



**E I M A C**  
 Division of Varian  
 SAN CARLOS  
 CALIFORNIA

**8158**  
**3CX10,000A1**

**LOW-MU**  
**POWER TRIODE**

The Eimac 8158/3CX10,000A1 is a ceramic and metal power triode intended primarily for use as an audio amplifier or modulator. This tube is also recommended for voltage-regulator applications where high current capability and low tube drop are important. Up to 12 kilowatts of plate power can be dissipated on its air-cooled anode. A water-cooled version, the 3CW20,000A1, is available with a 20 kw dissipation rating.



**CHARACTERISTICS**

**ELECTRICAL**

Filament: Thoriated-Tungsten	Min.	Nom.	Max.
Voltage . . . . .		7.5	V
Current . . . . .	94		104 A
Amplification Factor . . . . .	5.5		7.0
Interelectrode Capacitances:			
Grid-Filament . . . . .	45		57 pF
Output . . . . .	3.4		4.2 pF
Grid-Plate . . . . .	25		32
Transconductance (Ib = 2.0 amps, Eb = 3000 volts)	20,000		umhos

**MECHANICAL**

Base . . . . .	Coaxial
Recommended Socket . . . . .	Eimac SK-1300
Recommended Chimney . . . . .	Eimac SK-1306
Operating Position . . . . .	Vertical, base up or down
Cooling . . . . .	Forced air
Maximum Operating Temperatures:	
Anode Core . . . . .	250 °C
Ceramic-to-Metal Seals . . . . .	250 °C
Maximum Dimensions:	
Height . . . . .	8.75 in
Diameter . . . . .	7.0 in
Net Weight . . . . .	12 lbs

**AUDIO-FREQUENCY  
 AMPLIFIER OR MODULATOR  
 CLASS-AB<sub>1</sub>**

**MAXIMUM RATINGS (Per Tube)**

DC Plate Voltage . . . . .	7000	volts
DC Plate Current . . . . .	5.0	amps
Plate Dissipation . . . . .	12	kw
Grid Dissipation . . . . .	100	watts

\*Adjust for zero-signal plate current  
 \*\*At max-signal without negative feedback

Effective grid circuit resistance must not exceed  
 200,000 ohms

**TYPICAL OPERATION, Two Tubes,  
 Sinusoidal Wave**

DC Plate Voltage . . . . .	7000	7000	volts
DC Grid Voltage* . . . . .	-1300	-1300	volts
Zero-Sig DC Plate Current . . . . .	1.5	1.5	amps
Max-Sig DC Plate Current . . . . .	5.8	7.0	amps
Load Resistance,			
Plate-to-Plate . . . . .	2460	1720	ohms
Peak AF Grid Driving Voltage (Per Tube) . . . . .			
	1300	1300	volts
Max-Sig Driving Power . . . . .	0	0	watts
Max-Sig Plate			
Output Power . . . . .	24,400	29,100	watts
Total Harmonic Distortion** . . . . .	2.9	3.6	percent



**AUDIO-FREQUENCY AMPLIFIER OR MODULATOR**  
Class-A

**TYPICAL OPERATION**

**MAXIMUM RATINGS**

DC Plate Voltage . . . . .	7000 volts
DC Plate Current . . . . .	See Class-A derating table on Page 3
Plate Dissipation . . . . .	12,000 watts

DC Plate Voltage . . . . .	2500 volts
DC Grid Voltage * . . . . .	-290 volts
DC Plate Current . . . . .	4.0 amps
Peak AF Grid Driving Voltage . . . . .	290 volts
Load Resistance . . . . .	2120 ohms
Plate Output Power . . . . .	1800 watts

\*Adjust to give listed zero-signal DC plate current

**VOLTAGE REGULATOR SERVICE**

Class-A

**TYPICAL OPERATION**

**MAXIMUM RATINGS**

DC Plate Voltage . . . . .	10,000 volts
DC Plate Current . . . . .	See Class-A derating table on Page 3
Plate Dissipation . . . . .	12,000 watts
Grid Dissipation . . . . .	100 watts

DC Plate Voltage (tube drop) . . . . .	0-5000 volts
DC Plate Current . . . . .	0-5 amps

(These values are chosen according to Class-A derating table on Page 3)

Note: "TYPICAL OPERATION" data are obtained by calculation from published characteristic curves. No allowance for circuit losses, either input or output, has been made.

**APPLICATION**

Cooling — The maximum temperature rating for the external surfaces of the 3CX10, 000A1 is 250°C. Sufficient forced-air cooling must be provided to keep the temperature of the anode core and the temperature of the ceramic-metal seals below 250°C. Tube life is usually prolonged if these areas are maintained at temperatures below this maximum rating. Minimum air-flow requirements to maintain anode-core and seal temperatures below 225°C with an inlet-air temperature of 50°C are tabulated. The use of these air-flow rates through the recommended socket/chimney and tube combination in the base-to-anode direction provides effective cooling of the tube.

