

DAFTAR PUSTAKA

- Danuri, R. (2015). Perancangan Alat Perajang Serbaguna Tipe Blade Sliding dengan Menggunakan Prinsip *Mechanical Ralph Steiner*. *Jurnal Teknik*. 3 (1), 1-40.
- Darius, C.dan Purnama, L. (2019). Pertanian Vertikal di Arjuna Utara. *Jurnal STUPA*, 1 (2), 817-828.
- Dwiyanti. (2013). Kajian Perkembangan Guna Lahan Terkait dengan perdagangan dan Industri Batik Di Desa Trusmi Kulon, Plered, Kabupaten Cirebon. *Jurnal ruang* , 1(2).
- Iqbal., Madang, T., Sembiring, E., N., dan Chozin, M.A. (2014). Rancang Bangun Aplikator Kompos Tebu Lahan Kering. *Jurnal keteknikan pertanian*. 2 (1).
- Iqbal., achmad, M., dan Sapsal, M., T. (2018). Compost Applicators For Horticulture. *Earth and Environmental Science*. 157.
- Isfarizky, Z., Ferdian., dan Alfatirta, M. (2017). Rancang Bangun Sistem Control Pemakaian Listrik Secara Multi Channel Berbasis Arduino (Studi Kasus Kantor LBH Banda Aceh). *Jurnal teknik eletro*. 2(2), 30-35.
- Limbong, M.A.M. Oppusunggu, K. Eswanto. 2018. Rancang Bangun Mesin Pencuci Umbi Wortel dengan Menggunakan Drum Pemutar Kapasitas 150 Kg/Jam. *Jurnal Ilmiah Mekanik*. 4 (2), 85-92.
- Lukman, L. (2011). Teknologi Budidaya Tanaman Sayur. Balai Penelitian Tanaman Sayur, Bandung.
- Monalisa, S., dan Infa, M. (2010). Kualitas Air Yang Mempengaruhi Pertumbuhan Ikan Nila (*Oreochromis Sp.*) Di Kolam Beton Dan Terpal. *Jurnal of tropical fisheries*. 5(2): 526-530.
- Nahar, L. (2018). Perencanaan Sistem Transmisi Daya pada Gerobal Sampah Motor. *Jurnal Mahasiswa Teknik Mesin*. 1(1). 28-33.
- Nugraha, RA., Pambudi, LT., Chilmawati, D. dan Haditomo, AHC. (2012). Aplikasi Teknologi Akuaponik pada Budidaya Ikan Air Tawar untuk Optimalisasi Kapasitas Produksi. *Jurnal Saintek Perikanan*. 8(1): 46- 51.
- Rohandi, E., Meyanti, E., A., Nisa., H. (2019). Sistem Penyiraman Tanaman Sayur Secara Aeroponik Berdasarkan Suhu dan Kelembaban Berbasis IOT Menggunakan Metode Fuzzy. *Jurnal Informatika Polinema*. 5(2). 84-90.
- Robert L. Motto P.E. 2009. *Elemen-Elemen Mesin Dalam Perancangan Mekanis*. Edisi 1. Penerbit Andi. Yogyakarta.
- Saputra, H., dan Zulkarnain, R., A. (2013). Simulasi Tegangan Perubahan Bentuk Pada Rangka Sepeda Air Hamors Menggunakan Software Solidwort. *Jurnal integrasi*. 7(2): 91-96.

- Sastrawati, I. dan Santoso, L. (2011). Perubahan Guna Lahan di Suburban Selatan Kota Makassar. Prosiding. *Jurnal Hasil Penelitian Fakultas Teknik*. 5, 1-8.
- Sularso, Suga K. 2004. *Dasar Perencanaan dan Pemilihan Elemen Mesin*. Pradnya Paramita: Jakarta.
- Tim BPS SULSEL. (2020). Luas Penggunaan Lahan Pertanian dan Bukan Pertanian di Provinsi Sulawesi Selatan. Makassar.
- Utami, MS. (2018). Pengaruh Cahaya Terhadap Pertumbuhan Tanaman. Universitas Udayana: Bali

LAMPIRAN

Lampiran 1. Perhitungan Total Gaya Tiang Penyangga

Jika Gaya pada masing-masing kaki tiang penyangga disebut dengan F maka $F_1=F_2=F_3=F_4$ dengan nilai 5 N.

