



E I M A C
 Division of Varian
 SAN CARLOS
 CALIFORNIA

3CW20,000H3

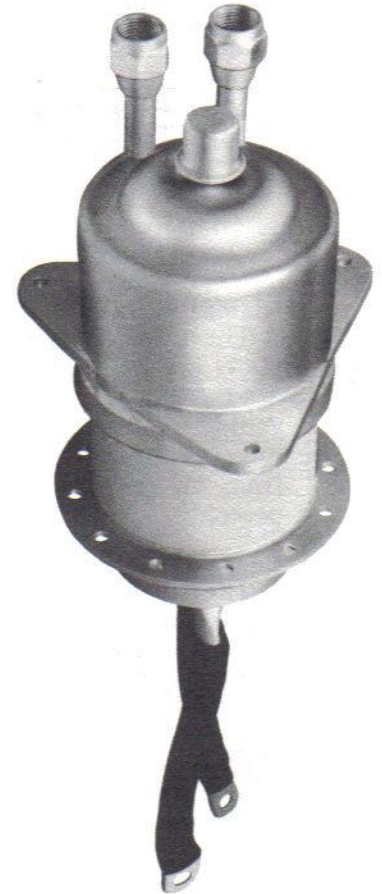
MEDIUM-MU

WATER-COOLED

POWER TRIODE

The Eimac 3CW20,000H3 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 20 kilowatts of plate dissipation with low water flow and pressure drop.

Input of 40 kilowatts is permissible up to 90 megacycles. Plentiful reserve emission is available from its 750 watt filament. The grid structure is rated at 250 watts, making this tube an excellent choice for severe applications.



GENERAL CHARACTERISTICS

ELECTRICAL

Filament: Thoriated-Tungsten	Min.	Nom.	Max.	
Voltage - - - - -		7.5		volts
Current - - - - -	94		104	amps
Amplification Factor - - - - -		20		
Interelectrode Capacitances, Grounded Cathode:				
Grid-Filament - - - - -	48		58	μf
Plate-Filament - - - - -	1.2		1.5	μf
Grid-Plate - - - - -	30		38	μf
Frequency for Maximum Ratings - - - - -			90	Mc

MECHANICAL

Base - - - - -	See Outline
Operating Position - - - - -	Vertical, base up or down
Cooling - - - - -	Water and Forced Air
Maximum Operating Temperatures:	
Ceramic-to-Metal Seals - - - - -	250°C
Maximum Dimensions:	
Height - - - - -	See Outline
Diameter - - - - -	See Outline
Net Weight - - - - -	12 pounds



RF INDUSTRIAL OSCILLATOR

Class-C (Filtered DC Power Supply)

MAXIMUM RATINGS:

DC PLATE VOLTAGE	- - - -	12,000 VOLTS
DC PLATE CURRENT	- - - -	4.0 AMPS
DC GRID VOLTAGE	- - - -	—1000 VOLTS
DC GRID CURRENT	- - - -	0.6 AMP
PLATE INPUT POWER	- - - -	40 KW
PLATE DISSIPATION (NOMINAL)	- - - -	20 KW

TYPICAL OPERATION*

DC Plate Voltage	- - - -	7000	10,000 volts
DC Plate Current	- - - -	4.0	4.0 amps
DC Grid Voltage	- - - -	—670	—800 volts
DC Grid Current	- - - -	.275	.315 amps
Peak Positive Grid Voltage	- - - -	340	340 volts
Driving Power	- - - -	260	340 watts
Plate Input Power	- - - -	28	40 kW
Plate Dissipation	- - - -	9	12 kW
Plate Output Power	- - - -	19	28 kW
Approximate Load Impedance	- - - -	720	1270 ohms

*Loaded Conditions

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

ELECTRICAL

Filament

The rated filament voltage for the 3CW20,000H3 is 7.5 volts. Filament voltage, as measured at the tube, 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.

Control Grid Operation

The grid current rating is 0.6 ampere dc. This value should not be exceeded for more than very short periods such as during tuning and over-current protection in the grid circuit should be provided. Ordinarily it will not be necessary to operate with more than 0.2 to 0.4 amp 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 250 watts.

Plate Operation

Maximum plate voltage rating of 12,000 volts and maximum plate current of 4.0 amps should not be applied simultaneously as rated plate dissipation may be exceeded. The 40 kilowatts input rating applies for Class C amplifier or oscillator service with no modulation.

Plate over-current protection should be provided to remove plate voltage quickly in the event of an over-load 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.

High Frequency Operation

The 3CW20,000H3 is usable to 140 Mc. At this frequency, plate voltage must be reduced to 7000 volts in Class C service.

MECHANICAL

Mounting

The 3CW20,000H3 must be mounted vertically, either base up or down.

Cooling

The anode of the 3CW20,000H3 is cooled by circulating water through the integral anode-water jacket. The table below lists minimum water-flow rates at various plate dissipation levels. The table is based upon a water temperature rise of 20°C.

