



H-1588

**CERMOLOX®**  
 1000 Watts PEP Output  
 37 dB Open Loop Third  
 Order Distortion  
 42 dB Third Order  
 Distortion w/Cathode R  
 Full Input to 400 MHz  
 Sturdy, Reliable  
 Matrix Oxide Cathode

# RCA-8792

## Beam Power Tube

The RCA-8792\* is designed specifically to meet the high linearity and low noise requirements of modern HF, single sideband equipments. In these equipments it can deliver one kilowatt, peak envelope power output at an open loop, 3rd order distortion level of better than 37 dB and 5th order distortion level of better than 45 dB.

Its high gain, CERMOLOX tube construction also makes it ideally suited to modern FM broadcast equipment where it can deliver one kilowatt output at 70% efficiency with a gain of better than 20 dB.

It is equally well suited to VHF-TV applications where it will deliver over one kilowatt of peak sync power output, and to UHF, Class B linear service, where it will deliver 300 watts carrier power output.

The sturdy, coaxial, CERMOLOX tube construction minimizes tube inductances and feed-thru capacitances. This enables the use of simple, economical circuit techniques for HF and UHF operation and also minimizes induced noise problems in linear systems. Its efficient, forced-air-cooled radiator reduces blower noise problems and increases overall system efficiency, while the rugged matrix cathode increases system reliability.

\*Formerly RCA Dev. No. A2887A.

### General Data

#### Electrical:

##### Heater-Cathode:

|                                       |                                                                                        |
|---------------------------------------|----------------------------------------------------------------------------------------|
| Type .....                            | Unipotential, Oxide Coated, Matrix Type                                                |
| Voltage <sup>a</sup> (ac or dc) ..... | $\begin{cases} 5.5 \text{ typ.} & \text{V} \\ 5.8 \text{ max.} & \text{V} \end{cases}$ |
| Current (@ 5.5 V) .....               | 17.3 A                                                                                 |
| Minimum Heating Time .....            | 180 s                                                                                  |
| Mu Factor <sup>b</sup> .....          | 6.5                                                                                    |
| (Grid No.1 to Grid No.2)              |                                                                                        |

##### Direct Interelectrode Capacitances:

|                                                |         |
|------------------------------------------------|---------|
| Grid No.1 to Plate <sup>c</sup> .....          | 0.14 pF |
| Grid No.1 to Cathode-Heater .....              | 38 pF   |
| Plate to Cathode-Heater <sup>c</sup> .....     | 0.02 pF |
| Grid No.1 to Grid No.2 .....                   | 52 pF   |
| Grid No.2 to Plate .....                       | 16 pF   |
| Grid No.2 to Cathode-Heater <sup>c</sup> ..... | 1.4 pF  |

#### Mechanical:

|                           |                                |
|---------------------------|--------------------------------|
| Operating Position .....  | Any                            |
| Maximum Length .....      | (84.8 mm) 3.34 in              |
| Greatest Diameter .....   | (95.3 mm) 3.75 in              |
| Terminal Connection ..... | See <i>Dimensional Outline</i> |
| Socket .....              | See page 7                     |
| Radiator .....            | Integral part of tube          |
| Weight (approx.) .....    | (0.9 kg) 2 lbs                 |

#### Thermal:

|                                                          |             |
|----------------------------------------------------------|-------------|
| Seal Temperature <sup>d</sup> .....                      | 250 max. °C |
| (Plate, Grid No.1, Grid No.2 Cathode-Heater, and Heater) |             |
| Plate Core Temperature <sup>d</sup> .....                | 250 max. °C |

### Footnotes for General Data

<sup>a</sup> See Section V.A. 3 of 1CE-300.

<sup>b</sup> For: plate voltage = 2500 V  
 grid No.2 voltage = 600 V  
 plate current = 600 mA

<sup>c</sup> With special shield adapter.

<sup>d</sup> See *Dimensional Outline* for temperature measurement points.

This bulletin gives application information unique to the RCA-8792. General information, covering the installation and operation of this tube type, is given in the "Application Guide for RCA Power Tubes", 1CE-300. Close attention to the instructions contained therein will assure longer tube life, safer operation, less equipment downtime, and fewer tube handling accidents.

