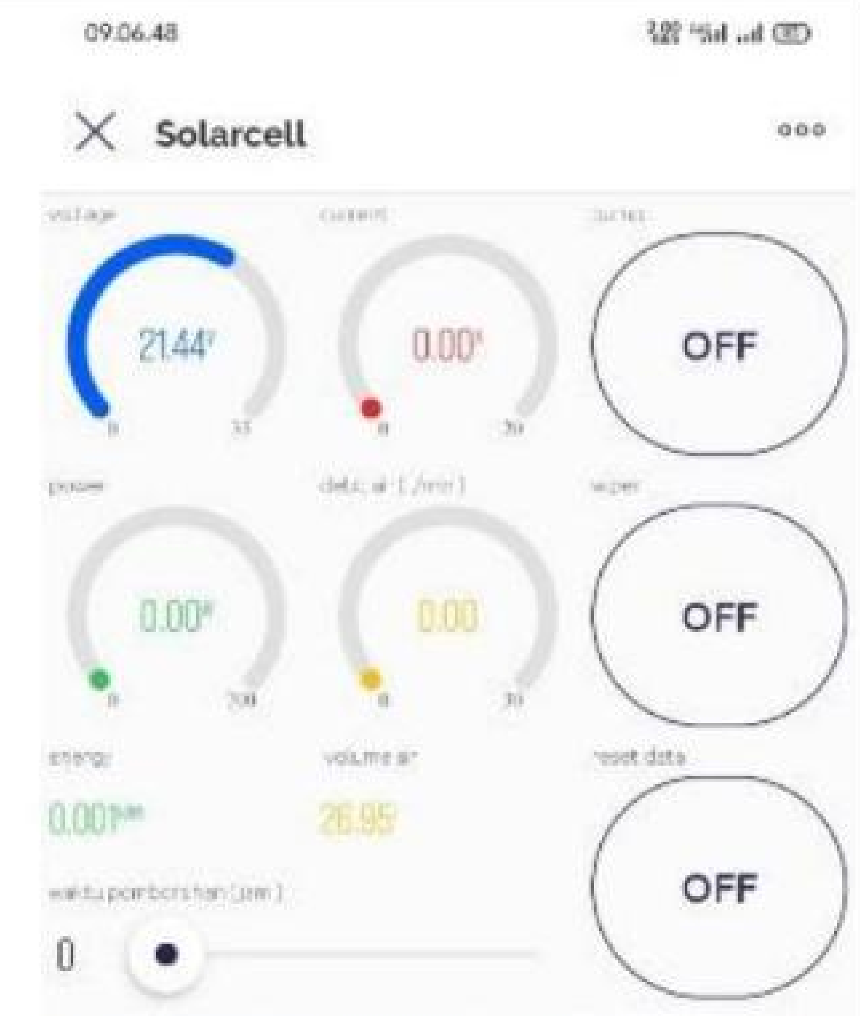
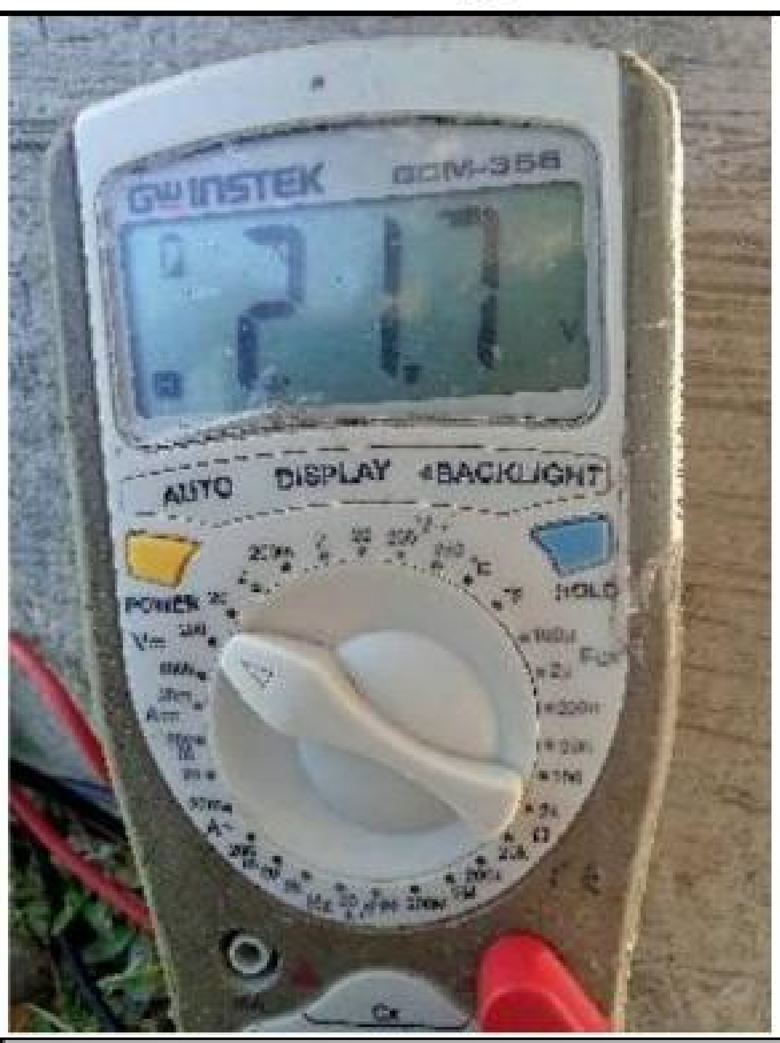
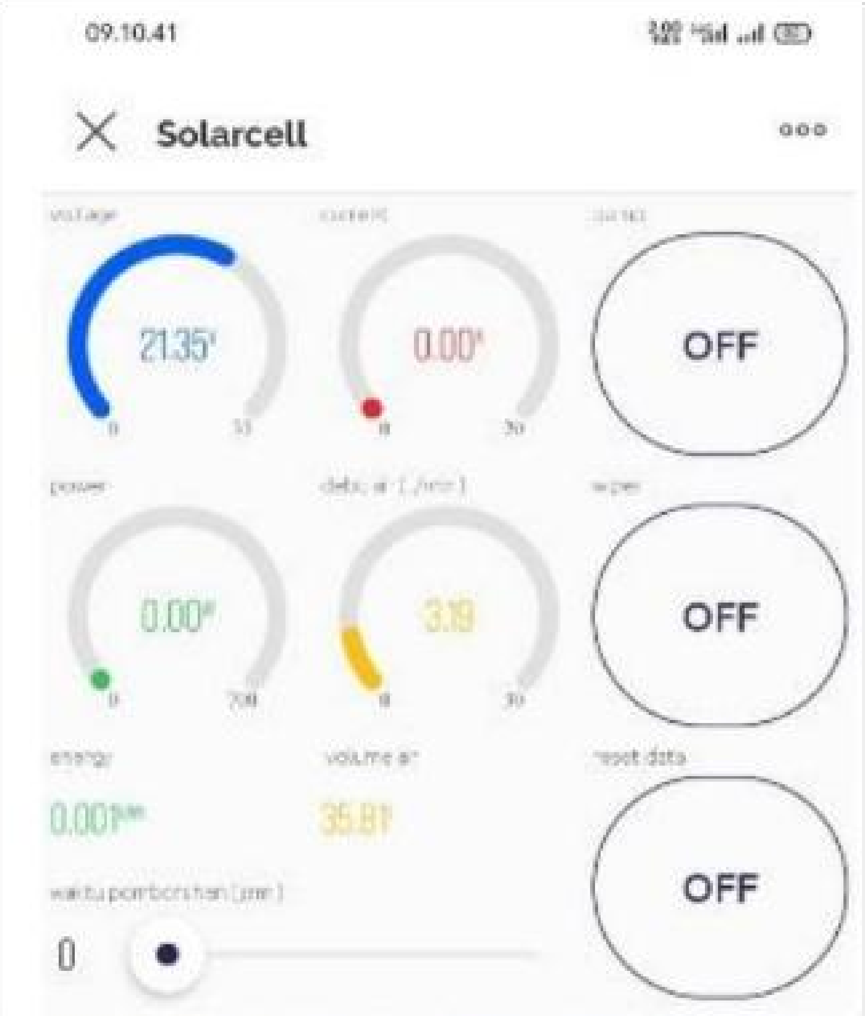
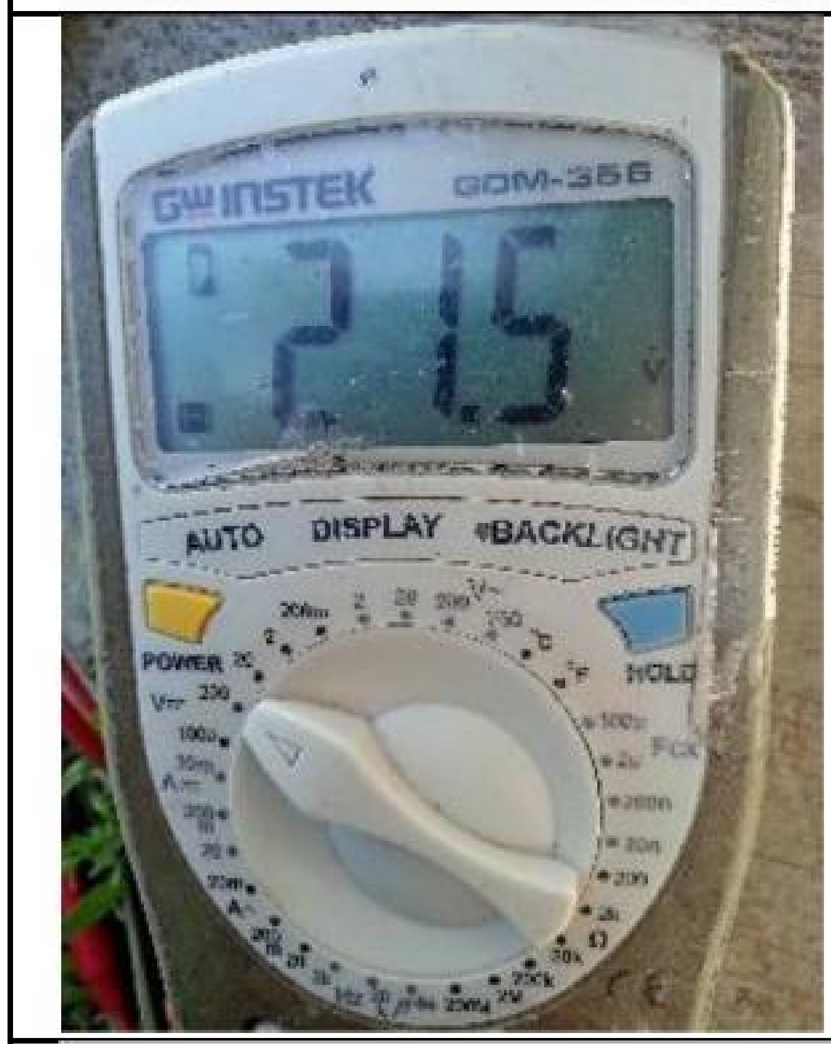
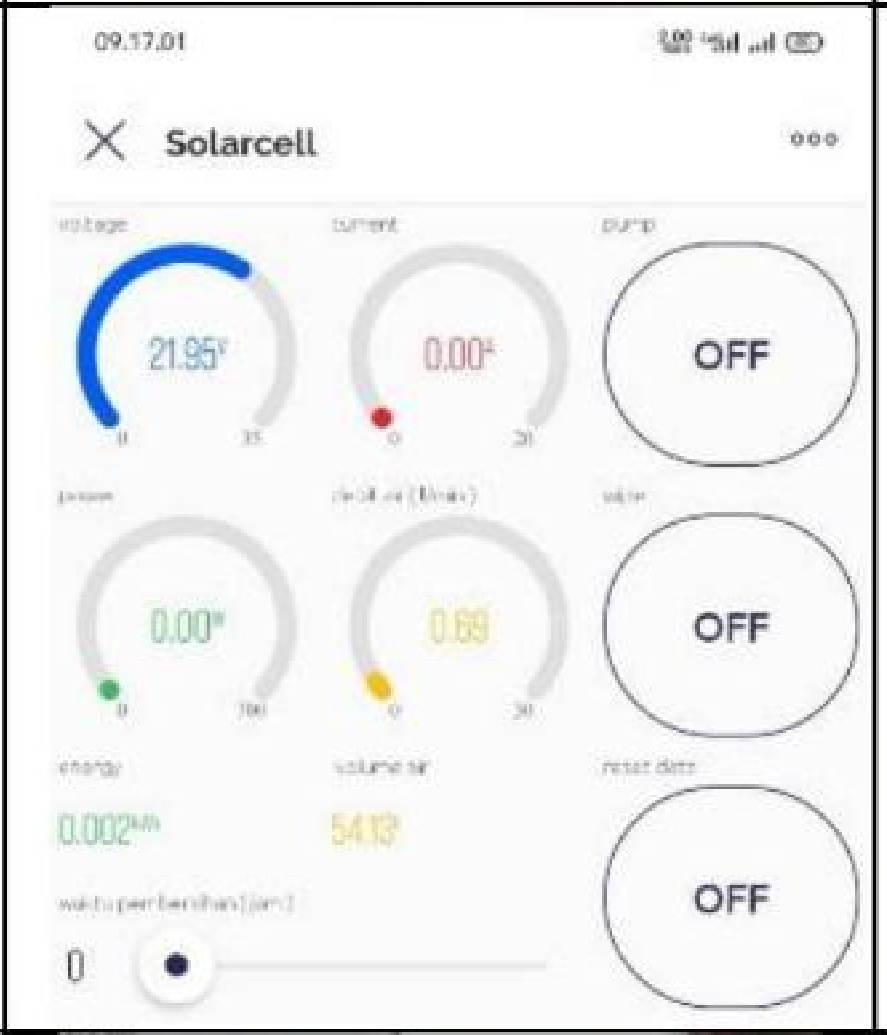
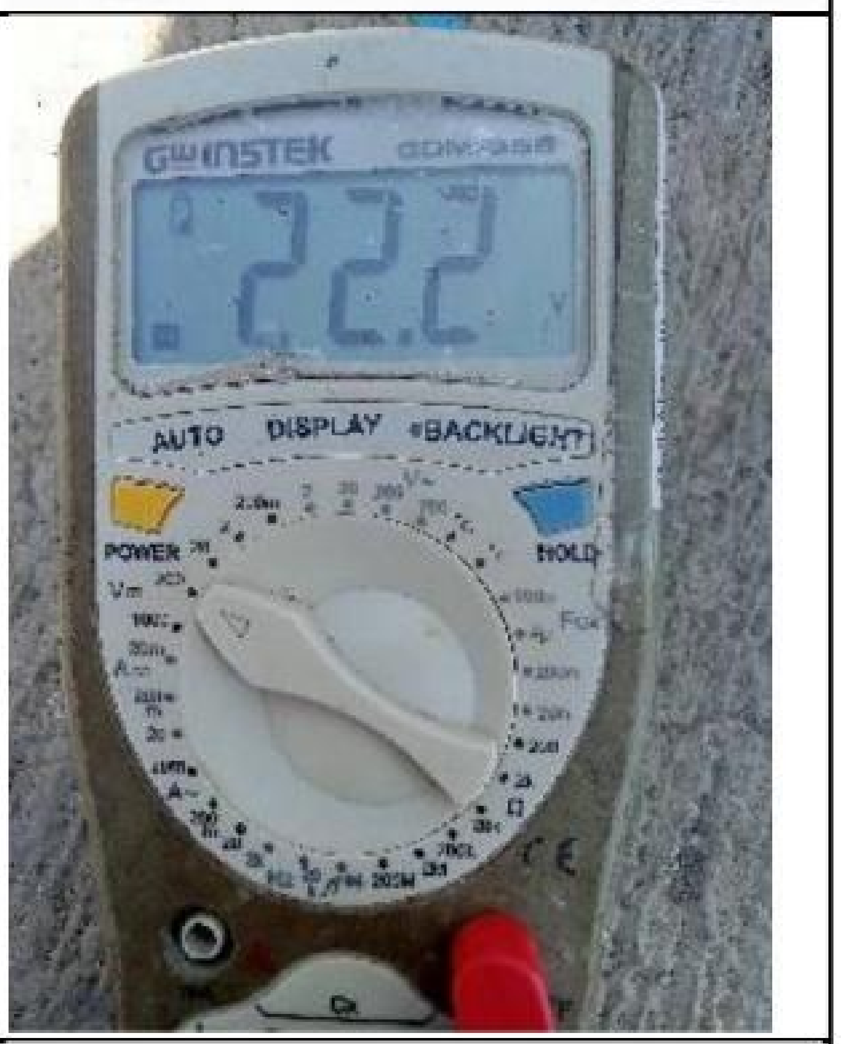
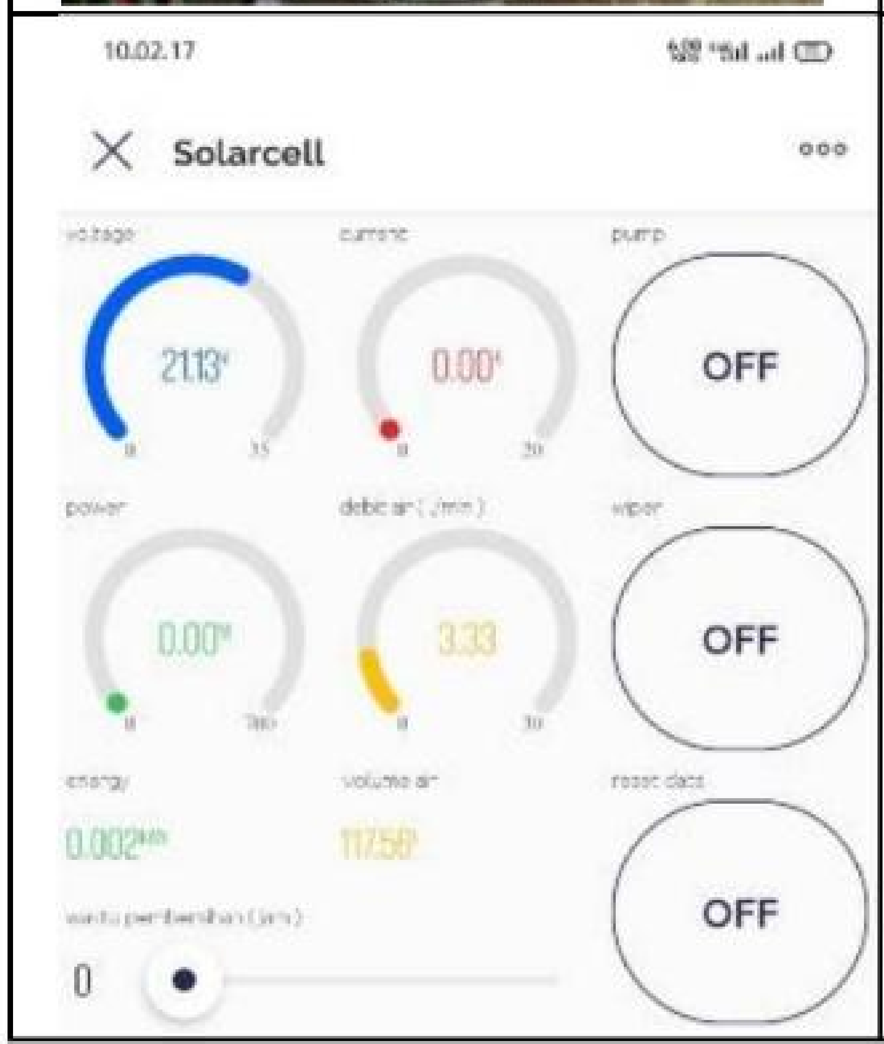
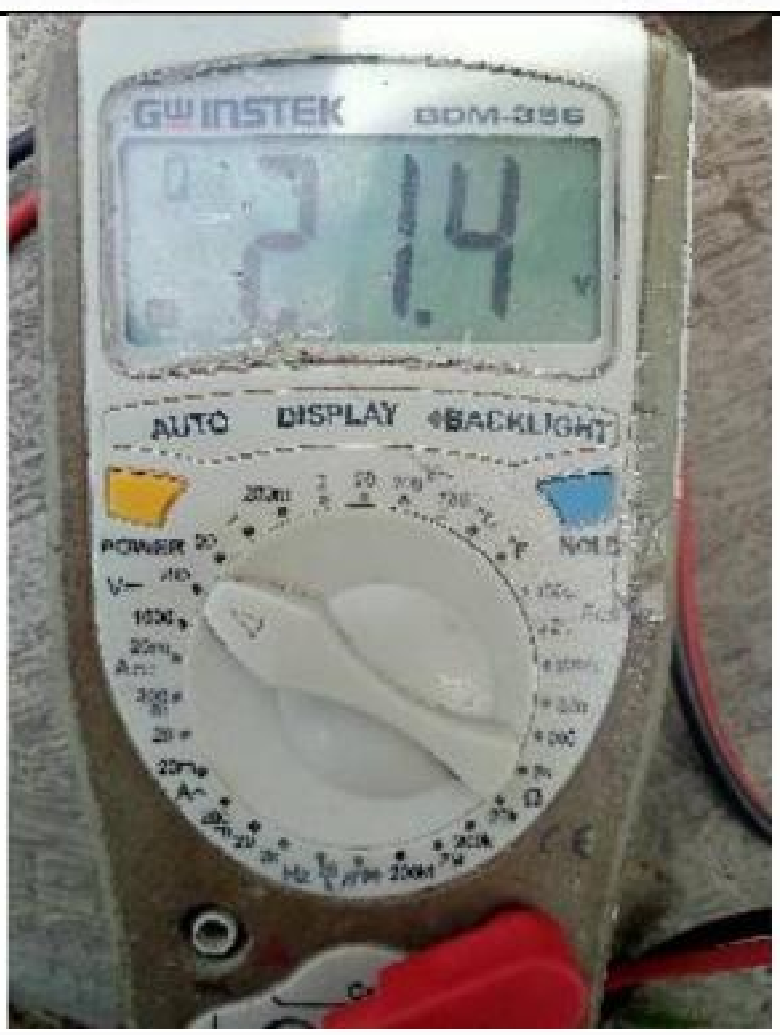
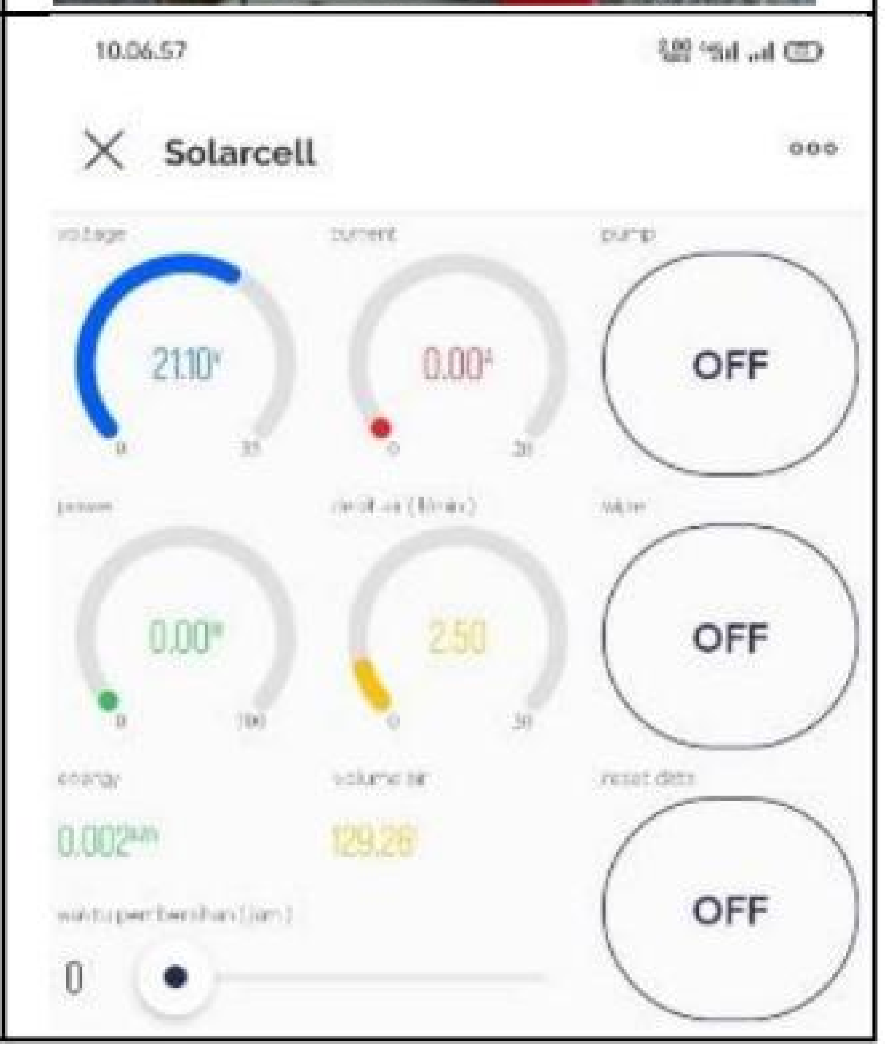
LAMPIRAN A

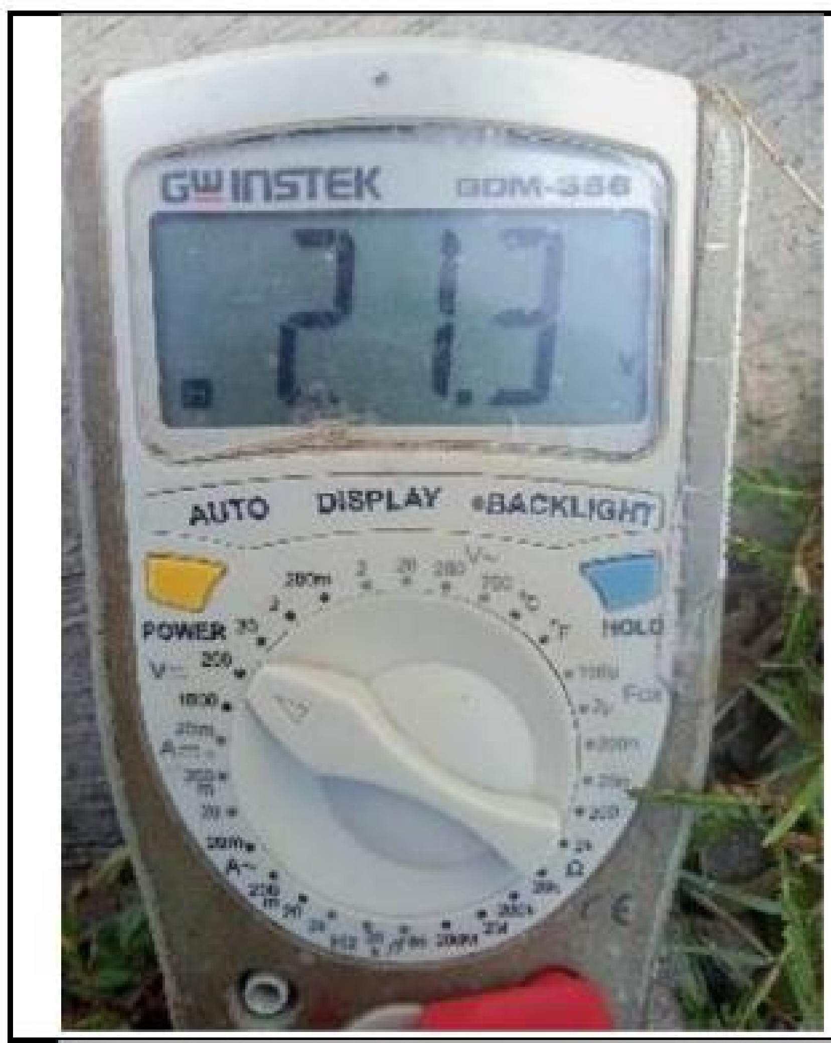
Dokumentasi Kegiatan

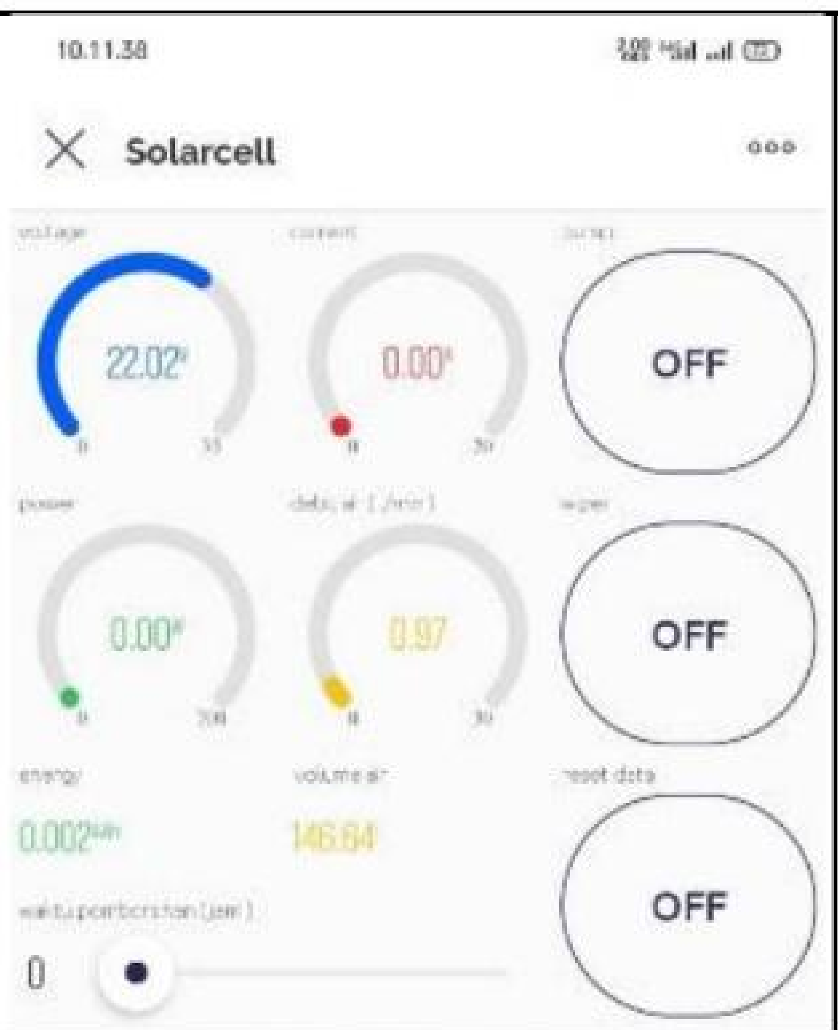
Perakitan Mekanikal		

LAMPIRAN B

Pengambilan Data Tegangan Output Panel Surya Tanpa Beban

Pengambilan Data Pengukuran Tegangan		
 09.06.48 Solarcell voltage 21.44V current 0.00A pump OFF power 0.00W debit air (L/min) 0.00 wiper OFF energy 0.001kWh volume air 26.95L reset data OFF waktu pemberhentian (jam) 0	 GW INSTEK GDM-356 21.7 V AUTO DISPLAY BACKLIGHT POWER HOLD	 09.10.41 Solarcell voltage 21.35V current 0.00A pump OFF power 0.00W debit air (L/min) 3.19 wiper OFF energy 0.001kWh volume air 35.81L reset data OFF waktu pemberhentian (jam) 0
 GW INSTEK GDM-356 21.5 V AUTO DISPLAY BACKLIGHT POWER HOLD	 09.17.01 Solarcell voltage 21.95V current 0.00A pump OFF power 0.00W debit air (L/min) 0.69 wiper OFF energy 0.002kWh volume air 54.13L reset data OFF waktu pemberhentian (jam) 0	 GW INSTEK GDM-356 22.2 V AUTO DISPLAY BACKLIGHT POWER HOLD
 10.02.17 Solarcell voltage 21.13V current 0.00A pump OFF power 0.00W debit air (L/min) 3.33 wiper OFF energy 0.002kWh volume air 117.56L reset data OFF waktu pemberhentian (jam) 0	 GW INSTEK GDM-356 21.4 V AUTO DISPLAY BACKLIGHT POWER HOLD	 10.06.57 Solarcell voltage 21.10V current 0.00A pump OFF power 0.00W debit air (L/min) 2.50 wiper OFF energy 0.002kWh volume air 129.26L reset data OFF waktu pemberhentian (jam) 0




10.11.38

Solarcell

voltage 22.02V (0–35)

current 0.00A (0–20)

pump OFF

power 0.00W (0–700)

debit air (L/min) 0.97 (0–30)

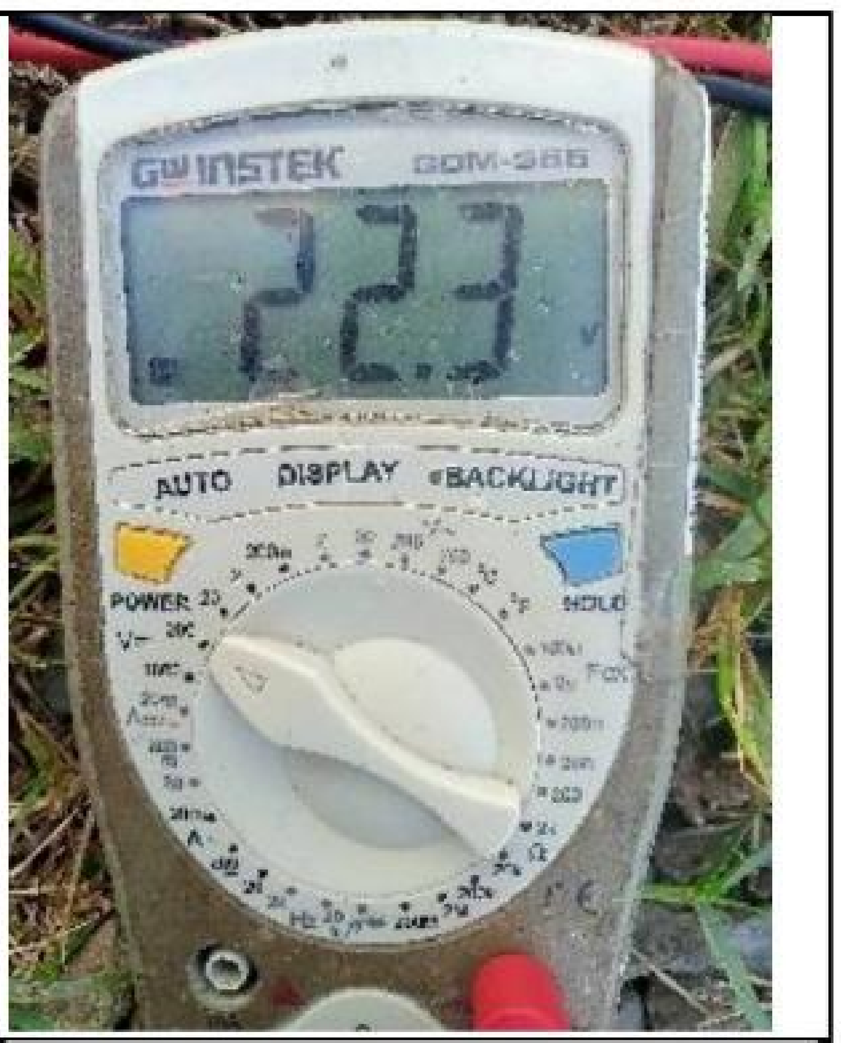
wiper OFF

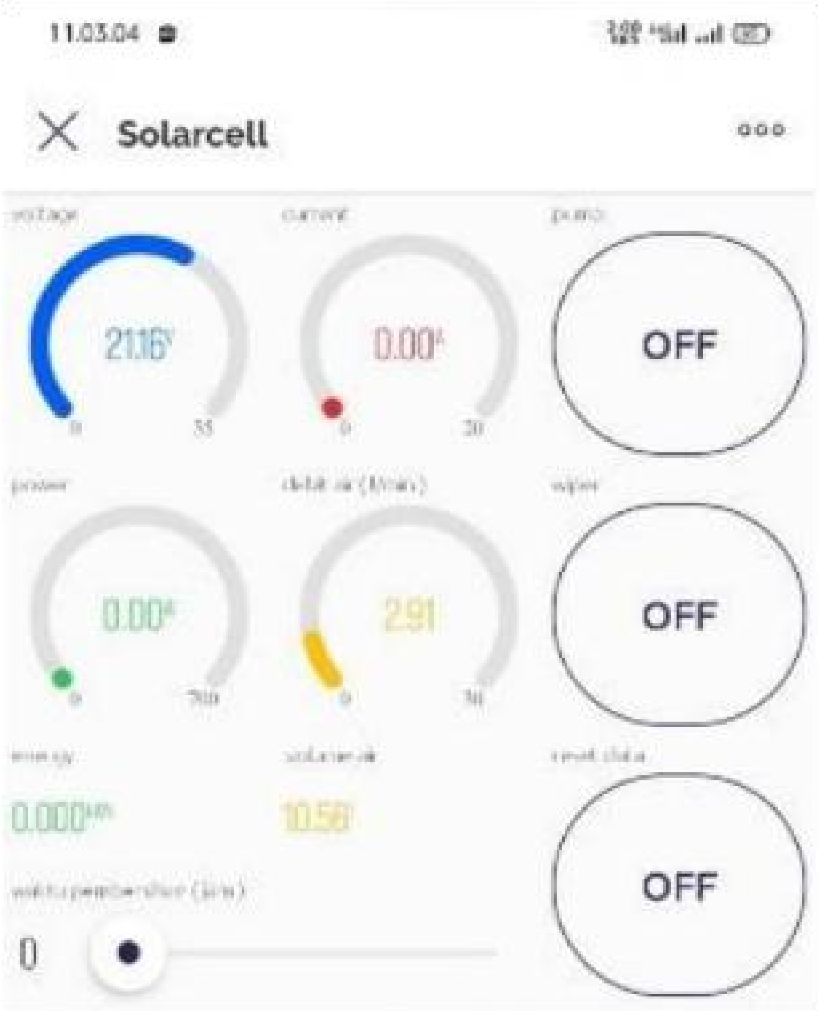
energy 0.002kWh

volume air 146.64L

reset data OFF

waktu pembersihan (jam) 0




11.03.04

Solarcell

voltage 21.16V (0–35)

current 0.00A (0–20)

pump OFF

power 0.00W (0–700)

debit air (L/min) 2.91 (0–30)

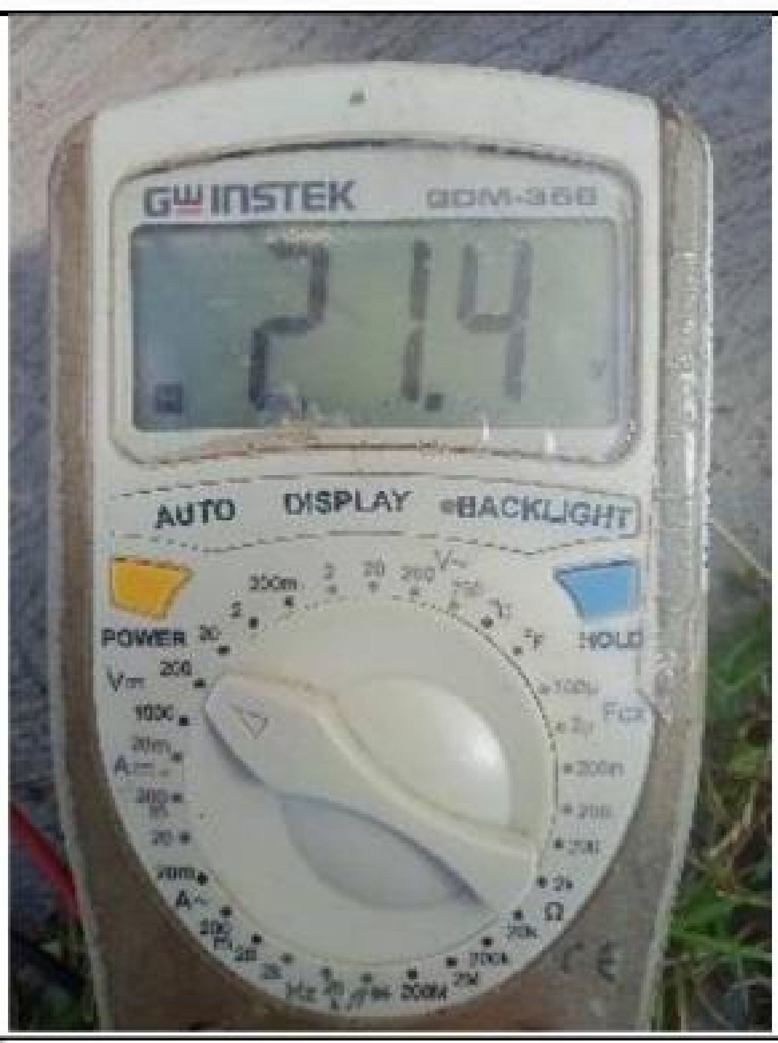
wiper OFF

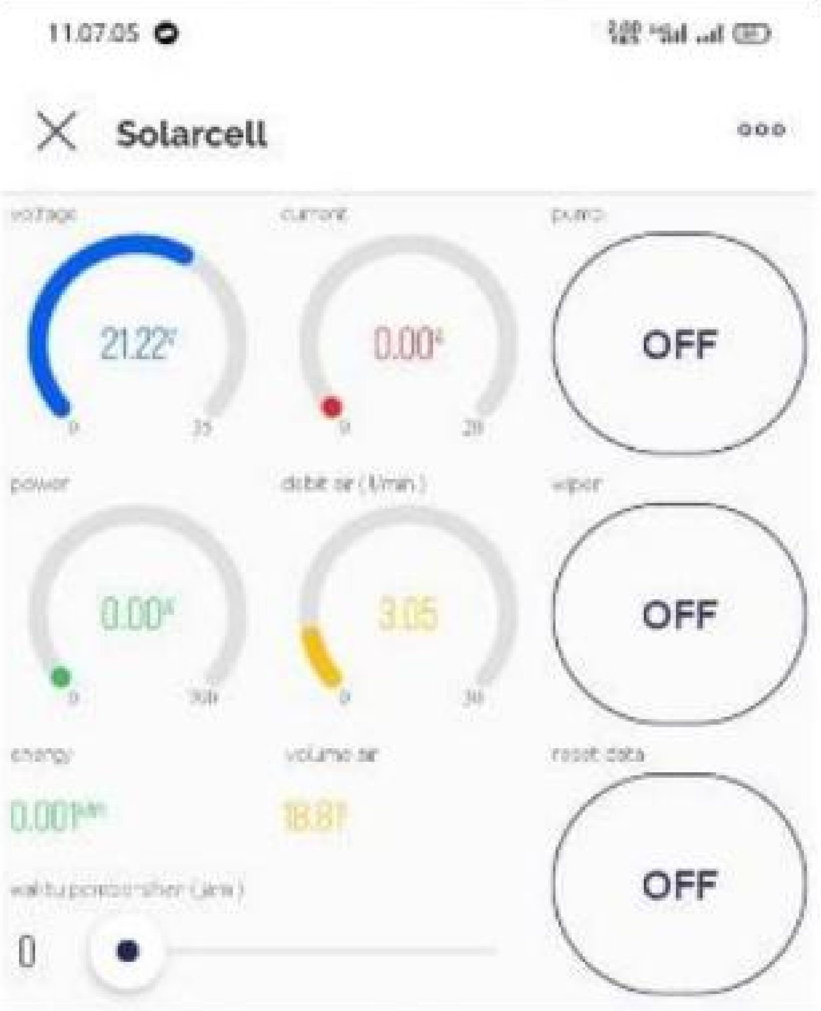
energy 0.000kWh

volume air 10.56L

reset data OFF

waktu pembersihan (jam) 0




11.07.05

Solarcell

voltage 21.22V (0–35)

current 0.00A (0–20)

pump OFF

power 0.00W (0–700)

debit air (L/min) 3.05 (0–30)

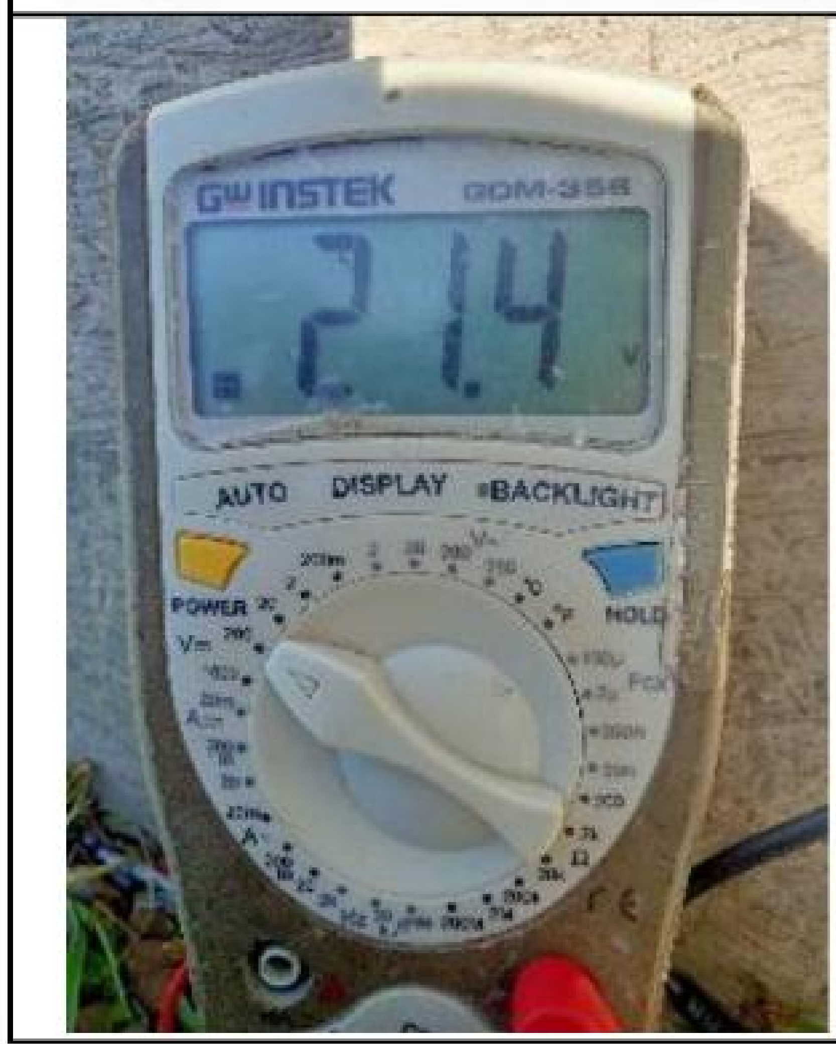
wiper OFF

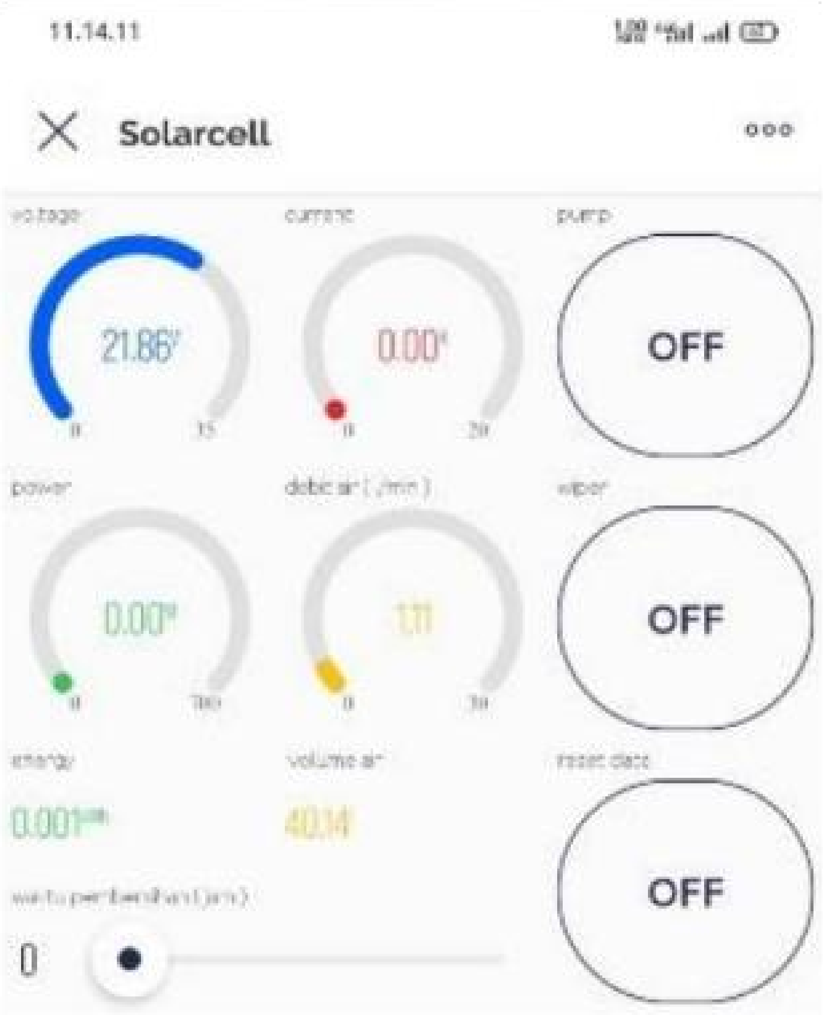
energy 0.001kWh

volume air 18.87L

reset data OFF

waktu pembersihan (jam) 0




11.14.11

Solarcell

voltage 21.86V (0–35)

current 0.00A (0–20)

pump OFF

power 0.00W (0–700)

debit air (L/min) 1.11 (0–30)

