Re: find mA rating for unknown power transformer?

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- *From*: "Chronic Philharmonic" <karl.uppiano@xxxxxxxxxxx>
- *Date*: Mon, 29 Oct 2007 00:08:38 GMT

"Phil S." <psymonds_no_spam@xxxxxxxxxxx> wrote in message
news:YcqdnZW5IPlhhrjanZ2dnUVZ_qWtnZ2d@xxxxxxxxxxxxxx

> "Chronic Philharmonic" <karl.uppiano@xxxxxxxxxxx> wrote in message
> news:lT7Vi.3848$%r.2457@xxxxxxxxxxx
>
> > "Phil S." <psymonds_no_spam@xxxxxxxxxxx> wrote in message
> > news:bLadnU349d1PnbjanZ2dnUVZ_u2mnZ2d@xxxxxxxxxxxxxx
> >
> > > "Chronic Philharmonic" <karl.uppiano@xxxxxxxxxxx>
> > > wrote in message
> > > news:p73Vi.698$TO4.187@xxxxxxxxxxx
> > >
> > > > "Phil S."
> > > > <psymonds_no_spam@xxxxxxxxxxx>
> > > > wrote in message
> > > > news:_d6dnSkHOsanNrnanZ2dnUVZ_hOdnZ2d@xxxxxxxxxxxxxx
> > > >
> > > > > I've got an old power
> > > > > transformer that is meant for
> > > > > a tube amplifier.
> > > > > It has 3 filament windings
> > > > > and one HT secondary.
> > > > > Running the primary
> > > > > direct from the wall supply,
> > > > > 120v, the HT secondary
> > > > > with out a load is
> > > > > 655vac across the outer legs.
> > > > > It has a center tap that I
> > > > > ignored for
> > > > > this purpose. So, I can guess
> > > > > that 327−0−327 is probably
> > > > > 300−0−300

> give or take 10−15v. The
> hard part is figuring out how
> much current
> capacity exists without
> killing the transformer.
>
> I have tested with 10W
> sandblock resistors (what I
> have on−hand)
> across the HT secondary
> and have these results. 14K7
> = 643vac,
> 9K8=640vac, 5K8=634vac,
> and 1K5 smoked & toasted
> at 590vac. Now, I
> realize that 1K5/590v is
> 390mA and 230W. This
> seems well beyond what
> is appropriate for this
> transformer. I am guessing it
> is capable of
> something around
> 150−180mA. But all this is
> trial and error.
>
> Is there a more definitive
> approach to uncovering the
> required
> information and properly
> back−solving for an answer?
> To repeat, the
> question is how many mA
> capacity is there?

10W wirewound resistors are not beefy enough for sustained operation. The test will let the smoke out of those in short order. I need to get the whole thing onto a fireproof surface and build a ladder with 25W rated resistors.

What would I use to measure temperature? Your run of the mill kitchen thermometer, like that all metal one I stick in a turkey? I'm not looking to buy something I'll use only one time, though it would be a perfectly good excuse to buy a gadget.

Those infared thermometers are pretty slick.
http://www.amazon.com/Professional−Contact−Digital−Infrared−Thermometer/dp/B000GYN95S

Or you might be able to use a stick−on LCD thermometer.
http://www.thermometersdirect.co.uk/acatalog/Thermometers_Direct__Liquid_Crystal_Thermometers__LCD__17.htm

They're pretty inexpensive, if you can find one with enough range.

> You have enough data to establish a load line (plot output voltage vs. current and extend the line to zero volts and maximum current − a short circuit). Most transformers are rated for a particular voltage at a particular current, and the voltage will drop as you load it more. That doesn't mean it isn't capable of sourcing more current; only that it won't deliver a particular rated voltage anymore.
>
> The more heavily you load it, the hotter it will become. I would pick a temperature above which it should not go (Fahrenheit 451? − no probably less than that :−) and see how much load it can handle before it reaches your selected cutoff temperature. This is a steady−state temperature. It should be able to source considerably higher current without overheating if the duty cycle is short.
>
> I would start by measuring the temperature with no load after several hours. Then measure the temperature with moderate load after several hours. Plot those two lines on a graph, and extend the line to the short−circuit current (obtained from the load line), and see where the temperature line crosses your cutoff temperature. Assuming the output voltage is still high enough, that's your maximum steady state−load.

Thanks. I recognize that a transformer is a passive thing that will continue to provide what current is demanded until is burns up.
Curiously enough, I didn't consider that temperature is an indicator

> that could be used in working the problem. It seems I'll need to get a
> heftier (able to handle more watts) load and something that can be
> scaled, like a bank of 25W wirewound resistors. Then I get to plot both
> temperature and voltage drop. Between the two, I ought to be able to get
> a decent idea of a reasonable and safe limit. I'm thinking a drop of 5%
> is safe and 10% might be too much. This is just based on my concept of
> what a manufacturer would likely have allowed. Given the age of the
> transformer, I'd guess 40 years old, I'd expect it to be a little
> overbuilt, but even in those days, the manufacturers were watching cost.
> So it seems, the idea is to get it running at maybe 120 F and certainly
> no more than 180F. 120 is too hot to touch comfortably, and is hot
> enough for my taste.

> Plotting this on graphs, you might be able to use your existing loads if they can withstand continuous operation (given the need for extended temperature tests). If the temperature measurement is precise enough and the data points not too close together, you should be able to plot a couple of points, and simply extrapolate the line. It's probably accurate enough.

Yup, I get it. This temperature thing is clever! Thanks.

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