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**Linear RF Power Amplifier<sup>e</sup>****Single-Sideband, Suppressed-Carrier Service**

*Peak envelope conditions for a signal having a minimum peak-to-average power ratio of 2.*

**Maximum CCS Ratings, Absolute-Maximum Values:**

|                                                | up to 400 MHz |
|------------------------------------------------|---------------|
| DC PLATE VOLTAGES <sup>f</sup> . . . . .       | 3500 max. V   |
| DC GRID-No.2 VOLTAGE <sup>g</sup> . . . . .    | 1000 max. V   |
| DC PLATE CURRENT AT PEAK OF ENVELOPE . . . . . | 1.25 max. A   |
| GRID-No.2 INPUT <sup>g</sup> . . . . .         | 50 max. W     |
| PLATE DISSIPATION . . . . .                    | 1.5 max. kW   |

**Maximum Circuit Values:****Grid-No.1-Circuit Resistance Under Any Condition:**

With fixed bias . . . . . 5000 max.  $\Omega$

With cathode bias . . . . . Not recommended

Grid-No.2 Circuit Impedance . . . . . See note **g**

Plate Circuit Impedance . . . . . See note **f**

**RF Power Amplifier & Oscillator—Class C Telegraphy<sup>e</sup> and****RF Power Amplifier—Class C FM Telephony<sup>e</sup>****Maximum CCS Ratings, Absolute-Maximum Values:**

|                                             | up to 400 MHz |
|---------------------------------------------|---------------|
| DC PLATE VOLTAGE <sup>f</sup> . . . . .     | 3500 max. V   |
| DC GRID-No.2 VOLTAGE <sup>g</sup> . . . . . | 1000 max. V   |
| DC GRID-No.1 VOLTAGE <sup>k</sup> . . . . . | -300 max. V   |
| DC PLATE CURRENT . . . . .                  | 1.0 max. A    |
| DC GRID-No.1 CURRENT . . . . .              | 0.2 max. A    |
| GRID-No.2 INPUT <sup>g</sup> . . . . .      | 50 max. W     |
| PLATE DISSIPATION . . . . .                 | 1500 max. W   |

**Maximum Circuit Values:**

Grid-No.1-Circuit Resistance . . . . . 5000 max.  $\Omega$

Grid-No.2-Circuit Impedance . . . . . See note **g**

Plate-Circuit Impedance . . . . . See note **f**

**Typical Class AB<sub>1</sub> CCS Operation with "Two-Tone" Modulation**

*In a grid-drive circuit at 30 MHz*

|                                                    |        |        |          |
|----------------------------------------------------|--------|--------|----------|
| DC Plate Voltage . . . . .                         | 2500   | 2500   | V        |
| DC Grid-No.2 Voltage . . . . .                     | 600    | 600    | V        |
| DC Grid-No.1 Voltage <sup>h</sup> . . . . .        | -65    | -61    | V        |
| Zero-Signal DC Plate Current . . .                 | 0.5    | 0.6    | A        |
| Effective RF Load Resistance . .                   | 1050   | 1050   | $\Omega$ |
| DC Plate Current at Peak of Envelope . . . . .     | 1.0    | 1.1    | A        |
| Average DC Plate Current . . . . .                 | 0.75   | 0.85   | A        |
| DC Grid-No.2 Current at Peak of Envelope . . . . . | -0.020 | -0.022 | A        |
| Average DC Grid-No.2 Current . .                   | -0.014 | -0.017 | A        |
| Peak RF Grid Voltage . . . . .                     | 50     | 47     | V        |
| Output Circuit Efficiency (Approx.) . . . . .      | 90     | 90     | %        |
| Useful Power Output (Approx.):                     |        |        |          |
| Average . . . . .                                  | 530    | 600    | W        |
| Peak Envelope . . . . .                            | 1060   | 1200   | W        |
| Distortion Products Level <sup>i</sup>             |        |        |          |
| Third Order . . . . .                              | 35     | 37     | dB       |
| Fifth Order . . . . .                              | 45     | 47     | dB       |

