

## Re: Selenium rectifier question

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"Jerry G." <[jerryg50@xxxxxxxxxxxxxxxxxxxxx](mailto:jerryg50@xxxxxxxxxxxxxxxxxxxxx)> wrote in message  
[news:WoydnU8t2MHTYp3VnZ2dnUVZ\\_vWtnZ2d@xxxxxxxxxxxxxxxxxxxxxxxxxxxxx](mailto:news:WoydnU8t2MHTYp3VnZ2dnUVZ_vWtnZ2d@xxxxxxxxxxxxxxxxxxxxxxxxxxxxx)

The diodes are probably breaking down. You need to have them rated at 2.8X of the voltage for the peak to peak from the AC. I would use diodes rated to at least 3000 V to 4000 V minimum in this case because the no load voltage is over 900 V. You can use 4 of 600 V in series to get the proper voltage rating. I would also put caps at about 0.005 uF / 5 kV rated across each diode. This would be for HF noise suppression.

You should find out the required current needed for the supply load. The diodes should be rated to at least 3X the required current at minimum. This will allow for the inrush when the power supply is started up. The electrolytic filter caps have to get charged up.

In series with each leg of diodes in series, I would put a 10 ohm 5 Watt resistor in an average tube power amp supply.

If you use 1 Amp rated diodes, you can easily find diodes rated to 1000 Volts. This would allow for 900 Watts maximum load at 1000 Volts. Using 3 in series on each leg of the rectification path would be very adequate for a 1000 Volt no load source.

I would not re-use the present diodes at this time. Most likely they may be damaged even if they read okay.

Before going to all this trouble, make sure you find the cause of the original rectifier failure. It may be age, but a short or something pulling too much current should not be ruled out.

If you want to go more authentic and you have the space, get an 8 pin octal socket, and a 5U4-GT tube. Knock out the holes in the chassis and install the tube rectifier assembly. You will need a high voltage isolated floating 5 Volt 2 Amp supply just for the heater. The heater is tied hot to the cathode of this tube. You can then feed the AC 900 Volts plate to plate, and the rectified plus source would be on the cathode.

## Re: Selenium rectifier question

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Jerry G.

I'm not sure that 10 ohms is going to do too much to limit the inrush current at these sorts of voltages, and will produce little useable running voltage drop to compensate for the higher DC that will be produced by the replacement silicon diodes over the original selenium stack. As far as grafting in a 5U4 goes, I think that I would want to know a bit more about the actual AC supply level, as this device is rated maximum 450–0–450, and if the HT supply was up at over 600v DC off load (ie before the delay circuit had applied the DC to the output stage) by the time that the variac was at 70%, this would indicate that more than this was being produced by the transformer whilst it was off load.

Depending on the voltage rating of the main filter caps, I would feel inclined to use 3 x 1000v PIV 1 or 2 amp diodes in series, as Jerry suggests, with a couple of high voltage 3 watt zeners in inverse series with each rectifier string, before the filter caps. That will ensure that the forward voltage drop of the original seleniums, which will have been taken into consideration by the designer when he specced the caps and the output stage supply, is effectively preserved by the replacement rectifier arrangement. The zener value would be chosen to provide a similar drop to that which the selenium stacks produced

Another possibility might be to use microwave oven diodes, which are also constructed as multi–diode 'stacks', so might better emulate the original selenium stacks for forward voltage drop. They are extremely high voltage working and quite meaty, current–wise. I must add, however, that I have never tried any in this sort of application, so they might have more or less voltage drop than you need.

Jerry's advice to bypass the diodes with suitably rated caps is good, and I would absolutely concur on that point. Also, on not re–using the diodes that you have in there at the moment, and on making sure that there is not some other problem that led to the demise of the seleniums. These were never the most robust devices, if subjected to long term overload ...

Arfa

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