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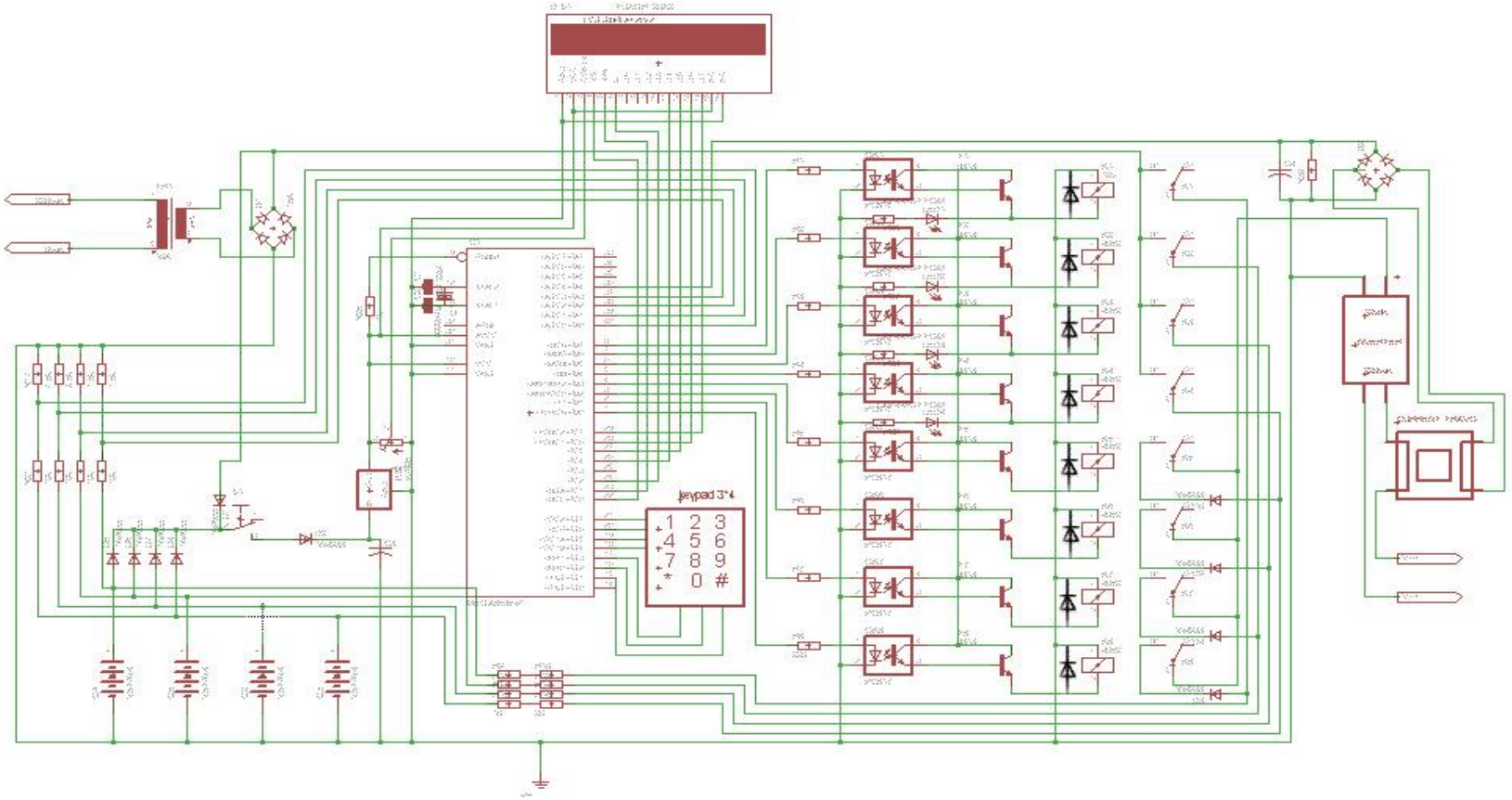
DAFTAR LAMPIRAN