**Calculated CCS Operation:**

*In a grid-drive circuit at 108 MHz with an output circuit bandwidth of 2.0 MHz<sup>n</sup>*

|                                               |        |   |
|-----------------------------------------------|--------|---|
| DC Plate Voltage . . . . .                    | 3350   | V |
| DC Grid-No.2 Voltage . . . . .                | 500    | V |
| DC Grid-No.1 Voltage . . . . .                | -120   | V |
| DC Plate Current . . . . .                    | 0.55   | A |
| DC Grid-No.2 Current . . . . .                | -0.010 | A |
| DC Grid-No.1 Current . . . . .                | 0      | A |
| Drive Power (Approx.) . . . . .               | 15     | W |
| Output-Circuit Efficiency (Approx.) . . . . . | 95     | % |
| Useful Power Output . . . . .                 | 1250   | W |

**Linear RF Power Amplifier<sup>e</sup>  
Class AB or Class B Telephony**

*Carrier conditions for use with a maximum modulation factor of 1.0*

**Maximum CCS Ratings, Absolute-Maximum Values:**

|                                             |           |    |
|---------------------------------------------|-----------|----|
| DC PLATE VOLTAGE <sup>f</sup> . . . . .     | 3500 max. | V  |
| DC GRID-No.2 VOLTAGE <sup>g</sup> . . . . . | 1000 max. | V  |
| DC PLATE CURRENT . . . . .                  | 700 max.  | mA |
| GRID-No.2 INPUT . . . . .                   | 50 max.   | W  |
| PLATE DISSIPATION . . . . .                 | 1500 max. | W  |

**Grid-Modulated RF Power Amplifier<sup>e</sup> –  
Class C Television Service**

*Synchronizing-level conditions per tube unless otherwise specified*

**Maximum CCS Ratings, Absolute-Maximum Values:**

*Up to 400 MHz*

|                                             |           |    |
|---------------------------------------------|-----------|----|
| DC PLATE VOLTAGE <sup>f</sup> . . . . .     | 3500 max. | V  |
| DC GRID-No.2 VOLTAGE <sup>g</sup> . . . . . | 1000 max. | V  |
| DC PLATE CURRENT . . . . .                  | 1.25 max. | A  |
| GRID-No.2 INPUT . . . . .                   | 50 max.   | W  |
| PLATE DISSIPATION . . . . .                 | 1500 max. | W  |
| GRID-No.1 CURRENT . . . . .                 | 200 max.  | mA |

**Calculated CCS Operation as a Class AB<sub>1</sub> Amplifier:**

*In a cathode drive circuit at 400MHz with an output circuit bandwidth of 3.5 MHz<sup>n</sup>*

|                                             |      |    |
|---------------------------------------------|------|----|
| DC Plate Voltage . . . . .                  | 2600 | V  |
| DC Grid-No.2 Voltage <sup>g</sup> . . . . . | 500  | V  |
| DC Grid-No.1 Voltage <sup>m</sup> . . . . . | -65  | V  |
| DC Plate Current . . . . .                  | 550  | mA |
| DC Grid-No.1 Current . . . . .              | 0    | A  |
| DC Grid-No.2 Current . . . . .              | -10  | mA |
| Drive Power (Approx.) . . . . .             | 25   | W  |
| Output Circuit Eff. (Approx.) . . . . .     | 90   | %  |
| Useful Power Output . . . . .               | 300  | W  |

**Typical Operation in Grid-Drive Circuit at 216 MHz**

*Bandwidth<sup>p</sup> of 6.0 MHz*

|                                              |      |    |
|----------------------------------------------|------|----|
| DC Plate Voltage . . . . .                   | 2500 | V  |
| DC Grid-No.2 Voltage . . . . .               | 500  | V  |
| Peak RF Grid-No.1 Voltage:                   |      |    |
| Synchronizing level . . . . .                | 80   | V  |
| Pedestal level . . . . .                     | 60   | V  |
| DC Grid-No.1 Voltage . . . . .               | -70  | V  |
| DC Plate Current:                            |      |    |
| Synchronizing level . . . . .                | 1.2  | A  |
| Pedestal level . . . . .                     | 0.9  | A  |
| DC Grid No.2 Current Pedestal level. . . . . | -40  | mA |
| DC Grid-No.1 Current (Approx.):              |      |    |
| Synchronizing level . . . . .                | 5.0  | mA |
| Pedestal level . . . . .                     | 00   | A  |
| Driver Power Output (Approx.):               |      |    |
| Synchronizing level . . . . .                | 110  | W  |
| Pedestal level . . . . .                     | 65   | W  |
| Useful Power Output (Approx.):               |      |    |
| Synchronizing level . . . . .                | 1350 | W  |
| Pedestal level . . . . .                     | 750  | W  |

**Footnotes for Ratings**

<sup>e</sup> See Section V.C. of 1CE-300.

