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Current monitoring with non-invasive sensor and arduino

By Vincent Demay (http://www.homautomation.org/author/doume/) in Arduino (http://www.homautomation.org/category/arduino/), Electronics (http://www.homautomation.org/category/electronics/)

September 17, 2013 (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/) 52 Comments (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comments)

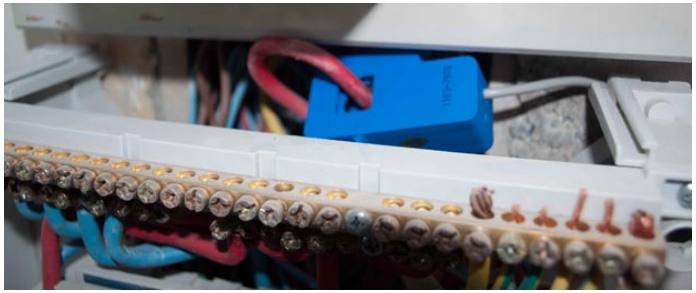
(http://www.homautomation.org/category/x10/)

(http://www.homautomation.org/category/arduino

In this post we will see you to measure energy consumption with a non-invasive sensor (YHDC SCT-013-000 (http://www.seeedstudio.com/depot/noninvasive-ac-current-sensor-100a-max-p-547.html) and an Arduino.

Disclaimer: Be careful even if the sensor is a non-invasive one, you are playing around high voltage

Total Price: less than $52

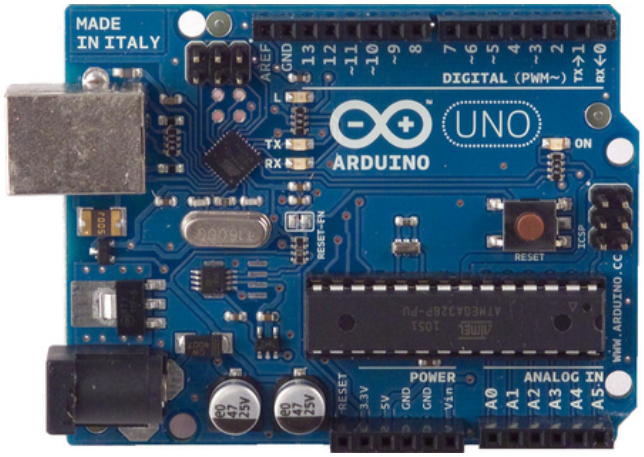


(http://www.homautomation.org/wp-content/uploads/2013/09/header2.jpg)

Needed Hardware.

WS2801 led strip (http://www.homautomation.org/2015/12/24/four-amazing-projects-based-on-ws2801-led-strip/)

Enhanced NRF24L01 radio with a DIY Dipole Antenna modification (http://www.homautomation.org/2015/12/22/enhanced-nrf24l01-radio-with-a-diy-dipole-antenna-modification/)



(http://www.homautomation.org/wp-content/uploads/2013/09/ArduinoUno_r2_front450px.jpg)

Arduino Uno

Price: less than $30 (Amazon (http://www.amazon.com/s/?_encoding=UTF8&camp=1789&creative=390957&field-keywords=Arduino%20Uno&linkCode=ur2&rh=i%3Aaps%2Ck%3AArduino%20Uno&tag=homauomatio03-20&url=search-alias%3Daps))

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- March 2015 (http://www.homautomation.org/2015/03/)
- February 2015 (http://www.homautomation.org/2015/02/)
- January 2015 (http://www.homautomation.org/2015/01/)
- December 2014

(http://www.homautomation.org/wp-content/uploads/2013/09/current100a.jpg)
A Non-invasive AC Current Sensor

Price: $12 (Amazon (http://www.amazon.com/s/?_encoding=UTF8&camp=1789&creative=390957&field-keywords=Non-invasive%20AC%20Current%20Sensor&linkCode=ur2&rh=i%3Aaps%2Ck%3ANon-invasive%20AC%20Current%20Sensor&tag=homauomatio03-20&url=search-alias%3Daps))