MINIMUM COOLING WATER-FLOW REQUIREMENTS		
Plate Dissipation (kW)	Water Flow (gpm)	Pressure Drop (psi)
10	2	2.5
15	3	3.0
20	4	3.5
25	5	4.0

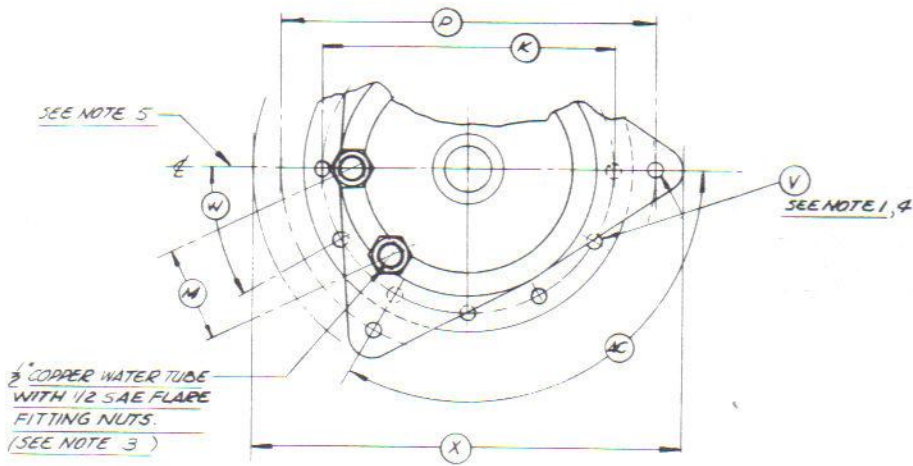
Since power dissipated by the filament represents 750 watts and grid dissipation can reach 250 watts, 1000 watts has been added to anode dissipation in preparing this tabulation.

The cooling table assumes that the maximum outlet-water temperature will be below 70°C to preclude "spot" boiling.

Additional forced-air cooling of the tube's base is also required to maintain ceramic-to-metal seal temperatures below the 250°C maximum. Approximately 40 cfm of cooling air directed into the base structure will generally satisfy this requirement.

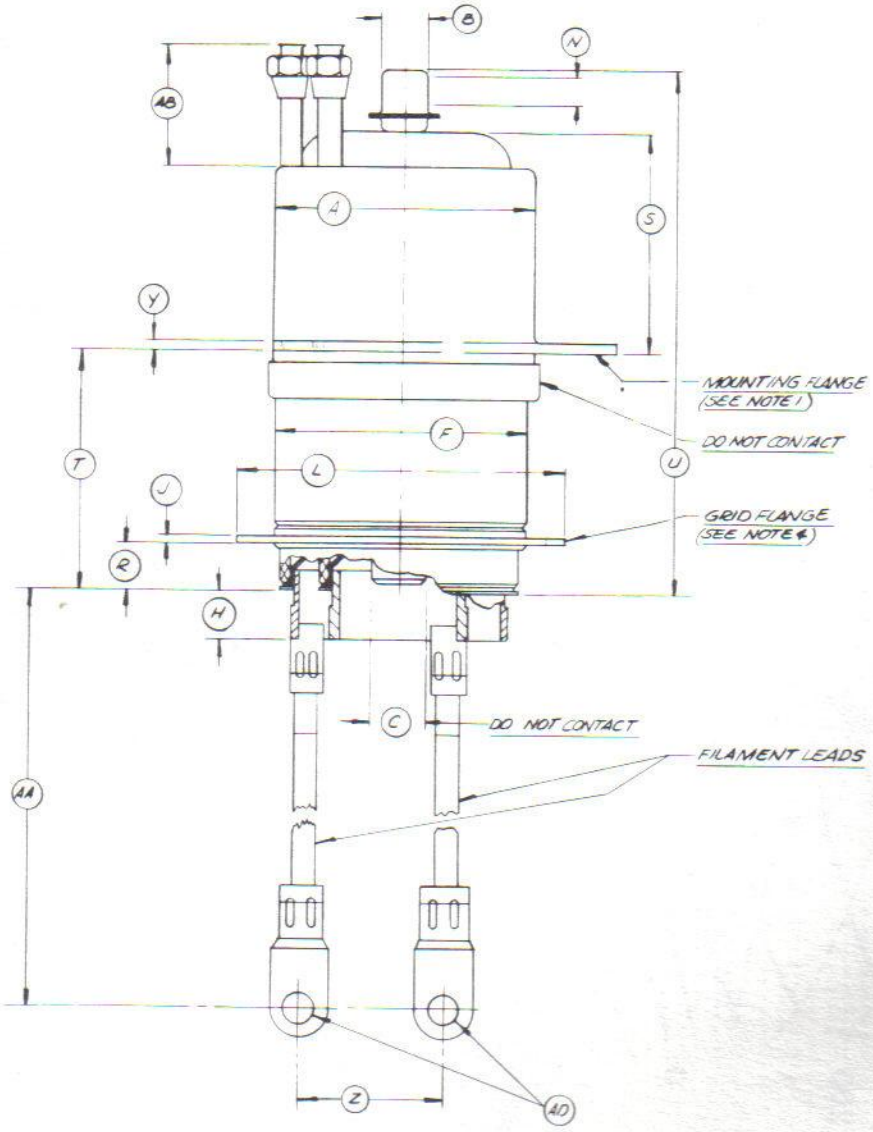
Special Application

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



DIMENSIONS IN INCHES			
DIMENSIONAL DATA			
DIM.	MIN.	MAX.	REF.
A	4.050	4.250	
B	.860	.890	
C	.720	.760	
F	3.792	3.832	
H	.530	.700	
J			.125
K	4.425	4.445	
L	5.030	5.090	
M			1.500
N	.375		
P	5.990	6.010	
R	.800	.860	
S	3.300	3.500	
T	3.950	4.100	
U	8.250	8.750	
V			.250
W	29°	31°	
X			6.750
Y			.250
Z			2.000
AA	8.500	9.000	
AB			2.000
AC	118°	122°	
AD			.390

3/8" COPPER WATER TUBE WITH 1/2 SAE FLARE FITTING NUTS. (SEE NOTE 3)



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



3CW20,000H3