<sup>f</sup> See Section V.B. and V.B.1 of 1CE-300.

<sup>g</sup> See Section V.B.2 of 1CE-300.

<sup>h</sup> Adjust to specified zero-signal DC plate current.

<sup>i</sup> The figures for 3rd and 5th order distortion levels are based upon operation with no feedback or neutralization employed to enhance performance. This performance can be improved by approximately five dB by the insertion of

a ten ohm, unbypassed cathode resistor. See also Section V.C.2.c.(1) of 1CE-300.

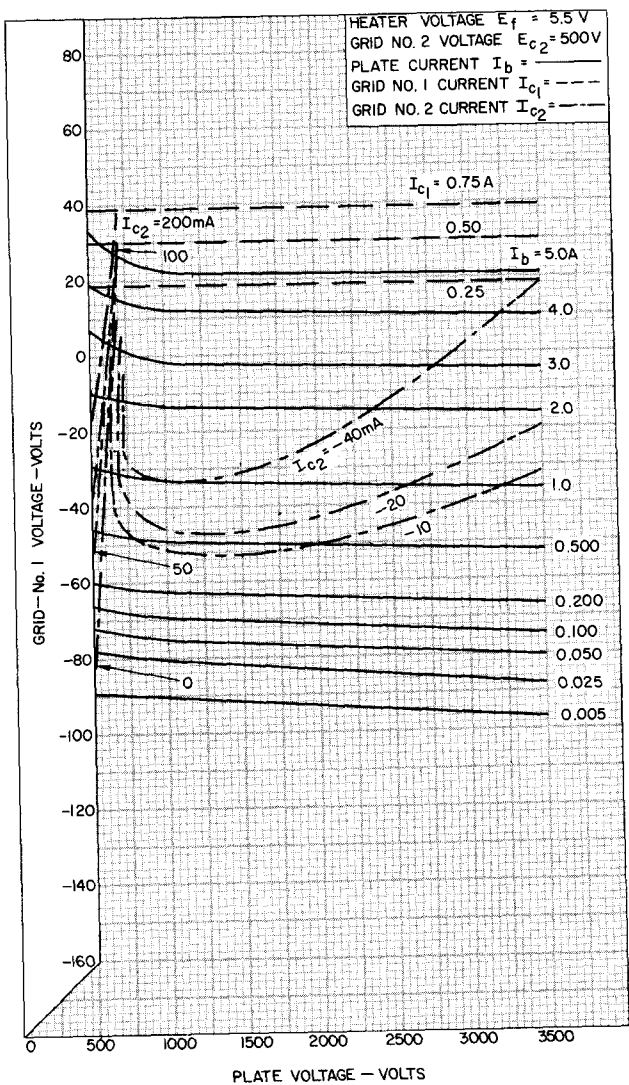
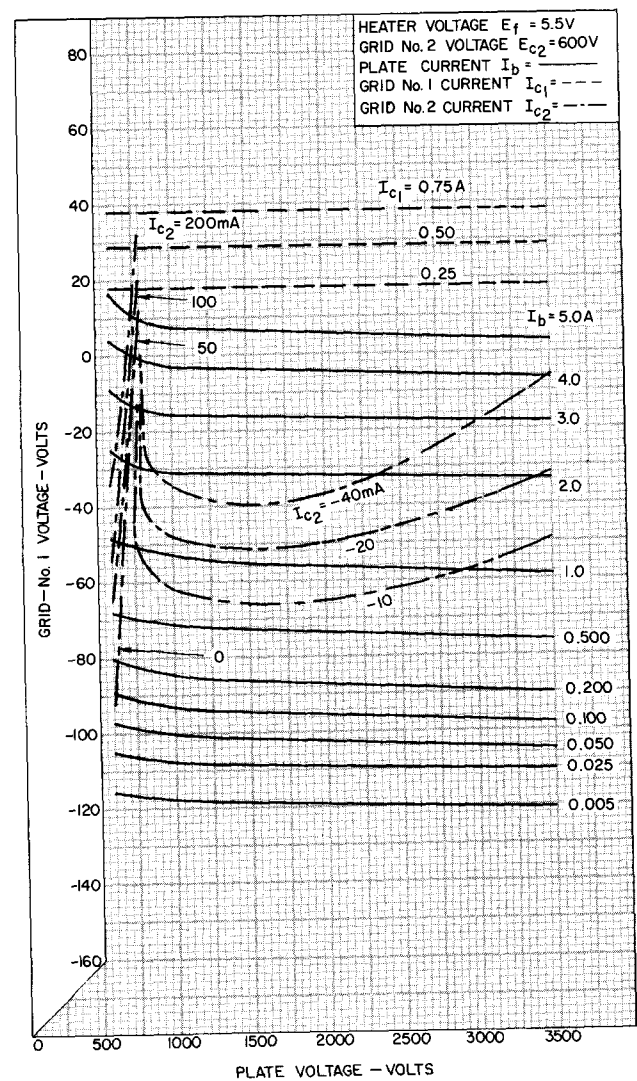
<sup>k</sup> See Section V.B.3 of 1CE-300.

