International Journal of Education, Social Science & Humanities.
Finland Academic Research Science Publishers
ISSN: 2945-4492 (online) | (SJIF) = 8.09 Impact factor
Volume-12| Issue-5| 2024 Published: |22-05-2024|

DIMENSIONS AND APPLICATION PROBLEMS OF MODERN GENERATORS

https://doi.org/10.5281/zenodo.11111844

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Abstract

In this article, the peculiarities of the dimensions and use of modern generators, their modern scientific research, and the adaptation of their characteristic features to the processes during their use are analyzed in a deep scientific way.

METHODS. The research used a systematic-structural approach based on the principles of objectivity, universality, concreteness, logical and historical dialectics. Scientific analysis of the content of these application processes is provided based on systematic approaches.

INTRODUCTION. Today, it is sometimes referred to as an electrical generator, a device that converts mechanical energy into electrical energy. It consists of several components that work together to produce electricity. Generators are made to offer temporary or portable electricity when the primary power source is out or unavailable.

RESULTS AND DISCUSSION

Generators are needed to provide backup power when the main power grid is unavailable or during a crisis. These reliable devices are often used in residences, workplaces and businesses to guarantee uninterrupted power supply. But have you ever thought about the mechanism of the generator? This article examines the internal operations of the generator and explains how it works.

There are two main categories of generators: inverter generators and conventional generators. They are standard generators and inverter generators.

Standard generators are the most popular type. They consist of an engine, an alternator, a voltage regulator and a fuel system. Gasoline, diesel, LPG, or natural gas are just a few of the fuels that can be used to power generators. Inverter generators are a more advanced and efficient type of generator.[1] They use electronic circuits to convert the generated power into a clean and stable form.

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Inverter generators are known for their quiet operation and fuel efficiency, making them ideal for camping, outdoor activities and sensitive electronic devices.

Modern generators may vary in size and application, but their inner workings are generally the same across the board. The main parts of an electric generator include:

Main; the framework contains and supports the components of the generator. This allows people to operate the generator safely and protects it from damage. Engine; the heart of a generator is its engine, which converts fuel into mechanical energy. Gasoline, diesel, propane or natural gas can be used to power different types of generators.

Alternator: Alternator is responsible for converting mechanical energy into electrical energy. Alternating current (AC) is produced by a combination of rotor and stator.

Fuel system: The task of supplying the engine with gasoline falls on the fuel system. Fuel lines, fuel pump and fuel tank are all there. The technical characteristics of the generator determine the type of fuel used.

Exhaust System: Diesel and gasoline engines produce exhaust gases that contain toxic chemicals. The exhaust system safely directs and removes these gases through a pipe made of iron or steel.

Voltage Regulator: Voltage regulator ensures stable and stable voltage output of the generator. It regulates electrical output to prevent damage to connected devices or equipment.

Battery Charger: Generators rely on a battery to run. The battery charger is responsible for charging the battery by providing a full float of 2.33 volts per cell.

Controls: The control panel is located on the outside of the generator and contains several gauges and switches. Features may vary by generator, but the control panel usually includes a starter, engine control gauges, and a frequency converter.

A generator is a device that produces electricity or converts energy from one type to another at the expense of an external energy source; hardware or machine. For example, acetylene generator, ice generator, steam generator, gas generator, electric generator, etc. In particular, electric generators are divided into direct current and alternating current generators. [2] The term generator applies equally to both AC and DC electrical machines and devices that generate electrical vibrations. In the first case, mechanical energy is converted into electrical energy, and in the second case, the electrical energy of the source is converted into the energy of vibrations of a certain frequency, desired shape and power. There are two

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types of generators: direct current generators and alternating current generators. Alternating current generators are widely used in tractors and cars. Relay-regulators adjust the voltage produced by the generator, keep it unchanged at the specified level and perform the task of transmitting it to consumers.

Currently, three-phase synchronous alternating current generators with electromagnetic induction are mainly used. Generators are subject to the following requirements:

- Simplicity of construction
- Long-term uninterrupted operation
- Reliability in use
- Small size and mass
- Low price
- Being able to provide the battery and consumers with the necessary current even at the frequency of small rotations.

Advantages of alternating current generators: Compared to constant current generators, the consumption of non-ferrous metal copper, which is expensive, is 2.5 times less. DC generators do not have a collector, instead of a complex wound armature, a simple wound stator and a field winding consist of a single coil. In DC generators, the specific power per 1 kg of mass does not exceed 45 W, and in AC generators, the specific power per 1 kg of mass is 160 W. Since AC generators do not have a collector (in DC generators, a spark appears between the collector and the rotor when the frequency of rotation is increased), it allows to increase the frequency of rotation of the rotor up to 12,000 rpm. This makes it possible to produce the required amount of current even at the frequency of small rotations.

The structure and principle of operation of an alternating current generator. An alternating current generator consists of two main parts: a stationary stator and a movable (rotating) rotor. The stator has a three-phase colored magnetic wire wrapped around it. And the rotor consists of a winding coil with pole systems, as well as contact rings. The stator windings of modern generators are always three-phase, that is, they consist of three windings, called simple phases, which are located at an angle of 120° to each other.

Phase coils can be connected in the form of "star" or "delta". In it, voltage can be in the form of phase and linear current. When connected in the form of a "delta", the phase and line voltage will be in the following connection, the phase and line current will have the same form. In large-power generators, the connection of the coils in the "delta" method is used more. Rectifiers are installed on generators to

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convert the current received from alternating current generators into constant voltage.

CONCLUSIONS. A lot of theoretical and practical work is being done on the problem we have analyzed above. But despite this, this problem is a very urgent problem of today as a problem of great importance in the development of science. Therefore, it is necessary to make scientific hypotheses based on the above scientific data. At the same time, we can consider that these conclusions will greatly contribute to the enrichment of knowledge in this field.

REFERENCES:

1. Калентионок Е.В., Волков А.А., Мышковец Е.В., Цыганков В.М. Устойчивость электроэнергетических систем. Минск: Изд-во 2007. 131 с.
2. Андерсон П., Фуад А. Управление энергосистемами и устойчивость; пер. с англ. под ред. Я.Н. Лугинского. М.: Энергия, 1980. 568 с.
3. Портной М.Г., Рабинович Р.С. Управление энергосистемами для обеспечения устойчивости. М.: Энергия, 1978. 352 с.
4. Щедрин Н.Н. Упрощение электрических систем при моделировании. М.: Энергия, 1966. 159 с.
5. Синицын А.С., Кузьменко А.А. Использование принципа интегральной адаптации для повышения устойчивости системы возбуждения синхронного генератора // Технология техносферной безопасности. 2013. № 3. С. 77-83.
6. Енин В.Н., Степанов А.В. Моделирование переходных процессов и анализ динамической устойчивости синхронных генераторов при воздействии больших возмущений // Наука и образование. 2012. № 10. С. 495-504.