

# PIOTRON

## DESCRIPTION

The GL-889-A is a three-electrode power tube designed for use as a radio-frequency, amplifier, oscillator, or Class B modulator. The plate is water-cooled and is capable of dissipating 3 to 5

kilowatts, depending upon the class of service. The design of the mount and terminal connections minimizes lead inductance and makes the tube particularly suitable for high-frequency applications.

## TECHNICAL INFORMATION

*These data are for reference only. For design information refer to specifications.*

### GENERAL CHARACTERISTICS

Number of electrodes..... 3

#### Electrical

Filament voltage..... 11 volts

Filament current..... 125 amperes

#### Average Characteristics

Amplification Factor,  $E_b = 5$  kv,  $I_b = 1.0$  amp..... 21  
 $E_c = 75$  v,  $E_f = 11$  v a-c

Grid-plate transconductance..... 9000 micromhos

Direct interelectrode capacitances:

Grid-plate..... 17.5 micromicrofarads

Grid-filament..... 23.3 micromicrofarads

Plate-filament..... 2.7 micromicrofarads

Frequency for maximum ratings..... 50 megacycles



TECHNICAL INFORMATION (CONT'D)

Mechanical

|   |                      |
|---|----------------------|
| Type of cooling .....                             | water and forced air |
| Maximum outlet temperature .....                  | 70 centigrade        |
| Water flow .....                                  | 3-6 gal per min      |
| Air flow to bulb, from a 3-inch diam nozzle ..... | 15 cu ft per min     |
| Gasket .....                                      | Cat. No. 5182028P8   |
| Net weight, approximate .....                     | 2 pounds             |
| Shipping weight, approximate .....                | 9 pounds             |
| Mounting position .....                           | vertical, anode down |

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

CLASS B AUDIO-FREQUENCY POWER AMPLIFIER (TWO TUBES):

|   |      | Typical<br>Operation |      | Maximum* |           |
|---|------|----------------------|------|----------|-----------|
|   |      |                      |      | Ratings  |           |
| D-c plate voltage .....                         | 5000 | 6000                 | 7500 | 8500     | volts     |
| Maximum signal plate current†, per tube .....   |      |                      |      | 2.0      | amperes   |
| D-c maximum signal plate input†, per tube ..... |      |                      |      | 12       | kilowatts |
| Plate dissipation†, per tube .....              |      |                      |      | 5.0      | kilowatts |
| D-c grid voltage .....                          | 180  | -230                 | -300 |          | volts     |
| Peak a-f grid input voltage .....               | 1460 | 1680                 | 1700 |          | volts     |
| Zero signal plate current .....                 | 0.4  | 0.4                  | 0.4  |          | ampere    |
| Maximum signal plate current .....              | 3.2  | 3.6                  | 3.2  |          | amperes   |
| Maximum signal plate input† .....               | 16   | 21.6                 | 24   |          | kilowatts |
| Maximum signal driving power, approx .....      | 170  | 180                  | 150  |          | watts     |
| Effective load, plate-to-plate .....            | 2520 | 3680                 | 5000 |          | ohms      |
| Maximum signal plate power output .....         | 8.8  | 12                   | 15   |          | kilowatts |

CLASS B RADIO-FREQUENCY POWER AMPLIFIER

Carrier conditions per tube for use with a max modulation factor of 1.0

|                                   |  |      |      |      |           |
|-----------------------------------|--|------|------|------|-----------|
| D-c plate voltage .....           |  | 6000 | 7500 | 8500 | volts     |
| D-c grid voltage .....            |  | -250 | -300 |      | volts     |
| D-c plate current .....           |  | 0.9  | 0.9  | 1.0  | ampere    |
| Plate input .....                 |  |      |      | 7.5  | kilowatts |
| Plate dissipation .....           |  |      |      | 5.0  | kilowatts |
| Peak r-f grid input voltage ..... |  | 920  | 1000 |      | volts     |
| Driving power, approx† .....      |  | 95   | 80   |      | watts     |
| Plate power output .....          |  | 1.5  | 2    |      | kilowatts |