<sup>m</sup> Adjust for zero-signal DC plate current of 0.2 A.

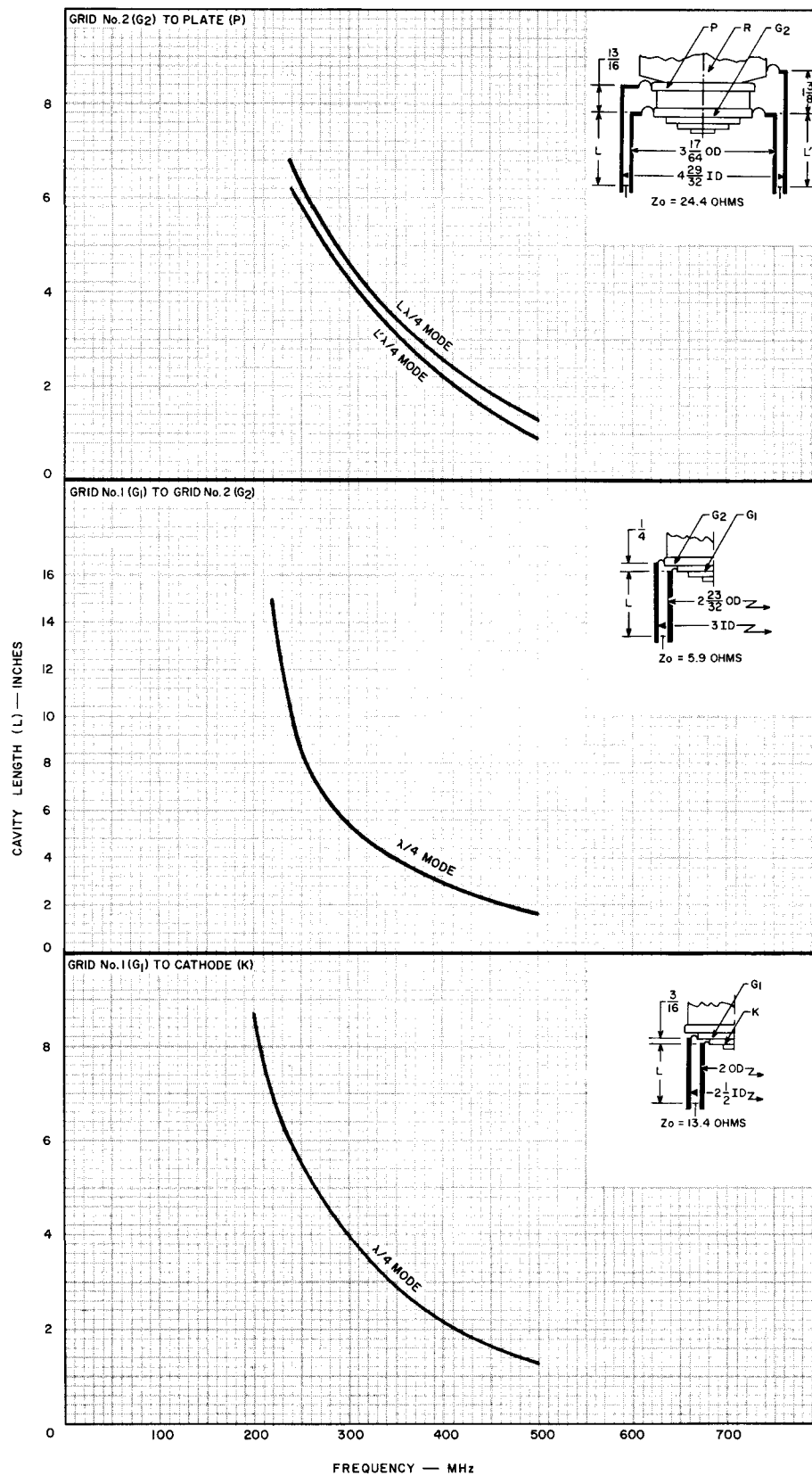
<sup>n</sup> Computed between half-power points using two times tube capacity.

