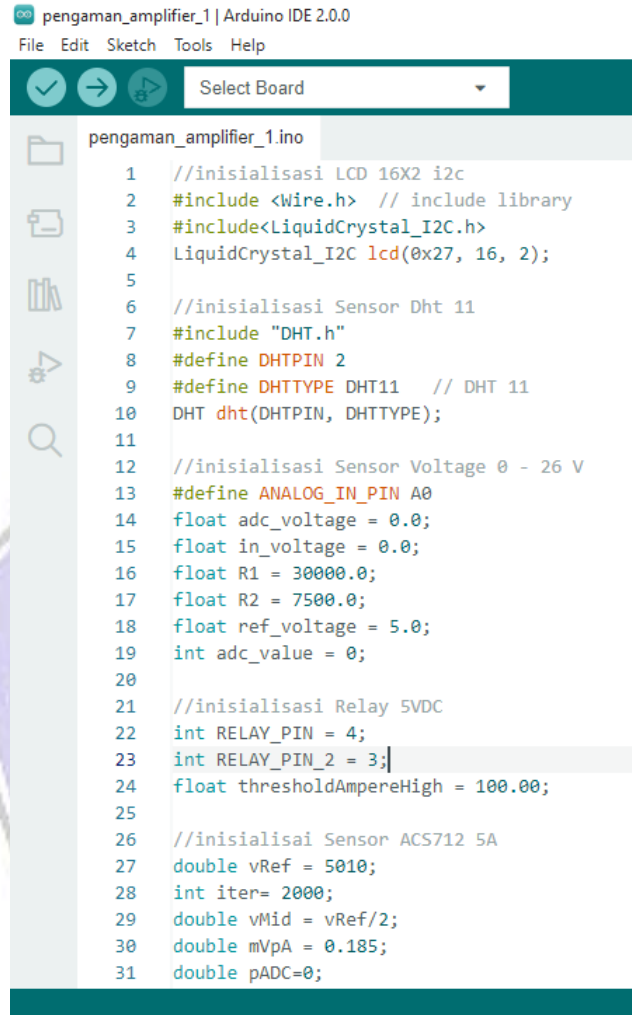


LAMPIRAN

Lampiran pemrograman alat

Lampiran 1



```
pengaman_amplifier_1 | Arduino IDE 2.0.0
File Edit Sketch Tools Help

pengaman_amplifier_1.ino
1 //inisialisasi LCD 16X2 i2c
2 #include <Wire.h> // include library
3 #include<LiquidCrystal_I2C.h>
4 LiquidCrystal_I2C lcd(0x27, 16, 2);
5
6 //inisialisasi Sensor Dht 11
7 #include "DHT.h"
8 #define DHTPIN 2
9 #define DHTTYPE DHT11 // DHT 11
10 DHT dht(DHTPIN, DHTTYPE);
11
12 //inisialisasi Sensor Voltage 0 - 26 V
13 #define ANALOG_IN_PIN A0
14 float adc_voltage = 0.0;
15 float in_voltage = 0.0;
16 float R1 = 30000.0;
17 float R2 = 7500.0;
18 float ref_voltage = 5.0;
19 int adc_value = 0;
20
21 //inisialisasi Relay 5VDC
22 int RELAY_PIN = 4;
23 int RELAY_PIN_2 = 3;
24 float thresholdAmpereHigh = 100.00;
25
26 //inisialisai Sensor ACS712 5A
27 double vRef = 5010;
28 int iter= 2000;
29 double vMid = vRef/2;
30 double mVpA = 0.185;
31 double pADC=0;
```

Lampiran 2

pengaman_amplifier_1 | Arduino IDE 2.0.0

File Edit Sketch Tools Help

Select Board

pengaman_amplifier_1.ino

```
32 unsigned long awalPrint=0;
33 unsigned long jeda=4000;
34
35 void setup() {
36     Serial.begin(9600);
37     dht.begin();
38     pinMode(RELAY_PIN, OUTPUT);
39     pinMode(RELAY_PIN_2, OUTPUT);
40     // Auto-calibrate vMid on reset
41     double adcSum = 0;
42     for (int i = 0; i < iter; i++) {
43         adcSum += analogRead(A0);
44     }
45     double avg_adc = adcSum / iter;
46     double vAvg = (avg_adc / 1024.0) * vRef;
47     vMid = vAvg; // Set vMid to the calculated average voltage
48     Serial.println("Auto-calibrated vMid to: " + String(vMid) + " mV");
49     lcd.init();
50     lcd.backlight();
51     digitalWrite(RELAY_PIN, HIGH); // Ensure relay is on initially
52     digitalWrite(RELAY_PIN_2, HIGH);
53     lcd.setCursor(10, 1);
54     lcd.print("ON");
55 }
56
57 void autoAdjustvMid(double Amp, double vDelta) {
58     // Auto adjust vMid if current is below 20mA
59     if (Amp < 20) vMid = vDelta;
60 }
61
62 void loop() {
```

Lampiran 3

```
engaman_amplifier_1.ino
66 Serial.println(temperatureC);
67
68 //baca nilai voltage
69 adc_value = analogRead(ANALOG_IN_PIN);
70 adc_voltage = (adc_value * ref_voltage) / 1024.0;
71 in_voltage = adc_voltage / (R2/(R1+R2));
72 float hasil = in_voltage - 4.00;
73 Serial.print("Input Voltage = ");
74 Serial.println(hasil, 2);
75 // baca nilai ACS712
76 double adc = 0;
77 double analog0 = analogRead(A0);
78 for (int i = 0; i < iter; i++) {
79   adc += analogRead(A0);
80 }
81 double avg_adc = adc / iter;
82 double vAvg = (avg_adc / 1024.0) * vRef;
83 double vDelta = vMid - vAvg;
84 double Amp = vDelta / mVpA;
85
86 if (millis() - awalPrint > jeda) {
87   awalPrint = millis();
88   Serial.println("Jeda \t: " + String(jeda) + " ms");
89   Serial.println("ADC A0 \t: " + String(analog0) + " , " + String(avg_adc) + " (avg_adc): adc/" + String(iter));
90   Serial.println("sumADC \t: " + String(adc) + " , " + String(adc - pADC) + " Deviation ");
91   Serial.println("vRef \t: " + String(vRef) + " mV");
92   Serial.println("vMid \t: " + String(vMid) + " mV");
93   Serial.println("vAvg \t: " + String(vAvg) + " mV \t avg/1023*vRef");
94   Serial.println("vDelta \t: " + String(vDelta) + " mV \t " + String(vMid) + "-tmp_vAvg");
95   Serial.println("Amp \t: " + String(Amp) + " mA \t vDelta/185");
96   pADC = adc;
```

Ln 50, Col 65 UTF-8

