

AUXILIARY POWER SUPPLY SYSTEM FOR 1.5 MW, 40MHz CW RF AMPLIFIER

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A 1.5MW RF (≈ 40 MHz) amplifier using Eimac tetrode 4CM2500KG is being developed at Institute for Plasma Research (IPR), for the ion cyclotron resonance heating (ICRH) system of Super conducting Steady State tokamak, SST1. This RF amplifier is used to amplify an input power of 200kW to about 1.5MW. It needs few DC power supplies for its operation as an amplifier, namely a HVDC power supply, a screen grid power supply, a filament power supply and a control grid power supply for anode biasing, screen biasing, filament heating and control grid biasing respectively. The DC power supply for filament, control grid and screen grid together are categorized as auxiliary power supplies. These auxiliary power supplies play vital role in the operation of the RF amplifier and have been developed in-house.

Filament power supply is one of the important auxiliary power supplies of this amplifier. This amplifier needs about 10Kw ([15v@650A](#)) of AC/DC power for filament heating. Therefore, We have developed a DC power supply rated for [15V@1000ADC](#) for this purpose. Careful design of the filament power supply can extend the life of the amplifier. Another important auxiliary power supply for this amplifier is the control grid power supply. This amplifier needs 4kW of DC power (500V@8ADC) for its' control grid. Therefore, We have developed a DC power supply rated for [600V@10ADC](#) to bias the control grid. Under any circumstances, the control grid voltage must not be equal to zero; otherwise it may lead to catastrophe. The most important auxiliary power supply for this amplifier is the screen grid power supply. This amplifier needs a dc power of 6kW([1500V@4ADC](#)) for its' screen grid. Therefore, We have developed a DC power supply rated for [1600V@5ADC](#) for screen biasing.

All the control signals and safety interlocks have been incorporated in all these power supplies for the remote operation from a PC located in the control room, which is located at a distance of 20 meters. In this paper, the test results and various calibrations of all the auxiliary power supplies on a dummy load would be presented. Also few important points, which were evolved during DC testing of the amplifier, with these power supplies, would be highlighted.