Lampiran 1

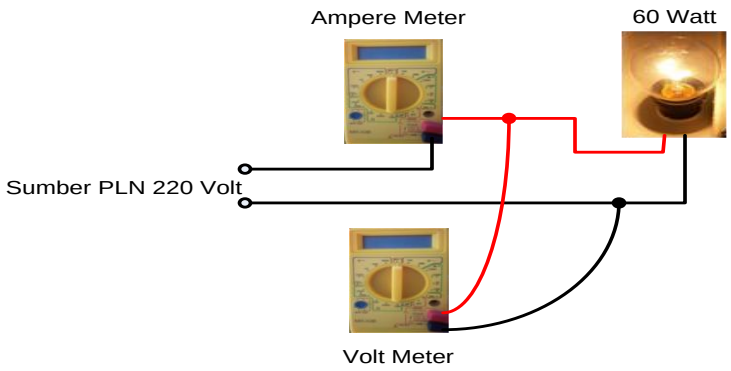
GAMBAR SISTEM



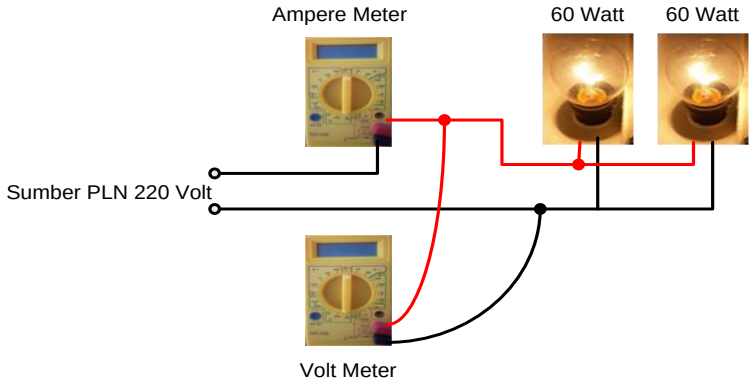
Lampiran 2

MODELING PENGUKURAN BEBAN

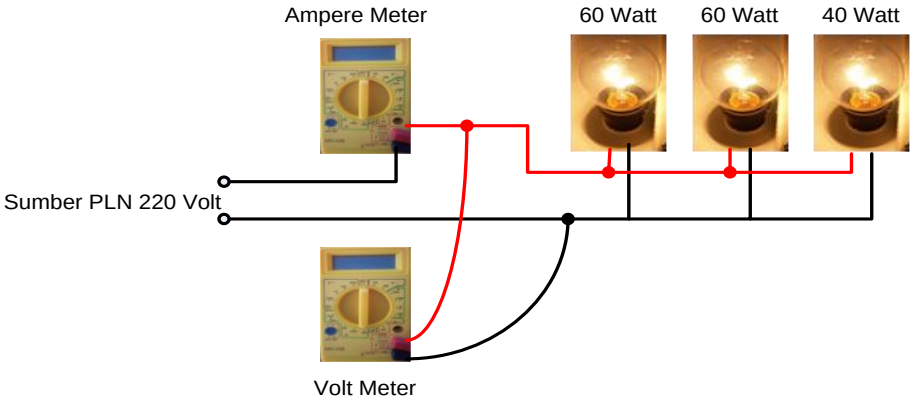
Modeling untuk pengukuran 1 beban lampu 60 Watt



Modeling untuk pengukuran 2 beban lampu 120 Watt



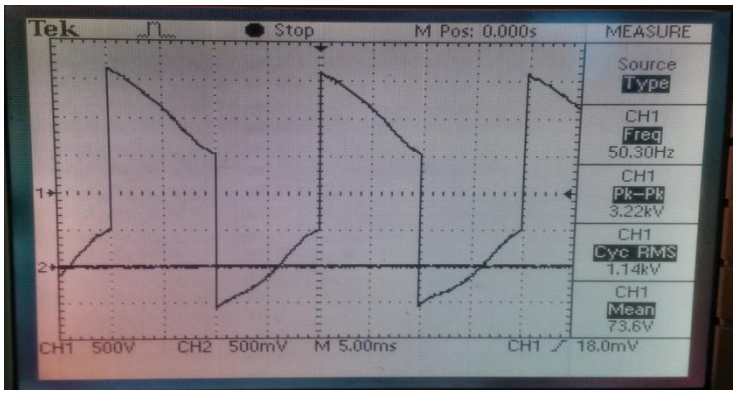
Modeling untuk pengukuran 3 beban lampu 160 Watt



