



EIMAC

A Division of Varian Associates
SAN CARLOS, CALIFORNIA

3CW20,000A3

WATER-COOLED
MEDIUM-MU
POWER TRIODE

The EIMAC 3CW20,000A3 is a ceramic and metal power triode intended primarily for use as a power oscillator in industrial-heating applications. It is also recommended for use as a grounded-grid FM amplifier, as a conventional plate-modulated amplifier, or as a linear amplifier.



GENERAL CHARACTERISTICS

ELECTRICAL

	<i>Min.</i>	<i>Nom.</i>	<i>Max.</i>	
Filament: Thoriated-Tungsten				
Voltage - - - - -		7.5		volts
Current - - - - -	94		104	amperes
Amplification Factor - - - - -		20		
Interelectrode Capacitances, Grounded Cathode:				
Input - - - - -			58	$\mu\mu\text{f}$
Output - - - - -			1.5	$\mu\mu\text{f}$
Feedback - - - - -			38	$\mu\mu\text{f}$
Frequency for Maximum Ratings - -			140	MHz

MECHANICAL

Base - - - - -	Coaxial
Recommended Socket - - - - -	EIMAC SK-1300
Operating Position - - - - -	Vertical, base up or down
Cooling - - - - -	Water and Forced Air
Maximum Operating Temperatures:	
Anode Core - - - - -	250°C
Ceramic-to-Metal Seals - - - - -	250°C
Maximum Dimensions:	
Height - - - - -	11.4 inches
Diameter - - - - -	4.7 inches
Net Weight - - - - -	12 pounds

RADIO-FREQUENCY INDUSTRIAL OSCILLATOR

Class-C

MAXIMUM RATINGS

DC PLATE VOLTAGE - - - - -	7000 VOLTS
DC PLATE CURRENT - - - - -	4.0 AMPS
PLATE DISSIPATION - - - - -	20 KW
GRID DISSIPATION - - - - -	250 WATTS

TYPICAL OPERATION, Optimum Load

DC Plate Voltage - - - - -	6000	7000	volts
DC Grid Voltage - - - - -	-575	-670	volts
DC Plate Current - - - - -	4.0	4.0	amps
DC Grid Current - - - - -	610	670	mA
Plate Input Power - - - - -	24	28	kW
Plate Output Power - - - - -	18.9	22.4	kW

RADIO-FREQUENCY POWER AMPLIFIER

Grounded-Grid, Class C

MAXIMUM RATINGS

DC PLATE VOLTAGE - - - - -	7000 VOLTS
DC PLATE CURRENT - - - - -	4.0 AMPS
PLATE DISSIPATION - - - - -	20 KW
GRID DISSIPATION - - - - -	250 WATTS

TYPICAL OPERATION

DC Plate Voltage - - - - -	6000	7000	volts
DC Grid Voltage - - - - -	-535	-625	volts
DC Plate Current - - - - -	4.0	4.0	amps
DC Grid Current - - - - -	545	530	mA
Driving Power - - - - -	3700	4100	watts
Plate Output Power - - - - -	20.5	24.5	kW

THESE SPECIFICATIONS ARE BASED ON DATA APPLICABLE AT PRINTING DATE. SINCE EIMAC HAS A POLICY OF CONTINUING PRODUCT IMPROVEMENT, SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.



**RADIO-FREQUENCY POWER AMPLIFIER
PLATE-MODULATED**

Class-C

MAXIMUM RATINGS

DC PLATE VOLTAGE	-	-	-	-	5500	VOLTS
DC PLATE CURRENT	-	-	-	-	3.0	AMPS
PLATE DISSIPATION	-	-	-	-	13.5	KW
GRID DISSIPATION	-	-	-	-	250	WATTS

TYPICAL OPERATION

DC Plate Voltage	-	-	-	-	4000	5000	volts
DC Grid Voltage	-	-	-	-	-480	-600	volts
DC Plate Current	-	-	-	-	3.0	3.0	amps
DC Grid Current	-	-	-	-	660	550	mA
Driving Power	-	-	-	-	530	515	watts
Plate Output Power	-	-	-	-	9.7	12.4	kW

