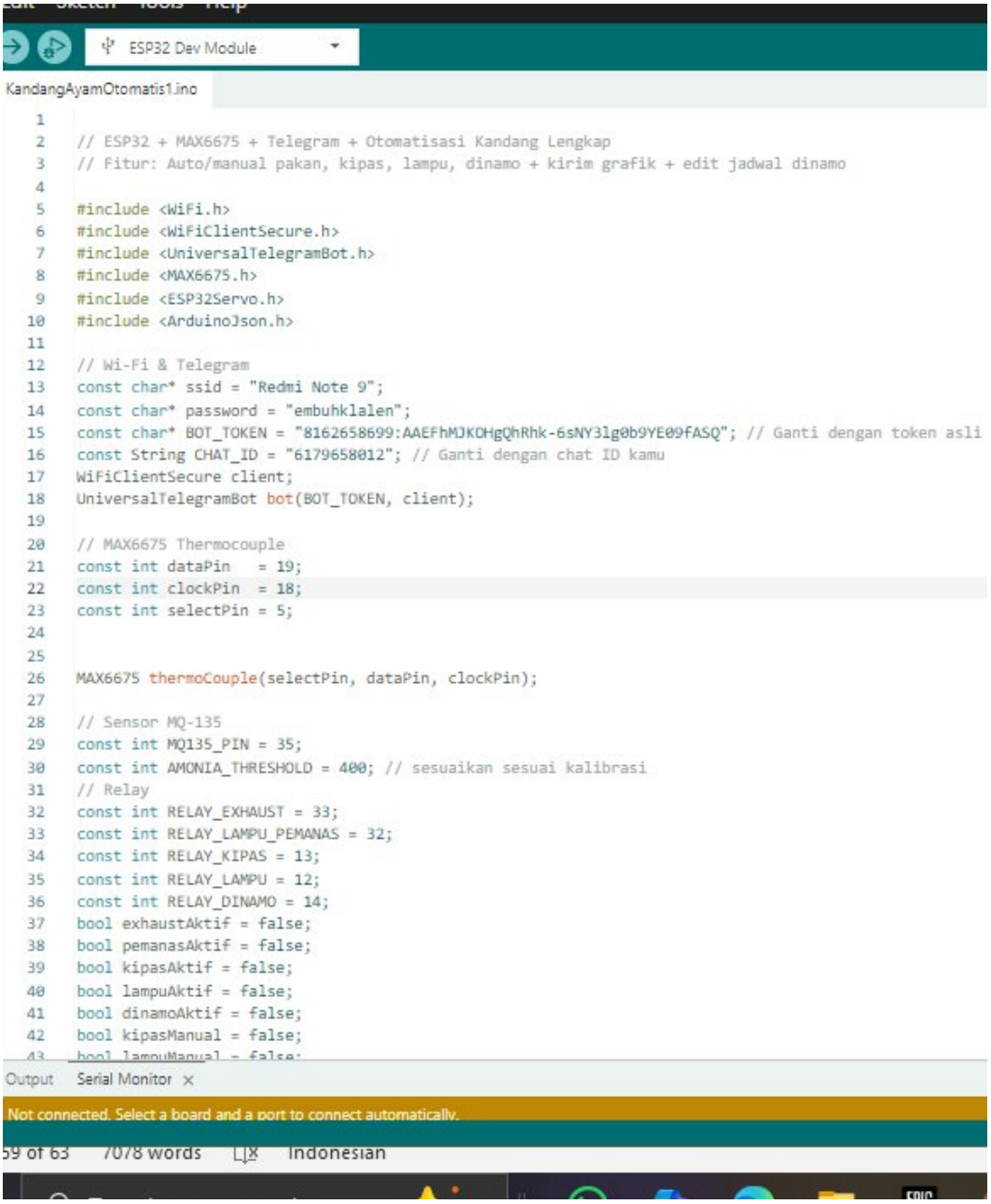
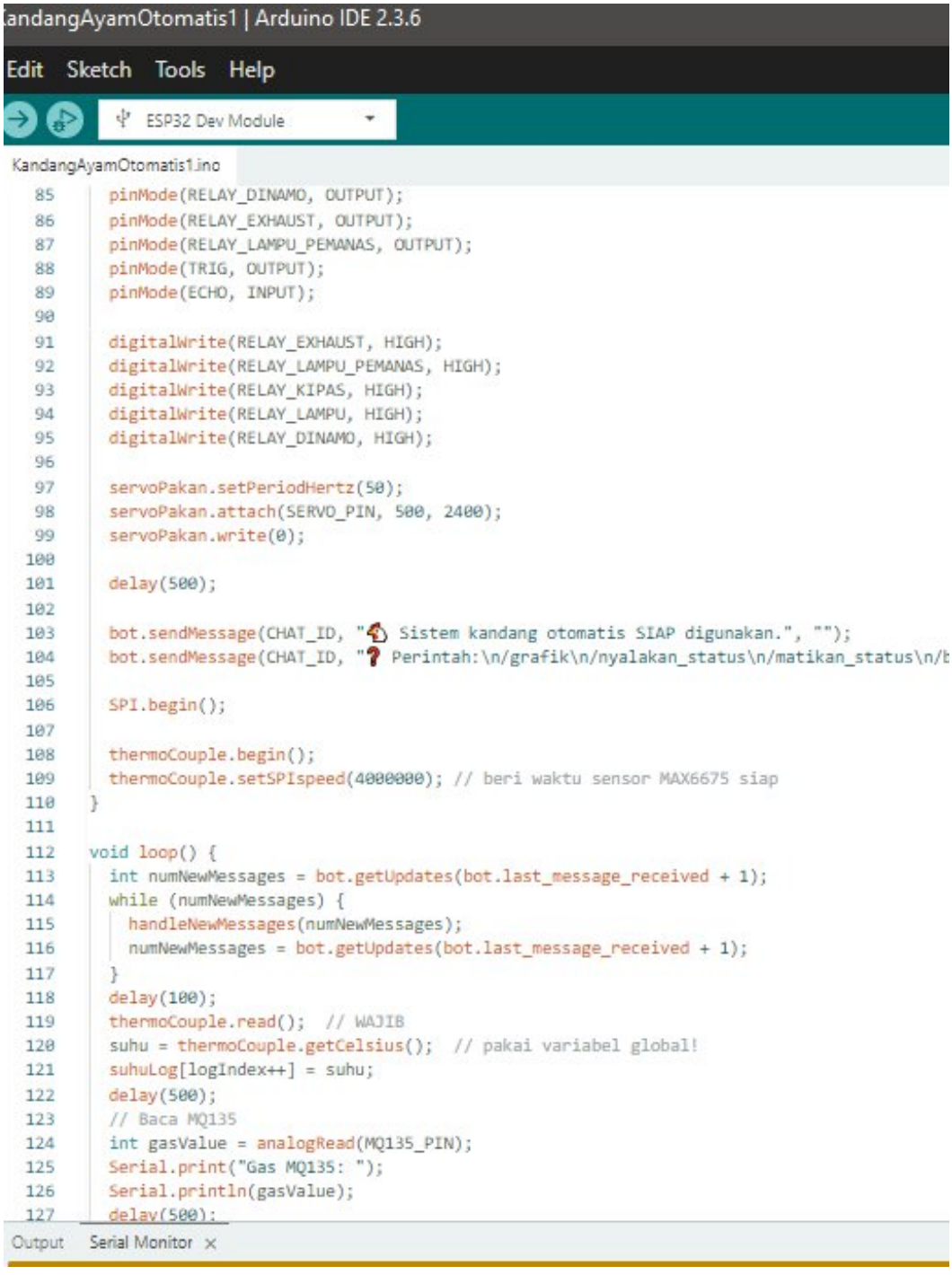
LAMPIRAN

