

# Using a Relay with NodeMCU ESP8266

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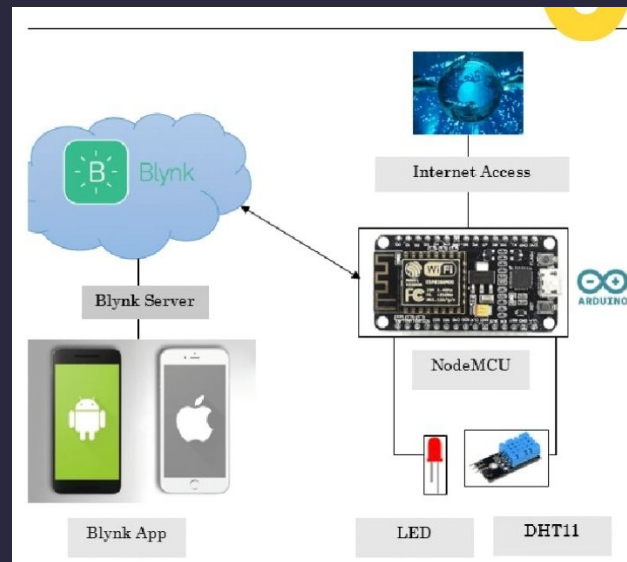
**/02** Soil Moisture Sensor and automates the water pump





# /01

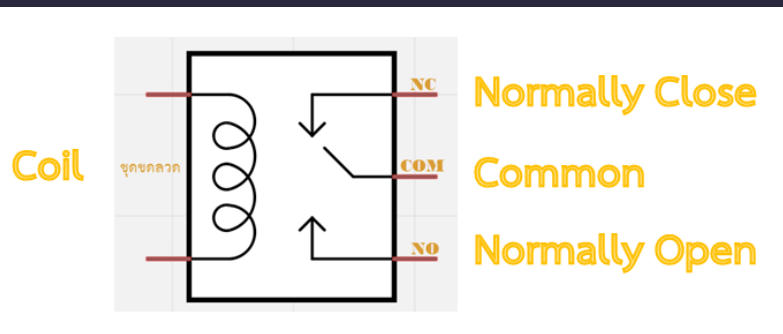
## Relay



# Relay

A relay is an electrical device that functions similarly to a switch, allowing the interruption of a circuit. It is controlled by an electrical signal. Relays come in various types, ranging from small ones used in general electronics to large relays used in high-voltage electrical applications. While their physical appearances may vary, they operate on similar principles.

To use a relay, it is employed to interrupt a circuit. Relays are versatile and can be used in various configurations and applications.

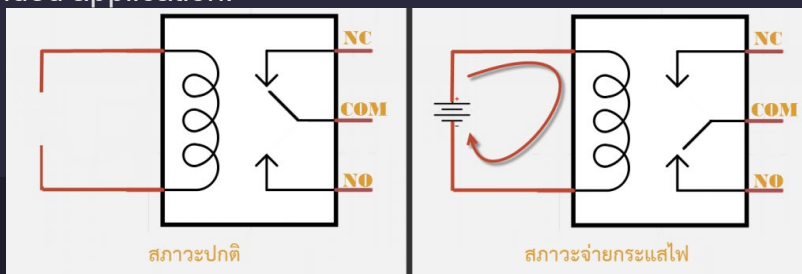


# Relay

Inside a relay, there are typically coils and contact points:

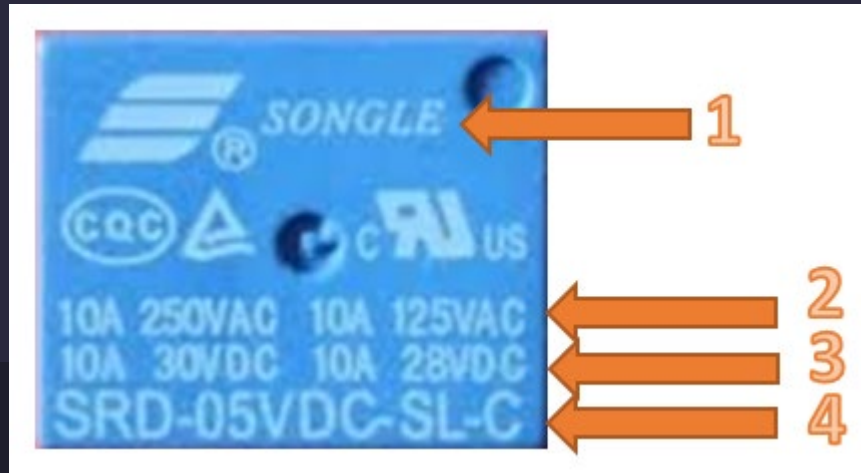
1. Normally Close (NC) Contact: This contact is normally closed, meaning it is in a closed circuit state when there is no electrical current passing through the coil. In its default state, this contact is connected to the Common (COM) terminal. It opens or disconnects when an electric current flows through the coil.
2. Normally Open (NO) Contact: This contact is normally open, meaning it is in an open circuit state when there is no electrical current passing through the coil. In its default state, this contact is not connected to the Common (COM) terminal. It closes or connects when an electric current flows through the coil.
3. Common (COM) Terminal: The Common terminal is shared between the NC and NO contacts. Its connection to either contact depends on whether there is an electrical current flowing through the coil. It acts as a common point that can be connected to either the NC or NO contact based on the relay's operation.

