

VACUUM CHAMBERS TESTING DEVICE

Type **TKP-1**

TECHNICAL DESCRIPTION AND OPERATION MANUAL



I'm happy
because I have a
perfect Polish
product.



And I don't
have one yet



MANUFACTURER: Zakład Pomiarowo-Badawczy Energetyki
ENERGOPOMIAR-ELEKTRYKA Spółka z o.o.

ADDRESS: ul. Świętokrzyska 2
44-101 Gliwice
Postbox 71"A"

PHONE: Head Quarters (32) 237-66-15

FAX: (32) 231-08-70

PRODUCTION: Tel. (32) 237-66-70

INTERNET: www.elektryka.com.pl

E-MAIL: produkcja@elektryka.com.pl

Chief Inspectorate for Environmental Protection: E0022500W

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This product consists of different materials - some of them are recyclable, others require disposal - which means you need to obtain information on the recycling or disposal systems for this kind of products in your local regulations, or return the product to the seller/manufacturer.

Note: *Some parts of this device may contain substances that are contaminating or hazardous for the environment. It is not allowed to dispose of this product along with other domestic waste (as shown by the symbol below), as it may cause major harm to the environment and human health.*

It is required to perform a "selective collection" for the purpose of disposal as specified in the Act as of 11/Sept/2015 on Used Electrical and Electronic Equipment (Polish Journal of Laws Dz.U.z 2015r, poz. 1688).



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1. PRODUCT USE

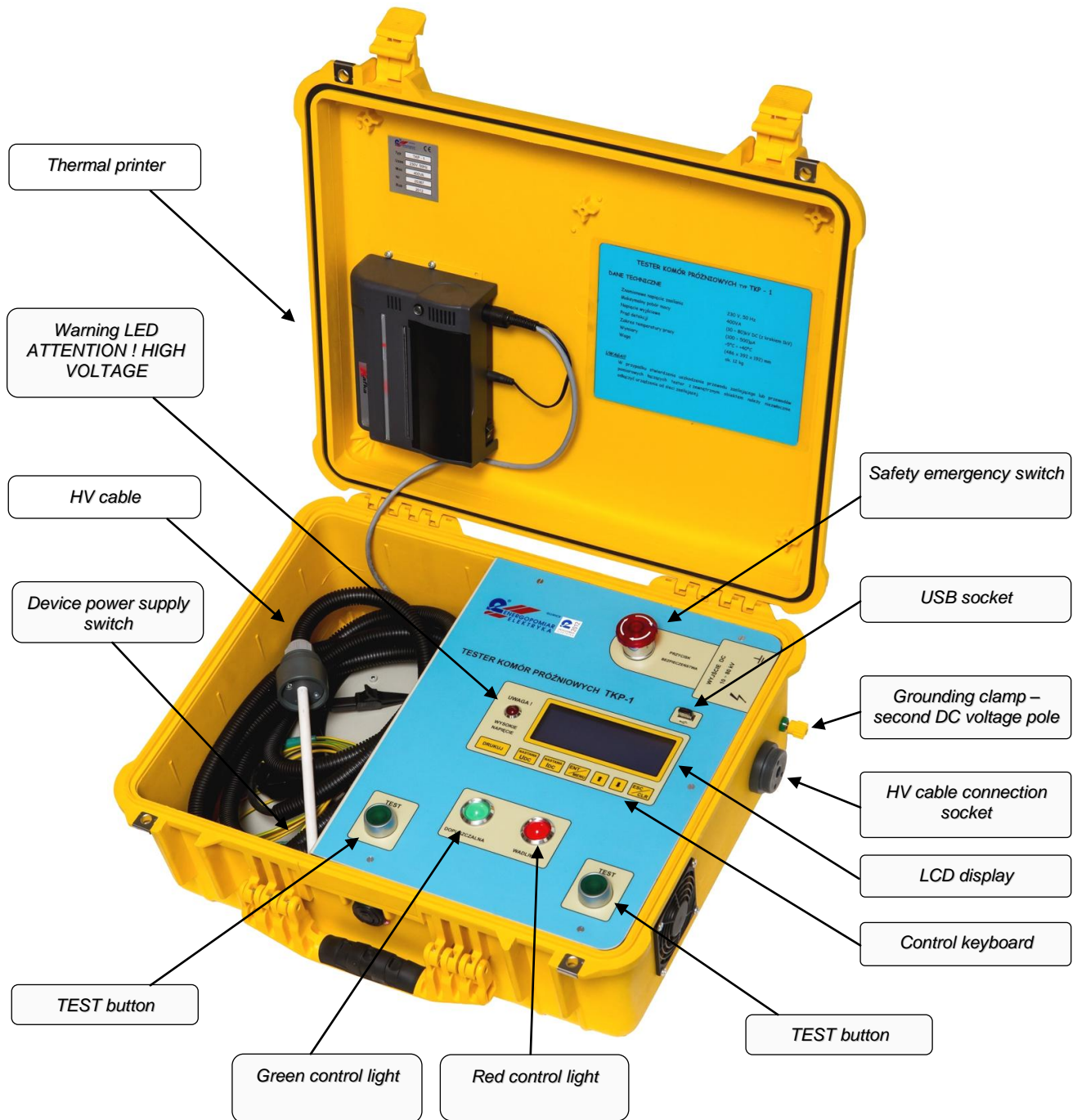
TKP-1 Vacuum Chambers Tester is a portable microprocessor device used for testing vacuum chambers of switches. The testing involves the analysis of leakage current rate as the DC voltage is generated.