Lampiran 1 Kode Pemrograman Lengkap




KandangAyamOtomatis1 | Arduino IDE 2.3.6
Edit Sketch Tools Help
ESP32 Dev Module
KandangAyamOtomatis1.ino
43 bool lampuManual = false;
44 bool exhaustManual = false;
45 bool pemanasManual = false;
46
47 // Servo Pakan
48 Servo servoPakan;
49 const int SERVO_PIN = 25;
50 bool pakanTerbuka = false;
51
52 // Sensor Ultrasonik untuk Pakan
53 const int TRIG = 27;
54 const int ECHO = 26;
55
56 // Timer
57 unsigned long lastTime = 0;
58 unsigned long interval = 15000;
59 unsigned long lastDinamoTime = 0;
60 unsigned long dinamoInterval = 3600000; // default 1 jam
61 bool kirimOtomatis = false;
62
63 // Data suhu untuk grafik
64 #define MAX_LOG 20
65 float suhuLog[MAX_LOG];
66 String waktuLog[MAX_LOG];
67 int logIndex = 0;
68
69 unsigned long lastLogTime = 0;
70 const unsigned long logInterval = 15UL * 60UL * 1000UL; // 15 menit dalam ms
71
72 // Variabel suhu global
73 float suhu = 0;
74
75 void setup() {
76 Serial.begin(115200);
77 WiFi.begin(ssid, password);
78 while (WiFi.status() != WL_CONNECTED) {
79 delay(500); Serial.print(".");
80 }
81 client.setInsecure();
82
83 pinMode(RELAY_KIPAS, OUTPUT);
84 pinMode(RELAY_LAMPU, OUTPUT);
Output Serial Monitor


andangAyamOtomatis1 | Arduino IDE 2.3.6
Edit Sketch Tools Help
ESP32 Dev Module
KandangAyamOtomatis1.ino
pinMode(RELAY_DINAMO, OUTPUT);
pinMode(RELAY_EXHAUST, OUTPUT);
pinMode(RELAY_LAMPU_PEMANAS, OUTPUT);
pinMode(TRIG, OUTPUT);
pinMode(ECHO, INPUT);
digitalWrite(RELAY_EXHAUST, HIGH);
digitalWrite(RELAY_LAMPU_PEMANAS, HIGH);
digitalWrite(RELAY_KIPAS, HIGH);
digitalWrite(RELAY_LAMPU, HIGH);
digitalWrite(RELAY_DINAMO, HIGH);
servoPakan.setPeriodHertz(50);
servoPakan.attach(SERVO_PIN, 500, 2400);
servoPakan.write(0);
delay(500);
bot.sendMessage(CHAT_ID, " Sistem kandang otomatis SIAP digunakan.", "");
bot.sendMessage(CHAT_ID, " Perintah:\n/grafik\n/nyalakan_status\n/matikan_status\n/b
SPI.begin();
thermoCouple.begin();
thermoCouple.setSPIspeed(4000000); // beri waktu sensor MAX6675 siap
}
void loop() {
int numNewMessages = bot.getUpdates(bot.last_message_received + 1);
while (numNewMessages) {
handleNewMessages(numNewMessages);
numNewMessages = bot.getUpdates(bot.last_message_received + 1);
}
delay(100);
thermoCouple.read(); // WAJIB
suhu = thermoCouple.getCelsius(); // pakai variabel global!
suhuLog[logIndex++] = suhu;
delay(500);
// Baca MQ135
int gasValue = analogRead(MQ135_PIN);
Serial.print("Gas MQ135: ");
Serial.println(gasValue);
delay(500);
Output Serial Monitor

KandangAyamOtomatis1 | Arduino IDE 2.3.6

Edit Sketch Tools Help

ESP32 Dev Module

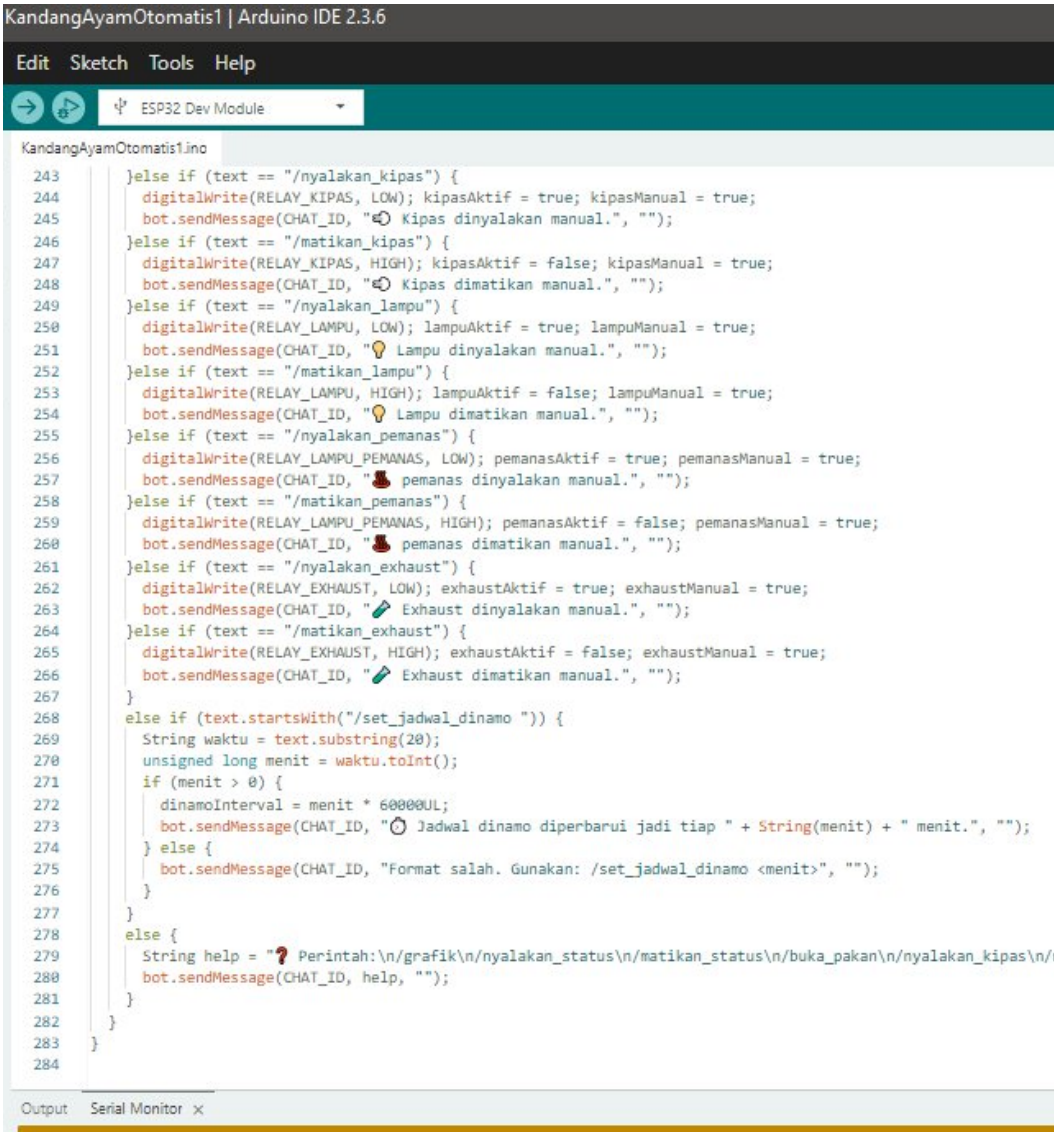
KandangAyamOtomatis1.ino

```
// Atur kipas exhaust otomatis
if (!exhaustManual){
  if (gasValue > 20) { // ambang batas, sesuaikan dengan uji coba
    digitalWrite(RELAY_EXHAUST, LOW); // nyalakan
    exhaustAktif = true;
  } else {
    digitalWrite(RELAY_EXHAUST, HIGH); // matikan
    exhaustAktif = false;
  }
}
if (logIndex >= MAX_LOG) logIndex = 0;

if (!kipasManual && !pemanasManual) {
  if (suhu >= 30) {
    digitalWrite(RELAY_KIPAS, LOW); kipasAktif = true;
    digitalWrite(RELAY_LAMPU_PEMANAS, HIGH); pemanasAktif = false;
  } else if (suhu < 26) {
    digitalWrite(RELAY_KIPAS, HIGH); kipasAktif = false;
    digitalWrite(RELAY_LAMPU_PEMANAS, LOW); pemanasAktif = true;
  } else {
    digitalWrite(RELAY_KIPAS, HIGH); kipasAktif = false;
    digitalWrite(RELAY_LAMPU_PEMANAS, HIGH); pemanasAktif = false;
  }
}

if (millis() - lastDinamoTime > dinamoInterval) {
  digitalWrite(RELAY_DINAMO, LOW); dinamoAktif = true;
  delay(25000);
  digitalWrite(RELAY_DINAMO, HIGH); dinamoAktif = false;
  lastDinamoTime = millis();
}

long durasi = bacaUltrasonik();
int jarak = durasi * 0.034 / 2;
if (jarak >= 16 && !pakanTerbuka) {
  servoPakan.write(50);
  pakanTerbuka = true;
  delay(500);
} else if (jarak <= 14) {
  servoPakan.write(21);
  pakanTerbuka = false;
  delay(500);
```