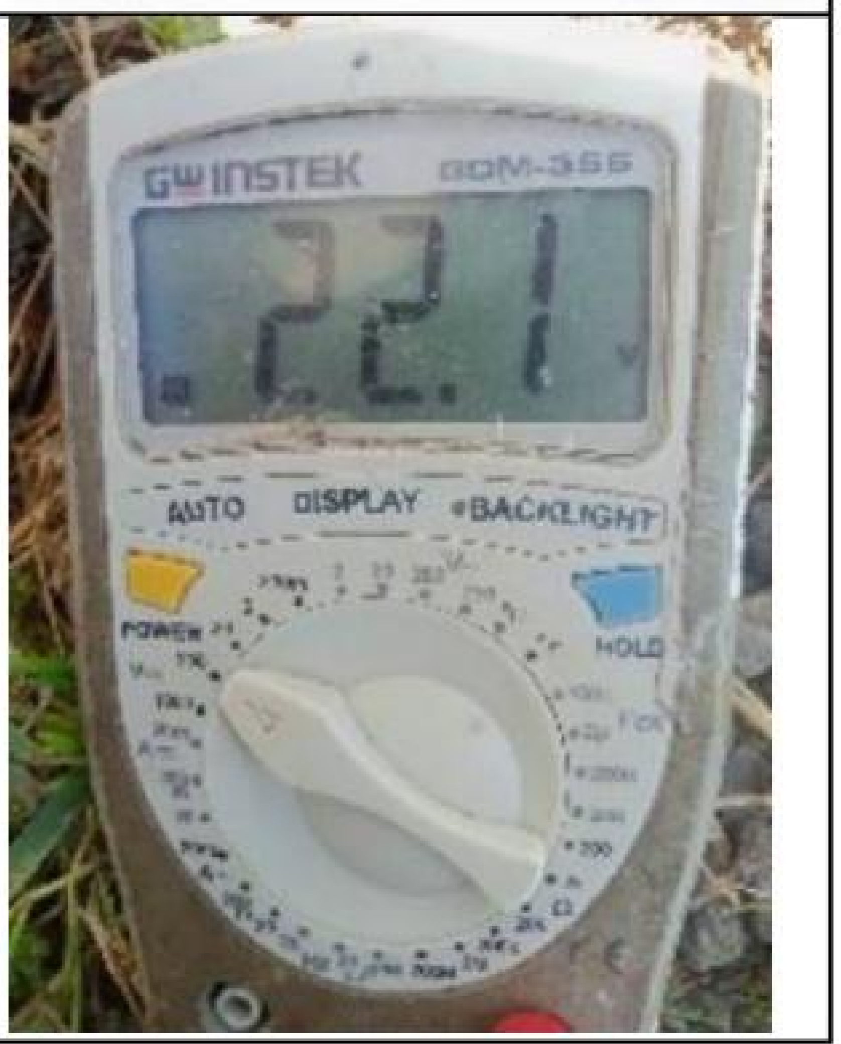
wiper OFF

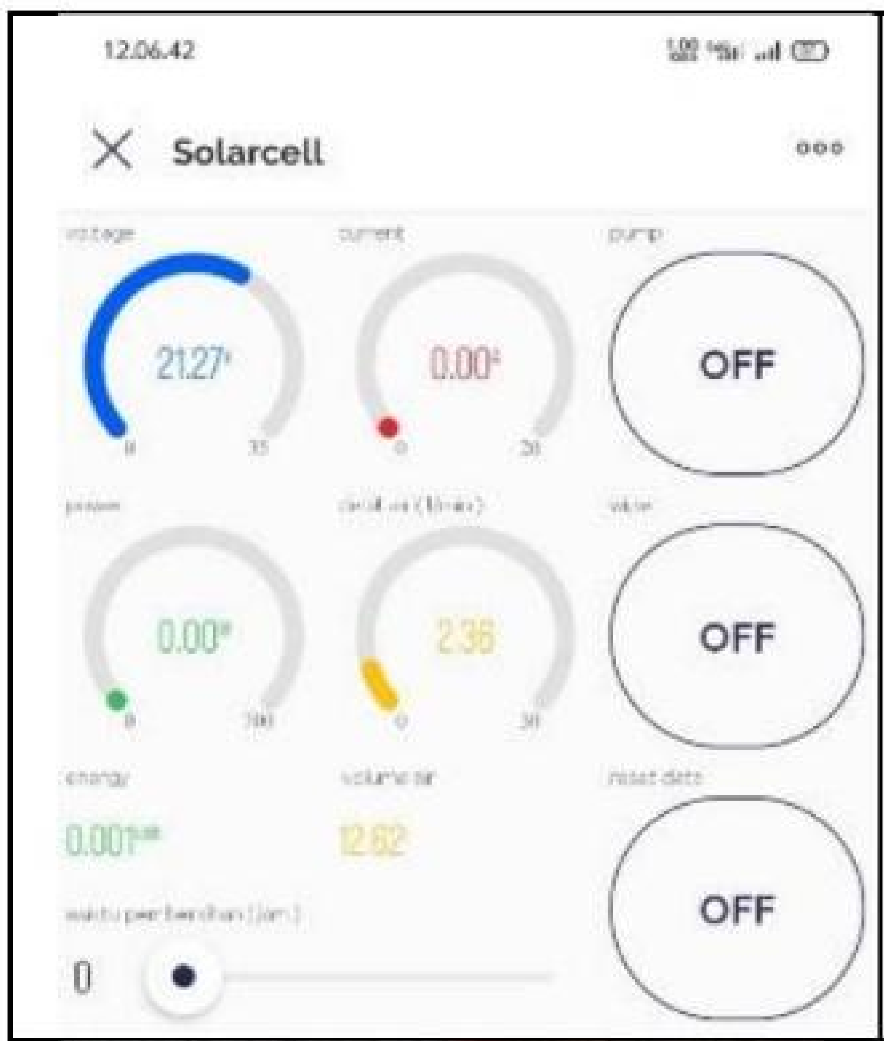
energy 0.001kWh

volume air 40.14L

reset data OFF

waktu pembersihan (jam) 0





12.06.42

Solarcell

voltage 21.27V (0–35)

current 0.00A (0–20)

pump OFF

power 0.00W (0–700)

debit air (l/min) 2.36 (0–30)

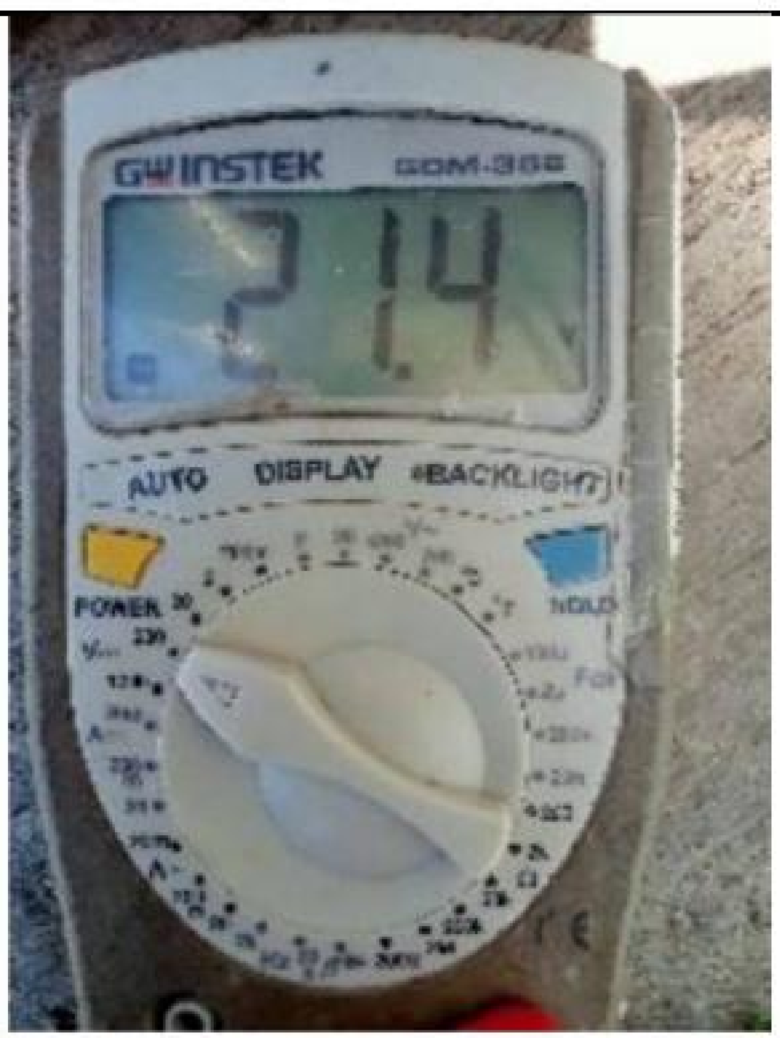
valve OFF

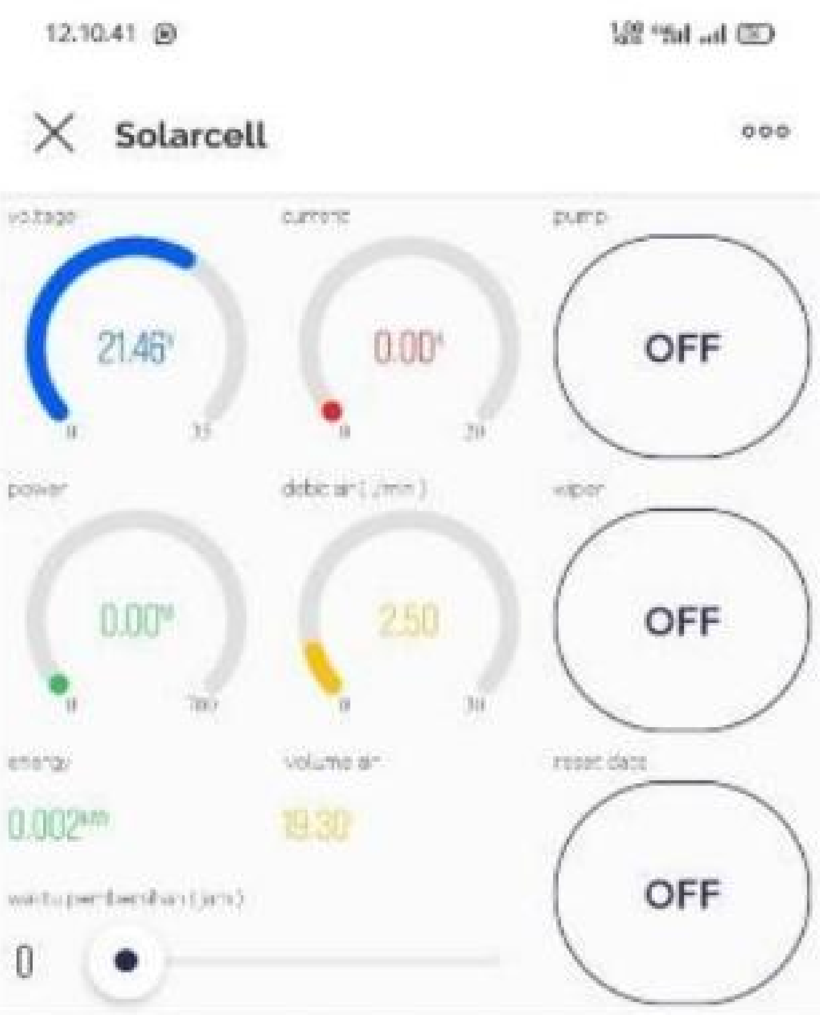
energy 0.001kWh

volume air 12.62

reset data OFF

waktu pembersihan (jam) 0





12.10.41

Solarcell

voltage 21.46V (0–35)

current 0.00A (0–20)

pump OFF

power 0.00W (0–700)

debit air (l/min) 2.50 (0–30)

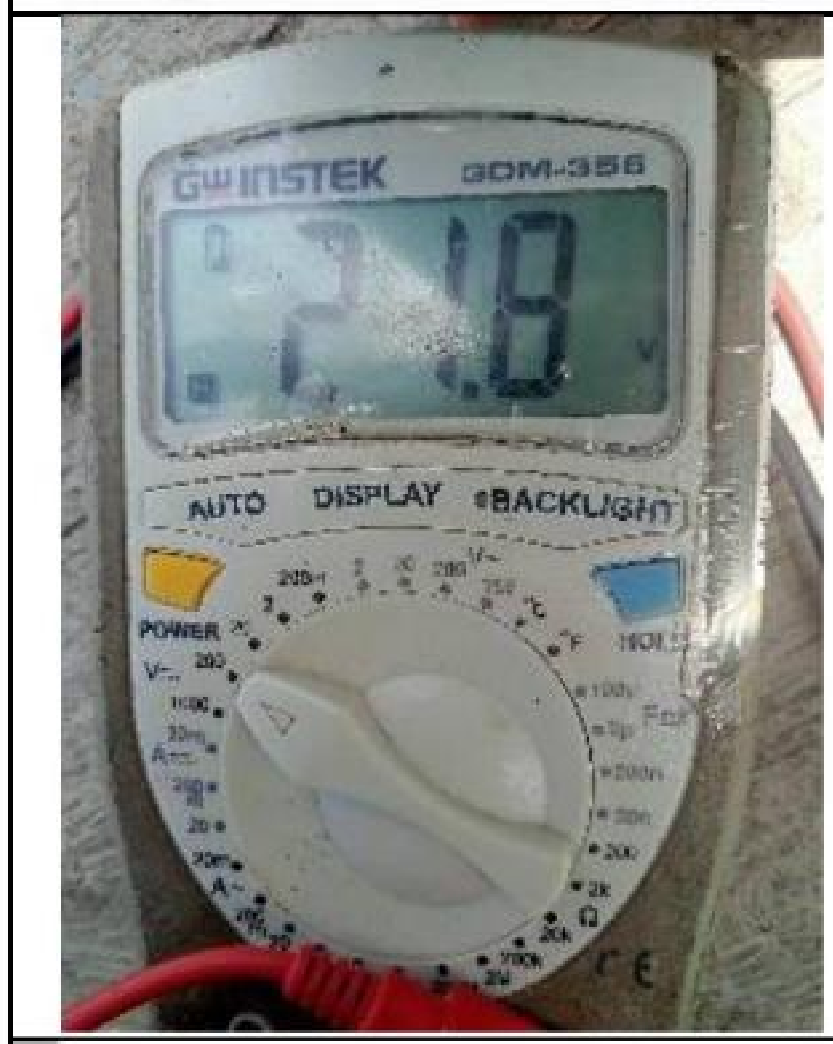
wiper OFF

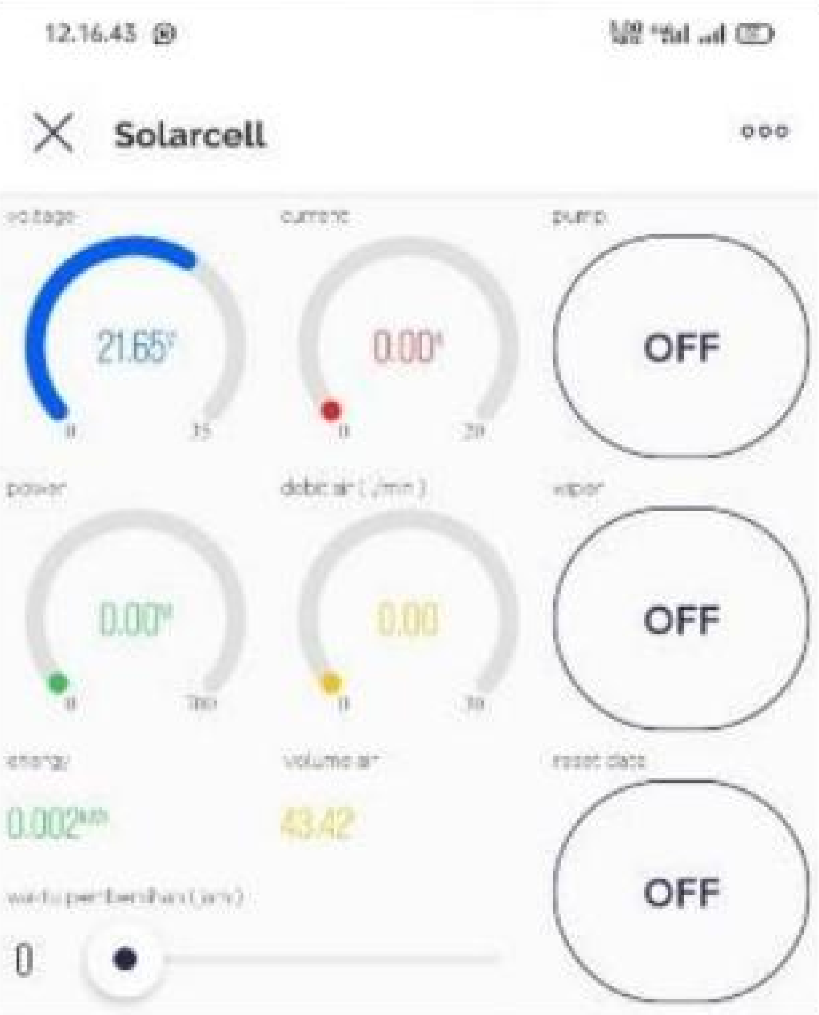
energy 0.002kWh

volume air 19.30

reset data OFF

waktu pembersihan (jam) 0





12.16.43

Solarcell

voltage 21.65V (0–35)

current 0.00A (0–20)

pump OFF

power 0.00W (0–700)

debit air (l/min) 0.00 (0–30)

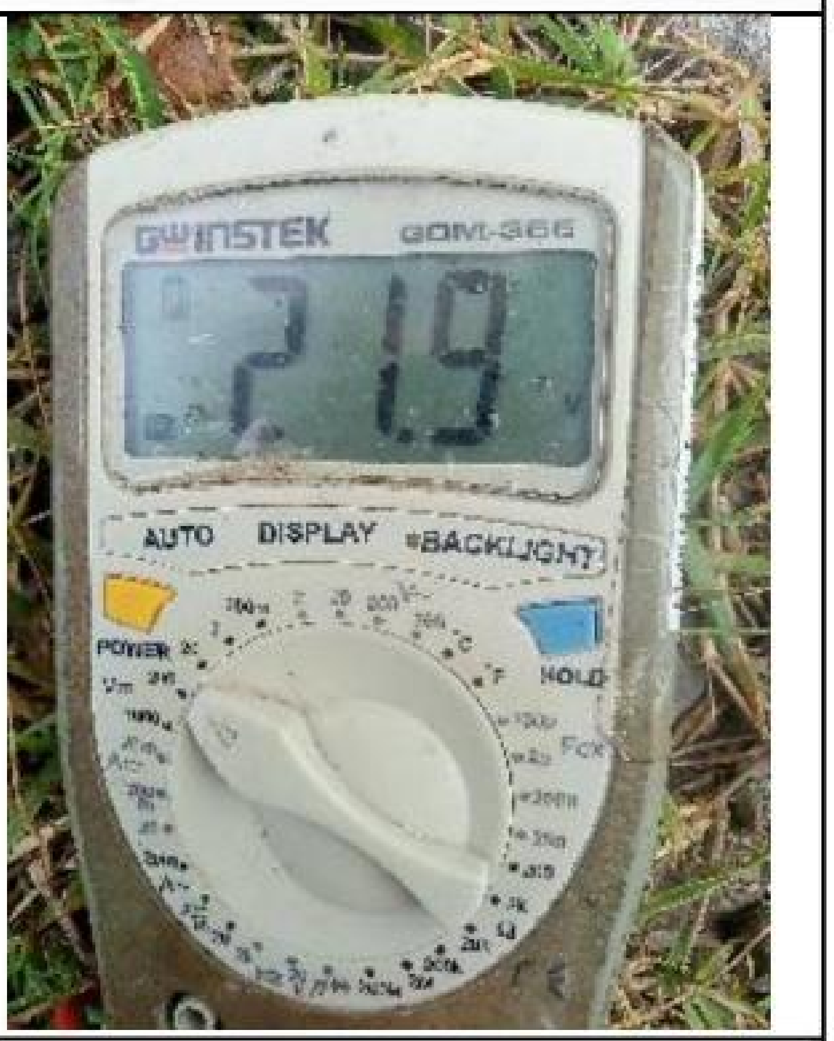
wiper OFF

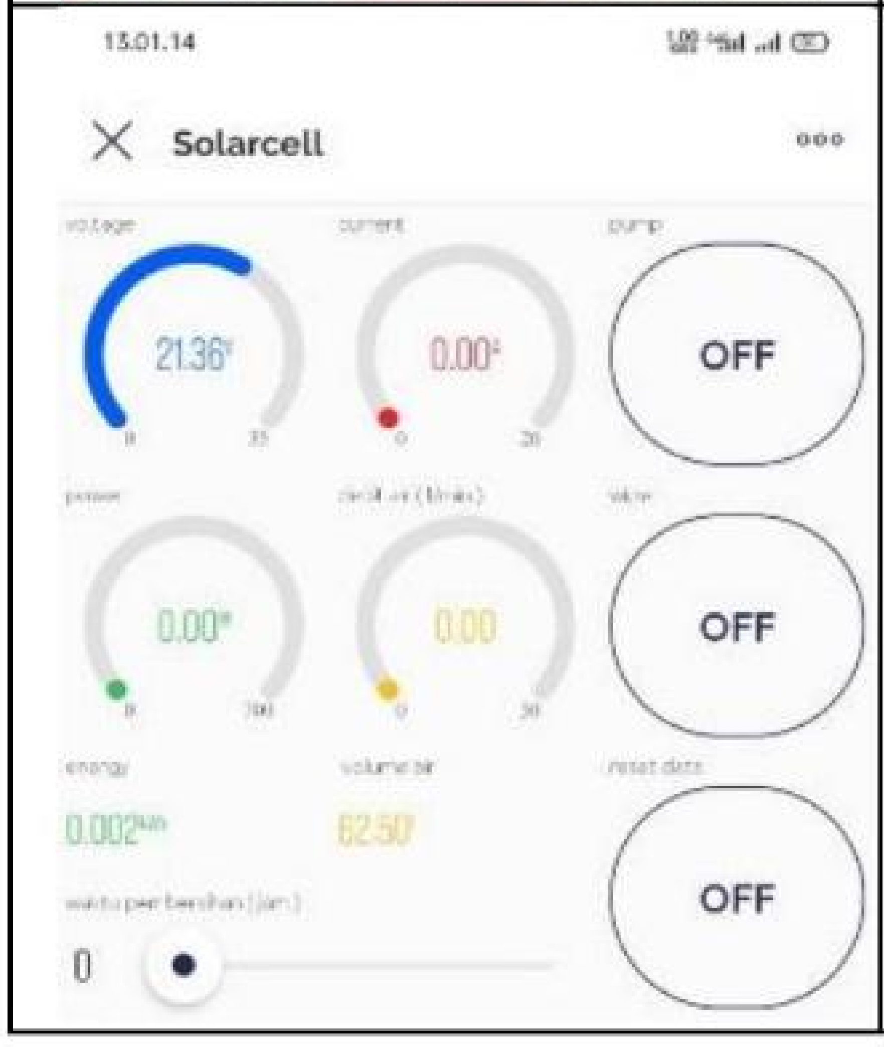
energy 0.002kWh

volume air 43.42

reset data OFF

waktu pembersihan (jam) 0





13.01.14

Solarcell

voltage 21.36V (0–35)

current 0.00A (0–20)

pump OFF

power 0.00W (0–700)

debit air (l/min) 0.00 (0–30)

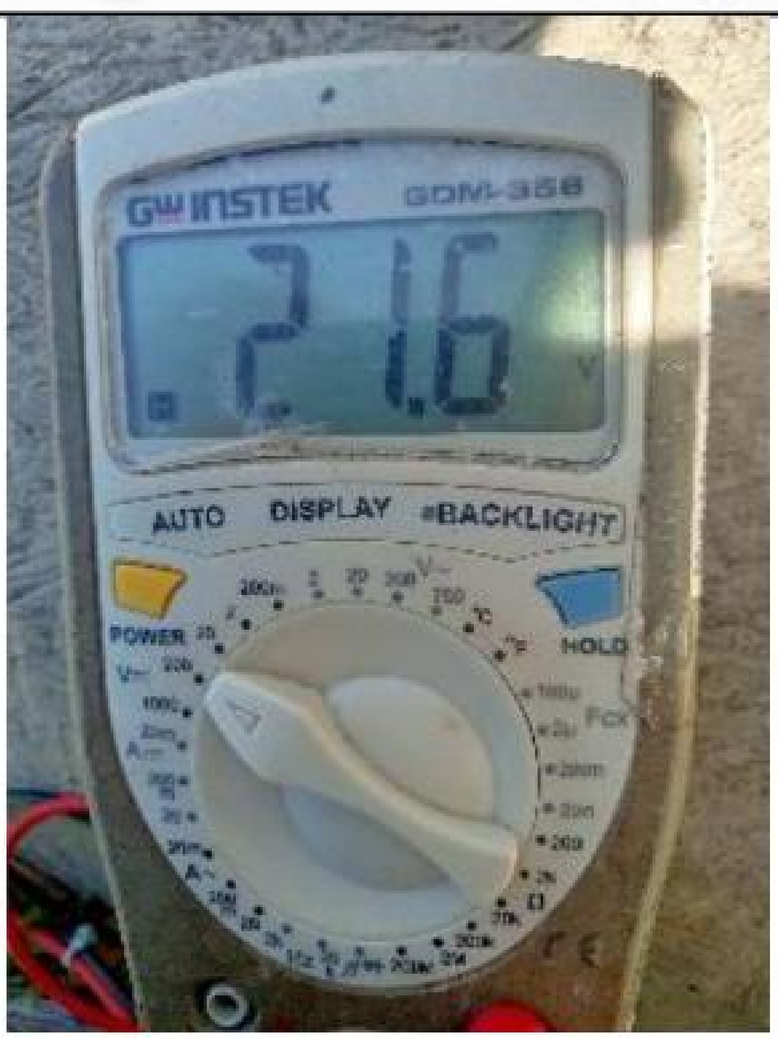
valve OFF

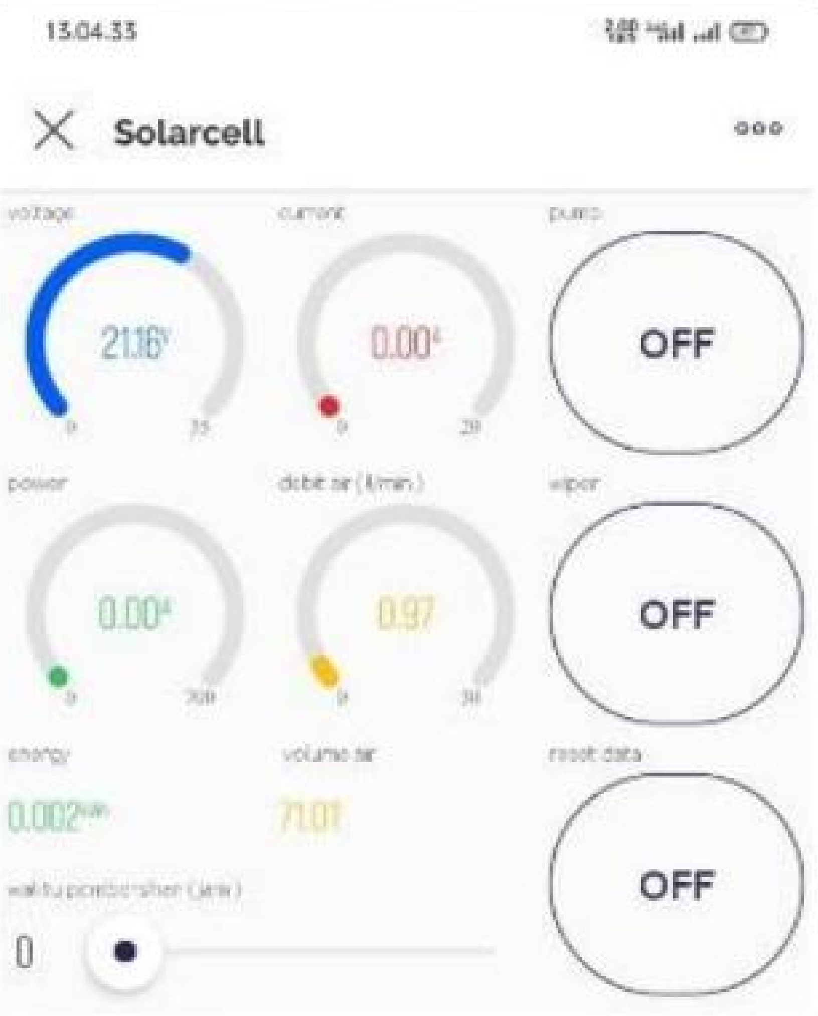
energy 0.002kWh

volume air 62.50

reset data OFF

waktu pembersihan (jam) 0





13.04.33

Solarcell

voltage 21.16V (0–35)

current 0.00A (0–20)

pump OFF

power 0.00W (0–700)

debit air (l/min) 0.97 (0–30)

