

INTEGRATION OF THE OPERATION OF A HOT WATER SUPPLY AND HEATING SYSTEM

Selikhov Yu.A., Gorbunov K.A., Peremot K.V., Alekseenko D.S.

National Technical University

"Kharkiv Polytechnic Institute", Kharkiv

The energy crisis, the reduction of reserves of organic fuel and its increase in price dictates the need to use alternative energy sources. In this regard, the development of schematic and structural solutions with the use of new materials and equipment in the creation of automated power plants using solar energy are urgent tasks. The paper presents a two-circuit solar installation developed by us [1] for hot water supply and heating of buildings with round-the-clock computer control. New materials were used in the installation, an automation scheme using an automated workplace (ARM) was developed, and technical means of automation based on a complex of regulatory and functional blocks on a microprocessor controller of the KONTRAST "KR-500" series were selected. The installation automation system is managed by artificial intelligence. Artificial intelligence, controlling the operation of the two-circuit solar installation, provided round-the-clock computer control, protection of the installation from emergency modes, as well as signaling deviated from nominal modes and environmental protection.

This made it possible to extend the life of the equipment and reduce energy consumption [2]. The solar installation created according to the new scheme was installed in one of the boarding houses in the southern region of Ukraine. According to the main technological parameters: coolant heating temperature, specific heat flows and efficiency, a comparative calculation and analysis of the obtained experimental data of the new solar installation was performed, as well as economic and exergetic calculations [3] of the payback period of the new solar installation were made.

Conclusions. For the proposed technological scheme of the solar installation, the following were selected: new materials, equipment, technical means of automation, and a control scheme from the APM was developed. The results of the work of the solar installation showed: the payback period of the installation is comparable to the installation period of the entire installation - about four months; coolant temperature increased to 90 °C compared to the prototype - 63 °C; The efficiency of the installation increased to 92% compared to the prototype - 72%.

References:

1. Геліоводонагрівник. Патент України № 75178, Бюл.№ 3, 2006.
2. Полімерна композиція. Патент України № 72078 А, Бюл.№ 1, 2005.
3. Эксергетические расчеты технических систем: Справ. пособие/ Бродянский В.М. и др.: Под ред. Долинского А.А., Бродянского В.М. АН УССР. Ин-т технической теплофизики.- Киев: Наук. Думка, 1991.-360 с.