<sup>p</sup> Measured at the -1.0 dB point of a double tuned output circuit.

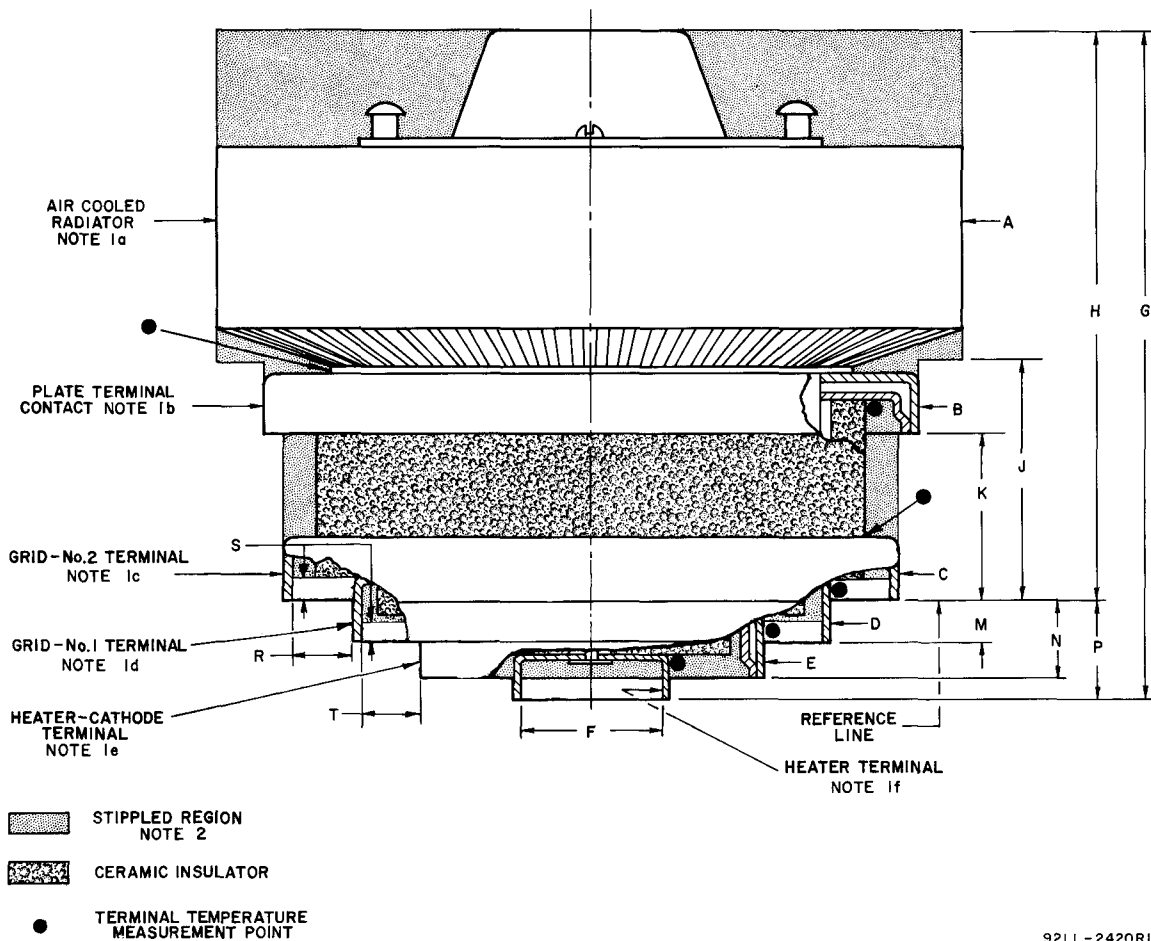
Typical Constant Current Characteristics