2. TECHNICAL DATA

Rated voltage of device power supply:	230V , 50Hz
Max. power consumption:	approx. 400VA
Adjustment range of output voltage:	(10 ÷ 80)kV DC (every 1kV)
Detection current:	(0.1 ÷ 0.5)mA
Permissible basic error of voltage measurement:	± 1kV
Permissible basic error of current measurement:	± 2μA
Operating temperature:	-5 °C ÷ +40 °C
Humidity:	up to 80 %
Dimensions:	486×392×192mm
Mass:	approx. 12kg

3. STRUCTURAL DESCRIPTION

Vacuum Chambers Tester Type **TKP-1** is placed in the suitcase made of a highly mechanical resistant material.



Power supply

This device is supplied from 230V, 50Hz zero-phase network. Internal, measuring and control circuits are secured with a 2A fuse. The device is powered up using the power supply switch on the side edge. In emergency, use the safety switch to power down and stop the operation of the device. The switch is released by rotating the dial clockwise.

Output circuit

The device enables generation of the DC voltage adjustable between 10kV and 80kV with a step every 1kV. This output features the detection of exceeded adjustable threshold of load current within the range (0.1 ÷ 0.5)mA with a step every 0.01mA. When this threshold is exceeded, the output voltage drops and the corresponding control light is lit.

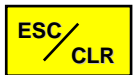
To connect the HV cable and the neutral wire that come as a standard equipment of the device, use the socket and clamp on the right side of casing.

Control keyboard

Button functions are as follows:



- to enter the MENU or confirm your selection,

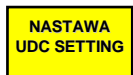


- to leave the MENU or cancel your choice and to clear the red light

DEFECTIVE WADLIWA,



- to navigate through the MENU or change the value while setting the date and time,



- to navigate the cursor to the left while setting the date and time,



- to navigate the cursor to the right while setting the date and time,



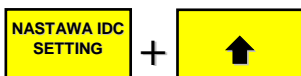
- to decrease the set output voltage,



- to increase the set output voltage,



- to decrease the set current detection,



- to increase the set current detection,



- to print the current memory record,

The buttons are active only when a test with the generation of output DC voltage is currently not running.

Control buttons and control lights

To switch on the DC output voltage use the two green monostable buttons described as **TEST**. The generation of output voltage is possible only when both buttons are pressed at the same time. To switch on the output circuit the TKP-1 cannot be in the process of setting output parameters or viewing the MENU.

When the output DC voltage is switched on the LED **ATTENTION UWAGA!** flashes **HIGH VOLTAGE WYSOKIE NAPIĘCIE** .

Once the test is finished and while viewing the memory records using the red or green control light, the test result is shown. If the load current does not exceed the set detection threshold during the test, then once the test is finished the green control light **PERMISSIBLE DOPUSZCZALNA** is lit, and if the detection threshold is exceeded the red light **DEFECTIVE WADLIWA** is lit. For the red light to be lit the **ESC/CLR** button must be pressed.

