

LAMPIRAN A

Program

```
#include <UTFT.h>
#include <PZEM004Tv30.h>
#include <URTouch.h>
#include <EEPROM.h>
#include <TimerOne.h>
UTFT myGLCD(ILI9341_16,38,39,40,41);
URTouch myTouch( 6, 5, 4, 3, 2);
//Defining Variables
extern uint8_t SmallFont[];
extern uint8_t BigFont[];
extern uint8_t SevenSegNumFont[];
unsigned long prefMilis;
int x, y;
int pencacah;
char currentPage, selectedUnit;
#define cap1 12
#define cap2 11
#define cap3 10

//pzem serial 1
#if !defined(PZEM1_SERIAL)
#define PZEM1_SERIAL Serial1
#endif
#if defined(ATMega2560)
PZEM004Tv30 pzem1(PZEM_SERIAL1, PZEM_RX_PIN,
PZEM_TX_PIN);
#elif defined(ATMega2560)
#else
PZEM004Tv30 pzem1(PZEM1_SERIAL);
#endif

//pzem serial 2
#if !defined(PZEM2_SERIAL)
#define PZEM2_SERIAL Serial2
#endif
#if defined(ATMega2560)
```

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PZEM004Tv30 pzem2(PZEM_SERIAL2, PZEM_RX_PIN,
PZEM_TX_PIN);
#elif defined(ATMega2560)
#else
PZEM004Tv30 pzem2(PZEM2_SERIAL);
#endif
//pzem serial 3
#if !defined(PZEM3_SERIAL)
#define PZEM3_SERIAL Serial3
#endif
#if defined(ATMega2560)
PZEM004Tv30 pzem3(PZEM_SERIAL3, PZEM_RX_PIN,
PZEM_TX_PIN);
#elif defined(ATMega2560)
#else
PZEM004Tv30 pzem3(PZEM3_SERIAL);
#endif

```

```

float voltage1, current1, power1, energy1, frequency1, pf1, va1, VAR1;
float voltage2, current2, power2, energy2, frequency2, pf2, va2, VAR2;
float voltage3, current3, power3, energy3, frequency3, pf3, va3, VAR3;
float voltage3ph, current3ph, power3ph, energy3ph, frequency3ph,
pf3ph, va3ph, VAR3ph;
float arus1, arus2, arus3, arus3ph;

```

```

float ss, setelah, hasil;
float c_hasil;
float pf_setelah;
float pf_sebelum;
double S , q_sebelum , q_setelah , kebutuhan , capasitor , micro_farad ;
double xc;
double qc;
double tg_sudut;

```

```

float nilaiVAR_Sebelum;
float nilaiVAR_Sesudah;

```

```

float radsin = acos(pf3ph);

```

```

float Sin = sin(radsin);

float phi2 = 0.98;
float radarcos2 = (phi2 * 3.14) / 180;
float rad2 = acos((radarcos2) * 180 / 3.14);
float Arccos2 = rad2 * 57.3;

float beforePF;
float afterPF;

void setup() {

  Serial.begin(9600);
  myGLCD.InitLCD();
  myGLCD.clrScr();
  myTouch.InitTouch();
  myTouch.setPrecision(PREC_MEDIUM);

  pinMode(cap1, OUTPUT);
  pinMode(cap2, OUTPUT);
  pinMode(cap3, OUTPUT);
  digitalWrite(9, HIGH);
  digitalWrite(cap1, LOW);
  digitalWrite(cap2, LOW);
  digitalWrite(cap3, LOW);
  HomeScreen();
  currentPage = '0';
  selectedUnit = '0';
}

void loop() {

  if (currentPage == '0') {

    if (myTouch.dataAvailable()) {
      myTouch.read();
      x=myTouch.getX();
      y=myTouch.getY();
    }
  }
}

```