CLASS C RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR—PLATE-MODULATED

Carrier conditions per tube for use with a max modulation factor of 1.0

|   |      |      |       |           |
|---|------|------|-------|-----------|
| D-c plate voltage .....                   | 5000 | 6000 | 6000  | volts     |
| D-c grid voltage .....                    | -800 | -900 | -1000 | volts     |
| D-c plate current .....                   | 0.9  | 1.0  | 1.0   | amperes   |
| D-c grid current, approx .....            | 0.12 | 0.1  | 0.25  | amperes   |
| Plate input .....                         |      |      | 6.0   | kilowatts |
| Plate dissipation .....                   |      |      | 3.0   | kilowatts |
| Peak r-f grid input voltage, approx ..... | 1300 | 1420 |       | volts     |
| Driving power, approx .....               | 155  | 140  |       | watts     |
| Plate power output .....                  | 2.75 | 4.0  |       | kilowatts |

CLASS C RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR

Key-down conditions per tube without modulation  $\pi$

|   |      |      |      |       |           |
|---|------|------|------|-------|-----------|
| D-c plate voltage .....                   | 5000 | 6000 | 7500 | 8500  | volts     |
| D-c grid voltage .....                    | -500 | -600 | -800 | -1000 | volts     |
| D-c plate current .....                   | 1.5  | 1.8  | 2.0  | 2.0   | amperes   |
| D-c grid current, approx .....            | 0.19 | 0.21 | 0.24 | 0.25  | ampere    |
| Plate input .....                         |      |      |      | 16    | kilowatts |
| Plate dissipation .....                   |      |      |      | 5     | kilowatts |
| Peak r-f grid input voltage, approx ..... | 1200 | 1460 | 1830 |       | volts     |
| Driving power, approx .....               | 220  | 290  | 400  |       | watts     |
| Plate power output .....                  | 5    | 7    | 10   |       | kilowatts |

†Averaged over any audio-frequency cycle.

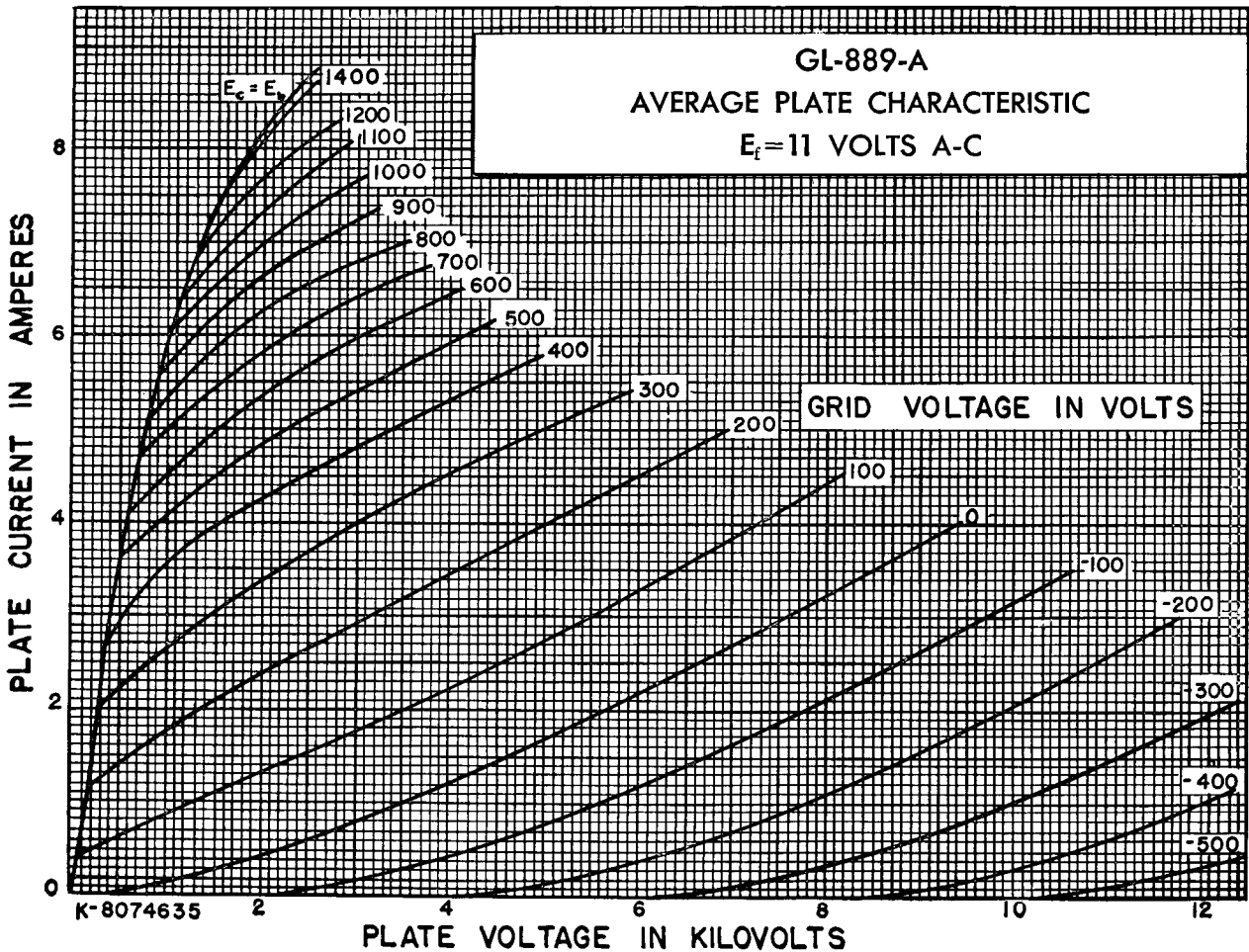
‡At crest of audio-frequency cycle.

