OPERATION STATUS OF ELECTROMAGNETIC ACTUATORS IN AGRICULTURE

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At the end of the last century and in the early 2000s produced more than 100 types of complete control units for the various sectors of agriculture and a very wide range of major series. Volume production of starters reached about 17 ... 19 mln. Pcs. year.

Analysis of the most popular 17 model projects for livestock and farms on which created breeding complexes in the USSR, showed that 90% used switching devices - a device with the current load of 25 A, in respect of starters - this actuators 0, 1, 2 sizes .

The purpose of research - determine the real state of operation of electromagnetic actuators that operate in the agricultural sector of Ukraine and demand measures to reduce bounce starters.

Materials and methods of research. Research of operation starters were held for all types of actuators operating in economies of Ukraine. For a quantitative description of the system, starter used mathematical tools of probability theory, mathematical statistics, stochastic processes.

Results. When designing starters them include the following operational and special requirements:

a) Consideration of environmental conditions;

b) long life, reliability, reliability;

c) the simplicity and ease of observation, inspection and replacement parts, maintainability;

d) low operating costs, including low consumption electric actuator;

e) ensure normal conditions of staff (ergonomic, aesthetic);

e) safety in the manufacture, installation and operation.

Starters must be manufactured and operated according to the technical specifications and instructions guide specific types of actuators. Typically, technological equipment intended for livestock farms and complexes equipped with actuators general industrial use, durability class B, C. These actuators are not suitable for continuous operation in specific conditions of agriculture because they do not meet the requirements to protect the environment from exposure (to 30 % of all failures), breaking down before napratsyuyut defined resource durability. Domestic electrical industry, unfortunately, does not produce starters for agricultural purposes, unlike electric motors.

Operating starters in agriculture differ from the conditions of their work in the factory. For starters, most manufacturing plants is in normal conditions and the environment they work in the modes envisaged by GOST and technical conditions, the voltage three-phase network with stable and symmetric. Serves these actuators and network are usually very skilled staff, conducted measures provided system requires planning and preventive repairs and maintenance.

In agriculture, most starters in difficult operating conditions, they operate in abnormal operating conditions (repetitive short-term with major interruptions); placed on often unstable voltage (voltage amplitude of the daily movement of customers is 20%) with variable asymmetry, due to mixed connection of consumers.

Because of the specific characteristics of livestock buildings and conditions in livestock and poultry farms each year with about 17 % rejection of electromagnetic starters, and starters allocation failures in the agricultural sector include: the livestock - 70%; on crop production – 20 %; in Mechanical workshops – 10 %.

Statutory and actual values of the environment (temperature, humidity, corrosive gas content), which are starters in agriculture, do not correspond to the value defined by normative documents on electrical equipment. Inspection of Environment and poultry livestock premises diverse zones of the country showed that the premises are not equipped with mechanical ventilation, humidity in winter, spring and autumn was 95 ... 98% ammonia content often reached - 0.09 g/m^3, hydrogen sulphide - 0.08 g/m^3 of carbon dioxide - 14.7 g/m^3, which is 5 ... 6 times the acceptable standards.

In addition to the negative impact of environmental factors on the state of starters regimes create significant impact of their work. Analysis of technological schedules starters shows that they operated mainly in repetitive interruptions and the short-continuous mode, they are characterized by seasonal work in one shift.

Conclutions

1. Summarizing observations we can say that the causes of malfunctions and low reliability of performance indicators starters are:

- the impact of environmental conditions on the switching device;
- specific modes associated with infrequent on and long intervals between them;
- nevidrehulovanist protective devices and actuators work in abnormal conditions;
- low quality of electricity;
- unsatisfactory operation starters;
- defects in manufacturing, construction, repair, etc..

2. On the basis of surveys of farms agricultural sector for some areas the most common types of actuators:

˜ ПМЕ domestic production – 46 %; ПМЛ – 25 %; ПАЕ - 11.3 %; П6 - 4.2 %;

˜ foreign production MDSt – 3 %; SLA - 0,5 %; others – 10 %.

3. To prevent the impact of aggressive environment for livestock in practice, in operation, apply the following effective measures to ensure the safety and reliability starters:

a) placing starters general industrial use in separate rooms;

b) production of starters in a special version, suitable for use in adverse conditions;

c) use of corrosion inhibitors to protect parts of starters

hostile environment;

d) the use of sacrificial protection of electrical contacts, special oils for contacts that reduce environmental impact;

e) to reduce the impact of dust on the device is recommended to use screens and filters, clean the contacts using the tool, choose a convenient orientation surfaces contacts.