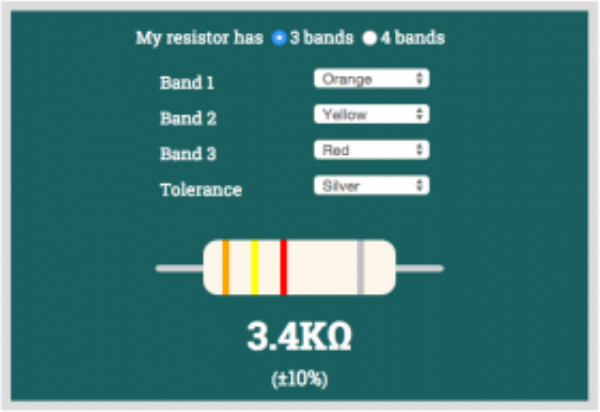
Mine is a YHDC SCT-013-000 CT (http://www.seeedstudio.com/depot/noninvasive-ac-current-sensor-100a-max-p-547.html) 100A max

mc/)

- Uncategorized (Http://Www.homautomation.org/Category/Uncategorized/)
- X10 (Http://Www.homautomation.org/Category/X10/)

MY ONLINE RESISTOR CALCULATOR

Compute your resistor value :



(http://www.homautomation.org/a-online-resistor-calculator/)

MY CUSTOM FRITZING PARTS

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September 2014 (http://www.homautomation.org/2014/09/)

July 2014 (http://www.homautomation.org/2014/07/)

June 2014 (http://www.homautomation.org/2014/06/)

April 2014 (http://www.homautomation.org/2014/04/)

March 2014 (http://www.homautomation.org/2014/03/)

February 2014 (http://www.homautomation.org/2014/02/)

October 2013 (http://www.homautomation.org

And some electronics components for less than $10:

- a 33 Ohm Resistor
- Two 10kOhm resistors
- A 10uF Capacitor

Understanding the sensor.

Understanding the way the sensor is working is the main difficulty. OpenenergyMonitor website has a real nice article about this sensor: Yhdc SCT-013-000 Current Transformer (http://openenergymonitor.org/emon/buildingblocks/report-yhdc-sct-013-000-current-transformer).

“Current transformers (CTs) are sensors that are used for measuring alternating current. They are particularly useful for measuring whole building electricity consumption (or generation for that matter).

The split core type such as the CT in the picture above, is particularly suitable for DIY use it can be clipped straight on to either the

(http://www.homautomation.org/fritzing-parts)

/2013/10/)

September 2013 (http://www.homautomation.org/2013/09/)

live or neutral wire coming into the building without having to do any high voltage electrical work.

Like any other transformer, a current transformer has a primary winding, a magnetic core, and a secondary winding.

*In the case of whole building monitoring the primary is the live **or** the neutral wire (not both) coming into the building itself and goes through the hole in the CT. The secondary winding comprises many turns of fine wire housed within the casing of the transformer."*

OpenEnergyMonitor (http://openenergymonitor.org/emon/buildingblocks/ct-sensors-introduction)

Some Physical computing to build the circuit.

Current generated by the sensor

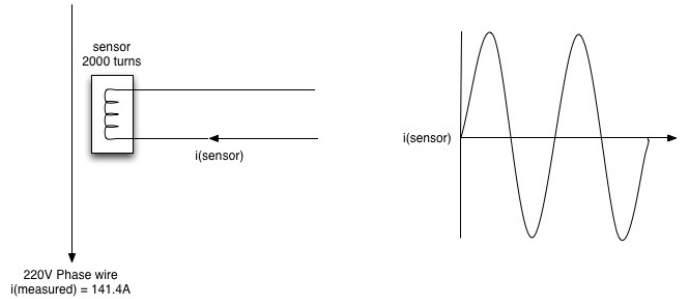
The measured current is alternative, and the sensor is calibrated to measure a max of 100A AC. 100A is the RMS (http://en.wikipedia.org/wiki/Root_mean_square) value of the maximum current the sensor can handle.