$$1. \text{ Total Gaya (F}_5\text{)} = F_1 + F_2 + F_3 + F_4 = 20$$

Jadi :

$$F = \frac{F_5}{4}$$

$$F = \frac{20}{4}$$

$$F = 5 \text{ N}$$

Lampiran 2. Perhitungan Poros Silinder

Adapun data yang dibutuhkan dalam proses perancangan poros silinder ini dapat dilihat sebagai berikut:

$$1. \text{ Daya yang ditransmisikan : } 0,13 \text{ Hp} = 0,096 \text{ kw}$$

Putaran poros : 16 RPM

$$2. \text{ Momen Puntir (T)}$$

$$T = 9,74 \times 10^5 \frac{P}{n_2} = 9,74 \times 10^5 \times \frac{0,096}{16} = 5844 \text{ kg.mm}$$

$$3. \text{ Pembebanan}$$

Berat Puli : 1 kg

$$\text{ gaya tarik } v - \text{ belt} = \frac{2T}{R} = 2 \times \frac{7,5}{5} = 3 \text{ kg kg}$$

Beban puli total : 1 + 3 = 4 Kg

Lampiran 3. Perhitungan Puli

Kecepatan RPM tereduksi oleh sistem transmisi dari motor listrik dengan 1400 RPM menjadi 16 RPM dengan bantuan *gear box*. Daya 0,5 Hp dengan kecepatan torsi 1400 RPM direduksi menggunakan *gear box* dengan perbandingan 1:50 sehingga kecepatan torsi dari 1400 RPM menjadi 28 RPM. Perancangan transmisi disesuaikan dengan penggunaan jenis motor penggerak.

Motor listrik : 1400 RPM, Pully: 7,5 cm

Input Gear box : 1400 RPM, pully: 7,5 cm

Output Gear box : 28 RPM, pully: 6,5

Mesin pencuci : 16 RPM, pully 10 cm

$$n_1 = 1440 = 28 \text{ rpm}; n_2 = 16 \text{ rpm}$$

$$i = \frac{n_1}{n_2} = \frac{D_p}{d_p} = \frac{28 \text{ rpm}}{16 \text{ rpm}} = 1,75 = \frac{2}{1}$$

$$i = \frac{D_p}{d_p} = \frac{2}{1}$$

Maka dapat digunakan puli dengan perbandingan $D_p:d_p$ yaitu 2 : 1, agar memperoleh kecepatan mesin sebesar 16 RPM maka digunakan ukuran puli dengan diameter 10 cm dan 5 cm.

Lampiran 4. Perhitungan sabuk

Untuk mendapatkan data sabuk dapat dilakukan dengan perhitungan sebagai berikut:

1. Daya yang ditransmisikan : 0,13 Hp = 0.096 kW

Putaran poros motor : 1400 RPM

Putaran poros silinder : 16 RPM

Jarak sumbu poros (C) : 930 mm

2. Penampang sabuk V : tipe A

3. Diameter puli

$$D_p = 100 \text{ mm}$$

$$d_p = 65 \text{ mm}$$

4. Diameter luar puli (d_k , D_k)

$$d_k = d_p + (2 \times 5,5) = 65 + (2 \times 5,5) = 76 \text{ mm}$$

$$D_k = D_p + (2 \times 5,5) = 100 + (2 \times 5,5) = 111 \text{ mm}$$

5. Kecepatan sabuk

$$v = \frac{d_p \cdot n_1}{60 \cdot 1000}$$

$$v = \frac{75 \times 426}{60 \cdot 1000}$$

$$v = 1,8 = \frac{m}{\text{detik}}$$

1,8m/detik < 25 m/detik, baik

6. Panjang Sabuk (L)

$$\begin{aligned}
 L &= 2C + \frac{\pi}{2}(dp + Dp) + \frac{1}{4C}(Dp - dp)^2 \\
 &= 2(930) + \frac{\pi}{2} \times (100 + 65) + \frac{1}{4 \times 930} (100 - 65)^2 \\
 &= 1860 + \frac{\pi}{2} (165) + \frac{1}{3720} \times (1225) \\
 &= 1860 + 259 + 0,3 = 2119,3 \text{ mm}
 \end{aligned}$$

7. Jarak sumbu poros

$$C = \frac{b + \sqrt{b^2 - 8(Dp - dp)^2}}{8}$$

Dimana

$$b = 2L - 3.14(Dp + dp)$$

$$b = 2(2119,3) - 3.14(100 + 65)$$

$$b = 4238,6 - 518,1 = 3720,2$$

Maka jarak sumbu poros adalah:

$$\begin{aligned}
 C &= \frac{b + \sqrt{b^2 - 8(Dp - dp)^2}}{8} \\
 &= \frac{3720,2 + \sqrt{3720^2 - 8(100 - 65)^2}}{8} \\
 &= \frac{3720,2 + 3718}{8} \\
 &= 929,7 \text{ mm} = 930 \text{ mm}
 \end{aligned}$$

