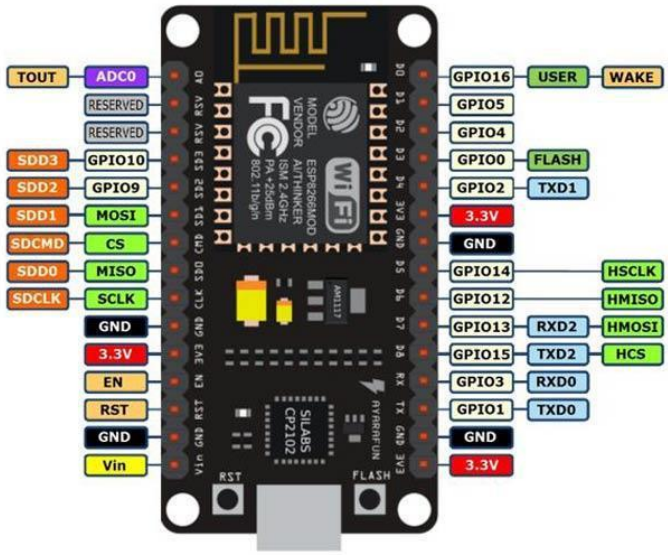
Lampiran

1. NodeMCU esp8266

Spesifikasi NodeMCU ESP8266 yang terbaru adalah sebagai berikut.

1. Miktrokontroler: Tensilica 32-bit RISC CPU Xtensa LX106
2. Tegangan operasi: 3.3V
3. Tegangan Masukan: 7-12V
4. Pin Digital I/O (DIO): 16
5. Pin Analog Input (ADC): 1
6. UARTs: 2
7. SPIs: 1
8. I2Cs: 1
9. Flash Memory: 4 MB
10. SRAM: 64 KB
11. Clock Speed: 80 MHz
12. PCB Antenna

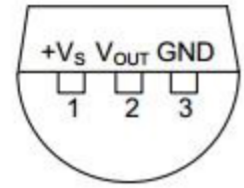


2. LM35

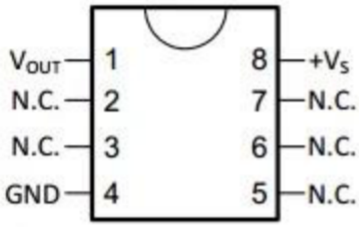
NDV Package
3-Pin TO-CAN
(Top View)

Case is connected to negative pin (GND)
Refer the second NDV0003H page for reference

LP Package
3-Pin TO-92
(Bottom View)

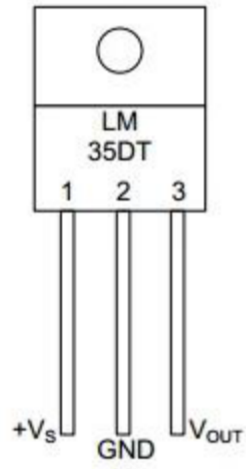


D Package
8-PIN SOIC
(Top View)



N.C. = No connection

NEB Package
3-Pin TO-220
(Top View)



Pin Functions

PIN					TYPE	DESCRIPTION
NAME	TO46	TO92	TO220	SO8		
V_{OUT}	2	2	3	1	O	Temperature Sensor Analog Output
N.C.	—	—	—	2	—	No Connection
	—	—	—	3		
GND	3	3	2	4	GROUND	Device ground pin, connect to power supply negative terminal
N.C.	—	—	—	5	—	No Connection
	—	—	—	6		
	—	—	—	7		
$+V_S$	1	1	1	8	POWER	Positive power supply pin

6 Specifications

6.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)(1)(2)

		MIN	MAX	UNIT
Supply voltage		–0.2	35	V
Output voltage		–1	6	V
Output current			10	mA
Maximum Junction Temperature, $T_J$max			150	°C
Storage Temperature, T_{stg}	TO-CAN, TO-92 Package	–60	150	°C
	TO-220, SOIC Package	–65	150	

(1) If Military/Aerospace specified devices are required, please contact the Texas Instruments Sales Office/ Distributors for availability and specifications.
(2) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. DC and AC electrical specifications do not apply when operating the device beyond its rated operating conditions.

