
Subject: power transformer voltages

Posted by [scrap](#) on Fri, 01 Jan 2016 15:48:14 GMT

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replaced all caps on tube driver board. no heater voltage from power transformer. schematic is vague on voltages concerning this item. the transformer has two primary windings one with center tap. I'm led to believe these are for domestic or European line voltages. it has five secondary windings. one is +15/-15vdc to power the pre-amp, one is 6.3vac for the tube heaters, one is 450vdc for B+ voltage to the plates, one is 400vdc for the screen grids and the fifth is 300vdc? for bias voltage?? I've looked all over the net for one of these transformers and the company that manufactured them (cin-tran) was bought by standex international in 2001 does not produce them anymore. I will probably have the transformer re-wound by weber or mercury but I will have to supply them the voltage requirements. anyone who can confirm the above values would be greatly appreciated. thank you, scrap.

Subject: Re: power transformer voltages

Posted by [stevem](#) on Sat, 02 Jan 2016 12:10:59 GMT

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Everything looks good but for that really high bias voltage! That winding must have shorted to the V + winding as for 6L6 type output tubes you only need a max of 70 volts to start off with!

At this point since the amp would work with the right bias voltage I would just buy a separate little transformer just to supply the bias voltage and it only needs to be rated to supply 500 ma at most!

You can take a guess of the true voltage needed by the rating on the bias circuits filter cap(s) just figure they were running them at 5 volts less than what's printed on them.

In the end with some 450 volts on the plates you should only need a max of -54 volts, and I would guess that the amp would bias in at only -49.

You could also derive a whole new bias voltage off of the amps 450 volt V+ winding if that voltage source does not use a bridge rectifier set up.

The amp will make a little less max power as you will be pulling some 200 ma off of what the output tubes could have had to work with, but these amps are dam loud anyway!

Of course like you posted you could just send out to be rewound and just tell the rewinder that the amp ran two 6L6 tubes at 450 volts and that should be all they need, just note that it will not be in any way shape or form cheap to get that done!

Like I posted, I think a little transformer is your fastest and best bet!!

In going over my notes just now a transformer like a Hammond 161f56 should do the job just fine.

Subject: Re: power transformer voltages
Posted by [scrap](#) on Sat, 02 Jan 2016 13:40:39 GMT
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I am sorry for my misinformation, but these are the voltages I've gathered from the schematic. What I've measured from the transformer is 0 from all of the secondary windings except for the +15-15. (how that happened is hard to guess). I got the amp for free out of a dumpster and it looked so good I figured I could fix it. I recapped the driver board (\$23) and am looking at a couple of vintage ev 12s to load it with, I'm trying to determine if 2 50 watt speakers @ 8 ohms in parallel can handle the 100 watts output from the amp. So the bias should be 70 vdc. that tells me a great deal. (the schematic has a big black blob where that voltage is shown) I appreciate your comment greatly and hope you have a great new year. thank you.

Subject: Re: power transformer voltages
Posted by [steven](#) on Sun, 03 Jan 2016 11:18:13 GMT
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That's ok.
It makes no sense that you would only have the 15 volt winding working and all the others dead! Do they ohm check open , and like I posted that 70 volts would be the max raw voltage you would need, at pin 5 of the output tubes you should only need a -47 to -54 volts DC .
I am rather surprised that the Kustom schematic does not give that voltage!
Can you post up the schematic?

Subject: Re: power transformer voltages
Posted by [scrap](#) on Sun, 03 Jan 2016 14:05:16 GMT
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I've checked the resistance on all of the windings off the secondary and although they don't read as open, they only show about 1 or 2 ohms. but when I powered it up and noticed there was no heater voltage. so I checked all the other ones and got nothing except the low voltage winding. I've been kind of busy as of late and haven't been able to do a more thorough test on them. after the 7th I will get the chance to examine it in depth. I bought the schematic from musicparts.com and I'm not sure if they drew it up or it's a factory schematic but, it's not laid out very well and some of the values are unreadable. I've tried to e-m it to another person who needed a copy of it and it refuses to be copied. maybe I can print it out and then either scan it or take a picture of it to reinsert it back into this computer so I can send it out. after all, I paid for it, I should be able to give it to anyone I please. if I finally do manage to e-m it out, I will send it to you for your collection. once again, thank you.