Lampiran 5. Kecepatan Rantai

Jika diketahui daya rencana sebesar 22 kw, jarak bagi rantai 22 mm, jumlah gigi *sprocket* atas adalah 55 buah dan putaran *sprocket* atas adalah 16 RPM, maka kecepatan rantai dapat di ketahui melalui rumus :

$$v = \frac{p \cdot z_1 \cdot n_1}{1000 \times 60}$$

$$v = \frac{22 \times 55 \times 16}{1000 \times 60}$$

$$v = \frac{19.360}{60.000}$$

$$v = 0,322 \text{ m}$$

Lampiran 6. Panjang Rantai

Jika diketahui jarak sumbu poros adalah 26 mm dan jarak bagi rantai adalah 22 dapat di ketahui melalui rumus:

$$L_p = \frac{Z_1 + Z_2}{2} + 2C_p + \frac{|(z_1 + z_2)/6,28|}{C_p}$$

$$L_p = \frac{55 + 55}{2} + 2(26) + \frac{|(55 + 55)/6,28|}{26}$$

$$L_p = 55 + 52 + \frac{|(100)/6,28|}{26}$$

$$L_p = 55 + 52 + 0,67$$

$$L_p = 107,67$$

Lampiran 7. Jarak Sumbu Poros

Jika diketahui Jumlah gigi *sprocket* atas dan Jumlah gigi *sprocket* bawah adalah 55, panjang rantai adalah 107,67, jarak sumbu poros dapat di ketahui melalui rumus:

$$C_p = \frac{1}{4} \left\{ \left(\frac{L - \frac{Z_1 + Z_2}{2}}{\sqrt{\left(L - \frac{Z_1 + Z_2}{2}\right)^2 - \frac{2}{9,86}(Z_2 - Z_1)^2}} \right) \right\}$$

$$C_p = \frac{1}{4} \left\{ \left(\frac{107,67 - \frac{55 + 55}{2}}{\sqrt{\left(107,67 - \frac{55 + 55}{2}\right)^2 - \frac{2}{9,86}(55 - 55)^2}} \right) \right\}$$

$$C_p = \frac{1}{4} \left\{ \left(\frac{52,67}{\sqrt{(52,67)^2 - \frac{2}{9,86}(0)^2}} \right) \right\}$$

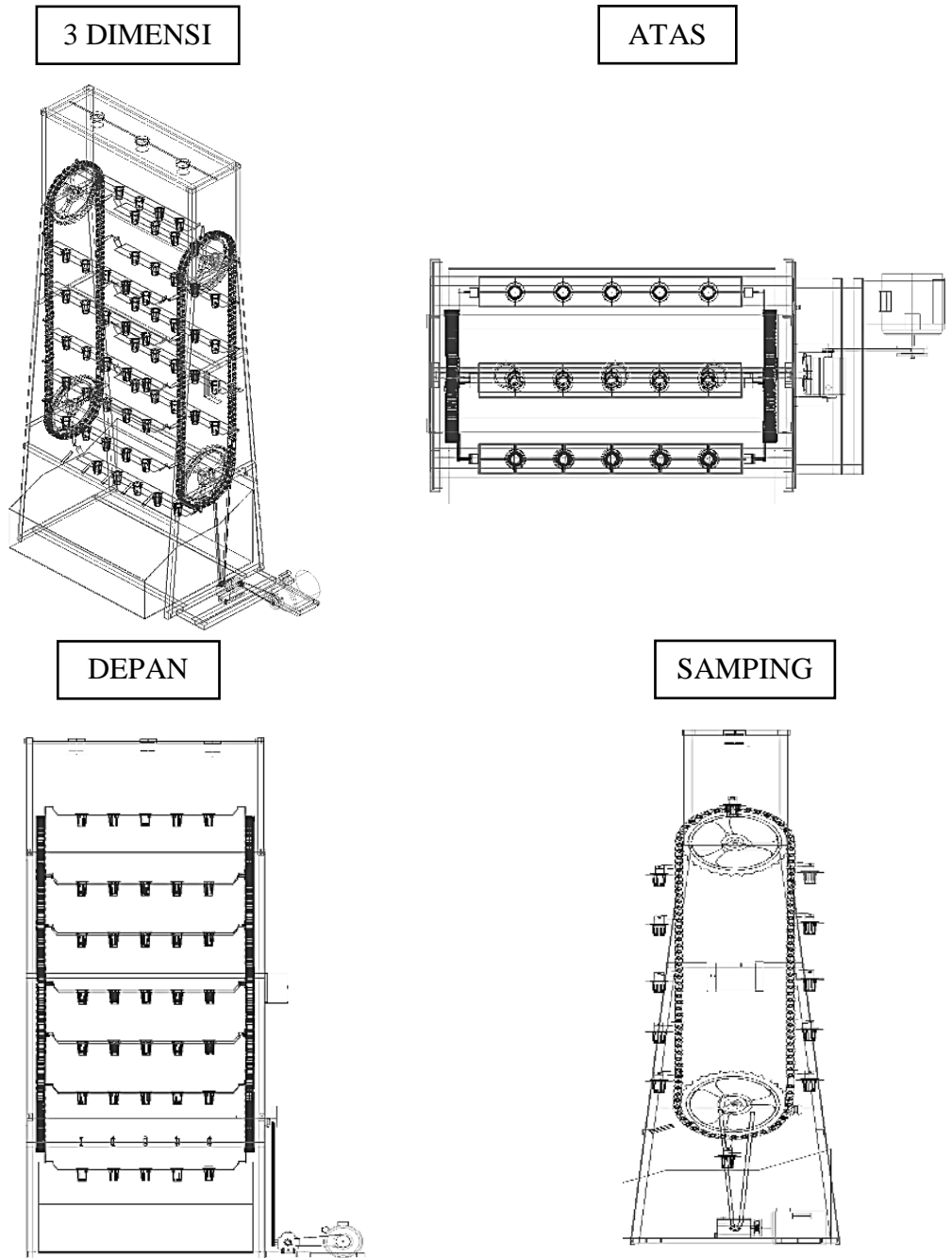
$$C_p = \frac{1}{4} \left\{ \left(\frac{52,67}{\sqrt{105,34}} \right) \right\}$$

