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ACS712 Current Sensor Module

Introduction

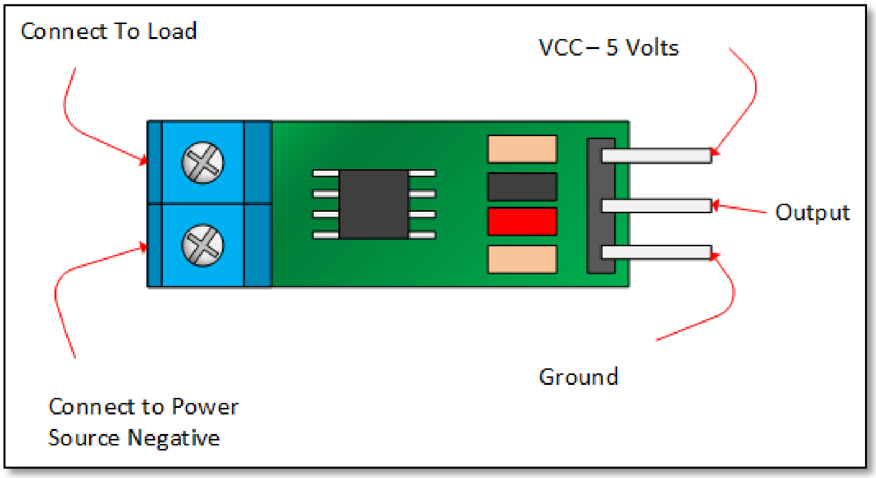
Sensing and controlling current flow is a fundamental requirement in a wide variety of applications including, over-current protection circuits, battery chargers, switching mode power supplies, digital watt meters, programmable current sources, etc. One of the simplest techniques of sensing current is to place a small value resistance (also known as Shunt resistor) in between the load and the ground and measure the voltage drop across it, which in fact, is proportional to the current flowing through it.

Whereas this technique is easy and straightforward to implement, it may not be very precise because the value of the shunt resistor slightly varies with its temperature, which in fact is not constant because of the Joule heating. Besides, this simple technique does not provide an isolation between the load and current sensing unit, which is desirable in applications involving high voltage loads.

Specification

	5A Module	**20A Module**	**30A Module**
Supply Voltage (VCC)	5Vdc Nominal	5Vdc Nominal	5Vdc Nominal
Measurement Range	-5 to +5 Amps	-20 to +20 Amps	-30 to +30 Amps
Voltage at 0A	VCC/2 (nominally 2.5Vdc)	VCC/2 (nominally 2.5Vdc)	VCC/2 (nominally 2.5VDC)
Scale Factor	185 mV per Amp	100 mV per Amp	66 mV per Amp
Chip	ACS712ELC-05A	ACS712ELC-10A	ACS712ELC-30A

Images



Packing List

- Arduino Current Sensor Module ACS712 (30A)

Requirements

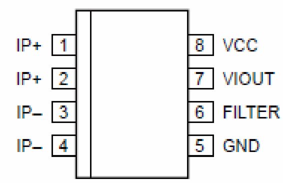
It can be interface with any microcontroller such as PIC, SK40C, SK28A, SKds40A, Arduino series.

Necessary hardware to follow this guide:

- Arduino Uno
- Arduino Current Sensor Module ACS712 (30A)
- Male-Female/Female-Female jumper wire
- Resistor (220Ohm)
- Battery 9V