6.2 ESD Ratings

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001(1)	±2500	V

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

6.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)

		MIN	MAX	UNIT
Specified operating temperature: T_{MIN} to T_{MAX}	LM35, LM35A	–55	150	°C
	LM35C, LM35CA	–40	110	
	LM35D	0	100	
Supply Voltage (+V_S)		4	30	V

6.4 Thermal Information

THERMAL METRIC(1)(2)		LM35				UNIT
		NDV	LP	D	NEB	
		3 PINS		8 PINS	3 PINS	
$R_{\theta JA}$	Junction-to-ambient thermal resistance	400	180	220	90	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	24	—	—	—	

6.5 Electrical Characteristics: LM35A, LM35CA Limits

Unless otherwise noted, these specifications apply: −55°C ≤ T_J ≤ 150°C for the LM35 and LM35A; −40°C ≤ T_J ≤ 110°C for the LM35C and LM35CA; and 0°C ≤ T_J ≤ 100°C for the LM35D. V_S = 5 Vdc and I_{LOAD} = 50 µA, in the circuit of Full-Range Centigrade Temperature Sensor. These specifications also apply from 2°C to T_{MAX} in the circuit of Figure 14.

PARAMETER	TEST CONDITIONS	LM35A			LM35CA			UNIT
		TYP	TESTED LIMIT(1)	DESIGN LIMIT(2)	TYP	TESTED LIMIT(1)	DESIGN LIMIT(2)	
Accuracy(3)	T_A = 25°C	±0.2	±0.5		±0.2	±0.5		°C
	T_A = –10°C	±0.3			±0.3		±1	
	T_A = T_{MAX}	±0.4	±1		±0.4	±1		
	T_A = T_{MIN}	±0.4	±1		±0.4		±1.5	
Nonlinearity(4)	T_{MIN} ≤ T_A ≤ T_{MAX}, –40°C ≤ T_J ≤ 125°C	±0.18		±0.35	±0.15		±0.3	°C
Sensor gain (average slope)	T_{MIN} ≤ T_A ≤ T_{MAX}	10	9.9		10		9.9	mV/°C
	–40°C ≤ T_J ≤ 125°C	10	10.1		10		10.1	
Load regulation(5) 0 ≤ I_L ≤ 1 mA	T_A = 25°C	±0.4	±1		±0.4	±1		mV/mA
	T_{MIN} ≤ T_A ≤ T_{MAX}, –40°C ≤ T_J ≤ 125°C	±0.5		±3	±0.5		±3	
Line regulation(5)	T_A = 25°C	±0.01	±0.05		±0.01	±0.05		mV/V
	4 V ≤ V_S ≤ 30 V, –40°C ≤ T_J ≤ 125°C	±0.02		±0.1	±0.02		±0.1	
Quiescent current(6)	V_S = 5 V, 25°C	56	67		56	67		µA
	V_S = 5 V, –40°C ≤ T_J ≤ 125°C	105		131	91		114	
	V_S = 30 V, 25°C	56.2	68		56.2	68		
	V_S = 30 V, –40°C ≤ T_J ≤ 125°C	105.5		133	91.5		116	
Change of quiescent current(5)	4 V ≤ V_S ≤ 30 V, 25°C	0.2	1		0.2	1		µA
	4 V ≤ V_S ≤ 30 V, –40°C ≤ T_J ≤ 125°C	0.5		2	0.5		2	
Temperature coefficient of quiescent current	–40°C ≤ T_J ≤ 125°C	0.39		0.5	0.39		0.5	µA/°C
Minimum temperature for rate accuracy	In circuit of Figure 14, I_L = 0	1.5		2	1.5		2	°C
Long term stability	T_J = T_{MAX}, for 1000 hours	±0.08			±0.08			°C

3. YL-69

SOIL MOISTURE RECORDER SPECIFICATIONS

Data Recorder

Measurement Range:	+/- 1200mV
Accuracy:	+/-0.01% FSR
Input range:	0 to 2.5V DC
Memory:	32,767 readings; software configurable memory wrap
Reading Rate:	1 reading every 2 seconds to 1 every 12 hours
Input Connection:	Removable screw terminal plug
Operating Environment:	-40 to +80°C (-40 to +176°F), 0-95% RH, non-condensing
Battery Type:	3.6V Lithium Battery included; **user replaceable**
Battery Life:	10 years typical @ 15 min reading rate
Dimensions:	0.8"x1.7"x2.7"(21mmx44mmx69mm)
Weight:	2 oz. (56 g)
Weatherproof Enclosure:	Anodized aluminum case w/mounting flange. Communications port plug 3.5"x2.9"x1.1"(87mmx73mmx27mm) 7 oz. (198 g)

