

LAMPIRAN A

Program

```
#include <PZEM004Tv30.h>
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include <WiFi.h>
#if !defined(PZEM_RX_PIN) &&
!defined(PZEM_TX_PIN)
#define PZEM_RX_PIN 16
#define PZEM_TX_PIN 17
#endif
#if !defined(PZEM_SERIAL)
#define PZEM_SERIAL Serial2
#endif
#if defined(ESP32)
PZEM004Tv30 pzem(PZEM_SERIAL, PZEM_RX_PIN,
PZEM_TX_PIN);
#elif defined(ESP8266)
#else
PZEM004Tv30 pzem(PZEM_SERIAL);
#endif

#define BLYNK_PRINT Serial
#define cap10 19
#define cap5 18
#define cap3 5
unsigned long timeShow = 0;
unsigned long prefMilis;
int flagRun;
double s , q_sebelum , q_setelah , kebutuhan ,
capasitor , micro_farad ;
double xc;
double qc;
double tg_sudut;
float v, i , w , e, f, pf;
float v0, i0 , w0 , e0, f0, pf0;
float v1, i1 , w1 , e1, f1, pf1;
float ss, setelah, hasil;
float c_hasil;
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float pf_setelah;
float pf_sebelum;

#define BLYNK_TEMPLATE_ID "TMPL60ihFJmZA"
#define BLYNK_TEMPLATE_NAME "Tugas Akhir"
#define BLYNK_AUTH_TOKEN
"FwMq62BjO3UB183UpblZirBXNBXGndVZ"
#define BLYNK_PRINT Serial

#include <WiFi.h>
#include <WiFiClient.h>
#include <BlynkSimpleEsp32.h>

char auth[] = BLYNK_AUTH_TOKEN;
char ssid[] = "iPhone Dhiya";
char pass[] = "1233456abc";

unsigned long backTimer;
bool signupOK = false;
LiquidCrystal_I2C lcd(0x27, 20, 4);

void setup() {
  Blynk.begin(auth, ssid, pass);

  Serial.begin(9600);
  lcd.begin();
  lcd.backlight();
  pinMode(cap10, OUTPUT);
  pinMode(cap5, OUTPUT);
  pinMode(cap3, OUTPUT);
  digitalWrite(cap10, LOW);
  digitalWrite(cap5, LOW);
  digitalWrite(cap3, LOW);

}
void loop() {
  showLcd();
  pzemRead();
  rumusJL();
}

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logicNew();
Blynk.run();

if ((millis() - prefMilis) > 1000) {
Serial.println("voll= " + String(v) + " ");
Serial.println("current= " + String(i) + " ");
Serial.println("watt= " + String(w) + " ");
Serial.println("energy= " + String(e) + " ");
Serial.println("frek= " + String(f) + " ");
Serial.println("pf= " + String(pf) + " ");
Serial.println("_____");
Serial.println("kebutuhan= " + String(c_hasil) +
" ");
Serial.println("_____");
Blynk.virtualWrite(V1,v);
Blynk.virtualWrite(V2,i);
Blynk.virtualWrite(V3,w);
Blynk.virtualWrite(V4,e);
Blynk.virtualWrite(V5,pf);
delay(1500);
prefMilis = millis();
}
}

void pzemRead() {
v = pzem.voltage();
i = pzem.current();
w = pzem.power();
e = pzem.energy();
f = pzem.frequency();
pf = pzem.pf();

}

void rumus() {
s = v * i;
q_sebelum = w * (tan(acos (pf)));
q_setelah = w * (tan(acos (0.98)));
kebutuhan = q_sebelum - q_setelah;
kapasitor = (kebutuhan * 1000) / ((3.14 * 3.14)
* f) * (v * v);
}

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micro_farad = (capasitor * 1000000) / 1000;
xc = 1 / (2 * 3.14 * f * micro_farad);
qc = (v * v) / xc;
tg_sudut = qc / w;
setelah = atan(tg_sudut);
ss = sqrt((kebutuhan * kebutuhan) + (w * w));
hasil = (w / ss);
}
void rumusJL() {
//Rumus S
s = v * i;
float radarcos1 = (pf * 3.14) / 180;
float rad1 = acos((radarcos1) * 180 / 3.14);
float Arccos1 = rad1 * 57.3;
// Rumus Q1
float radsin = (Arccos1 * 3.14) / 180;
float Sin = sin(radsin);
float Q1 = v * i * Sin;
//Rumus Arccos 2
float phi2 = 0.98;
float radarcos2 = (phi2 * 3.14) / 180;
float rad2 = acos((radarcos2) * 180 / 3.14);
float Arccos2 = rad2 * 57.3;
// Rumus Q
float radtan = (Arccos2 * 3.14) / 180;
float Tan = tan(radtan);
float Q = w * Tan;
// Rumus Q2
float Q2 = Q1 - Q;
//Rumus Z
float Z = pow(v, 2) / Q2;
float C = (1 / (2 * 3.14 * 50 * Z)) * 1000000;
if (C < 0) {
C = C * -1;
}
else {