Plate** Dissipation (Watts)	SEA LEVEL		10,000 FEET	
	Air Flow (CFM)	Pressure Drop (Inches of Water)	Air Flow (CFM)	Pressure Drop (Inches of Water)
4000	85	0.18	125	0.25
6000	145	0.38	210	0.55
8000	215	0.68	315	0.99
10,000	295	1.08	430	1.60
12,000	390	1.62	565	2.35

\*\*Since the power dissipated by the filament is about 750 watts and since grid dissipation can, under some circumstances, represent another 100 watts, allowance has been made in preparing this tabulation for an additional 850 watts dissipation.

## APPLICATION

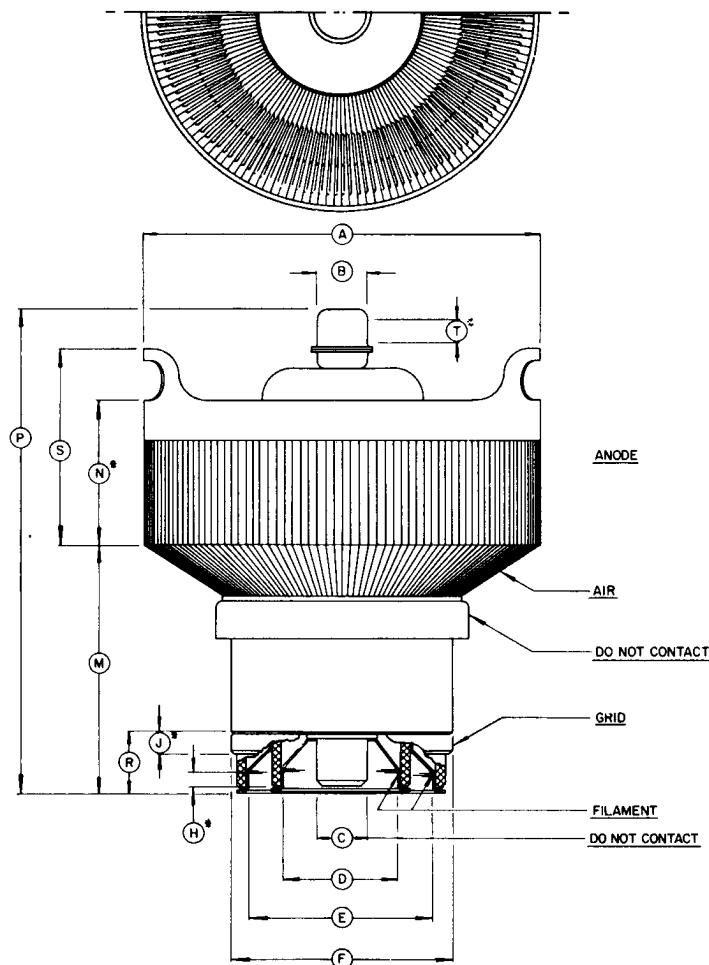
**Voltage-Regulator Service** — Maximum DC plate current and voltage are restricted according to the following table.

CLASS-A DERATING TABLE	
DC Plate Voltage (Volts)	Max. DC Plate Current (mA)
0 - 2400	5000
3000	4000
4000	3000
5000	2000
6000	1500
7000	1000
8000	700
9000	500
10,000	350

**Filament Operation**—The rated filament voltage for the 3CX10,000A1 is 7.5 volts. Filament voltage, as measured at the socket, should not be allowed to deviate from the rated value by more than plus or minus five percent.

**Cooling**—The maximum temperature rating for the external surfaces of the 3CX10,000A1 is 250°C. Sufficient forced-air cooling must be provided to maintain the temperature of the ceramic-metal seals and anode core below 250°C. Tube life is usually prolonged if these areas are maintained at temperatures below this maximum rating. Minimum air-flow requirements to maintain anode-core and seal temperatures below 225°C with an inlet-air temperature of 50°C are tabulated. The use of these air-flow rates provides effective cooling of the tube. When air-flow is in the anode-to-base direction, special care must be taken to insure adequate cooling of the filament stem structure. A separate supply of air may have to be directed into the area between the filament contact areas to maintain safe seal temperatures.

**Special Applications**—If it is desired to operate this tube under conditions widely different from those given here, write to Power Grid Tube Marketing, EIMAC, Division of Varian, 301 Industrial Way, San Carlos, Calif., for information and recommendations.



\* CONTACT SURFACE  
ALL DIMENSIONS IN INCHES

### DIMENSION DATA

REF.	NOM.	MIN.	MAX.
A		6.928	7.050
B		.855	.895
C		.720	.760
D		1.896	1.936
E		3.133	3.173
F		3.792	3.832
H		.188	
J		.188	
M		3.950	4.300
N		2.412	2.788
P		8.250	8.750
R		.986	1.050
S		3.412	3.788
T		.375	



3CX10,000A1