$$C_p = \frac{1}{4} \left\{ \left(\frac{52,67}{10,26} \right) \right\}$$

$$C_p = \frac{1}{4} \{ (5,13) \}$$

$$C_p = 1,289$$

Lampiran 8. Proyeksi



	SKALA	SATUAN UKURAN	Keterangan:	
	1:10	MM		
KEBUN VERTIKAL				
TEKPERT	PROYEKSI	NO.	A4	

Lampiran 9. Bahasa Program

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x3f,20,4);
int pwm980=5;
int kon[8]={0, 55, 100, 150, 170, 255, 255, 255 };
int pwm1;
unsigned int superdetik,detik,menit,jam;
void waktu ()
{
    superdetik++;
    if(superdetik>=10)
    {superdetik=0;
    detik++;}
    if(detik>=60)
    {detik=0;
    menit++;}
    if(menit>=60)
    {menit=0;
    jam++;}
    if(jam>=1)
    {jam=0;}
}
void setup() {
    Serial.begin(9600);
    pinMode(pwm980,OUTPUT);
    lcd.backlight();
    lcd.init();
```



```

lcd.setCursor(0,0);
lcd.print("ALFIAN NURDIN");
lcd.setCursor(0,1);
lcd.print("G041181333");
}
void loop() {
waktu();
Serial.println(detik);// baca detik
Serial.println(menit);// baca menit
Serial.println(jam);// baca jam
lcd.setCursor(0,2);
lcd.print("TIME: ");
lcd.setCursor(6,2);
lcd.print(jam );
lcd.print(" ");
lcd.setCursor(8,2);
lcd.print(":");
lcd.print(menit );
lcd.print(" ");
lcd.setCursor(11,2);
lcd.print(":");
lcd.print(detik );
lcd.print(" ");
lcd.setCursor(15,2);
lcd.print(":");
lcd.print(superdetik );
lcd.print(" ");
// EXPERT SECARA LANGSUNG //

```



```

else if ((((((detik ==46))&&((menit ==1))&&((jam ==00)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==48))&&((menit ==1))&&((jam ==00)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==50))&&((menit ==1))&&((jam ==00)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==52))&&((menit ==1))&&((jam ==00)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==54))&&((menit ==1))&&((jam ==00)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==56))&&((menit ==1))&&((jam ==00)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==58))&&((menit ==1))&&((jam ==00)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==0))&&((menit ==2))&&((jam ==00)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==2))&&((menit ==2))&&((jam ==00)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

//----- 4 jam-----
//-----//

if ((((((detik ==0))&&((menit ==00))&&((jam ==4)))))) {analogWrite (pwm980,
kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==2))&&((menit ==00))&&((jam ==4)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==4))&&((menit ==00))&&((jam ==4)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==6))&&((menit ==00))&&((jam ==4)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==8))&&((menit ==00))&&((jam ==4)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==10))&&((menit ==00))&&((jam ==4)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

```