So First of all we need to know the measurable max peak-current

```
i(measured) = √2 * i(rms_current) =
1.414 * 100A = 141.4 A
```

The current at the output of the sensor is defined by its number of turns (here is 2000)

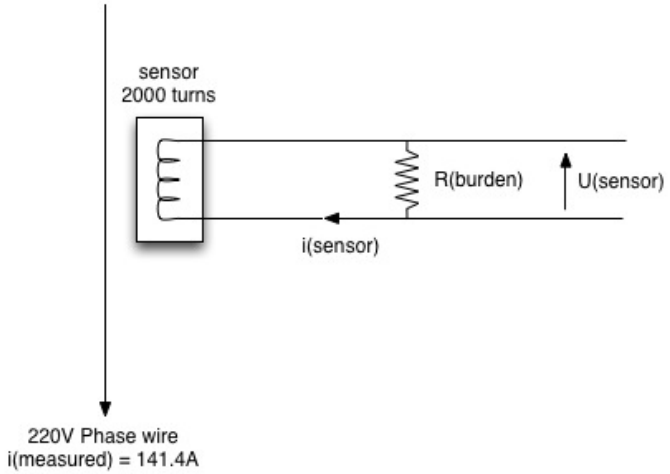
```
i(sensor) = i(measured) / nb_turns
= 141.1A / 2000 = 0.0707A
```



(http://www.homautomation.org/wp-content/uploads/2013/09/step11.jpg)

Convert current to voltage

Arduino can only handle voltage (between 0V and 5V) so we need to convert this current into an acceptable voltage. so let add a burden resistor in the circuit.



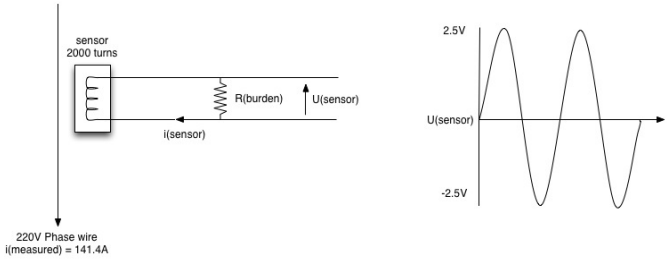
(http://www.homautomation.org/wp-content/uploads/2013/09/step2.jpg)

As the current is alternative around 0 and to maximize measurement resolution, the max voltage at burden resistance should be Max_accepted_voltage / 2 = 2.5V.

Now we are going to compute the better Burden resistor value

```
R(burden) = U(sensor)/I(sensor) = 2
.5V / 0.0707A = 35.4Ω
```

The ideal Burden resistor is 35.4Ω, it is not a current resistor, let use a 33Ω Resistor



(http://www.homautomation.org/wp-content/uploads/2013/09/step3.jpg)

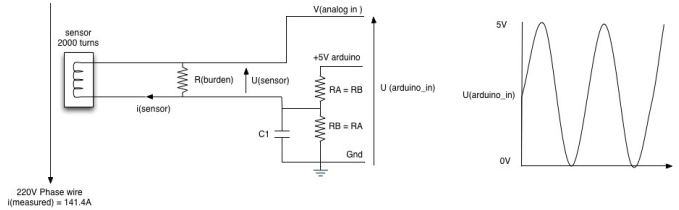
Arduino can not measure negative voltage, so we need to add 2.5V to U(sensor) to make the voltage measurable. (between 0V and 5V)

We add

- 2 resistors (10kΩ is good to avoid too

many energy consumption)

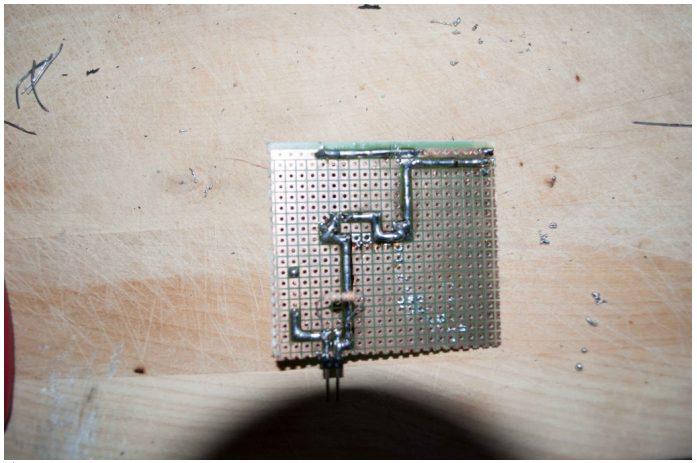
- The capacitor C1 (10uF) has a low *reactance* – a few hundred ohms – and provides an alternative path for the alternating current to bypass the resistor.