```

// tombol ke 1 di homescreen
if ((x>=35) && (x<=285) && (y>=90) && (y<=130)) {
    drawFrame(35, 90, 285, 130);
    currentPage = '1';
    myGLCD.clrScr();
    Daya();
}
//tombol ke2 di homescreen
if ((x>=35) && (x<=285) && (y>=140) && (y<=180)) {
    drawFrame(35, 140, 285, 180);
    currentPage = '2';
    myGLCD.clrScr();
    cosPhi();
    beforePF = pf3ph;
    Serial.print("Pf sebelum ");
    Serial.println(beforePF);
}
//tombol ke 3 di homescreen
if ((x>=35) && (x<=285) && (y>=190) && (y<=230)) {
    drawFrame(35, 190, 285, 230);
    currentPage = '3';
    myGLCD.clrScr();
    kebutuhanVAR();//tampilan belum di atur
}

}
}

// tampilan tombol daya, daya perphase dan 3phase
if (currentPage == '1') {
    teganganArus();
    if (myTouch.dataAvailable()) {
        myTouch.read();
        x=myTouch.getX();

```

```

y=myTouch.getY();
// tombol kembali
if ((x>=10) && (x<=70) &&(y>=10) && (y<=50)) {
    drawFrame(10, 10, 60, 36);
    currentPage = '0';
    myGLCD.clrScr();
    HomeScreen();
}
}
}

// tampilan tombol cos Phi, penampilan pembacaan cos phi
if (currentPage == '2') {
    cos();

    if (myTouch.dataAvailable()) {
        myTouch.read();
        x=myTouch.getX();
        y=myTouch.getY();
        //tombol On
        if ((x>=150) && (x<=200) &&(y>=190) && (y<=230)) {
            drawFrame(150, 190, 200, 230);
            currentPage = '2';
            capOtomatis();
        }
        // tombol kembali
        if ((x>=10) && (x<=70) &&(y>=10) && (y<=50)) {
            drawFrame(10, 10, 60, 36);
            currentPage = '0';
            myGLCD.clrScr();
            HomeScreen();
        }
    }
}
if (myTouch.dataAvailable()) {
    myTouch.read();
    x=myTouch.getX();
    y=myTouch.getY();
    // tombol off
    if ((x>=210) && (x<=260) &&(y>=190) && (y<=230)) {

```

```

drawFrame(210, 190, 260, 230);
currentPage = '2';
pf_setelah = 0;
digitalRead(capOtomatis == LOW);
digitalWrite(cap1, LOW);
digitalWrite(cap2, LOW);
digitalWrite(cap3, LOW);
}
// tombol saklar 1.33 var
if ((x>=10) && (x<=82) &&(y>=60) && (y<=95)) {
drawFrame(10, 60, 82, 95);
currentPage = '2';
cosPhi();
Serial.print("Pf sesudah ");
Serial.println(afterPF);
digitalWrite(cap1, HIGH);
digitalWrite(cap2, LOW);
digitalWrite(cap3, LOW);
}
// tombol saklar 2.5 var
if ((x>=10) && (x<=82) &&(y>=105) && (y<=140)) {
drawFrame(10, 105, 82, 140);
currentPage = '2';
cosPhi();
Serial.print("Pf sesudah ");
Serial.println(afterPF);
digitalWrite(cap1, LOW);
digitalWrite(cap2, HIGH);
digitalWrite(cap3, LOW);
}
// tombol saklar 3.73
if ((x>=10) && (x<=82) &&(y>=150) && (y<=185)) {
drawFrame(10, 150, 82, 185);
currentPage = '2';
cosPhi();
Serial.print("Pf sesudah ");
Serial.println(afterPF);
digitalWrite(cap1, HIGH);

```

```

    digitalWrite(cap2, HIGH);
    digitalWrite(cap3, LOW);
  }
  // tombol saklar 5 kvar
  if ((x>=10) && (x<=82) &&(y>=195) && (y<=230)) {
    drawFrame(10, 195, 82, 230);
    currentPage = '2';
    cosPhi();
    Serial.print("Pf sesudah ");
    Serial.println(afterPF);
    digitalWrite(cap1, LOW);
    digitalWrite(cap2, LOW);
    digitalWrite(cap3, HIGH);
  }
}
}

