

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

**3CW10,000H3**  
 INDUSTRIAL  
 MEDIUM-MU  
 WATER-COOLED  
 POWER TRIODE

The EIMAC 3CW10,000H3 is a water-cooled, ceramic-metal power triode designed primarily for use in industrial radio-frequency heating services. Its water-cooled anode is conservatively rated at 10 kilowatts of plate dissipation with low water flow and pressure drop.

Input of 30 kilowatts is permissible up to 90 Megahertz. Plentiful reserve emission is available from its 560 watt filament. The grid structure is rated at 150 watts making this tube an excellent choice for severe applications.



**GENERAL CHARACTERISTICS**

**ELECTRICAL**

Filament: Thoriated-Tungsten	<u>Min.</u>	<u>Nom.</u>	<u>Max.</u>	
Voltage - - - - -		7.5		Volts
Current - - - - -	73		78	Amps
Amplification Factor - - - - -		20		
Interelectrode Capacitances, Grounded Cathode Connection:				
Input - - - - -			53	$\mu\mu\text{f}$
Output - - - - -			1.5	$\mu\mu\text{f}$
Grid-Plate - - - - -			25	$\mu\mu\text{f}$
Frequency for Maximum Ratings			90	MHz

**MECHANICAL**

Base - - - - -						See Outline
Operating Position - - - - -						Vertical, base up or down
Cooling - - - - -						Water and Forced Air
Maximum Operating Temperature - - - - -						250°C
Maximum Dimensions:						
Height - - - - -						See Outline
Diameter - - - - -						See Outline
Net Weight - - - - -						10 Pounds

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.



### RF INDUSTRIAL OSCILLATOR

Class-C (Filtered DC Power Supply)

#### MAXIMUM RATINGS:

DC PLATE VOLTAGE	- - - -	10,000 Volts
DC PLATE CURRENT	- - - -	3.0 Amps
DC GRID VOLTAGE	- - - -	-1000 Volts
DC GRID CURRENT	- - - -	0.5 Amp
PLATE INPUT POWER	- - - -	30 kW
PLATE DISSIPATION	- - - -	10 kW

#### TYPICAL OPERATION\*

DC Plate Voltage	- - - -	7000	9000 Volts
DC Plate Current	- - - -	2.88	2.9 Amps
DC Grid Voltage	- - - -	-700	-900 Volts
DC Grid Current	- - - -	0.180	0.185 Amps
Peak Positive Grid Voltage	- - - -	250	250 Volts
Driving Power	- - - -	170	215 Watts
Plate Input Power	- - - -	20.15	26.1 kW
Plate Dissipation	- - - -	5.15	5.5 kW
Plate Output Power	- - - -	15	20.6 kW
Approximate Load Impedance	- - - -	1120	1470 Ohms

\*Loaded Conditions

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

## APPLICATION

### ELECTRICAL

#### Filament

For the 3CW10,000H3 the rated filament voltage is 7.5 volts. Filament voltage, as measured at the tube, must be maintained at 7.5 volts plus or minus five percent for maximum tube life and consistent performance.

#### Control Grid Operation

The grid current rating is 0.5 ampere dc. This value should not be exceeded for more than very short periods such as during tuning. Over-current protection in the grid circuit should be provided. Ordinarily it will not be necessary to operate with more than 0.25 amperes grid current to obtain reasonable efficiency. In industrial heating service with varying loads, grid current should be monitored continuously with a dc current meter. The maximum grid dissipation rating is 150 watts.

#### Plate Operation

Plate over-current protection should be provided to remove plate voltage quickly in the event of an overload or an arc-over at the load. In addition current limiting power supply resistors should be used. These precautions are especially important in industrial service with its wide variations in loading.

Spark gaps from plate to ground should be used to prevent transient voltages from flashing across the tube envelope during any fault conditions.

### MECHANICAL

#### Mounting

The 3CW10,000H3 must be mounted vertically, either base up or down. A grid contact

flange is provided for bolting to a strap or a grid deck. Heavy flexible leads are provided for applying the filament voltage.

#### Cooling

Anode cooling is accomplished by circulating water through the integral anode-water jacket.

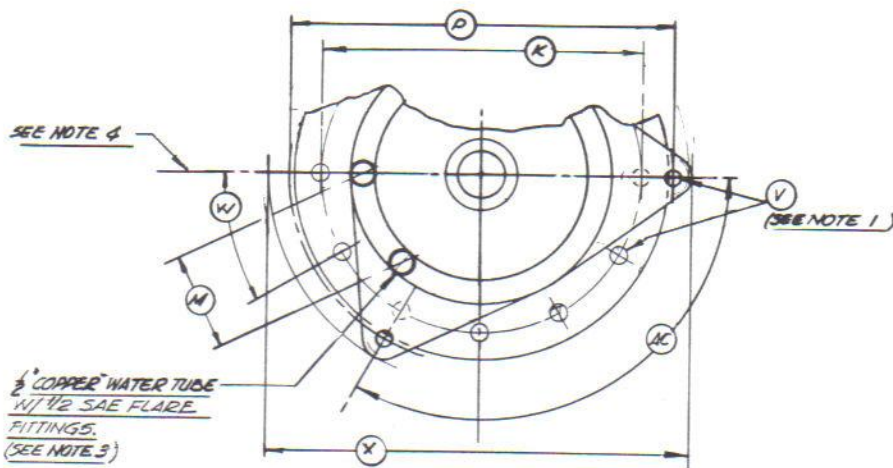
The table below lists the minimum water flow requirement for adequate anode cooling at various plate dissipation levels. In all cases, the outlet water temperature must not exceed 70°C nor should inlet water pressure exceed 60 psi. This table is based upon 15°C temperature rise of water from inlet to outlet.

