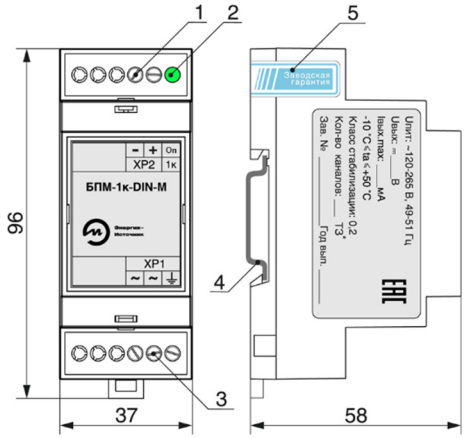
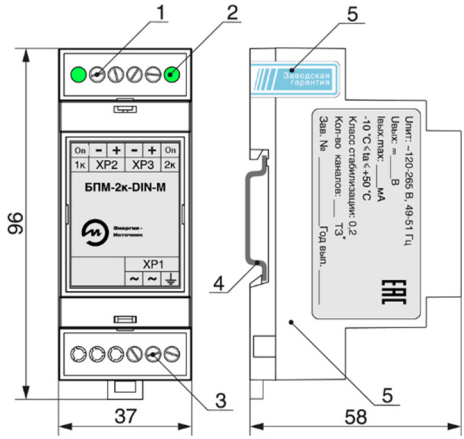


Figure A.7. Dimensions of БПМ-1к Units
(all units but 120, 250, 500 mA) (DIN-M Version)



1 are DG128-5.0-02P terminal blocks for connecting output voltage;
2 are channel-status LEDs;
3 is a DG128-5.0-03P terminal block for supplying mains voltage;
4 is a DIN rail;
5 is the warranty label.

Figure A.8. Dimensions of БПМ-2к Units
(all units but 120, 250 mA) (DIN-M Version)

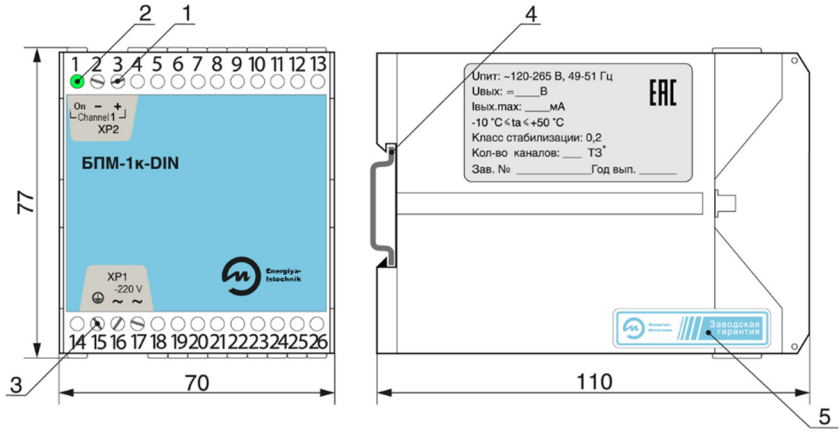
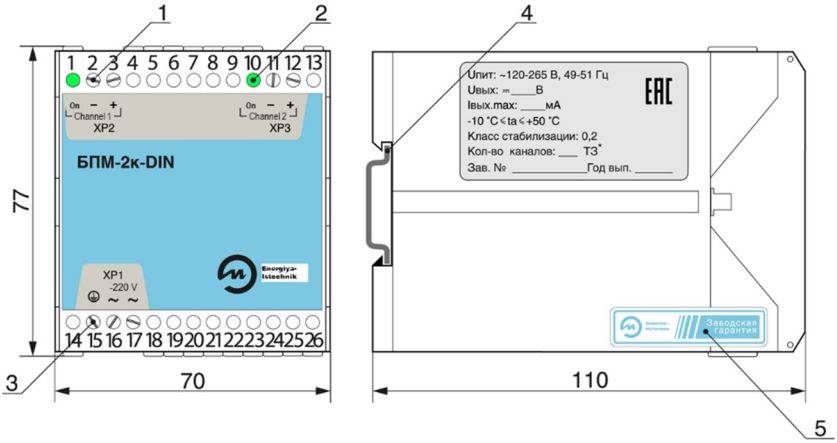


Figure A.9. Dimensions of БПМ-1к Units
(120, 250, 500 mA) (DIN Version)



1 are DG128-5.0-02P terminal blocks for connecting output voltage;
2 are channel-status LEDs;
3 is a DG128-5.0-03P terminal block for supplying mains voltage;
4 is a DIN rail;
5 is the warranty label.