C = C;
}
c_hasil = C;
}
void showLcd() {

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lcd.setCursor(3, 0);
lcd.print("Data Pembacaan");

lcd.setCursor(0, 1);
lcd.print("V= |");
lcd.setCursor(2, 1);
lcd.print(v);

lcd.setCursor(0, 2);
lcd.print("I= |");
lcd.setCursor(2, 2);
lcd.print(i);

lcd.setCursor(0, 3);
lcd.print("F= |");
lcd.setCursor(2, 3);
lcd.print(f);

lcd.setCursor(10, 1);
lcd.print("Pf= |");
lcd.setCursor(14, 1);
lcd.print(pf);

lcd.setCursor(10, 2);
lcd.print("P = ");
lcd.setCursor(14, 2);
lcd.print(w);

lcd.setCursor(10, 3);
lcd.print("CAP= ");
lcd.setCursor(14, 3);
lcd.print(c_hasil);
delay(5000);
lcd.clear();
delay(500);
}

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void logicNew() {

if (c_hasil >= 0.5 and c_hasil <= 3.0) {
if (i <= 0) {
digitalWrite(cap10, LOW);
digitalWrite(cap5, LOW);
digitalWrite(cap3, LOW);

}
else {
digitalWrite(cap10, LOW);
digitalWrite(cap5, LOW);
digitalWrite(cap3, HIGH);

}

}
else if (c_hasil > 3.0 and c_hasil <= 5.0) {
if (i <= 0) {
digitalWrite(cap10, LOW);
digitalWrite(cap5, LOW);
digitalWrite(cap3, LOW);

}
else {
digitalWrite(cap10, LOW);
digitalWrite(cap5, HIGH);
digitalWrite(cap3, LOW);

}

}
else if (c_hasil > 5.0 and c_hasil <= 8.0) {
if (i <= 0) {
digitalWrite(cap10, LOW);
digitalWrite(cap5, LOW);
digitalWrite(cap3, LOW);

}
else {
digitalWrite(cap10, LOW);
digitalWrite(cap5, HIGH);
}
}
}

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digitalWrite(cap3, HIGH);

}
}
else if (c_hasil > 8.0 and c_hasil <= 10.0) {
if (i <= 0) {
digitalWrite(cap10, LOW);
digitalWrite(cap5, LOW);
digitalWrite(cap3, LOW);

}
else {
digitalWrite(cap10, HIGH);
digitalWrite(cap5, LOW);
digitalWrite(cap3, LOW);

}
}
else if (c_hasil > 10.0 and c_hasil <= 13.0) {
if (i <= 0) {
digitalWrite(cap10, LOW);
digitalWrite(cap5, LOW);
digitalWrite(cap3, LOW);

}
else {
digitalWrite(cap10, HIGH);
digitalWrite(cap5, LOW);
digitalWrite(cap3, HIGH);

}
}
else if (c_hasil > 13.0 and c_hasil <= 15.0) {
if (i <= 0) {
digitalWrite(cap10, LOW);
digitalWrite(cap5, LOW);
digitalWrite(cap3, LOW);

}
else {
digitalWrite(cap10, HIGH);

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digitalWrite(cap5, HIGH);
digitalWrite(cap3, LOW);

}
}
else if (c_hasil > 15.0 and c_hasil <= 18.0) {
if (i <= 0) {
digitalWrite(cap10, LOW);
digitalWrite(cap5, LOW);
digitalWrite(cap3, LOW);

}
else {
digitalWrite(cap10, HIGH);
digitalWrite(cap5, HIGH);
digitalWrite(cap3, HIGH);

}
}
else if ( c_hasil > 18.0) {
if (i <= 0) {
digitalWrite(cap10, LOW);
digitalWrite(cap5, LOW);
digitalWrite(cap3, LOW);

}
else {
digitalWrite(cap10, HIGH);
digitalWrite(cap5, HIGH);
digitalWrite(cap3, HIGH);

}
}
else {
digitalWrite(cap10, LOW);
digitalWrite(cap5, LOW);
digitalWrite(cap3, LOW);

}
delay(2000);
}

```


LAMPIRAN B

Dokumentasi



Komponen yang terpasang didalam panel box



Rangkaian push button, lampu indikator, saklar dan LCD I2C 20 x 4 pada pintu



Rangkaian kapasitor dan relay DC 12 V



Tampak depan



Tampak samping

BIODATA PENULIS



Nama : Dhiya Ulhaq
Tempat/Tanggal lahir : Kebumen,07 Mei 2002
Alamat : DS. Surotrunan RT03/03
Email : Ulhaqdhi29@gmail.com
Telepon/HP : 085878755142
Hobi : Membaca
Motto : Tidak ada kata terlambat

Riwayat Pendidikan

- SDN 2 Surotrunan Tahun 2009-2015
- SMP Negeri 7 Kebumen Tahun 2015-2018
- SMK Negeri 2 Kebumen Tahun 2018-2021
- Politeknik Negeri Cilacap Tahun 2021-2024
Prodi D3 Teknik Listrik

Penulis telah mengikuti sidang Tugas Akhir pada tanggal 5 agustus 2024 sebagai salah satu persyaratan untuk memperoleh gelar Ahli Madya (A.Md.)