

基于 PLC 的自动灌溉控制系统设计

摘要:传统的灌溉方式不但灌水量多、耗水量大,而且不能实时适量的灌溉,促使了水资源、劳动力的浪费。这与我国发展节约环保型社会资源的方向极不吻合。传统灌溉设备基本上采用继电器的控制方式,其调试和维护不方便,灵敏度也不够高,不能按照植物的实时生长环境进行自动实时灌溉。而可编程控制器(PLC)能够改善系统可靠性、增进系统灵活性,符合各类环境条件下工作要求。在系统硬件结构不变更的前提下,可以利用变更软件设置来达到满足多种运行体系的要求,是传统的继电器控制方式最优替代品。

设计将 PLC 定义为控制核心,结合组态王报警监控,外部检测环节由温湿度传感器、光照度传感、电源、电磁阀和水泵等组成。凭借对应传感器获取的实时环境参数,再由 PLC 分析与组态之间通讯,由报警界面反馈给 PLC 进行电磁阀控制水泵通断实现自动灌溉控制。该体系可以增进灌溉效率,实现节能节水的目标,同时,能减轻灌溉工作者的劳动压力,将科学高效的灌溉方式融入于控制器中,减少了对栽种经验的要求,进而提高了作物出产效率。

关键词: PLC; 温湿度传感器; 光照传感器; 组态王

Design of automatic irrigation control system based on PLC

Abstract: the traditional way of irrigation not only has a large amount of water, but also can't irrigate in real time, which promotes the waste of water resources and labor. This is not in line with the direction of developing environmental friendly social resources in China. The traditional irrigation equipment basically adopts the relay control mode, which is inconvenient in debugging and maintenance, and not sensitive enough to conduct automatic real-time irrigation according to the real-time growth environment of plants. The PLC can improve the system reliability, enhance the system flexibility, and meet the requirements of various environmental conditions. On the premise that the hardware structure of the system does not change, the software settings can be changed to meet the requirements of a variety of operation systems, which is the best alternative to the traditional relay control mode.

In the design, PLC is defined as the control core. Combined with Kingview alarm monitoring, the external detection link is composed of temperature and humidity sensor, illumination sensor, power supply, solenoid valve and water pump. Based on the real-time environmental parameters obtained by the corresponding sensors, the communication between PLC analysis and configuration is carried out, and the alarm interface is fed back to PLC to control the on-off of water pump controlled by solenoid valve to realize automatic irrigation control. The system can improve irrigation efficiency, achieve the goal of energy saving and water saving, at the same time, reduce the labor pressure of irrigation workers, integrate scientific and efficient irrigation methods into the controller, reduce the requirements of planting experience, and then improve the production efficiency of crops.

Key words: PLC, temperature and humidity sensor, light sensor, Kingview

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