Soil Moisture Probes

Measurement Range:	(EC-5) 0 to 100% VWC saturation (EC-20) 0 to 40% VWC saturation
Measurement Type:	VWC (Volumetric Water Content)
Measurement Accuracy:	(EC-5) +/- 3% typical, ALL soils (EC-20) +/- 4% typical on low EC and medium textured soils (Both models) +/-1% with soil specific calibration
Calibration:	Digital calibration through software
Calibration Date:	Automatically recorded within device
Life Expectancy (probes):	3-5 years
Measurement Time:	10ms
Measurement Resolution:	$0.002 m^3/m^3$
Operating Environment:	-40 to +60 degC (-40 t0 +140 degF), 0-100% RH (EC-5 and EC-20 models)
Power Requirement (probes)	Powered from data recorder's internal battery. No external power required.
Dimensions (probes):	(EC-5) 2.1"x0.6"x0.06" (55mm x 15mm x 1.5mm) (Cable length) - 16' (5 m), (tinned, wire leads) (EC-20) 10"x1.25"x0.06" (255mmx32mm x1.5mm) Cable length) - 16' (5 m), (tinned, wire leads)

SOFTWARE FEATURES

Multiple Graphs:	Simultaneously analyze data from several units or deployments; easily switch to a single data series
Real-Time Recording:	Collect and display data in real-time while continuing to log
Data Table:	Instantly access tabular view for detailed dates, times, values, and annotations
Scaling Options:	Autoscale function fits data to the screen, or allows user to manually enter their own values
Printing:	Automatically print graphical or tabular data
Statistics:	Calculate averages, min, max and standard deviation
Export Data:	Export data in a variety of common formats, or switch to Excel® with a single click
Calibration:	Automatically calculate and store calibration parameters
Logger Configuration:	Easy set up and launch of data loggers with immediate or delayed start, preferred sample rate, and device ID
Communications:	Automatic or user-enabled communications port configuration (Baud rate, COM port selection)

4. Breadboard

Solderless Plug-in BreadBoards

Solderless BreadBoard Specifications

BB300 Body Material: White ABS Plastic with Black Printed Legend
BB400/BB830/BB1660 Body Material: White ABS Plastic with Color Printed Legend
BB400T/BB830T/BB1660T Body Material: Transparent ABS Plastic with Color Printed Legend

Hole Pitch/Style: 0.1" (2.54 mm), Square Wire Holes

ABS Heat Distortion Temperature: 84° C. (183° F.)

Spring Clip Contact: Phosphor Bronze with Plated Nickel Finish
Contact Life: 50,000 insertions
Rating: 36 Volts, 2 Amps

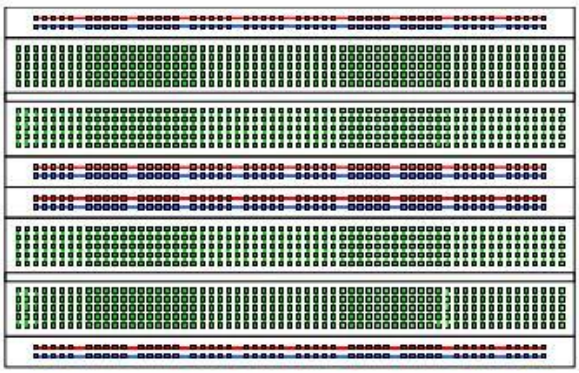
Insertion Wire Size: 21 to 26 AWG wire, or 0.025" Square post headers
0.016 to 0.028 inches diameter (0.4 to 0.7mm diameter)

Backing: Peelable adhesive tape for attaching to a surface.
Metal back plates provided with 1660 tie point breadboards.
Metal Back Plate Thickness: 0.031 inches (0.8mm)

All BPS BreadBoards are Lead-Free and ***RoHS Compliant***.

Internal Connections

The BB1660 and BB1660T breadboards have four rows of 63 vertical columns. Each column has 5 connected holes each (the green lines). This is the circuit area. The are also 8 "rails" (or distribution strips) for power and ground running horizontally (the red and blue lines).
A distribution strip can be used to carry a signal if it is not needed for power or ground.



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5. **Water Pump motor 220V**

Description:

This is Micro Submersible Water Pump DC 3V-5V, can be easily integrate to your water system project. The water pump works using water suction method which drain the water through its inlet and released it through the outlet. You can use the water pump as exhaust system for your aqurium and controlled water flow fountain.

