ACS712 Current Sensor

Basic Overview

The ACS712 Current Sensors offered on the internet are designed to be easily used with micro controllers like the Arduino.

These sensors are based on the Allegro ACS712ELC chip.

These current sensors are offered with full scale values of 5A, 20A and 30A.

The basic functional operation of each of these devices is identical. The only difference is with the scale factor at the output as detailed below.

Sensor Specifications

|	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

ACS712 Module Pin Outs and Connections

The picture below identifies the pin outs for the ACS172 Modules.

Pay attention to the polarity at the load end of the device.   If you are connected as illustrated below, the output will raise. If you connect it opposite of this picture, the output will decrease from the 2.5 volt offset.
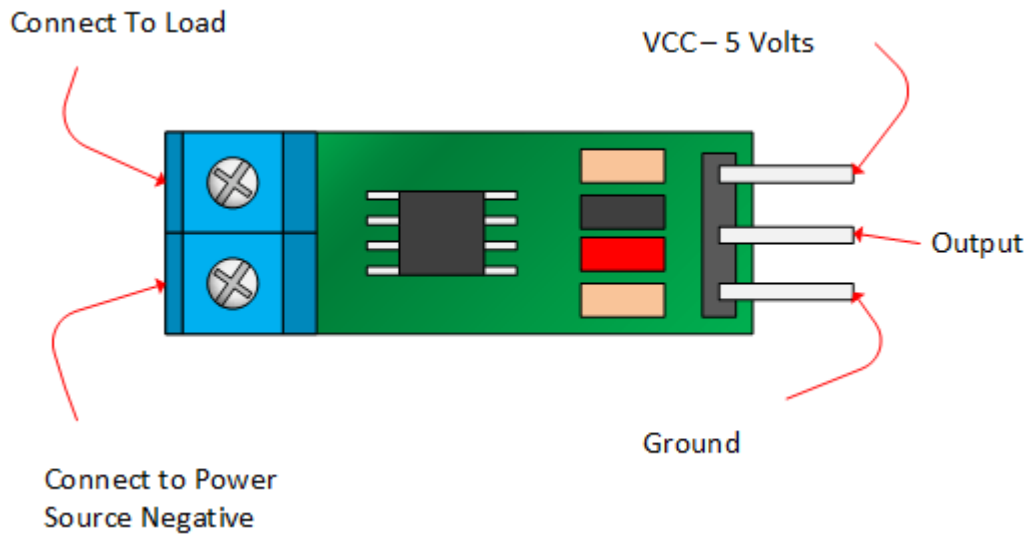
Basic Hook Up and Functional Description

As mentioned before, these modules are primarily designed for use with micro-controllers like the Arduino. In those applications, the connections would be as picture below:
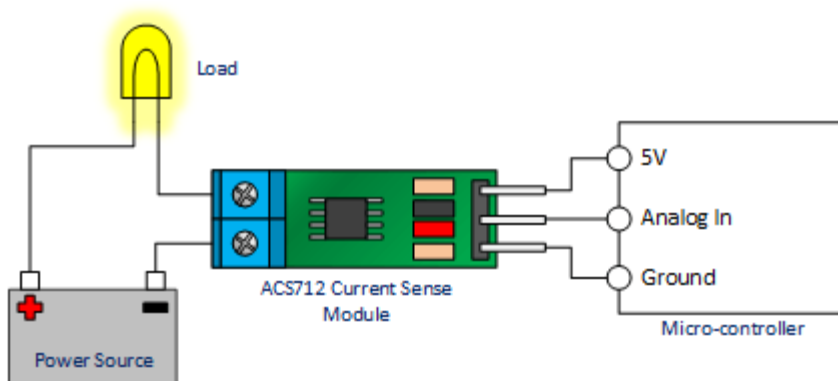
If the light bulb shown in the picture above were disconnected, the output of the ACS712 module would be 2.500 volts.

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.

The ACS712 Example Project Code

```
/*
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);

}
```