MENU options

If the TKP-1 is not in the process of generating output voltage, pressing the **ENT/MENU** button the control unit switches to viewing mode of the MENU. Using the buttons **↑, ↓, ENT/MENU, ESC/CLR** and **PRINT DRUKUJ** enables you to view the memory records, print the current record with the thermal printer, clear the memory, set the date and time as well as transfer the memory records to FLASH (pen drive). Editable files as *ddggmmss.txt* (where *dd* – day of month, *gg* – hour, *mm* – minute, *ss* – second of the tester memory record) are saved in the catalogue TKPxxxxx (where xxxxx is the factory number of the TKP-1 tester, from which the memory was transferred). **If there are two files with the same name, the old one will be overwritten by the new file.**

To leave the viewing of the menu press **ESC/CLR**.

4. TESTER OPERATION

NOTE!

Due to the OSH regulations the tester must be first connected to the tested vacuum chamber that is disconnected from the power supply voltage and opened. To connect use the delivered HV cable and neutral wire.

The tester must be connected to 230V, 50 Hz mains socket with zero resetting-system. After the tester is powered up with the power supply switch, the output voltage and the detection threshold of load current must be set, unless you change these to values different from those tested before. Current values are shown on the LCD display.

If you want to change the output voltage, you must press and hold the **SETTING NASTAWA UDC** button clicking the buttons **↑** or **↓** , changes will be displayed.

If you want to change the threshold of load current detection, you must press and hold the **SETTING NASTAWA IDC** button clicking the buttons **↑** or **↓** , changes will be displayed.

While setting the output voltage or detection current, when you press the **↑** or **↓** button the parameter being set is quickly changed.

The set values can be changed only when the tester control unit is in the MENU viewing mode and is not in the process of voltage generation.

Once both **TEST** buttons are pressed the output DC voltage with parameters that correspond to the set values. As the voltage is being generated, the LCD displays the set values and actual voltages, currents and the test duration.

The voltage is generated as long as the **TEST** buttons are pressed and held, or when the load current exceeds the set value. After the test is finished, the results are automatically saved in the memory and are shown on the display. If the green light is lit, the chamber is acceptable, whereas the red means the chamber is defect – it is then necessary to clear this signal with ESC button.

Please note that in the TKP-1 tester the criterion for the defect vacuum chamber is the exceed of the load current of output voltage.

To check the correctness of the result it is advisable to repeat the test on the same chamber but after changing the DC voltage polarity. To do this, change the places of connecting the HV cable and neutral wire to the tested chamber with one another.

The output voltage drops within a couple of seconds after the voltage generation is finished. For the user's safety, before disconnecting the HV cable and neutral wire from the contacts of the tested chamber, it is required to touch both of the poles with an unloading rod connected to the station grounding system.

Once the test is finished you can view the memory records, print a test report using the thermal printer and perform other operations described in this manual (*see Section 3. Structural description – MENU options*).

For safety reasons the device is equipped with emergency switch.

When using the **TKP-1** device it is absolutely necessary to follow the generally applicable electrical equipment safe operation regulations and the specific instructions on HV measurements.

5. TKP-1 TESTER SAFE OPERATING CONDITIONS

1. Before use please read the Technical Description and TKP-1 Tester Operation Manual.
2. The device meets the I class protection requirements. The protection against electric shock, apart from basic insulation, uses an additional protective connection between the metal casings and the power supply network protective wire.
3. Check the power supply cable, especially the 230V,50Hz network for zero-resetting. **NOTE!** If the power supply cable or the measuring cables that connect the tester with the external object are damaged, the device must be immediately disconnected from the power supply network.
4. The device generates the signals that are dangerous for human life, therefore, it is necessary to strictly follow the safety operation instructions.
5. While measuring follow the Safe Operation Instructions specified for a given type of measurements.
6. The output clamp and the HV socket must be clean and in a good technical condition.
7. Use only the wires with appropriate voltage insulation.
8. The replaced fuse must be of appropriate type and rated current.

NOTE !!!

- ✓ The device can be used only by trained and competent persons.
- ✓ Before using the tester, warnings and instructions as regards operation safety must be read and understood.
- ✓ The warnings and instructions must be observed when operating the tester.

**CHECK LIST OF
VACUUM CHAMBERS TESTER
Type TKP-1**

Factory No Manufacture date

Checked and acceptanced by

Based on the conducted tests and measurements it has been confirmed that the Vacuum Chambers Tester Type TKP-1 Factory No meets the requirements specified in the device technical data.

Zakład Pomiarowo - Badawczy Energetyki ENERGOPOMIAR - ELEKTRYKA Spółka z o.o. grants for the Vacuum Chambers Tester Type TKP-1 a warranty compliant with the Warranty Card.