(http://www.homautomation.org/wp-content/uploads/2013/09/step41.jpg)

Building Arduino Shield.

We are using Analog input 5 from the Arduino to connect the circuit



(http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/dsc_0773/)

Arduino Code.

If you take a look at openenergymonitor.org (http://openenergymonitor.org/emon/buildingblocks/how-to-build-an-arduino-energy-monitor-measuring-current-only) you can get an Arduino lib allowing to convert the raw data from analog input into a nice useful values.

EmonLib (https://github.com/openenergymonitor/EmonLib)

Once downloaded and placed in your arduino librairies folder you can start the code

```
#include "EmonLib.h"                   // In
EnergyMonitor emon1;                   // Cr

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

  emon1.current(5, 60);             // Curre
  //calibration is explained bellow
}

void loop()
{
  double Irms = emon1.calcIrms(1480);  // Ca

  Serial.print(Irms*230.0);            // Ap
  Serial.print(" ");
  Serial.println(Irms);                // Ir
}
```

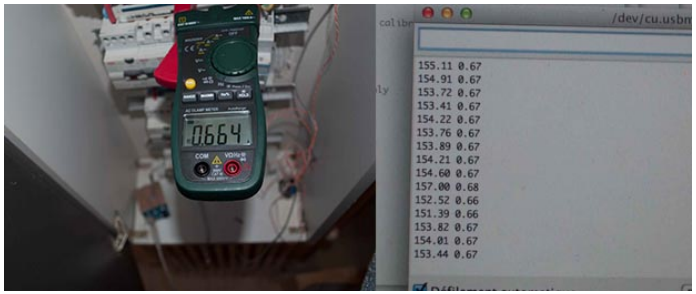
To well understand how to calibrate emon1 take a look at openenergymonito.org (http://openenergymonitor.org/emon/buildingblocks/ct-and-ac-power-adaptor-installation-and-calibration-theory) section *Current sensor – calibration theory.*

```
calibration_value = ( i(measured) /
i(sensor) ) / R(burden)
calibration_value = (141.4 A /  0.0
707A) / 33Ω
calibration_value = 2000/33Ω = 60
```

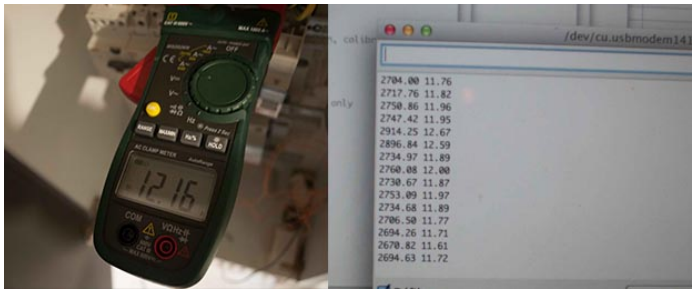
1480 is the number of sample used to compute a value. More info on openenergymonitor.org (http://openenergymonitor.org/emon/buildingblocks/explanation-of-the-phase-correction-algorithm)

And the result.

I checked Arduino returned value with a amperemeter.



(http://www.homautomation.org/wp-content/uploads/2013/09/test1.jpg)



(http://www.homautomation.org/wp-content/uploads/2013/09/test2.jpg)

And Last pictures from where it is placed into the board

(http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/dsc_0776/)

Next.

Next step is to connect the Arduino to wifi network in order expose a Web Service to monitor current consumption.

Sources.

http://openenergymonitor.org/emon/buildingblocks/ct-sensors-interface (http://openenergymonitor.org/emon/buildingblocks/ct-sensors-interface)

http://openenergymonitor.org/emon/buildingblocks/how-to-build-an-arduino-energy-monitor-measuring-current-only (http://openenergymonitor.org/emon/buildingblocks/how-to-build-an-arduino-energy-monitor-measuring-current-only)

http://openenergymonitor.org/emon/buildingblocks/ct-and-ac-power-adaptor-installation-and-calibration-theory (http://openenergymonitor.org/emon/buildingblocks/ct-and-ac-power-adaptor-installation-and-calibration-theory)