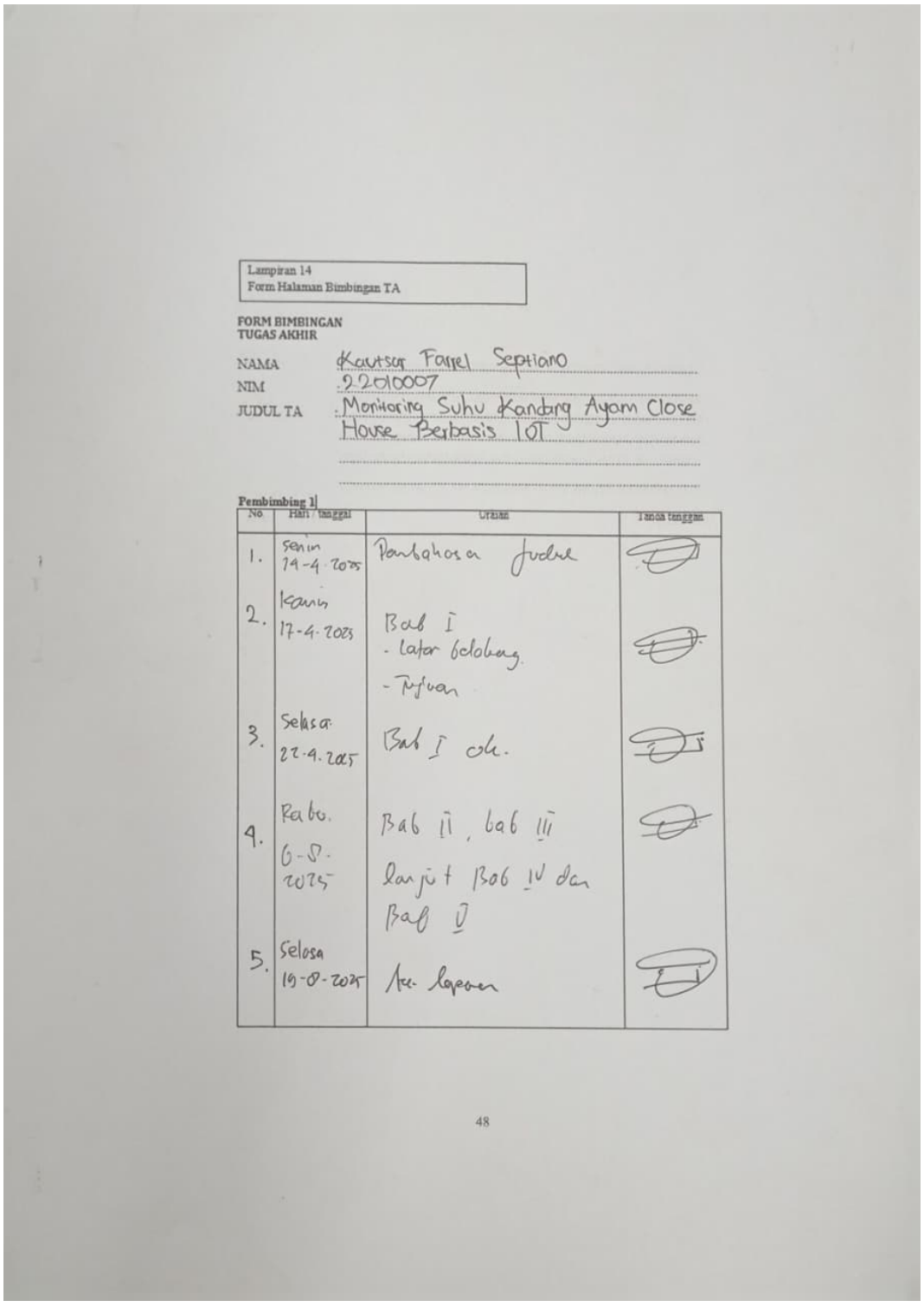
Output Serial Monitor ×


KandangAyamOtomatis1 | Arduino IDE 2.3.6
Edit Sketch Tools Help
ESP32 Dev Module
KandangAyamOtomatis1.ino
Serial.print("Suhu: "); Serial.print(suhu); Serial.println(" °C");
Serial.print("Gas MQ135: "); Serial.println(gasValue);
Serial.print("Jarak: "); Serial.print(jarak); Serial.println(" cm");
if (millis() - lastTime > interval && kirimOtomatis) {
lastTime = millis();
String pesan = " Update:\n";
pesan += " Suhu: " + String(suhu, 2) + "°C\n";
pesan += " Amonia: " + String(gasValue) + "ppm\n";
pesan += " Kipas: " + String(kipasAktif ? "AKTIF" : "OFF") + "\n";
pesan += " Lampu: " + String(lampuAktif ? "AKTIF" : "OFF") + "\n";
pesan += " Pemanas: " + String(pemanasAktif ? "AKTIF" : "OFF") + "\n";
pesan += " Exhaust: " + String(exhaustAktif ? "AKTIF" : "OFF") + "\n";
pesan += " Dinamo: " + String(dinamoAktif ? "AKTIF" : "OFF") + "\n";
pesan += " Pakan: " + String(pakanTerbuka ? "TERBUKA" : "TERTUTUP");
bot.sendMessage(CHAT_ID, pesan, "");
}
logSuhu();
delay(100);
}
void logSuhu() {
if (millis() - lastLogTime > logInterval || logIndex == 0) {
lastLogTime = millis();
suhuLog[logIndex] = suhu;
int jam = (millis() / 3600000UL) % 24;
int menit = ((millis() % 3600000UL) / 60000UL);
char waktu[10];
sprintf(waktu, "[%02d:%02d]", jam, menit);
waktuLog[logIndex] = String(waktu);
logIndex++;
if (logIndex >= MAX_LOG) logIndex = 0;
Serial.print(" Log suhu: "); Serial.print(suhu);
Serial.print(" °C pada "); Serial.println(waktuLog[logIndex - 1]);
}
}
long bacaUltrasonik() {
Output Serial Monitor