// tampilan tombol VAR, Penampilan perhitungan Nilai VAR dan
// kapasitor
if (currentPage == '3') {
  VAR();
  if (myTouch.dataAvailable()) {
    myTouch.read();
    x=myTouch.getX();
    y=myTouch.getY();
    // tombol kembali
    if ((x>=10) && (x<=70) &&(y>=10) && (y<=50)) {
      drawFrame(10, 10, 60, 36);
      currentPage = '0';
      myGLCD.clrScr();
      HomeScreen();
    }
  }
}

PZEM();
rumus();
rumus2();
}

```

```

void rumus(){ // rumus daya semu  $S = V_a$ 
  S = voltage3ph * current3ph;
  q_sebelum = power3ph * (tan(acos (pf3ph)));
  q_setelah = power3ph * (tan(acos (0.98)));
  kebutuhan = q_sebelum - q_setelah;
  capasitor = (kebutuhan * 1000) / (((3.14 * 3.14) * frequency3ph) *
(voltage3ph * voltage3ph));
  micro_farad = (capasitor * 1000000) / 1000;
  xc = 1 / (2 * 3.14 * frequency3ph * micro_farad);
  qc = (voltage3ph * voltage3ph) / xc;
  tg_sudut = qc / power3ph;
  setelah = atan(tg_sudut);
  ss = sqrt((kebutuhan * kebutuhan) + (power3ph * power3ph));
  hasil = (power3ph / ss);
}

```

```

void rumus2(){ // perhitungan kapasitor
  S = voltage3ph * current3ph;
  float radarcos1 = (pf3ph * 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 = voltage3ph * current3ph * 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 = power3ph * Tan;
// Rumus Q2
float Q2 = Q1 - Q;

```



```

//Rumus Z
float Z = pow(voltage3ph, 2) / Q2;
float C = (1 / (2 * 3.14 * 50 * Z)) * 1000000;
if (C < 0) {
    C = C * -1;
}
else {
    C = C;
}
c_hasil = C;
Serial.print("kapasitor : ");
Serial.print(c_hasil);
Serial.println("uF");
}

void capOtomatis() { //untuk mengaktifkan tombol otomatis perbaikan
    // KEADAAN 1
    if (c_hasil >= 1.0 and c_hasil <= 29.0) {
        if (current3ph <= 0) {
            digitalWrite(cap1, LOW);
            digitalWrite(cap2, LOW);
            digitalWrite(cap3, LOW);
        }
        else {
            digitalWrite(cap1, HIGH);
            digitalWrite(cap2, LOW);
            digitalWrite(cap3, LOW);
        }
    }
    //KEADAAN 2
    else if (c_hasil > 29.0 and c_hasil <= 55.0) {
        if (current3ph <= 0) {
            digitalWrite(cap1, LOW);
            digitalWrite(cap2, LOW);
            digitalWrite(cap3, LOW);
        }
        else {
            digitalWrite(cap1, LOW);
            digitalWrite(cap2, HIGH);

```

```

    digitalWrite(cap3, LOW);
  }
}
// KEADAAN 3
else if (c_hasil > 55.0 and c_hasil <= 84.0) {
  if (current3ph <= 0) {
    digitalWrite(cap1, LOW);
    digitalWrite(cap2, LOW);
    digitalWrite(cap3, LOW);
  }
  else {
    digitalWrite(cap1, HIGH);
    digitalWrite(cap2, HIGH);
    digitalWrite(cap3, LOW);
  }
}
// KEADAAN 4
else if (c_hasil > 84.0 and c_hasil <= 110.0) {
  if (current3ph <= 0) {
    digitalWrite(cap1, LOW);
    digitalWrite(cap2, LOW);
    digitalWrite(cap3, LOW);
  }
  else {
    digitalWrite(cap1, LOW);
    digitalWrite(cap2, LOW);
    digitalWrite(cap3, HIGH);
  }
}

}

// membuat tampilan awal
void HomeScreen(){
//judul
myGLCD.setBackColor(0,0,0);
myGLCD.setColor(255, 255, 255);

```

