The CS-45AL is a Hall effect current sensor capable of measuring bi-directional current flow. These devices can be used in AC and DC systems requiring isolation from the measured circuit. It features zero insertion loss and very small footprint. Its non-invasive type of measuring make it extremely easy to deploy in most applications.

**Features and Benefits**
- Measures bi-directional AC and DC currents
- Fast response time
- High isolation from measured circuit
- 5V single supply operation
- Non-invasive installation
- Analog output proportional to measured current
- Zero insertion loss
- Easy to deploy with most uController systems

**Applications**
- Battery Chargers and Power supplies
- High current RC and Robotic battery systems
- Motor Control and Load detection
- Solar / Wind powered systems
- Automotive audio equipment
- Telecom Power supplies
- 2-way radio equipment
- Power management systems
- RV and other recreational vehicle battery systems

**Typical Characteristics**
- **Product Type:** Inductive Analog Current Sensor
- **Sensed Current Type:** AC/DC
- **Current Range:** ±45Amps
- **Sensitivity:** 17mv/A/pass ±3.5 mV @5V Vcc
- **Supply Current:** 11mA
- **Supply Voltage:** 4.5 to 10.5 VDC
- **Offset Voltage:** Vcc/2
- **Response Time:** 3µS
- **Operating Temperature:** -25 °C to 85 °C
- **Max Wire Gauge Accepted:** AWG #8

Sensitivity of the device is referenced from a supply of 5volts, if a different voltage is used the sensitivity can be calculated by feeding a known current source and using the formula on the next page.
The CS_45AL current sensor outputs an analog voltage ($V_{out}$) in linear proportion to the current flowing across the sensor. This output voltage can then be monitored by an Analog to Digital converter (ADC). $V_{out}$ is typically $\frac{1}{2}$ of the $V_{supply}(V_{cc})$ with zero current flowing through the board, $V_{out}$ increases from $\frac{1}{2}$ $V_{cc}$ with a forward current flow and decreases with reversed flow (see FIG. 1). The amount of voltage increment per Ampere of flowing current is the device Sensitivity.

$$V_{out} = \frac{1}{2}(V_{cc}) + (Current)\text{Sensitivity} \quad \text{or} \quad \text{Current} = \frac{V_{out} - \frac{1}{2}(V_{cc})}{\text{Sensitivity}}$$

Example: $V_{cc}=5\,v$, Current=$40\,\text{Amps}$, Sensitivity=$17\,\text{mv/Amp/pass}$

$$V_{out} = \frac{1}{2}(5) + (40)(0.017) = 3.18\,\text{volts}$$

Simple code for reading current in Arduino™ Environment. $V_{out}$ connected to ADC1, $V_{cc}=5\,v$

$$\text{Current} = \frac{((\text{analogRead}(1)*(5.00/1024))- 2.5)}{0.017};$$

Maximum Wire size: The opening for wire insertion can accept up to #8 Standard gauge wire. Some wires with thicker insulation may not fit.