

# Program for the use of energy-saving operational technological systems in the automation of technological processes

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**Abstract:** Energy saving in the automation of technological processes is carried out with the help of energy-saving monitoring equipment through the software of the operating system. This system helps automate robotic processes to identify remote indicators to automatically implement energy-saving operations through technological system operations. Also, as another feature, the system only requires a local network to connect. Regardless of the technological system, the technical characteristics of the central monitoring equipment that ensures automatic operation and the automated energy-saving monitoring equipment are similar to each other. By objects designed to save energy, this system is the optimal operation of the heat source system, the adjustment of the temperature of the supply water. In the technological system, according to the system, it will be possible to change technological parameters such as heat source equipment, room temperature adjustment and outdoor air intake volume adjustment. Currently, the technical system operations manager has the role of performing these energy-saving operations, but finding the optimal value for each of these operations poses challenges. The operations manager is also responsible for tasks outside of facility operations, such as maintenance management, so regularly changing optimal settings can be a very problematic system. This system uses robotic process automation technology.

**Kalit so'zlar:** The basis of the technological system, process automation, technical robotization, operating system, alternative energy saving, technical software, optimization of technological processes, technical error, energy consumption, energy efficiency.

## Introduction

Currently, automation and management systems of technological objects are almost widely used in most industries of the Republic of Uzbekistan. Saving energy resources in technological processes allows continuous monitoring of the main operating parameters. Indicators of the technological installation of the energy-saving system in the automation of technological processes provide instructions for the continuous operation of the automated system and energy saving in technological processes. Therefore, the problem of developing optimal energy-saving control systems is becoming a very urgent issue. The article examines issues of improving energy efficiency in technological processes through software and hardware support. The introduction of energy-saving systems for managing the main technological objects in the system increases the useful efficiency of these technological processes. The generalized structure of the software of the energy-saving control system, which is usually obtained by decomposition in technological processes related to temperature energy, the system is divided into separate functional subsystems and program modules. The software structure offered in this automated system is basically universal and invariant for different management objects. The main components of the technical support of the energy saving management system in automated processes are considered. A practical example of the implementation of software and hardware of the energy saving system is shown based on the control of dynamic modes of a group of heat engineering devices multi-part roller belts and drying units based on industrial controllers. The current stage of industrial technology development includes a high level of automation. Many production operations are carried out during automation and robotization of technological processes. Currently, almost no modern production can work without supervision. Automated systems have become the main stage of systems that allow solving increasingly complex optimization problems. Another important area of development of modern production is the widespread introduction of energy saving. Technologies and measures aimed at increasing the energy efficiency of technological devices are being implemented. This is one of the most important components that allow the above directions to be fully implemented. Designing a scheme of energy-saving control systems that significantly reduces energy consumption in the control system of technological processes helps to increase the productivity of technological processes, as well as to