```

myGLCD.setFont(BigFont);
myGLCD.print("Perbaikan Cos Phi", CENTER, 10);
myGLCD.setColor(255, 0, 0);
myGLCD.drawLine(0,32,319,32);
myGLCD.setColor(255, 255, 255);
myGLCD.setFont(SmallFont);
myGLCD.print("By Ryan Fardon Faiza", CENTER, 41);
myGLCD.setFont(BigFont);
myGLCD.print("Main Menu", CENTER, 64);

//tombol ke1
myGLCD.setColor(16, 167, 103);
myGLCD.fillRoundRect (35, 90, 285, 130);
myGLCD.setColor(255, 0, 0);
myGLCD.drawRoundRect (35, 90, 285, 130);
myGLCD.setFont(BigFont);
myGLCD.setBackColor(16, 167, 103);
myGLCD.print("DAYA PerPhase", CENTER, 102);

//tombol ke2
myGLCD.setColor(16, 167, 103);
myGLCD.fillRoundRect (35, 140, 285, 180);
myGLCD.setColor(255, 0, 0);
myGLCD.drawRoundRect (35, 140, 285, 180);
myGLCD.setFont(BigFont);
myGLCD.setBackColor(16, 167, 103);
myGLCD.print("Cos Phi", CENTER, 152);

// tombol Ke3
myGLCD.setColor(16, 167, 103);
myGLCD.fillRoundRect (35, 190, 285, 230);
myGLCD.setColor(255, 0, 0);
myGLCD.drawRoundRect (35, 190, 285, 230);
myGLCD.setFont(BigFont);
myGLCD.setBackColor(16, 167, 103);
myGLCD.print("Kebutuhan VAR", CENTER, 202);
}

void drawFrame(int x1, int y1, int x2, int y2) {

```

```

myGLCD.setColor(255, 0, 0);
myGLCD.drawRoundRect(x1, y1, x2, y2);
while (myTouch.dataAvailable())
    myTouch.read();
    myGLCD.setColor(255, 255, 255);
    myGLCD.drawRoundRect(x1, y1, x2, y2);
}

```

```

void Daya() { // currentPage 1
myGLCD.setColor(100, 155, 203);
myGLCD.fillRoundRect (10, 10, 60, 36);
myGLCD.setColor(255, 255, 255);
myGLCD.drawRoundRect (10, 10, 60, 36);
myGLCD.setFont(SmallFont);
myGLCD.setBackColor(100, 155, 203);
myGLCD.print("BACK", 18, 17);

```

```

myGLCD.setBackColor(0, 0, 0);
myGLCD.setFont(SmallFont);
myGLCD.print("Tegangan Dan Arus Phase", 100, 18);
myGLCD.setColor(255, 0, 0);
myGLCD.drawLine(0,50,319,50);
myGLCD.setBackColor(0, 0, 0);

```

```

myGLCD.setColor(255, 255, 255);
myGLCD.setFont(SmallFont);
myGLCD.print("1 Phase", 30, 57);

```

```

myGLCD.setFont(BigFont);
myGLCD.print(" Phase RST:", 145, 67);
myGLCD.setColor(223, 77, 55);

```

```

myGLCD.fillRoundRect (10, 70, 138, 120);
myGLCD.setColor(225, 255, 255);
myGLCD.drawRoundRect (10, 70, 138, 120);
myGLCD.setBackColor(223, 77, 55);
myGLCD.setColor(255, 255, 255);
myGLCD.print("R", 16, 76);

```

```

myGLCD.setColor(223, 77, 55);

myGLCD.fillRoundRect (10, 130, 138, 180);
myGLCD.setColor(225, 255, 255);
myGLCD.drawRoundRect (10, 130, 138, 180);
myGLCD.setBackColor(223, 77, 55);
myGLCD.setColor(255, 255, 255);
myGLCD.print("S", 16, 136);
myGLCD.setColor(223, 77, 55);

myGLCD.fillRoundRect (10, 190, 138, 240);
myGLCD.setColor(225, 255, 255);
myGLCD.drawRoundRect (10, 190, 138, 240);
myGLCD.setBackColor(223, 77, 55);
myGLCD.setColor(255, 255, 255);
myGLCD.print("T", 16, 196);
myGLCD.setColor(223, 77, 55);

myGLCD.fillRoundRect (160, 100, 300, 200);
myGLCD.setColor(225, 255, 255);
myGLCD.drawRoundRect (160, 100, 300, 200);
myGLCD.setBackColor(223, 77, 55);
myGLCD.setColor(255, 255, 255);
myGLCD.print(" 3Phase", 169, 106);
myGLCD.setColor(223, 77, 55);

