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DIAGNOSTICS OF THE ELECTRIC MOTOR DURING ITS OPERATION AND PREDICTION OF ITS RESOURCE

Carrying out a variety of tasks in industry, electric motors are key elements in many systems, providing motion, actuation and energy. However, regardless of their power and reliability, electric motors are subject to wear and tear and can

become a source of problems that can lead to accidents, failures and unplanned stops in the production process. That is why it is important to carry out diagnostics of electric motors during their operation, and not only during scheduled maintenance periods. This allows you to detect potential problems in time, avoid accidents and maintain the reliability and efficiency of production processes.

Electric motors are subject to wear and tear, like any other equipment. To identify problems in a timely manner, units are tested. To do this, several methods for diagnosing electric motors are used. Identifying hidden problems in electric motors that can be corrected can optimize motor efficiency and performance. Timely maintenance extends service life and prevents problems from reoccurring. Common methods for diagnosing electric motors:

Static testing is performed while the engine is offline. It can determine the condition of the insulation and electrical circuit of the motor. Dynamic analysis is performed while the engine is running. It can identify problems related to power quality, motor performance and loads. Together, these motor diagnostic techniques will paint a picture of the motor's health and provide information to predict potential problems. Approximately 80% of electric motor failures occur due to malfunctions of the interterm insulation system. The insulation begins to wear down as the coils rub against each other due to the movement that occurs when the engine starts. Insulation can further deteriorate due to the formation of chemical deposits, which are usually found when the engine is over-lubricated. Static testing using modern technologies helps determine whether there are problems in the electrical circuit of the unit. This is the most informative method for diagnosing an electric motor. With its help, the following problems are solved:

- Checking the winding resistance
- Ground continuity test
- Polarization test
- Line or step voltage tests
- Test for voltage surges and short circuits.

The suite of technologies for dynamic analysis includes portable analyzers and monitoring systems. They have been designed to measure power quality, motor performance, overcurrent or current imbalance, and torque characteristics.

The use of both methods of electric motor diagnostics guarantees a complete identification of faults and weak points of the motor. Based on the data obtained, a decision is made on the need for engine repair and maintenance.

Electric motor maintenance: During maintenance of electric motors, the insulation resistance of the motor and bearings must be checked. If the insulation level does not meet the standards, the windings are dried. Electric motor maintenance includes the following operations:

- cleaning the engine from dirt and dust,
- checking the serviceability of grounding,

- serviceability of mounting of the electric motor and individual elements,
- measuring the degree of heating, noise and vibration levels,
- checking the reliability of the contact connection,
- elimination of identified faults,
- calculation of the insulation resistance coefficient.

The characteristics of the premises, as well as the machines with which the electric motors interact, significantly influence the maintenance time of the devices. You should also take into account the fact that engine maintenance can only be performed in a specialized place. But there are cases when electric motors are serviced at home. For example, the commutator is cleaned, or the old brush is replaced. Regular engine maintenance will help prevent breakdowns or prevent unwanted engine problems. Electric motors, as well as their parts, require technical inspection and testing every 6 months. If regular maintenance is observed, the efficiency of the electric motor itself can be maintained. As a rule, malfunctions of electric motors occur due to wear and tear of the material, aging of parts, as well as violation of the rules for the technical use of mechanisms. A timely technical inspection of the electric motor contributes to the most accurate determination of the cause of the malfunction, which determines the success of the repairs necessary to eliminate the breakdown of the electric motor.

Therefore, performing regular diagnostics and maintenance on electric motors while they are running plays a key role in maintaining the reliability and efficiency of production processes. The integrated use of static and dynamic diagnostic methods allows us to identify potential problems and eliminate them before emergency situations occur. Regular maintenance, in turn, extends the life of electric motors and prevents unwanted problems from occurring. This approach to equipment management not only ensures the safety of the production process, but also increases its efficiency and economic benefits.