**RADIO-FREQUENCY
LINEAR AMPLIFIER**

Grounded-Grid, Class-AB₂

MAXIMUM RATINGS

DC PLATE VOLTAGE	-	-	-	-	7000	VOLTS
DC PLATE CURRENT	-	-	-	-	5.0	AMPS
PLATE DISSIPATION	-	-	-	-	20	KW
GRID DISSIPATION	-	-	-	-	250	WATT

*Adjust to give specified zero-signal dc plate current

TYPICAL OPERATION

DC Plate Voltage	-	-	-	-	6000	7000	volts
DC Grid Voltage*	-	-	-	-	-270	-325	volts
Zero-Sig Plate Current	-	-	-	-	500	500	mA
Max-Sig DC Plate Current	-	-	-	-	4.0	4.0	amps
Max-Sig DC Grid Current	-	-	-	-	300	250	mA
Peak RF Grid Voltage	-	-	-	-	540	585	volts
Driving Power	-	-	-	-	1900	2050	watts
Plate Output Power	-	-	-	-	18	20	kW

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

APPLICATION

MECHANICAL

Mounting — The 3CW20,000A3 must be operated vertically, base down or up. The tube must be protected from severe vibration and shock.

Cooling — The anode of the 3CW20,000A3 is cooled by circulating water through the integral anode-water jacket. The table below lists minimum water-flow rates at various plate dissipation levels.

MINIMUM COOLING WATER-FLOW REQUIREMENTS		
Plate Dissipation (kW)	Water Flow (gpm)	Pressure Drop (psi)
10	6.3	4.9
15	9.0	9.2
20	12.0	15.0

Since power dissipated by the filament represents 750 watts and grid dissipation can reach 250 watts, 1000 watts has been added to anode dissipation in preparing this tabulation.

The cooling table assumes that the maximum outlet-water temperature will be below 70°C to preclude "spot" boiling. Further, the inlet-water temperature must not exceed 60°C. In all cases, maximum system water pressure must be below 50 pounds per square inch. Water flow and air flow must be started before applying any voltages to the tube and may be stopped simultaneously with the removal of tube voltages. Suitable flow and temperature interlocks should be provided to protect the tube from inadequate flow rates.

Base cooling is accomplished by a stream of

air directed at the center of the socket and tube base from a duct or nozzle approximately two inches in diameter, not more than 5 inches from the socket. A minimum of 30 CFM is required at sea level.

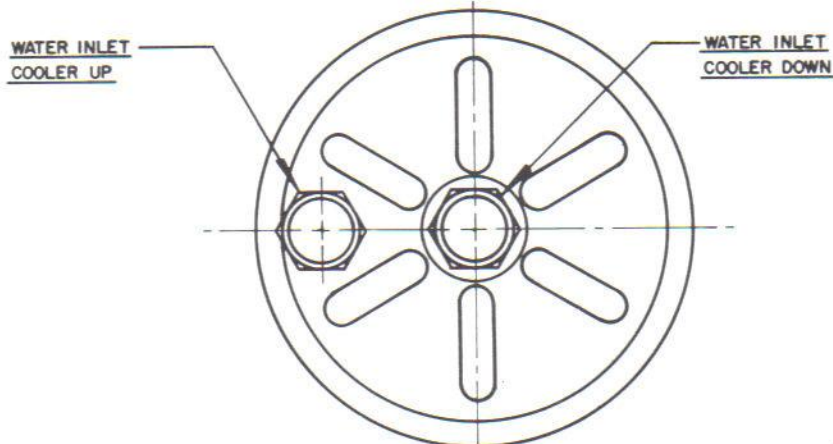
ELECTRICAL

Filament — The rated filament voltage for the 3CW20,000A3 is 7.5 volts. Filament voltage, as measured at the socket, should be maintained at this value for consistent performance and maximum tube life. In no case should it be allowed to vary from 7.5 volts by more than plus or minus five percent.