Relays can have multiple sets of contacts, and the exact configuration may vary depending on the manufacturer and the intended application.



## Relay

1. The manufacturer's brand and model (brand) and various standard symbols.
2. Details of the alternating current (VAC) supported for operation.
3. Details of the direct current (VDC) supported for operation.
4. Model, voltage level on the wire side, type, structure, and coil sensitivity data.



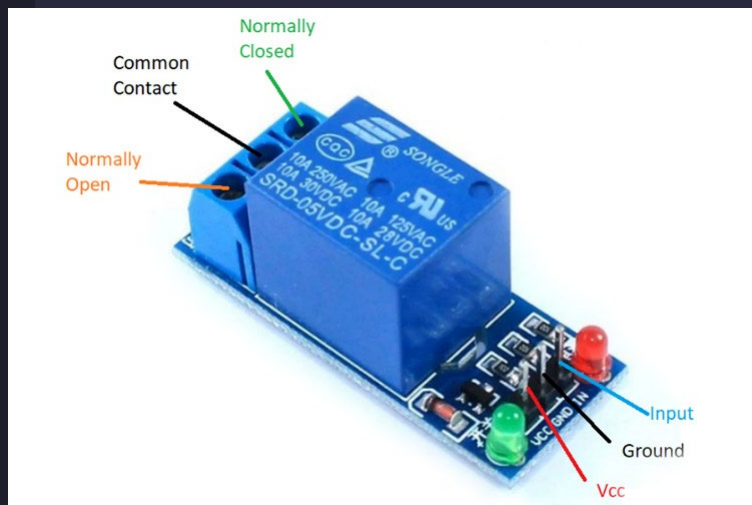
## → The main features of the Relay Module.

The 1-Channel 5V Relay Module is a module used to control loads with both DC and AC electrical voltages. It can handle a maximum load of AC 250V/10A and DC 30V/10A. It operates using TTL logic signals to control its operations with an Active Low signal format. The drive current required is typically 15-20mA. Additionally, it features LEDs that indicate the power status and relay state.

### Single-Channel Relay Module Specifications

- Supply voltage – 3.75V to 6V
- Quiescent current: 2mA
- Current when the relay is active: ~70mA
- Relay maximum contact voltage – 250VAC or 30VDC
- Relay maximum current – 10A

