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Automatic Water Dispenser

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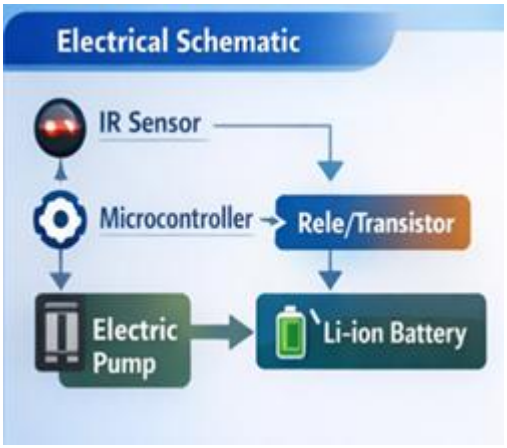
Abstract: This article describes the structure and operating principle of an automatic water dispenser based on an infrared sensor and a microcontroller. The device provides automatic water dispensing by detecting the user's movement without contact. The article analyzes in detail the functions of the main components of the automatic water dispenser system, including the IR sensor, microcontroller control board, electric pump, relay module and Li-ion battery. The automatic and manual control modes of the device, energy saving, hygienic convenience and application possibilities in everyday life are also considered. The results of this study are of practical importance in the design and improvement of automated water supply devices.

Keywords: automatic water dispenser, infrared sensor, microcontroller, electric pump, relay module, Li-ion battery, automatic control, sensor system, energy-saving device, water supply automation.

Introduction. Today, the need for automated devices that provide comfort, hygiene and energy efficiency in everyday life is growing. In particular, contactless systems for water use play an important role in improving sanitary requirements and optimizing water consumption. In this regard, automatic water dispensers based on infrared sensors and microcontrollers are of practical relevance. An automatic water dispenser detects user movement through a sensor and automatically controls the water flow. Such devices are more convenient, safe and energy-efficient than manually controlled systems, and can be used in homes, public places and for various household needs. This article analyzes the structure, operating principle and efficiency of an automatic water dispenser and highlights its practical advantages.

Methodology. This study is aimed at developing and analyzing an automatic water dispenser, using a systematic and practical approach. Initially, the literature on sensor and automatic control systems was studied, and a device model based on an infrared sensor and a microcontroller was developed. The principle of operation of the device is based on detecting user movement using an IR sensor and processing this signal using a microcontroller.



The control signal is used to turn on and off an electric pump through a relay or transistor. Electrical and functional diagrams were created, and automatic and manual control modes of the device were tested. During the study, the stability of the device's operation, response speed, and energy consumption were evaluated.

The results showed that the automatic water dispenser is energy-efficient, convenient, and effective for daily use.

Results. As a result of the experiments, the stable and reliable operation of the automatic water dispenser based on an infrared sensor and a microcontroller was determined. The IR sensor quickly detected the movement when the user's hand approached, and the microcontroller

ensured the timely start of the electric pump. When the hand was removed from the sensor zone, the water flow automatically stopped, which led to a decrease in water consumption. During the tests, the device operated smoothly in automatic and manual control modes. The pump start-up and shutdown time was short, and the water transfer process was continuous. The power source based on a Li-ion battery ensured the device's long-term independent operation, and low energy consumption was noted. The results obtained confirm that the automatic water dispenser is hygienically convenient, energy-efficient, and effective for daily use. This device is suitable for practical use and can be used in the development of automated water supply systems.

Conclusion: Based on the analysis and the developed color diagrams, the automatic water dispenser based on an infrared sensor and a microcontroller has shown its effective and reliable operation. The internal structure and functional connections of the device are aimed at ensuring the harmonious operation of the pump, relay module, microcontroller and Li-ion battery. Automatic control of the water flow by detecting user movement using an IR sensor increases hygienic comfort and reduces water consumption. The presented diagrams clearly describe the principle of operation of the device, electrical connections and the location of the main elements, confirming that its structure is simple and suitable for practical use. Independent power supply from the battery increases the portability of the device, and the use of a relay module ensures electrical safety and reliability. In general, the automatic water dispenser is an energy-saving, hygienic and modern technical solution that can be widely used in domestic conditions, public places and automated water supply systems. The results obtained are of significant practical importance for improving such devices and introducing them into automatic control systems.

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