LAMPIRAN 3

PENGUJIAN SISTEM

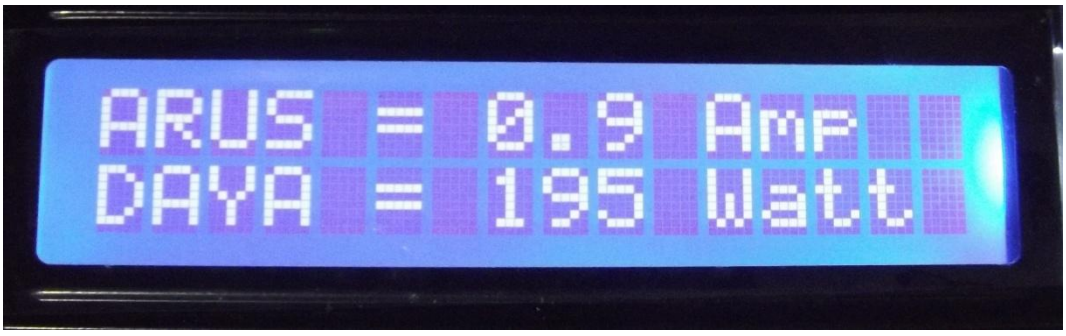
Pengujian Beban Resistif (Beban Lampu)



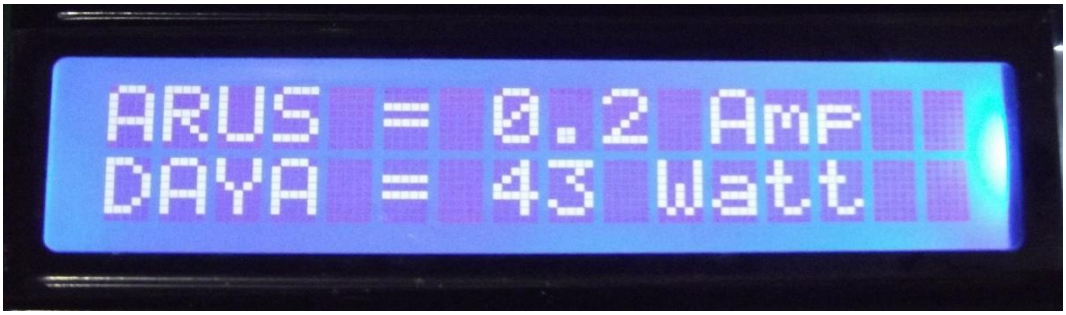
Grafik Pengukuran Beban Resistif (Beban Lampu)

Beban Lampu Pijar 60 W

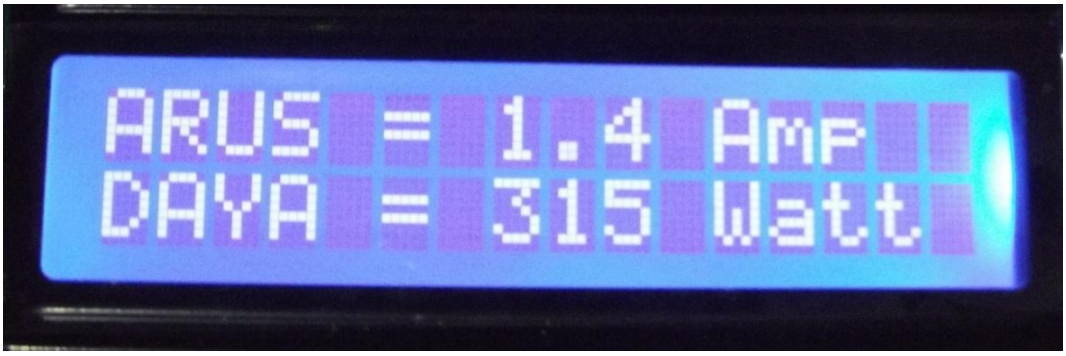
Beban Lampu Pijar 120 W



Beban Lampu Pijar 160 W

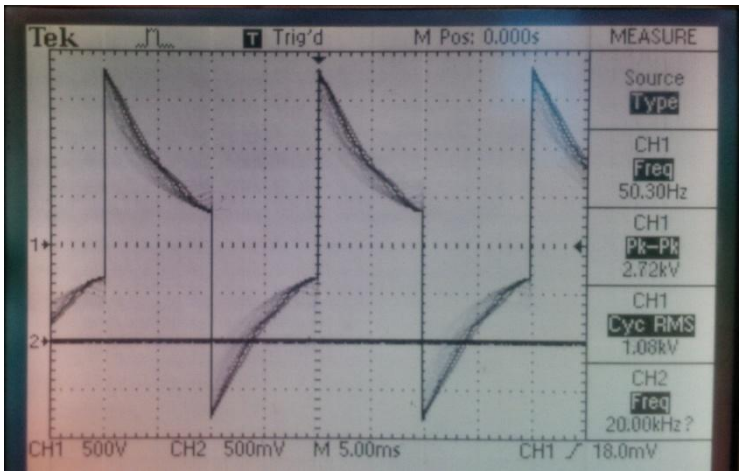


Beban mejikjer 40 W



Beban Mejikjer 300 W

Pengujian Beban Induktif (Beban Bor)



