INTERNATIONAL JOURNAL ON ORANGE TECHNOLOGY

https://journals.researchparks.org/index.php/IJOT e-ISSN: 2615-8140 | p-ISSN: 2615-7071

Volume: 4 Issue: 7 |Jul 2022

Energy-Saving Methods of Operating Asynchronous Motors

Mirzaliev Bobur Batiyorvich

Fergana Polytechnic Institute, mirzaliyevbobur3@gmail.com

--***--

Abstract: When the engine is started, in some mechanisms its speed is required to increase very evenly over a period of time, and in others the starting torque is required to be much greater. In order for the engine to be easily started, its starting torque must be large enough, and the starting current must be as small as possible.

Keywords: Motor, windings, current, torque, phase, stator, short-circuited.

In order for the motor to run easily, its torque should be large enough, and the current should be as small as possible. When the motor is running, in some mechanisms, its speed increases very smoothly over a certain period of time, and in some cases, the torque is required to be much larger. It is known that motor running for its stator windings must be connected to the network. When a three-phase current passes through the windings, a rotating magnetic field is formed in the stator. Since the rotor is stationary at the beginning of the run, i.e. s = 1, it works in conditions close to short-circuit conditions for a short time. Therefore, the stator current, i.e., the starting current, is much larger during the start of the drive. $I_{yu}=I_2$ Direct connection of asynchronous motors with a short-circuited rotor Small and medium power motors are connected directly to the network with the help of a ruby or a magnetic walker, this method is the most common and easiest method. It is determined by the rated current of the motor.

$$I_H = \frac{p}{\sqrt{3}\,U_H \cos\varphi}$$

Since the rotor is stationary (l, = 0, i.e. s = l) at the beginning of the movement, a much larger current is generated. This current is called the current. In asynchronous motors with a short-circuited rotor, the starting current is 4 ... 7 times greater than the rated current of the motor. A decrease in the gain during the operation of a high-power motor has a bad effect on the operation of the main asynchronous motors connected to this network and operating. Because the torque of the motor is directly proportional to the square of the mains voltage (A / = (/f)). Therefore, it is not suitable to connect any high-power asynchronous motor directly to the mains. Usually, the power of the motor connected to the direct mains is the transformer from which the motor receives energy should not exceed 25% of its power. In practice, depending on the power of the power supply transformers, short-circuited rotor asynchronous motors with a power of 55...75 kW can be connected directly to the network. Reducing the network voltage. It is used for driving asynchronous motors with a rotor, as well as for driving medium-power motors in low-power electric field networks. The running current of an induction motor is directly proportional to the value of the mains voltage. When the value of the network voltage is reduced to a certain extent, the driving current is also reduced. Using an autotransformer (or a simple transformer) to determine the value of the mains voltage; is reduced by changing the connection schemes of the stator windings and by connecting an active or reactive resistor in series with the stator windings. Switching the stator winding from the star method to the delta method. The stator coils of an induction motor are often connected in a delta manner. When the circuits are connected in a triangle, the running current is much higher. If the circuits are connected in a star manner, If the circuits are connected in a star manner, the voltage supplied to some phase circuits decreases by 3 times, therefore, the phase currents also decrease by √3 times. In this case, the line currents are reduced three times. Changing the connection scheme of the stator coils is performed using a three-phase pereklu chatel or contactor. When the asynchronous motor is running, the relay is in position 1. In this case, the stator windings are connected in a star manner, the

https://journals.researchparks.org/index.php/IJOT e-ISSN: 2615-8140 | p-ISSN: 2615-7071
Volume: 4 Issue: 7 |Jul 2022

