

IMPROVEMENT OF ENERGY AND DYNAMIC INDICATORS OF ELECTRIC DRIVES OF AGRICULTURAL MACHINES WITH HEAVY STARTING CONDITIONS

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Relevance and formulation of the problem. The presence in agro-industrial production of machines with severe start conditions, significant moments of inertia, the moment of shift, causes a number of measures to reduce energy consumption during transitional processes: Start-up start, use of transmitting devices. However, such measures do not fully ensure the requirements for the reliability of machines and equipment and create prerequisites for the overestimation of the power of driving electric motors and equipment of electricity supply.

The most common in the agro-industrial production of electric drive with asynchronous motors is inherent in small controllability and low dynamic properties. Small controllability is due not only to the impossibility of changing the speed in a wide range at a constant frequency of network current, but also the severity of the implementation of the smooth start modes in particular. Significant electromagnetic moments significantly worsen transitional modes, arising when switching to the motor's circles.

One of the possible ways to increase manageability and improvement of dynamic indicators of asynchronous electric drive are the effect on electromagnetic transitional processes. The emergence and rapid development of modern technical controls - power semiconductor devices, elements of microelectronics, causes a decrease in the percentage of unmanaged electric drives [1-3].

The main materials of the research. For electric motors, the loss is a complex function of electric, magnetic and mechanical loads, and each of them is nonlinearly associated with losses in the relevant elements of the electric motor.

At the same time, with a purposeful effect on the electric motor there is an opportunity to change in the limits of its total losses, without changing the mode of operation on the shaft, which is characterized by the moment and angular velocity. Obviously, the most effective energy point of view is the mode of operation of the engine, which is characterized by the smallest losses [1, 3].

In the most common types of electric drives (uncontrolled) when passing transitions when the angular velocity is set by jump, energy loss, and, accordingly, energy consumption during the transition process is proportional to the total moment of electricity inertia, the square of the speed of the ideal idle speed, the range of changing slip and depends on load.

Methods for improving energy and dynamic electric actuators can be divided into several directions: improvement of procedures for selecting the power of driving engines for specific machines; increasing the efficiency of the mass unregulated electric drive - the transition to energy-saving engines with less losses; creation of special additional technical means that ensure minimizing the harmful effects on the energy indicators of the reflection of the load from the nominal; transition from an unregulated electric drive to an adjustable [1, 3].

The most effective way to reduce costs is the implementation of controlled transitional processes [1, 3]. For agricultural machines, for which time transition processes

is of great importance, the control of transition processes during the launch is of particular importance. Due to the limited number of launches, most of such equipment has long been operating in an underloaded mode. In addition, the implementation of the startup modes is associated with the unsatisfactory dynamics of launching of engines - sharp and significant fluctuations in the moment and speed at the initial moment of the process, which can lead to damage to working bodies, transmitting devices.

Conclusions. When analyzing the features of the electric drive of agricultural machines, for which time of transitional processes is a great value, it is possible to draw the following conclusions:

- these agricultural machines are characterized by significant moments of inertia and launchers, which involves the use of special devices or measures to make startup in order to reduce costs during transitional processes;
- all machines are equipped with unmanaged electric drive with the overvoltage of installed electric motors on average 25...40 %, which satisfies the transition processes during startup, but negatively affects energy performance during prolonged work;
- significant fluctuations in the dynamic moment during launch leads to damage to transmitting devices (muffs, gearboxes) and working bodies associated with the uncoordinated dynamics of starting driving electric motors and working machines;
- significant moments of inertia and launchers lead to significant energy expenses during transitional processes, which affects the requirements for power equipment - power of power transformers, intersection of feed lines.

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