Pin Assignment

Pin-out Diagram

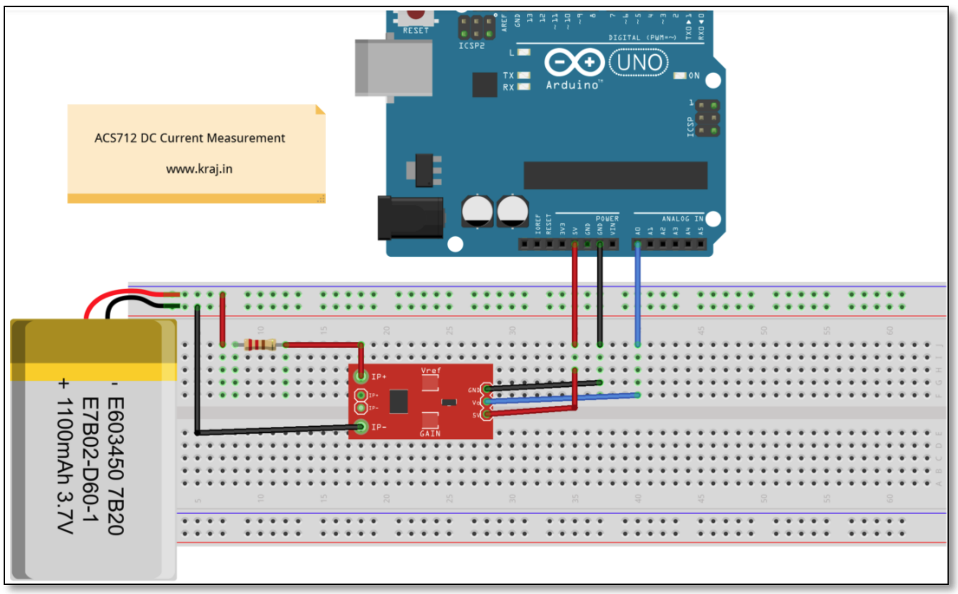


Terminal List Table

Number	Name	Description
1 and 2	IP+	Terminals for current being sampled; fused internally
3 and 4	IP–	Terminals for current being sampled; fused internally
5	GND	Signal ground terminal
6	FILTER	Terminal for external capacitor that sets bandwidth
7	VIOUT	Analog output signal
8	VCC	Device power supply terminal

Hardware Interface/Setup

As mentioned, these modules are primarily designed for use with micro-controllers like the Arduino. In those applications, the connections would be as picture below:



If the light bulb shown in the picture above were disconnected, the output of the ACS712 module would be 2.500 volts. Once connected, the output would be scaled to the current drawn through the bulb. If this were a 5 Amp module and the light bulb pulled 1 Amp, the output of the module would be 2.685 volts.

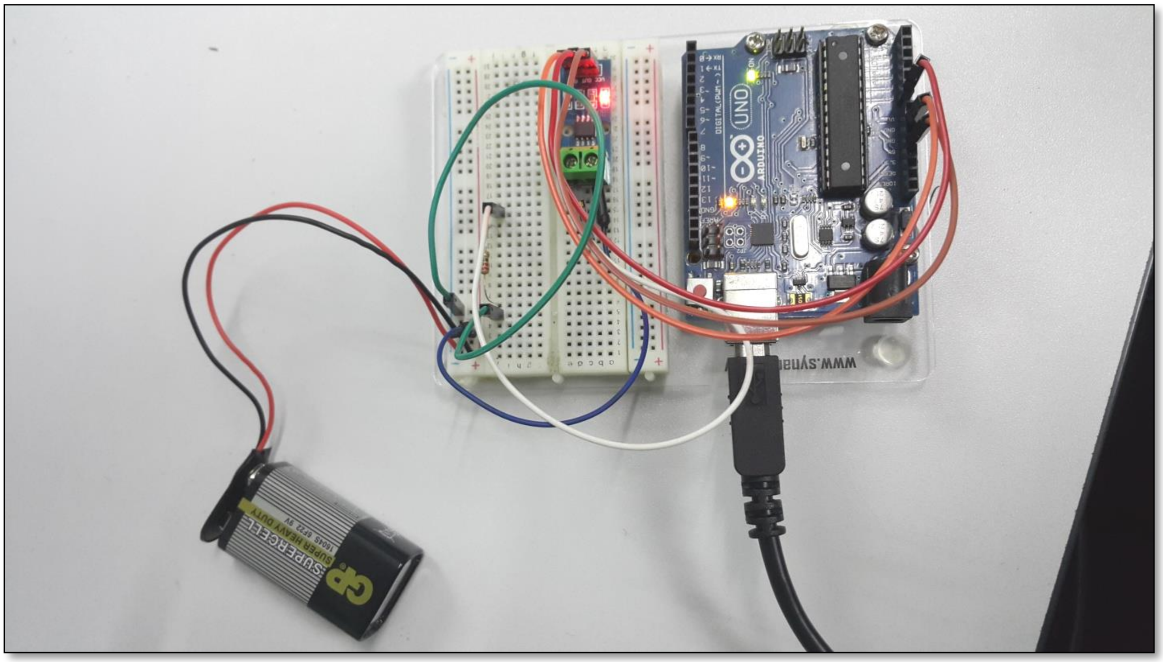
Now imagine the battery polarity reversed. Using the same 5A module, the output would be 2.315 volts. IMPORTANT NOTE – This device is a Hall Effect transducer. It should not be used near significant magnetic fields