```

else if ((((((detik ==0))&&((menit ==2))&&((jam ==4)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==2))&&((menit ==2))&&((jam ==4)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

//----- 8 jam-----
//-----//

if ((((((detik ==0))&&((menit ==00))&&((jam ==8)))))) { analogWrite (pwm980,
kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==2))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==4))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==6))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==8))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==10))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==12))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==14))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==16))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==18))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==20))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==22))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==24))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==26))&&((menit ==00))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

```



```

else if ((((((detik ==40))&&((menit ==1))&&((jam ==8)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==42))&&((menit ==1))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==44))&&((menit ==1))&&((jam ==8)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==46))&&((menit ==1))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==48))&&((menit ==1))&&((jam ==8)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==50))&&((menit ==1))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==52))&&((menit ==1))&&((jam ==8)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==54))&&((menit ==1))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==56))&&((menit ==1))&&((jam ==8)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==58))&&((menit ==1))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==0))&&((menit ==2))&&((jam ==8)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==2))&&((menit ==2))&&((jam ==8)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

//----- 12 jam-----
//-----//

if ((((((detik ==0))&&((menit ==00))&&((jam ==12)))))) { analogWrite (pwm980,
kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==2))&&((menit ==00))&&((jam ==12)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==4))&&((menit ==00))&&((jam ==12)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

```



```

else if ((((((detik ==54))&&((menit ==1))&&((jam ==12)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==56))&&((menit ==1))&&((jam ==12)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==58))&&((menit ==1))&&((jam ==12)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==0))&&((menit ==2))&&((jam ==12)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==2))&&((menit ==2))&&((jam ==12)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

//----- 16 jam-----
//-----

if ((((((detik ==0))&&((menit ==00))&&((jam ==16)))))) {analogWrite (pwm980,
kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==2))&&((menit ==00))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==4))&&((menit ==00))&&((jam ==16)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==6))&&((menit ==00))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==8))&&((menit ==00))&&((jam ==16)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==10))&&((menit ==00))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==12))&&((menit ==00))&&((jam ==16)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==14))&&((menit ==00))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==16))&&((menit ==00))&&((jam ==16)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==18))&&((menit ==00))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

```



```

else if ((((((detik ==32))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==34))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==36))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==38))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==40))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==42))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==44))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==46))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==48))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==50))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==52))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==54))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==56))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==58))&&((menit ==1))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==0))&&((menit ==2))&&((jam ==16)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==2))&&((menit ==2))&&((jam ==16)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

```

```

//----- 20 jam-----
-----//

if ((((((detik ==0))&&((menit ==00))&&((jam ==20)))))) { analogWrite (pwm980,
kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==2))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==4))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==6))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==8))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==10))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==12))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==14))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==16))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==18))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==20))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==22))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==24))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==26))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==28))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==30))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==32))&&((menit ==00))&&((jam ==20)))))) { analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

```



```

else if ((((((detik ==46))&&((menit ==1))&&((jam ==20)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==48))&&((menit ==1))&&((jam ==20)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==50))&&((menit ==1))&&((jam ==20)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==52))&&((menit ==1))&&((jam ==20)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==54))&&((menit ==1))&&((jam ==20)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==56))&&((menit ==1))&&((jam ==20)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==58))&&((menit ==1))&&((jam ==20)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==0))&&((menit ==2))&&((jam ==20)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==2))&&((menit ==2))&&((jam ==20)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

//----- 24 jam-----
//-----

if ((((((detik ==0))&&((menit ==00))&&((jam ==24)))))) {analogWrite (pwm980,
kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==2))&&((menit ==00))&&((jam ==24)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==4))&&((menit ==00))&&((jam ==24)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==6))&&((menit ==00))&&((jam ==24)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

else if ((((((detik ==8))&&((menit ==00))&&((jam ==24)))))) {analogWrite
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}

else if ((((((detik ==10))&&((menit ==00))&&((jam ==24)))))) {analogWrite
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}

```



```
else if ((((((detik ==0))&&((menit ==2))&&((jam ==24)))))) { analogWrite  
(pwm980, kon[7]); lcd.setCursor(0,3); lcd.print("POMPA ON ");}  
  
else if ((((((detik ==2))&&((menit ==2))&&((jam ==24)))))) { analogWrite  
(pwm980, kon[0]); lcd.setCursor(0,3); lcd.print("POMPA OFF ");}  
  
}
```

Lampiran 10. Dokumentasi Penelitian



