The EIMAC 8240/3CW5000A1 and 8241/3CW5000F1 are low-mu water-cooled power triodes intended for use as audio amplifiers or modulators. Their maximum rated plate dissipation is 5000 watts. The two types are identical except for the addition of flexible leads for the grid and filament terminals on the 8241/3CW5000F1.

Two of these tubes, in Class AB1 audio service, will deliver more than 10 kilowatts maximum-signal plate output power at 6000 plate volts without drawing grid current.

These two types are electrically identical to the air-cooled EIMAC 8238/3CX3000A1 except for the plate dissipation rating.

**GENERAL CHARACTERISTICS**

**ELECTRICAL**

Filament: Thoriated Tungsten

<table>
<thead>
<tr>
<th>Voltage</th>
<th>7.5 ± 0.37 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current, at 7.5 volts</td>
<td></td>
</tr>
<tr>
<td>8240/3CW5000A1</td>
<td>51.5 A</td>
</tr>
<tr>
<td>8241/3CW5000F1</td>
<td>50.5 A</td>
</tr>
<tr>
<td>Transconductance (Average)</td>
<td></td>
</tr>
<tr>
<td>I_B = 1.0 Adc, E_B = 3000 Vdc · 11,000 μmhos</td>
<td></td>
</tr>
<tr>
<td>Amplification Factor (Average)</td>
<td>4.9</td>
</tr>
</tbody>
</table>

1. Characteristics and operating values are based on performance tests. These figures may change without notice as the result of additional data or product refinement. EIMAC Div. of Varian should be consulted before using this information for final equipment design.

**MECHANICAL**

Maximum Overall Dimensions:

- Length (excluding leads on 8241/3CW5000F1) | 12.625 in; 321 mm |
- Diameter | 3.255 in; 82.2 mm |
- Net Weight (Approximate) | 3.5 lbs; 1.6 kg |
- Operating Position | Axis vertical, base down or up |
- Maximum Operating Temperature: 250°C

Cooling:

- Seals and Envelope | Forced Air |
- Plate | Water |
- Base | See Outline Drawings |

(Effective 5-15-71) © by Varian

Printed in U.S.A.
AUDIO FREQUENCY POWER AMPLIFIER OR MODULATOR
Class AB1, Grid Driven (Sinusoidal Wave)

ABSOLUTE MAXIMUM RATINGS (per tube)

DC PLATE VOLTAGE ............ 6000 VOLTS
DC PLATE CURRENT ........... 2.5 AMPERES
PLATE DISSIPATION .......... 5000 WATTS
GRID DISSIPATION .......... 50 WATTS

1. Approximate value; adjust to give stated zero-
signal plate current.
2. Per tube.

TYPICAL OPERATION (Class AB1, Sinusoidal Wave,
Two Tubes)
Plate Voltage .......... 4000 5000 6000 Vdc
Grid Voltage ........ -860 -1080 -1300 Vdc
Zero-Signal Plate
Current ................ 500 400 335 mA
Max. Signal Plate
Current ................ 3.0 2.8 2.65 A
Peak af Grid Voltage ........ 760 995 1250 V
Peak Driving Power .... 0 0 0 W
Max. Signal Plate
Input Power .............. 12,000 14,000 16,000 W
Max. Signal Plate
Dissipation .................. 3000 3000 3000 W
Max. Signal Plate
Output Power .............. 6000 8000 10,000 W
Load Resistance
(plate to plate) .......... 2160 3320 4560 Ω

NOTE: TYPICAL OPERATION data are obtained by measurement or calculation from published characteristic curves.
Adjustment of the grid voltage to obtain the specified plate current at the specified bias, and plate voltages is
assumed. If this procedure is followed, there will be little variation in output power when the tube is changed.