}

void cosPhi(){ //currentPage 2
    // tombol back
    myGLCD.setColor(100, 155, 203);
    myGLCD.fillRoundRect (10, 10, 60, 36);
    myGLCD.setColor(255, 255, 255);
    myGLCD.drawRoundRect (10, 10, 60, 36);
    myGLCD.setFont(SmallFont);
    myGLCD.setBackColor(100, 155, 203);
    myGLCD.print("BACK", 18, 17);
    // titel Cos
    myGLCD.setBackColor(0, 0, 0);

```

```

myGLCD.setFont(BigFont);
myGLCD.print("Cos Phi", 130, 18);
myGLCD.setColor(255, 0, 0);
myGLCD.drawLine(0,50,319,50);
myGLCD.setBackColor(0, 0, 0);
    // tombol on
myGLCD.setColor(100, 155, 203);
myGLCD.fillRoundRect (150, 190, 200, 230);
myGLCD.setColor(255, 255, 255);
myGLCD.drawRoundRect (150, 190, 200, 230);
myGLCD.setFont(BigFont);
myGLCD.setBackColor(100, 155, 203);
myGLCD.print("ON", 158, 202);
myGLCD.setBackColor(0, 0, 0);
    // tombol off
    myGLCD.setColor(255, 0, 0);
myGLCD.fillRoundRect (210, 190, 260, 230);
myGLCD.setColor(255, 255, 255);
myGLCD.drawRoundRect (210, 190, 260, 230);
myGLCD.setFont(BigFont);
myGLCD.setBackColor(255, 0, 0);
myGLCD.print("OFF", 212, 202);
myGLCD.setBackColor(0, 0, 0);
    // garis tengah
    myGLCD.setColor(255, 255, 255);
myGLCD.drawLine (205, 60, 205, 183);
myGLCD.setBackColor(0, 0, 0);
// cos phi sebelum
myGLCD.setBackColor(0, 0, 0);
myGLCD.setFont(SmallFont);
myGLCD.print("Cos Phi", 120, 72);
myGLCD.print("Sebelum", 120, 90);
myGLCD.setBackColor(0, 0, 0);
// cos phi sesudah
myGLCD.setBackColor(0, 0, 0);
myGLCD.setFont(SmallFont);
myGLCD.print("Cos Phi", 240, 72);
myGLCD.print("Sesudah", 240, 90);

```

```

myGLCD.setBackgroundColor(0, 0, 0);

// tombol 1.33VAr
myGLCD.setColor(255, 0, 0);
myGLCD.fillRoundRect (10, 60, 82, 95);
myGLCD.setColor(255, 255, 255);
myGLCD.drawRoundRect (10, 60, 82, 95);
myGLCD.setFont(SmallFont);
myGLCD.setBackgroundColor(255, 0, 0);
myGLCD.print("1.33KVAR", 16, 72);
myGLCD.setBackgroundColor(0, 0, 0);
// tombol 2.5
myGLCD.setColor(255, 0, 0);
myGLCD.fillRoundRect (10, 105, 82, 140);
myGLCD.setColor(255, 255, 255);
myGLCD.drawRoundRect (10, 105, 82, 140);
myGLCD.setFont(SmallFont);
myGLCD.setBackgroundColor(255, 0, 0);
myGLCD.print("2.5KVAR", 18, 117);
myGLCD.setBackgroundColor(0, 0, 0);
// tombol 3.73
myGLCD.setColor(255, 0, 0);
myGLCD.fillRoundRect (10, 150, 82, 185);
myGLCD.setColor(255, 255, 255);
myGLCD.drawRoundRect (10, 150, 82, 185);
myGLCD.setFont(SmallFont);
myGLCD.setBackgroundColor(255, 0, 0);
myGLCD.print("3.73KVAR", 16, 162);
myGLCD.setBackgroundColor(0, 0, 0);
//tombol 5
myGLCD.setColor(255, 0, 0);
myGLCD.fillRoundRect (10, 195, 82, 230);
myGLCD.setColor(255, 255, 255);
myGLCD.drawRoundRect (10, 195, 82, 230);
myGLCD.setFont(SmallFont);
myGLCD.setBackgroundColor(255, 0, 0);
myGLCD.print("5KVAR", 29, 207);
myGLCD.setBackgroundColor(0, 0, 0);

```

