

ABSTRAK

Masalah yang umum terjadi pada penggunaan syringe pump yaitu saat pemberian dosis yang terkadang berhenti tiba-tiba karena obat hampir habis. Sebabnya, kami merancang alat syringe pump dengan nearly empty yang dapat memudahkan user mengatasi masalah tersebut. Dengan alarm nearly empty user dapat mengambil tindakan selanjutnya, seperti mengganti spuit yang telah habis untuk memastikan kelangsungan perawatan pasien dengan akurat. Alat ini terdiri dari rangkaian arduino mega 2560, motor stepper, dan sensor nearly empty. Pemilihan ukuran spuit dilakukan secara otomatis, 20 ml atau 50 ml. User dapat mengatur volume, flowrate, timer, dan tombol start untuk memulai. Alat ini membutuhkan tegangan AC 220V, dikalibrasi dengan IDA 4 Plus dan dilengkapi alarm nearly empty. Pengukuran volume pada spuit 20ml didapat nilai error terbesar 1,6% dan terkecil 0,4%. Pada spuit 50ml nilai error terbesar 1,6% dan terkecil 0,03%. Pengukuran flowrate pada spuit 20ml didapat nilai error terbesar 0,52% dan terkecil 0,11%. Pada spuit 50ml didapat nilai error terbesar 0,19% dan terkecil 0,03%. Pengukuran nearly empty dengan volume pada spuit 20ml didapat nilai error terbesar 0,14% dan terkecil 0%. Pada spuit 50ml nilai error terbesar 0,62%, dan terkecil 0%. Modul dapat digunakan sesuai fungsinya karena % error masih di bawah standar $\pm 5\%$.

Kata Kunci: Syringe Pump, Nearly Empty, Mega 2560, Motor Stepper

ABSTRACT

A common problem that occurs when using a Syringe Pump is that when administering a dose, it sometimes stops suddenly because the drug is almost finished. Therefore, we designed a syringe pump with an almost empty condition which can make it easier for users to overcome this problem. With a near-empty alarm the user can take further action, such as replacing a spent syringe to ensure accurate continuity of patient care. This tool consists of an Arduino Mega 2560 circuit, a stepper motor, and an almost empty sensor. Syringe size selection is done automatically, 20 ml or 50 ml. Users can set the volume, flow rate, timer, and start button to get started. This tool requires AC 220V voltage, is calibrated with IDA 4 Plus and is equipped with a near-empty alarm. When measuring the volume on a 20ml syringe, the largest error value was 1.6% and the smallest was 0.4%. On a 50ml syringe, the largest error value was 1.6% and the smallest was 0.03%. Measuring the flow rate on a 20ml syringe obtained the largest error value of 0.52% and the smallest 0.11%. On a 50ml syringe, the largest error value was 0.19% and the smallest was 0.03%. When measuring almost empty with a syringe volume of 20ml, the largest error value was 0.14% and the smallest was 0%. On a 50ml syringe, the largest error value was 0.62%, and the smallest was 0%. The module can be used according to its function because the % error is still below the standard of $\pm 5\%$.

Keywords: *Syringe Pump, Nearly Empty, Mega 2560, Stepper Motor*