

HW-101 and HP-23A restoration

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w5rkl:

I'm restoring an HW-101 and HP-23A supply. The HW-101 is almost complete except for the carrier null pot needs replacing. The HP-23A supply was thoroughly checked, brought up slowly using a variac, with no signs of problems. All voltages checked out ok. However, after about 30 to 45 minutes of testing, the HP-23A HV filter capacitors became a bit warm as did the power transformer. Thinking the HV caps were leaky, I rebuilt the supply with all new modern capacitors, diodes, and HV equalizing resistors. After ensuring no shorts existed, the circuit was wire exactly as it should be, diodes were wired correctly, and the power supply resistance checks were exactly what the manual stated, I connected the HW-101 to the HP-23 and power it up. Everything was going fine. After 30 to 45 minutes of receiving, I felt the HV capacitors and the power transformer and both were as warm as the original Heath capacitors were. This didn't make sense, since 90% of the 30 to 45 minutes was simply receiving. The final amplifiers' bias setting is set at 50ma, exactly what it should be. The resonant plate current in CW mode, at full output into a 50 ohm dummy load is 225ma, normal for full output.

Very little transmitting, in the beginning of the time period, occurred. In standby mode, the final tubes are biased to cut off so current flow in the final tubes, 6146A in this case, would be zero. Since the HV has it own circuit, in standby with both final tubes in complete cut off, capacitor heating clearly indicates more than bleeder current is being drawn from the HP-23 HV supply. The equalizing resistors, two 100K 2 watt resistors across each series capacitor for a total series parallel resistance of 100K, double as the equalizing resistors as well as

bleeder resistors. The HV measures 794VDC on the plates of the 6146A in the HW-101. I measured resistance from the plate caps of the 6146A to the HP-23 supply HV output and it shows no resistance, no shorts to grounds, and the resistance checks, again, are what the manual shows.

Heath's SB-400 and SB-401 uses the same HV supply circuit as the HP-23 except it's internal to the transmitter. The components are the same except the power transformer in the SB-400 and SB-401 transmitter is physically smaller. Other than that, there is no difference in the HV supplies. Neither of my SB-400 and SB-401 have a capacitor heating problem, even if the transmitter is in standby for half an hour or more.

I've used the same small modern capacitors in both of my SB-400 and SB-401 transmitters that I used in the HP-23 and have never experience capacitor heating in the SB-400 and SB-401 HV supplies as I have with this HP-23. Why this is happening has me stumped. ???

Any suggestions?

73

Mike

W5RKL

WQ9E:

Mike,

In my experience the HP-23 supplies generate a fair amount of heat. Years ago I used my SB-102/HP-23A at field day and after an hour of operation you didn't want to leave your hand on the transformer. It was being used by an operator running SSB and this was before the days of processors so it was a fairly low duty cycle. That same HP-23A and SB-102 (but with new filter caps) is still working fine today. Since the HP-23A HV supply is a voltage doubler the capacitors are seeing a fair amount of ripple and they may heat up a bit above ambient but unless they are getting noticeably hot I wouldn't worry. If I get a chance later tonight I will leave one of my Heath rigs running receive only for awhile tonight and I will get an exact temperature reading on the caps and transformer-note that it

will be a little cooler than yours since my basement is still a chilly 62 degrees given that spring is just now arriving here.

73, Rodger WQ9E

W1RKW:

Hi Mike,

The HW101 was my first rig and I have it still. Haven't touched it in years. It's mothballed somewhere in the basement and have no clue if it still works.

I don't remember the PS operating temp or ever remember worrying about its operating temp. I suppose I could hook it up and run it for an hour and take some temp measurements.

I guess the big question to ask is how warm is the warm you're experiencing? Are the transformer and caps uncomfortably warm? Remember the transformer is supplying other voltages to the rig such as 12V and 6V for the filaments which have a larger current draw so some of the heating could be from that especially since that is constant. As far as the caps go, aren't the bleeder resistors mounted directly underneath the caps? Maybe the caps are getting warm from the resistors via heat convection?

I'll pull my old HW101 out and hook it up this weekend and let you know what I find. Hopefully it still works.

Bob

w5rkl:

Thanks Roger and Bob for your comments. The caps are not hot but more like luke warm or a slight bit warmer. The HW-101's output doesn't indicate it's being affected by the warm capacitors. The final tubes are not warmer than normal and, surprisingly, after a 20 minute back and forth CW QSO on 40 meters at 105 watts, the finals are much cooler than the finals in both my SB-400 or SB-401 for the same QSO time. The 400 and 401 higher heat is not only caused by the final tubes but lack of air flow through

the final cage. The case doesn't have side and rear vents like the 101 does.

Again, thanks for the comments guys and look forward to hear the results of your test Roger and Bob.

73
Mike
W5RKL

Tom WA3KLR:

I was an original owner of a HW-101 that I built in 1971. I had it for about 16 years then sold it. During the last overhaul I found that many of the resistors had gone way up in value. Part of that problem was that Heath undersized many of the resistor wattages.

After putting in a new resistor of the proper value, I found that when I calculated the dissipation based on the actual voltage drop across the new resistor, I had to replace the resistor again with a higher wattage one. I don't have the documentation since I don't own the unit anymore. This was the cause of all of the performance decreases.

P.S. I home-brewed my own power supply for the HW-101 using a TV transformer. Much stiffer than the wimpy Heath supply.

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