Industrial EMP Solutions
CIVILIAN CRITICAL INFRASTRUCTURE PROTECTION
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UPS and Static Switch Tester

(for express test after HEMP impact)

* For civilian critical infrastructure protection
* For express-test industrial uninterruptable power supplies (UPS) performance and serviceability
* Simplicity and ease of use
* For a quick check of the industrial UPS functionality after exposure to HEMP, as well as for use in a normal situation
* Replaces the complex test that previously required special equipment
* Significantly reduces testing time to a few minutes

Some types of electric consumers in critical infrastructure systems (computer servers, medical equipment, communication systems, and other critical applications where even millisecond power interruptions are unacceptable) are powered through very high quality industrial Uninterruptable Power Supplies (UPS) with a capacity from several kilowatts to hundreds of kilowatts. But the UPS itself is a very complex electronic unit that uses many microelectronic components and microprocessors, that is, it is a type of equipment that is very vulnerable to HEMP.

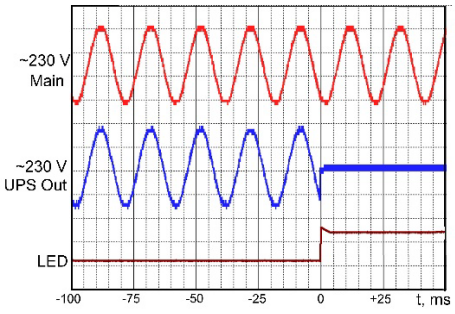
A possible situation when, after HEMP impact and shutdown of many types of electrical equipment and power supply networks, a gradual return of all electrical equipment to a working state is required. In this case, it will be necessary to check its performance. In accordance with the IEC62040-4, 2024 standard, a very wide range of tests is provided for UPS, involving long and rather complex measurements of UPS characteristics using special equipment.

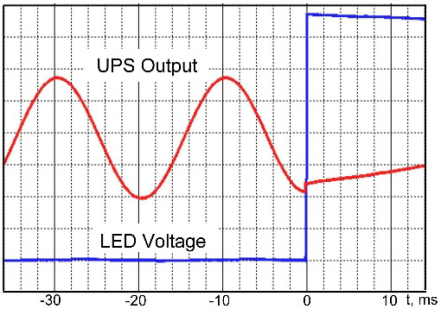
Although all these parameters and tests are undoubtedly important, there are only a few basic characteristics, adherence to which ensures at least a minimal ability of the UPS to perform its functions (which is very important, for example, after the UPS is subjected to a HEMP).

One of the main functions of the UPS is its ability to very quickly switch the power supply of the critical load from the main AC supply network to battery power or a quick switch to bypass. Without special technical means (such as a storage oscilloscope equipped with special active voltage dividers, for example), it is not easy to check the serviceability of such UPS functions. Such equipment requires skill in setting up and working with it.

Our UPS tester allows to solve this problem and very easily and very quickly test this parameter and also most important addition parameters of the UPS such as the frequency and level of the output voltage (in accordance with the requirements of the IEC 62040-3 standard, deviations from nominal values are allowed at the UPS output: voltage ±10%, frequency ±2%.

The tester can be used for testing single-phase UPS or three-phase UPS with phase-by-phase testing of each phase. For testing, one of the inputs of this instrument is connected to the main AC network (to ordinary electrical outlet) using a regular cable with a regular 2-pin or 3-pin plug, and the second – to the electrical network intended for critical loads (to specific electrical outlet). When the operator disconnects the UPS from the main AC network (by external CB only and not by internal CB at the UPS input!), the LED in the instrument should not turn ON. This will confirm that the voltage at the UPS output was not interrupted (or its interruption did not exceed 1.0 ms). This function of the device is explained below in the oscillograms.





As can be seen from the presented oscillograms, the device's reaction time to a voltage break at the UPS output is much less than even one millisecond.

The device is also equipped with a voltage and frequency meter, which complements its functional capabilities. With the help of the switch, this meter can be connected either to the main power supply or to the UPS output voltage.

The device is also equipped with two green indicators for the presence of the main voltage and the output voltage of the UPS, as well as a switch for synchronizing the voltage polarity in the outlets belonging to the main power supply network and belonging to the UPS output network intended for critical loads (the connection of the phase and neutral wires in these outlets does not always match).

Specification

Nominal voltage on the tester inputs, VAC	230 ±10%
Measurement range:	
-for voltage, V	100 – 300
-for frequency, Hz	45-65
Power consumptions, W	<5
Accuracy measurement for voltage and frequency	1% ± 2 dig.
Reaction time for voltage interruption, msec	0.5
Dimensions, mm	175 x 150 x 75
Weight, kg	1.2

The developed device can find wide application for express testing of UPSs, Transfer Switches, Bypass Switches, etc., whether in operation, during commissioning, or after repair, also independently of HEMP.

Important Note:
The device must be turned ON immediately before conducting the test and turned OFF immediately after the test is completed. Prolonged operation of the device in the on state is not allowed.

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