MINIMUM WATER-COOLING REQUIREMENT		
Plate Dissipation (kW)	Water Flow (gpm)	Pressure Drop (psi)
8	3.2	5.5
10	4.4	8.1
12	5.8	13.4

Additional stem cooling air must be provided. 8 CFM of air directed against the center filament contact ring 1/2 inch below the outer filament contact ring by a 1 1/2 inch I.D. air duct arranged at a 45° angle with the center line of the tube will provide adequate cooling.

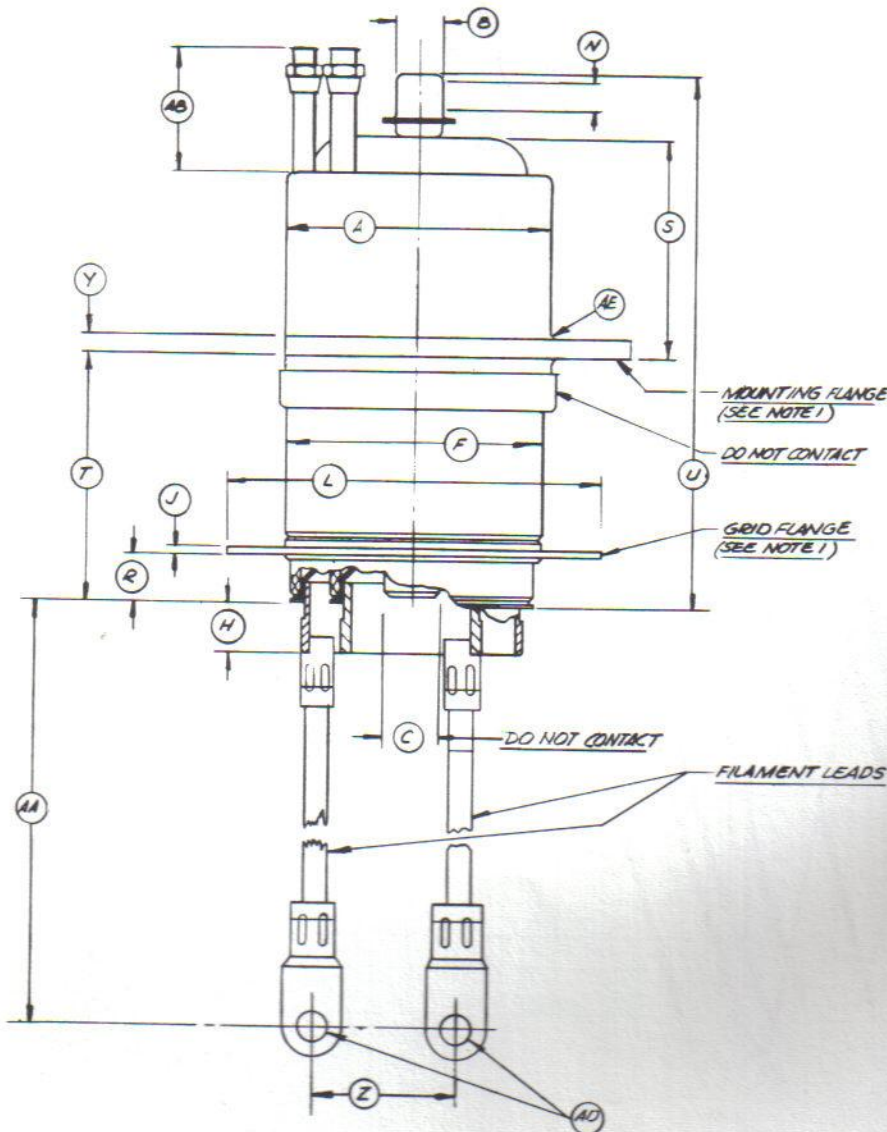
#### Special Applications

If it is desired to operate this tube under conditions widely different from those given here, write to Power Grid Tube Division, EIMAC, Division of Varian, 301 Industrial Way, San Carlos, California 94070 for information and recommendations.



1/2" COPPER WATER TUBE  
W/ 1/2 SAE FLARE  
FITTINGS.  
(SEE NOTE 3)

DIMENSIONS IN INCHES			
DIMENSIONAL DATA			
DIM.	MIN.	MAX.	REF.
A	3.525	3.725	
B	.860	.690	
C	.720	.760	
F	3.792	3.832	
H	.590	.700	
J			.125
K	4.425	4.445	
L	5.030	5.090	
M			1.500
N	.375		
P	5.220	5.280	
R	.800	.860	
S	3.000	3.250	
T	4.250	4.400	
U	8.500	8.900	
V			.250
W	29°	31°	
X	5.950	6.050	
Y			.250
Z			2.000
AA	8.500	9.000	
AB			2.000
AC	118°	122°	
AD			.390
AE			.0622



**NOTES:**

1. 12 MOUNTING HOLES IN EACH FLANGE.
2. REF. DIMS. ARE FOR INFO. ONLY AND ARE NOT REQ'D FOR INSP. PURPOSES.
3. EITHER FITTING CAN BE USED AS INLET OR OUTLET.
4. MTG. FLANGE, FIL. LEADS & WATER FITTINGS ARE TO BE ORIENTED AS SHOWN.



3CW10,000H3

### EIMAC 3CW10,000H3

#### CONSTANT CURRENT

#### CHARACTERISTICS

— PLATE CURRENT—AMPERES

----- GRID CURRENT—AMPERES