TAGS

arduino (http://www.homautomation.org/tag/arduino-2/)

current (http://www.homautomation.org/tag/current/)

Install an... (http://www.homautomation.org/2013/09/16/install-and-configure-transmission-on-your-raspbmc/)

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52 COMMENTS

Pingback: 433Mhtz RF communication between Arduino and Raspberry Pi | Homautomation (http://www.homautomation.org/2013/09/21/433mhtz-rf-communication-between-arduino-and-raspberry-pi/)

Maurizio Bianchi (http://www.betalabs.eu)

October 28, 2013 at 10:22 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-6)

There’s a mistake in I(sensor) formula as 141.1A / 2000 = 0.0707A (missing zero). The same applies to 2.5V * 0.0707A = 35.4Ω.

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=6#respond)

Vincent Demay

October 29, 2013 at 2:10 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-8)

Thanks for the review

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-

sensor-and-arduino/?
replytocom=8#respond)

Pingback: Current monitoring with non-invasive sensor and... (http://www.scoop.it/t/gim-by-cornut-chauvinc/p/4014359120/2014/01/17/current-monitoring-with-non-invasive-sensor-and-arduino-homautomation)

Damien

February 24, 2014 at 8:23 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-41)

Thanks for this article, which is the best I found on the subject. I was looking for a true understanding of how this works and I could clearly

understand the clockworks with my basic general knowledge in electronics.

It would be wonderful if you could add a brief explaination on how to choose the capacitor value (capacitance).

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=41#respond)

thieuduc2011

March 5, 2014 at 1:59 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-56)

Hello Vincent Demay,
I'm making Project like your project using SCt-013-030 sensor,

This sensor already has a burden resistor (62 ohm) inside, and the voltage output is 0-1V,

I ‘ve connected and made sketch similar to your code (with some different values suitable for my sensor), and i think it’s noway wrong but my arduino uno still get values 0 from A0.

I don’t know why and want to ask you that should i use an op amp circuit to amplify the voltage (ex: 100 times). and if i do that, which functions should i add to emonlib???

Hope you answer my question soon… Thanks

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=56#respond)

Vincent Demay

March 6, 2014 at 10:25 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-57)

Hi Thieuduc2011,
Did you try to mesure current with another device such as a multimeter to be sure there is current througout the wire? Or you can try to measure output of your sensor to check if there is a voltage. If so, your A0 pin should not stay a 0. Measuring voltage between 0 and 1V on the A0 pin should be ok.
One last question : do your sensor output

voltage as a sinusoid between -1V and 1V or it is already rectified?

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=57#respond)

Shiu Kumar

October 9, 2014 at 2:28 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-350)

Hi

I am trying this but the EmonLib seems to be not for Arduino. Could

you please provide the correct library which is working.

Thanks
Shiu

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=350#respond)

Vincent Demay

October 9, 2014 at 6:45 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-352)

Hi,

Emonlib for arduino is available here : https://github.com/openenergymonitor/EmonLib (https://github.com/openenergymonitor/EmonLib). Simply download to Arduino IDE ‘libraries’ folder. Restart of IDE required.

Best

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=352#respond)

thieuduc2011

March 9, 2014 at 3:25 pm

(http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-59)

Hi Vincent Demay,
Thanks for replying me soon, I ‘ve used a digital multimeter to measure output of my sensor and I got the value very very small: 0.04 A althougth I use my sensor to measure the current throughout the wire connected to supply power to my desktop when it’ve already been running… it can be small like that.

I also use a Oscilloscope to measure the voltage output to A0 pin. it was very small that it seem to be a noise.

And it hasnt change the value when I disconnected the power supply.

I think the output voltage as a sinusoid -1 to 1V

Can you give me some advices now?

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=59#respond)

Vincent Demay

March 10, 2014 at 6:48 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-61)

Sorry, I wrote down a new comment instead of replying, My response below.

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=61#respond)

Vincent Demay

March 10, 2014 at 6:41 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-60)

Hi Thieuduc2011,

if your sensor is this one http://garden.seeedstudio.com/images/b/bc/SCT013-030V.pdf (http://garden.seeedstudio.com/images/b/bc/SCT013-030V.pdf), it means it is a 0A to 30A sensor with 1800 turns and an integrated burden of 62 ohm. Your desktop should consume something like 1A or less.

