



EIMAC

A Division of Varian Associates
SAN CARLOS, CALIFORNIA

3CW5000H3

INDUSTRIAL
MEDIUM-MU
WATER-COOLED
POWER TRIODE

The EIMAC 3CW5000H3 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 5 kilowatts of plate dissipation with low water flow and pressure drop.

Input of 12.5 kilowatts is permissible up to 75 megahertz. Plentiful reserve emission is available from its 375 watt filament. The grid structure is rated at 150 watts making this tube an excellent choice for severe applications.

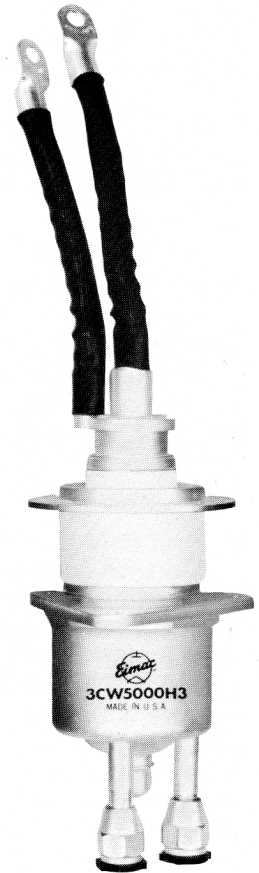
GENERAL CHARACTERISTICS

ELECTRICAL

| Filament: Thoriated-Tungsten | <u>Min.</u> | <u>Nom.</u> | <u>Max.</u> | |
|---|-------------|-------------|-------------|------------------|
| Voltage - - - - - | | 7.5 | | Volts |
| Current - - - - - | 48 | | 53 | amps |
| Amplification Factor - - - - - | | 20 | | |
| Interelectrode Capacitances, Grounded Cathode Connection: | | | | |
| Grid-Filament - - - - - | 29.2 | | 40.2 | $\mu\mu\text{f}$ |
| Plate-Filament - - - - - | 0.60 | | 1.20 | $\mu\mu\text{f}$ |
| Grid-Plate - - - - - | 17.8 | | 24.2 | $\mu\mu\text{f}$ |
| Frequency for Maximum Ratings - | | | 75 | MHz |

MECHANICAL

| | | | | | |
|----------------------------------|--|--|--|--|---------------------------|
| Base - - - - - | | | | | See Outline |
| Operating Position - - - - - | | | | | Vertical, base up or down |
| Cooling - - - - - | | | | | Water and Forced Air |
| Maximum Operating Temperatures - | | | | | 250°C |
| Maximum Dimensions: | | | | | |
| Height - - - - - | | | | | See Outline |
| Diameter - - - - - | | | | | See Outline |
| Net Weight - - - - - | | | | | 7.5 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 | - - - - | 6000 volts |
| DC PLATE CURRENT | - - - - | 2.5 amps |
| DC GRID VOLTAGE | - - - - | —1000 volts |
| DC GRID CURRENT | - - - - | 0.4 amp |
| PLATE INPUT POWER | - - - - | 12.5 kW |
| PLATE DISSIPATION (NOMINAL) | - - - - | 5 kW |

TYPICAL OPERATION*

| | | | |
|----------------------------|---------|--------|------------|
| DC Plate Voltage | - - - - | 4000 | 6000 volts |
| DC Plate Current | - - - - | 2.5 | 2.08 amps |
| DC Grid Voltage | - - - - | —300 | —500 volts |
| DC Grid Current | - - - - | .245 | .180 amps |
| Peak Positive Grid Voltage | - - - - | 280 | 265 volts |
| Driving Power | - - - - | 142 | 136 watts |
| Plate Input Power | - - - - | 10,000 | 12,500 kW |
| Plate Dissipation | - - - - | 2,500 | 2,500 kW |
| Plate Output Power | - - - - | 7,500 | 10,000 kW |
| Approximate Load Impedance | - - - - | 910 | 1,625 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

The rated filament voltage for the 3CW5000H3 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 0.4 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 0.275 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

Maximum plate voltage rating of 6000 volts and maximum plate current of 2.5 amperes dc should not be applied simultaneously as rated plate dissipation may be exceeded. The 12.5 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 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.

High Frequency Operation

The 3CW5000H3 is usable to 110 MHz. At this frequency, plate voltage must be reduced to 4000 volts in Class C service.

MECHANICAL

Mounting

The 3CW5000H3 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.

