METHODS OF REDUCING THE NETWORK IMPACT OF TRANSIENT PROCESSES WHEN COMMISSIONING LARGE POWER EQUIPMENT

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Abstract: Today, much attention is paid to energy saving, and at the same time, great attention is paid to quality indicators and losses of electricity in energy supply. One of the problems that are difficult to solve in electromechanical systems is the effect of transient processes that occur in electrical equipment, as a result of which the efficiency of network electrical systems decreases and various types of accidents occur. Various measures are used to solve these problems, but these methods are not effective in all cases. Therefore, when choosing a method of reducing the effect of transient processes, it is necessary to pay attention to a number of aspects of the electric conductor used. We will analyze what method is effective for using high-power equipment in terms of torque and power required during startup, and taking into account the impact on the network during startup wattage.

One of the important aspects in industrial enterprises is the productivity of production. Increasing production productivity directly leads to the economic development of the enterprise. In industrial enterprises, large-capacity equipment is widely used to achieve large production volumes. The useful thing about large-capacity equipment is that it is possible to ensure large production productivity in small and comfortable conditions, with small-capacity equipment, it is required to apply several of them to achieve this production volume, which leads to a large location and a complex scheme. To simplify the schemes and achieve sufficient productivity, the use of large-capacity equipment is the optimal solution.

In order to move large-capacity equipment, in turn, it is advisable to use large-capacity electric drives in them. Depending on the work performed by the equipment and the mode of operation, an electrical conductor of the corresponding power and number of revolutions is selected for it. For the power supply of large-capacity electric drives, it will

be necessary to choose a supply scheme suitable for its capacity. As the power of electrical conductors increases, the effect that they exert on the network at the time of their operation also increases. Electrothenic is known that at the time of the start of electrical equipment, a current of five to seven times the rated current that an electric conductor will want is a current of greater value. This, in turn, directly affects the decrease in the voltage value in the network and the operating mode of other istemolers connected to the same network, as well as an increase in the load at startup time for the supply transformer, can be a major disadvantage.

To reduce the impact of this, smooth engine start devices are installed in production enterprises through additional resistors for some types of electrical conductors, and this is much more effective. But there is such equipment in which it is important that the size of the power and the number of revolutions does not change, synchronous engines are used in this type of equipment, depending on the mode of operation. Reducing the speed of the electric conductor with additional resistors in such equipment leads to a decrease in the starting moment and a very large load effect on the electric conductor.

Therefore, the electrical conductors of this type of device are launched by connecting them correctly to the network. Synchronous engines can be started in several ways, let's analyze them below. One method of starting synchronous engines is to start using an additional loop connected to its valve, in which an auxiliary loop is mounted on the engine valve and serves as an additional auxiliary device to achieve synchronous rotations at launch time. The second method of starting synchronous engines is the method of starting by changing the frequency value assigned to it. In this way, the frequency is triggered by gradually increasing the frequency during the start-up process of the engine through a switch device.

The change in the moment of start when starting through a frequency converter gives a noticeable smooth surface, but in large-capacity equipment this method of starting is not considered effective enough. Another way to start synchronous engines is to start the engine asynchronously by connecting it directly to the network. When starting this way,

the engine initially operates in asynchronous mode, with the stator current falling to the nominal once the start-time transient process is completed, at which point the rotor part of the engine is fed a synchronous current i.e. a constant current and the engine starts to run synchronously. This method is widely used in the deployment of large-capacity equipment in industrial enterprises. At a time when the engine is properly connected to the network from the mountain, its start-time switch mode triggers a voltage decrease in the sezis for the network. The result of this is the work of other equipment that can request energy from the same network

Considering that the value of the network voltage is reduced by 5-7 times at the time of start-up by connecting directly to the network, the istemol current at the start-up time of the operation of the circuit will be 5-7 times larger than the nominal, this value change in large-capacity equipment can lead to very large accidents and Therefore, the method of starting by connecting rectors is used to reduce the impact of transient processes at startup time, which allows you to achieve significant efficiency.

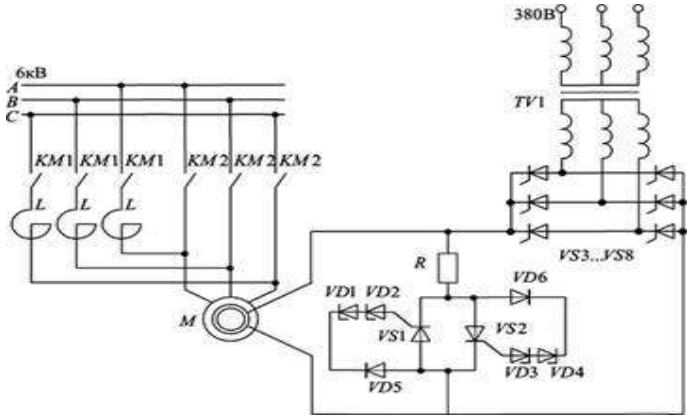

Figure 1. Scheme for starting a synchronous engine through a reactor

When connecting and starting rectors, the transient process generated by the equipment is quenched in the reactor, and the effect on the network is significantly reduced. Starting through reactors is carried out in two stages, the first stage when the synchronous engine is started in asynchronous mode through a network connected through the reactor- at this time the starting moment generated in the synchronous engine is large, and the moment and power at the start time are maintained. The power of the current, which is several times the nominal generated at the time of operation, is routed from the equipment

to the network and is quenched in the network-connected reactor circuits, and at this time there is no voltage drop on the main network.

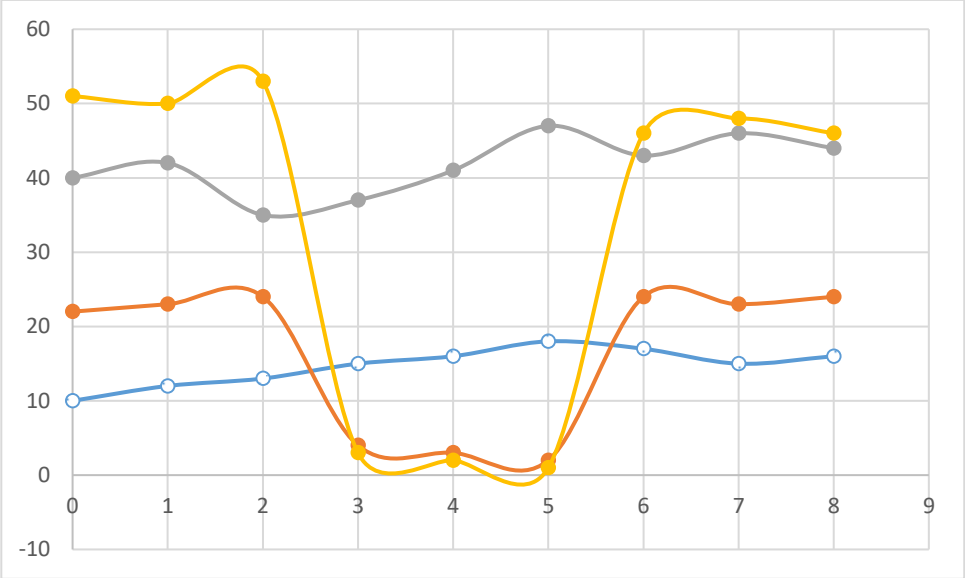

Figure 2 changes in power, voltage and frequency on the network at the time of starting the synchronous engine.

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At the time of starting a synchronous engine at large power, the voltage drop in the network changes significantly, and the main parameters of the network are practically not affected by the change. Other equipment that receives electricity from the network is also not greatly affected by voltage drops.

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