The Automatic Irrigation Soil Moisture Detection Module Kit is a comprehensive DIY solution designed to simplify plant care by automating watering based on real-time soil moisture levels. This kit is ideal for hobbyists, students, educators, and home gardeners who want to maintain optimal plant hydration without constant manual intervention. By integrating a capacitive soil moisture sensor with a mini submersible water pump and a 5 V relay control module, the system provides precise, hands-free irrigation for potted plants, small gardens, or indoor green spaces.

The capacitive sensor detects moisture levels in the soil and sends analog signals to a microcontroller, which in turn controls the relay to activate the pump when watering is required. This ensures that plants receive the right amount of water, reducing the risk of over- or under-watering and promoting healthy growth.

Designed with learning and experimentation in mind, the kit includes all essential components, such as the soil sensor, relay module, submersible pump, tubing, jumper wires, and power interface options. It is compatible with microcontrollers like Arduino, enabling users to explore automation, electronics, and IoT concepts while creating a practical and functional irrigation system. The kit offers an accessible introduction to environmental monitoring and smart gardening applications.

Adult supervision is strongly recommended

The minimum age for DIY beginner solder kits generally ranges from 8 to 14 years old, depending on the complexity of the project and the supervision available.

Many simple LED flashing kits, buzzer kits, or basic educational solder boards are labelled for ages 8–12+, but adult supervision is strongly recommended for anyone under 14 because soldering involves hot tools and small electronic components.

Younger children (around 8–10) can safely learn soldering if the kit uses large through-hole components and includes clear instructions.

These kits focus on building confidence while teaching basic safety—such as handling a hot soldering iron, avoiding burns, and working in a well-ventilated area.

For older beginners (12–16), more detailed kits with extra components, small pads, or basic troubleshooting are appropriate. At this age, users can better understand polarity, circuit diagrams, and proper solder technique.

Regardless of age, the key factors are maturity, dexterity, patience, and supervision. With the right kit and guidance, soldering is a safe and rewarding skill for children, teens, and adults. Always follow safety rules, use proper tools, and start with simple projects to build confidence.

Components Included

- Soil Moisture Sensor Probe
- Soil Moisture Sensor Module
- 5 V Relay Module
- Mini Submersible Water Pump
- Plastic Battery Holder
- USB Power Cable
- Jumper Wires
- 0.5 m Vinyl Tubing

Specifications

- **Operating Voltage:** 3.3 V – 5 V DC
- **Relay Module:** 5 V, supports up to 10 A switching
- **Water Pump:** DC 3–6 V, flow rate 80–120 L/H
- **Soil Moisture Sensor:** Analog output, corrosion-resistant

Assembly Instructions

Connecting the Soil Moisture Sensor

1. Attach the two probes of the sensor to the corresponding terminals on the sensor module.
2. Connect the module's **VCC** to a 3.3 V or 5 V power supply.
3. Connect the **GND** pin to the ground of your microcontroller or power source.
4. Connect the **Analog Output (AO)** to an analogue input pin on your microcontroller (e.g., A0 on Arduino).

Setting Up the Relay Module

1. Connect the relay's **VCC** to a 5 V power supply.
2. Connect **GND** to ground.
3. Connect the **IN** pin to a digital output pin on your microcontroller (e.g., D2 on Arduino).

Connecting the Water Pump

1. Connect the pump's positive terminal to the relay's Normally Open (NO) terminal.
2. Connect the negative terminal to ground (GND).
3. Connect the relay's Common (COM) terminal to the positive terminal of your power source (battery or USB).

Powering the System

- Insert batteries into the battery holder and connect it to the microcontroller and relay module.
- Alternatively, supply power via the USB cable from a USB source.

Operation Instructions

1. Verify all connections and ensure the power source is properly connected.
2. Insert the soil moisture sensor probe into the soil near the plant roots.
3. Upload the monitoring and control code to your microcontroller.
4. When the soil moisture drops below the set threshold, the microcontroller activates the relay, powering the pump to irrigate the plants.
5. Once the soil reaches the desired moisture level, the relay deactivates, turning off the pump automatically.