## Electrode Cavity Tuning Characteristics



## Dimensional Outline



## Tabulated Dimensions\*

| Dim. | Value                  |                                    | Dia. |      |
|------|------------------------|------------------------------------|------|------|
| A    | 3.72 ± .03             | (94.49 ± .76)                      | Dia. |      |
| B    | 3.210                  | (81.54)                            | Dia. | Min. |
| C    | 3.010                  | (76.45)                            | Dia. | Min. |
| D    | 2.307                  | (58.60)                            | Dia. | Min. |
| E    | 1.710                  | (43.44)                            | Dia. | Min. |
| F    | 0.725                  | (18.41)                            | Dia. | Max. |
| G    | 3.24 ± .10             | (82.3 ± 2.5)                       |      |      |
| H    | 2.78 ± .07             | (70.61 ± 1.78)                     |      |      |
| J    | 1.160 + .005<br>- .000 | (29.464 + .127)<br>(29.464 - .000) |      |      |
| K    | 0.82 ± .03             | (20.83 ± .76)                      |      |      |
| M    | 0.200 ± .025           | (5.08 ± .63)                       |      |      |
| N    | 0.37 ± .03             | (9.40 ± .76)                       |      |      |
| P    | 0.46 ± .03             | (11.68 ± .76)                      |      |      |
| R    | 0.250                  | (6.35)                             |      | Min. |
| S    | 0.105                  | (2.66)                             |      | Min. |
| T    | 0.200                  | (5.08)                             |      | Min. |

\*Dimensions are in inches unless otherwise stated. Dimensions in parentheses are in millimeters and are derived from the basic inch dimensions (1 inch = 25.4 mm).

**Note 1:** The contact distance\* indicated is the minimum uniform length as measured from the edge of the terminal. Concentricity between the various diameters is maintained within such tolerances that the tube will enter a gauge having suitably spaced, concentric apertures or post of the indicated diameters\*.

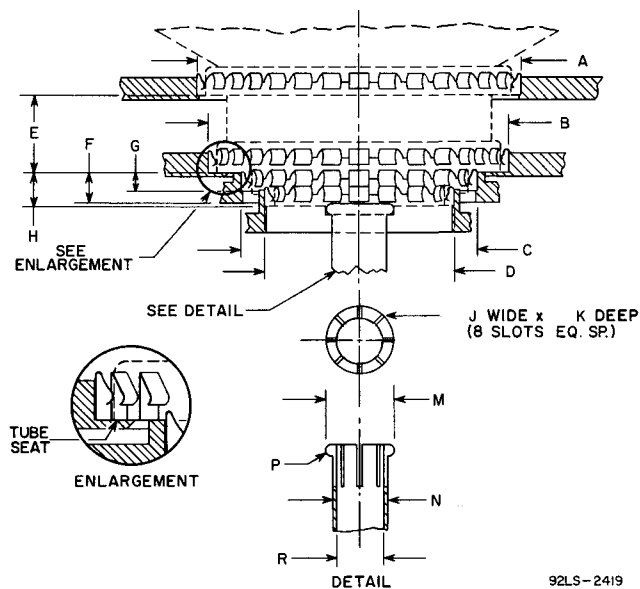
|                                | Contact Distance | Gauge Diameter  |
|--------------------------------|------------------|-----------------|
| 1.a Radiator                   | 0.850 (21.59)    | 3.7805 (96.024) |
| 1.b Plate Terminal             | 0.220 (5.59)     | 3.2605 (82.816) |
| 1.c Grid No.2 Terminal         | 0.220 (5.59)     | 3.0605 (77.736) |
| 1.d Grid No.1 Terminal         | 0.175 (4.45)     | 2.3375 (59.372) |
| 1.e Heater-Cathode<br>Terminal | 0.115 (2.92)     | 1.7445 (41.310) |
| 1.f Heater Terminal<br>(post)  | 0.135 (3.43)     | 0.6945 (17.640) |

**Note 2:** Keep all stippled regions clear. In general do not allow contacts to protrude into these annular regions. If special connectors are required which may intrude on these regions, contact RCA Power Tube Application Engineering, Lancaster, Pa., for guidance.

