



866-A/866

HALF-WAVE MERCURY-VAPOR RECTIFIER

RCA-866-A/866, a half-wave mercury-vapor rectifier, supersedes the well-known RCA types 866-A and 866. This tube combines the ability of the 866-A to withstand high peak inverse voltages and the ability of the 866 to conduct at relatively low applied voltages. The 866-A/866 employs a ceramic cap insulator and is constructed in a dome-type bulb. This construction minimizes the danger of bulb cracks caused by corona discharge. An edgewise-wound ribbon filament made of a new alloy material provides a cathode having a large emission reserve and improved life. Two 866-A/866's operating in a full-wave rectifier are capable of delivering to the input of a choke-input filter a rectified voltage of 3180 volts at 0.5 ampere with good regulation.

GENERAL

FILAMENT VOLTAGE *	2.5	Volts
FILAMENT CURRENT	5.0	Amperes
TUBE VOLTAGE DROP (Approx.)	15	Volts
BULB	ST-19	
CAP	Medium, with Insulating Collar	
BASE	Medium 4-Pin, Bayonet	

MAXIMUM RATINGS

PEAK INVERSE ANODE VOLTAGE	2000 max.	5000 max.	10000 max.	Volts
PEAK ANODE CURRENT	2 max.	1 max.	1 max.	Amperes
AVERAGE ANODE CURRENT	0.5 max.	0.25 max.	0.25 max.	Ampere
SUPPLY FREQUENCY	150 max.	1000 max.	150 max.	
CONDENSED-MERCURY TEMPERATURE RANGE#	25 - 70	25 - 70	25 - 60	°C

*The filament should be allowed to come up to operating temperature before anode voltage is applied. For average conditions, the delay is approximately 30 seconds.

#Operation at $40^{\circ} \pm 5^{\circ}\text{C}$ is recommended.

INSTALLATION and APPLICATION

The base pins of the 866-A/866 fit the standard 4-contact socket such as the RCA stock No. 9937. The socket should be installed to hold the tube in a vertical position with the base down. The plate lead is brought out through a separate seal at the top of the bulb.

The condensed-mercury temperature of the 866-A/866 should be kept within the ranges shown under RATINGS. It is recommended that for the most satisfactory operation the condensed-mercury temperature be maintained at $40 \pm 5^{\circ}\text{C}$. This temperature can be measured with a thermocouple or a small thermometer attached with a minimum amount of putty at a point near the base end of the bulb. Lower than recommended condensed-mercury temperature raises the potential at which the tube starts to conduct and is unfavorable for long filament life. Higher than recommended condensed-mercury temperature decreases the potential at which the tube starts and is favorable for long filament life but reduces the peak inverse voltage which the tube can stand.

The coated filament should be operated at the rated voltage of 2.5 volts under average operating conditions. The filament voltage, measured at the tube terminals, should not vary more than plus or minus 5% from the rated value. This tolerance should include the effects of transmitter modulation load as well as the normal power-supply regulation. Less than the recommended filament voltage may cause a high voltage drop with consequent bombardment of the filament and eventual loss of emission. Greater than recommended voltage will also shorten the life of the filament. The plate-circuit return of each tube should be made preferably to the center tap of the transformer winding supplying the filament voltage; if this is impossible, the return should be made to that side of the filament to which the cathode shields are connected. When the filaments of two or more tubes are connected in parallel, the filament terminals to which the cathode shields are connected should be tied together. These recommendations are made in order to insure uniform starting voltage for each tube in a multi-tube arrangement.

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

Caution should be observed when the filament voltage is measured because the filament circuit is at high d-c potential.

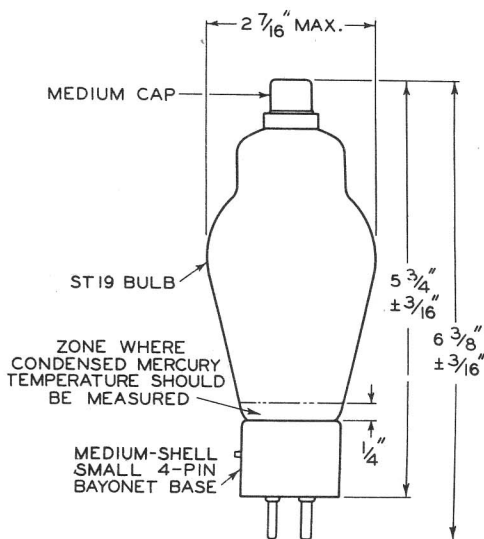
The filament of the 866-A/866 should be allowed to come up to operating temperature before the plate voltage is applied. For average conditions, the delay should be approximately 30 seconds. If there is evidence of arc-back in the tube, the time delay should be increased. In radio transmitters during "standby" periods, the filament should be kept at its rated voltage to avoid delay in "coming back". A protective relay having an obtainable delay period of one minute is desirable in the plate circuit to prevent automatically the application of plate voltage before the filament has reached operating temperature.

When an 866-A/866 is first placed in service, the filament should be operated at normal voltage for approximately 10 minutes without plate voltage in order to distribute the mercury properly. This procedure need not be repeated unless, during subsequent handling, the mercury is spattered on the filament and plate.

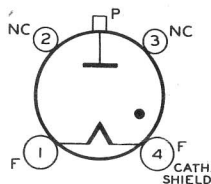
The 866-A/866 should be isolated from the transmitter as much as possible in order to avoid the detrimental effect of electromagnetic and electrostatic fields. These fields tend to produce breakdown in mercury vapor, are detrimental to tube life and make filtering difficult. External shielding should be used when the tubes are in proximity to these external fields. R-f filtering should be used when the tubes are affected by r-f voltages. When shields are used, special attention must be given to adequate ventilation and to the maintenance of normal condensed-mercury temperature.

Filter circuits of either the choke-input or the condenser-input type may be used. If the condenser-input type of filter is used, special attention must be given to the instantaneous peak value of the a-c input voltage which is about 1.4 times the RMS value as measured by an a-c voltmeter. It is important, therefore, that the filter condensers (especially the input condenser) have a sufficiently high breakdown rating to withstand the instantaneous peak value. With the condenser-input type of filter, the peak plate current of the tube is considerably higher than the load current. When choke input to the filter is used, the peak plate current is substantially reduced. This type of filter is preferable from the standpoint of obtaining the maximum continuous d-c output from the 866-A/866 under the most favorable conditions.

Two or more 866-A/866's may be connected in parallel to give a corresponding increase in output current over a single tube. In this service, a stabilizing resistor of approximately 50 ohms should be connected in series with each plate in order that a proportionate share of the total load current will be carried by each tube. In special cases where it is desirable to minimize the small power loss caused by the voltage drop through the stabilizing resistors, an inductance of approximately one-third henry may be connected in series with the plate lead of each tube in place of the resistor. The inductance has the added advantage of limiting the peak plate current to each tube, which is especially desirable when a condenser-input type of filter is used.



BOTTOM VIEW of SOCKET CONNECTIONS



P - PLATE
 F - FILAMENT
 NC - NO CONNECTION
 ● - GAS TUBE TYPE