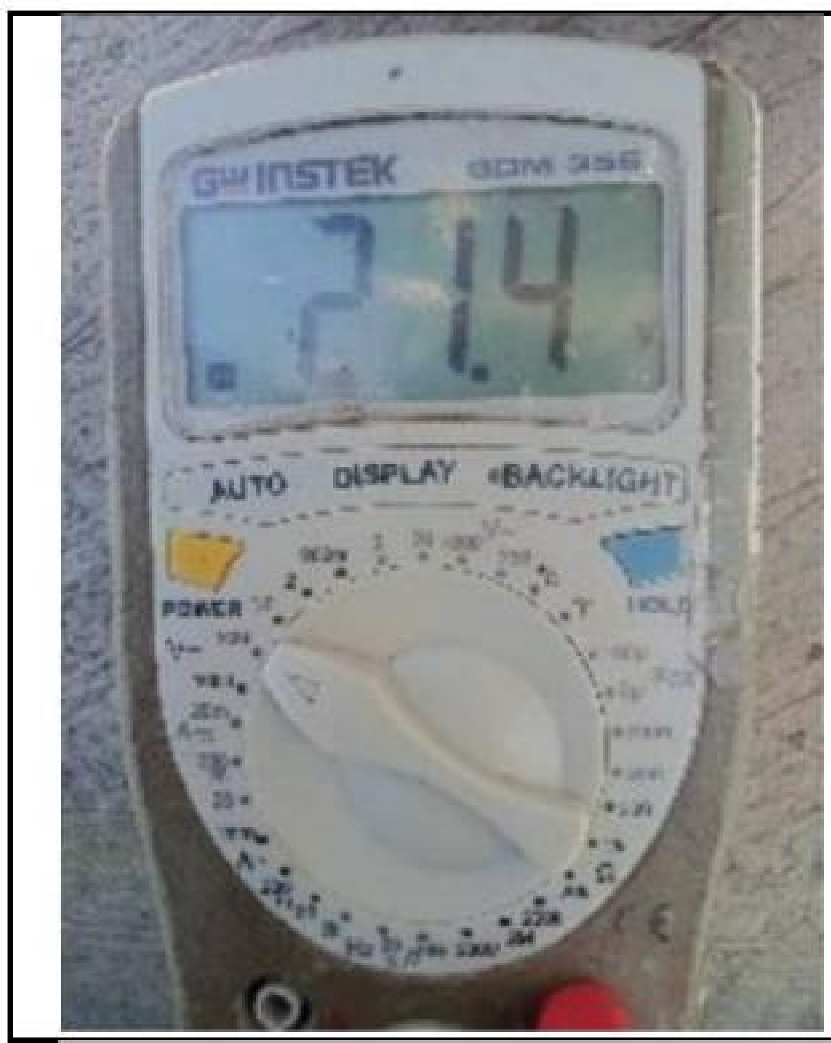
wiper OFF

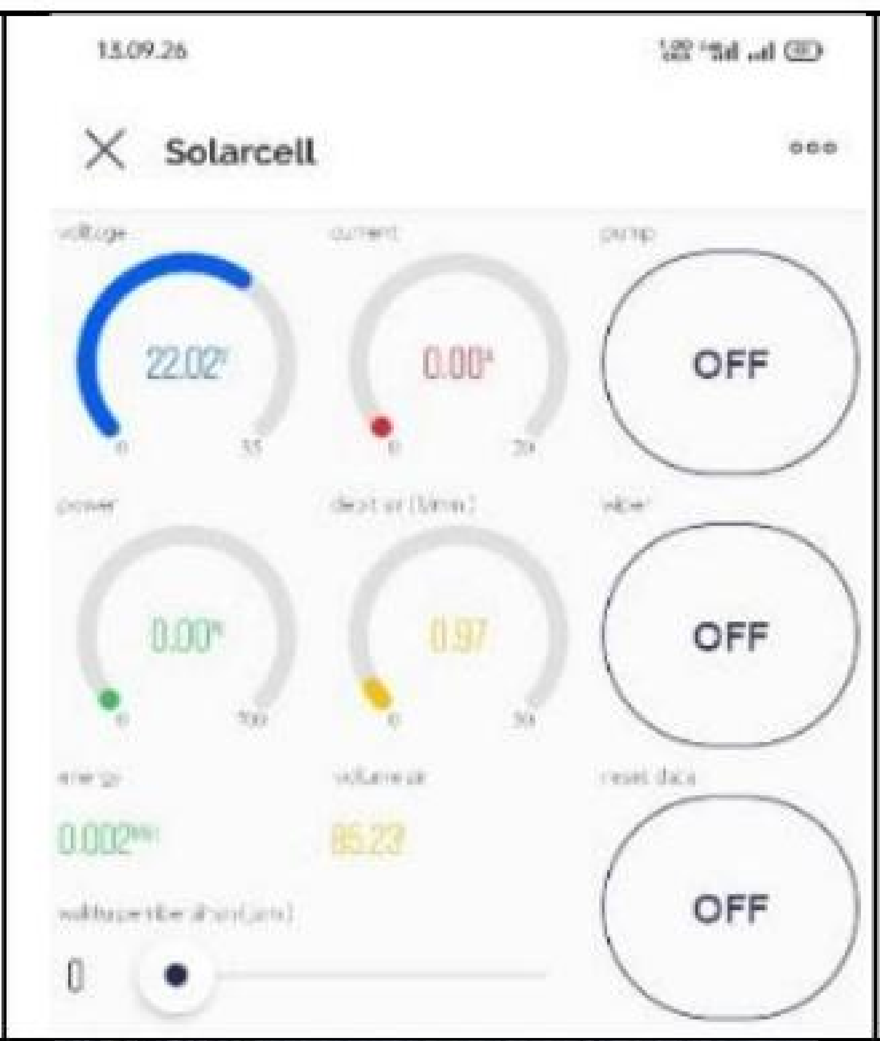
energy 0.002kWh

volume air 71.01

reset data OFF

waktu pembersihan (jam) 0




13.09.26

Solarcell

voltage 22.02V

current 0.00A

pump OFF

power 0.00W

debit air (l/min) 0.97

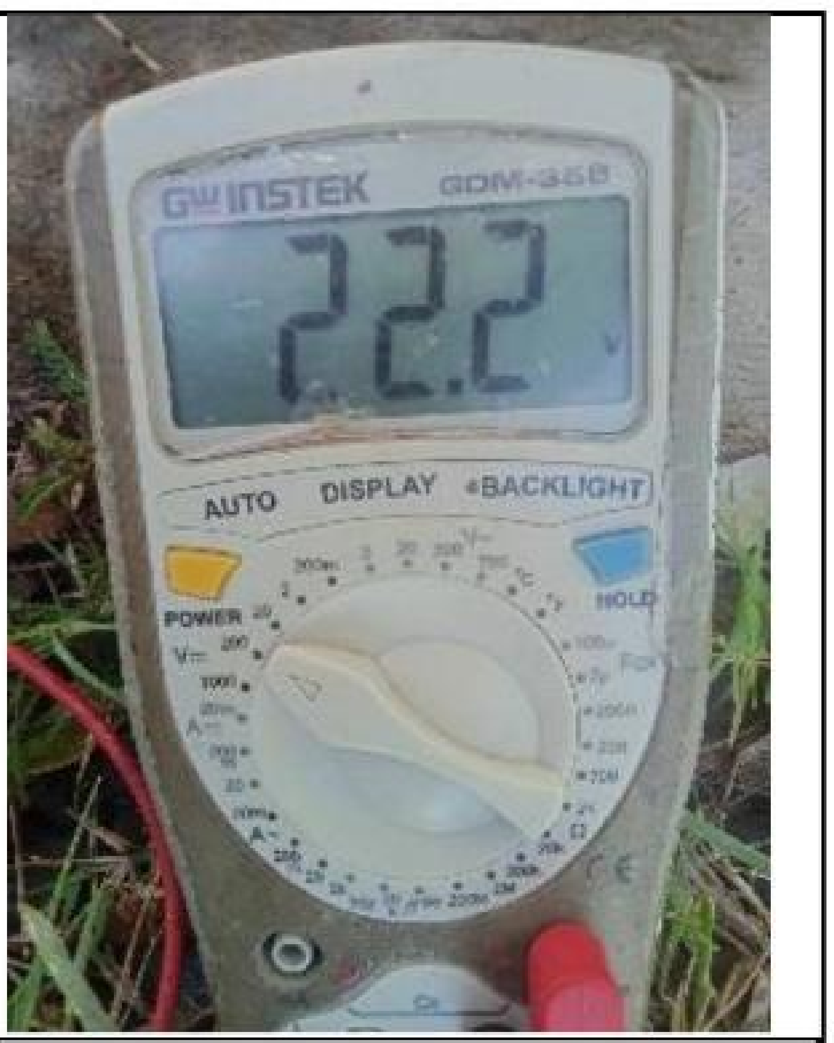
wiper OFF

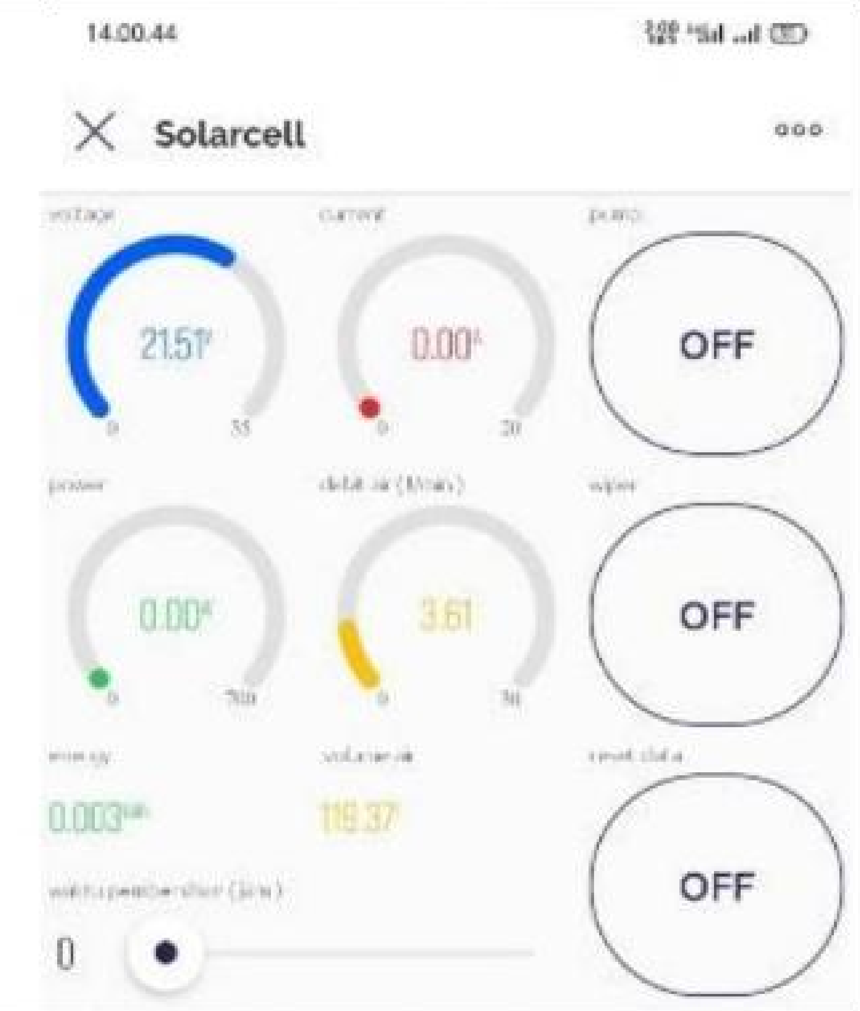
energy 0.002kWh

volume air 85.23

reset data OFF

waktu pemberhentian (jam) 0




14.00.44

Solarcell

voltage 21.51V

current 0.00A

pump OFF

power 0.00W

debit air (l/min) 3.61

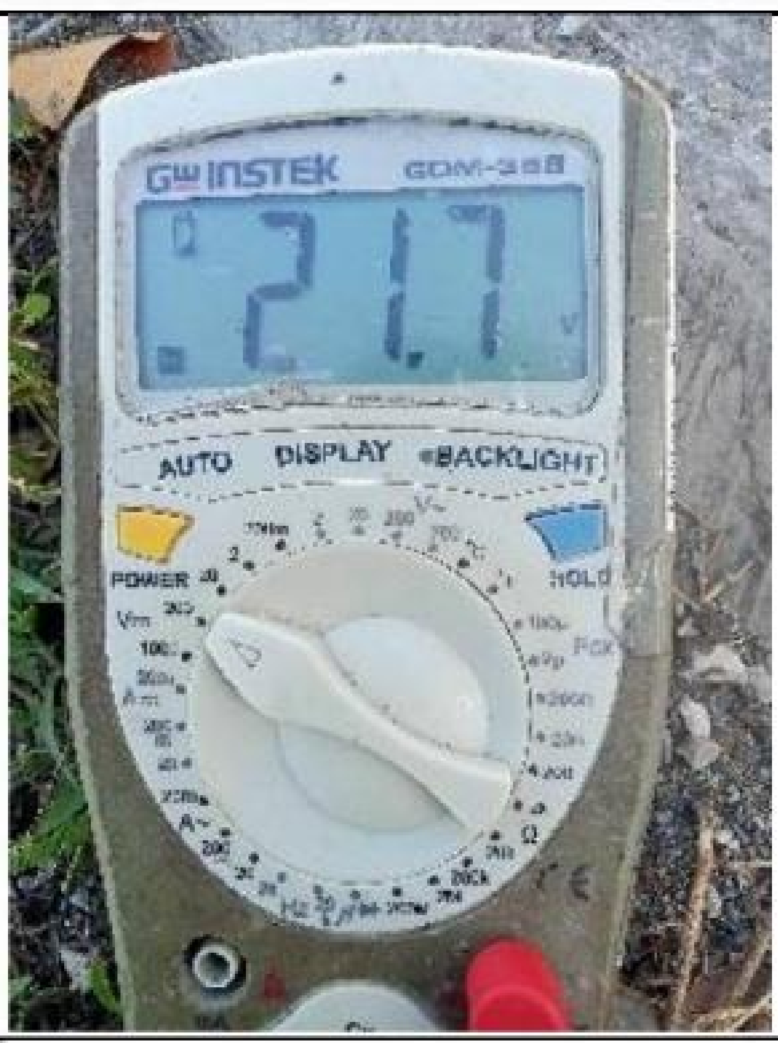
wiper OFF

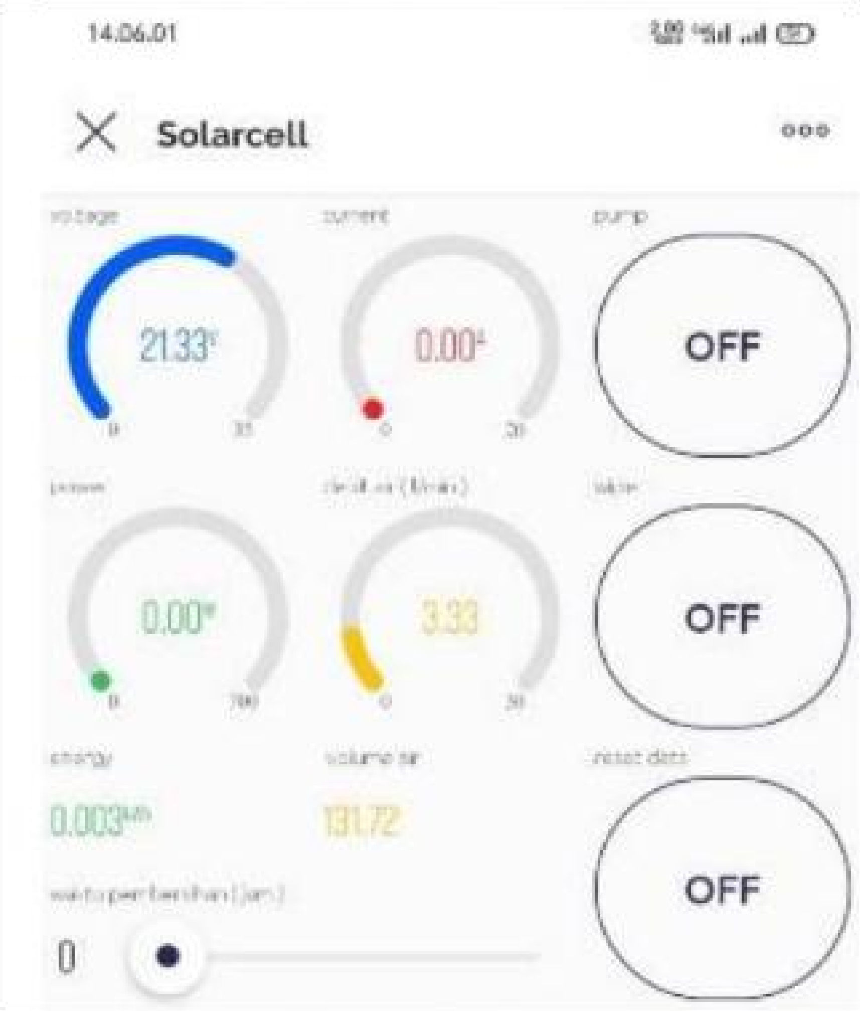
energy 0.003kWh

volume air 119.37

reset data OFF

waktu pemberhentian (jam) 0




14.06.01

Solarcell

voltage 21.33V

current 0.00A

pump OFF

power 0.00W

debit air (l/min) 3.33

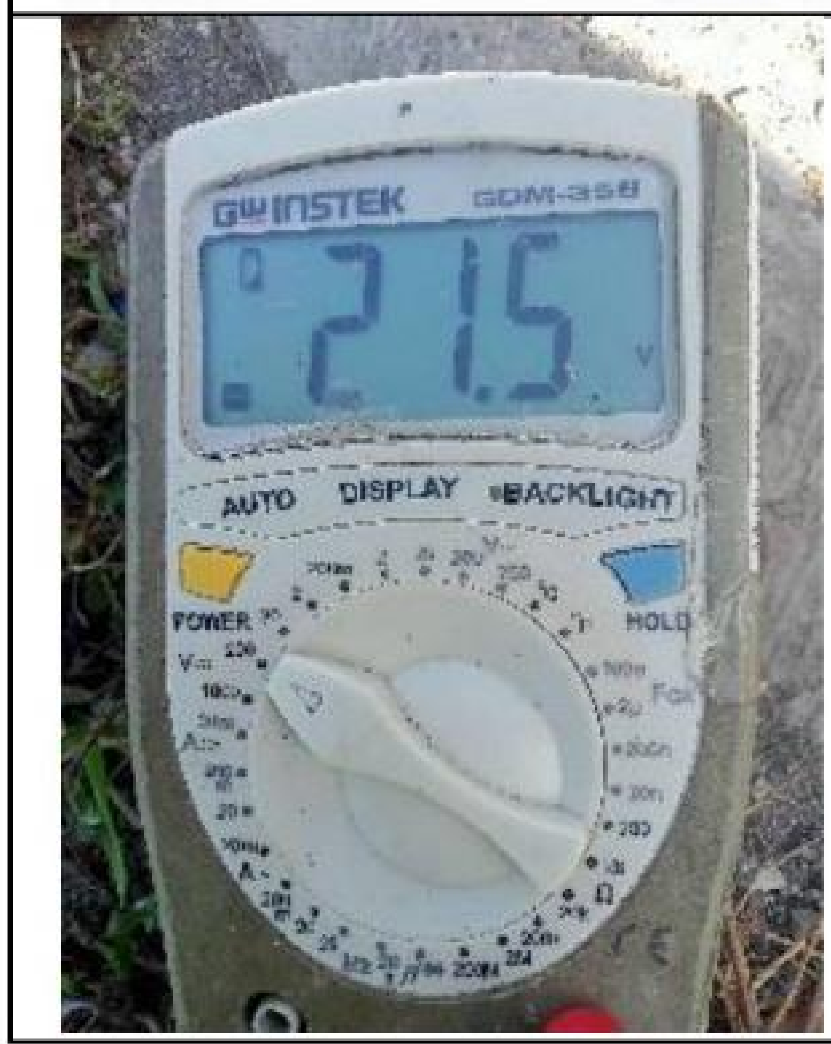
wiper OFF

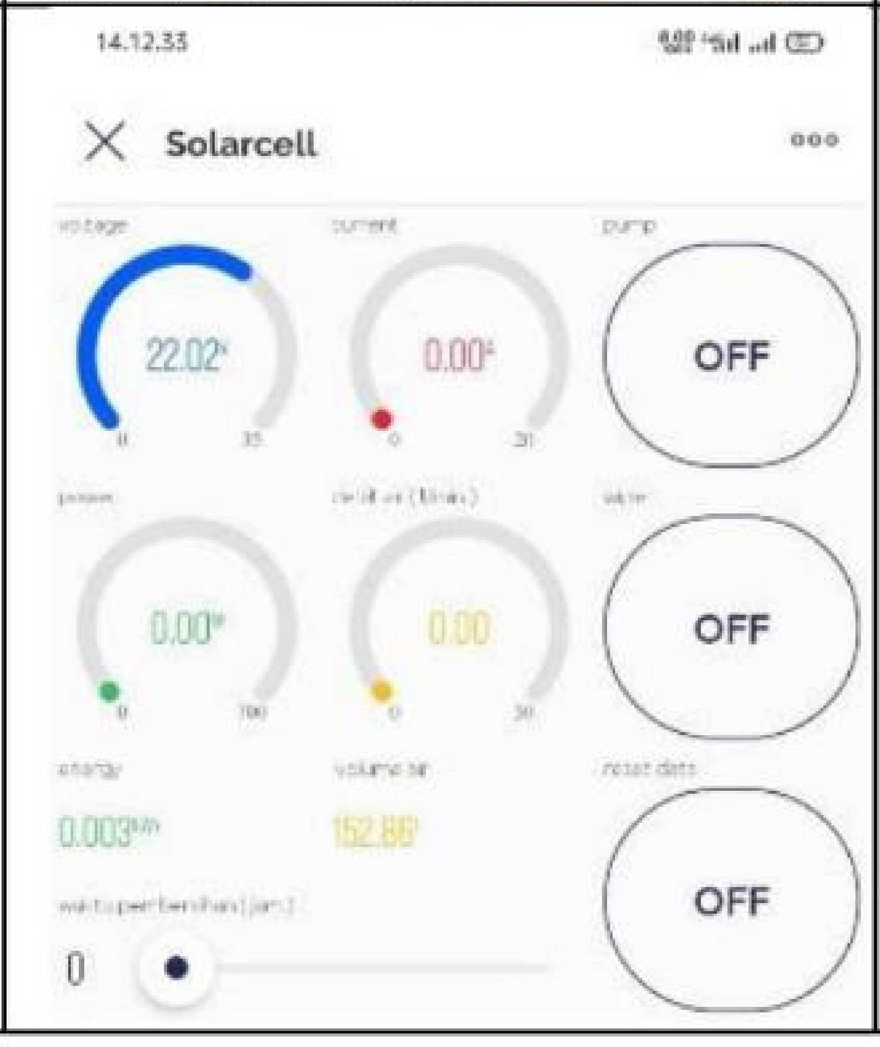
energy 0.003kWh

volume air 131.72

reset data OFF

waktu pemberhentian (jam) 0




14.12.33

Solarcell

voltage 22.02V

current 0.00A

pump OFF

power 0.00W

debit air (l/min) 0.00

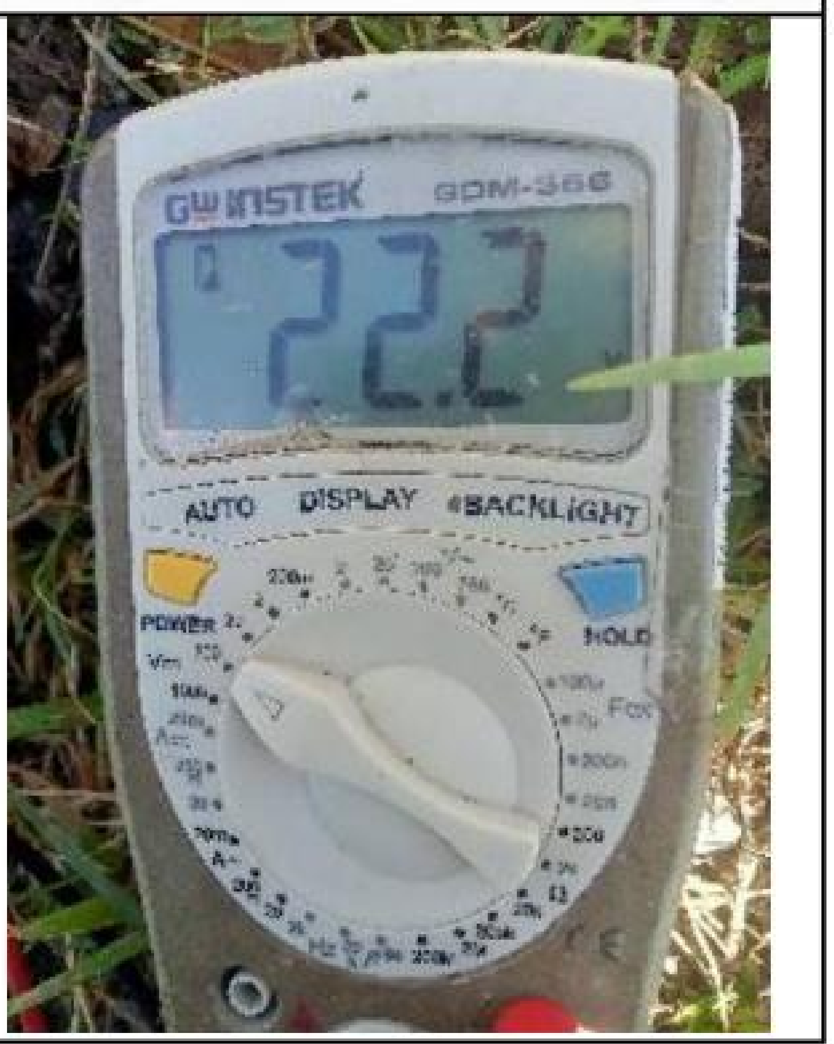
wiper OFF

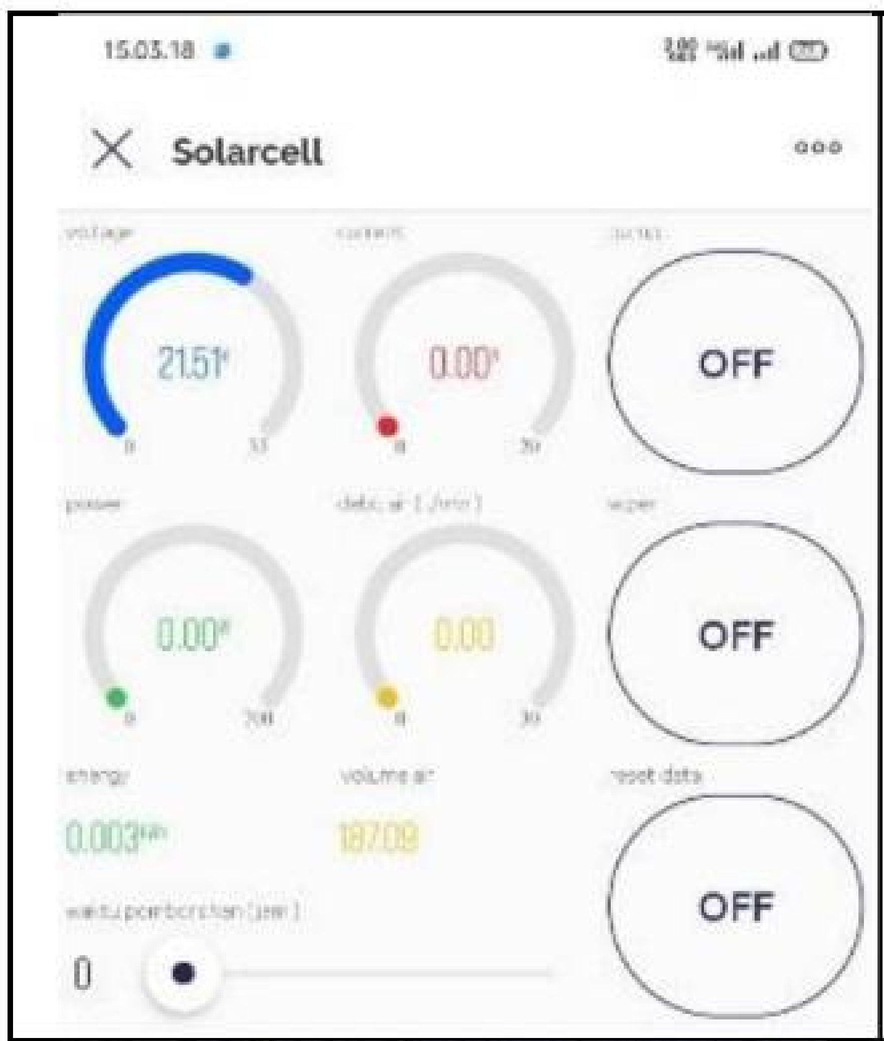
energy 0.003kWh

volume air 152.66

reset data OFF

waktu pemberhentian (jam) 0




15.03.18

Solarcell

voltage 21.51V

current 0.00A

pump OFF

power 0.00W

debit air (l/min) 0.00

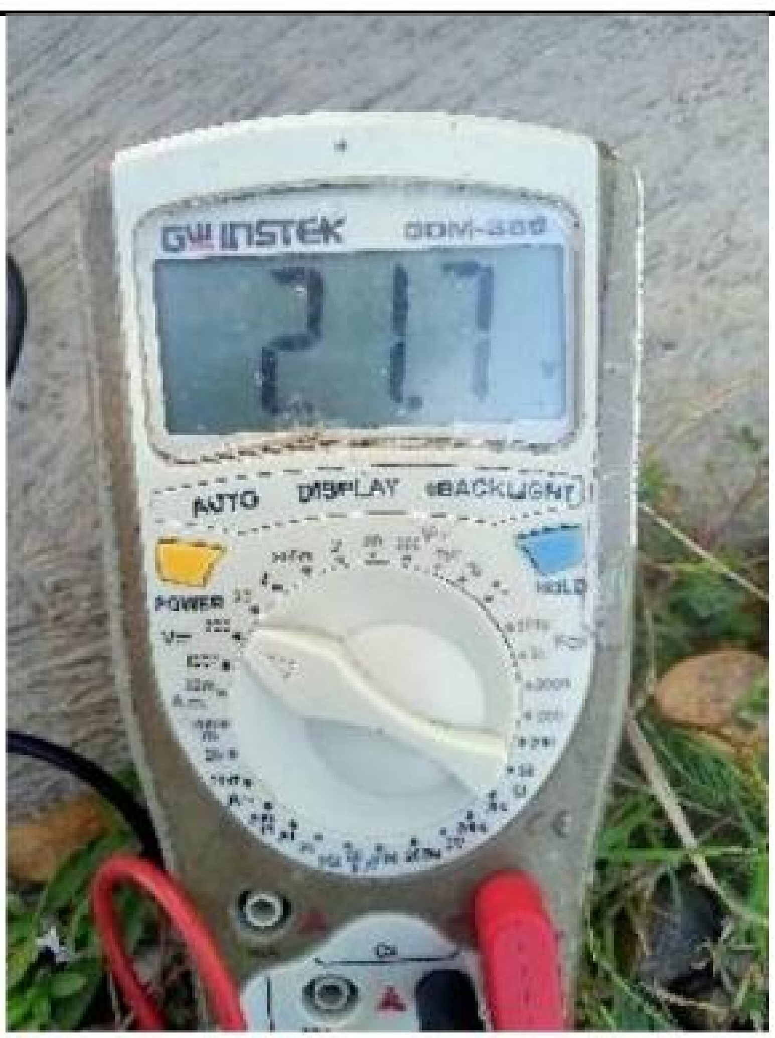
wiper OFF

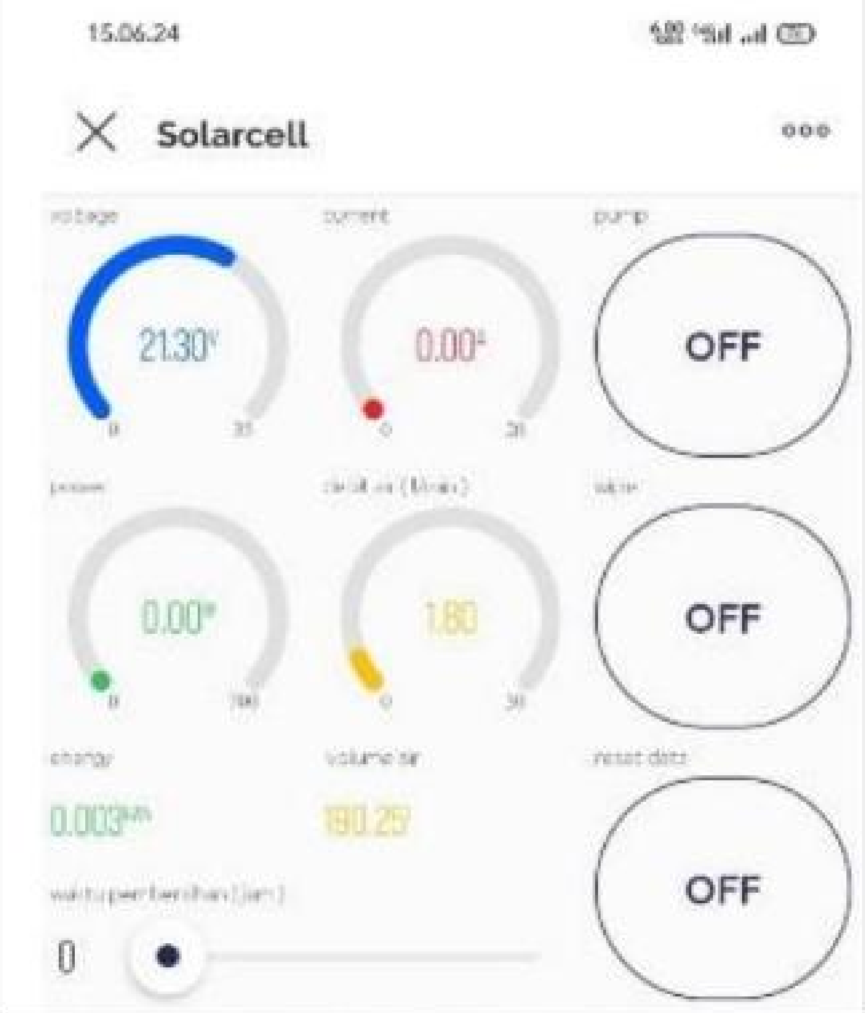
energy 0.003kWh

volume air 187.09

reset data OFF

waktu pembersihan (jam) 0




15.06.24

Solarcell

voltage 21.30V

current 0.00A

pump OFF

power 0.00W

debit air (l/min) 1.80

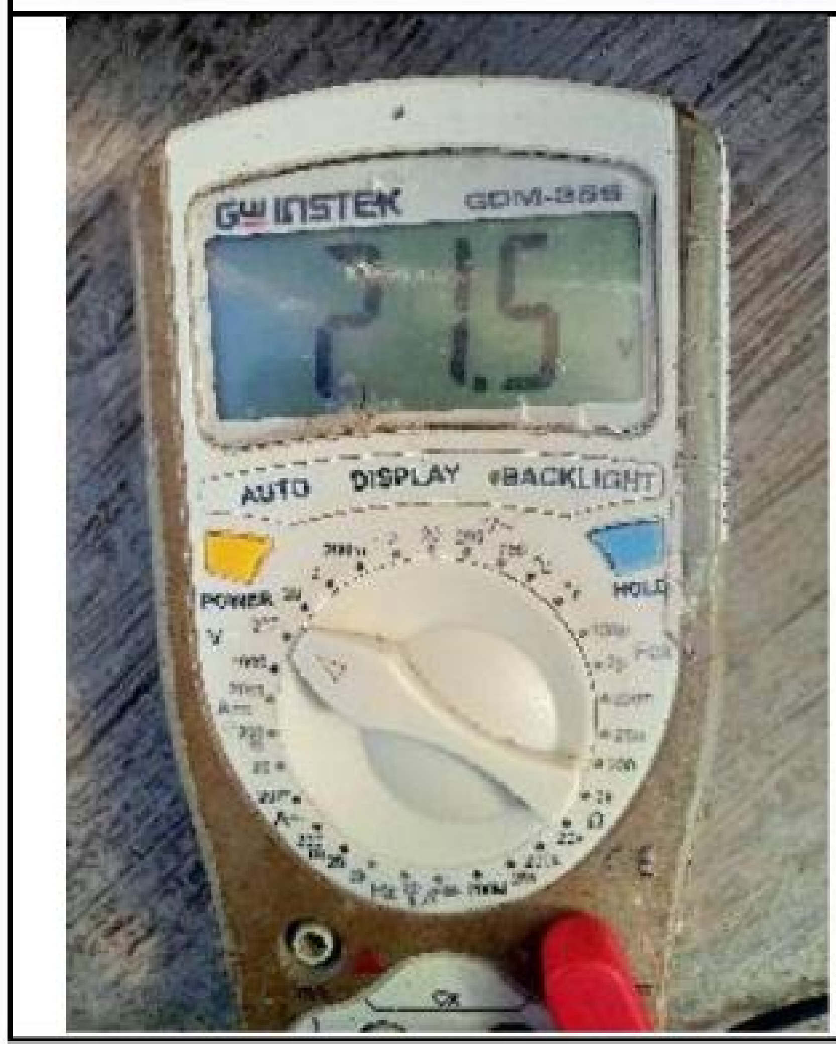
wiper OFF

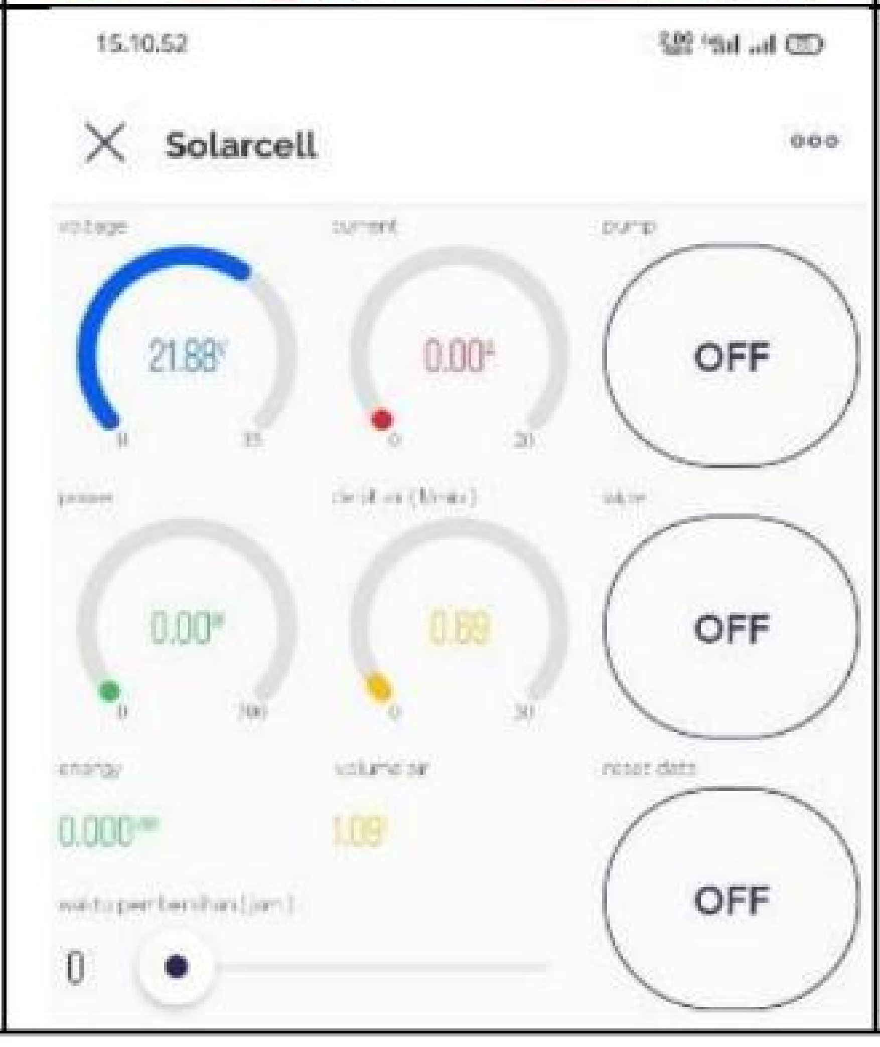
energy 0.003kWh

volume air 190.25

reset data OFF

waktu pembersihan (jam) 0




15.10.52

Solarcell

voltage 21.88V

current 0.00A

pump OFF

power 0.00W

debit air (l/min) 0.69

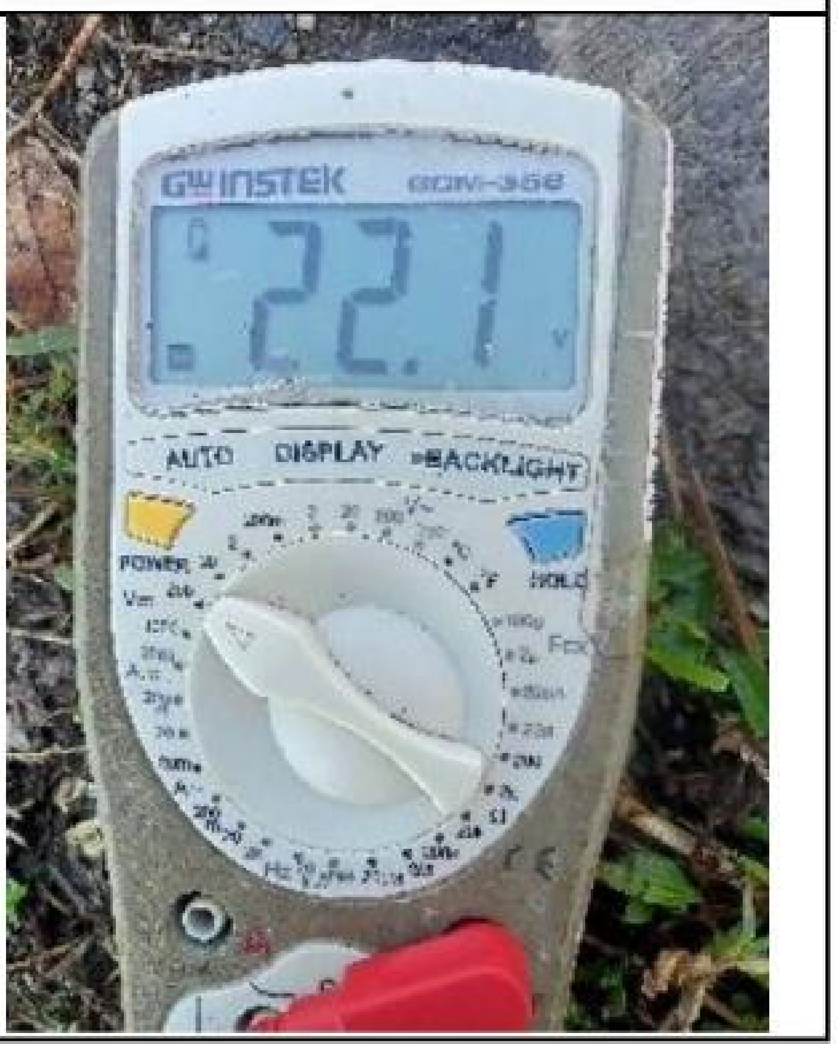
wiper OFF

energy 0.000kWh

volume air 1.09

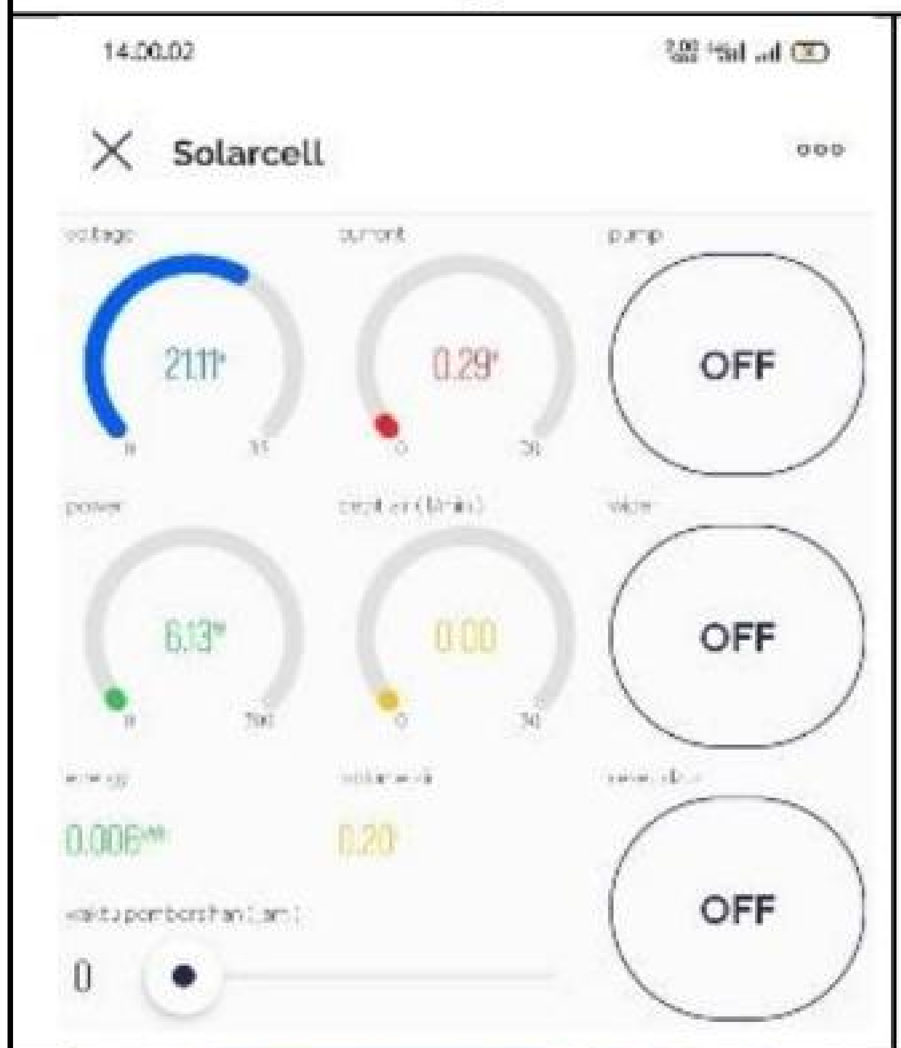
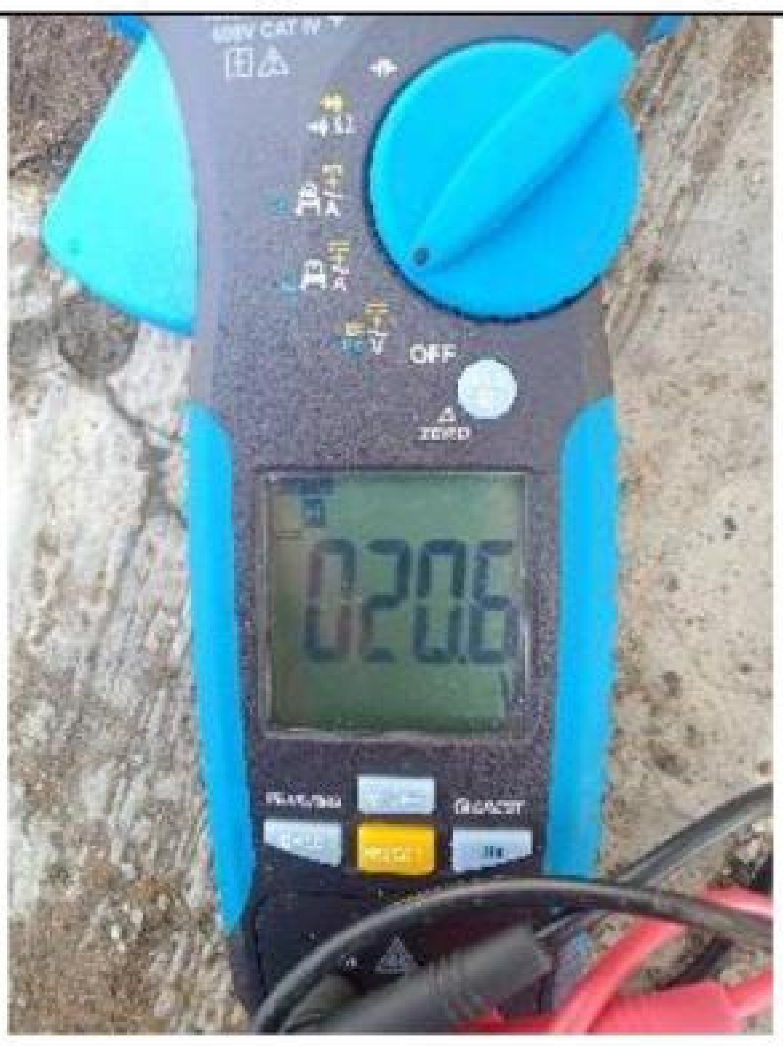
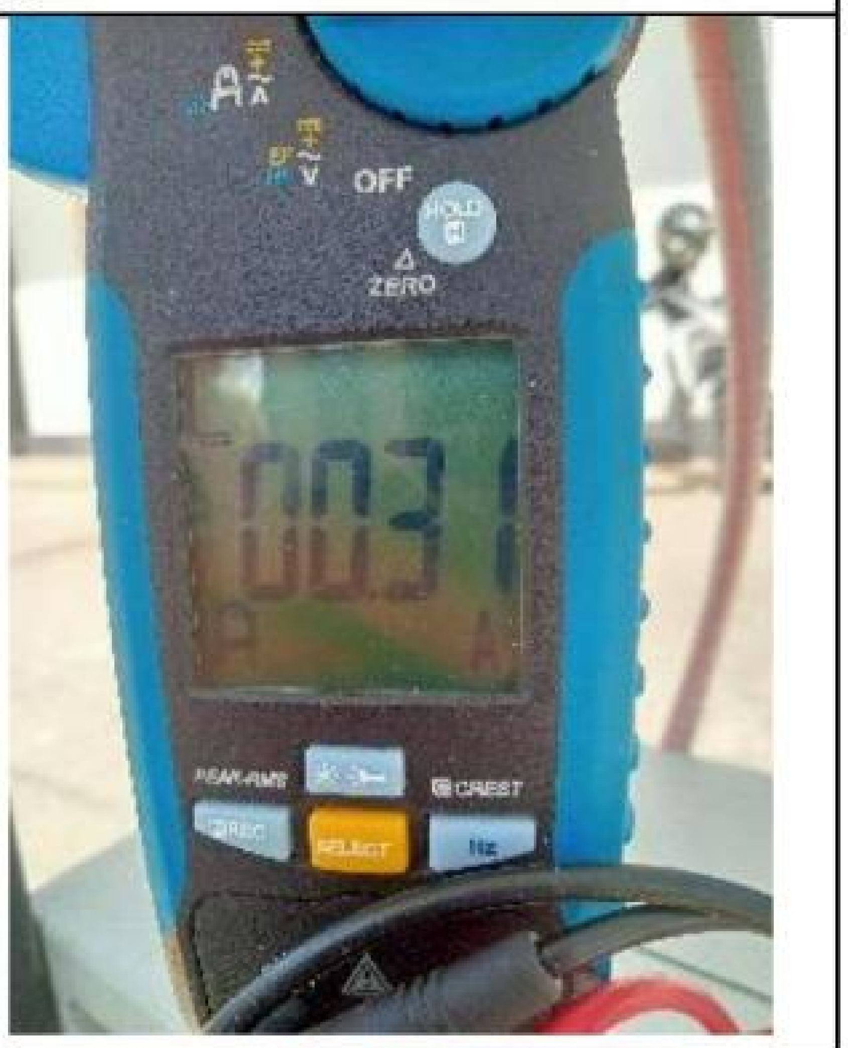
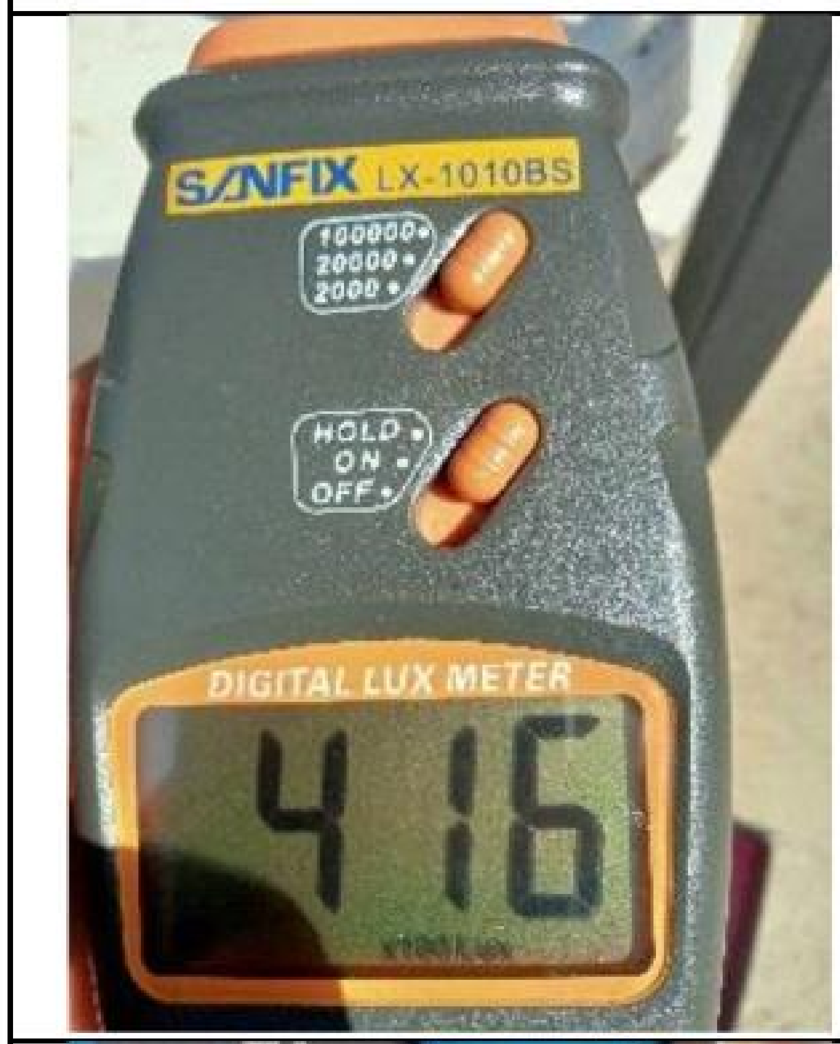
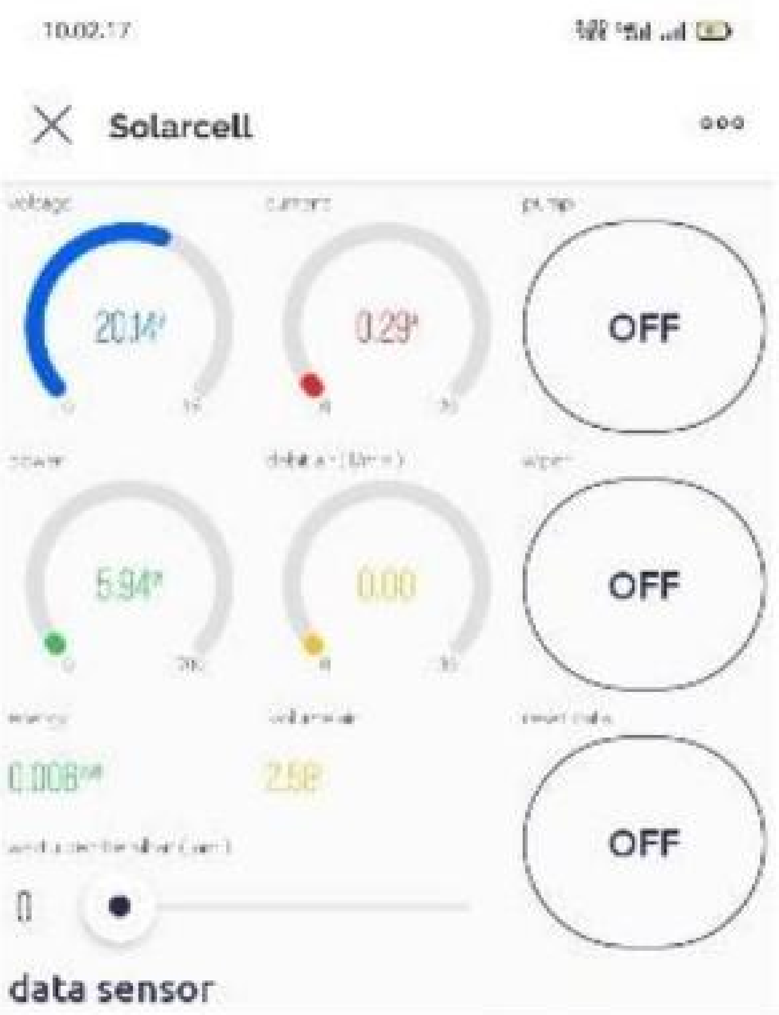
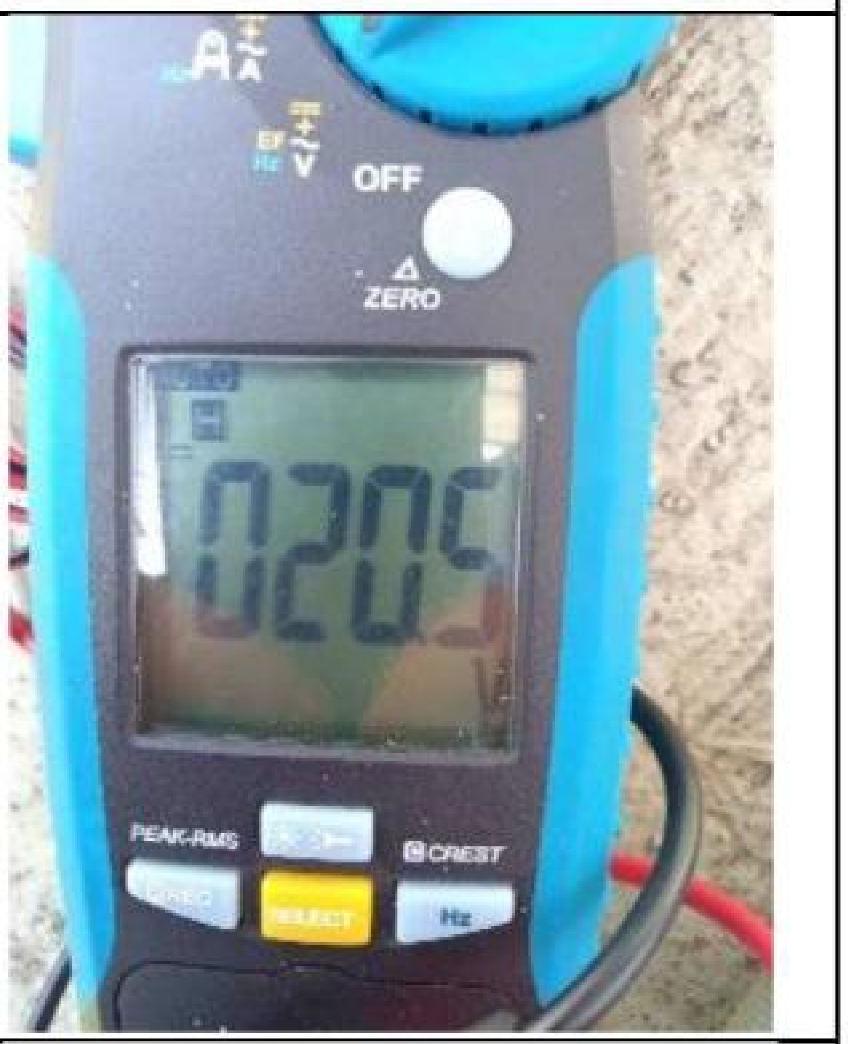
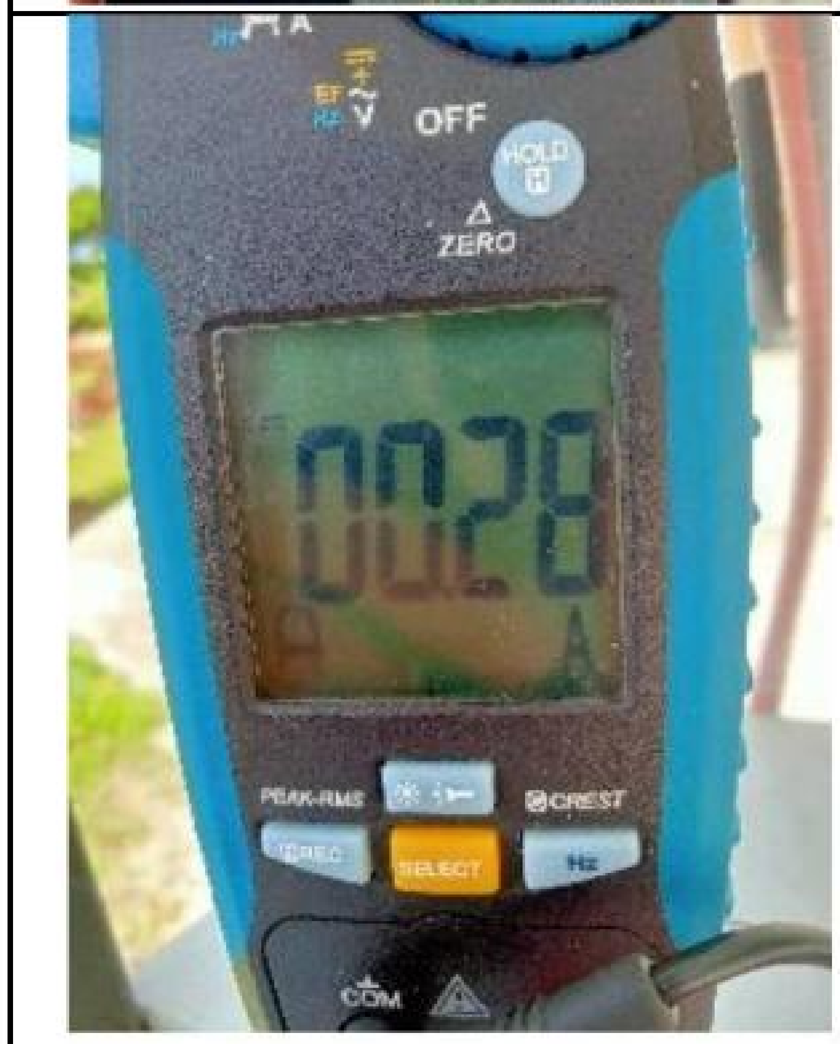
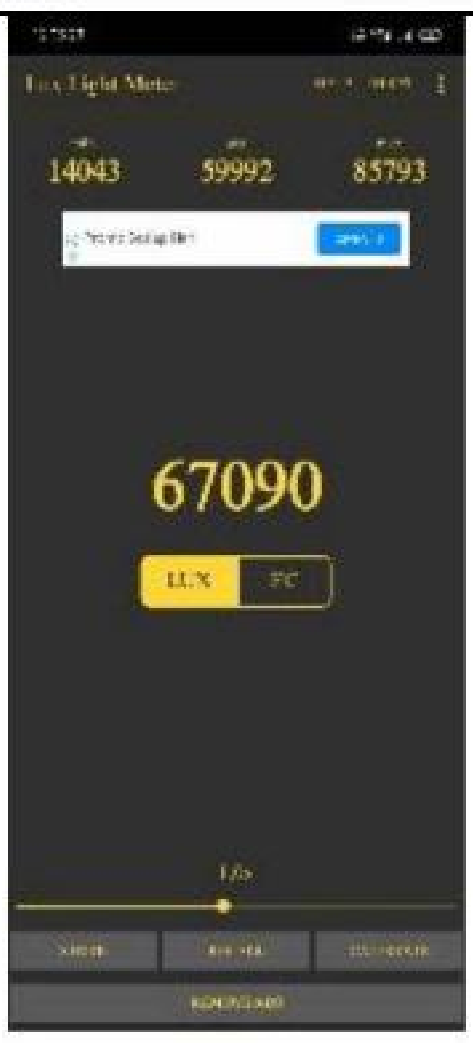
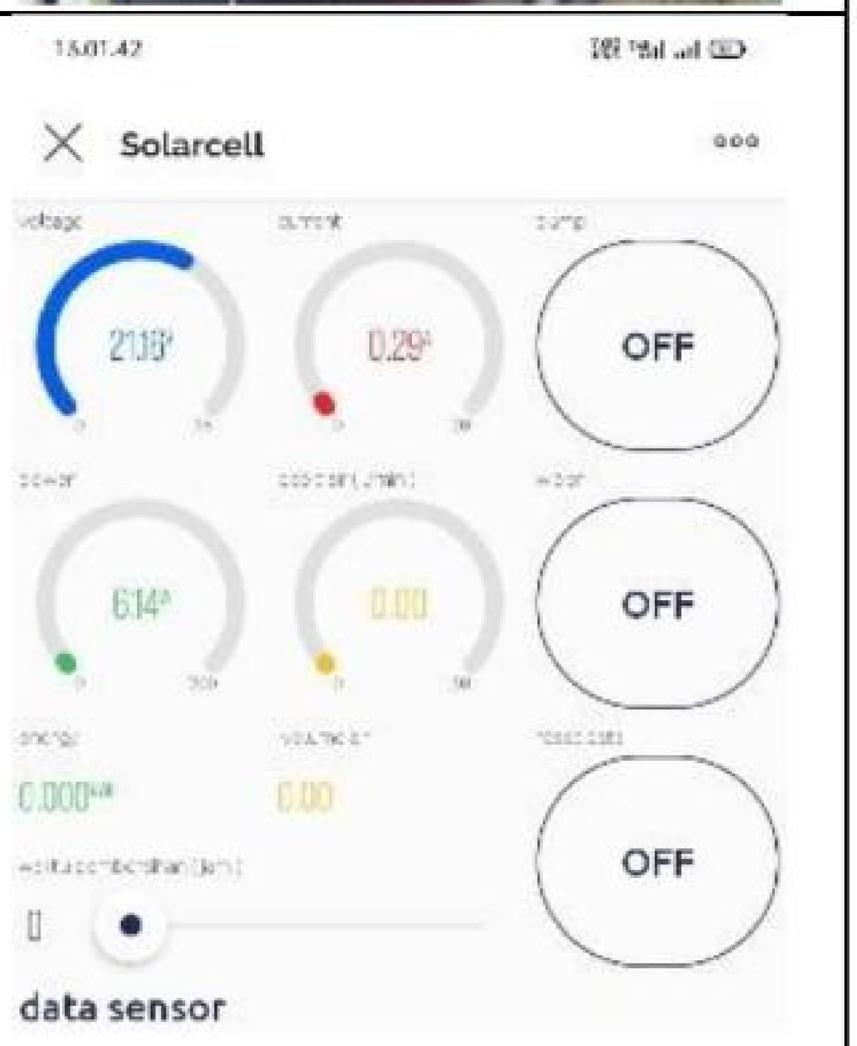
reset data OFF