```

}

void kebutuhanVAR(){ // currentPage 3
myGLCD.setColor(100, 155, 203);
myGLCD.fillRoundRect (10, 10, 60, 36);
myGLCD.setColor(255, 255, 255);
myGLCD.drawRoundRect (10, 10, 60, 36);
myGLCD.setFont(SmallFont);
myGLCD.setBackColor(100, 155, 203);
myGLCD.print("BACK", 18, 17);
myGLCD.setColor(255, 0, 0);
myGLCD.drawLine(0,50,319,50);
myGLCD.setBackColor(0, 0, 0);
}

void PZEM() { // data sensor Pzem
voltage1 = pzem1.voltage() ;
current1 = pzem1.current();
power1 = pzem1.power();
energy1 = pzem1.energy();
frequency1 = pzem1.frequency();
pf1 = pzem1.pf();
arus1 = 1000 * current1; //nilai arus dalam mA
//daya semu(S) fasa R
if (pf1 == 0) {
    va1 = 0;
} else {
    va1 = voltage1 * current1;
}
//daya reaktif(Q) fasa R
if (pf1 == 0) {
    VAR1 = 0;
} else {
    VAR1 = va1 * Sin ;
}

voltage2 = pzem2.voltage();
current2 = pzem2.current();

```



```

power2 = pzem2.power();
energy2 = pzem2.energy() / 1000; //kwh
frequency2 = pzem2.frequency();
pf2 = pzem2.pf();
arus2 = 1000 * current2; //nilai arus dalam mA

```

```

//daya semu(S) fasa S
if (pf2 == 0) {
    va2 = 0;
} else {
    va2 = voltage2 * current2;
}
//daya reaktif(Q) fasa S
if (pf2 == 0) {
    VAR2 = 0;
} else {
    VAR2 = va2 * Sin;
}

```

```

voltage3 = pzem3.voltage();
current3 = pzem3.current();
power3 = pzem3.power();
energy3 = pzem3.energy() / 1000; //kwh
frequency3 = pzem3.frequency();
pf3 = pzem3.pf();
arus3 = 1000 * current3; //nilai arus dalam mA

```

```

//daya semu(S) fasa T
if (pf3 == 0) {
    va3 = 0;
} else {
    va3 = voltage1 * current1;
}
//daya reaktif(Q) fasa T
if (pf3 == 0) {
    VAR3 = 0;
} else {
    VAR3 = va3 * Sin;
}

```

```

// 3 Phase
voltage3ph = sqrt(sq(voltage1) + sq(voltage2) + sq(voltage3));
current3ph = (current1 + current2 + current3) * 1/3;
power3ph = voltage3ph * current3ph * beforePF;
energy3ph = (energy1 + energy2 + energy3);
va3ph = sqrt(sq(va1) + sq(va2) + sq(va3));
VAR3ph = sqrt(sq(VAR1) + sq(VAR2) + sq(VAR3));
frequency3ph = (frequency1 + frequency2 + frequency3)/3;
pf3ph = (pf1 + pf2 + pf3)/3;
arus3ph = (arus1 + arus2 + arus3) * 1/3;

