

# GENERAL ELECTRIC

## Transmitting Tube GL-893 - - Description and Rating

### Technical Information

The GL-893 is a three-electrode, water-cooled vacuum tube designed for use as a radio-frequency amplifier, oscillator, or Class B modulator. A particular advantage of this tube is the unique construction of the filament which permits operation from single-phase, three-phase, or six-phase alternating current, or from direct current, for all classes of service.

### CHARACTERISTICS AND RATINGS

#### ELECTRICAL

|                                     |  |       |               |
|-------------------------------------|--|-------|---------------|
| Filament Voltage, per strand        |  | 10    | Volts         |
| Filament Current, per terminal      |  | 61    | Amperes       |
| Amplification Factor                | $E_b = 15 \text{ kv}, I_b = 1.0 \text{ amp}$ | 36    |               |
| Grid-plate Transconductance         | $E_c = -300, E_f = 20 \text{ a-c}$           | 16000 | Micromhos     |
| Direct Interelectrode Capacitances: |  |       |               |
| Grid-plate*                         |  | 33    | $\mu\text{f}$ |
| Input                               |  | 48    | $\mu\text{f}$ |
| Output                              |  | 3.2   | $\mu\text{f}$ |
| Frequency for Maximum Ratings       |  | 5     | Megacycles    |

#### MECHANICAL

|                                 |  |                      |          |
|---------------------------------|--|----------------------|----------|
| Gasket, Cat. No. 5182028P2      |  |                      |          |
| Type of Cooling                 |  | Water and Forced Air |          |
| Water Flow, gallons per minute  |  |                      | 8-15     |
| Air Flow, cubic feet per minute |  |                      |          |
| To Stem                         |  |                      | 2        |
| Net Weight, approx              |  |                      | 12 lb    |
| Shipping Weight, approx         |  |                      | 27 lb    |
| Installation and Operation      |  |                      | GEH-1152 |

### MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

#### CLASS B A-F POWER AMPLIFIER (TWO TUBES)

|                                       |       |       |       |           |           |
|---------------------------------------|-------|-------|-------|-----------|-----------|
| D-c Plate Voltage                     | 12000 | 15000 | 18000 | 20000 max | Volts     |
| Max Signal Plate Current, per tube*   |       |       |       | 4.0 max   | Amperes   |
| D-c Max Signal Plate Input, per tube* |       |       |       | 60 max    | Kilowatts |
| Plate Dissipation, per tube*          |       |       |       | 20 max    | Kilowatts |
| D-c Grid Voltage                      | -260  | -350  | -450  |           | Volts     |
| Peak A-f Grid Input Voltage           | 1480  | 1560  | 1720  |           | Volts     |
| Zero Signal Plate Current             | 0.8   | 0.8   | 0.8   |           | Ampere    |
| Max Signal Plate Current              | 7.0   | 6.0   | 5.5   |           | Amperes   |
| Max Signal Plate Input*               | 84.0  | 90.0  | 99.0  |           | Kilowatts |
| Max Signal Driving Power, approx      | 220   | 190   | 140   |           | Watts     |
| Effective Load Resistance,            |       |       |       |           |           |
| Plate-to-plate                        | 4000  | 6000  | 8000  |           | Ohms      |
| Max Signal Plate Power Output         | 52.0  | 60.0  | 70.0  |           | Kilowatts |

**CLASS B R-F POWER AMPLIFIER**

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

|                             |       |       |       |           |           |
|-----------------------------|-------|-------|-------|-----------|-----------|
| D-c Plate Voltage           | 12000 | 15000 | 15000 | 20000 max | Volts     |
| D-c Grid Voltage            | -250  | -340  | -340  |           | Volts     |
| D-c Plate Current           | 1.5   | 1.5   | 2.0   | 2.0 max   | Amperes   |
| Plate Input                 |       |       |       | 32 max    | Kilowatts |
| Plate Dissipation           |       |       |       | 20 max    | Kilowatts |
| Peak R-f Grid Input Voltage | 700   | 790   | 900   |           | Volts     |
| Driving Power, approx **    | 130   | 150   | 200   |           | Watts     |
| Plate Power Output          | 6     | 7.5   | 10    |           | Kilowatts |

