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CONNECTING THE PUMPS TO THE PLC CONTROLLER AND DEVELOPING ITS SOFTWARE

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Annotatsiya. Ushbu maqolada meliorativ yerlarda sug’orishda artesian suvlarini ko’tarish uchun uch fazali nasoslardan foydalanish hamda ularni masofadan turib boshqarishda PLC kontrollerlarini qo’llash nazarda tutilgan. PLC kontrollerlariga nasosning ulanish sxemasi va uni boshqarish uchun dasturiy ta’minot tizimini ishlab chiqishga qaratilgan.

Kalit so’zlar: PLC kontroller, Daryolar, Orol dengizi, LOGO, Tadqiqot, Artezian quduqlar

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ПОДКЛЮЧЕНИЕ НАСОСОВ К ПЛК-КОНТРОЛЛЕРУ И РАЗРАБОТКА ЕГО ПРОГРАММНОГО ОБЕСПЕЧЕНИЯ

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Абстрактный. В данной статье предусмотрено использование трехфазных насосов для подъема артезианской воды при орошении мелиоративных земель и использование ПЛК-контроллеров для их дистанционного управления. Целью работы является разработка схемы подключения насоса к контроллерам ПЛК и программного комплекса для его управления.

Ключевые слова: ПЛК-контроллер, Реки, Аральское море, ЛОГО, Исследования, Артезианские скважины.

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Abstract. This article envisages the use of three-phase pumps for raising artesian water in the irrigation of reclamation lands and the use of PLC controllers for their remote control. It is aimed at developing a pump connection scheme to PLC controllers and a software system for its control.

Key words: PLC controller, Rivers, Aral Sea, LOGO, Research, Artesian wells

Enter. In our young independent country, which is implementing consistent and comprehensive reforms in all sectors of the national economy, great attention is being paid to the issues of providing water to the population and production, as well as the rational use of existing water resources. In addition, great work is being done to provide the population, especially rural residents, with clean drinking water [1, 2, 6]. Naturally, water supply systems are expanding, technically improving, and at the same time becoming more complex. [3, 4, 7, 8, 9,].

Groundwater can be extracted using the following structures (Fig. 1):

1. bore wells - artesian wells;
2. mine wells;
3. horizontal water intake facilities;
4. radiant water intake structures;
5. captage (spring water collection) facilities.

Depending on the type of water sources (spring, seep and artesian water sources), water is released on the ground using different devices [1, 2, 5].

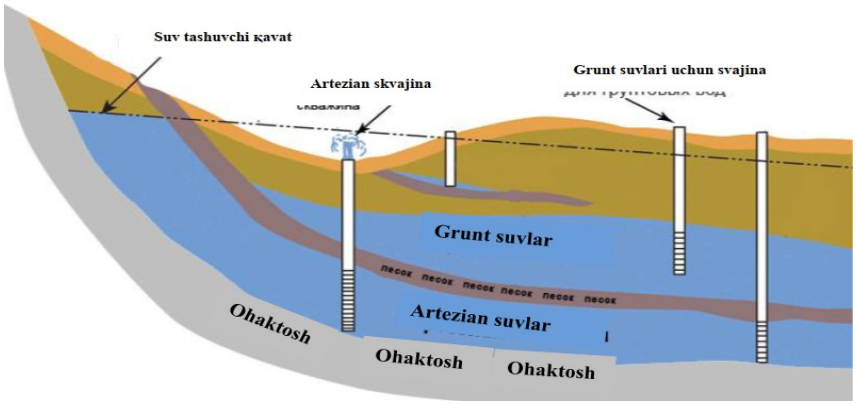


Figure 1. Location schemes of underground water

Material and methods

In preparation for studying this method, a number of literature, sources [6] were studied and analyzed, the compatibility of various similar materials was checked. However, publications and research results showed that there is a lack of a convenient method of three-phase electric motor in search sources. On the one hand, the lack of a theoretical basis for the full software support of this method makes it difficult for us to conduct research. The process of controlling a three-phase electric motor is presented in the PLC software system and is written using the ladder programming language.

Characteristics	
Software language	Ladder
Project development environment	GX 3
Processor module	DMK series FX3U

Program memory block	STEPS RAM
Program memory	64 thousand steps
buffer battery	Yes
Cycle time LD	65 ns
MOV cycle time is	642 ns
The number of RS-422 ports is	1
The number of discrete input channels is	32
Discrete input circuit type	Source, consumer
The number of discrete output channels is	32
Discrete output type	relay contact
Output load constant current / voltage	2A / 30V
Output load AC/voltage	2A / 250V

The PLC programming language includes the following general scheme. To carry out the research, we use CADe SIMU schematic assembly program. Through this program, the rotation speed of the three-phase motor is adjusted and stabilized. Ladder diagrams are special schemes widely used to document industrial control logic systems. If we were to make a simple ladder diagram showing a pump controlled by SB1 and SB2, it would look like this:

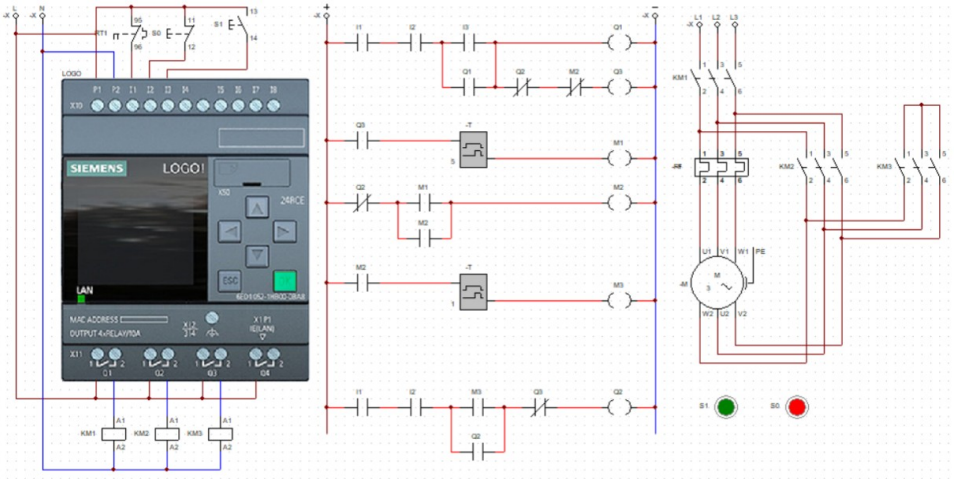
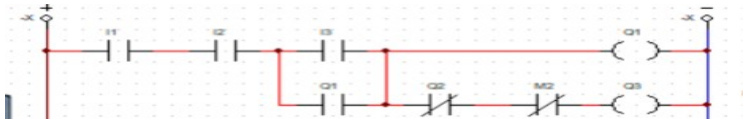
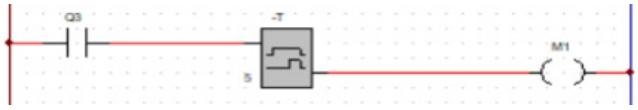


Figure 2. CADe SIMU software and controller programming in ladder language.

We write a ladder program for the controller for the pump:

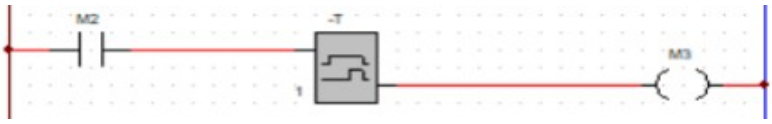


Part 1. Analog digital output from outputs Q1 and Q2

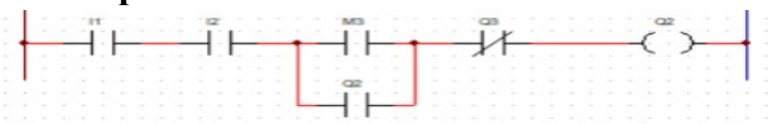


Part 2. Connection timer Q3 output signal for 5s

Part 3. Adjusting the analog signal M1 and M2 to the rotation speed of the electric motor



Part 4. Stop the electric motor after the end of the time



Part 5. Adjusting the Q2 output signal

Results and discussion

The result of the study shows that: we identify the pump starter by the configuration of the internal logo. Configures outputs q1, q2 and q3 in logo programming (Figure 3).

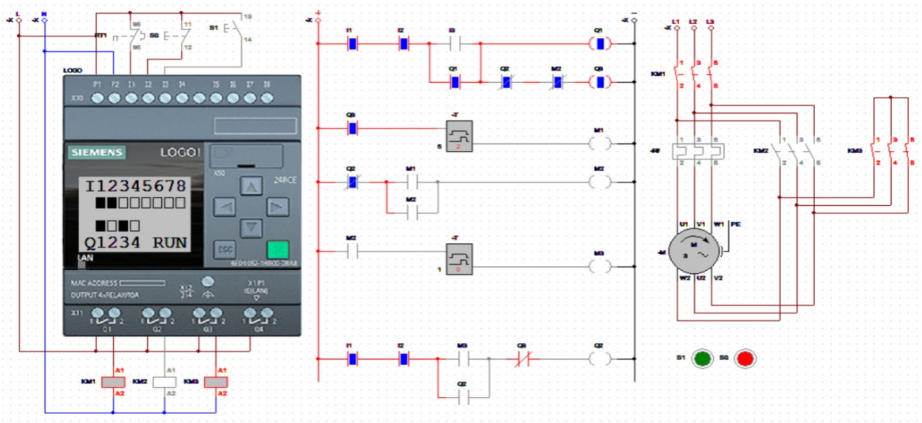


Figure 3. CADe SIMU program and the result of the program in ladder language to the controller.

The research work is devoted to the consideration of the organization of the human-machine interface in the automation of pump units. To implement the process, the most popular and highly efficient SIEMENS LOGO programmable logic controller was selected. Through this, the automation of the pump unit control process was implemented.

Summary

As a result of the research, in order to increase the efficiency of the automated process, it was required to install a human-machine interface in this system, so the necessary parameters were studied. The characteristics and parameters of all technical equipment related to the process were presented in full in the research work. As a result, the effectiveness of the developed programs and processes was proven. The results of the research showed that the automation of pump units and the organization of the human-machine interface can be a solution to issues such as

the efficiency of the process, the transition from human labor to the machine system, and the establishment of intelligent water management. For this reason, the application of research work guarantees good results for us.

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