



## Cushman CE-5

Isolate the filament from the original power supply and connect to an AC transformer through a Variac. Then follow the Voltages and durations in the chart. (I used a 12.6 Volt transformer through my Variac -- This allows a variable output of 0-12.6 Volts AC. Some people use DC for this because it is easier to come by, but filaments were designed to operate from AC, not DC, and many experts suggest that DC will be less effective at best, and damaging at worst.) Note that the last five steps are performed with the anode and cathode at operating voltages. Be sure to check the maximum potential difference allowed between the cathode and the filament!! You may need to have a resistor in place to raise the potential at the filament, which will be dangerous! Use brains and caution! Be aware that your isolation transformer must be able to withstand the isolation Voltage as well!

Filament Voltage as a % of rated		
Step	Duration (Minutes)	% of Rated Voltage
1	5	34%
2	2	44%
3	2	65%
4	2	102%
5	2	124%
6	2	161%
7	90*	124%
8	390*	117%
9	295*	110%
10	200*	107%
11	270*	102%
* Cathode & Anode At Operating Voltages		

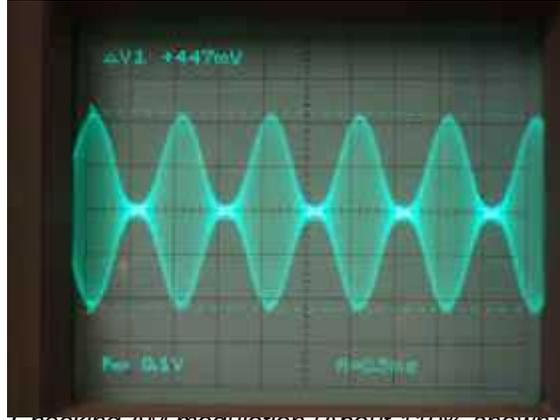
## Calibration and Disposition

Calibration information on the CE-5 is unavailable. I did find a copy of the manual online, a terrible copy with limited service information. The calibration in the manual was limited to trimming, rather than full, detailed instructions. This was enough to get the monitor in usable condition, but I am not willing to risk throwing it out of working condition to experiment on calibration. Monitor functions work well, deviation measurements are reasonably close, and output levels are very usable, though off by as much as +10 dBm. Deviation was checked using the [Bessel function](#) -- a very simple and accurate method. The frequency accuracy is better than 0.0036% and short term stability after warm up is better than I can measure -- Most excellent.





Measuring output power



Checking AM modulation (About 110% shown)



FM deviation Measurement check, 4 kHz shown



