

Eitel-McCullough, Inc.

SAN BRUNO, CALIFORNIA

4PR60A

RADIAL-BEAM
PULSE TETRODE

MODULATOR
AMPLIFIER

The Eimac 4PR60A is a high-vacuum tetrode intended for pulse-modulator service in circuits employing inductive or resistive loads. This tube unilaterally replaces the 715C and the 5D21.

The 4PR60A has a maximum plate dissipation rating of 60 watts, is cooled by radiation and convection, and delivers pulse power output in the range of 300 kilowatts with one kilowatt of pulse driving power.

GENERAL CHARACTERISTICS

ELECTRICAL

Cathode: Oxide-coated, Unipotential

Heater Voltage	26.0	volts
Heater Current	2.25	amperes
Minimum Heating Time	3	minutes

Direct Interelectrode Capacitances (Average)

Grid-Plate (without shielding)	0.3	$\mu\mu\text{f}$
Input	43.0	$\mu\mu\text{f}$
Output	9.0	$\mu\mu\text{f}$

MECHANICAL

Minimum Shock Test	200g
Base	Fits E. F. Johnson Co. Socket Number 122-234 or equivalent
Mounting Position	Any
Cooling	Radiation and Convection
Recommended Heat Dissipating Plate Connector	Eimac HR-8
Maximum Over-All Dimensions	
Length	6 inches
Diameter	3 1/4 inches
Net Weight	12 ounces
Shipping Weight	1.75 pounds

RATINGS

MAXIMUM RATINGS—Pulse Modulator Service (Per Tube)

D-C PLATE VOLTAGE	20 MAX. KILOVOLTS
D-C SCREEN VOLTAGE ¹	1.5 MAX. KILOVOLTS
D-C GRID VOLTAGE ²	—1.0 MAX. KILOVOLT
PEAK POSITIVE GRID VOLTAGE	300 MAX. VOLTS
PEAK PLATE CURRENT	18 MAX. AMPERES
PEAK POSITIVE PLATE VOLTAGE	25 MAX. KILOVOLTS
PLATE DISSIPATION (AVERAGE)	60 MAX. WATTS
SCREEN DISSIPATION (AVERAGE)	8 MAX. WATTS
SEAL TEMPERATURES	200 MAX. DEG. C

DUTY

For peak plate currents in excess of 5 amperes, the duty shall not exceed 0.001, and the product of peak current in amperes and pulse duration in microseconds shall not exceed 40. The tube shall not be operated for longer than 5 microseconds in any 100 microsecond interval.

For peak plate current values of less than 5 amperes, the pulse duration-current factor of 40 applies, and the plate dissipation rating of 60 watts determines the maximum permissible duty.

TYPICAL OPERATION

Pulse Modulator (Per Tube)

D-C Plate Voltage	15.8	20.0	kilovolts
Pulse Plate Current	14.0	16.0	amperes
D-C Screen Voltage	1.25	1.25	kilovolts
Pulse Screen Current*	4.0	3.0	amperes
D-C Grid Voltage	-600	-600	volts
Pulse Grid Current*	1.1	1.1	amperes
Pulse Positive Grid Voltage	100	100	volts
Duty	.001	.001	
Pulse Length	2	2	μsec
Peak Positive Plate Voltage	25	25	kilovolts
Peak Plate Current	16	18	amperes
Pulse Power Input	220	320	kilowatts
Pulse Power Output	210	305	kilowatts
Plate Output Voltage	15.0	19.0	kilovolts

¹Screen grid series protective resistance shall be 20,000 ohms, minimum.

²Control grid series resistance shall be 100,000 ohms, maximum.

*Approximate values.



APPLICATION

MECHANICAL

Mounting—The 4PR60A may be mounted and operated in any position. A flexible connecting strap should be provided between the plate terminal and the external plate circuit.

The 4PR60A is designed to withstand 200g shocks of short duration transferred to the tube through clamps on the metal skirt. Such clamps must be shaped to fit the contour of the skirt and must be fastened to the tube before being tightened to the chassis in order that no distorting force will be applied. No lateral pressure or clamping action should be applied to the base pins or to any part of the tube other than the skirt. The skirt is internally connected to the cathode.

Adequate ventilation must be provided so that the seals and envelope under operating conditions do not exceed 200°C.