}

//mengatur tampilan pada tombol Daya
void teganganArus(){ // currentPage 1 pemanggilan dan penampilan
sensor pzem
//pemanggilan nilai sensor V Phase R
myGLCD.setFont(BigFont);
myGLCD.setColor(0, 255, 0);
myGLCD.printNumI(voltage1, 30, 76, 3,'0');
myGLCD.setFont(BigFont);
myGLCD.print(" V",95, 76);
// pemanggilan nilai sensor A Phase R
myGLCD.setFont(BigFont);
myGLCD.setColor(0, 255, 0);
myGLCD.printNumI(arus1,30, 96);
myGLCD.setFont(BigFont);
myGLCD.print("mA", 105, 96);
//pemanggilan nilai sensor V Phase S
myGLCD.setFont(BigFont);
myGLCD.setColor(0, 255, 0);
myGLCD.printNumI(voltage2,30, 136, 3,'0');
myGLCD.setFont(BigFont);
myGLCD.print(" V", 95, 136);
// pemanggilan nilai sensor V Phase S
myGLCD.setFont(BigFont);
myGLCD.setColor(0, 255, 0);
myGLCD.printNumI(arus2,30, 156);

```

```

myGLCD.setFont(BigFont);
myGLCD.print("mA", 105, 156);
//pemanggilan nilai sensor V Phase T
myGLCD.setFont(BigFont);
myGLCD.setColor(0, 255, 0);
myGLCD.printNumI(voltage3,30, 196, 3,'0');
myGLCD.setFont(BigFont);
myGLCD.print(" V", 95, 196);
// pemanggilan nilai sensor A Phase T
myGLCD.setFont(BigFont);
myGLCD.setColor(0, 255, 0);
myGLCD.printNumI(arus3,30, 216);
myGLCD.setFont(BigFont);
myGLCD.print("mA", 105, 216);
//pemanggilan nilai sensor V Phase RST /3Phase
myGLCD.setFont(BigFont);
myGLCD.setColor(0, 255, 0);
myGLCD.printNumI(voltage3ph,176, 130, 3,'0');
myGLCD.setFont(BigFont);
myGLCD.print(" V", 240, 130);
// pemanggilan nilai sensor A Phase RST /3Phase
myGLCD.setFont(BigFont);
myGLCD.setColor(0, 255, 0);
myGLCD.printNumI(arus3ph, 176, 150);
myGLCD.setFont(BigFont);
myGLCD.print("mA", 250, 150);
delay(1000);
}

```

```

// mengatur tampilan pada tampilan cos phi
void cos(){ // currentPage 2 penampilan dan pemanggilan cos phi
myGLCD.setFont(BigFont); // sebelum
myGLCD.setColor(0, 255, 0);
myGLCD.setBackColor(0, 0, 0);
myGLCD.print("0.", 120, 140);
myGLCD.printNumI( beforePF * 100, 148, 140);
myGLCD.setFont(BigFont); // sesudah
myGLCD.setColor(0, 255, 0);
myGLCD.setBackColor(0, 0, 0);

```

```

myGLCD.print("0.", 240, 140);
myGLCD.printNumI(afterPF, 268, 140);

}

void VAR(){
    // nilai Q sebelum
    float phi1 = acos(beforePF);
    float Q1 = power3ph * (tan(phi1));
    // nilai Q sesudah
    float phi2 = acos(0.98);
    float Q2 = power3ph * (tan(phi2));
    // nilai Qc
    float Qc = Q1 - Q2;
    // perhitungan nilai kapasitor dari Qc
    float C_Ha = Qc / (2 * 3.14 * 50 * (voltage3ph * voltage3ph));
    float C = C_Ha * 1000000;
    if (isnan(C)){
        Serial.println("Gagal C");
    }
    else{
        Serial.print("nilai Kebutuhan CAP : ");
        Serial.print(C);
        Serial.println(" uF");
    }
    Serial.println();
    // garis tengah
    myGLCD.setColor(255, 255, 255);
    myGLCD.drawLine (162, 60, 162, 170);
    myGLCD.setBackColor(0, 0, 0);
    // pengaturan tampilan Q sebelum
    myGLCD.setBackColor(0, 0, 0);
    myGLCD.setFont(SmallFont);
    myGLCD.setColor(0, 255, 0);
    myGLCD.print("Q Lama", 20, 70);
    myGLCD.print("Cos phi=", 20, 85);
    myGLCD.printNumI(beforePF*100,90, 85);
    myGLCD.print("phi=", 20, 100);

```