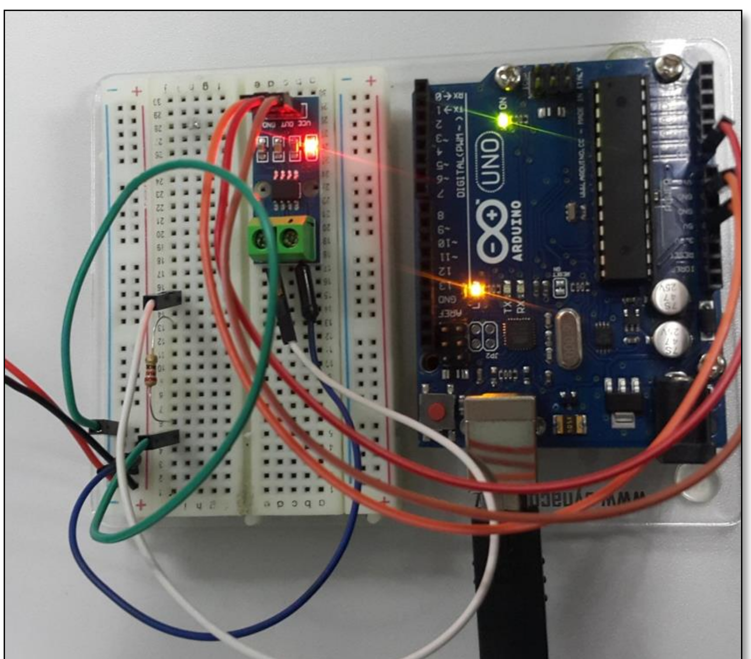
Example Code

This is example code for moisture sensor module. The full code can be download at https://www.elecrow.com/wiki/index.php?title=ACS712_Current_Sensor-_5A

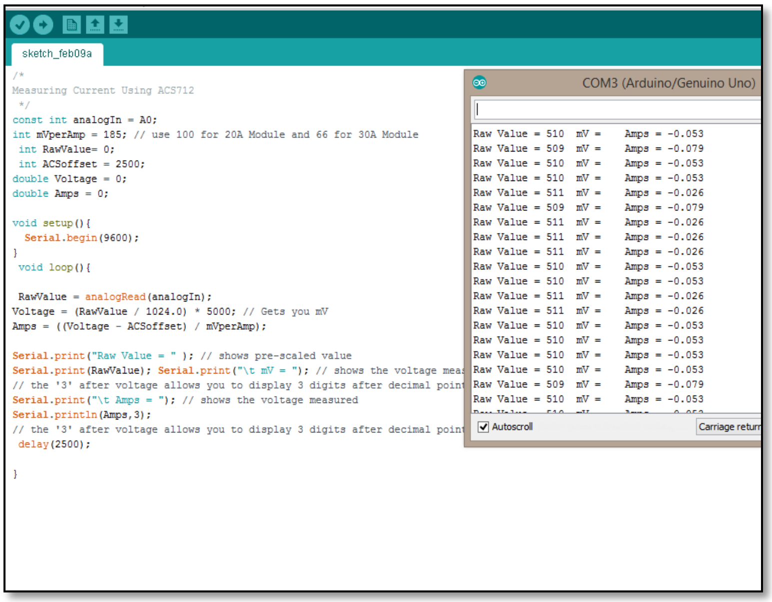
```
/*
Measuring Current Using ACS712
 */
const int analogIn = A0;
int mVperAmp = 185; // use 100 for 20A Module and 66 for 30A Module
 int RawValue= 0;
 int ACSoffset = 2500;
double Voltage = 0;
double Amps = 0;

void setup(){
  Serial.begin(9600);
}
 void loop(){

 RawValue = analogRead(analogIn);
Voltage = (RawValue / 1024.0) * 5000; // Gets you mV
Amps = ((Voltage - ACSoffset) / mVperAmp);

Serial.print("Raw Value = " ); // shows pre-scaled value
Serial.print(RawValue); Serial.print("\t mV = "); // shows the voltage measured
Serial.print(Voltage,3);
// the '3' after voltage allows you to display 3 digits after decimal point
Serial.print("\t Amps = "); // shows the voltage measured
Serial.println(Amps,3);
// the '3' after voltage allows you to display 3 digits after decimal point
 delay(2500);

}
```

CONNECTION





RESULTS



Applications

1. Motor control
2. Load detection and management
3. Switched-mode power supplies
4. Overcurrent fault protection.