Subject: Re: power transformer voltages
Posted by [steven](#) on Sun, 03 Jan 2016 22:52:14 GMT
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I have someone who will send me a copy so don't sweat it.

Subject: Re: power transformer voltages
Posted by [chicagobill](#) on Mon, 04 Jan 2016 02:34:09 GMT
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How are you reading the ac voltages? What voltage is the transformer primary set for?

Subject: Re: power transformer voltages
Posted by [scrap](#) on Mon, 04 Jan 2016 15:58:21 GMT
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right now I'm using a sperry multimeter. the primary appears to be set for 117-125 vac. it does have a second primary with a center tap that leads me to believe it can be switched to European line voltage, but that's a guess considering I've never seen a transformer that had two separate primary windings in an amplifier. I pulled the terminal blocks and tested them right from the secondary windings. I also powered the amp up and ran the pre-amp out into a separate power amp which worked. thank you.

Subject: Re: power transformer voltages
Posted by [stevem](#) on Mon, 04 Jan 2016 17:07:47 GMT
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If you are reading a winding resistance on the secondary side and the amp does not blow fuses then you should be seeing some level of secondary ac voltage and some level of DC voltage after the rectifiers .

Subject: Re: power transformer voltages
Posted by [chicagobill](#) on Mon, 04 Jan 2016 18:19:54 GMT
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Agree with Steve, it is not very often that a transformer will fail without blowing fuses, unless the primary has opened up. Are you using any sort of light bulb limiter or Variac on this amp?

I got access to a copy of the schematic for this thing (Thanx P) and it has dual primaries for 110/220/240 volt ac inputs. For 110 vac there are three jumpers that need to be installed on the board, JP7, JP9 and JP10.

There are 5 secondary windings, #1- 6.3 volts ac for the tube filaments, #2- 50 volts ac (my guesstimate) for the bias supply, #3 and #4- 16 volts ac one each for the positive and negative 15 volt dc supplies and #5- 318 volts ac (again my guesstimate) for the 450 volt dc high tension circuit.

There are fuses for each of the five secondary circuits, so be certain that all of the fuses are good and making good connections.

Subject: Re: power transformer voltages
Posted by [scrap](#) on Mon, 04 Jan 2016 19:23:45 GMT
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I did get a very low reading when testing for resistance on 4 of the 5 secondary outputs.

Subject: Re: power transformer voltages
Posted by [scrap](#) on Mon, 04 Jan 2016 19:33:12 GMT
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I tried it at first with a 150 w light bulb limiter and nothing smoked, so I tried it direct. that's when I noticed the tubes (7027A) weren't glowing which made me start checking all the secondary windings. As for fuses, the schematic shows that they were eliminated in lieu of the main fuse on the primary. The actual board is blank in all those positions. You have concurred with my reasoning about the second primary winding being for 240 vac. I'll have a chance to examine the voltages more closely on Thursday. I ordered an oscillator from Hantek that will convert this laptop so I can trace the signal throughout the entire driver board. Hopefully I will be able to make accurate measurements. I will relay anything I find to this forum for use of anyone else who comes across this problem. thank you.

Subject: Re: power transformer voltages
Posted by [chicagobill](#) on Mon, 04 Jan 2016 20:21:03 GMT
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Okay, I see the grid that shows the secondary fuses replaced with jumpers for the domestic versions of the amp. European standards are/were different from the US standards. They require the secondary fuses while the US doesn't.

Reading dc resistance of the windings of a transformer really only tells you if the winding is open or not. There isn't any direct correlation between the winding resistance and the voltage output.