So:
i(measured) = √2 * i(rms_current) = 1.414 * 1A = 1.41 A
i(sensor) = i(measured) / nb_turns = 1.41A / 1800 = 0.8mA
v(sensor) = 0.8mA * 62ohm = 0,05 Volt (sinusoidal around 0V)
It is really small. Maybe to test you should try it on a bigger circuit (sensor only around the phase cable — red).
I did my first test on an electrical oven circuit measuring the output voltage after the burden resistor (integrated in your case)

Anyway, you should add 2.5V to your output before connecting it to your Arduino A0 Pin. To transform it as a positive voltage (sinusoid around 2.5 V – You can use the same resistors as mine)

To calibrate emolib:
calibration_value = (i(measured) / i(sensor)) / R(burden)

calibration_value = (nb_turn) / R(burden)
calibration_value = 1800 / 62 = 29

Let me know if you succeed or not in getting some values.

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=60#respond)

Vishal

July 27, 2014 at 12:36 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-168)

Hi,

Is this calibration value, actually a multiplying constant (factor) internally in code for calculation of the Current and Voltage? Does do — (# of ticks x calibration constant)x((3.3V)/2^(#bit resolution of ADC)).

I think that is what it is doing, but just want to double check.

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=168#respond)

Vincent Demay

July 29, 2014 at

7:20 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-170)

Hi Vishal,

You’re right, It is the way current is computed.
Best.

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=170#respond)

thieuduc2011

March 18, 2014 at 4:17 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-63)

dear Vincent Demay,
Sr for replying to you for a long time. ^^. I ‘ve tried all the way you suggested but nothing changed even I’ve test with fridge and a cooker . I’m very worry about my project…

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=63#respond)

Joan

March 26, 2014 at 2:33 pm

(http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-65)

Thanks for the post! 😀
As Damien asked…how do you choose the capacitor?

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=65#respond)

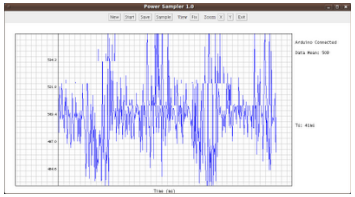
Vincent Demay

March 26, 2014 at 4:05 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-66)

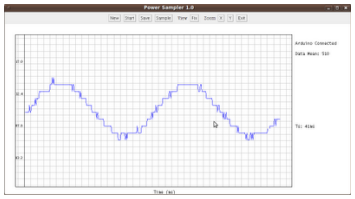
Hey Joan and Damien,

The Capacitor is used to reduce noise (I used a 10uF).
You can find the full explanation here: http://openenergymonitor.blogspot.fr/2010/03/reducing-noise-adding-capacitor.html (http://openenergymonitor.blogspot.fr/2010/03/reducing-noise-adding-capacitor.html)

but without the capacitor you'll get an output with the following form:



And with the capacitor – much better:



Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=66#respond)

Joan

March 29, 2014 at 7:26 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-68)

Thanks Vincent !! 😀

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-

sensor-and-arduino/?

replytocom=68#respond)

Stuart

May 16, 2014 at 2:56 pm

(http://www.homautomation.org/2013/09/17

/current-monitoring-with-non-invasive-

sensor-and-arduino/#comment-99)

Thanks for this, I may give it a go.

Just wondering, how do you power your Arduino? I dont have a socket nearby and dont want to have a cable training outside.

Sorry if its a silly question.

Stuart

Reply

(http://www.homautomation.org/2013/09/17

/current-monitoring-with-non-invasive-

sensor-and-arduino/?

replytocom=99#respond)

Vincent Demay

May 16, 2014 at 5:10 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-100)

Hello Stuart,

The Arduino is powered with a socket into the electrical panel, so no cable outside of the panel. If you want to power it via batteries, you can follow this tutorial (http://www.homautomation.org/2014/04/03/best-ways-to-power-a-arduino-according-to-your-need/)

It is not a silly question,
Best,

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=100#respond)

Wilis Permadi

May 30, 2014 at 10:38 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-124)

