CCHRC

Robbin Garber-Slaght <robbin@cchrc.org>

Re: Chat transcript

1 message

Joe Schlereth <jds@crmagnetics.com> Fri, Feb 16, 2018 at 5:32 AM
To: robbin@cchrc.org

Robbin,

Thank you for your interest.

I have attached the CR8400 Series catalog page,

The Maximum Linearly Sensed Current range the CR8410-1000-G is 0-7AAC and the CR8420-1000 is 0-50AAC

There are 2 formulas to the right hand side of the catalog pages.

Key:

1.) (I) = Desired Full Scale Input Current in AAC

2.) (DCR) = Direct Current Resistance of the CT

3.) (TE) = Effective Turns Ratio Including Losses

4.) (Vmax) = Max Voltage (Saturation) CT will develop in VAC

5.) (R) = Burden Resistor

6.) (V) = Desired Full Scale Secondary Voltage in VAC

7.) (VL) = Best Secondary Voltage Linear Range in VAC

8.) (Ir) = Maximum AC Input Current to be linearly sensed

You can find (Vmax, DCR, TE and Ir) on the attached CR8400, series catalog page beside the part numbers.

Ex: Lets say you are designing a circuit that requires a 0-1AAC input and you want to envelope a Secondary Voltage of 0-250mV. The application will also require the device to have the best accuracy possible and linear down in the low currents with a frequency range of 60- 400 Hz.

Knowing the above information I will first look at the "-G" or Ground Fault Current Transformers. I will choose the CR8410-1000-G Ground Fault Current Transformers because the application will require the device to have the best accuracy possible and linear down in the low currents.

So, Looking at a CT that is in the ranges required I would state, (Ir) must be within 1AAC and the (Vmax) must be within 0.25VAC. I would choose the CR8410-1000-G, the CR8410-1000-G has an (Ir) of 7AAC and has a (Vmax) of 0.8VAC. So, the CR8410-1000-G so far meets our requirements. We will have to solve for "VL" to be sure the 0.25VAC secondary will be possible with a 1AAC input.

The first formula is solving for "VL", Formula is: VL = Vmax - (I * DCR / TE).

VL = 0.8Vmax - (1AAC * 38DCR / 1007TE), So, VL = 0.762VAC. For best linearity, choose R such that V < 0.8 VL. So, I will multiply our VL of 0.762VAC by 0.8 which equals 0.6098VAC. So, 0.6098VAC is the most linear secondary voltage we can receive with an input of 0-1AAC.

We will now look at if "VL" of 0.6098 AC is within our 0.25VAC target voltage, and it is. So, we now know that the CR8410-1000-G will be linear from 0-1AAC input to a proportional 0.25VAC output.

Now we can look at the second formula (V = (I * R / TE) to find the proper burden resistor to place in parallel with the CR8410-1000-G secondary leads.

We know that "V" needs to equal 0.25VAC, what we don't know is what "R" needs to be. I will then change the Formula to solve for "R" . (R = V * TE / I)

R = 0.25VAC * 1007TE / 1AAC. R = 251.75 Ohms. If we place a 251.75 Ohm Resistor in parallel with the secondary of the CR8410-1000-G, you will receive a perfect 0-1AAC input to a proportional 0.25VAC output. However, you will never find a 251.75 Ohm resistor.

So, I would go back to the formula (V = (I * R / TE) and put a more common resistor value in "R" like 250 Ohms and solve for what the output will be. Ex: V = (1AAC* 250Ohms / 1007TE). So, V = 0.2482VAC out. Now with a 250 Ohms resistor in parallel with secondary leads of the CR8410-1000-G you will receive a 0-1AAC input to a proportional 0-0.2482VAC output. This would be considered a good design.

Now, we are using a 250 Ohm Burden Resistor we need to calculate for the wattage of the resistor. We do this by knowing the secondary current of the CR8410-1000-G. Formula is (Desired Full Scale Input Current / TE = Secondary Current) So, (1AAC / 1007TE = 99.3Micro Amps). Now that we know the secondary current we can calculate for Wattage. Wattage = (Full Scale Secondary Current * Full Scale Secondary Voltage = Wattage of the Burden Resistor). So,(99.3 Micro Amps * 0.2482VAC = 246 Micro Watts). We state to choose the wattage of the burden to be 10x's higher than the rated wattage. So, (10 * 246 Micro Watts = 2.46 mwatts). The resistor will need to be 250 Ohms and at least 0.25 watts.

Lastly, choose the most accurate resistor possible, the accuracy of the resistor must be added into the total accuracy of the CT.

I have also attached the PDF Dave wrote up about how to select high turn current transformers. This PDF will have the accuracy and frequency range specifications to help choose a CT.

Let me know if you have any questions.

Regards,

Joe Schlereth

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On Thu, Feb 15, 2018 at 1:42 PM, LiveChat <support@livechatinc.com> wrote:

Chat transcript

Joe S — Thu, 02/15/18 01:21:02 pm America/Chicago
Hi, do you need any help?

Client — 01:21:02 pm
I have some 8400 series cts and I am trying to figure out what amp they read, I have an 8410 and an 8420

Joe S — 01:22:00 pm
Sure, What is the full part number? Ex: CR8410-1000 or CR8410-2000, CR8420-1000 or 2000?
CR8400 Series.pdf

Client — 01:22:23 pm
cr8410-1000-g
cr8420-1000

Joe S — 01:22:58 pm
Sure, this is a lot of information can I email it to you?

Client — 01:23:17 pm
sure robbin@cchrc.org

Joe S — 01:23:35 pm
Sure, I will email shortly.

Client closed the chat. — 01:25:34 pm

Duration: 4m 32s

Chat started on: http://www.crmagneti...und-fault-current-transformers/cr8410
Referrer: https://www.google.com/
Visitor geolocation: Fairbanks, Alaska, United States / 137.229.78.176

E-mail from LiveChat

2 attachments

CR8400 Series.pdf
126K

High Turn Ratio CT Selection Guide.pdf
213K