KandangAyamOtomatis1 | Arduino IDE 2.3.6
Edit Sketch Tools Help
ESP32 Dev Module
KandangAyamOtomatis1.ino
long bacaUltrasonik() {
digitalWrite(TRIG, LOW); delayMicroseconds(2);
digitalWrite(TRIG, HIGH); delayMicroseconds(10);
digitalWrite(TRIG, LOW);
return pulseIn(ECHO, HIGH);
}
void handleNewMessages(int numNewMessages) {
for (int i = 0; i < numNewMessages; i++) {
String text = bot.messages[i].text;
String from_id = bot.messages[i].chat_id;
if (from_id != CHAT_ID) continue;
if (text == "/grafik") {
String g = " Grafik Suhu (5 jam terakhir):\n";
for (int j = 0; j < MAX_LOG; j++) {
if (waktuLog[j] != "") {
g += waktuLog[j] + " " + String(suhuLog[j], 1) + "°C\n";
}
}bot.sendMessage(CHAT_ID, g, "");
}else if (text == "/nyalakan_status") {
kirimOtomatis = true;
bot.sendMessage(CHAT_ID, " Kirim otomatis diaktifkan.", "");
}else if (text == "/matikan_status") {
kirimOtomatis = false;
bot.sendMessage(CHAT_ID, " Kirim otomatis dimatikan.", "");
}else if (text == "/buka_pakan") {
servoPakan.write(50); delay(1000);
servoPakan.write(21); pakanTerbuka = true;
bot.sendMessage(CHAT_ID, " Pakan dibuka manual.", "");
}else if (text == "/nyalakan_kipas") {
digitalWrite(RELAY_KIPAS, LOW); kipasAktif = true; kipasManual = true;
bot.sendMessage(CHAT_ID, " Kipas dinyalakan manual.", "");
}else if (text == "/matikan_kipas") {
digitalWrite(RELAY_KIPAS, HIGH); kipasAktif = false; kipasManual = true;
bot.sendMessage(CHAT_ID, " Kipas dimatikan manual.", "");
}else if (text == "/nyalakan_lampu") {
digitalWrite(RELAY_LAMPU, LOW); lampuAktif = true; lampuManual = true;
bot.sendMessage(CHAT_ID, " Lampu dinyalakan manual.", "");
}else if (text == "/matikan_lampu") {
digitalWrite(RELAY_LAMPU, HIGH); lampuAktif = false; lampuManual = true;
bot.sendMessage(CHAT_ID, " Lampu dimatikan manual.", "");
Output Serial Monitor


KandangAyamOtomatis1 | Arduino IDE 2.3.6
Edit Sketch Tools Help
ESP32 Dev Module
KandangAyamOtomatis1.ino
}else if (text == "/nyalakan_kipas") {
digitalWrite(RELAY_KIPAS, LOW); kipasAktif = true; kipasManual = true;
bot.sendMessage(CHAT_ID, " Kipas dinyalakan manual.", "");
}else if (text == "/matikan_kipas") {
digitalWrite(RELAY_KIPAS, HIGH); kipasAktif = false; kipasManual = true;
bot.sendMessage(CHAT_ID, " Kipas dimatikan manual.", "");
}else if (text == "/nyalakan_lampu") {
digitalWrite(RELAY_LAMPU, LOW); lampuAktif = true; lampuManual = true;
bot.sendMessage(CHAT_ID, " Lampu dinyalakan manual.", "");
}else if (text == "/matikan_lampu") {
digitalWrite(RELAY_LAMPU, HIGH); lampuAktif = false; lampuManual = true;
bot.sendMessage(CHAT_ID, " Lampu dimatikan manual.", "");
}else if (text == "/nyalakan_pemanas") {
digitalWrite(RELAY_LAMPU_PEMANAS, LOW); pemanasAktif = true; pemanasManual = true;
bot.sendMessage(CHAT_ID, " pemanas dinyalakan manual.", "");
}else if (text == "/matikan_pemanas") {
digitalWrite(RELAY_LAMPU_PEMANAS, HIGH); pemanasAktif = false; pemanasManual = true;
bot.sendMessage(CHAT_ID, " pemanas dimatikan manual.", "");
}else if (text == "/nyalakan_exhaust") {
digitalWrite(RELAY_EXHAUST, LOW); exhaustAktif = true; exhaustManual = true;
bot.sendMessage(CHAT_ID, " Exhaust dinyalakan manual.", "");
}else if (text == "/matikan_exhaust") {
digitalWrite(RELAY_EXHAUST, HIGH); exhaustAktif = false; exhaustManual = true;
bot.sendMessage(CHAT_ID, " Exhaust dimatikan manual.", "");
}
else if (text.startsWith("/set_jadwal_dinamo ")) {
String waktu = text.substring(20);
unsigned long menit = waktu.toInt();
if (menit > 0) {
dinamoInterval = menit * 60000UL;
bot.sendMessage(CHAT_ID, " Jadwal dinamo diperbarui jadi tiap " + String(menit) + " menit.", "");
} else {
bot.sendMessage(CHAT_ID, "Format salah. Gunakan: /set_jadwal_dinamo <menit>", "");
}
}
else {
String help = " Perintah:\n/grafik\n/nyalakan_status\n/matikan_status\n/buka_pakan\n/nyalakan_kipas\n/
bot.sendMessage(CHAT_ID, help, "");
}
}
}
Output
Serial Monitor

Lampiran 2 Form Bimbingan 1



Lampiran 14
Form Halaman Bimbingan TA

FORM BIMBINGAN TUGAS AKHIR

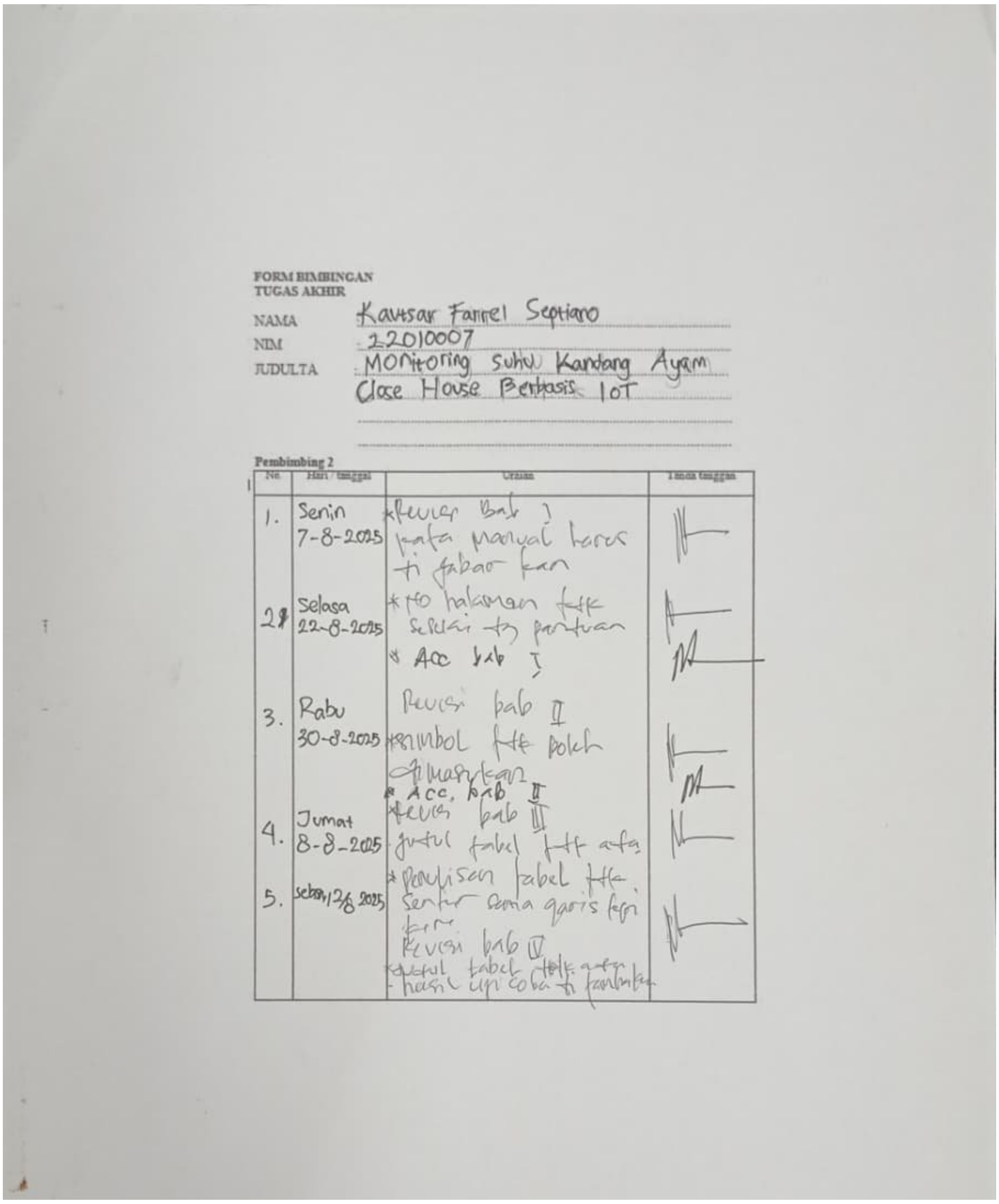
NAMA : Kautsar Farrel Septiano
NIM : 22010007
JUDUL TA : Monitoring Suhu Kandang Ayam Close House Berbasis IOT