Specification:

Input Voltage: DC 3V-5V
Flow Rate: 1.2-1.6 L/min
Operation Temperature: 80 Deg.C
Operating Current: 0.1-0.2A
Suction Distance: 0.8 meter (Max)
Outside diameter of water outlet: 7.5mm
Inside diameter of water outlet: 5.0 mm
Diameter of water Inlet : 5.0 mm
Wire Length: 200 mm
Size: 45 x 30 x 25 mm
Weight: 30g

Lampiran program

```
#define THINGER_SERIAL_DEBUG

#include <ThingerESP8266.h>
#include <ESP8266WiFi.h>
#include <DHT.h>
#include "arduino_secrets.h"
#include <SimpleTimer.h>
#include <ThingerESP8266.h>
#include <LiquidCrystal_I2C.h>

#define DHTPIN D5 //Pin data dari DHT terhubung ke pin D7 NodeMCU
#define DHTTYPE DHT11
#define CAHAYA D7

DHT dht(DHTPIN, DHTTYPE);
LiquidCrystal_I2C LCD(0x27,16,2); //lcd board
ThingerESP8266 thing(USERNAME, DEVICE_ID,
DEVICE_CREDENTIAL); float hum,temp;
const int pinDigital = A0;
const int relay = D3;
float sensorValue = 0;
String kondisi, kondisia, kondisi_cahaya=
""; SimpleTimer timer;
unsigned long previousMillis = 0;
const long interval = 3000;

void sendSensor()
{//lcd to android && LCD to board lcd int POT =
  analogRead(A0);
```

```
 Serial.print(POT);

LCD.setCursor(0,0);LCD.print("ADC");LCD.setCursor(4,0);LCD.print(POT);LC
D.print(" ");
 LCD.setCursor(0,1);LCD.print("PUMP");



 if (POT>500){
 Serial.println("KERING");//ke serial monitor
 LCD.setCursor(9,0);LCD.print("KERING");
 LCD.setCursor(5,1);LCD.print("ON ");
 digitalWrite(relay,LOW);
 for(int x=0; x<=10; x++){     LCD.setCursor(9,1);LCD.print(x);delay(500);}
 LCD.clear();
 digitalWrite(relay,HIGH);
 LCD.setCursor(0,0);LCD.print("AIR MERESAP");
 LCD.setCursor(0,1);LCD.print("    WAIT");
 for(int x=9; x>0; x--){       LCD.setCursor(9,1);LCD.print(x);
 delay(500);}
 LCD.clear();
 }

 else if (POT>400&&POT<500){
 Serial.println("NORMAL");
 LCD.setCursor(9,0);LCD.print("NORMAL");
 LCD.setCursor(5,1);LCD.print("OFF");
 digitalWrite(relay,HIGH); }



 else if (POT<400){
 Serial.println("BASAH");
 LCD.setCursor(9,0);LCD.print("BASAH ");
```

```
  LCD.setCursor(5,1);LCD.print("OFF");
  digitalWrite(relay,HIGH);
  }
}

void setup() {
  // open serial for monitoring
  Serial.begin(115200); thing.add_wifi(SSID,
  SSID_PASSWORD);
  pinMode(relay,OUTPUT);
  pinMode(CAHAYA, INPUT);
  timer.setInterval(1000L, sendSensor);
  LCD.init();
  LCD.backlight();

  dht.begin();

  thing.add_wifi(SSID, SSID_PASSWORD);
  thing["dht11"] >> [](pson& out){
    out["humidity"] = hum;
    out["celsius"] = temp;
  };
  thing["moisture"] >> [](pson & out) {
  out = analogRead(sensorValue);
  };
  thing["Dataku"] >> [](pson & out){
  out ["kondisi"] = kondisi;};
  thing["Data cahaya"] >> [](pson & out){
  out ["kondisi_cahaya"] = kondisi_cahaya;};

}
```

```
void loop() {
  timer.run();
  thing.handle();
  //sensor membutuhkan waktu 250 ms ketika membaca suhu dan kelembaban
  float h = dht.readHumidity(); //Membaca kelembaban
  float t = dht.readTemperature(); //Membaca suhu dalam satuan Celcius
  float f = dht.readTemperature(true); //Membaca suhu dalam satuan Fahrenheit

  hum = h;
  temp = t;
  delay(1000);
  Serial.print("Suhu: ");
  Serial.print(t);
  Serial.println (" *C ");
unsigned long currentMillis = millis();
if(currentMillis - previousMillis >=
interval) {
previousMillis - currentMillis;
int POT = analogRead(A0);
int cahaya = digitalRead(CAHAYA);

if(cahaya == 0)
{
kondisi_cahaya = "Nyalakan lampu";
}else{
kondisi_cahaya = "Matikan lampu";
}

if(POT>500){
kondisi = "Kering, nyalakan motor";
thing.call_endpoint("moisure");
}else if (POT>400&&POT<500){
```

```
kondisi = "Normal";}
else if (POT<400){
kondisi = "basah";}
else if (POT<200){
kondisi = "Terlalu basah, berpotensi tanaman
mati";} }


}
```