

## LAMPIRAN

### Lampiran 1.

#### Kapasitor bank sebagai filter

Didapatkan total kua arus sebesar 25,73

Tegangan kapasitor 16 V

Tegangan terendah 6,19 V

Waktu 1detik

Frekuensi 29,091Hz

$$V_{tinggi} - V_{rendah} = \frac{Q_1 - Q_2}{C}$$

$$\frac{V_1 - V_2}{T} = \frac{I}{C}$$

$$V_{rip} = \frac{I}{FC}$$

$$\frac{16 \text{ V} - 6,19 \text{ V}}{1} = \frac{25,73 \text{ A}}{29,09 \text{ Hz} \times C}$$

$$9,81 \text{ V} = \frac{25,73 \text{ A}}{29,09 \text{ Hz} \times C}$$

$$29,81 \text{ Hz} \times C = \frac{25,73 \text{ A}}{9,81 \text{ V}}$$

$$C = \frac{2,6224}{29,81 \text{ Hz}}$$

$$C = 0,087 \text{ F}$$

#### Kapasitor bank sebagai pennyimpanan sementara

Didapatkan tegangan sebesar : 13,5 V

Total kuat arus : 59,4 A

Waktu : 6,2 detik

$$C = \frac{Q}{V}$$

$$C = \frac{Q}{13,5 V}$$

$$C = \frac{I \times t}{13,5 V}$$

$$C = \frac{59,4 A \times 6,2 S}{13,5 V}$$

$$C = \frac{356,4 C}{13,5 V}$$

$$C = 26,89 F$$

**Total ukuran kapasitor bank**

$$C_{total} = C_1 + C_2$$

$$26,89 F + 0,087 F = 27,76 F$$

**Hasil Pengujian Kapasitor 2,7 V 10 F**

$$\frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} = \frac{5}{10} = \frac{10}{5} = 2 F$$

$$2,7 + 2,7 + 2,7 + 2,7 + 2,7 = 13,5 V$$

Hasil Pengukuran :

Tegangan 13,6 V

Kuat Arus 5A

Waktu Konstan 5 detik

$$C = \frac{Q}{V}$$

$$C = \frac{i \times t}{V}$$

$$C = \frac{5 A \times 5 S}{13,6 V}$$

$$C = 1,86 F$$

**Hasil Pengujian Kapasitor 2,7 V 100 F**

$$\frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} = \frac{5}{100} = \frac{100}{5} = 20 \text{ F}$$

$$2,7 + 2,7 + 2,7 + 2,7 + 2,7 = 13,5 \text{ V}$$

Hasil pengukuran :

Tegangan 13,6 V

Kuat Arus 5,43 A

Waktu konstan 5 detik

$$C = \frac{Q}{V}$$

$$C = \frac{i \times t}{V}$$

$$C = \frac{5,43 \text{ A} \times 48 \text{ s}}{13,6 \text{ V}}$$

$$C = 19,2 \text{ F}$$

**Pengujian Kapasitor 2,7 V 5 F**

$$\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{5}{5} = 1 \text{ F}$$

$$2,7 + 2,7 + 2,7 + 2,7 + 2,7 = 13,5 \text{ V}$$

Hasil pengukuran :

Tegangan 13,6 V

Kuat Arus 5,43A

Waktu konstan 0,4 detik

$$C = \frac{Q}{V}$$

$$C = \frac{i \times t}{V}$$

$$C = \frac{5,43 \text{ A} \times 0,4 \text{ S}}{13,6 \text{ V}}$$

$$C = 1,086 \text{ F}$$

### **Pengisian dengan Sumber *Battery* Aki 46AH**

Dari Percobaan didapatkan :

Tegangan sebesar 12 V

Kuat Arus 14,65 A

Waktu 22s

$$C = \frac{Q}{V}$$

$$C = \frac{Q}{12 \text{ V}}$$

$$C = \frac{I \times t}{12 \text{ V}}$$

$$C = \frac{14.65 \text{ A} \times 22 \text{ s}}{12 \text{ V}}$$

$$C = \frac{322,298 \text{ C}}{12 \text{ V}}$$

$$C = 26,8581 \text{ F}$$

### **Pengisian Sumber *Battery* Charge 20Ah**

Dari Percobaan diatas didapatkan :

Tegangan sebesar 15,2 V

Kuat Arus 20,1 A

Waktu 21,18 detik

Berdasarkan (2.60)

$$C = \frac{Q}{V}$$

$$C = \frac{Q}{15,2 \text{ V}}$$

$$C = \frac{I \times t}{15,2 \text{ V}}$$

$$C = \frac{20.1 \text{ A} \times 20.46 \text{ s}}{15,2 \text{ V}}$$

$$C = \frac{411,254 \text{ C}}{15,2 \text{ V}}$$

$$C = 27,0562 \text{ F}$$

### **Energi yang tersimpan dalam kapasitor bank**

Di dapatkan data sebagai berikut :

Tegangan 12 V

Kapasitansi 26,8581 F

$$\text{Energi tersimpan } w = \frac{1}{2} C V^2 \text{ Joule}$$

$$w = \frac{1}{2} 26,8581 \text{ F} \times 12^2 \text{ V}$$

$$w = 13,429 \times 144$$

$$w = 1933,783 \text{ J}$$

Didapatkan data sebagai berikut :

