

ABSTRAK

Penelitian ini dilakukan dengan tujuan untuk merancang dan membangun alat Syringe pump, yaitu sebuah alat kesehatan yang digunakan untuk menginfuskan obat cair ke dalam tubuh pasien secara periodik dalam jangka waktu tertentu. Prinsip kerja alat syringe pump itu adalah menyalurkan obat dari spuit ukuran tertentu ke tubuh pasien yang dialirkan secara berkala yang digerakkan langsung oleh motor stepper. Sensor infrared photodiode sebagai pendeteksi nearly empty untuk mendeteksi cairan hampir habis dan habis, dan menggunakan driver motor untuk menggerakkan motor stepper. Gerakan motor menyebabkan ulir berputar ke depan, yang mengakibatkan plunger (bagian yang mendorong suntikan) terdorong, dan inilah awal dari proses injeksi yang terjadi. Melalui tugas akhir ini, tim melakukan perancangan sebuah alat Rancang Bangun Syringe Pump Dilengkapi Sistem Occlusion dan Nearly Empty Dengan Pemilihan Spuit Otomatis. Sebagai solusi dari permasalahan tersebut. Alat ini bisa mendeteksi Nearly Empty dengan menggunakan sensor Infrared Photodiode sebagai deteksi Nearly Empty. Untuk spuit ukuran 10ml Nearly stabil di garis 1ml sedangkan untuk Empty stabil di garis 0,4ml. Untuk spuit ukuran 20ml Nearly stabil di garis 5ml sedangkan untuk Empty stabil di garis 1ml. Untuk spuit ukuran 50ml Nearly stabil di garis 10ml sedangkan untuk Empty stabil di garis 2ml. Dengan flowrate 10ml, 20ml, 30ml, 40ml, dan 50ml. Dan pada pengukuran flowrate di spuit 10ml didapat error terbesar pada setting flowrate 30ml/jam yaitu sebesar 1,71%, error terendah pada setting flowrate 10ml/jam sebesar 0,46%, pada spuit 20ml diperoleh error terbesar pada setting flowrate 30ml/jam sebesar 0,47%, error terendah pada setting flowrate 40ml/jam sebesar 0,05%, dan pada spuit 50ml diperoleh error terbesar pada setting flowrate 10ml/jam sebesar 1,73%, error terendah pada setting flowrate 30ml/jam sebesar 0,36%.

Kata Kunci: Syringe pump, Infrared Photodiode, Nearly Empty, arduino uno

ABSTRACT

The objective of this research is to develop and construct a syringe pump. A syringe pump is a medical instrument used to deliver liquid medication into the patient's body over a specified duration at consistent intervals. The working principle of the syringe pump is to distribute medicine from a syringe of a certain size to the patient's body which is delivered periodically and is driven directly by a stepper motor. Infrared photodiode sensor as a near empty detector to detect almost empty and empty liquid, and uses a motor driver to move the stepper motor. The movement of the motor will cause the thread to move forward so that it pushes the plunger (injection pusher) and the injection process begins to occur. Through this final project, the team designed a Syringe Pump Design Tool Equipped with an Occlusion and Nearly Empty System with Automatic Syringe Selection. As a solution to this problem. This tool can detect Nearly Empty by using an Infrared Photodiode sensor to detect Nearly Empty. For a 10ml syringe, Nearly is stable at the 1ml line, while for Empty it is stable at the 0.4ml line. For the 20ml syringe, Nearly is stable at the 5ml line, while for Empty it is stable at the 1ml line. For the 50ml syringe, Nearly is stable at the 10ml line, while for Empty it is stable at the 2ml line. With flow rates of 10ml, 20ml, 30ml, 40ml and 50ml. And when measuring the flowrate on a 10ml syringe, the biggest error was obtained at the flowrate setting of 30ml/hour, namely 1.71%, the lowest error was at the flowrate setting of 10ml/hour, it was 0.46%, on the 20ml syringe the largest error was obtained at the flowrate setting of 30ml/hour, it was 0.46%. 0.47%, the lowest error at the flowrate setting of 40ml/hour was 0.05%, and on the 50ml syringe the largest error was obtained at the flowrate setting of 10ml/hour of 1.73%, the lowest error at the flowrate setting of 30ml/hour was 0.36 %.

Keywords: Syringe pump, Infrared Photodiode, Nearly Empty, arduino uno