

Crowtail- Electricity Sensor

From Elecrow

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Description

The Electricity sensor module is a member of Crowtail. It is based on the TA12-200 current transformer which can transform the large AC into small amplitude. You can use it to test large alternating current up to 5A.

Model: CT010593E (<https://www.elecrow.com/crowtail-electricity-sensor-p-1670.html>)



Features

- Crowtail compatible interface
- Maximum 5A input
- High accuracy
- Small size

Specification

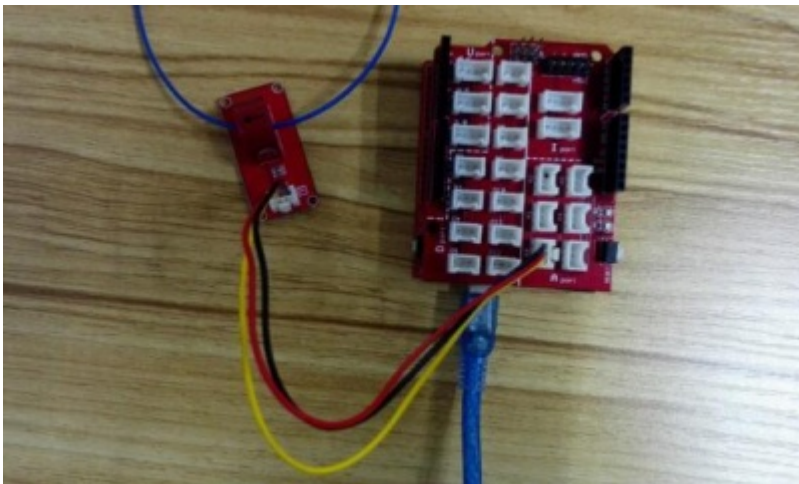
Items	Min	Norm	Max	Unit
Transformation ratio	-	2000:1	-	-
Input Current	0	-	5	A
Output Current	0	-	2.5	mA
Sampling Resistance	-	800	-	Ω
Sampling Voltage	0	-	2	V
Working Frequency	20	-	20K	HZ
Nonlinear scale	-	-	0.2%	-
Phase Shift	-	-	5'	-
Operating Temperature	-55	-	85	$^{\circ}\text{C}$
Dielectric strength	-	6	-	KVAC/1min

Usage

With Arduino

The following sketch demonstrates a simple application of measuring the amplitude of the alternating voltage. The SIG pin will output a alternating voltage based on the alternating current being measured. You can measure the value using ADC.

Connect the module to the analog A0 of Crowtail- Base board Put the alternating current wire through the hole of the current transformer.



1. Copy and paste code as below to a your Arduino sketch.

```

/*****
//      Function: Measure the amplitude current of the alternating current and
//                      the effective current of the sinusoidal alternating current.
//      Hardware: Crowtail - Electricity Sensor
//      Date:   June 2,2016
//      by www.elecrow.com
#define ELECTRICITY_SENSOR A0 // Analog input pin that sensor is attached to

float amplitude_current;           //amplitude current
float effective_value;             //effective current

void setup()
{
    Serial.begin(9600);
    pins_init();

```

```

}
void loop()
{
    int sensor_max;
    sensor_max = getMaxValue();
    Serial.print("sensor_max = ");
    Serial.println(sensor_max);
    //the VCC on the Crowtail interface of the sensor is 5v
    amplitude_current=(float)sensor_max/1024*5/800*2000000;
    effective_value=amplitude_current/1.414;//minimum_current=1/1024*5/800*2000000/1.414=8.6(mA)
    //Only for sinusoidal alternating current
    Serial.println("The amplitude of the current is(in mA)");
    Serial.println(amplitude_current,1);//Only one number after the decimal point
    Serial.println("The effective value of the current is(in mA)");
    Serial.println(effective_value,1);
}
void pins_init()
{
    pinMode(ELECTRICITY_SENSOR, INPUT);
}
/*Function: Sample for 1000ms and get the maximum value from the SIG pin*/
int getMaxValue()
{
    int sensorValue;          //value read from the sensor
    int sensorMax = 0;
    uint32_t start_time = millis();
    while((millis()-start_time) < 1000)//sample for 1000ms
    {
        sensorValue = analogRead(ELECTRICITY_SENSOR);
        if (sensorValue > sensorMax)
        {
            /*record the maximum sensor value*/
            sensorMax = sensorValue;
        }
    }
    return sensorMax;
}
}

```

Note: The minimum effective current that can be sensed by the code can be calculated using the equation below. $\text{minimum_current} = 1/1024 * 5/800 * 2000000/1.414 = 8.6(\text{mA})$.

2. Open the serial monitor, The results is as follows:

```

COM7
sensor_max = 466
The amplitude of the current is(in mA)
5688.5
The effective value of the current is(in mA)
4023.0
sensor_max = 243
The amplitude of the current is(in mA)
2966.3
The effective value of the current is(in mA)
2097.8
Autoscroll No line ending 9600 baud

```

Resource

- Crowtail- Electricity Sensor eagle file (http://www.elecrow.com/wiki/index.php?title=File:Crowtail-_Electricity_Sensor_eagle_file.zip)

Retrieved from "https://www.elecrow.com/wiki/index.php?title=Crowtail-_Electricity_Sensor&oldid=16635"

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