ENERGY EFFICIENCY ACHIEVEMENT STUDY BY COMPENSATING REACTIVE POWER IN MINING ENTERPRISES

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In mining enterprises, reactive power is mainly achieved through capacitor batarekas when compensing. Obtaining reactive power from the network will lead to an increase in electricity consumption on the network. Electricity consumption today causes significant economic damage. One of the associ consumers of reactive power is asynchronous electric motors.

The goal of reactive power compensation qlish is to reduce power wastes in consumers and power grids. That is, using full power will prevent the coefficient from getting smaller.

Reactive power compensation methods

1. The natural method
2. Artificial (method of using a special compensating device)

Natural method

Replacement of a low-load conductor with a small capacity. Systematically reduce the voltage of the conductor, which works with low load. Restriction to the salt operating modes of the conductors and the payvandiash transformer. In cases where there is no negative impact on the technological process, replacing asynchronous conductors with synchronous conductors. Using the most desirable valve changer circuit.

Artificial (method of using a special compensating device)

1. Sequential connection of inductive reel
2. Parallel connection of capacitor battery
3. Use of synchronous compensators

This is a type of techniques for compensing reactive power by connecting inductive coils in series. But at present, this method is not used in manufacturing enterprises. This is due to the fact that the inductive reel is connected in series, which reduces the consumer's reliable performance. Therefore, this method is not used.

Calculation is carried out by the following expressions.

$U_r=U\cdot sinf;\quad I_T=P/1{,}73Ucosf;\quad I_r=I_T\cdot sinf;\quad \Delta U=U_r-U_2;\quad X_L=U_r/I_r;\quad L=X_L/\omega.$

The capacitor batareka compensates the reactive power as a result of limiting the reactive current by connecting in parallel to the feeders and the network.

Calculation is carried out by the following expressions.

$I_T=P/1{,}73Ucosf;\ I_{r1}=I_T\cdot sinf_1;\ I_{r2}=I_T\cdot sinf_2;\ I_{r1}-I_{r2}=\Delta I_r;\ U_r=U\cdot sinf;\ X_c=U_r/\Delta I_r;\ C=1/\omega X_c.$

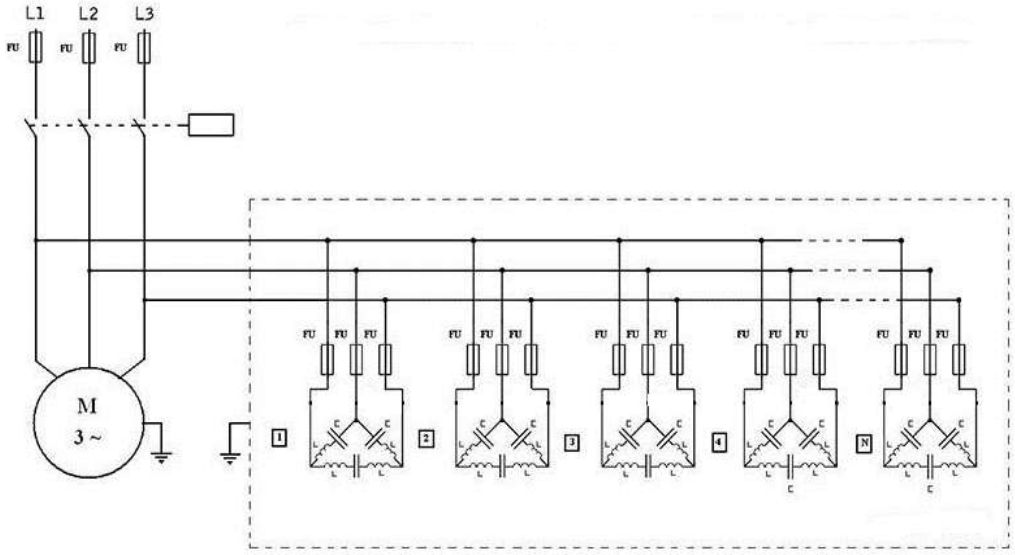

Figure 1. Reactive power capacitance coupling scheme through capacitor batareka

At the time of the study, the methods of compensation were studied, and one of the methods of compensation of reactive power to low and medium power consumers was aimed at implementation through capacitor batarekas.

In this study, an automatic control system for the compensation of reactive power was developed and experimental tests were carried out. In the case of reactive power capacitance, we achieve optimal control system by connecting capacitor batarekas in series, depending on the electrical network load.

