
精准液体采集系统的设计与实现

摘要：精准液体采集，在实验室、化学行业、医药业、水处理分析、食品业、饮料业等多个行业都有广泛的应用。行业中，常常需要对液体进行精准的采集，用于对实验结果定量的分析、实现对液体精准的比例做掌控。现阶段精准液体采集在国内有数十家企业在做，但是存在几个“痛点”。液体采集设备无法满足食用标准、抗腐蚀能力差、价格昂贵、系统运行成本高等问题。

本设计是通过 STM32 单片机控制蠕动泵采集液体的一套简易且精准的液体采集设备。本系统将会运用法国意法半导体公司推出的 STM32 单片机作为系统的控制中心，运用广州大彩公司的串口屏作为人机交互，运用采液算法计算输出数据控制蠕动泵动作，从而实现采集液体。为实现精准采集的目的，本系统设置了流量反馈及系统急停两大功能模块。为满足食用标准及抗腐蚀标准，系统采用上海卡默尔步进蠕动泵。为实现良好的人机交互体验，系统使用一键输入参数，全自动化运行。为实现系统安全运行，设计运行参数实时监控及蠕动泵采液动作实时监控，即一旦出现系统运行故障，系统将采取有效的停止操作，保护设备及人员安全。

关键词： 单片机；蠕动泵；精准采液



Design and implementation of precise liquid collection system

Abstract: Precise liquid collection is widely used in laboratories, chemical industry, pharmaceutical industry, water treatment analysis, food industry, beverage industry and other industries. In the industry, through accurate collection of liquid, it is to realize quantitative analysis of experimental results and control of accurate proportion of liquid. At this stage, there are dozens of domestic enterprises engaged in precise liquid collection, but there are several "pain points". Liquid collection equipment can not meet the food standard, poor corrosion resistance, high price, high system operation cost and so on.

This design is a set of simple and accurate liquid collection equipment which is controlled by STM32 single chip microcomputer to collect liquid by peristaltic pump. The system is designed with stm32f103c8t6 single chip microcomputer as the core controller. The liquid parameters and flow parameters are input through the touch screen. The output data is calculated by the algorithm to control the peristaltic pump action and collect the liquid. To achieve accurate output system, two modules, flow feedback and system emergency stop, are set. In order to meet the food standard and anti-corrosion standard, the system adopts Shanghai Carmel step peristaltic pump. In order to realize the simple operation of the system, the system adopts the control module of one key input and automatic operation. In order to ensure the safety function, the system is designed to monitor the operation parameters and peristaltic pump action. In case of failure, the system will take effective stop operation to protect the safety of equipment and personnel.

Key words: single chip microcomputer; peristaltic pump; precise liquid extraction



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