$\pi$  Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

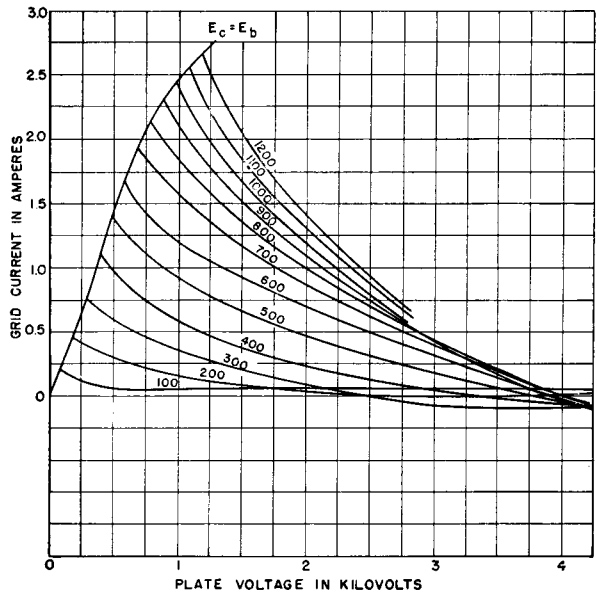
**APPLICATION NOTES**

\*GL-889 can be operated at maximum ratings in all classes of service at frequencies as high as 50 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced as the frequency is raised. (Other maximum ratings are the same as shown under **TECHNICAL INFORMATION**.) The tabulation below shows the highest percentage of maximum plate voltage and power input that can be used up to 150 megacycles for the various classes of service. Special attention should be given to adequate ventilation of the bulb at these frequencies.

|   |     |    |     |     |            |
|---|-----|----|-----|-----|------------|
| Frequency   | 50  | 75 | 100 | 150 | megacycles |
| Class B r-f   |     |    |     |     |            |
| Max plate voltage and plate input   | 100 | 90 | 83  | 72  | per cent   |
| Class C plate-modulated   |     |    |     |     |            |
| Max plate voltage and plate input   | 100 | 85 | 75  | 60  | per cent   |
| Class C   |     |    |     |     |            |
| Max plate voltage   | 100 | 87 | 78  | 65  | per cent   |
| Max plate input   | 100 | 85 | 70  | 50  | per cent   |
| Plate Series Protective Resistors (see paragraph describing plate circuit under Installation in the Instructions) |     |    |     |     |            |
| Series resistor   | 25  | 50 | 100 | 150 | ohms       |
| Maximum power output of rectifier   | 16  | 40 | 100 | 250 | kilowatts  |