```

myGLCD.printNumI(phi1,55, 100);
// Q1
myGLCD.print("Q1 =", 20, 115);
myGLCD.print("P tan phi", 55, 115);
myGLCD.print("=", 44, 130);
myGLCD.printNumI(power3ph, 55, 130);
myGLCD.print("tan", 90, 130);
myGLCD.printNumI(phi1, 120, 130);
myGLCD.print("=", 44, 145);
myGLCD.printNumI(Q1 , 55, 145);
myGLCD.print("VAR", 100, 145);
// pengaturan tampilan Q sesudah
myGLCD.setBackgroundColor(0, 0, 0);
myGLCD.setFont(SmallFont);
myGLCD.setColor(0, 255, 0);
myGLCD.print("Q Baru", 180, 70);
myGLCD.print("Cos phi=", 180, 85);
myGLCD.print("0.98",250, 85);
myGLCD.print("phi=", 180, 100);
myGLCD.print("11.47",215, 100);
// Q2
myGLCD.print("Q2 =", 180, 115);
myGLCD.print("P tan phi", 215, 115);
myGLCD.print("=", 204, 130);
myGLCD.printNumI(power3ph, 215, 130);
myGLCD.print("tan", 250, 130);
myGLCD.printNumI(phi2, 280, 130);
myGLCD.print("=", 204, 145);
myGLCD.printNumI(Q2 , 215, 145);
myGLCD.print("VAR", 260, 145);
myGLCD.setBackgroundColor(0, 0, 0);
// perhitungan Q1 dan Q2
myGLCD.setBackgroundColor(0, 0, 0);
myGLCD.setFont(SmallFont);
myGLCD.setColor(255, 255, 255);
myGLCD.print("Qc = Q1 - Q2", 20, 180);
myGLCD.print("=", 44, 200);
myGLCD.printNumI(Qc, 60, 200);
myGLCD.print("VAR", 100, 200);





```

```
// perhitungan nilai kapasitor
myGLCD.print("C =      Qc", 140, 180);
myGLCD.print("2.3,14.50.(380)^2", 174, 202);
myGLCD.print("=", 160, 220);
myGLCD.printNumI(C , 176, 220);
myGLCD.print("uF", 240, 220);
    //garis bawah
myGLCD.setColor(255, 0, 0);
myGLCD.drawLine(170,195,310,195);
myGLCD.setBackColor(0, 0, 0);

}
```

LAMPIRAN B
Gambar Dokumentasi

	<p style="text-align: center;">Perancangan Alat</p>
	<p style="text-align: center;">Perancangan Alat setelah diWairing</p>
	<p style="text-align: center;">Pengukuran menggunakan alar ukur Cos Phi</p>

	<p>Pengujian alat pada beban motor dan monitoring pada LCD TFT</p>
	<p>Pengujian Pada lampu Pijar</p>
	<p>Tampilan pada alat ukur Cos Phi pada beban Lampu pijar</p>
	<p>Tampilan pada LCD Cos Phi pada beban Lampu pijar</p>



Pengujian menggunakan
Blower



Pengujian menggunakan
Blower dan 2 motor induksi
0,5 Hp

BIODATA PENULIS



Nama : Ryan Fardon Faiza
Tempat/Tanggal lahir : Banyumas, 24 ANovember 2003
Alamat : Desa Kuntuli, Jl.Pramuka Rt.02
Rw.03, Kecamatan Sumpiuh,
Kabupaten Banyumas
Email : Ryanfardonfaiza123@gmail.com
Telepon/HP : 0895360844250
Hobi : Tidak menentu, tergantung musim
Motto : Selalu ingat Allah SWT

Riwayat Pendidikan

- MI Miftahul Jannah Kuntuli Tahun 2009-2015
- SMP Negeri 2 Sumpiuh Tahun 2015-2018
- SMK Maarif NU 1 Sumpiuh 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.)