

At the Repair Bench – Heathkit® HP-23B - October 2022

Every now and then, I will come across a repair that should have been avoidable with proper equipment maintenance. Unfortunately, some maintenance is beyond the skill set of the equipment owner. This month's repair is just such a repair.

The Heathkit® HP-23B is a multi-output power supply used in conjunction with several of that company's ham radio equipment offerings. The PSU provides outputs of 700VDC at 250mA, 350VDC at 150mA, 250VDC at 100mA, -100VDC at 20mA, and 12.6VAC at 5.5A. The incoming power is a standard 120VAC at about 350 watts. The unit is heavy, weighing in at about sixteen pounds.

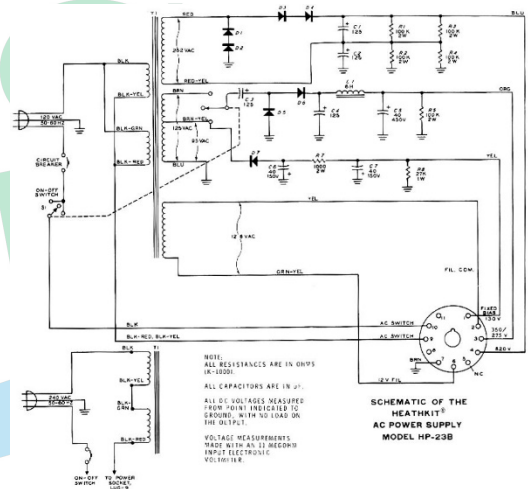


This particular HP-23B came to me with the complaint that it would repeatedly trip the chassis-mounted 2.92-ampere circuit breaker. The owner would press the reset button, and almost immediately it would trip out again. This behavior led me to believe that there was either a dead short circuit somewhere, or a condition that would mimic a short circuit very closely. Time for some detective work.

The circuit breaker is installed in the power transformer primary winding circuit, so I started out by applying some judicious use of the ohmmeter to the primary circuit, only to find that all was as it should be. No problem there, so it was off to the secondary side.

I decided to eliminate the simplest circuit first, which is the 12.6VAC output. This circuit is simply taken from an isolated secondary winding and carried to the output plug as the two secondary leads from the winding – no additional components. There was no short circuit there, and the winding resistance was reasonable. I moved on to the DC outputs.

The three DC output circuits are easily isolated by opening a single wire lead in each circuit, which would then allow for resistance readings to ground at various points in those circuits. It did not take very long to identify an "almost" shorted 125µF filter capacitor in the medium/low voltage output circuit. This capacitor had extremely high leakage and would obviously require replacement.



I next removed and bench-tested all of the electrolytic capacitors in the unit, and I found relatively high leakage in three of the four 125µF filter capacitors and in one of the 40µF electrolytics used in the -100VDC bias circuit.

There is a company called Hayseed Hamfest (www.hayseedhamfest.com) who provides re-cap kits for this power supply. The beauty of their kit is that the unit retains its original appearance, though it functions like brand new. The kit is offered in multiple formats – either with or without the smaller capacitors, and in standard or in increased working voltage versions. I ordered up the standard voltage kit in the complete (all capacitors) version and sat back and waited for it to come in.

The installation of the capacitors was a straightforward repair, as all of the parts are intended to fit exactly in place of the originals so as to preserve the factory appearance of the unit. Post-repair testing showed all to be functional and the voltages to be at the manual specified levels. I wrapped and boxed the PSU and shipped it back to the owner (after he paid my bill, of course!)



This put another one in the “WIN” column, but it did reveal an important point. When it comes to older electronic equipment, periodic maintenance should probably include at least the testing of, if not the actual replacement of, any and all capacitors that are likely to age poorly. This obviously includes filter capacitors, as they do a huge part

of the job when making clean DC from the transformed AC supply. See you next month!