Figure A.10. Dimensions of БПМ-2к Units
(120, 250 mA) (DIN Version)

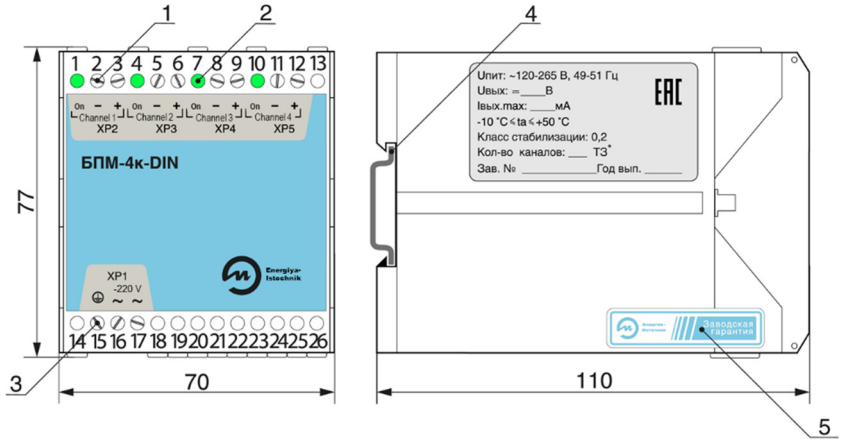
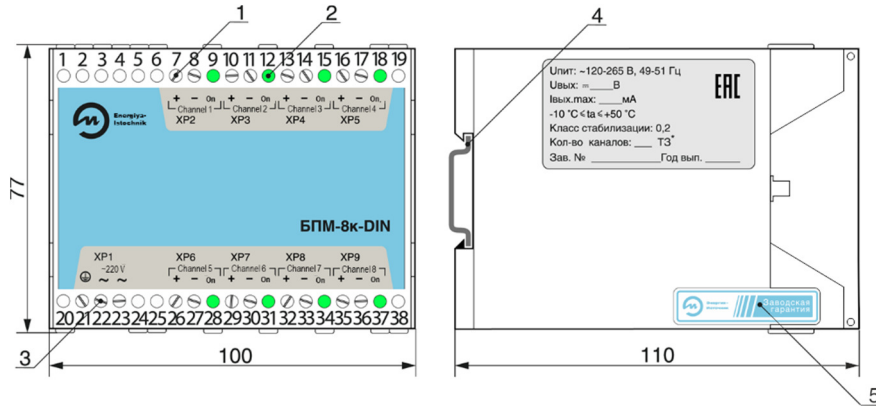


Figure A.11. Dimensions of БПМ-4к Units
(DIN Version)



1 are DG128-5.0-02P terminal blocks for connecting output voltage;
2 are channel-status LEDs;
3 is a DG128-5.0-03P terminal block for supplying mains voltage;
4 is a DIN rail;
5 is the warranty label.

Figure A.12. Dimensions of БПМ-8к Units
(DIN Version)

APPENDIX B

Unit Wiring Diagrams

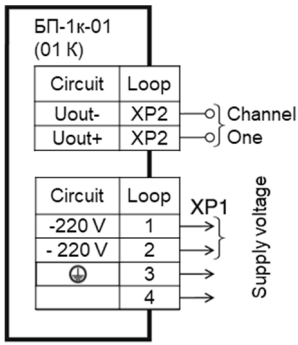


Figure B.1. БП-1к Unit Wiring Diagram (01, 01K Version)

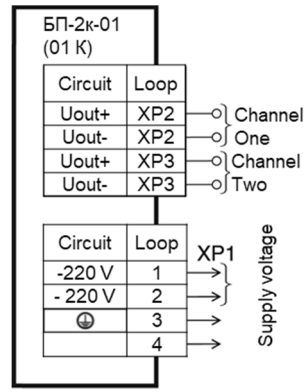


Figure B.2. БП-2к Unit Wiring Diagram (01, 01K Version)

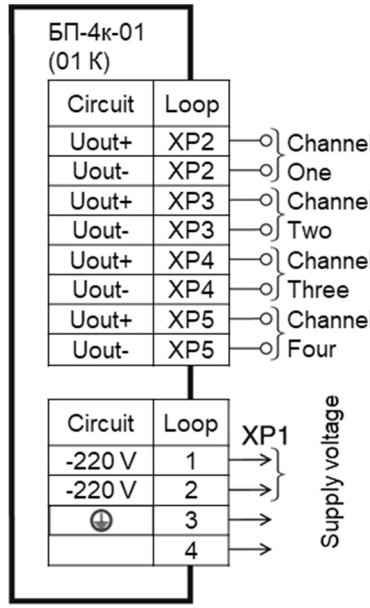


Figure B.3. БП-4к Unit Wiring Diagram (01, 01K Version)