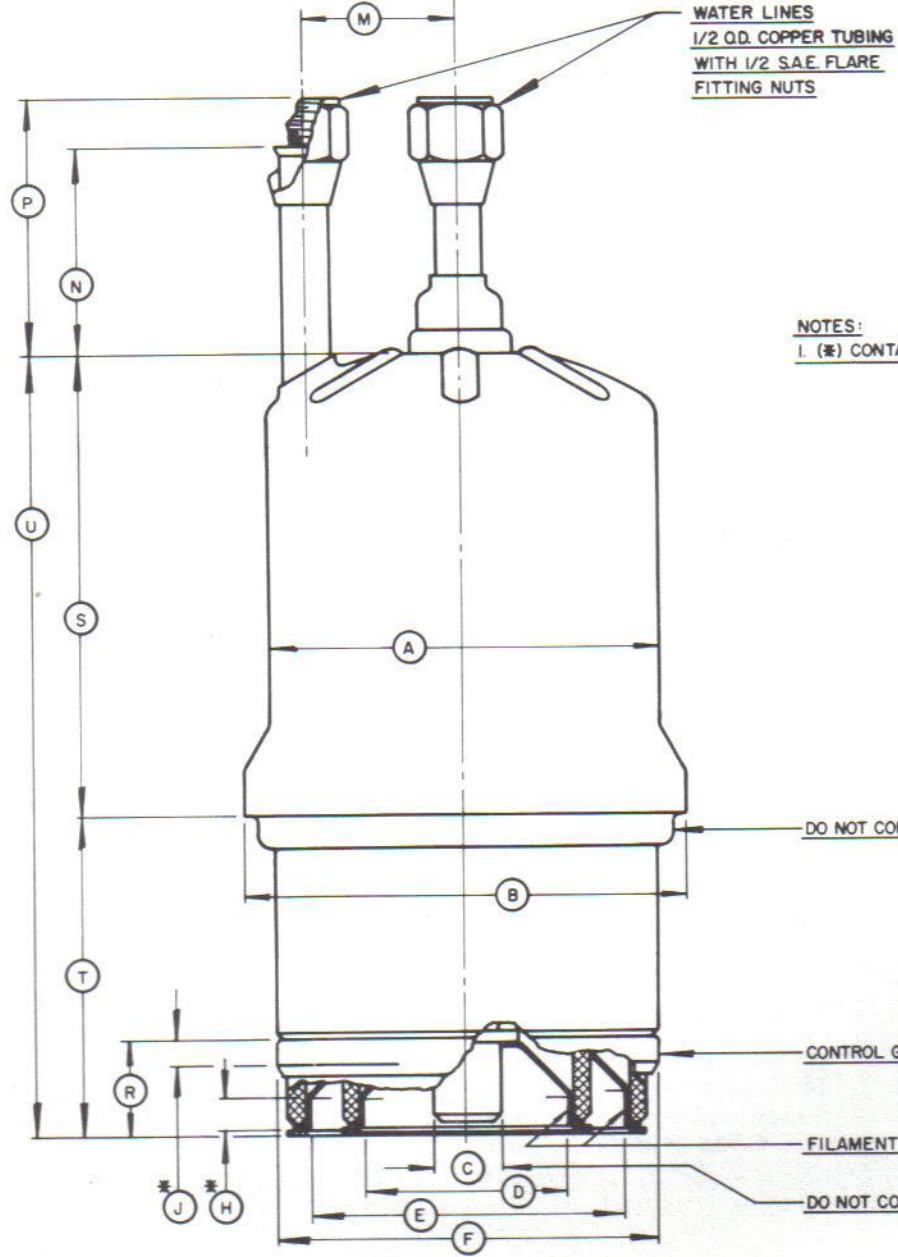
Grid Dissipation — The rated grid dissipation of the 3CW20,000A3 is 250 watts. Grid dissipation is the approximate product of dc grid current and peak positive grid voltage. In equipment where plate loading varies widely, such as radio-frequency heating oscillators, care should be taken to insure that grid dissipation does not exceed the 250 watt maximum.

Plate Operation — Plate input is limited to 28 kilowatts in Class-C and Class-AB applications. In Class-C, plate-modulated applications, this rating is reduced to 15 kilowatts. The 20 kilowatt anode dissipation capability provides a large margin of safety in most applications.

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, California, for information and recommendations.



DIMENSIONS IN INCHES			
DIMENSIONAL DATA			
REF.	MIN.	MAX.	NOM.
A	4.094	4.156	
B	4.594	4.656	
C	.720	.760	
D	1.896	1.936	
E	3.133	3.173	
F	3.792	3.832	
H	.188		
J	.188		
M	1.500	1.750	
N	1.937	2.187	
P	2.312	2.812	
R	.986	1.050	
S	4.780	5.025	
T	3.350	3.650	
U	8.125	8.625	



NOTES:
 I. (*) CONTACT SURFACE



3CW20,000A3