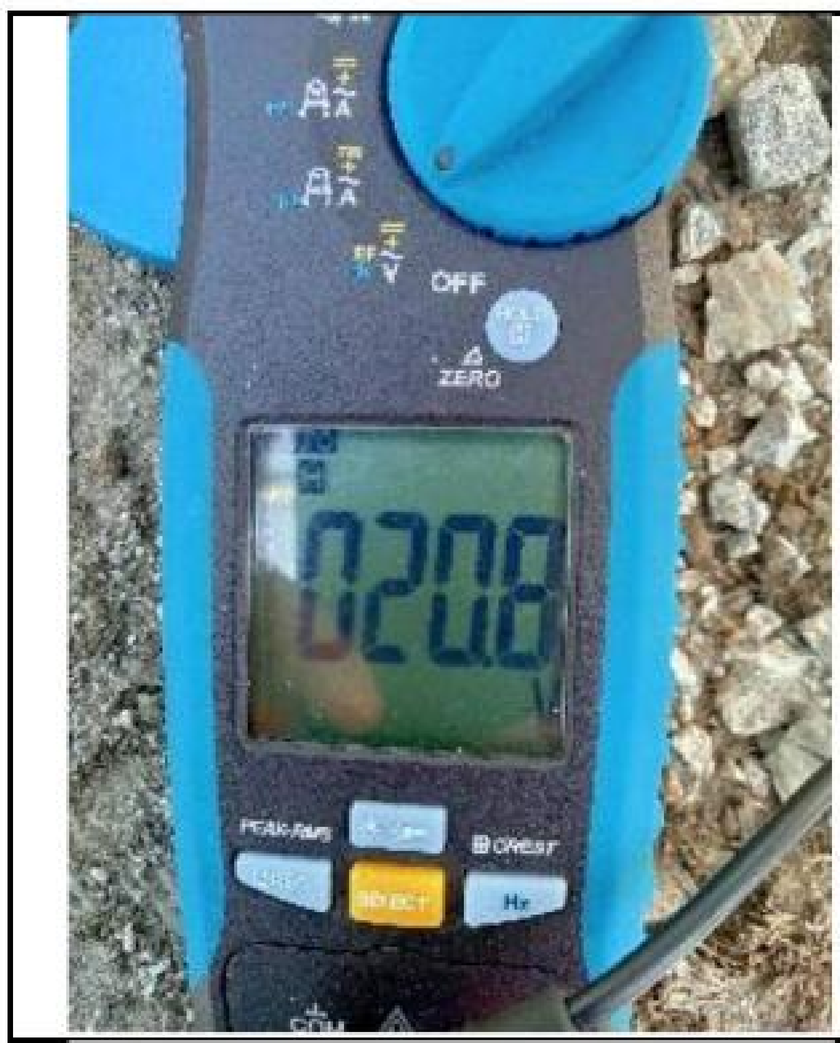
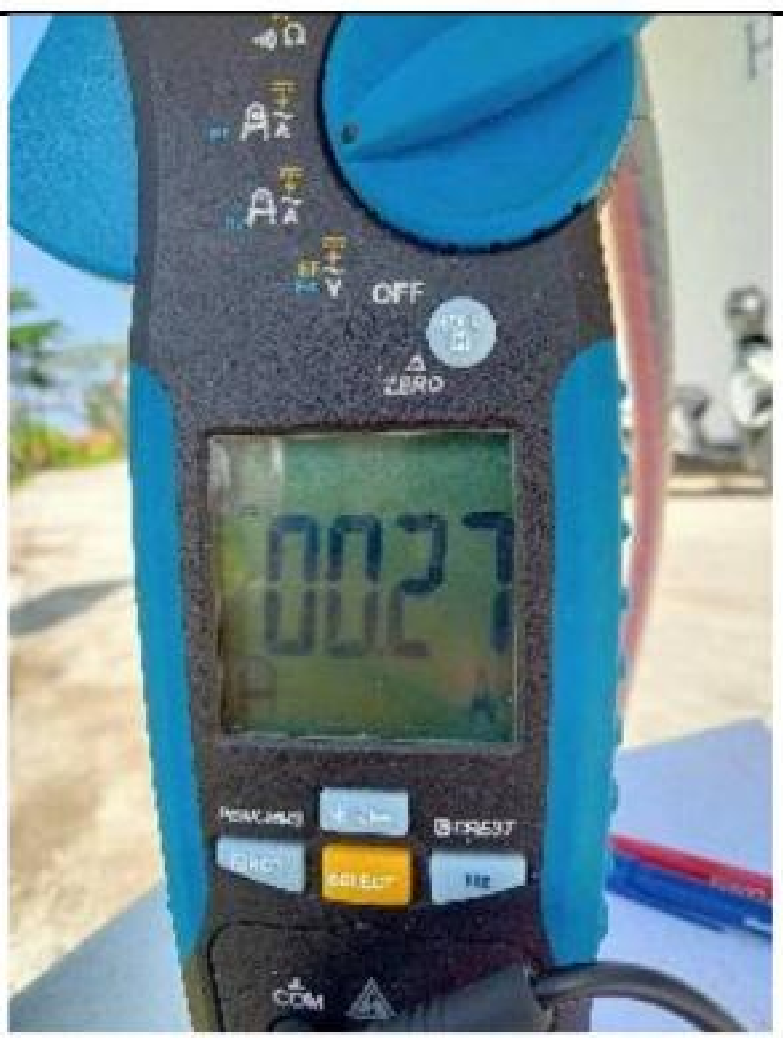
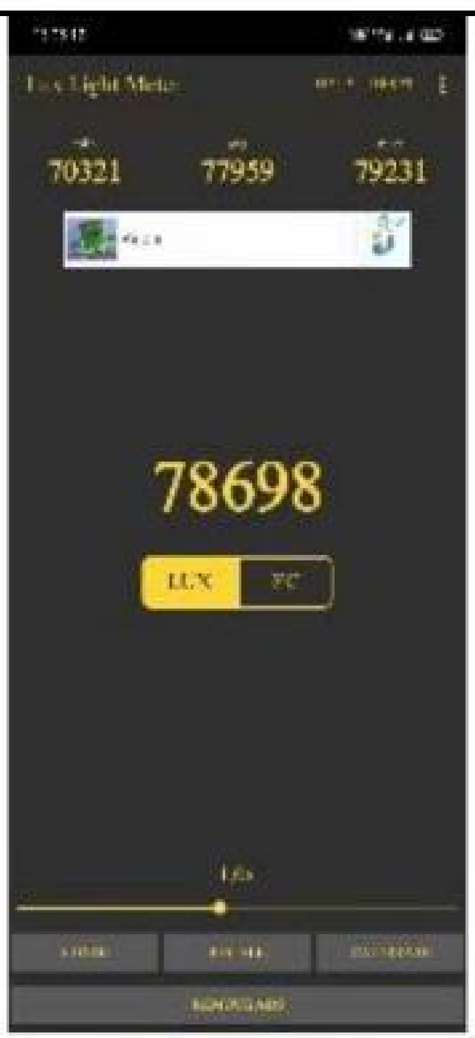
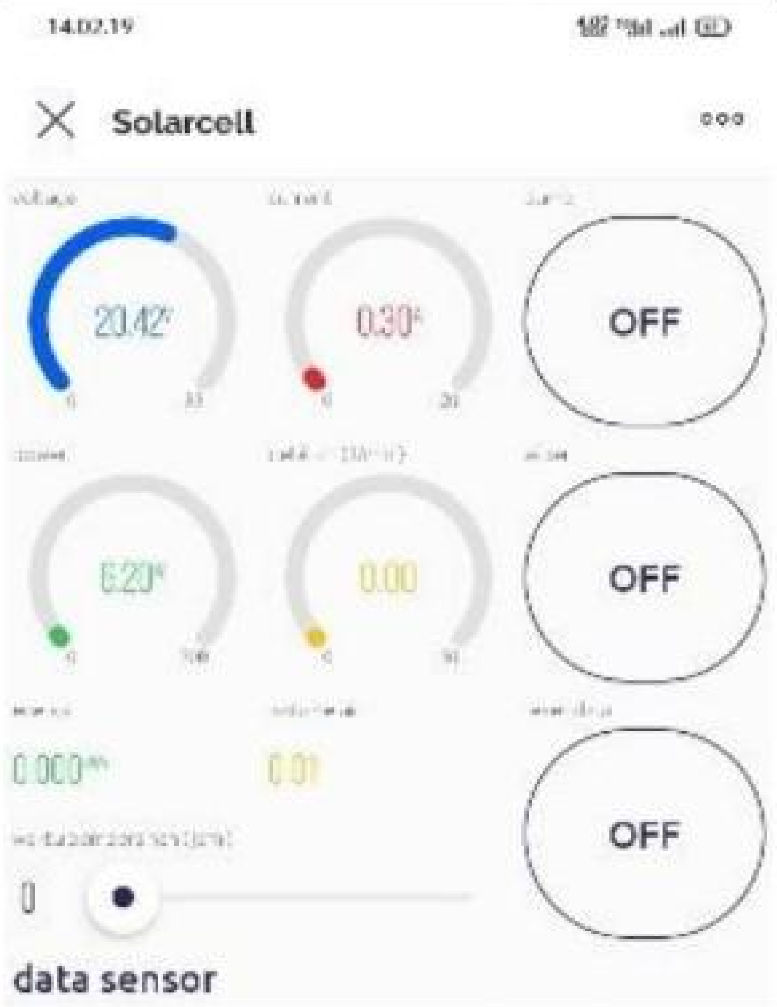
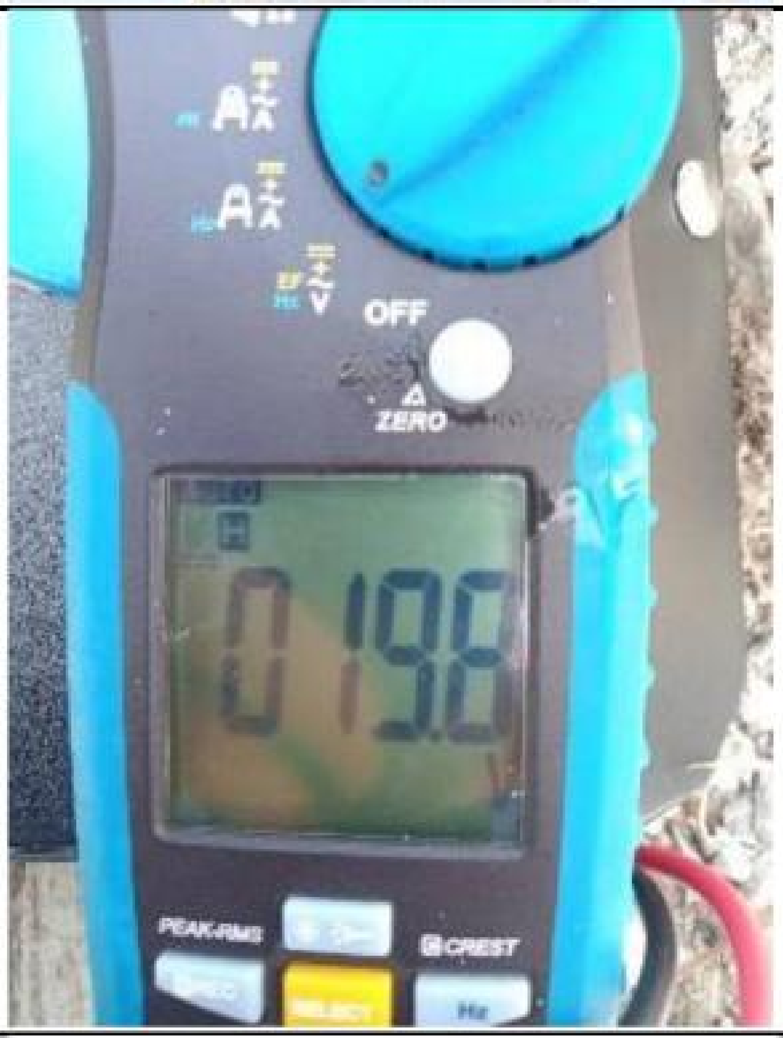
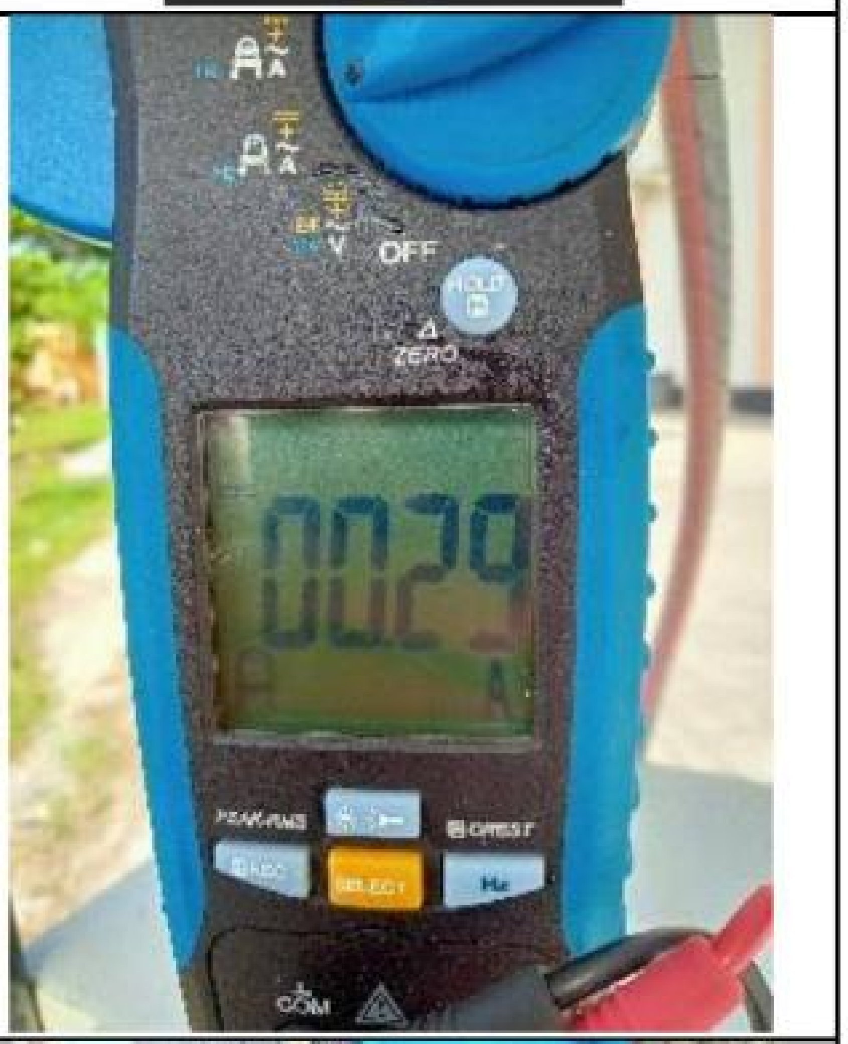
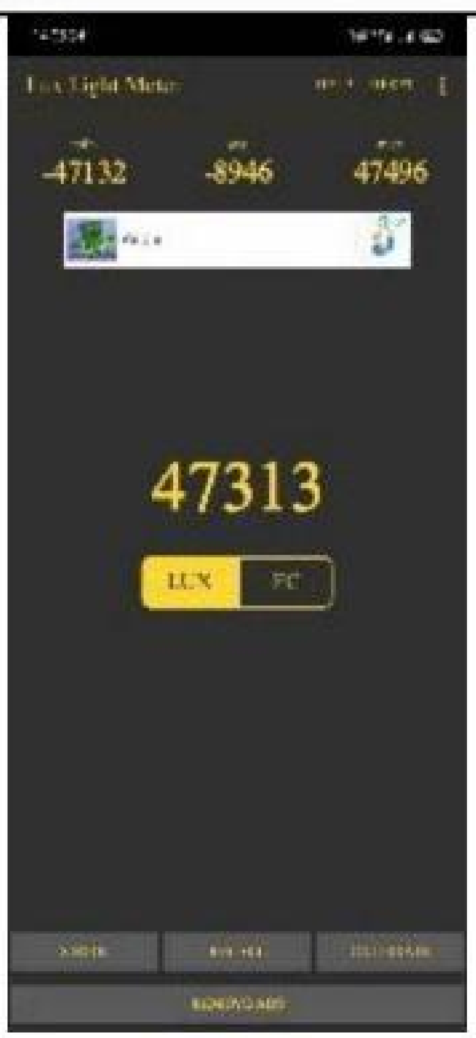
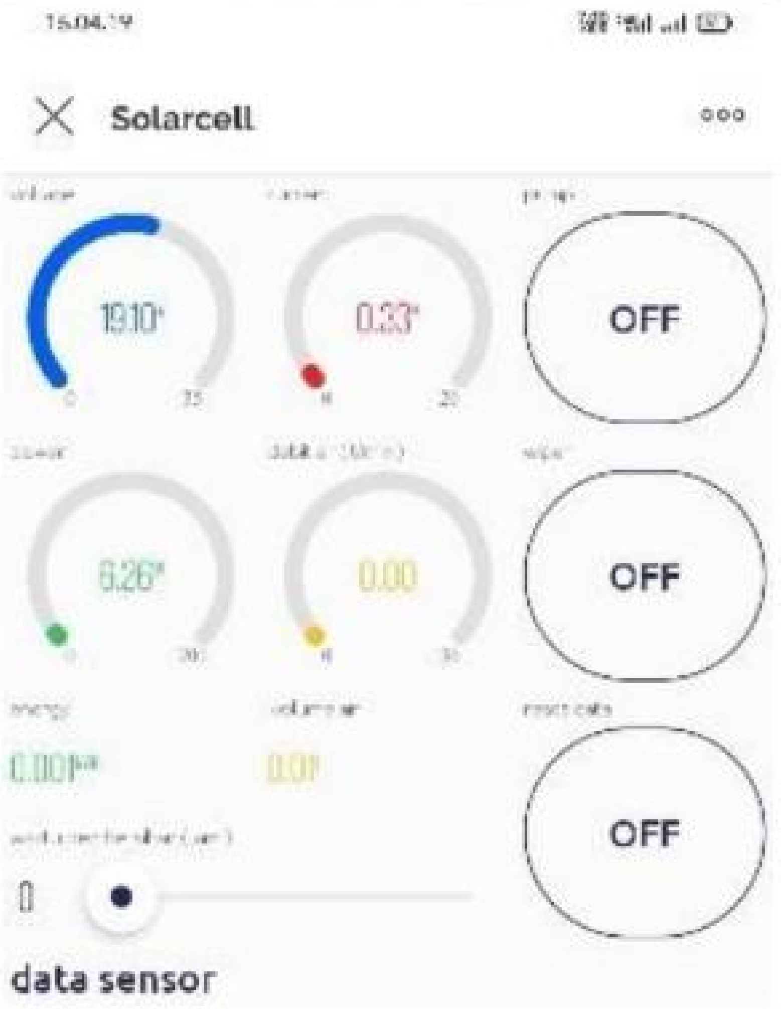
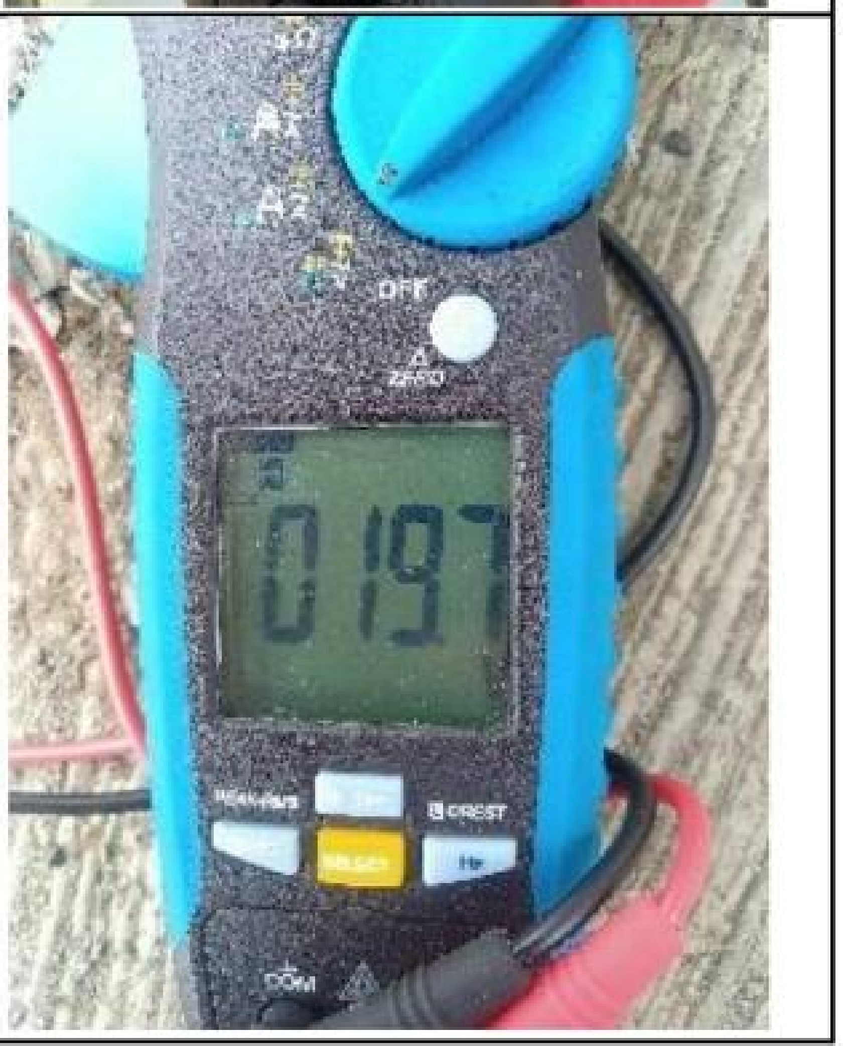
waktu pembersihan (jam) 0

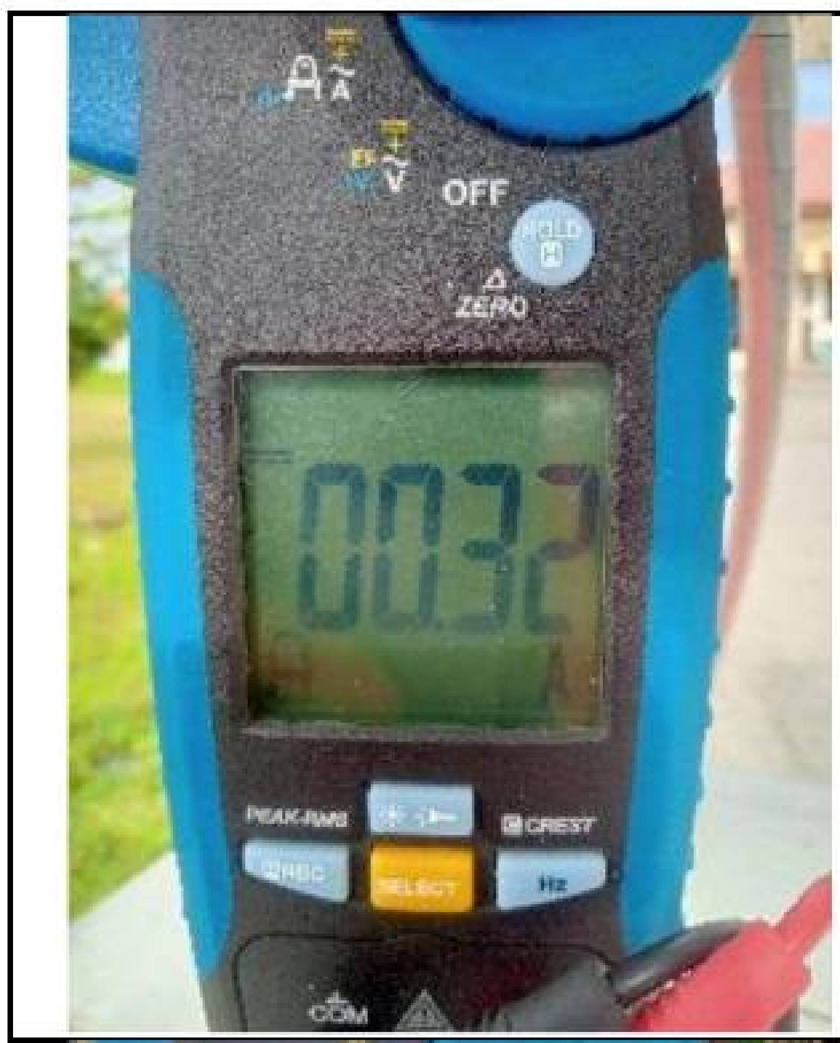
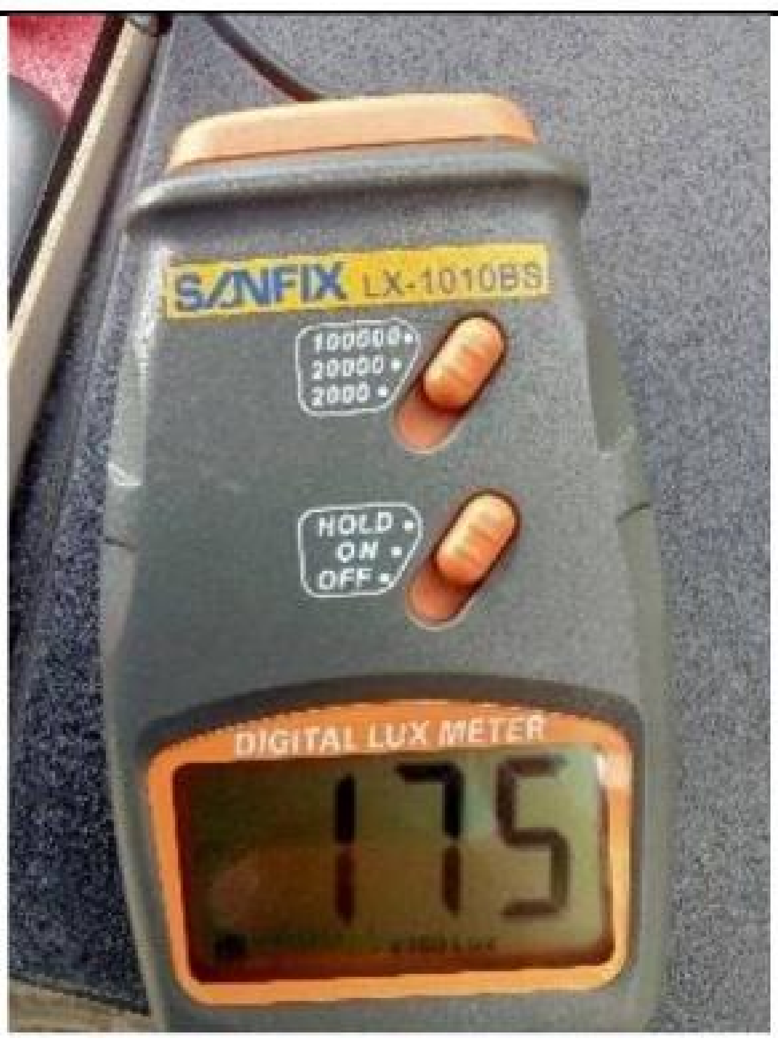
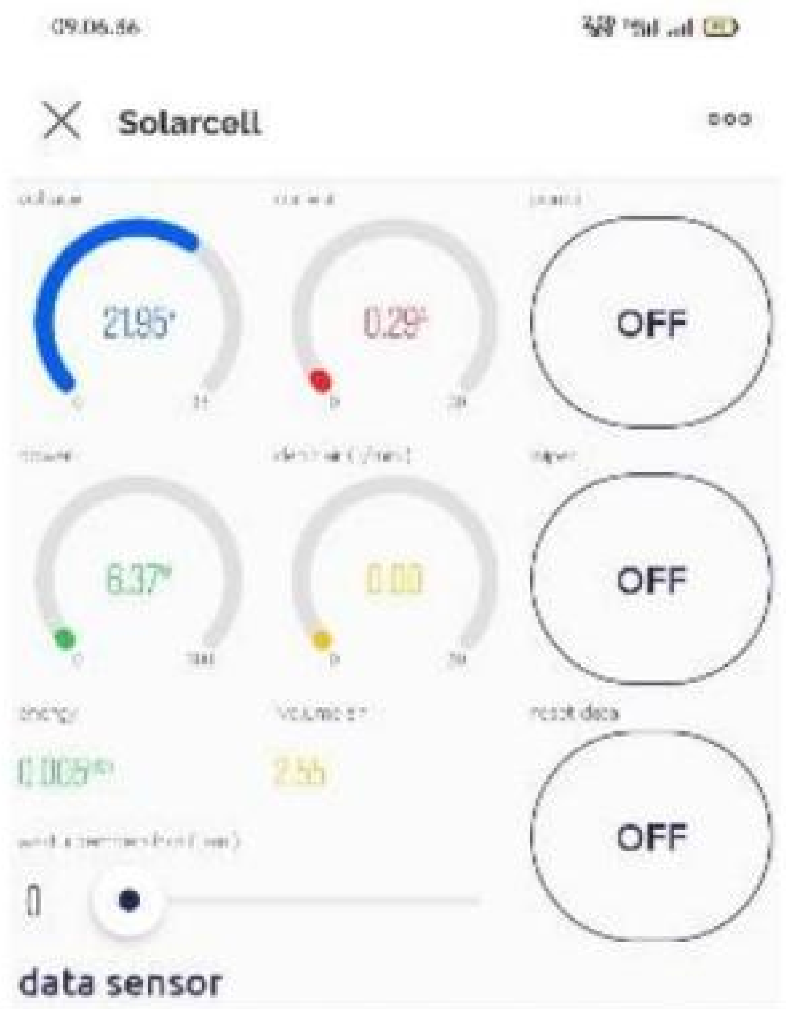
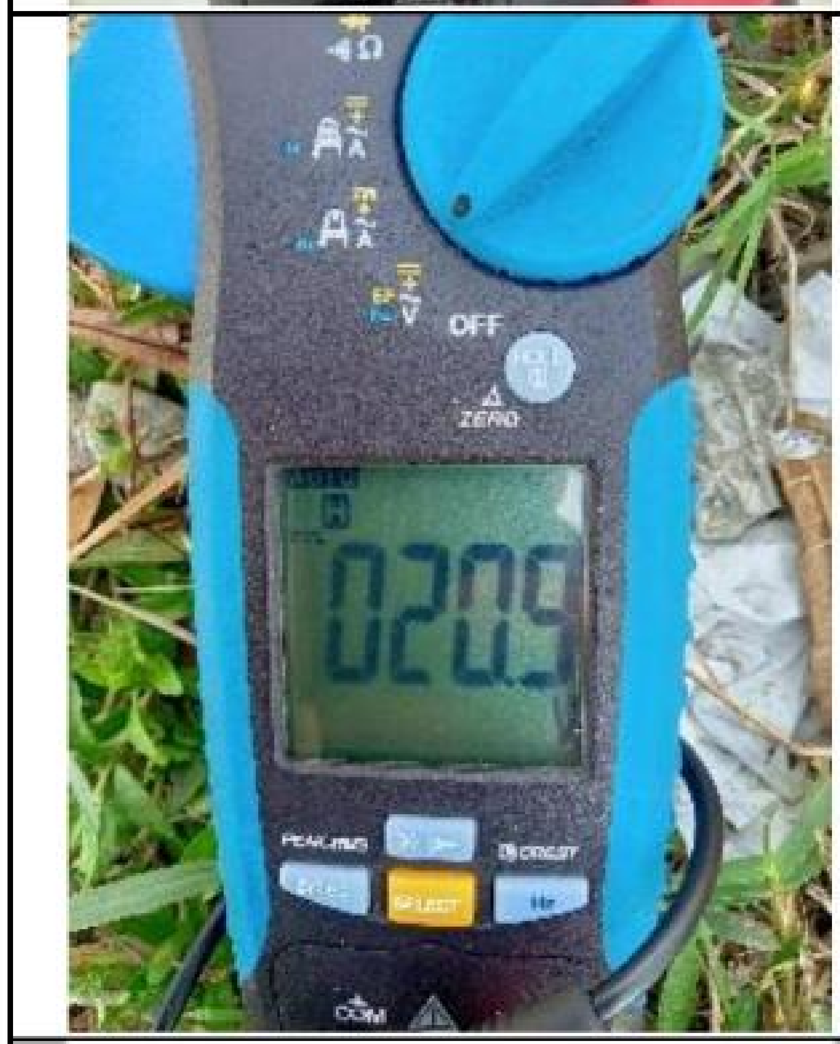
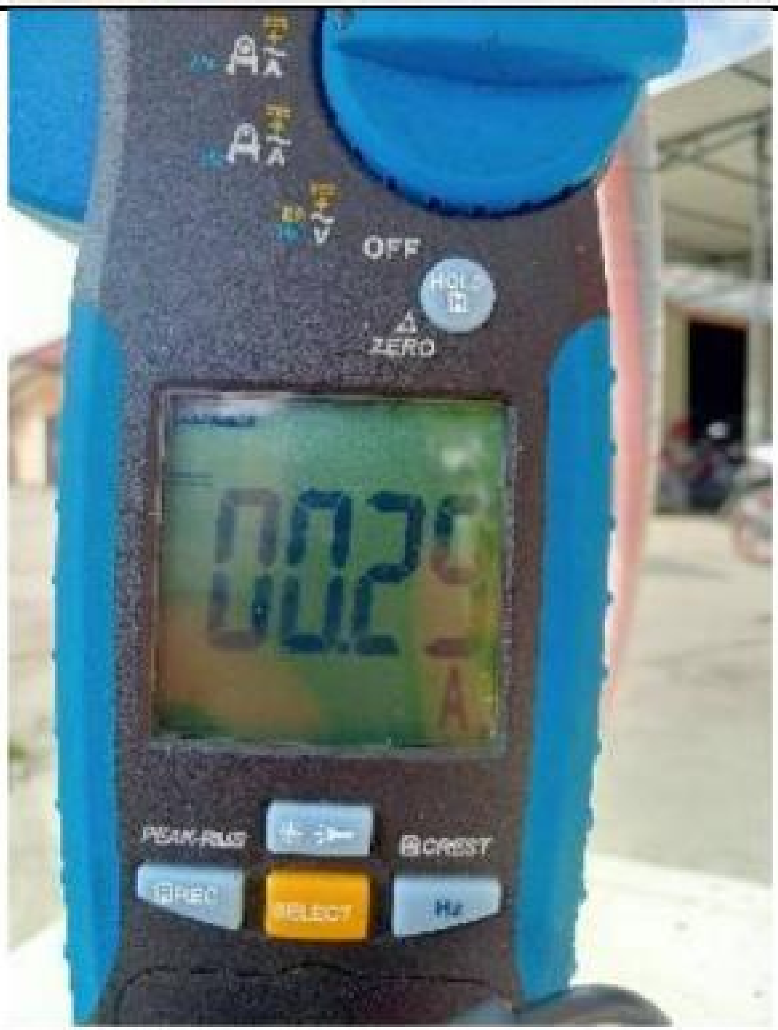
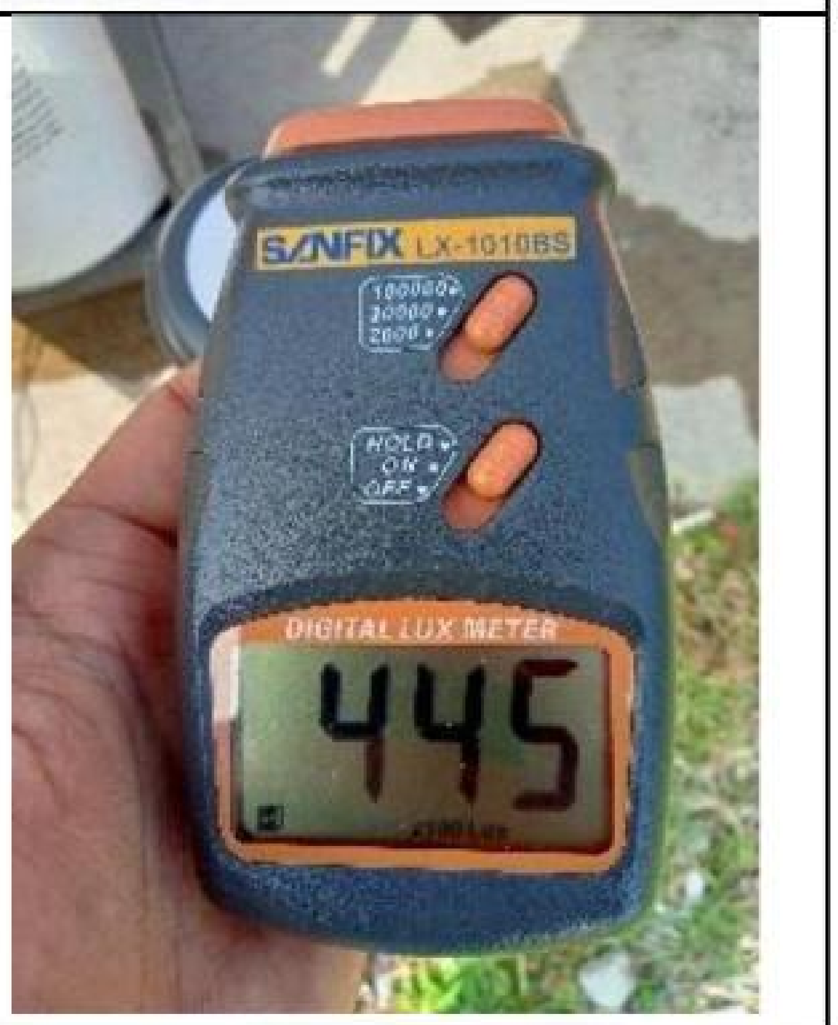
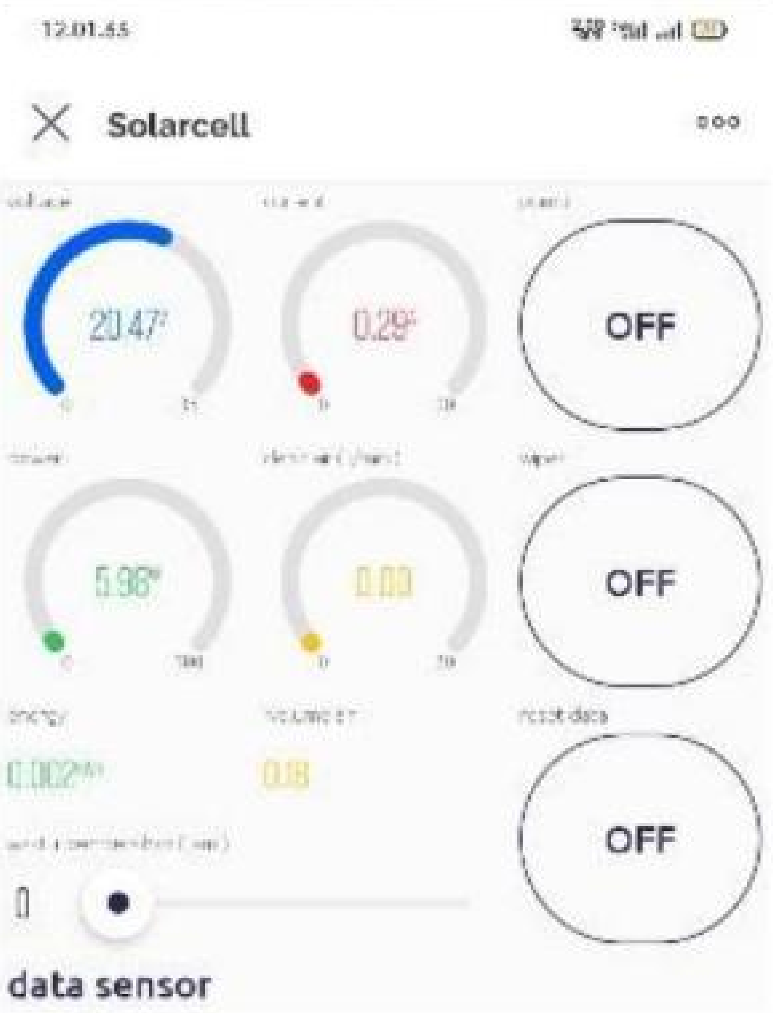
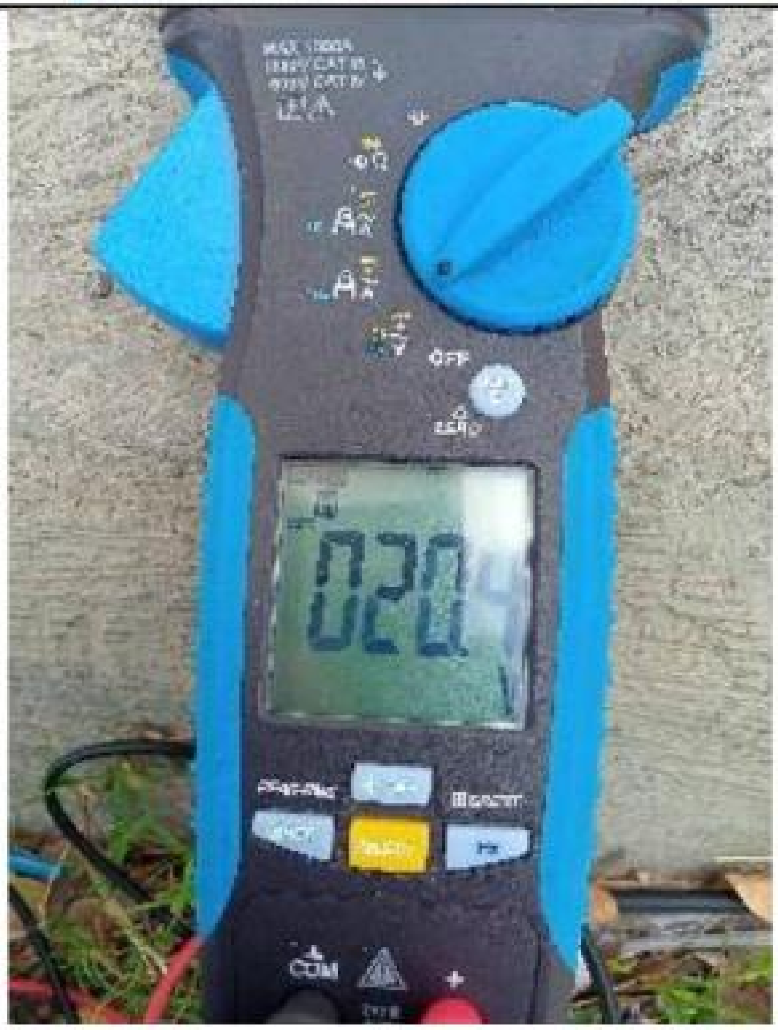
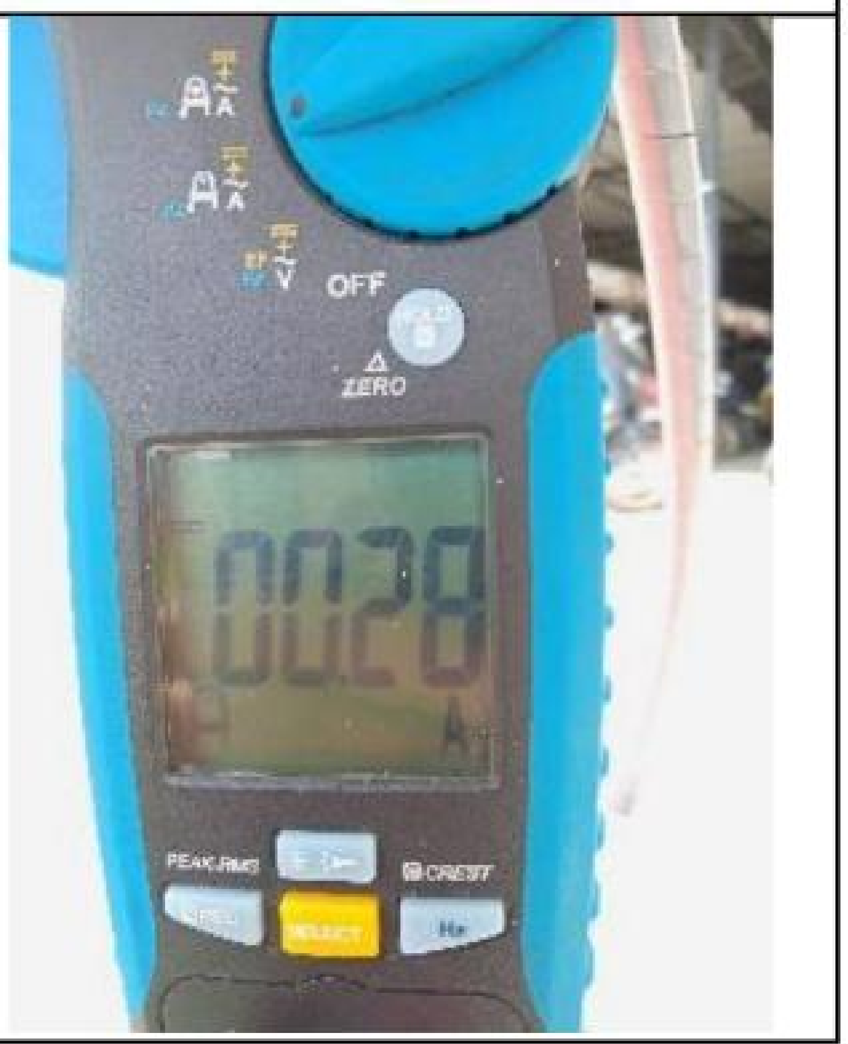


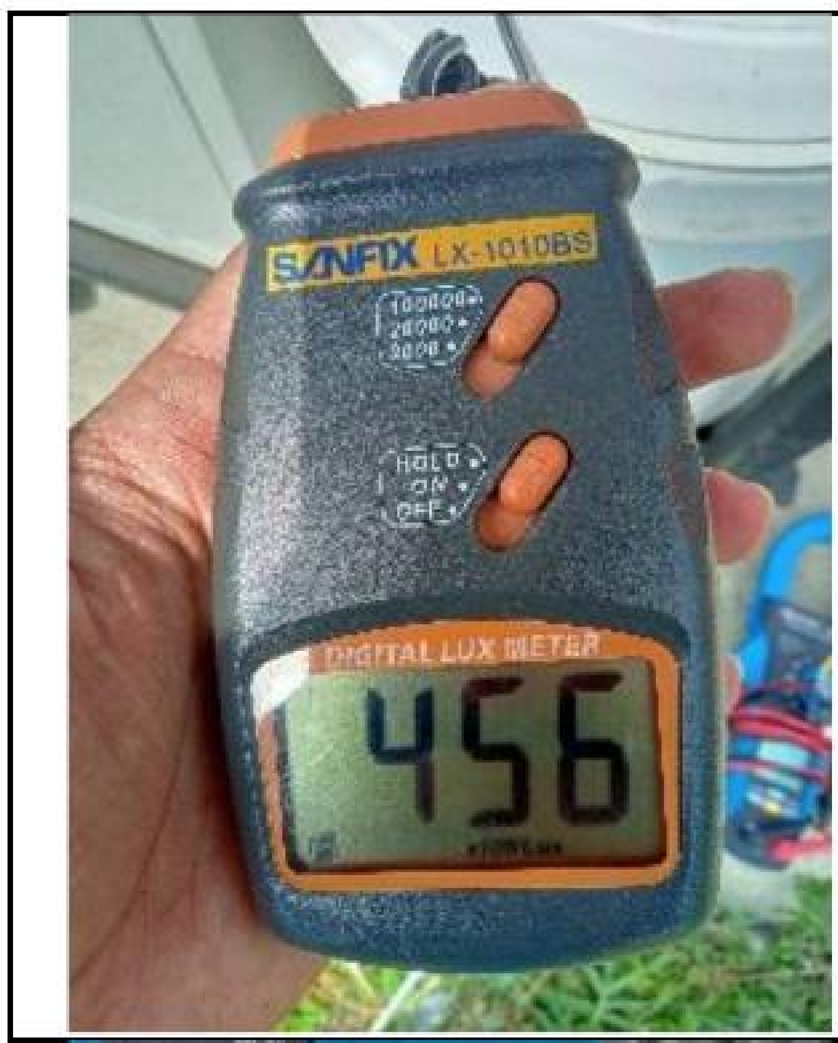
LAMPIRAN C

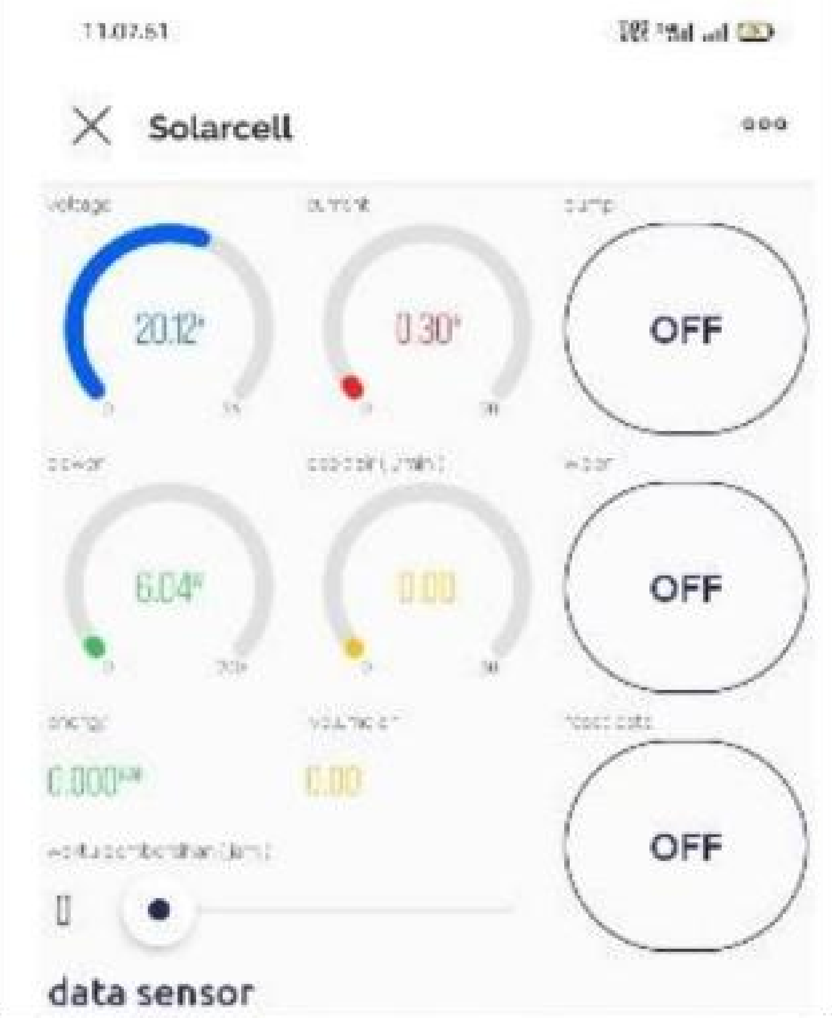
Pengambilan Data Tegangan Dan Arus Panel Surya Dengan Beban

Pengambilan Data Pengukuran Tegangan Dan Arus		
 14.00.02 Solarcell voltage 21.11 current 0.29 pump OFF power 6.13 debit air (l/min) 0.00 wiper OFF energy 0.006 volume air 0.20 reset data OFF waktu pembersihan (jam) 0		
 SANFIX LX-1010BS 100000 20000 2000 HOLD ON OFF DIGITAL LUX METER 416 x100 Lux	 10.02.17 Solarcell voltage 20.14 current 0.29 pump OFF power 5.94 debit air (l/min) 0.00 wiper OFF energy 0.006 volume air 2.58 reset data OFF waktu pembersihan (jam) 0 data sensor	
 00.28 OFF HOLD ZERO PEAK-RMS REC SELECT CREST Hz COM	 Lux Light Meter 14043 59992 85793 67090 LUX FC	 15.01.42 Solarcell voltage 21.18 current 0.29 pump OFF power 6.14 debit air (l/min) 0.00 wiper OFF energy 0.000 volume air 0.00 reset data OFF waktu pembersihan (jam) 0 data sensor

 020.8 OFF ZERO PEAK-RMS SELECT CREST Hz COM	 0027 OFF ZERO PEAK-RMS SELECT CR637 Hz COM	 Lux Light Meter 70321 77959 79231 78698 LUX FC
 14.02.19 Solarcell 20.42 0.30 OFF 6.20 0.00 OFF 0.000 0.01 OFF data sensor	 	 0029 OFF ZERO PEAK-RMS SELECT CREST Hz COM
 Lux Light Meter -47132 -8946 47496 47313 LUX FC	 16.04.19 Solarcell 19.10 0.33 OFF 6.26 0.00 OFF 0.001 0.01 OFF data sensor	 0197 OFF ZERO PEAK-RMS SELECT CREST Hz COM

	 SANFIX LX-1010BS 100000 20000 2000 HOLD ON OFF DIGITAL LUX METER 175	09.06.66 Solarcell 21.95 0.29 OFF 6.37 0.00 OFF 0.005 2.55 OFF data sensor
		