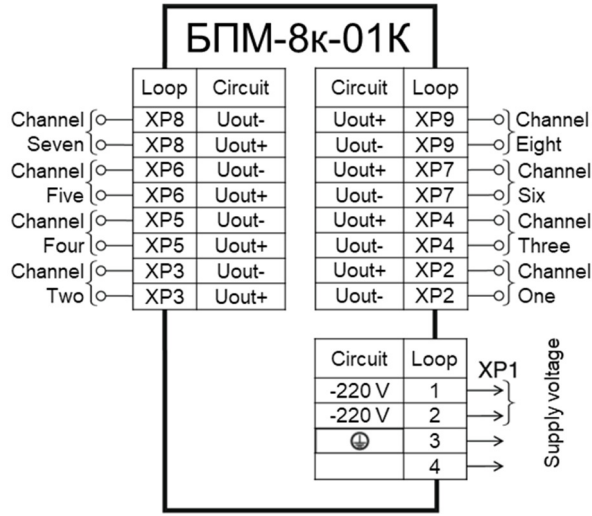


Figure B.4. БП-8к Unit Wiring Diagram
(01K Version)

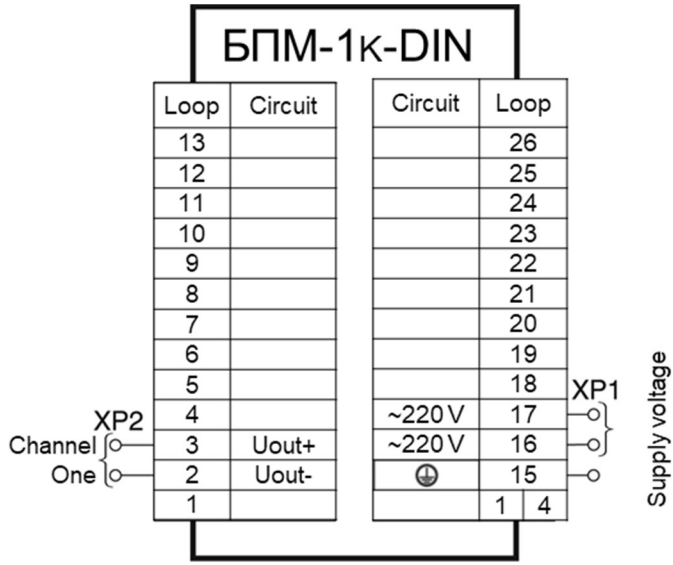


Figure B.5. БПМ-1к Unit Wiring Diagram
(120, 250, 500 mA) (DIN Version)

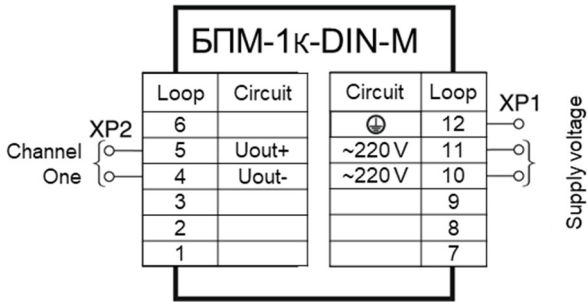


Figure B.6. БПМ-1к Unit Wiring Diagram
(all units but 120, 250, 500 mA) (DIN-M Version)

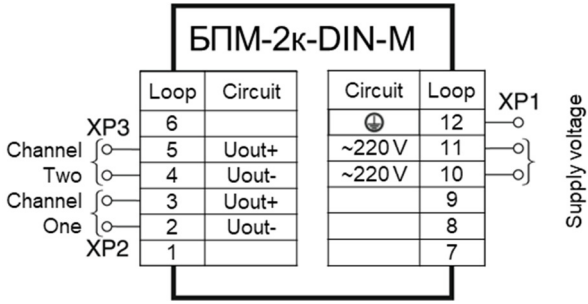


Figure B.7. БПМ-2к Unit Wiring Diagram
(all units but 120, 250 mA) (DIN-M Version)

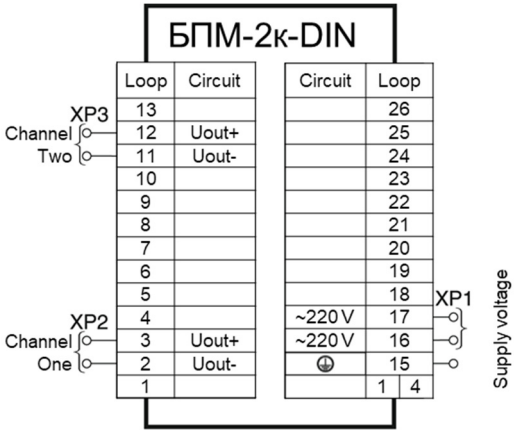


Figure B.8. БПМ-2к Unit Wiring Diagram
(120, 250 mA) (DIN Version)