Pembimbing 1

No	Hari / tanggal	Uraian	Tanda tangan
1.	Senin 14-4-2025	Pembahasan judul	
2.	Kamis 17-4-2025	Bab I - Latar belakang - Tujuan	
3.	Selasa 22-4-2025	Bab I ok.	
4.	Rabu. 6-5-2025	Bab II, bab III lanjut Bab IV dan Bab V	
5.	Selasa 19-8-2025	Acc. laporan	

48

Lampiran 3 Form Bimbingan 2



FORM BIMBINGAN
TUGAS AKHIR

NAMA Kautsar Farrel Septiano
NIM 22010007
JUDULTA Monitoring suhu Kandang Ayam Close House Berbasis IoT

Pembimbing 2

No.	Hari / tanggal	Uraian	Tanda tangan
1.	Senin 7-8-2025	* Revisi Bab I kata manual harus di jabarkan	[signature]
2.	Selasa 22-8-2025	* No halaman titik sesuai di panduan * Acc bab I	[signature]
3.	Rabu 30-8-2025	Revisi bab II * simbol titik boleh dihilangkan * Acc. bab II	[signature]
4.	Jumat 8-8-2025	* Revisi bab III judul tabel titik atas	[signature]
5.	selasa, 12/8 2025	* Penulisan tabel titik. Senter semua garis tepi kan Revisi bab IV * judul tabel titik atas - hasil uji coba di tambahkan	[signature]

FORM BIMBINGAN
TUGAS AKHIR

NAMA : KAUTSAR FARREL SEPTIANO
NIM : 22010007
JUDUL LAPORAN : Monitoring Suhu Kandang Ayam Close House Berbasis IoT

Pembimbing 2

No	Hari / tanggal	Uraian	Tanda tangan
1.	Rabu, 13-8-2025	Acc bab III bab IV Revisi:	
2.	Kamis, 14-8-2025 ~~Jumat, 8-8~~	penulisan judul bab font huruf sesuai dgn panduan Acc bab IV Revisi bab V	
3.	Jumat, 15-8-2025	tabel tambahkan kata masuk	
4.	Senin, 18-8-2025	Acc bab V	
5.	Selasa, 19-8-2025	Siap sidang	

Lampiran 4 Surat Kesediaan Membimbing 1

SURAT KESEDIAAN MEMBIMBING TUGAS AKHIR

Yang bertanda tangan di bawah ini :

Nama	: Bahrun Niam,M.T
NIPY	: 09.015.277
Jabatan Fungsional	: Dosen Tetap Prodi DIII Teknik Elektronika

Dengan ini menyatakan bersedia menjadi Pembimbing 1 pada Tugas Akhir Mahasiswa berikut :

Nama	: Kautsar Farrel Septiano
NIM	: 22010007
Program Studi	: DIII Teknik Elektronika
Judul Laporan Tugas	: **SISTEM MONITORING SUHU PADA KANDANG AYAM PINTAR BERBASIS IoT**

Demikian Pernyataan ini dibuat agar dilaksanakan sebagaimana mestinya.

Tegal, 06 Agustus 2025

Mengetahui,	
Ka. Prodi DIII Teknik Elektronika	Calon Dosen Pembimbing 1,
Rony Darpono, M.T	**Bahrun Niam, M.T**
NIPY. 09.015.282	NIPY. 09.015.277

Lampiran 5 Surat Kesediaan Membimbing 2

SURAT KESEDIAAN MEMBIMBING TUGAS AKHIR

Yang bertanda tangan di bawah ini :

Nama	: Martselani Adias Sabara, M.T
NIPY	: 03.014.270
Jabatan Fungsional	: Dosen Tetap Prodi DIII Teknik Elektronika

Dengan ini menyatakan bersedia menjadi Pembimbing 2 pada Tugas Akhir Mahasiswa berikut :

Nama	: Kautsar Farrel Septiano
NIM	: 22010007
Program Studi	: DIII Teknik Elektronika
Judul Laporan Tugas	: **SISTEM MONITORING SUHU PADA KANDANG AYAM PINTAR BERBASIS IoT**

Demikian Pernyataan ini dibuat agar dilaksanakan sebagaimana mestinya.

Tegal, 06 Agustus 2025

Mengetahui,	
Ka. Prodi DIII Teknik Elektronika	Calon Dosen Pembimbing 2,
Rony Darpono, M.T	**Martselani Adias Sabara, M.T**
NIPY. 09.015.282	NIPY. 03.014.270

Lampiran 6 Form Penilaian Bimbingan TA

PENILAIAN BIMBINGAN TUGAS AKHIR INDIVIDU

Judul : Sistem Monitoring Suhu Pada Kandang Ayam Pintar Berbasis IoT

Nama : Kautsar Farrel Septiano

NIM : 22010007

Kelas : 6A / D3 Teknik Elektronika

I. Nilai Bimbingan Tugas Akhir (Pembimbing I)

No	Unsur Yang Dinilai	Nilai
1	Kedisiplinan dalam bimbingan	75
2	Kreativitas pemecahan dalam bimbingan	80
3	Penguasaan materi tugas akhir	80
4	Kelengkapan dan referensi tugas akhir	75
Total Nilai = (Jumlah Nilai / 4)		77,5

II. Nilai Bimbingan Tugas Akhir (Pembimbing II)

No	Unsur Yang Dinilai	Nilai
1	Kedisiplinan dalam bimbingan	75
2	Kreativitas pemecahan dalam bimbingan	75
3	Penguasaan materi tugas akhir	75
4	Kelengkapan dan referensi tugas akhir	75
Total Nilai = (Jumlah Nilai / 4)		75

Nilai Bimbingan $= \frac{TotalNilaiPembimbing1 + TotalNilaiPembibing2}{2}$

$= 76,25$

Tegal, 19 Agustus 2025

Mengetahui,

Pembimbing 1

Bahrun Niam, M.T

Pembimbing 2

Martselani Adias Sabara, M.T

Lampiran 7 Form revisi 1

FORMULIR REVISI

UJIAN TUGAS AKHIR

NAMA : KAUTSAR FARREL SEPTIANO

NIM : 22010007

JUDUL : **SISTEM MONITORING DAN KONTROL SUHU PADA KANDANG AYAM PINTAR BERBASIS IoT**

KETUA PENGUJI

No	Hari/Tanggal	Uraian	Tanda Tangan
1	rabu, 3 september 2025	Acc Laporan dapat	

Ketua Penguji

Ulil Albab, M.T

NIPY. 04.015.271

Lampiran 8 Form revisi 2

FORMULIR REVISI

UJIAN TUGAS AKHIR

NAMA : KAUTSAR FARREL SEPTIANO

NIM : 22010007

JUDUL : **SISTEM MONITORING DAN KONTROL SUHU PADA KANDANG AYAM PINTAR BERBASIS IoT**

PENGUJI 1

No	Hari/Tanggal	Uraian	Tanda Tangan
1	Selasa 2 September 2025	acc Laporan - Tugas Akhir	

Penguji 1

Dany Sucipto, M.T

09.015.278

Lampiran 9 Form revisi 3

FORMULIR REVISI

UJIAN TUGAS AKHIR

NAMA : KAUTSAR FARREL SEPTIANO

NIM : 22010007

JUDUL : **SISTEM MONITORING DAN KONTROL SUHU PADA KANDANG AYAM PINTAR BERBASIS IoT**

PENGUJI 2

No	Hari/Tanggal	Uraian	Tanda Tangan
1	1 Sep 2025	Penggunaan api [illegible]	
2	2 Sep 2025	ace revisi	