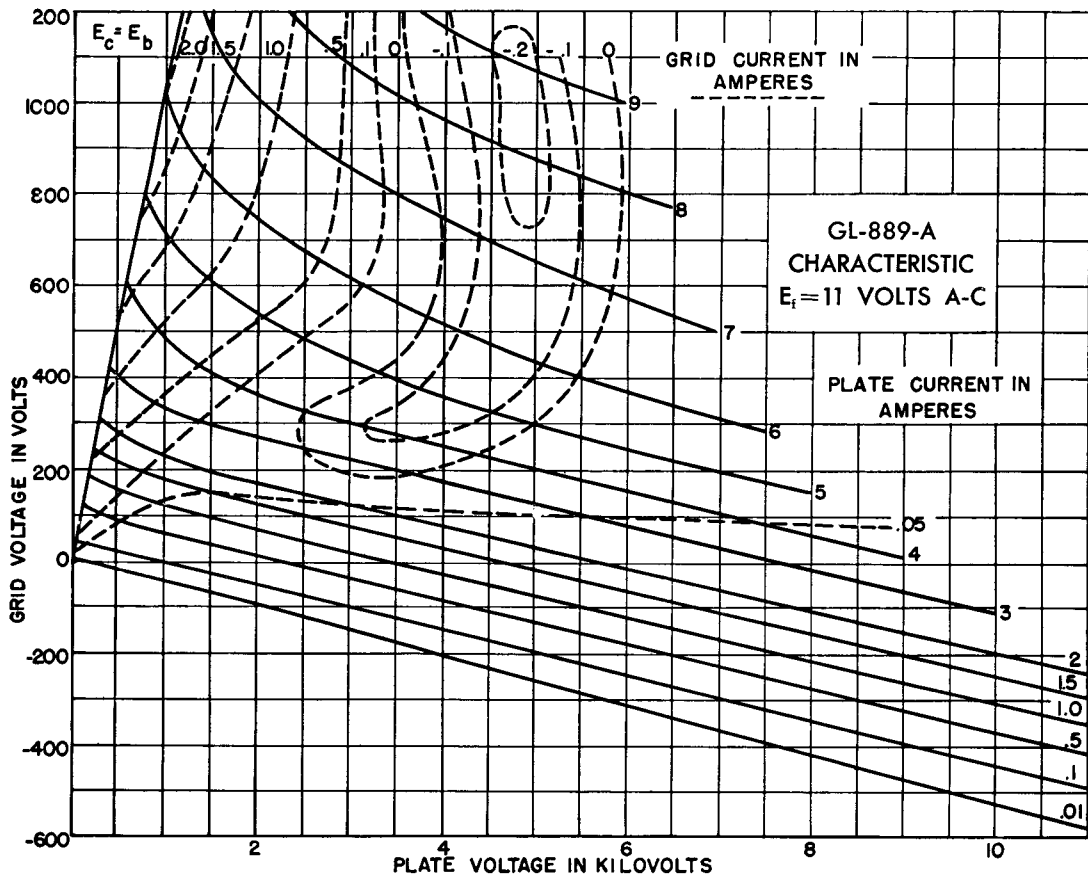


GL-889-A  
 TYPICAL GRID-PLATE TRANSFER CHARACTERISTIC  
 $E_f = 11$  VOLTS A-C



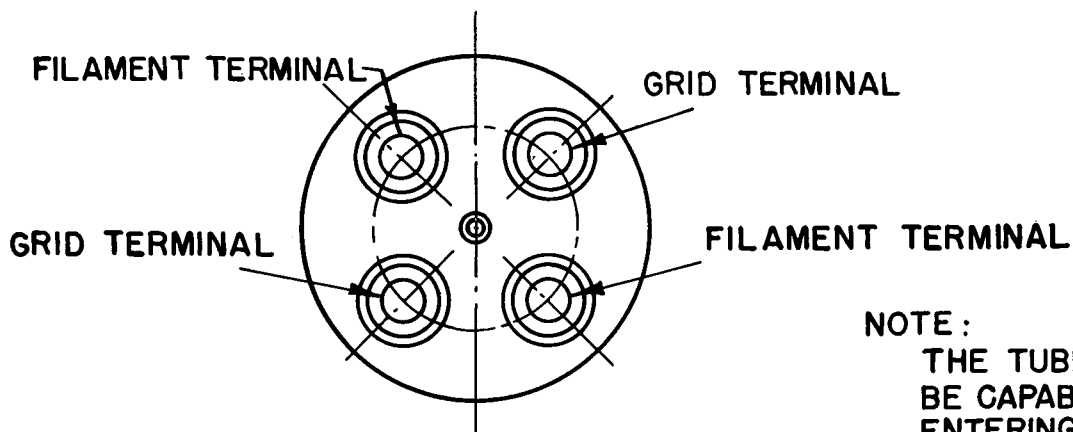
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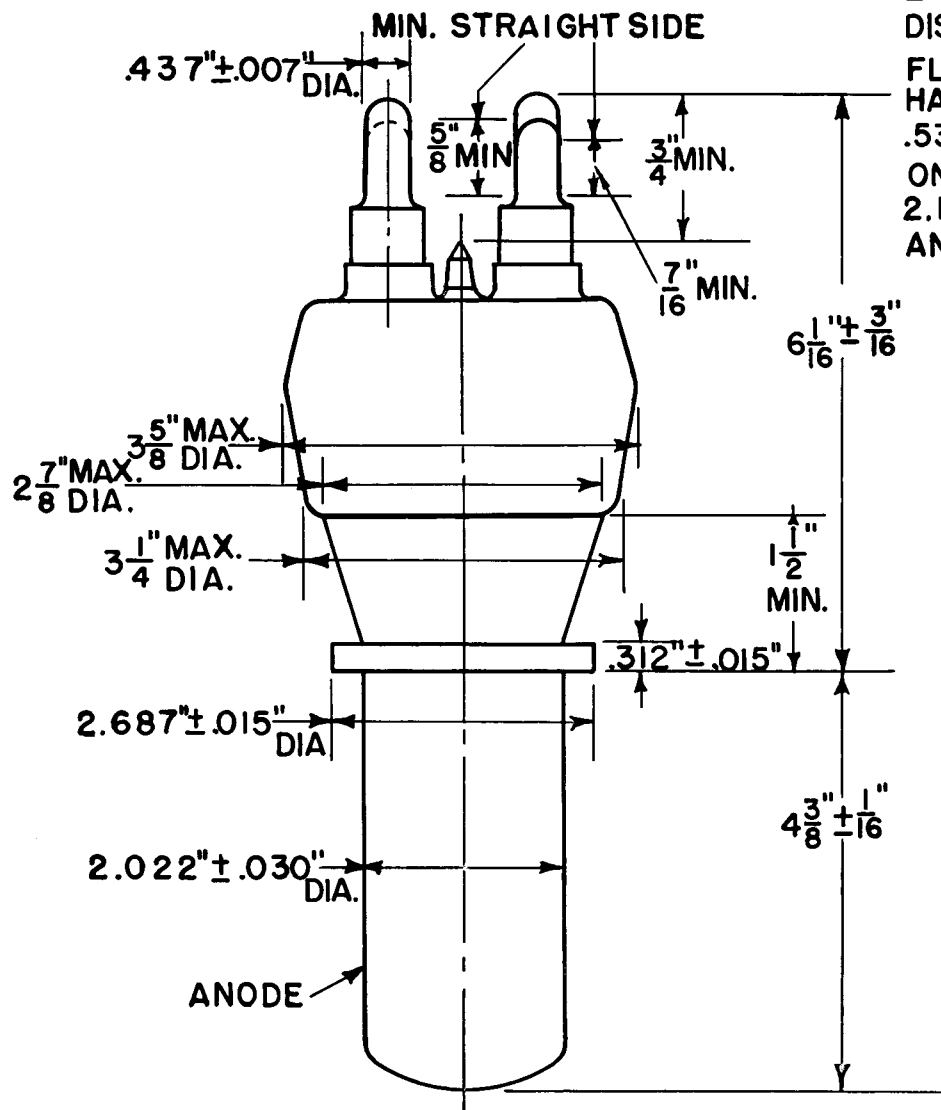


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NOTE:  
THE TUBE BASE SHALL  
BE CAPABLE OF  
ENTERING TO A  
DISTANCE OF  $\frac{5}{8}$ " IN A  
FLAT PLATE GAUGE  
HAVING FOUR HOLES  
.536"  $\pm$  .001" DIA. ARRANGED  
ON A CIRCLE OF  
2.125"  $\pm$  .001" DIA. AT  
ANGLES OF  $90^\circ \pm 10'$



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