12.01.55 Solarcell 20.47 0.29 OFF 5.98 0.00 OFF 0.002 0.8 OFF data sensor		



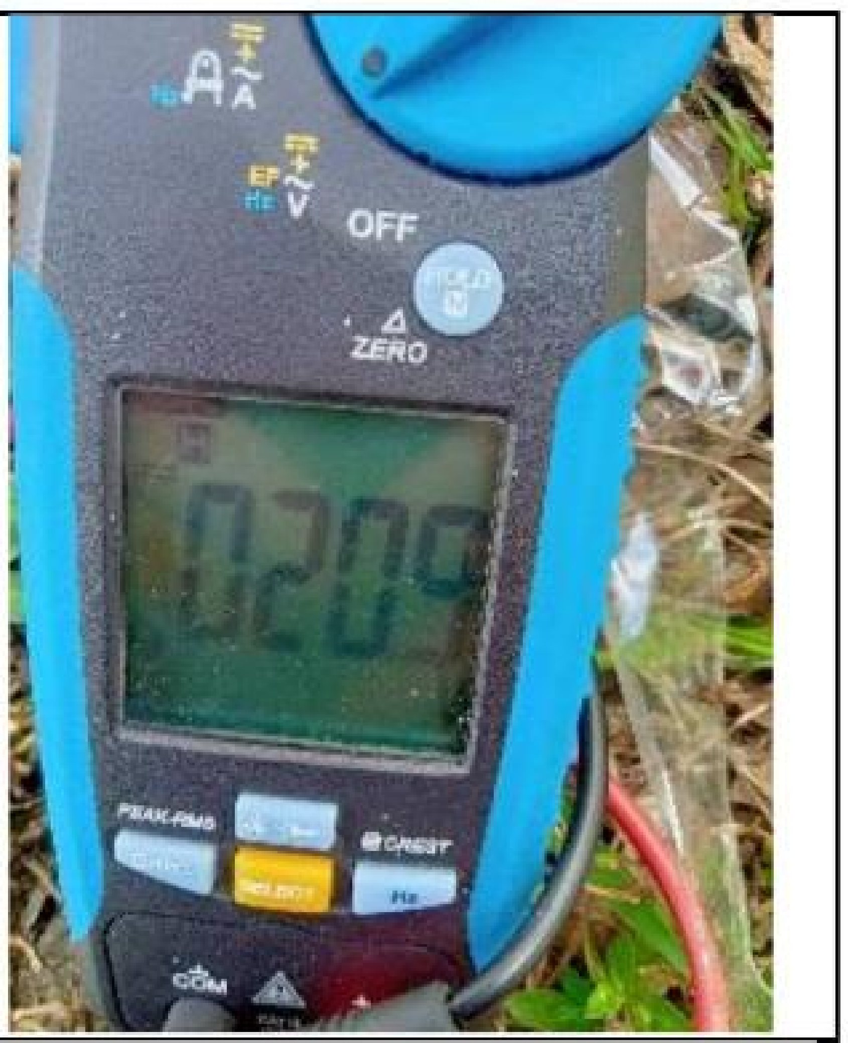


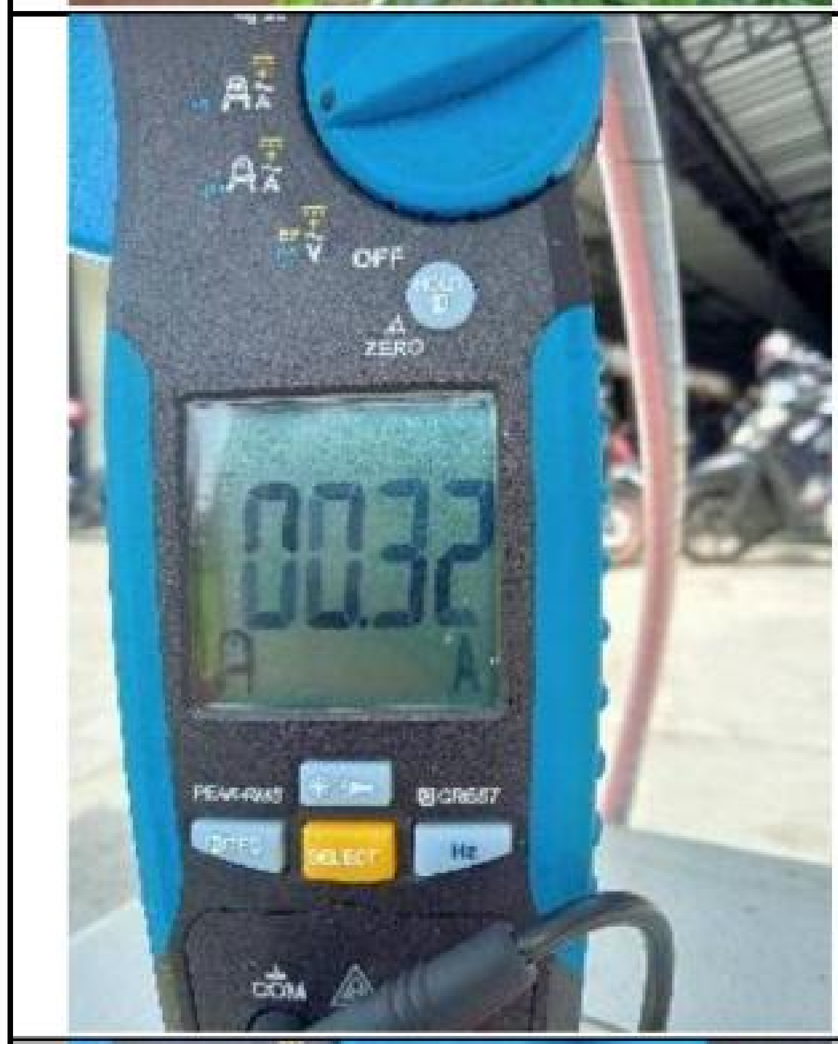
11.07.51

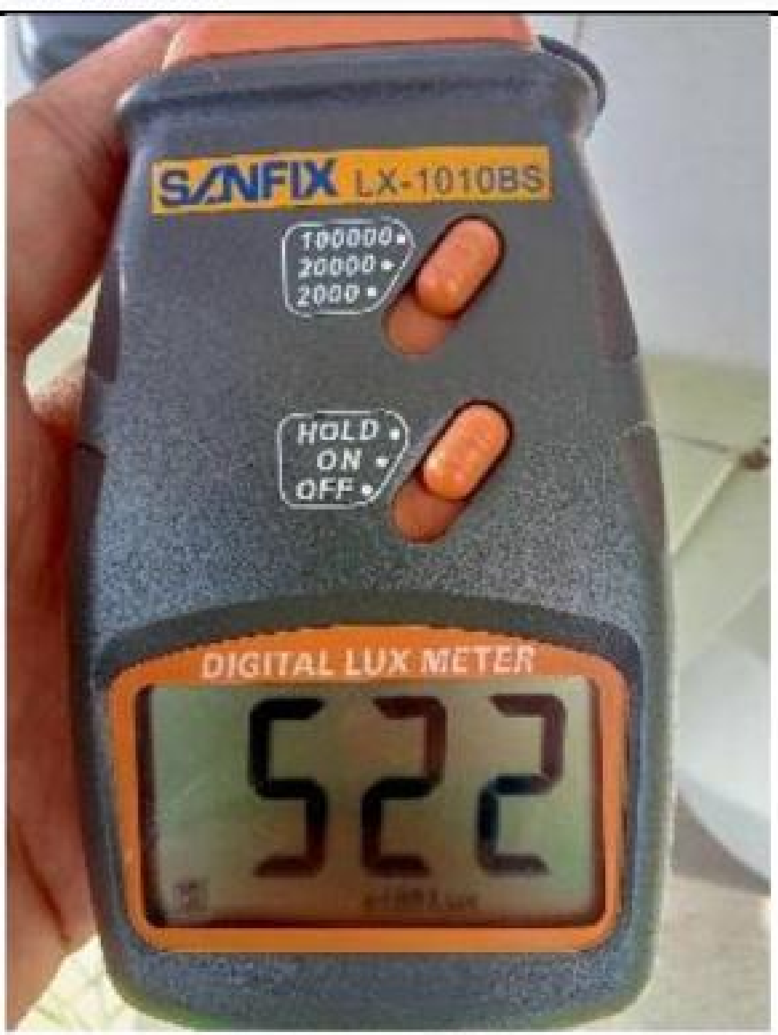
Solarcell

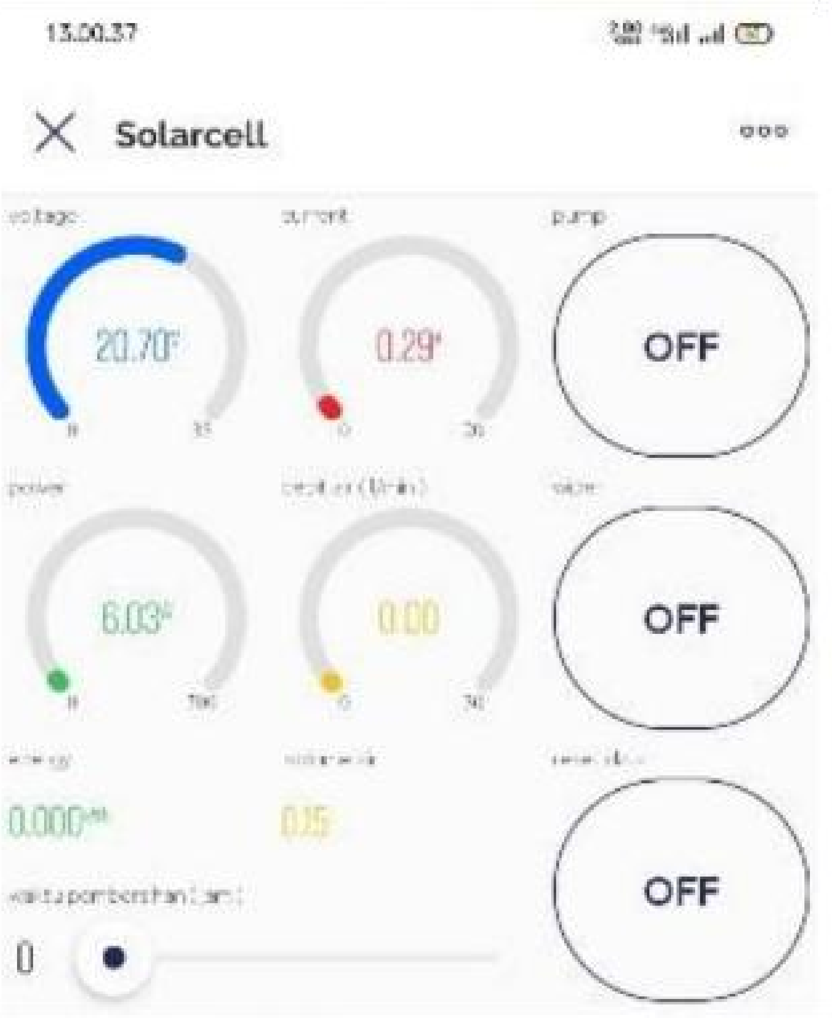
voltage 20.12
current 0.30
pump OFF
power 6.04
debit air (l/min) 0.00
wiper OFF
energy 0.000
volume air 0.00
reset data OFF
waktu pembersihan (jam) 0

data sensor





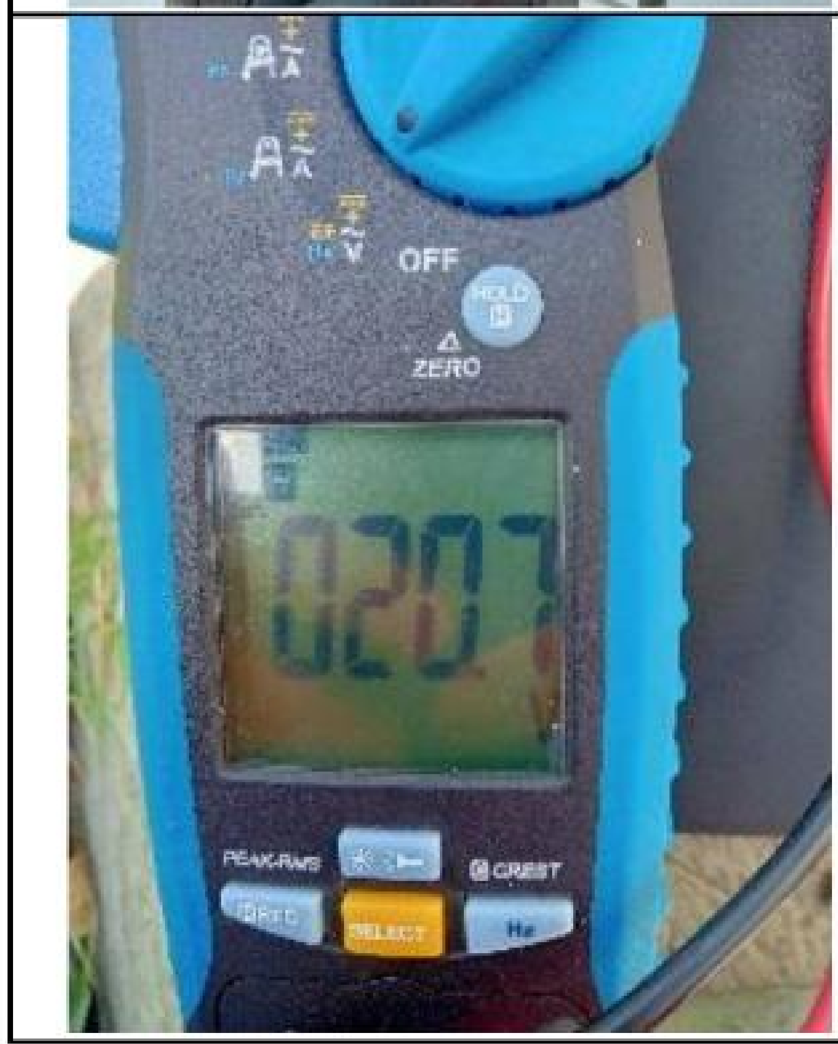


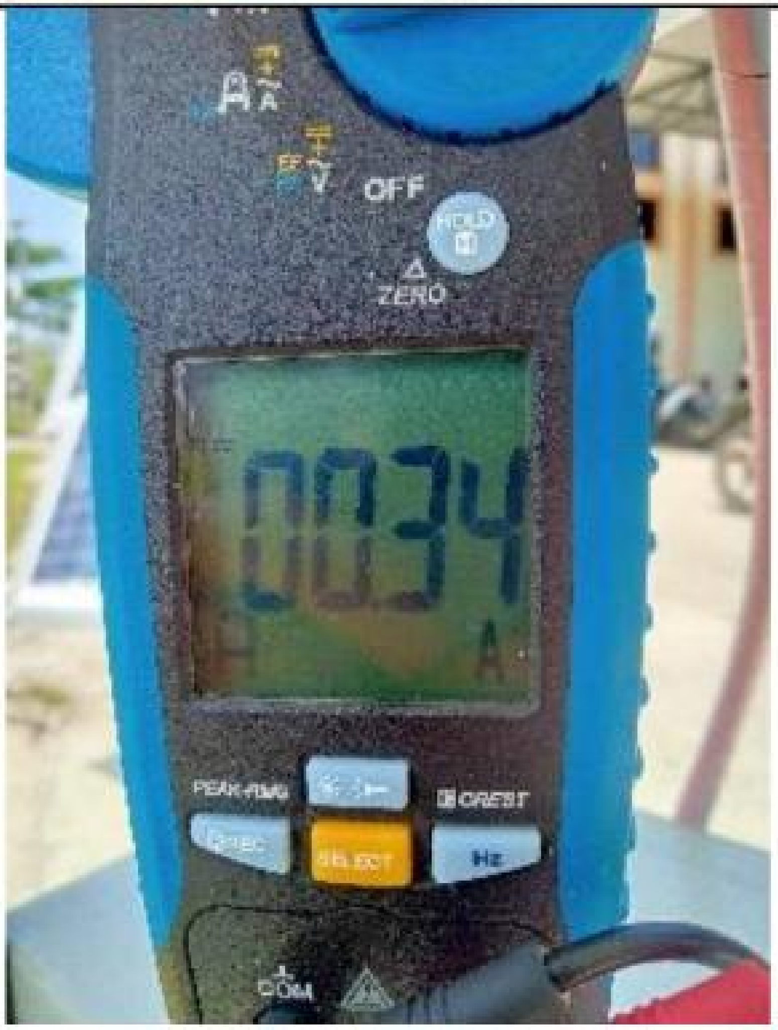


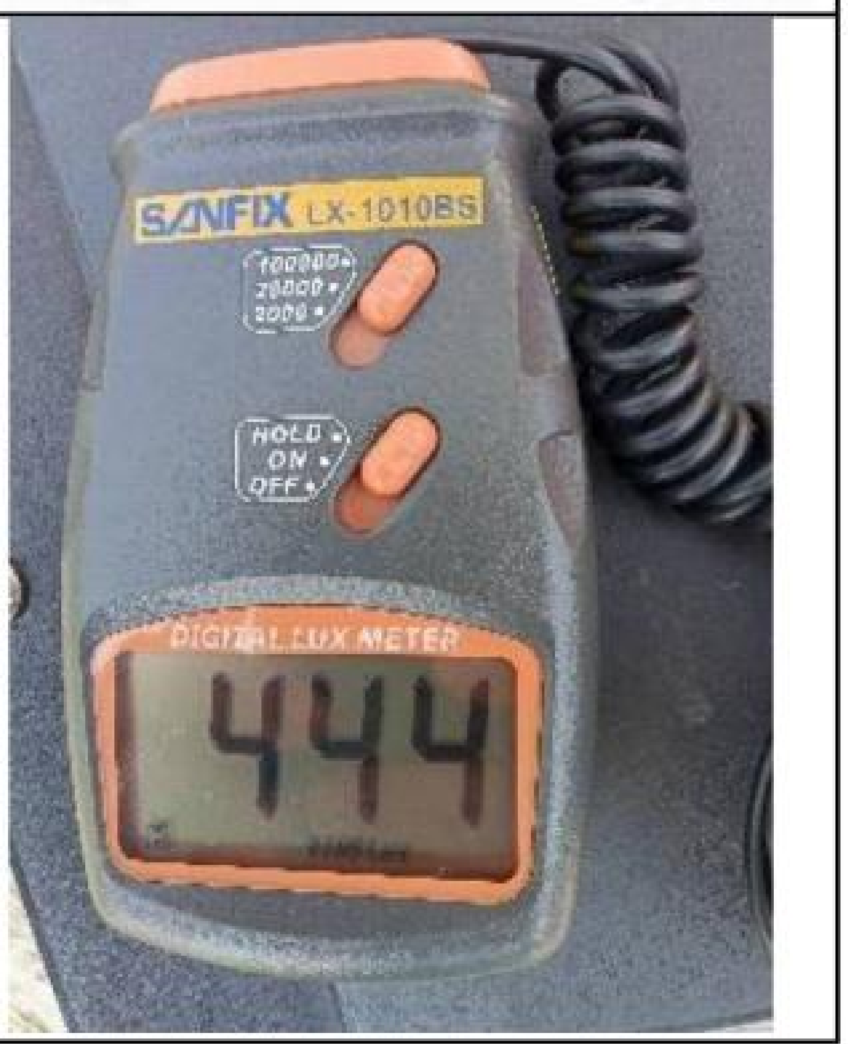
13.00.37

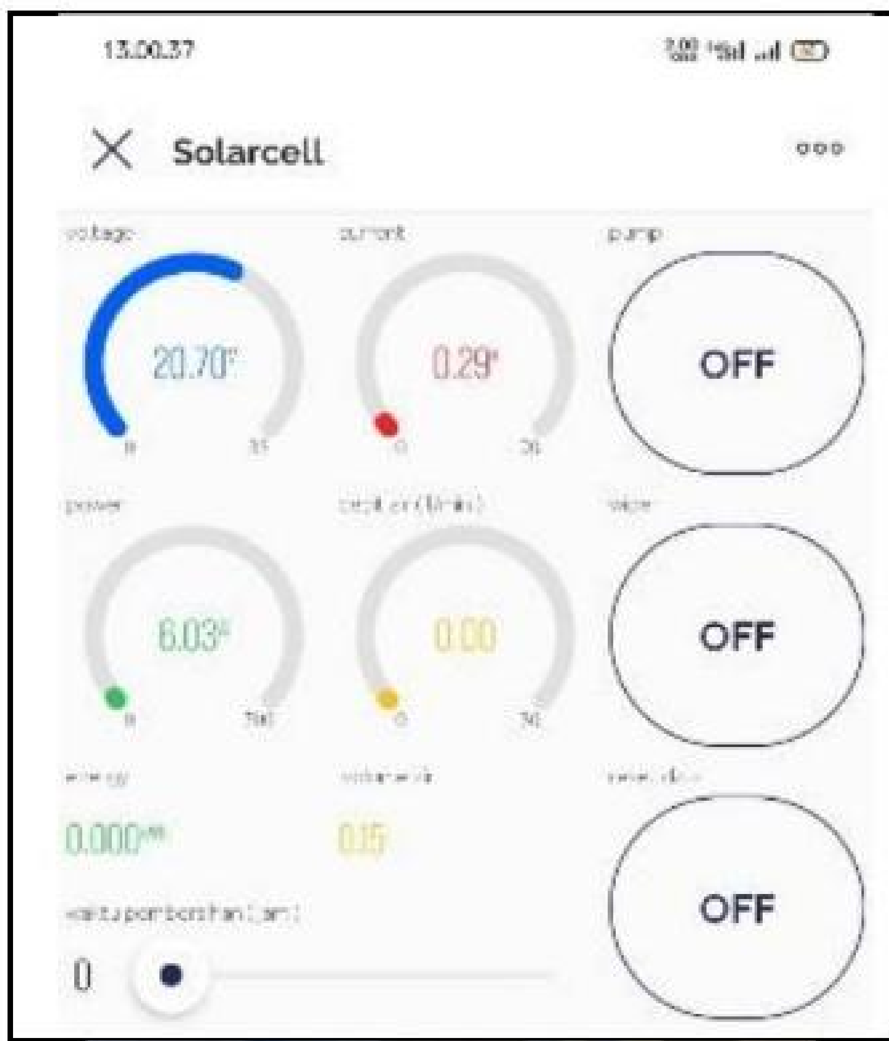
Solarcell

voltage 20.70
current 0.29
pump OFF
power 6.03
debit air (l/min) 0.00
wiper OFF
energy 0.000
volume air 0.15
reset data OFF
waktu pembersihan (jam) 0








