Impulse Power Supplies: General Trends and Benefits.

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ABSTRACT

The article is devoted to research and analysis of the state of the power supply market. General trends in the development and optimization of their parameters are revealed, and the advantage of switching power supplies is also substantiated. Samples of modern efficient network adapters and uninterruptible power supplies are given.

Keywords: Power supply, network adapter, uninterruptible power supply, switching power supply, high-frequency converter.

One of the most important components of any low voltage system is the power supply. This market segment, as in the production of many other security systems, is constantly evolving and improving: the process of reducing the size of the device, increasing productivity, adapting to the conditions of the power grid, and so on. What are the advantages of switching power supplies for the user and what products are available in this segment?

Common power issues for any equipment:

- global voltage fluctuations in the network;
- losses in wires of long nodes of the system, which is especially typical for large objects;
- Noise and crosstalk (electromagnetic compatibility problems) from one system node to another from a common source.

All these problems are successfully solved with the help of modern modifications of switching power supplies, which are increasingly replacing traditional transformer (linear) power supplies from the market. For example, you don't have to go far - look at the power supply installed on your computer or other office equipment, cell phone charger, power supplies that come with any household appliances. Most power supplies are switching power supplies. This is not a coincidence. More and more electrical equipment manufacturers choose them, considering them reliable, technologically advanced and easy to use.

The production of modern switching power supplies provides a better and more reliable element base, a high level of production capacity, adherence to technology, new equipment for testing parameters in the production process, product quality control, as well as a deep understanding of product quality, the features are as follows. At present, only taking into account the above requirements and a qualified approach to the development of the scheme and structure, the product will be successful in the market

Network adapter AT-12/15

Network adapter AT-12/05

Benefits of impulse blocks

Wide input voltage range (from 80 to 265 V) with variable output parameters.

In our country, the voltage drop in the network (especially in rural areas) is a serious problem, although according to GOST for existing electrical networks, the voltage must be within 220 V (+ -1105%), any power supply in the range from 187 to 242 V must provide all the specified parameters in the voltage range. This is not an easy task, especially for power units, since the stability of the output voltage of the unit at the minimum input voltage and maximum output current and at the maximum voltage level in the network and the maximum load current should not be disturbed due to overheating at the maximum allowable ambient temperature. It is also necessary to take into account the short-term voltage drop in the network associated with the connection of large electrical consumers.

Many manufacturers are cunning, indicating a narrower range of input voltages in the passport, although it is known that in many areas 190V in the network is the norm.

Improved high-frequency converter circuit (efficiency up to 95%)

Many losses in a switching power supply are associated with transients when the main element is reconnected. Often, energy losses are minimal, since the main elements are in one stable state (on or off). Transformer (linear) power supplies require a stabilizer to stabilize the output voltage, which leads to additional losses.

The quality of the output voltage in terms of noise and electrical interference allows you to simultaneously power different types of loads.

Both linear and dynamic loads can be connected to the power supply. In this case, it is necessary to use various types of filters (inductive and capacitive) in the output circuit to stabilize the output parameters of the power supply.

Stability of output parameters in a wide temperature range.

This is especially true for output current and voltage. Another element of manipulating numbers on the part of the block manufacturer is the output current: in the product passport, the maximum is often indicated instead of the nominal. When operating at maximum load, at best, the temperature protection (if any) is activated after a short time in the device. And often, during prolonged operation at high temperatures, the components of the block lose their parameters significantly over time, which

is especially typical for electrolytic capacitors, the power of which is significantly reduced, which in turn leads to an increase in the levels of output ripple. The rated load current is the current that must always be supplied to the load, regardless of the situation, for a long time and while maintaining the specified ripple level.

Output voltage compensation when the load is running on long lines.

The equipment connected to the power supply is rated for a specific voltage rating. Since it is located at a considerable distance from the power supply, losses in the wires are an important factor. You can cover them by increasing the cross section of the wire from the power supply to the equipment or by applying a trimmer that increases the voltage at the output of the power supply.

The switching power supply has significantly smaller dimensions and weight (especially for powerful linear power supplies) compared to a linear power supply of the same power.

Smaller transformers are used to deliver the same power as the frequency increases. The mass of linear stabilizers is mainly made up of powerful, heavy low-frequency power transformers and radiators of power elements operating in a linear mode.

Significantly lower cost of production in production, which in turn affects the price for the consumer.

Switching power supplies do not have expensive low-frequency transformers that make up the bulk of the cost of linear power supplies.