Hello Vincent 🙂

I have project that display current value of my electricity load on xively.com, i use SCT 013-030 and emonlib library, on local measuring, my arduino send an accurately value from this sensor (i use serial

monitor), but when i connect it to xively, it sent wrong value, can you give me some advice abaout it?

regards

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=124#respond)

engineer

August 2, 2014 at 9:14 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-175)

R(burden) = U(SENSOR)/I(sensor) = 2.5V * 0.0707A = 35.4Ω

Correct formula is

R(burden) = U(SENSOR)/I(sensor) = 2.5V / 0.0707A = 35.4Ω

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=175#respond)

Vincent Demay

August 2, 2014 at 11:38 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-176)

Thanks. Was a typo.
Fixed it
Thanks again. Best.

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?

replytocom=176#respond)

Eduardo

September 25, 2014 at 7:38 pm
(http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-331)

Hi,

Congratulation for the article.
I can to meter the power factor? I f yes, how to?

Thank you!

Reply
(http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=331#respond)

Dorothy

September 30, 2014 at 11:15 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-339)

I was just wondering, the current sensor has a jack in the end, how do you connect it to the shield that you made. Did you just cut the jack then connect the wires to the resistors?

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=339#respond)

Vincent Demay

October 1, 2014 at 7:16 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-

arduino/#comment-340)

Hi Dorothy;

Yes exactly I cut the wire to remove the jack, but if you want to keep it you can buy a simple connector.

Best,

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=340#respond)

Antonio

November 9, 2014 at 10:13 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-429)

What happens if the value of the burden resistor is high?
you can have a high voltage output and therefore dangerous?
Or the sensor is unable to provide the necessary power so that the probe YHDC SCT-013-000 CT is not likely to have a dangerous situation?

Thanks

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=429#respond)

Tom

November 30, 2014 at 10:29 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-452)

I´m having an issue that the arduino measures current around 50 Watts while nothing is connected and power consumption is = 0. Any idea how I could fix that? I set up the arduino just as described at openenergymonitor and I use a calibration of 89, what delivers good results using power over 100 watts up to 2600 watts. But it is very bad that it measures 50 Watts when nothing is connected. I appreciate any help, thank you!!!

PS. I´m using 5V and a 33 Ohms burden resistor

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=452#respond)

Vincent Demay

December 3, 2014 at 4:06 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-457)

Hi Tom,

You can try to change the value of the burden resistor to be more precise with low consumption. If you do so you have to compute every parameter according to this new burden.

Hope this help

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=457#respond)

Tom

December 14, 2014 at 4:19 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-473)

Hi Vincent,

unfortunately changing the burden resistor seems to have no effect on the output. I tried a 1.8k resistor and also no resistor, the output while nothing with power is

connected is always around 40-50 watts, 0,16-0,18 Irms 😕

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=473#respond)

Charl

May 8, 2015 at 2:26 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-16482)

Hi,

Lets say at 100% load the signal will dance from 0 to 5V. How do you read the peak values ? I mean the

read could happen just as the wave its 2.5V.

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=16482#respond)

Tinamore

June 2, 2015 at 6:20 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-20287)

Hello Vincent
How much mA the resolution of the circuit above?
Can measure resolution about mA ?
Thanks

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?

replytocom=20287#respond)

johnnypeste

August 28, 2015 at 4:25 pm
(http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-26736)

In this code isn't Irms always positive? And I agree that it should be… But then, how can I distinguish importing from exporting energy? I have a grid-tie solar inverter and when the sun is shining I'm exporting to the grid. How can I modify the code or the electronic setup to know if I'm consuming or producing electricity?

Reply
(http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=26736#respond)

beeper

September 11, 2015 at 3:58 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-28045)

Hi Vincent,
i have a short question. I want to use your introductions to measure a circuit with a max of 16A. I have done the following calculations:
i(measured max) = 1,414 * 16A = 22,627A
i(sensor) = 22,68A / 2000 = 0,01131A
R(burden) = 2,5V / 0,011314 = 220,9708 Ohm
I want to use a 220 Ohm resistor. Are my calculations correct? I am 100% sure or i fail to see something.
Thanks for your assistance,
beeper

Reply

(http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=28045#respond)

Arif Indra

September 24, 2015 at 12:09 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-28995)

Hi Vincent
I work with SCT-013-000 30A, and my circuit is same with you except the burden resistor I use 110ohm. The problem is If I measure the output with osciloscope I still have negatif voltage. I already used GND arduino to become the osciloscope reference. Do you have any idea? what am I miss? Thanks for helping me

Reply

(http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=28995#respond)

Lucas

October 4, 2015 at 3:00 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-29831)

Thank you very much!