13.00.37

Solarcell

voltage 20.70V

current 0.29A

pump OFF

power 6.03W

debit air (l/min) 0.00

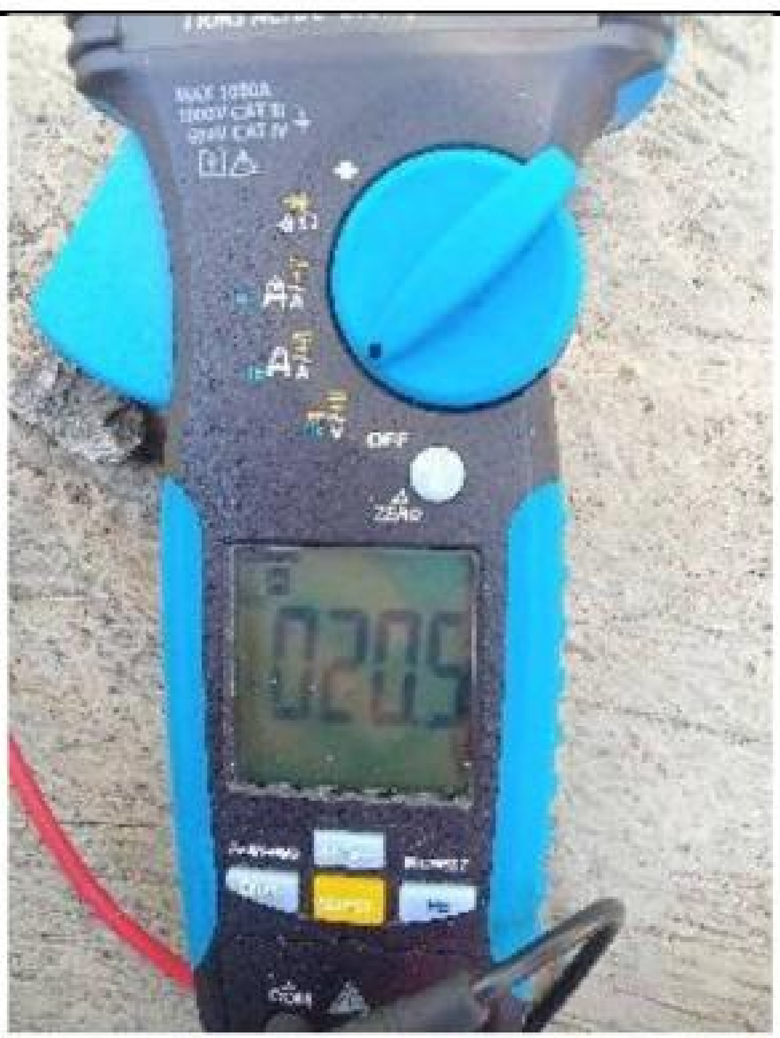
valve OFF

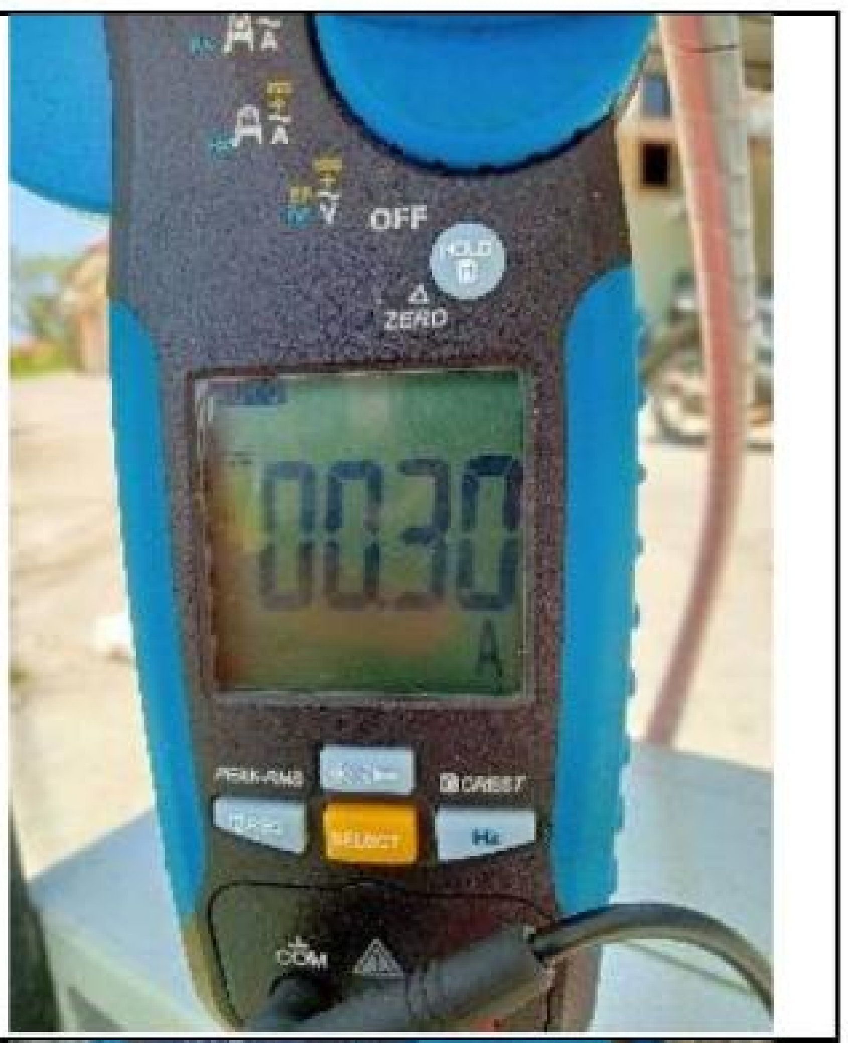
energy 0.000kWh

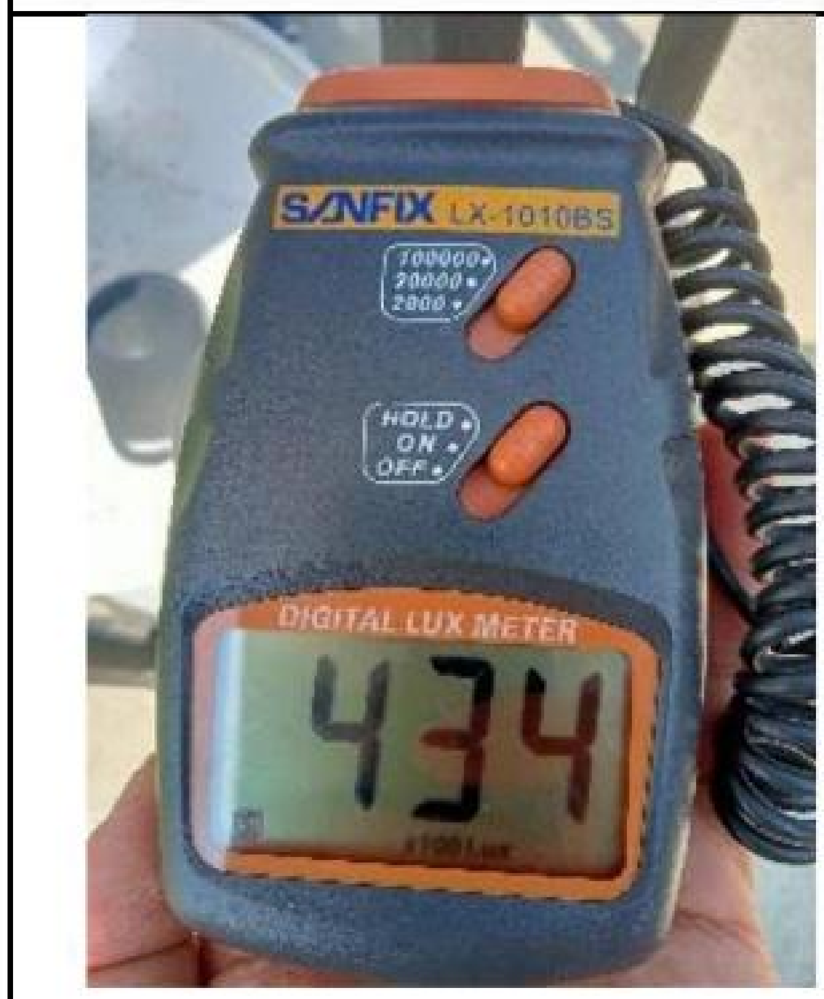
volume air 0.15

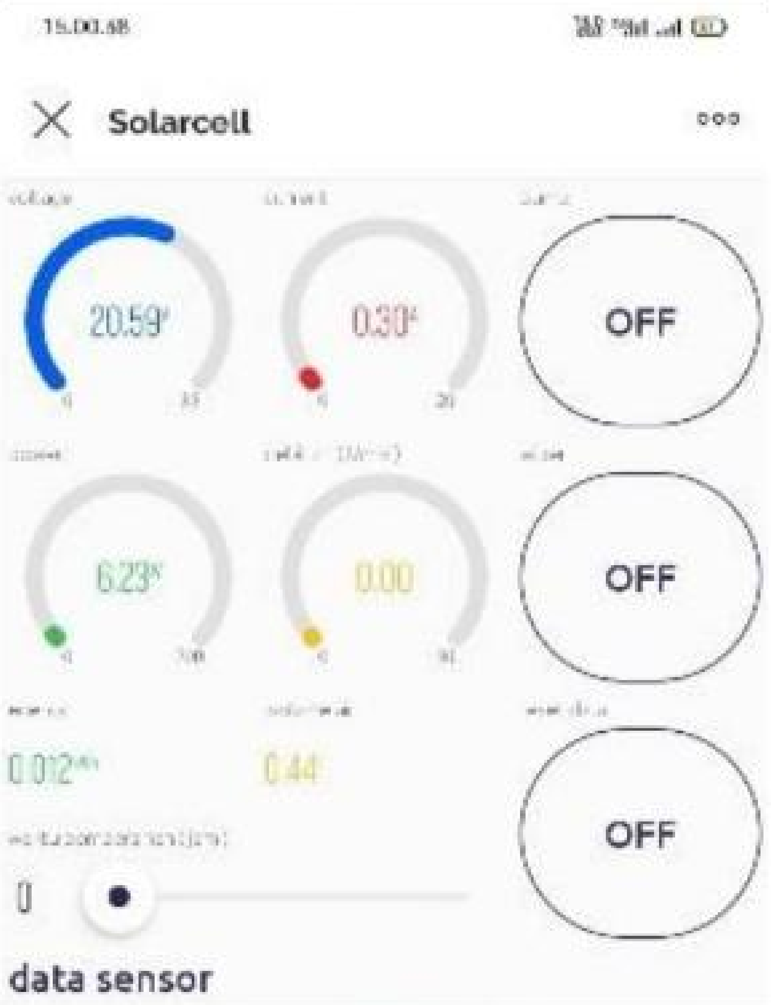
reset data OFF

waktu pembersihan (jam) 0








15.00.48

Solarcell

voltage 20.59V

current 0.30A

pump OFF

power 6.23W

debit air (l/min) 0.00

valve OFF

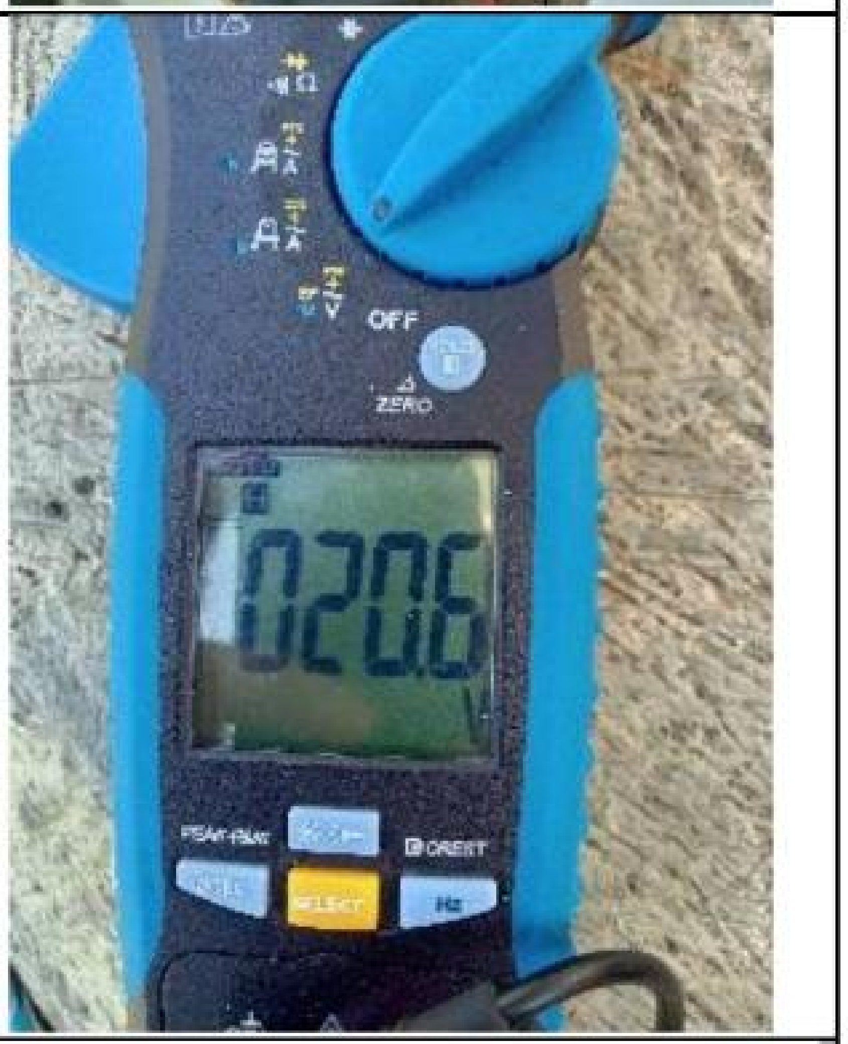
energy 0.012kWh

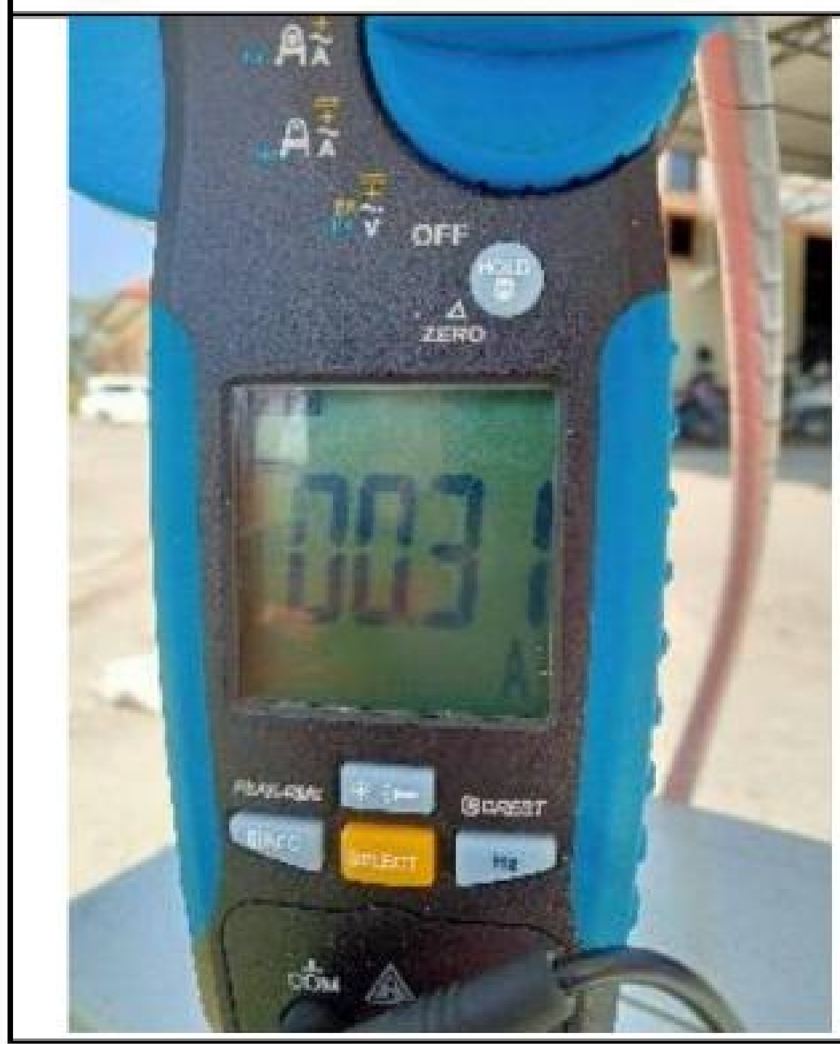
volume air 0.44

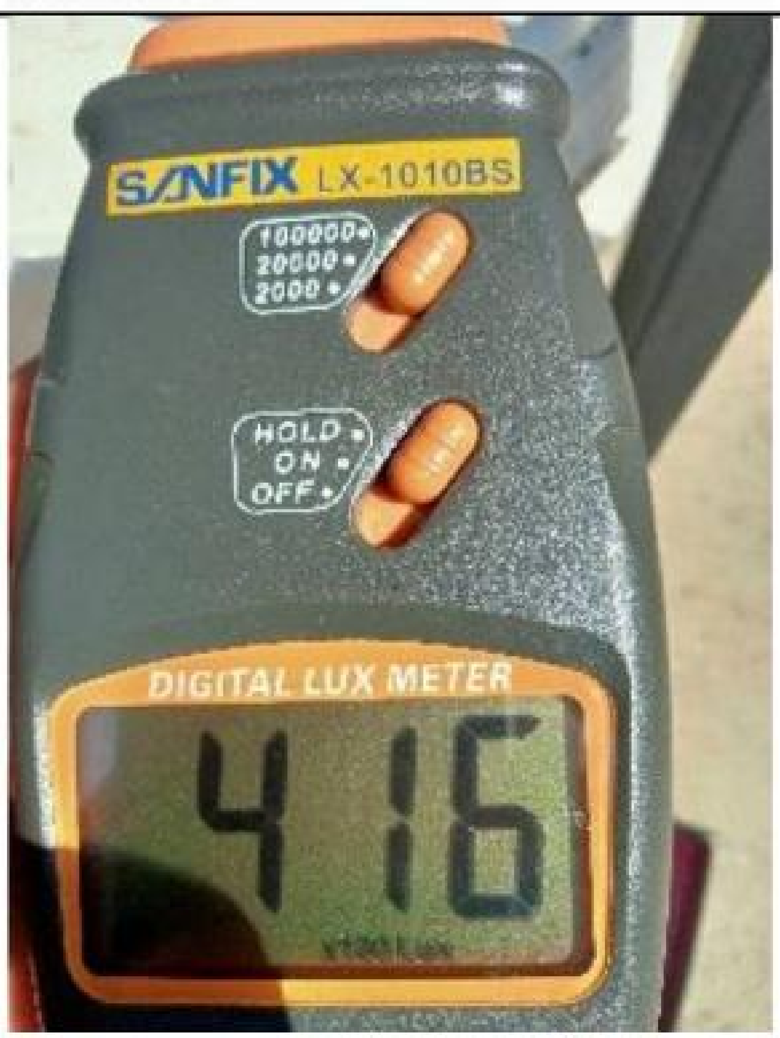
reset data OFF

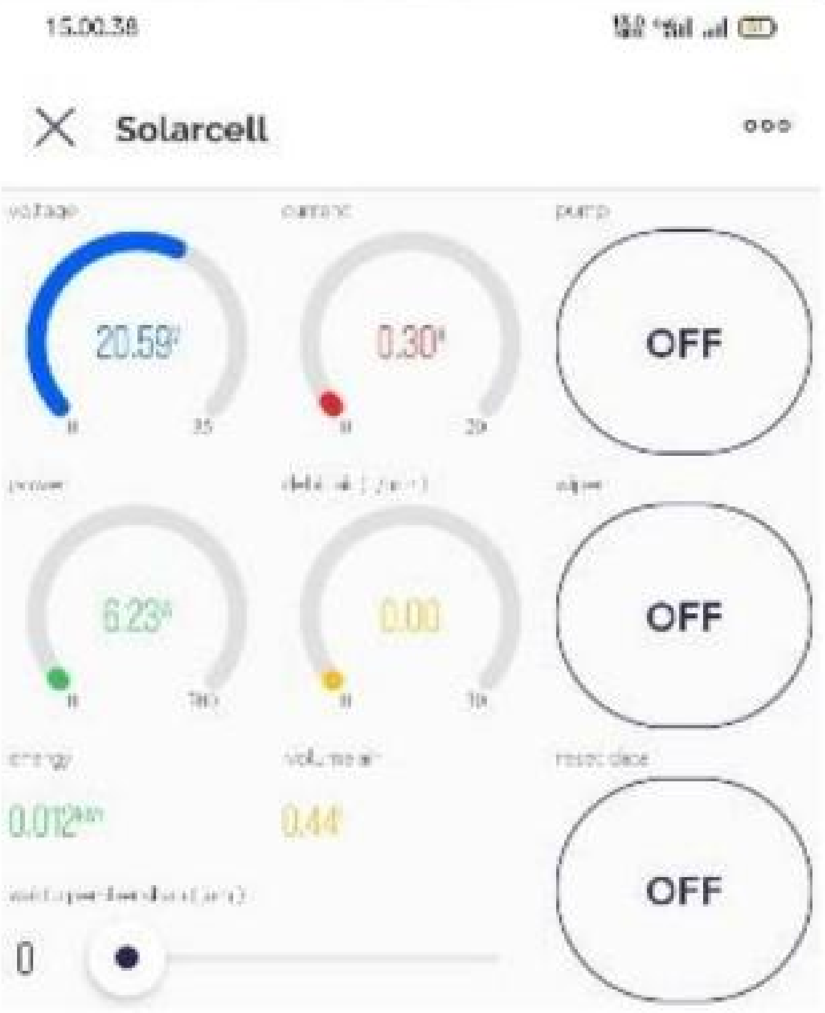
waktu pembersihan (jam) 0

data sensor








15.00.38

Solarcell

voltage 20.59V

current 0.30A

pump OFF

power 6.23W

debit air (l/min) 0.00

valve OFF

energy 0.012kWh

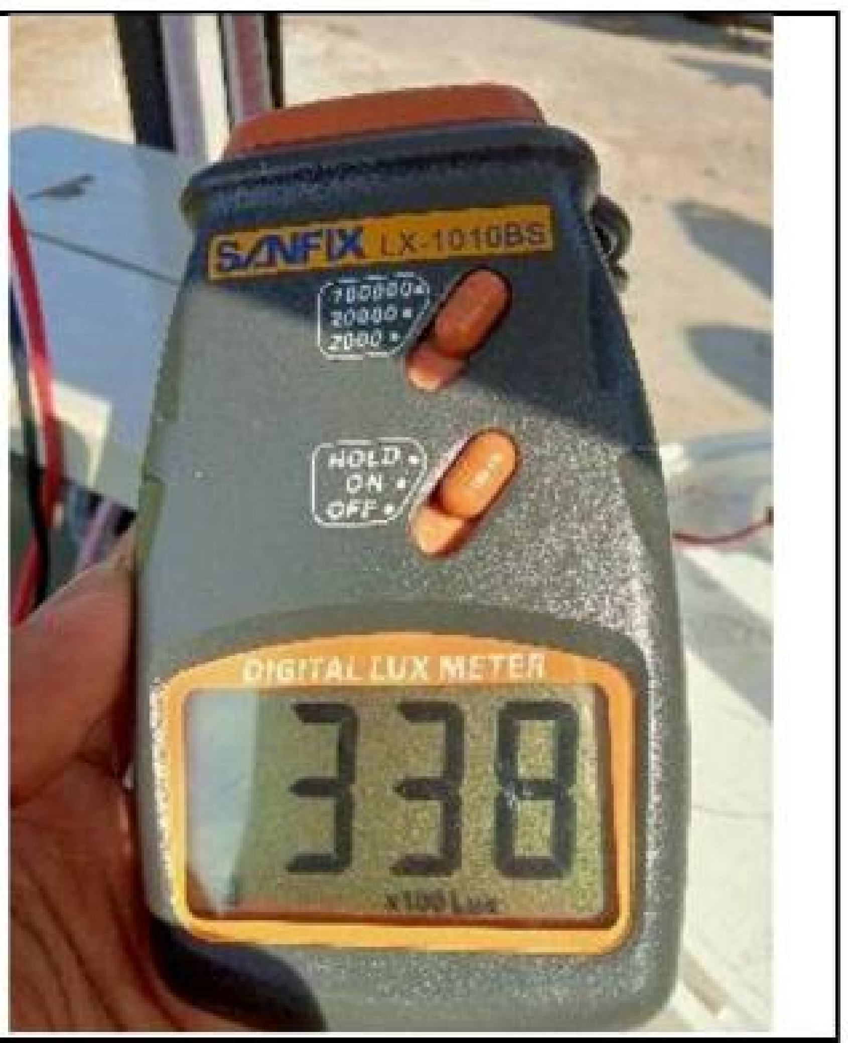
volume air 0.44

reset data OFF

waktu pembersihan (jam) 0

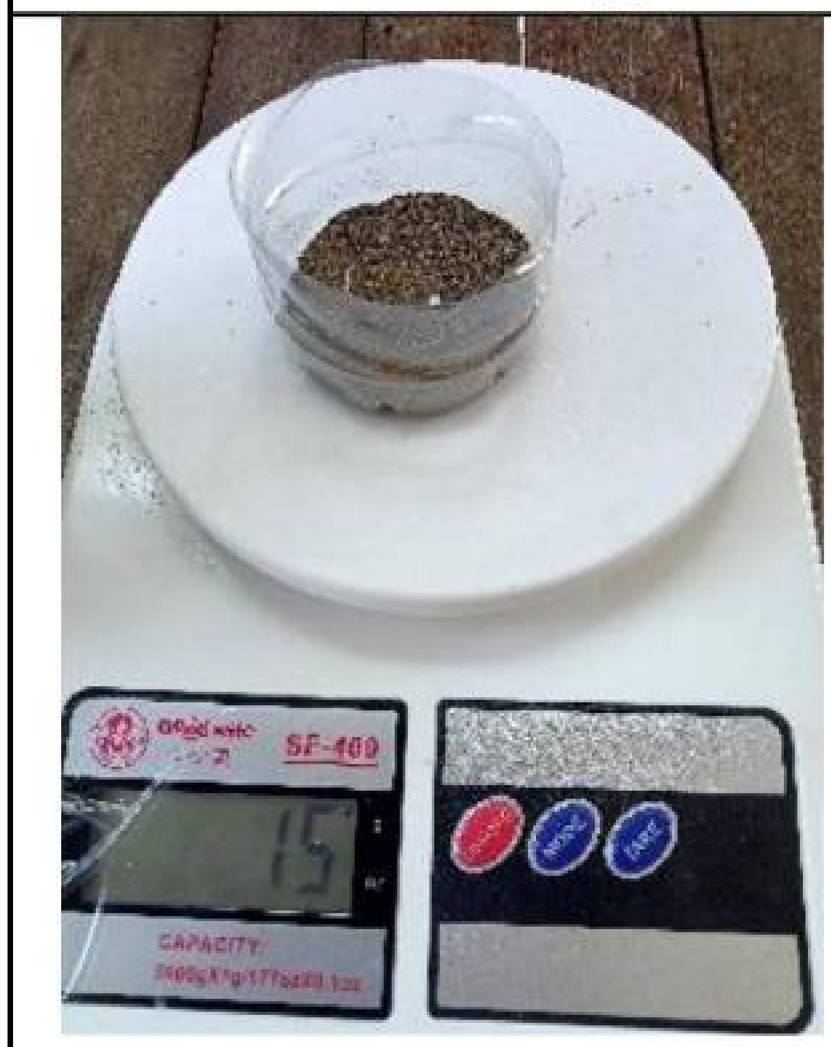
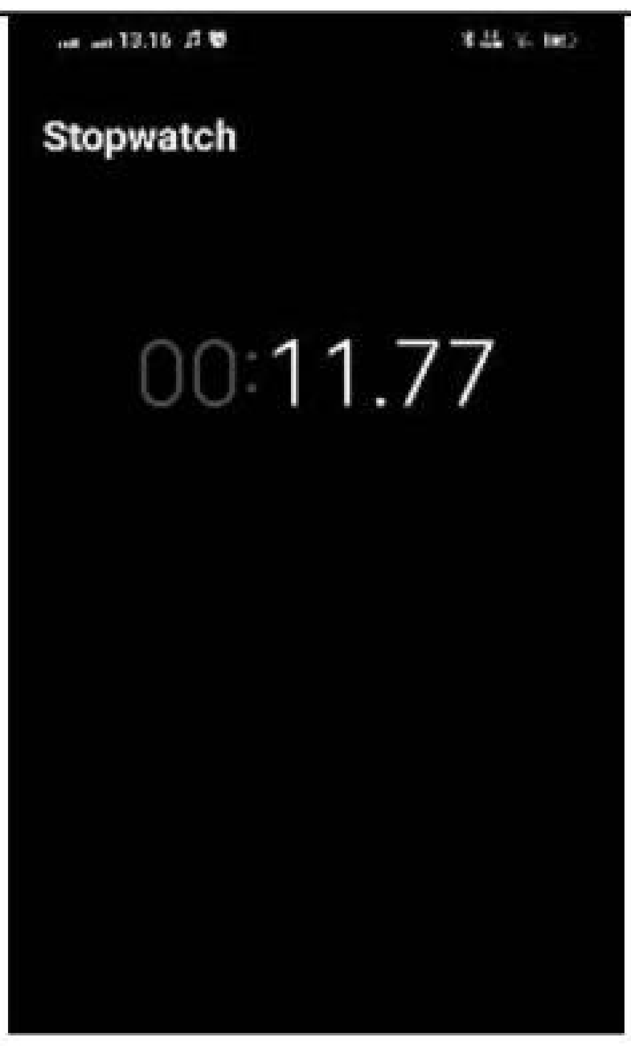
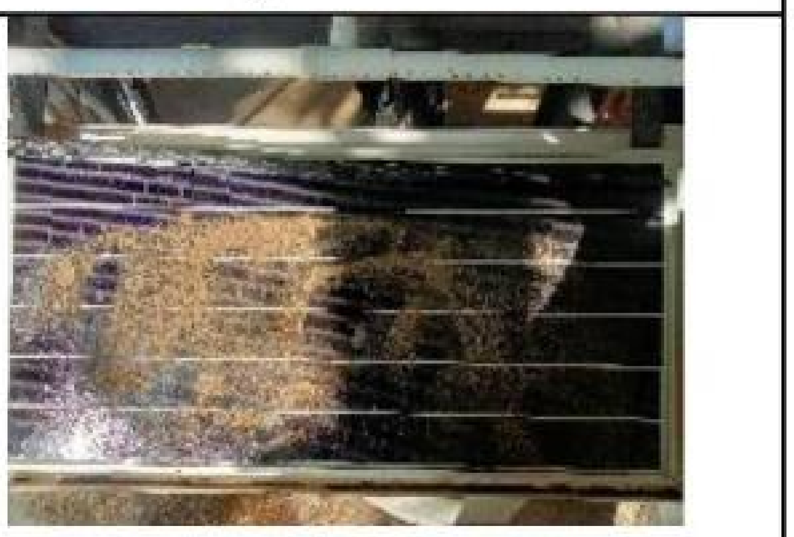
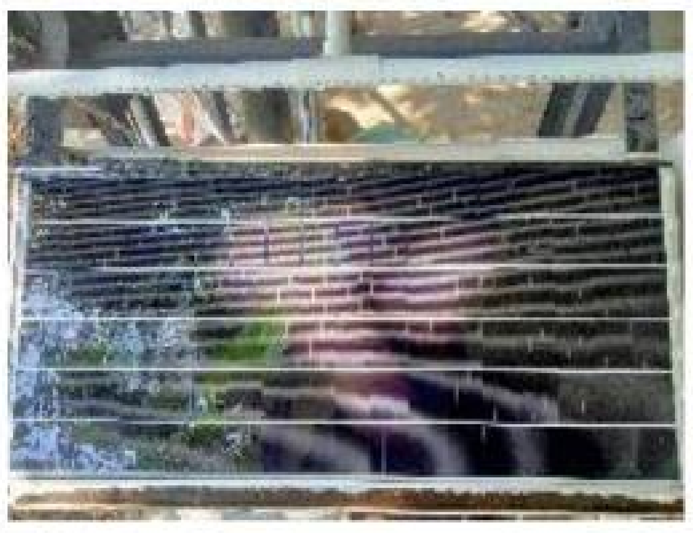
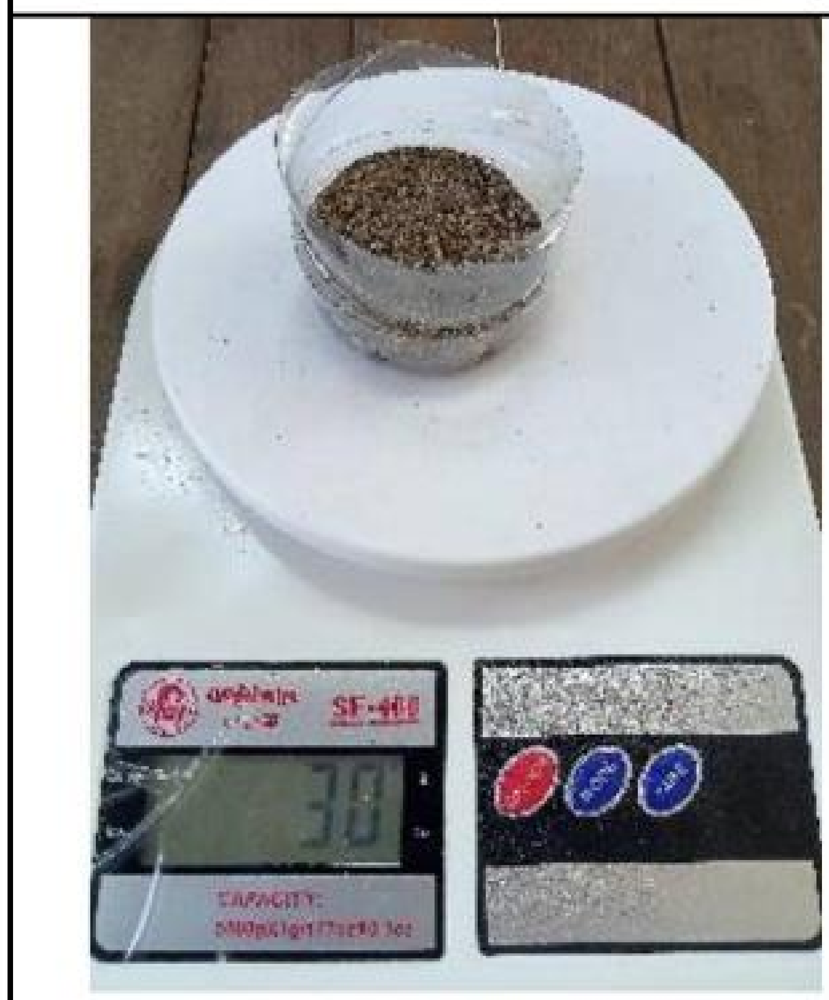
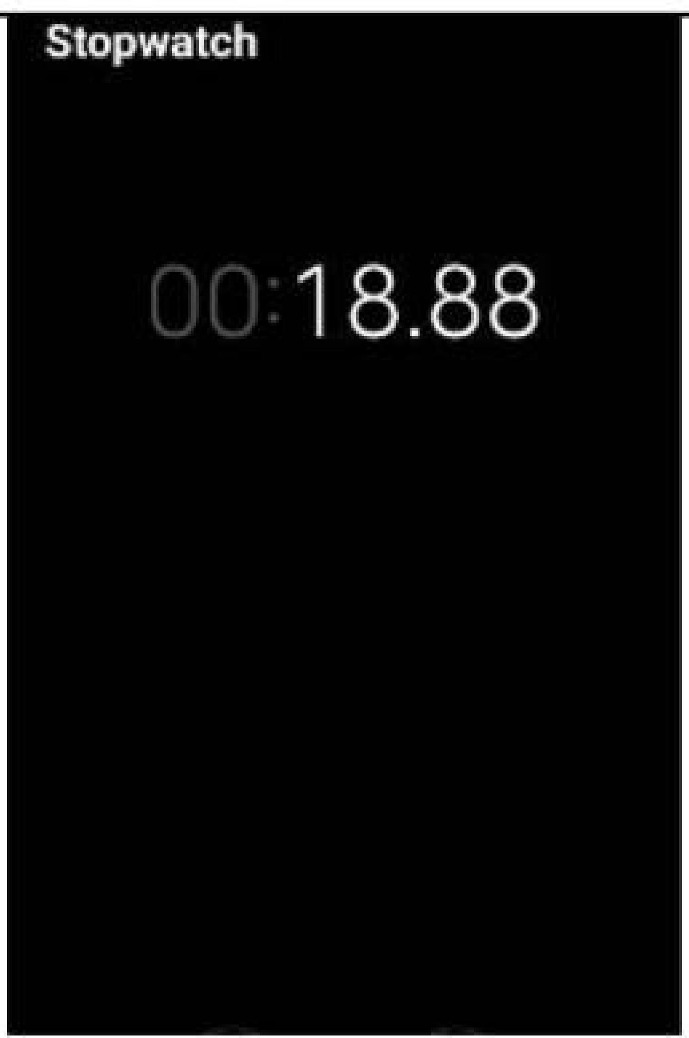
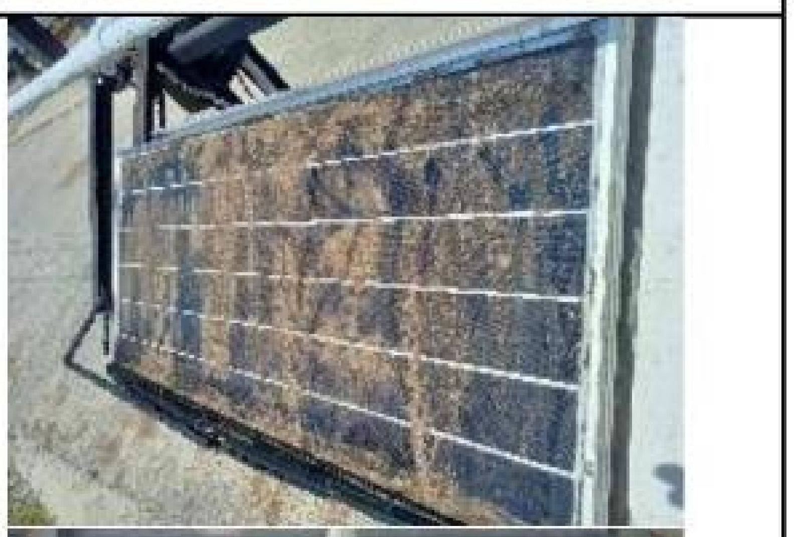
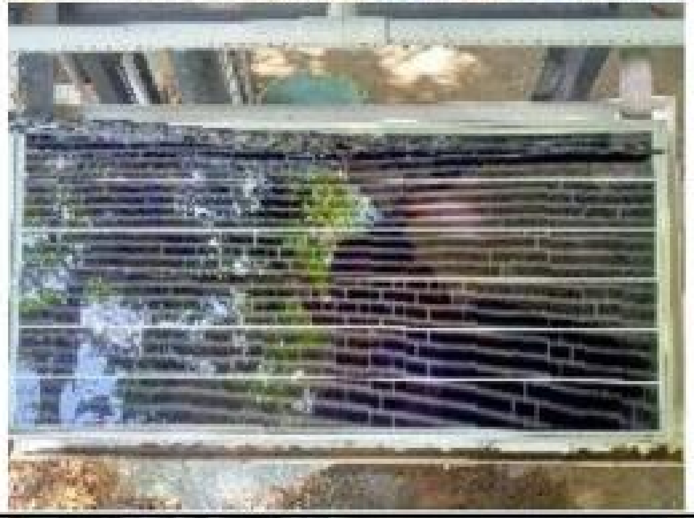
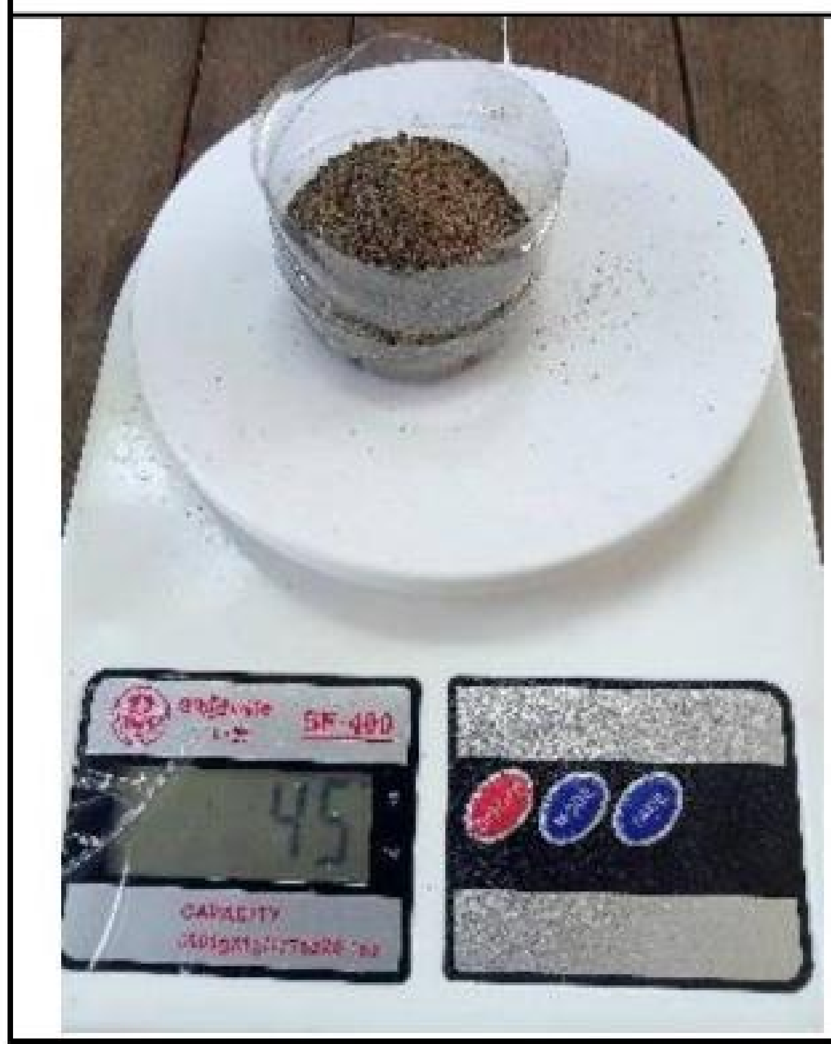
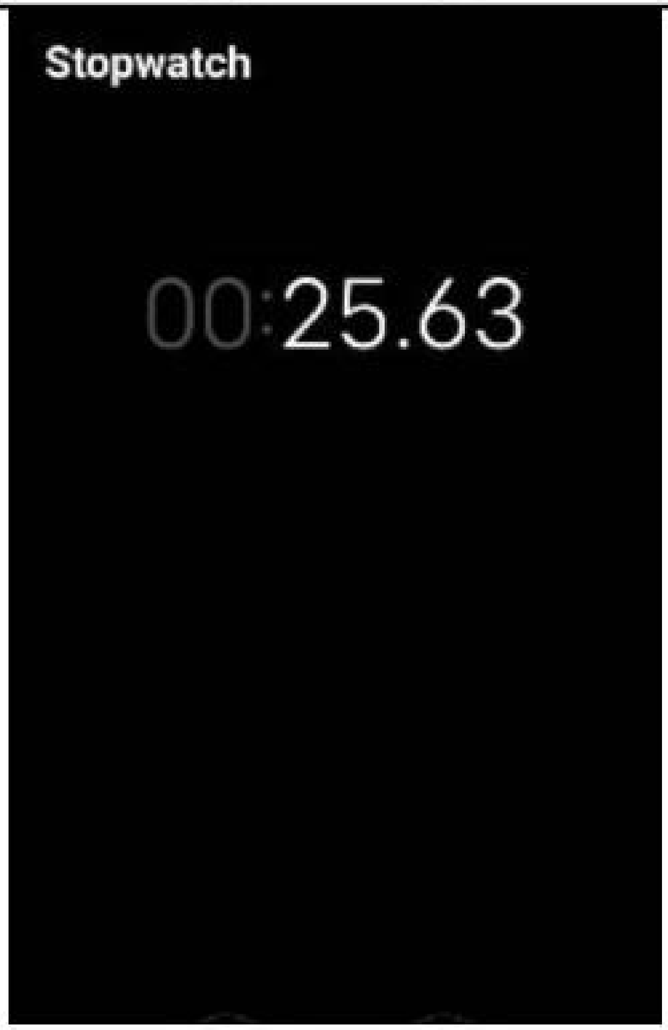
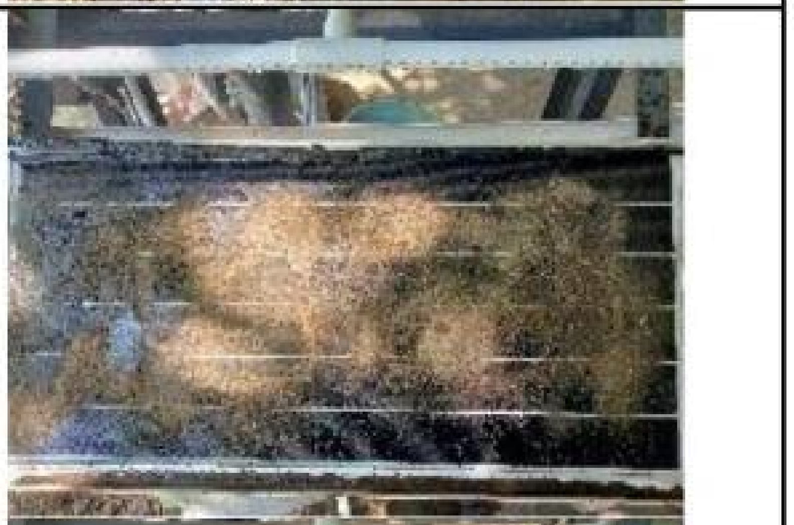
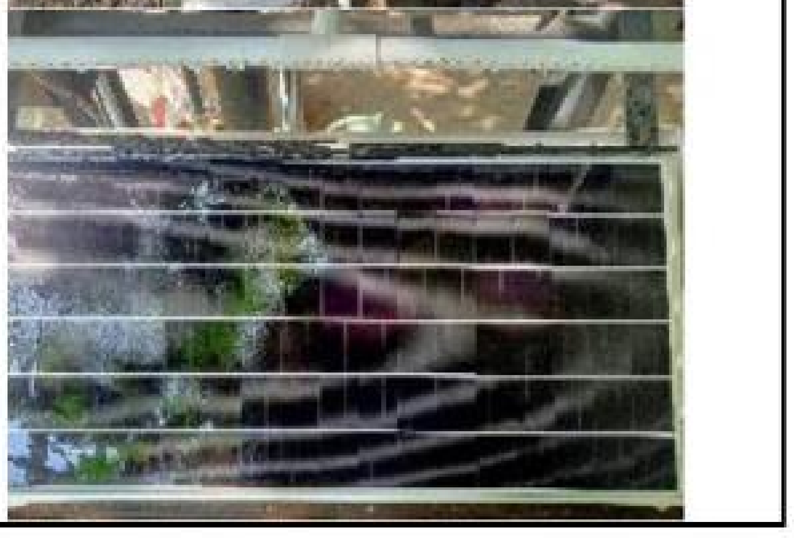
020.7
OFF
ZERO
PEAK-RMS
CREST
SELECT
Hz
COM

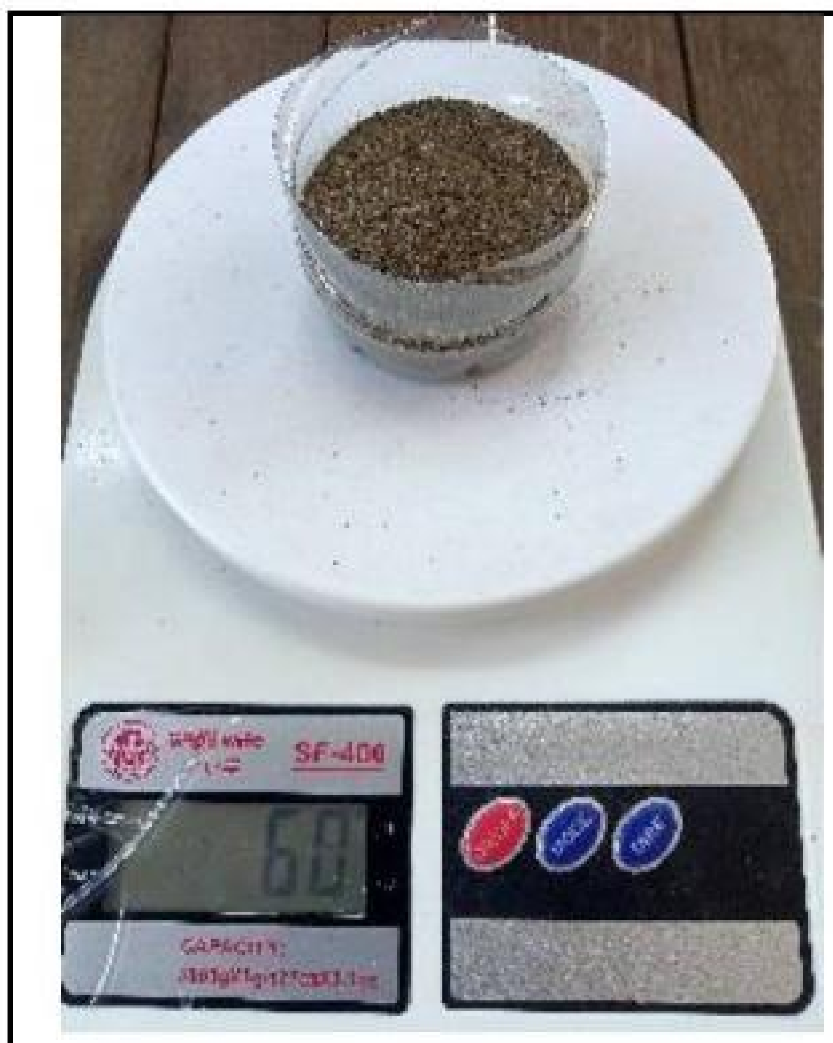
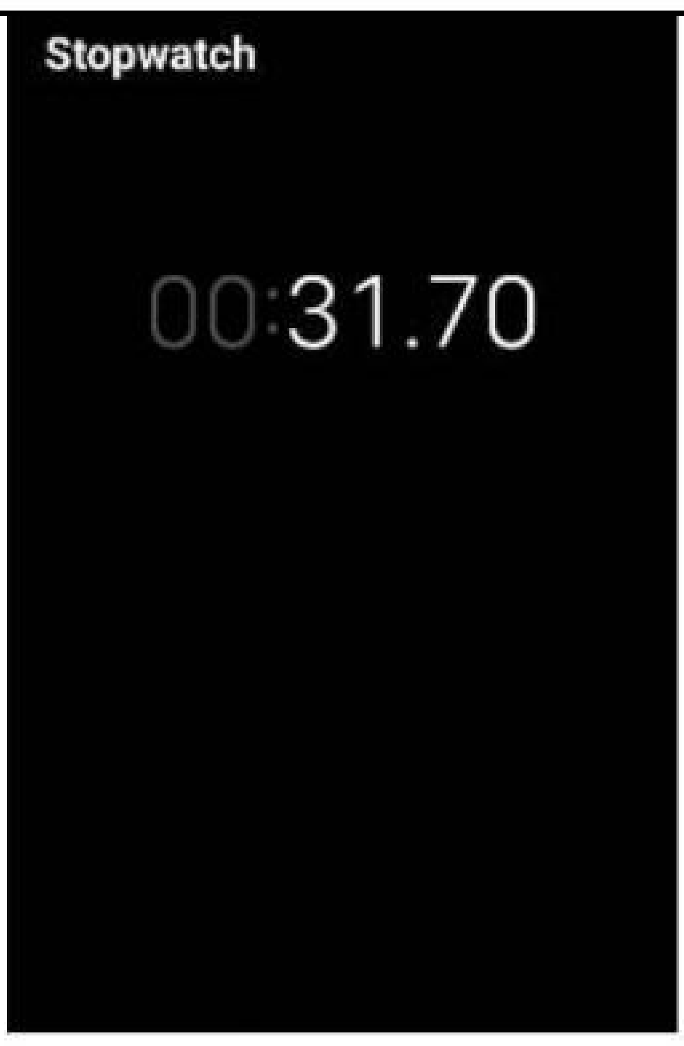
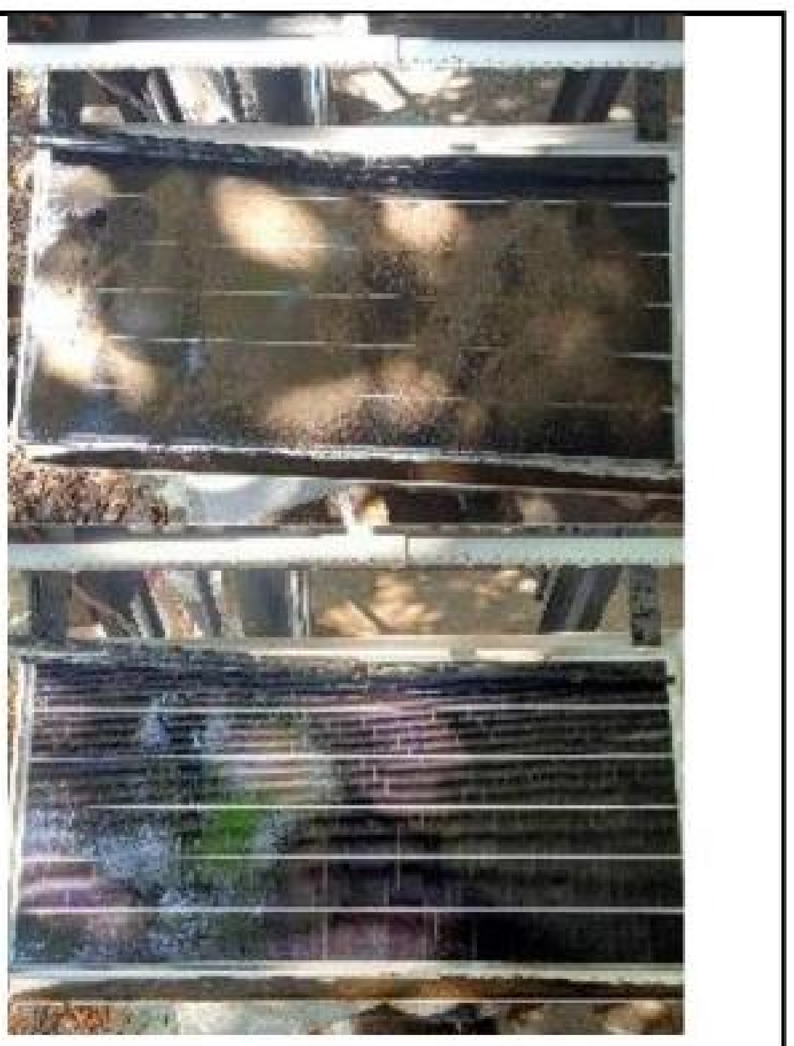
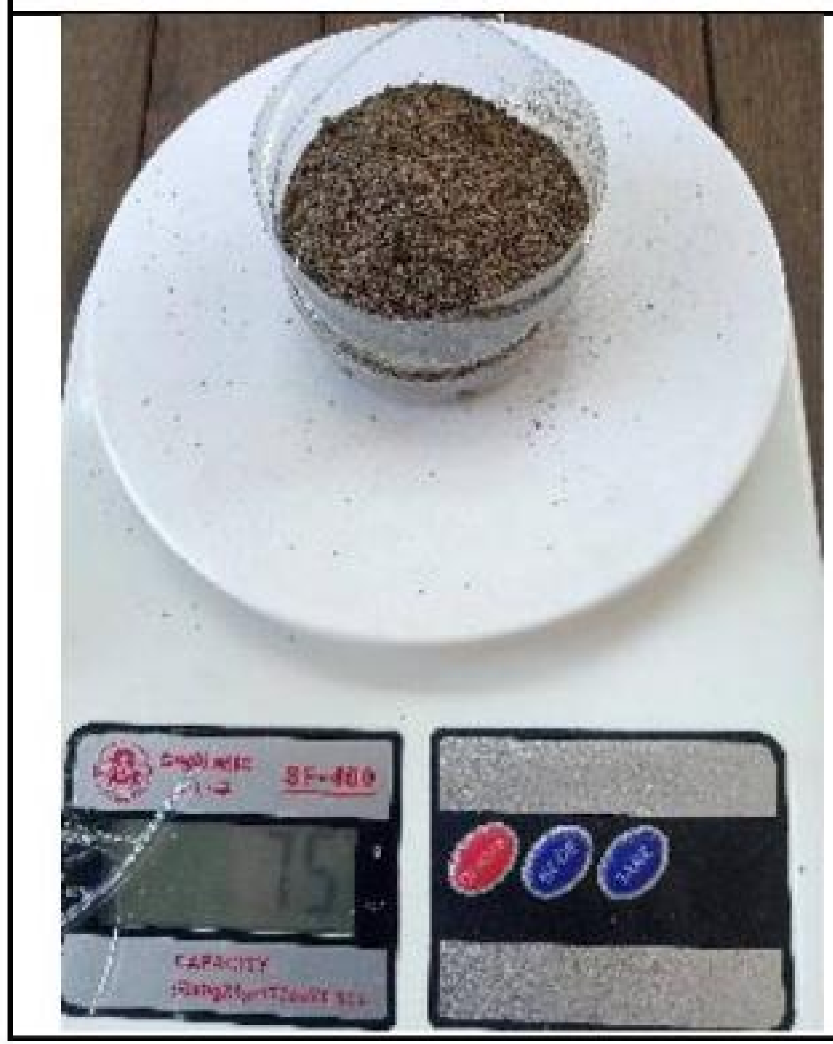
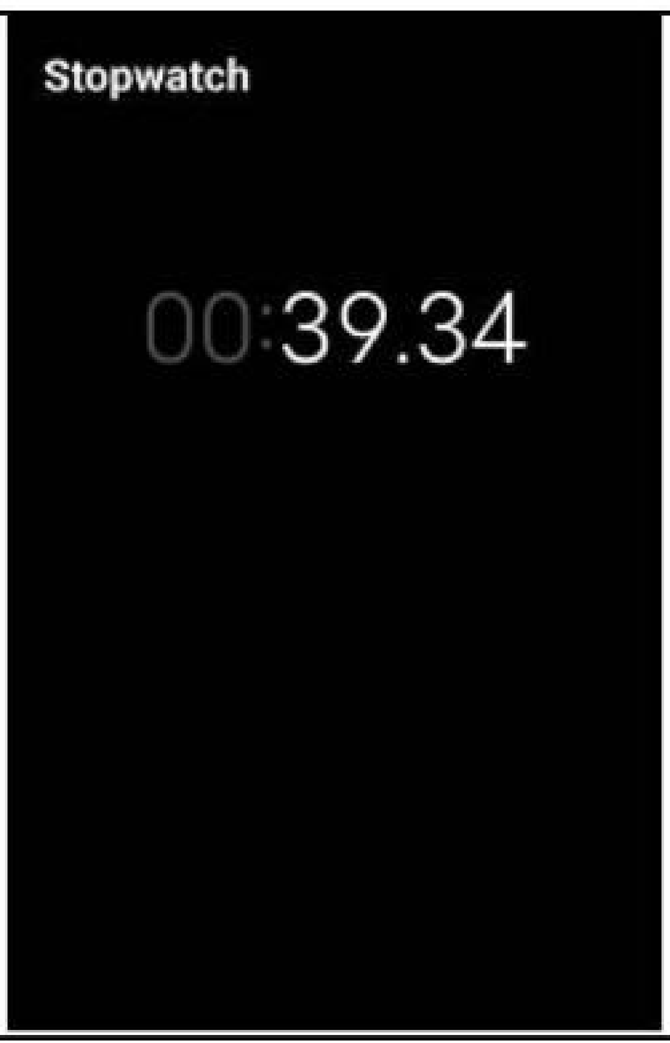
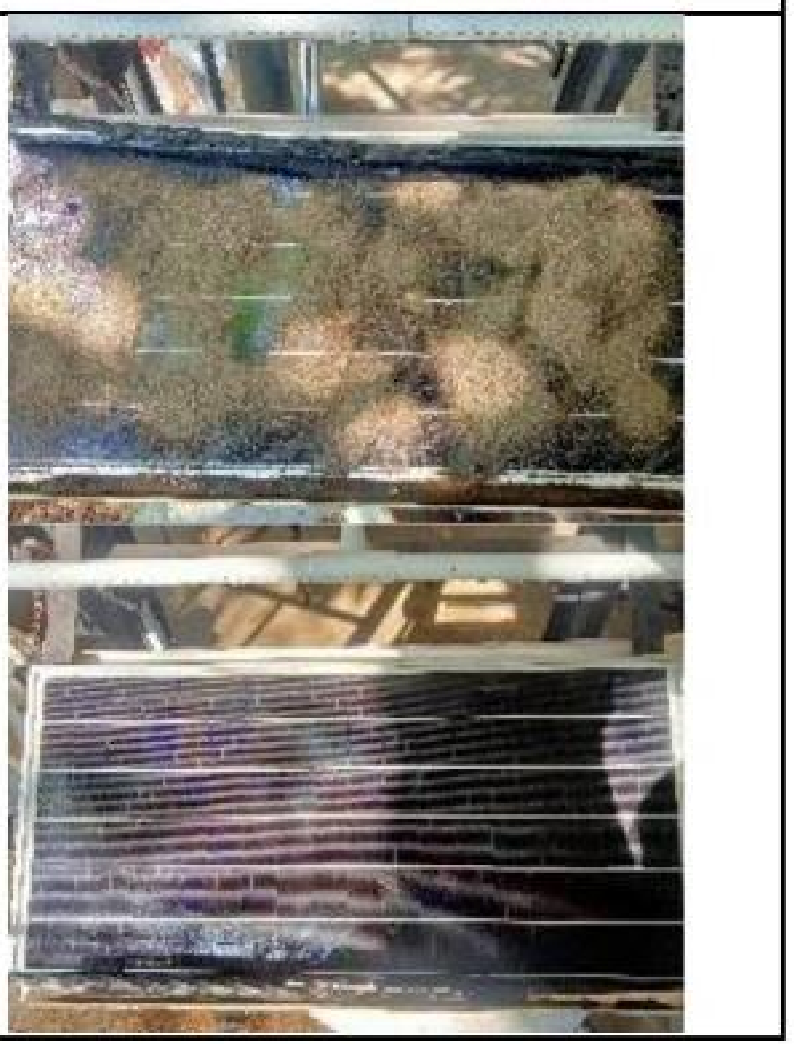
00.3
OFF
HOLD
ZERO
PEAK-RMS
CREST
SELECT
Hz
COM


SANFIX LX-1010BS
200000
20000
2000
HOLD
ON
OFF
DIGITAL LUX METER
338
x100 Lux

LAMPIRAN D

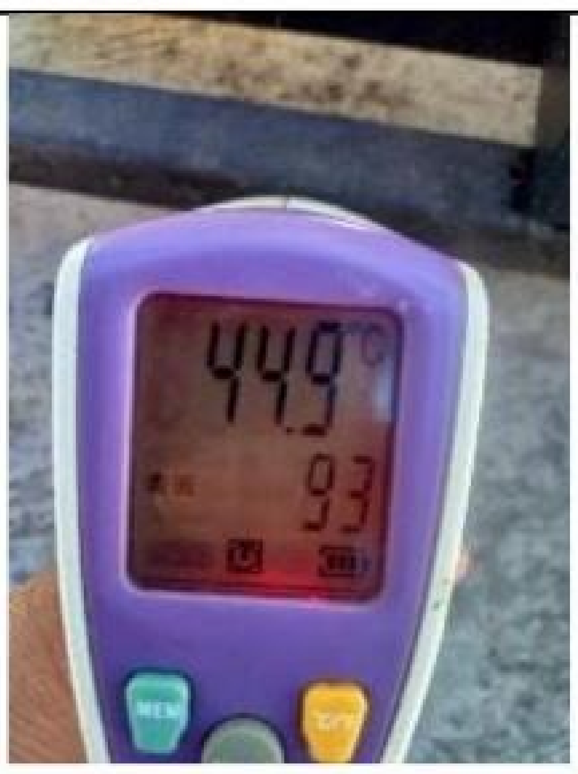
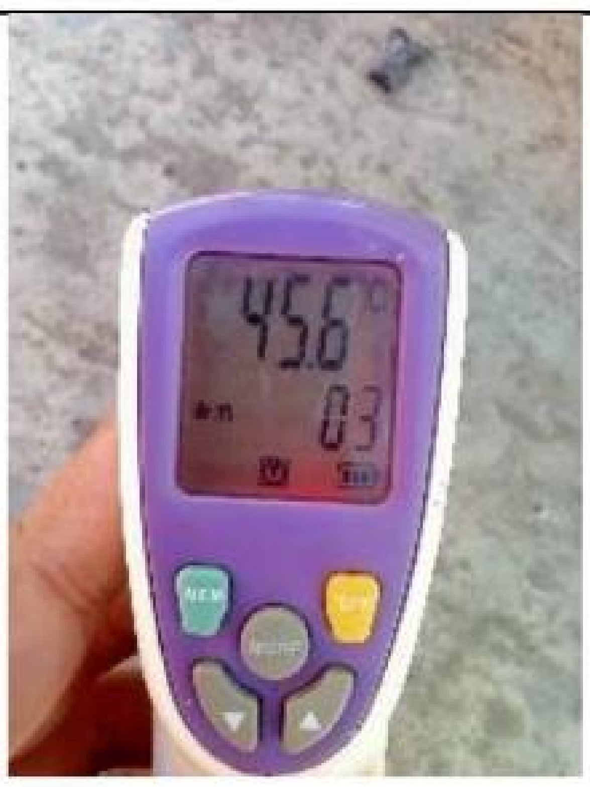
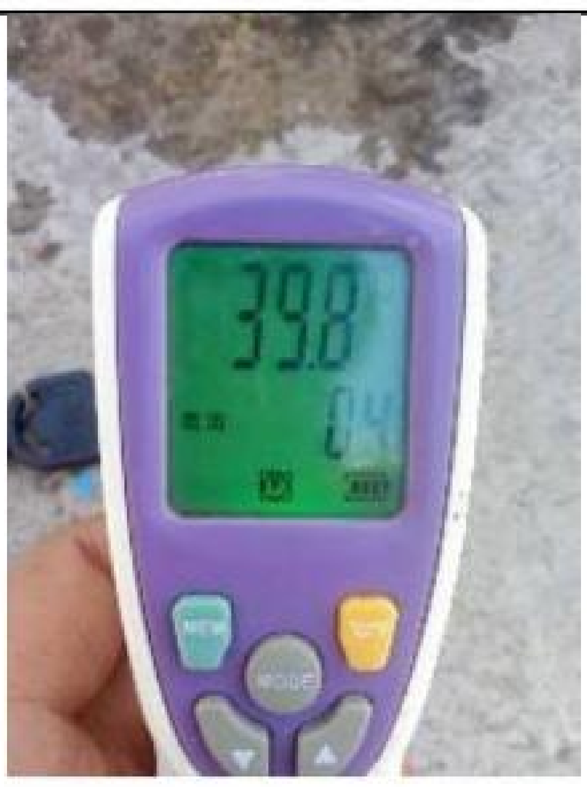
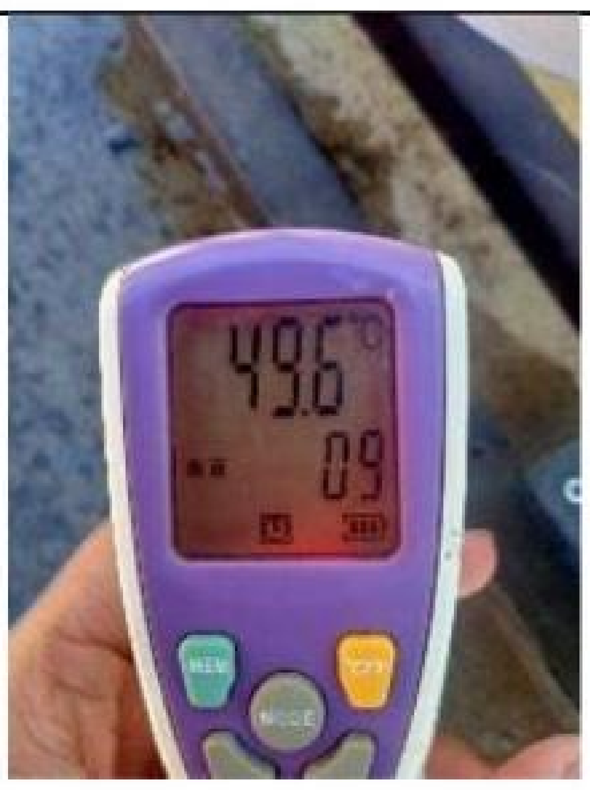
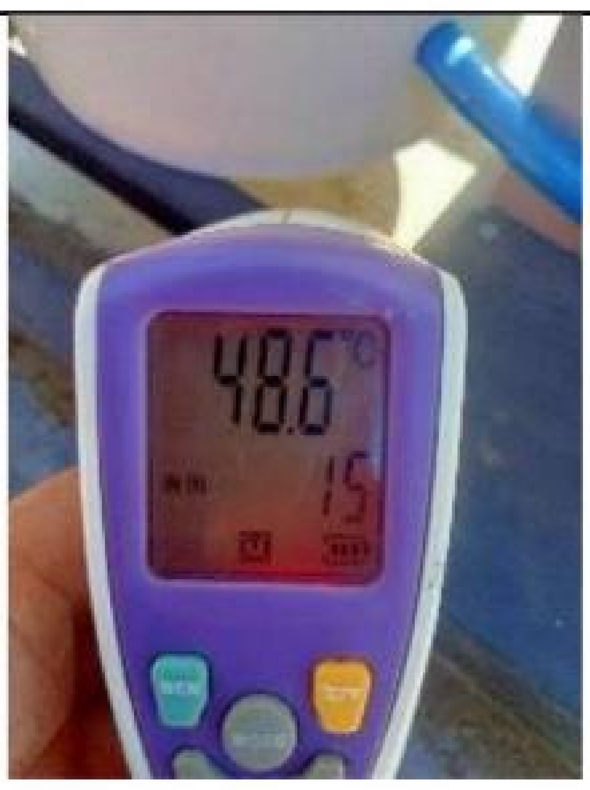
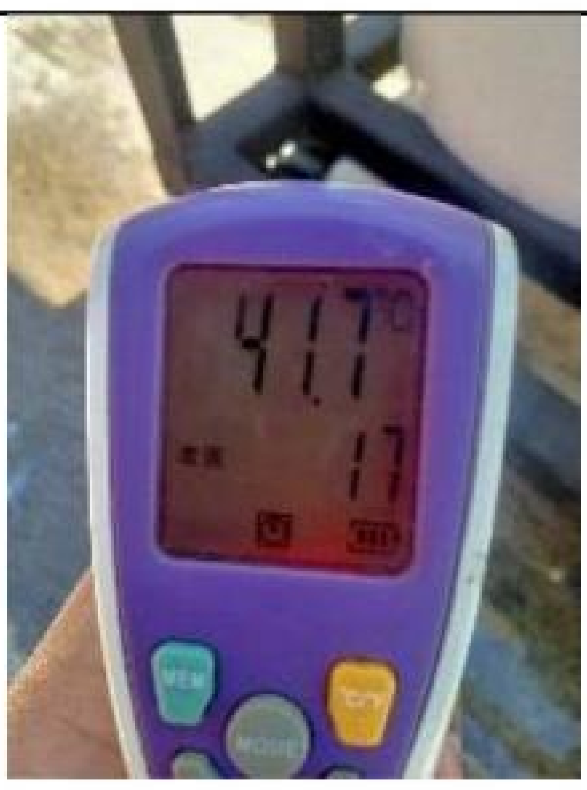
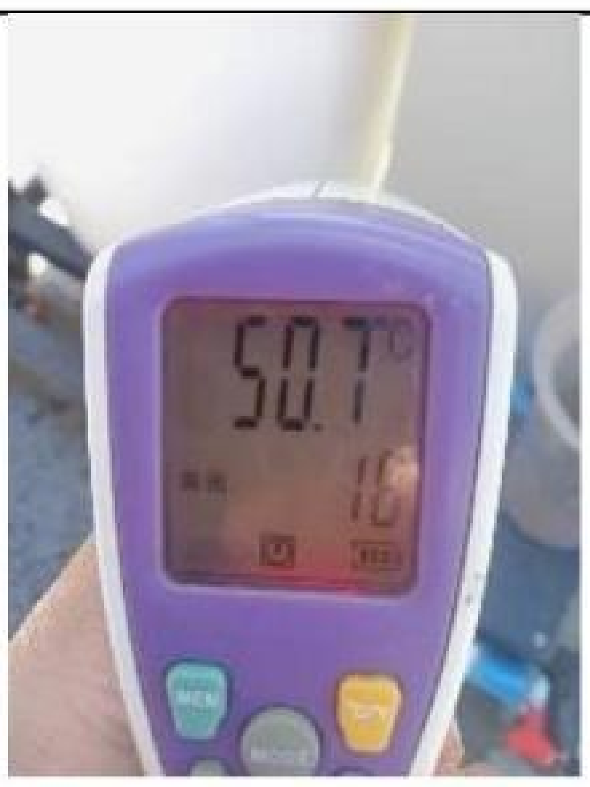
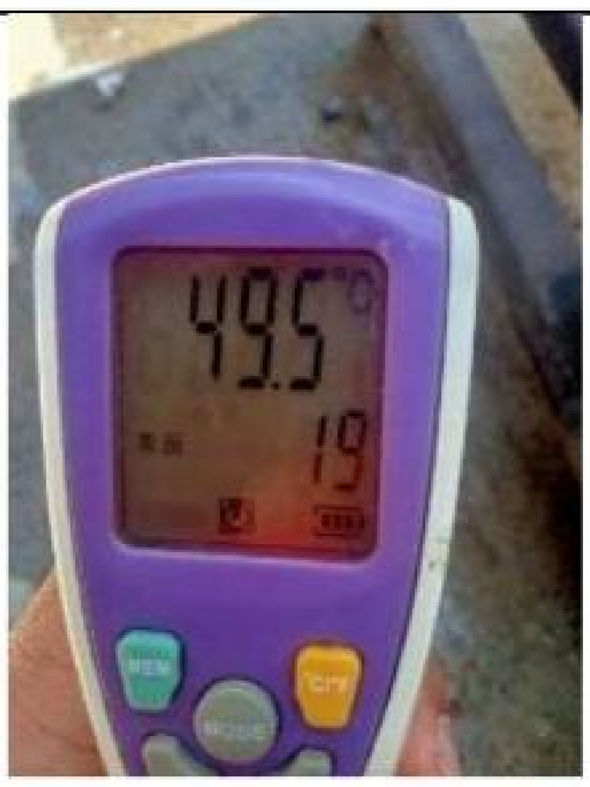
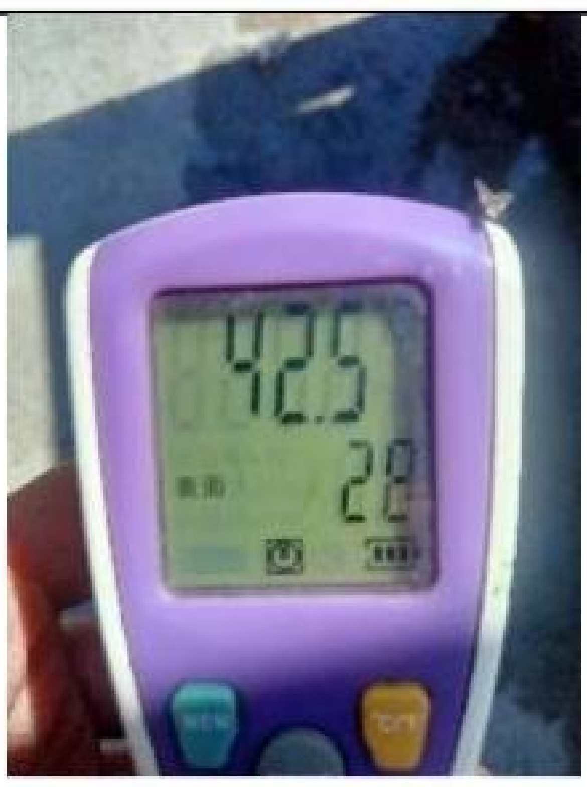
Pengambilan Data Pembersihan Panel Surya