ACCORDTEC uninterruptible power supplies. All models of power supplies of the ACCORDTEC trademark (Russia) are made on the basis of switching power supplies. High quality standards are confirmed by tests carried out as part of obtaining fire certificates and certificates of conformity. The line of uninterruptible power supplies also includes network adapters.

Basic models.

BBP-20 is an energy efficient source. Designed to power a load with a voltage of 12V with a current consumption of not more than 2A. This power supply can be powered by AC voltage from 80 to 265V. The maximum load current is 2.5A. The BBP-20 has built-in electronic output protection against short circuits and overloads. The battery circuit is protected by a protective cover. It is possible to connect to the network and output 12V. The output voltage is set in the range from 12 to 15V to compensate for the drop in output voltage on the connecting wires.

BBP-30 is designed to power a 12V load with a current consumption of 3A. The maximum load current is 4.9A. This uninterruptible power supply has built-in electronic protection against short circuits and overcurrent and power loads. The BBP-30 also has a deep discharge protection function

Uninterruptible source power supply BBP-20

Uninterruptible source power supply BBP-30

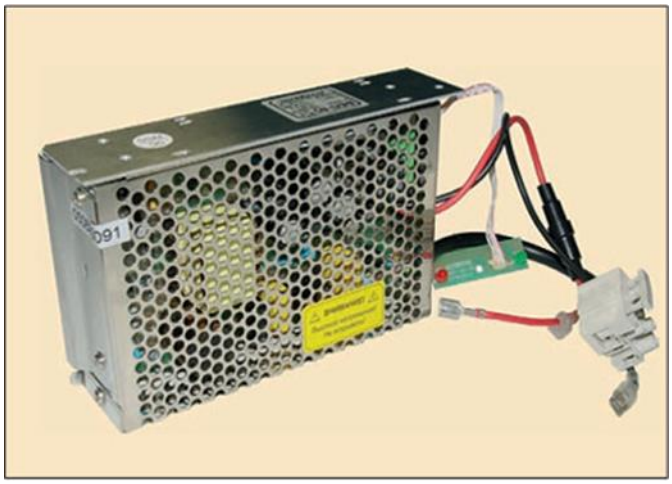
A typical 12 volt lead-acid battery will fail due to irreversible chemical changes upon deep discharge and a voltage drop of about 10 volts. However, maintenance-free batteries with a sealed gel electrolyte are deprived of this disadvantage. These batteries (from manufacturers supplying quality products) can withstand up to 200 deep discharge cycles, plus 50-60 charge-discharge cycles will train the battery well and even increase its capacity.

However, when a dangerous deep discharge limit is reached, it is considered necessary to include a battery disconnect circuit in the UPS. This is due to the fact that there are many models of Chinese-made batteries on the market that can withstand only a few cycles due to the use of cheaper technologies and materials. Protection devices are made on the basis of a relay or a strongly grounding transistor, since the use of cheap bipolar transistors as a key leads to an additional voltage drop in the key and, as a result, a reduction in the reserve operation time.

BBP-30 has two pairs of blocks for connecting the load, which simplifies the installation process. The output voltage can be adjusted from 12V to 15V to compensate for the output voltage drop on the connecting wires. BBP-30 is currently available in three versions: without a case, in a case designed to accommodate batteries up to 7A/h, and in a case designed to accommodate batteries up to 17A/h.

BBP-80 is a functional analogue of BBP-30 and is designed to power a load with a voltage of 12 V and a current consumption of 8A. The maximum load current is 10A.

Two versions are available: without housing and in housing for installing a 17 Ah battery. BBP-80 can operate on batteries with a capacity of up to 33 Ah.



Uninterruptible power supply BBP-80 BK.

Network adapters of the ACCORDTEC series.

Network adapters of the ACCORDTEC series include a budget version of the analogues of the transformer unit. AT-12/15, AT-12/30 models are designed to power a 12V DC load with a current consumption of 1.5 and 3A, respectively. Electronic protection is required in case of short circuit and over current and output power. The output voltage is set in the range from 12 to 15V to compensate for the drop in output voltage on the connecting wires.

These power supplies are available in a standard version, as well as in a housing for mounting on a DIN rail. Such mounting blocks are designed for installation in electrical cabinets and boxes. The ACCORDTEC line of power supplies also has an adapter for charging a load with a voltage of 24V and a current consumption of not more than 3A. Model AT-12/05 is a power adapter for powering equipment with a voltage of 12 V and a current consumption of not more than 0.5A. To connect the load, a cable with a pin connector is provided.

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