ELECTRICAL

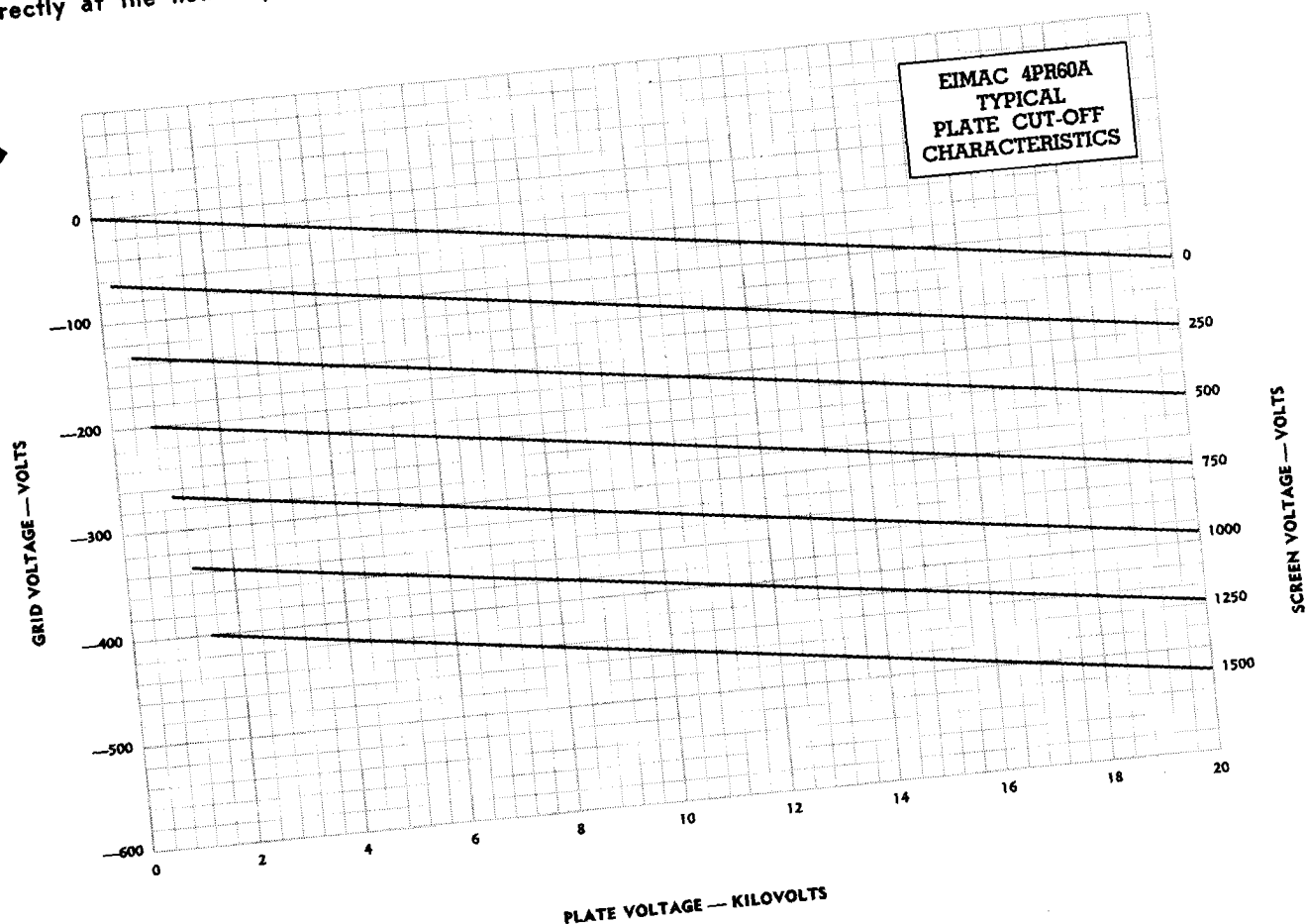
Heater Voltage—The heater voltage, as measured directly at the heater pins, should be the rated