**CLASS C R-F POWER AMPLIFIER AND OSCILLATOR - PLATE-MODULATED**

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

|                                     |       |       |       |           |           |
|-------------------------------------|-------|-------|-------|-----------|-----------|
| D-c Plate Voltage                   | 10000 | 10000 | 12000 | 12000 max | Volts     |
| D-c Grid Voltage                    | -800  | -800  | -1000 | -3000 max | Volts     |
| D-c Plate Current                   | 1.5   | 2.0   | 2.0   | 2.0 max   | Amperes   |
| D-c Grid Current, approx            | 0.10  | 0.16  | 0.14  | 0.4 max   | Amperes   |
| Plate Input                         |       |       |       | 24 max    | Kilowatts |
| Plate Dissipation                   |       |       |       | 12        | Kilowatts |
| Peak R-f Grid Input Voltage, approx | 1200  | 1280  | 1500  |           | Volts     |
| Driving Power, approx               | 120   | 210   | 210   |           | Watts     |
| Plate Power Output                  | 11    | 15    | 18    |           | Kilowatts |

**CLASS C R-F POWER AMPLIFIER AND OSCILLATOR**

Key-down conditions per tube without modulation #

|                                     |       |       |       |           |           |
|-------------------------------------|-------|-------|-------|-----------|-----------|
| D-c Plate Voltage                   | 12000 | 15000 | 18000 | 20000 max | Volts     |
| D-c Grid Voltage                    | -800  | -900  | -1000 | -3000 max | Volts     |
| D-c Plate Current                   | 3.5   | 3.6   | 3.6   | 4.0 max   | Amperes   |
| D-c Grid Current, approx            | 0.26  | 0.25  | 0.21  | 0.4 max   | Amperes   |
| Plate Input                         |       |       |       | 70 max    | Kilowatts |
| Plate Dissipation                   |       |       |       | 20 max    | Kilowatts |
| Peak R-f Grid Input Voltage, approx | 1430  | 1520  | 1630  |           | Volts     |
| Driving Power, approx               | 360   | 370   | 340   |           | Watts     |
| Plate Power Output                  | 30    | 40    | 50    |           | Kilowatts |

\* Averaged over any audio-frequency cycle.

\*\* At crest of audio-frequency cycle.

# 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.

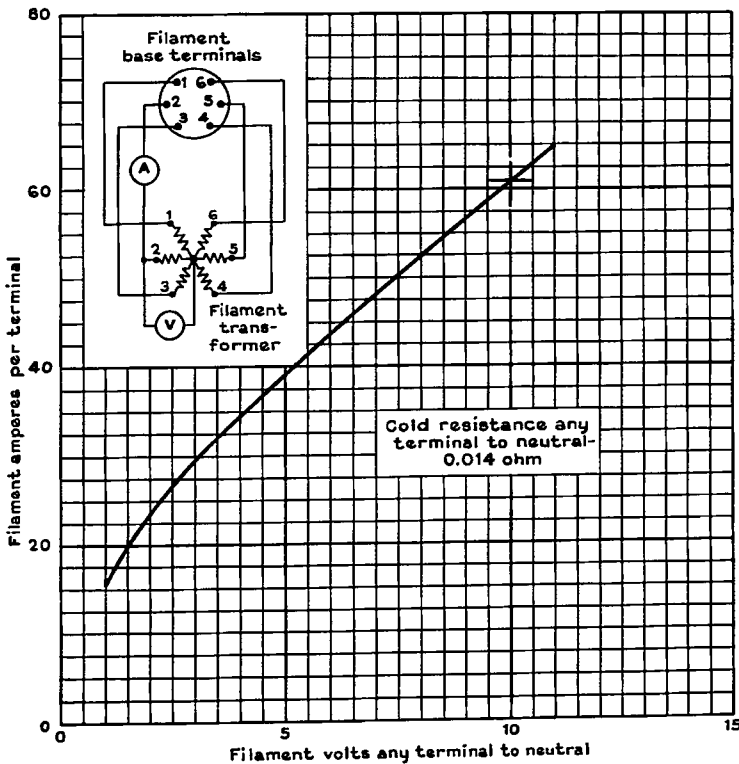
GL-893 can be operated at maximum ratings in all classes of service at frequencies as high as 5 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced as the frequency is raised (Other maximum ratings are the same as shown under CHARACTERISTICS and RATINGS.) The tabulation below shows the highest percentage of maximum plate voltage and power input that can be used up to 40 mc for the various classes of service. Special attention should be given to adequate ventilation of the bulb at these frequencies.