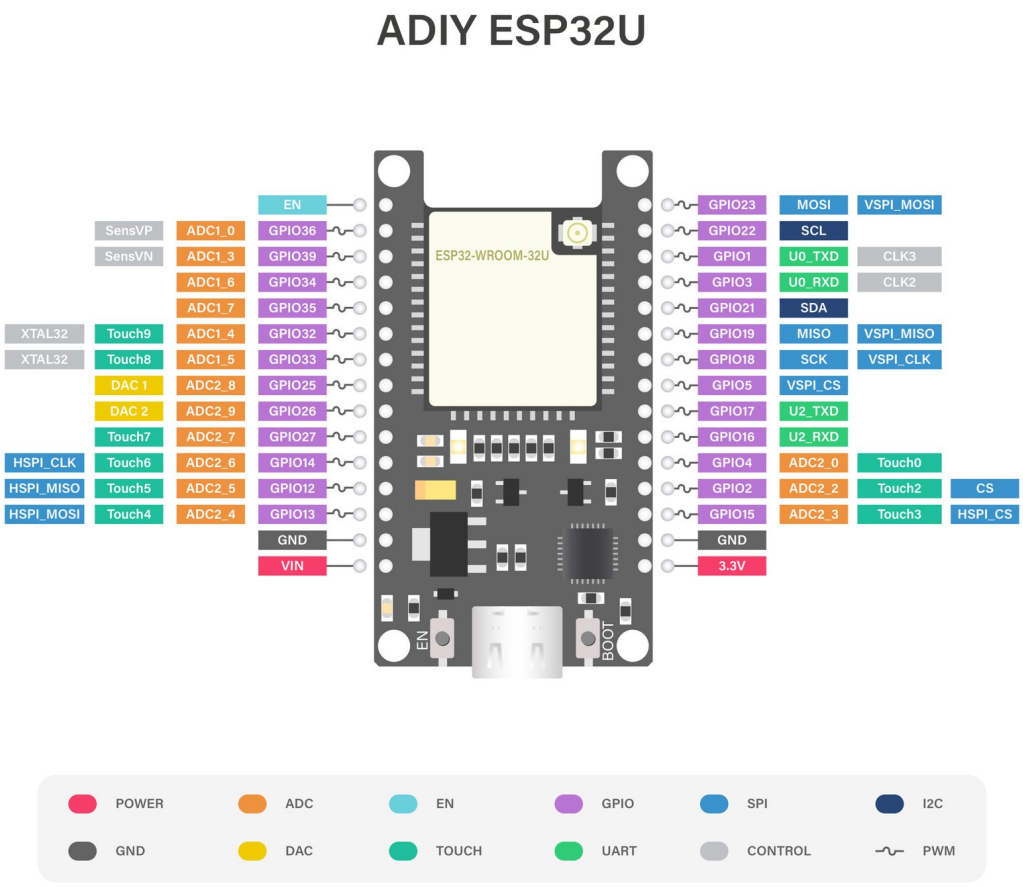
Penguji 2

Martselani Adias Sabara, M.Kom

NIPY. 03.014.270

Lampiran 10 Dokumentasi Pembuatan Alat

Lampiran 11 Datasheet esp 32

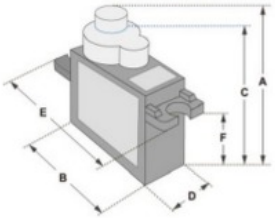


Lampiran 12Datasheet servo sg90

121

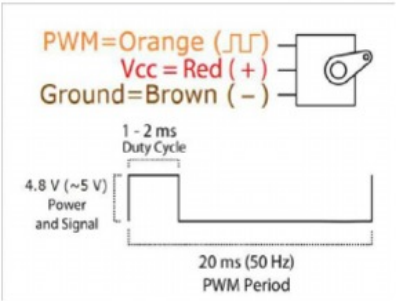
SERVO MOTOR SG90
DATA SHEET

Tiny and lightweight with high output power. Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but smaller. You can use any servo code, hardware or library to control these servos. Good for beginners who want to make stuff move without building a motor controller with feedback & gear box, especially since it will fit in small places. It comes with a 3 horns (arms) and hardware.



Dimensions & Specifications
A (mm) : 32
B (mm) : 23
C (mm) : 28.5
D (mm) : 12
E (mm) : 32
F (mm) : 19.5
Speed (sec) : 0.1
Torque (kg-cm) : 2.5
Weight (g) : 14.7
Voltage : 4.8 - 6

Position "0" (1.5 ms pulse) is middle, "90" (~2ms pulse) is middle, is all the way to the right, "-90" (~1ms pulse) is all the way to the left.



Lampiran 13 Datasheet relay 4 channel

Rajguru Electronics www.rajguruelectronics.com

Relay Board 4 Channel 5v

Description:

Relays are the Hulks (tm -DC Comics) of the electronics world. Often dumb and simple, but DANG they can control lots of power. These are ideal in situations where you need to comfortably control AC or DC power levels. Transistors and FETs can do the same job, but often not with the convenience and reliability of a good old relay.

Use this 4 Channel Relay Module board to interface any Microcontroller with Electrical Appliances/Loads. Can also be used in driving high power motors.4-channel relay output modules, relay output contacts 250A 10A. Input IN1, IN2, IN3, IN4, the signal line LOW effective. VCC, GND power input, can relay a separate power supply relay power input of JD-VCC.

Product Summary:

- Module can be controlled directly by Microcontroller (Raspberry Pi, Arduino, 8051, AVR, PIC, DSP, ARM, ARM, MSP430, TTL logic)
- Easy to install and fix
- Optically Isolated relays to protect your microcontroller from damage if the equipment being controlled fails
- Four screw holes, hole diameter 3.1mm
- Relay status indicator light, release status LED is off
- Relay Maximum output: DC 30V/10A, AC 250V/10A
- Size: 75mm (l) x 55mm (b) x 19.3mm (h)
- Weight: 58 gm
- PCB Color: Blue

Lampiran 14 Datasheet relay 2 channel

COMPONENTS101

(/)

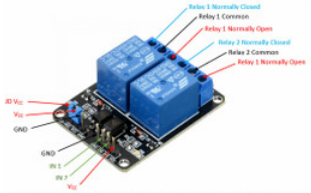
ents101) (https://pinterest.com/components101)

5V Dual-Channel Relay Module

5 January 2021 - 0 Comments

(/sites/default/files/components/Dual-Channel-Relay-Module.jpg)

5V Dual-Channel Relay Module



(/sites/default/files/component_pin/Dual-Channel-Relay-Module-Pinout.jpg)

Dual-Channel Relay Module Pinout

The dual-channel relay module is more or less the same as a single-channel relay module, but with some extra features like optical isolation. The dual-channel relay module can be used to switch mains powered loads from the pins of a microcontroller.

Dual-Channel Relay Module Pinout

Pin Number	Pin Name	Description
1	JD-V_{CC}	Input for isolated power supply for relay coils
2	V_{CC}	Input for directly powering the relay coils
3	GND	Input ground reference
4	GND	Input ground reference
5	IN1	Input to activate the first relay
6	IN2	Input to activate the second relay
7	V_{CC}	V_{CC} to power the optocouplers, coil drivers, and associated circuitry

Dual-Channel Relay Module Specifications

- Supply voltage – 3.75V to 6V
- Trigger current – 5mA
- Current when relay is active - ~70mA (single), ~140mA (both)
- Relay maximum contact voltage – 250VAC, 30VDC
- Relay maximum current – 10A

Lampiran 15 datasheet sensor mq135

TECHNICAL DATA MQ-135 GAS SENSOR

FEATURES

Wide detecting scope — Fast response and High sensitivity
Stable and long life — Simple drive circuit

APPLICATION

They are used in air quality control equipments for buildings/offices, are suitable for detecting of NH3,NOx, alcohol, Benzene, smoke,CO_2 ,etc.

