



VOLTAGE CHANGE REACTIVE POWER AUTOMATIC VERIFICATION IN COMPENSATION DEVICE

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ABSTRACT

This article presents calculations for regulating voltage in electrical networks due to reactive power. In addition, a mathematical model of the state before and after the introduction of an automatic reactive power compensation device has been developed.

Introduction

One of the important indicators of the quality of electricity is the actual voltage value is calculated, it is a phase or a line depending on the connection scheme of the consumer voltage may be. Network between one stage of transformation voltage changes in a relatively small interval, therefore, in order to simplify calculations, in practice, from the concept of voltage deviation is used.

When choosing electrical equipment, the following measures to reduce reactive power consumption should be taken into account:

- to prevent the selection of electrical conductors and transformers with reduced load without justification;
- selection of synchronous drives based on technical and economic conditions for non-adjustable electric drives with constant operation mode;
- planning of measures to limit the operation of asynchronous drives determined by the possibility of their use based on the conditions of the technological process;
- use of other technical means to increase the technical and economic indicators of the power supply system by affecting the consumption and generation of reactive power

In order to control the largest reactive power transmitted from the energy system networks to the consumer's networks during the peak load hours, a special reactive power from automated information and measurement systems of electricity accounting and control and indicating 30-minute maximum loads and contact hours energy meters are used. Electronic meters are used to control the reactive energy consumed (transmitted to the energy system) from the energy system during periods of large (small) loads. In this case, electronic counters must be able to take into account the following quantities separately:

- a) reception of reactive energy during peak hours;
- b) reception of reactive energy during minimum load hours;



- v) return of reactive energy during peak hours;
- g) return of reactive energy during minimum load hours

Analyzing the composition of reactive power consumers shows that the main reactive power consumers are devices of four different types

- asynchronous motors 40%
- electric heaters 8%
- all types of transformers 35%
- power transmission lines (waste in them) make up 7%.

This is the current in an active-inductive load when voltage is applied to the electrical network lags behind by shifting from tension to angle. Electricity receiving asset and consumes reactive power.

Literature analysis and methodology

Active and reactive power of electricity consumers is not only intermediate time during the period, it changes during the transition of one production shift. Reactive power coefficient clearly shows the share of reactive power in active power. Electric Active power consumed by active power consumers of energy is work performs and other types of energy: mechanical, heat, light, chemical, compressed air changes into energy and gas.

Reactive power does not perform useful work in electrical receivers electromagnetic field in electric motors, transformers and power lines spent on production. 22% of power grid 100% reactive power 110-750kV of the power network in power station power transformers 6.5% district in voltage-increasing autotransformers in substations with in electrical networks, 13.5% voltage-reducing transformers, and 58% 6- It is formed from the loss of reactive power of consumers in 10kV busbars Active R and reactive power Q are transmitted through the resistance R of the power supply system active power loss is as follows.

An additional waste of voltage appears in the district electric networks. Voltage loss during transmission of active power R and reactive power Q through power supply networks with active R and reactive X resistance. Compensation of reactive power means its production or consumption with the help of compensation devices.

Results

It is known that the current passing through the capacitors is 90° from the voltage applied to it in front of the corner. and the current passing through the inductive coil is poured into it lags behind in voltage by 90° . Reactive power compensation is an important technical event and can be used for several purposes. First reactive power compensation reactive power balance necessary to provide.

Second, the use of compensating devices in the electricity network to reduce wastage.

Thirdly, compensating devices are used to adjust voltages is used.

When the balance of reactive powers is fulfilled, the voltage in the energy system is maintained at a certain amount. Reactive power imbalance in the network voltage changes. There is not enough reactive power produced in power plants. Therefore, 2/3 of the reactive power needed by consumers is taken from the power grid and 1/3 with the help of compensating devices. By installing compensating devices (capacitor batteries), the voltage loss in the line is reduced.



In all cases, the following technique and mode are used when using compensation devices it is necessary to study the limits of requirements.

- 1) necessary power reserve at load nodes
- 2) placement of reactive power on the bus of the source
- 3) voltage deviation
- 4) the ability to conduct electrical networks

Conclusion

Currently, reactive power compensation is an important factor that allows solving the problem of energy saving in almost any enterprise. According to the estimates of local and leading foreign experts, the share of energy resources, in particular, electricity, in the cost of production is 30-40 percent. Reactive power compensation is the key to energy conservation. Accordingly, when the reactive power is compensated (using RQAK - automatically controlled capacitor units), the current consumed from the network is reduced by 7-35%, depending on the cosφ, as well as the heating of the conductive wires and the wear of the insulation.

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