| FREQUENCY   | 5   | 20 | 40 | Mc |
|---|-----|----|----|----|
| <b>MAXIMUM PERMISSIBLE PERCENTAGE OF MAXIMUM RATED PLATE VOLTAGE AND PLATE INPUT:</b> |     |    |    |    |
| <b>Class B R-f</b>  |     |    |    |    |
| Percentage Plate Voltage  | 100 | 85 | 65 |    |
| Percentage Plate Input  | 100 | 82 | 73 |    |
| <b>Class C Plate Modulated</b>  |     |    |    |    |
| Percentage Plate Voltage  | 100 | 80 | 64 |    |
| Percentage Plate Input  | 100 | 75 | 64 |    |
| <b>Class C</b>  |     |    |    |    |
| Percentage Plate Voltage  | 100 | 80 | 60 |    |
| Percentage Plate Input  | 100 | 66 | 50 |    |

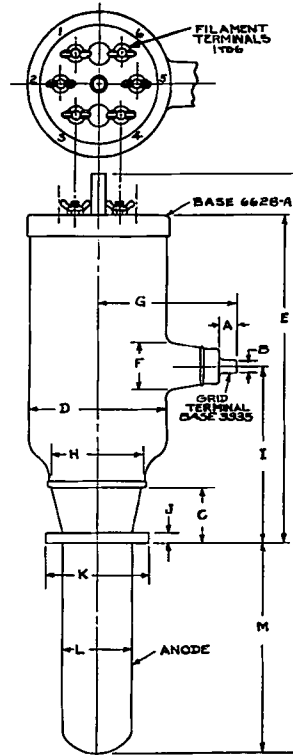
**APPLICATION NOTES**

Plate Series Protective Resistors (see paragraph describing plate circuit under Installation in the Instructions).

|  |    |     |     |     |      |
|--|----|-----|-----|-----|------|
| Series Resistor, ohms                        | 10 | 20  | 40  | 80  | 100  |
| Maximum Power Output of Rectifier, kilowatts | 40 | 100 | 250 | 640 | 1600 |



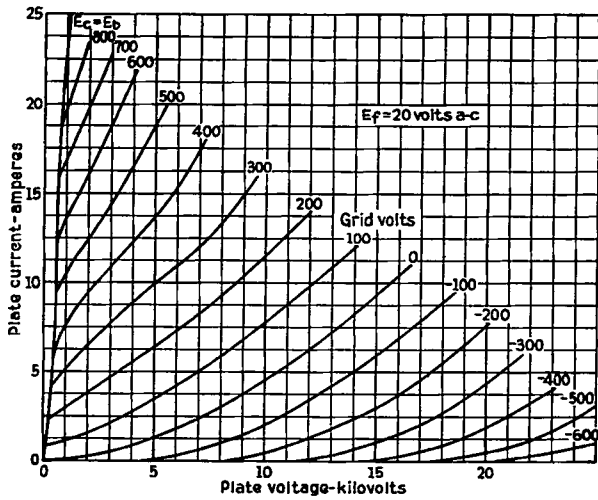
Average Filament Characteristic  
K-7050605 5-22-39



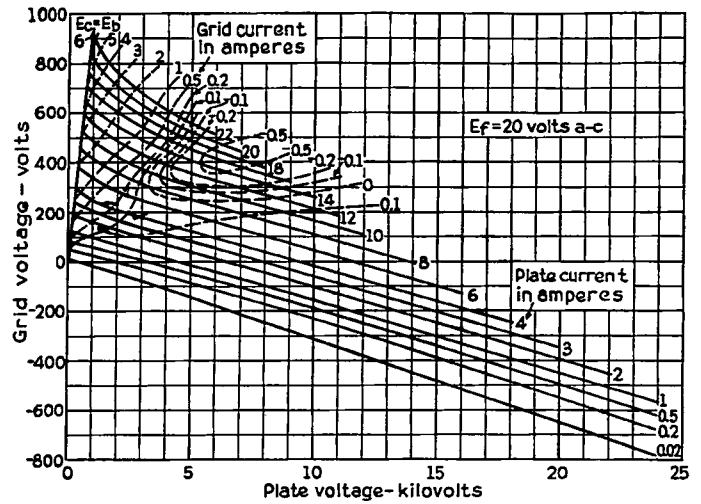
| DIMENSIONS IN INCHES | MIN. MAX. |        |
|----------------------|-----------|--------|
|                      | A         | .687   |
| B                    | .561      | .571   |
| C                    | 2.000     | 2.250  |
| D                    | 5.870     | 6.130  |
| E                    | 14.000    | 15.000 |
| F                    | 1.500     | 3.060  |
| G                    | 5.625     | 6.375  |
| H                    | 3.810     | 4.060  |
| I                    | 7.375     | 8.125  |
| J                    | .480      | .520   |
| K                    | 4.672     | 4.702  |
| L                    | 3.125     | 3.250  |
| M                    | 9.000     | 9.500  |
| N                    | 24.500    | 26.750 |

° AVAILABLE STRAIGHT SIDE 0.500" MIN.