Quick Easy Sample Arduino Code:

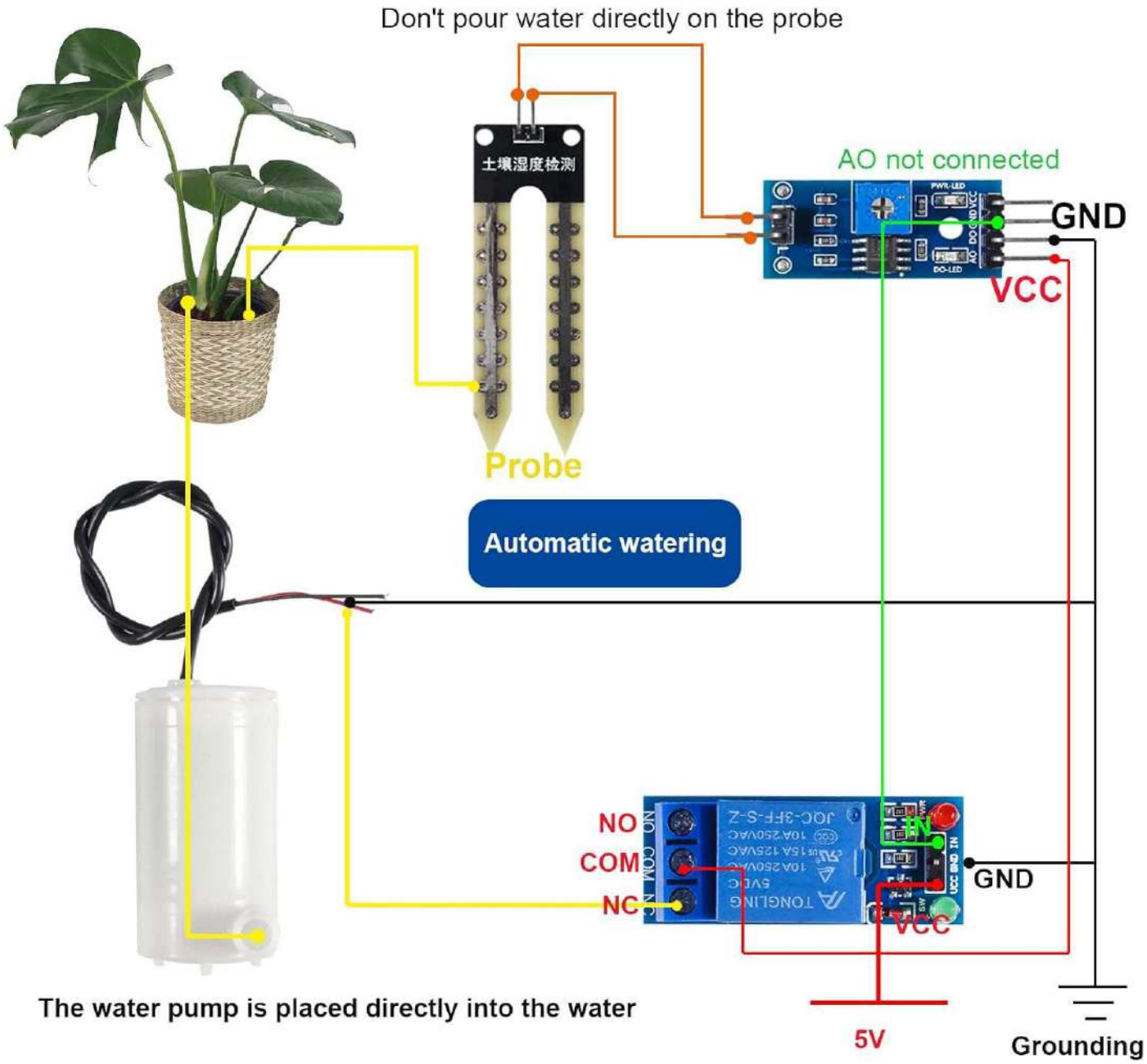
```
const int sensorPin = A0; // Soil moisture sensor analog pin
const int relayPin = 2;   // Relay module control pin
const int threshold = 500; // Soil moisture threshold value

void setup() {
    pinMode(relayPin, OUTPUT);
    digitalWrite(relayPin, LOW);
    Serial.begin(9600);
}

void loop() {
    int sensorValue = analogRead(sensorPin);
    Serial.print("Soil Moisture Level: ");
    Serial.println(sensorValue);

    if (sensorValue < threshold) {
        digitalWrite(relayPin, HIGH); // Turn on pump
        Serial.println("Pump ON");
    } else {
        digitalWrite(relayPin, LOW); // Turn off pump
        Serial.println("Pump OFF");
    }
    delay(1000);
}
```

Simple Setup without microcontroller Just follow Wirring Diagram and your set



Important Notes

- **Calibration:** Modify the soil moisture threshold in your microcontroller code to suit the specific needs of your plants and soil type.
- **Power Supply:** Make sure your voltage source matches the kit's operating requirements to avoid damaging components.
- **Water Quality:** Always use clean water to prevent blockages in the pump and tubing.
- **Maintenance:** Periodically inspect the soil moisture sensor and water pump to ensure they function correctly and clean them when necessary.

Following these guidelines will help your Automatic Irrigation Kit run smoothly, keeping your plants properly hydrated and soil moisture at optimal levels.