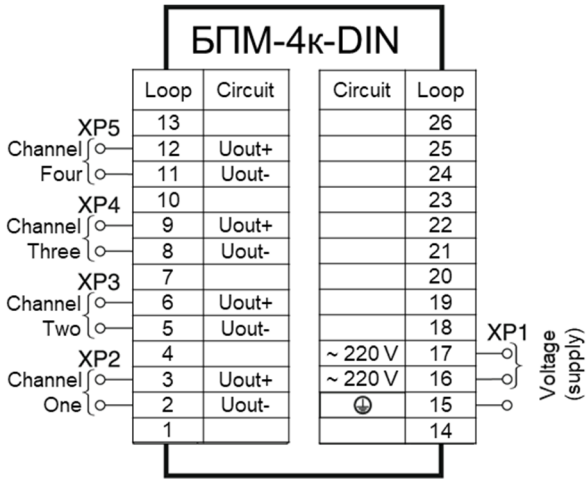


Figure B.9. БПМ-4к Unit Wiring Diagram (DIN Version)

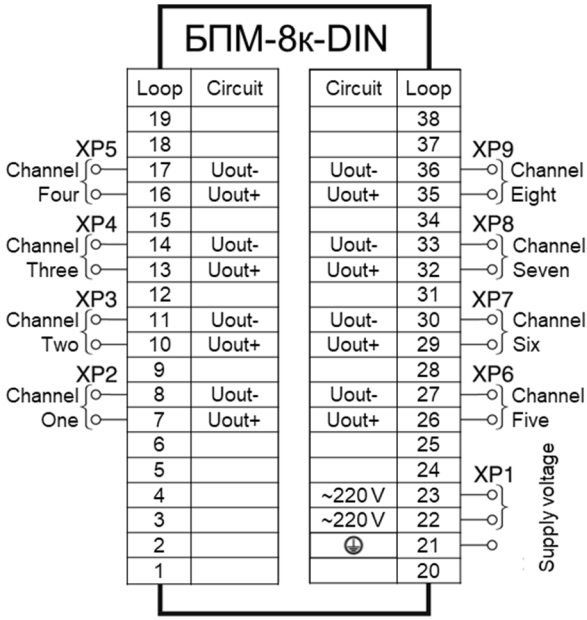
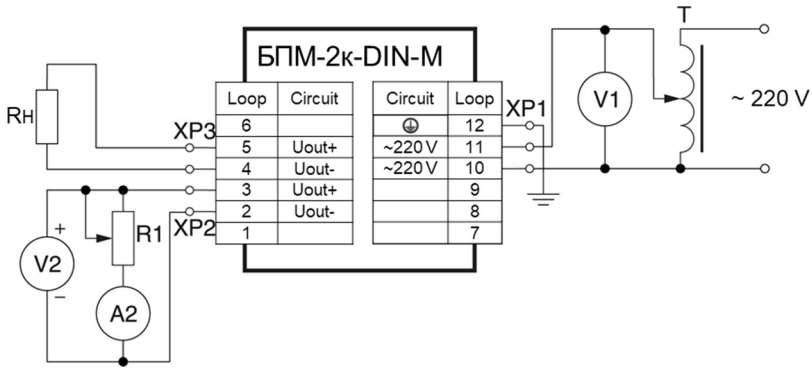


Figure B.10. БПМ-8к Unit Wiring Diagram (DIN Version)

APPENDIX C

Unit Verification Diagram



T is an AOCH-20-220-75Ц4 laboratory-class autotransformer;
R1 is a 1.5-kOhm resistor;
V1, V2 are PC5000 multimeters;
A2 is a PC5000 multimeter;
R_l is the load resistance calculated as follows (B.1):

$$R_l = U_{out} / I_{max} \qquad \text{(C.1)}$$

where U_{out} is the rated output voltage, V (see Table 1);
I_{max} maximum load current per channel, A (see Table 1).

Figure C.1. Unit Verification Diagram

Энергия –
Источник

Energiya-Istochnik LLC
454138 Chelyabinsk, 290 Prospekt Pobedy, Office 112
Sales Department: phone/fax +7(351)749-93-60, 749-93-55, 742-44-47
Technical support: phone: +7 (351) 751-23-42
E-Mail: info@en-i.ru
www.eni-bbmv.ru