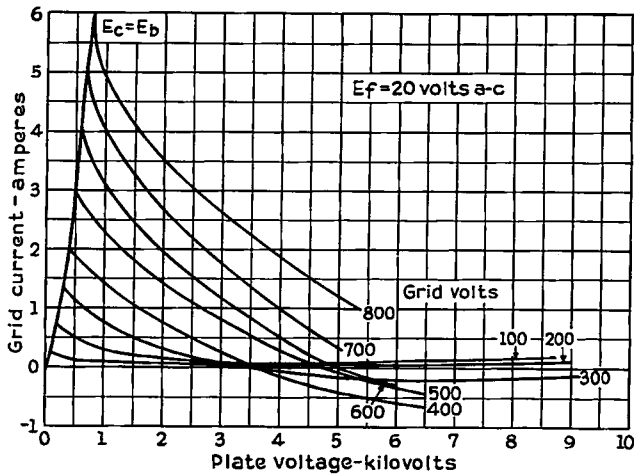
Outline Transmitting Tube  
GL-893  
K-5344783 2-11-42



Average Plate Characteristics for  
Transmitting Tube GL-893  
K-7050615 5-22-39

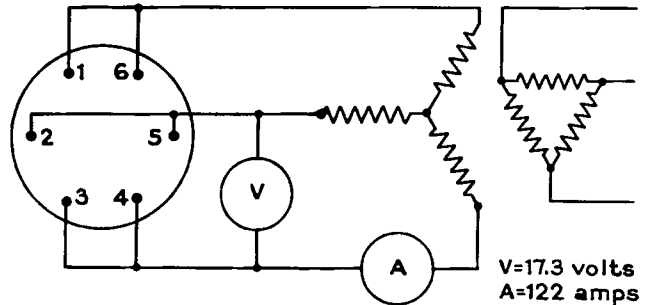


Characteristics for Transmitting  
Tube GL-893  
K-7050611 5-22-39



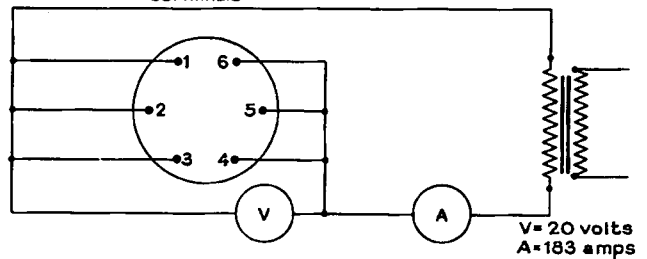
Typical Grid-plate Transfer  
Characteristics for Transmitting  
Tube GL-893  
K-7050618 4-25-39

Filament base  
terminals

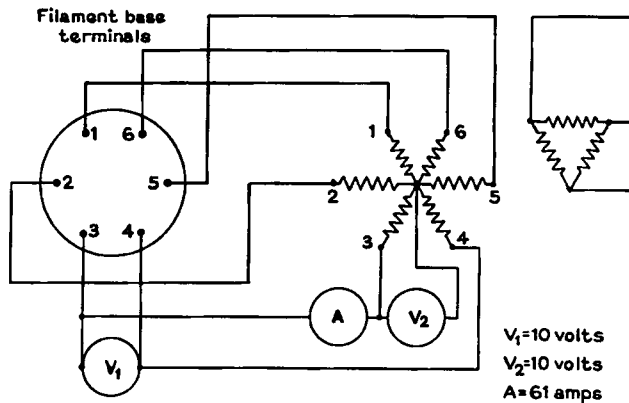


Three-phase A-c Filament Excitation

Filament base  
terminals

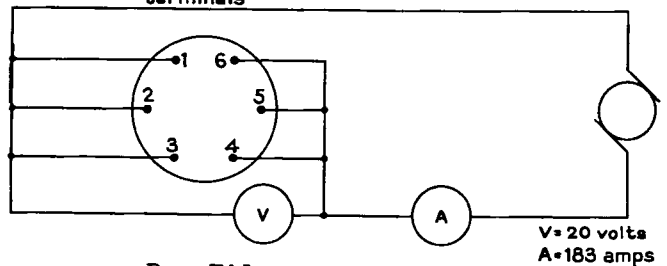


Single-phase A-c Filament Excitation



Six-phase A-c Filament Excitation

Filament base  
terminals



D-c Filament Excitation

NOTE: Terminals must be connected in correct phase relation as shown.  
K-7050604 Filament Connections and Excitation Circuits 5-22-39

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.