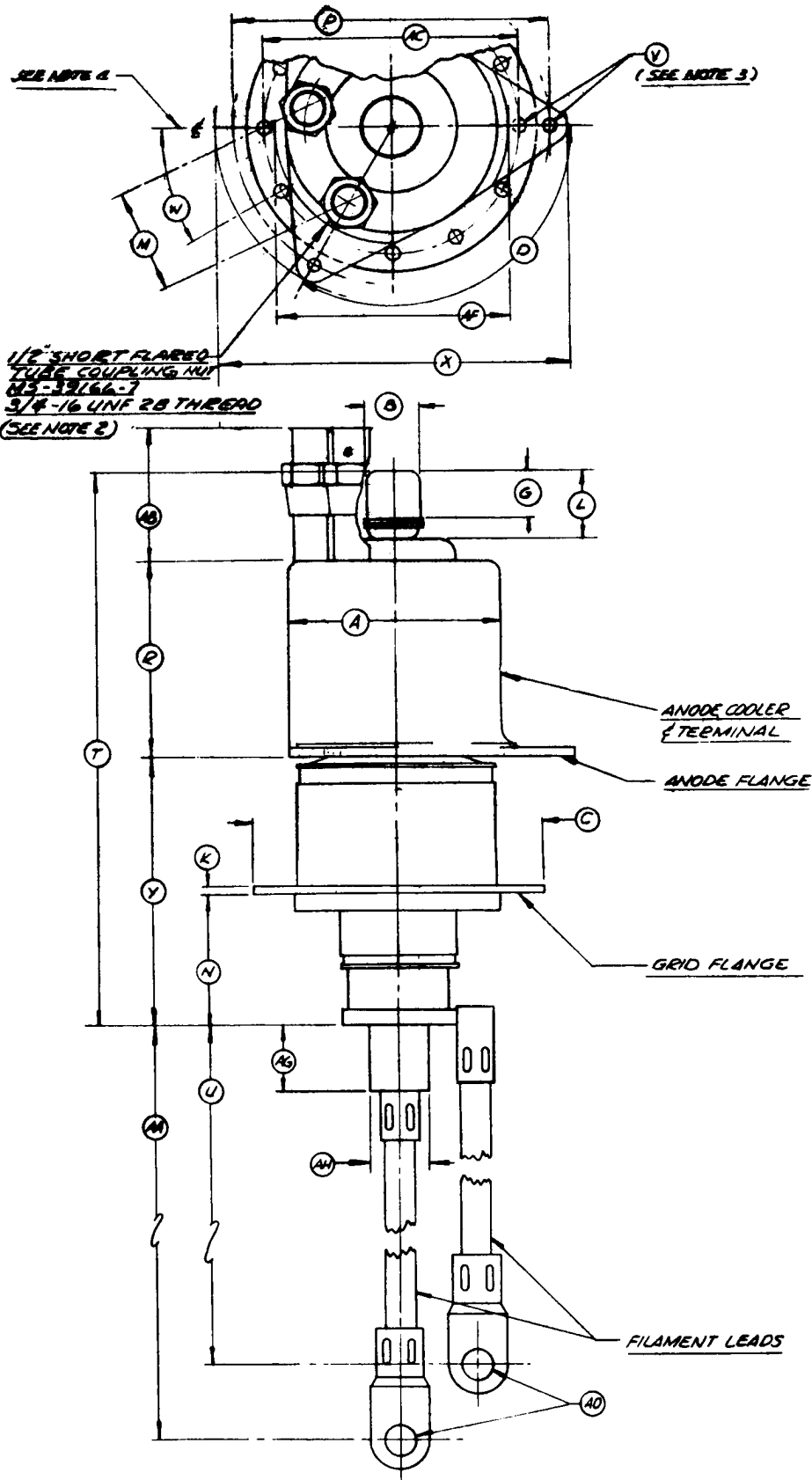
The table below lists the minimum water flow requirement for adequate anode cooling at various plate dissipation levels. In all cases, the outlet water temperature must not exceed 70°C nor should inlet water pressure exceed 60 psi. This table is based upon 15°C temperature rise inlet to outlet water.

| MINIMUM WATER-COOLING REQUIREMENT | | |
|-----------------------------------|------------------|---------------------|
| Plate Dissipation (kW) | Water Flow (gpm) | Pressure Drop (psi) |
| 3.0 | 0.65 | 0.27 |
| 5.0 | 1.10 | 0.70 |
| 7.0 | 1.75 | 1.75 |

Additional stem cooling air must be provided. 13 CFM of air directed against the center filament contact ring 1/2" below the outer filament contact ring by a 1 1/2" I.D. air duct arranged at a 45° angle with the center line of the tube will provide adequate cooling.

Special Application

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



| DIMENSIONS IN INCHES | | | |
|----------------------|-------|-------|-------|
| DIMENSIONAL DATA | | | |
| Dim. | MIN. | MAX. | REF. |
| A | 3.300 | 3.400 | |
| B | .780 | .843 | |
| C | 4.230 | 4.250 | |
| D | 118° | 122° | |
| G | .687 | .812 | |
| K | | | .125 |
| L | 1.000 | 1.125 | |
| M | | | 1.500 |
| N | 1.703 | 1.953 | |
| P | 4.615 | 4.635 | |
| R | 2.625 | 2.875 | |
| T | 8.000 | 9.000 | |
| U | 7.937 | 8.437 | |
| V | | | .250 |
| W | 29° | 31° | |
| X | 5.330 | 5.420 | |
| Y | 3.875 | 4.250 | |
| AA | 8.937 | 9.437 | |
| AB | | | 2.000 |
| AC | 3.855 | 3.885 | |
| AD | | | .390 |
| AF | | | 3.625 |
| AG | .812 | .937 | |
| AH | .859 | .890 | |

NOTE:
 1. REF. DIM. ARE FOR INFO ONLY & ARE NOT REQ'D FOR INSR PURPOSES.
 2. EITHER FITTING CAN BE USED AS INLET OR OUTLET.
 3. 3 HOLES IN ANODE FLANGE, 12 HOLES IN GRID FLANGE.
 4. MFG. FLANGE, FIL. LEADS & WATER FITTINGS ARE TO BE ORIENTED AS SHOWN.



3CW5000H3

EIMAC 3CW5000H3 CONSTANT CURRENT CHARACTERISTICS

— PLATE CURRENT — AMPERES
..... GRID CURRENT — AMPERES