Grafik Pengukuran Beban Induktif (Beban Bor)

Beban induktif mesin bor 75 W

LAMPIRAN 4

KODE PROGRAM

```
#include <mega8535.h>
#include <lcd.h>
#include <stdio.h>
#include <delay.h>
// Alphanumeric LCD Module functions
#asm
  .equ __lcd_port=0x15 ; //PORTC
#endasm
#define ADC_VREF_TYPE 0x40
#define inverter1    PORTB.0
#define inverter2    PORTB.1
#define inverter3    PORTB.2
#define inverter4    PORTB.3
#define chars1       PORTB.7
#define chars2       PORTB.6
#define chars3       PORTB.5
#define chars4       PORTB.4
char                   lcd_buffer[31];
int
step=0,y,dtkey,dt,puluhan,satuan,daya_inverter1,daya_inverter2,daya_inverter3,daya_i
nverter4,daya;
float
Baterai[5],charger1=1,charger2=1,charger3=1,charger4=1,Vcharger,Vfull,arus;
void inisialisasi_LCD()  {lcd_init (16);}
void inisialisasi_ADC()  {ADMUX=ADC_VREF_TYPE;
                  ADCSRA=0x84;
                  SFIOR&=0xEF;
                  SFIOR|=0x10;}
float read_adc(unsigned char adc_input)
     {ADMUX=adc_input|ADC_VREF_TYPE;ADCSRA|=0x40;
     while ((ADCSRA & 0x10)==0);
     ADCSRA|=0x10;
     return ADCW;}
void baca_sensor()
          { Baterai[1]=read_adc(0)/26.41;  //KANAN
            Baterai[2]=read_adc(1)/26.41;
            Baterai[3]=read_adc(2)/26.41;
            Baterai[4]=read_adc(3)/26.41;
            arus     =read_adc(4)/190;
            daya     =220*arus;}
void charger() {if(Baterai[1]< Vcharger) {charger1=1;} else {if(Baterai[1]> Vfull)
{charger1=1;}}
           if(Baterai[2]< Vcharger) {charger2=1;} else {if(Baterai[2]> Vfull) {charger2=1;}}
           if(Baterai[3]< Vcharger) {charger3=1;} else {if(Baterai[3]> Vfull) {charger3=1;}}
```

```
            if(Baterai[4]< Vcharger) {charger4=1;} else {if(Baterai[4]> Vfull) {charger4=1;}}
            if(charger1==1){chars1=1;}  else {chars1=0;}
            if(charger2==1){chars2=1;}  else {chars2=0;}
            if(charger3==1){chars3=1;}  else {chars3=0;}
            if(charger4==1){chars4=1;}  else {chars4=0;}
             }
void detek_key()
{ dtkey=200;
 PORTD.4=0;
 dt=(~PIND & 0x0F);
 switch (dt)
 {case 8 : dtkey=3;break;
  case 4 : dtkey=2;break;
  case 2 : dtkey=1;break;
 }
 PORTD.4=1; PORTD.5=0;
 dt=(~PIND & 0x0F);
 switch (dt)
 {
  case 2 : dtkey=4;break;
  case 4 : dtkey=5;break;
  case 8 : dtkey=6;break;
 }
 PORTD.5=1; PORTD.6=0;
 dt=(~PIND & 0x0F);
 switch (dt)
 {
  case 2 : dtkey=7;break;
  case 4 : dtkey=8;break;
  case 8 : dtkey=9;break;
 }

 PORTD.6=1; PORTD.7=0;
 dt=(~PIND & 0x0F);
 switch (dt)
 {
  case 2 : dtkey=110;break;
  case 4 : dtkey=0;break;
  case 8 : dtkey=111;break;
 }
 PORTD.7=1;
}
void tampil()  {lcd_clear            ();
            lcd_gotoxy          (0,0);
            sprintf             (lcd_buffer,"ARUS = %0.3f Amp",arus);
            lcd_puts       (lcd_buffer);
            lcd_gotoxy          (0,1);
```

```
        sprintf         (lcd_buffer,"DAYA = %i Watt",daya);
        lcd_puts    (lcd_buffer); }
void tampil_bat(){
        lcd_clear       ();
        lcd_gotoxy      (0,0);
        sprintf         (lcd_buffer,"BATERAI1 = %0.1fV",Baterai[1]);