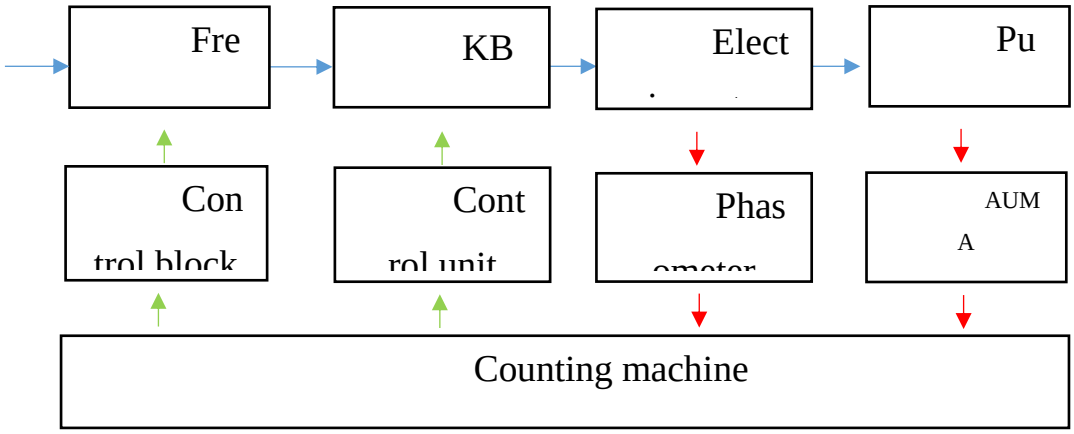

Figure 2. Functional scheme of the optimal control system of electric motors of the water outlet device

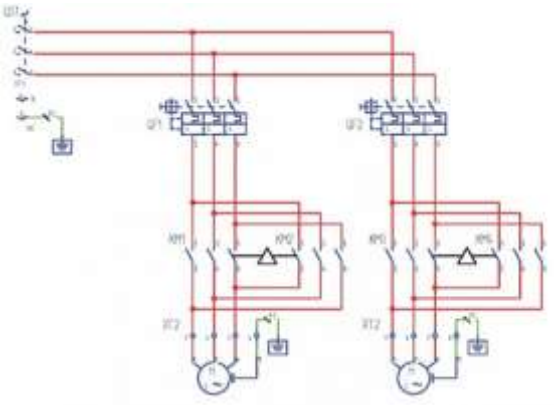

Figure 3. Scheme of parallel connection of the water outlet device with electric motors

The result achieved according to the developed control system: - a linear speed control scheme of centrifugal pumps with the connection of electric motors to the technological process is developed;

Control system has been developed that allows you to increase the coefficient of active power without choking on the load through the sensors with reverse connection of electric motors.

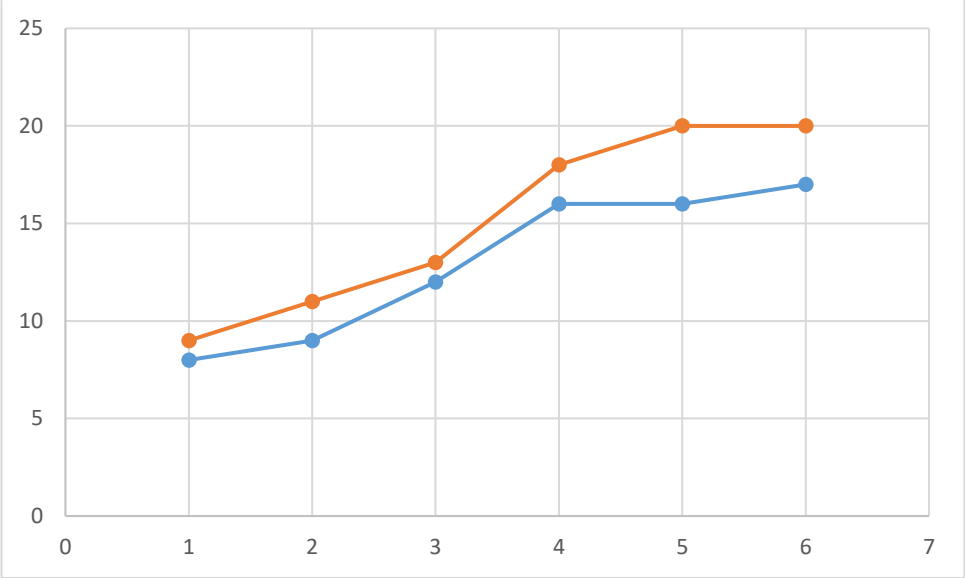

Figure 3.

As a result of the introduction of linear control system of centrifugal pumps, it increased performance and efficiency, that is, reducing centrifugal pumps by up to 1.8 times the current strength in the transient process, reducing the shrinkage temperatures of electric motors by 4-6℃.

Through feedback sensors, centrifugal pumps were able to reduce dynamic moments in transient processes by controlling electric motors, as well as Save up to 2-3% electricity by changing its speed without choking on the load.

In exchange for the control system, which allows to increase the coefficient of active power without a link to the load as a result of the introduction

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