Tegangan 15.2 V

Kapasitansi 27,0562 F

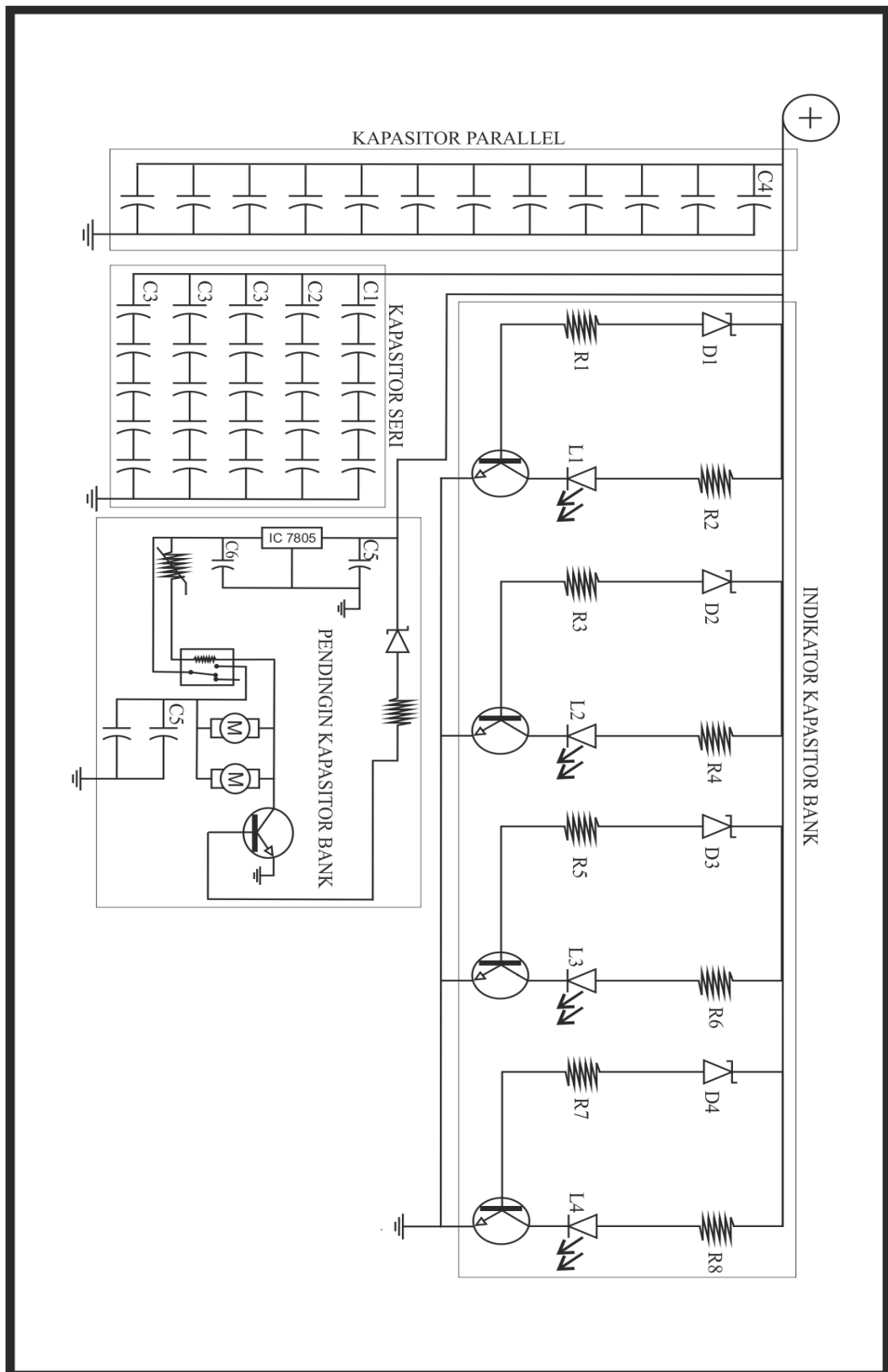
$$\text{Energi tersimpan } w = \frac{1}{2} C V^2 \text{ Joule}$$

$$w = \frac{1}{2} 27,0562 \text{ F} \times 15,2^2 \text{ V}$$










$$w = 13,528 \times 231,04$$

$$w = 3125,532 \text{ J}$$

## Lampiran 2. Wiring Diagram



### Lampiran 3. Keterangan *Wiring Diagram* Kapasitor Bank

-  Kapasitor: C1 = 2,7 V 100 F, C2 = 2,7 V 5 F, C3 = 2,7 V 10 F,  
 C4 = 16 V 6800  $\mu$ F, C5 = 10 V 4700  $\mu$ F, C6 = 16 V 4700  $\mu$ F
-  Dioda Zener: D1 = 12 V, D2 = 13 V, D3 = 13 V, D4 = 15 V
-  Lampu LED: L1 = Biru, L2 = Hijau, L3 = Kuning, L4 = Merah
-  *Transistor*: NPN
-  IC 7805
-  *Relay*: 5 V
-  Motor Kipas: 5 V
-  Resistor: R1 = 1,4k $\Omega$ , R2 = 1K $\Omega$ , R3 = 1,3K $\Omega$ , R4 = 180 $\Omega$ ,  
 R5 = 1,3K $\Omega$ , R6 = 1,3K $\Omega$ , R7=1K $\Omega$ , R8= 1,4K $\Omega$
-  *Thermistor*: NTC 45° C

### Lampiran 3. Foto Hasil Rancangan Kapasitor Bank