Subject: Re: power transformer voltages
Posted by [scrap](#) on Mon, 04 Jan 2016 21:20:48 GMT
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I will power it up Thursday to re-check those, maybe I missed something. I replaced all the electrolytic caps but didn't really look at any of the resistors. the ones on the tube board all look good.

Subject: Re: power transformer voltages
Posted by [stevem](#) on Tue, 05 Jan 2016 11:36:43 GMT
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one thing you can do since that 6.3 volt winding works to prove out the trans is to disconnect all the secondary wires and then if you gave a veriac or another tube amp do this. Into each what seems like dead windings pump in some low voltage or feed in the 6.3 volts from the other amp, if you then read a higher ac voltage on the transformers primary side then they is a good chance that the PT may be good !

Subject: Re: power transformer voltages
Posted by [chicagobill](#) on Tue, 05 Jan 2016 17:53:33 GMT
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I would only suggest that you do this as a last resort, as it can be very dangerous if you don't know what you are doing.

In any case, I'm still not sure that the transformer has been completely tested.

Subject: Re: power transformer voltages
Posted by [scrag](#) on Tue, 05 Jan 2016 20:19:29 GMT
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I will try that. I have an Ampeg v4 with a good heater winding that I can jumper into the Kustom. That might help me put another pice of the puzzle in place. I'm hoping that I can get this up and running, I want to use it as a bass amp on stage, it will cut down on the stuff I have to lug around. I worked as an electrician for a number of years and have first hand knowledge on how to deal with high voltage. (been poked by a 208 high leg from a 3 phase circuit and worse than that a 277 single wire which hurt like %#*&!). That Ampeg is giving me some trouble but right now I'd rather get this Kustom fixed. thank you.

Subject: Re: power transformer voltages
Posted by [stevem](#) on Wed, 06 Jan 2016 11:36:23 GMT
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If you have a ac type 9 volt or whatever wall wart you can use that also . The turns ratio on the 450 volt winding is 3.84, so pumping in 9 volts will give you 34 volts or so showing up on the primary side if it's good, and the 300 volt winding with its 2.56 ratio should net you some 23 volts on the primary.

I have a V4 I am restoring right now and there are two different models, the latter ones that came out in 1976 have a diode clipping distortion channel and the death caps (grounding cap) in these amps tend to blow up as they are not even rated for 200 volts and they also have physical failure issues with the multi color banded coupling caps in the audio circuit.

Let me know if you have issues when you get into that one!

Subject: Re: power transformer voltages

Posted by [scrap](#) on Wed, 06 Jan 2016 13:41:14 GMT

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thanks for that info on the wall wart, that should prove useful. My v4 is another story. it's a 1971 or thereabouts with no master volume. when I got it the pre-amp worked but the power amp had blown all of the screen grid resistors which burned right through the main board. I bought a replacement board and transferred all the components to it. those odd multicolored caps were crazed pretty badly so I decided to replace every cap. I eliminated the death cap when I changed the original cord to three prong. I found all of the multistage caps at antique radio supply and tubes and more. I think the blowout damaged the power transformer one that one too. one leg reads normal but the other leg reads about 50 volts below normal and when I power it up it motorboats. I'll have to go back into it later when I get this Kustom straightened out. if you need anything for yours let me know. I've been collecting schematics for all of the v4s. I haven't heard any good reviews of the distortion feature on them. Most prefer the non-master volume over the others. thank you for the advise, it is very helpful.

Subject: Re: power transformer voltages

Posted by [stevem](#) on Wed, 06 Jan 2016 23:42:53 GMT

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If you do power it from the Ampeg you should stick in a 1/2 amp fast blow fuse by means of a inline fuse holder or something just to be on the safe side.

Subject: Re: power transformer voltages

Posted by [scrap](#) on Thu, 07 Jan 2016 14:07:43 GMT

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good advice. I will do that. I should be able to get back to it later this day. I'll post my results when I get them. thank you.