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=29831#respond)

Pingback: deckerego/EnergyMeter | GITROOM (https://gitroom.org/?p=32596)

aranganathan

January 6, 2016 at 5:25 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-34870)

how to measure 3 phase AC current and voltage ???

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=34870#respond)

MIKE

January 25, 2016 at 11:09 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-35182)

Hi, I don´t understand the value I recieve. I am not getting any value aside from 0,18. It should have nothing to do with the wat I connected it, because I attached it to only one way of the cable. Has anybody experienced this before?

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=35182#respond)

Albert

February 5, 2016 at 9:08 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-35451)

Could you double the resolution by rectifying the input voltage (instead of adding the DC bias)? That would also remove R1 & R2 (adding the

diodes for the rectifier)? Am I missing something that makes this a bad idea?

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=35451#respond)

Ludovic

April 11, 2016 at 11:18 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-37886)

Just thinking quickly about the rectifier : The point is that you'll loose the VDiode*2 part of the signal : each diode of the diode bridge will

“eat” about 0.7V.
I don’t have the brain enought awaken to compute correctly, but you will loose at least 0.7V of the signal part.
When the signal is already lower than 0.7V (small power consumption), you then will not be able to measure anything !

Not sure that my theory is perfect, but I think it’s the main line…

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=37886#respond)

Chari (http://electricalsmarts.com)

February 18, 2016 at 5:48 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-35767)

Very good post on CTs, I also have an article regarding types of CTs on my page if anyone is interested in learning more about Current Transformer Theory (http://electricalsmarts.com/current-transformer-theory/). Cheers!

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=35767#respond)

santosh gairhe

April 8, 2016 at 11:44 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-37637)

Can you please tell me how to interface arduino to 5A Current transformer module with LM358 OPAMP on board. Four pins are available on board VCC, Vout, GND, GND. It will be a great help. Thanks in advance

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=37637#respond)

Pradeep

May 2, 2016 at 7:51 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-38092)

Sir, can we connect this thing with ESP8266 module and can monitor data from Blynk app.

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=38092#respond)

eli

June 21, 2016 at 10:47 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-38701)

hi did you found out if it can go with esp8266 ? (the module with adc pin)

Reply (http://www.homautomation.o

rg/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=38701#respond)

Edgar Estrada

May 23, 2016 at 1:21 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-38423)

Hello!
Do you know how could I implement the usage of this sensor with a Raspberry Pi?

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=38423#respond)

joseph

July 11, 2016 at 8:50 am (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-38835)

im also interested in this. any help would be appreciated

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=38835#respond)

Srinivasan

July 12, 2016 at 10:26 am (http://www.homautomation.o

rg/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-38840)

Hello,
It would be nice if someone could answer this question. And the codes involved if possible. Thanks a ton.

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=38840#respond)

dabo02

August 2, 2016 at 12:29 am (http://www.homautomation.org/2013/09/1

7/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-38949)

You would need the ADC add-on for it… after that you just open the arduino library copy and paste the measuring part of the code and after that you are free to go

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=38949#respond)

manohar

July 12, 2016 at 12:46 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-38843)

hello,
i want to measure three coils
current for three phase motor.
in example he used only one coil
how to change.
please.....
can anyone help me.

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=38843#respond)

Cameron

July 12, 2016 at 9:18 pm (http://www.homautomation.org/2013/09/17

/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-38845)

Just picked up my SCT-013-000 CT today.
Also have plans to implement it in a Raspberry Pi project.
Has anyone done this yet?

Reply (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=38845#respond)

Rudi

July 19, 2016 at 10:40 pm (http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/#comment-38892)

Can this sensor be used to measure DC current as well?

Reply

(http://www.homautomation.org/2013/09/17/current-monitoring-with-non-invasive-sensor-and-arduino/?replytocom=38892#respond)

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