### Mounting

See the preferred mounting arrangement below. See section III.C.3.a of 1CE-300 for a description of the fixed method of mounting. The adjustable method is not recommended for the 8792. Special sockets are available.

### Preferred Mounting Arrangement and Layout of Associated Contacts



### Tabulated Dimensions\*

| Dim. | Value         |        |
|------|---------------|--------|
| A    | 3.425 (87.00) | Dia.   |
| B    | 3.210 (81.53) | Dia.   |
| C    | 2.505 (63.63) | Dia.   |
| D    | 1.912 (48.56) | Dia.   |
| E    | 0.820 (20.83) |        |
| F    | 0.330 (8.38)  |        |
| G    | 0.200 (5.08)  |        |
| H    | 0.370 (9.40)  |        |
| J    | 0.025 (0.64)  |        |
| K    | 0.500 (12.70) |        |
| M    | 0.725 (18.42) | Dia.   |
| N    | 0.594 (15.09) | Dia.   |
| P    | 0.062 (1.57)  | Radius |
| R    | 0.500 (12.70) | Dia.   |

**Note:** Finger stock is No.97-360A made by Instrument Specialties Co., Little Falls, N.J.

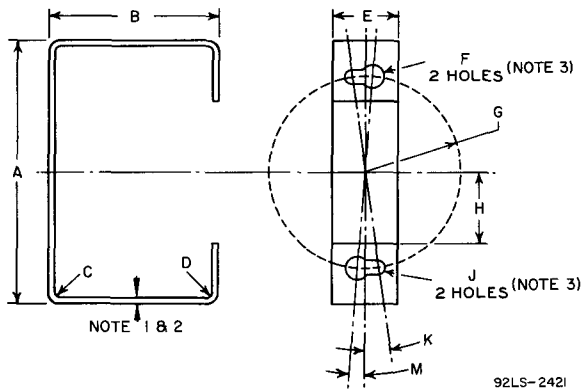
Sockets may be obtained from:

Erie Technological Products, Inc.  
644 West 12th Street, Erie, Pa. 16512

Jettron Products Incorporated  
56 Route 10, Hanover, N.J. 07936

\*Dimensions are in inches unless otherwise stated. Dimensions in parentheses are in millimeters and are derived from the basic inch dimensions (1 inch = 25.4 mm).

### Tube Extractor Suggested Design



#### Notes:

1. Material 1/16" thick cold rolled steel
2. Round all edges
3. Slot between holes

### Forced-Air Cooling

#### Air Flow:

*Through radiator* – Adequate air flow to limit the plate-core temperature to 250° C should be delivered by a blower through the radiator before and during the application of filament, plate, grid-No.2, and grid-No.1 voltages. In typical operation at 1500 watts, plate dissipation, and 225° C plate seal temperature, 29 cfm at 0.35 inches of water at 28°C ambient air temperature should be sufficient.

*To Plate, Grid-No.2, Grid-No.1, Cathode-Filament, and Filament Terminals* – A sufficient quantity of air should be allowed to flow past each of these terminals so that their temperature does not exceed the specified maximum value of 250° C.

*During Standby Operation* – Cooling air is required when only filament voltage is applied to the tube.

*During Shutdown Operation* – Air flow should continue for a few minutes after all electrode power is removed.

For further information on forced-air cooling, see section IV.C of 1CE-300.

### Tabulated Dimensions\*

| Dim. | Value        |                 |        |
|------|--------------|-----------------|--------|
| A    | 2.8          | (71.)           |        |
| B    | 1.8          | (46.)           |        |
| C    | 0.06         | (1.5)           | Radius |
| D    | 0.06         | (1.5)           | Radius |
| E    | 0.7          | (18.)           |        |
| F    | 0.250 ± .005 | (6.350 ± .127)  | Dia.   |
| G    | 1.015 ± .005 | (25.781 ± .127) | Radius |
| H    | 0.75         | (19.)           |        |
| J    | 0.140 ± .005 | (3.556 ± .127)  | Dia.   |
| K    | 8.3°         | 0.145 radians   |        |
| M    | 4.5°         | 0.078 radians   |        |

### Typical Cooling Characteristics