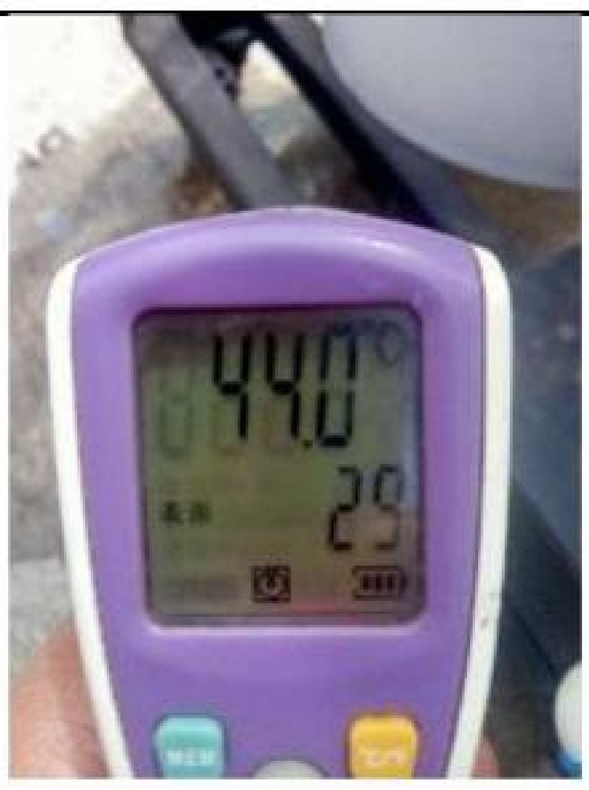
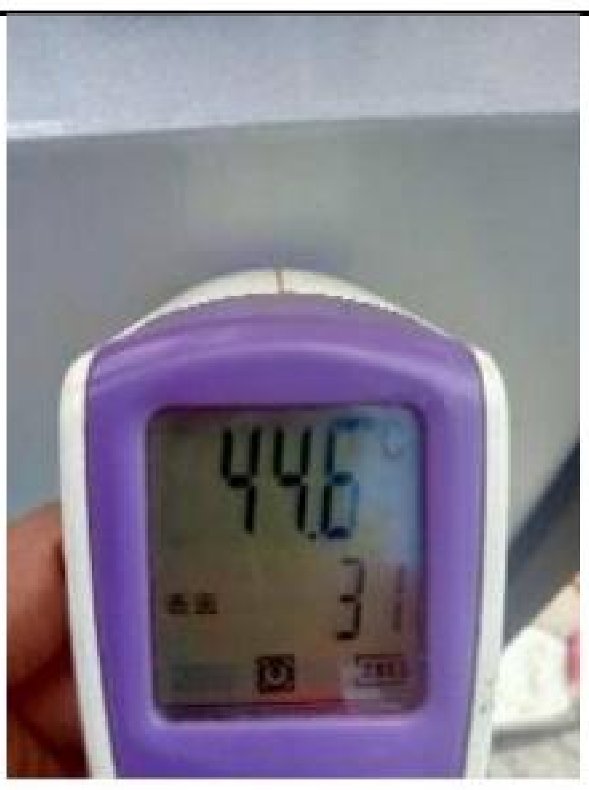
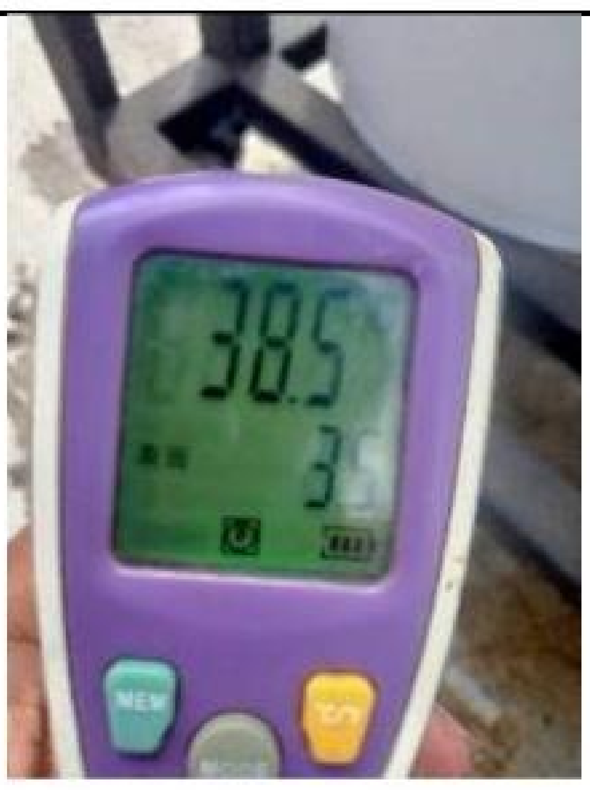
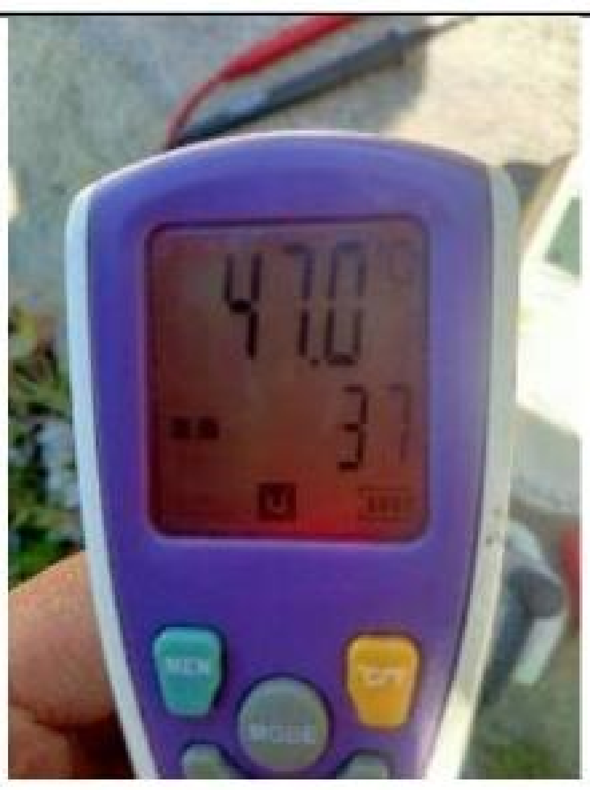
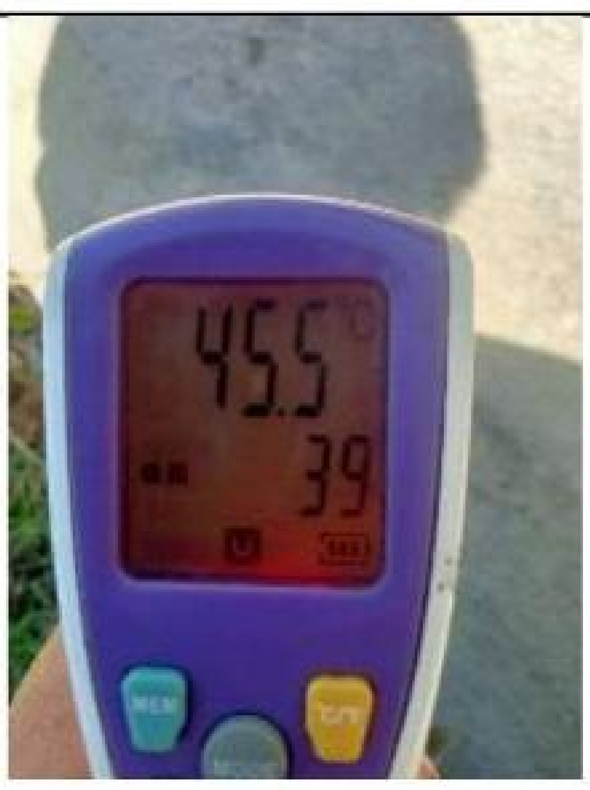
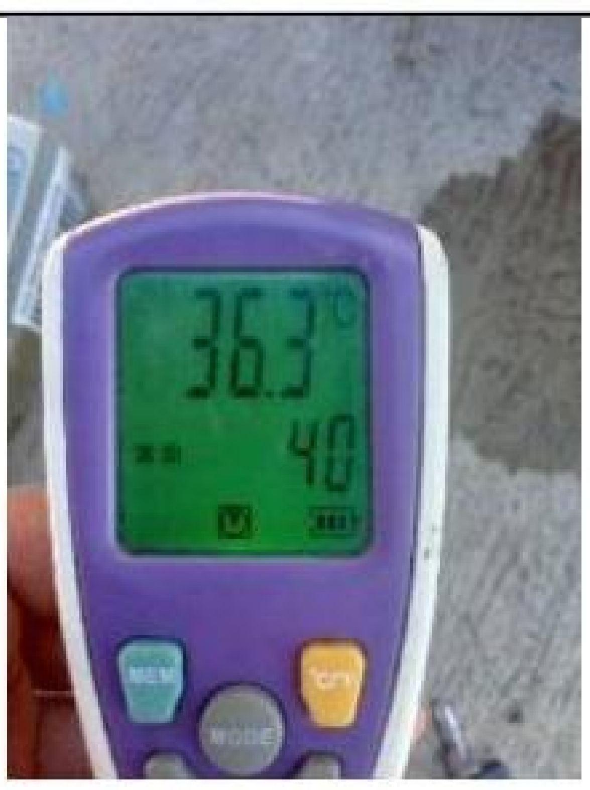
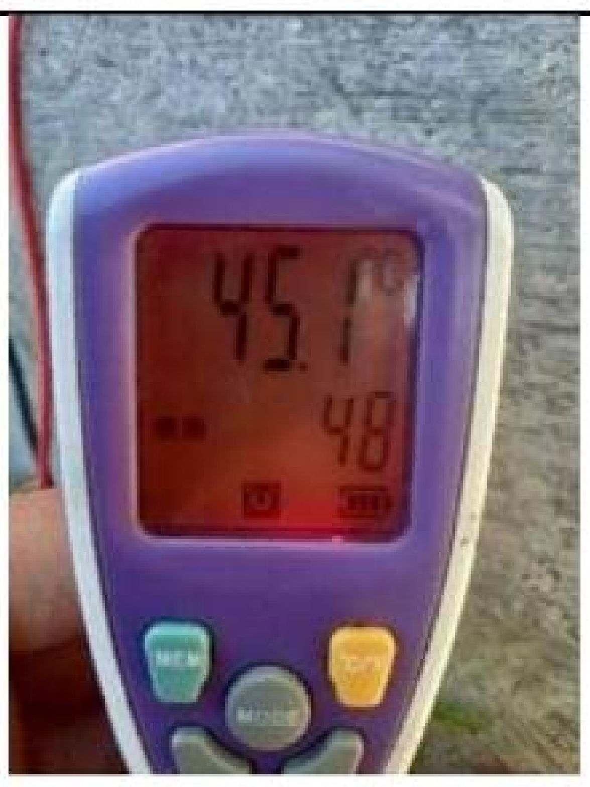
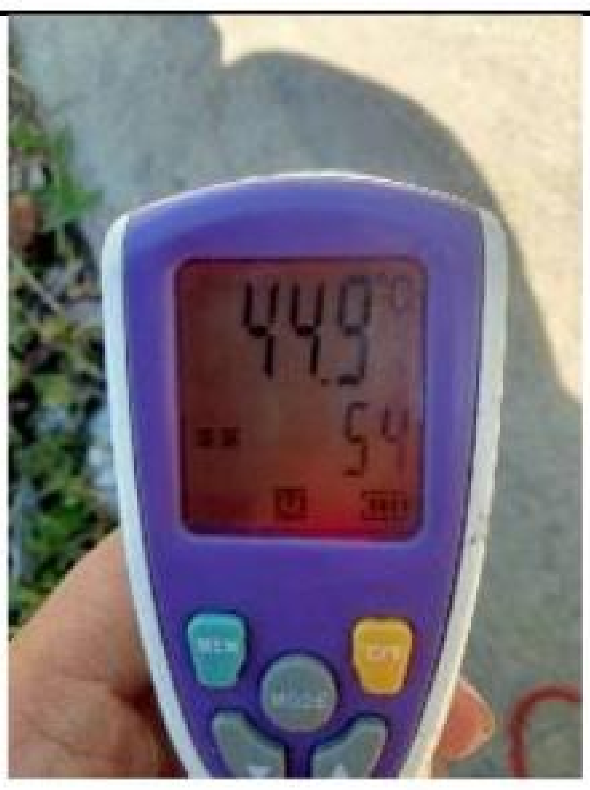
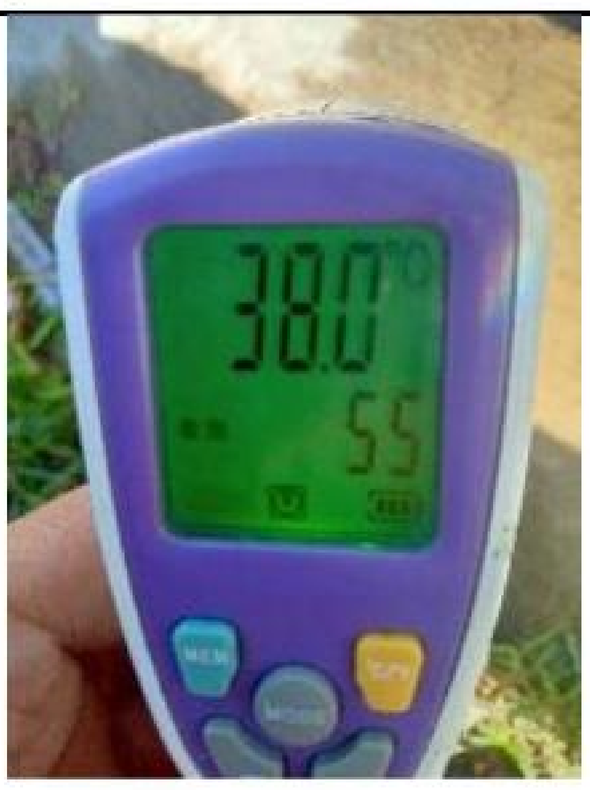
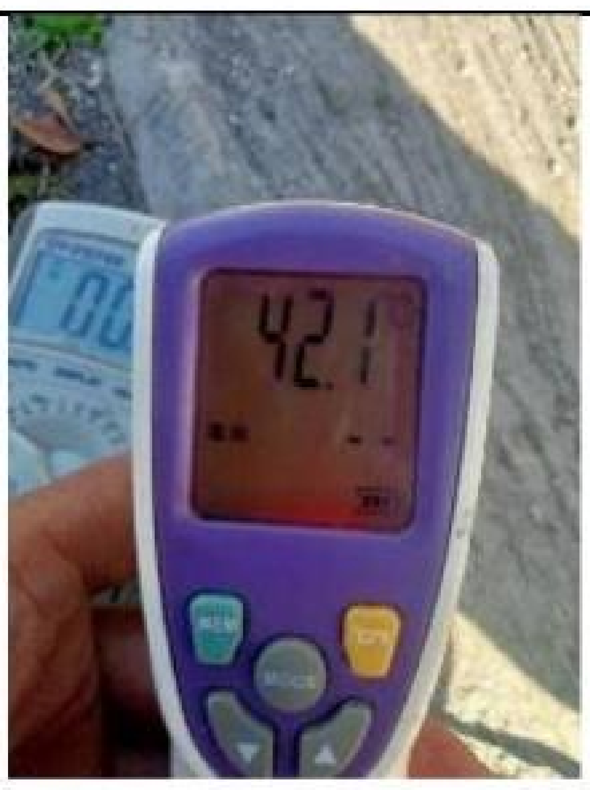
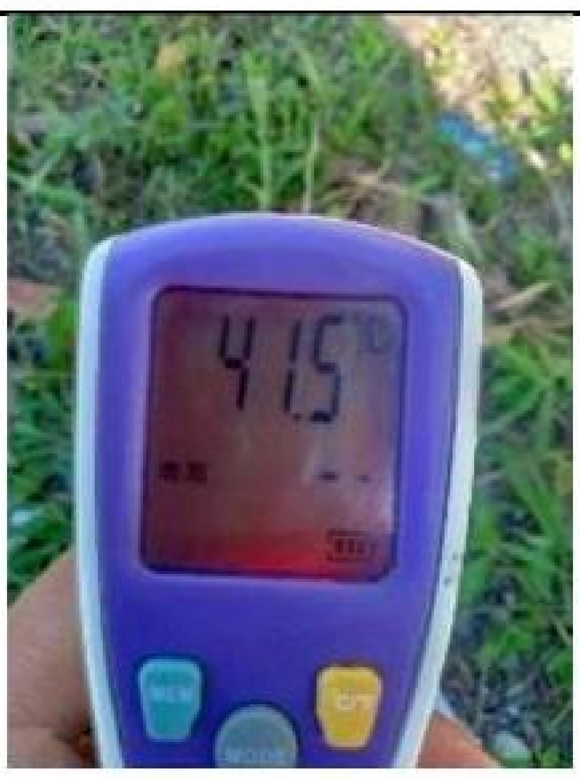
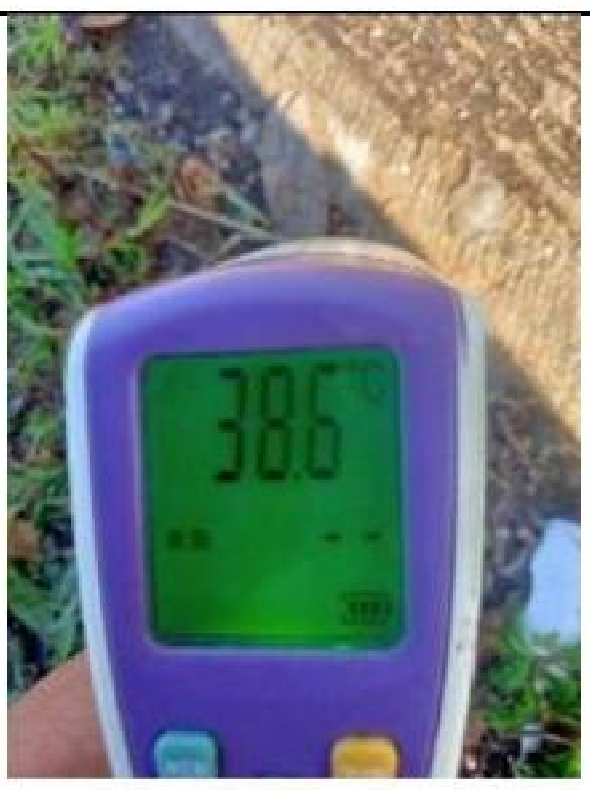
Pengambilan Data Pembersihan Panel Surya		
	 Stopwatch 00:11.77	 
	 Stopwatch 00:18.88	 
	 Stopwatch 00:25.63	 

	 Stopwatch 00:31.70	
	 Stopwatch 00:39.34	

LAMPIRAN E

Pengambilan Data Suhu pada Output Panel Surya

Pengambilan Data Pengukuran Suhu		
Normal	Berdebu	Dibersihkan
		
		
		

44.0 °C 29 MEM	44.6 °C 31	38.5 °C 35 MEM MODE
47.0 °C 37 MEM MODE	45.5 °C 39 MEM	36.3 °C 40 MEM MODE
45.1 °C 48 MEM MODE	44.9 °C 54 MEM MODE	38.0 °C 55 MEM MODE
42.1 °C MEM MODE	41.5 °C MEM MODE	38.6 °C

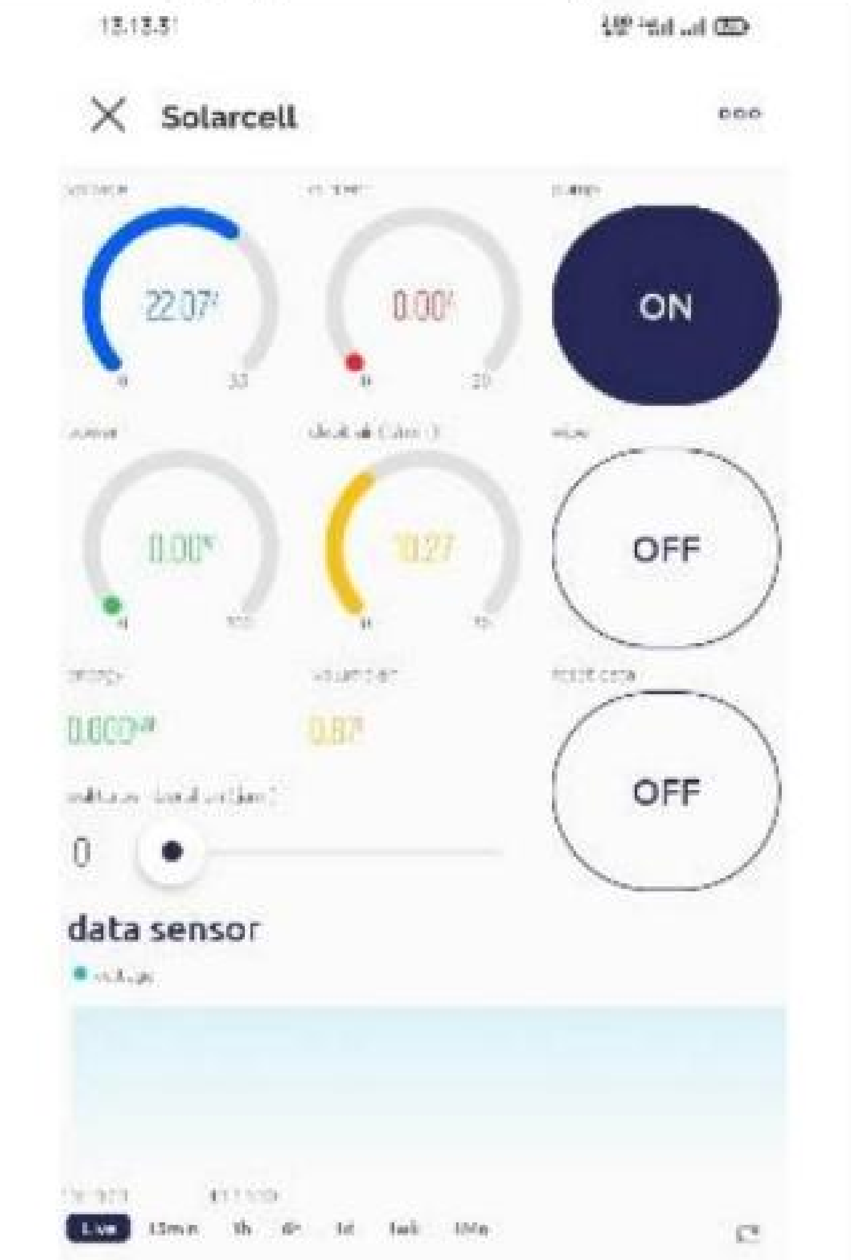
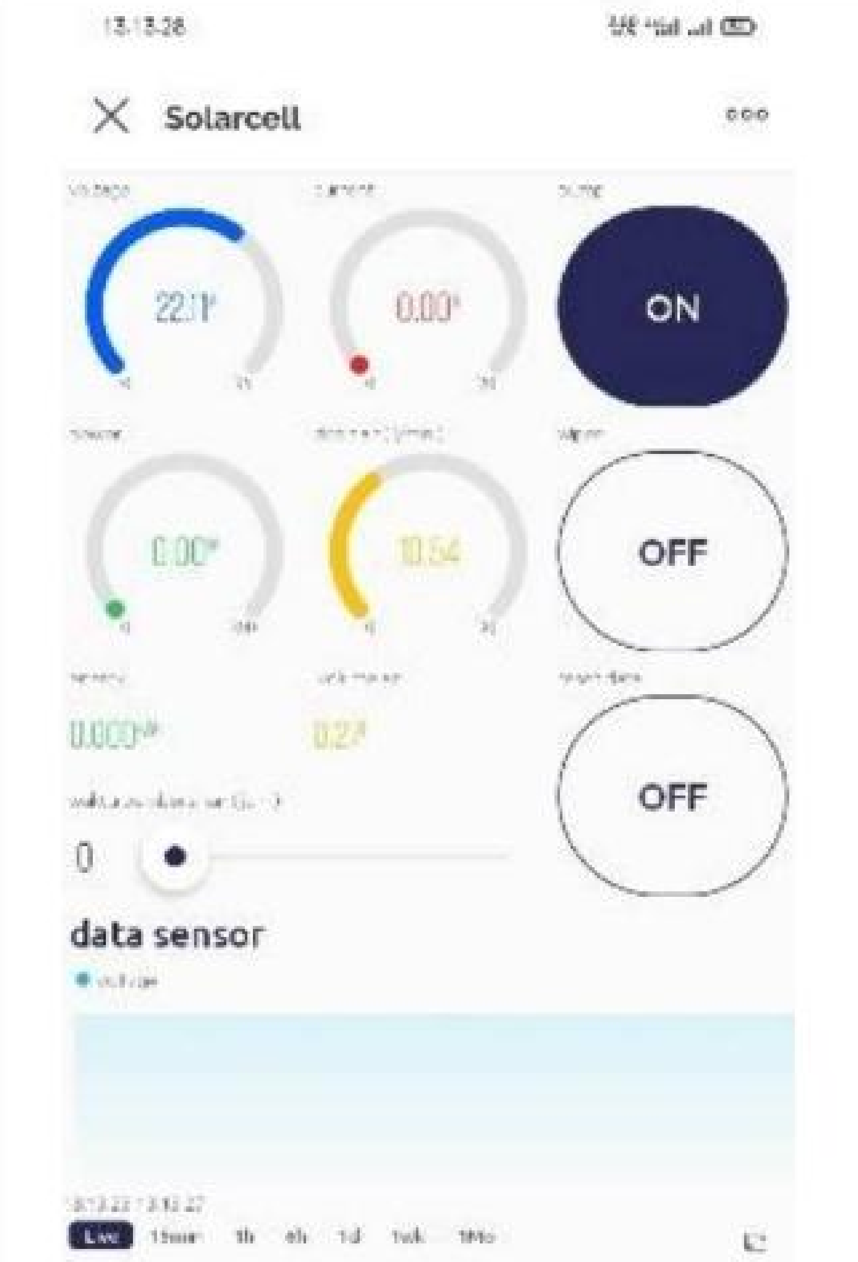
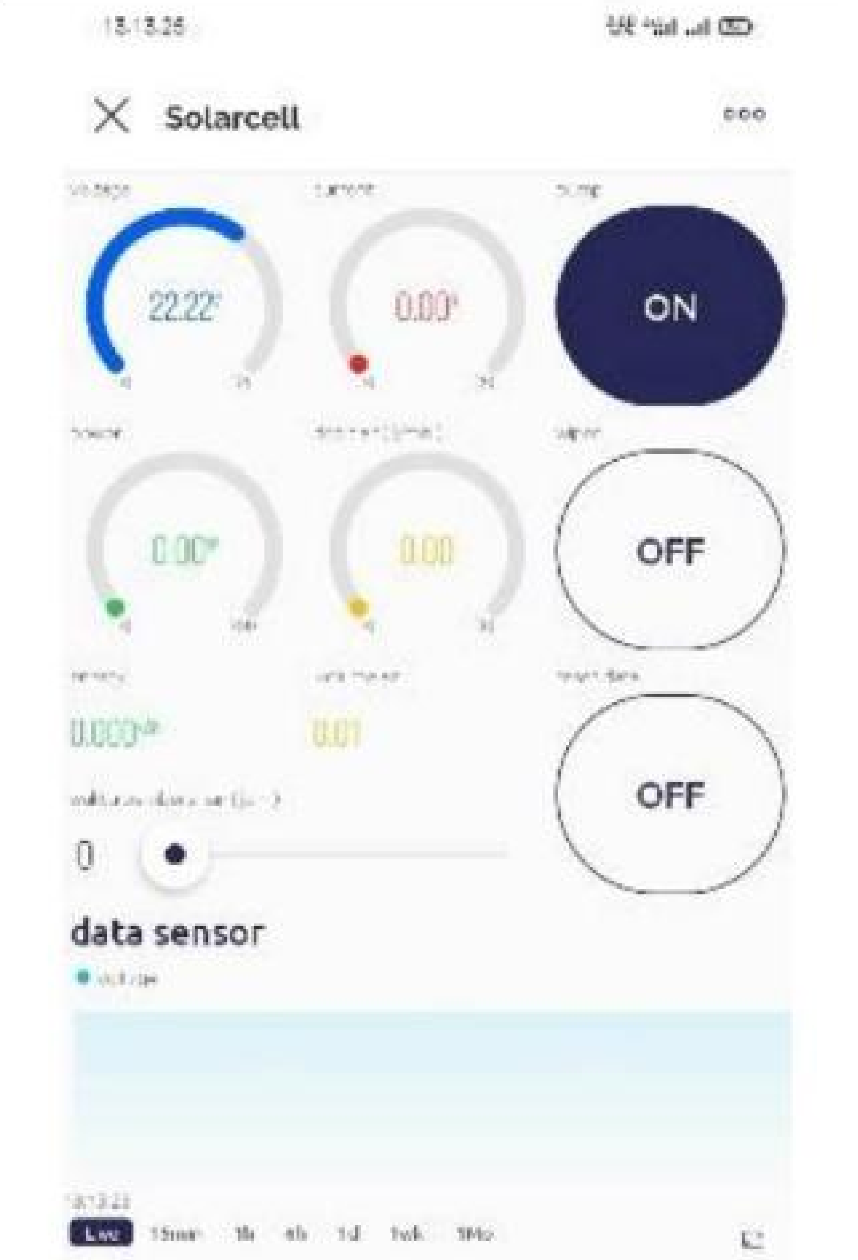
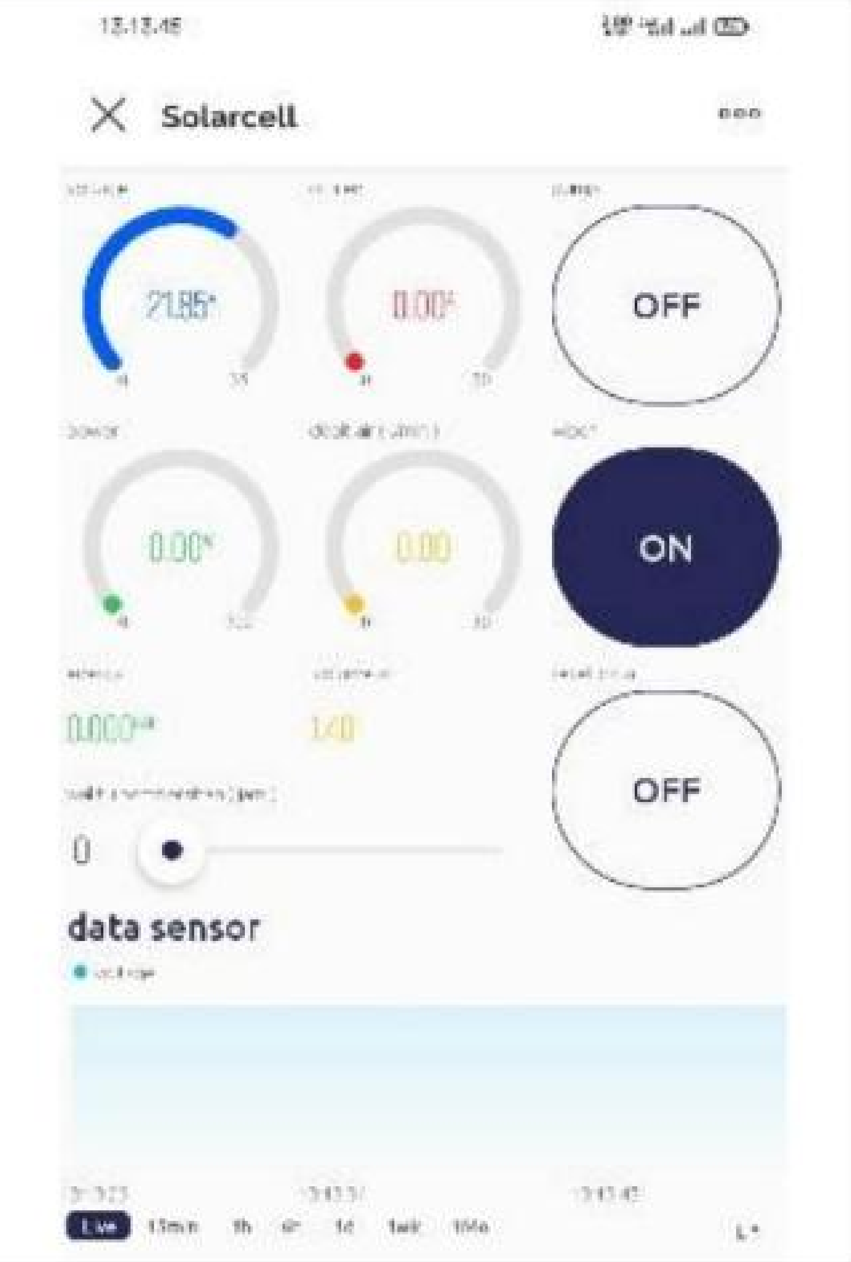
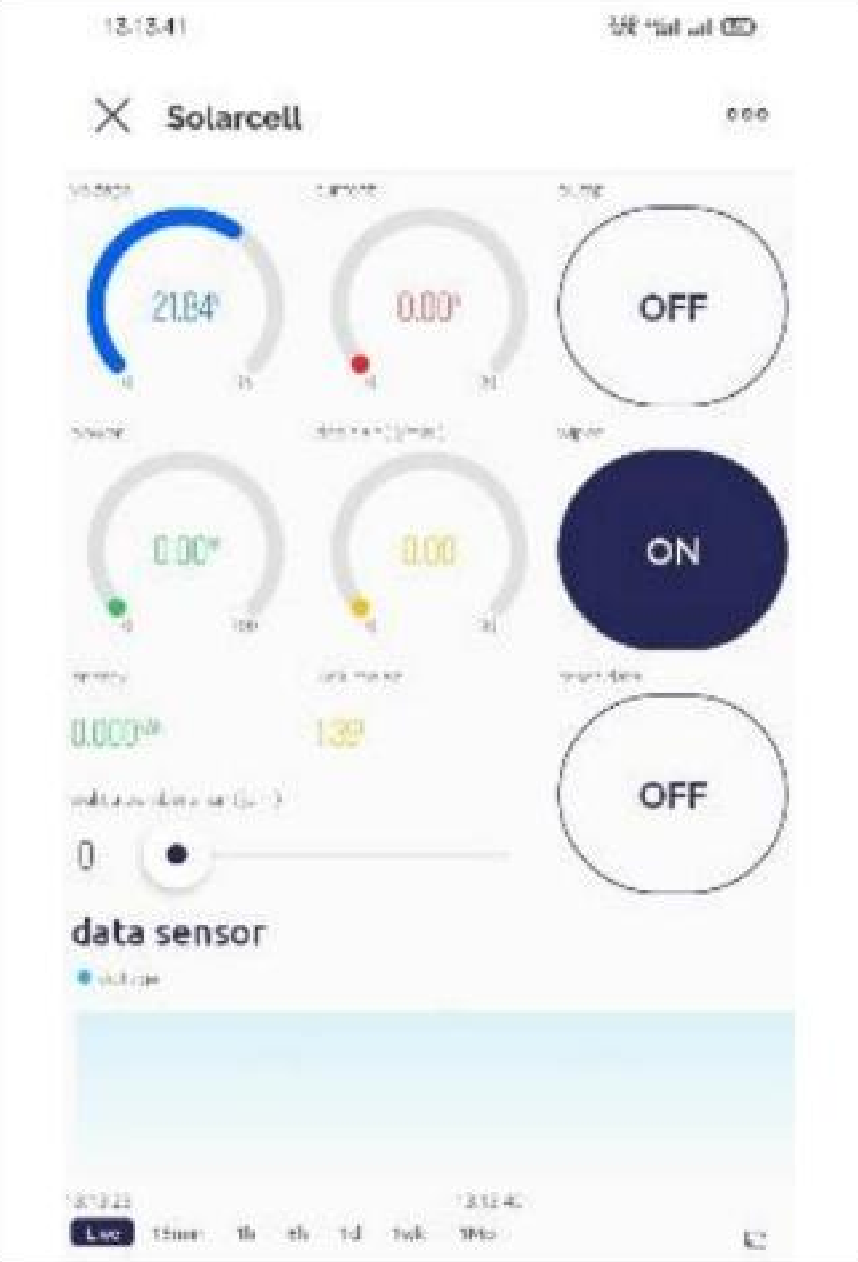
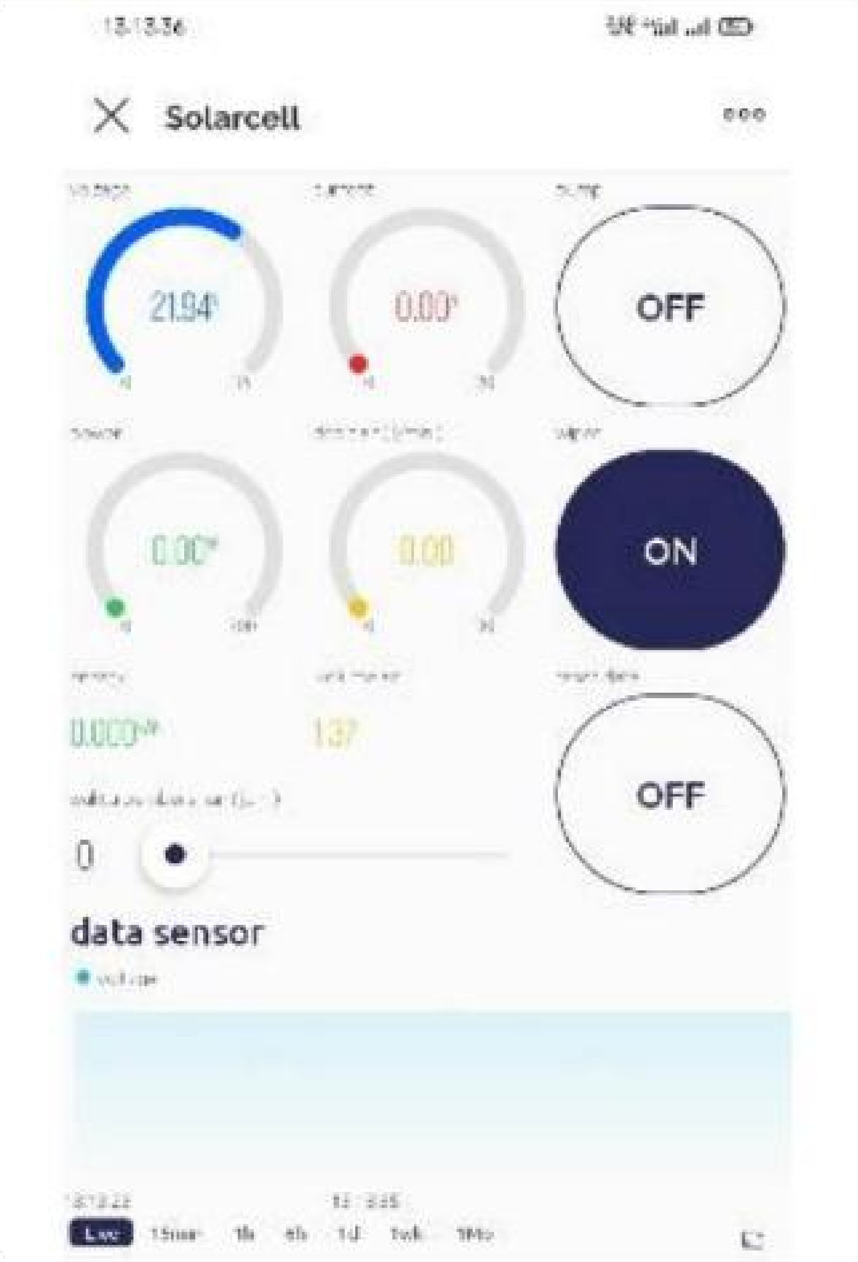
LAMPIRAN F

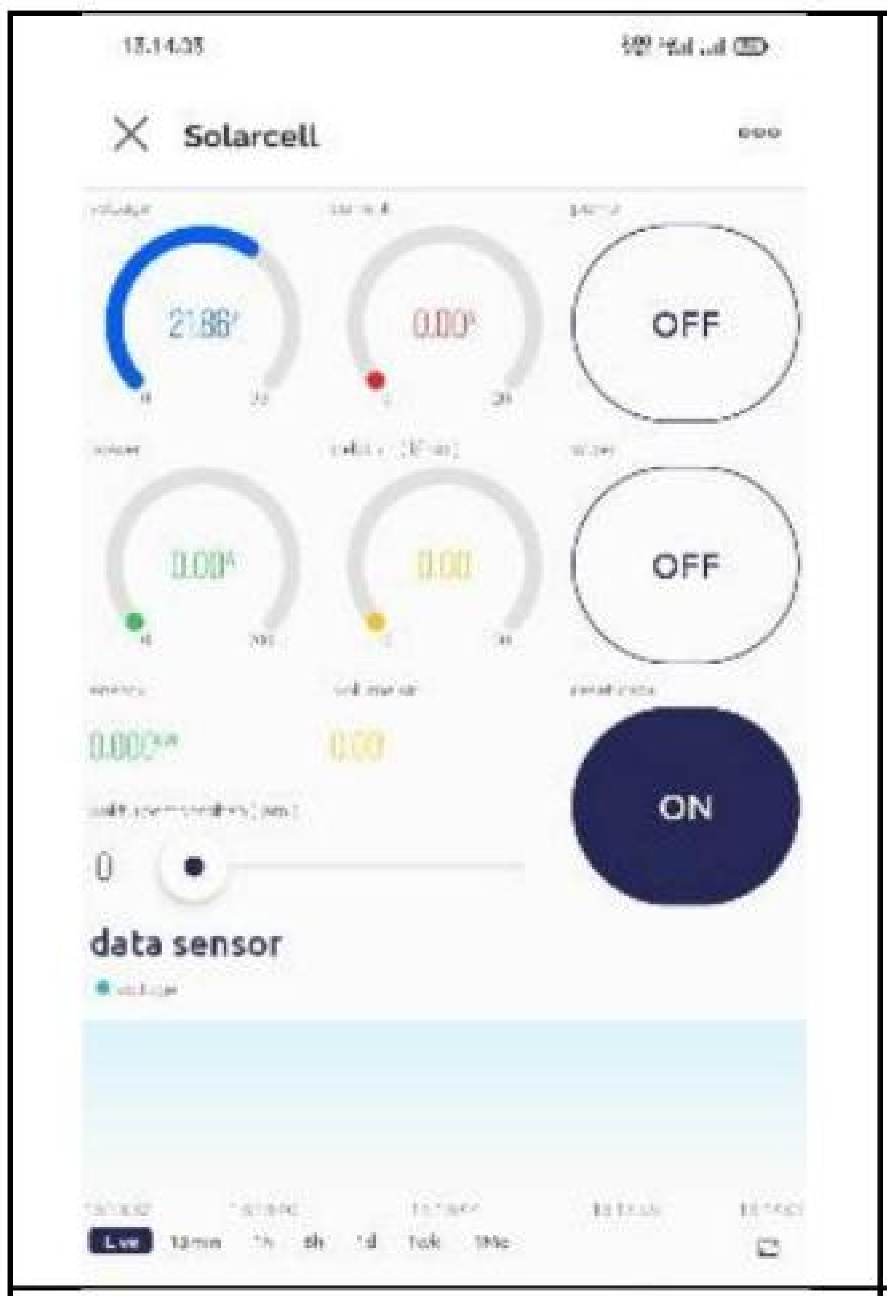
Pengambilan Jarak Koneksi WiFi

Pengambilan Jarak Koneksi WiFi		

LAMPIRAN G

Pengujian Widget di User Interface

Pengujian Widget di User Interface atau Blynk		
 13.13.31 Solarcell 22.07 0.00 ON 0.00 10.27 OFF 0.000 0.87 OFF 0 data sensor Live	 13.13.28 Solarcell 22.11 0.00 ON 0.00 10.54 OFF 0.000 0.27 OFF 0 data sensor Live	 13.13.25 Solarcell 22.22 0.00 ON 0.00 0.00 OFF 0.000 0.01 OFF 0 data sensor Live
 13.13.45 Solarcell 21.85 0.00 OFF 0.00 0.00 ON 0.000 1.40 OFF 0 data sensor Live	 13.13.41 Solarcell 21.84 0.00 OFF 0.00 0.00 ON 0.000 1.39 OFF 0 data sensor Live	 13.13.36 Solarcell 21.94 0.00 OFF 0.00 0.00 ON 0.000 1.37 OFF 0 data sensor Live


13.14.35

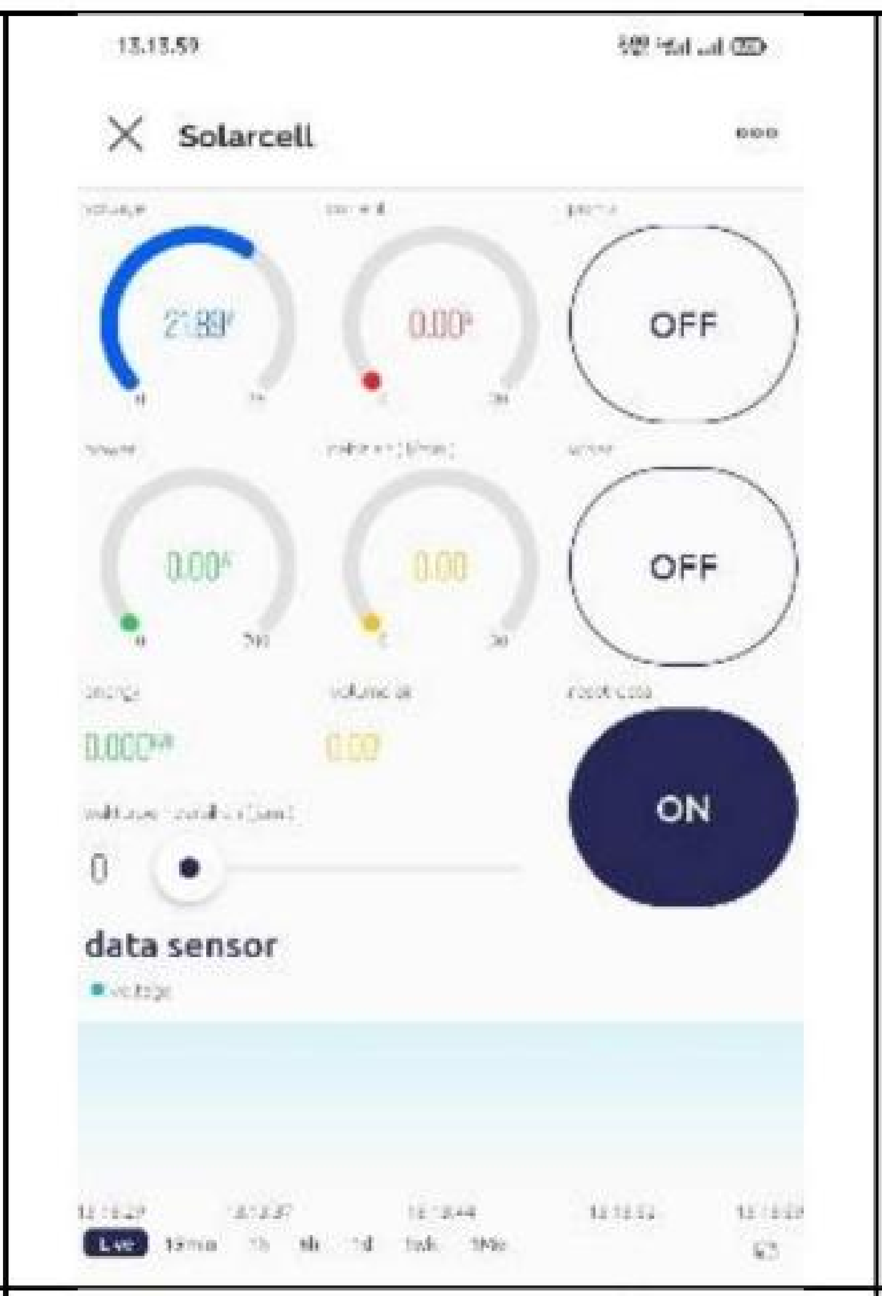
Solarcell

voltage 21.86V
current 0.00A
pump OFF
power 0.00W
debit air (l/min) 0.00
OFF
energy 0.000kWh
volume air 0.00
reset data ON
0

data sensor

voltage

Live 15min 1h 6h 1d 1wk 1Mo


13.13.59

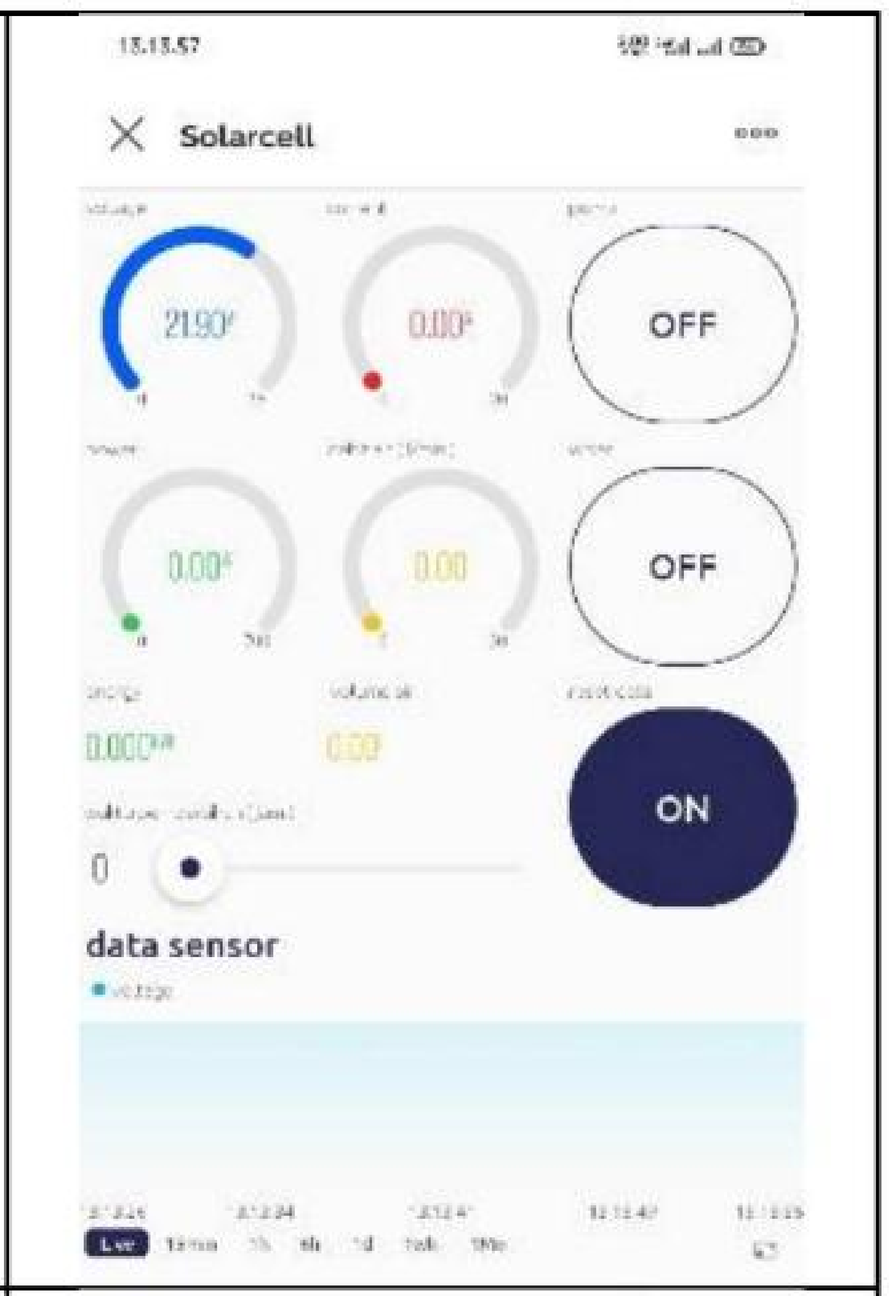
Solarcell

voltage 21.89V
current 0.00A
pump OFF
power 0.00W
debit air (l/min) 0.00
OFF
energy 0.000kWh
volume air 0.00
reset data ON
0

data sensor

voltage

Live 15min 1h 6h 1d 1wk 1Mo


13.13.57

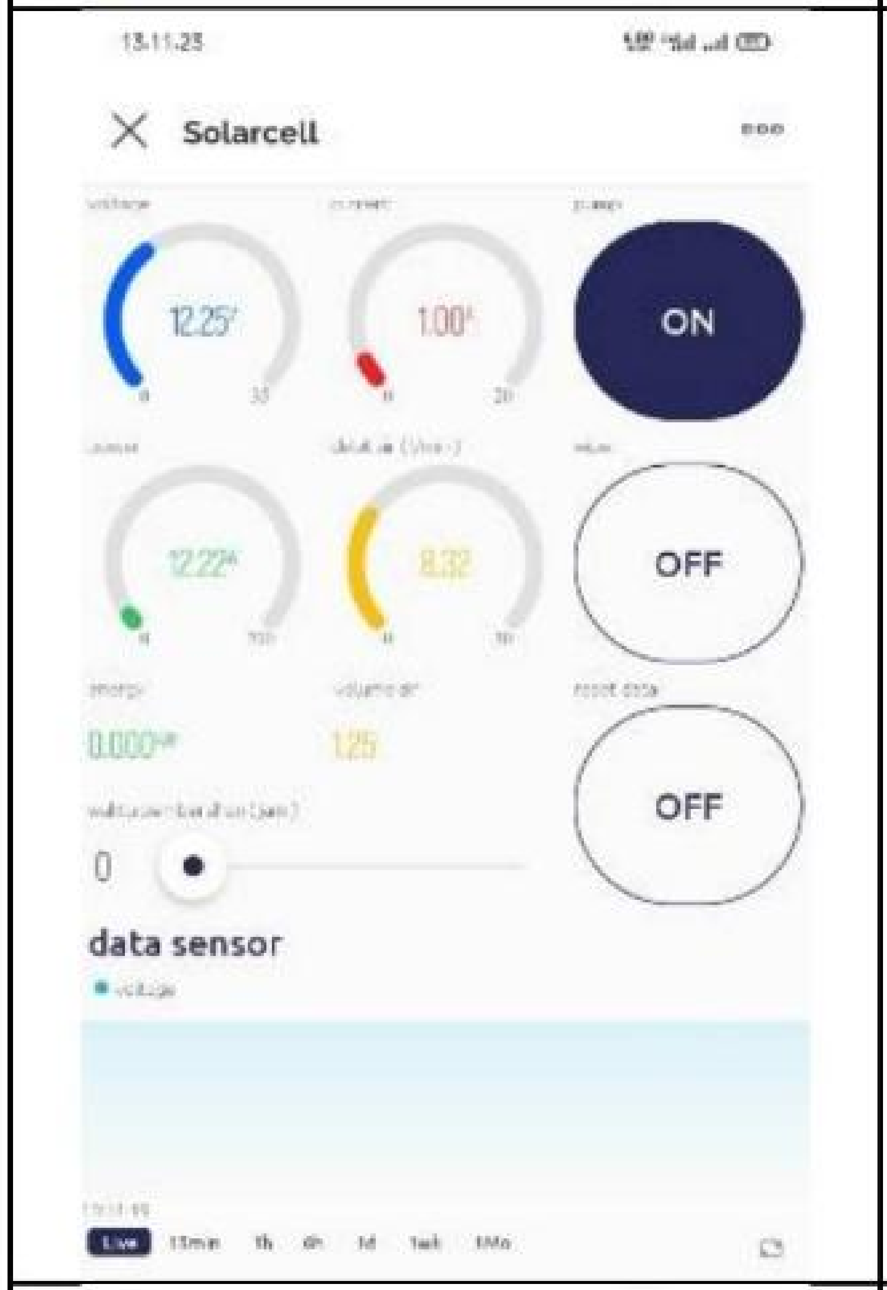
Solarcell

voltage 21.90V
current 0.00A
pump OFF
power 0.00W
debit air (l/min) 0.00
OFF
energy 0.000kWh
volume air 0.00
reset data ON
0

