



Automatic control system for a closed greenhouse

Russian Federation

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Design Bureau "Telecommunication Systems"

Relevance

Closed farm greenhouses require appropriate control of the microclimate, irrigation regimes, biochemical elements for the products growth and illumination. In such a greenhouse there is no possibility to establish a permanent presence of service personnel. Therefore, the remote control function is relevant. It is important to provide a possibility of the greenhouse manual control, together with the remote one.

The automation system includes:

1. Management Controller.
2. 16-channel radio-controlled relay.
3. 24-channel radio-controlled relay.
4. Water shut-off device (up to 10 pcs.).
5. Device for collecting information from wired level sensors.
6. Radio-controlled soil temperature and moisture sensor (up to 10 pcs.).
7. Water level sensor (4 pcs.).
8. Air temperature and humidity sensor (2 pcs.).
9. Light sensor.
10. DVR with a hard drive.
11. CCTV cameras (2 pcs.).
12. Tablet with vertical mounting elements.



The system provides:

- ❑ measurement and automatic transmission of data on the state of air temperature and humidity, soil temperature and humidity, water level in tanks with nutrient solution and water

- ❑ maintaining the specified characteristics of the microclimate and irrigation



The use



The system is designed for automatic maintenance of the microclimate and watering the soil in closed-type greenhouses with overall dimensions: 40m * 10m * 4m.



The system provides:

1. Collection and processing of readings from sensors, transfer of information to actuating devices.
2. Control of pumps for supplying water and fertilizers to the beds and fans of microclimate control.
3. Management of water shut-off devices.
4. Supply or shutdown of the water supply to the beds.
5. Collection and transmission of readings from water level sensors in tanks.
6. Collection and transmission of data on temperature and soil moisture.
7. Collection and transmission of data on the amount of fertilizers in the tanks.
8. Collection and transmission of data on temperature and humidity in the greenhouse.
9. Video surveillance in the greenhouse.
10. Transmission and storage of video recordings from CCTV cameras.
11. Elements control and management using a tablet and remote control using cellular communications.
12. The range of wireless communication between the elements is up to 20m.





The functioning is carried out on the basis of software using various sensors and devices.

Manual mode is carried out through the control cabinet, in which each element of the system is controlled separately.

Thanks to the control system with a central controller, it is possible to work in automatic and automated modes.

Uniqueness

The system operates in the following modes: automatic; manual.



Uniqueness



Remote control and monitoring allow real-time monitoring of the microclimate state in the greenhouse, and wireless communication between the system's sensors provides the ability to freely move devices without being tied to a fixed wiring.

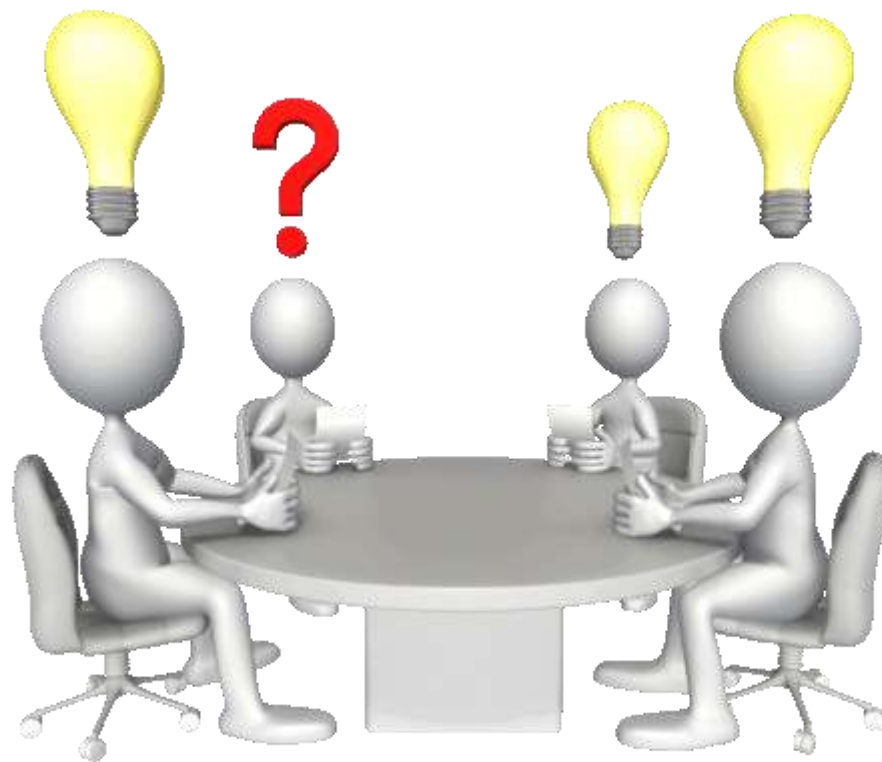


Greenhouse control cabinet



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