RANGE VALUES FOR EQUIPMENT DESIGN

Filament: Current at 7.5 volts (8240/3CW5000A1) ......................... 49.0 54.0 A
(8241/3CW5000F1) ......................... 48.0 53.0 A

Amplification Factor ........... 4.3 5.6

APPLICATION

MECHANICAL

MOUNTING - The 3CW5000A1 and 3CW5000F1
must be mounted vertically, base down or up at
the convenience of the circuit designer. The
filament connections to the 3CW5000A1 should
be made through spring collets. These are
available from EIMAC with the following part
numbers: 149575 Inner line collet;
149576 Outer line collet
Reasonable care should be taken that these
collets do not impart undue strain to the termi-

COLUMNS - With an anode dissipation of 5000
watts and with an incoming water temperature of
50°C maximum, 7.7 gpm of cooling water must
be supplied to the anode cooling jacket. Outlet
water temperature from the cooling jacket should
never exceed 70°C, and water pressure on the
jacket should not exceed 60 psi. The pressure
drop across the anode cooling jacket itself, with
a water flow of 7.7 gpm, will be approximately
6 psi.

The grid-terminal contact surface and adjacent
the ceramic must be cooled by forced air, with quantity,
velocity, and direction adjusted to limit the
maximum seal temperature to less than 250°C.

The filament stem structure also requires
forced-air cooling. A minimum of 6 cfm should be
directed into the space between the inner and
outer filament contacting surfaces.

Both air and water flow must be supplied be-
fore or simultaneously with the application of
electrode voltages, including the filament, and
may be removed simultaneously with them. Where
long life and consistent performance are factors,
cooling in excess of minimum requirements is
normally beneficial.

ELECTRICAL

FILAMENT OPERATION - The filament voltage,
as measured at the filament terminals, should be
7.5 volts, with maximum allowable variations due
to line fluctuations of from 7.12 to 7.87 volts.
**HIGH VOLTAGE** - The 3CW5000A1 and 3CW5000F1 operate at voltages which can be deadly, and the equipment must be designed properly and operating precautions must be followed. Equipment must be designed so that no one can come in contact with high voltages. All equipment must include safety enclosures for high-voltage circuits and terminals, with interlock switches to open the primary circuits of the power supplies and to discharge high-voltage condensers when access doors are opened.

Interlock switches must not be bypassed or "cheated" to allow operation with access doors open. Always remember that HIGH VOLTAGE CAN KILL.

**SPECIAL APPLICATIONS** - If it is desired to operate these tubes under conditions widely different from those given here write to the Power Grid Tube Division, EIMAC Division of Varian, 301 Industrial Way, San Carlos, CA. 94070, for information and recommendations.
DIMENSIONAL DATA

<table>
<thead>
<tr>
<th>DIM</th>
<th>INCHES</th>
<th>MILLIMETERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3.245</td>
<td>82.42</td>
</tr>
<tr>
<td>B</td>
<td>1.109</td>
<td>28.17</td>
</tr>
<tr>
<td>C</td>
<td>0.665</td>
<td>16.86</td>
</tr>
<tr>
<td>D</td>
<td>1.490</td>
<td>37.85</td>
</tr>
<tr>
<td>E</td>
<td>2.990</td>
<td>76.45</td>
</tr>
<tr>
<td>F</td>
<td>0.812</td>
<td>20.62</td>
</tr>
<tr>
<td>G</td>
<td>1.375</td>
<td>34.93</td>
</tr>
<tr>
<td>H</td>
<td>0.359</td>
<td>9.12</td>
</tr>
<tr>
<td>J</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>K</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>L</td>
<td>3.875</td>
<td>98.43</td>
</tr>
<tr>
<td>M</td>
<td>4.000</td>
<td>101.60</td>
</tr>
<tr>
<td>N</td>
<td>3.750</td>
<td>95.25</td>
</tr>
<tr>
<td>P</td>
<td>7.500</td>
<td>190.50</td>
</tr>
</tbody>
</table>

NOTE: REF DIMS ARE FOR INFO ONLY AND NOT REQ. FOR INSPECTION PURPOSES.