data sensor

voltage

Live 15min 1h 6h 1d 1wk 1Mo


13.11.25

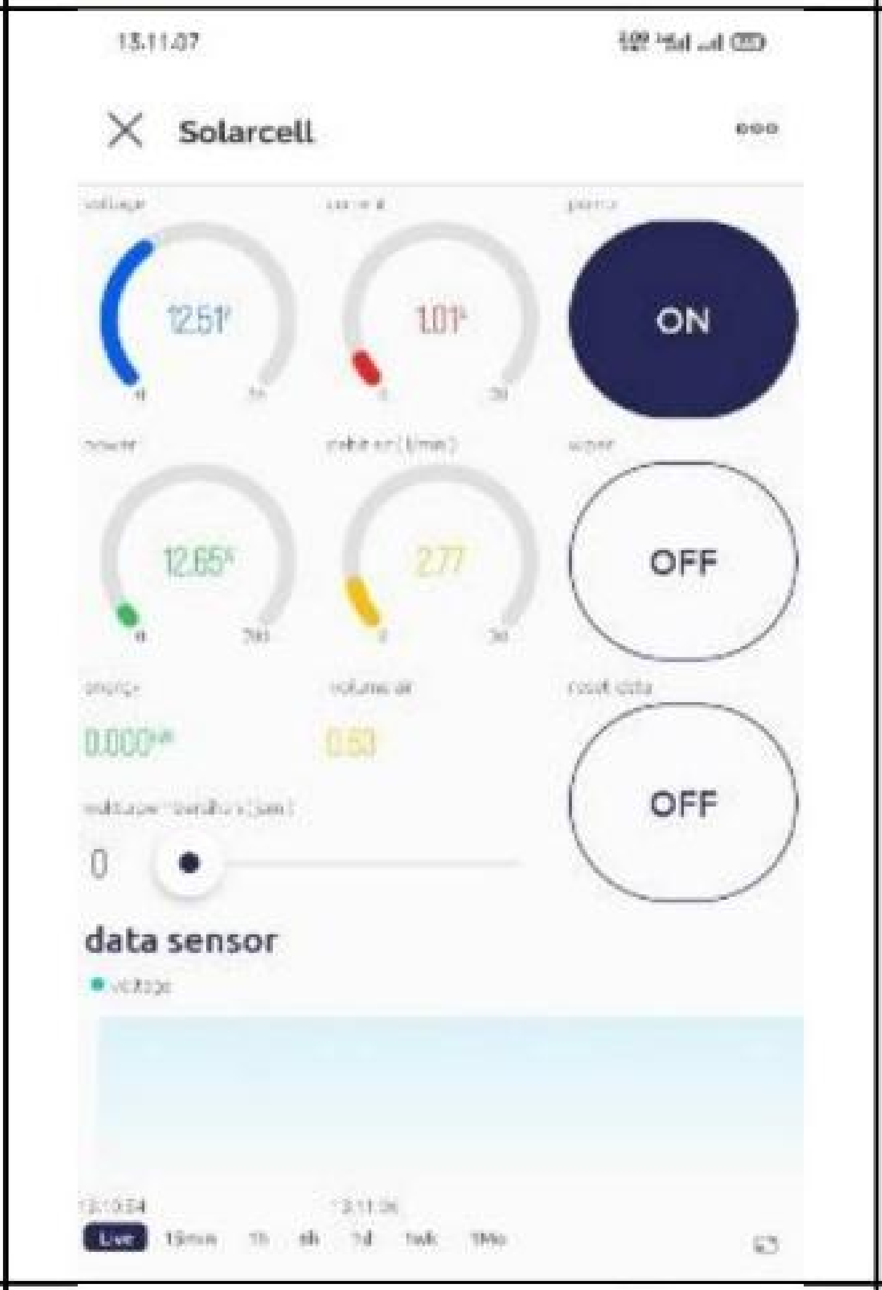
Solarcell

voltage 12.25V
current 1.00A
pump ON
power 12.22W
debit air (l/min) 8.32
OFF
energy 0.000kWh
volume air 1.25
reset data OFF
0

data sensor

voltage

Live 15min 1h 6h 1d 1wk 1Mo


13.11.07

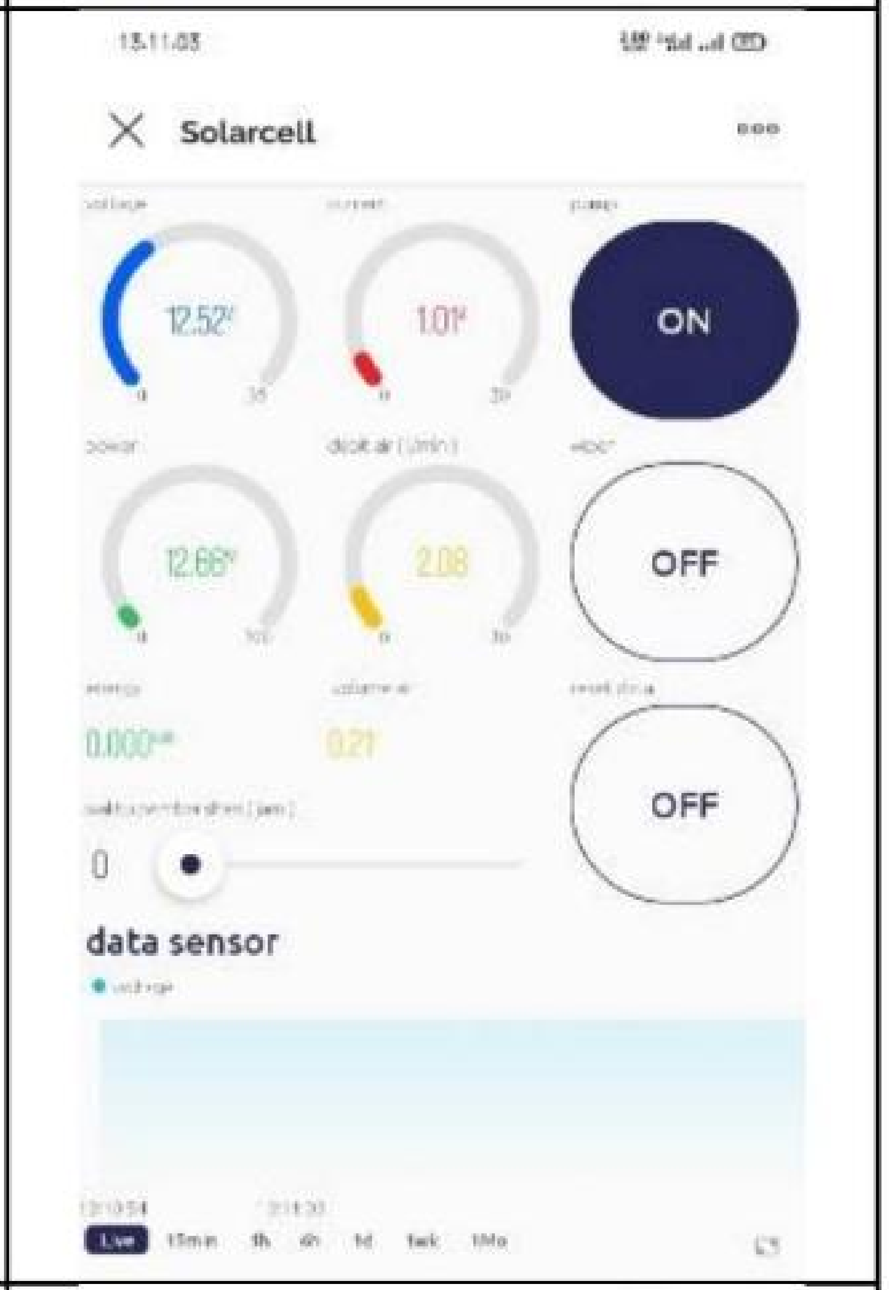
Solarcell

voltage 12.51V
current 1.01A
pump ON
power 12.65W
debit air (l/min) 2.77
OFF
energy 0.000kWh
volume air 0.53
reset data OFF
0

data sensor

voltage

Live 15min 1h 6h 1d 1wk 1Mo


13.11.03

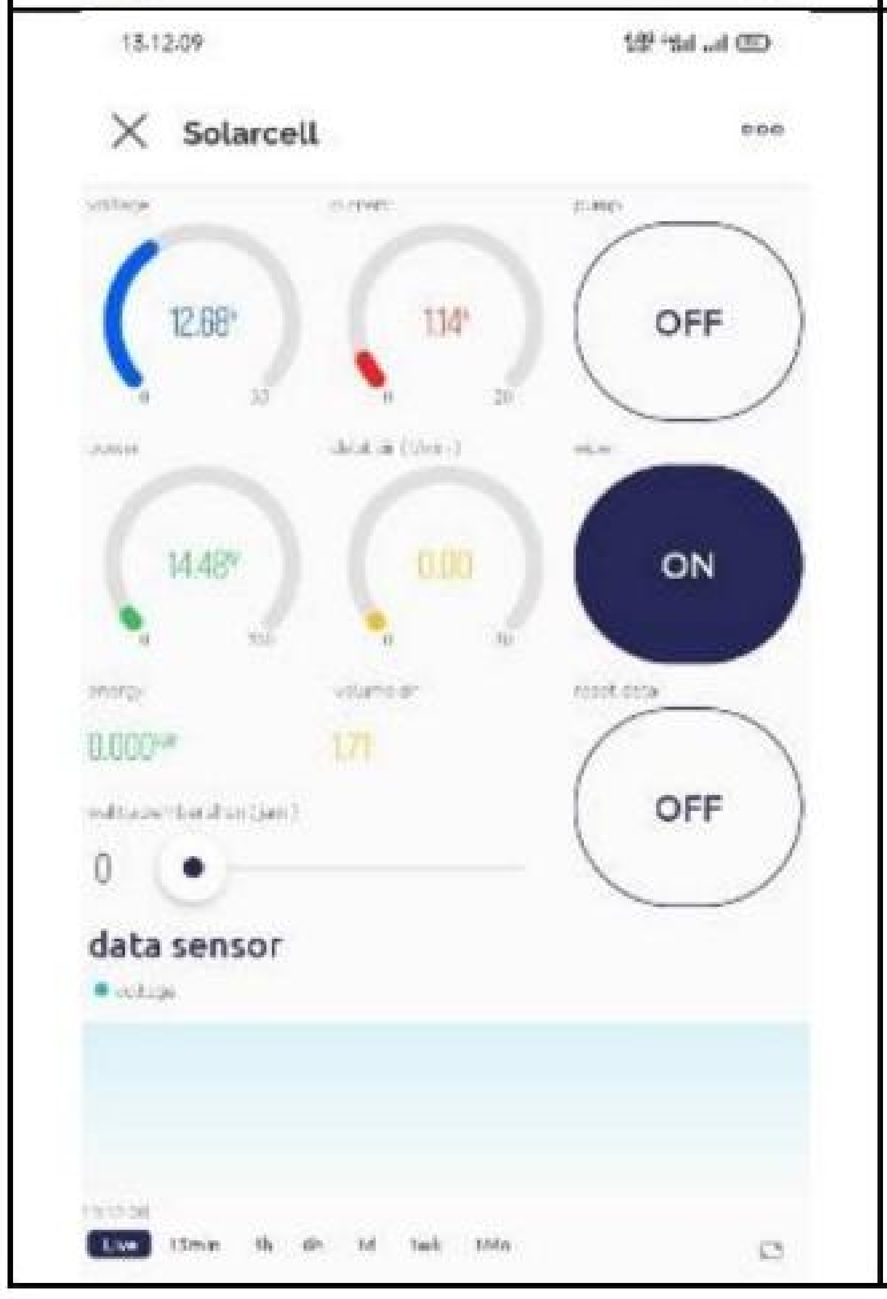
Solarcell

voltage 12.52V
current 1.01A
pump ON
power 12.66W
debit air (l/min) 2.08
OFF
energy 0.000kWh
volume air 0.21
reset data OFF
0

data sensor

voltage

Live 15min 1h 6h 1d 1wk 1Mo


13.12.09

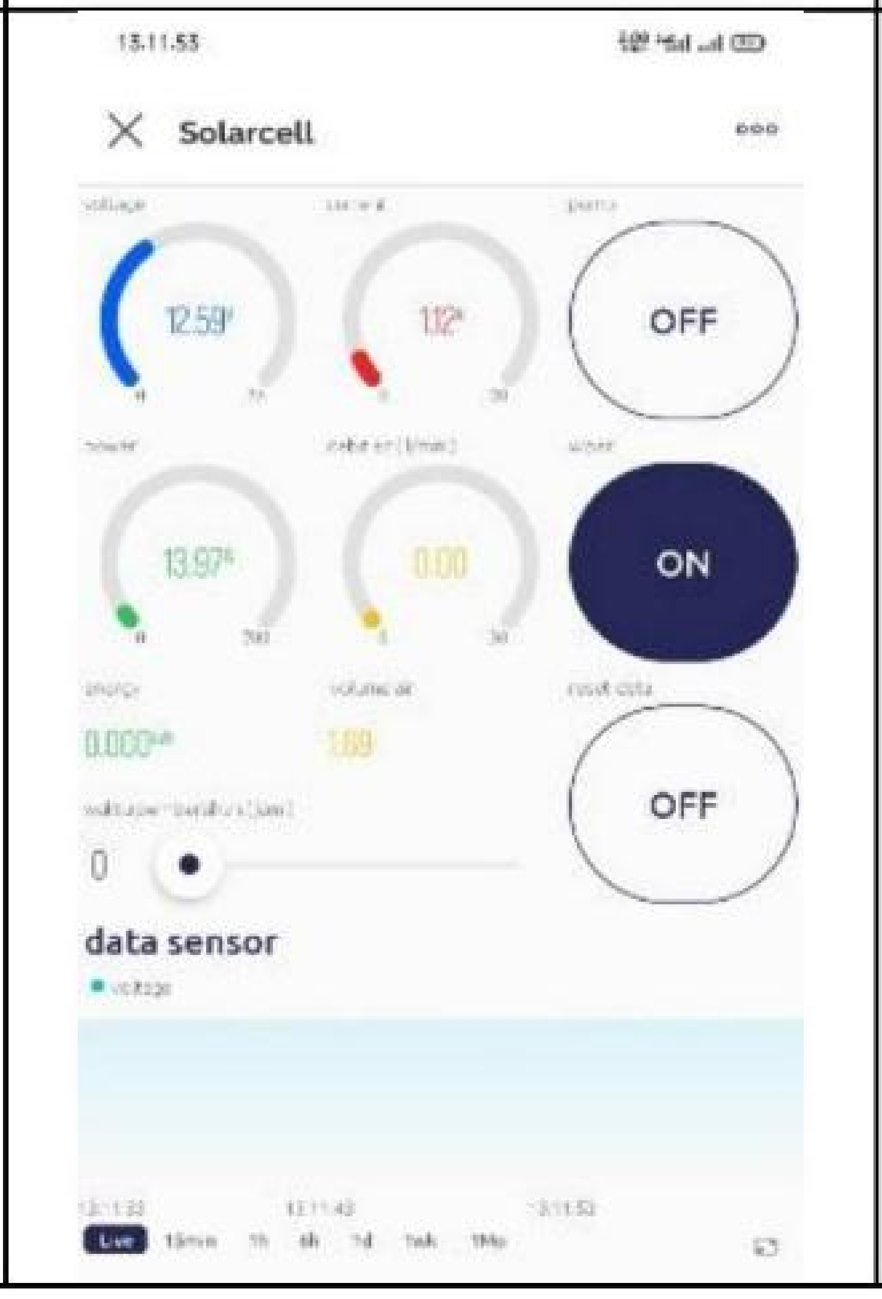
Solarcell

voltage 12.68V
current 1.14A
pump OFF
power 14.48W
debit air (l/min) 0.00
ON
energy 0.000kWh
volume air 1.71
reset data OFF
0

data sensor

voltage

Live 15min 1h 6h 1d 1wk 1Mo


13.11.53

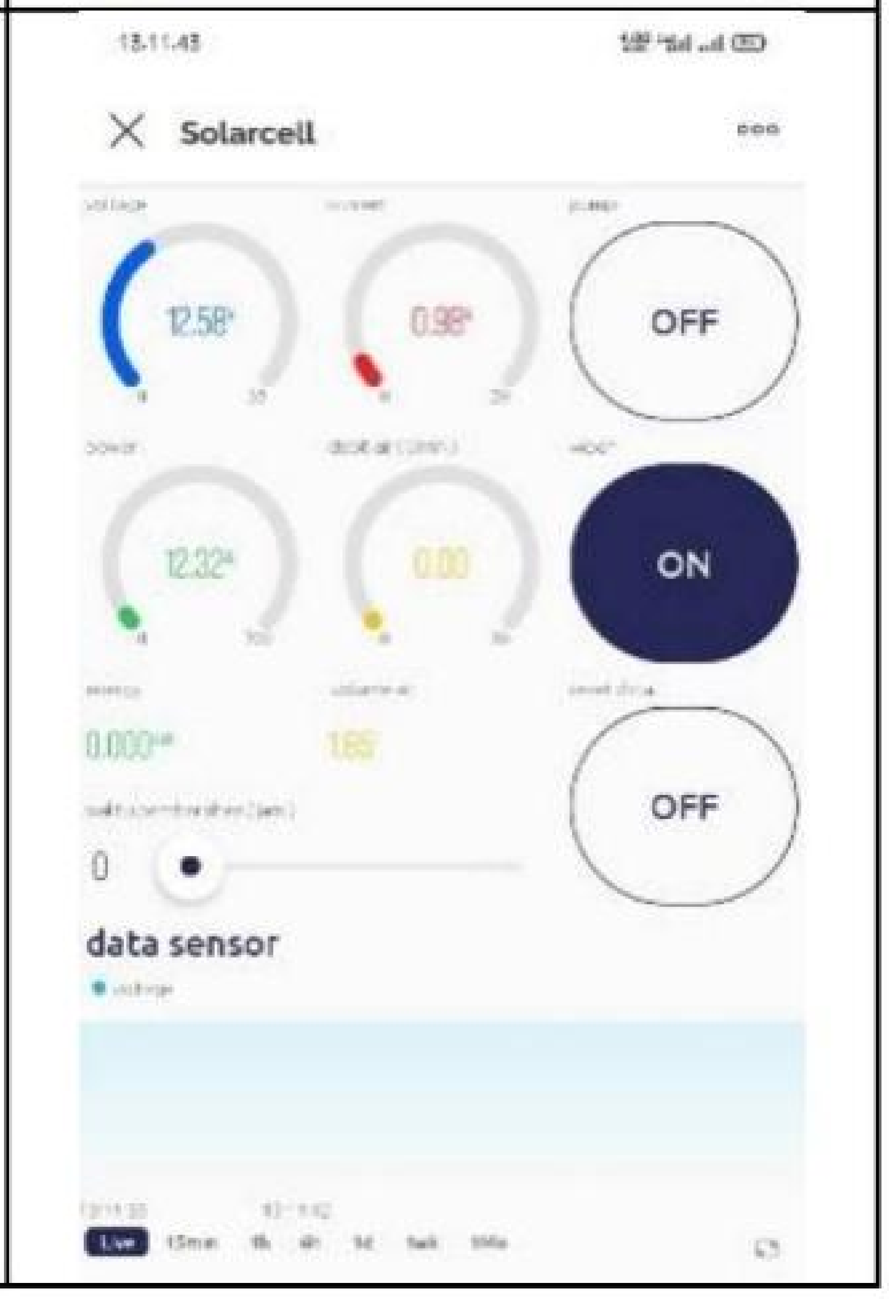
Solarcell

voltage 12.59V
current 1.12A
pump OFF
power 13.97W
debit air (l/min) 0.00
ON
energy 0.000kWh
volume air 1.69
reset data OFF
0

data sensor

voltage

Live 15min 1h 6h 1d 1wk 1Mo


13.11.43

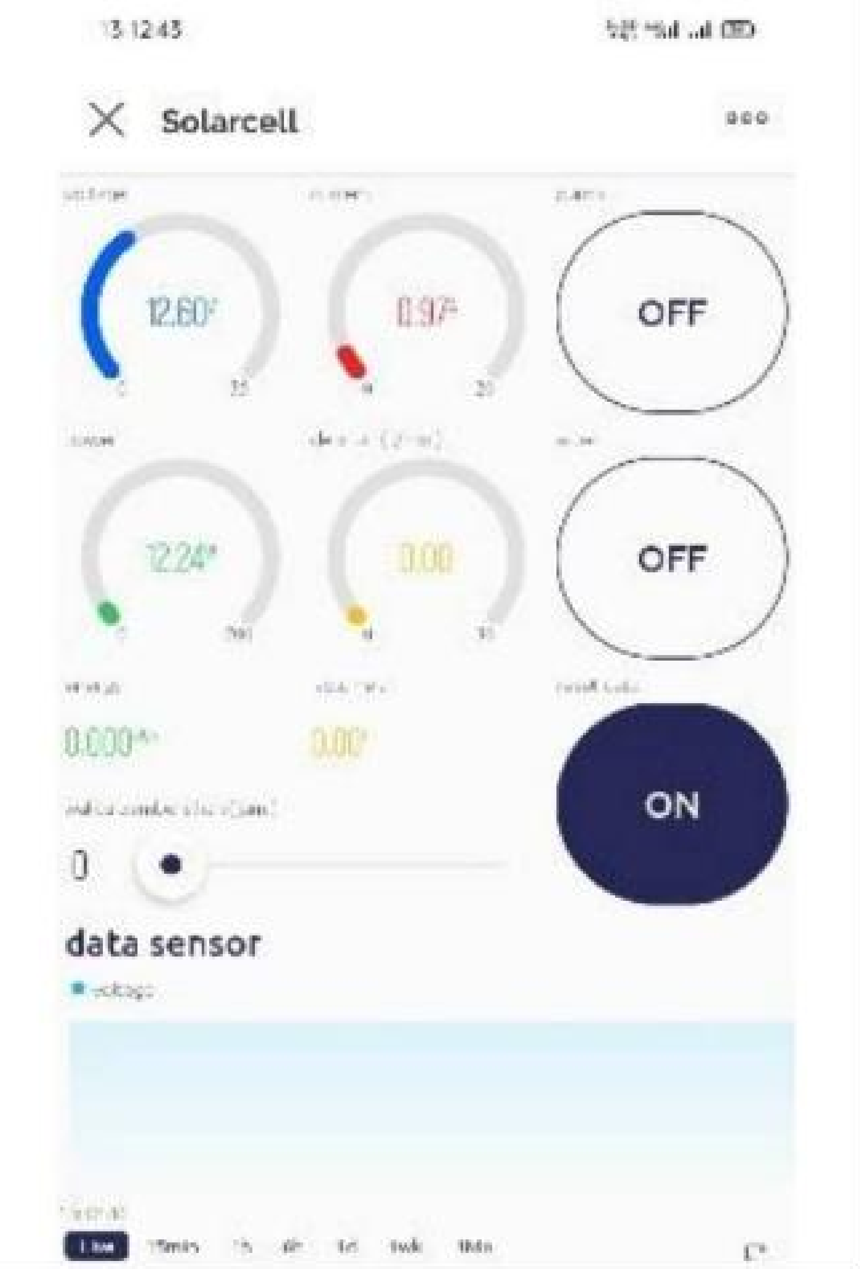
Solarcell

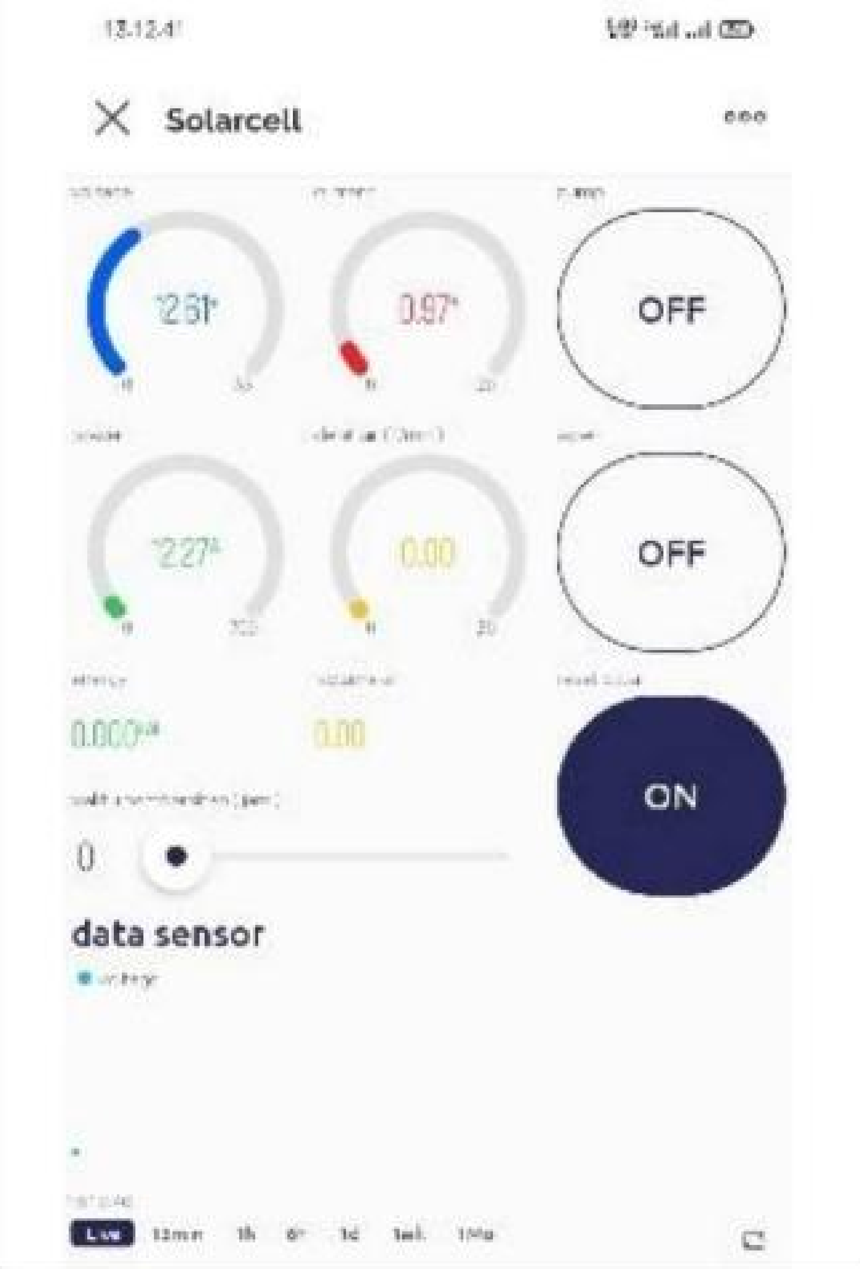
voltage 12.58V
current 0.98A
pump OFF
power 12.32W
debit air (l/min) 0.00
ON
energy 0.000kWh
volume air 1.69
reset data OFF
0

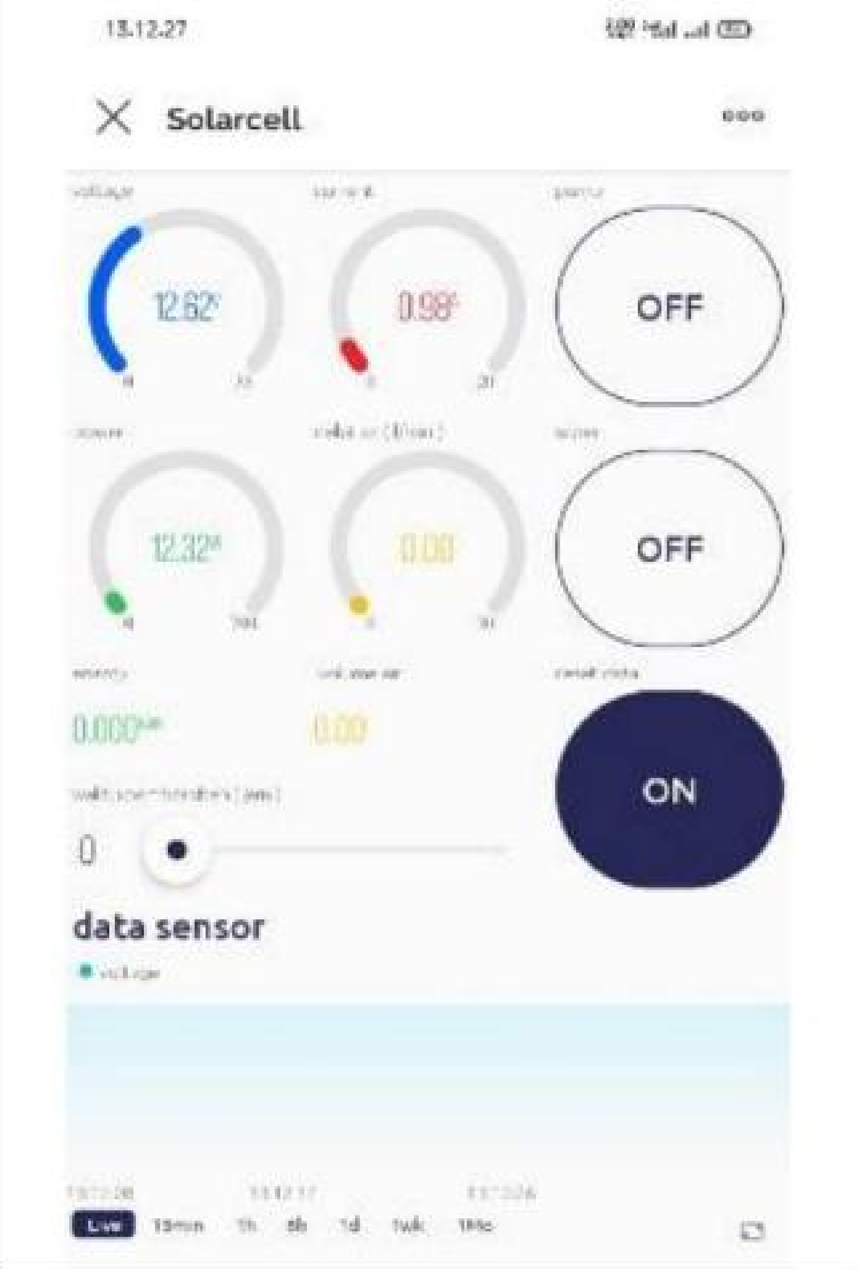
data sensor

voltage

Live 15min 1h 6h 1d 1wk 1Mo

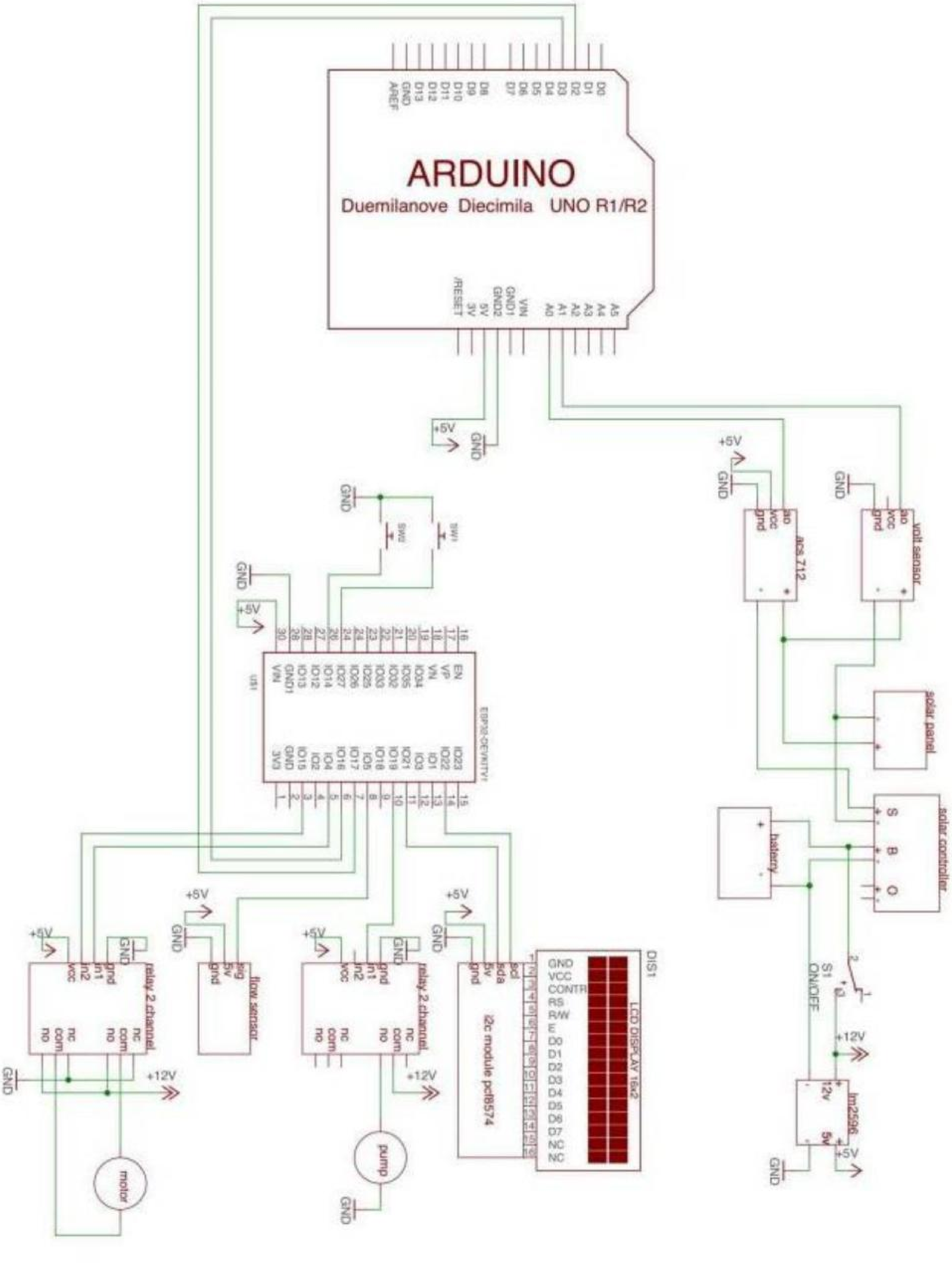

13.12.43
Solarcell
voltage
12.60
0
35
0.97
0
20
OFF
12.24
0
200
0.00
OFF
0.000
0.00
ON
0
data sensor
voltage
Live
15min
1h
6h
1d
1wk
1Mo


13.12.41
Solarcell
12.61
0
35
0.97
0
20
OFF
12.27
0
0.00
0
20
OFF
0.000
0.00
ON
0
data sensor
voltage
Live
15min
1h
6h
1d
1wk
1Mo


13.12.27
Solarcell
voltage
12.62
0
35
0.98
0
20
OFF
12.32
0
200
0.00
0
OFF
0.000
0.00
ON
0
data sensor
voltage
Live
15min
1h
6h
1d
1wk
1Mo

LAMPIRAN H

Wiring Sistem



LAMPIRAN I

Program Sistem

A. Program Arduino Uno

```
#include <SoftwareSerial.h>
SoftwareSerial mySerial(2, 3); // RX, TX
#include <EEPROM.h>
#include "ACS712.h"
#define pincurrent A0
#define pinvolt A1
#define pinled 13

ACS712 sensor(ACS712_20A, pincurrent);
float current,voltage,power,energy,wh,recw=0,lwh;
float zero_factor = 0.12; // zero untuk sensor current
float factorcurrent = 1.0; // factor kalibrasi arus
float factorvoltage = 1.0; // factor kalibrasi tegangan

unsigned long previousMillis = 0;
const long interval = 1000;
int counter=0;

// referensi https://how2electronics.com/interfacing-0-25v-dc-voltage-
sensor-with-arduino/

float read_voltage(int pinsensor){
float adc_voltage = 0.0;
float in_voltage = 0.0;
float R1 = 30000.0;
float R2 = 7500.0;
float ref_voltage = 5.0;
int adc_value = 0;
adc_value = analogRead(pinsensor);
adc_voltage = (adc_value * ref_voltage) / 1024.0;
in_voltage = adc_voltage / (R2/(R1+R2)) ;
return in_voltage;
}
```

```
void setup() {
recw = EEPROM.get(0, recw);
pinMode(pinled, OUTPUT);
Serial.begin(9600);
mySerial.begin(9600);
Serial.println(" ready ");
}
void loop() {
unsigned long currentMillis = millis();
if (currentMillis - previousMillis >= interval) {
previousMillis = currentMillis;

current=0;
voltage=0;
for(int i=0; i<100; i++){
current += sensor.getCurrentDC();
voltage += read_voltage(pinvolt);
delay(1);
}
current = current / 100.0;
current = (current - zero_factor)*factorcurrent;
if(current<0.0)current=0;
voltage = (voltage / 100.0)*factorvoltage;
power = current * voltage;

recw += power;
wh = recw / 3600;
energy = wh / 1000; // konvert ke kwh

if(lwh!=wh){
EEPROM.put(0, recw);
lwh=wh;
}
Serial.print(current);
Serial.print("A ");
Serial.print(voltage);
Serial.print("V ");
Serial.print(power);
Serial.print("W ");
Serial.print(energy,4);
Serial.print("K ");
Serial.print(counter);
Serial.print("C ");
Serial.println();

mySerial.print(current);
mySerial.print("A ");
mySerial.print(voltage);
mySerial.print("V ");
mySerial.print(power);
mySerial.print("W ");
mySerial.print(energy,4);
mySerial.print("K ");
mySerial.print(counter);
mySerial.print("C ");
mySerial.println();
counter++;
}

if(Serial.available()){
char c=Serial.read();
if(c=='R'){
recw=0;
EEPROM.put(0, recw);
Serial.println(" reset kwh ok ");
digitalWrite(pinled,1);
delay(1000);
digitalWrite(pinled,0);
}
}
if(mySerial.available()){
char cc=mySerial.read();
if(cc=='R'){
recw=0;
EEPROM.put(0, recw);
Serial.println(" reset kwh ok ");
digitalWrite(pinled,1);
delay(1000);
digitalWrite(pinled,0);
}
}
}
```

B. Program ESP32

```
// sistemmonitoring0@gmail.com
// Sandiku312213

#include <ESP32Servo.h>

#define pump 19
#define rpwm 4
#define lpwm 15
#define flow 5
#define rsw 14
#define lsw 27

// token blynk
#define BLYNK_TEMPLATE_ID "TMPL6vONPVkri"
#define BLYNK_TEMPLATE_NAME "solarcell"
#define BLYNK_AUTH_TOKEN
"bCKIODMUw5ttN6ckHLdyBzVkUP5DVaAS"

#define BLYNK_PRINT Serial // tampilakan informasi blynk di serial
#include <BlynkSimpleEsp32.h> // library blynk

// input wifi dan password
char auth[] = BLYNK_AUTH_TOKEN;
char ssid[] = "WIFI-TE1"; // type your wifi name
char pass[] = "politeknikcilacap"; // type your wifi password
BlynkTimer timers;

#include <NTPClient.h>
const long utcOffsetInSeconds = 25200;
// Define NTP Client to get time
WiFiUDP ntpUDP;
NTPClient timeClient(ntpUDP, "id.pool.ntp.org", utcOffsetInSeconds);
String tanggal,waktu;
```

```
int jam;

// lcd library
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 16, 2);

#define pinled 2

// eeprom library
#include <EEPROM.h>

int setwaktu;
float arus,tegangan,power,energy;

int count1=0,count2=0;

float konst = 7.2; // faktor kalibrasi
float debit_air;

volatile byte count;

unsigned int flow_mlt;
float total_volume,ltotal_volume;
float total_volume_liter;
unsigned long oldTime;
int laju_aliran;

String statuspump="F";
String statuswiper="S";
int startwiper=0;
String settime="";
String settime1="";
int t1,t2=15;

// external interupsi
ICACHE_RAM_ATTR void countPulse(){
 count++;
 }
```

```
// membaca input dari blnyk
BLYNK_WRITE(V7){
 int pinValue = param.asInt();
 setwaktu = pinValue;
 Serial.print("set waktu:");
 Serial.println(pinValue);
 EEPROM.write(0, pinValue);
 EEPROM.commit();
}

// membaca input dari blnyk
BLYNK_WRITE(V5){
 int pinValue = param.asInt();
 if(pinValue==1){
 if(digitalRead(pump)==1) {
 digitalWrite(pump,0);
 statuspump="N";
 }
 else {
 digitalWrite(pump,1);
 statuspump="F";
 }
 }
 Serial.print("pump:");
 Serial.println(pinValue);
}

// membaca input dari blnyk
BLYNK_WRITE(V6){
 int pinValue = param.asInt();
 if(pinValue == 1){
 if(startwiper==0) {
 startwiper=1;
 if(digitalRead(rsw)==0) {digitalWrite(rpwm, 0);digitalWrite(lpwm,
1);statuswiper="R";}
 if(digitalRead(lsw)==0) {digitalWrite(rpwm, 1);digitalWrite(lpwm,
0);statuswiper="L";}
```

```
 if(digitalRead(rsw)==1&&digitalRead(lsw)==1) {digitalWrite(rpwm,
0);digitalWrite(lpwm, 1);statuswiper="R";}
 }
 else {
 startwiper=0;
 digitalWrite(rpwm, 1);digitalWrite(lpwm, 1);
 }
 }
 Serial.print("wiper:");
 Serial.println(pinValue);
}

// membaca input dari blnyk
BLYNK_WRITE(V8){
 int pinValue = param.asInt();
 if(pinValue==1){
 total_volume=0;
 EEPROM.put(10, total_volume);
 EEPROM.commit();
 Serial2.print("R");
 Serial.println("reset ok");
 }
 Serial.print("reset:");
 Serial.println(pinValue);
}


void get_time(){
 timeClient.update();
 unsigned long epochTime = timeClient.getEpochTime();
 struct tm *ptm = gmtime ((time_t *)&epochTime);
 int monthDay = ptm->tm_mday;
 int currentMonth = ptm->tm_mon+1;
 int currentYear = ptm->tm_year+1900;
 tanggal=String(monthDay);
 tanggal+="-";
 tanggal+=String(currentMonth);
 tanggal+="-";
 tanggal+=String(currentYear);
 jam = timeClient.getHours();
 waktu = timeClient.getFormattedTime();
 Serial.println(tanggal);
 Serial.println(waktu);
 Serial.println(jam);
}

void display_lcd(){
 count1++;
 if( count1 >=5 ){count1=0;count2++;}
 if(count2>2)count2=0;
 if(count2==0){
 lcd.clear();
 lcd.setCursor(0,0);
 lcd.print(arus);
 lcd.print("A");
 lcd.setCursor(13,0);
 lcd.print("P:");
 lcd.print(statuspump);

 lcd.setCursor(0,1);
 lcd.print(tegangan);
 lcd.print("V");
 lcd.setCursor(13,1);
 if(startwiper==0) lcd.print("W:");
 else lcd.print("w:");
 lcd.print(statuswiper);
 }
 if(count2==1){
 lcd.clear();
 lcd.setCursor(0,0);
 lcd.print(power);
 lcd.print("W");
 lcd.setCursor(13,0);
 lcd.print("P:");
 lcd.print(statuspump);

 lcd.setCursor(0,1);
 lcd.print(energy,3);
lcd.print("kWh");
lcd.setCursor(13,1);
if(startwiper==0) lcd.print("W:");
else lcd.print("w:");
lcd.print(statuswiper);
}
if(count2==2){
lcd.clear();
lcd.setCursor(0,0);
lcd.print(debit_air);
lcd.print("L/m");
lcd.setCursor(13,0);
lcd.print("P:");
lcd.print(statuspump);

lcd.setCursor(0,1);
lcd.print(total_volume_liter);
lcd.print("L");
lcd.setCursor(13,1);
if(startwiper==0) lcd.print("W:");
else lcd.print("w:");
lcd.print(statuswiper);
}

if(count2==2){
lcd.clear();
lcd.setCursor(0,0);
lcd.print("T:");
lcd.print(waktu);

lcd.setCursor(13,0);
lcd.print("P:");
lcd.print(statuspump);

lcd.setCursor(0,1);
lcd.print("D:");
lcd.print(tanggal);

lcd.setCursor(13,1);
```

```
 if(startwiper==0) lcd.print("W:");
 else lcd.print("w:");
 lcd.print(statuswiper);
 }
}

// update ke blnyk dan tampilan blynk
void tasktimer(){


 if(setwaktu==jam){
 if(t1<t2){
 if(t1==0)Blynk.logEvent("notifications","Wiper dan pompa Nyala
otomatis!");
 startwiper=1;
 if(digitalRead(rsw)==0) {digitalWrite(rpwm, 0);digitalWrite(lpwm,
1);statuswiper="R";}
 if(digitalRead(lsw)==0) {digitalWrite(rpwm, 1);digitalWrite(lpwm,
0);statuswiper="L";}
 if(digitalRead(rsw)==1&&digitalRead(lsw)==1) {digitalWrite(rpwm,
0);digitalWrite(lpwm, 1);statuswiper="R";}
 digitalWrite(pump,0);
 statuspump="N";
 Serial.println("saatnya on");
 }
 else{
 if(t1==t2)Blynk.logEvent("notifications","Wiper dan pompa Mati
otomatis!");
 startwiper=0;
 digitalWrite(rpwm, 1);digitalWrite(lpwm, 1);
 statuswiper="S";
 digitalWrite(pump,1);
 statuspump="N";
 Serial.println("saatnya on");
 }
 t1++;
 }
 else{
  t1=0;
 }

 // menampilkan di blynk
 Blynk.virtualWrite(V0,tegangan);
 Blynk.virtualWrite(V1,arus);
 Blynk.virtualWrite(V2,power);
 Blynk.virtualWrite(V3,energy);
 Blynk.virtualWrite(V4,total_volume_liter);
 Blynk.virtualWrite(V9,debit_air);

 display_lcd();

}

// fungsi setup hanya di run sekali saat esp pertama on
// gunanya untuk inisalisasi / konfigurari input output
void setup(){
 Serial.begin(9600);
 Serial2.begin(9600);
 // konfigurasi eeprom
 EEPROM.begin(512);
 // baca memory dr eeprom
 setwaktu = EEPROM.read(0);
 Serial.print("setwaktu:");
 Serial.println(setwaktu);
 total_volume = EEPROM.get(10, total_volume);
 Serial.print("ml:");
 Serial.println(total_volume);
 pinMode(pinled, OUTPUT);
 pinMode(pump, OUTPUT);
 digitalWrite(pump, 1); // off
 pinMode(lpwm, OUTPUT);
 pinMode(rpwm, OUTPUT);
 digitalWrite(rpwm, 1);digitalWrite(lpwm, 1);
 pinMode(flow, INPUT_PULLUP);
 pinMode(rsw, INPUT_PULLUP);
 pinMode(lsw, INPUT_PULLUP);

 ESP32PWM::allocateTimer(0);
 ESP32PWM::allocateTimer(1);
 ESP32PWM::allocateTimer(2);
 ESP32PWM::allocateTimer(3);

lcd.begin();
lcd.backlight();
// tampilan awal lcd
lcd.clear();
lcd.setCursor(0,0);
lcd.print("ssid:");
lcd.print(ssid);
lcd.setCursor(0,1);
lcd.print("pass:");
lcd.print(pass);


 // inisialisasi blynk
 Blynk.begin(auth, ssid, pass);
 timers.setInterval(1000L, tasktimer);

 count  = 0;
 debit_air = 0.0;
 flow_mlt  = 0;

 oldTime  = 0;

 attachInterrupt(digitalPinToInterrupt(flow), countPulse, FALLING);
 Serial.println(" ready ");
 timeClient.begin();
}

String in="";
void loop()
{

 if(startwiper==1){
 if(digitalRead(rsw)==0) {digitalWrite(rpwm, 0);digitalWrite(lpwm,
1);statuswiper="R";}
```

```
if(digitalRead(lsw)==0) {digitalWrite(rpwm, 1);digitalWrite(lpwm,
0);statuswiper="L";}
}

Blynk.run(); // jalankan blynk
timers.run(); // jalankan timer

if(Serial2.available()){
char c = Serial2.read();
if(isDigit(c)||c=='.'||c=='-')in+=c;
if(c==' ')in="";
if(c=='A'){
arus= in.toFloat();
Serial.print(in);
Serial.print("a ");
in="";
}
if(c=='V'){
tegangan = in.toFloat();
Serial.print(in);
Serial.print("v ");
in="";
}
if(c=='W'){
power = in.toFloat();
Serial.print(in);
Serial.print("w ");
in="";
}
if(c=='K'){
energy = in.toFloat();
Serial.print(in);
Serial.print("kwh ");
Serial.println();
in="";
}
}

if ((millis() - oldTime) > 1000) {
 detachInterrupt(0);
 debit_air = ((1000.0 / (millis() - oldTime)) * count) / konst;
 oldTime = millis();
 flow_mlt = (debit_air / 60) * 1000;
 total_volume += flow_mlt;
 laju_aliran = debit_air;

 total_volume_liter = (float)total_volume/1000;

 Serial.print("S1:");
 Serial.print(digitalRead(rsw));
 Serial.print(" S2:");
 Serial.print(digitalRead(lsw));

 Serial.print(" DEBIT AIR: ");
 Serial.print(debit_air);
 Serial.print("L/m");
 Serial.print(" Vol: ");
 Serial.print(total_volume);
 Serial.print("mL");
 Serial.print(" Vol: ");
 Serial.print(total_volume_liter);
 Serial.println("L");

 if(ltotal_volume!=total_volume){
  EEPROM.put(10, total_volume);
  EEPROM.commit();
  ltotal_volume=total_volume;
 }
 get_time();
 count = 0;
 digitalWrite(pinled, digitalRead(pinled)^1);
 attachInterrupt(0, countPulse, FALLING);
 }

}
```