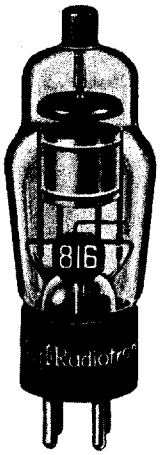
ØØ816RCA

HALF-WAVE MERCURY-VAPOR RECTIFIER

816

RCA-816 is a half-wave mercury-vapor rectifier designed for transmitting equipment requiring a small-size rectifier tube handling less power than the 866-A/866. The overall length of the 816 is less than 4-3/4 inches, but its maximum peak inverse voltage and peak plate current ratings are 5000 volts and 0.5 ampere, respectively: values one-half those of the 866-A/866. In addition to its compact size, the 816 features a dome-type bulb, a top-cap terminal, and an edgewise-wound ribbon filament made of a new alloy material to provide large emission reserve and long life.



Two 816's operating in a full-wave rectifier circuit are capable of delivering to the input of a choke-input filter a rectified voltage of approximately 1600 volts at 0.25 ampere with good regulation.

RATINGS

FILAMENT VOLTAGE (A.C.) #	2.5	Volts
FILAMENT CURRENT	2.0	Amperes
PEAK INVERSE VOLTAGE *	5000 *max.*	Volts
PEAK PLATE CURRENT	500 *max.*	Ma.
AVERAGE PLATE CURRENT	125 *max.*	Ma.
TUBE VOLTAGE DROP (Approx.)	15	Volts
BULB	ST-12	
CAP	Small Metal	
BASE	Small 4-Pin	

\# A delay of 10 seconds should be allowed for filament to reach operating temperature before application of plate voltage.

* For supply frequency up to 150 cycles and for condensed-mercury temperature of 20° to 60°C.

INSTALLATION

The *base* of the 816 fits the standard 4-contact socket which should be installed to hold the tube in a vertical position with the base down. The plate connection is made to the cap at the top of the bulb.

The *condensed-mercury* temperature of the 816 should be maintained between 20°C (68°F) and 60°C (140°F). 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 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 value of 2.5 volts under average operating conditions. The filament voltage, measured at the tube terminals, should not vary more than ±5% from the rated value. This tolerance should include the effects of regulation caused by 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 the rated voltage will also shorten the life of the filament.

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

The filament of the 816 should be allowed to come up to operating temperature before the plate voltage is applied. For average conditions, the delay should be approximately 10 seconds. If there is evidence of arc-back in the tube, the 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 is desirable in the plate circuit to prevent automatically the application of plate voltage until the filament has reached operating temperature.

When an 816 is first placed in service, the filament should be operated at normal voltage for approximately five 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.

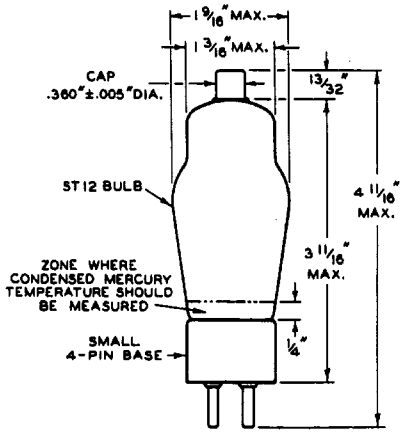
The 816 should be isolated from the transmitter as much as possible in order to avoid the detrimental effects of electromagnetic and electrostatic fields. These fields tend to produce breakdown in the mercury vapor, are detrimental to tube life and make filtering difficult. External shielding should 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.

APPLICATION

Filter circuits of either the condenser-input

or the choke-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 with an a-c voltmeter. It is important, therefore, that the filter condensers (especially the input condenser) have a sufficiently high breakdown rating to withstand this 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 current from the 816 under the most favorable conditions.

Two or more 816'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 resistor, an inductance of approximately one-third henry may be connected in series with the plate lead of each tube in place of the stabilizing resistor. The inductance has the added advantage of limiting the peak current to each tube, which is especially desirable when a condenser-input type of filter is used.



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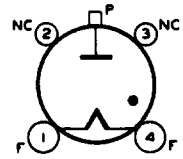
Bottom View of Socket Connections



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