

REDUCTION OF VOLTAGE FLUCTUATIONS IN THE NETWORK

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Анотація

В роботі розглянуто аналіз коливань напруги в межах та засоби по зменшенню коливань. Вплив коливань напруги на роботу електричних приладів. Визначено допустимі параметри коливань напруги.

Ключові слова: *коливання напруги, електричні прилади, параметри коливань напруги.*

Abstract

The analysis of voltage fluctuations within and means for reducing oscillations is considered in the work. Influence of voltage fluctuations on the operation of electrical appliances. Permissible parameters of voltage fluctuations are determined.

Keywords: *voltage fluctuations, electrical devices, parameters of voltage fluctuations.*

Introduction

In recent years, a significant number of power receivers have appeared which make high demands on the quality of electrical energy. They significantly affect the mode of operation of other consumers, and in most cases worsen the quality of electricity.

In connection with such changes in the operating conditions of urban electric networks, indicators of the quality of electric energy are deteriorating. This leads to a decrease in technical and economic indicators of networks and electrical receivers. According to DEST, strict requirements are put forward for indicators of the quality of electric energy. Such requirements are taken into account during the design and operation of urban networks.

The purpose of the work is to develop a method for determining the parameters of fluctuations and methods for reducing voltage fluctuations.

Research results

Voltage fluctuations are rapid changes in the current value of the voltage, occurring at a rate of 1-2% per second or more. Voltage fluctuations in amplitude (scale of voltage change), frequency and intervals are between successive voltage changes.

The cause of voltage fluctuation is electrical receivers with rapidly changing modes of operation.

Voltage fluctuations affect: increase in losses in the network; visual fatigue, reduced productivity, traumatism; reduction of the service life of electronic equipment; failure of capacitor batteries; unstable operation of excitation systems of synchronous generators and motors; equipment vibrations; possible loss of contactors.

During the operation of electric receivers with a sharply alternating shock load, sharp shocks in the power consumption occur in the power grid. This causes changes in the network voltage, the amplitudes of which can reach large values. These phenomena occur during the operation of rolling electric motors, electric arc furnaces, welding machines, etc. These circumstances have an extremely unfavourable effect on the operation of all electric receivers connected to this network, including the electric receivers that cause these changes.

With voltage fluctuations, as a result of which the voltage drops by more than 15% below the nominal value, it is possible to disconnect the magnetic starters that operate the electric motors.

Voltage fluctuations negatively affect the operation of lighting receivers. They lead to the flickering of lamps, which, if the threshold of irritation is exceeded, can be reflected in the long-term perception of people.

Voltage fluctuations are characterized by two indicators:

- the scale of the voltage change;
- dose of Flicker.

Measures to reduce voltage fluctuations:

1. Use of equipment with improved characteristics.
2. Connection to a powerful power supply system.
3. Distribution of loads on different transformers or busbar sections.
4. Reducing the resistance of the feeder section of networks.

Conclusions

Physical processes during voltage fluctuations, methods of measuring and calculating indicators, the effect of voltage fluctuations on electrical equipment and measures to reduce it are considered.

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