CONTROL AND PROTECTION OF THE SPEED OF UNDERWATER PUMPS IN A MODERN WAY

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Annotation: Control the speed of submersible pumps using a frequency converter.

Keywords: Submersible pumps, frequency converter, diode, transistor.Submersible pumps are mainly installed underground. They serve to pump water out of the ground. The amount of water used in enterprises can be different according to the monthly work plan. Therefore, if we can control the amount of water according to the work plan, we can achieve water as well as energy efficiency. To do this, we need to be able to control the speed of underwater pumps. Nowadays we have such an opportunity. There is an opportunity to adjust the speed of underwater pumps using a frequency converter, and this device also performs a protective function.

Controlling the speed of submersible pumps with the help of a frequency converter is the current modern method of controlling it, and this device also performs a protective function. There are several convenience and advantages to controlling your speed with a frequency changer:

- speed control and launch step width;
- Dynamic Torque smallness in speed control;
- low energy waste;
- smooth speed control at startup;
- the small size of the launch current.

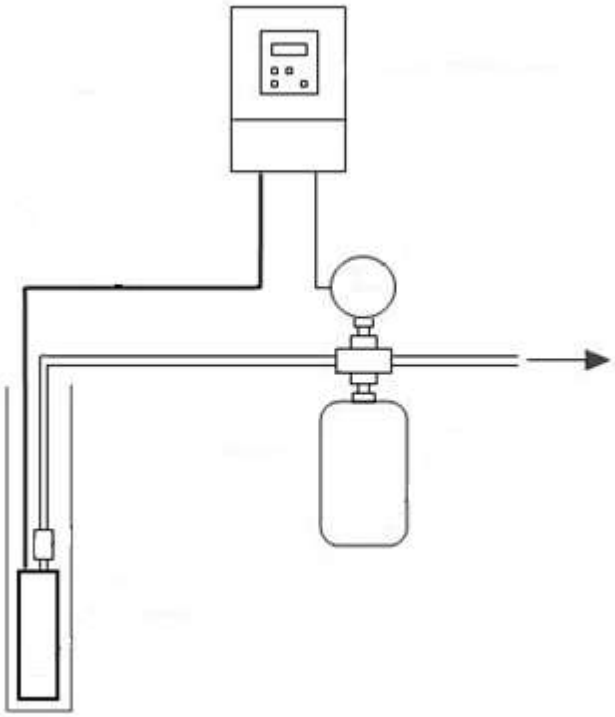

Figure 1. Kinematic scheme of the submersible pump.

Controlling the speed of underwater pumps with a frequency shifter, the engine in the pump also prolongs performance and operating time. The main reason for this is when the effect of mechanical force is reduced. The frequency converter is divided into two types:

- thyristorli;
- transistorized.

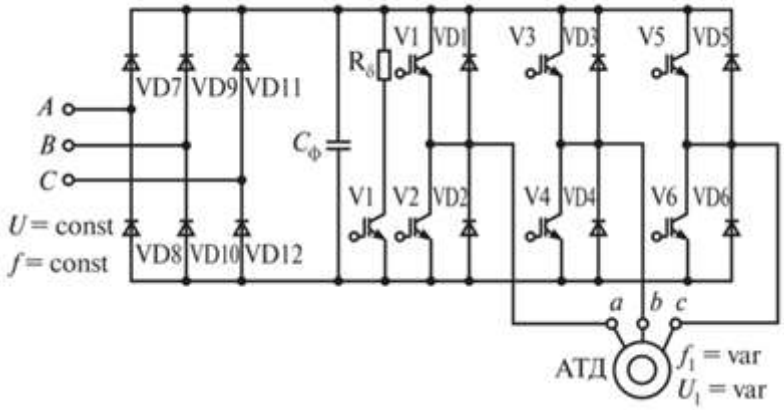

Figure 2. Submersible pump speed with frequency changer control scheme.

Thyristor frequency shifters vary the frequency from 0 to 50 Hz. This increases the speed to 3000 turnover of minutes. The thyristor control clamp increases the frequency depending on the size of the opening angle.

Transistor frequency transducers can also convert from 0 Hz to several thousand Gers. The transistor can be smoothly changed in frequency by the signal being fed to the base clamp.