SPECIFICATIONS

A. Standard work condition

Symbol	Parameter name	Technical condition	Remarks
Vc	Circuit voltage	5V±0.1	AC OR DC
V_H	Heating voltage	5V±0.1	ACOR DC
R_L	Load resistance	can adjust	
R_H	Heater resistance	33Ω ±5%	Room Tem
P_H	Heating consumption	less than 800mw	

B. Environment condition

Symbol	Parameter name	Technical condition	Remarks
Tao	Using Tem	-10℃…+45℃	
Tas	Storage Tem	-20℃…+70℃	
R_H	Related humidity	less than 95%Rh	
O_2	Oxygen concentration	21%(standard condition)Oxygen concentration can affect sensitivity	minimum value is over 2%

C. Sensitivity characteristic

Symbol	Parameter name	Technical parameter	Remark 2
Rs	Sensing Resistance	30KΩ -200KΩ (100ppm NH_3)	Detecting concentration scope : 10ppm-300ppm NH_3 10ppm-1000ppm Benzene 10ppm-300ppm Alcohol
a (200/50) NH_3	Concentration Slope rate	≤ 0.65	
Standard Detecting Condition	Temp: 20℃±2℃ Humidity: 65%±5%	Vc:5V±0.1 Vh: 5V±0.1	
Preheat time	Over 24 hour		

D. Structure and configuration, basic measuring circuit

	Parts	Materials
1	Gas sensing layer	SnO_2
2	Electrode	Au
3	Electrode line	Pt
4	Heater coil	Ni-Cr alloy
5	Tubular ceramic	Al_2O_3
6	Anti-explosion network	Stainless steel gauze (SUS316 100-mesh)
7	Clamp ring	Copper plating Ni
8	Resin base	Bakelite
9	Tube Pin	Copper plating Ni

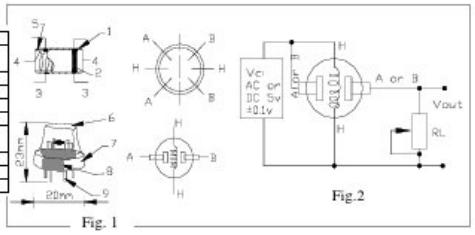
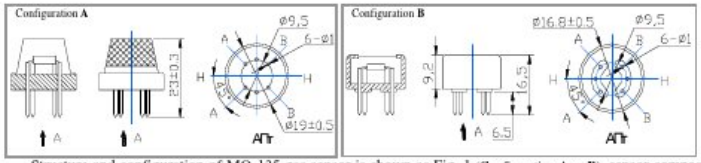


Fig.2

Fig. 1



Structure and configuration of MQ-135 gas sensor is shown as Fig. 1 (Configuration **A or B**), sensor composed by micro AL2O3 ceramic tube, Tin Dioxide (SnO2) sensitive layer, measuring electrode and heater are fixed into a crust made by plastic and stainless steel net. The heater provides necessary work conditions for work of

Lampiran 16 Datasheet sensor ultrasonik

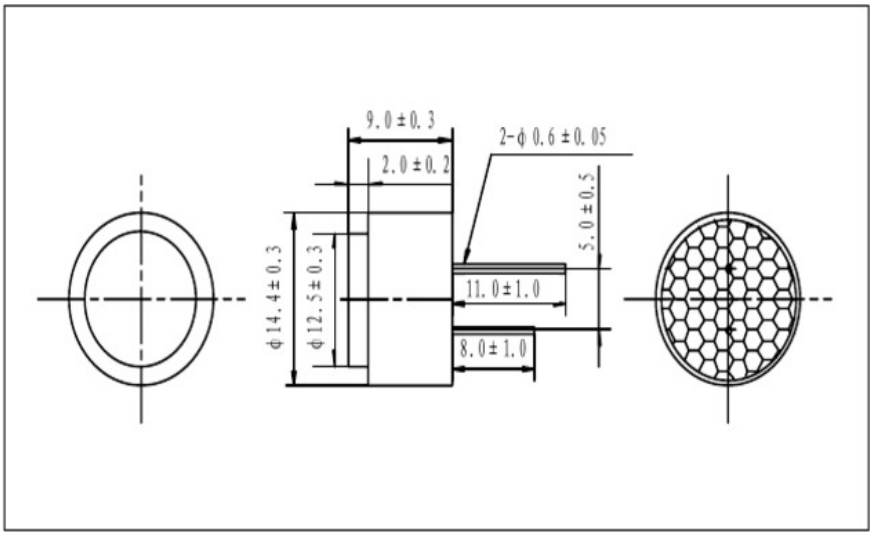
PIEZO ULTRASONIC SENSOR SPECIFICATIONS

■MODEL: T/R40-14.4A0-01

■ELECTRICAL SPECIFICATION:

1	Center frequency(KHz)	40±1.0KHz
2	Echo Sensitivity	⩾200mV (FIG1 SIMULATION TEST CIRCUIT)
3	Decay Time	⩽1.2ms (FIG1 SIMULATION TEST CIRCUIT)
4	Directivity (deg)	70±15
5	Capacitance (pF)	1800±15%
6	Allowable Maximum Input Voltage(Vp-p)	140(40KHz) Pulse width 0.5ms, interval 20ms
7	Mean Time To Failure	50000h
8	Operating Temperature(℃)	-40~+80
9	Storage temperature(℃)	-40~+85