        lcd_puts    (lcd_buffer);
        if (charger1==1) {lcd_gotoxy(0,1);lcd_putsf("PENGISIAN ON");} else
{lcd_gotoxy(0,1);lcd_putsf("PENGISIAN OFF");}
        delay_ms(1500);
        lcd_clear       ();
        lcd_gotoxy      (0,0);
        sprintf         (lcd_buffer,"BATERAI2 = %0.1fV",Baterai[2]);
        lcd_puts    (lcd_buffer);
        if (charger2==1){lcd_gotoxy(0,1);lcd_putsf("PENGISIAN ON");} else
{lcd_gotoxy(0,1);lcd_putsf("PENGISIAN OFF");}
        delay_ms(1500);
        lcd_clear       ();
        lcd_gotoxy      (0,0);
        sprintf         (lcd_buffer,"BATERAI3 = %0.1fV",Baterai[3]);
        lcd_puts    (lcd_buffer);
        if (charger3==1){lcd_gotoxy(0,1);lcd_putsf("PENGISIAN ON");} else
{lcd_gotoxy(0,1);lcd_putsf("PENGISIAN OFF");}
        delay_ms(1500);
        lcd_clear       ();
        lcd_gotoxy      (0,0);
        sprintf         (lcd_buffer,"BATERAI4 = %0.1fV",Baterai[4]);
        lcd_puts    (lcd_buffer);
        if (charger4==1){lcd_gotoxy(0,1);lcd_putsf("PENGISIAN ON");} else
{lcd_gotoxy(0,1);lcd_putsf("PENGISIAN OFF");}
        delay_ms(1500);
        }
void tampil2() {lcd_gotoxy(y,1);
        sprintf     (lcd_buffer,"%i",dtkey);
        lcd_puts    (lcd_buffer); }
void tampil3() {lcd_clear();
        lcd_gotoxy(0,0);
        lcd_putsf("DAYA/INVERTER OK ");
        lcd_gotoxy(8,1);
        lcd_putsf("WATT");
        lcd_gotoxy(3,1);
        sprintf     (lcd_buffer,"%i",daya_inverter1);
        lcd_puts    (lcd_buffer); }


void main(void){
inisialisasi_ADC();
```

```
inisialisasi_LCD();
PORTD=0xFF;
DDRD=0xF0;
PORTB=0x00;
DDRB=0xFF;
Vcharger = 12.5;
Vfull =    13.5;
lcd_clear();
lcd_gotoxy(0,0);lcd_putsf("DAYA/INVERTER :");
lcd_gotoxy(6,1);lcd_putsf("WATT");
while(step==0){detek_key();baca_sensor();charger();
                              if (dtkey==110)
{tampil_bat();lcd_clear();lcd_gotoxy(0,0);lcd_putsf("DAYA/INVERTER :");
                                    lcd_gotoxy(6,1);lcd_putsf("WATT");}
                              if (dtkey<=100)       {y++;
                              if (y==1) {puluhan=dtkey*10;tampil2();delay_ms(700);} else
                              if (y==2) {satuan=dtkey*1;tampil2();delay_ms(700);y=0;step=1;

daya_inverter1=puluhan+satuan;tampil3();delay_ms(1900);

inverter1=1;inverter2=1;inverter3=1;inverter4=1;delay_ms(100);}}}

while(step==1)
     {baca_sensor();charger();
       daya_inverter2=daya_inverter1*2;
       daya_inverter3=daya_inverter1*3;
       daya_inverter4=daya_inverter1*4;
         if(daya<=daya_inverter1)  {inverter1=0;inverter2=0;inverter3=1;inverter4=0;goto
end;}
         if(daya<=daya_inverter2)  {inverter1=0;inverter2=1;inverter3=1;inverter4=0;goto
end;}
         if(daya<=daya_inverter3)  {inverter1=1;inverter2=1;inverter3=1;inverter4=0;goto
end;}
         if(daya<=daya_inverter4)  {inverter1=1;inverter2=1;inverter3=1;inverter4=1;goto
end;}
         if(daya>=daya_inverter4)  {inverter1=1;inverter2=1;inverter3=1;inverter4=1;goto
end;}
      end:
      detek_key();
      if (dtkey==110) {tampil_bat();}
      tampil();delay_ms(200);

   };}
```