

ARDUINO CURRENT SENSOR AC 30A

To measure AC current using an Arduino, you can use a current sensor module like the **ACS712** (for lower currents) or the **SCT-013** (for higher currents like 30A). Below is a guide on how to use the **SCT-013** sensor to measure AC current up to 30A with an Arduino.

Components Needed:

1. **Arduino** (Uno, Nano, etc.)
 2. **SCT-013-030** (30A Non-Invasive AC Current Sensor)
 3. **Burden Resistor** (if not included with the sensor)
 4. **Jumper Wires**
 5. **Breadboard** (optional)
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Wiring the SCT-013 Sensor:

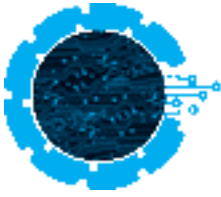
The SCT-013 is a non-invasive current sensor that uses a current transformer (CT) to measure AC current. It outputs a voltage proportional to the current passing through the wire it is clamped around.

1. **SCT-013 Output** → Connect to an analog input pin on the Arduino (e.g., A0).
 2. **Ground** → Connect to the Arduino's GND.
 3. **Burden Resistor** → If your SCT-013 does not have an internal burden resistor, you need to add one (typically 10-100 ohms) across the output terminals of the sensor.
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Arduino Code:

Here's a basic example to read the AC current using the SCT-013 sensor:

```
cpp
Copy
const int sensorPin = A0; // Pin connected to the SCT-013 output
```



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```
const float sensitivity = 0.1; // Sensitivity of the SCT-013 (30A version outputs 1V at 30A)
const float vRef = 5.0; // Arduino reference voltage
const int adcResolution = 1023; // 10-bit ADC resolution

void setup() {
  Serial.begin(9600); // Initialize serial communication
}

void loop() {
  float sensorValue = analogRead(sensorPin); // Read the analog value
  float voltage = (sensorValue / adcResolution) * vRef; // Convert to voltage
  float current = (voltage - (vRef / 2)) / sensitivity; // Calculate current (offset by Vref/2 for AC)

  Serial.print("Current: ");
  Serial.print(current);
  Serial.println(" A");

  delay(500); // Delay for stability
}
```

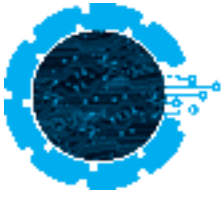
Explanation:

1. **Sensitivity:** The SCT-013-030 outputs 1V at 30A. So, the sensitivity is 0.1V/A.
2. **Voltage Calculation:** The Arduino's ADC converts the analog voltage to a digital value (0-1023 for 10-bit resolution). This is then converted back to a voltage.
3. **Current Calculation:** The voltage is offset by half of the reference voltage ($V_{ref}/2$) because the sensor output is centered around $V_{ref}/2$ for AC signals.

Calibration:

- Use a known load (e.g., a 10A load) to calibrate the sensor.
- Adjust the sensitivity or offset in the code if necessary.

Safety Notes:



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- Be careful when working with AC current. Ensure proper insulation and avoid touching live wires.
- The SCT-013 is non-invasive, so it does not require direct electrical contact with the AC line.