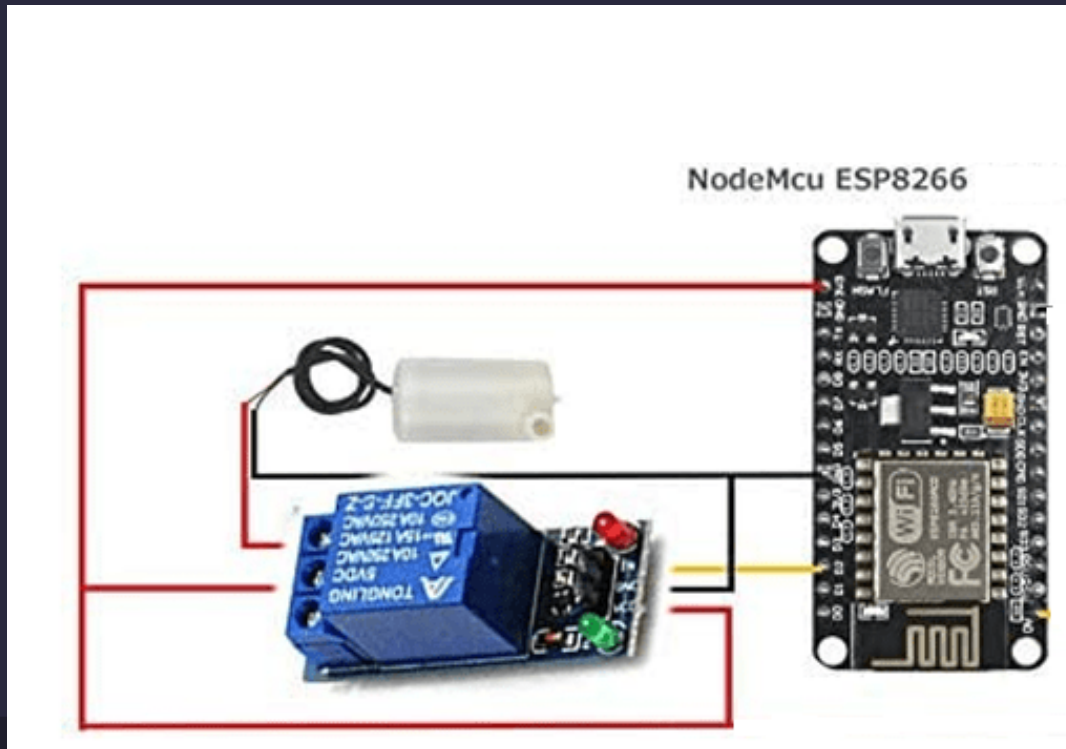
# → Relay Module Pin



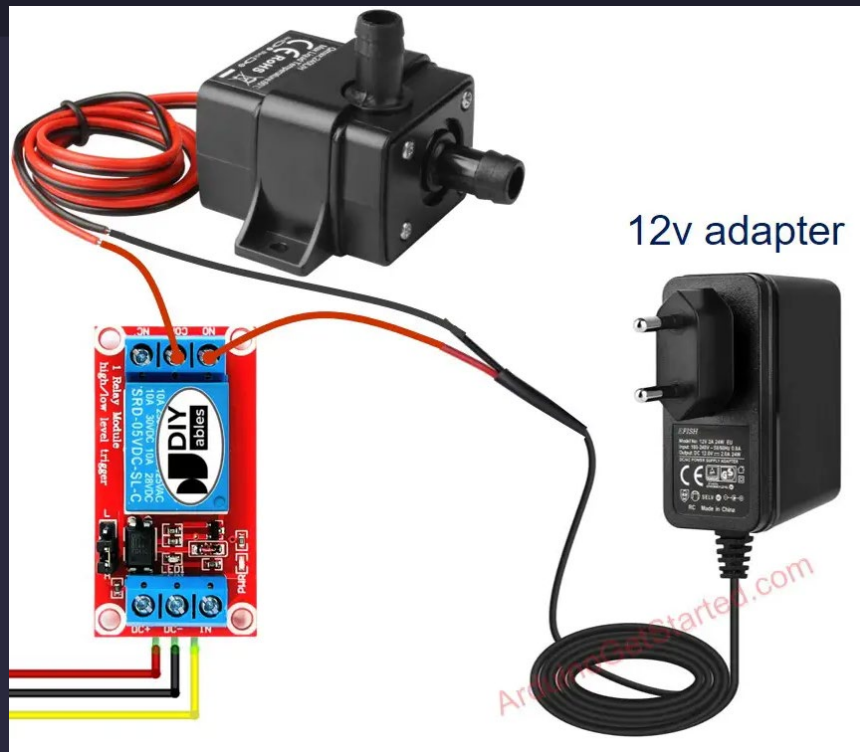
Single-Channel Relay Module Pin Description

Pin Number	Pin Name	Description
1	Relay Trigger	Input to activate the relay
2	Ground	0V reference
3	VCC	Supply input for powering the relay coil
4	Normally Open	Normally open terminal of the relay
5	Common	Common terminal of the relay
6	Normally Closed	Normally closed contact of the relay

# Wiring



# Wiring



# Coding

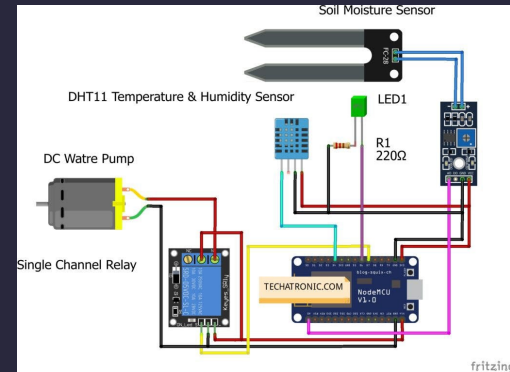
Please type this code into the Arduino IDE.

