

恒压供水控制的总体设计

摘要

本设计对恒压变频供水控制进行设计,主要对恒压变频的自动控制进行设计,通过管道压力的检测和设定值的比较,依据 PID 控制原理,进行变频器的频率控制输出。系统主要通过可编程控制器+上位机控制方式进行设计,在分析该系统的工艺要求基础上,提出详尽的控制策略和总体设计思路。系统主要由西门子 S7-1200 可编程控制器、传感器检测单元、变频器、电动机执行机构等组成,系统分为总体设计、硬件图纸设计、软件流程及程序设计以及上位机仿真设计等。在总体设计中对系统工艺进行详细分析,并提出总体设计的思路;在硬件设计中重点对 PLC 及其他接线进行详细设计和分析;在软件设计中,重点对程序流程进行分析,并完成软件程序以及上位机组态设计。系统设计通过仿真设计和调试,达到了设计的基本控制要求,控制逻辑清晰,功能实现满足了工艺的需求。

关键词: 变频恒压供水; 可编程控制器; 仿真设计

Abstract

In this design, the constant pressure variable frequency water supply control is designed, mainly for the automatic control of constant pressure variable frequency. Through the comparison of pipeline pressure detection and set value, according to the PID control principle, the frequency control output of the frequency converter is carried out. The system is mainly designed by the way of PLC + upper computer control. Based on the analysis of the process requirements of the system, the detailed control strategy and overall design idea are put forward. The system is mainly composed of Siemens s7-1200 programmable controller, sensor detection unit, frequency converter, motor actuator, etc. the system is divided into overall design, hardware drawing design, software flow and program design, and upper computer simulation design, etc. In the overall design, the system process is analyzed in detail, and the overall design idea is proposed; in the hardware design, the PLC and other wiring are mainly designed and analyzed in detail; in the software design, the program flow is mainly analyzed, and the software program and upper computer configuration design are completed. Through simulation design and debugging, the system design has achieved the basic control requirements of the design, the control logic is clear, and the function realization meets the process requirements.

Key words: variable frequency constant pressure water supply; programmable controller; simulation design

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