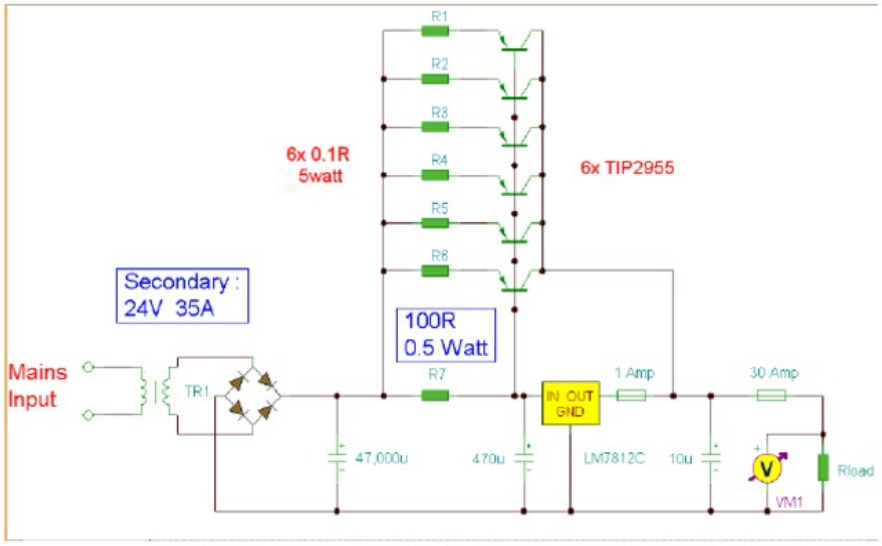
■APPEARANCE AND DIMENSIONS



Lampiran 17 Datasheet powersupply

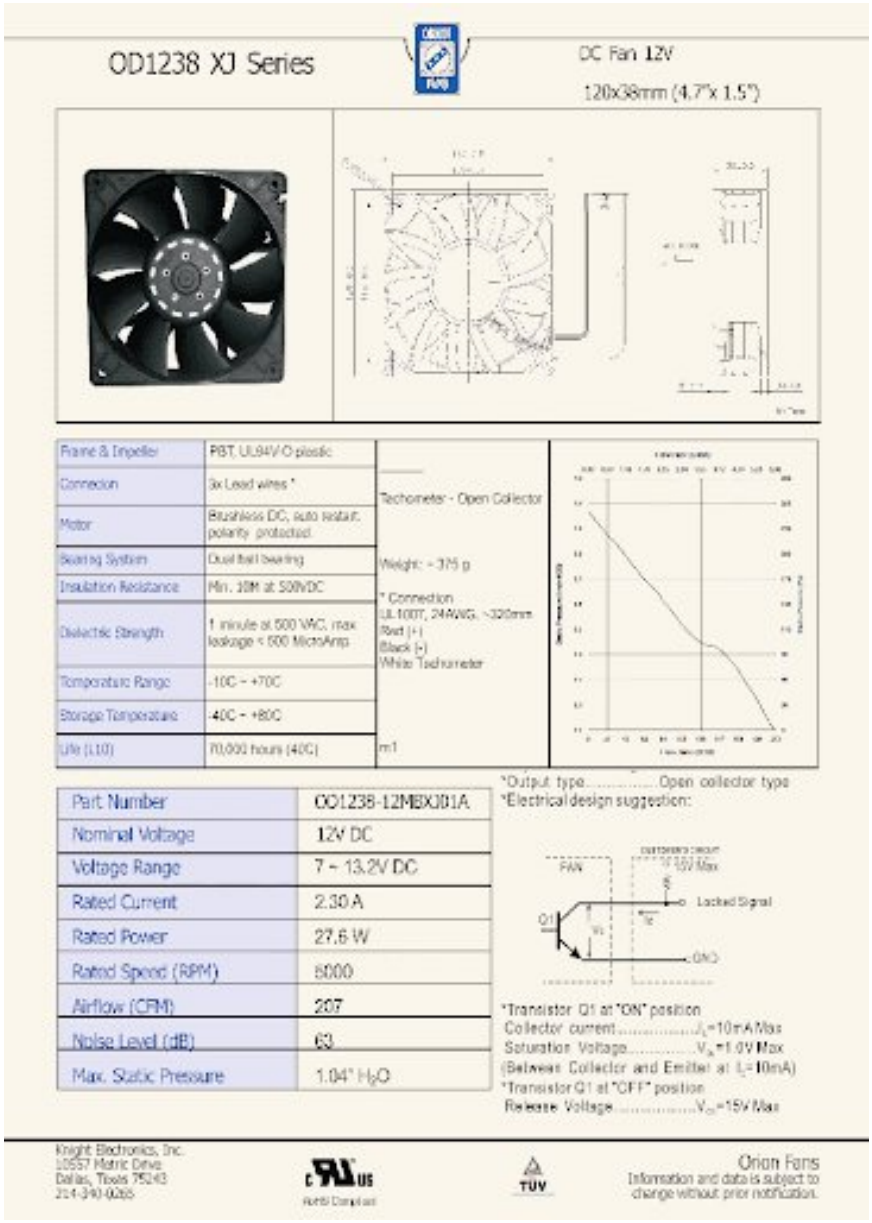
12 Volt 30 Amp PSU

Using a single 7812 IC voltage regulator and multiple outboard pass transistors, this power supply can deliver output load currents of up to 30 amps. The design is shown below:



Notes:
The input transformer is likely to be the most expensive part of the entire project. As an alternative, a couple of 12 Volt car batteries could be used. The input voltage to the regulator must be at least several volts higher than the output voltage (12V) so that the regulator can maintain its output. If a transformer is used, then the rectifier diodes must be capable of passing a very high peak forward current, typically 100amps or more. The 7812 IC will only pass 1 amp or less of the output current, the remainder being supplied by the outboard pass transistors. As the circuit is designed to handle loads of up to 30 amps, then six TIP2955 are wired in parallel to meet this demand. The dissipation in each power transistor is one sixth of the total load, but adequate heat sinking is still required. Maximum load current will generate maximum dissipation, so a very large heat sink is required. In considering a heat sink, it may be a good idea to look for either a fan or water cooled heat sink. In the event that the power transistors should fail, then the regulator would have to supply full load current and would fail with catastrophic results. A 1 amp fuse in the regulators output prevents a safeguard. The 400mohm load is for test purposes only and should not be included in the final circuit. A simulated performance is shown below:

Lampiran 18 Datasheet kipas dc



OD1238 XJ Series

DC Fan 12V

120x38mm (4.7"x 1.5")

Frame & Impeller	PBT, UL94V-0 plastic
Connection	3x Lead wires *
Motor	Brushless DC, auto restart, polarity protected
Bearing System	Dual ball bearing
Insulation Resistance	Min. 10M at 500VDC
Dielectric Strength	1 minute at 500 VAC, max leakage < 500 MicroAmp
Temperature Range	-10C ~ +70C
Storage Temperature	-40C ~ +80C
Life (L10)	70,000 hours (40C)

Techometer - Open Collector

Weight: ~ 375 g

* Connection
UL1007, 24AWG, ~320mm
Red (+)
Black (-)
White Tachometer

m1

Part Number	OD1238-12MBXJ01A
Nominal Voltage	12V DC
Voltage Range	7 ~ 13.2V DC
Rated Current	2.30 A
Rated Power	27.6 W
Rated Speed (RPM)	8000
Airflow (CFM)	207
Noise Level (dB)	63
Max. Static Pressure	1.04" H_2O

*Output type.....Open collector type
*Electrical design suggestion:

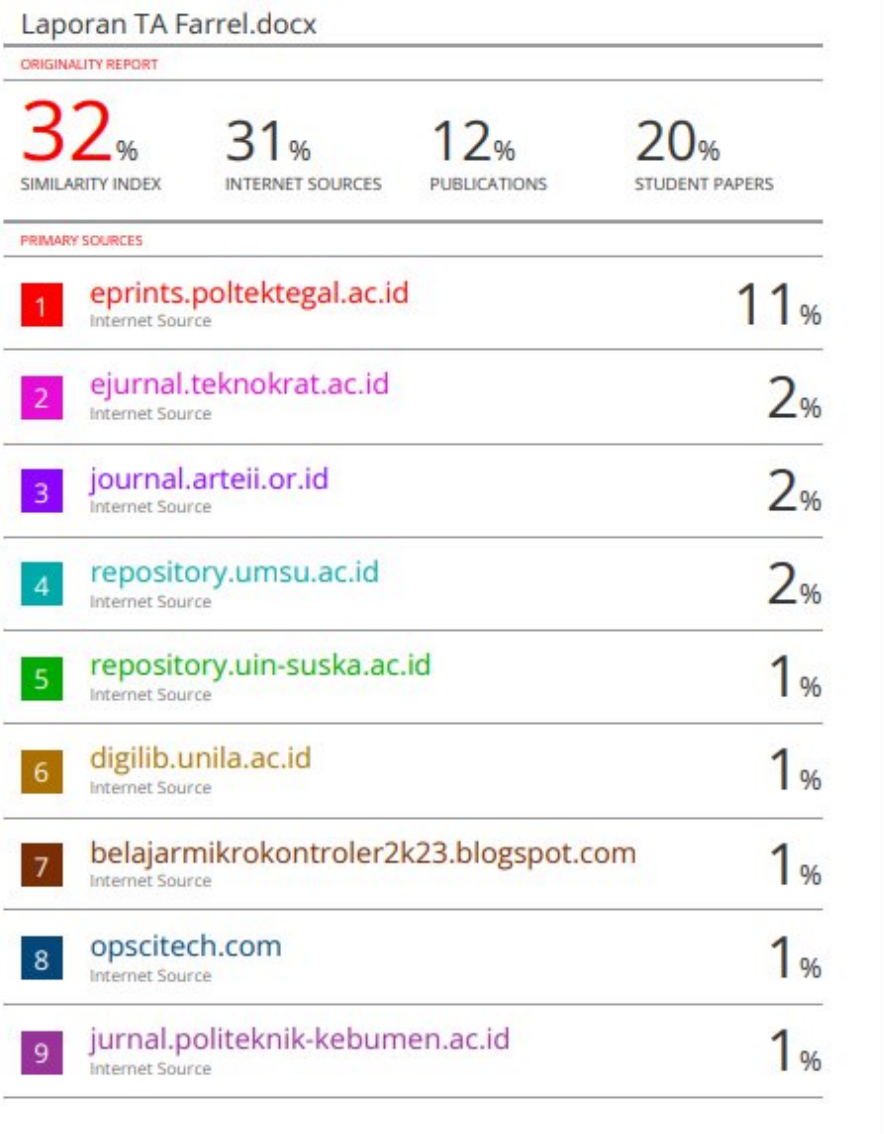
*Transistor Q1 at "ON" position
Collector current.....I_C=10mA Max
Saturation Voltage.....V_{CE}=1.0V Max
(Between Collector and Emitter at I_C=10mA)
*Transistor Q1 at "OFF" position
Release Voltage.....V_{CE}=15V Max

Knight Electronics, Inc.
10557 Metric Drive
Dallas, Texas 75243
214-340-0265

RoHS Compliant

Orion Fans
Information and data is subject to change without prior notification.

Lampiran 19 *Originally report by turnitin*



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