driving current is much smaller. After the engine is started, the clutch is quickly moved to position 2. In this case, the stator windings are connected in a delta manner and the engine operates under normal conditions. So, if the stator winding of the motor is switched from the star method to the delta method, the driving current in the network is reduced by three times. Since the starting torque of the motor is directly proportional to the square of the mains voltage, the value of the turning torque during the running is also reduced by three times. Therefore, motors running at nominal torque cannot be run in this way. Connecting an active or reactive resistance to the winding of the asynchronous motor stator. During operation, a reactive or active resistance is connected in series with the stator winding. An asynchronous motor is connected to the network using a relay, at which time the relay is in the open state. Current flows to the stator winding through the reactor, and the voltage drops across its inductive resistance (xr) (I1,xr). A reduced voltage is supplied to the stator windings. This voltage causes the motor to run. As the rotation speed increases, the EIuK E2 generated in the rotor winding decreases, and the driving current also decreases. As a result, the voltage drop in the resistors connected in series with the coil is also reduced, in which the voltage supplied to the motor increases automatically as the motor speed increases. After the engine is started, the fuse is connected and the mains voltage is applied to the engine, during which it starts working under normal conditions. The disadvantage of this method is the reduction of the driving torque as a result of the t2-fold increase of the mains voltage. The reactor core required to drive various engines is determined by the following formula.During the operation of short-circuited asynchronous motors, the current mainly passes through the upper part of the mast. The cross section of the upper part of the mast is smaller. This causes the active resistance of the rotor mast to increase. The increase in active resistance reduces the rotor current, and the cross section of the upper part of the mast is smaller than the cross section of the entire mast. This leads to an increase in the active resistance of the rotor bar. The increase in active resistance reduces the torque and increases the torque of the engine. So, the running current of a deep-phase motor is smaller than the running current of an ordinary short-circuited rotor motor, and the running torque is almost twice as high. In this case, the condition of driving the enginemuch improved. After the motor is started, the rotor current increases as the rotor speed increasesfrequency decreases. In this case, the inductive resistance of the rotor shaft also decreases, and the rotor current is evenly distributed in the cross section of the shaft. The active resistance of the rotor shaft is also reduced and the motor operates like a normal short-circuited rotor dvi gate. In order to increase the driving torque without changing the active resistance of the rotor in short-circuited rotor asynchronous motors double-chamber engines were invented. In their rotor there is a system of two cross-linked masts in the form of a checkered ring. The upper cage is called the running cage, and the rods are made of brass or bronze, which has a small cross-sectional area and a higher active resistance. Since these coils are located close to the top of the rotor, their inductive resistance is small. The lower cage is called the cage, the rods are made of copper, the cross section is larger. The active resistance of the working cells is small, and the inductive resistance is large. Electrically, both cells are parallel, so the rotor current is inversely proportional to the total resistance of the cells. Because the active resistance of the rotor is large, the power dissipation is greater. This reduces the efficiency of the engine. In addition, the manufacturing technology of such rotors is complicated and expensive. Typically, the power of deep wedge engines is 100 kW and more, and the power of double-slot engines is 200 kW t and more.The fact that the motor rotation frequency remains the same when the mechanical load connected to the shaft changes, or the ability to change its rotation frequency when the value of the torque changes, is considered one of the important indicators of any motor. With the change of the load value, the rotation frequency of the asynchronous motor changes even if it is very small (1 ... 6%). So, to change the rotation frequency of an asynchronous motor, it is necessary to change the frequency of the voltage supplied to the motor or the number of pairs of poles, or else the slippage of the motor. Changing the frequency of rotation of the motor by changing the frequency of the source voltage. By changing the frequency of the supply voltage, the method of fast energization of an asynchronous motor is the most effective method from the economic point of view and the possibility point of view. Motor slippage in the middle of the speed range when adjusting the speed by changing the frequency as a result of its almost constant

https://journals.researchparks.org/index.php/IJOT e-ISSN: 2615-8140 | p-ISSN: 2615-7071
Volume: 4 Issue: 7 |Jul 2022

power consumption, the motor cannot be doubled. The asynchronous electric drives, whose speed is controlled by changing the frequency, do not differ from the constant current electric drives with their static and dynamic characteristics. Taking into account that short-circuited rotor asynchronous motors are almost twice as light as DC motors and three times cheaper, we see the possibility of wide application of frequency-controlled asynchronous motors in the future. The first frequency converters were based on electromechanical devices. In such a frequency converter, the voltage value and frequency obtained from the synchronous generator SD are controlled independently. Later, the creation and development of improved semiconductors led to the invention of thyristor and transistor frequency converters. Thyristor and transistor frequency converters (TChO') are divided into two groups: indirect and direct ChOs. In indirect TChO's, the mains voltage is rectified in BV and sent to the autoinverter BI, where the alternating voltage is changed to an alternating voltage whose frequency can be adjusted. The mains voltage with a standard frequency (f1) is supplied to the input of U1 Bv. Bconverts the alternating voltage to the constant voltage E0. This voltage can be adjusted over a wide range using the control circuit of the BVBT. In an asynchronous motor, the rotation frequency of the rotating magnetic field is directly proportional to the frequency of the mains voltage f1=50Hz.In practice, the frequency of the mains voltage is constant f1=50hz. Therefore, special semiconductor or electric machine frequency converters are used to change the rotation frequency of the motor by changing the voltage frequency. Synchronous machines and phase rotor asynchronous machines can be used as frequency converters. This method is asynchronous with several short-ended rotors it is used in mechanisms that require the same change of engine rotation speed at the same time. This adjustment system is used in the roller mechanism of the rolling mill. Each roller in the roller is rotated by an asynchronous motor, and it is required to adjust the speed of the rollers at the same time.

Used literature

1. Султонов Р. А. У., Кодиров Х. М. У., Мирзалиев Б. Б. Выбор механических двигателей электрического тока, используемых в системе электропривода //Проблемы современной науки и образования. – 2019. – №. 11-2 (144).
2. Nosirovna N. N. et al. Energy saving technologies and problems of their implementation //Проблемы современной науки и образования. – 2019. – №. 12-2 (145).
3. Nosirovna, N. N., Kamolovich, K. N., No'Monjonov Shakhzod Dilshodjohn, O. G., & Bakhtiyorovich, M. B. (2019). Energy saving technologies and problems of their implementation. *Проблемы современной науки и образования*, (12-2 (145)).
4. Mirzaliyev B. B. THE PROCESS OF SWITCHING ON UNCHANGED VINE MACHINES //Theoretical & Applied Science. – 2020. – №. 1. – С. 772-776.
5. MB Baxtiyorvich, SBA Ogli - ACADEMICIA: An International …, 2021 - indianjournals.com
6. Improving the device is one of the key issues in this regard, which is important in terms of the importance of the KU device in industrial reactive energy coverage and system management …
7. Ivanov - Smolensky A.V. Electric car. V 2-x t. Uchebnik dlya vuzov.– M.
8. Kopylov I.P. Elektricheskie mashiny: Uchebnik dlya vuzov. - M.: Vyssh. Shk., 2000.
9. A. N. Abramov, A. S. Ivanov-Smolensky. Design of hydrogen generators and synchronous compensators. Moscow, Vysshaya school, 2018.