When controlling the speed with a frequency converter, the power also changes in a proportional way to the speed.

P=Mω

P- active power in the rotor

M- torque acting on the rotor

ω- rotor angular velocity

In the above scheme, the alternating current is first a three-phase diode (VD7.VD9. VD11.VD8.VD10.VD12)into a fixed current. Also through filters (cosf), the O'garmas current is transferred to the idealny constant current. The latest process is transistors (V1.V2.V3.V4.V5.V6.VD1.VD2.VD3.VD4.VD5. VD6) by converting a fixed current into a variable current with varying frequency. With this process, the frequency is changed to a sufficient amount.

Like all engines, asynchronous motors have electrical protection. This protection protects the electric motor from short circuit, overload, frequency fluctuations, voltage deviations and other similar risk factors.

Relay machines must fulfill all these requirements in one way or another. The functions of the protective apparatus are: signaling, adding the consumer to the network, and vice versa disconnecting it from the network.

It is advisable to carry out the protection of asynchronous electric motors with BMRZ. It has the convenience of electrical apparatus. At BMRZ, the limit of setting current, frequency, voltage and other magnitudes has the ability to control over a wide range. At the same time, it is also possible to put patience time or not at all. In the BMRZ electrical

apparatus, it is possible to see an event on the screen and transmit, control it data through a Madame. Each electrical apparatus has its own function and capabilities. The task of the BMRZ electrical apparatus is to protect (disconnect from the network, add to the network). Control (direct, remote). BMRZ electrical apparatus works in a modern protection system it transmits using fiber optic cables.

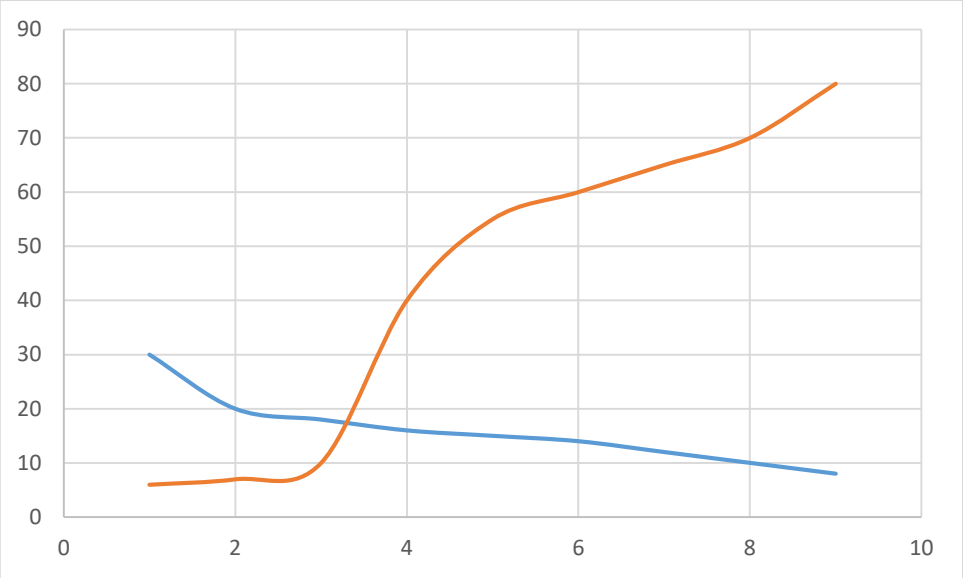

Figure 3. Electrical energy efficiency and protection reliability

In conclusion, submersible pumps provide the area by pumping water from under the ground. In order to reduce the waste of water and energy, as well as improve the protection of the pump, frequency shifters are used. The frequency converter is considered very convenient due to its high functions. In the protection of asynchronous electric motors, it is advisable to use an electric apparatus (BMRZ) that is suitable and reliable for the time requirement. This protective apparatus is not limited to protection. He has the opportunity to remotely enter a condition in it at certain values. These conditions are the main magnitude of current, attenuation and frequency. No matter how small the change in the value of these electric magnitudes is, the BMRZ protection apparatus will immediately command the cammuting apparatus in relation to it by sensing it. Electric motors are disconnected from the mains, avoiding improper operation.

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