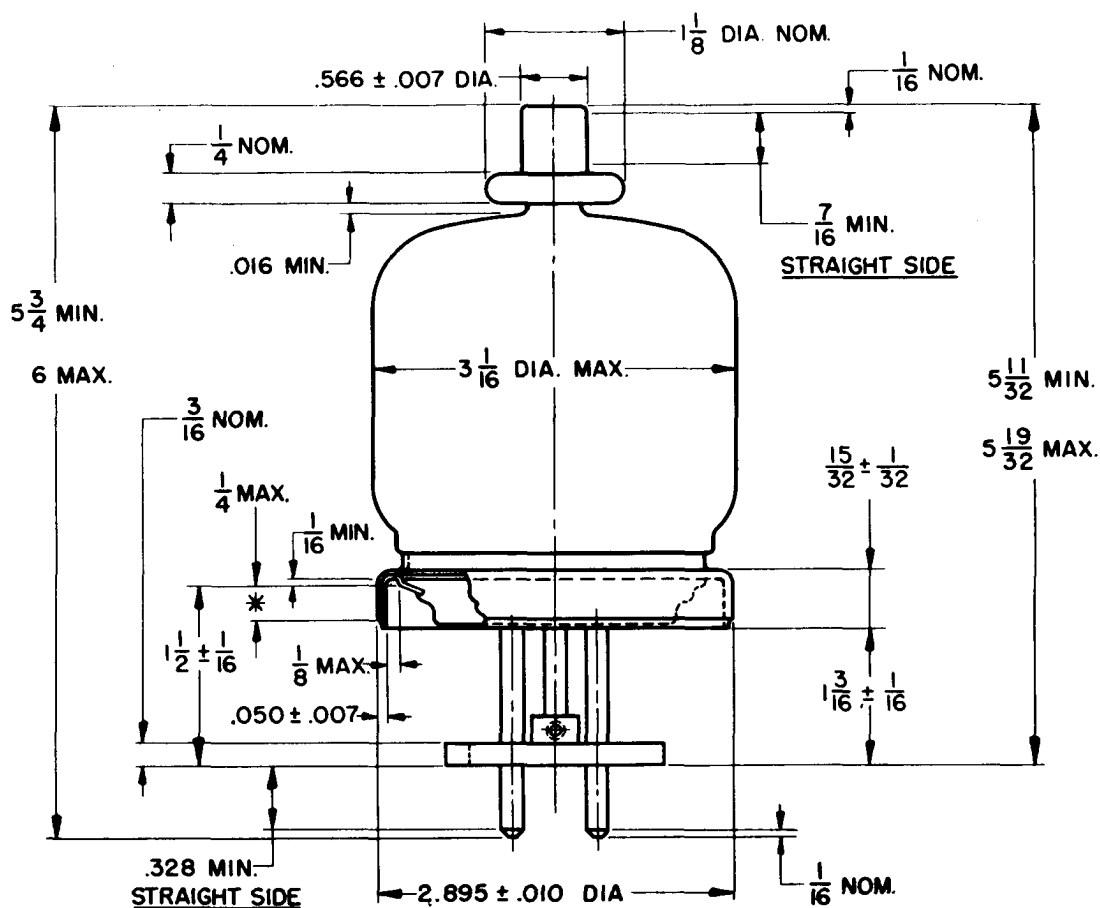
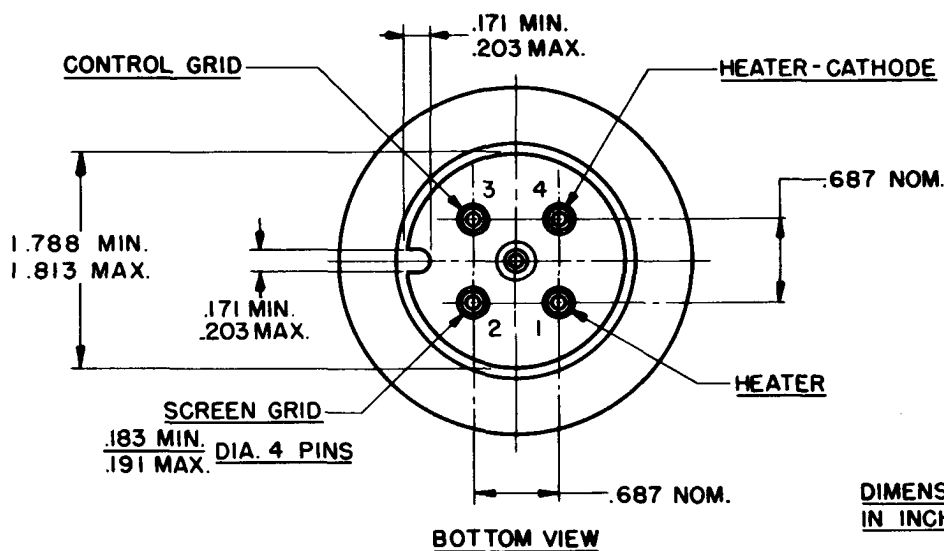
value of 26.0 volts. Variations in heater voltage must be kept within the range from 23.4 to 28.6 volts.

Screen Dissipation—The average power dissipated by the screen of the 4PR60A must not exceed eight watts. A protective series resistance of not less than 20,000 ohms must be inserted in the screen-voltage supply circuit and the screen should be adequately by-passed directly to the cathode by means of a suitable capacitor.

Plate Voltage—The plate-supply voltage for the 4PR60A should not exceed 20 kilovolts. In circuits employing inductive loading, the peak instantaneous plate voltage should not exceed 25 kilovolts.

Plate Dissipation—Under normal operating conditions, the plate dissipation of the 4PR60A should not be allowed to exceed 60 watts. Plate dissipation in excess of maximum rating is permissible for short periods of time, such as during adjustment procedures. The 4PR60A should not be operated without a heat dissipating plate connector such as the recommended Eimac HR-8.





THE BASE SHALL BE CAPABLE OF
ENTERING A GAUGE 1/4" THICK
HAVING 4 HOLES WHOSE DIA'S ARE
.214" AND WHICH ARE LOCATED ON
11/16" CENTERS AND A CENTER
HOLE OF .250" DIA.

***CYLINDRICAL SURFACE AVAILABLE
FOR CLAMPING MUST NOT BE
DEFORMED BY ACTION OF CLAMPS**