Approved by

Date

WARRANTY CARD

Name and type of device: Vacuum Chambers Tester Type TKP-1
.....
.....

Factory Number:.....

Date of sale:.....

Manufacturer/ Seller: (Seller's Seal)

Seller's Signature:.....

WARRANTY CONDITIONS

These warranty conditions shall apply as additional and do not in any way limit the rights of purchaser arising out of law.

ZPBE ENERGOPOMIAR-ELEKTRYKA Sp. z o.o. 44-101 Gliwice, ul. Świątokrzyska 2 guarantees that the device specified in the warranty, hereinafter the "Product", is operational in compliance with the technical conditions of operation described in the manual.

Please make sure that the factory number of the Product is the same as that provided in the Warranty Card.

1. This warranty covers the malfunctions of the Product caused by defective parts or production defects.
2. Warranty repairs do not include periodical maintenance and inspections of the Product, especially cleaning, adjustments, operation check, correction of operation or parameters programming errors of the user and other actions that are required of the user. The warranty does not cover natural wear and tear of the Product parts such as battery packs, batteries, connecting wires and cables, laboratory clamps,, and other parts with a specific period of use, etc.
3. In order to be able to use the rights arising out of this warranty upon applying for warranty service, the Buyer / User must inclusively present the following:
 - a. correctly filled out warranty card, (factory number, device type, date of purchase identical with the date of sale on the invoice, seller's seal),
 - b. defective Product.
4. The warranty ensures the repair with spare parts available free of charge and labour, in compliance with the conditions specified in this warranty, within 24 months after the sale of the Product.
5. Delivering the Product to Manufacturer (except for the Products permanently installed in electrical power systems), especially sending it by means of third parties, the Buyer / User is obliged to provide it with an appropriate packaging. The Buyer / User shall be exclusively liable for any damage or destruction of the Product due to its improper packaging.
6. Malfunction reported within the warranty period specified in Section 4 shall be removed within 14 days. The period begins with the first working day that follows that on which the Product is delivered to the Manufacturer as specified in Section 3 and 5. The period of removing the

- malfunction may be prolonged when it is necessary to obtain the parts required for the repair from abroad.
7. The Buyer / User has the right to replace the Product with a new one if:
 - a. within the warranty period specified in Section 4, the Manufacturer performs five warranty repairs and the Product shows defects that prevent it from being used for its designed purpose,
 - b. the defect cannot be removed.
 8. The warranty does not cover Products with mechanical or electrical damage not resulting from the reasons that the Manufacturer is liable for, as specified in Section 1, especially Products:
 - a. with damage caused during the transport and reloading,
 - b. with damage due to improper usage or use of the Product not in compliance with the operation manual or safety regulations,
 - c. damaged as a result of fire, flood, lightning, or other natural disasters, war or social unrest, unexpected incidents, liquid intrusion, over-voltages in the electrical energy and/or telecommunications network, connecting the electrical energy network not as specified in the operation manual,
 - d. which are modified, changed, attuned or repaired by persons other than the Manufacturer so that the warranty seal is compromised or there is any other intervention into the Product,
 - e. whose Warranty Card or serial numbers are changed, blurred or erased in any way,
 - f. damaged in effect of conducting operation tests at the site.
 9. The Manufacturer shall not be liable as specified in this (Warranty Service) Agreement if the required repairs cannot be made due to import / export restrictions on spare parts or other legal regulations, unexpected circumstances that make the repairs impossible or negative effects of force majeure.
 10. Any defective products or parts that are replaced as part of the warranty shall be the property of the Manufacturer.
 11. The Manufacturer is not liable towards the Buyer / User for any loss, damage or destruction of the Product that result from reasons other than the defects within the Product, as well as for damage due to the Product defects.
 12. The warranty rights do not include the Buyer / User's right to seek the reimbursement of lost profits due to the Product failure.
 13. The warranty for the Product sold shall not exclude, limit or suspend the Buyer / User's rights towards the Manufacturer arising out of the fact that the goods does not correspond to the Agreement.

ZPBE ENERGOPOMIAR-ELEKTRYKA Sp. z o.o.

44-101 Gliwice, ul Świętokrzyska 2

Tel. +48 32 237 66 15

Fax.: +48 32 231 08 70

e-mail: sekretariat@elektryka.com.pl

www.elektryka.com.pl