achieve the required quality of manufactured products and increase their performance. Therefore, the design and implementation of such systems is relevant and attracts a lot of attention from researchers. Currently, many scientific articles have been published on this topic, and the design and development of industrial automation systems, the optimal management of energy saving are important for the scheme of complex technological facilities. It should be noted that one of the main tasks is to provide algorithmic indicators of energy saving and solutions in the automation of technological processes. The problems of optimal control of energy-intensive technological objects are, as a rule, a time-consuming study, since the algorithmic support structure of the designed system can include: Complex calculation algorithms in technological processes (model identification, technical systems synchronization program, optimal control system, simulation modeling parameters). In the technological system, the software and technical implementation of process automation should be taken into account, not only the complexity of the algorithmic support used in the systems, but also the characteristics of the control object and its model. . Modern systems for managing technological objects are, as a rule, a system built on the basis of universal or specialized computers (for example, personal computers or industrial controllers), and the complexity of the system's software and hardware is mainly determined by its complexity. of the computer. The formation of the model of automated technological processes and the control object is mainly proportional to the power of the energy coming into the system. Energy-intensive control systems of industrial facilities, as a rule, include a large number of computational algorithms, in which the theory of optimal systems, artificial intelligence, etc. are widely used in industrial sectors. It should also be noted that for most industrial facilities it is necessary to perform control actions in real time, which in turn imposes high performance requirements on the software and hardware of the system in order to save energy. Consideration of theoretical and practical aspects of software and reduction of intellectual energy consumption by technically complex technological objects is of great interest. Software design in an automated system (software chain) is a technological process that is often repeated by software. Technical requirements are translated into a specific software concept. At the initial stage of the design, this presentation is mostly abstract, it expresses a certain concept defined in the later stages and leads to forms close to the texts of the program modules of the system. The software design process can be conditionally divided into several sub-processes, among which are usually distinguished initialization, energy saving and interface design. The first subprocess defines the second subprocess, which is responsible for forming abstractions at the level of system design. The technician creates abstractions in the system and fills them with details at the algorithmic level, the third sub-process (technical error indicators) ensures the formation of the graphical user interface. During the initial design process, the problem of structuring energy-saving software for automated processes in the technological system is solved. In this case, systematization is carried out depending on individual components (subsystems and modules). At this stage, relationship models between system components are also defined. Identifying the generalized software structure of energy efficiency improvement software in the technological system, including operational information management subsystem and technical system, interface subsystem modules in knowledge evaluation. In addition to the above components, the subsystem includes all the necessary assistants, and is related to the components that ensure the operation of the main components (output mechanism, database management, technical system models, operating system, energy efficiency, etc. 'indicators). Software and technical implementation of technological processes for a real industrial facility is, in most cases, a rather complex and research-intensive task consisting of several stages, starting from the operating system and up to the selection of the necessary technical means for initial production. software design and provision. In this case, the performance indicators of the operating system are implemented together with the required functionality of the system. In the technological processes considered in the article, the main task is to divide the system obtained through the generalized software structure of alternative energy into separate functional subsystems and software modules. These technological processes are basically universal with regard to various management objects in the operating system. Thus, we can conclude about the structure, that the operating system efficiency indicator of energy resources obtained at the initial design stage of energy-saving software for different industrial facilities should be similar, but in the stages of detailed and interface design, the software supply implementation modules and subsystems. can vary significantly in terms of complexity. This technological system also depends on a simplified program. Achieving the efficiency of energy resources in industrial sectors is an

equally important stage in the design of technological processes - it should be carried out based on technical implementation and developed algorithmic software systems. Although this step is more of a solution, it is more of an engineering problem than a research, and it is recommended to consider not only parameters that many technicians should consider, but also characteristics such as speed reliability. Construction of new industrial facilities and reconstruction of existing enterprises is a project. The project consists of a set of technical documents. In principle, the need to build or rebuild the facility, including supporting documents necessary for the production of non-standard equipment, as well as performing all types of construction-installation and adjustment works includes calculations and drawings necessary for. Depending on the complexity of the object being built, the project consists of certain parts will be Technical, technological, construction, plumbing, electrical engineering, may be parts such as automats. Automation project department control and automatic adjustment of existing technological processes and technological design of an organization or management unit specializing in this field automation department of the institute. The organization that creates the technological part of the project during the design process and or the order placed by the customer serves as the basis. One of the main priorities for the development of robotics projects based on the control of technological processes and automated systems is based on the review of the current stage of industrial development. In technological processes continuity of technological processes using working main equipment continuously. At the same time, there are all the prerequisites that determine complex and complete automation of technological processes. Processes Growth and development of labor productivity in the industrial sector of Uzbekistan new technologies aimed at improving and improving quality leads to restoration and improvement of production efficiency, control systems developed and implemented based on the latest tools measurement and automation. Automation of technological processes is the most important means of increasing labor productivity, material and energy reduction costs, increase product quality, introduction of progressive production improve management methods and operational reliability. Determination values of quantities describing the state of the control object: pressure, temperature, flow rate, level in technical devices, physical and chemical parameters substances processed at various stages of the technological process; and so on. All functions for technological analysis during manual control the process is carried out by the individual, including acceptance and implementation decisions on the impact on the process. A manual remote control can also be used when the process is influenced by special devices controlled by a person. In this without, information about process parameters can be obtained using automatic systems for automatic control and management of recorded measurement indicators depending on the devices.

### **Conclusion**

This article discusses the features of software and technical implementation of energy saving to increase the efficiency of the operating system in the automation of technological processes. One of the main goals and tasks is to reduce energy consumption and increase efficiency indicators in the design program of control systems of complex technological facilities. Forming a generalized structure of software and hardware for energy-saving control systems and devices for building a software scheme for energy-saving control systems based on hardware industrial controllers for multi-part dynamic modes were considered. The system of technological process control objects in the industrial enterprise made it possible to reduce energy costs in dynamic modes.

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