Motor\_Pumb.ino

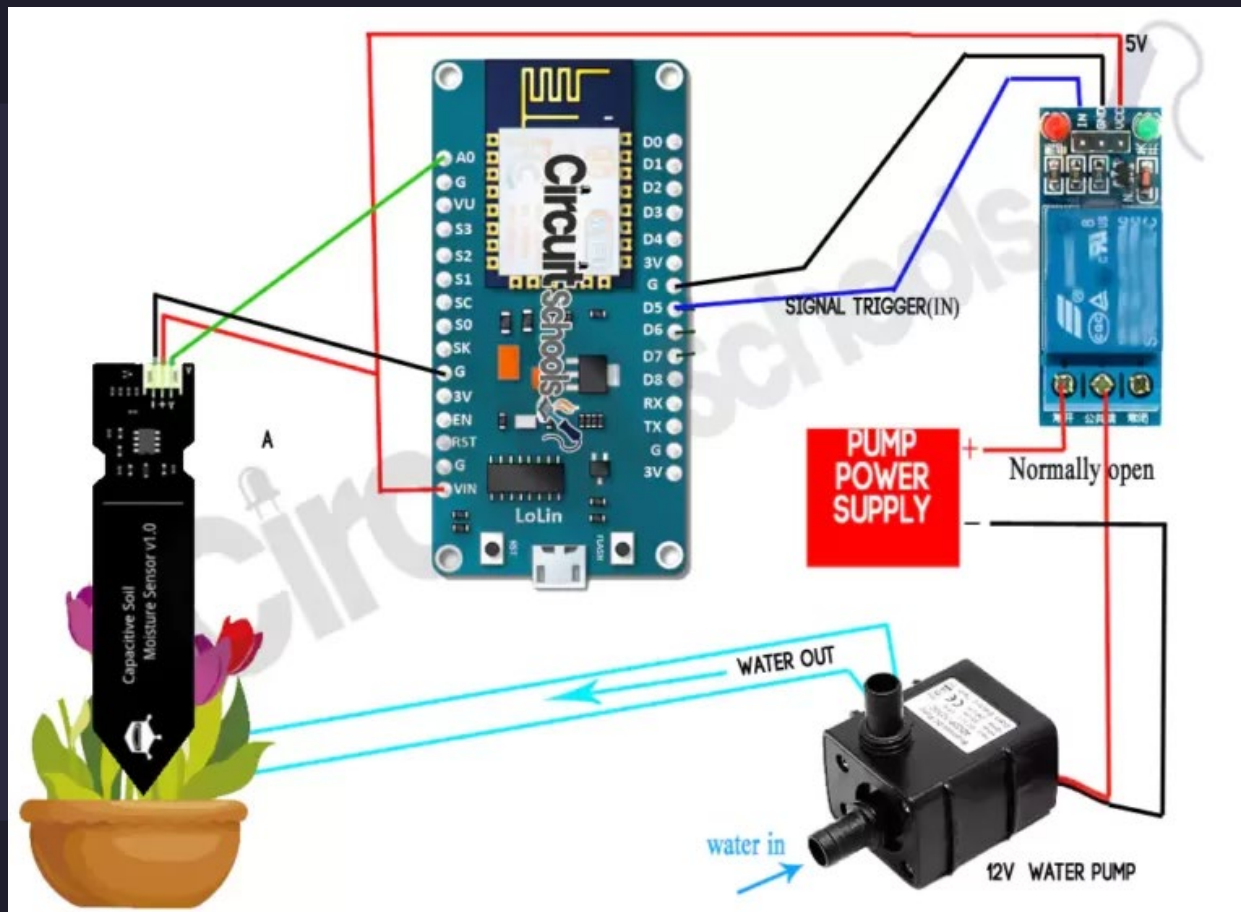
```
1  const int Relay1 = 2; // pin GPIO2=D4, which connects to the pump the via the relay
2
3  // the setup function runs once when you press reset or power the board
4  void setup() {
5      // initialize digital pin GPIO2 as an output.
6      pinMode(Relay1, OUTPUT);
7  }
8
9  // the loop function runs over and over again forever
10 void loop() {
11     digitalWrite(Relay1, HIGH); // turn on pump 4 seconds
12     delay(4000);
13     digitalWrite(Relay1, LOW); // turn off pump 4 seconds
14     delay(4000);
15 }
```

# /02

## /Soil Moisture Sensor and automates the water pump



# Wiring



# Coding

automates\_water\_pump.ino

```
1  const int AirValue = 616;    //replace the value from calibration in air
2  const int WaterValue = 335;  //replace the value from calibration in water
3  int soilMoistureValue = 0;
4  int soilmoisturepercent=0;
5  void setup() {
6      pinMode(13,OUTPUT); // pin where relay trigger connected
7      Serial.begin(9600); // open serial port, set the baud rate to 9600 bps
8  }
9  void loop() {
10     soilMoistureValue = analogRead(A0); //Mention where the analog pin is connected on arduino
11     Serial.println(soilMoistureValue);
12     soilmoisturepercent = map(soilMoistureValue, AirValue, WaterValue, 0, 100);
13     if(soilmoisturepercent < 10) // change this at what level the pump turns on
14     {
15         Serial.println("Nearly dry, Pump turning on");
16         digitalWrite(13,HIGH); // Low percent high signal to relay to turn on pump
17     }
18     else if(soilmoisturepercent >85) // max water level should be
19     {
20         Serial.println("Nearly wet, Pump turning off");
21         digitalWrite(13,low); // high percent water high signal to relay to turn on pump
22     }
23
24     delay(400); //Wait for few milliseconds and then continue the loop.
25 }
26
```



# Q/A

